



IdeaCentre Q190
Hardware Maintenance Manual



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Machine Types: 10115/6281



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Chapter 1. About this manual

This manual contains service and reference information for IdeaCentre Q190 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.

Important Safety Information

Be sure to read all CAUTION and DANGER sections in this manual before following 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。

執行任何指示前，請確實閱讀本書中的所有警告及危險聲明。

Chapter 2. Safety information

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 computer 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 Field Replaceable Units (FRUs)
- 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 a tester, 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 while handling the part.
- 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 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
<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 45C1566 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.

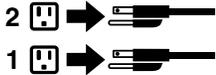


		
≥18 kg(37 lbs)	≥32 kg(70.5 lbs)	≥55 kg(121.2 lbs)

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.



Chapter 3. General information

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.

This section lists the physical specifications for your computer.

Type IdeaCentre Q190

This section lists the physical specifications.

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

Electrical input:

Input voltage: 90V-264V(AC)

Input frequency: 47Hz-63Hz

Chapter 4. General Checkout

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.

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.

Chapter 5. Using the Setup Utility

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:

1. 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.
2. 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 and 0-9) and symbols. For security reasons, it is a good idea to use a strong password that cannot be easily compromised. We suggest the passwords should adhere to the following rules:

- Must have at least seven characters in length
- Contain at least one alphabetic character 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, and 0-9). For more information, see “Password considerations” on page 13.

1. Start the Setup Utility program (see “Starting the Setup Utility program” on page 13).
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, and 0-9).

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**.

Enabling or disabling a device

The Devices options is used to enable or disable user access to the following devices:	
USB Functions	Select whether to enable or disable USB (Universal Serial Bus) functions. If the functions are disabled, no USB devices can be used.
SATA Controller	When feature is set to Disabled , all devices connected to the SATA connectors (e.g. hard disk drives or the optical disk drive) are disabled and can't be accessed.
Onboard Audio Controller	Select whether to enable or disable the Onboard Audio Controller , when feature is set to Disabled all devices connected to the audio connectors (e.g. a headphone or a microphone) are disabled and can't be used.
Onboard Ethernet Controller or Onboard PXE Controller	Select whether to enable or disable Onboard Ethernet Controller , or select whether to enable or disable load onboard PXE (Preboot Execution Environment) .

To enable or disable a device, do the following:

1. Start the Setup Utility program (see “Starting the Setup Utility program” on page 13).
2. From the Setup Utility program menu, select **Devices**.
3. Select:
 - USB Setup** press the **Enter** key, and then select **USB Functions**.
 - ATA Drives Setup** press the **Enter** key , and then select **SATA Mode**.
 - Audio Setup** press the **Enter** key, and then select **Onboard Audio Controller**.
 - Network Setup** press the **Enter** key, then select **Onboard Ethernet Support** or **LAN Boot Agent**.
4. Select **Disabled** or **Enabled** and press the **Enter** key.
5. Return to the Setup Utility program menu and select the **Exit** option.
6. Select **Save changes and Exit** from the menu.

Note: If you do not want to save the settings, select **Discard changes and Exit** from the menu.

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 13).
2. Select **Start Up**.
3. Select Quick Boot Mode, Numlock, Option Keys Display, 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.

Chapter 6. Symptom-to-FRU Index

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 11. 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 18.

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

Power Supply Problems

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

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

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.
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 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 (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.

Chapter 7. Locations

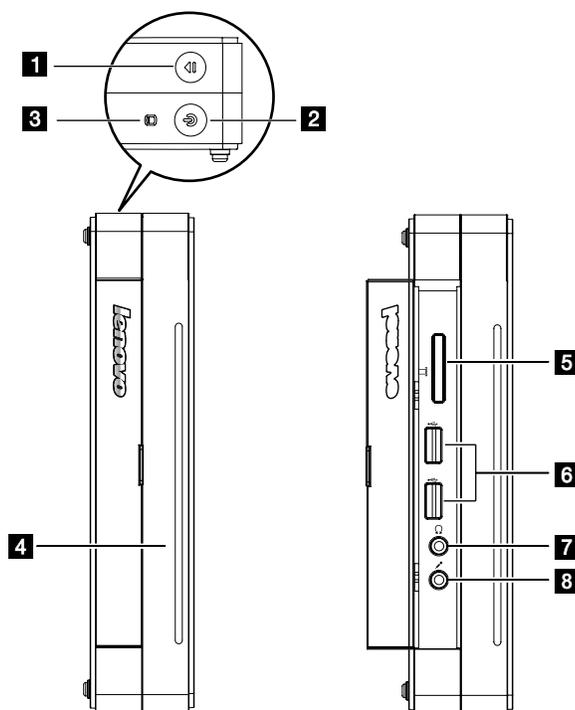
This section provides illustrations to help locate the various connectors, controls and components of the computer.

Locating components, controls and connectors

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

Front view

The following illustration shows the location of controls and components on the front of the computer.

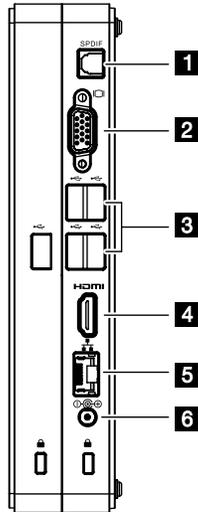


1. Eject button	2. Power button
3. Hard disk drive indicator	4. Optical drive (selected models only)
5. Memory card reader	6. USB ports (2)
7. Headphone connector	8. Microphone connector

Rear view

The following illustration shows the location of connectors on the rear of the computer.

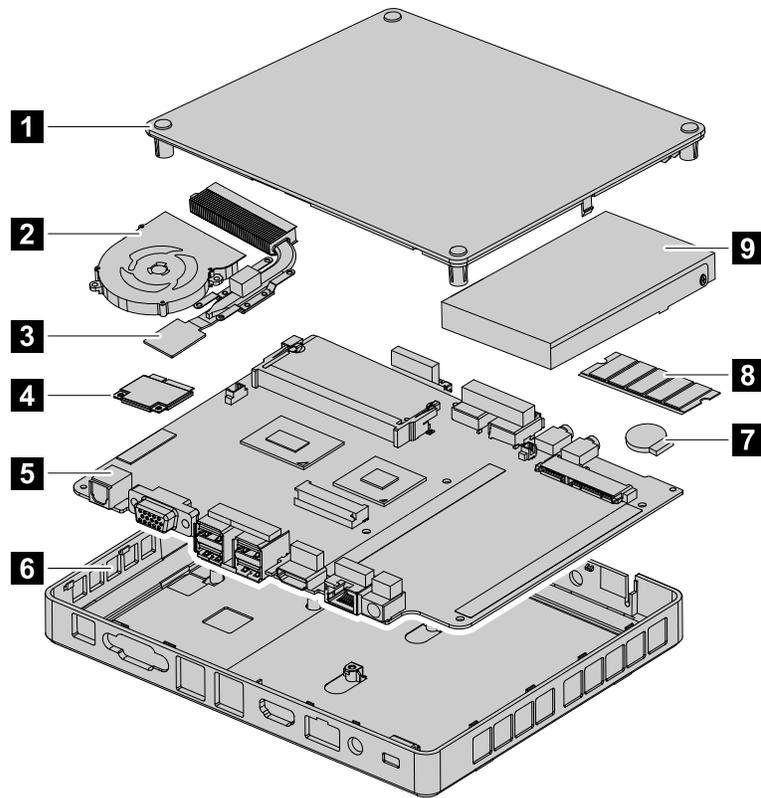
Attention: Be sure not to block any air vents on the computer. Blocked air vents may cause overheating.



1. S/P DIF port	2. VGA connector
3. USB ports (5)	4. HDMI-out port
5. Ethernet connector	6. Power connector

Hardware components

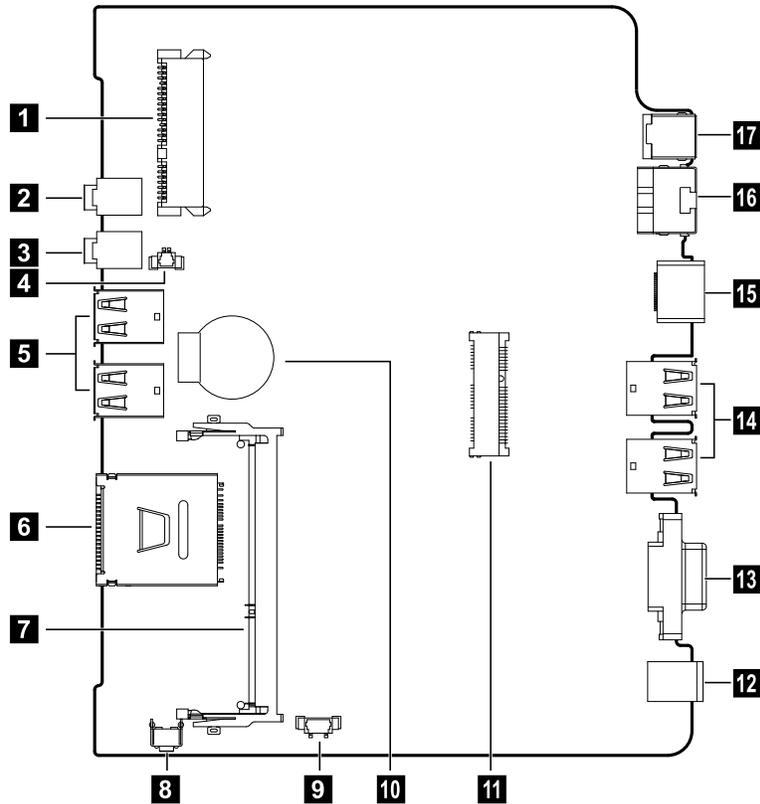
The following illustration shows the components that make up your computer.



1. Computer cover	6. Chassis
2. System fan	7. RTC battery
3. Heat-sink	8. Memory module
4. Wi-Fi card	9. Hard disk drive
5. Motherboard	

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 computing functions and supports a variety of devices that are factory-installed or that you can install later.



1. Hard disk drive SATA connector	10. RTC battery
2. Microphone connector	11. Mini PCIE connector
3. Line out connector	12. SPDIF port
4. RTC battery connector	13. VGA connector
5. USB ports (2)	14. USB ports (2)
6. Card reader	15. HDMI-out port
7. Memory slot	16. Ethernet connector
8. Power button	17. Power connector
9. System fan power connector	

Chapter 8. Replacing hardware

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.

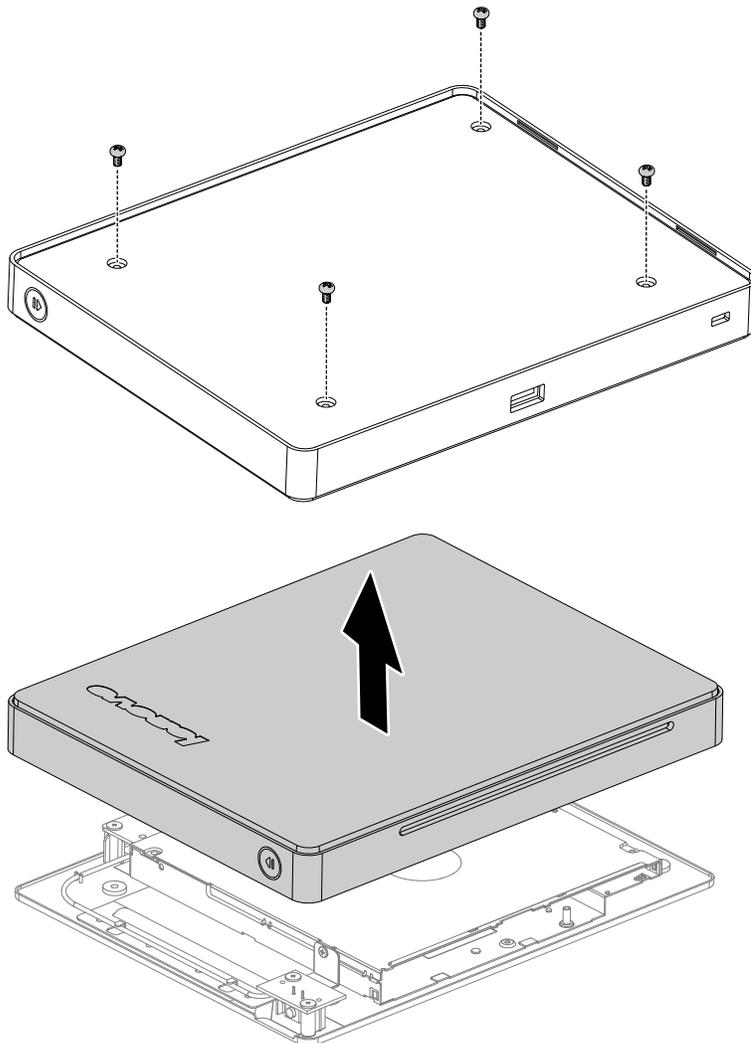
Replacing the optical drive

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

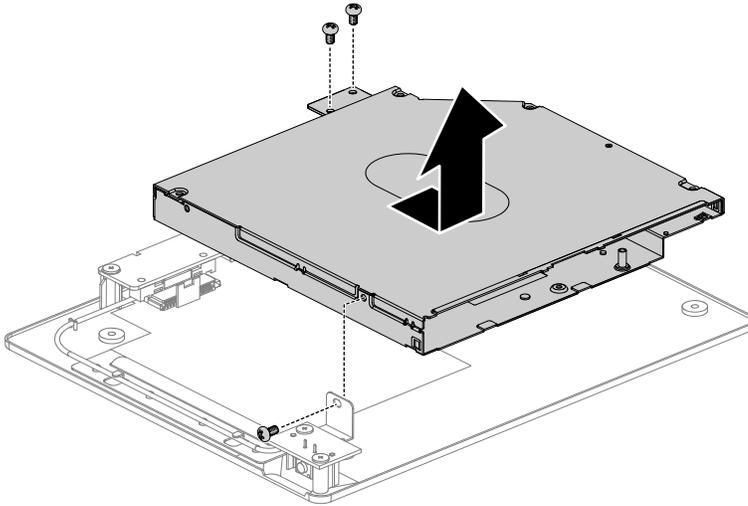
Note: It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

To replace the optical drive

- Step 1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Unplug all power cords from electrical outlets.
- Step 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 “Left and right view” and “Rear view” for help with locating the various connectors.
- Step 4. Remove the 4 screws and open the optical disk drive box as shown.



Step 5. Remove the 3 screws and slide the optical disk drive out as shown.



Step 6. Install the new optical drive as follows:

- a. Align the new optical drive with the bezel, push it into position and secure it with 3 screws.
- b. Line up the optical drive bezel with the optical disk drive box and secure it with the remaining screws.

Removing the computer cover

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

Note: It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

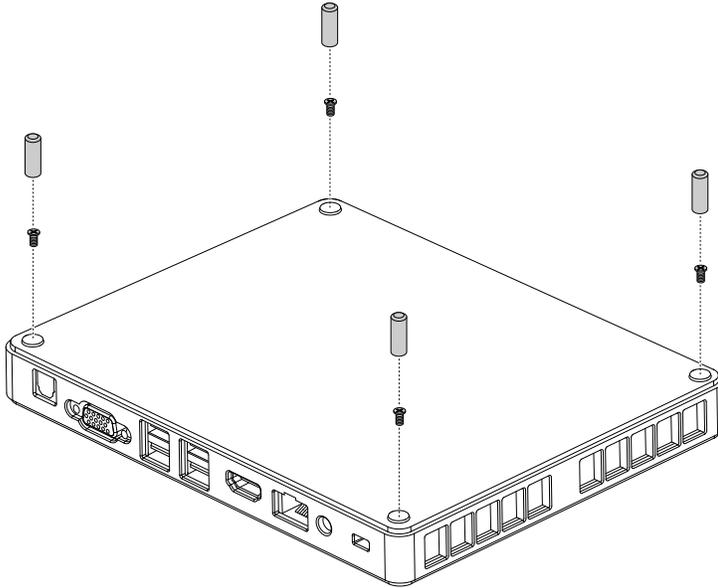
To remove the computer cover

Step 1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

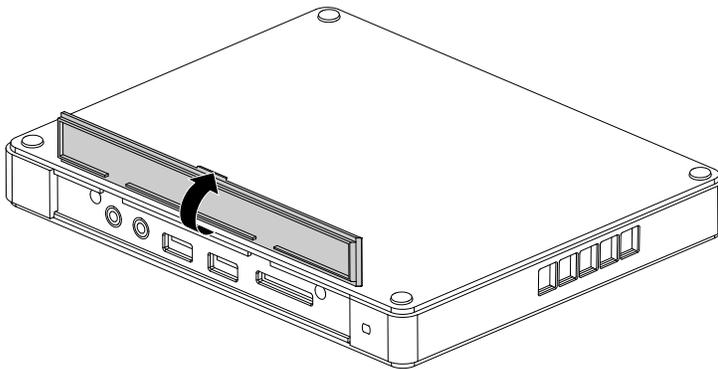
Step 2. Unplug all power cords from electrical outlets.

Step 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 “Left and right view” and “Rear view” for help with locating the various connectors.

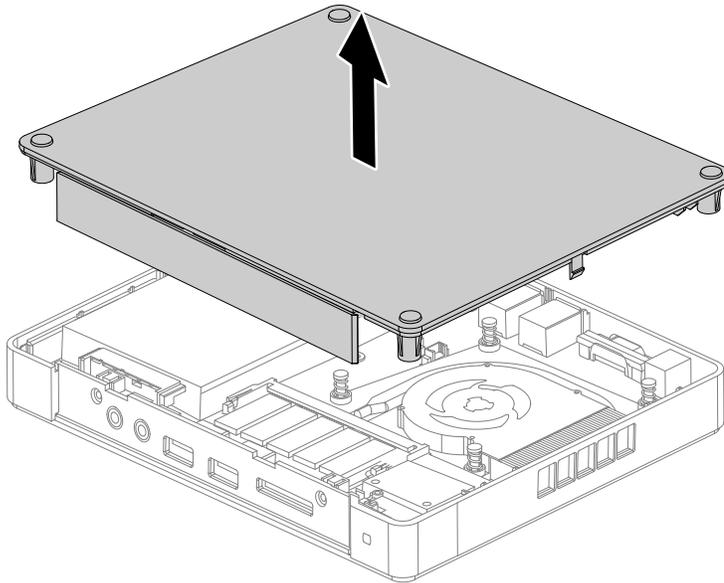
Step 4. Remove the rubber caps that protects the screws, then remove the 4 screws that secure the computer cover to the chassis.



Step 5. Open the side door and remove the cover from this side gently.



Step 6. Lift up the computer cover as shown.



Step 7. To install the computer cover:

- a. Line up the computer cover with the chassis as shown.
- b. Secure the computer cover to the chassis with the 4 screws.

Replacing the hard disk drive

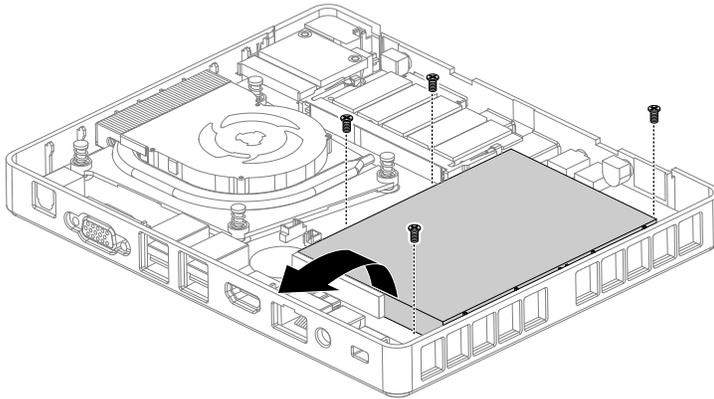
Attention: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

Note: It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

To replace the hard disk drive

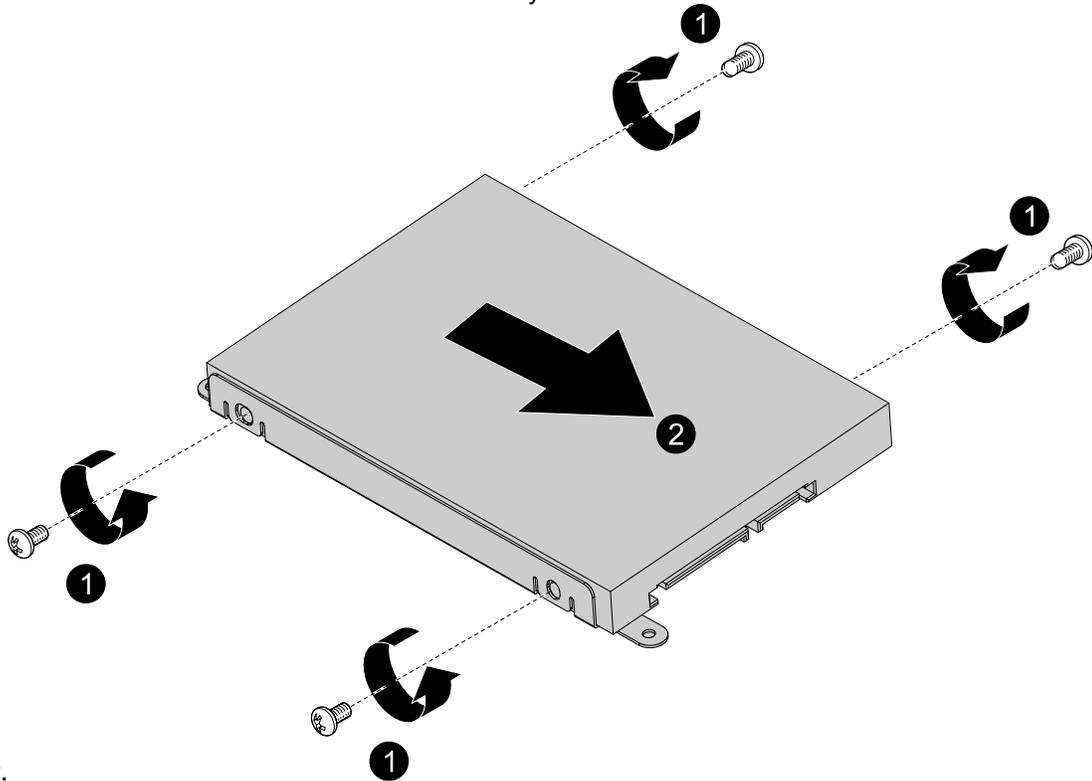
- Step 1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Unplug all power cords from electrical outlets.
- Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.
- Step 4. Remove the computer cover. Refer to “Removing the computer cover”.
- Step 5. Remove the 4 screws that secure the hard disk drive to the motherboard.

Step 6. Lift up the back of the hard disk drive and pull it out as shown.



Step 7. Remove the 4 screws that secure the hard disk drive to the hard disk drive bay.

Step 8. Slide out the hard disk drive out of the bay to remove



it.

Step 9. To install the new hard disk drive as follows:

- a. Slide the new hard disk drive bay into bay and secure it to the bay with the 4 screws.
- b. Slide the new hard disk drive and bay into position and secure it to the chassis with the 4 screws.

Step 10. Reattach the computer cover.

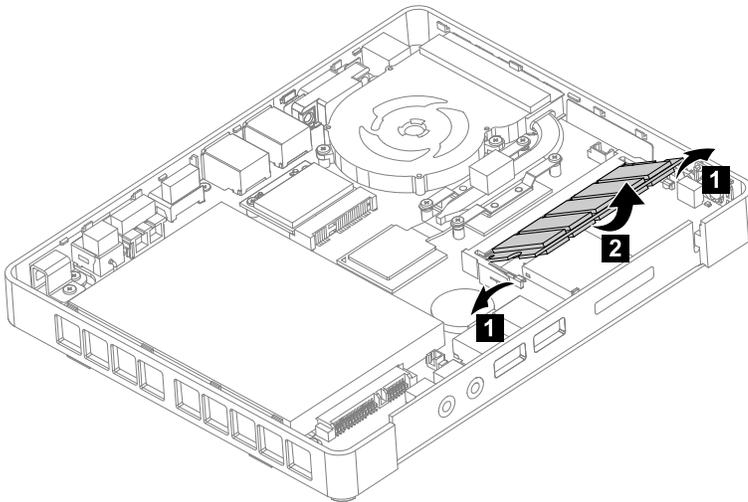
Replacing a memory module

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

Note: It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

To replace a memory module

- Step 1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Unplug all power cords from electrical outlets.
- Step 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 “Left and right view” and “Rear view” for help with locating the various connectors.
- Step 4. Remove the computer cover. Refer to “Removing the computer cover”.
- Step 5. Push out the latches on both sides of the memory socket to release the memory module. **1**
Gently pull the memory module upward to remove it from its socket. **2**



- Step 6. Align the new memory module with the memory socket, then insert it and push down on the top edge. Make sure the latches lock the memory module in place.
- Step 7. Reattach the computer cover and secure it with the screws.

Replacing the WLAN card

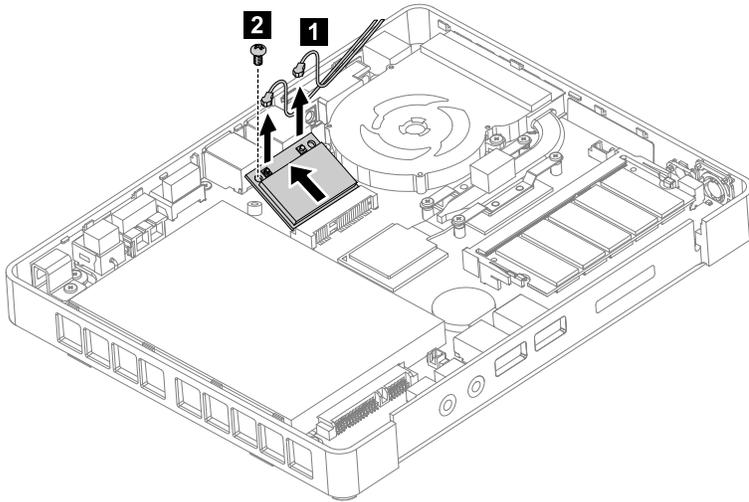
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

Note: It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

To replace the WLAN card:

- Step 1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Unplug all power cords from electrical outlets.
- Step 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 “Left and right view” and “Rear view” for help with locating the various connectors.
- Step 4. Remove the computer cover. Refer to “Removing the computer cover”.

- Step 5. Disconnect the 2 antenna cables from the WLAN card. **1**
- Step 6. Remove the screw that secures the WLAN card to the motherboard. **2**
- Step 7. Pull the WLAN card upward to remove it from the card port.



- Step 8. Line up the new WLAN card, then insert it into the card port and secure it to the motherboard with the screw.
- Step 9. Connect the 2 antenna cables to the new WLAN card.
- Step 10. Reattach the computer cover.

Replacing the heat-sink

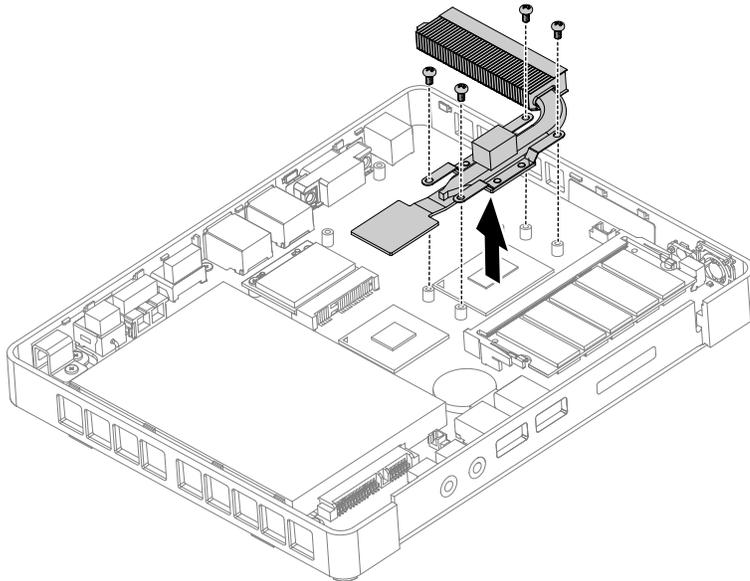
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

Note: It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

To replace the heat-sink:

- Step 1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Unplug all power cords from electrical outlets.
- Step 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 “Left and right view” and “Rear view” for help with locating the various connectors.
- Step 4. Remove the computer cover. Refer to “Removing the computer cover”.
- Step 5. Remove the system fan. Refer to “Replacing the system fan”.

- Step 6. Remove the 4 screws that secure the system fan to the motherboard.
- Step 7. Remove the heat-sink by lifting it up.



- Step 8. To install the new heat-sink:
- Line up the new heat-sink with the mounting holes on the chassis and place it into position.
 - Secure the new heat-sink with the 4 screws.
- Step 9. Reattach the system fan and computer cover.

Replacing the system fan

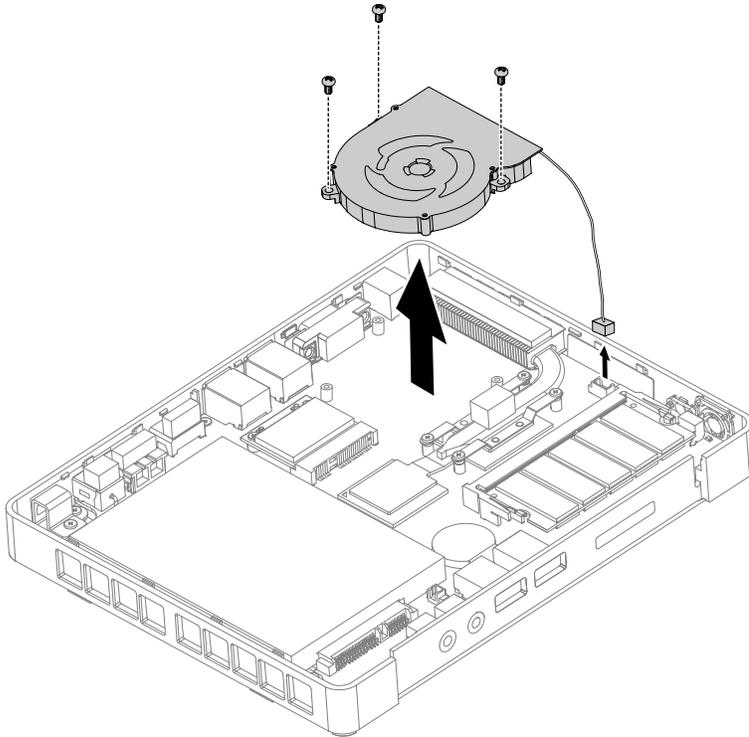
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

Note: It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

To replace the system fan:

- Step 1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Unplug all power cords from electrical outlets.
- Step 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 “Left and right view” and “Rear view” for help with locating the various connectors.
- Step 4. Remove the computer cover. Refer to “Removing the computer cover”.

- Step 5. Remove the 3 screws that secure the system fan to the motherboard.
- Step 6. Disconnect the system fan power cables from the motherboard.
- Step 7. Remove the system fan by lifting it up.



- Step 8. To install the new system fan:
- Line up the new system fan with the mounting holes on the chassis and place it into position.
 - Secure the new system fan with the 3 screws.
 - Connect the new system fan power cable to the connector on the motherboard.
- Step 9. Reattach the computer cover.

Replacing the motherboard

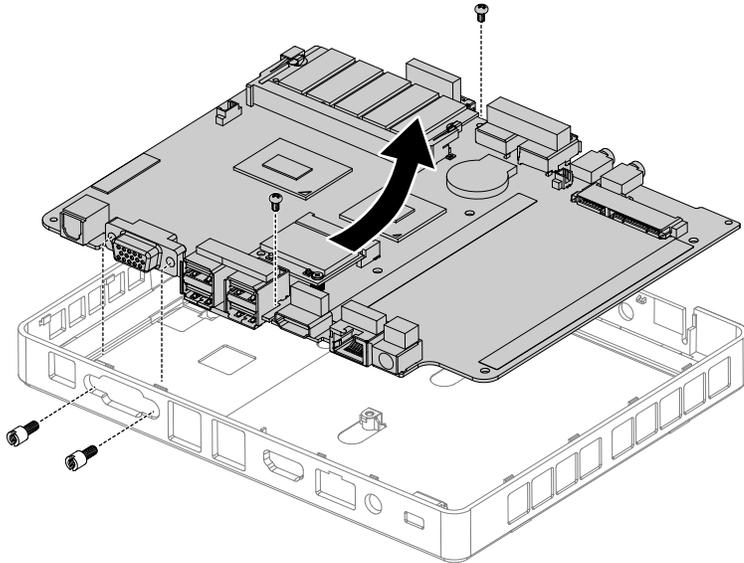
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

Note: It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

To replace the motherboard:

- Step 1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Unplug all power cords from electrical outlets.
- Step 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 “Left and right view” and “Rear view” for help with locating the various connectors.
- Step 4. Remove the computer cover. Refer to “Removing the computer cover”.
- Step 5. Remove the hard disk drive. Refer to “Replacing the hard disk drive”.

- Step 6. Remove the memory module. Refer to “Replacing a memory module”.
- Step 7. Remove the WLAN card. Refer to “Replacing the WLAN card”.
- Step 8. Remove the power button. Refer to “Removing the power button”.
- Step 9. Remove the system fan. Refer to “Replacing the system fan”.
- Step 10. Remove the heat-sink. Refer to “Replacing the heat-sink”.
- Step 11. Remove all the cables connected to the motherboard.
- Step 12. Remove the four screws that secure the motherboard to the chassis.
- Step 13. Slide the motherboard up then lift it out to remove it.



- Step 14. Place the new motherboard into the chassis, aligning the screw holes in the motherboard with the mounting holes in the chassis.
- Step 15. Secure the new motherboard to the chassis using the screw.
- Step 16. Attach all related components to the new motherboard.
- Step 17. Reattach the computer cover.

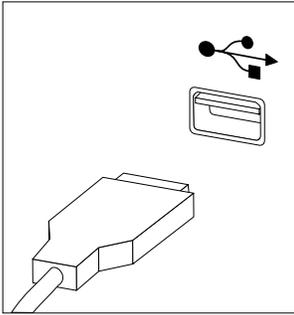
Replacing the keyboard and mouse

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

Note: It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

To replace the keyboard and mouse

- Step 1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Unplug all power cords from electrical outlets.
- Step 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 “Left and right view” and “Rear view” for help with locating the various connectors.



Note: Your keyboard will be connected to a USB connector on one side or at the rear of the computer.

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

Note: The mouse can be replaced using the same method.

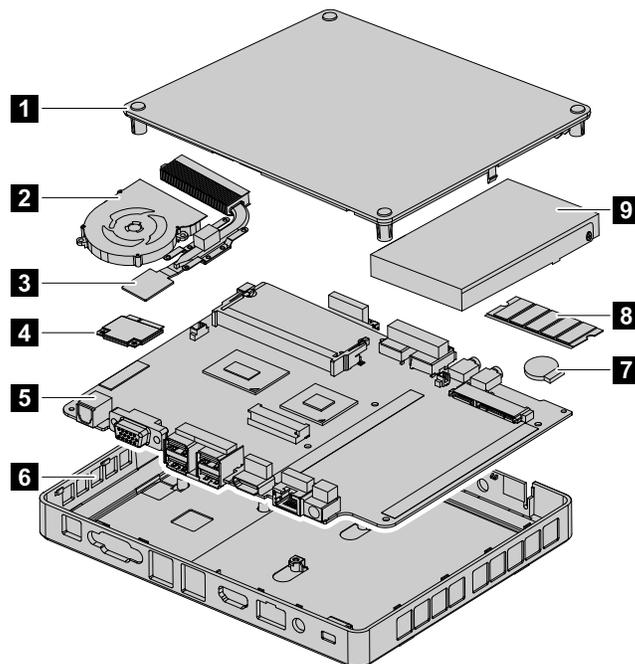
FRU lists

This chapter lists the information on the field replaceable units (FRUs).

Attention: Be sure to read and understand all the safety information before replacing any FRUs.

Notes: FRUs that have a 1 or 2 in the CRU column are Customer Replaceable Units (CRUs).

- 1 identifies parts that are fairly simple to replace, requiring few or no tools.
- 2 identifies parts that are slightly more difficult to replace.
- N identifies parts that are not to be replaced by the customer.



Item #	Description	Lenovo P/N	CRU ID
8	RAM		
	M471B5773DH0-CK0 2GB D3-1600S RAM-HF	1-100226	N
	HMT325S6CFR8C-PB 2GB D3-1600S RAM-HF	1-100227	
	MT8KTF25664HZ-1G6M1 2GB D3L-1600S RAM-HF	1-100228	
	Elp_R J2108BDBG-GN-F 2GB D3-1600S RAM	1-100425	
	M471B5273DH0-CK0 4GB D3-1600S RAM-HF	1-100230	
	HMT351S6CFR8C-PB 4GB D3-1600S RAM-HF	1-100231	
	MT16KTF51264HZ-1G6M1 4GB D3L-1600S RAM-HF	1-100232	
	Elp_R J2108BDBG-GN-F 4GB D3-1600S RAM	1-100426	
	M471B1G73BH0-CK0-CK0 8GB D3-1600S RAM-HF	1-100234	
	HMT41GS6MFR8C-PB 8GB D3-1600S RAM-HF	1-100235	
	MT16JTF1G64HZ-1G6D1 8GB D3-1600S RAM-HF	1-100099	
9	HDD		
	Seagate ST320LT012 5400RPM 7MM 320G HDD	16-200212	N
	WD3200LPVT-08G33T1 7mm 5.4K rpm 320G HDD	16-200265	
	Hitachi HTS545032A7E380 5400RPM 320G HDD 7mm	16-200068	
	WD WD3200BPVT 5400RPM 320G HDD	16-200022	
	Seagate ST500LT012 5400RPM 7MM 500G HDD	16-200211	
	ST500LM012 5.4K 9.5 500G HDD	16-200210	
	WD5000LPVT-08G33T1 7mm 5.4K rpm 500G HDD	16-200264	
	Hitachi HTS545050A7E380 5400RPM 500G HDD 7mm	16-200067	
	WD WD5000BPVT-24HXZ 5400RPM 500G HDD	16-004846	
	ST1000LM024 5.4K 9.5 1T HDD	16-200208	
	WD WD10JPVT-24A1YT0 5400PRM 9.5mm 1T HDD	16-200071	
HT HTS541010A9E680 5400RPM 1TB HDD	16-200193		
	SSD		
	Sandisk U100 SDSA5DK 24G mSATA SSD	16-200252	N
	Samsung MZMPA024HMCD 24G mSATA SSD	16-200256	
ODD			
	HLDS CA40N Slim SATA Slot BD Combo	25-205779	N
	Panasonic UJ265 Slot BD Combo	25-209300	
	SONY Optiarc AD-7800H Slot Rambo	25-203881	
	Panasonic UJ8C5 Slot Rambo	25-209301	
	HLDS GA31N Slim SATA Slot DVDRW	25-009580	
	Power Supply		
	Delta ADP-65YB DA 65W ADAPTER	36200337	1
	Liteon PA-1650-52LC NB Power Adapter (EPS2.0)	36001678	

4	Wi-Fi Card		
	Cbt BCM4313 MOW M PCIE NB HMC wifi card	20002505	N
	LTN RTL8188EE 11n HMC WiFi card	20200218	
	LTN RTL8188CE 11n SB HMC WiFi card(wowl)	11200352	
	Q190 WLAN Antenna (White and black)	90202225	
Motherboard			
5	Q190 NON_WIN8 Celeron 887 HM70 MB	90001754	N
	Q190 WIN8 Celeron 887 HM70 MB	90001755	
	Q190 WIN8_PRO Celeron 887 HM70 MB	90001756	
	Q190 NON_WIN8 I3_2365M HM76 MB	90001982	
	Q190 WIN8 I3_2365M HM76 MB	90001983	
	Q190 WIN8_PRO I3_2365M HM76 MB	90001984	
1&6&9	Chasiss		
	Q190 IO COVER	90202214	N
	Q190 Bottom Case	90202215	
	Q190 TOP Case(W/Button)	90202216	
	Q190 ODD Bracket	90202217	
	Q190 HDD Bracket For HDD	90202218	
	Q190 HDD Bracket For SSD	90202219	
	Q190 Bottom Stand	90202220	
	Q190 ODD Bottom Case	90202221	
	Q190 ODD TOP Case(W/Button)	90202222	
	Other Connector and Cable		
	Q180 USB to USB connector assy	31052494	N
	Q180 ODD button cable	31052499	
	Q190 SSD Connector Card	90001979	
	Q190 USB to SATA Connection board	90001980	
	Q190 ODD Button Control Board	90001981	
3	Thermal Module		
	Q190 AVC Thermal	90202223	N
	Q190 DELTA FAN	90202224	
	Keyboard		
	Sunrex EKB-10YA(US) B-Silk USB KB-LVT8	25209111	1
	Primax KB4721(US) B-Silk USB KB-LVT8	25209112	
	Chicony KU-1153(US) B-Silk USB KB-LVT8	25209113	
	Sunrex EKB-10YA(TW) B-Silk USB KB-LVT8	25209114	
	Sunrex EKB-10YA(TH) B-Silk USB KB-LVT8	25209115	
	Sunrex EKB-10YA(CZ-SL) B-S USB KB-LVT8	25209116	
	Sunrex EKB-10YA(IN) B-Silk USB KB-LVT8	25209117	
Sunrex EKB-10YA(RU) B-Silk USB KB-LVT8	25209118		

Sunrex EKB-10YA(UK) B-Silk USB KB-LVT8	25209119	
Sunrex EKB-10YA(Nordic) B-S USB KB-LVT8	25209120	
Sunrex EKB-10YA(LA) B-Silk USB KB-LVT8	25209121	
Sunrex EKB-10YA(AR) B-Silk USB KB-LVT8	25209122	
Sunrex EKB-10YA(SW) B-Silk USB KB-LVT8	25209123	
Sunrex EKB-10YA(GE) B-Silk USB KB-LVT8	25209124	
Sunrex EKB-10YA(TR) B-Silk USB KB-LVT8	25209125	
Sunrex EKB-10YA(SP) B-Silk USB KB-LVT8	25209126	
Sunrex EKB-10YA(SL) B-Silk USB KB-LVT8	25209127	
Sunrex EKB-10YA(IT) B-Silk USB KB-LVT8	25209128	
Sunrex EKB-10YA(HB) B-Silk USB KB-LVT8	25209129	
Sunrex EKB-10YA(FR) B-Silk USB KB-LVT8	25209130	
Sunrex EKB-10YA(GK) B-Silk USB KB-LVT8	25209131	
Sunrex EKB-10YA(HG) B-Silk USB KB-LVT8	25209132	
Sunrex EKB-10YA(BG) B-Silk USB KB-LVT8	25209133	
Sunrex EKB-10YA(HR) B-Silk USB KB-LVT8	25209134	
Sunrex EKB-10YA(JP) B-Silk USB KB-LVT8	25209135	
Sunrex EKB-10YA(EN-FR) B-S USB KB-LVT8	25209136	
Sunrex EKB-10YA(PT) B-Silk USB KB-LVT8	25209137	
Sunrex EKB-10YA(BE-EN) B-S USB KB-LVT8	25209138	
Sunrex EKB-10YA(DU) B-S USB KB-LVT8	25209139	
USB Mouse		
Liteon LXH-SM-8825 B-Silk Mouse	25200528	1
Chicony LXH-MSU-1111 B-Silk Mouse	25200529	
Sunrex LXH-EMS-10ZA B-Silk Mouse	25200530	
2.4GHz Wireless KB/MS		
MultimediaRemoteN5902(US-Eng-W8)	25-014044	1
MultimediaRemoteN5902(FR-Gray-W8)	25-014045	
MultimediaRemoteN5902(UK-Gray-W8)	25-014046	
MultimediaRemoteN5902(GR-Gray-W8)	25-014048	
MultimediaRemoteN5902(LA-SP-Gray-W8)	25-014049	
MultimediaRemoteN5902(JP-Gray-W8)	25-014050	
VESA Mount		
Q180 Small VESA Mount W/O ODD	31052512	N
Q180 Big VESA Mount W/ODD	31052511	

Power Cord			
longwell black1.0m 3wire ULCSA power cord	31-033857	1	
Volex 1M C5 US power cord	31-033858		
Luxshare1.0M C5 US power cord	31-049517		
Grandsun black1.0m3wire CCC power cord(R)	31-032953		
Luxshare 1.0M C5 CCC power cord	31-045147		
longwell black 1.0m SAA power cord	31-035397		
Volex 1M C5 Australia power cord	31-049500		
Luxshare1.0M C5 Australia power cord	31-049520		
Longwell black1.0m Japan C5 power cord(R)	31038887 line cord + 31039655 3pin2pin converter		
Longwell JPN 3_2pin convert AC plug(R)			
Volex1MC5JPN power cord	31-049506 line cord + 31039655 3pin2pin converter		
Longwell JPN 3_2pin convert AC plug(R)			
Luxshare1.0M C5 JPN power cord	31-049519 line cord + 31039655 3pin2pin converter		
Longwell JPN 3_2pin convert AC plug(R)			
longwell black1.0m ASTA power cord	31-035396		
Volex1MC5BRT power cord	31-049496		
longwell black1.0m VDE power cord	31-035332		
Volex1MC5 European power cord	31-049497		
Luxshare1.0M C5 European power cord	31-049518		
longwell black1.0m India power cord	31-035395		
Longwell black1.0m Italy C5 power cord®	31-039104		
Volex 1M C5 Italy power cord	31-049504		
Longwell black1.0m Brazil power cord®	31-035828		
Volex 1M C5 Brazil power cord	31-049505		
Longwell black1.0m Argentina C5 power cord®	31-039100		
Volex 1M C5 LA power cord	31-049507		
Longwell black1.0m Denmark C5 power cord®	31-039101		
Volex 1M C5 Danmark power cord	31-049503		
Longwell black1.0m Switzerland C5 power cord®	31-039103		
Volex 1M C5 Switzerland power cord	31-049508		
Longwell black1.0m Israel C5 power cord®	31-039107		
Volex 1M C5 Israel power cord	31-049502		
Longwell black1.0m Taiwan C5 power cord®	31-038885		
Volex 1M C5 TW power cord	31-049499		

	Longwell black1.0m Korea C5 power cord®	31-039106	
	Volex 1MC5 Korea power cord	31-049498	
	Longwell black1.0m SA C5 power cord®	31-039105	
	Volex 1M C5 South Africa power cord	31-049501	

Chapter 9. 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 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, a daily event or a weekly event.
- On LAN Wake Up: This feature allows LAN adapter card to wake the System.