



ideacentre 510/510A Series Hardware Maintenance Manual

Machine Types: 90J0 [ideacentre 510A-15ARR/Energy Star] / 90HU
[ideacentre 510-15ICB/Energy Star] / 90HV [ideacentre 510A-15ICB/
Energy Star]



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Chapter 1. About this manual

This manual contains service and reference information for Lenovo ideacentre 300 series desktop computers listed on the cover. It is intended only for trained servicers who are familiar with Lenovo computer products.

Before servicing a Lenovo product, be sure to read the Safety Information.

The description of the TV card in this manual is only used for the machines which have the TV card. It is invalid for those machines which do not have TV card.

Important Safety Information

Be sure to read all caution and danger statements in this book before performing any of the instructions.

Veillez lire toutes les consignes de type DANGER et ATTENTION du présent document avant d'exécuter les instructions.

Lesen Sie unbedingt alle Hinweise vom Typ "ACHTUNG" oder "VORSICHT" in dieser Dokumentation, bevor Sie irgendwelche Vorgänge durchführen

Leggere le istruzioni introdotte da ATTENZIONE e PERICOLO presenti nel manuale prima di eseguire una qualsiasi delle istruzioni

Certifique-se de ler todas as instruções de cuidado e perigo neste manual antes de executar qualquer uma das instruções

Es importante que lea todas las declaraciones de precaución y de peligro de este manual antes de seguir las instrucciones.

执行任何说明之前，请确保已阅读本书中的所有警告和危险声明。

執行任何指示前，請確實閱讀本書中的所有警告及危險聲明。

Chapter 2. Safety information

This chapter contains the safety information that you need to be familiar with before servicing a computer.

General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
 1. Ensure you can stand safely without slipping.
 2. Distribute the weight of the object equally between your feet.
 3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
 4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back.
Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.
Remember: Metal objects are good electrical conductors.
- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

Electrical safety



CAUTION:

Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the computer covers, unless instructed otherwise in the installation and configuration procedures.

Observe the following rules when working on electrical equipment.

Important: Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents. Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
 - Performing a mechanical inspection
 - Working near power supplies
 - Removing or installing Field Replaceable Units (FRUs)
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
 - Ensure that another person, familiar with the power-off controls, is near you.
Remember: Another person must be there to switch off the power, if necessary.
 - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.
Remember: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
 - When using a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
 - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
 - Power supply units
 - Pumps
 - Blowers and fans
 - Motor generators

and similar units. (This practice ensures correct grounding of the units.)

- If an electrical accident occurs:
 - Use caution; do not become a victim yourself.
 - Switch off power.

- Send another person to get medical aid.

Safety inspection guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
 - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
 - b. The power cord should be the appropriate type as specified in the parts listings.
 - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious alterations. Use good judgment as to the safety of any alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling electrostatic discharge-sensitive devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people while handling the part.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

Note: The use of a grounding system is desirable but not required to protect against ESD damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the ac plug on ac-operated computers.

Grounding requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Safety notices

The caution and danger safety notices in this section are provided in the language of English.



DANGER

Electrical current from power, telephone and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect	To Disconnect
<ol style="list-style-type: none"> 1. Turn everything OFF. 2. First, attach all cables to devices. 3. Attach signal cables to connectors. 4. Attach power cords to outlet. 5. Turn device ON. 	<ol style="list-style-type: none"> 1. Turn everything OFF. 2. First, remove power cords from outlet. 3. Remove signal cables from connectors. 4. Remove all cables from devices.



CAUTION:

When replacing the lithium battery, use only Part Number 45C1566 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.



CAUTION:

When laser products (such as CD-ROMs, DVD-ROM drives, fiber optic devices, or transmitters) are installed, note the following:




- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.



DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following: Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

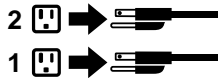


		
≥18 kg(37 lbs)	≥32 kg(70.5 lbs)	≥55 kg(121.2 lbs)

CAUTION:
Use safe practices when lifting.



CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



CAUTION:
Do not place any object weighing more than 82 kg (180 lbs.) on top of rack-mounted devices.



Chapter 3. General information

This chapter provides general information that applies to all machine types supported by this publication.

Specifications

This section lists the physical specifications for your computer.

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Environment

Air temperature:

Operating: 10° to 35°C

Transit: -20° to 55°C

Humidity:

Operating: 35% to 80%

Transit: 20% to 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 changed. Be extremely careful during write operations such as copying, saving, or formatting. Data or programs can be overwritten if you select an incorrect drive.

General error messages appear if a problem or conflict is found by an application program, the operating system, or both. For an explanation of these messages, refer to the information supplied with that software package.

Use the following procedure to help determine the cause of the problem:

1. Power-off the computer and all external devices.
2. Check all cables and power cords.
3. Set all display controls to the middle position.
4. Power-on all external devices.
5. Power-on the computer.
 - Look for displayed error codes
 - Look for readable instructions or a main menu on the display.
 - If you did not receive the correct response, proceed to step 6.
 - If you do receive the correct response, proceed to step 7.
6. Look at the following conditions and follow the instructions:
 - If the computer displays a POST error, go to “POST error codes”.
 - If the computer hangs and no error is displayed, continue at step 7.
7. If 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, and 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 is not 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 character (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:

- Strong passwords contain 7-16 characters, combine letters and numbers.
- Do not use your name or your user name.
- Do not use a common word or a common name.
- Be 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 character (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, and then press the **Enter** key.
4. Re-type the password to confirm, and then press the **Enter** key. If you type 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, and then press **Enter** key.
4. Type the new password, and then press **Enter** key. Re-type the password to confirm the new password, if you type the new password correctly, the new password will be installed. A Setup Notice will display that changes have been saved.

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**, **Enter** blank fields for each new password line item. A setup notice will display that changes have been saved.
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 character (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, and press the **Enter** key.
4. Re-type the password to confirm, if you type 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, and then press the **Enter** key.
4. Type the new password, and then press the **Enter** key. Re-type the password to confirm the new password, if you type the new password correctly, the new password will be installed. A setup notice will display that changes have been saved.

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**, **Enter** blank fields for each new password line item. A setup notice will display that changes have been saved.
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:	
Serial Port Setup	Select this option to enable or disable Serial Port (com).
USB Functions	Select whether to enable or disable USB (Universal Serial Bus) functions. If it is disabled, the USB keyboard and/or USB mouse may be not able to be used without device driver support.
ATA Drive Setup	Select IDE, ACHI mode or disable SATA controller. Device driver support is required for ACHI mode. Depending on how the hard disk image was installed, changing this setting may prevent the system from booting.
Video Setup	To configure video related functions. This option allows you to configure system's initiate graphic adapter from either IGD (Integrated Graphics Device) or PEG (PCI Express Graphics). Keep on the IGD enabled based on the setup options.

Onboard Audio Controller	Select whether to enable or disable the Onboard Audio Controller , when feature is set to Disabled all devices connected to the audio connectors (e.g. a headphone or a microphone) are disabled and can't be used.
Onboard Ethernet Controller or LAN Boot Agent	Select whether to enable or disable Onboard Ethernet Controller , or select whether to enable or disable load onboard PXE (Preboot Execution Environment) , or SMC (Secure Managed Client) . This feature will allow the computer to boot from a server image.

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:
 - Serial Port Setup** press the **Enter** key, and then select **Serial Port Setup**.
 - USB Setup** press the **Enter** key, and then select **USB Functions**.
 - ATA Device Setup** press the **Enter** key. Select **Configure SATA as**, press the **Enter** key, and then select SATA mode.
 - Video Setup** press the **Enter** key, and then select **Video Setup**.
 - Audio Setup** press the **Enter** key, and then select **Onboard Audio Controller**.
 - Network Setup** press the **Enter** key, and then select **Onboard Ethernet Support** or **LAN Boot Agent**.
4. Select **Disabled** or **Enabled** and then 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.

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

Selecting a startup device

If your computer does not 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 startup 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, and 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 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 in configuration.	Check the configuration and ensure the startup drive is in the boot sequence.
No operating system installed on the boot drive.	Install an operating system on the boot drive.
The boot sector on the 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(s) connection	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 system-board 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 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

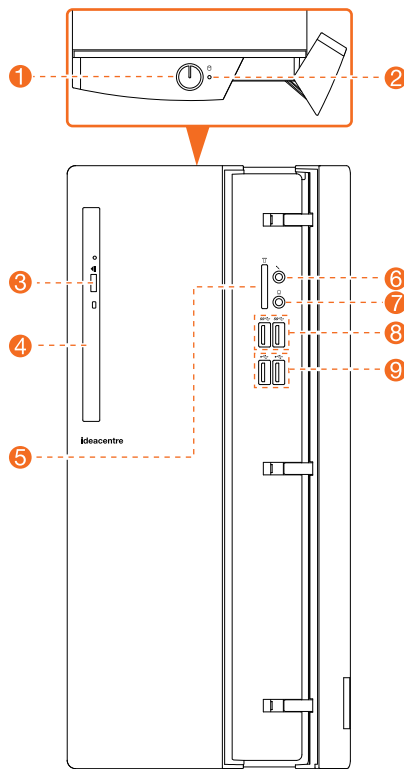
This section provides illustrations to help locate the various connectors, controls and components of the computer.

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.

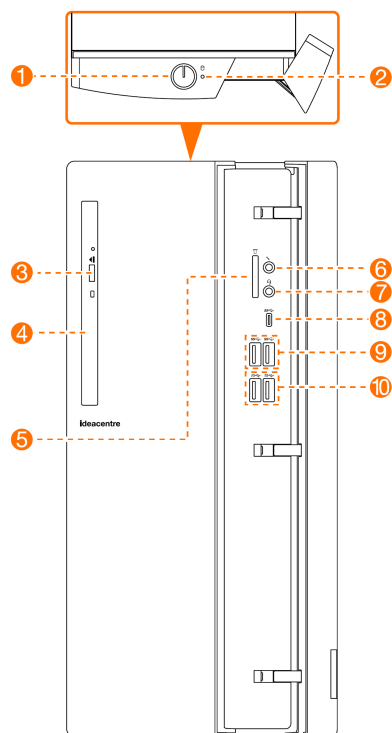
Table 1. ideacentre 510A-15ARR



1. Power button	6. Microphone connector
2. Storage drive indicator	7. Headphone connector
3. Optical drive eject button	8. USB 3.0 connectors (2)
4. Optical Drive	9. USB 2.0 connectors (2)
5. Memory card reader	

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

Table 2. ideacentre 510/510A-15ICB

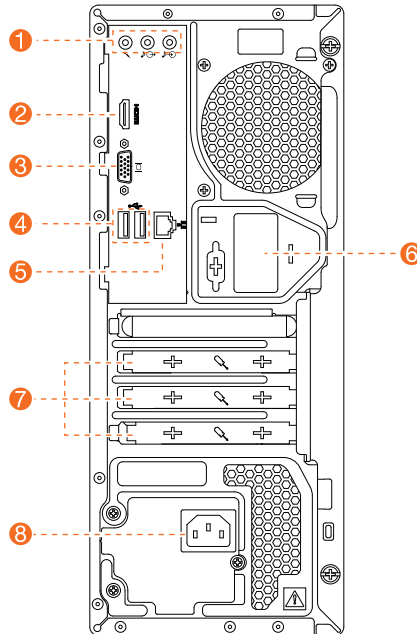


1. Power button	6. Microphone connector
2. Storage drive indicator	7. Combo audio jack
3. Optical drive eject button	8. USB 3.0 Type-C connector
4. Optical Drive	9. USB 3.0 connectors (2)
5. Memory card reader	10. USB 3.1 connectors (2)

Rear view

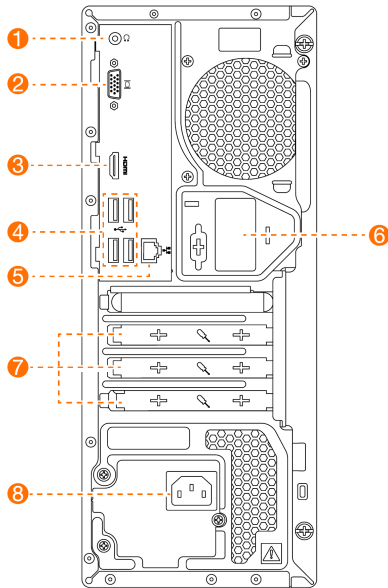
The following illustrations show the location of connectors and components on the rear of the 310 series computers.

Table 3. *ideacentre 510A-15ARR*



1. Audio connectors	5. Ethernet connector
2. HDMI-out connector	6. Wi-Fi antenna
3. VGA-out connector	7. Expansion card slots
4. USB 2.0 connectors (2)	8. Power connector

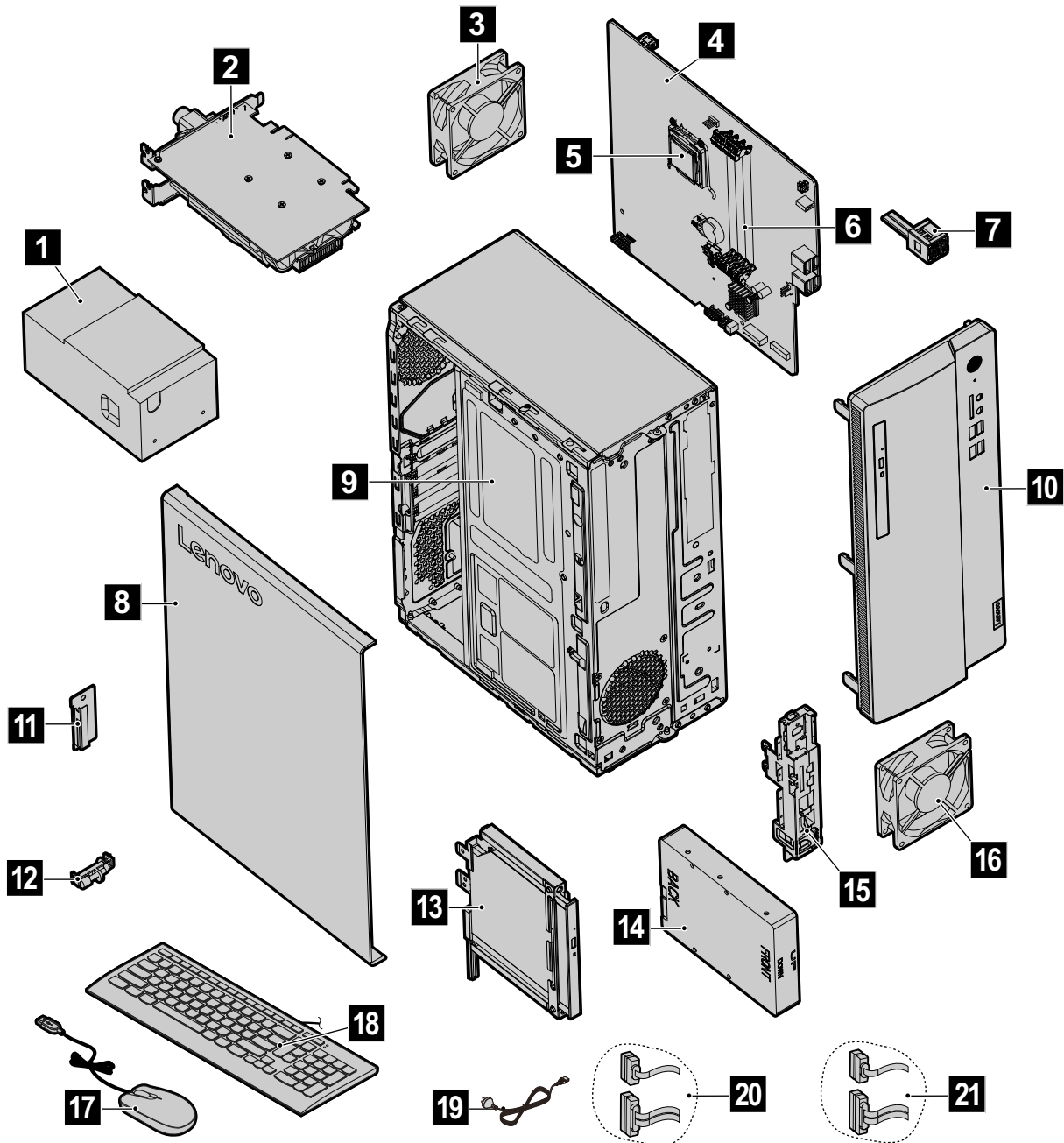
Table 4. ideacentre 510/510A-15ICB



1. Headphone connector	5. Ethernet connector
2. VGA-out connector	6. Wi-Fi antenna
3. HDMI-out connector	7. Expansion card slots
4. USB 2.0 connectors (4)	8. Power connector

Hardware components

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



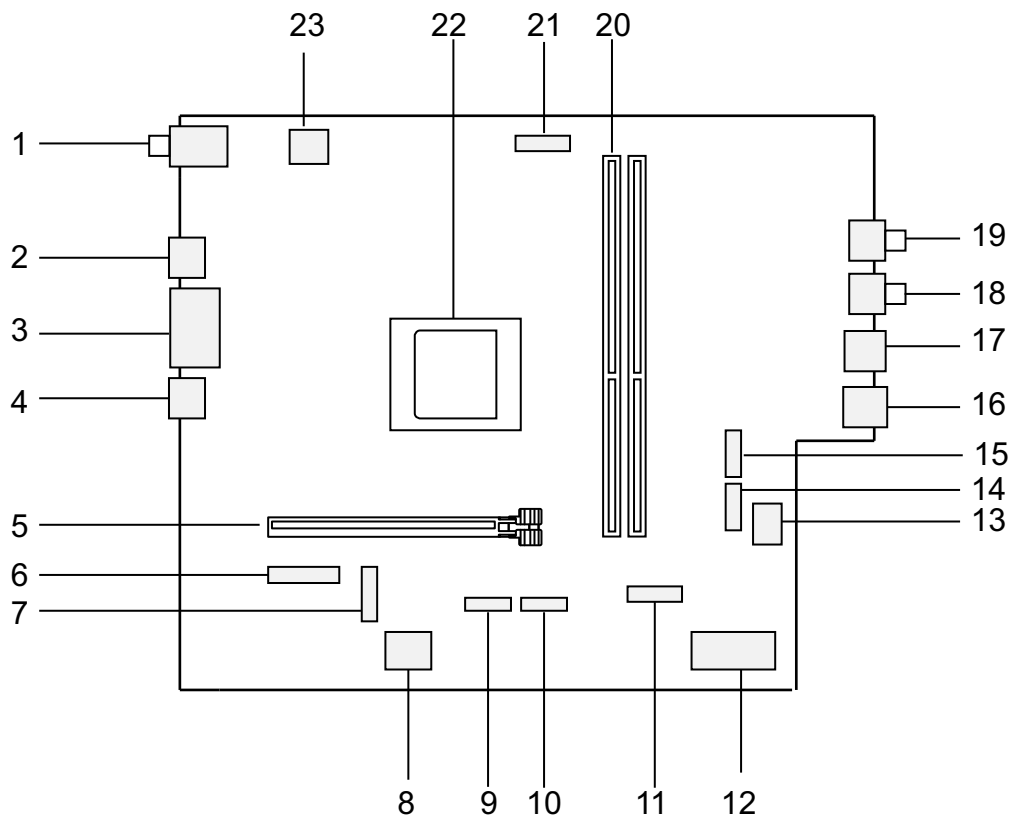
1. Power supply assembly	12. Thermal sensor
2. PCI express adapter card	13. Optical drive
3. Rear system fan	14. Storage drive
4. Motherboard	15. Front I/O assembly (including the card reader)
5. Microprocessor	16. Front system fan

6. Memory module	17. Mouse
7. Power button board	18. Keyboard
8. Computer cover	19. Power cord
9. Chassis	20. SATA cable (for connecting the storage drive)
10. Front bezel	21. SATA cable (for connecting the optical drive)
11. Front Wi-Fi antenna	

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.

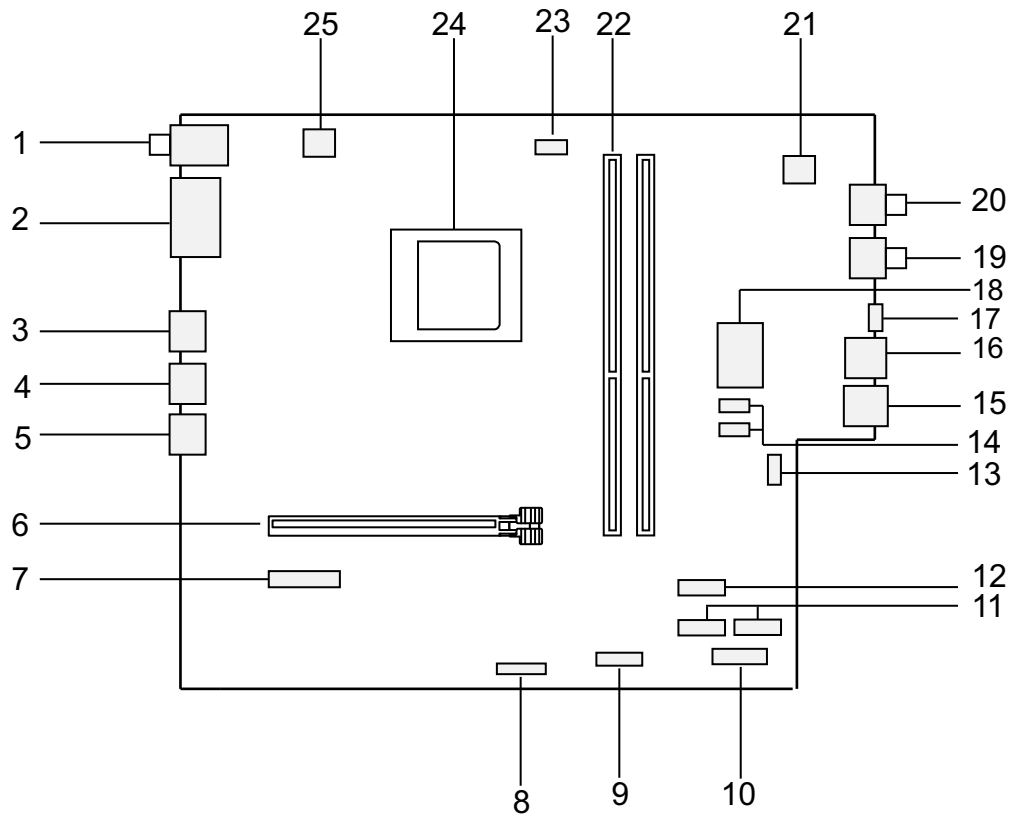
Table 5. *ideacentre 510A-15ARR*



1. Audio connectors	13. Auxiliary fan connector
2. HDMI-out connector	14. Front USB connector
3. VGA-out connector	15. Front panel connector
4. USB 2.0 and Ethernet connectors	16. USB 2.0 connectors (2)
5. PCI express X 16 adapter slot	17. USB 3.0 connectors (2)
6. PCI express X 1 adapter slot	18. Headphone connector

7. M.2 Wi-Fi card slot	19. Microphone connector
8. SATA power connector	20. Memory slots (2)
9. SATA 3.0 connector	21. Microprocessor fan connector
10. SATA 3.0 connector	22. Microprocessor socket
11. M.2 storage drive connector	23. 4-pin power connector
12. 10-pin power connector	

Table 6. ideacentre 510/510A-15ICB



1. Audio connectors	14. SATA power connectors (2)
2. VGA-out connector	15. USB 3.1 Gen 2 connectors (2)
3. HDMI-out connector	16. USB 3.1 Gen 1 connectors (2)
4. USB 2.0 connectors (2)	17. USB 3.0 Type-C connector
5. USB 2.0 and Ethernet connectors	18. 10-pin power connector
6. PCI express X 16 adapter slot	19. Headphone connector
7. PCI express X 1 adapter slot	20. Microphone connector
8. Front USB connector	21. Front panel connector
9. M.2 Wi-Fi card slot	22. Memory slots (2)
10. M.2 storage drive connector	23. Microprocessor fan connector

11. SATA 3.0 connectors (2)	24. Microprocessor socket
12. SATA 3.0 connector	25. 4-pin power connector
13. Auxiliary fan 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

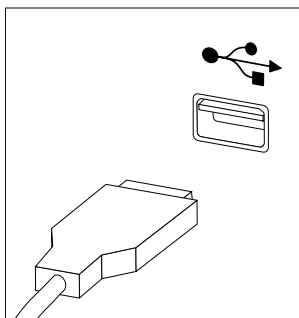
Before proceeding with the disassembly procedure, make sure that you do the following:

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

Replacing the 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.

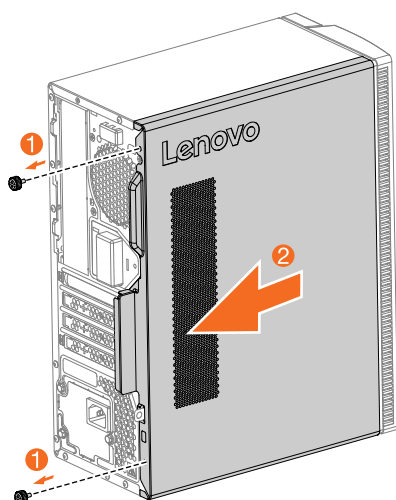
Removing the computer cover

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 computer screen from scratches or other damage.

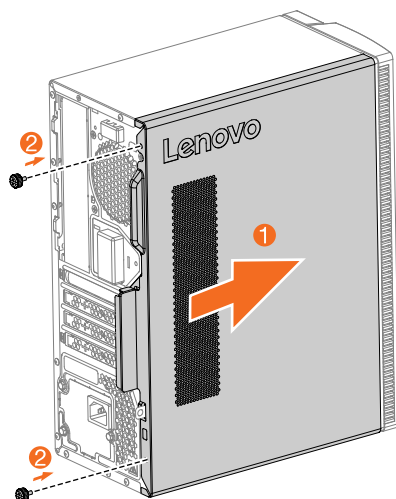
To remove the computer cover:

- 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 2 screws that secure the computer cover at the rear of the chassis.



Step 5. To reinstall the computer cover:

- a. Line up the computer cover with the chassis, and then slide it back.
- b. Secure the computer cover to the chassis with the screws.



Replacing the power supply assembly

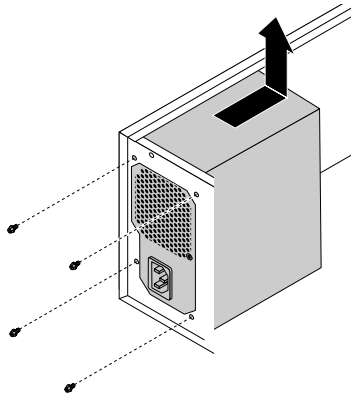
Note: For this procedure, it helps to lay the computer flat.

To replace the power supply assembly:

- 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 computer cover. Refer to Removing the computer cover.
- Step 5. Lay the computer on its side. Then, disconnect the power supply assembly cables from the motherboard.

Step 6. Remove the four screws that secure the power supply assembly.

Step 7. Slide then lift the power supply assembly out of chassis.



Step 8. Install the new power supply assembly :

- a. Position the new power supply assembly in the chassis so that the four screw holes in the power supply assembly align with those in the chassis. Then, install the four screws to secure the power supply assembly.
- b. Connect the power supply assembly cables to the connectors on the motherboard.

Step 9. Reattach the computer cover.

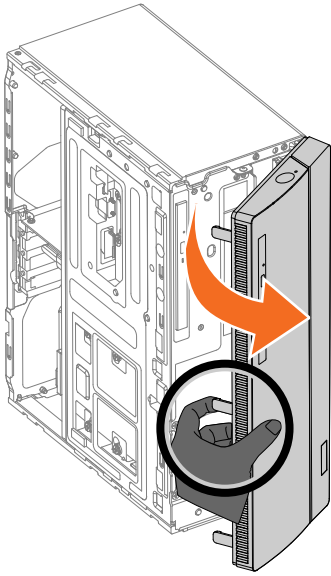
Removing the front bezel

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

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

To remove the front bezel:

- 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 computer cover. Refer to Removing the computer cover.
- Step 5. Release the three plastic tabs on the left side of the front bezel, and then pivot the front bezel outward.



Step 6. To reattach the bezel:

- a. Align the three plastic tabs on the right side of the front bezel with the corresponding holes in the chassis. Then, pivot the front bezel inward until it snaps into position.

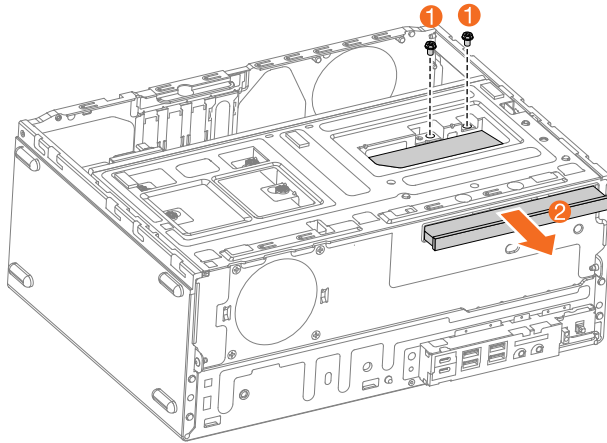
Step 7. Reinstall all the removed parts, and then reconnect the cables.

Replacing an optical drive

Note: For this procedure, it helps to lay the computer flat.

To replace an optical drive:

- 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 computer cover. Refer to Removing the computer cover.
- Step 5. Remove the front bezel. Refer to Removing the front bezel.
- Step 6. Disconnect the data and power cables from the rear of the optical drive.
- Step 7. Press the index button , and then push the optical drive out.



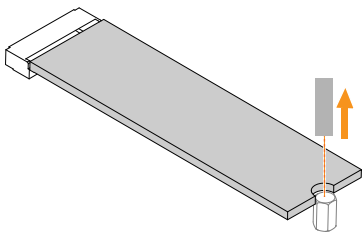
- Step 8. To install the new optical drive:
- Insert the new optical drive into the chassis until it locks into place.
 - Connect the data and power cables to the new optical drive.
- Step 9. Reinstall all the removed parts.

Replacing the M.2 storage drive

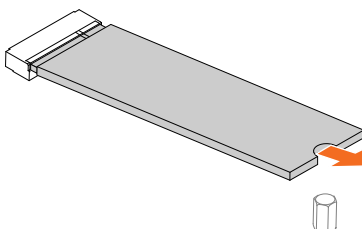
Note: For this procedure, it helps to lay the computer flat.

To replace the M.2 storage drive:

- Remove any media from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Unplug all power cords from electrical outlets.
- 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.
- Remove the computer cover. Refer to Removing the computer cover.
- Remove the screw that secures the M.2 storage drive to the motherboard.



- Step 6. Pull the M.2 storage drive out.



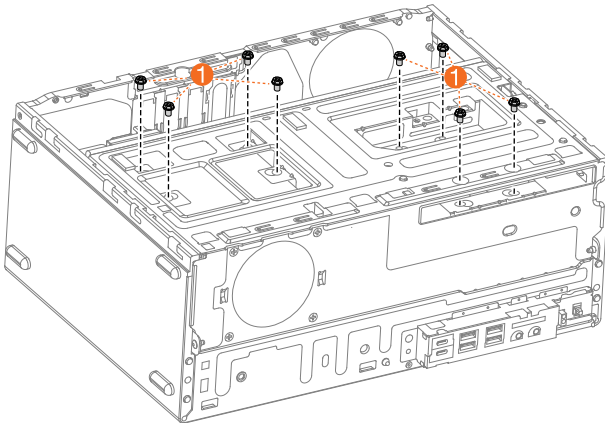
- Step 7. To install the new M.2 storage drive :
- Insert the new M.2 storage drive into the M.2 slot.
 - Secure the new M.2 storage drive to the motherboard with one screw.
- Step 8. Reinstall all the removed parts, and then reconnect the cables.

Replacing the storage drive

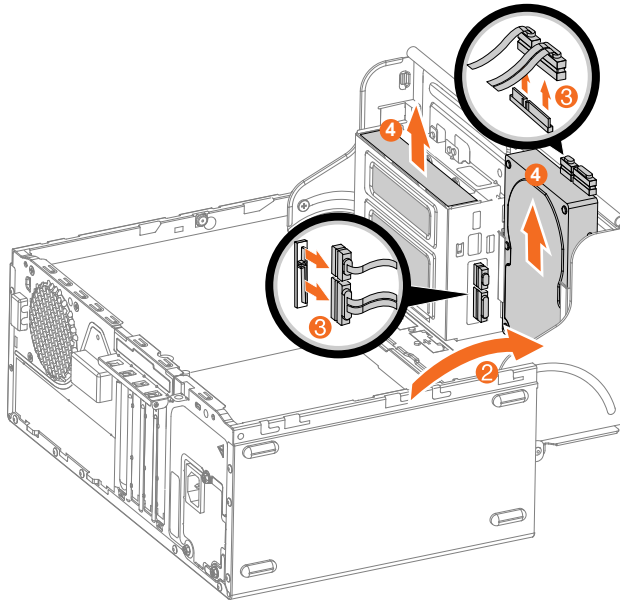
Note: For this procedure, it helps to lay the computer flat.

To replace the storage drive:

- 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 computer cover. Refer to Removing the computer cover.
- Step 5. Remove the front bezel. Refer to Removing the front bezel.
- Step 6. Remove the four screws that secure the 3.5-inch storage drive to the primary or secondary drive bay.



- Step 7. Pivot the drive bay assembly upward. **2**
- Step 8. Disconnect the data and power cables from the primary or secondary 3.5-inch storage drive. **3**
- Step 9. Slide the 3.5-inch storage drive out of the chassis. **4**



Step 10. To install the new 3.5-inch storage drive :

- a. Slide the new 3.5-inch storage drive into the drive bay.
- b. Secure the new 3.5-inch storage drive to the drive bay with the four screws.
- c. Connect the power and data cables to the 3.5-inch storage drive.
- d. Pivoting the drive bay assembly downward.

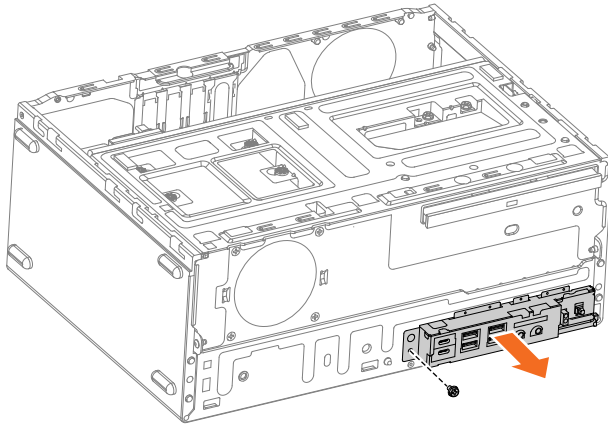
Step 11. Reinstall all the removed parts, and then reconnect the cables.

Replacing the front card reader

Note: For this procedure, it helps to lay the computer flat.

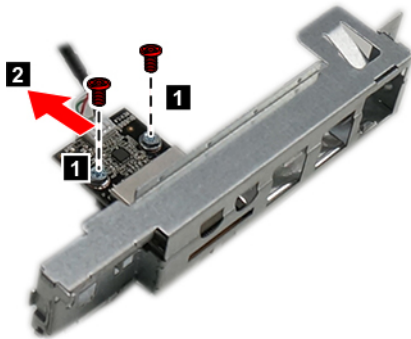
To replace the the front card reader:

- 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 computer cover. Refer to Removing the computer cover.
- Step 5. Remove the front bezel. Refer to Removing the front bezel.
- Step 6. Disconnect the data cables from the connectors on motherboard.
- Step 7. Remove the screw that secures the front I/O assembly to the chassis.
- Step 8. Slide the front I/O assembly out of chassis.



Step 9. Remove the two screws that secure the card reader to the front I/O assembly. **1**

Step 10. Remove the card reader from the front I/O assembly. **2**



Step 11. Install the new card reader :

- a. Align the new card reader into position, and then secure it to the front I/O assembly with two screws.
- b. Slide the front I/O assembly into the chassis and secure it with one screw.
- c. Connect the data cables to the motherboard.

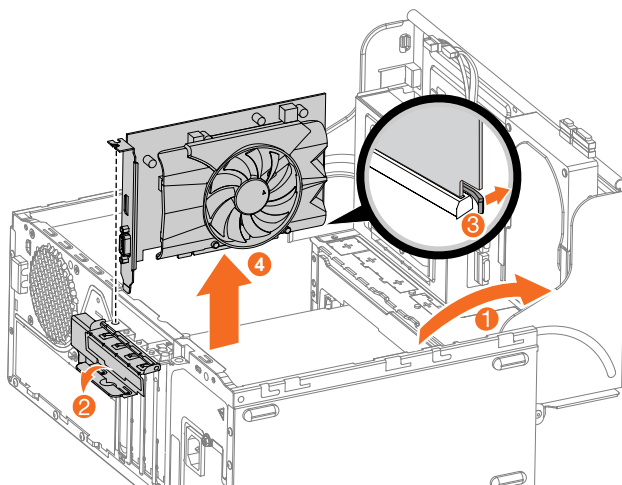
Step 12. Reinstall all the removed parts, and then reconnect the cables.

Replacing the PCI Express card

To replace the PCI Express 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 computer cover. Refer to Removing the computer cover.
- Step 5. Remove the front bezel. Refer to Removing the front bezel.
- Step 6. Pivoting the drive bay assembly upward **1**.
- Step 7. Pivot the card latch outward to open the latch **2**.

Step 8. Press the card retaining latch **3** as shown to disengage the latch. Grasp the card and gently pull it out of the slot **4**.



Step 9. To install the new PCI Express card:

- Insert the new PCI Express card into the appropriate PCI Express card slot on the motherboard.
- Pivot the card retaining latch to the closed position.
- Pivot the card latch to the closed position.
- Pivot the drive bay assembly downward.

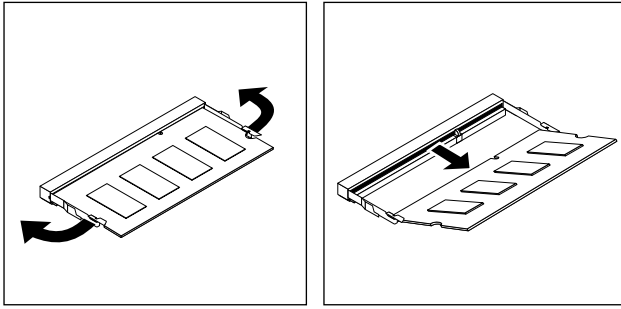
Step 10. Reinstall all the removed parts, and then reconnect the cables.

Replacing a memory module

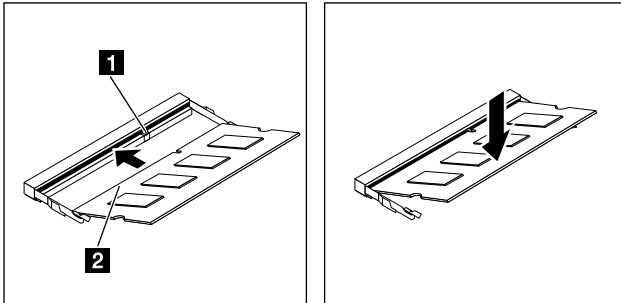
Note: For this procedure, it helps to lay the computer flat.

To replace a memory module:

- Remove any media from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Unplug all power cords from electrical outlets.
- 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.
- Remove the computer cover. Refer to Removing the computer cover.
- Remove the front bezel. Refer to Removing the front bezel.
- Pivot the drive bay assembly upward.
- Locate the memory module connectors. Refer to Locating connectors, controls and components.
- To replace a SO-DIMM memory module, refer to the following instructions:**
- Remove the memory module being replaced by opening the retaining clips as shown.

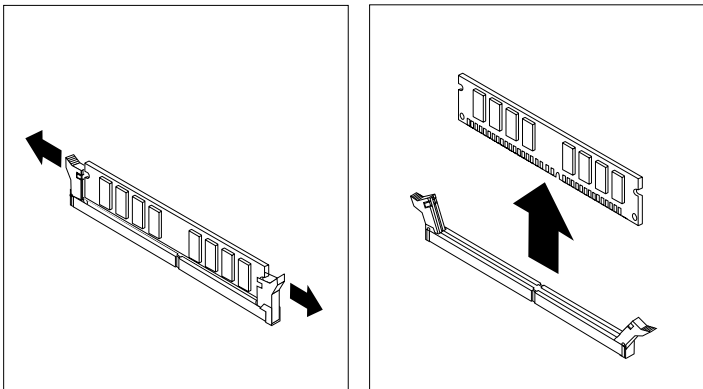


Step 10. Position the new memory module over the memory slot. Ensure that the notch **2** on the memory module aligns correctly with the slot key **1** in the memory slot. Press the memory module down until snaps into position.

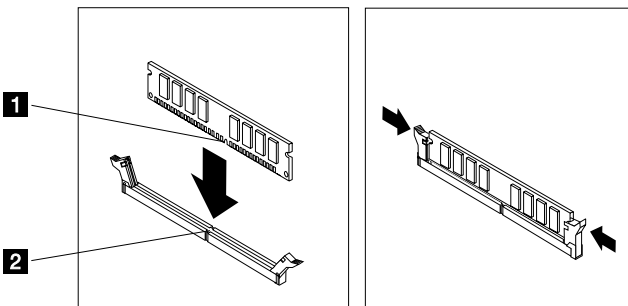


Step 11. **To replace a UDIMM memory module, refer to the following instructions:**

Step 12. Remove the memory module being replaced by opening the retaining clips as shown.



Step 13. Position the new memory module over the memory connector. Make sure the notch **1** on the memory module is correctly aligned with the connector key **2** on the system board. Push the memory module straight down into the connector until the retaining clips close.



Step 14. Pivot the drive bay assembly downward.

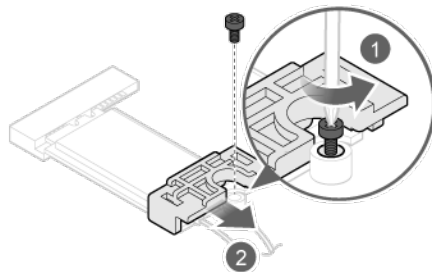
Step 15. Reinstall all the removed parts, and then reconnect the cables.

Replacing the Wi-Fi card

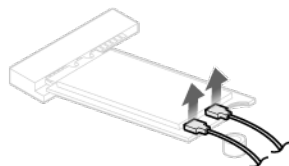
Note: For this procedure, it helps to lay the computer flat.

To replace the Wi-Fi card:

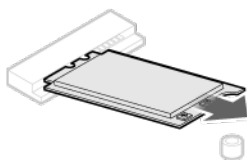
- Step 1. Remove any media from the drives, shut down the operating system, and turn off the computer and all attached devices.
- Step 2. Unplug all power cords from electrical outlets.
- Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and 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 computer cover. Refer to Removing the computer cover.
- Step 5. Remove the front bezel. Refer to Removing the front bezel.
- Step 6. Pivot the drive bay assembly upward.
- Step 7. Remove the screw that secure the Wi-Fi card to the motherboard **1**.
- Step 8. Remove the Wi-Fi card cover **2**.



- Step 9. Disconnect the 2 antenna cables from the Wi-Fi card.



- Step 10. Pull the Wi-Fi card out from the slot.



Step 11. Install the new Wi-Fi card:

- a. Line up the new Wi-Fi card, and then insert it into the same card slot.
- b. Connect the 2 antenna cables to the new Wi-Fi card.
- c. Secure the Wi-Fi card to the motherboard with one screw.

Step 12. Pivot the drive bay assembly downward.

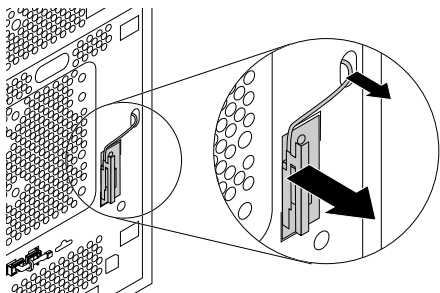
Step 13. Reinstall all the removed parts, and then reconnect the cables.

Replacing the front Wi-Fi antenna

Note: For this procedure, it helps to lay the computer flat.

To replace the front Wi-Fi antenna:

- 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 computer cover. Refer to Removing the computer cover.
- Step 5. Remove the front bezel. Refer to Removing the front bezel.
- Step 6. Disconnect the front Wi-Fi antenna cable from the Wi-Fi card.
- Step 7. Peel off the front Wi-Fi antenna from the front panel, and then remove it from the chassis.



Step 8. Install the new front Wi-Fi antenna:

- a. Peel off the release paper on the adhesive surface of the new Wi-Fi antenna.

- b. Route the new Wi-Fi antenna cable through the corresponding hole, and then stick the new Wi-Fi antenna to the front panel.
- c. Connect the new Wi-Fi antenna cable to the Wi-Fi card.

Step 9. Reinstall all the removed parts, and then reconnect the cables.

Replacing the rear Wi-Fi antenna

Note: For this procedure, it helps to lay the computer flat.

To replace the rear Wi-Fi antenna:

- 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 computer cover. Refer to Removing the computer cover.
- Step 5. To replace the rear Wi-Fi antenna, use the same way as that of replacing the front Wi-Fi antenna. Refer to Replacing the front Wi-Fi antenna.

Replacing the heat-sink and fan assembly

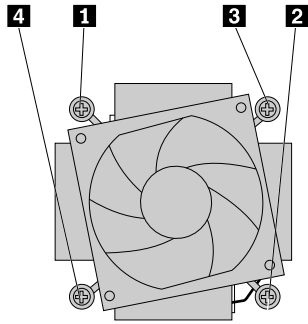
Note: For this procedure, it helps to lay the computer flat.

To replace the heat-sink and fan assembly:

- 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 computer cover. Refer to Removing the computer cover.
- Step 5. Remove the front bezel. Refer to Removing the front bezel.
- Step 6. Pivot the drive bay assembly upward.
- Step 7. Disconnect the heat sink and fan assembly cable from the microprocessor fan connector on the motherboard.

Loosen the four screws that secure the heat sink and fan assembly to the motherboard in the following sequence:

- a. Partially remove screw **1**, fully remove screw **2**, and then fully remove screw **1**.
- b. Partially remove screw **3**, fully remove screw **4**, and then fully remove screw **3**.



Step 8. Lift the failing heat sink and fan assembly off the motherboard.

Note: Do not touch the thermal grease while handling the heat sink and fan assembly.

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

- a. Position the new heat sink and fan assembly on the motherboard so that the four screws are aligned with the holes in the motherboard. Ensure that the heat sink and fan assembly cable faces toward the microprocessor fan connector on the motherboard.
- b. Tighten the four screws to secure the new heat sink and fan assembly.
- c. Connect the heat sink and fan assembly cable to the microprocessor fan connector on the motherboard.

Step 10. Pivot the drive bay assembly downward.

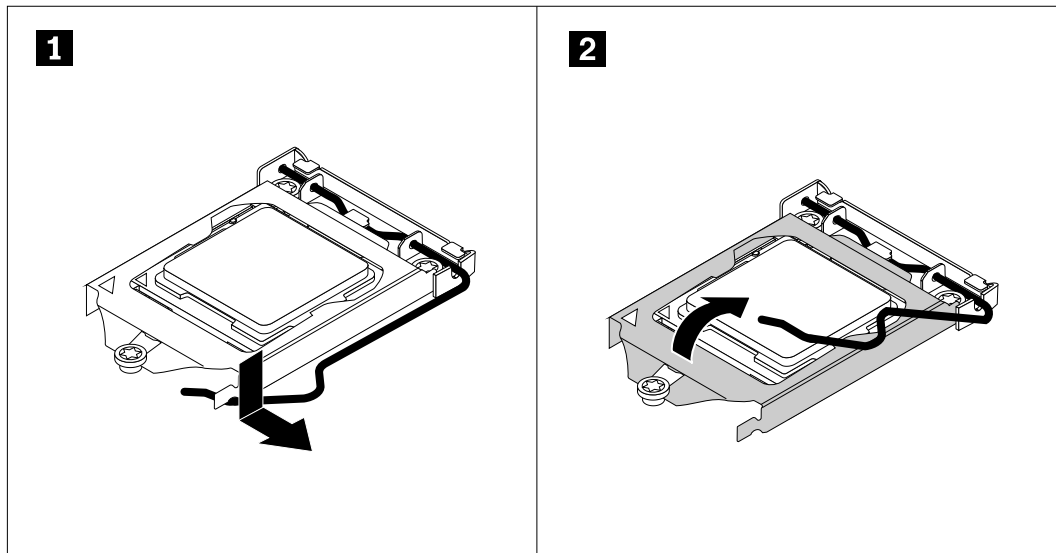
Step 11. Reinstall all the removed parts, and then reconnect the cables.

Replacing the microprocessor

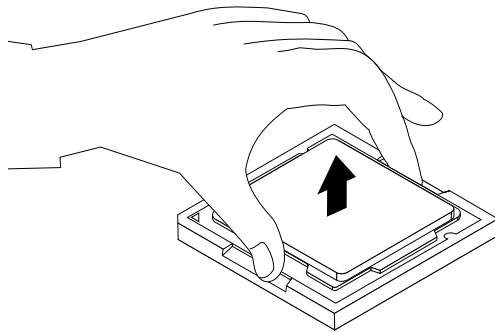
Note: For this procedure, it helps to lay the computer flat.

To replace the microprocessor

- 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 computer cover. Refer to Removing the computer cover.
- Step 5. Remove the front bezel. Refer to Removing the front bezel.
- Step 6. Pivot the drive bay assembly upward.
- Step 7. Remove the heat-sink and fan assembly. Refer to Replacing the heat-sink and fan assembly.
- Step 8. Press the small handle downward to release it from the retainer, and then open the retainer to access the microprocessor.



Step 9. Lift the microprocessor straight up and out of the microprocessor socket.



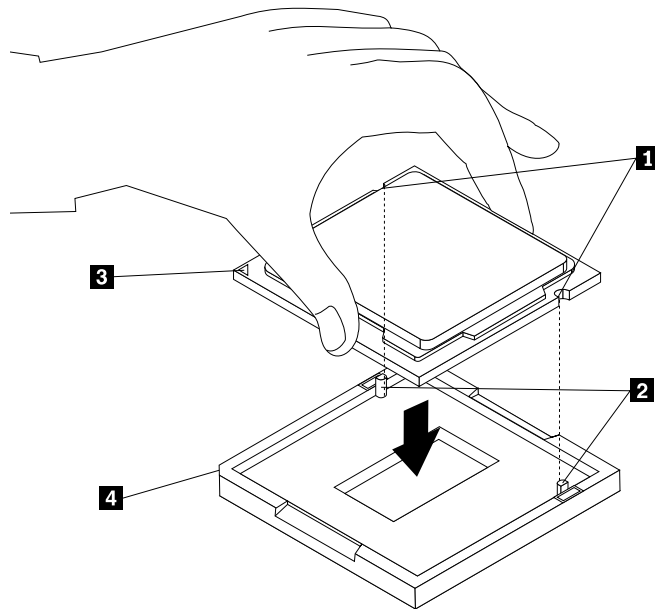
Note:

- a. Your microprocessor and socket might look different from the one illustrated.
- b. Touch only the edges of the microprocessor. Do not touch the gold contacts on the bottom.
- c. Do not drop anything onto the microprocessor socket while it is exposed. The socket pins must be kept as clean as possible.

Step 10. Ensure that the small handle is in the raised position and the microprocessor retainer is fully open.

Step 11. Remove the protective cover that protects the gold contacts of the new microprocessor.

Step 12. Note the orientation of the new microprocessor. Hold the new microprocessor by its edges and align the notches **1** on it with the tabs **2** in the microprocessor socket. Then, carefully lower the new microprocessor straight down into the microprocessor socket.



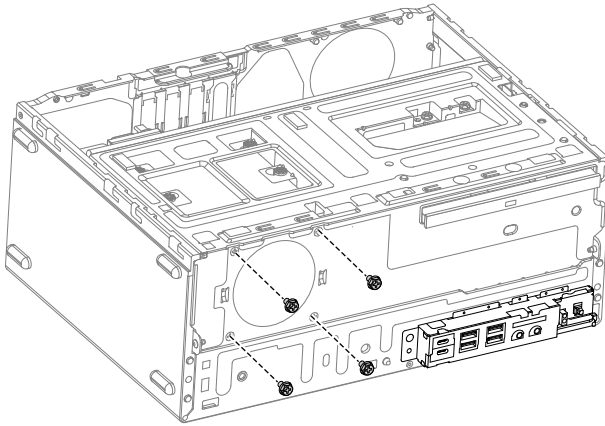
Note: The small triangle **3** on one corner of the new microprocessor is the microprocessor orientation indicator. The new microprocessor is in the correct orientation when this indicator points to the beveled corner **4** of the microprocessor socket.

- Step 13. Close the microprocessor retainer and lock it into position with the small handle to secure the new microprocessor in the socket.
- Step 14. Reinstall the heat sink and fan assembly.
- Step 15. Pivot the drive bay assembly downward.
- Step 16. Reinstall all the removed parts, and then reconnect the cables.

Replacing the front fan

To replace the front fan: (Selected models only)

- 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 computer cover. Refer to Removing the computer cover.
- Step 5. Remove the front bezel. Refer to Removing the front bezel.
- Step 6. Pivot the drive bay assembly upward.
- Step 7. Disconnect the front fan power cable from the corresponding connector on the motherboard.
- Step 8. The system fan is connected to the chassis by four rubber mounts. Break or cut the rubber mounts and gently pull the system fan out of the chassis.



Step 9. To install the new system fan:

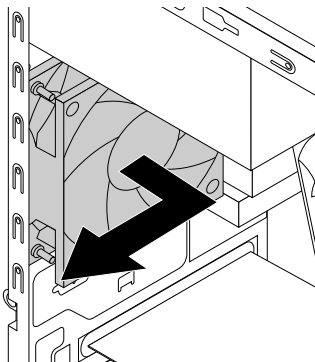
- a. On the inside of the front panel, push the four rubber mounts on the new system fan through the corresponding holes in the chassis.
- b. On the outside of the front panel, pull the tips of the rubber mounts until the system fan is secured in place.
- c. Connect the fan power cable to the corresponding connector on the motherboard.
- d. Pivot the drive bay assembly downward.

Step 10. Reinstall all the removed parts, and then reconnect the cables.

Replacing the rear fan

To replace the rear fan: (Selected models only)

- 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 computer cover. Refer to Removing the computer cover.
- Step 5. Disconnect the rear fan power cable from the corresponding connector on the motherboard.
- Step 6. Pull the rear fan assembly out of the chassis.



Step 7. To install the new rear fan:

- a. On the inside of the rear panel, push the four rubber mounts on the new rear fan through the corresponding holes in the chassis.
- b. On the outside of the rear panel, pull the tips of the rubber mounts until the rear fan is secured in place.
- c. Connect the fan power cable to the corresponding connector on the motherboard.

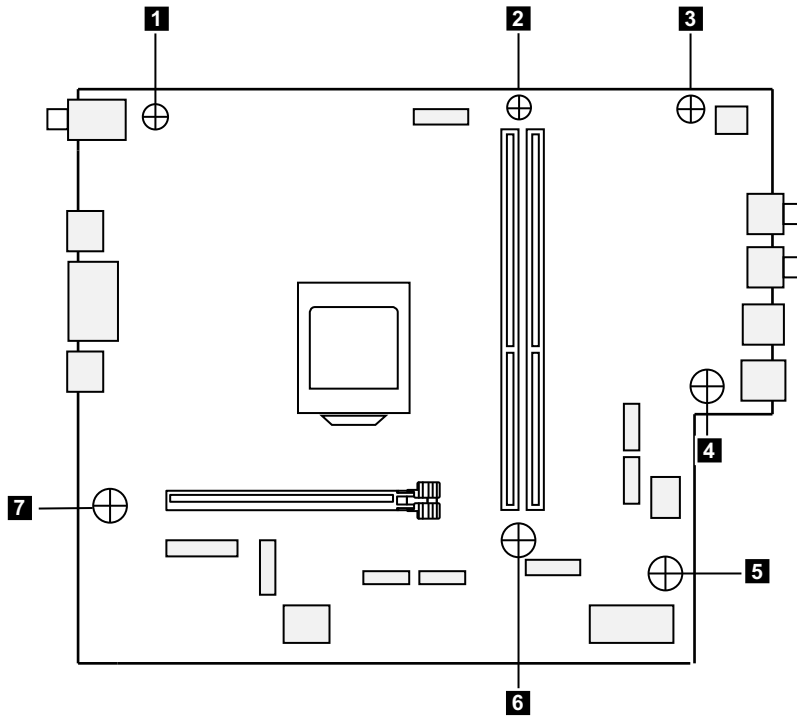
Step 8. Reinstall all the removed parts, and then reconnect the cables.

Replacing the motherboard

Note: For this procedure, it helps to lay the computer flat.

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 computer cover. Refer to Removing the computer cover.
- Step 5. Remove the front bezel. Refer to Removing the front bezel.
- Step 6. Pivot the drive bay assembly upward.
- Step 7. Remove the memory module. Refer to Replacing a memory module.
- Step 8. Remove the heat-sink assembly. Refer to Replacing the heat-sink and fan assembly.
- Step 9. Remove the CPU. Refer to Replacing the microprocessor.
- Step 10. Remove the PCI Express card. Refer to Replacing the PCI Express card.
- Step 11. Remove the Wi-Fi card. Refer to Replacing the Wi-Fi card.
- Step 12. Remove the front fan. Refer to Replacing the front fan.
- Step 13. Remove the rear fan. Refer to Replacing the rear fan.
- Step 14. Disconnect the all cables from the connectors on motherboard.
- Step 15. Remove the 7screws that secure the motherboard to the chassis.



Step 16. Lift up the motherboard to remove it.

Step 17. Install the new motherboard:

- a. Line up the holes on the new motherboard with mounting holes on the chassis and secure it with seven screws.

Step 18. Reinstall all the removed parts, and then reconnect the cables.

Chapter 9. FRU lists

This chapter lists the information on the field replaceable units (FRUs) for Lenovo ideacentre 510 and 510A series computers.

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.

NO.	FRU	CRU No.
1	Side chassis	1
2	Memory	1
3	Front cover	1
5	ODD	1
6	ODD Bracket	1
7	ODD cable	N
8	HDD	1
9	3.5 " HDD Bracket	1
10	2.5" HDD/SSD Bracket	1
11	HDD Cable	N
12	Power switch cable	N
13	Power Supply	2
14	Fan + Heat sink	N
15	Thermal sensor cable	N
16	Graphic card	1
18	Mechanical chassis	N
	Rubber block	
	cable organizer *4	
	rubber foot*2	
19	CPU	N
20	Mother board FRU=Mother board+Cmos battery+CPU Holder	N
	Mother board	
	Cmos battery	
	CPU Holder	
21	SSD	1
22	Power Cord	1

23	Keyboard	1
24	Mouse	1
25	Cmos battery	1
26	Front Fan	N
27	Rear Fan	N
28*	RF Antenna FRU=RF cable*2	N
29*	Antenna Cover	N
30*	Wi-Fi Card	2
31*	Wi-Fi Card Cover	2
34*	Optional USB ports	N
35*	Optional Card reader kit	N

FRU list of ideacentre 510A–15ARR

FRU P/N	Description
ANTENNA	
00XJ134	Fru, 15L New Rear antenna
00XJ133	Fru, Lx 15L New Front antenna
BDPLANAR	
01LM348	FRU,AMD RRPR 65W Koll,WIN DPK
01LM347	FRU,AMD RRPR 65W Koll,NO DPK
FAN	
01EF483	rear System fan for TW
01EF548	Front system fan for TW
CABLE	
00XL184	Fru, 250mm sensor cable
00XL213	Fru,SATA PWRcable(300mm+200mm)
00XL216	Fru400mmSATA cable 1 latch L_angle
04X2799	Fru, 370mm SATA cable
00XL217	Fru 400mm SATA power cable
00XL392	Fru 1.8M DVI-D M/M Cable
CARDREADER	
01AJ839	7 in 1 Card reader
DT_KYB	
00XH949	USB Calliope KB SR BRL
00XH608	USB Calliope KB BK JPN
00XH610	USB Calliope KB BK KOR
00XH948	USB Calliope KB SR BEL ENG
00XH967	USB Calliope KB SR KOR

00XH961	USB Calliope KB SR HBW
00XH959	USB Calliope KB SR GRE
00XH965	USB Calliope KB SR JPN
00XH633	USB Calliope KB BK NORDIC
00XH968	USB Calliope KB SR LA SPA
00XH978	USB Calliope KB SR SWS
00XH976	USB Calliope KB SR SPA
00XH611	USB, Calliope, KB, BK, LA SPA
00XH973	USB Calliope KB SR RUS
00XH591	USB, Calliope, KB, BK, BEL ENG
00XH971	USB Calliope KB SR POR
00XH975	USB Calliope KB SR SLK
00XH982	USB Calliope KB SR UKE
00XH604	USB Calliope KB BK HBW
00XH605	USB Calliope KB BK HUN
00XH635	USB Calliope KB BK CAN ENG/FRA
00XH607	USB Calliope KB BK ITA
00XH955	USB Calliope KB SR FRA
00XH951	USB Calliope KB SR TC/ENG
00XH626	USB Calliope KB BK EURO ENG
00XH627	USB Calliope KB BK SLV
00XH598	USB Calliope KB BK FRA
00XH958	USB Calliope KB SR GER
00XH601	USB Calliope KB BK GER
00XH952	USB Calliope KB SR CZE
00XH602	USB Calliope KB BK GRE
00XH950	USB Calliope KB SR BUL
00XH622	USB Calliope KB BK THAI
00XH624	USB Calliope KB BK TUR
00XH625	USB Calliope KB BK UKE
00XH630	USB Calliope KB BK IND ENG
00XH593	USB Calliope KB BK BUL
00XH594	USB Calliope KB BK TC/ENG
00XH595	USB Calliope KB BK CZE
00XH621	USB Calliope KB BK SWS
00XH992	USB Calliope KB SR CAN EN/FR

00XH990	USB Calliope KB SR NORDIC
00XH587	USB Calliope KB BK ENG
00XH987	USB Calliope KB SR IND ENG
00XH981	USB Calliope KB SR TUR
00XH979	USB Calliope KB SR THAI
00XH588	USB Calliope KB BK ARA
00XH994	USB KB SLV_CZ-SL
00XH618	USB Calliope KB BK SLK
00XH619	USB Calliope KB BK SPA
00XH614	USB Calliope KB BK POR
00XH993	USB Calliope KB BK CZE/SLK
00XH616	USB Calliope KB BK RUS
00XH964	USB Calliope KB SR ITA
00XH962	USB Calliope KB SR HUN
00XH983	USB Calliope KB SR EURO ENG
00XH945	USB Calliope KB SR ARA
00XH944	USB Calliope KB SR ENG
00XH984	USB Calliope KB SR SLV
HDD_ASM	
00PC552	HDD,2TB,7200,DT3,SATA3,STD
00PC551	HDD,1TB,7200,DT3,SATA3,STD
45K0625	HDD,2TB,7200,DT3,SATA3,STD
45K0623	HDD,1TB,7200,DT3,SATA3,STD
HEATSINK	
01EF397	AMD AM4 65W CPU Cooler
KYB_MOUSE	
00XH883	WL KM Calliope SR TUR
00XH881	WL KM Calliope SR THAI
00XH867	WL KM Calliope SR JPN
00XH866	WL KM Calliope SR ITA
00XH860	WL KM Calliope SR GER
00XH869	WL KM Calliope SR KOR
00XH857	WL KM Calliope SR FRA
00XH996	2.4G SVG CZ_SL
00XH846	Primax RFBU71 2.4G SVG US
00XH894	WL KM Calliope SR CAN ENG/FRA

00XH892	WL KM Calliope SR Nordic
00XH889	WL KM Calliope SR IND ENG
00XH875	WL KM Calliope SR RUS
00XH854	WL KM Calliope SR CZE
00XH864	WL KM Calliope SR HUN
00XH863	WL KM Calliope SR HBW
00XH861	WL KM Calliope SR GRE/UK
00XH873	WL KM Calliope SR POR
00XH851	WL KM Calliope SR NoBAT BRL
00XH870	WL KM Calliope SR LA SPA
00XH850	WL KM Calliope SR BEL ENG
00XH847	WL KM Calliope SR ARA
00PH144	USB Calliope Mouse SR-GY
00XH878	WL KM Calliope SR SPA
00XH877	WL KM Calliope SR SLK
00XH880	WL KM Calliope SR SWS
00XH885	WL KM Calliope SR Euro ENG
00XH884	WL KM Calliope SR UKE
00XH853	WL KM Calliope SR TC/ENG
00XH852	WL KM Calliope SR BUL
00XH895	WL KM Calliope SR NoBAT LA SPA
00XH886	WL KM Calliope SR SLV
LINECORD	
00XL044	Fru, LINECORD,DK,1.8M,3P,NON-LH
00XL028	Fru, LINECORD,IL,1.8M,3P,NON-LH
00XL046	Fru, LINECORD,DK,1.8M,3P,NON-LH
00XL019	Fru, LINECORD,TW,1.8M,3P,NON-LH
00XL007	C13 LINECORD,CCC,1.8M,Black, 3P
00XL038	Fru, LINECORD,ZA,1.8M,3P,NON-LH
00XL040	Fru, LINECORD,ZA,1.8M,3P,NON-LH
00XL030	Fru, LINECORD,CH,1.8M,3P,NON-LH
00XL006	Fru, US/CA,1.8M,3P,NON-LH
00XL004	Fru,US/CA,1.8M,3P,NON-LH
00XL024	Fru, LINECORD,GB,1.8M,3P,NON-LH
00XL025	Fru, LINECORD,GB,1.8M,3P,NON-LH
01YW108	Fru, LINECORD,TW,1.8M,3P,NON-LH

00XL023	Fru, LINECORD,GB,1.8M,3P,NON-LH
00XL050	Fru, LINECORD,TH,1.8M,3P,NON-LH
00XL042	Fru, LINECORD,AU,1.8M,3P,NON-LH
01YW102	Fru, LINECORD,TW,1.8M,3P,NON-LH
00XL016	Fru, EU/KR,1.8M,3P,NON-LH
00XL018	Fru, LINECORD,TW,1.8M,3P,NON-LH
00XL022	Fru, LINECORD,IN,1.8M,3P,NON-LH
00XL014	Fru, EU/KR,1.8M,3P,NON-LH
00XL045	Fru, LINECORD,DK,1.8M,3P,NON-LH
00XL027	Fru, LINECORD,IL,1.8M,3P,NON-LH
00XL032	Fru, LINECORD,BR,1.8M,3P,NON-LH
00XL001	Fru, JP,Anti-TR,1.8M,3P,NON-LH
00XL035	Fru, LINECORD,AR,1.8M,3P,NON-LH
00XL037	Fru, LINECORD,AR,1.8M,3P,NON-LH
00XL034	Fru, LINECORD,BR,1.8M,3P,NON-LH
00XL047	Fru, LINECORD,IT,1.8M,3P,NON-LH
00XL049	Fru, LINECORD,IT,1.8M,3P,NON-LH
00XL009	Fru, LINECORD,CN,1.8M,3P,NON-LH
00XL015	Fru, EU/KR,1.8M,3P,NON-LH
00XL005	Fru, US/CA,1.8M,3P,NON-LH
00XL029	Fru, LINECORD,CH,1.8M,3P,NON-LH
00XL039	Fru, LINECORD,ZA,1.8M,3P,NON-LH
00XL031	Fru, LINECORD,CH,1.8M,3P,NON-LH
00XL000	Fru, JP,Anti-TR,1.8M,3P,NON-LH
00XL010	Fru, LINECORD,CN,1.8M,3P,NON-LH
01YW106	Fru, LINECORD,TW,1.8M,3P,NON-LH
00XL020	Fru, LINECORD,IN,1.8M,3P,NON-LH
00XL043	Fru, LINECORD,AU,1.8M,3P,NON-LH
00XL036	Fru, LINECORD,AR,1.8M,3P,NON-LH
00XL041	Fru, LINECORD,AU,1.8M,3P,NON-LH
00XL033	Fru, LINECORD,BR,1.8M,3P,NON-LH
00XL026	Fru, LINECORD,IL,1.8M,3P,NON-LH
00XL017	Fru, LINECORD,TW,1.8M,3P,NON-LH
00XL048	Fru, LINECORD,IT,1.8M,3P,NON-LH
MECH_ASM	
01EF793	333HT2,F-Bezel ASSY,AVC
01EF791	333HT1,F-Bezel ASSY,AVC

01EF792	333HT1,Odd-door ASSY,AVC
01EF774	333ET1,Side-Cover,AVC
00XD328	HDMI_COVER Kit
01EF773	333ET1,Base-chassis,AVC
01EF905	M.2 SSD Brkt Assy(213mm MB)
MECHANICAL	
01MN426	AVC Wi-Fi Card Small Cover
00XD436	VGA rubber cover
01MN670	AVC,AMD Knoll R/IO Shielding
MEMORY	
01AG839	8GB DDR4 2666 UDIMM,Micron
01AG826	4GB DDR4 2666 UDIMM,Hynix
01AG828	16GB DDR4 2666 UDIMM,Hynix
01AG845	8GB DDR4 2666 UDIMM,Ramaxel
01AG830	4GB DDR4 2666 UDIMM,Ramaxel
01AG835	16GB DDR4 2666 UDIMM,Samsung
01AG832	4GB DDR4 2666 UDIMM,Micron
01AG840	16GB DDR4 2666 UDIMM,Micron
01AG827	8GB DDR4 2666 UDIMM,Hynix
01AG833	4GB DDR4 2666 UDIMM,Samsung
01AG846	16GB DDR4 2666 UDIMM,Ramaxel
01AG834	8GB DDR4 2666 UDIMM,Samsung
SP	
01AG239	AMD Ryzen 3 2200G 3.5GHz/4C/4M/AM4/65
01AG238	AMD Ryzen 5 2400G 3.6GHz/4C/4M/AM4/65
01AG083	AMD PRO A6-8570 3.5GHz/2C/1M 65W AM4
01AG067	AMD A10-9700 2M, 3.5GHz, 4C 65W AM4
01AG066	AMD A12-9800 3.8GHz/4C/2M 65W AM4
01AG068	AMD A8-9600 3.1GHz/4C/2M 65W AM4
01AG069	AMD A6-9500 3.5GHz/2C/1M 65W AM4
SSD_ASM	
00UP702	256G,M.2,2280,PCIe3x4,IN,OPAL
00UP686	128G,M.2,2242,PCIe3x2,SKH
00UP646	256G,M.2,2280,PCIe3x4,TOS,OPAL
00UP650	128G,M.2,2242,PCIe3x2,TOS
00UP448	128G,M.2,2280,PCIe3x4,SAMSG,STD
00UP488	256G,M.2,2280,PCIe3x4,SAM,OPAL

PWR_SUPPLY	
00PC746	100-240Vac,SFF 210W PSU
00PC745	100-240Vac,SFF 180W PSU
00PC750	100-240Vac,SFF 180W PSU
MOUSE	
00PH131	USB Calliope Mouse Black(Orange wh
00PH143	Chicony USB Fingerprint MC B_O
OPT_DRIVE	
45K0494	9.0mm DVD Rambo without bezel
RUBBER	
01EF846	Graphic Card Rubber 15L,AVC
VIDEO_CARD	
01AJ846	BLD GT730 1GB DDR5 64Bit
01AJ860	RX550 2GD5 128b DVI+DP+H HP
01AJ845	GT730 1GB DDR5 64Bit
01AJ847	NV GT730 2G VGA+HDMI HP
01AJ848	NV GT730 2G VGA+HDMI HP
01AJ874	BLD@RX560@4G/D5/H/DP/DVI/HP
WIRELESS	
01AX709	Wireless,CMB,LTN,NFA435A

Chapter 10. General information

This chapter provides general information that applies to all machine types supported by this publication.

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.