Lenovo 3000 V200
Service and Troubleshooting Guide

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> **Note**
>
> Before using this information and the product it supports, be sure to read the following:
>
> - *Safety and Warranty Guide* included in the package with this publication.
> - Wireless related information in online *Access Help* and Appendix D, "Notices," on page 47.
> - *Regulatory Notice* included in the package with this publication.

Contents

Read first

When your computer is turned on or the battery is charging, the base, the palm rest, and some other parts may become hot. Avoid keeping your hands, your lap, or any other part of your body in contact with a hot section of the computer for any extended length of time. When you use the keyboard, avoid keeping your palms on the palm rest for a prolonged period of time.

Your computer generates some heat during normal operation. The amount of heat depends on the amount of system activity and the battery charge level. Extended contact with your body, even through clothing, could cause discomfort or even a skin burn. Periodically take breaks from using the keyboard by lifting your hands from the palm rest; and be careful not to use the keyboard for any extended length of time.

When the ac adapter is connected to an electrical outlet and your computer, it generates heat. Do not place the adapter in contact with any part of your body while using it. Never use the ac adapter to warm your body. Extended contact with your body, even through clothing, may cause a skin burn.
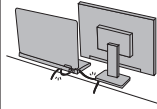
Route the cables of an ac adapter, a mouse, a keyboard, a printer, or any other electronic device, or communication lines, so that they cannot be walked on, tripped over, pinched by your computer or other objects, or in any way subjected to treatment that could disturb the operation of your computer. Applying strong force to the cables may damage or break them.

Before moving your computer, do one of the following: turn it off, press Fn+F4 to put it in sleep mode, or press Fn+F12 to put it in hibernation mode.

Before moving the computer, make sure that the power on indicator is off. This will help to prevent damage to the hard disk drive, and possible loss of data.

Do not drop, bump, scratch, twist, hit, vibrate, push or place heavy objects on your computer, display, or external devices.

Use a quality carrying case that provides adequate cushion and protection. Do not pack your computer in a tightly packed suitcase or bag.

Place liquids away from your computer to avoid spills, and keep your computer away from water to avoid the danger of electrical shock.

Chapter 1. Finding information

This guide and other publications

Setup Instructions
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> helps you to unpack your computer and get started. It includes a few tips for first-time users, and introduces software preinstalled by Lenovo™.

This *Service and Troubleshooting Guide*
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> provides information about caring for your computer, basic troubleshooting information, some recovery procedures, help and service information, and warranty information for your computer. The troubleshooting information in this Guide applies only to problems that might prevent you from accessing the comprehensive online manual, called *Access Help*, preinstalled on your computer.

Access Help
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> is a comprehensive online manual that provides answers to most of your questions about your computer, helps you to configure preinstalled features and tools, or solve problems. To open *Access Help*, do either of the following:
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> - Press the Lenovo Care^{SM} button. Under Quick Links in the Lenovo Care, click **Access on-system help**.
> - Click **Start**, move the pointer to **All Programs**; then to **Lenovo Care**. Click **Access Help**.

Lenovo Care
>
> provides an easy access to software tools and key Lenovo sites, eliminating the need to carry other reference manuals around. To open Lenovo Care, press the Lenovo Care button on your keyboard. For more information about using the Lenovo Care button, see "Finding information with the Lenovo Care button" on page 2.

Safety and Warranty Guide
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> includes general safety instructions and complete Lenovo Limited Warranty.

Regulatory Notice
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> supplements this Guide. Read it before you use the wireless features of your computer. Your computer complies with the radio frequency and safety standards of any country or region in which it has been approved for wireless use. You are requested to install and use your computer in strict accordance with the local RF regulations.

Finding information with the Lenovo Care button

The Lenovo Care button can help you in many situations when your computer is working normally, and even when it is not. Press the Lenovo Care button to open the Lenovo Care and get access to informative illustrations and easy-to-follow instructions for getting started and staying productive.

You can also use the Lenovo Care button to turn on your computer and immediately enter the Rescue and Recovery™ workspace, which runs independently of the Windows® operating system and is hidden from it.

Chapter 2. Caring for your computer

Though your computer is designed to function reliably in normal work environments, you need to use common sense in handling it. By following these important tips, you will get the most use and enjoyment out of your computer.

Important tips

Be careful about where and how you work

- Do not leave the base of your computer, or any other part that becomes hot during operation, in contact with your lap or any part of your body for an extended period when the computer is functioning or when the battery is charging. Your computer dissipates some heat during normal operation. This heat is a function of the level of system activity and battery charge level. Extended contact with your body, even through clothing, could cause discomfort or, eventually, a skin burn.

- When the ac adapter is connected to an electrical outlet and your computer, it generates heat. Do not place the adapter in contact with any part of your body while using it. Never use the ac adapter to warm your body. Extended contact with your body, even through clothing, may cause a skin burn.

- Route the cables of an ac adapter, a mouse, a keyboard, a printer, or any other electronic device, or communication lines, so that they cannot be walked on, tripped over, pinched by your computer or other objects, or in any way subjected to treatment that could disturb the operation of your computer. Applying strong force to the cables may damage or break them.

- Place liquids away from your computer to avoid spills, and keep your computer away from water (to avoid the danger of electrical shock).

- Store packing materials safely out of the reach of children to prevent the risk of suffocation from plastic bags.

- Keep your computer away from magnets, activated cellular phones, electrical appliances, or speakers (within 13 cm or 5 in).

- Avoid subjecting your computer to extreme temperatures (below 5°C/41°F or above 35°C/95°F).

- Some appliances, such as certain portable desktop fans or air purifiers, can produce negative ions. If a computer is close to such an appliance, and is exposed for an extended time to air containing negative ions, it may become electrostatically charged. Such a charge may be discharged through your hands when you touch the keyboard or other parts of the computer,

or through connectors on I/O devices connected to it. Even though this kind of electrostatic discharge (ESD) is the opposite of a discharge from your body or clothing to the computer, it poses the same risk of a computer malfunction.

Your computer is designed and manufactured to minimize any effects of electrostatic charge. An electrostatic charge above a certain limit, however, can increase the risk of ESD. Therefore, when using the computer close to an appliance that can produce negative ions, give special attention to the following:

– Avoid directly exposing your computer to the air from an appliance that can produce negative ions.
– Keep your computer and peripherals as far as possible from such an appliance.
– Wherever possible, ground your computer to facilitate safe electrostatic discharge.

Note: Not all such appliances cause a significant electrostatic charge.

Be gentle with your computer

- Avoid placing any objects (including paper) between the display and the keyboard or under the keyboard.
- Do not drop, bump, scratch, twist, hit, vibrate, push, or place heavy objects on your computer, display, or external devices.
- Your computer display is designed to be opened and used at an angle slightly greater than 90 degrees. Do not open the display beyond 135 degrees, as this might damage the computer hinge.

Carry your computer properly

- Before moving your computer, be sure to remove any media, turn off attached devices, and disconnect cords and cables.
- Be sure your computer is in sleep or hibernation mode, or turned off, before moving it. This will prevent damage to the hard disk drive and data loss.
- When picking up your open computer, hold it by the bottom. Do not pick up or hold your computer by the display.
- Use a quality carrying case that provides adequate cushion and protection. Do not pack your computer in a tightly packed suitcase or bag.

Handle storage media and drives properly

- If your computer comes with an optical drive, do not touch the surface of a disc or the lens on the tray.
- Wait until you hear the CD or DVD click into the center pivot of an optical drive before closing the tray.

- When installing your hard disk, follow the instructions shipped with your hardware, and apply pressure only where needed on the device.

Take care in setting passwords

- Remember your passwords. If you forget a supervisor or hard disk password, Lenovo authorized service provider will not reset it, and you might have to replace your system board or hard disk drive.

Other important tips

- Your computer modem might use only an analog telephone network, or public-switched telephone network (PSTN). Do not connect the modem to a PBX (private branch exchange) or any other digital telephone extension line because this could damage your modem. Analog phone lines are often used in homes, while digital phone lines are often used in hotels or office buildings. If you are not sure which kind of phone line you are using, contact your telephone company.
- Your computer might have both an Ethernet connector and a modem connector. If so, be sure to connect your communication cable to the correct one, so your connector is not damaged.
- Register your Lenovo products with Lenovo (refer to the Web page: http://www.lenovo.com/register). This can help authorities return your computer to you if it is lost or stolen. Registering your computer also enables Lenovo to notify you about possible technical information and upgrades.
- Only an authorized Lenovo repair technician should disassemble and repair your computer.
- Do not modify or tape the latches to keep the display open or closed.
- Take care not to turn your computer over while the ac adapter is plugged in. This could break the adapter plug.
- Turn off your computer if you are replacing a device, or else verify that the device is warm- or hot-swappable.
- Before you install any of the following devices, touch a metal table or a grounded metal object. This action reduces any static electricity from your body. The static electricity could damage the device.
  - ExpressCard
  - Smart Card
  - Memory Card, such as SD Card, Memory Stick, MultiMediaCard, xD-Picture Card, and Memory Stick Pro card.
  - Memory module
  - PCI Express Mini Card
- When transferring data to or from a Flash Media Card, such as an SD card, do not put your computer in sleep or hibernation mode before the data transfer is complete. To do so might cause damage to your data.

Cleaning the cover of your computer

Occasionally clean your computer as follows:

1. Prepare a mixture of a gentle kitchen-use detergent (one that does not contain abrasive powder or strong chemicals such as acid or alkaline). Use 5 parts water to 1 part detergent.
2. Absorb the diluted detergent into a sponge.
3. Squeeze excess liquid from the sponge.
4. Wipe the cover with the sponge, using a circular motion and taking care not to let any excess liquid drip.
5. Wipe the surface to remove the detergent.
6. Rinse the sponge with clean running water.
7. Wipe the cover with the clean sponge.
8. Wipe the surface again with a dry, soft lint-free cloth.
9. Wait for the surface to dry completely and remove any cloth fibers from the computer surface.

Cleaning your computer keyboard

1. Absorb some isopropyl rubbing alcohol on a soft, dust-free cloth.
2. Wipe each keytop surface with the cloth. Wipe the keys one by one; if you wipe several keys at a time, the cloth may hook onto an adjacent key and possibly damage it. Make sure that no liquid drips onto or between the keys.
3. Allow to dry.
4. To remove any crumbs and dust from beneath the keys, you can use a camera blower with a brush or cool air from a hair drier.

Note: Avoid spraying cleaner directly on the display or the keyboard.

Cleaning your computer display

1. Gently wipe the display with a dry, soft lint-free cloth. If you see a scratchlike mark on your display, it might be a stain transferred from the keyboard when the cover was pressed from the outside.
2. Wipe or dust the stain gently with a soft, dry cloth.
3. If the stain remains, moisten a soft, lint-free cloth with water or a 50-50 mixture of isopropyl alcohol and water that does not contain impurities.
4. Wring out as much of the liquid as you can.
5. Wipe the display again; do not let any liquid drip into the computer.
6. Be sure to dry the display before closing it.

Care for the fingerprint reader

The following actions could damage the fingerprint reader (in some models) or cause it not to work properly:

- Scratching the surface of the reader with a hard, pointed object.
- Scraping the surface of the reader with your nail or anything hard.
- Using or touching the reader with a dirty finger.

If you notice any of the following conditions, gently clean the surface of the reader with a dry, soft, lint-free cloth:

- The surface of the reader is dirty or stained.
- The surface of the reader is wet.
- The reader often fails to enroll or authenticate your fingerprint.

Chapter 3. Solving computer problems

Note: See *Access Help* if your system is running and *Access Help* is accessible. This chapter presents information for use when *Access Help* is inaccessible.

Frequently asked questions

This section lists frequently asked questions and tells where you can find detailed answers. For details about each publication included in the package with your computer, see "This guide and other publications" on page 1.

What safety precautions should I follow when using my computer?
See the separate *Safety and Warranty Guide* for detailed information about safety.

How can I prevent problems with my computer?
See "Read first" on page v, and also Chapter 2, "Caring for your computer," on page 3 of this Guide. More tips can be found in the "Preventing problems" section in online *Access Help*.

What are the main hardware features of my new computer?
See the "Lenovo 3000 tour" section in online *Access Help*.

Where can I find the detailed specifications for my computer?
See http://www.lenovo.com/support.

I need to upgrade a device *or* **I need to replace one of the following: the hard disk drive, memory, or the keyboard.**
See the Appendix B, "Customer Replaceable Units (CRUs)," on page 41of this Guide for the list of Customer Replaceable Units and the location of the instructions for removing or replacing components.

My computer is not operating properly.
Study the "Problem solving " section in online *Access Help*. This Guide describes only problems that might prevent you from accessing the online help system.

Where are the recovery discs?
Your computer did not come with a recovery disc or Windows disc. For an explanation of the alternative recovery methods offered by Lenovo, see the "Restoring factory contents" on page 23 of this Guide.

How can I contact the Customer Support Center?
See Chapter 6, "Getting help and service," on page 33 of this Guide. For the phone numbers of the Customer Support Center nearest to you, see "Worldwide telephone list" on page 35.

Where can I find warranty information?

See the separate *Safety and Warranty Guide* for detailed warranty information. For the warranty applicable to your computer, including the warranty period and type of warranty service, see Appendix A, "Warranty information," on page 39.

Diagnosing problems

If you have a problem with your computer, you can test it by using PC-Doctor® for Windows. To run PC-Doctor for Windows, do as follows:

1. Click **Start**.
2. Move the pointer to **All Programs** and then to **PC-Doctor for Windows**.
3. Click **PC-Doctor**.

For more information about PC-Doctor for Windows, see the Help for the program.

Attention

Running any tests can take up to several minutes or longer. Make sure you have time to run the entire test; do not interrupt the test while it is running.

When preparing to contact the Customer Support Center, be sure to print the test log so that you can rapidly provide information to the help technician.

Troubleshooting

If you do not find your problem here, see *Access Help*. The following section only describes problems that might prevent you from accessing this help system.

Error messages

The following is a list of the messages that the BIOS can display. Most of them occur during POST. Some of them display information about a hardware device, e.g., the amount of memory installed. Others may indicate a problem with a device, such as the way it has been configured. Following the list are explanations of the messages and remedies for reported problems. If your system displays one of the messages marked below with an asterisk (*), write down the message and contact your marketing representative. If your system fails after you make changes in the BIOS Setup Utility menus, reset the computer, enter BIOS Setup Utility and configure default settings or correct the error.

Code	Message	Description
0200	Failure Fixed Disk	Fixed disk is not working or not configured properly. Check to see if fixed disk is attached properly. Run BIOS Setup Utility. Find out if the fixed-disk type is correctly identified.
0210	Stuck key	Stuck key on keyboard.
0211	Keyboard error	Keyboard not working.
0212*	Keyboard Controller Failed	Keyboard controller failed test. May require replacing keyboard controller.
0213	Keyboard locked - Unlock key switch	Unlock the system to proceed.
0220	Monitor type does not match CMOS - Run SETUP	Monitor type not correctly identified in BIOS Setup Utility.
0230*	Shadow Ram Failed at offset: nnnn	Shadow RAM failed at offset nnnn of the 64k block at which the error was detected.
0231*	System RAM Failed at offset: nnnn	System RAM failed at offset nnnn of the 64k block at which the error was detected.
0232*	Extended RAM Failed at offset: nnnn	Extended memory not working or not configured properly at offset nnnn.
0250	System battery is dead - Replace and run SETUP	The CMOS clock battery indicator shows the battery is dead. Replace the battery and run BIOS Setup Utility to reconfigure the system.
0251	System CMOS checksum bad - Default configuration use	System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. The BIOS installed Default Setup Values. If you do not want these values, enter BIOS Setup Utility and enter your own values. If the error persists, check the system battery or contact your dealer.
0260*	System timer error	The timer test failed. Requires repair of system board.
0270*	Real time clock error	Real-time Clock fails BIOS hardware test. May require board repair.
0271	Check date and time settings	BIOS found date or time out of range and reset the Real -Time Clock. May require setting legal date (1991-2099).

Code	Message	Description
0280	Previous boot incomplete - Default configuration used	Previous POST did not complete successfully. POST loads default values and offers to run BIOS Setup Utility. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail. On systems with control of wait states, improper BIOS Setup Utility settings can also terminate POST and cause this error on the next boot. Run BIOS Setup Utility and verify that the wait-state configuration is correct. This error is cleared the next time the system is booted.
0281	Memory Size found by POST differed from CMOS	Memory size found by POST differed from CMOS.
02B0 02B1	Diskette drive A error Diskette drive B error	Drive A: or B: is present but fails the BIOS POST diskette tests. Check to see that the drive is defined with the proper diskette type in BIOS Setup Utility and that the diskette drive is attached correctly.
02B2	Incorrect Drive A type - run SETUP	Type of diskette drive A: not correctly identified in BIOS Setup Utility.
02B3	Incorrect Drive B type - run SETUP	Type of diskette drive B: not correctly identified in BIOS Setup Utility.
02D0	System cache error - Cache disabled	RAM cache failed and BIOS disabled the cache. On older boards, check the cache jumpers. You may have to replace the cache. See your dealer. A disabled cache slows system performance considerably.
02F0	CPU ID	CPU socket number for Multi-Processor error.
02F4*	EISA CMOS not writable	ServerBIOS2 test error: Cannot write to EISA CMOS.
02F5*	DMA Test Failed	ServerBIOS2 test error: Cannot write to extended DMA (Direct Memory Access) registers.
02F6*	Software NMI Failed	ServerBIOS2 test error: Cannot generate software NMI (Non-Maskable Interrupt).
02F7*	Fail - Safe Timer NMI Failed	ServerBIOS2 test error: Fail-Safe Timer takes too long.
N/A	Device Address Conflict	Address conflict for specified device.
N/A	Allocation Error for : device	Run ISA or EISA Configuration Utility to resolve resource conflict for the specified device.

Code	Message	Description
N/A*	Failing Bits: nnnn	The hex number nnnn is a map of the bits at the RAM address which failed the memory test. Each 1 (one) in the map indicates a failed bit. See errors 230, 231, or 232 above for offset address of the failure in System, Extended, or Shadow memory.
N/A	Invalid System Configuration Data	Problem with NVRAM (CMOS) data.
N/A	I/O device IRQ conflict	I/O device IRQ conflict error.
N/A	One or more I2O Block Storage Devices were excluded from the Setup Boot menu	There was not enough room in the IPL table to display all installed I2O block-storage devices.
N/A	Operating system not found	Operating system cannot be located on either drive A: or drive C:. Enter BIOS Setup Utility and see if fixed disk and drive A: are properly identified. Make sure that: • The hard disk drive is correctly installed. • A startable disc is in the drive. If you still see the same error message, check the boot sequence using BIOS Setup Utility.
N/A*	Parity Check 1 nnnn	Parity error found in the system bus. BIOS attempts to locate the address and display i on the screen. If it cannot locate the address, it displays ????. Parity is a method for checking errors in binary data. A parity error indicates that some data has been corrupted.
N/A*	Parity Check 2 nnnn	Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays ????.
N/A	Press F1 to resume, F2 to Setup, F3 for previous	Displayed after any recoverable error message. Press F1 to start the boot process or F2 to enter BIOS Setup Utility and change the settings. Press F3 to display the previous screen (usually an initialization error of an Option ROM, i.e., an add-on card). Write down and follow the information shown on the screen.

Errors without messages

Problem:	When I turn on the computer, nothing appears on the screen and the computer does not beep while starting up. **Note:** If you are not sure whether you heard any beeps, turn off the computer; then turn it on again, and listen again. If you are using an external monitor, see "Computer screen problems" on page 18.
Solution:	If a user password is set, press any key to display the user password prompt; then type the correct password and press Enter. If the user password prompt does not appear, the brightness level might be set to minimum brightness. Adjust the brightness level by pressing Fn+F11. If the screen still remains blank, make sure that: • The battery is installed correctly. • The ac adapter is connected to the computer and the power cord is plugged into a working electrical outlet. • The computer power is on. (Turn on the power switch again for confirmation.) If these items are properly set, and the screen remains blank, have the computer serviced.
Problem:	When I turn on the computer, nothing appears on the screen, but I hear two or more beeps.
Solution:	Make sure that the memory card is installed correctly. If it is, but the screen is still blank, and you hear five beeps, have the computer serviced.
Problem:	When I turn on the computer, only a white cursor appears on a blank screen.
Solution:	Restore backed-up files to your Windows environment or the entire contents of your hard disk to the original factory contents using Rescue and Recovery. If you still see only the cursor on the screen, have the computer serviced.
Problem:	My screen goes blank while the computer is on.
Solution:	Your screen saver or power management may be enabled. Do one of the following to exit from the screen saver or to resume from sleep or hibernation mode: • Touch the touch pad. • Press a key. • Press the power switch.

A password problem

Problem:	I forgot my password.
Solution:	
	• If you forgot your user password, you must take your computer to a Lenovo authorized servicer or a marketing representative to have the password canceled.
	• If you forgot your HDD password, Lenovo authorized servicer can not reset your password or recover data from the hard disk. You must take your computer to a Lenovo authorized servicer or a marketing representative to have the hard disk drive replaced. Proof of purchase is required, and a fee will be charged for parts and service.
	• If you forget your supervisor password, Lenovo authorized servicer cannot reset your password. You must take your computer to a Lenovo authorized servicer or a marketing representative to have the system board replaced. Proof of purchase is required, and a fee will be charged for parts and service.

Keyboard problems

Problem:	A number appears when you type a letter.
Solution:	The numeric lock function is on. To disable it, press Fn+Delete.
Problem:	All or some of the keys on the external numeric keypad do not work.
Solution:	Make sure that the external numeric keypad is correctly connected to the computer.

Sleep or hibernation problems

Problem:	The computer enters sleep mode unexpectedly.
Solution:	If the processor overheats, the computer automatically enters sleep mode to allow the computer to cool and to protect the processor and other internal components. Check the settings for sleep mode.

Problem:	The computer enters sleep mode (the sleep indicator turns on) immediately after Power-on self-test (POST).
Solution:	Make sure that: • The battery is charged. • The operating temperature is within the acceptable range. See "Specifications" on page 44. If the battery is charged and the temperature is within range, have the computer serviced.
Problem:	The `critical low-battery` error message appears, and the computer immediately turns off.
Solution:	The battery power is getting low. Connect the ac adapter to the computer, or replace the battery with a fully charged one.
Problem:	When you take action to return from sleep mode, the computer display remains blank.
Solution:	Check whether an external monitor was disconnected or turned off while the computer was in sleep mode. If you disconnected or turned off the external monitor, connect it or turn it on before resuming the computer from the sleep mode. When resuming the computer from the sleep mode without attaching the external monitor or turning it on, and the computer display remains blank, press Fn+F7 to bring up the computer display. **Note:** If you use the Fn+F7 key combination to apply a presentation scheme, press Fn+F7 at least three times in three seconds, and the image is displayed on the computer screen.
Problem:	The computer does not return from sleep mode, or the sleep indicator stays on and the computer does not work.
Solution:	If the computer does not return from sleep mode, it may have entered sleep or hibernation mode automatically because the battery is depleted. Check the sleep indicator. • If the sleep indicator is on, your computer is in sleep mode. Connect the ac adapter to the computer; then press any key or the power button. • If the sleep indicator is off, your computer is in hibernation mode or power-off state. Connect the ac adapter to the computer; then press power button to resume operation. If the system still does not return from sleep mode, your system may stop responding and you cannot turn off the computer. Reset the computer. Unsaved data may be lost. To reset the computer, press and hold the power button for 4 seconds or more. If the computer is still not reset, remove the ac adapter and the battery.

Computer screen problems

Problem:	The screen is blank.
Solution:	
	Do the following:

- Press Fn+F7 to bring up the image.
  Note: If you use the Fn+F7 key combination to apply a presentation scheme, press Fn+F7 at least three times in three seconds, and the image is displayed on the computer screen.
- If you are using the ac adapter, or using the battery, and the battery status indicator is on (is green), press Fn+F11 to make the screen brighter.
- If the sleep status indicator is on (is green), press any key or the power button to resume from the sleep mode.
- If you still have the problem, do the Solution in the following problem "The screen is unreadable or distorted."

Problem:	The screen is unreadable or distorted.
Solution:	Make sure that: • The display device driver is installed correctly. • The screen resolution and color quality are correctly set. • The monitor type is correct. To check these settings, do as follows: 1. Right-click on the desktop, and click **Personalize**. 2. Click **Display Settings** and check whether the screen resolution and color quality are correctly set. 3. Click **Advanced Settings**. 4. Click the **Adapter** tab. 5. Make sure that the correct device driver name is shown in the adapter information window. **Note:** The device driver name depends on the video chip that has been installed on your computer. 6. Click the **Properties** button. If you are prompted for an administrator password or confirmation, type the password or provide confirmation. Check the "Device status" box and make sure the device is working properly. If not, click the **Troubleshoot** button. 7. Click the **Monitor** tab. 8. Make sure the information is correct. 9. Click the **Properties** button. If you are prompted for an administrator password or confirmation, type the password or provide confirmation. Check the "Device status" box and make sure the device is working properly. If not, click the **Troubleshoot** button.
Problem:	Incorrect characters appear on the screen.
Solution:	Did you install the operating system or application program correctly? If they are installed and configured correctly, have the computer serviced.
Problem:	Missing, discolored, or bright dots appear on the screen every time you turn on your computer.
Solution:	This is an intrinsic characteristic of the TFT technology. Your computer's display contains multiple thin-film transistors (TFTs). A small number of missing, discolored, or bright dots on the screen might exist all the time.

Problem:	A message, "Unable to create overlay window," appears when you try to start DVD playback. *-or-* You get poor or no playback while running video playback, DVD playback, or game applications.
Solution:	Do either of the following: • If you are using 32-bit color mode, change the color depth to 16-bit mode. • If you are using a desktop size of 1280×1024 or larger, reduce the desktop size and the color depth.

Battery problems

Problem:	The battery cannot be fully charged by the power-off method in the standard charge time for your computer.
Solution:	For details, see the Battery and power category in Troubleshooting under the "Problem solving" section in *Access Help*.
Problem:	Your computer shuts down before the battery status indicator shows empty, *-or-* Your computer operates after the battery status indicator shows empty.
Solution:	Discharge and recharge the battery.
Problem:	The operating time for a fully charged battery is short.
Solution:	For details, see the Battery and power category in Troubleshooting under the "Problem solving" section in *Access Help*.
Problem:	The computer does not operate with a fully charged battery.
Solution:	The surge protector in the battery might be active. Turn off the computer for one minute to reset the protector; then turn on the computer again.
Problem:	The battery does not charge.
Solution:	For details, see the Battery and power category in Troubleshooting under the "Problem solving" section in *Access Help*.

A hard disk drive problem

Problem:	The hard disk drive does not work.
Solution:	In the Boot menu in BIOS Setup Utility, make sure that the hard disk drive is included in the Boot Sequence correctly.

A startup problem

Problem:	The Microsoft® Windows operating system will not start.
Solution:	Use the Rescue and Recovery workspace to help solve or identify your problem. For details about Rescue and Recovery, see Chapter 4, "Recovery options," on page 23

A fingerprint authentication problem

Problem:	You cannot register or authenticate your finger because it is wrinkled, rough, dry, injured, stained, oily, wet, or different one from what you have registered.
Solution:	To improve the situation, try the following: • Clean or wipe your hands to remove any excess dirt or moisture from the fingers. • Enroll and use a different finger for authentication. • If your hands are too dry, apply lotion to them. For details, see the Fingerprint reader category in Troubleshooting under the "Problem solving" section in *Access Help*.

Other problems

Problem:	Your computer does not respond.
Solution:	
	• To turn off your computer, press and hold the power switch for 4 seconds or more. If the computer still does not respond, remove the ac adapter and the battery. • Your computer might lock when it enters sleep mode during a communication operation. Disable the sleep timer when you are working on the network.

Problem:	The computer does not start from a device you want.
Solution:	See the Startup menu of the BIOS Setup Utility. Make sure that the startup sequence in the BIOS Setup Utility is set so that the computer starts from the device you want.
	Also make sure that the device from which the computer starts is enabled. In the startup menu in the BIOS Setup Utility, make sure that the device is included in the "Boot priority order" list. If it is included in the "Excluded from boot order" list, it is disabled. Select the entry for it in the list and press the x key. This moves the entry to the "Boot priority order" list.

Chapter 4. Recovery options

Using Rescue and Recovery

If Windows is not running properly, use the Rescue and Recovery workspace to help solve or identify your problem. Do the following:

1. Turn off your computer.
2. Press the Lenovo Care button to turn on the computer and immediately enter the Rescue and Recovery workspace.
3. After the Rescue and Recovery workspace opens, you can do the following:
   - Rescue and restore your files, folders, or backups.
   - Configure your computer and passwords.
   - Communicate using the Internet and link to the support site.
   - Troubleshoot and diagnose problems using diagnostics.

For more information about using Rescue and Recovery features, see the "Recovery overview" section in online *Access Help*.

Restoring factory contents

Instead of providing a recovery disc or a Windows disc with your computer, Lenovo provides simpler alternative methods of accomplishing the tasks typically associated with these discs. The files and programs for these alternative methods are on your hard disk, which eliminates having to locate misplaced discs and problems associated with using an incorrect disc version.

The complete backup of all the files and programs that Lenovo preinstalled on your computer resides in a hidden protected area, or partition, of the hard disk. Although hidden, the backups in the partition consume hard disk space. Therefore, when checking the capacity of your hard disk according to Windows, you might note that the total capacity of the disk appears to be smaller than anticipated. This discrepancy is explained by the contents of the hidden partition.

The Product Recovery Program contained within this area enables you to restore the complete contents of your hard disk to the same state as it was when originally shipped from the factory.

Note: The recovery process might take a couple of hours.

To recover the hard disk to its original contents, do the following:

23

Attention: All of the files on the primary hard disk partition (usually drive C) will be lost in the recovery process. However, before any data is overwritten, you will be given the opportunity to save one or more files to other media.

1. If possible, save all your files and shut down your operating system.
2. Turn off your computer for at least 5 seconds.
3. Select the On position of the wireless radio switch on your computer.

   Note: If you forget to select the On position of the wireless radio switch, your wireless network card will not be recognized, and the wireless card driver will not be included in your system.

4. Press the Lenovo Care button to turn on the computer and immediately enter the Rescue and Recovery workspace.
5. Click **Restore your system**, select **Restore my hard drive to the original factory state**, and follow the instructions on the screen.

Recovering data

If you performed a backup operation using the Rescue and Recovery program, you also have one or more backups stored that reflect the contents of the hard disk as it existed at various points in time. These backups might be stored on your hard disk, or a network drive, or on removable media, depending on the options you selected during the backup operation.

You can use either the Rescue and Recovery program or the Rescue and Recovery workspace to restore the contents of the hard disk to an earlier state using any of the stored backups. You can use the Lenovo Care button to turn on your computer and enter the Rescue and Recovery workspace that runs independently of the Windows operating system.

After the Rescue and Recovery workspace opens you can perform a recovery operation, even if you are unable to start Windows.

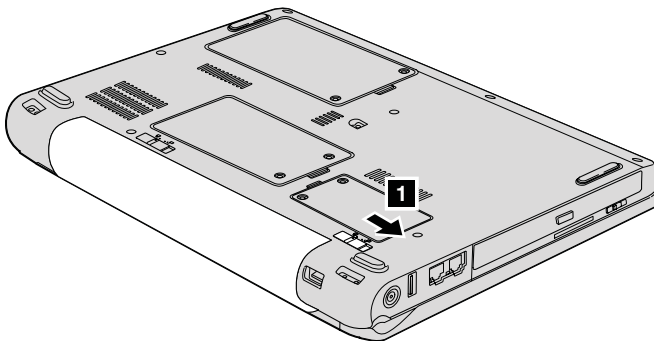# Chapter 5. Upgrading and replacing devices

Replacing the battery

> **Important**
>
> Read *Safety and Warranty Guide* before replacing the battery.

1. **Turn off the computer, or enter hibernation mode.** Then disconnect the ac adapter and all cables from the computer.

   Note: If you are using an ExpressCard, the computer might not be able to enter hibernation mode. If this happens, turn off the computer.
2. Close the computer display, and turn the computer over.
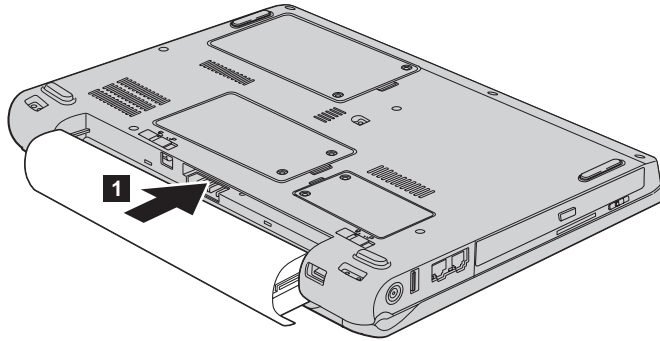3. Unlock the battery latch 1 by sliding it to the unlocked position.

4. Unlock the battery latch 2 by sliding it to the unlocked position. While holding the latch in the unlocked position, remove the battery 3 .
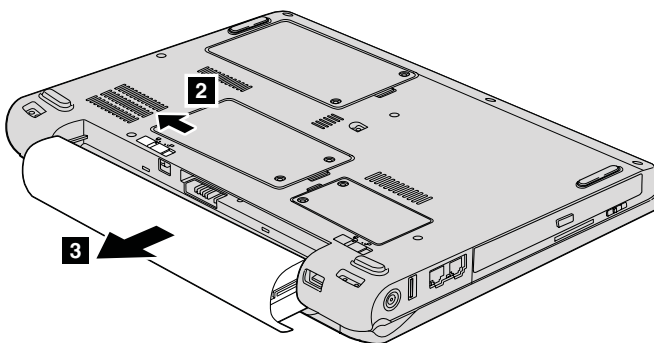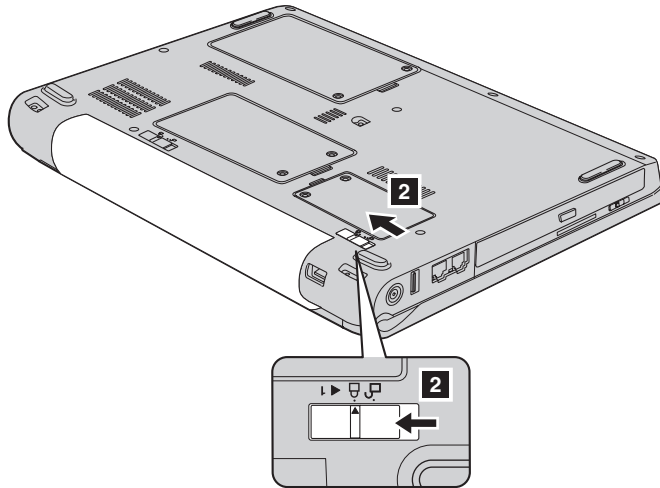
5. Install a fully charged battery **1** .

6. Slide the battery latch to the locked position **2** .

7. Turn the computer over again. Connect the ac adapter and cables to the computer.

Upgrading the hard disk drive

> **Important**
>
> Read *Safety and Warranty Guide* before replacing the hard disk drive.

You can increase the storage capacity of your computer by replacing the hard disk drive with one of greater capacity. You can purchase a new hard disk drive from your Lenovo reseller or a marketing representative.

Notes:

1. Replace the hard disk drive only if you upgrade it or have it repaired. The connectors and bay of the hard disk drive were not designed for frequent changes, or drive swapping.

2. The Rescue and Recovery workspace and the Product Recovery program are not included on an optional hard disk drive.
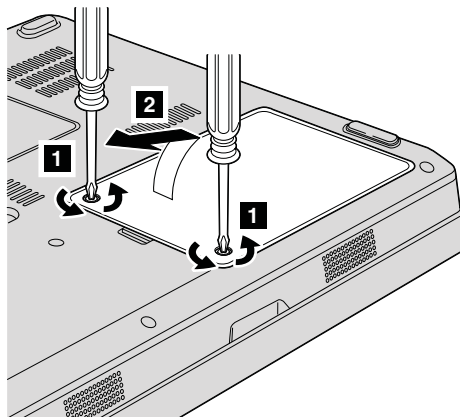

Attention

Handling a hard disk drive

- Do not drop the drive or subject it to physical shocks. Put the drive on a material, such as soft cloth, that absorbs the physical shock.
- Do not apply pressure to the cover of the drive.
- Do not touch the connector.

The drive is very sensitive. Incorrect handling can cause damage and permanent loss of data on the hard disk. Before removing the hard disk drive, make a backup copy of all the information on the hard disk, and then turn the computer off. Never remove the drive while the system is operating, in sleep mode, or in hibernation mode.

To replace the hard disk drive, do the following:

1. **Turn off the computer**; then disconnect the ac adapter and all cables from the computer.

2. Close the computer display, and turn the computer over.

3. Remove the battery.

4. Unfasten two screws **1**, and remove the hard disk cover **2**.

5. Disconnect the hard disk drive and remove it by pulling out the tab **3**.
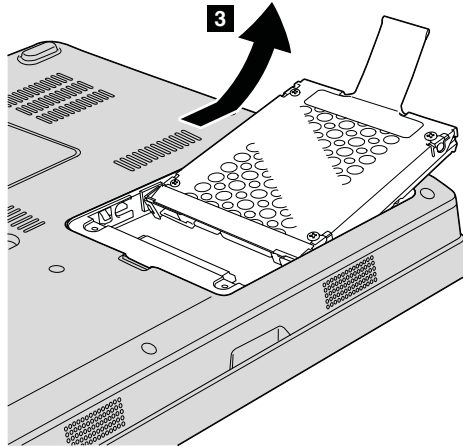
6. Insert a new hard disk drive into the hard disk drive bay **1**, then firmly install it.
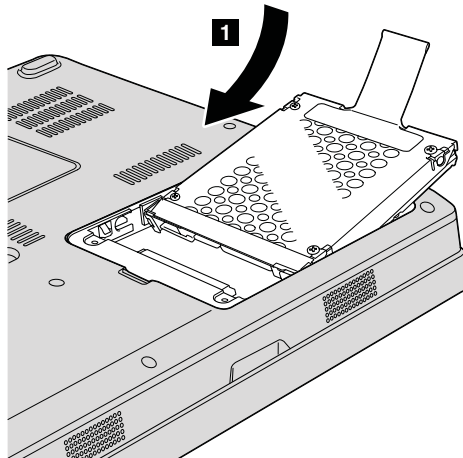
7. Reinstall the cover by aligning the front side of the cover first **1** , and closing the cover **2** . Then tighten the two screws **3** .
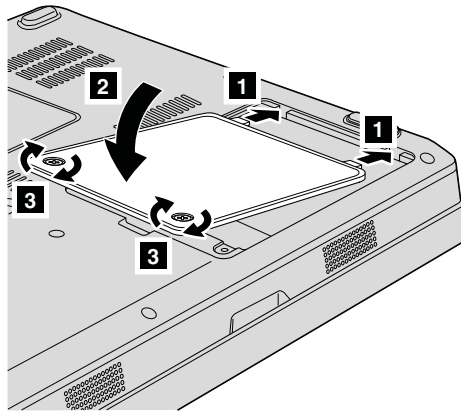
8. Reinstall the battery.
9. Turn the computer over again. Connect the ac adapter and cables to the computer.

Replacing memory

> **Important**
>
> Read *Safety and Warranty Guide* before replacing memory.

Increasing memory capacity is an effective way to make programs run faster. You can increase the amount of memory in your computer by installing a PC2-5300 (double data rate (DDR) II 667) synchronous dynamic random access memory (DRAM) unbuffered small outline dual inline memory module (SO-DIMM), available as an option, in the memory slot of your computer. SO-DIMMs with different capacities are available.

Note: Use only the memory types supported by your computer. If you incorrectly install the optional memory or install an unsupported memory type, a warning beep will sound when you try to start the computer.

To install an SO-DIMM, do the following:
1. Touch a metal table or a grounded metal object. This action reduces any static electricity in your body, that could damage the SO-DIMM. Do not touch the contact edge of the SO-DIMM.

2. **Turn off the computer**; then disconnect the ac adapter and all cables from the computer.

3. Close the computer display, and turn the computer over.

4. Remove the battery.

5. Unfasten the two screws **1** on the cover of the memory slot, and remove the cover **2** .
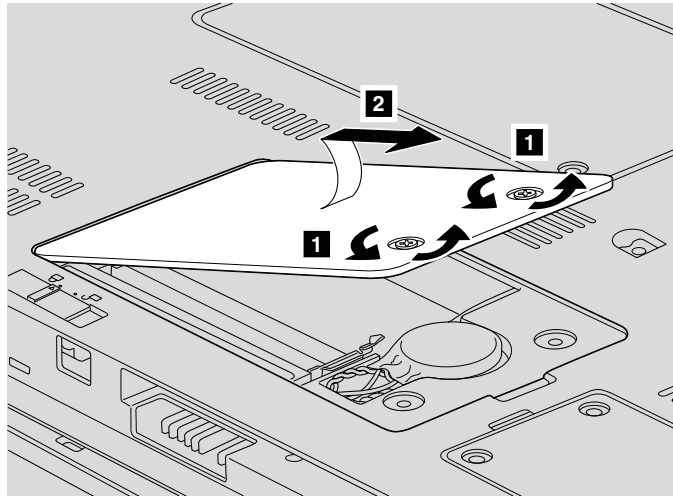
6. If the SO-DIMM is already installed in the memory slot, remove it to make room for the new one by pressing out on the latches on both edges of the socket at the same time. Be sure to save it for future use.
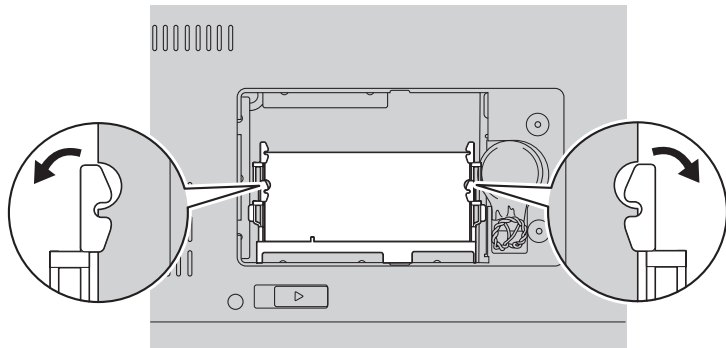
7. Find the notch on the contact edge side of the SO-DIMM.

Attention: To avoid damaging the SO-DIMM, do not touch its contact edge.

8. With the notched end of the SO-DIMM toward the contact edge side of the socket, firmly insert the SO-DIMM into the socket at an angle of about 20 degrees **1**, then press it firmly **2**.
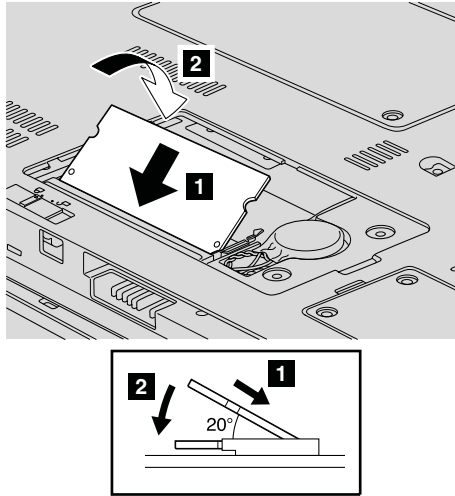
9. Push the SO-DIMM down until it snaps into place.
10. Make sure that the memory module is firmly fixed in the slot and does not move easily.
11. Reinstall the cover of the memory slot by aligning the front side of the cover first **1**, and closing the cover **2**. Then tighten the two screws **3**.
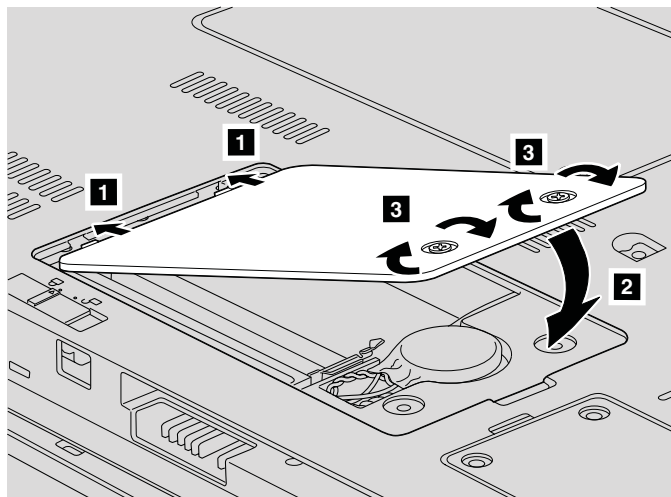
Attention: When you have replaced the SO-DIMM, do not use your computer until you have closed the memory slot cover. Never use the computer with the cover open.

12. Reinstall the battery.
13. Turn the computer over again, and reconnect the ac adapter and cables to the computer.

To make sure that the SO-DIMM is installed correctly, do as follows:

1. Turn the computer on.
2. While the initial screen is displayed, press F1. The BIOS Utility screen opens. The "Memory" item shows the amount of memory you can utilize.

Chapter 6. Getting help and service

Getting help and service

If you need help, service, technical assistance, or just want more information about Lenovo computers, you will find a wide variety of sources available from Lenovo to assist you. This section contains information about where to go for additional information about Lenovo computers, what to do if you experience a problem with your computer, and whom to call for service should it be necessary.

Microsoft Service Packs are the latest software source for Windows product updates. They are available via Web download (connection charges may apply) or via a disc. For more specific information and links, please go to the Microsoft Web site at http://www.microsoft.com. Lenovo offers Up and Running technical assistance with installation of, or questions related to, Service Packs for your Lenovo-preinstalled Microsoft Windows product. For information, please contact the Customer Support Center at the phone number(s) listed in "Worldwide telephone list" on page 35. Some fees might apply.

Getting help on the Web

The Lenovo Web site on the World Wide Web has up-to-date information about Lenovo computers and support. The address for the Lenovo home page is http://www.lenovo.com.

You can find support information for your Lenovo 3000 computer at http://www.lenovo.com/support. Research this Web site to learn how to solve problems, find new ways to use your computer, and learn about options that can make working with your Lenovo computer even easier.

Calling the Customer Support Center

If you have tried to correct the problem yourself and still need help, during the warranty period, you can get help and information by telephone through the Customer Support Center. The following services are available during the warranty period:

- Problem determination - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.

- Lenovo hardware repair - If the problem is determined to be caused by Lenovo hardware under warranty, trained service personnel are available to provide the applicable level of service.
- Engineering change management - Occasionally, there might be changes that are required after a product has been sold. Lenovo or your reseller, if authorized by Lenovo, will make selected Engineering Changes (ECs) available that apply to your hardware.

The following items are not covered:
- Replacement or use of parts not manufactured for or by Lenovo or nonwarranted parts

  Note: All warranted parts contain a 7-character identification in the format FRU XXXXXXX
- Identification of software problem sources
- Configuration of BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of application programs

To determine if your Lenovo hardware product is in warranty and when the warranty expires, go to http://www.lenovo.com/support, and click **Warranty**, then follow the instructions on the screen.

Refer to your Lenovo hardware warranty for a full explanation of Lenovo warranty terms. Be sure to retain your proof of purchase to obtain warranty service.

If possible, be near your computer when you make your call in case the technical assistance representative needs to help you resolve a computer problem. Please ensure that you have downloaded the most current drivers and system updates, run diagnostics, and recorded information before you call. When calling for technical assistance, please have the following information available:
- Machine Type and Model
- Serial numbers of your computer, monitor, and other components, or your proof of purchase
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information for your system

The telephone numbers for your Customer Support Center location are located in the Worldwide telephone list section of this guide.

Note: Telephone numbers are subject to change without notice. For the latest list of Customer Support Center telephone numbers and hours of

operation, visit the Support Web site at http://www.lenovo.com/
support/phone. If the number for your country or region is not listed,
contact your Lenovo reseller or Lenovo marketing representative.

Getting help around the world

If you travel with your computer or relocate it to a country where your
Lenovo machine type is sold, your computer might be eligible for
International Warranty Service, which automatically entitles you to obtain
warranty service throughout the warranty period. Service will be performed
by service providers authorized to perform warranty service.

Service methods and procedures vary by country, and some services might
not be available in all countries. International Warranty Service is delivered
through the method of service (such as depot, carry-in, or on-site service) that
is provided in the servicing country. Service centers in certain countries might
not be able to service all models of a particular machine type. In some
countries, fees and restrictions might apply at the time of service.

To determine whether your computer is eligible for International Warranty
Service and to view a list of the countries where service is available, go to
http://www.lenovo.com/support, click **Warranty**, and follow the instructions
on the screen.

Worldwide telephone list

Phone numbers are subject to change without notice. For the most current
phone numbers, go to http://www.lenovo.com/support/phone.

Country or Region	Telephone Number
Africa	Africa: +44 (0)1475-555-055 South Africa: +27-11-3028888 and 0800110756 Central Africa: Contact the nearest Business Partner
Argentina	0800-666-0011 (Spanish)
Australia	1300-880-917 (English)
Austria	01-24592-5901 (30 day up and running support) 01-211-454-610 (Warranty service and support) (German)
Belgium	02-210-9820 (30 day up and running support) 02-225-3611 (Warranty service and support) (Dutch) 02-210-9800 (30 day up and running support) 02-225-3611 (Warranty service and support) (French)
Bolivia	0800-0189 (Spanish)

Country or Region	Telephone Number
Brazil	Sao Paulo region: (11) 3889-8986 Outside Sao Paulo region: 0800-701-4815 (Brazilian Portuguese)
Brunei	801-1041
Canada	1-800-565-3344 (English, French) In Toronto only call: 416-383-3344
Chile	800-224-488 188-800-442-488 (Toll free) (Spanish)
China (Hong Kong S.A.R.)	Notebooks: 852-2516-3919 Desktops: 800-938-008
China (Macau S.A.R.)	Notebooks: 0800-689 Desktops: 0800-686
Colombia	1-800-912-3021 (Spanish)
Costa Rica	Toll free: 0-800-011-1029 (Spanish)
Croatia	0800-0426
Cyprus	+357-22-841100
Czech Republic	+420-2-7213-1316
Denmark	4520-8200 (30 day up and running support) 7010-5150 (Warranty service and support) (Danish)
Dominican Republic	1-866-434-2080 (Spanish)
Ecuador	1-800-426911 (Spanish)
El Salvador	800-6264 (Spanish)
Estonia	+ 372 66 00 800 + 372 6776793
Finland	09-459-6960 (30 day up and running support) +358-800-1-4260 (Warranty service and support) (Finnish)
France	0238-557-450 (30 day up and running support) 0810-631-020 (Software warranty service and support) 0810-631-213 (Hardware warranty service and support) (French)
Germany	07032-15-49201 (30 day up and running support) 01805-25-35-58 (warranty service and support) (German)
Greece	+30-210-680-1700
Guatemala	1800-624-0051 (Spanish)

Country or Region	Telephone Number
Honduras	Tegucigalpa: 232-4222 San Pedro Sula: 552-2234 (Spanish)
Hungary	+36-1-382-5720
India	1800-425-6666 or +91-80-2678-8970 (English)
Indonesia	001-803-606-282 (English/Bahasa (Indonesia))
Ireland	01-815-9202 (30 day up and running support) 01-881-1444 (warranty service and support) (English)
Israel	+972-3-531-3900 - Givat Shmuel Service Center (Hebrew, English)
Italy	02-7031-6101 (30 day up and running support) 39-800-820094 (warranty service and support) (Italian)
Japan	0120-000-817 (toll free) 0570-064-400
Korea	1588-6782 (Korean)
Latvia	+371 7070360
Lithuania	+370 5 278 66 00
Luxembourg	+352-298-977-5063 (French)
Malaysia	1800-88-1889 (English/Bahasa (Malay))
Malta	+35621445566
Mexico	001-866-434-2080 (Spanish)
Middle East	+44 (0)1475-555-055
Netherlands	+31-20-514-5770 (Dutch)
New Zealand	0800-777-217 (English)
Nicaragua	001-800-220-1830 (Spanish)
Norway	6681-1100 (30 day up and running support) 8152-1550 (warranty service and support) (Norwegian)
Panama	206-6047 (Spanish) Lenovo Customer Support Center-toll free: 001-866-434-2080
Peru	0-800-50-866 (Spanish)
Philippines	1800-1601-0033

Country or Region	Telephone Number
Poland	+48-22-878-6999
Portugal	+351-21-892-7147 (Portuguese)
Romania	+4-021-224-4015
Russian Federation	+7-495-7558800 (Russian)
Singapore	800-6011-343 (English)
Slovakia	+421-2-4954-5555
Slovenia	+386-1-4796-699
Spain	91-714-7983 0901-100-000 (Spanish)
Sri Lanka	+94-11-249-3523 (English)
Sweden	08-477-4420 (30 day up and running support) 077-117-1040 (warranty service and support) (Swedish)
Switzerland	058-333-0900 (30 day up and running support) 0800-55-54-54 (warranty service and support:) (German/French/Italian)
Taiwan	0800-000-701 (Mandarin)
Thailand	1800-060-066 (Thai)
Turkey	00800-4463-2041 (Turkish)
United Kingdom	01475-555-055 (30 day up and running support) 08705-500-900 (standard warranty support) (English)
United States	1-800-426-7378 (English)
Uruguay	000-411-005-6649 (Spanish)
Venezuela	0-800-100-2011 (Spanish)
Vietnam	For northern area and Hanoi: 84-4-843-6675 For southern area and Ho Chi Minh City: 84-8-829-5160 (English, Vietnamese)

Appendix A. Warranty information

This Appendix provides information regarding the warranty period and type of warranty service applicable to your Lenovo hardware product in your country or region. For the terms and conditions of the Lenovo Limited Warranty that applies to your Lenovo hardware product, see Chapter 3, Warranty Information in the *Safety and Warranty Guide* included with your Lenovo hardware product.

Machine Type	Country or Region of Purchase	Warranty period	Types of Warranty Service
0764	US, Canada, Mexico, Brazil, Australia, Japan	Parts and Labor - 1 year Battery pack - 1 year	3 1
	Other	Parts and Labor - 1 year Battery pack - 1 year	4 1

Types of warranty service

If required, your Service Provider will provide repair or exchange service depending on the type of warranty service specified for your Lenovo hardware product in the above table and as described below. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations, additional charges may apply outside your Service Provider's normal service area, contact your local Service Provider representative or your reseller for country and location specific information.

1. **Customer Replaceable Unit (″CRU″) Service**

   Under CRU Service, your Service Provider will ship CRUs to you for you to install. Most CRUs are easy to install whereas others may require some technical skill and tools. CRU information and replacement instructions are shipped with your product and are available from Lenovo at any time upon request. You may request that a Service Provider install some CRUs under one of the other types of warranty service designated for your product. Installation of external CRUs (such as mice, keyboards, or monitors) is your responsibility. Lenovo specifies in the materials shipped with a replacement CRU whether the defective CRU must be returned. When return is required, 1) return instructions, a prepaid return shipping label, and a container are included with the replacement CRU, and 2) you

may be charged for the replacement CRU if your Service Provider does not receive the defective CRU within thirty (30) days of your receipt of the replacement.

2. **On-site Service**

Under On-Site Service, your Service Provider will either repair or exchange the product at your location. You must provide a suitable working area to allow disassembly and reassembly of the Lenovo product. For some products, certain repairs may require your Service Provider to send the product to a designated service center.

3. **Courier or Depot Service**

Under Courier or Depot Service, your product will be repaired or exchanged at a designated service center, with shipping arranged by your Service Provider. You are responsible for disconnecting the product. A shipping container will be provided to you for you to return your product to a designated service center. A courier will pick up your product and deliver it to the designated service center. Following its repair or exchange, the service center will arrange the return delivery of the product to you.

4. **Customer Carry-In or Mail-In Service**

Under Customer Carry-In or Mail-In Service, your product will be repaired or exchanged at a designated service center, with delivery or shipping arranged by you. You are responsible to deliver or mail, as your Service Provider specifies, (prepaid unless specified otherwise) the product suitably packaged to a designated location. After the product has been repaired or exchanged, it will be made available for your collection. Failure to collect the product may result in your Service Provider disposing of the product as it sees fit. For Mail-in Service, the product will be returned to you at Lenovo's expense, unless your Service Provider specifies otherwise.

Appendix B. Customer Replaceable Units (CRUs)

Customer Replaceable Units (CRUs) are computer parts that can be upgraded or replaced by the customer. There are two types of CRUs: *internal* and *external*. External CRUs are easy to install, whereas internal CRUs require some technical skills and in some cases might require tools such as a screwdriver. However, both internal and external CRUs are safe for removal by the customer.

Customers are responsible for replacing all external CRUs. Internal CRUs can be removed and installed by customers or by a Lenovo service technician during the warranty period.

Your computer contains the following types of external CRUs:

- **External CRUs (pluggable):** These CRUs unplug from the computer. Examples of these types of CRUs include the ac adapter and power cord.
- **External CRUs with latches:** These CRUs include a latch to help you remove and replace the part. Examples of these types of CRUs include the notebook main battery, an optical drive, a hard-disk drive, and an extended battery.

Your computer contains the following types of internal CRUs:

- **Internal CRUs (located behind an access panel):** These CRUs are isolated parts within the computer that are concealed by an access panel that is typically secured by either one or two screws. Once the access panel is removed, only the specific CRU is visible. Examples of these types of CRUs include memory modules and hard disk drives.
- **Internal CRUs (located within the product):** These CRUs are accessible only by opening the computer's outer case. Examples of these CRUs include PCI Express Mini Cards and the integrated keyboard.

Online *Access Help* provides instructions for replacing internal and external CRUs. To open *Access Help*, click **Start**, move the pointer to **All Programs**; then to **Lenovo Care**. Click **Access Help**.

Additionally, the Service and Troubleshooting Guide (this guide) and *Setup Instructions* provide instructions for several critical CRU's.

If you are unable to access these instructions or if you have difficulty replacing a CRU, you can use either of the following additional resources:

- The Online Hardware Maintenance Manual and Online Videos available from the Support Web site http://www.lenovo.com/support/site.wss/document.do?sitestyle=lenovo&lndocid=part-video.
- The Customer Support Center. For the telephone number of the Support Center for your country or region, see "Worldwide telephone list" on page 35.

Note: Only use computer parts provided by Lenovo. See Chapter 3, Warranty Information in the *Safety and Warranty Guide* **for warranty information about the CRUs for your machine type.**

	Service and Troubleshooting Guide	Setup Instructions	Access Help	Online Hardware Maintenance Manual	Online Video
External CRUs (pluggable)					
AC adapter		X			
Power cord for ac power adapter		X			
External CRUs (with latches)					
Battery	X		X	X	X
Optical drive			X	X	X
Memory	X		X	X	X
Internal CRUs (behind an access panel)					
Hard disk drive	X		X	X	X
Internal CRUs (located within the product)					
PCI Express Mini Card			X	X	X

Appendix C. Features and specifications

For details about each part and its function of your computer, see "About your computer" in online *Access Help*.

Features

Processor
- See the system properties of you computer. You can do this as follows: Click **Start**, right-click **Computer**; then from the pull down menu select **Properties**.

Memory
- Double data rate (DDR) synchronous dynamic random access memory (DRAM) II

Storage device
- 2.5-inch hard disk drive

Display
The color display uses TFT technology:
- Size: 12.1 inch
- Resolution:
  - LCD: 1280-by-800
  - External monitor: Up to 2048-by-1536
- Brightness control
- Integrated camera (on some models)

Keyboard
- Fingerprint reader (on some models)
- 84-key, 85-key, or 89-key
- Touch pad
- Fn key function
- Lenovo Care button
- Volume control buttons
- Instant on button

Interface
- External-monitor connector
- Stereo headphone jack
- Microphone jack
- 3 Universal Serial Bus (USB) connectors
- RJ11 telephone connector

- RJ45 Ethernet connector
- IEEE1394 connector

ExpressCard slot

- ExpressCard

Optical drive

- CD-ROM, DVD-ROM, Combo or Multi drive depending on the model.

Wireless features

- Integrated wireless LAN
- *Bluetooth* (on some models)
- Wireless radio switch

Digital media reader

- 5-in-1 (SD card, MMC, Memory Stick, xD-Picutre Card, Memory Stick Pro) digital media slot

Specifications

Size

- Width: 305 mm
- Depth: 227 mm
- Height: 31.7 to 32.3 mm

Environment

- Maximum altitude without pressurization: 3048 m (10000 ft)
- Temperature
  - At altitudes up to 2438 m (8000 ft)
    - Operating with no optical disc in the drive: 5° to 35°C (41° to 95°F)
    - Operating with an optical disc in the drive: 10° to 35°C (50° to 95°F)
    - Non-operating: 5° to 43°C (41° to 109°F)
  - At altitudes above 2438 m (8000 ft)
    - Maximum operating temperature, 31.3°C (88° F)

  Note: When you charge the battery pack, its temperature must be at least 10°C (50°F).
- Relative humidity:
  - Operating with no optical disc in the drive: 8% to 95%
  - Operating with an optical disc in the drive: 8% to 80%

Heat output

- 65 W (222 Btu/hour) maximum

Power source (ac adapter)
- Sine-wave input at 50 to 60 Hz
- Input rating of the ac adapter: 100-240 V ac, 50 to 60 Hz

Battery pack
- Lithium-ion (Li-Ion) battery pack
  - Nominal voltage: 11.1 V dc
  - Capacity: 2.6 AH or 5.2 AH, depending on the model

Battery life
- For percentage of battery power remaining, see Power Meter on the task tray.

Specifications

Appendix D. Notices

Notices

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Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, used, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from

Lenovo authorized dealers. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables or connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible party:
   Lenovo (United States) Incorporated
   1009 Think Place - Building One
   Morrisville, NC 27650
   U.S.A.
   Telephone: (919) 294-5900

Industry Canada Class B emission compliance statement

This Class B digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-Lenovo option cards.

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