



ideacentre All-In-One 520 (27 inch) Computer Hardware Maintenance Manual

Machine Types: F0D0 [AIO 520-27 IKL/Energy Star]



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Chapter 1. About this manual

This manual contains service and reference information for Lenovo All-In-One 520 series 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 lb) 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 non-conductive 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)

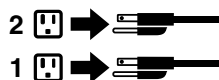
CAUTION:

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 All-In-One 520

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. Re-type the password to confirm, then press the **Enter** key. If you typed the password correctly, the password will be installed.

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. Re-type the password to confirm the new password. If you typed the new password correctly, the new password will be installed. A Setup Notice confirming that changes have been saved will be displayed.

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

1. From the **Security** menu, select **Set Administrator Password** and press the **Enter** key.
2. The password dialog box will be displayed. Type the current password and press the **Enter** key.
3. To delete an **Administrator Password**, leave each new password line item blank, then press the **Enter** key. A Setup Notice confirming that changes have been saved will be displayed.
4. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
5. 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. Re-type the password to confirm. If you typed the password correctly, the password will be installed.

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. Re-type the password to confirm the new password. If you typed the new password correctly, the new password will be installed. A Setup Notice confirming that changes have been saved will be displayed.

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

1. From the **Security** menu, select **Set Power-On Password** and press the **Enter** key.
2. The password dialog box will be displayed. Type the current password and press the **Enter** key.
3. To delete the **Power-On Password**, leave each new password line item blank, then press Enter. A Setup Notice confirming that changes have been saved will be displayed.
4. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
5. 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 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 Mode	When this 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 cannot be accessed.
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 Device 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.
- b. Select IDE/AHCI Mode: Device driver support is required for AHCI. Depending on how the hard disk image was installed, changing this setting may prevent the system from booting.

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.

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 be caused by the following.

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.

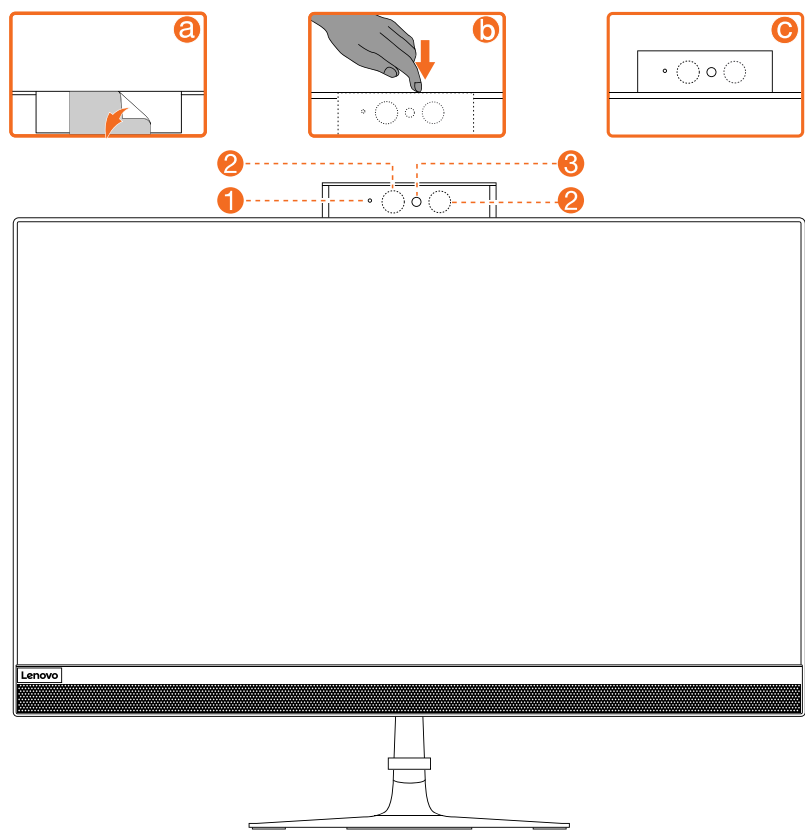
Chapter 7. Locating connectors, controls and components

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

Font view

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

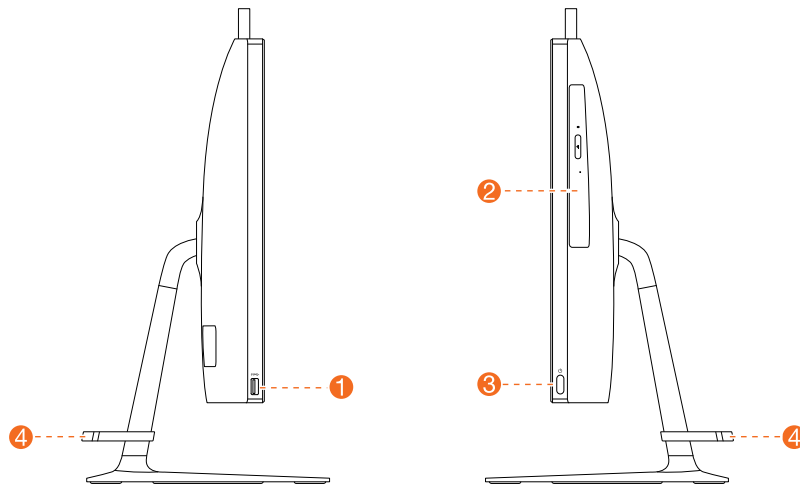
Attention: Be careful not to block any air vents on the computer. Blocked air vents can cause overheating.



1. Camera LED indicator	3. Built-in camera
2. Infrared LEDs (Selected models only)	

Left and right view

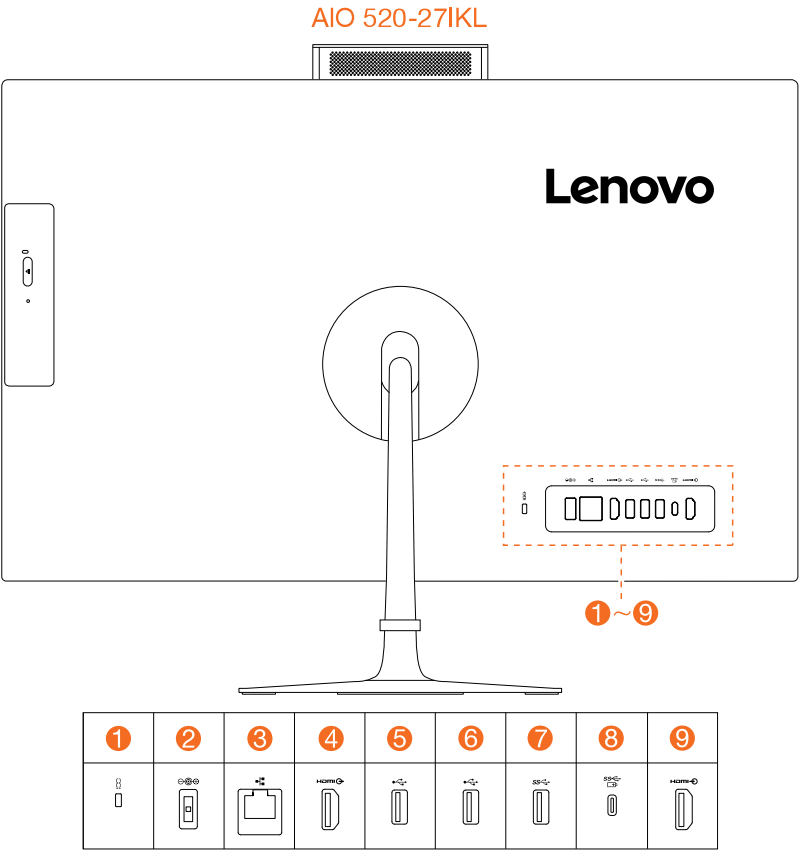
The following illustration shows the location of connectors, controls and components on the left and right side of the computer.



1. USB 3.0 connectors	3. Power button
2. Optical drive (Optional)	4. Cable clip

Rear view

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

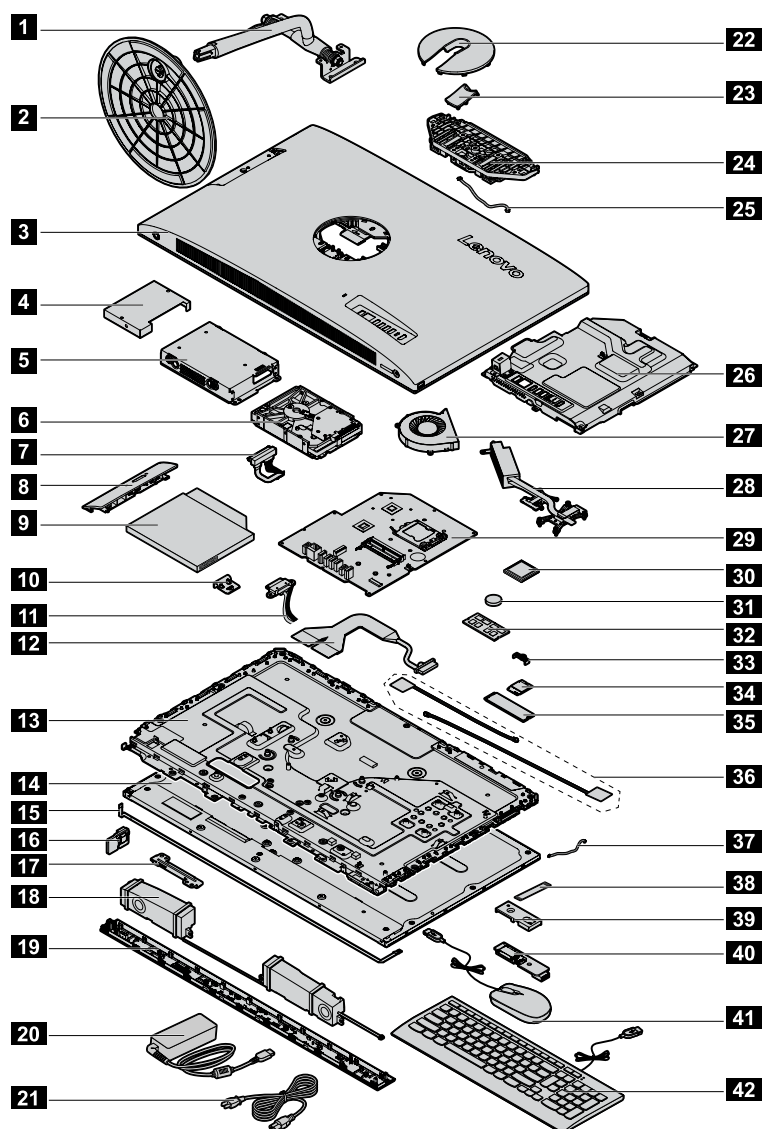


1. Security cable slot	6. USB 2.0 connector
2. Power connector	7. USB 2.0 connector
3. Ethernet connector	8. USB 3.0 Type-C connector/USB power off charging connector
4. HDMI-out connector	9. HDMI-in connector (Optional)
5. USB 2.0 connector	

Hardware components

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

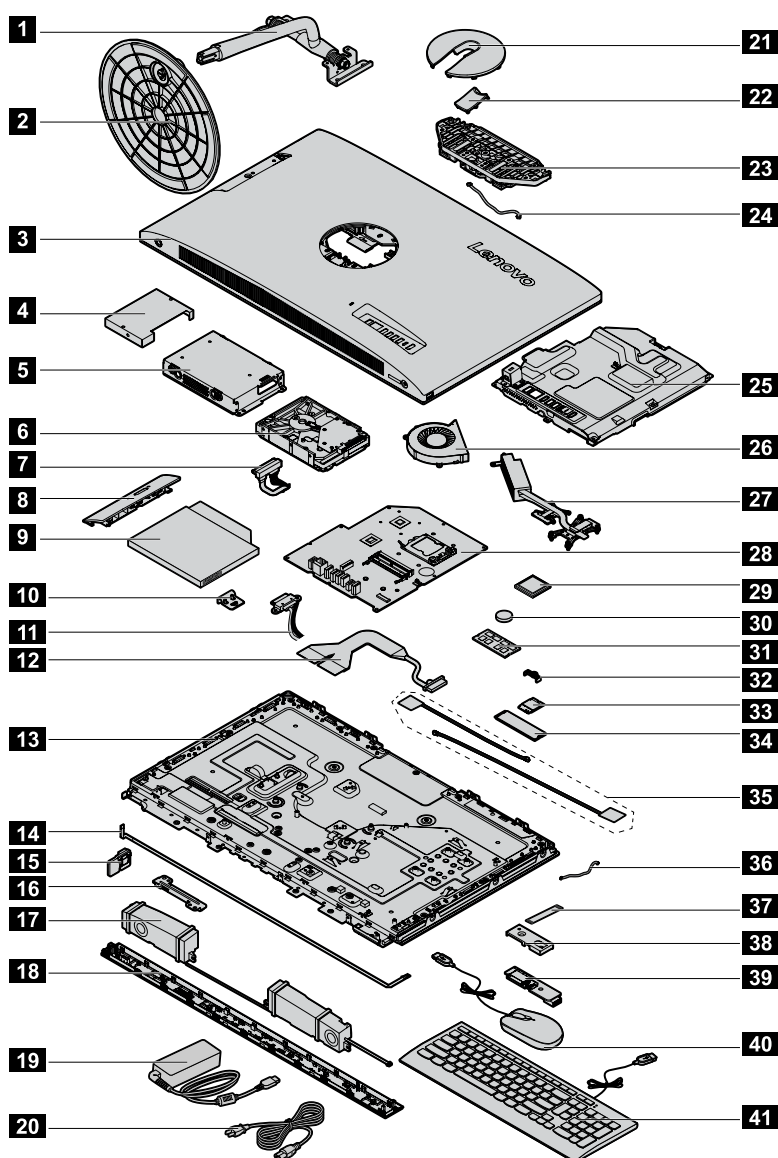
None touch model



1. Stand holder	22. Hinge cover (top)
2. Stand base	23. Hinge cover (bottom)
3. Rear cover	24. Camera module
4. HDD shielding	25. Camera cable (within camera module)
5. HDD bracket	26. Motherboard frame
6. Hard disk drive	27. System fan
7. HDD cable	28. Heatsink
8. ODD bezel	29. Motherboard
9. Optical disk drive	30. CPU
	31. RAM
	32. SATA controller
	33. SATA power cable
	34. SATA data cable
	35. SATA hard disk drive
	36. SATA optical disk drive
	37. SATA power supply
	38. SATA data cable
	39. SATA hard disk drive
	40. SATA optical disk drive
	41. Keyboard
	42. Mouse

10. ODD bracket with latch assembly	31. Battery
11. ODD cable	32. Memory card
12. LVDS cable	33. Wi-Fi cover
13. LCD Main frame	34. Wi-Fi card
14. LCD panel	35. SSD
15. LCD backlight cable	36. RF Antenna cables
16. Power switch board	37. Card reader cable
17. Microphone Module (with bracket)	38. USB and Audio cable
18. Speaker system	39. Side I/O shielding
19. Front deco	40. Side I/O USB board
20. Power adapter	41. Mouse
21. Power cord	42. Keyboard

Touch model



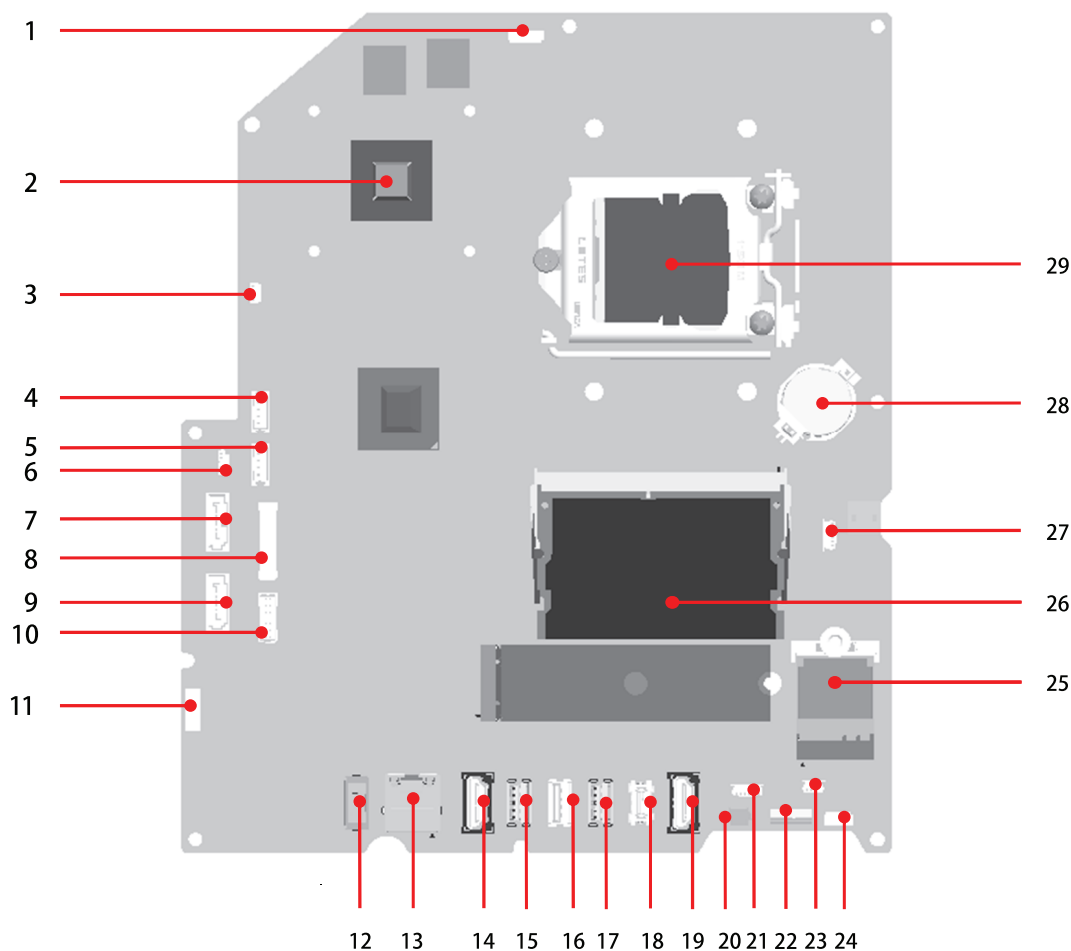
1. Stand holder	22. Hinge cover (bottom)
2. Stand base	23. Camera module
3. Rear cover	24. Camera cable (within camera module)
4. HDD shielding	25. Motherboard frame
5. HDD bracket	26. System fan
6. Hard disk drive	27. Heatsink
7. HDD cable	28. Motherboard
8. ODD bezel	29. CPU
9. Optical disk drive	30. Battery
10. ODD bracket with latch assembly	31. Memory card
11. ODD cable	32. Wi-Fi cover

12. LVDs cable	33. Wi-Fi card
13. LCD panel module	34. SSD
14. LCD backlight cable	35. RF Antenna cables
15. Power switch board	36. Card reader cable
16. Microphone Module (with bracket)	37. USB and Audio cable
17. Speaker system	38. Side I/O shielding
18. Front deco	39. Side I/O USB board
19. Power adapter	40. Mouse
20. Power cord	41. Keyboard
21. Hinge cover (top)	

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. The following illustration shows the location of connectors and components on the front of the motherboard.

AIO 520-27IKL



1. Camera connector	16. USB 2.0 Connector
2. VGA	17. USB 3.0 Connector
3. System Fan Connector	18. USB 3.0 TypeC Connector
4. ODD Power Connector	19. HDMI—in Connector
5. HDD Power Connector	20. Power FFC Connector
6. Touch Connector	21. Mic Connector
7. ODD SATA Connector	22. I/O FFC Connector
8. LVDS Connector	23. Speaker Connector
9. HDD SATA Connector	24. I/O Cable Connector
10. LVDS Connector	25. WiFi card connector
11. Backlight Connector	26. RAM connector

12. DC-IN Connector	27. Bluetooth connector
13. Ethernet Connector	28. Battery
14. HDMI—out Connector	29. CPU
15. USB 2.0 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. To obtain copies of the Safety and Warranty Guide, go to the Support Web site at: <http://consumersupport.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:

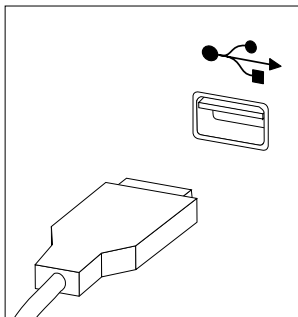
1. Turn off the power to the system and all peripherals.
2. Unplug all power and signal cables from the computer.
3. Place the system on a flat, stable surface.

Replacing the keyboard and mouse

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

To replace the keyboard and mouse:

- Step 1. Remove any media from the drives, shut down the computer, and turn off 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. .
- Step 4. Locate the connector for the keyboard. Refer to Locating connectors, controls and components to locate the various connectors.
- Step 5. Disconnect the defective keyboard cable from the computer and connect the new keyboard cable to the same connector.

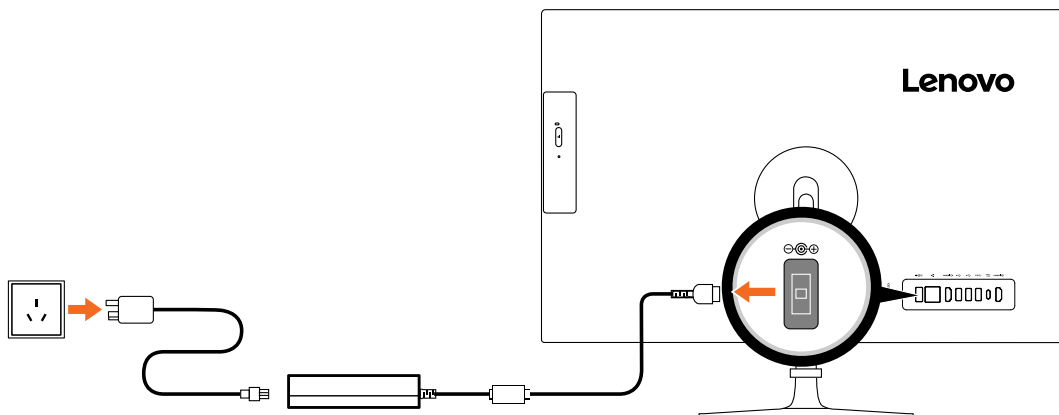


- Step 6. The mouse can be replaced using the same method.

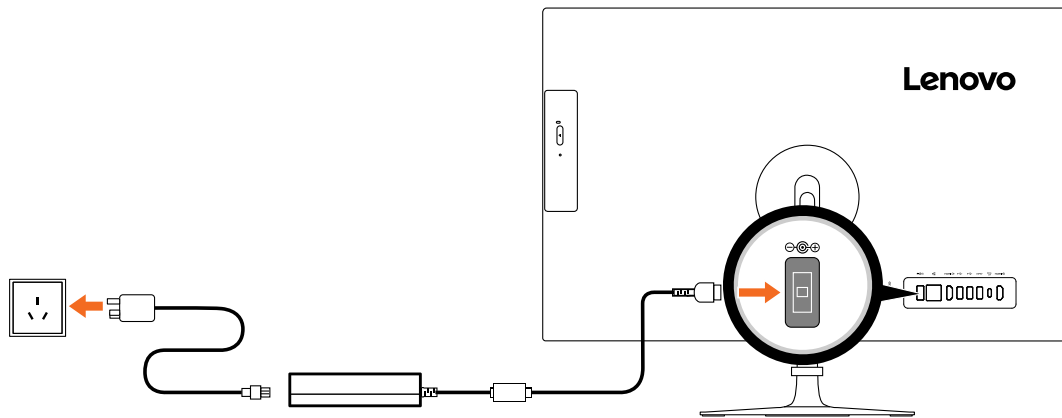
Replacing the adapter

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

- Step 1. Remove any media from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Disconnect the adapter from the connector on the computer, then unplug the adapter from electrical outlet.



Step 3. Connect the new adapter as shown.

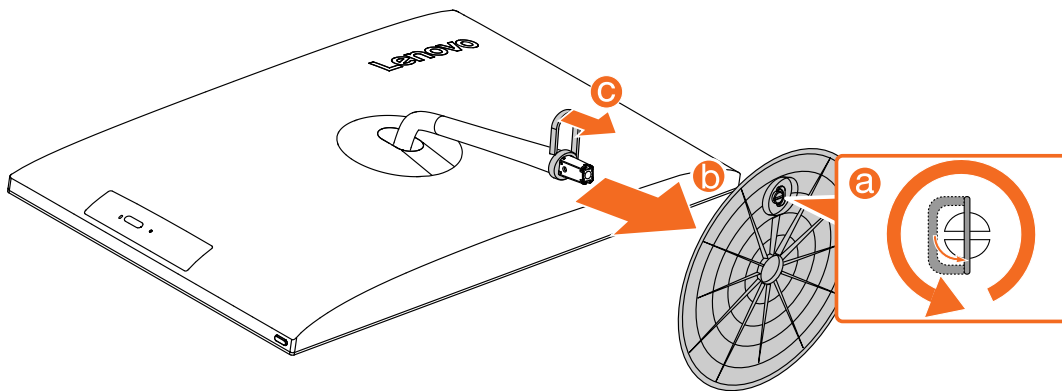


Removing the stand base

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 touch screen from scratches or other damage.

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Twist the hand screw ring counter-clockwise until the stand base is loosened. **a**
- Step 5. Remove the stand base from the stand holder and put it aside. **b**

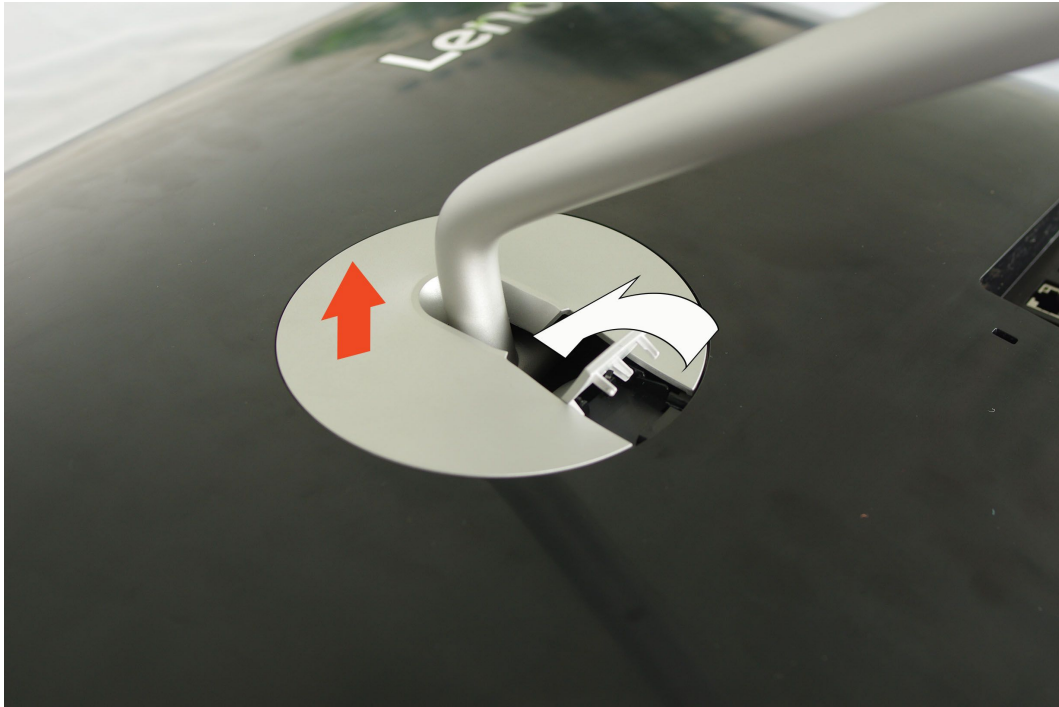


Replacing the optical drive

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 touch screen from scratches or other damage.

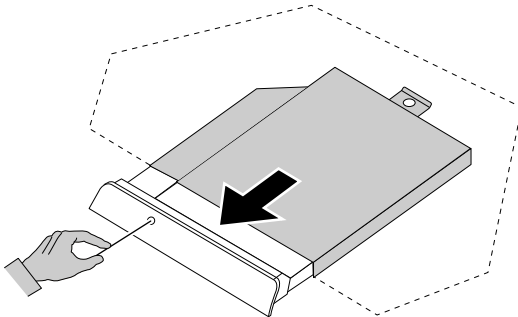
- Step 1. Remove any media from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Unplug all power cords from electrical outlets.
- Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the hinge covers.



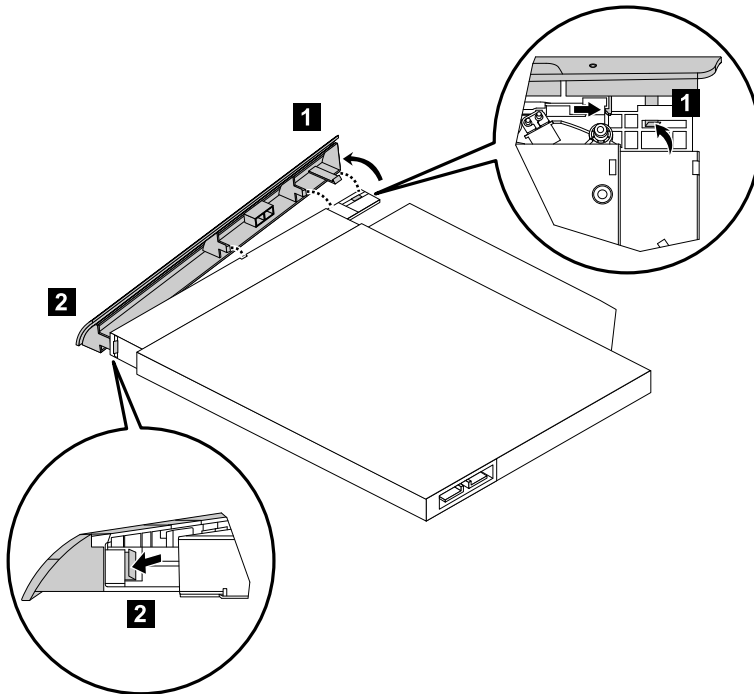
Step 5. Push the optical drive out using the ODD latch assembly.



Step 6. Push a small iron stick (paper clip) into the small hole on the optical drive bezel so that the disk springs out as shown.



Step 7. Remove the optical drive bezel from the optical drive as shown. **1 2**



Step 8. To install the new optical drive:

- a. Insert the tabs on the optical drive bezel into the corresponding holes in the new optical drive, and then push the bezel back into position.
- b. Gently push the disk forward until it snaps into position.
- c. Slide the new optical drive into the drive bay.

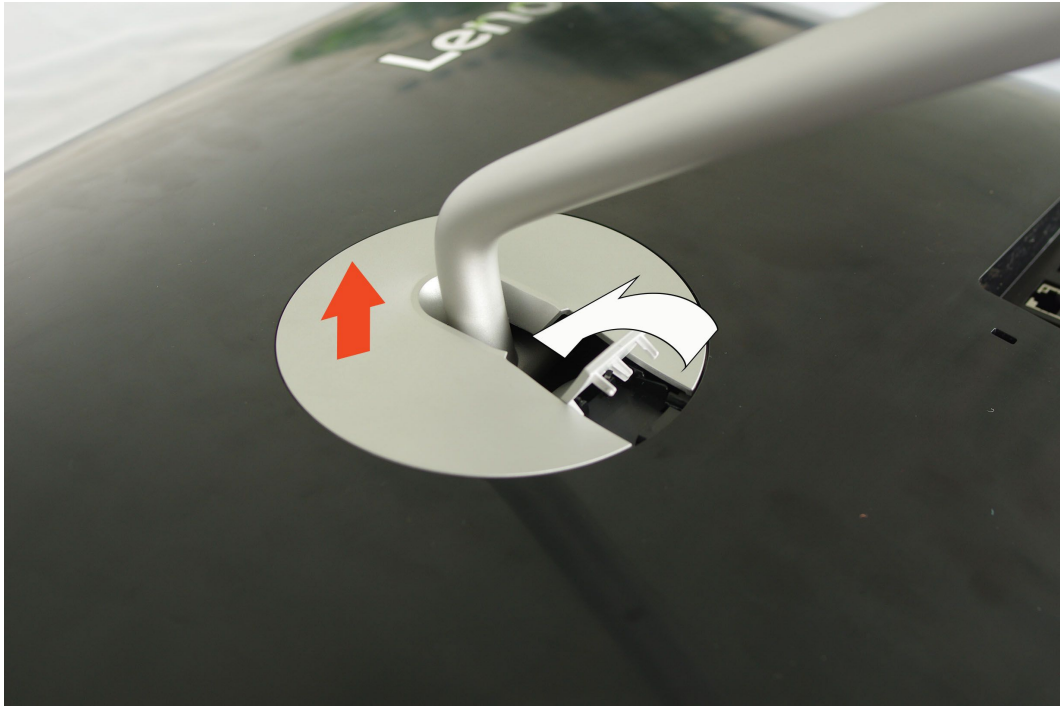
Step 9. Reattach the hinge cover.

Removing the rear cover

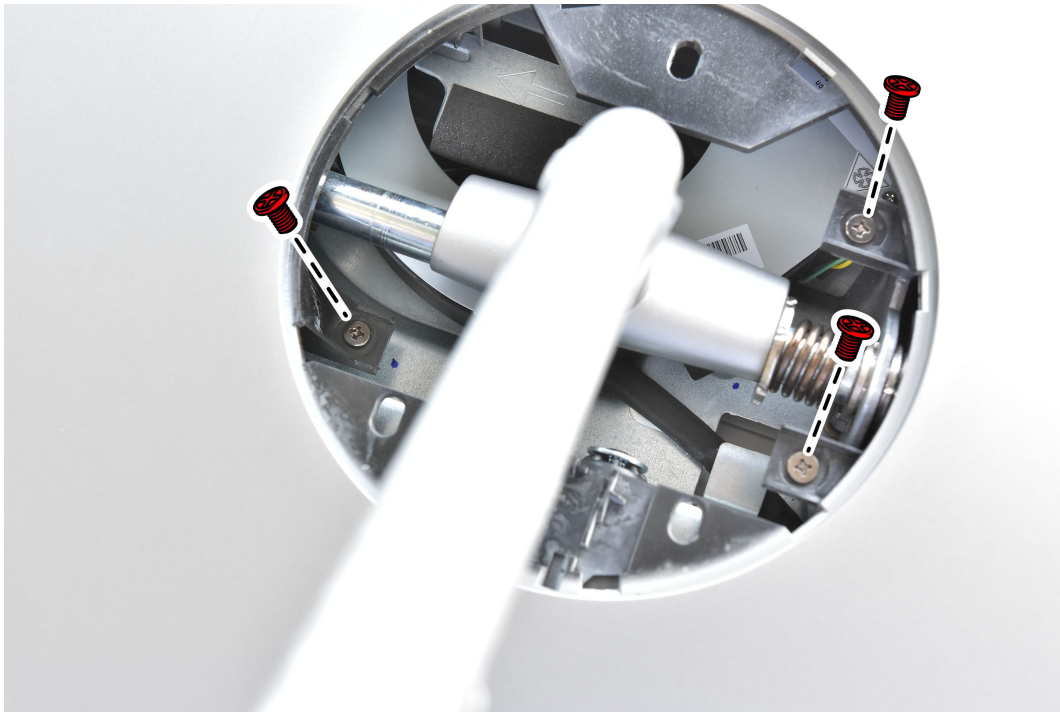
Attention: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

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 touch screen from scratches or other damage.

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the hinge covers.



Step 6. Remove the three screws that secure the rear cover to the chassis.



Step 7. Remove the optical drive. Refer to Replacing the optical drive.

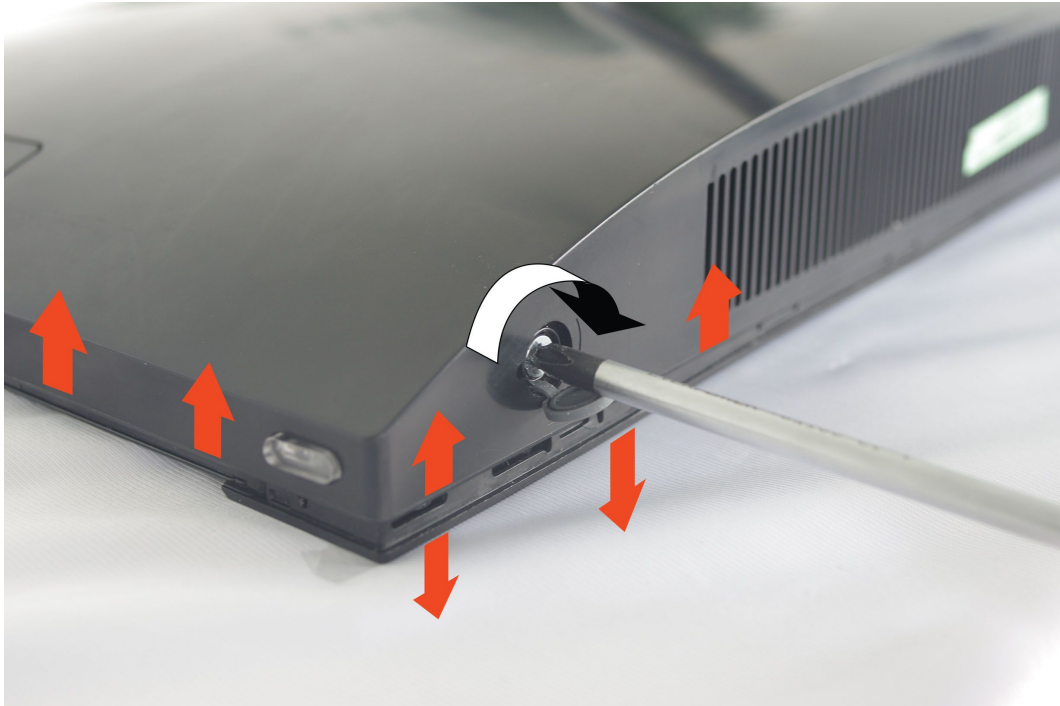
Step 8. Remove the screw that secure the rear cover to the chassis.



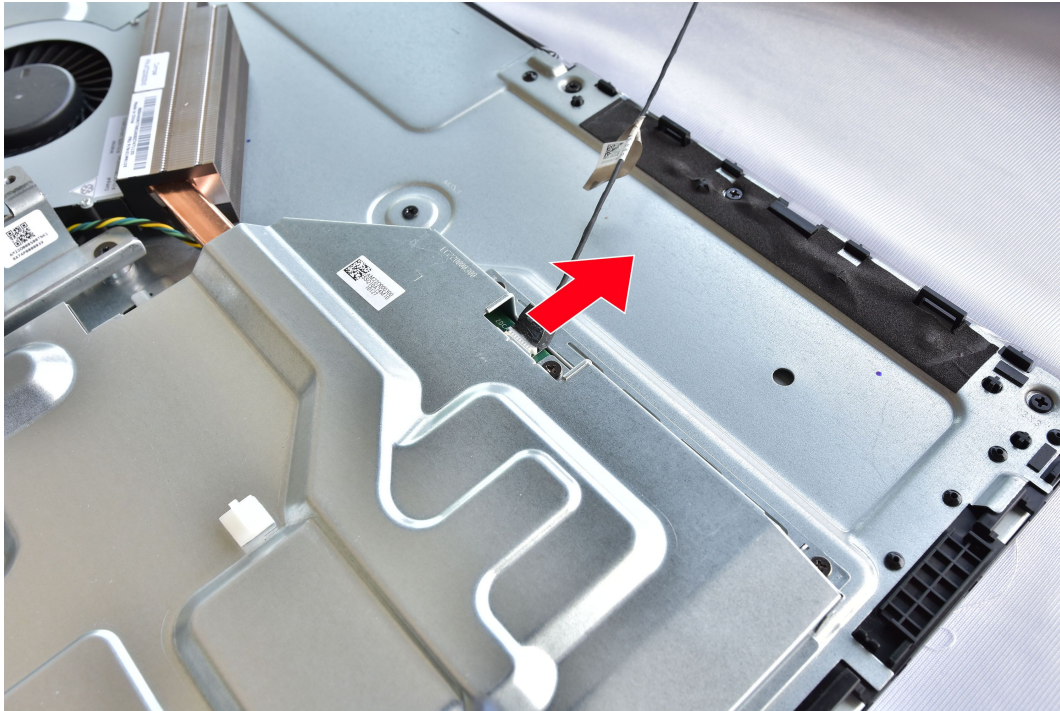
Step 9. Remove the screw cover rubber.



Step 10. Rotate the screwdriver 90 degrees to the right, and then lift up the rear cover from the left side bottom.



Step 11. Unplug the camera cable that connect to the Motherboard.



Step 12. To reattach the rear cover:

- a. Reconnect the cable to the motherboard.
- b. Line up the motherboard frame with the chassis.
- c. Align the rear cover with the chassis.
- d. Press the rear cover until it snaps into position.

Removing the motherboard frame

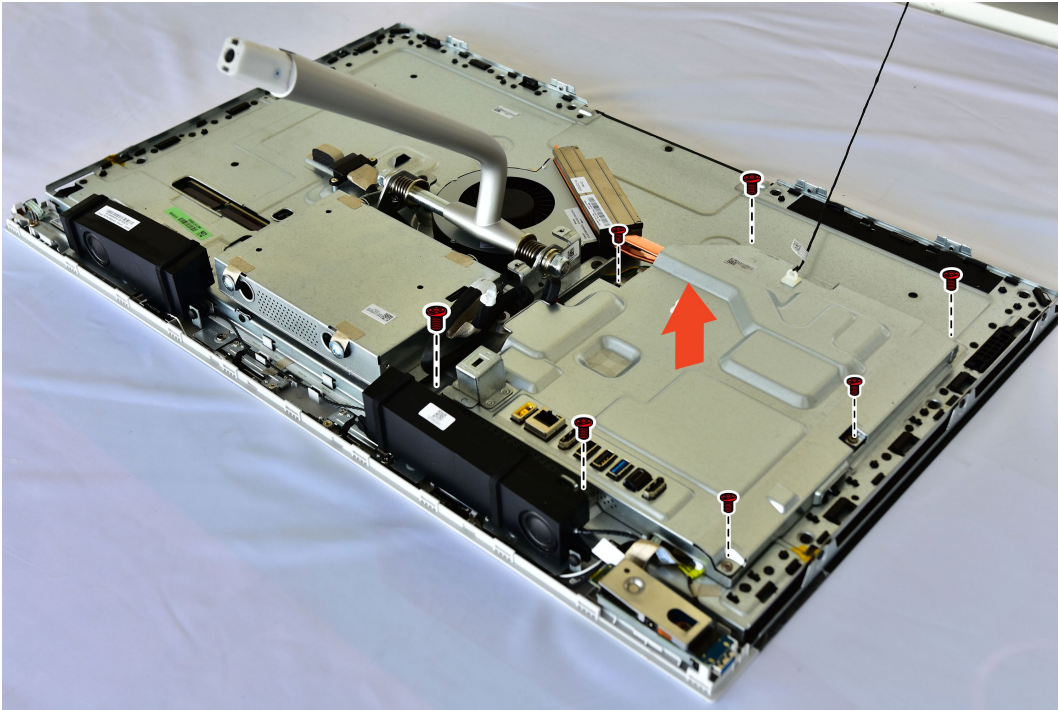
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

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 middle cover:

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.

Step 6. Remove the seven screws that secure the motherboard frame to the chassis.



Step 7. To reattach the motherboard frame:

- a. Line up the motherboard frame with the chassis.
- b. Secure the motherboard frame to the chassis with seven screws.

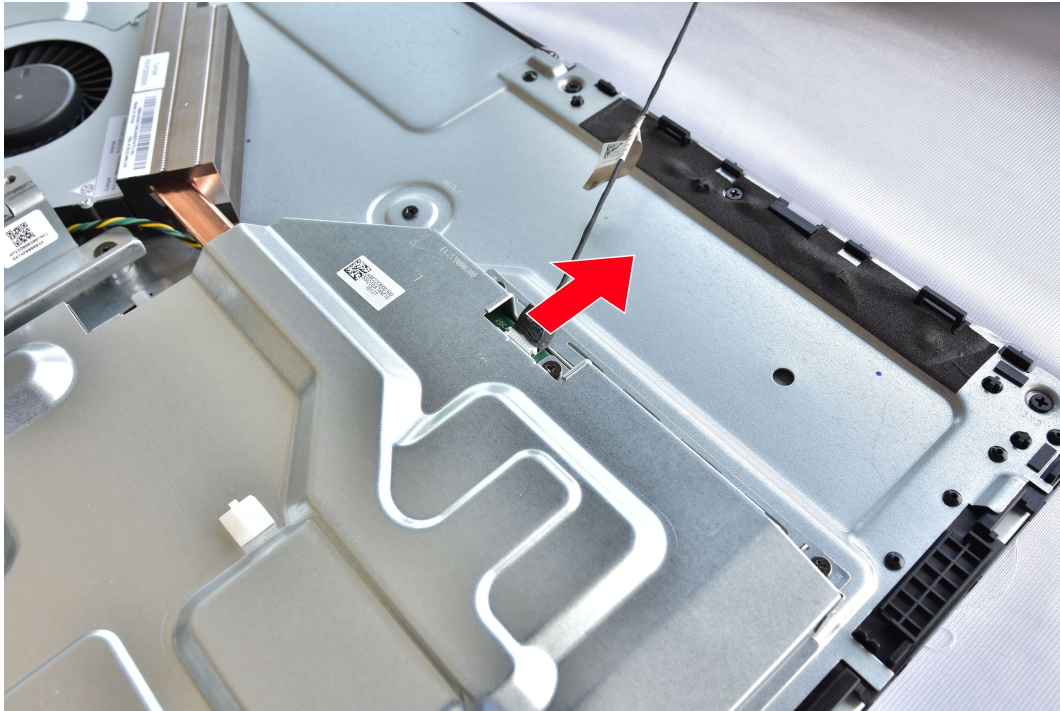
Replacing the camera

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

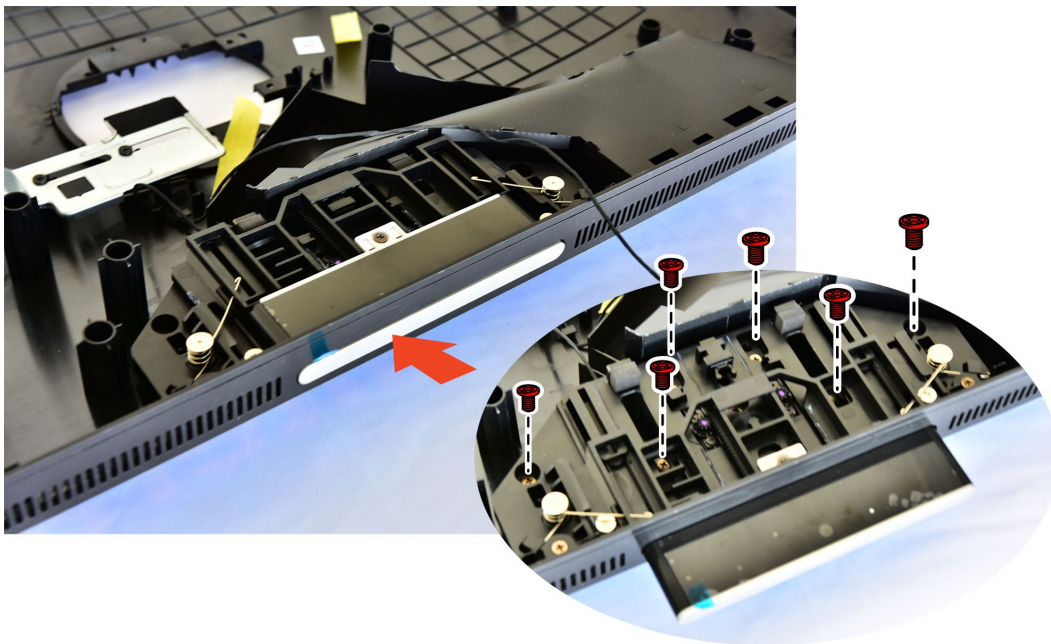
Note: It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

To replace the camera:

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the motherboard frame. Refer to Removing the motherboard frame.
- Step 7. Disconnect the camera cable from the corresponding connector on the motherboard.



Step 8. Press the camera to make it out of the chassis and remove the six screws, and then press the camera into the chassis again and pull out the camera module.



Step 9. To install the new camera module:

- a. Place the new camera module into position, secure the module to the chassis with six screws.
- b. Connect the camera cable to the motherboard.

Step 10. Reattach the motherboard frame, rear cover and stand base.

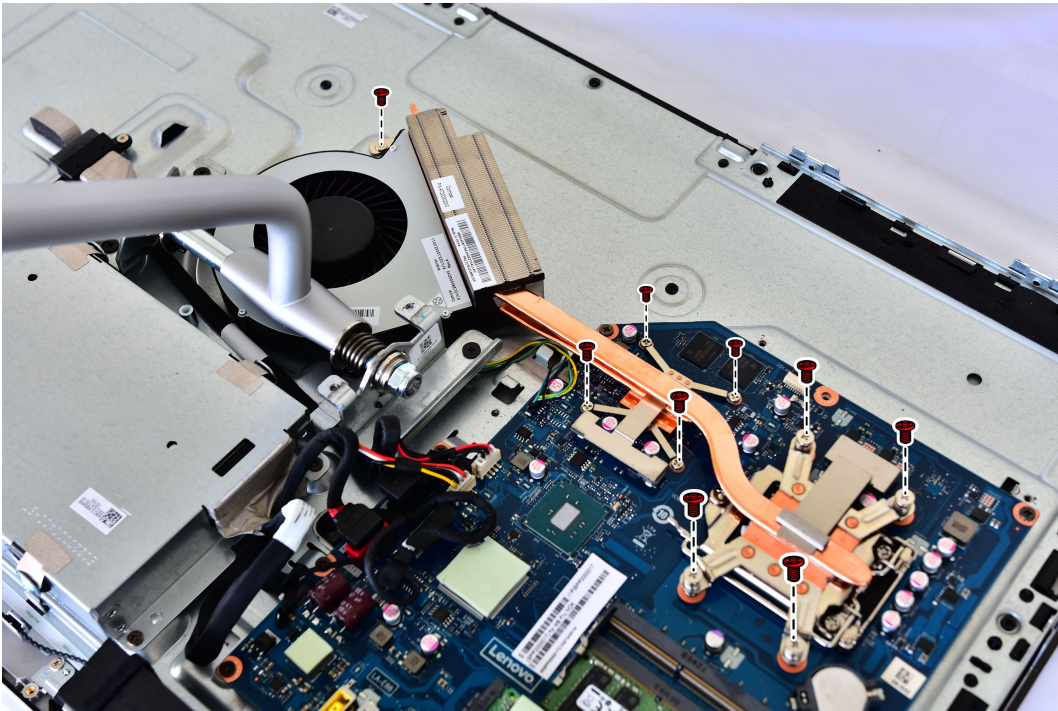
Replacing the heat-sink

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 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the motherboard frame. Refer to Removing the motherboard frame
- Step 7. Remove the camera. Refer to Replacing the camera.
- Step 8. Loosen the nine screws that secure the heat-sink to the motherboard, and then lift up the heat-sink and remove it.



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

Attention: Use an alcohol pad to wipe the thermal grease off the CPU.

- Step 9. To install the new heat-sink:

- a. Position the new heat-sink on the motherboard so that the nine screws are aligned with the holes in the motherboard and wind shielding.
- b. Tighten the screws in numeric order to secure the new heat-sink to the motherboard.

Step 10. Reattach the camera cable, motherboard frame, rear cover, and stand base.

Replacing the hard disk drive

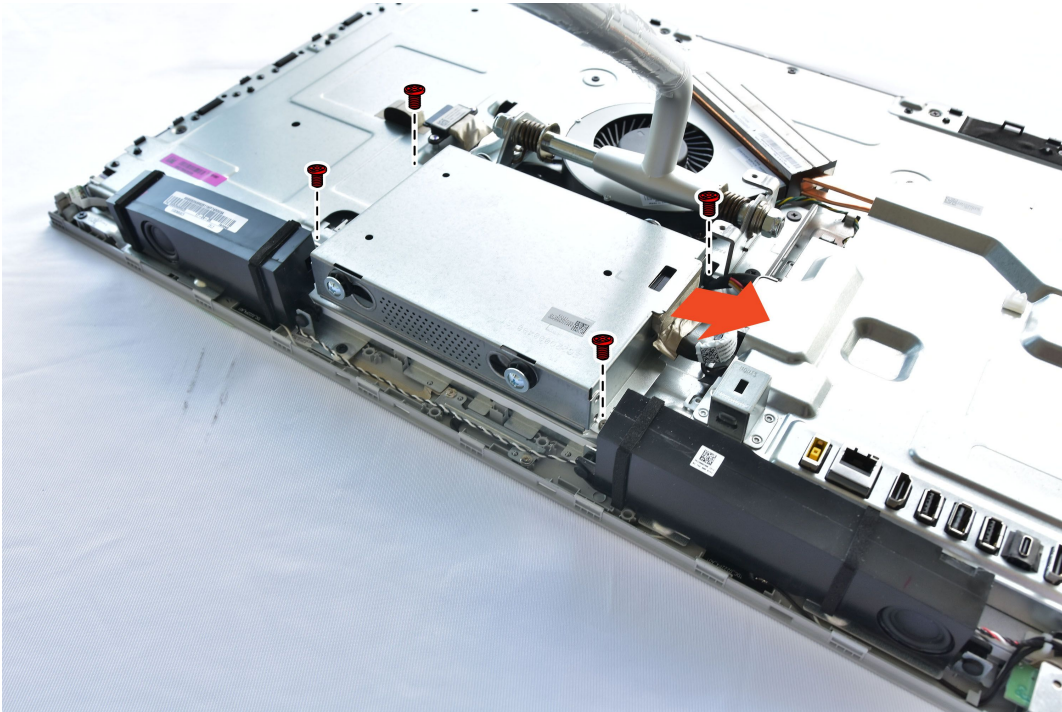
Attention: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

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 touch screen from scratches or other damage.

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.

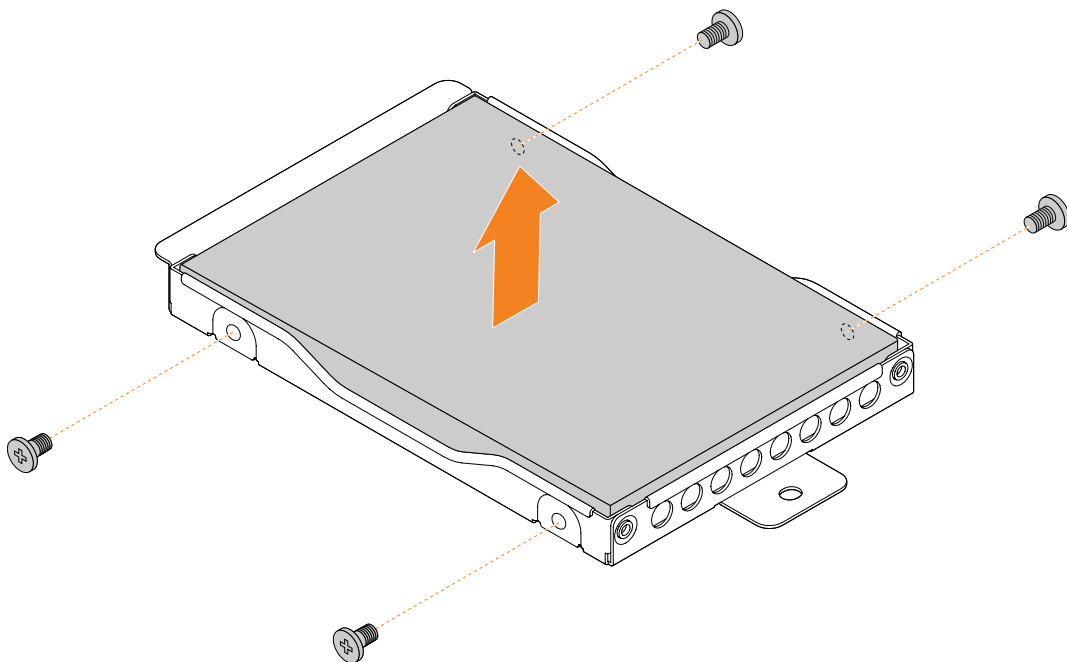
Step 6. Disconnect the signal cable from the hard disk drive.

Step 7. Remove the four screws that secure the hard disk drive to the chassis.



Step 8. Pull the hard disk drive and bracket to left, and then lift them up.

Step 9. Remove the four screws that secure the hard disk drive to the bracket.



Step 10. To install the new hard disk drive:

- a. Line up the new hard disk drive with the bracket and secure it with four screws.
- b. Connect the data and power cables to the new hard disk drive.

- c. Slide the hard disk drive and bracket back into position.

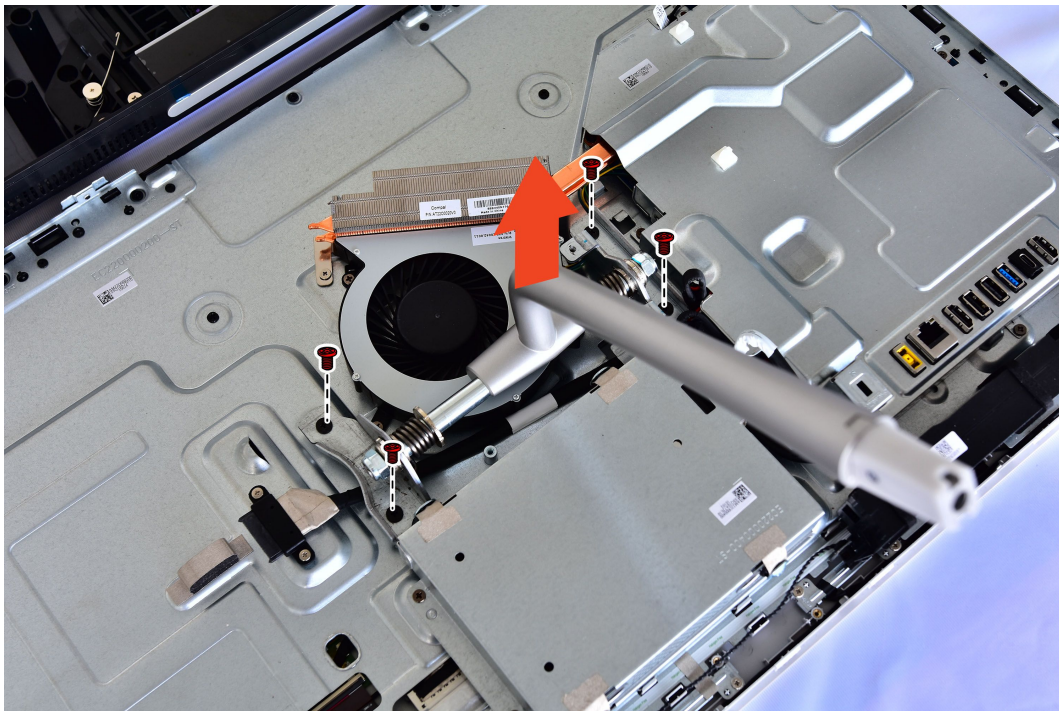
Step 11. Reattach the rear cover and stand base.

Removing the stand holder

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 touch screen from scratches or other damage.

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the four screws that secure the stand holder to the chassis.



- Step 7. To reattach the stand holder:
 - a. Align the holes in the stand holder with the corresponding holes in the chassis.
 - b. Secure the stand holder to the chassis with four screws.

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 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the stand holder. Refer to Removing the stand holder
- Step 7. Remove the motherboard frame. Refer to Removing the motherboard frame
- Step 8. Disconnect the system fan power cable from the motherboard.
- Step 9. Remove the screws that secure the system fan to the chassis.



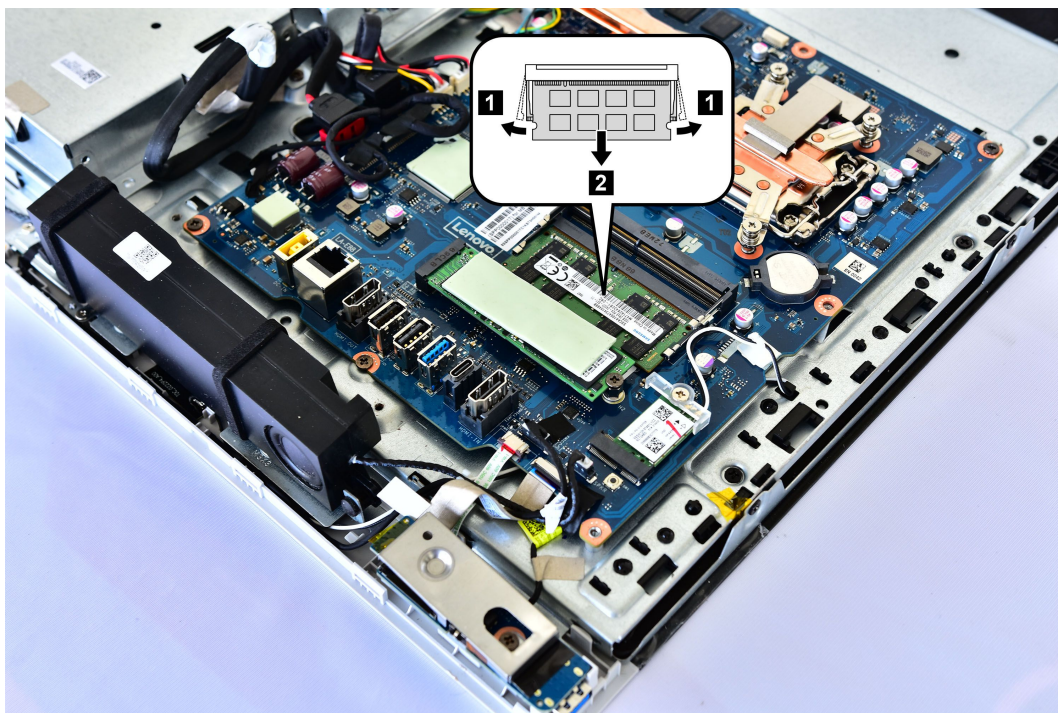
- Step 10. Lift the system fan up to remove it.
- Step 11. To install the new system fan:
 - a. Place the new system fan into position, and then secure it to the chassis with screws.
 - b. Connect the system fan power cable to the connector on the motherboard.
- Step 12. Reattach the motherboard frame, stand holder, rear cover and stand base.

Replacing the memory module

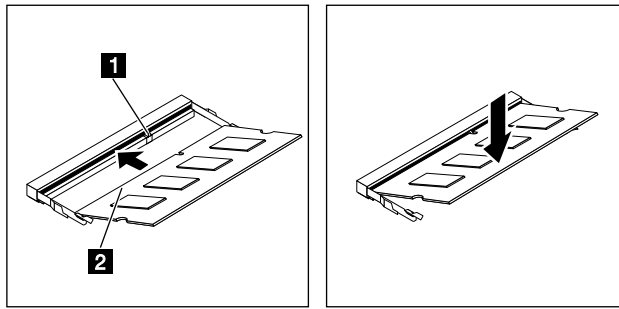
Attention: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

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 touch screen from scratches or other damage.

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the motherboard frame. Refer to Removing the motherboard frame
- Step 7. Push out the latches on both sides of the memory socket to release the memory module and gently pull the memory module upward to remove it from its socket.



- Step 8.
- Step 9. To install the new memory module:
 - a. Position the new memory module over the memory slot. Ensure that the notch **2** on the memory module aligns correctly with the slot key **1** in the memory socket. Press the memory module down until snaps into position.



b. Reinstall the memory cover.

Step 10. Reattach the motherboard frame, rear cover and stand base.

Replacing the solid state 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 touch screen from scratches or other damage.

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the motherboard frame. Refer to Removing the motherboard frame

- Step 7. Remove the screw that secure the solid state drive to the motherboard, and then slide out the solid state drive. **3**



- Step 8. To install the new solid state drive:
- Insert the solid state drive into the slot.
 - Secure the new solid state drive to motherboard with one screw.
 - Reinstall the memory cover.
- Step 9. Reattach the motherboard frame, rear cover and stand base.

Replacing the Wi-Fi 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 Wi-Fi card:

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the motherboard frame. Refer to Removing the motherboard frame

- Step 7. Remove the screw that secures the Wi-Fi card to the motherboard.
- Step 8. Disconnect the antenna cables from the Wi-Fi card.
- Step 9. Pull the Wi-Fi card out of the slot.



- Step 10. To install the new Wi-Fi card:
- Insert the new Wi-Fi card into the Wi-Fi card slot.
 - Connect the antenna cables to the new Wi-Fi card.
 - Secure the new Wi-Fi card to the motherboard with the screw.
- Step 11. Reattach the motherboard frame, rear cover and stand base.

Replacing the side USB board

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 side USB board:

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.

- Step 6. Disconnect the antenna cables from the side USB board.
- Step 7. Remove the screw that secures the side USB board to the bottom frame.
- Step 8. Lift up the side USB board.



- Step 9. To install the new side USB board:
- Insert the new side USB board into the side USB board slot.
 - Secure the new side USB board to the bottom frame with the screw.
 - Connect the antenna cables to the new side USB board.
- Step 10. Reattach the rear cover, and stand base.

Replacing the CPU

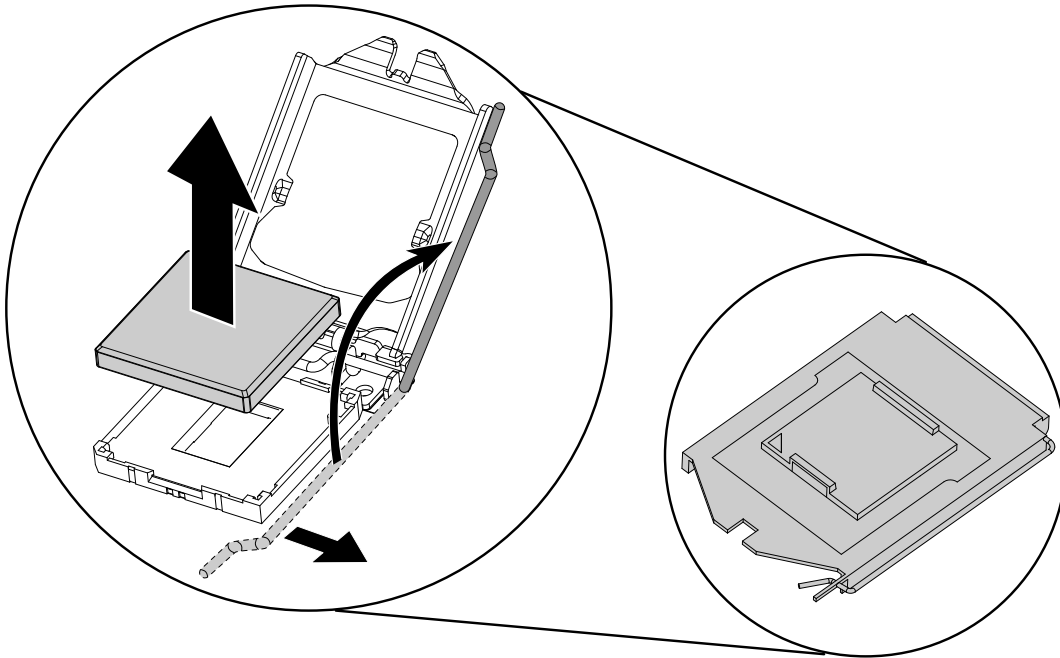
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

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 CPU

- 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 heat-sink. Refer to Replacing the heat-sink.

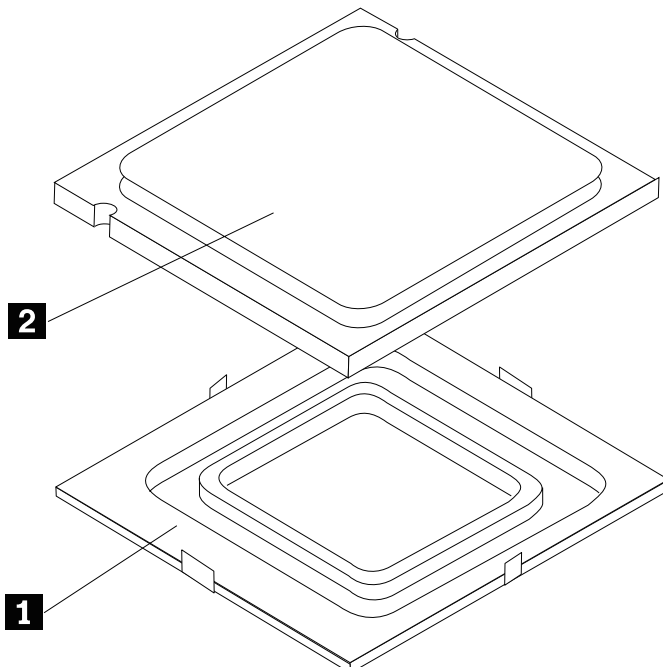
- Step 5. Lift the small handle and open the retainer.
- Step 6. Lift the microprocessor straight up and out of the socket.



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

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

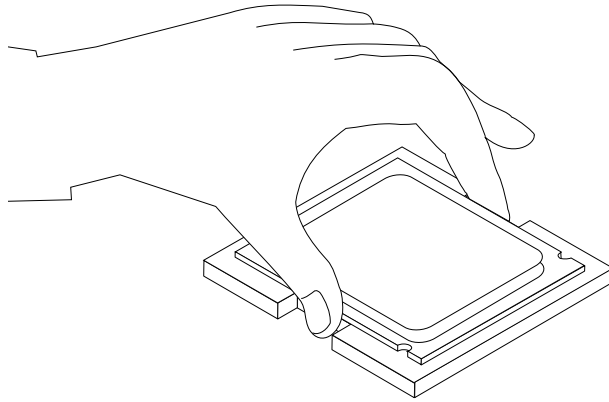
- Step 7. Holding the sides of the microprocessor with your fingers, remove the protective cover **1** that protects the gold contacts on the new microprocessor. **2**



- Step 8. Holding the sides of the microprocessor with your fingers, position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket.

Important: To avoid damaging the microprocessor contacts, keep the microprocessor completely level while installing it into the socket.

- Step 9. Lower the microprocessor straight down into its socket on the motherboard.



- Step 10. To secure the microprocessor in the socket, close the microprocessor retainer and lock it into position with the small handle.
- Step 11. Use a thermal grease syringe to place 5 drops of grease on the top of the microprocessor. Each drop of grease should be 0.03ml (3 tick marks on the grease syringe).
- Step 12. Reattach the heat-sink, EMI cover, middle cover, optical drive, stand holder, foot cover and stand base.

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 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the motherboard frame. Refer to Removing the motherboard frame.
- Step 7. Remove the memory modules. Refer to Replacing the memory module.
- Step 8. Remove the solid state drive. Refer to Replacing the solid state drive.
- Step 9. Remove the heat-sink. Refer to Replacing the heat-sink.
- Step 10. Remove the CPU. Refer to Replacing the CPU.
- Step 11. Remove the Wi-Fi card. Refer to Replacing the Wi-Fi card.

Step 12. Remove all the cables from the motherboard.

Step 13. Remove the four screws that secure the motherboard to the chassis, and then lift the motherboard up to remove it.



Step 14. To install the new motherboard:

- a. Align the four screw holes in the new motherboard with the screw holes in the chassis.
- b. Secure the new motherboard to the chassis with four screws.
- c. Connect all the cables to the new motherboard.

Step 15. Install the following parts to the new motherboard:

- Wi-Fi card
- Heat-sink
- Solid state drive
- Memory module

Step 16. Reattach the motherboard frame, rear cover and stand base.

Replacing the speaker system

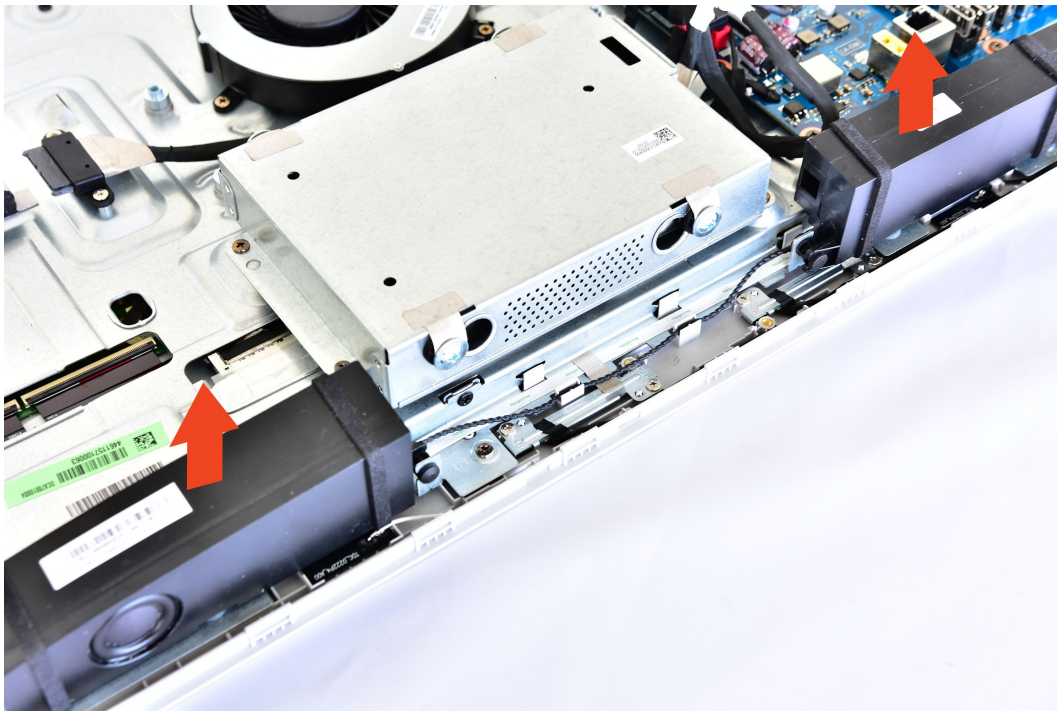
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

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 speaker system:

Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the motherboard frame. Refer to Removing the motherboard frame
- Step 7. Disconnect the speaker system cable from the connector on the motherboard, and then slide the rubber screws of the speaker system out of the screw slots.
- Step 8. Lift up the speaker system to remove it.



- Step 9. To install the new speaker system:
 - a. Slide in the rubber screws of the new speaker system into the screw slots in the chassis.
 - b. Connect the cable to the motherboard.
- Step 10. Reattach the motherboard frame, rear cover and stand base.

Replacing the Microphone module

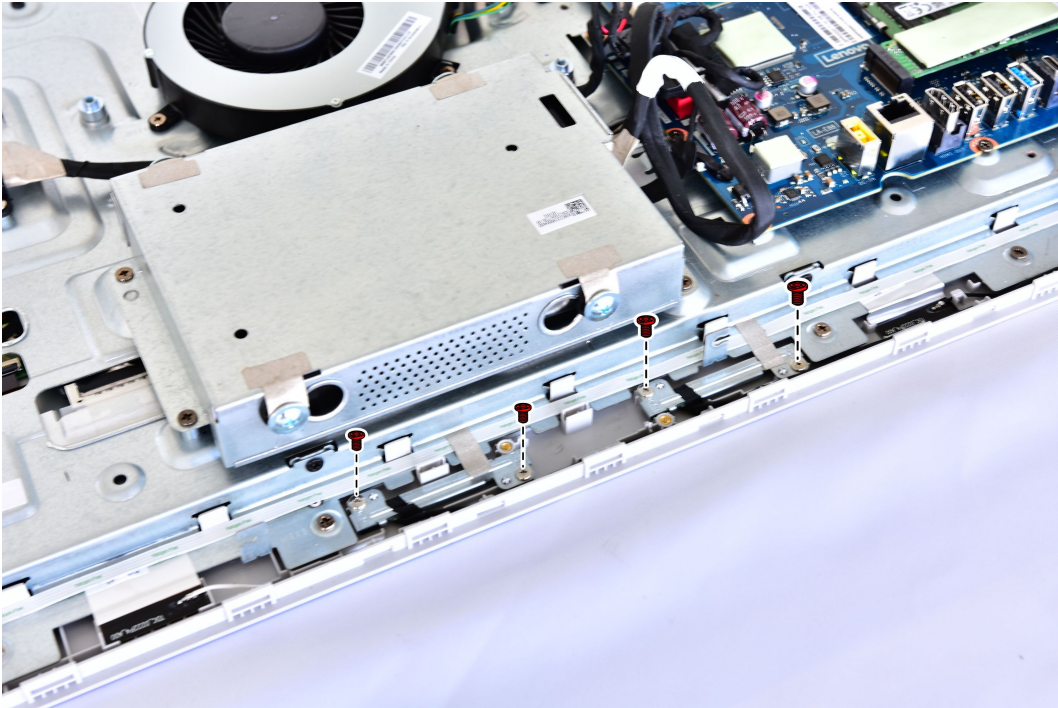
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

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 speaker system:

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the motherboard frame. Refer to Removing the motherboard frame
- Step 7. Remove the speaker system. Refer to Replacing the speaker system
- Step 8. Disconnect the microphone module cable from the connector on the motherboard, and remove the screw that secures the microphone module to the chassis.
- Step 9. Lift up the microphone module to remove it.



- Step 10. To install the new microphone module:
 - a. Secure the new microphone module to the chassis with the screw.
 - b. Connect the cable to the motherboard.
- Step 11. Reattach the speaker system, motherboard frame, rear cover and stand base.

Replacing the power switch module

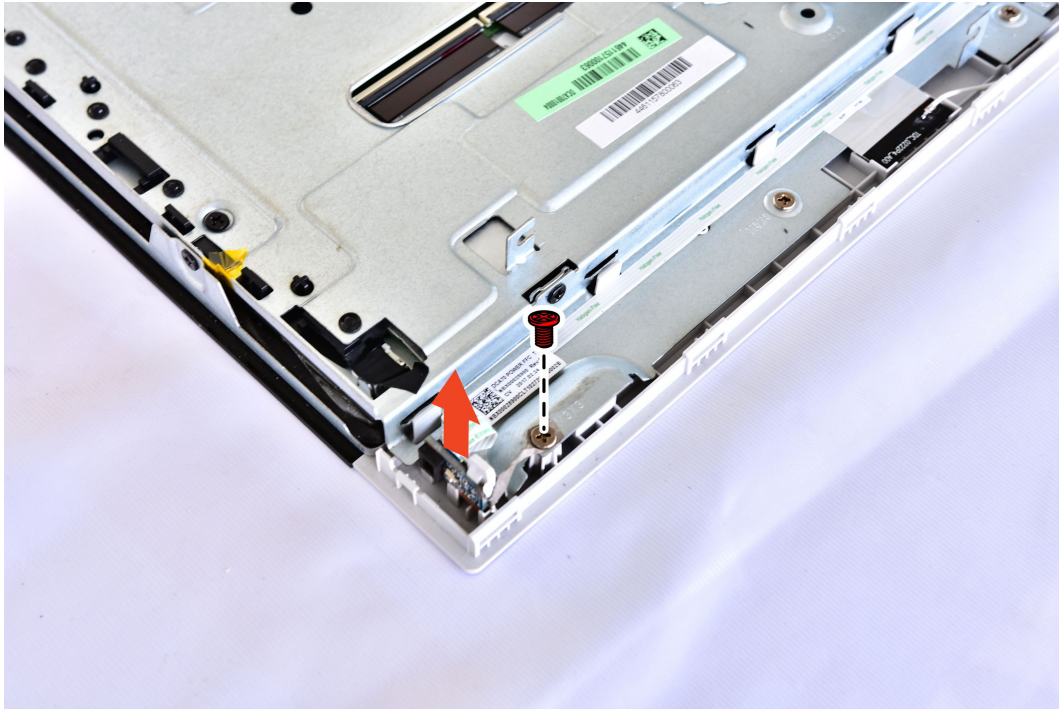
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

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 Wi-Fi card:

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the motherboard frame. Refer to Removing the motherboard frame
- Step 7. Remove the screw that secures the power switch module to the chassis.
- Step 8. Disconnect the cables from the power switch module.
- Step 9. Pull the power switch module out of the slot.



- Step 10. To install the new power switch module:
- Insert the new power switch module into the slot.
 - Connect the antenna cables to the new power switch module.
 - Secure new the power switch module to the chassis with the screw.
- Step 11. Reattach all other removed parts.

Replacing the LCD panel module

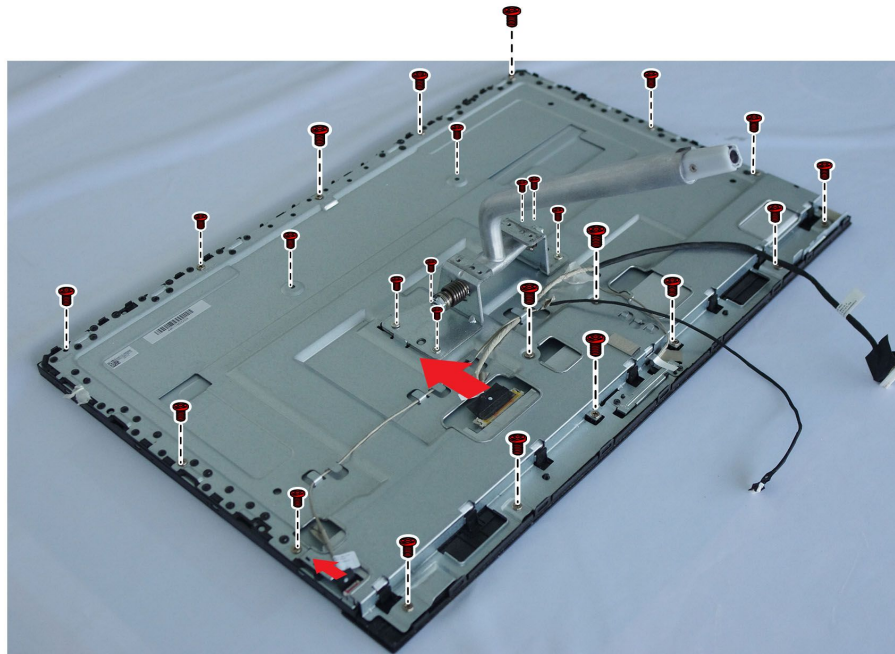
Note: Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

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 LCD panel module:

- Step 1. Remove any media 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 Locating connectors, controls and components to locate the various connectors.
- Step 4. Remove the stand base. Refer to Removing the stand base.
- Step 5. Remove the rear cover. Refer to Removing the rear cover.
- Step 6. Remove the stand holder. Refer to Removing the stand holder.
- Step 7. Remove the motherboard frame. Refer to Removing the motherboard frame
- Step 8. Remove the memory modules. Refer to Replacing the memory module.
- Step 9. Remove the solid state drive. Refer to Replacing the solid state drive.
- Step 10. Remove the heat-sink. Refer to Replacing the heat-sink.
- Step 11. Remove the CPU. Refer to Replacing the CPU.
- Step 12. Remove the motherboard. Refer to Replacing the motherboard.
- Step 13. Remove the LVDS cable and converter cable from the connectors in the LCD panel.
- Step 14. Remove the screws that secure the main frame to the LCD panel.



Step 15. Lift up the main frame to remove it.



Step 16. If your device is a touch computer, disconnect the touch cable from the connector on the motherboard. Otherwise, skip this step. Refer to Locating connectors, controls and components to locate the touch connector.

Step 17. To install the new the LCD panel module:

- a. Align the new LCD panel with the main frame.
- b. Secure the new LCD panel to the main frame with screws.
- c. Connect the touch(touch model only), LVDS and converter cables to the connectors in the new LCD panel.

Step 18. Reattach all other removed parts.

Chapter 9. FRU lists

This chapter lists the information on the field replaceable units (FRUs) for ideacentre All-In-One AIO 520-27 IKL desktop computer.

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

FRU P/N	Description
AC_ADAPTER	
00PC728	AC_ADAPTER,150W,100-240Vac,3P
00PC727	AC_ADAPTER,120W,100-240Vac,3P
ANTENNA	
00XJ121	AIO520-C7 Antenna
BDPLANAR	
01LM149	MB Intel Kaby Lake-S B250,GF940
01LM150	MB Intel Kaby Lake-S B250,GF940
01LM147	MB Kaby Lake-S B250,UMA,HDMI
01LM148	MB Kaby Lake-S B250,UMA,HDMI
CABLE	
00XL352	C.AFFC 20P 80MM M/B-IO/B
00XL353	C.A M/B-LVDS_LG
00XL354	C.A M/B-BK_LG
00XL367	C.AFFC H-CONN SET 220 MB-IO/B
00XL355	C.A MB-TOUCH
00XL366	C.A FFC 20P MB-IO/B TOUCH
00XL350	C.AFFC 4P 480MM M/B-PWR/B
00XL348	C.A M/B-SATA_HDD
00XL351	C.AFFC 4P 619MM M/B TOUCH-PWR/B
00XL349	C.A M/B-SATA_ODD
00XL356	C.A M/B-MIC_DUAL
CARDPOP	
01LM244	IO Board
DISPLAY	
01AG972	LGD QHD LM270WQ4_SSB3
DT_KYB	
00XH633	USB Calliope KB BK NORDIC
00XH945	USB Calliope KB SR ARA
00XH944	USB Calliope KB SR ENG
00XH604	USB Calliope KB BK HBW
00XH605	USB Calliope KB BK HUN

00XH607	USB Calliope KB BK ITA
00XH598	USB Calliope KB BK FRA
00XH602	USB Calliope KB BK GRE
00XH950	USB Calliope KB SR BUL
00XH601	USB Calliope KB BK GER
00XH971	USB Calliope KB SR POR
00XH973	USB Calliope KB SR RUS
00XH968	USB Calliope KB SR LA SPA
00XH627	USB Calliope KB BK SLV
00XH626	USB Calliope KB BK EURO ENG
00XH610	USB Calliope KB BK KOR
00XH608	USB Calliope KB BK JPN
00XH975	USB Calliope KB SR SLK
00XH982	USB Calliope KB SR UKE
00XH965	USB Calliope KB SR JPN
00XH978	USB Calliope KB SR SWS
00XH976	USB Calliope KB SR SPA
00XH967	USB Calliope KB SR KOR
00XH979	USB Calliope KB SR THAI
00XH961	USB Calliope KB SR HBW
00XH981	USB Calliope KB SR TUR
00XH959	USB Calliope KB SR GRE
00XH621	USB Calliope KB BK SWS
00XH987	USB Calliope KB SR IND ENG
00XH622	USB Calliope KB BK THAI
00XH964	USB Calliope KB SR ITA
00XH630	USB Calliope KB BK IND ENG
00XH618	USB Calliope KB BK SLK
00XH994	USB KB SLV_CZ-SL
00XH992	USB Calliope KB SR CAN EN/FR
00XH625	USB Calliope KB BK UKE
00XH990	USB Calliope KB SR NORDIC
00XH619	USB Calliope KB BK SPA
00XH962	USB Calliope KB SR HUN
00XH624	USB Calliope KB BK TUR
00XH611	USB,Calliope,KB,BK,LA SPA
00XH955	USB Calliope KB SR FRA
00XH993	USB Calliope KB BK CZE/SLK
00XH952	USB Calliope KB SR CZE
00XH594	USB Calliope KB BK TC/ENG

00XH614	USB Calliope KB BK POR
00XH595	USB Calliope KB BK CZE
00XH951	USB Calliope KB SR TC/ENG
00XH948	USB Calliope KB SR BEL ENG
00XH958	USB Calliope KB SR GER
00XH949	USB Calliope KB SR BRL
00XH593	USB Calliope KB BK BUL
00XH591	USB,Calliope,KB,BK,BEL ENG
00XH616	USB Calliope KB BK RUS
00XH983	USB Calliope KB SR EURO ENG
00XH587	USB Calliope KB BK ENG
00XH984	USB Calliope KB SR SLV
00XH588	USB Calliope KB BK ARA
00XH635	USB Calliope KB BK CAN ENG/FRA
FAN	
00XD814	Sysfan for Mutuo_P8 110x15mm
HDD_ASM	
45K0623	HDD,1TB,7200,DT3,SATA3,STD
00PC552	HDD,2TB,7200,DT3,SATA3,STD
00PC551	HDD,1TB,7200,DT3,SATA3,STD
45K0625	HDD,2TB,7200,DT3,SATA3,STD
HEATSINK	
01MN104	AVC SB42U000001-1 35W C7 Intel K
01MN105	AVC SB43000001-1 35W+25W C7 HSK
KYB_MOUSE	
00XH801	WL KM Calliope BK NoBAT BRL
00XH884	WL KM Calliope SR UKE
00XH885	WL KM Calliope SR Euro ENG
00XH996	2.4G SVG CZ_SL
00XH845	WL KM Calliope BK NoBAT LA SPA
00XH886	WL KM Calliope SR SLV
00XH797	WL KM Calliope BK ARA
00XH844	WL KM Calliope BK CAN ENG/FRA
00XH800	WL KM Calliope BK BEL ENG
00XH895	WL KM Calliope SR NoBAT LA SPA
00XH873	WL KM Calliope SR POR
00XH870	WL KM Calliope SR LA SPA
00XH866	WL KM Calliope SR ITA
00PH144	USB Calliope Mouse SR-GY
00XH995	WL KM Calliope BK CZE/SLK

00XH867	WL KM Calliope SR JPN
00XH827	WL KM Calliope BK SLK
00XH869	WL KM Calliope SR KOR
00XH860	WL KM Calliope SR GER
00XH857	WL KM Calliope SR FRA
00XH880	WL KM Calliope SR SWS
00XH830	WL KM Calliope BK SWS
00XH878	WL KM Calliope SR SPA
00XH823	WL KM Calliope BK POR
00XH825	WL KM Calliope BK RUS
00XH877	WL KM Calliope SR SLK
00XH828	WL KM Calliope BK SPA
00XH820	WL KM Calliope BK LA SPA
00XH804	WL KM Calliope BK CZE
00XH842	WL KM Calliope BK Nordic
00XH839	WL KM Calliope BK IND ENG
00XH817	WL KM Calliope BK JPN
00XH802	WL KM Calliope BK BUL
00XH807	WL KM Calliope BK FRA
00XH803	WL KM Calliope BK TC/ENG
00XH810	WL KM Calliope BK GER
00XH811	WL KM Calliope BK GRE/UK
00XH851	WL KM Calliope SR NoBAT BRL
00XH850	WL KM Calliope SR BEL ENG
00XH835	WL KM Calliope BK Euro ENG
00XH816	WL KM Calliope BK ITA
00XH813	WL KM Calliope BK HBW
00XH833	WL KM Calliope BK TUR
00XH854	WL KM Calliope SR CZE
00XH836	WL KM Calliope BK SLV
00XH847	WL KM Calliope SR ARA
00XH814	WL KM Calliope BK HUN
00XH831	WL KM Calliope BK THAI
00XH894	WL KM Calliope SR CAN ENG/FRA
00XH834	WL KM Calliope BK UKE
00XH892	WL KM Calliope SR Nordic
00XH819	WL KM Calliope BK KOR
00XH889	WL KM Calliope SR IND ENG
00XH883	WL KM Calliope SR TUR
00XH881	WL KM Calliope SR THAI

00XH853	WL KM Calliope SR TC/ENG
00XH875	WL KM Calliope SR RUS
00XH861	WL KM Calliope SR GRE/UK
00XH852	WL KM Calliope SR BUL
00XH863	WL KM Calliope SR HBW
00XH864	WL KM Calliope SR HUN
00XH796	WL KM Calliope BK ENG
00XH846	Primax RFBU71 2.4G SVG US
LINECORD	
00XL074	Fru, LINECORD,IT,1M,3P,NON-LH
00XL051	Fru,US/CA,1M,3P,NON-LH
00XL090	Fru, LINECORD,CN,1M,3P,NON-LH
00XL080	Fru, LINECORD,AU,1M,3P,NON-LH
00XL002	Fru, JP,Anti-TR,1M,2P,NON-LH
00XL057	Fru, LINECORD,AR,1M,3P,NON-LH
00XL067	Fru, LINECORD,DK,1M,3P,NON-LH
00XL062	Fru, LINECORD,BR,1M,3P,NON-LH
00XL093	Fru, LINECORD,TW,1M,3P,NON-LH
00XL079	Fru, LINECORD,AU,1M,3P,NON-LH
00XL063	Fru, EU/KR,1M,3P,NON-LH
00XL078	Fru, LINECORD,AU,1M,3P,NON-LH
00XL065	Fru, EU/KR,1M,3P,NON-LH
00XL052	Fru, US/CA,1M,3P,NON-LH
00XL089	Fru, LINECORD,CN,1M,3P,NON-LH
00XL081	Fru, LINECORD,ZA,1M,3P,NON-LH
00XL059	Fru, LINECORD,AR,1M,3P,NON-LH
00XL083	Fru, LINECORD,ZA,1M,3P,NON-LH
00XL066	Fru, LINECORD,DK,1M,3P,NON-LH
00XL003	Fru, JP,Anti-TR,1M,2P,NON-LH
00XL058	Fru, LINECORD,AR,1M,3P,NON-LH
00XL069	Fru, LINECORD,CH,1M,3P,NON-LH
00XL084	Fru, LINECORD,IL,1M,3P,NON-LH
00XL071	Fru, LINECORD,CH,1M,3P,NON-LH
00XL075	Fru, LINECORD,GB,1M,3P,NON-LH
00XL092	Fru, LINECORD,TW,1M,3P,NON-LH
00XL094	Fru, LINECORD,IN,1M,3P,NON-LH
00XL064	Fru, EU/KR,1M,3P,NON-LH
00XL086	Fru, LINECORD,IL,1M,3P,NON-LH
00XL085	Fru, LINECORD,IL,1M,3P,NON-LH
00XL097	Fru, LINECORD,TH,1M,3P,NON-LH

00XL073	Fru, LINECORD,IT,1M,3P,NON-LH
00XL072	Fru, LINECORD,IT,1M,3P,NON-LH
00XL096	Fru, LINECORD,IN,1M,3P,NON-LH
00XL053	Fru, US/CA,1M,3P,NON-LH
00XL091	Fru, LINECORD,TW,1M,3P,NON-LH
00XL060	Fru, LINECORD,BR,1M,3P,NON-LH
00XL076	Fru, LINECORD,GB,1M,3P,NON-LH
00XL070	Fru, LINECORD,CH,1M,3P,NON-LH
00XL082	Fru, LINECORD,ZA,1M,3P,NON-LH
00XL077	Fru, LINECORD,GB,1M,3P,NON-LH
00XL068	Fru, LINECORD,DK,1M,3P,NON-LH
00XL061	Fru, LINECORD,BR,1M,3P,NON-LH
MECH_ASM	
01MN181	AIO521 RGBIR CAM TS
01MN184	DCA70_MB_S_TS
01MN179	AIO521 FHD CAM TS
01MN183	DCA70_MB_S_NON_TS
01MN180	AIO520 RGBIR CAM NT
01MN182	DCA70_M_FME_NON_TS
01MN173	DCA70_ODD BEZEL_TS
01MN172	DCA70_ODD BEZEL_NT
01MN169	DCA70_BK_CER_SUB_TS
01MN168	DCA70_BK_CER_SUB_NT
01MN189	VBA10_HDD_SHIELDING_ASSY
01MN178	AIO520 FHD CAM NT
01MN176	DCA70_ODD LATCH_NT
01MN188	DCA70_SIDE_IO_SHIELDING
01MN175	DCA70_NON-ODD BEZEL_TS
01MN187	DCA70_MIC
01MN248	Side Io Shielding
01MN167	DCA70_FR_BE_SUB_TS
01MN249	HDD Bracket
01MN185	520_HDD_BRACKET_ASSY
01MN166	DCA70_FR_BE_SUB_NON_TS
01MN257	ASSY DUAL MIC Module
01MN190	DCA70_STAND_BASE_CX
01MN186	DCA70_TOUCH_MODULE
01MN192	DCA70_STAND_ARM_TS_CX
01MN191	DCA70_STAND_ARM_NT_CX
01MN171	DCA70_BK_CER_RELEASE_TS

01EF416	ASSY Shielding for HDD
MECHANICAL	
01EF469	Bracket,For WIFI Antenna Kit
01MN201	DCA70_ODD_CER_DUMMY_TS
01MN202	DCA70_STAND_CABLE_CLIP
01MN200	DCA70_ODD_CER_DUMMY_NON_TS
01MN196	DCA70_HINGE_CER_TOP_NON_TS
01MN203	BCA10_SPEAKER_RUBBER
01MN197	DCA70_HINGE_CER_TOP_TS
01MN198	DCA70_HINGE_CER_BTM_NON_TS
01MN199	DCA70_HINGE_CER_BTM_TS
MEMORY	
01FR300	4G DDR4 2400 SODIMM
01AG714	16GB DDR4 2400 SoDIMM
01AG709	4GB DDR4 2400 SoDIMM
01AG711	8GB DDR4 2400 SoDIMM
01AG701	4GB DDR4 2400 SoDIMM
01AG813	16GB DDR4 2666 SoDIMM,MICRON
01AG819	16GB DDR4 2666 SoDIMM,Ramaxel
01FR302	16G DDR4 2400 SODIMM
01FR301	8G DDR4 2400 SODIMM
01AG708	4GB DDR4 2400 SoDIMM
01AG812	8GB DDR4 2666 SoDIMM,MICRON
01AG818	8GB DDR4 2666 SoDIMM,Ramaxel
SSD	
00UP455	FRU 16GB M.2 Optane Memory
SSD_ASM	
00UP436	256G,M.2,2280,PCIe3x4,SAM,OPAL
00UP433	256G,M.2,2280,PCIe3x4,INTEL,OPAL
00UP448	128G,M.2,2280,PCIe3x4,SAMSG,STD
00UP641	256G,M.2,2280,PCIe3x4,TOS,OPAL
SCREW	
01EF559	For SSD
PAD	
01MN363	Laird Tflex 3 pad for M.2 SSD
MOUSE	
00PH131	USB Calliope Mouse Black(Orange wh
SP	
01AG091	Intel i7-7700T 2.9GHZ/4C/6M/LGA 35W
01AG103	I I5-7400T 2.4GHZ/4C/6M 35W

01AG113	Intel Core i3-7100T 3.4GHZ/2C/3M 35W
01AG115	Intel Pentium G4560T 2.9GHZ/2C/3M 35W
OPT_DRIVE	
45K0494	9.0mm DVD Rambo without bezel
WIRELESS	
01AX709	Wireless,CMB,LTN,NFA435A

Chapter 10. General information

This chapter provides general information that applies to all computer models covered by this manual.

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.