



Lenovo Flex 20 All-In-One PC
Hardware Maintenance Manual



ideaideaideaCentreidea

Machine Types: 10142/F0A9



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Contents

Chapter 1. About this manual	1
Important Safety Information	1
Chapter 2. Safety information	3
General safety	3
Electrical safety	3
Safety inspection guide	5
Handling electrostatic discharge-sensitive devices	5
Grounding requirements	6
Safety notices	6
Chapter 3. General information	9
Specifications	9
Chapter 4. General Checkout	11
Chapter 5. Using the Setup Utility.	13
Starting the Lenovo BIOS Setup Utility program	13
Viewing and changing settings	13
Using passwords.	13
Enabling or disabling a device	15
Selecting a startup device	16
Changing booting mode	17
Exiting the Lenovo BIOS Setup Utility program	17
Chapter 6. Symptom-to-FRU Index	19
Hard disk drive boot error	19
Power Supply Problems	19
POST error codes	20

Undetermined problems	20
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Chapter 7. Locating connectors, controls and components 21

Chapter 8. Replacing hardware 25

General information.	25
Replacing the keyboard and mouse	26
Replacing the power adapter	26
Removing the rear cover.	28
Replacing the battery	30
Replacing the hard disk drive	31
Replacing the system fan	34
Replacing the heat-sink	35
Replacing a memory module	36
Replacing the Wi-Fi card.	36
Replacing the I/O board	37
Replacing the speaker system	38
Replacing the Windows function board	39
Replacing the motherboard.	40
Replacing the converter board	41
Replacing the camera	42
Replacing the LED panel module	45

Chapter 9. FRU lists-Flex 20 47

Chapter 10. Additional Service Information 55

Chapter 1. About this manual

This manual contains service and reference information for Lenovo Flex 20 All-In-One 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-tuner card in this manual applies only to computers with a TV-tuner card installed. It does not apply to computers without a TV-tuner 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:

- Keep the areas around the computer clear and clean 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 across both feet.
 3. Lift slowly. 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 lbs.) or objects that you think are too heavy for you.
- Do not perform any action that would create a hazard for the customer, or would make the computer unsafe.
- Before you start the computer, ensure that other service representatives and customer personnel are not in a position that would create a hazard for them.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the computer.
- Keep your tool case away from areas that people may walk through to ensure no-one trips 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, tie or fasten it back.
- 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.
- Reattach all covers correctly before returning the computer 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 any attached power cords, telecommunication cables, network cables, and modem cables 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 rubber floor mats near their equipment that contain small conductive fibers to decrease electrostatic discharge.

- 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 computer, unplug the power cord. If you cannot unplug it, ask the customer to power-off the electrical outlet that supplies power to the machine and to lock the electrical outlet in the off position.
- If you need to work on a computer 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 the maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools to ensure they are safe to use.
- 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 wet floors, non-grounded power extension cables, conditions that may cause or allow power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. This surface is conductive, and touching a live circuit can cause personal injury and damage to the computer.
- Do not service the following parts with the power on when they are removed from their normal operating positions in a computer:
 - 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 potential hazards posed by these products. Each computer, 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 hazards are present, you must determine how serious the apparent hazard could be and whether you can continue without first resolving the problem.

Consider the following items 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 as 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 hazards, 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 computer, 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 any equipment that will be attached to this product to a properly wired outlet.**
- **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 cables, network cables, and modem cables 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 outlets. 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 into or immerse in 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:

These diodes emit 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)

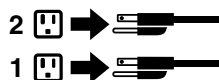
CAUTION:

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 computer models covered by this manual.

Specifications

This section lists the physical specifications for your computer.

This section lists the physical specifications for your computer.

Type Lenovo Flex 20

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 90% (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 may have been 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, 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 did receive the correct response, proceed to step 7.

6. If one of the following happens, follow the instruction given:
 - 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 the test stops and 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 Lenovo BIOS Setup Utility program

To start the Lenovo BIOS 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 the Lenovo BIOS Setup Utility program is displayed, release the **F1** key.

Note: If a Power-On Password or an Administrator Password has been set, the Setup Utility program menu will not be displayed until you type your password. For more information, see “Using passwords.”

Viewing and changing settings

System configuration options are listed in the Lenovo BIOS Setup Utility program menu. To view or change settings, see “Starting the Setup Utility program.”

You must use the keyboard when using the Lenovo BIOS Setup Utility menu. The keys used to perform various tasks are displayed on the bottom of each screen.

Using passwords

You can use the Lenovo BIOS Setup Utility program to 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 passwords, read the following sections.

Password considerations

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

- For a strong password, use 7-16 characters and a mix of letters and numbers.
- Do not use your name or your user name.
- Do not use a common word or a common name.
- Use something significantly different from your previous password.

Attention: Administrator and Power-On passwords are not case sensitive.

Administrator Password

Setting an Administrator Password deters unauthorized persons from changing configuration settings. You might want to set an Administrator Password if you are responsible for maintaining the settings of several computers.

After you set an Administrator Password, a password prompt is displayed every time you access the Lenovo BIOS Setup Utility program.

If both the Administrator and Power-On Password are set, you can type either password. However, you must use your Administrator Password to change any configuration settings.

Setting, changing, or deleting an Administrator Password

To set an Administrator Password, do the following:

Note: A password can be any combination of letters and numbers up to 16 characters (a-z and 0-9). For more information, see “Password considerations” on page 13.

1. Start the Lenovo BIOS Setup Utility program (see “Starting the Lenovo BIOS Setup Utility program” on page 13).
2. From the **Security** menu, select **Set Administrator Password** and press the **Enter** key.
3. The password dialog box will be displayed. Type the password then press the **Enter** key.
4. Retype the password to confirm, then press the **Enter** key. If you typed the password correctly, the password will be installed. A Setup Notice will be displayed confirming that your changes has been saved.
5. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
6. Select **Save Changes and Exit** from the menu.

To change an Administrator Password, do the following:

1. Start the Lenovo BIOS Setup Utility program (see “Starting the Lenovo BIOS Setup Utility program” on page 13).
2. From the **Security** menu, select **Set Administrator Password** and press the **Enter** key.
3. The password dialog box will be displayed. Type the current password then press the **Enter** key.
4. Type the new password, then press the **Enter** key. Retype the new password to confirm it. If you typed the new password correctly, the new password will be installed. A Setup Notice will be displayed confirming that your changes have been saved.
5. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
6. Select **Save Changes and Exit** from the menu.

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

1. Start the Lenovo BIOS Setup Utility program (see “Starting the Lenovo BIOS Setup Utility program” on page 13).
2. From the **Security** menu, select **Set Administrator Password** and press the **Enter** key.
3. The password dialog box will be displayed. Type the current password and press the **Enter** key.
4. Leave each new password line item blank, then press the **Enter** key. A Setup Notice will be displayed confirming that your changes have been saved.
5. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
6. Select **Save Changes and Exit** from the menu.

Power-On Password

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

Setting, changing, or deleting a Power-On Password

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

To set a Power-On Password, do the following:

1. Start the Lenovo BIOS Setup Utility program (see "Starting the Lenovo BIOS Setup Utility program" on page 13).
2. From the **Security** menu, select **Set Power-On Password** and press the **Enter** key.
3. The password dialog box will be displayed. Type the password, then press the **Enter** key.
4. Retype the password to confirm. If you typed the password correctly, the password will be installed.
5. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
6. Select **Save Changes and Exit** from the menu.

To change a Power-On Password, do the following:

1. Start the Lenovo BIOS Setup Utility program (see "Starting the Lenovo BIOS Setup Utility program" on page 13).
2. From the **Security** menu, select **Set Power-On Password** and press the **Enter** key.
3. The password dialog box will be displayed. Type the current password then press the **Enter** key.
4. Type the new password, then press the **Enter** key. Retype the new password to confirm it. If you typed the new password correctly, the new password will be installed. A Setup Notice will be displayed confirming that your changes have been saved.
5. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
6. Select **Save Changes and Exit** from the menu.

To delete a previously set Power-On Password, do the following :

1. Start the Lenovo BIOS Setup Utility program (see "Starting the Lenovo BIOS Setup Utility program" on page 13).
2. From the **Security** menu, select **Set Power-On Password** and press the **Enter** key.
3. The password dialog box will be displayed. Type the current password and press the **Enter** key.
4. Leave each new password line item blank, then press Enter. A Setup Notice will be displayed confirming that your changes have been saved.
5. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
6. Select **Save Changes and Exit** from the menu.

Enabling or disabling a device

The Devices options is used to enable or disable user access to the following:	
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 Mode	Select Disabled/IDE/AHCI mode. Device driver support is required for AHCI or RAID . Depending on how the hard disk drive image was installed, changing this setting may prevent the system from booting.
Onboard Audio Controller	Select whether to enable or disable the Onboard Audio Controller . When this feature is set to Disabled all devices connected to the audio connectors (e.g. headphones or a microphone) are disabled and cannot be used.
Onboard Ethernet Controller or LAN Boot Agent	Select whether to enable or disable the 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 an option as follows:
 - Select **USB Setup**, press the **Enter** key, then select **USB Functions**.
 - Select **ATA Drivers Setup**, press the **Enter** key, then select **SATA Mode**.
 - Select **Audio Setup**, press the **Enter** key, then select **Onboard Audio Controller**.
 - Select **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 Lenovo BIOS Setup Utility program menu and select the **Exit** option.
6. Select **Save Changes and Exit** from the menu.

Notes:

- a. 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 boot from a device such as the CD/DVD-ROM drive disk or hard disk as expected, follow one of the procedures below.

Selecting a temporary startup device

Use this procedure to start up from any boot device.

Note: Not all CDs, DVDs or hard disk drives 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 the **Startup Device Menu** does not display using these steps, repeatedly press and release the **F12** key rather than keeping it pressed when turning on the computer.

3. Use ↑ and ↓ arrows to select the desired startup device from the **Startup Device Menu** and press the **Enter** key 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 Lenovo BIOS Setup Utility program (see “Starting the Lenovo BIOS Setup Utility program” on page 13).
2. From the Lenovo BIOS Setup Utility program main menu, select the **Startup** option.
3. Press the **Enter** key, and select the devices for the **Primary Boot Sequence**. Read the information displayed on the right side of the screen.
4. Use - and + arrows to select a device. Use the <+> or <-> keys to move a device up or down. Use the <x> key to exclude the device from or include the device in the boot sequence.
5. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
6. Select **Save Changes and Exit** from the menu.

Notes:

- a. If you do not want to save the settings, select **Discard Changes and Exit** from the menu.
- b. If you have changed these settings and want to return to the default settings, select **Load Optimal Defaults** from the menu.

Changing booting mode

There are two boot modes UEFI and Legacy for your computer. The default boot mode for your computer is the UEFI mode. If you need to install a legacy Windows operating system (any operating system before Windows 8) on your computer, you must change the boot mode to Legacy support. The legacy Windows operating system cannot be installed if you don't change the boot mode.

To change the booting mode, do the following:

1. Start the Lenovo BIOS Setup Utility program (see “Starting the Lenovo BIOS Setup Utility program” on page 13).
2. From the Lenovo BIOS Setup Utility program main menu, select the **Startup** option.
3. Select the **Boot Priority**, then press **Enter** key. From the pop up “**Boot Priority**” window choose **Legacy** mode.
4. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
5. Select **Save Changes and Exit** from the menu.

Exiting the Lenovo BIOS Setup Utility program

After you finish viewing or changing settings, press the **Esc** key to return to the Lenovo BIOS Setup Utility program main menu. You might have to press the **Esc** key several times. Do one of the following:

- If you want to save the new settings, select **Save Changes and Exit** from the menu. When the **Save & reset** window shows, select the **Yes** button, and then press the **Enter** key to exit the Lenovo BIOS Setup Utility program.
- If you do not want to save the settings, select **Discard Changes and Exit** from the menu. When the **Reset Without Saving** window shows, select the **Yes** button, and then press the **Enter** key to exit the Lenovo BIOS Setup Utility program.

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 20.

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 can have the following causes.

Error	FRU/Action
The startup drive is not included in the boot sequence configuration.	Check the configuration and ensure the startup drive is in the boot sequence.
No operating system is installed on the boot drive.	Install an operating system on the boot drive.
The boot sector on the startup 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. Use the operating system to format the hard disk drive.
The drive is defective.	Replace the hard disk drive.

Power Supply Problems

Follow these procedures if you suspect there is a power supply problem.

Check/Verify	FRU/Action
Check that the following are properly installed: <ul style="list-style-type: none">• Power Cord• On/Off Switch connector• System Board Power Supply connectors• Microprocessor connections	Reseat connectors
Check the power cord.	Power Cord
Check the power-on switch.	Power-on Switch

POST error codes

Each time you turn the computer on, it performs a series of tests to check that the system is operating correctly and that certain options are set. This series of tests is called the *Power-On Self-Test*, or *POST*. POST does the following:

- Checks some basic motherboard operations
- Checks that the memory is working correctly
- Starts video operations
- Verifies that the boot drive is working

POST Error Message	Description/Action
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, select Keyboardless operation in Startup and set the option to Enabled . The BIOS then ignores the missing keyboard during POST.
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 in the boot device.

Undetermined problems

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

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

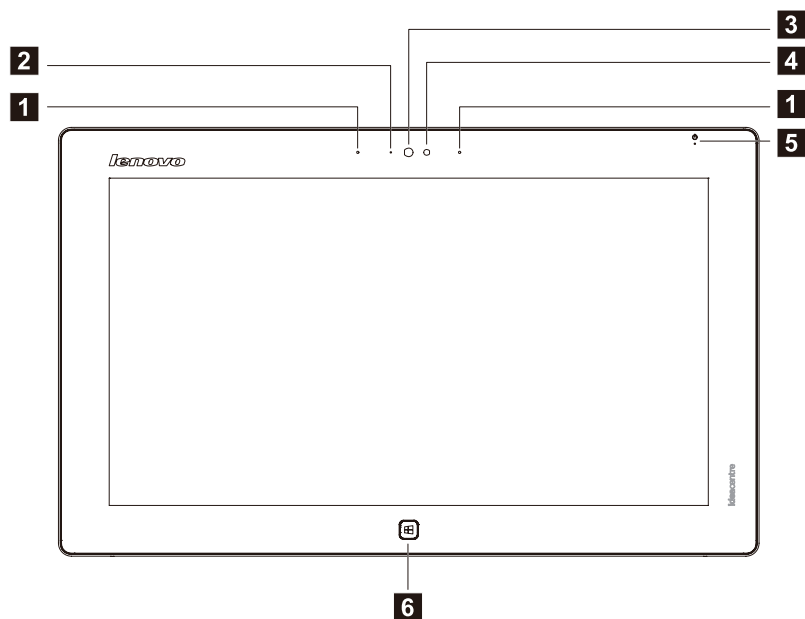
Chapter 7. Locating connectors, controls and components

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

Front view

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

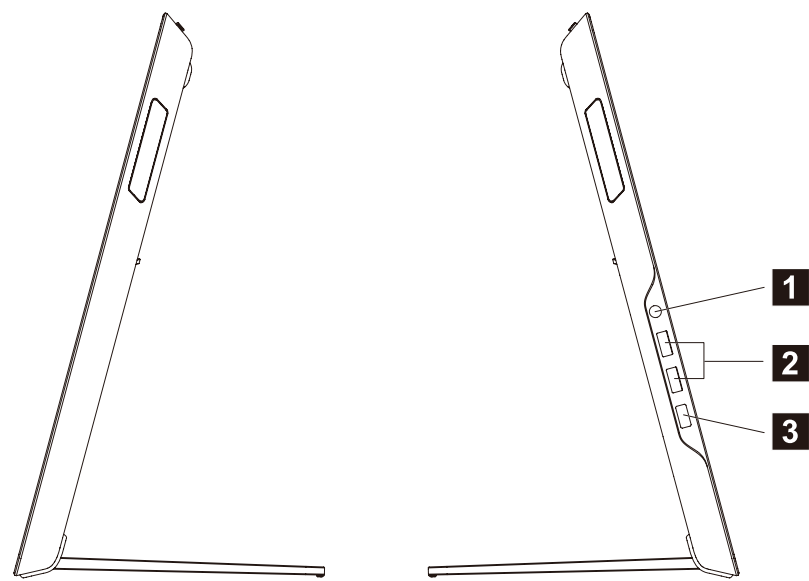
Attention: Be careful not to block any air vents on the computer. Blocked air vents can cause overheating.



1. Built-in microphone	4. Ambient light sensor
2. Camera LED indicator	5. Power LED indicator
3. Built-in camera	6. Windows button

Left and right view

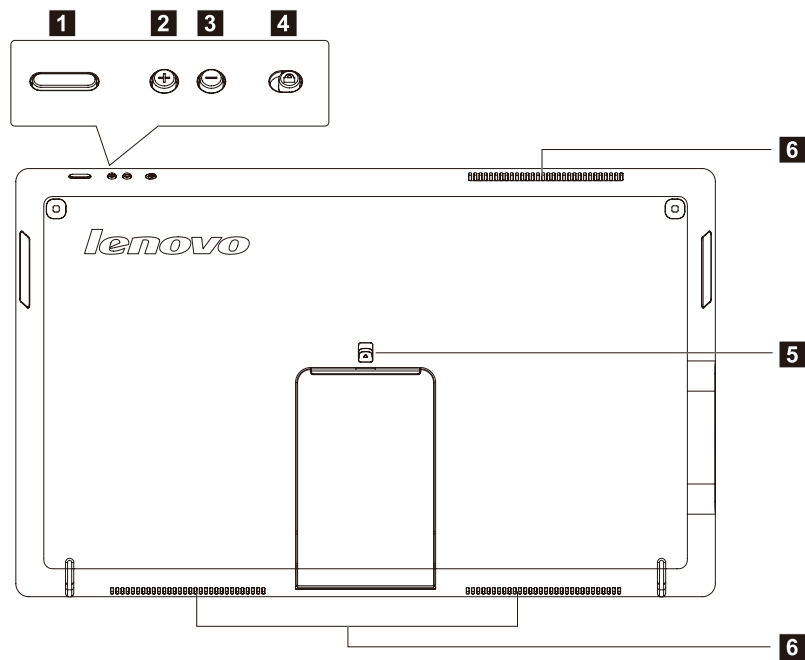
The following illustration shows the location of connectors, controls and components on the left and right side of the computer.



1. Combo audio jack	3. Power connector
2. USB 3.0 connectors (2)	

Rear view

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



1. Power button	4. Screen rotation lock button
2. Volume up	5. Stand lock
3. Volume down	6. Air vents

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. To obtain copies of the Safety and Warranty Guide, go to the Support Web site at: <http://support.lenovo.com>.

Note: Use only parts provided by Lenovo.

General information

Pre-disassembly instructions

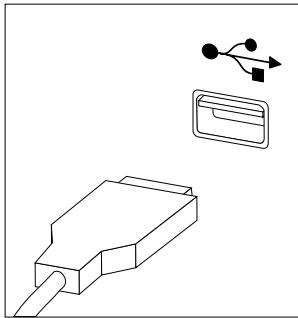
Before starting the disassembly procedure, make sure that you do the following:

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 keyboard and mouse

To replace the keyboard and mouse:

- Step 1. Remove any media (disks, CDs, DVDs 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.

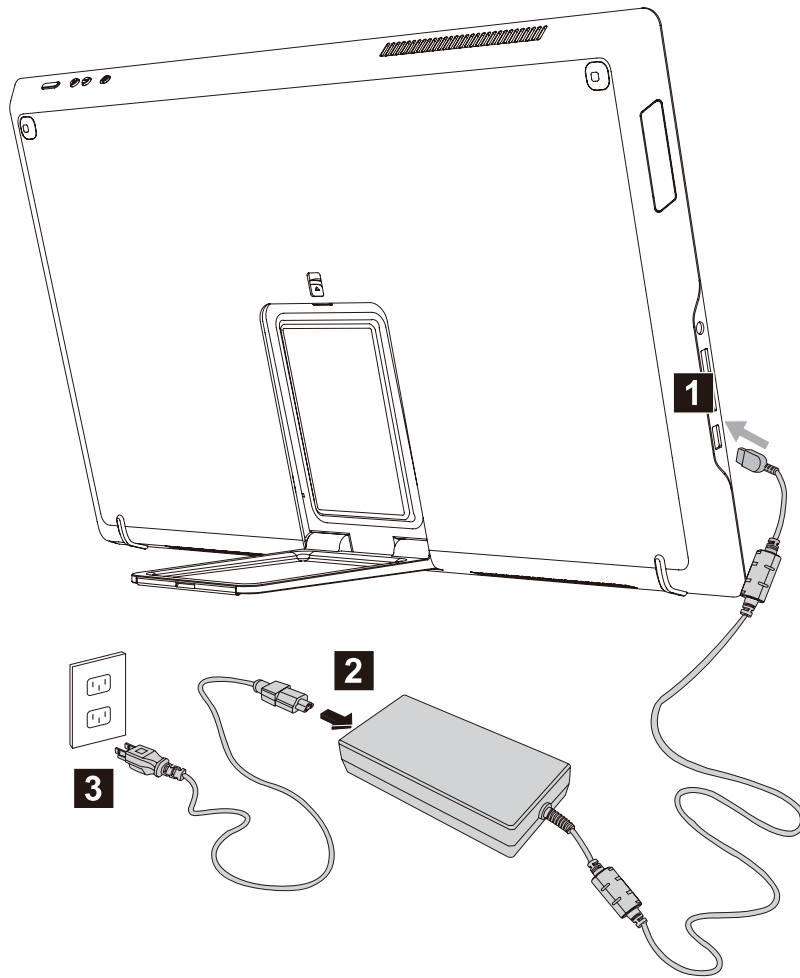
Note: The mouse can be replaced using the same method.

Replacing the power adapter

To replace the power adapter:

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

Step 3. Disconnect the failing power adapter from the computer.



Step 4. To install the new power adapter:

- a. Connect the new power adapter to the same connector.

Removing the rear cover

Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the rear 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 touch screen from scratches or other damage.

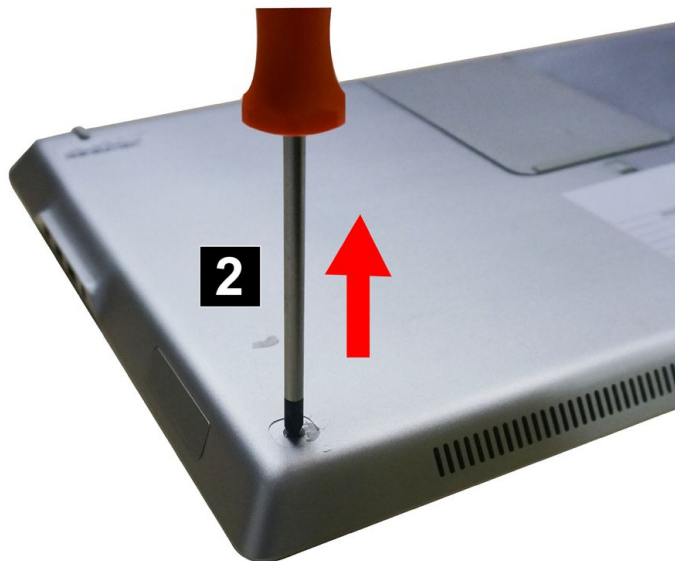
To remove the rear cover:

- Step 1. Remove any media (disks, CDs, DVDs, 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.

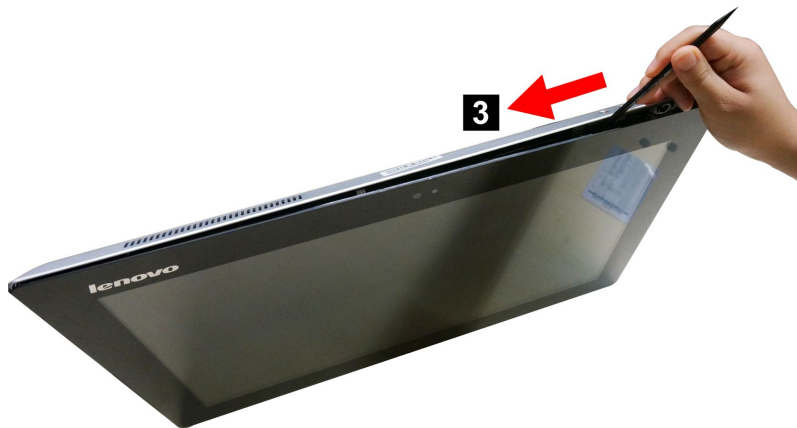
Step 4. Remove the two rubber caps that protect the screws. **1**



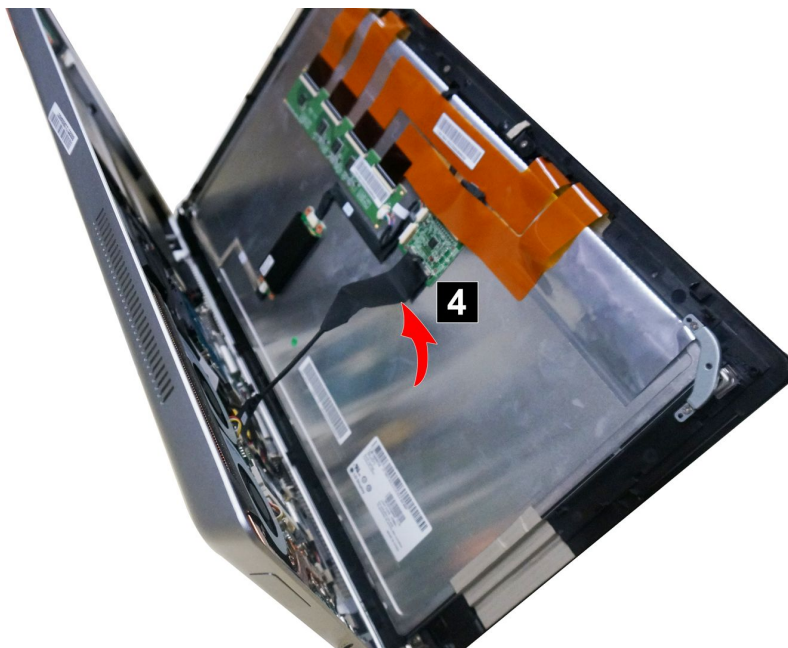
Step 5. Loosen the two screws that secure the rear cover to the front bezel. **2**



Step 6. Use a flat head screw driver, put the head of screwdriver into the slot in between the panel and the rear cover as shown. Then prise the rear cover away from the panel. **3**



Step 7. Disconnect the transform cable from the connector, and separate the rear cover and the panel. **4**



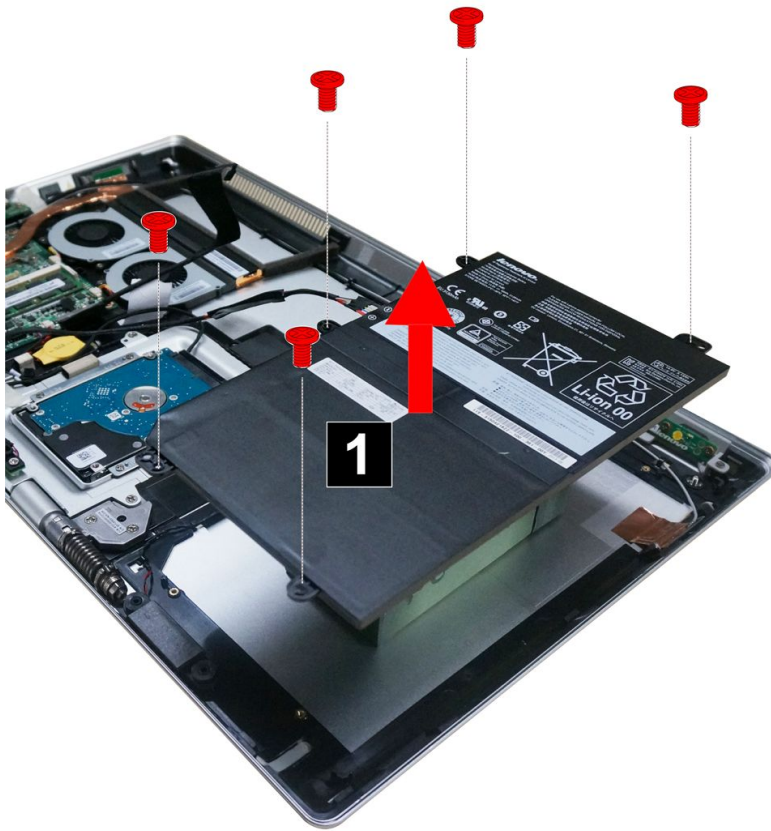
- Step 8. To reattach the rear cover:
- Line up the rear cover with the front bezel and reconnect the transform cable.
 - Line up the holes on the rear cover with mounting holes on the front bezel, and place the rear cover into position.
 - Secure the rear cover to the front bezel with the two screws.
 - Reattach the two rubber caps.

Replacing the battery

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

To replace the battery:

- Step 1. Remove any media (disks, CDs, DVDs, 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 rear cover. Refer to “Removing the rear cover”.
- Step 5. Disconnect the power cable from the connector on the motherboard.
- Step 6. Remove the five screws that secure the battery to the rear cover, then lift up the battery pack as shown.



- Step 7. To install a new battery:
 - a. Line up the holes with mounting holes on the rear cover, then place it into position.
 - b. Secure the new battery to the chassis with the five screws.
 - c. Connect the power cable to the connector on the motherboard.
- Step 8. Reattach the rear cover.

Replacing the hard disk drive

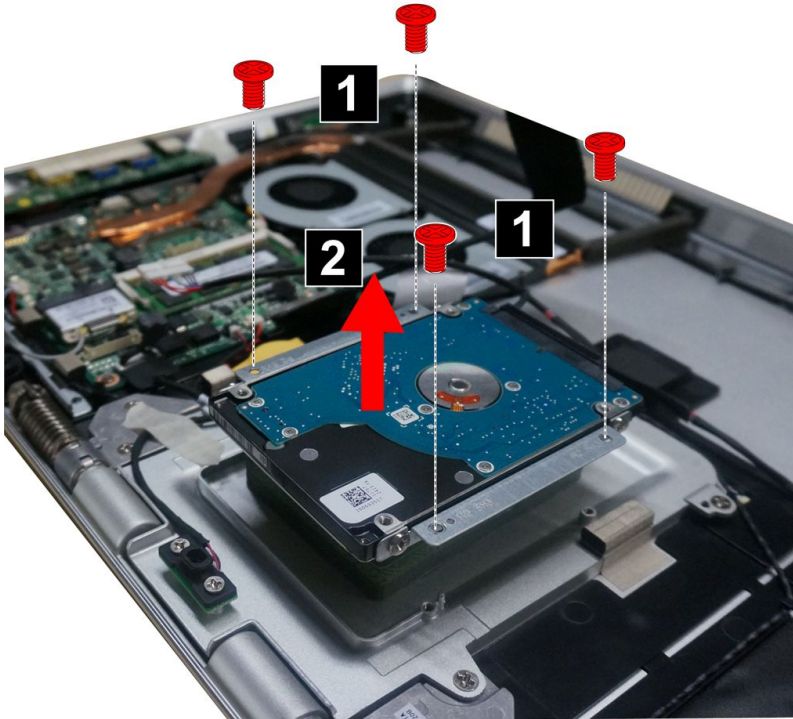
Attention: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the rear cover.

To replace the hard disk drive:

- Step 1. Remove any media (disks, CDs, DVDs 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 rear cover. Refer to "Removing the rear cover".
- Step 5. Disconnect the battery power cable from the connector on the motherboard.

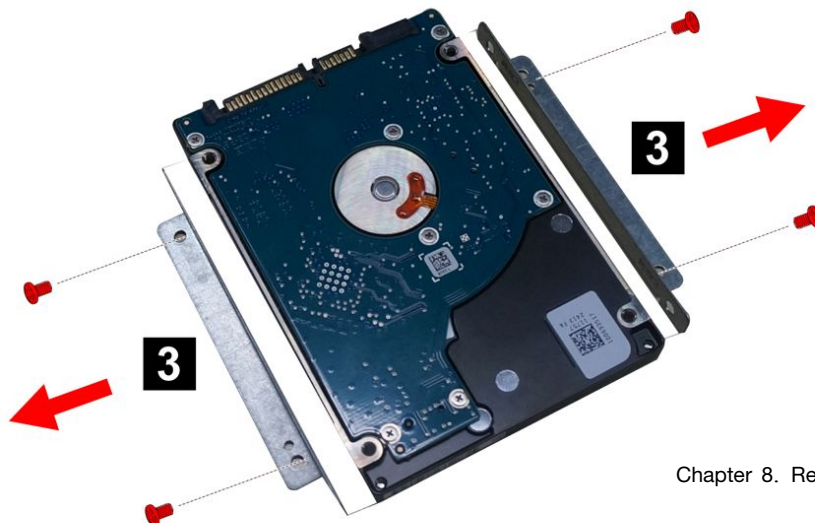
Step 6. Remove the 4 screws that secure the hard disk drive to the rear cover. **1**

Step 7. Lift up the hard disk drive to remove it. **2**



Step 8. Disconnect the data and power cable from the hard disk drive.

Step 9. Remove the 4 screws that secure the hard disk drive to the bracket pieces. **3**



- b. Slide the new hard disk drive into the hard disk drive bay.
- c. Secure the new hard disk drive to the rear cover with the 4 screws.
- d. Connect the data and power cables to the new hard disk drive.

Step 11. Reattach the rear cover and secure it with the screws.

Replacing the system fan

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

To replace the system fan:

- Step 1. Remove any media (disks, CDs, DVDs 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 rear cover. Refer to "Removing the rear cover".
- Step 5. Disconnect the power cable from the connector on the motherboard.
- Step 6. Remove the three screws that secure the system fan to the rear cover.
- Step 7. Lift up the system fan to remove it. **1**



- Step 8. To install the new system fan:
 - a. Line up the new system fan with the mounting holes on the rear cover and place it into position.
 - b. Secure the new system fan to the rear cover with the three screws.
 - c. Connect the new power cable to the connector on the motherboard.

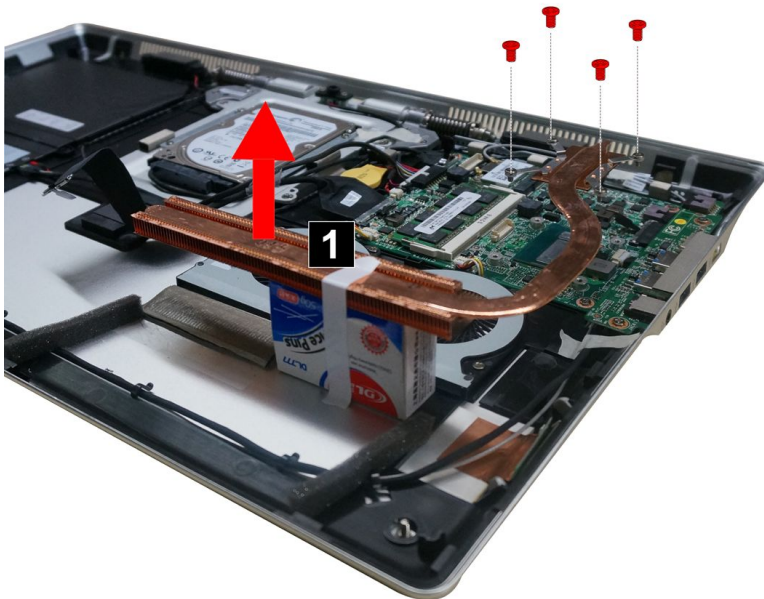
Step 9. Reattach the rear cover and secure it with the screws.

Replacing the heat-sink

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

To replace the heat-sink:

- Step 1. Remove any media (disks, CDs, DVDs 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 rear cover. Refer to "Removing the rear cover".
- Step 5. Remove the 4 screws that secure the heat-sink module to the motherboard.
- Step 6. Lift up the heat-sink to remove it. **1**



Attention: Place the heat-sink upside down on a flat surface to prevent thermal grease contaminating other components.

- Step 7. To install the new heat-sink:
- a. Use an alcohol pad to wipe the thermal grease off the CPU.
 - b. Line up the new heat-sink module with the mounting holes on the motherboard.
 - c. Secure the new heat-sink to the motherboard with the screws, making sure to fit the screws in sequence following the numbers printed on the new heat-sink.
 - d. Use the adhesive tape to seal the gap between the heat-sink and system fan.

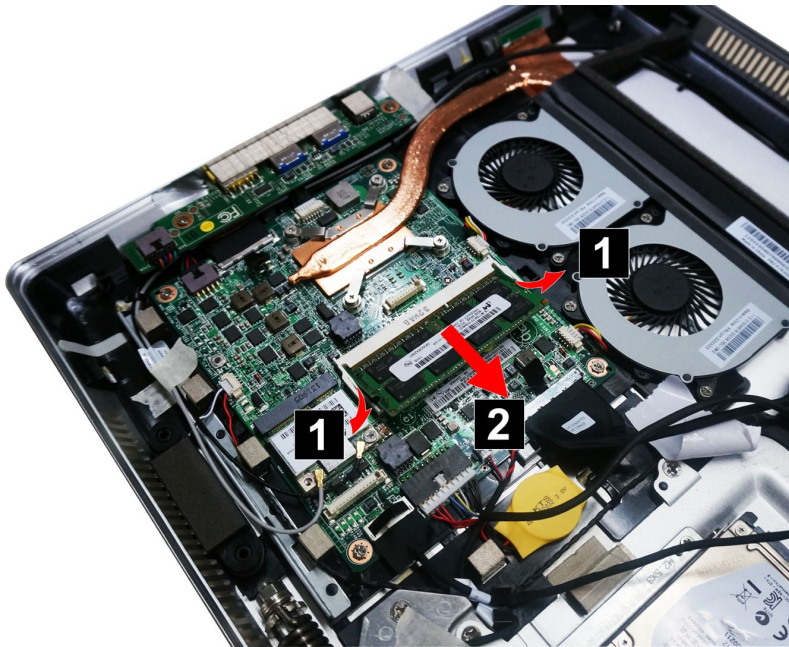
Step 8. Reattach the rear cover and secure it with the screws.

Replacing a memory module

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

To replace a memory module:

- Step 1. Remove any media (disks, CDs, DVDs, 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 rear cover. Refer to “Removing the rear 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. To install the new memory module:
 - a. Align the new memory module with the memory socket, then insert it and push down on the top edge.
 - b. Make sure the latches lock the memory module in place.
- Step 7. Reattach the rear cover and secure it with the screws.

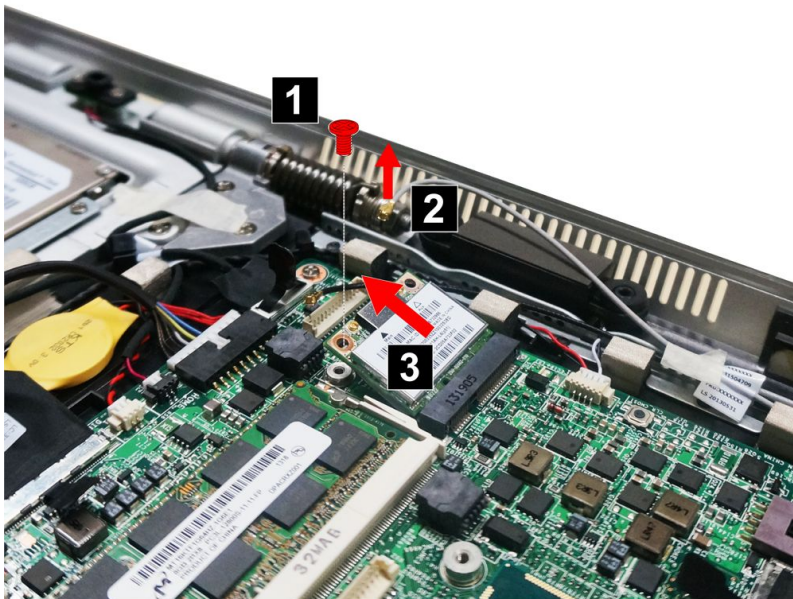
Replacing the Wi-Fi card

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

To replace the Wi-Fi card:

- Step 1. Remove any media (disks, CDs, DVDs, 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 rear cover. Refer to “Removing the rear cover”.
- Step 5. Remove the screw that secures the Wi-Fi card to the motherboard. **1**
- Step 6. Disconnect the antenna and data cables from the Wi-Fi card. **2**
- Step 7. Pull the Wi-Fi card upward to remove it from the socket. **3**



- Step 8. To install the new Wi-Fi card:
 - a. Insert the new Wi-Fi card into the card port and secure it with the screw.
 - b. Connect the antenna cables to the new Wi-Fi card.
- Step 9. Reattach the rear cover and secure it with the screws.

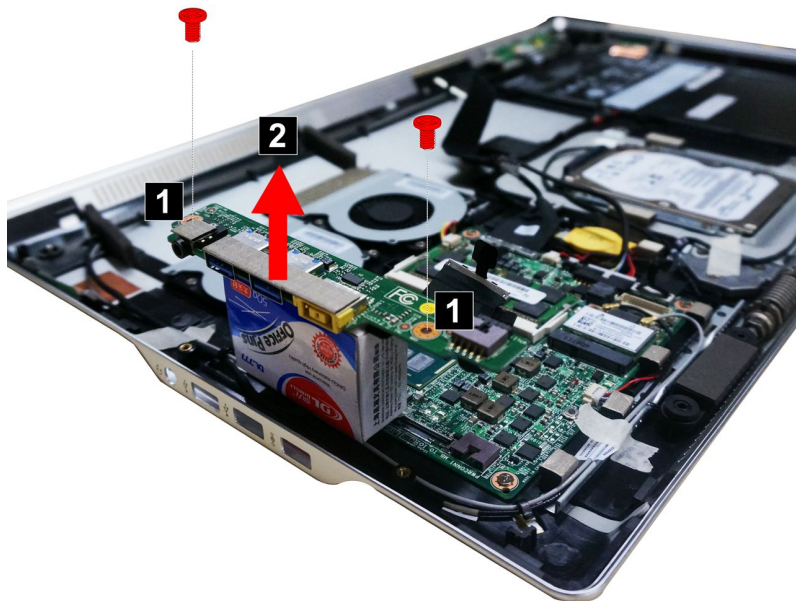
Replacing the I/O board

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

To replace the I/O board:

- Step 1. Remove any media (disks, CDs, DVDs, 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 rear cover. Refer to “Removing the rear cover”.
- Step 5. Disconnect the data cable from the I/O board.
- Step 6. Remove the 2 screws that secure the I/O board to the rear cover. **1**
- Step 7. Slide the I/O board, and then lift up the I/O board to remove it. **2**



- Step 8. To install the new I/O board:
- Line up the I/O board with the mounting holes on the rear cover, then slide the new I/O into position and secure it with the 2 screws.
 - Connect the data cable to the connector on the I/O board.
- Step 9. Reattach the rear cover and secure it with the screws.

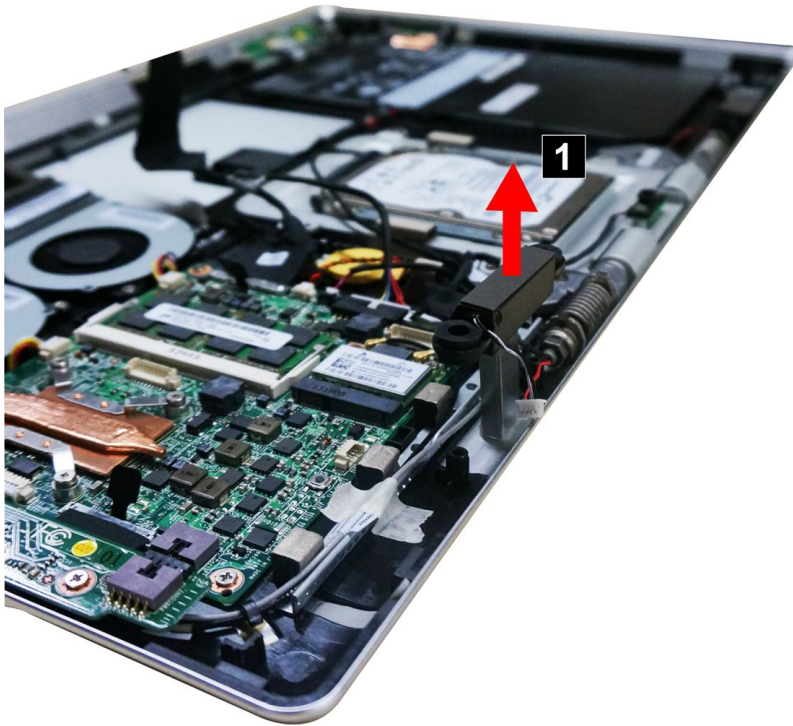
Replacing the speaker system

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

To replace the speaker system:

- Step 1. Remove any media (disks, CDs, DVDs, 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 rear cover. Refer to “Removing the rear cover”.

- Step 5. Disconnect the speaker cable from the connector on motherboard.
- Step 6. Lift up speaker system to remove it. **1**



- Step 7. To install the new speaker system:
- a. Line up the new speaker system with the mounting rubber screws.
 - b. Connect the new speaker cable to the connector on the motherboard.
- Step 8. Reattach the rear cover and secure it with the screws.

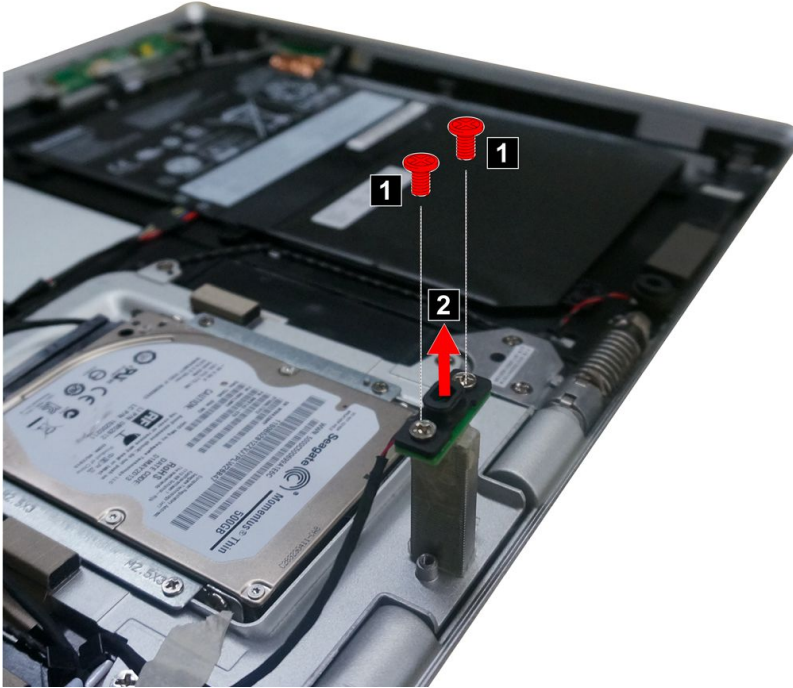
Replacing the Windows function board

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

To replace the power switch board:

- Step 1. Remove any media (disks, CDs, DVDs, 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 rear cover. Refer to “Removing the rear cover”.

- Step 5. Disconnect the Windows function data cable from the connector on the motherboard.
- Step 6. Remove the two screws that secure the Windows function board to the rear cover **1** and lift up the Windows function board to remove it. **2**



- Step 7. To install the Windows function board:
- Line up the holes on the new Windows function board with the mounting holes on the rear cover and secure the new Windows function board with the screws.
 - Connect the data cable to the connector on the motherboard.
- Step 8. Reattach the rear cover and secure it with the screws.

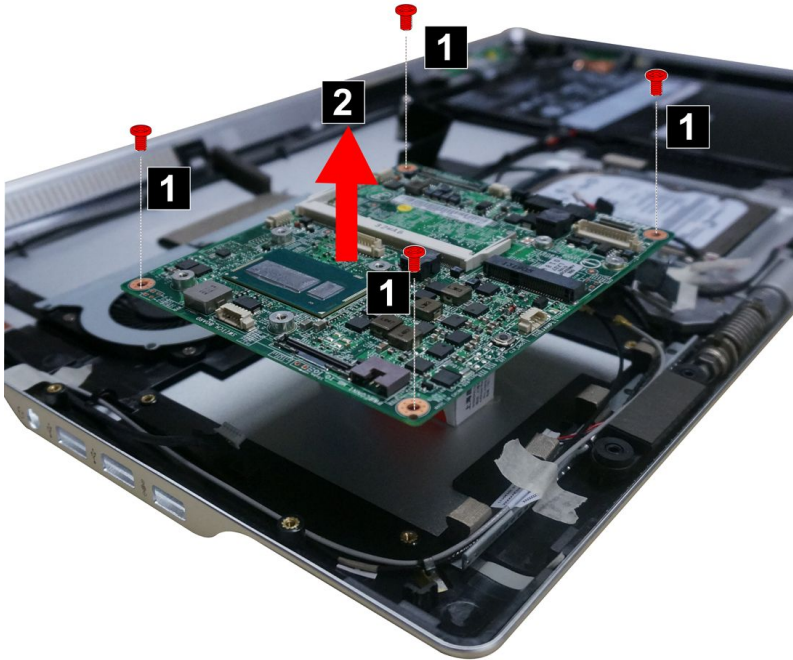
Replacing the motherboard

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

To replace the motherboard:

- Step 1. Remove any media (disks, CDs, DVDs, 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 rear cover. Refer to “Removing the rear cover”.
- Step 5. Remove all memory modules. Refer to “Replacing a memory module”.
- Step 6. Remove the I/O board. Refer to “Replacing the I/O board”.

- Step 7. Remove the heat-sink. Refer to “Replacing the heat-sink”.
- Step 8. Remove the Wi-Fi card. Refer to “Replacing the Wi-Fi card”.
- Step 9. Remove all the cables connected to the motherboard.
- Step 10. Remove the four screws that secure the motherboard to the rear cover **1** and lift it up to remove it. **2**



- Step 11. To install the new motherboard:
- Insert the notched end of the Wi-Fi card into the card port on the new motherboard and secure it with the screw.
 - Connect the antenna cable(s) to the Wi-Fi card.
 - Line up the holes on the new motherboard with the mounting holes on the rear cover and secure the new motherboard with the four screws.
 - Attach the heat-sink, Wi-Fi card, memory modules and I/O board to the new motherboard.
 - Connect all the cables to the new motherboard.
- Step 12. Reattach the rear cover and secure it with the screws.

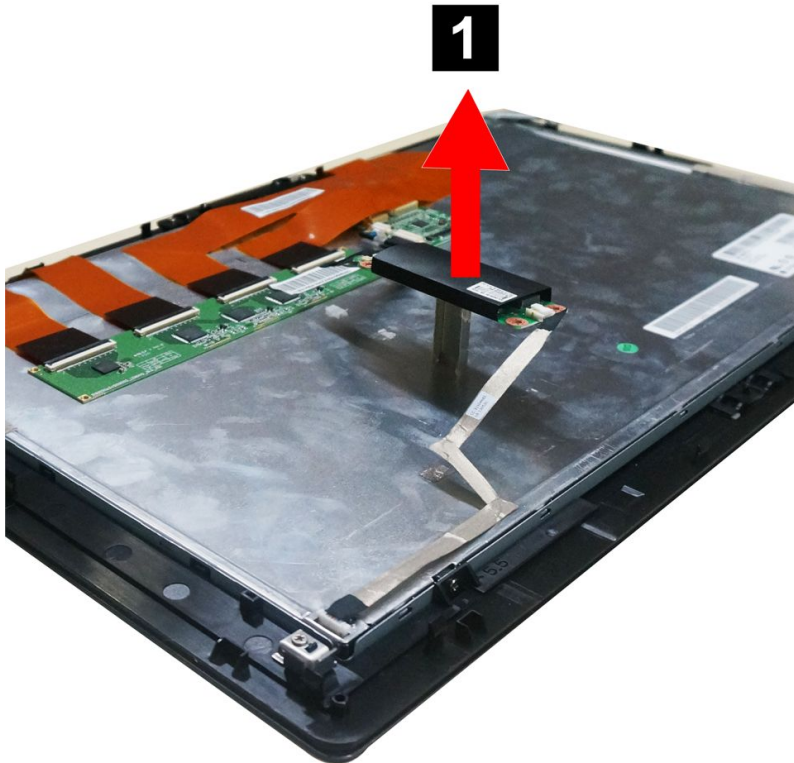
Replacing the converter board

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

To replace the converter board:

- Step 1. Remove any media (disks, CDs, DVDs, 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 rear cover. Refer to “Removing the rear cover”.
- Step 5. Disconnect the two cables from the converter board.
- Step 6. Lift up the converter board to remove it. **1**



- Step 7. To install the new converter board:
- Line up the holes in the new converter board with the mounting marks on the LED panel and attach the new converter board to the LED panel.
 - Connect the two cables to the new converter board.
- Step 8. Reattach the rear cover and secure it with the screws.

Replacing the camera

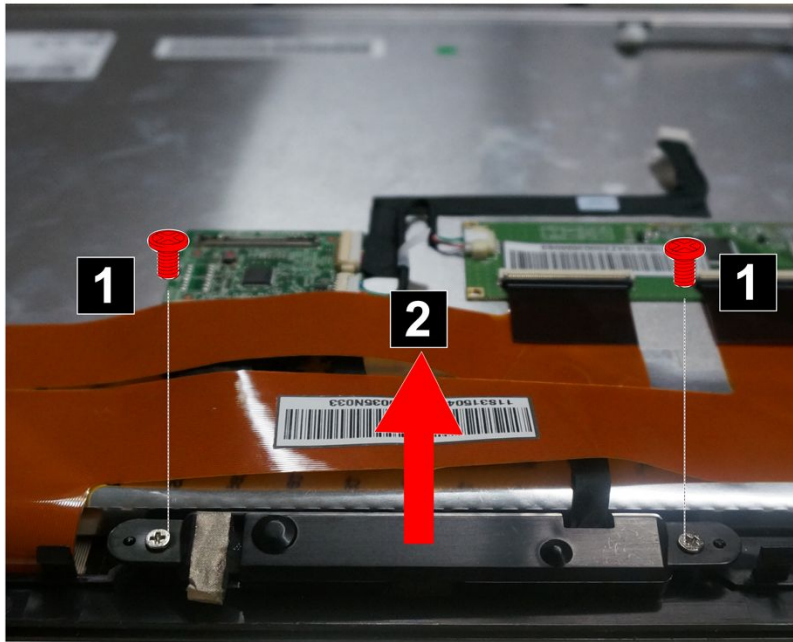
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the rear cover.

To replace the camera:

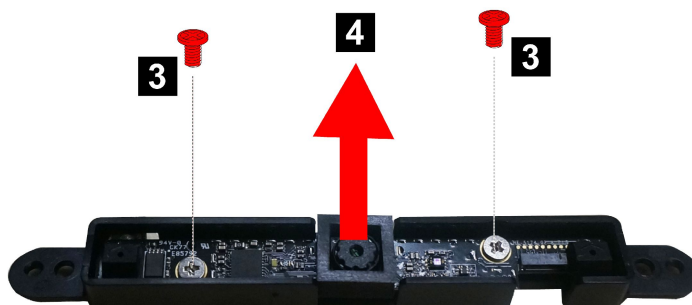
- Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Unplug all power cords from electrical outlets.

- 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 rear cover. Refer to “Removing the rear cover”.

- Step 5. Remove the 2 screws that secure the camera to the front bezel. **1**
- Step 6. Lift up the camera **2** and disconnect the data cable from the camera.



- Step 7. Remove the two screws that secure the camera to the housing **3**, then lift the camera out as shown. **4**



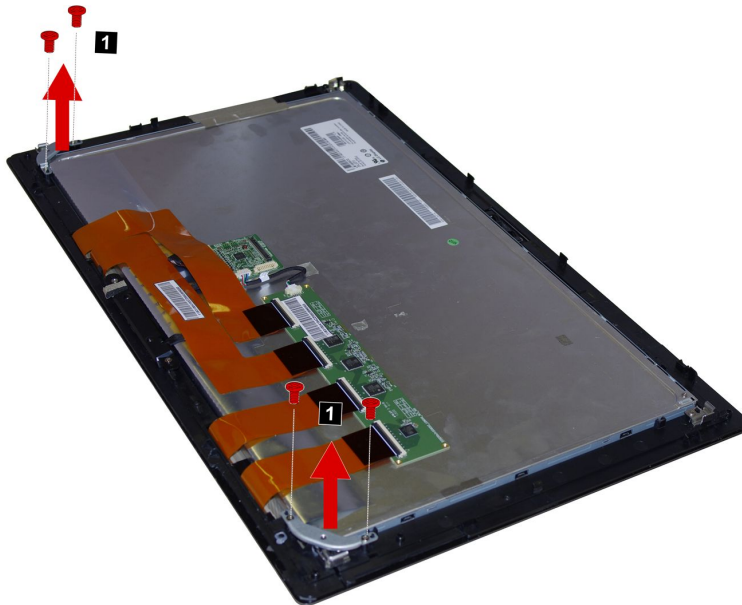
Step 9. Reattach the rear cover and secure it with the screws.

Replacing the LED panel module

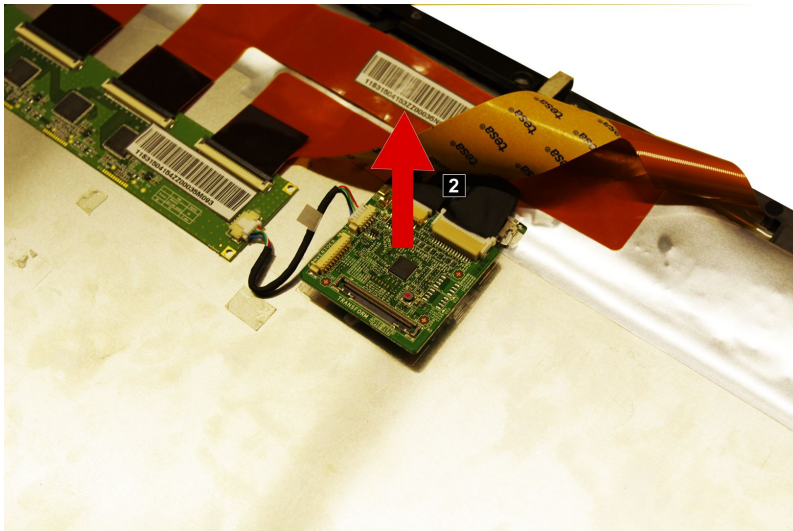
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the rear cover.

To replace the LED panel module:

- Step 1. Remove any media (disks, CDs, DVDs, 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 rear cover. Refer to “Removing the rear cover”.
- Step 5. Remove the converter board and cables. Refer to “Replacing the converter board”.
- Step 6. Remove the camera and housing. Refer to “Replacing the camera”.
- Step 7. Remove the tape that secures the LVDS cable to the connector.
- Step 8. Press the pins to unlock the LVDS cable from the connector on the LED panel, then pull it out.
- Step 9. The LED panel module including: LED panelGlassFront bezelTouch control board
- Step 10. Remove the four screws that secure the front bezel hinge, then lift up the front bezel hinge to remove it. **1**



Step 11. Remove the transform board, LVDS, camera, and touch cable from the LED panel. **2**



Step 12. To install the new the LED panel module:

- a. Connect the LVDS cable to the connector and touch control board.
- b. Reattach the converter board, transform board to the LED panel.
- c. Reattach the camera to the front bezel.
- d. Connect the converter cables to the connectors on both LED panel and converter board.
- e. Connect the LVDS cable to the connectors on both LED panel and transform board.
- f. Connect the touch cable to the connectors on both transform board and touch control board.
- g. Attach the front bezel hinge to the front bezel.

Step 13. Reattach the rear cover and secure it with the screws.

Chapter 9. FRU lists-Flex 20

This chapter lists the information on the field replaceable units (FRUs) for Lenovo Flex 20 All-In-One desktop computer.

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.

Description	Service part number (FRU)	CRU ID
System board		
90003704 for MB FRU W8P	90003704	N
90003703 for MB FRU W8S	90003703	N
90003702 for MB FRU NOK	90003702	N
90003701 for MB FRU W8P	90003701	N
90003700 for MB FRU W8S	90003700	N
90003699 for MB FRU NOK	90003699	N
90003698 for MB FRU W8P	90003698	N
90003697 for MB FRU W8S	90003697	N
90003696 for MB FRU NOK	90003696	N
90003695 for MB FRU W8P	90003695	N
90003694 for MB FRU W8S	90003694	N
90003693 for MB FRU NOK	90003693	N
NOK M ULT 3556U MB	90004377	N
W8S M ULT 3556U MB	90004378	N
W8P M ULT 3556U MB	90004379	N
Power supply		
Liteon PA-1900-72IA 90w common adapter®	36200416	1
DELTA ADP-90XD BC 90W common adapter ®	36200415	1
Cables		
MGE 900mm wifi antenna cable_Beta	31504712	N
LS 900mm wifi antenna cable _Beta	31504711	N
MGE 350mm wifi antenna cable_Beta	31504710	N
LS 350mm wifi antenna cable_Beta	31504709	N
MGE140mm Webcam cable	31504708	N

LS 140mm Webcam cable	31504707	N
MGE 230mm 7+15 HDD cable	31504706	N
LS 230mm 7+15 HDD cable	31504705	N
MGE 600mm Power button cable	31504704	N
LS 600mm Power button cable	31504703	N
MGE 160mm MB to Trans cable	31504702	N
LS 160mm MB to Trans cable	31504701	N
MGE 50mm lvds cable	31504700	N
LS 50mm lvds cable	31504699	N
MGE 80mm touch control cable_Mastouch	31504698	N
LS 80mm touch control cable_Mastouch	31504697	N
MGE 80mm touch control cable_LG	31504696	N
LS 80mm touch control cable_LG	31504695	N
MGE 80mm IO board cable	31504694	N
LS 80mm IO board cable	31504693	N
MGE 330mm home key cable	31504692	N
LS 330mm home key cable	31504691	N
MGE 150mm FFC cable	31504690	N
LS 150mm FFC cable	31504689	N
MGE 80mm DC in cable	31504688	N
LS 80mm DC in cable	31504687	N
MGE 200mm converter to panel cable	31504686	N
LS 200mm converter to panel cable	31504685	N
MGE 150mm MB converter cable	31504684	N
LS 150mm MB converter cable	31504683	N
Thermal module		
TS CML3252809A6C Beta CPU HS	31504679	N
AVC SE42000001 Beta CPU HS	31504678	N
Fan		
AVC BAAA0705R5HPOFF Beta CPU FAN	31504677	N
SUNON EG50050S1-C280-S9A Beta CPU FAN	31504676	N
Battery		
sony polymer 4S1P 50WH	31504218	N
Sanyo polymer 4S1P 48.48WH	31504217	N
Touch control board		
LG 19.5" PCT touch CB--Beta	31504154	N
Mastouch 19.5" PCT Touch CB-Beta	31504152	N
Power cord		

US/Canada/Barbados/Belize/Bolivia/Costa Rica/Columbia/Dominican Republic/Ecuador/El Salvador/Guatemala/Haiti/Honduras/Jamaica/ Mexico/Netherlands Antilles/ Nicaragua/ Panama/ Philippines/Peru/Venezuela/ (Thainland)	31033857	1
US/Canada/Barbados/Belize/Bolivia/Costa Rica/Columbia/Dominican Republic/Ecuador/El Salvador/Guatemala/Haiti/Honduras/Jamaica/ Mexico/Netherlands Antilles/ Nicaragua/ Panama/ Philippines/Peru/Venezuela/ (Thainland)	31033858	1
US/Canada/Barbados/Belize/Bolivia/Costa Rica/Columbia/Dominican Republic/Ecuador/El Salvador/Guatemala/Haiti/Honduras/Jamaica/ Mexico/Netherlands Antilles/ Nicaragua/ Panama/ Philippines/Peru/Venezuela/ (Thainland)	31049517	1
Australia/New Zealand	31035397	1
Australia/New Zealand	31049500	1
Australia/New Zealand	31049520	1
Japan	31503423	1
Japan	31503424	1
Japan	31503425	1
UK/Hong Kong/Singapore/ Malaysia/Bahrain/Bangladesh/Botswana/Burma/ Brunei /Cyprus/Ghana/Ireland/Jordan/Kenya/Kuwait/Malta/ Nigeria/Oman/ Qatar/United Arab Emirates/Trinidad and Tobago/Saudi Arabia/Sri Lanka	31035396	1
UK/Hong Kong/Singapore/ Malaysia/Bahrain/Bangladesh/Botswana/Burma/ Brunei /Cyprus/Ghana/Ireland/Jordan/Kenya/Kuwait/Malta/ Nigeria/Oman/ Qatar/United Arab Emirates/Trinidad and Tobago/Saudi Arabia/Sri Lanka	31049496	1
UK/Hong Kong/Singapore/ Malaysia/Bahrain/Bangladesh/Botswana/Burma/ Brunei /Cyprus/Ghana/Ireland/Jordan/Kenya/Kuwait/Malta/ Nigeria/Oman/ Qatar/United Arab Emirates/Trinidad and Tobago/Saudi Arabia/Sri Lanka	31503352	1
Albania/Algeria/Angola/Austria/Azerbaijan/Belarus/Belgium/Bosnia/Bulgaria/Croatia//Cambodia/Cote d'Ivoire/Czech/Estonia/Egypt/Finland/France/Georgia/Germany/ Greece/Herzegovina/Hungary/Indonesia/Iceland/Kazakhstan/Kyrgyzstan/Laos/Latvia/ Lebanon/Lithuani	31035332	1
Albania/Algeria/Angola/Austria/Azerbaijan/Belarus/Belgium/Bosnia/Bulgaria/Croatia//Cambodia/Cote d'Ivoire/Czech/Estonia/Egypt/Finland/France/Georgia/Germany/ Greece/Herzegovina/Hungary/Indonesia/Iceland/Kazakhstan/Kyrgyzstan/Laos/Latvia/ Lebanon/Lithuani	31049497	1
Albania/Algeria/Angola/Austria/Azerbaijan/Belarus/Belgium/Bosnia/Bulgaria/Croatia//Cambodia/Cote d'Ivoire/Czech/Estonia/Egypt/Finland/France/Georgia/Germany/ Greece/Herzegovina/Hungary/Indonesia/Iceland/Kazakhstan/Kyrgyzstan/Laos/Latvia/ Lebanon/Lithuani	31049518	1
India/(Bangladesh/Sri Lanka)	31035395	1
India/(Bangladesh/Sri Lanka)	31503353	1
Italy/ Chile/Libya	31039104	1
Italy/ Chile/Libya	31049504	1
Italy/ Chile/Libya	31503359	1
Brazil	31035828	1
Brazil	31049505	1
Brazil	31503357	1
LA (High Voltage) Argentina, Paraguay, Uruguay	31039100	1
LA (High Voltage) Argentina, Paraguay, Uruguay	31049507	1
LA (High Voltage) Argentina, Paraguay, Uruguay	31503356	1

Denmark	31039101	1
Denmark	31049503	1
Denmark	31503360	1
Switzerland/Liechtenstein	31039103	1
Switzerland/Liechtenstein	31049508	1
Switzerland/Liechtenstein	31503361	1
Israel	31039107	1
Israel	31049502	1
Israel	31503362	1
Taiwan	31038885	1
Taiwan	31049499	1
Taiwan	31503354	1
Korea	31039106	1
Korea	31049498	1
Korea	31503358	1
South Africa/Macao/Namibia/Nepal/Pakistan/Swaziland /Uganda	31039105	1
South Africa/Macao/Namibia/Nepal/Pakistan/Swaziland /Uganda	31049501	1
South Africa/Macao/Namibia/Nepal/Pakistan/Swaziland /Uganda	31503355	1
Accessories		
E-dice China USA UK Germany	31504730	1
E-dice 2nd	31504621	1
Lenovo E-dice	31502702	1
Striker	20002641	1
Joystick	20002640	1
Speaker		
Ouxun(GGEC)Beta 1.5w Speaker	25213867	N
Keyboard & Mouse		
Liteon SK-8861(CH) 2.4G KB Only-Silver8	25210752	N
Liteon SK-8861(SA) 2.4G KB Only-Silver8	25210744	N
Liteon SK-8861(SL) 2.4G KB Only-Silver8	25210656	N
Liteon SK-8861(ES) 2.4G KB Only-Silver8	25210654	N
Liteon SK-8861(IT) 2.4G KB Only-Silver8	25210653	N
Liteon SK-8861(Nordic) 2.4G KB Only-S8	25210652	N
Liteon N70 2.4G mouse+D for S Silk JP	25210202	N
Liteon SK-8861(JP) 2.4G KB Only-Silver8	25210201	N
Liteon SK-8861(CS-SK) 2.4G KB Only-S8	25210200	N
Liteon SK-8861(RU) 2.4G KB Only-Silver8	25210199	N
Liteon SK-8861(US-EU) 2.4G KB Only-S8	25210198	N
Liteon SK-8861(BE-EN) 2.4G KB Only-S8	25210197	N
Liteon SK-8861(US-IN) 2.4G KB Only-S8	25210196	N

Liteon SK-8861(TH) 2.4G KB Only-Silver8	25210195	N
Liteon SK-8861(LA) 2.4G KB Only-Silver8	25210194	N
Liteon SK-8861(EN-FR) 2.4G KB Only-S8	25210193	N
Liteon SK-8861(LA-AR) 2.4G KB Only-S8	25210192	N
Liteon SK-8861(KR) 2.4G KB Only-Silver8	25210191	N
Liteon SK-8861(TW) 2.4G KB Only-Silver8	25210190	N
Liteon SK-8861(US) 2.4G KB only-Silver8	25209812	N
Liteon N70 2.4G mouse+D for Silver Silk	25209297	N
Liteon SK-8861(DE) 2.4G KB only-Silver8	25209296	N
Liteon SK-8861(FR) 2.4G KB only-Silver8	25209295	N
Liteon SK-8861(GB) 2.4G KB only-Silver8	25209294	N
Liteon SK-8861(US-EU) 2.4G KB-Silver8	25209232	N
Liteon SK-8861(BE-EN) 2.4G KB-Silver8	25209231	N
Liteon SK-8861(PT) 2.4G KB-Silver8	25209230	N
Liteon SK-8861(EN-FR) 2.4G KB-Silver8	25209229	N
Liteon SK-8861(JP) 2.4G KB-Silver8	25209228	N
Liteon SK-8861(KR) 2.4G KB-Silver8	25209227	N
Liteon SK-8861(BG) 2.4G KB-Silver8	25209226	N
Liteon SK-8861(HU) 2.4G KB-Silver8	25209225	N
Liteon SK-8861(GR) 2.4G KB-Silver8	25209224	N
Liteon SK-8861(FR) 2.4G KB-Silver8	25209223	N
Liteon SK-8861(IL) 2.4G KB-Silver8	25209222	N
Liteon SK-8861(IT) 2.4G KB-Silver8	25209221	N
Liteon SK-8861(SL) 2.4G KB-Silver8	25209220	N
Liteon SK-8861(ES) 2.4G KB-Silver8	25209219	N
Liteon SK-8861(TR) 2.4G KB-Silver8	25209218	N
Liteon SK-8861(DE) 2.4G KB-Silver8	25209217	N
Liteon SK-8861(CH) 2.4G KB-Silver8	25209216	N
Liteon SK-8861(SA) 2.4G KB-Silver8	25209215	N
Liteon SK-8861(LA-AR) 2.4G KB-Silver8	25209214	N
Liteon SK-8861(LA) 2.4G KB-Silver8	25209213	N
Liteon SK-8861(Nordic) 2.4G KB-Silver8	25209212	N
Liteon SK-8861(GB) 2.4G KB-Silver8	25209211	N
Liteon SK-8861(RU) 2.4G KB-Silver8	25209210	N
Liteon SK-8861(US-IN) 2.4G KB-Silver8	25209209	N
Liteon SK-8861(CS-SK) 2.4G KB-Silver8	25209208	N
Liteon SK-8861(TH) 2.4G KB-Silver8	25209207	N
Liteon SK-8861(TW) 2.4G KB-Silver8	25209206	N
Liteon SK-8861(US-MY) 2.4G KB-Silver8	25209205	N
Liteon SK-8861(US) 2.4G KB-Silver8	25209204	N

Liteon SM-8861 Mouse(JP) Silver	25205774	N
Liteon SM-8861 Mouse(MY) Silver	25203608	N
Liteon SM-8861 Mouse(No Battery) Silver	25203607	N
Liteon SM-8861(WW) Mouse Silver	25203606	N
Camera		
AZW 720P RT 9712 Beta CAM	20200500	N
CCY 720P VC 9712 Beta CAM	20200499	N
Bison 720P VC 9712 Beta CAM	20200498	N
Wireless LAN card		
Liteon WB335 1x1BGN+BT4.0 HMC	20200437	N
Liteon WB222 2x2ABGN+BT4.0 HMC	20200225	N
Cbt BCM943142HM 1x1BGN+BT4.0 HMC	20200222	N
Hard Disk Drive		
KahunaV 500G(8G MLC)ST500LM000 HDD-LH	16200420	N
WD5000LPVT-08G33T1 7mm 5.4K rpm 500G HDD	16200264	N
Seagate ST500LT012 5400RPM 7MM 500G HDD	16200211	N
Hitachi HTS545050A7E380 5400RPM 500G HDD 7mm	16200067	N
Boards		
MSI Beta power switch board MP	11202011	N
MSI Beta windows board MP	11202008	N
MSI Beta transform board MP	11202005	N
MSI Beta IO board MP	11202002	N
IO board	11201941	N
Memory Module		
1-100943 M471B1G73DB0-YK0 8GB D3L-1600S RAM-HF	1100943	N
M471B5173DB0-YK0 4GB D3L-1600S RAM-HF	1100942	N
M471B1G73QH0-YK0 8GB D3L-1600S RAM-HF	1100907	N
M471B5173QH0-YK0 4GB D3L-1600S RAM-HF	1100906	N
RamaxeI Elp_R J4208EBBG-GN-F 4GB D3L-1600S RAM	1100640	N
Hynix HMT451S6AFR8A-PB	1100638	N
M471B5273DH0-YK0	1100637	N
Elp_R J4208EBBG-GN-F 8GB D3-1600S RAM	1100636	N
MT16KTF1G64HZ-1G6E1	1100635	N
HMT41GS6AFR8A-PB	1100634	N
M471B1G73BH0-YK0	1100633	N
LCD Touch Module		
BETA LCD Touch Module for LG	888015672	N
BETA LCD Touch Module for Mastouch	888015673	N
Mechanicals		
Beta Back Cover	90203929	N

Beta Hinge	90203930	N
Beta Hinge Cover	90203931	N
Beta Hinge Lock	90203932	N
AVC Beta Rubber-foot2	31504911	N
AVC Beta Windows key	31504910	N
AVC Beta rubber key	31504909	N
AVC Beta bracket for Lock	31504908	N
AVC Beta bracket for camera	31504907	N
AVC Beta bracket for HDD	31504906	N
AVC Beta rear-cover	31504725	N

Chapter 10. 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.

Advanced configuration and power interface (ACPI) BIOS

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

Automatic Power-On features

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

- **Wake Up on Alarm:** You can specify a date and time at which the computer will be turned on automatically. This can be either a single event , a daily event or a weekly event.
- **Wake Up on LAN:** This feature allows LAN adapter card to wake the System.