ThinkPad

User Guide

ThinkPad S230u

Notes: Before using this information and the product it supports, be sure to read and understand the following:

- *Safety, Warranty, and Setup Guide*
- *Regulatory Notice*
- “Important safety information” on page iv
- Appendix D “Notices” on page 121

The *Safety, Warranty, and Setup Guide* and the *Regulatory Notice* have been uploaded to the Web site. To refer to them, go to http://www.lenovo.com/ThinkPadUserGuides and click **User Guides & Manuals**, then follow the instructions on the screen.

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Contents

Read this first iii
Important safety information iv
Conditions that require immediate action . . . v
Safety guidelines v

Chapter 1. Product overview 1
Locating computer controls, connectors, and indicators. 1
Front view. 1
Right-side view. 3
Left-side view 4
Bottom view 6
Status indicators 6
Locating important product information 8
Machine type and model label. 8
FCC ID and IC Certification number label . . . 9
Features 9
Specifications 10
Operating environment 11
Lenovo programs 11

Chapter 2. Using your computer . . . 13
Registering your computer 13
Frequently asked questions 13
Tablet mode. 14
Using tablet mode 14
Using the multi-touch screen 17
Using the tablet buttons 19
Special keys and buttons 19
Using the UltraNav pointing device. 21
Using the TrackPoint pointing device 22
Using the touch pad. 23
Disabling the UltraNav pointing device . . . 23
Adding the UltraNav icon to the Windows notification area 24
Power management 24
Using the battery power 24
Using the ac power adapter. 25
Managing the power plans 26
Power-saving modes 26
Connecting to the network 26
Ethernet connections 27
Wireless connections 27
Presentations and Multimedia. 28
Changing the display settings 28
Using an external display. 29
Using a projector 30
Using audio features 30
Using the integrated camera 31
Using a media card 31
Inserting a media card 32
Removing a media card 32

Chapter 3. You and your computer . . 33
Accessibility and comfort 33
Ergonomic information. 33
Comfort 34
Accessibility information 34
Traveling with your computer 35
Travel tips 35
Travel accessories 35

Chapter 4. Security 37
Attaching a mechanical lock 37
Using passwords. 37
Passwords and sleep mode. 37
Typing passwords 37
Power-on password. 38
Hard disk passwords 38
Supervisor password 40
Hard disk security 42
Setting the security chip 43
Notice on deleting data from your hard disk drive or solid-state drive 44
Using firewalls 44
Protecting data against viruses 44

Chapter 5. Recovery overview 47

Chapter 6. Replacing devices 49
Static electricity prevention. 49
Disabling the built-in battery 49
Replacing the SIM card 49
Replacing the hard disk drive or solid-state drive . 51
Replacing the keyboard 53
Replacing a Mini PCI ExpressCard for wireless LAN connection 57
Installing or replacing the wireless WAN card. . . 60

Chapter 7. Advanced configuration. . 65
Installing a new operating system 65
Installing the Windows 8 operating system . . 65
Installing device drivers 66
ThinkPad Setup 66
Main menu 66

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Config menu 67
Date/Time menu 71
Security menu 71
Startup menu 75
Restart menu 77
Updating your system UEFI BIOS 77
Using system management 77
System management 78
Setting management features 78

Chapter 8. Preventing problems . . . 81
General tips for preventing problems 81
Making sure device drivers are current 82
Taking care of your computer 83
Cleaning the cover of your computer 84

Chapter 9. Troubleshooting computer problems 87
Diagnosing problems 87
Troubleshooting 87
Computer stops responding 87
Spills on the keyboard 88
Error messages 88
Errors without messages 90
Beep errors 91
Memory module problems 91
Networking problems 92
Problems with the keyboard and other pointing devices 94
Problems with the display and multimedia devices 95
Battery and power problems 99
Problems with drives and other storage devices 102
A software problem 103
Problems with ports and connectors 104

Chapter 10. Getting support 105
Before you contact Lenovo 105
Getting help and service 105
Using diagnostic programs 106
Lenovo Support Web site 106
Calling Lenovo 106
Finding ThinkPad options 107
Purchasing additional services 107

Appendix A. Regulatory information 109
Wireless related information 109
Location of the UltraConnect wireless antennas 110
Locating wireless regulatory notices 111
Export classification notice 111
Electronic emission notices 111
Federal Communications Commission Declaration of Conformity 111
Industry Canada Class B emission compliance statement 111
European Union - Compliance to the Electromagnetic Compatibility Directive . . . 112
German Class B compliance statement . . . 112
Korea Class B compliance statement 113
Japan VCCI Class B compliance statement . . 113
Japan compliance statement for products which connect to the power mains with rated current less than or equal to 20 A per phase 113
Lenovo product service information for Taiwan 113

Appendix B. WEEE and recycling statements 115
Important WEEE information 115
Japan recycling statements 115
Recycling information for Brazil 116
Battery recycling information for the European Union 116
Battery recycling information for Taiwan 117
Battery recycling information for the United States and Canada 117

Appendix C. ENERGY STAR model information 119

Appendix D. Notices 121
Trademarks 122

Appendix E. Restriction of Hazardous Substances Directive (RoHS) 123
China RoHS 123
Turkish RoHS 123
Ukraine RoHS 123
India RoHS 124

Read this first

Be sure to follow the important tips given here to get the most use and enjoyment out of your computer. Failure to do so might lead to discomfort or injury, or cause your computer to fail.

Protect yourself from the heat that your computer generates.



When your computer is turned on or the battery is charging, the base, the palm rest, and some other parts may become hot. The temperature they reach depends on the amount of system activity and the level of charge in the battery.

Extended contact with your body, even through clothing, could cause discomfort or even a skin burn.

- 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 time.
- Periodically take hands from using the keyboard by lifting your hands from the palm rest.

Protect yourself from the heat generated by the ac power adapter.



When the ac power adapter is connected to an electrical outlet and your computer, it generates heat.

Extended contact with your body, even through clothing, may cause a skin burn.

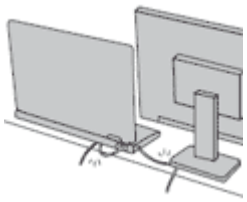
- Do not place the ac power adapter in contact with any part of your body while it is in use.
- Never use it to warm your body.

Prevent your computer from getting wet.



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

Protect the cables from being damaged.

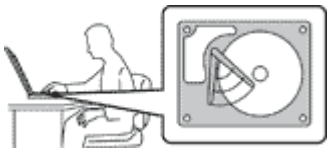


Applying strong force to cables may damage or break them.

Route communication lines, or the cables of an ac power adapter, a mouse, a keyboard, a printer, or any other electronic device, 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 interfere with the operation of your computer.

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Protect your computer and data when moving it.



Before moving a computer equipped with a hard disk drive, do one of the following, and ensure that the power button is off or is blinking:

- Turn it off.
- Put it in sleep mode.

This will help to prevent damage to the computer, and possible loss of data.

Handle your computer gently.



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

Carry your computer carefully.



- Use a quality carrying case that provides adequate cushioning and protection.
- Do not pack your computer in a tightly packed suitcase or bag.
- Before putting your computer in a carrying case, ensure that it is off, in sleep mode. Do not put a computer in a carrying case while it is turned on.

Important safety information

Note: Read the important safety information first.

This information can help you safely use your notebook computer. Follow and retain all information included with your computer. The information in this document does not alter the terms of your purchase agreement or the Lenovo® Limited Warranty. For more information, see “Warranty Information” in the *Safety, Warranty, and Setup Guide* that comes with your computer.

Customer safety is important. Our products are developed to be safe and effective. However, personal computers are electronic devices. Power cords, power adapters, and other features can create potential safety risks that can result in physical injury or property damage, especially if misused. To reduce these risks, follow the instructions included with your product, observe all warnings on the product and in the operating instructions, and review the information included in this document carefully. By carefully following the information contained in this document and provided with your product, you can help protect yourself from hazards and create a safer computer work environment.

Note: This information includes references to power adapters and batteries. In addition to notebook computers, some products (such as speakers and monitors) ship with external power adapters. If you have such a product, this information applies to your product. In addition, computer products contain a coin-sized internal battery that provides power to the system clock even when the computer is unplugged, so the battery safety information applies to all computer products.

Conditions that require immediate action

Products can become damaged due to misuse or neglect. Some product damage is serious enough that the product should not be used again until it has been inspected and, if necessary, repaired by an authorized servicer.

As with any electronic device, pay close attention to the product when it is turned on. On very rare occasions, you might notice an odor or see a puff of smoke or sparks vent from your product. Or you might hear sounds like popping, cracking or hissing. These conditions might merely mean that an internal electronic component has failed in a safe and controlled manner. Or, they might indicate a potential safety issue. However, do not take risks or attempt to diagnose the situation yourself. Contact the Customer Support Center for further guidance. For a list of Service and Support phone numbers, see the following Web site:
http://www.lenovo.com/support/phone

Frequently inspect your computer and its components for damage or wear or signs of danger. If you have any question about the condition of a component, do not use the product. Contact the Customer Support Center or the product manufacturer for instructions on how to inspect the product and have it repaired, if necessary.

In the unlikely event that you notice any of the following conditions, or if you have any safety concerns with your product, stop using the product and unplug it from the power source and telecommunication lines until you can speak to the Customer Support Center for further guidance.

- Power cords, plugs, power adapters, extension cords, surge protectors, or power supplies that are cracked, broken, or damaged.
- Signs of overheating, smoke, sparks, or fire.
- Damage to a battery (such as cracks, dents, or creases), discharge from a battery, or a buildup of foreign substances on the battery.
- A cracking, hissing or popping sound, or strong odor that comes from the product.
- Signs that liquid has been spilled or an object has fallen onto the computer product, the power cord or power adapter.
- The computer product, power cord, or power adapter has been exposed to water.
- The product has been dropped or damaged in any way.
- The product does not operate normally when you follow the operating instructions.

Note: If you notice these conditions with a product (such as an extension cord) that is not manufactured for or by Lenovo, stop using that product until you can contact the product manufacturer for further instructions, or until you get a suitable replacement.

Safety guidelines

Always observe the following precautions to reduce the risk of injury and property damage.

Service and upgrades

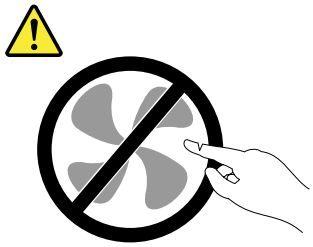
Do not attempt to service a product yourself unless instructed to do so by the Customer Support Center or your documentation. Only use a Service Provider who is approved to repair your particular product.

Note: Some computer parts can be upgraded or replaced by the customer. Upgrades typically are referred to as options. Replacement parts approved for customer installation are referred to as Customer Replaceable Units, or CRUs. Lenovo provides documentation with instructions when it is appropriate for customers to install options or replace CRUs. You must closely follow all instructions when installing or replacing parts. The Off state of a power indicator does not necessarily mean that voltage levels inside a product are zero. Before you remove the covers from a product equipped with a power cord, always ensure

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that the power is turned off and that the product is unplugged from any power source. If you have any questions or concerns, contact the Customer Support Center.

Although there are no moving parts in your computer after the power cord has been disconnected, the following warnings are required for your safety.



CAUTION:
Hazardous moving parts. Keep fingers and other body parts away.

CAUTION:



Before replacing any CRUs, turn off the computer and wait three to five minutes to let the computer cool before opening the cover.

Power cords and power adapters

DANGER

Use only the power cords and power adapters supplied by the product manufacturer.

The power cords shall be safety approved. For Germany, it shall be H05VV-F, 3G, 0.75 mm^2, or better. For other countries, the suitable types shall be used accordingly.

Never wrap a power cord around a power adapter or other object. Doing so can stress the cord in ways that can cause the cord to fray, crack, or crimp. This can present a safety hazard.

Always route power cords so that they will not be walked on, tripped over, or pinched by objects.

Protect power cords and power adapters from liquids. For instance, do not leave your power cord or power adapter near sinks, tubs, toilets, or on floors that are cleaned with liquid cleansers. Liquids can cause a short circuit, particularly if the power cord or power adapter has been stressed by misuse. Liquids also can cause gradual corrosion of power cord terminals and/or the connector terminals on a power adapter, which can eventually result in overheating.

Always connect power cords and signal cables in the correct order and ensure that all power cord connectors are securely and completely plugged into receptacles.

Do not use any power adapter that shows corrosion at the ac input pins or shows signs of overheating (such as deformed plastic) at the ac input pins or anywhere on the power adapter.

Do not use any power cords where the electrical contacts on either end show signs of corrosion or overheating or where the power cord appears to have been damaged in any way.

Extension cords and related devices

Ensure that extension cords, surge protectors, uninterruptible power supplies, and power strips that you use are rated to handle the electrical requirements of the product. Never overload these devices. If power strips are used, the load should not exceed the power strip input rating. Consult an electrician for more information if you have questions about power loads, power requirements, and input ratings.

Plugs and outlets

DANGER

If a receptacle (power outlet) that you intend to use with your computer equipment appears to be damaged or corroded, do not use the outlet until it is replaced by a qualified electrician.

Do not bend or modify the plug. If the plug is damaged, contact the manufacturer to obtain a replacement.

Do not share an electrical outlet with other home or commercial appliances that draw large amounts of electricity; otherwise, unstable voltage might damage your computer, data, or attached devices.

Some products are equipped with a three-pronged plug. This plug fits only into a grounded electrical outlet. This is a safety feature. Do not defeat this safety feature by trying to insert it into a non-grounded outlet. If you cannot insert the plug into the outlet, contact an electrician for an approved outlet adapter or to replace the outlet with one that enables this safety feature. Never overload an electrical outlet. The overall system load should not exceed 80 percent of the branch circuit rating. Consult an electrician for more information if you have questions about power loads and branch circuit ratings.

Be sure that the power outlet you are using is properly wired, easily accessible, and located close to the equipment. Do not fully extend power cords in a way that will stress the cords.

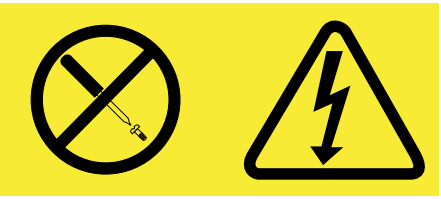
Be sure that the power outlet provides the correct voltage and current for the product you are installing.

Carefully connect and disconnect the equipment from the electrical outlet.

Power supply statement

DANGER

Never remove the cover on a power supply or any part that has the following label attached.



Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

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External devices

CAUTION:
Do not connect or disconnect any external device cables other than USB cable while the computer power is on; otherwise, you might damage your computer. To avoid possible damage to attached devices, wait at least five seconds after the computer is shut down to disconnect external devices.

General battery notice

DANGER

Personal computers manufactured by Lenovo contain a coin cell battery to provide power to the system clock. In addition, many mobile products, such as notebook computers, utilize a rechargeable battery pack to provide system power when in portable mode. Batteries supplied by Lenovo for use with your product have been tested for compatibility and should only be replaced with approved parts.

Never attempt to open or service any battery. Do not crush, puncture, or incinerate batteries or short circuit the metal contacts. Do not expose the battery to water or other liquids. Only recharge the battery pack strictly according to instructions included in the product documentation.

Battery abuse or mishandling can cause the battery to overheat, which can cause gasses or flame to "vent" from the battery pack or coin cell. If you notice any signs of bulging, leakage or corrosion on the exterior of the product, this may be the result of an internal battery fault. If this occurs, stop using the product immediately and please contact the Lenovo Support team for further instructions. Factory replacement of the batteries may be required.

Batteries can degrade when they are left unused for long periods of time. For some rechargeable batteries (particularly Lithium Ion batteries), leaving a battery unused in a discharged state could increase the risk of a battery short circuit, which could shorten the life of the battery and can also pose a safety hazard. Do not let rechargeable Lithium-Ion batteries completely discharge or store these batteries in a discharged state.

Built-in rechargeable battery notice

DANGER

Do not attempt to replace the internal rechargeable lithium ion batteries. Contact Lenovo Support for factory replacement.

Lithium coin cell battery notice

DANGER

Danger of explosion if battery is incorrectly replaced.

When replacing the lithium coin cell battery, use only the same or an equivalent type that is recommended by the 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.

The following statement applies to users in the state of California, U.S.A.

California Perchlorate Information:

Products containing manganese dioxide lithium coin cell batteries may contain perchlorate.

Perchlorate Material - special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate

Heat and product ventilation

**DANGER**

Computers, ac power adapters, and many accessories can generate heat when turned on and when batteries are charging. Notebook computers can generate a significant amount of heat due to their compact size. Always follow these basic precautions:

- **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.**
- **Do not operate your computer or charge the battery near flammable materials or in explosive environments.**
- **Ventilation slots, fans and/or heat sinks are provided with the product for safety, comfort, and reliable operation. These features might inadvertently become blocked by placing the product on a bed, sofa, carpet, or other flexible surface. Never block, cover, or disable these features.**
- **When the ac power 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 power adapter to warm your body. Extended contact with your body, even through clothing, may cause a skin burn.**

For your safety, always follow these basic precautions with your computer:

- **Keep the cover closed whenever the computer is plugged in.**
- **Regularly inspect the outside of the computer for dust accumulation.**
- **Remove dust from vents and any perforations in the bezel. More frequent cleanings might be required for computers in dusty or high-traffic areas.**
- **Do not restrict or block any ventilation openings.**
- **Do not operate your computer inside furniture, as this might increase the risk of overheating.**
- **Airflow temperatures into the computer should not exceed 35°C (95°F).**

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Electrical current safety information

DANGER

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

To avoid a shock hazard:

- **Do not use your computer during a lightning storm.**
- **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.**
- **Whenever 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 all attached cables and disable batteries before opening any accessible device covers unless instructed otherwise in the installation and configuration procedures.**
- **Do not use your computer until all internal parts enclosures are fastened into place. Never use the computer when internal parts and circuits are exposed.**

DANGER

Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To connect:

1. **Turn everything OFF.**
2. **First, attach all cables to devices.**
3. **Attach signal cables to connectors.**
4. **Attach power cords to outlets.**
5. **Turn devices ON.**

To disconnect:

1. **Turn everything OFF.**
2. **First, remove power cords from outlets.**
3. **Remove signal cables from connectors.**
4. **Remove all cables from devices.**

The power cord must be disconnected from the wall outlet or receptacle before installing all other electrical cables connected to the computer.

The power cord may be reconnected to the wall outlet or receptacle only after all other electrical cables have been connected to the computer.

Liquid crystal display (LCD) notice

CAUTION:
The liquid crystal display (LCD) is made of glass, and rough handling or dropping the computer can cause the LCD to break. If the LCD breaks and the internal fluid gets into your eyes or on your hands, immediately wash the affected areas with water for at least 15 minutes; if any symptoms are present after washing, get medical care.

Note: For products with mercury-containing fluorescent lamps (for example, non-LED), the fluorescent lamp in the liquid crystal display (LCD) contains mercury; dispose of according to local, state, or federal laws.

Using headphones or earphones

CAUTION:
Excessive sound pressure from earphones and headphones can cause hearing loss. Adjustment of the equalizer to maximum increases the earphone and headphone output voltage and the sound pressure level. Therefore, to protect your hearing, adjust the equalizer to an appropriate level.

Excessive use of headphones or earphones for a long period of time at high volume can be dangerous if the output of the headphone or earphone connectors do not comply with specifications of EN 50332-2. The headphone output connector of your computer complies with EN 50332-2 Sub clause 7. This specification limits the computer's maximum wide band true RMS output voltage to 150 mV. To help protect against hearing loss, ensure that the headphones or earphones you use also comply with EN 50332-2 (Clause 7 limits) for a wide band characteristic voltage of 75 mV. Using headphones that do not comply with EN 50332-2 can be dangerous due to excessive sound pressure levels.

If your Lenovo computer came with headphones or earphones in the package, as a set, the combination of the headphones or earphones and the computer already complies with the specifications of EN 50332-1. If different headphones or earphones are used, ensure that they comply with EN 50332-1 (Clause 6.5 Limitation Values). Using headphones that do not comply with EN 50332-1 can be dangerous due to excessive sound pressure levels.

Additional safety information

**DANGER**

Plastic bags can be dangerous. Keep plastic bags away from babies and children to avoid danger of suffocation.

Notice for tablet personal computer users

Safety notice for users in Australia

**DANGER**

Do not connect phone line while using tablet mode.

Notice for users in the U.S.A.

Many personal computer products and accessories contain cords, cables or wires, such as power cords or cords to connect the accessory to a personal computer. If this product has such a cord, cable or wire, then the following warning applies:

WARNING: Handling the cord on this product or cords associated with accessories sold with this product will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling***.

Save these instructions.

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Chapter 1. Product overview

This chapter provides information about the locations of connectors, locations of important product labels, computer features, specifications, operating environment, and the preinstalled Lenovo programs.

This chapter contains the following topics:

- “Locating computer controls, connectors, and indicators” on page 1
- “Locating important product information” on page 8
- “Features” on page 9
- “Specifications” on page 10
- “Operating environment” on page 11
- “Lenovo programs” on page 11

Locating computer controls, connectors, and indicators

This section introduces the computer hardware features to give you the basic information you will need to start using the computer.

Front view



Figure 1. ThinkPad S230u front view

1 Integrated camera	6 System status indicator (illuminated ThinkPad® logo)
2 Built-in microphones	7 TrackPoint® buttons
3 Ambient light sensor	8 Touch pad
4 Volume control buttons	9 TrackPoint pointing stick
5 Built-in stereo speakers	10 Windows® button

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1 Integrated camera

Use the camera to take pictures or hold a video conference. For details, see “Using the integrated camera” on page 31.

2 Built-in microphones

The built-in microphones capture sound and voice when used with an application program capable of handling audio.

3 Ambient light sensor

The ambient light sensor detects the surrounding light conditions. Then the computer adjusts the screen brightness accordingly.

4 Volume control buttons

The volume control buttons enable you to adjust the volume while you are using your computer in the tablet mode.

5 Built-in stereo speakers

Your computer is equipped with a pair of built-in stereo speakers.

6 System status indicator (illuminated ThinkPad logo)

The illuminated ThinkPad logo on the palm rest functions as a system status indicator. Your computer has several status indicators. For the detailed information about the location and meaning of each indicator, see “System status indicators” on page 6.

UltraNav® pointing device

7 TrackPoint button
8 Touch pad
9 TrackPoint pointing stick

The keyboard contains the Lenovo unique UltraNav pointing device. Pointing, selecting, and dragging are integral process that you can perform without moving your fingers from a typing position. For more information, see “Using the UltraNav pointing device” on page 21.

10 Windows button

Press the Windows button to switch between the current workspace and the Start screen.

Right-side view



Figure 2. ThinkPad S230u right-side view

Note: Your computer keyboard might look different from the illustration above.

1 Hard disk or solid-state drive bay	5 Power status indicator
2 Fan louvers	6 ac power connector
3 USB 3.0 connector	7 Power button
4 Mini DisplayPort connector	8 Screen rotation lock button

1 Hard disk or solid-state drive bay

Depending on models, your computer might have a large-capacity, customer-upgradable hard disk drive that can meet a variety of storage demands.

Some models are equipped with a solid-state drive for data storage, making your computer lighter, smaller, and faster.

2 Fan louvers

The internal fan and louvers enable air to circulate in the computer and cool the central processor.

Note: To avoid impeding the airflow, do not place any obstacle in front of the fan.

3 USB 3.0 connector

The USB 3.0 connector is used for connecting devices compatible with a USB interface, such as a USB printer or a digital camera.

Attention: When you attach a USB cable to the connector, ensure that the USB mark is facing upward. Otherwise the connector might be damaged.

4 Mini DisplayPort connector

Use the mini DisplayPort connector to connect your computer to a compatible projector, external monitor, or high-definition television.

5 Power status indicator

The power status indicator shows the status of ac power.

6 ac power connector

Connect the ac power adapter to the ac power connector to provide ac power to the computer and charge the battery.

7 Power button

Use the power button to turn on the computer. To turn off the computer, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms.
2. Click **Settings → Power → Shut down**.

If your computer stops responding and you cannot turn it off, press and hold the power button for four seconds or more. If the computer still is not responding, detach the ac power adapter to reset the computer.

You also can program the power button so that by pressing the power button you can shut down the computer or put it into sleep or hibernation mode. To define the power button, click the battery status icon in the Windows notification area, and then click **More power options → Choose what the power buttons do**.

8 Screen rotation lock button

Use the screen rotation lock button to lock the screen rotation function.

Left-side view



Figure 3. ThinkPad S230u left-side view

Note: Your computer keyboard might look different from the illustration above.

1 Combo audio jack	5 Media card reader slot
2 USB 3.0 connector	6 Subscriber Identification Module (SIM) card slot
3 Mini HDMI connector	7 Security keyhole
4 Ethernet connector	

1 Combo audio jack

To listen to the sound from your computer, you can connect a headphone or a headset that has a 3.5 mm 4-pole plug to the combo audio jack.

Notes:

- If you are using a headset with a function switch, for example, a headset for a mobile digital device, do not press this switch while using the headset. If you press it, the headset microphone will be disabled, and the integrated microphones on the computer will be enabled instead.
- The combo audio jack does not support a conventional microphone. For more information, see “Using audio features” on page 30.

2 USB 3.0 connector

The USB 3.0 connector is used for connecting devices compatible with a USB interface, such as a USB printer or a digital camera.

Attention: When you attach a USB cable to the connector, ensure that the USB mark is facing upward. Otherwise the connector might be damaged.

3 Mini HDMI connector

Your computer comes with a mini high-definition multimedia interface (HDMI) connector, a digital audio and video interface that can connect a compatible digital audio device or video monitor, such as a high-definition television. .

4 Ethernet connector

Connect your computer to a LAN with the Ethernet connector.

DANGER

To avoid the risk of electrical shock, do not connect the telephone cable to the Ethernet connector. You can only connect an Ethernet cable to this connector.

Two indicators, to the bottom-right and left of the connector, show the status of the network connection. When your computer connects to a LAN and a session with the network is available, the bottom yellow indicator is steady green. While data is being transmitted, the bottom-right indicator blinks green.

5 Media card reader slot

Depending on the model, your computer might have a media card reader slot. For more information about the supported cards, see “Using a media card” on page 31.

6 Subscriber Identification Module (SIM) card slot

If your computer has the wireless WAN feature, it might require a SIM card to establish wireless WAN connections. Depending on the country of delivery, the SIM card might be already installed in the SIM card slot.

7 Security keyhole

Purchase a security cable lock that fits this keyhole to lock your computer to a stationary object to protect your computer from theft.

Bottom view

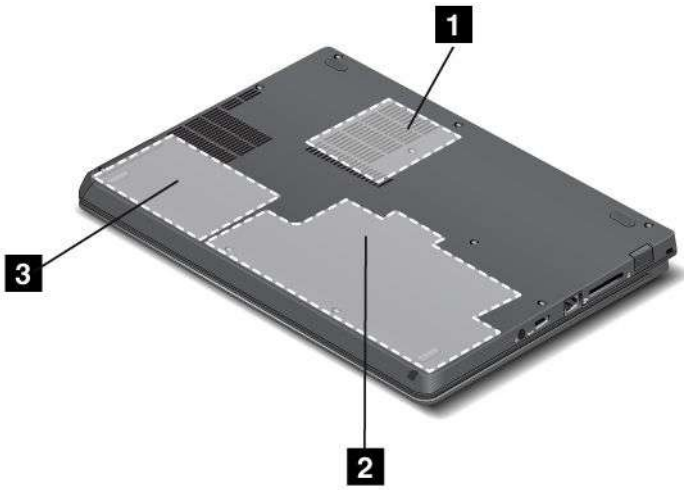


Figure 4. ThinkPad S230u bottom view

Note: Your computer bottom view might look slightly different from the illustration above.

1 Fan louvers	3 Hard disk drive or solid-state drive
2 Integrated battery	

1 Fan louvers

The internal fan and louvers enable air to circulate in the computer and cool the central processor.

Note: To avoid impeding airflow, do not place any obstacle in front of the fan.

2 Integrated battery

Use your computer with the battery power whenever ac power is unavailable.

3 Hard disk drive or solid-state drive

Depending on models, your computer might have a large-capacity, customer-upgradable hard disk drive that can meet a variety of storage demands.

Some models are equipped with a solid-state drive for data storage, making your computer lighter, smaller, and faster.

Note: The hidden service partition is the reason why there is less free space than expected on your hard disk drive or solid-state drive. This reduction is more noticeable on the solid-state drive because of its smaller capacity.

Status indicators

The status indicators show the current status of your computer.

System status indicators

The illuminated dot in the ThinkPad logo on the outer lid of your computer and on the palm rest works as a system status indicator.



Note: Your computer keyboard might look different from the illustration above.

The meaning of the indicator is as follows:

- **Red:** The computer is on (in normal mode).
- **Fast blinking red:** The computer is turning off.
- **Slow blinking red:** The computer is in sleep mode.
- **Off:** The computer is off.

Power status indicator

Your computer has an indicator that shows the status of ac power.



Note: Your computer keyboard might look different from the illustration above.

The meaning of the indicator is as follows:

- **Green:** The ac power adapter is connected.
- **Off:** The ac power adapter is not connected.

Locating important product information

This section provides information to help you locate your machine type and model label, FCC ID and IC Certification label, and the Windows Certificate of Authenticity (COA) label.

Machine type and model label

The machine type and model label identifies your computer. When you contact Lenovo for help, the machine type and model information helps support technicians to identify your computer and provide faster service.

You can find the machine type and model of your computer on the label as shown below:



FCC ID and IC Certification number label

There is no FCC ID or IC Certification number for the PCI Express Mini Card shown on the enclosure of your computer. The FCC ID and IC Certification number label is affixed on the card installed in the PCI Express Mini Card slot of your computer.



If you need to remove the Wireless LAN card for repair or replacement, follow the procedure in “Replacing a Mini PCI ExpressCard for wireless LAN connection” on page 57. If you have purchased a wireless WAN enabled computer, the wireless WAN PCI Express Mini Card is preinstalled at the factory. If you need to remove this card for repair or replacement, follow the procedure in “Installing or replacing the wireless WAN card” on page 60.

Note: Only Lenovo authorized wireless LAN or wireless WAN cards are allowed to be used in your computer. If you install an unauthorized PCI Express Mini Card that is not approved for use in your computer, the computer will not start, but will only display an error message and emit audible beeps.

Features

This topic lists the features of your computer.

Tablet features

- Multi-touch screen
- Volume control buttons
- Screen rotation lock button
- Windows button

Processor

To view the system properties of your computer, go to your desktop and move the cursor to the top-right or bottom-right corner of the screen to display the charms. Then, click **Settings** → **PC info**.

Memory

Double data rate 3 synchronous dynamic random access memory modules (DDR3 SDRAM)

Storage device

2.5-inch (7 mm height) hard disk drive or solid-state drive

Display

The color display uses the Thin Film Transistor (TFT) technology.

- Size: 12.5 inches (317.50 mm)
- Resolution:
  - LCD: 1366 x 768
  - External monitor: up to 2560 x 1600
- Brightness control
- Integrated camera
- Built-in microphones

Keyboard

- 6-row keyboard
- UltraNav pointing device (TrackPoint pointing device and multi-touch touch pad)
- Fn key

Interface

- Mini HDMI port
- Mini DisplayPort connector (on some models)
- Combo audio jack
- USB 3.0 connectors
- RJ45 Ethernet connector
- 4-in-1 media card reader
- SIM card slot

Wireless features

- Integrated wireless LAN
- Integrated wireless WAN (on some models)

Specifications

This section lists the physical specifications for your computer.

Size

- Width: 12.32 inches (313 mm)
- Depth: 9.37 inches (238 mm)
- Height: 0.80 inch (20.4 mm)

Heat output

65 W (222 Btu/hr) maximum or 90 W (307 Btu/hr) maximum, depending on the model

Power source (ac power adapter)

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

Battery pack
Integrated lithium-ion (Li-Ion) battery pack

Battery life
For the percentage of the remaining battery power, refer to the battery status icon in the Windows notification area.

Operating environment

This section provides information about your computer operating environment.

Environment:

- Maximum altitude without pressurization: 3048 m (10 000 ft)
- Temperature
  - At altitudes up to 2438 m (8000 ft)
    - Operating: 5.0°C to 35.0°C (41°F to 95°F)
    - Storage: 5.0°C to 43.0°C (41°F to 109°F)
  - At altitudes above 2438 m (8000 ft)
    - Maximum temperature when operating under the unpressurized condition: 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: 8% to 80%
  - Storage: 5% to 95%

If possible, place your computer in a well-ventilated and dry area without direct exposure to sunshine.

Keep electrical appliances such as an electric fan, radio, air conditioner, and microwave oven away from your computer because the strong magnetic fields generated by these appliances can damage the monitor and data on the hard disk drive.

Do not place any beverages on top of or beside the computer or other attached devices. If liquid is spilled on or in the computer or an attached device, a short circuit or other damage might occur.

Do not eat or smoke over your keyboard. Particles that fall into your keyboard can cause damage.

Lenovo programs

Your computer comes with Lenovo programs to help you work more easily and securely.

Note: To learn more about the programs and other computing solutions offered by Lenovo, go to http://www.lenovo.com/support.

To access Lenovo programs, press the Windows key to go to the Start screen. Click a Lenovo program to launch it. If you cannot find the program you need, move the cursor to the bottom-right corner of the screen to bring up the charms. Then click the **Search** charm to search for the desired program.

You computer might be preinstalled with the following Lenovo programs.

Active Protection System™

The Active Protection System program protects your hard disk drive when the shock sensor inside your computer detects a condition that could damage the drive, such as system tilt, excessive vibration, or shock. The hard disk drive is less vulnerable to damage when it is not operating. This is because when the hard disk drive is not operating, the system stops it from spinning, and might also move the read and write heads of the drive to areas that do not contain data. As soon as the shock sensor senses that the environment is stable again (minimal change in system tilt, vibration, or shock), it turns the hard disk drive on.

Fingerprint Software

If your computer comes with a fingerprint reader, the Fingerprint Software program enables you to enroll your fingerprint and associate it with your Windows password. As a result, the fingerprint authentication can replace your password and enable simple and secure user access.

Lenovo Cloud Storage

The Lenovo Cloud Storage program enables you to upload and store your local files to a remote Lenovo server. You can view and download the stored files at any time.

Lenovo Companion

Through the Lenovo Companion program, you can get the information about the accessories for your computer, view bolgs and articles about your computer, and check for recommended programs.

Lenovo Settings

Use the Lenovo Settings program to enhance your computing experience by turning your computer into a portable hotspot, configuring camera and audio settings, optimizing your power settings, and creating and managing multiple network profiles.

Lenovo Mobile Access

The Lenovo Mobile Access program enables you to manage your mobile broadband connection. You can create an account, add money to the account, and purchase mobile broadband sessions using your account.

Lenovo Solution Center

The Lenovo Solution Center program enables you to troubleshoot and resolve computer problems. It combines diagnostic tests, system information collection, security status, and support information, along with hints and tips for maximum system performance.

Lenovo Support

The Lenovo Support program enables you to register your computer with Lenovo, check the computer health condition and the battery status, download and view user manuals for your computer, get the warranty information of your computer, and explore help and support information.

Password Manager

The Password Manager program automatically captures and fills in authentication information for Windows programs and Web sites.

System Update

The System Update program helps you keep the software on your computer up-to-date by downloading and installing software update packages (Lenovo programs, device drivers, UEFI BIOS updates, and other third party applications).

Note: Depending on your computer model, some of the programs might not be available. Lenovo programs vary by geographic locations and are subject to update.

Chapter 2. Using your computer

This chapter provides information on using some of the computer components.

This chapter contains the following topics:

- “Registering your computer” on page 13
- “Frequently asked questions” on page 13
- “Tablet mode” on page 14
- “Special keys and buttons” on page 19
- “Using the UltraNav pointing device” on page 21
- “Power management” on page 24
- “Connecting to the network” on page 26
- “Using an external display” on page 29
- “Presentations and Multimedia” on page 28
- “Using a projector” on page 30
- “Using audio features” on page 30
- “Using the integrated camera” on page 31
- “Using a media card” on page 31

Registering your computer

When you register your computer, information is entered into a database, which enables Lenovo to contact you in case of a recall or other severe problem. After you registered your computer with Lenovo, you will also receive quicker service when you call Lenovo for help. In addition, some locations offer extended privileges and services to registered users.

To register your computer with Lenovo, do one of the following:

- Connect your computer to the Internet. Launch the preinstalled Lenovo Support program. Then click **Registration** and follow the instructions on the screen to register your computer.
- Go to http://www.lenovo.com/register, and follow the instructions on the screen to register your computer.

Frequently asked questions

The following are a few tips that will help you optimize the use of your computer.

To ensure that you receive the best performance from your computer, go to the following Web page to find information such as aids for troubleshooting and answers to frequently asked questions: http://www.lenovo.com/support/faq

Can I get my user guide in another language?

- To download the user guide in another language, go to: http://www.lenovo.com/support. Then follow the instructions on the screen.

How to use the battery power more effectively?

- To conserve the power of your computer, see “Power-saving modes” on page 26.

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- To achieve the best balance between performance and power saving, see “Managing the power plans” on page 26.

Concerned about security or need to securely dispose of data stored on your hard disk drive or solid-state drive?

- Study Chapter 4 “Security” on page 37 to find out how you can protect your computer from theft and unauthorized use.
- Use the Password Manager program to protect the data stored on your computer.
- Before you dispose of the data on the hard disk drive or solid-state drive, be sure to read “Notice on deleting data from your hard disk drive or solid-state drive” on page 44.

Is getting connected in different locations a challenge?

- To troubleshoot a wireless networking issue, go to http://www.lenovo.com/support/faq.
- To learn more about using the wireless features of your computer, refer to “Wireless connections” on page 27.
- To travel more confidently, be sure to check the tips in “Traveling with your computer” on page 35.
- Press F8 to enable or disable the wireless features.

Need to give presentations or attach an external monitor often?

- Ensure that you follow the procedure for “Using an external display” on page 29.
- With the Extend desktop function, you can display output on both the computer display and an external monitor.

Need to attach or replace a device?

- See Chapter 6 “Replacing devices” on page 49 for more information about replacing the devices of your computer.

You have been using your computer for some time already, and it is getting slower?

- Follow “General tips for preventing problems” on page 81.
- You can diagnose problems yourself by using the preinstalled diagnostic software.
- Check for recovery solutions in Chapter 5 “Recovery overview” on page 47.

Print the following sections and keep them with your computer in case you are unable to access this online user guide when necessary.

- “Installing a new operating system” on page 65
- “Computer stops responding” on page 87
- “Power problems” on page 100

Tablet mode

Your computer can be used in tablet mode. This section introduces how to use your notebook computer in tablet mode.

Using tablet mode

In tablet mode, you can use your computer in a creative and intuitive way by folding down the computer display to turn your computer into a tablet.

To use your computer in tablet mode, do the following:

1. Open the computer display slowly, holding the upper left and right sides of the computer display with both hands. Your computer is now in **notebook mode**.



2. Open the computer display by at least 45 degrees, preferably by 90 degrees. Grasp the center of one side of the computer display with one hand while holding the keyboard bezel with the other hand; then rotate the display slowly clockwise until the back of the display is facing the keyboard. Your computer is now in **picture frame mode**.

   Note: While rotating the display, do not press the upper edge of either side of the display.



3. Close the computer display slowly, holding the upper left and right sides with both hands.

   Note: Make sure that the display is rotated at 180 degrees, so that the back of the display faces the keyboard.



4. Your computer is now in **tablet mode**.

To switch your computer from tablet mode to notebook mode, do the following:

1. Open the display by at least 45 degrees, preferably by 90 degrees.
2. Rotate the display slowly counter-clockwise until the front of the display is facing the keyboard.



Your computer is now in **notebook mode**.

Tips on using your computer in tablet mode

- To close the computer display, first make sure that the display either faces the keyboard or is positioned at 180 degrees to the keyboard, so that the back of the display faces the keyboard.
- Do not pick up or hold the computer by the display only.
- Do not hit, vibrate, or bump the computer display.

- To allow free ventilation, do not place any obstacle, such as a thick-piled carpet or a soft cushion, in front of the fan.
- When you use the computer in picture frame mode, hold the display with one hand and use the Tablet Digitizer Pen.
- If you hold the computer with one hand while using it in tablet mode, do not expose it to excessive vibration, shock, or rotation.
- When using computer outdoors, protect against exposure to rain or moisture.
- If you put your computer in a carrying case, put it into notebook mode and close the display.

Using the multi-touch screen

This topic provides instructions on how to use the multi-touch screen.

Tap

Tap once on an item to select or open it. This operation is similar to a click on a mouse.

Press and hold

Press and hold an item to display information about it, or to open the context menu. This operation is similar to a right-click on a mouse.

Zoom in or zoom out

Move your fingers closer together on the screen to zoom in, or move two fingers apart on the screen to zoom out.

Rotate

Put two or more fingers on an item and then rotate your fingers. This operation enables you to rotate the item. Only some items can be rotated.

Slide to scroll

Move your finger on the screen to scroll through items such as Web pages, photos, and lists. This operation is similar to the scrolling operation on a mouse.

Slide to rearrange

Drag an item in the direction opposite to how you would scroll. For example, if you would scroll left or right, drag the item up or down. After you have moved the item to a desired location, release it.

Swipe to select

Swipe an item a short distance in a direction opposite to how the page scrolls to select the item. A quick and short movement works best. This operation enables you to select an item such as a photo, a program tile, or the text.

Swipe from edge

Swipe in with your finger starting from an edge of the screen.

- Swiping in from the right edge of your screen to display the charms.
- Swiping in from the left edge of your screen to achieve any of the following:
  - Display an open program.
  - Snap a program. Swipe in from the left edge of your screen, and drag the program until a border is displayed. Then, move the program to a desired position.

  - Display a list of recently opened programs. Swipe in from the left edge of your screen without lifting your finger, and then drag the program back to the left edge. Then a list of recently opened programs is displayed.
  - Close a program. Swipe in from the left edge of your screen, and drag the program to the bottom of your screen.
- Swiping in from the top edge of your screen to achieve any of the following
  - Display the menu commands, such as **Save**, **Edit**, and **Delete**.
  - Close a program. Swipe in from the top edge of your screen, and drag the program to the bottom of your screen.
- Swiping in from the bottom edge of your screen to display the menu commands, such as **Save**, **Edit**, and **Delete**.

Tips on using the multi-touch screen

- The multi-touch screen is a glass panel covered with a plastic film. For input you can use any finger. Do not apply pressure or place any metallic object on the screen. Otherwise, the screen might be damaged or malfunction.
- Before you put your computer in a carrying case, put it into notebook mode and close the display. Do not put your computer in a carrying case when it is in tablet mode.
- Regularly calibrate the accuracy of the finger input to avoid a discrepancy.

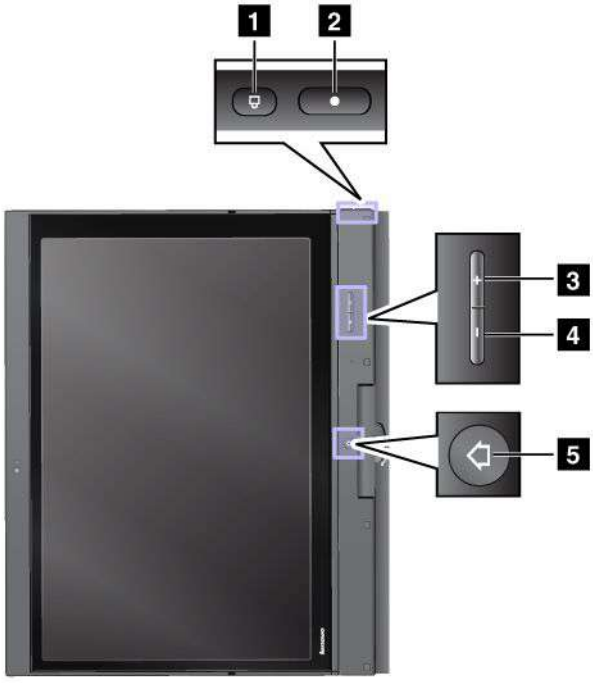
Cleaning the multi-touch screen

To clean the multi-touch screen, do the following:

1. To remove fingerprints or dust from the multi-touch screen, use a dry, soft, lint-free cloth or a piece of absorbent cotton. Do not apply solvents to the cloth.
2. Gently wipe foreign particles and dust from the multi-touch screen with one side of the cloth.
3. Wipe smudges or fingerprints with the other side of the cloth, or with a clean cloth.
4. After using the cloth, wash it with a neutral detergent.

Using the tablet buttons

On the display bezel near the screen is a row of buttons with which you can control your computer in tablet mode, without the use of the keyboard.



1 Screen Rotation button: Press it to lock the screen rotation function.

2 Power button: Press it to turn on the computer.

3 Speaker volume up button: Press it to increase the speaker volume.

4 Speaker volume down button: Press it to decrease the speaker volume.

5 Windows button: Press it to switch between the current workspace and the Start screen.

Special keys and buttons

Your computer has several special keys and buttons to help you work more easily and effectively.

The following figure shows the locations of the special keys and buttons on your computer.



1 Function keys

Volume and mute keys

- **F1:** Mutes or unmutes the speakers.

If you mute the sound and turn off your computer, the sound will remain muted when you turn on your computer again. To turn on the sound, press F2 or F3.

- **F2:** Decreases the speaker volume.
- **F3:** Increases the speaker volume.
- **F4:** Mutes or unmutes the microphones.

Display management keys

- **F5:** The computer display becomes dimmer.
- **F6:** The computer display becomes brighter.

You can temporarily change the computer display brightness by pressing these two keys. To change the default brightness level, right-click the battery status icon in the Windows notification area, then click **Adjust screen brightness** and make changes as desired.

- **F7:** Switches the display output location between the computer display and an external monitor.

Other functions

- **F8:** Enables or disables the Airplane mode.

  The Airplane mode disables the wireless features of your computer to comply with airline regulations. When you press this key, a list of wireless connections is displayed. You can quickly turn on or turn off all the wireless network connections.
- **F9:** Opens the **Settings** charm.
- **F10:** Opens the **Search** charm.
- **F11:** Press this key to view the programs that you have opened.
- **F12:** Press this key to view all programs.
- **Fn Lock (Esc):** Opens the ThinkPad Keyboards Properties window where you can toggle the F1-F12 key functionality.
- **Fn+B:** Has the same function as the Break key.

- **Fn+P:** Has the same function as the Pause key.
- **Fn+S:** Has the same function as the SysRq key.
- **Fn+K:** Has the same function as the ScrLK key.

You can toggle the ThinkPad F1-F12 key functionality to use the keys in default mode or in legacy mode. In default mode, you can initiate the special functions illustrated on each key by pressing the corresponding key directly. In legacy mode, to initiate the special functions illustrated on each key, press and hold the Fn key and then press the desired function key, then release both keys.

To toggle the F1-F12 key functionality in the Windows environment, do the following:

1. Open the ThinkPad Keyboard Properties window by pressing the Fn lock key.
2. Configure the settings following the instructions on the screen.

To toggle the F1-F12 key functionality through the ThinkPad Setup program, do the following:

1. Start the computer. When the ThinkPad logo screen is displayed, press F1. The ThinkPad Setup program main menu opens.
2. Select **Config → Keyboard/Mouse → Change to F1-F12 keys**.
3. Configure the settings following the instructions on the screen.
4. Save changes and exit.

2 Windows key

Press this key to switch between the current workspace and the Start screen.

For information about using the Windows key with other keys, refer to the help information system of the Windows operating system.

Using the UltraNav pointing device

Your computer comes with the UltraNav pointing device. The UltraNav pointing device consists of the TrackPoint pointing device and the touch pad, each of which is itself a pointing device with both basic and extended functions. You can configure both devices by choosing the settings you prefer.

- Set both the TrackPoint pointing device and the touch pad as pointing devices.
- Set the TrackPoint pointing device as the main pointing device and the touch pad for scrolling, tap zones, and slow-motion pointer functions only.
- Set the TrackPoint pointing device as the main pointing device, and disable the touch pad.
- Set the touch pad as the main pointing device, and disable the TrackPoint pointing device.

Changing the UltraNav pointing device settings

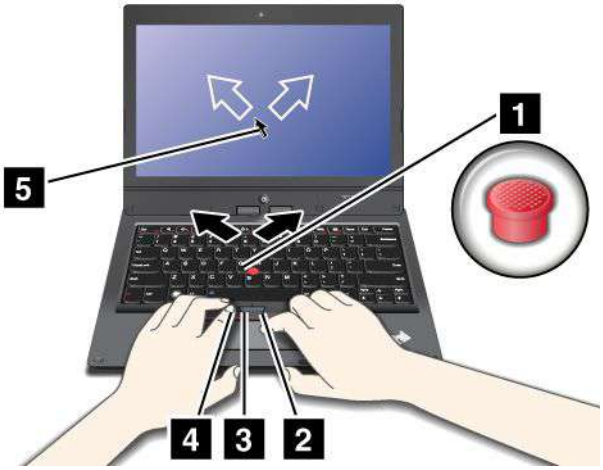
To change the UltraNav pointing device settings, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
2. Click **Hardware and Sound → Mouse → UltraNav**.
3. Change the settings as you desire.

You also can change the UltraNav pointing device settings by clicking the **UltraNav** icon in the Windows notification area. To display the **UltraNav** icon in the Windows notification area, see “Adding the UltraNav icon to the Windows notification area” on page 24.

Using the TrackPoint pointing device

The TrackPoint pointing device consists of a pointing stick 1 on the keyboard and three click buttons at the bottom of the keyboard. To move the pointer 5 on the screen, you apply pressure to the nonslip cap on the pointing stick in any direction parallel to the keyboard; the pointing stick itself does not move. The speed at which the pointer moves depends on the pressure you apply to the pointing stick. The functions of the left 4 and right 2 click buttons correspond to those of the left and right mouse buttons on a conventional mouse. The TrackPoint center button 3, called the scroll bar, enables you to scroll Web pages or documents in any direction with no need to use the graphic scroll bars on the side of the window.



Note: Your computer keyboard might look slightly different from the illustration above.

If you are not familiar with the TrackPoint pointing device, these instructions will help you get started:

1. Place your hands in the typing position, and press gently with an index finger or a middle finger on the pointing stick in the direction in which you want the pointer to move.

   To move the pointer, press the pointing stick away from you to move it up, toward you to move it down, to one side or the other to move it sideways.

   Note: The pointer might drift. This is not a defect. Stop using the TrackPoint pointing device for a few seconds; the pointer will stop moving.
2. To select and drag as required by your software, press the left or right click button with either thumb and move the TrackPoint pointing stick.

Customizing the TrackPoint pointing device

You can customize the TrackPoint pointing device and its buttons as follows:

- Switch the functions of the left and right buttons.
- Change the sensitivity of the TrackPoint pointing device.
- Enable the TrackPoint Scrolling Tips.

To change the TrackPoint pointing device settings, see “Changing the UltraNav pointing device settings” on page 21.

Changing the cap

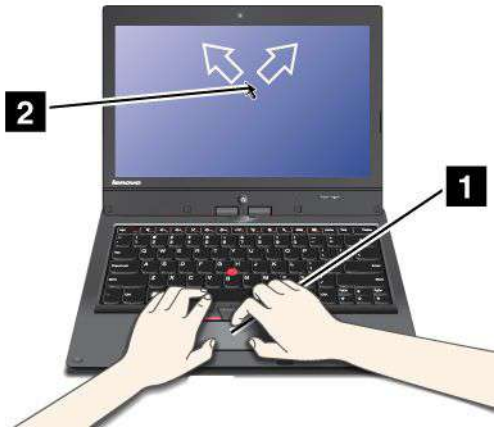
The cap 1 on the end of the TrackPoint pointing stick is removable. You can replace it as shown below.



Note: If you replace the keyboard, a new keyboard is shipped with the default cap. If you wish, you can keep the cap from your old keyboard and use it on the new one.

Using the touch pad

The touch pad is a pad 1 below the TrackPoint buttons at the bottom of the keyboard. To move the pointer 2 on the screen, slide your fingertip over the pad in the direction in which you want the pointer to move.



Note: Your computer keyboard might look slightly different from the illustration above.

The touch pad of your computer supports multi-touch with which you can zoom in, zoom out, scroll, or rotate on the screen while browsing the Internet or reading or editing a document.

For details, refer to the help information system of the UltraNav pointing device.

Customizing the touch pad

To change the touch pad settings, see “Changing the UltraNav pointing device settings” on page 21.

Disabling the UltraNav pointing device

You can use the external mouse simultaneously with the UltraNav pointing device. If you want to disable the UltraNav pointing device, do the following:

1. Open the Mouse Properties window. See “Changing the UltraNav pointing device settings” on page 21.
2. To disable the TrackPoint pointing device or touch pad, clear the check box for **Enable TrackPoint** or **Enable TouchPad** .
3. Click **OK**.

Adding the UltraNav icon to the Windows notification area

For easy access to the UltraNav properties, you can enable the display of the **UltraNav** icon in the Windows notification area.

To enable the display of the **UltraNav** icon in the Windows notification area, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
2. Click **Hardware and Sound → Mouse → UltraNav**.
3. Select the check box for **Show UltraNav icon on the system tray**.
4. Click **OK**.

You can now change the properties of the UltraNav pointing device by clicking the UltraNav icon in the Windows notification area.

Power management

When you use your computer away from electrical outlets, you depend on battery power to keep your computer running. Different computer components consume power at different rates. The more you use the power-intensive components, the faster you consume battery power. Mobility has revolutionized business by allowing you to take your work wherever you go. With ThinkPad batteries, you will be able to work longer without being tied to an electrical outlet.

Using the battery power

You can use your battery power more efficiently with the help of this introduction.

Checking the battery status

The battery status icon in the Windows notification area displays the percentage of battery power remaining.

The rate at which you use battery power will determine how long you can use the battery of your computer between charges. Because each computer user has different habits and needs, it is difficult to predict how long a battery charge will last. There are two main factors:

- How much energy is stored in the battery when you begin to work.
- The way you use your computer:
  - How often you access the hard disk drive.
  - How bright you make the computer display.

To check for detailed battery status information, do one of the following:

- Open the Lenovo Support program and click **Battery Health**.
- Open the Lenovo Settings program and click **Power**.

Charging the battery

When you find that the percentage of power remaining is low, for example, the battery alarm goes off, you need to charge your battery by connecting your computer to ac power. The battery will be fully charged in about six hours. This is affected by the battery size and the physical environment.

To increase the life of the battery, the computer does not start recharging the battery if the remaining power is greater than 95%.

Maximizing the battery life

To maximize the life of the battery, do the following:

- Use the battery until the charge is completely depleted; that is, use the battery until the battery status indicator starts blinking orange.
- Recharge the battery completely before using it. The battery is fully charged if the battery indicator shows green.
- Always use power saving mode.

Using the ac power adapter

The power to run your computer can come either from the lithium-ion (Li-ion) battery pack provided with it, or from ac power through the ac power adapter.

The ac power adapter that came with your computer has two basic components:

- The transformer pack that converts ac power for use with the computer.
- The power cord that plugs into the ac outlet and into the transformer pack.

Attention: Using an improper power cord could cause severe damage to your computer.

Connecting the ac power adapter

To use the ac power adapter, do the following:

Note: Be sure to perform the steps in the given order.

1. Plug the ac power adapter into an ac outlet.
2. Connect the power cord to the transformer pack.
3. Insert the power jack into the computer.

Tips on using the ac power adapter

- When the ac power adapter is not in use, disconnect it from the electrical outlet.
- Do not bind the power cord tightly around the ac power adapter transformer pack when it is connected to the transformer.
- Before you charge the battery, ensure that its temperature is at least 10°C (50°F).
- You can charge the battery when the ac power adapter is connected to the computer and the battery is installed. You need to charge it in any of the following conditions:
  - When a new battery is installed
  - If the battery charge is low
  - If the battery has not been used for a long time

Managing the power plans

You can manage your power plans to achieve the best balance between performance and power saving. To change the power plan, do the following:

1. Click the battery status icon in the Windows notification area.
2. Click **More power options**.
3. Select the power plan you desire following the instructions on the screen.

Power-saving modes

You can use the following power-saving modes to conserve the power of your computer.

- **Sleep:** In sleep mode, your work is saved to memory. Then, the display and the solid-state drive or the hard disk drive are turned off. When your computer wakes up, your work is restored within seconds.
- **30 Day Standby function:** Depending on the computer model, your computer might support the 30 Day Standby function. When this function is enabled, the computer consumes even less power in the sleep mode and takes only seconds to resume normal operation when you press the power button. To enable the 30 Day Standby function, open the Lenovo Settings program and click **Power**.
- **Always On USB function off:** The Always On USB drains your battery power. You can disable it when you do not need it. To disable the Always On USB function, open the Lenovo Settings program and click **Power**.
- **Wireless off:** If you do not need the wireless features, like Bluetooth and wireless LAN, turn them off. This will help conserve power. To turn off the wireless features, press Fn+F8.

Enabling the wakeup function

To enable the wakeup function, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Then click **Settings → Control Panel**.
2. Click **System and Security → Schedule tasks**. If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
3. From the left pane, select the task folder for which you want to enable the wakeup function. The scheduled tasks are displayed.
4. Double-click a scheduled task, and then click the **Conditions** tab.
5. In the **Power** pane, select the check box for **Wake the computer to run this task**.

Setting the actions for critical and low power

When your battery power falls below a certain level, some actions will be triggered. For example, the alarm will go off or your computer will go into sleep mode or power off.

To change the critical and low power level, and the corresponding actions triggered, do the following:

1. Click the battery status icon in the Windows notification area, and then click **More power options**.
2. Click **Change plan settings → Change advanced power settings → Battery**.
3. Change the settings as you desire in the **Battery** list.

Connecting to the network

Your computer has one or more network cards that enable you to connect your computer to the Internet and other network connections.

Ethernet connections

You can connect to a local network or a broadband connection by using the built-in Ethernet feature of your computer.

DANGER

Your computer has an Ethernet connector. To avoid the risk of electrical shock, do not connect the telephone cable to the Ethernet connector.

Wireless connections

Wireless communication is the transfer of data without the use of cables by means of radio waves only.

Depending on the wireless device used in your computer, you might be able to connect to the following categories of wireless networks.

Wireless LAN

A wireless local area network (LAN) covers a relatively small geographic area, such as an office building or a house. Devices based on the 802.11 standards can connect to this network.

Your computer comes with a built-in wireless LAN card and a configuration utility to help you make wireless connections and monitor the status of your connection, so that you can stay connected to your network while you are in the office, in a meeting room, or at home, with no need for a wired connection.

Wireless WAN

Wireless Wide Area Network (wireless WAN) covers a broader geographic area like a city or an entire country. Cellular networks are used for the data transmission.

Note: Wireless WAN service is provided by authorized service providers in some countries.

Some ThinkPad notebook computers come with a built-in wireless WAN card integrating some wireless WAN technologies, such as 1xEV-DO, HSPA, 3G or GPRS. By using the built-in wireless WAN card and the configuration utility that comes with your computer, you can establish wireless WAN connections and monitor the status of your connection.

Bluetooth

Bluetooth is one of a number of technologies used to create a wireless personal area network. Bluetooth can connect devices a short distance from one another, and is commonly used for connecting peripheral devices to a computer, transferring data between hand-held devices and a personal computer, or remotely controlling and communicating with devices such as mobile phones.

Using the wireless LAN and wireless WAN connections

You can check your wireless connection status and signal strength through the wireless network icon in the Windows notification area.

To enable or disable your wireless feature, press F8. When you press this key, a list of wireless connections is displayed. You can quickly turn on and turn off all the wireless network connections.

The Locations Awareness program enables you to manage your location profiles. By switching between location profiles as you move your computer from place to place, you can quickly and easily connect to a network with no need to reconfigure your settings manually and restart the computer each time. To access the Location Awareness program, open the Lenovo Settings program and click **Location Awareness**.

Attention: If you want to use your computer on an airplane, check the wireless services with the airline before boarding.

- If you carry your computer with the wireless feature into an airplane, check the services with the airline before boarding the airplane.
- If there are restrictions on the use of computers on an airplane with the wireless feature, you need to disable it before boarding.

To locate the wireless antennas on your computer, see “Location of the UltraConnect wireless antennas” on page 110.

Tips for using the wireless connection feature

To achieve the best connection, use the following guidelines:

- Place your computer so that there are as few obstacles as possible between the wireless LAN access point and the computer.
- To achieve the best wireless connection, open your computer display to an angle slightly greater than 90 degrees.
- If you use the wireless feature (the 802.11 standard) of your computer simultaneously with a Bluetooth option, the data transmission speed can be delayed and the performance of the wireless feature can be degraded.

Note: You can purchase a wireless network card as an option from Lenovo at http://www.lenovo.com/accessories/services/index.html.

Using Bluetooth

To send data to a Bluetooth-enabled device, do the following:

1. Right-click the data that you want to send.
2. Select **Send To → Bluetooth Devices**.

To receive the data, click the Bluetooth icon in the Windows notification area, and click **Receive a File**.

To configure a Bluetooth device or manage connection settings, do the following:

1. Click the Bluetooth icon in the Windows notification area, and then click **Open Settings**.
2. Configure the Bluetooth settings as you desire.

For details, refer to the Windows help information system.

Note: If you use the wireless feature (the 802.11 standard) of your computer simultaneously with a Bluetooth option, the data transmission speed can be delayed and the performance of the wireless feature can be degraded.

Presentations and Multimedia

You can connect your computer to a projector to give presentations or you can connect your computer to an external monitor to expand your workspace.

Changing the display settings

To change the display settings like the display resolution and font size, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Then click **Settings → Control Panel**.
2. Click **Appearance and Personalization → Display**.

3. Select the display you want to configure. Follow the instructions on the screen to change the display settings.

Using an external display

If an external monitor is connected to your computer, you can switch the display of your computer output between the computer display and the external monitor. You also can display the same output on both or display different output on each.

Note: If you attach an external monitor, a video interface cable with a ferrite core installed on the cable is required.

To use an external monitor, do the following:

1. Connect the external monitor to your computer through the VGA connector, the Mini DisplayPort connector, or the HDMI connector. Connect the external monitor to an electrical outlet.

   Note: If the monitor connector is not compatible with the Mini DisplayPort connector or the HDMI connector on your computer, you can use a convert cable to establish the connection. Convert cables are available as options from Lenovo at http://www.lenovo.com/accessories/services/index.html.
2. Turn on the external monitor.
3. Change the display output location by pressing F7. This enables you to view output on the external monitor, the computer display, or both monitors.

Note: If your computer cannot detect the external monitor, right-click on the desktop, then select **Screen resolution**. Click the **Detect** button.

Your computer supports a maximum video resolution of up to 2560 x 1600, provided that the external monitor also supports that resolution. For more details, refer to the manuals provided with your monitor. You can set any resolution for either the computer display or the external monitor. When you use both at the same time, the resolution of both is the same. If you set a higher resolution for the computer display, you can see only part of the screen at a time. You can see other parts by moving the image with the TrackPoint pointing device or another pointing device.

Considerations for using an external monitor

- When installing an operating system, you must install the display driver for your monitor that is supplied with the computer, and the monitor INF file that is supplied with the external monitor.
- If you set a resolution higher than the resolution you are using on the computer monitor, and use an external monitor that does not support that resolution, take advantage of the virtual screen function, which enables you to display only a part of the high-resolution screen image your computer produces. You can see other parts of the image by moving the screen with the TrackPoint pointing device or another pointing device.
- If the external monitor you are using is outdated, the resolution and the refresh rate might be limited.
- If you want to show DOS full-screen while in the Extend mode, only the main display shows DOS; the other display is blacked out.
- If you are using the Extend mode, when an application using DirectDraw or Direct3D is played in full-screen mode, it is shown only on the main display.

Setting the main display

If your computer has the Intel® graphics card, you can designate the other display as the main display by doing the following:

1. Right-click on your desktop, and then click **Screen resolution**.
2. Select the display which you want to set as main. Then select the **Make this my main display** check box.

Setting the monitor type

To set your monitor type, do the following:

1. Right-click on the desktop, and click **Screen resolution**.

   Note: If your computer cannot detect the external monitor, click the **Detect** button.
2. Click the icon for the desired monitor.
3. Set **Resolution**.
4. Click **Advanced Settings**.
5. Click the **Monitor** tab. Check the monitor information window to ensure that the monitor type is correct. If it is, click **OK** to close the window; otherwise proceed with the following steps.
6. If more than two monitor types are displayed, select **Generic PnP Monitor** or **Generic Non-PnP Monitor**.
7. Click **Properties**. If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
8. Click the **Driver** tab.
9. Click **Update Driver**.
10. Click **Browse my computer for driver software**, and then click **Let me pick from a list of device drivers on my computer**.
11. Clear the **Show compatible hardware** check box.
12. Select **Manufacturer** and **Model** for your monitor. If you cannot find your monitor on the list, stop the installation of this driver and use the driver shipped with your monitor.
13. After updating the driver, click **Close**.
14. Click **OK**.

Using a projector

To make presentations, you can attach a projector to your computer through the Mini DisplayPort connector or the Thunderbolt connector on your computer.

Note: If the projector connector is not compatible with the Mini DisplayPort connector or the Thunderbolt connector on your computer, you can purchase a converter cable on http://www.lenovo.com/accessories/services/index.html.

It might take several seconds before the projector displays the image. If you do not see your desktop displayed after 60 seconds, press F7 to switch between different display output locations.

Your projector might have one or more audio-input connectors. To project sound, you will need to attach the combo audio jack on your computer to these connectors, using an audio cable (commercially available).

Using audio features

Your computer is equipped with the following:

- Combo audio jack, 1/8 inch (3.5 mm) in diameter
- Built-in stereo speakers
- Built-in digital microphone

Your computer also has an audio chip that enables you to enjoy various multimedia audio features:

- Compliant with Intel High Definition Audio

- Recording and playback of PCM and WAV files in 16-bit or 24-bit format
- Playback of a WAV file at a sample rate of 44.1KHz to 192 KHz
- Playback of MIDI files through a Wave table synthesizer under Microsoft Windows operating systems
- Playback of MP3 files through the Windows Media Player or a software MP3 player
- Recording from various sound sources

Note: The combo audio jack does not support a conventional microphone.

The following table shows which functions of the audio devices attached to the jacks on your computer are supported.

Table 1. Audio feature list

Jack	Headset with a 3.5 mm 4-pole plug	Conventional headphone	Conventional microphone
Combo audio jack	Headphone and microphone functions supported	Headphone function supported	Not supported

Configuring for sound recording

To configure the microphone for optimized sound recording, open the Realtek HD Audio Manager window by doing the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
2. Click **Hardware and Sound → Realtek HD Audio Manager**.

Using the integrated camera

If your computer has an integrated camera, you can use the camera to preview your video image and take a snapshot of your current image. To start the camera, press F6 to open the Lenovo Settings program, and then click **Camera**. When the camera is started, the green camera-in-use indicator turns on.

You also can use the integrated camera with other programs that provide features such as photographing, video capturing, and video conferencing. To use the integrated camera with other programs, open one of the programs and start the photographing, video capturing, or video conferencing function. Then, the camera will start automatically and the green camera-in-use indicator will turn on. For more information about using the camera with a program, refer to the help information system of the program.

Configuring camera settings

To configure the camera settings, do one of the following:

- Configure the camera settings directly from the program that is using the camera. For details, see the help information system of the program.
- Click **Lenovo Settings** from the Start screen, and then click **Camera**. Follow the instructions on the screen.

Using a media card

Your computer has one media card reader slot. The media card reader slot supports the following four types of cards:

- Secure Digital (SD) card

- Secure Digital High-Capacity (SDHC) card
- Secure Digital eXtended-Capacity (SDXC) card
- MultiMediaCard (MMC)

Note: While transferring data to or from a media card, such as an SD card, do not put your computer into sleep mode before the data transfer is completed; otherwise, your data could become damaged.

For more information on media cards, refer to any of the following topics:

Inserting a media card

Attention: Before you start installing any of the following cards, touch a metal table or a grounded metal object. This action reduces any static electricity from your body. The static electricity could damage the card.

To insert a media card into the 4-in-1 media card reader slot, do the following:

1. Ensure that the card is correctly oriented.
2. Insert the card firmly into the 4-in-1 media card reader slot. Press the card firmly into the slot.

If the media card is not plug and play, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
2. Click **Hardware and Sound → Device Manager**.
3. From the **Action** menu, select **Add legacy hardware**. The Add Hardware Wizard starts.
4. Follow the instructions on the screen.

Removing a media card

Attention:

- Before removing the card, stop the card first. Otherwise, data on the card might be corrupted or lost.
- Do not remove the card while the computer is in sleep mode. Otherwise, the system might not respond when you try to resume operation.

To remove a media card, do the following:

1. Click **Show hidden icons** in the Windows notification area.
2. Right-click the **Safely Remove Hardware and Eject Media** icon.
3. Select the corresponding item to eject the card from the Windows operating system.
4. Press the card to eject it from your computer.
5. Remove the card from your computer and store it safely for future use.

Note: If you do not remove the card from your computer after you eject the card from the Windows operating system, the card can no longer be accessed. To access the card, you must remove it once, then insert it again.

Chapter 3. You and your computer

This chapter provides information about accessibility, comfort, and traveling with your computer.

- “Accessibility and comfort” on page 33
- “Traveling with your computer” on page 35

Accessibility and comfort

Good ergonomic practice is important to get the most from your personal computer and to avoid discomfort. Arrange your workplace and the equipment you use to suit your individual needs and the kind of work that you perform. In addition, use healthy work habits to maximize your performance and comfort while using your computer.

The following topics provide information about arranging your work area, setting up your computer equipment, and establishing healthy work habits.

Lenovo is committed to providing the latest information and technology to our customers with disabilities. Refer to our accessibility information which outlines our efforts in this area.

Ergonomic information

Working in the virtual office might mean adapting to frequent changes in your environment. For example, adapting to the surrounding light sources, proper seating, and the placement of your computer hardware can help you improve your performance and achieve greater comfort.

This example shows someone in a conventional setting. Even when not in such a setting, you can follow many of these tips. Develop good habits, and they will serve you well.



General posture: Make minor modifications in your working posture to deter the onset of discomfort caused by long periods of working in the same position. Frequent short breaks from your work also help to prevent minor discomfort associated with your working posture.

Display: Position the display to maintain a comfortable viewing distance of 20-30 inches (510-760 mm). Avoid glare or reflections on the display from overhead lighting or outside sources of light. Keep the display

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screen clean and set the brightness to levels that enable you to see the screen clearly. Press F5 or F6 to adjust display brightness.

Head position: Keep your head and neck in a comfortable and neutral (vertical, or upright) position.

Chair: Use a chair that gives you good back support and seat height adjustment. Use chair adjustments to best suit your desired posture.

Arm and hand position: If available, use the armrests or an area on your working surface to provide weight support for your arms. Keep your forearms, wrists, and hands in a relaxed and neutral (horizontal) position. Type with a soft touch without pounding the keys.

Leg position: Keep your thighs parallel to the floor and your feet flat on the floor or on a footrest.

What if you are traveling?

It might not be possible to observe the best ergonomic practices when you are using your computer while on the move or in a casual setting. Regardless of the setting, try to observe as many of the tips as possible. Sitting properly and using adequate lighting, for example, will help you maintain desirable levels of comfort and performance.

Questions about vision?

The visual display screens of ThinkPad notebook computers are designed to meet the highest standards and to provide you with clear, crisp images and large, bright displays that are easy to see, yet easy on the eyes. Of course, any concentrated and sustained visual activity can be tiring. If you have questions on eye fatigue or visual discomfort, consult a vision care specialist for advice.

Comfort

Observe the following guidelines to achieve greater comfort and improve performance.

Active sitting and rest breaks: The longer you sit and work with your computer, the more important it is to observe your working posture. Follow “Ergonomic information” on page 33 and practice “active sitting” to avoid discomfort associated with your working postures. Making minor voluntary postural changes and taking short frequent work breaks are the key ingredients for healthy computing. Your computer is light and mobile; you can easily reposition your working surface to accommodate many posture modifications.

Work area setup options: Familiarize yourself with all of your office furniture so that you know how to adjust your work surface, seat, and other work tools to accommodate your preferences for comfort. If your work area is not in an office setting, be sure to take special note of employing active sitting and taking work breaks. Many ThinkPad product solutions are available to help you modify and expand your computer to best suit your needs. Access the following Web site to view some of these options: http://www.lenovo.com/accessories/services/index.html. Explore your options for docking solutions and external products that provide the adjustability and features that you want.

Accessibility information

Lenovo is committed to providing people with disabilities greater access to information and technology. As a result, the following information provides ways to help users that have hearing, vision, and mobility limitations get the most out of their computer experience.

Assistive technologies enable users to access information in the most appropriate way. Some of these technologies are already provided in your operating system. Others can be purchased through vendors, or accessed through the World Wide Web http://www.lenovo.com/healthycomputing.

Assistive technologies

Some accessibility technologies are available through the Accessibility Options program. Depending on your operating system, the number of accessibility options available varies. In general, accessibility options enhance the way users with hearing, vision, or mobility limitations navigate and use their computer. For example, some users might not have the fine motor skills required to use a mouse or select key combinations. Other users might require larger fonts or high-contrast display modes. In some cases, magnifiers and built-in speech synthesizers are available. For detailed information about each of these features, consult the Microsoft help information system.

To use the Accessibility Options program, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
2. Click **Hardware and Sound → Ease of Access → Ease of Access Center**.

Screen reader technologies

Screen reader technologies are primarily focused on software application interfaces, help information systems, and a variety of online documents. However, in the case where a screen reader cannot read documents, the document must first go through a conversion process. One solution converts Adobe PDF files into a format that is read by the screen-reader programs. This solution is a Web-based service provided by Adobe Systems Incorporated. Through http://access.adobe.com, Adobe PDF documents can be converted to HTML or plain text in many languages. One conversion option converts PDF documents on the Internet. A second option enables users to submit the URL of an Adobe PDF file through e-mail to convert it to HTML or ASCII text. Adobe PDF files on a local hard disk drive, local CD-ROM, or LAN also can be converted by attaching the Adobe PDF file to an e-mail message.

Traveling with your computer

This topic provides information to help you work with your computer when you are traveling.

Travel tips

Use the following travel tips to travel more confidently and efficiently with your computer.

- Although it is safe to allow your computer to go through the x-ray machines at airport security stations, it is important to keep your eyes on the computer at all times to prevent theft.
- Consider bringing an electrical adapter for use in an airplane or automobile.
- If you carry an ac power adapter, detach the ac cord from it to avoid damaging the cord.

Travel tips on airplanes

If you carry your computer into an airplane, take note of the following tips:

- If you intend to use your computer or wireless services (such as Internet and Bluetooth), check with the airline for restrictions and availability of services before boarding the airplane. If there are restrictions on the use of computers with wireless features on the airplane, you must abide by those restrictions. If necessary, disable wireless features before boarding.
- Be careful about the seat in front of you on airplanes. Angle your computer display so that it does not get caught when the person in front of you leans back.
- When taking off, remember to turn off your computer.

Travel accessories

The following is a checklist of items to consider packing when you are going to travel:

- ThinkPad ac power adapter
- ThinkPad AC/DC combo adapter
- External mouse (if you are accustomed to using one)
- Ethernet cable
- Extra charged battery
- A quality carrying case that provides adequate cushion and protection
- External storage device

If you are traveling to another country, you might need to consider an ac power adapter for the country to which you are traveling.

To purchase travel accessories, go to http://www.lenovo.com/accessories.

Chapter 4. Security

This chapter provides information about how to protect your computer from theft and unauthorized use.

- “Attaching a mechanical lock” on page 37
- “Using passwords” on page 37
- “Hard disk security” on page 42
- “Setting the security chip” on page 43
- “Notice on deleting data from your hard disk drive or solid-state drive” on page 44
- “Using firewalls” on page 44
- “Protecting data against viruses” on page 44

Attaching a mechanical lock

You can attach a mechanical lock to your computer to help prevent it from being removed without your permission.

Attach a mechanical lock to the keyhole of the computer; then secure the chain on the lock to a stationary object. Refer to the instructions shipped with the mechanical lock.

Note: You are responsible for evaluating, selecting, and implementing the locking devices and security features. Lenovo makes no comments, judgments, or warranties about the function, quality, or performance of locking devices and security features.

Using passwords

By using passwords, you can help prevent your computer from being used by others. Once you set a password, a prompt is displayed on the screen each time you turn on the computer. Enter your password at the prompt. You cannot use the computer unless you type the correct password.

Passwords and sleep mode

If you have set passwords and you put your computer into sleep mode, the procedure for resuming operation is as follows:

- You are not prompted to type the password when resuming operation.
- If any hard disk drive or solid-state drive has a password, it is unlocked automatically when you resume operation.

Note: If a Windows password has been set, you will be prompted to enter it.

Typing passwords

 If this icon is displayed, type a power-on password or a supervisor password.

 If this icon is displayed, type a user hard disk password. If you want to type a master hard disk password, do the following:

1. Press F1. The icon changes to this: 

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2. Type the master hard disk password.

Note: To return to the icon , press F1 again.

 If this icon is displayed, type a supervisor password.

Note: Press the Backspace key if you enter a wrong password while you are typing your password.

Power-on password

You can set a power-on password to help protect your computer against access by unauthorized users.

If you set a power-on password, the password prompt is displayed on the screen whenever you turn on the computer. You must enter the correct password to start using the computer.

Setting a power-on password

1. Print these instructions.
2. Save all open files, and exit all applications.
3. Turn your computer off and then turn it on again.
4. When the logo screen is displayed, press F1. The ThinkPad Setup program main menu opens.
5. Select **Security**, using the cursor directional keys to move down the menu.
6. Select **Password**.
7. Select **Power-on Password**.
8. In the **Enter New Password** field, type a desired password, and press Enter.
9. In the **Confirm New Password** field, retype the password and press Enter.

   Attention: You might want to record your password and store it in a safe place. Otherwise, if you forget it, you have to take your computer to a Lenovo reseller or a marketing representative to have the password canceled.
10. In the Setup Notice window that is displayed, press Enter to continue.
11. Press Fn+F10. The Setup Confirmation window opens. Select **Yes** to save configuration changes and exit.

Changing or removing the power-on password

To change the power-on password, follow steps 1 through 7. Enter your current password. When the **Enter New Password** field is displayed, type a new password in the field and then retype it to verify. To remove the password, follow steps 1 through 7. Type your current password. When the **Enter New Password** field is displayed, leave it blank and press Enter twice.

Hard disk passwords

Two types of hard disk passwords help protect the information stored on the hard disk drive:

- User hard disk password
- Master hard disk password, which requires a user hard disk password

If a user hard disk password has been set, but no master hard disk password has been, the user must enter the user hard disk password in order to gain access to files and applications on the hard disk drive.

The master password can be set and used only by a system administrator. Like a master key, it enables the administrator to get access to any hard disk drive in a system. The administrator sets the master password; no one else knows it. Then the administrator sets a user password for each computer in the network, and tells each user the password for his or her computer. The user can then change the user password as desired, but the administrator still can get access by using the master password.

Note: When a master hard disk password is set, only the administrator can remove the user hard disk password.

Setting a hard disk password

1. Print these instructions.
2. Save all open files, and exit all applications.
3. Turn your computer off and then on again.
4. When the logo screen is displayed, press F1. The ThinkPad Setup program main menu opens.
5. Select **Security**, using the cursor directional keys to move down the menu.
6. Select **Password**.
7. Select **Hard Disk *1* Password**.
8. A password window opens. You are prompted to select **User** or **User + Master**. Select **User** if you want to set only one hard disk password. If you are an administrator or supervisor, you can select **User + Master** to set two passwords. (The user can change the user password later.)
   - If you select **User + Master**, do the following:
     a. When a window for typing the new user hard disk password opens, type your new password in the **Enter New Password** field. Press Enter.
     b. In the **Confirm New Password** field, retype the password you just entered to verify it. Press Enter.
     c. A message window opens and prompts you to set the master hard disk password. Press Enter to continue.
     d. A window for typing the new master hard disk password opens. Type your new password in the **Enter New Password** field. Press Enter.
     e. In the **Confirm New Password** field, retype the password you just entered to verify it. Press Enter.
   - If you select **User** only, do the following:
     a. When a window for typing the new password opens, type your new password in the **Enter New Password** field. Press Enter.

        Notes:

        – You can set the minimum length of a hard disk password through the **Security** menu.
        – If you set a hard disk password of over seven characters, the hard disk drive can be used only with a computer that can recognize a hard disk password of over seven characters. If you then install the hard disk drive in a computer that cannot recognize a hard disk password that contains more than seven characters, you cannot get access to the drive.

     b. In the **Confirm New Password** field, retype the password you just entered to verify it. Press Enter.

   Attention: You might want to record your password and store it in a safe place. Otherwise, if you forget the user password, or both user and master passwords, Lenovo cannot reset your passwords or recover data from the hard disk drive. You must take your computer to a Lenovo reseller 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.
9. In the Setup Notice window that is displayed, press Enter to continue.

10. Press Fn+F10. The Setup Confirmation window opens. Select **Yes** to save configuration changes and exit.

The next time you turn on your computer, you will have to type the user or master hard disk password in order to start your computer and get access to your operating system.

Changing or removing a hard disk password

Follow steps 1 through 7 in “Setting a hard disk password” on page 39, typing your password to get access to the ThinkPad Setup program.

To change or remove the user hard disk password, do the following:

- To change the hard disk password, type the current password in the **Enter Current Password** field. Then type the new password in the **Enter New Password** field, and retype the password you just entered to verify it in the **Confirm New Password** field. Press Enter, and a Setup Notice window is displayed. Press Enter to exit from the Setup Notice window. The user hard disk password will be changed.
- To remove the hard disk password, type the current password in the **Enter Current Password** field. Then leave the **Enter New Password** and **Confirm New Password** fields blank, and press Enter. A Setup Notice window is displayed. Press Enter to exit from the Setup Notice window. The user hard disk password will be removed.

To change or remove the **User + Master** hard disk passwords, select **User HDP** or **Master HDP**.

If you choose **User HDP**, do the following:

- To change the user hard disk password, type the current user hard disk password or the current master hard disk password in the **Enter Current Password** field. Then type the new user hard disk password in the **Enter New Password** field, and retype the password you just entered to verify it in the **Confirm New Password** field. Press Enter, and a Setup Notice window is displayed. Press Enter to exit from the Setup Notice window. The user hard disk password is changed.
- To remove the user hard disk password, type the current master hard disk password in the **Enter Current Password** field. Then leave the **Enter New Password** and **Confirm New Password** fields blank, and press Enter. A Setup Notice window is displayed. Press Enter to exit from the Setup Notice window. The user hard disk password will be removed.

If you choose **Master HDP**, do the following:

- To change the master hard disk password, type the current master hard disk password in the **Enter Current Password** field. Then type the new master hard disk password in the **Enter New Password** field, and retype the password you just entered to verify it in the **Confirm New Password** field. Press Enter, and a Setup Notice window is displayed. Press Enter to exit from the Setup Notice window. The master hard disk password is changed.
- To remove the master hard disk password, type the current master hard disk password in the **Enter Current Password** field. Then leave the **Enter New Password** and **Confirm New Password** fields blank, and press Enter. A Setup Notice window is displayed. Press Enter to exit from the Setup Notice window. Both the user and master hard disk passwords will be removed.

Supervisor password

The supervisor password protects the system information stored in ThinkPad Setup. Without it, no one can change the configuration of the computer. It provides the following security features:

- If a supervisor password is set, a password prompt is displayed when you try to start the ThinkPad Setup program. Unauthorized users cannot get access to configuration data.

- The system administrator can use the supervisor password to get access to a computer even if the user of that computer has set a power-on password. The supervisor password overrides the power-on password.
- If both a supervisor password and a power-on password are set, you can do the following only if you have the supervisor password:
  - Deleting the power-on password
  - Changing or deleting the supervisor password
  - Enabling or disabling the Wake on LAN feature
  - Enabling or disabling the Internal Network Option ROM feature
  - Changing date and time
  - Enabling or disabling the Lock UEFI BIOS Settings feature
  - Enabling or disabling the Password at unattended boot feature
  - Specifying the minimum length for power-on passwords and hard disk passwords
  - Changing the setting for the security chip
  - Enabling or disabling the Boot Device List F12 Option feature
  - Enabling or disabling the Boot Order Lock feature
  - Enabling or disabling the Flash BIOS Updating by End-Users feature
  - Enabling or disabling the internal network device
  - Enabling or disabling the internal wireless device
  - Enabling or disabling the internal Bluetooth device
  - Enabling or disabling the internal wireless WAN device
  - Enabling or disabling the Security mode

Notes:

- The system administrator can set the same supervisor password on many ThinkPad notebook computers to make administration easier.
- By enabling the Lock UEFI BIOS Settings feature on the **Password** menu when you set the supervisor password, you make it impossible for anyone but you to make changes.

Setting, changing, or removing a supervisor password

Only a system administrator can set, change, or remove a supervisor password.

To set, change, or remove a supervisor password, do the following:

1. Print these instructions.
2. Save all open files, and exit all applications.
3. Turn your computer off and then turn it on again.
4. When the logo screen is displayed, press F1. The ThinkPad Setup program main menu opens.
5. Select **Security**, using the cursor directional keys to move down the menu.
6. Select **Password**.
7. Select **Supervisor Password**.
8. A window opens, prompting you to enter a new password. Depending on your needs, do one of the following:
   - To set a password, do the following:
     a. In the **Enter New Password** field, type a desired password and press Enter.

b. In the **Confirm New Password** field, retype the password and press Enter.

- To change a password, do the following:
  a. In the **Enter Current Password** field, type the current supervisor password and press Enter.
  b. In the **Enter New Password** field, type the new supervisor password; then retype the password you just entered to verify it in the **Confirm New Password** field. Press Enter.
- To remove a password, do the following:
  a. In the **Enter Current Password** field, type the current supervisor password and press Enter.
  b. Leave the **Enter New Password** and **Confirm New Password** fields blank. Press Enter.

Attention: You might want to record your password and store it in a safe place. If you forget your supervisor password, Lenovo cannot reset your password. You must take your computer to a Lenovo reseller or a Lenovo marketing representative to have the system board replaced. Proof of purchase is required, and a fee will be charged for parts and service.

9. In the Setup Notice window that is displayed, press Enter to continue.
10. Press Fn+F10. The Setup Confirmation window opens. Select **Yes** to save configuration changes and exit.

The next time you open the ThinkPad Setup program, you will be prompted to type your password to proceed.

Hard disk security

To protect passwords from unauthorized security attacks, several of the latest technologies and algorithms are integrated into UEFI BIOS and hardware design of ThinkPad notebook computers.

To maximize security, do the following:

- Set a power-on password as well as a hard disk password for your internal solid-state drive or hard disk drive. Refer to the procedures in “Power-on password” on page 38 and “Hard disk passwords” on page 38. For security, a longer password is recommended.
- To provide reliable security for UEFI BIOS, use the security chip and a security application with a Trusted Platform Module (TPM) management feature. Refer to “Setting the security chip” on page 43.
- If a hard disk drive or solid-state drive with encryption technology is installed on your computer, be sure to protect the contents of your computer memory from unauthorized access by use of drive encryption software, such as Microsoft Windows BitLocker® Drive Encryption. See “Using Windows BitLocker Drive Encryption” on page 42.
- Before you dispose of, sell, or hand over your computer, be sure to delete data stored on it. Refer to “Notice on deleting data from your hard disk drive or solid-state drive” on page 44.

Note: The hard disk drive built into your computer can be protected by UEFI BIOS.

Using Windows BitLocker Drive Encryption

To help protect your computer against unauthorized access, be sure to use drive encryption software, such as Windows BitLocker Drive Encryption.

Windows BitLocker Drive Encryption is an integral security feature of Windows 8. It is supported in the Pro and Enterprise editions of the Windows 8 operating system. It can help you protect the operating system and data stored on your computer, even if your computer is lost or stolen. BitLocker works by encrypting all user and system files, including the swap files.

BitLocker uses a Trusted Platform Module to provide enhanced protection for your data and to ensure early boot component integrity. A compatible TPM is defined as a V1.2 TPM.

To check the BitLocker status on the Windows 8 operating system, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings** → **Control Panel**.
2. Click **System and Security** → **BitLocker Drive Encryption**.

For details about Windows BitLocker Drive Encryption, see the Windows 8 Help and Support program, or search for “Microsoft Windows BitLocker Drive Encryption Step-by-Step Guide” on the Microsoft Web site.

Disk Encryption hard disk drive and Encryption solid-state drive

Some models contain the Disk Encryption hard disk drive or Encryption solid-state drive. This feature helps to protect your computer against security attacks on media, NAND flash or device controllers by use of a hardware encryption chip. For the efficient use of the encryption feature, be sure to set a hard disk password for the internal storage device.

Setting the security chip

Strict security requirements are imposed on network client computers that transfer confidential information electronically. Depending on the options you ordered, your computer might have an embedded security chip, a cryptographic microprocessor. With the security chip, you can do the following:

- Protect your data and system
- Strengthen access controls
- Secure communications

Setting the security chip

The choices offered on the **Security Chip** submenu under the **Security** menu of ThinkPad Setup are as follows:

- **Security Chip**: activate, inactivate, or disable the security chip.
- **Security Reporting Options**: enable or disable each security reporting option.
- **Clear Security Chip**: clear the encryption key.

Notes:

1. Ensure that the supervisor password has been set in ThinkPad Setup. Otherwise anyone can change the settings for the security chip.
2. If the security chip is removed or replaced, or a new one has been added, the computer will not start. You will hear four cycles of four beeps each.
3. If the security chip is inactive or disabled, the **Clear Security Chip** option will not be displayed.
4. When you clear the security chip, be sure to turn your computer off and then turn it on again after you set the security chip to **Active**. Otherwise, the **Clear Security Chip** option is not displayed.

To set an item on the **Security Chip** submenu, do the following:

1. Print these instructions.
2. Save all open files, and exit all applications.
3. Turn your computer off and then turn it on again.
4. When the logo screen is displayed, press F1. The ThinkPad Setup program main menu opens.
5. Using the cursor keys, move to **Security**. The **Security** menu opens.
6. Using the cursor keys, move to **Security Chip**, and press Enter. The **Security Chip** submenu opens.
7. Using the cursor keys, move to an item you want to set. When the item is highlighted, press Enter.

8. Set other items that you want to set.
9. Press Fn+F10 to save changes and exit.
10. Press Enter in the Setup Confirmation window to confirm the exit.

Notice on deleting data from your hard disk drive or solid-state drive

As computers spread into every corner of life, they process more and more information. The data on your computer, some of which might be sensitive, is stored on a hard disk drive or solid-state drive. Before you dispose of, sell, or hand over your computer, be sure to delete data stored on it.

Handing your computer over to someone else without deleting the loaded software, such as operating systems and application software, might even violate license agreements. You are advised to check the terms and conditions of those license agreements.

There are methods that seem to delete the data:

- Move the data to the recycle bin, and then click **Empty recycle bin**.
- Use the **Delete** option.
- Format your hard disk drive or solid-state drive, using the software for initializing it.
- Using the recovery program on your computer, bring the hard disk drive or solid-state drive back to the factory default settings.

These operations, however, only change the file allocation of the data; they do not delete the data itself. In other words, the data retrieval processing is disabled under an operating system such as Windows. The data is still there, even though it seems to be lost. Thus, it is sometimes possible to read the data by use of special software for data recovery. There is a risk that people of bad faith might read and misuse the critical data on hard disk drives or solid-state drives for unexpected purposes.

To prevent leakage of data, it becomes very important that you take responsibility for deleting all the data from the hard disk drive or solid-state drive when you dispose of, sell, or hand over your computer. You can destroy the data physically by smashing the hard disk drive or solid-state drive with a hammer, or magnetically by means of strong magnetic power, thus making the data unreadable. But we recommend that you make use of the software (payware) or service (pay service) specifically developed for the purpose.

For disposing of data on the hard disk drive or solid-state drive, Lenovo provides the Secure Data Disposal tool. To download the application, go to:
http://www.lenovo.com/support

Note: Running either application will take a couple of hours.

Using firewalls

If your system is preinstalled with a firewall program, it protects against computer Internet security threats, unauthorized accesses, intrusions, and Internet attacks. It also protects your privacy.

For more information about how to use the firewall program, refer to the help information system that comes with the program.

Protecting data against viruses

Your computer is preinstalled with an antivirus program so you can detect and eliminate viruses. The antivirus program is designed to help you detect and eliminate viruses.

Lenovo provides a full version of antivirus software on your computer with a free 30-day subscription. After 30 days, you must renew the license to continue receiving the antivirus software updates.

For more information about how to use your antivirus software, refer to the help information system of your antivirus software.

Chapter 5. Recovery overview

This section provides information about the recovery solutions provided on your computer.

Refreshing your computer

If your computer does not perform well and the problem might be caused by a recently installed program, you can refresh your computer without losing your personal files or changing your settings.

Attention: If you refresh your computer, the programs that came with your computer and the programs that you installed from Windows Store will be reinstalled, but all other programs will be removed.

To refresh your computer, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Change PC settings → General**.
2. In the **Refresh your PC without affecting your files** section, click **Get started**.

Resetting your computer to the factory default settings

You can reset your computer to the factory default settings. Resetting the computer will reinstall the operating system, and reinstall all the programs and settings that came with your computer.

Attention: If you reset your computer, all your personal files and settings will be deleted. To avoid data loss, make a backup copy of all the data that you want to keep.

To reset your computer, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Change PC settings → General**.
2. In the **Remove everything and reinstall Windows** section, click **Get started**.

Advanced startup options

Advanced startup options enable you to change the startup settings of your Windows operating system, start the computer from an external device, or restore the Windows operating system from a system image.

To use the advanced startup options, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Change PC settings → General**.
2. In the **Advanced startup** section, click **Restart now → Troubleshoot → Advanced options**.
3. Restart your computer following the instructions on the screen.

For more details about the recovery solutions, refer to the help information system of the Windows 8 operating system.

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Chapter 6. Replacing devices

This chapter provides instructions on how to install or replace hardware for your computer.

- “Static electricity prevention” on page 49
- “Disabling the built-in battery” on page 49
- “Replacing the SIM card” on page 49
- “Replacing the hard disk drive or solid-state drive” on page 51
- “Replacing the keyboard” on page 53
- “Replacing a Mini PCI ExpressCard for wireless LAN connection” on page 57
- “Installing or replacing the wireless WAN card” on page 60

Static electricity prevention

Static electricity, although harmless to you, can seriously damage computer components and options. Improper handling of static-sensitive parts can cause damage to the part. When you unpack an option or a CRU, do not open the static-protective package containing the part until the instructions direct you to install it.

When you handle options or CRUs, or perform any work inside the computer, take the following precautions to avoid static-electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters, memory modules, and other circuit boards by the edges. Never touch exposed circuitry.
- Prevent others from touching components.
- When you install a static-sensitive option or CRU, touch the static-protective package containing the part to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
- When possible, remove the static-sensitive part from the static-protective packaging and install the part without setting it down. When this is not possible, place the static-protective packaging on a smooth, level surface and place the part on it.
- Do not place the part on the computer cover or other metal surface.

Disabling the built-in battery

Before replacing any CRU, ensure that you have disabled the built-in battery by doing the following:

1. Turn off your computer and disconnect the ac power adapter and all cables from the computer.
2. Turn on your computer. When the ThinkPad logo is displayed, press F1 to enter ThinkPad Setup.
3. Select **Config → Power**. The **Power** submenu is displayed.
4. Select **Disable Built-in Battery**.
5. Click **Yes** in the Setup Warning window, then the computer will be turned off automatically. Wait three to five minutes to let the computer cool.

Replacing the SIM card

Before you start, print these instructions.

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Your computer might require a SIM card to establish wireless WAN connections. Depending on the country of delivery, you might need to purchase a SIM card , or a SIM card might already be installed in your computer, or the SIM card is part of the shipping contents that come with your computer.

If you find a SIM card included in the shipping contents, a dummy card is installed in the SIM card slot. Then proceed with the following instructions.

Note: The SIM card is identified by the IC chip mounted on one side of the card.

To replace the SIM card, do the following:

1. Disable the built-in battery. See “Disabling the built-in battery” on page 49.
2. Close the computer display, and turn it over.
3. Locate the SIM card door at the rear of the computer. Gently pivot the SIM card door upwards.



4. Gently push the card to remove it from the computer.



5. Hold the new card with the metal contact facing downwards. Then, insert the card firmly into the slot until you hear a click.



6. Close the SIM card door until it snaps into position.



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

Replacing the hard disk drive or solid-state drive

Before you start, print these instructions.

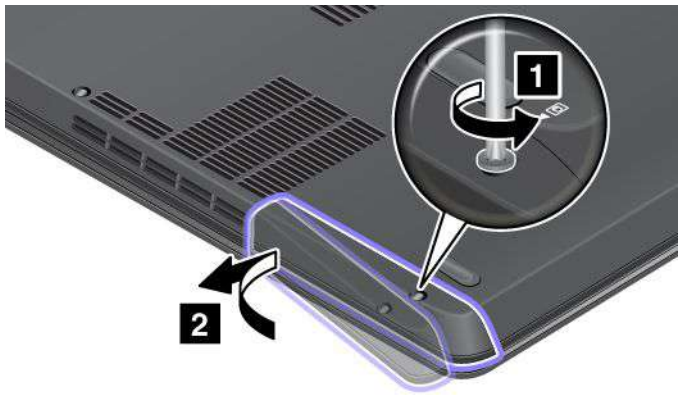
Attention: The hard disk drive is very sensitive. Incorrect handling can cause damage and permanent loss of data. Observe the following guidelines:

- Replace the hard disk drive or solid-state drive only if you upgrade it or have it repaired. The connectors and slot of the hard disk drive or solid-state drive are not designed for frequent changes, or drive swapping.
- Do not drop the hard disk drive or solid-state drive or subject it to physical shocks. Put the hard disk drive or solid-state drive on a material, such as soft cloth, that absorbs any physical shocks.
- Do not apply pressure to the cover of the hard disk drive or solid-state drive.
- Do not touch the connector.

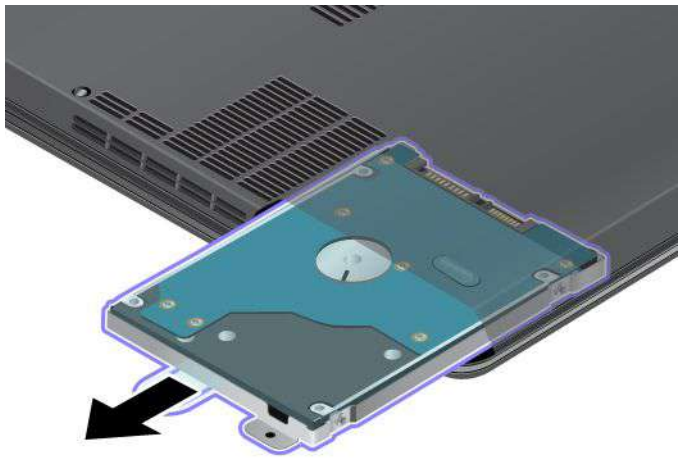
- Before removing the hard disk drive or solid-state drive, make a backup copy of all the information on it, and then turn the computer off.
- Never remove the hard disk drive or solid-state drive while the computer is operating, in sleep mode.

To replace the hard disk drive or solid-state drive, do the following:

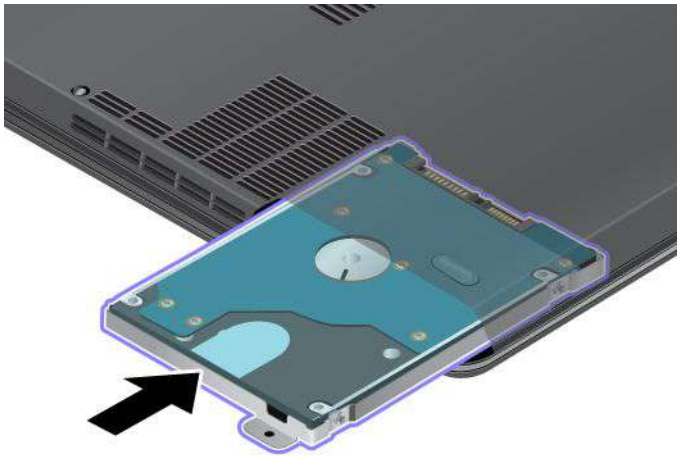
1. Disable the built-in battery. See “Disabling the built-in battery” on page 49.
2. Close the computer display, and turn the computer over.
3. Loosen the screw **1** that secures the hard disk drive slot cover, then remove the hard disk drive slot cover.



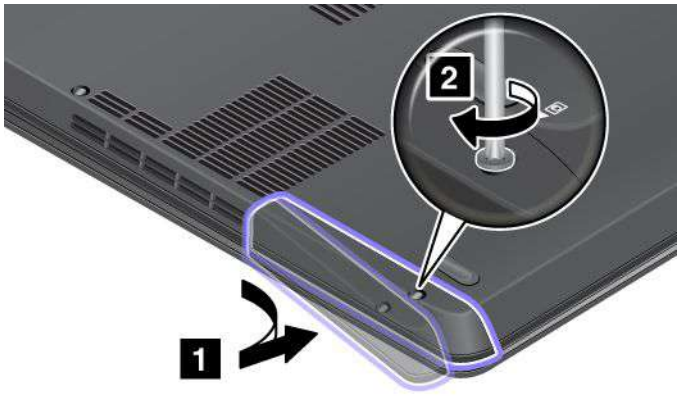
4. Remove the hard disk drive or solid-state drive by pulling out the tab.



5. Insert the new hard disk drive or solid-state drive into the slot and slide the hard disk drive or solid-state drive firmly into place.



6. Reinstall the hard disk drive or solid-state drive door **1**. Then tighten the screw **2**.



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

Replacing the keyboard

Before you start, print these instructions.

DANGER

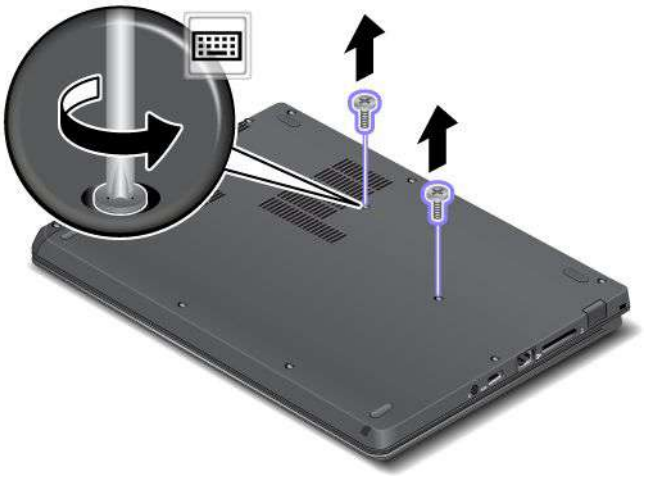
During electrical storms, do not connect the cable to or disconnect it from the telephone outlet on the wall.

DANGER

Electric current from power, telephone, and communication cables is hazardous. To avoid shock hazard, disconnect the cables before opening the cover of this slot.

To remove the keyboard, do the following:

1. Disable the built-in battery. See “Disabling the built-in battery” on page 49.
2. Close the computer display, and turn the computer over.
3. Remove the two screws that secure the keyboard at the bottom.

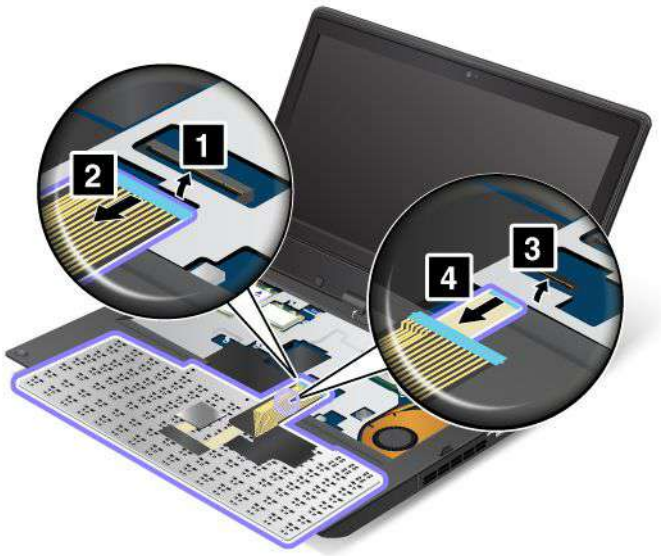


4. Turn the computer over and open the display.
5. Push hard in the direction shown by the arrows **1** to unlatch the front side of the keyboard. The keyboard will be detached slightly.



Note: Your computer keyboard might look different from the illustration above.

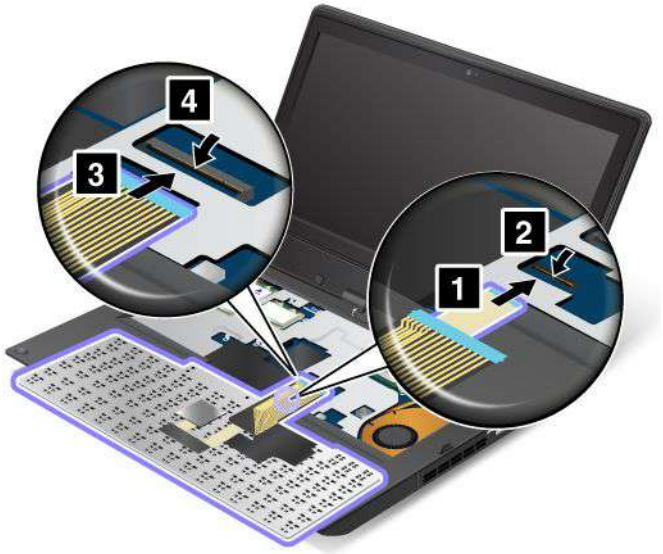
6. Remove the cables 2 and 4 by flipping the connectors 1 and 3 upwards.



Note: Your computer keyboard might look different from the illustration above.

To install the keyboard, do the following:

1. Attach the cables 1 and 3 by flipping the connectors 2 and 4 downwards.



Note: Your computer keyboard might look different from the illustration above.

2. Insert the keyboard. Ensure that the front edge of the keyboard is under the frame.



Note: Your computer keyboard might look different from the illustration above.

3. Slide the keyboard into place in the direction shown by the arrows.



Note: Your computer keyboard might look different from the illustration above.

4. Close the computer display and turn the computer over. Reinstall the two screws at the bottom.



5. Turn the computer over again. Connect the ac power adapter and all cables.

Replacing a Mini PCI ExpressCard for wireless LAN connection

Before you start, print these instructions.

DANGER

During electrical storms, do not connect the cable to or disconnect it from the telephone outlet on the wall.

DANGER

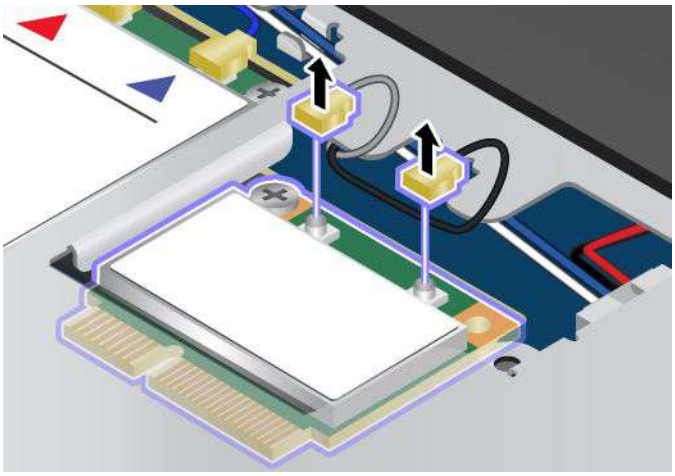
Electric current from power, telephone, and communication cables is hazardous. To avoid shock hazard, disconnect the cables before opening the cover of this slot.

Attention: Before you start installing a Mini PCI ExpressCard, touch a metal table or a grounded metal object. This action reduces any static electricity from your body. The static electricity could damage the card.

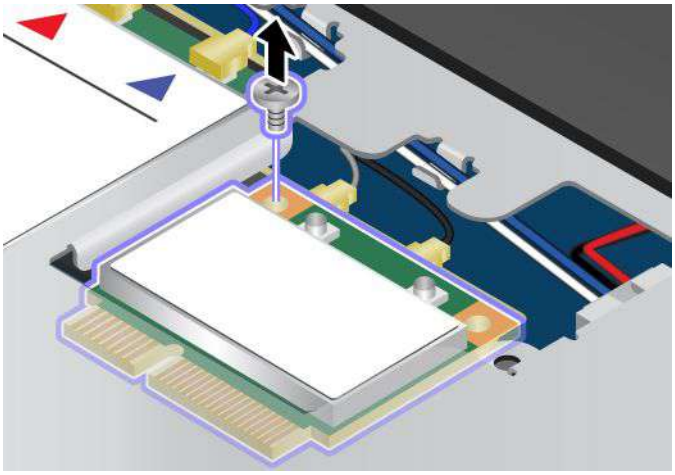
To replace the wiress LAN card, do the following:

1. Disable the built-in battery. See “Disabling the built-in battery” on page 49.
2. Close the computer display, and turn the computer over.
3. Remove the keyboard. See “Replacing the keyboard” on page 53.

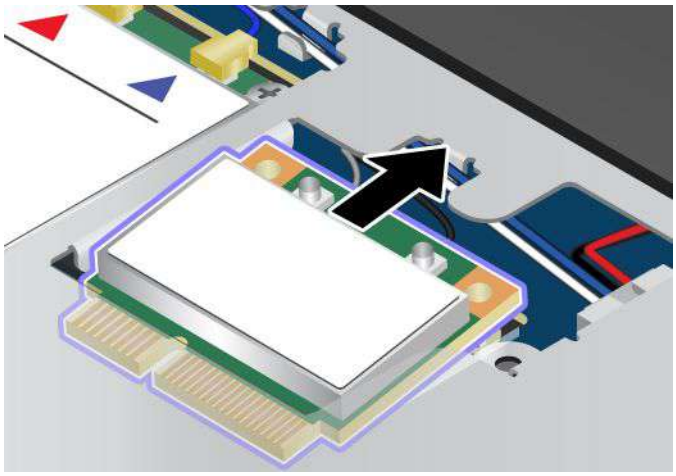
4. If a tool for removing connectors is included in the package with the new card, use it to disconnect the cables from the card. If no such tool is included, disconnect the cables by picking up the connectors with your fingers and gently unplugging them.



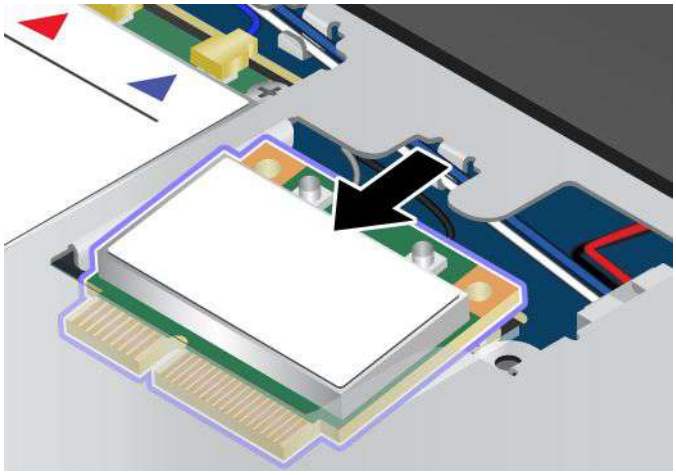
5. Remove the screw. The card pops up.



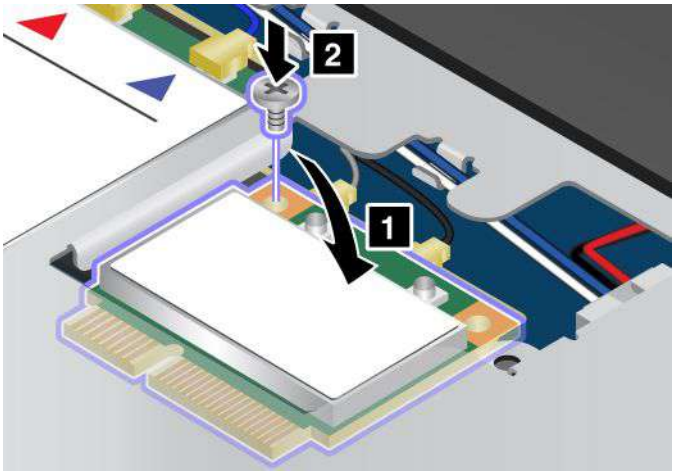
6. Remove the card.



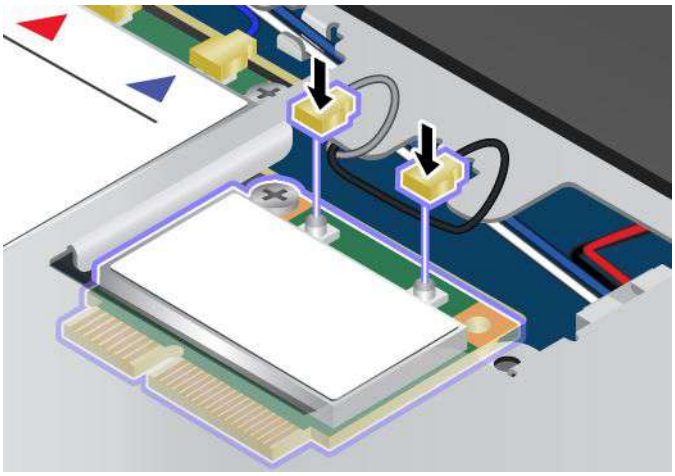
7. Align the contact edge of the new PCI Express Mini Card with the corresponding socket.



8. Pivot the card until it snaps into place 1. Secure the card with the screw 2.



9. Connect the antenna cables to the new PCI Express Mini Card as shown in the following figure. Be sure to attach the gray cable to the connector marked “MAIN” or “M” on the card, and the black cable to the connector marked “AUX” or “A”.



10. Reinstall the keyboard. See “Replacing the keyboard” on page 53.
11. Turn the computer over again. Connect the ac power adapter and all cables.

Installing or replacing the wireless WAN card

Before you start, print these instructions.

Depending on models, your computer might have a wireless WAN card installed in the Mini PCI ExpressCard slot. To install or replace it, read the following instructions.

Prerequisites for replacing or installing a wireless WAN card

DANGER

During electrical storms, do not connect the cable to or disconnect it from the telephone outlet on the wall.

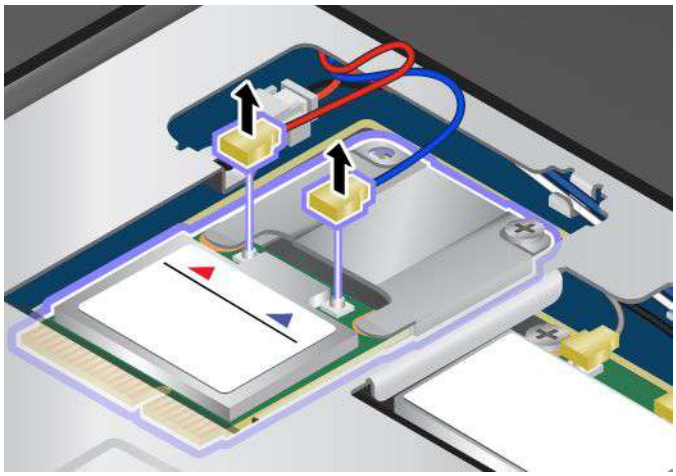
DANGER

Electric current from power, telephone, and communication cables is hazardous. To avoid shock hazard, disconnect the cables before opening the cover of this slot.

Attention: Before you start installing a Mini PCI ExpressCard, touch a metal table or a grounded metal object. This action reduces any static electricity from your body. The static electricity could damage the card.

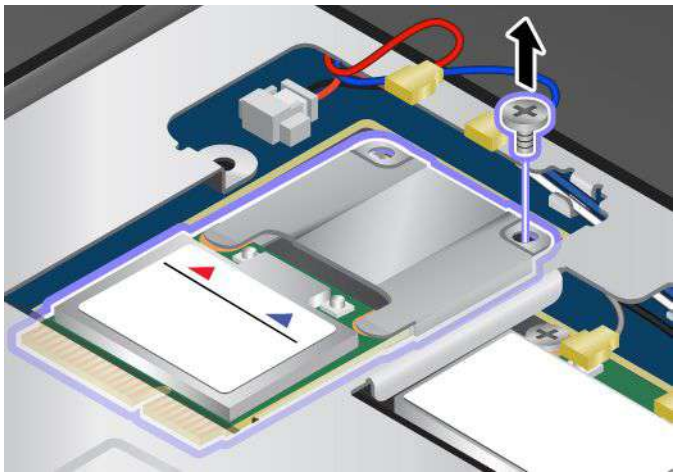
To install or replace the wireless WAN card, do the following:

1. Disable the built-in battery. See “Disabling the built-in battery” on page 49.
2. Close the computer display, and turn the computer over.
3. Remove the keyboard. See “Replacing the keyboard” on page 53.
4. If a tool for removing connectors is included in the package with the new card, use it to disconnect the cables from the card. If no such tool is included, disconnect the cables by picking up the connectors with your fingers and gently unplugging them.

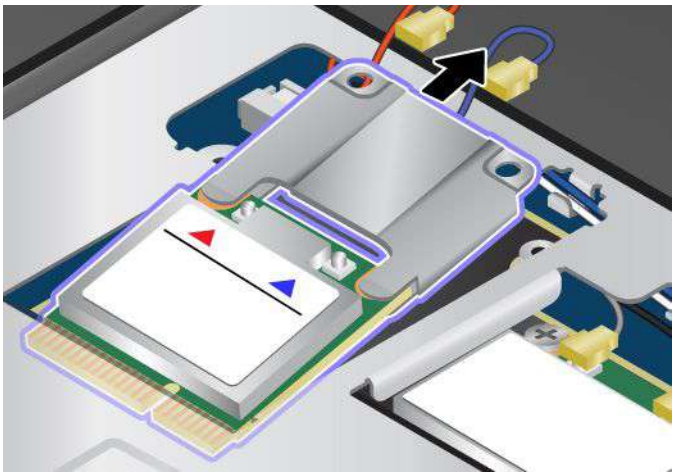


Note: Depending on the system configuration of your computer, the card might have only one connector.

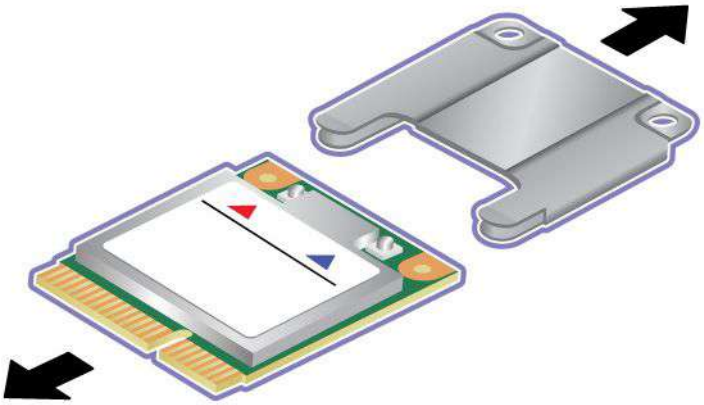
5. Remove the screw. The card with the bracket pops up.



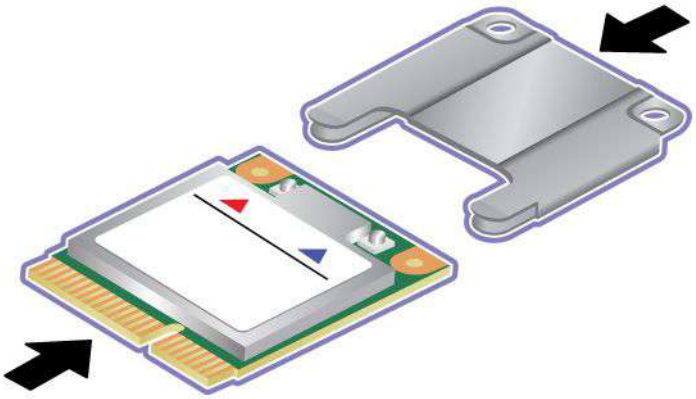
6. Remove the card with the bracket.



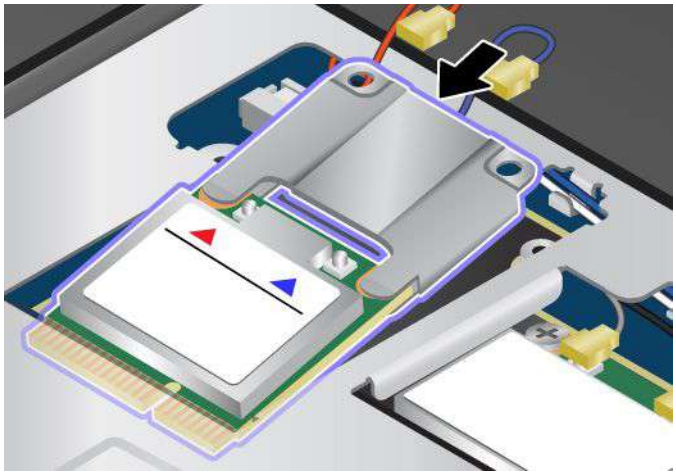
7. Pull the card out of the bracket.



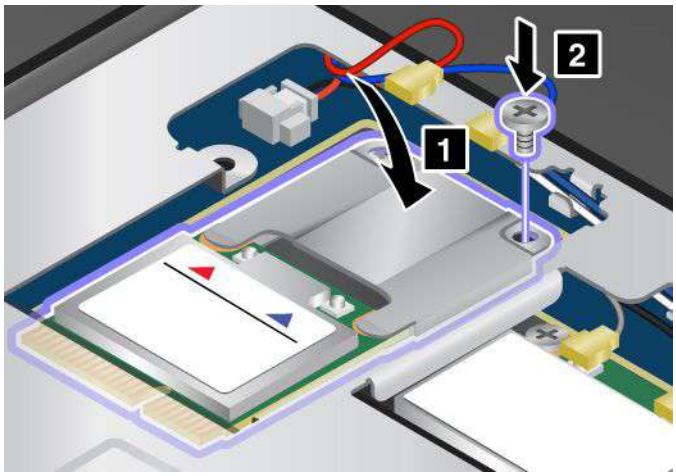
8. Insert the new card into the bracket.



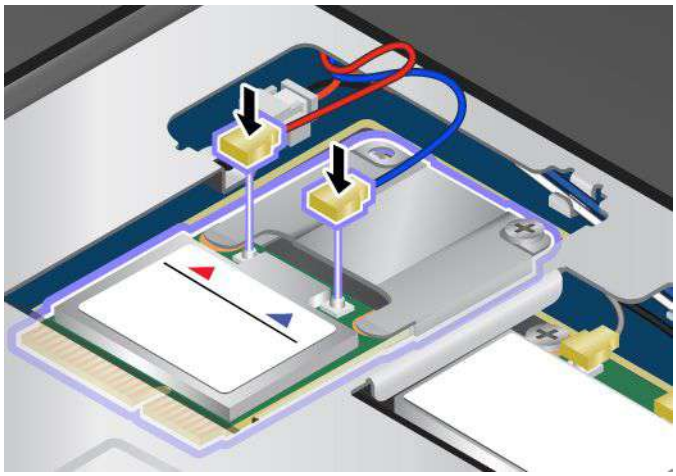
9. Align the contact edge of the new PCI Express Mini Card with the corresponding socket.



10. Pivot the card until it snaps into place **1**. Secure the card with the screw **2**.



11. Connect the antenna cables to the new PCI Express Mini Card as shown in the drawing. Be sure to attach the red cable to the connector marked “MAIN” or “M” on the card, and the blue cable to the connector marked “AUX” or “A”.



12. Reinstall the keyboard. See “Replacing the keyboard” on page 53.

13. Turn the computer over again. Connect the ac power adapter and all cables.

Chapter 7. Advanced configuration

If you need to install a new operating system, update your system UEFI BIOS, install new device drivers, or recover preinstalled software, this information will help you handle your computer with proper care and keep it in top working shape.

- “Installing a new operating system” on page 65
- “Installing device drivers” on page 66
- “ThinkPad Setup” on page 66
- “Using system management” on page 77

Installing a new operating system

If you install a new operating system in your computer, you need to install the supplement files and ThinkPad device drivers for it at the same time. For more information, see “Installing device drivers” on page 66.

Before you install the operating system, print the instructions you will use.

Notes:

- The UEFI BIOS features are supported only on the 64-bit version of the Windows 7 and Windows 8 operating system.
- Be sure to set a preferred setting for the **UEFI/Legacy Boot** option in ThinkPad Setup.
- After installing the new operation system, you should not change the initial **UEFI/Legacy Boot** setting in ThinkPad Setup. The **UEFI/Legacy Boot** setting must be the same as it was when the Windows operating system image was installed. Otherwise, the new operating system will not boot properly.

For the country or region code required in the installation, use one of the following:

Country or region: Code
China: SC
Denmark: DK
Finland: FI
France: FR
Germany: GR
Italy: IT
Japan: JP
Netherlands: NL
Norway: NO
Spain: SP
Sweden: SV
Taiwan and Hong Kong: TC
United States: US

Installing the Windows 8 operating system

Before you start, print these instructions.

To install the Windows 8 operating system and its related software on your computer, do the following:

1. Start ThinkPad Setup.
2. Select **Startup → Boot**.

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3. Change the boot priority order to boot your computer from the drive that contains the Windows 8 operating system installer.
4. Press F10.
5. Connect the drive that contains the Windows 8 operating system installer to your computer, and restart the computer.
6. Install the Intel Chipset Support for Windows 2000/XP/Vista/7/8.
7. Install device drivers. See “Installing device drivers” on page 66.

Installing the Windows 8 fix module

To download and install a Windows 8 fix module, go to the Microsoft Knowledge Base homepage at http://support.microsoft.com/, type the number of the fix module you need in the search field, and click **Search**.

Installing device drivers

The device drivers are available at http://www.lenovo.com/Drivers. Click your computer product name to view all the device drivers for your computer.

Attention: Always go tohttp://www.lenovo.com/Drivers for the latest device drivers. Do not download them from the Windows Update Web site.

ThinkPad Setup

Your computer comes with the ThinkPad Setup program to enable you to select various setup parameters.

To start ThinkPad Setup, do the following:

1. Turn on the computer. When the logo screen is displayed, press the F1 key. the ThinkPad Setup program main menu opens.

   If you have set a supervisor password, the ThinkPad Setup program main menu will be displayed after you enter the password. You can start ThinkPad Setup by pressing Enter instead of entering the supervisor password. However, you cannot change the parameters that are protected by the supervisor password. For more information, refer to “Using passwords” on page 37.
2. Use the cursor keys to move to an item that you want to change. When the item is highlighted, press Enter. A submenu is displayed.
3. Change the items you want to change. To change the value of an item, press the + or – key. If the item has a submenu, you can display it by pressing Enter.
4. Press Esc to exit from the submenu.
5. If you are on a nested submenu, press Esc repeatedly until you reach the ThinkPad Setup program main menu.
6. Select **Restart**. Move the cursor to the option you want to restart your computer; then press **Enter**. Your computer restarts.

If you need to restore the settings to the original state as of the time of purchase, press Fn+F9 to load the default settings. You also can select an option on the **Restart** submenu to load the default settings or discard the changes.

Note: You cannot restore the settings under the **Security** menu by pressing Fn+F9.

Main menu

The **Main** menu is the first interface you see after you enter ThinkPad Setup. It displays the following configuration of your computer:

- **UEFI BIOS Version**
- **UEFI BIOS Date (Year-Month-Day)**
- **Embedded Controller Version**
- **Machine Type Model**
- **System-unit serial number**
- **System board serial number**
- **Asset Tag**
- **CPU Type**
- **CPU Speed**
- **Installed memory**
- **UUID**
- **MAC address (Internal LAN)**
- **Preinstalled OS License**
- **UEFI Secure Boot**

Config menu

If you need to change the configuration of your computer, select **Config** from the ThinkPad Setup menu.

Notes:

- Default values are in **boldface**. The default settings are already optimized for you. If you consider changing the computer configuration, proceed with extreme caution. Setting the configuration incorrectly might cause unexpected results.
- On each submenu, press Enter to show selectable options and select a desired option, or type desired values from the keyboard directly.
- Some items are displayed on the menu only if the computer supports the corresponding features.

The following table lists the **Config** menu items.

Table 2. Config menu items

Menu item	Submenu item	Selection	Comments
Network	Wake On LAN	• Disabled • **AC Only** • AC and Battery	Enable the system to Power on when the Ethernet controller receives a magic packet (a special network message). If you select **AC Only**, the Wake on LAN function is enabled only when the ac power adapter is attached. If you select **AC and Battery**, the Wake on LAN function is enabled with any power sources. **Note:** AC power is required with magic packet type Wake on LAN.

Table 2. Config menu items (continued)

Menu item	Submenu item	Selection	Comments
			Note: The Wake on LAN function does not work when a hard disk password is set.
	Ethernet LAN Option ROM	• Disabled • **Enabled**	If you select **Disable**, it loads the Ethernet LAN Option ROM to enable startup from the integrated network device. This option must be enabled to display the MAC Address for the integrated network. **Note:** Ethernet LAN Option ROM submenu appears when Legacy Only or Legacy First with Both mode is selected in Startup Page.
	UEFI IPv4 Network Stack	• Disabled • **Enabled**	Enable or disable Internet Protocol Version 4 (IPv4) network stack for the UEFI environment. **Note:** UEFI IPv4 Network Stack, UEFI IPv6 Network Stack and UEFI PXE Boot Priority menus appear when UEFI Only or UEFI First with Both mode is selected in Startup Page.
	UEFI IPv6 Network Stack	• Disabled • **Enabled**	Enable or disable UEFI IPv6 Network Stack For UEFI environment. **Note:** UEFI IPv4 Network Stack, UEFI IPv6 Network Stack and UEFI PXE Boot Priority menus appear when UEFI Only or UEFI First with Both mode is selected in Startup Page.
	UEFI PXE Boot Priority	• IPv6 First • **IPv4 First**	Select Network Stack priority for UEFI PXE Boot. **Note:** UEFI IPv4 Network Stack, UEFI IPv6 Network Stack and UEFI PXE Boot Priority menus appear when UEFI Only or UEFI First with Both mode is selected in Startup Page.
	Wireless LAN Radio	• **On** • Off	If you select **On**, the internal wireless radio is turned on. If you select **Off**, the internal wireless radio is turned off.

Table 2. Config menu items (continued)

Menu item	Submenu item	Selection	Comments
USB	USB UEFI BIOS Support	• Disabled • **Enabled**	Enable or disable boot support from USB storage devices.
	USB 3.0 Mode	• Disabled • Enabled • **Auto**	Set the USB 3.0 controller mode for the ports shared between USB 2.0 and USB 3.0 controller. If you select **Auto**, it enables you to connect and route appropriate USB 3.0 or USB 2.0 connectors. If you select **Enabled**, it enables the USB 3.0 mode and allows the USB 3.0 to be supported in the Windows 8 operating system. If you select **Disabled**, it disables and hides the the USB 3.0 controller, and the USB 3.0 connectors will work as USB 2.0 connectors.
Keyboard/Mouse	Fn and Ctrl Key swap	• **Disabled** • Enabled	If you select **Enabled**, the Fn key works as the Ctrl key, and the Ctrl key works as the Fn key. **Note:** Even when **Enabled** is selected, you need to press the Fn key to resume the computer from sleep mode to normal operation.
	Fn Key Lock	• **Disabled** • Enabled	Enable or disable the Fn key lock. If you select **Enabled**, you can press the Fn key once to keep it in a pressed condition, then press the desired key. This is equivalent to pressing the desired key simultaneously with the Fn key. If you press the Fn key twice, the state is locked until you press the Fn key again.
	Change to “F1-F12 keys”	• **Default** • Legacy	If you select **Default**, you can press F1-F12 directly to initiate special functions illustrated on each key. If you select **Legacy** you need to press Fn and the corresponding key simultaneously to initiate the special functions illustrated on each key.

Table 2. Config menu items (continued)

Menu item	Submenu item	Selection	Comments
Display	Boot Display Device	• **ThinkPad LCD** • HDMI • DisplayPort	Select the display device to be activated at boot time. This selection is effective for boot time, password prompt, and ThinkPad Setup.
Power	Intel (R) SpeedStep technology	• Disabled • **Enabled**	Select the mode of Intel SpeedStep® technology at runtime. • **Maximum Performance**: Always highest speed • **Battery Optimized**: Always lowest speed • **Disabled**: No runtime support, lowest speed
	CPU Power Management	• Disabled • **Enabled**	Enable or disable the power saving feature that stops the microprocessor clock automatically when there are no system activities.
	Inter (R) Rapid Start Technology	• Disabled • **Enabled** Enter after: • Immediately • 1 minute • 2 minutes • 5 minutes • 10 minutes • 15 minutes • 30 minutes • 1 hour • 2 hours • **3 hours**	To use this feature, a special partition on the solid-state drive is required. When enabled, you can enable the 30 Day Standby function through the Lenovo Settings program. The function enables the computer to enter a lower power state after the specified time in sleep state. Also it takes only seconds to resume normal operation. **Note:** To use this feature, a special partition on the solid-state drive is required.
	Disable Built-in Battery		Use this feature to temporarily disable the built-in battery. The system will be automatically powered off after you select this item. Then the computer is ready to be serviced. **Note:** The ac power adapter must be disconnected to perform this operation. The built-in battery will be automatically enabled when the ac power adapter is reconnected.

Table 2. Config menu items (continued)

Menu item	Submenu item	Selection	Comments
Beep and Alarm	Password Beep	• **Disabled** • Enabled	Enable this option to have a beep sound when the system is waiting for a power-on, hard disk, or supervisor password. Different beeps will be sounded when the entered password matches or does not match the configured password.
	Keyboard Beep	• Disabled • **Enabled**	Enable or disable the keyboard beep when unmanageable key combinations are pressed.
Serial ATA (SATA)	SATA Controller Mode Option	• Compatibility • **AHCI**	Select SATA controller operation mode. If you select **Compatibility**, the SATA controller operates in compatibility mode.
CPU	Core Multi-Processing	• Disabled • **Enabled**	Enable or disable additional execution core units within a CPU. **Note:** If you are using a computer with a single-core processor, this item is not available.
	Intel(R) Hyper-Threading Technology	• Disabled • **Enabled**	Enable or disable additional logical processors within a processor core.

Date/Time menu

If you need to set the current date and time of your computer, select **Date/Time** from the ThinkPad Setup program main menu. The following submenu is displayed:

- System Date
- System Time

To change the date and time, do the following:

1. Using the up and down arrow keys to select the item to change the date or time.
2. Press Tab, Shift+Tab, or Enter to select a field.
3. Type the date or time.

   Note: Another way to adjust the date and time is by pressing + or –.
4. Press Fn+F10 to save the changes and restart the system.

Security menu

If you need to set the security features of your computer, select **Security** from the ThinkPad Setup menu.

Notes:

- Default values are in **boldface**. The default settings are already optimized for you. If you consider changing the computer configuration, proceed with extreme caution. Setting the configuration incorrectly might cause unexpected results.

- On each submenu, press Enter to show selectable options and select a desired option, or type desired values from the keyboard directly.
- Some items are displayed on the menu only if the computer supports the corresponding features.

The following table lists the **Config** menu items.

Table 3. Security menu items

Menu item	Submenu item	Selection	Comments
Password	Supervisor Password Password Status	• **Disabled** • Enabled	Refer to “Supervisor password” on page 40.
	Lock UEFI BIOS Settings	• **Disabled** • Enabled	Enable or disable the function that protects items in the ThinkPad Setup program from being changed by unauthorized users. By default, this is set to **Disabled**. If you set the supervisor password and enable this function, no one but you can change the items in the ThinkPad Setup program.
	Password at unattended boot	• **Disabled** • Enabled	If you select and **Enable Password at unattended boot**, a password prompt is displayed when the computer is turned on, from a power-off state. If you select **Disabled**, no password prompt is displayed; the computer goes ahead and loads the operating system. To prevent unauthorized access, you can set the user authentication on the operating system.
	Password at restart	• **Disabled** • Enabled	If you select and **Enable Password at restart**, a password prompt is displayed when you restart the computer. If you select **Disabled**, no password prompt is displayed; the computer goes ahead and loads the operating system. To prevent unauthorized access, you can set the user authentication on the operating system.
	Set Minimum Length	• **Disabled** • x characters (4≤x≤12)	Specify a minimum length for power-on passwords and hard disk passwords. If you set the supervisor password and specify a minimum length for passwords, no one but you can change the length.
	Power-On Password Password Status	• **Disabled** • Enabled	Refer to “Power-on password” on page 38.
	Hard Disk1 Password Password Status	• **Disabled** • Enabled	Refer to “Hard disk passwords” on page 38.

Table 3. Security menu items (continued)

Menu item	Submenu item	Selection	Comments
	Hard Disk2 Password Password Status	• **Disabled** • Enabled	Refer to “Hard disk passwords” on page 38.
Security Chip	Security Chip	• Active • **Inactive** • Disabled	If you select **Active**, the security chip is functional. If you select **Inactive**, the **Security Chip** option is visible, but the security chip is not functional. If you select **Disabled**, the **Security Chip** option is hidden and the security chip is not functional.
	Security Reporting Options		Enable or disable the following Security Reporting Options: • **BIOS ROM String Reporting**: BIOS text string • **CMOS Reporting**: CMOS data • **NVRAM Reporting**: Security data stored in the Asset ID • **SMBIOS Reporting**: SMBIOS data
	Clear Security Chip	**Enter**	Clear the encryption key. **Note:** This item is displayed only if you have selected **Active** for the **Security Chip** option.
	Physical Presence for Provisioning	• **Disabled** • Enabled	This option enables or disables the confirmation message when you change the settings of the security chip.
	Physical Presence for Clear	• Disabled • **Enabled**	This option enables or disables the confirmation message when you clear the security chip.
UEFI BIOS Update Option	Flash UEFI Updating by End-Users	• Disabled • **Enabled**	If you select **Enabled**, all users can update the UEFI . If you select **Disabled**, only the person who knows the supervisor password can update the UEFI BIOS.
	Secure RollBack Prevention	• Disabled • **Enabled**	If you select **Disabled**, you can flash the older version the UEFI BIOS.
Memory Protection	Execution Prevention	• Disabled • **Enabled**	Some computer viruses and worms cause memory buffers to overflow. By selecting **Enabled** you can protect your computer against attacks by such viruses and worms. If you find that an application program does not run correctly after choosing **Enabled**, select **Disabled** and reset the setting.

Table 3. Security menu items (continued)

Menu item	Submenu item	Selection	Comments
Virtualization	Intel (R) Virtualization Technology	• **Disabled** • Enabled	If you select **Enabled**, a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Virtualization Technology.
	Intel (R) VT-d Feature	• **Disabled** • Enabled	Intel VT-d stands for Intel Virtualization Technology for directed I/O. When enabled, a VMM can utilize the platform infrastructure for I/O virtualization.
I/O Port Access	Ethernet LAN	• Disabled • **Enabled**	If you select **Enabled**, you can use the Ethernet LAN device.
	Wireless LAN	• Disabled • **Enabled**	If you select **Enabled**, you can use the Wireless LAN device.
	Wireless WAN	• Disabled • **Enabled**	If you select **Enabled**, you can use the Wireless WAN device.
	Bluetooth	• Disabled • **Enabled**	If you select **Enabled**, you can use the Bluetooth device.
	USB Port	• Disabled • **Enabled**	If you select **Enabled**, you can use the USB connectors.
	Memory Card Slot	• Disabled • **Enabled**	If you select **Enabled**, you can use the memory card slot for a SD card or a MultiMediaCard.
	Integrated Camera	• Disabled • **Enabled**	If you select **Enabled**, you can use the integrated camera.
	Microphone	• Disabled • **Enabled**	If you select **Enabled**, you can use the microphone (internal, external, or line-in).
Anti-Theft	Intel AT Module Activation Current setting	• Disabled • **Enabled** • Permanently Disabled	Enable or disable the UEFI BIOS interface to activate the Intel AT module, which is an optional the anti-theft service from Intel. **Note:** If you set the Intel AT module activation to **Permanently Disabled**, you will be unable to enable this setting again.
	Computrace Current setting	• Disabled • **Enabled** • Permanently Disabled	Enable or disable the UEFI BIOS interface to activate the computrace module. Computrace is an optional monitoring service from Absolute Software. **Note:** If you set the computrace module activation to **Permanently Disabled**, you will be unable to enable this setting again.

Table 3. Security menu items (continued)

Menu item	Submenu item	Selection	Comments
Secure Boot	Secure Boot	• **Disabled** • Enabled	Enables or disables the UEFI secure boot feature. Enable or disable this function to forbid or allow an unauthorized operating system to run at boot time. **Note:** To enabe Secure Boot, you need to set the startup setting as **UEFI Only** and set **CSM Support** as **No**.
	Platform Mode	User Mode	This indicates that the platform is operating in setup mode or user mode.
	Reset to Manufacturing Default	**Enter**	Reset secure boot variables to the manufacturing default
	CertNames	Win8 Certificate	

Startup menu

To change the computer startup settings, select **Startup** from the ThinkPad Setup main menu.

Attention:

- After you change the startup sequence, you must be extremely careful not to specify a wrong device during a copy, save, or format operation. If you specify a wrong device, your data and programs might be erased or overwritten.
- If you are using the BitLocker drive encryption, you should not change the startup sequence. BitLocker drive encryption detects the change of startup sequence and locks the computer from booting.

Changing the startup sequence

To change the startup sequence, do the following:

1. Select **Boot** or **Network**, then press Enter. The default boot list is displayed, showing the order in which devices will be started up. Even devices that are not attached to or installed on your computer are listed.
   - Use the **Boot** submenu to specify the startup sequence that runs when you turn on the power.
   - Use the **Network** submenu to specify the startup sequence that runs when Wake on LAN is enabled. Wake on LAN is commonly used by LAN administrators in corporate networks to get remote access to your computer.
2. Set the startup sequence by using the following keys:
   - Use cursor keys to select a device.
   - Use F6 or the combination of Shift and + to move the device up to a higher priority.
   - Use F5 or – to move the device down to a lower priority.
3. Press Fn+F10 to save the changes and restart the system.

To change the startup sequence temporarily so that the system starts up from a different drive, do the following:

1. Turn off the computer.

2. Turn on the computer, then, while the ThinkPad logo is displayed at the lower-left of the screen, press F12.
3. Select the device you want to start first.

Note: The **Boot** menu will be displayed when the system cannot boot from any device or the operating system cannot be found.

The following table shows the contents of the **Startup** menu items.

Notes:

- Default values are in **boldface**.
- On each submenu, press Enter to show selectable options and select a desired option.
- Some items are displayed on the menu only if the computer supports the corresponding features.

The following table lists the **Startup** menu items.

Table 4. Startup menu items

Menu item	Selection	Comments
Boot		Refer to "Changing the startup sequence" on page 75.
Network Boot	• USB CD • USB FDD • ATA HDD0 • ATA HDD1 • ATA HDD2 • USB HDD • **PCI LAN**	Select top priority of the Boot Priority Order when waking from LAN.
UEFI/Legacy Boot	• **UEFI Only** • Both • Legacy Only	Enable the UEFI/Legacy boot.
UEFI/Legacy Boot Priority	• **UEFI First** • Legacy First	Select priority of boot option between **UEFI** and **Legacy**.
CSM Support	• **No** • Yes	Compatibility Support Module (CSM) is defined in UEFI spec.
Boot Mode	• **Quick** • Diagnostics	The **Quick** boot is intended to boot the operating system as soon as possible by reducing the POST elapsed time. The **Diagnostics** boot is to be used for the problem determination by performing tests of the devices.
Option Key Display	• Disabled • **Enabled**	If you select **Disabled**, then the message "To interrupt normal startup, press Enter" is not displayed during the POST.

Table 4. Startup menu items (continued)

Menu item	Selection	Comments
Boot Device List F12 Option	• Disabled • **Enabled**	F12 key is used to invoke a pop-up Boot device List. This option is only available when supervisor enters setup.
Boot Order Lock	• **Disabled** • Enabled	If you select **Disabled**, your computer will boot using the default priority. If you select **Enabled**, your computer will boot using the priority you have customized.

Restart menu

If you need to close the ThinkPad Setup program and restart the system, select **Restart** from the ThinkPad Setup program main menu. The following submenu options are displayed:

- **Exit Saving Changes**: Exit System Setup and save your changes to CMOS.
- **Exit Discarding Changes**: Exit System Setup without saving changes.
- **Load Setup Defaults**: Load the default value for all ThinkPad Setup items.
- **Discard Changes**: Discard the changes.
- **Save Changes**: Save the changes.

Updating your system UEFI BIOS

The Unified Extensible Firmware Interface (UEFI) BIOS is a part of the system programs that make up the basic layer of software built into your computer. The UEFI BIOS translates the instructions from other software layers.

Your computer system board has a module called EEPROM, also referred to as flash memory. You can update the UEFI BIOS and the ThinkPad Setup program by starting your computer with a flash update optical disc or flash update application running in the Windows environment.

In some instances when you add software, hardware, or a device driver, you might be informed that you need to update your UEFI BIOS in order for the new addition to work properly.

To update your UEFI BIOS, go to the following Web site and follow the instructions on the screen:
http://www.lenovo.com/Drivers

Using system management

This section is intended primarily for network administrators.

Your computer is designed for manageability, so that you can redirect more of your resources to better meet your business objectives.

This manageability, or “Total Cost of Ownership” (TCO), enables you to remotely operate client computers in the same way as you operate your own computer, such as turning on a client computer, formatting hard disk drive, and installing software.

Once the computer is configured and operational, you can manage it by use of software and manageability features already integrated into the client system and the network.

System management

Read this topic to learn more about features of system management:

Desktop Management Interface

The system UEFI BIOS of your computer supports an interface called System Management BIOS Reference Specification (SMBIOS) V2.6.1 SMBIOS provides information about the hardware components of your system. It is the responsibility of the BIOS to supply this database with information about itself and the devices on the system board. This specification documents the standards for getting access to this BIOS information.

Preboot eXecution Environment

Preboot eXecution Environment (PXE) technology makes your computer more manageable (it is PXE 2.1-compliant) by enabling it to boot (load an operating system or another executable image) from a server. Your computer supports the personal computer functions that PXE requires. For example, with the appropriate LAN card, your computer can be booted from the PXE server.

Note: Remote Program Load (RPL) cannot be used with your computer.

Wake on LAN

A network administrator can use Wake on LAN to turn on a computer from a management console.

When Wake on LAN is used with network management software, many functions, such as data transfer, software updates, and Flash updates of UEFI BIOS, can be performed remotely without remote attendance. This updating can be done after normal working hours and on weekends, to save time and increase productivity. Users are not interrupted during normal working hours, and LAN traffic is kept to a minimum.

If a computer is turned on by the Wake on LAN function, the **Network** boot sequence is used.

Asset ID EEPROM

The Asset ID EEPROM contains information about the system, including its configuration and the serial numbers of key components. It also includes a number of blank fields in which you can record information about the end users in your network.

Setting management features

To enable the network administrator to control your computer remotely, you must configure the network interface by setting the system-management features in the ThinkPad Setup program. You can configure the following functions in the program:

- Wake on LAN
- Network Boot sequence
- Flash update

If an administrator password (supervisor password) has been set, you will need to specify it when you start ThinkPad Setup to use these functions.

Wake on LAN

When the Wake on LAN feature is enabled on a computer that is connected to a LAN, a network administrator can start the computer remotely from a management console, using remote network-management software.

When your computer is not under the network administrator's system management, you can disable Wake on LAN.

To enable or disable Wake on LAN, do the following:

1. Start ThinkPad Setup.
2. Select **Config**. The **Config** submenu is displayed.
3. Select **Network**. The **Network item** submenu is displayed.
4. For **Wake On LAN**, select one of the following: **AC Only**, **AC and Battery**, or **Disabled**.
5. Press Fn+F10 to save changes and exit.

Network Boot sequence

When your computer is turned on remotely, the system will try to boot from the device that is specified in the **Network Boot** setting, and then follow the boot order list on the **Boot** menu.

To define a sequence, do the following:

1. On the ThinkPad Setup program menu, select **Startup**. The submenu is displayed.
2. Select **Network Boot** and press the Enter key. The boot device list is displayed.
3. Select a boot device from the list to make it as the top boot priority.
4. Press Fn+F10 to save changes and exit.

Note: If you want to initialize the setting to return to the default startup sequence, press F9. The default settings are automatically reloaded.

Flash update

Your network administrator can remotely update the system programs on your computer from a management console. The following requirements must be met:

- Your computer must be started over the LAN.
- Your computer must be engaged in a Preboot eXecution Environment.
- Network-management software must be installed on the remote administrator's computer.

Chapter 8. Preventing problems

An important part of owning a ThinkPad notebook computer is maintenance. With proper care, you can avoid common problems. This chapter provides information that can help you keep your computer running smoothly.

- “General tips for preventing problems” on page 81
- “Making sure device drivers are current” on page 82
- “Taking care of your computer” on page 83

General tips for preventing problems

1. If your computer is equipped with both a hard disk drive and an mSATA solid-state drive, you are not recommended to use the mSATA solid-state drive as a bootable device. The mSATA solid-state drive is designed and developed for “cache” function purpose only. If you use the mSATA solid-state drive as a bootable device, its reliability is not guaranteed.
2. Check the capacity of your hard disk drive from time to time. If the hard disk drive gets too full, the Windows operating system will slow down and might produce errors. To check the hard disk drive capaity, open the Windows Explorer and click **Computer**.
3. Empty your recycle bin on a regular basis.
4. Use disk defragment tool regularly on your hard disk drive to improve data seek and read times.
5. To free up disk space, uninstall unused application programs.

   Note: You also might want to look for application program duplication or overlapping versions.
6. Clean out your Inbox, Sent, and Trash folders from your e-mail client program.
7. Back up your data at least once a week. If critical data is present, it is a good idea to perform a daily backup operation. Lenovo has many backup options available for your computer. Rewritable optical drives are available for most machines and are easily installed.
8. Schedule system restore operations to take a system snapshot periodically. For more information about system restore, see Chapter 5 “Recovery overview” on page 47.
9. Update device drivers and UEFI BIOS when needed.
10. Profile your machine at http://www.lenovo.com/support to keep up to date with current drivers and revisions.
11. Ensure device drivers for non-Lenovo peripheral devices are kept up to date. You might want to read the device driver information release notes prior to updating for compatibility or known issues.
12. Keep a log book. Entries might include major hardware or software changes, driver updates, minor issues you have experienced, and how you resolved the minor issues.
13. If you ever need to run a recovery on your computer to return the preload onto the machine, the following tips might help along the way:
    - Remove all external devices such as the printer, keyboard, and so on.
    - Ensure that your battery is charged and that you have the ac power connected.
    - Boot into ThinkPad Setup and load the default settings.
    - Restart the computer and start the recovery operation.
    - If you use discs to recover the computer, do not remove the disc from the drive until prompted to do so.
14. For suspected hard disk drive issues, refer to “Diagnosing problems” on page 87 to run a diagnostic test of the drive before you call the Customer Support Center. If your computer does not start up, download the files to create a bootable self-test media from the following Web site: http://www.lenovo.com/hddtest. Run the test and record any messages or error codes. If the test

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returns any failing error codes or messages, call the Customer Support Center with the codes or messages and the computer in front of you. A technician will assist you further.

15. If required, you can find your country's Customer Support Center at: http://www.lenovo.com/support/phone. When calling the Customer Support Center, ensure that you have your machine model type, serial number, and the computer in front of you. Also, if the computer is producing error codes, it is helpful to have the error screen on or the message written down.

Making sure device drivers are current

Device drivers are programs that contain instructions for the operating system about how to operate or "drive" a certain piece of hardware. Each hardware component on your computer has its own specific driver. If you add a new component, the operating system needs to be instructed on how to operate that piece of hardware. After you install the driver, the operating system can recognize the hardware component and understand how to use it.

Note: Because drivers are programs, like any other file on your computer, they are susceptible to corruption and might not perform correctly if corruption occurs.

It is not always necessary to download the latest drivers. However, you should download the latest driver for a component if you notice poor performance from that component or if you added a new component. This might eliminate the driver as the potential cause of the problem.

Getting the latest drivers from the Web site

You can download and install updated device drivers from the Lenovo Web site by doing the following:

1. Go to http://www.lenovo.com/Drivers.
2. Click the product name of your computer in the **Current ThinkPad systems** list to see all the device drivers for your computer.
3. Click the driver you want, and follow the instructions on the screen.

Getting the latest drivers using System Update

The System Update program helps you keep the software on your system up-to-date. Update packages are stored on Lenovo servers and can be downloaded from the Lenovo Support Web site. Update packages can contain applications, device drivers, UEFI BIOS flashes, or software updates. When the System Update program connects to the Lenovo Support Web site, the System Update program automatically recognizes the machine type and model of your computer, the installed operating system, and the language of the operating system to determine what updates are available for your computer. The System Update program then displays a list of update packages and categorizes each update as critical, recommended, or optional to help you understand the importance. You have complete control of which updates to download and install. After you select the update packages you want, the System Update program automatically downloads and installs the updates without any further intervention from you.

The System Update program is preinstalled on your computer and is ready to run. The only prerequisite is an active Internet connection. You can start the program manually, or you can use the schedule feature to enable the program to search for updates automatically at specified intervals. You also can predefine scheduled updates to search by severity (critical updates, critical and recommended updates, or all updates) so the list you choose from contains only those update types that are of interest to you.

For more information about how to use System Update, refer to "Lenovo programs" on page 11.

Taking care of your computer

Although 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.

Be careful about where and how you work

- 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 inches).
- 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 might become electrostatically charged. Such a charge might 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 the palm rest.
- Your computer display is designed to be opened and used at an angle slightly greater than 90 degrees. Do not open the display beyond 180 degrees, as this might damage the computer hinge.
- Do not turn your computer over while the ac power adapter is plugged in. This could break the adapter plug.

Carry your computer properly

- Before moving your computer, be sure to remove any media, turn off attached devices, and disconnect cords and cables.
- When picking up your open computer, hold it by the bottom. Do not pick up or hold your computer by the display.

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 the drive before closing the tray.
- When installing the hard disk drive, mSATA solid-state drive, follow the instructions shipped with your hardware, and apply pressure only where needed on the device.
- Turn off your computer if you are replacing the hard disk drive or the mSATA solid-state drive.
- When replacing the hard disk drive, reattach the cover of the drive slot.

- Store your external and removable hard disk drive or optical drives in the appropriate containers or packaging when they are not being used.
- 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.
  - Memory module
  - Mini PCI card
  - Memory card, such as SD card, SDHC card, SDXC card, and MultiMediaCard

    Note: Not all listed devices are included in your computer.

    This action reduces any static electricity from your body. The static electricity could damage the device.
- While transferring data to or from a media card, such as an SD card, do not put your computer into sleep mode before the data transfer is completed; otherwise, your data could become damaged.

Take care in setting passwords

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

Register your computer

Register your ThinkPad computer with Lenovo at 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.

Be sure not to modify your computer

- Only an authorized ThinkPad repair technician should disassemble and repair your computer.
- Do not modify or tape the latches to keep the display open or closed.

Cleaning the cover of your computer

Occasionally clean your computer by doing the following:

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 fibers from the cloth.

Cleaning your computer keyboard

To clean the computer keyboard, do the following:

1. Apply some isopropyl rubbing alcohol to 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 might hook onto an adjacent key and possibly damage it. Ensure that no liquid drips onto or between the keys.
3. Allow to dry.

4. To remove any crumbs or dust from beneath the keys, you can use a camera blower with a brush or cool air from a hair dryer.

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

Cleaning your computer display

To clean the computer display, do the following:

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 or the TrackPoint pointing stick 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.

Chapter 9. Troubleshooting computer problems

This chapter provides information on what to do if you experience a problem with your computer.

This chapter contains the following topics:

- “Diagnosing problems” on page 87
- “Troubleshooting” on page 87

Diagnosing problems

If you experience problems with your computer, use the Lenovo Solution Center program as a starting point for solving them.

The Lenovo Solution Center program enables you to troubleshoot and resolve computer problems. It combines diagnostic tests, system information collection, security status, and support information, along with hints and tips for maximum system performance.

Note: If you are using other Windows operating system rather than Windows 8, go to http://www.lenovo.com/diags for the latest information on diagnostics for your computer.

To run the Lenovo Solution Center program on the Windows 8 operating system, see “Lenovo programs” on page 11.

For additional information, refer to the Lenovo Solution Center help system.

Note: If you are unable to isolate and repair the problem yourself after running the program, save and print the log files. You will need the log files when you speak to a Lenovo technical support representative.

Troubleshooting

If your computer has an error, it typically displays a message or an error code, or a beep sounds when you turn it on. When you experience a problem, refer to the corresponding sections in this topic to try to solve the problem by yourself.

Computer stops responding

Print these instructions now and keep it with your computer for reference later.

If your computer is completely unresponsive (you cannot use the UltraNav pointing device or the keyboard), do the following:

1. Press and hold the power button to turn off the computer.
   - If the computer is turned off, restart the computer by pressing the power button. If you can not restart the computer, go to step 2.
2. While the computer is turned off, remove all power sources from the computer. and reset the system by inserting a straightened paper clip into the emergency reset hole. Then hold down the power button for 10 seconds. Reattach the ac power adapter. If the computer does not turn back on, continue to step 3.

   Note: If the computer starts with ac power but does not start when ac power is removed, call the Customer Support Center for support.

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3. While the computer is off, remove all external devices that are attached to your computer (keyboard, mouse, printer, scanner, and so on). Repeat step 2. If step 2 is unsuccessful, continue with step 4.

   Note: The following steps involve removing static sensitive components from your computer. Ensure that you are properly grounded and remove all sources of power attached to the computer. If you are uncomfortable or unsure about removing components please call the Customer Support Center for assistance.
4. While the computer is off, remove all sources of power and external hardware and reset the system by inserting a straightened paper clip into the emergency reset hole. Then remove any non-original memory module added to your computer. If the computer still does not turn on, refer to Chapter 6 “Replacing devices” on page 49 for details of resetting other customer-replaceable components that are attached to your computer.

If the computer still does not start up, call the Customer Support Center and a Customer Support Specialist will assist you.

Spills on the keyboard

With a mobile computer, there are increased chances of spilling liquids on the keyboard. Because most liquids conduct electricity, liquid spilled on the keyboard could create numerous short circuits, potentially causing irreparable damage to your computer.

If you spill something on your computer:

Attention: Ensure that no liquid creates a short circuit between you and the ac power adapter (if in use). Although you might lose some data or work by turning off the computer immediately, leaving the computer on might make your computer unusable.

1. Carefully unplug the ac power adapter immediately.
2. Turn off the computer immediately. The more quickly you stop the current from passing through the computer the more likely you will reduce damage from short circuits.
3. Wait until you are certain that all the liquid is dry before turning on your computer.

Note: If you want to replace your keyboard, you can purchase a new one.

Error messages

- **Message**: 0177: Bad SVP data, stop POST task.

  Solution: Checksum of the supervisor password in the EEPROM is not correct. The system board should be replaced. Have the computer serviced.

- **Message**: 0183: Bad CRC of Security settings in EFI Variable. Enter ThinkPad Setup.

  Solution: Checksum of the Security settings in the EFI Variable is not correct. Enter ThinkPad Setup to check the Security settings, Press Fn+F10 and then press Enter to restart the system. If you still have a problem, have the computer serviced.

- **Message**: 0187: EAIA data access error.

  Solution: Enter ThinkPad Setup to check the Security settings. Press Fn+F10 and then press Enter to restart the system.

- **Message**: 0188: Invalid RFID Serialization Information Area.

  Solution: The EEPROM checksum is not correct (block # 0 and 1). Reset the block # 0 and 1, for example the box Serial Number, and/or block # 4 and 5, for example the UUID.

- **Message**: 0189: Invalid RFID configuration information area.

  Solution: The EEPROM checksum is not correct (block # 4 and 5). Reset the block # 0 and 1, for example the box Serial Number, and/or block # 4 and 5, for example the UUID.

- **Message**: 0190: Critical low-battery error.

  Solution: The computer turns off, because the battery is low. Connect the ac power adapter to the computer and charge the battery.

- **Message**: 0191: System Security - Invalid remote change requested.

  Solution: Bad system configuration change request has been detected, for example, the BootBlock update has failed or unknown request packet has been detected. To clear the error, enter the ThinkPad Setup program.

- **Message**: 0199: System Security - Security password retry count exceeded.

  Solution: This message is displayed if you enter a wrong supervisor password more than three times. Confirm the supervisor password and try again. To clear the error, enter the ThinkPad Setup program.

- **Message**: 1802: Unauthorized network card is plugged in - Power off and remove the network card.

  Solution: The Mini PCI Express network card is not supported on this computer. Remove it.

- **Message**: 1820: More than one external fingerprint readers are attached. Power off and remove all but the reader that you set up within your main operating system.

  Solution: There are more than one external fingerprint readers. Power off and remove all but the reader that you set up within your main operating system.

- **Message**: 0251: System CMOS checksum bad.

  Solution: The system CMOS might have been corrupted by an application program. The computer uses the default settings. Run ThinkPad Setup to reconfigure the settings. If you still see the same error code, have the computer serviced.

- **Message**: 0253: EFI Variable Block Data was destroyed.

  Solution: The system EFI Variable Block Data might have been corrupted.

- **Message**: 0271: Date and time error.

  Solution: Neither the date nor the time is set in the computer. Enter ThinkPad Setup to set the date and time.

- **Message**: ThinkVantage Active Protection sensor diagnostics failed.

  Solution: ThinkVantage® Active Protection sensor is not working correctly. Have the computer serviced.

- **Message**: 2100: Initialization error on HDD0 (Main HDD).

  Solution: The hard disk drive is not working. Have the hard disk drive serviced.

- **Message**: 2101: Detection error on HDD1 (Ultrabay HDD)

  Solution: The Ultrabay hard disk drive is not working. Have the Ultrabay hard disk drive serviced.

- **Message**: 2102: Detection error on HDD2 (Mini SATA)

  Solution: The Mini SATA device is not working. Have the Mini SATA device serviced.

- **Message**: 2110: Read error on HDD0 (Main HDD)

Solution: The main hard disk drive is not working. Have the main hard disk drive serviced.

- **Message**: 2111: Read error on HDD1 (Ultrabay HDD)

  Solution: The Ultrabay hard disk drive is not working. Have the Ultrabay hard disk drive serviced.

- **Message**: 2112: Read error on HDD2 (Mini SATA)

  Solution: The Mini SATA device is not working. Have the Mini SATA device serviced.

- **Message**: 2200: Machine Type and Serial Number are invalid.

  Solution: Machine Type and Serial Number are invalid. Have the computer serviced.

- **Message**: 2201: Machine UUID is invalid.

  Solution: Machine UUID is invalid. Have the computer serviced.

- **Message**: Fan error

  Solution: Cooling fan has failed. Have the computer serviced.

- **Message**: Thermal sensing error

  Solution: The thermal sensor is not functioning correctly. Shut down the computer immediately and have the computer serviced.

- **Message**: The battery installed is not supported by this system and will not charge. Please replace the battery with the correct Lenovo battery for this system. Press the ESC key to continue

  Solution: Unauthorized battery is connected to the system. Press the ESC to continue

- **Message**: This system does not support batteries that are not genuine Lenovo-made or authorized. The system will continue to boot, but may not charge unauthorized batteries.

  Attention: Lenovo has no responsibility for the performance or safety of unauthorized batteries, and provides no warranties for failures or damage arising out of their use.

  Solution: Unauthorized battery is connected to the system. If you still see the same error message, contact Lenovo for help.

Errors without messages

- **Problem**: My screen keeps blanking when I do not want it to.

  Solution: You can disable any system timers, such as the LCD turn-off timer or the blank timer by doing the following:

  1. Click the battery gauge in the Windows notification area. Then click **More power options → Choose when to turn off the display**.
  2. Change the settings as you desire by following the instructions on the screen.

- **Problem**: When I turn on the computer, nothing is displayed 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 by pressing and holding the power button for four seconds or more. Turn it on and listen again.

  Solution: Ensure that:

  – The battery is installed correctly.

– The ac power adapter is connected to the computer and the power cord is plugged into a working electrical outlet.
– The computer is turned on. (Turn the power button on again for confirmation.)

If a power-on password is set:

– Press any key to display the prompt for the power-on password. If the brightness level of the screen is low, increase it by pressing Home.
– Type the correct password and press Enter.

If these items are correctly set, and the screen remains blank, have the computer serviced.

- **Problem**: When I turn on the computer, only a white cursor is displayed on a blank screen.

  Solution: If you have modified a partition on your hard disk drive by using partition software, information about that partition, or the master boot record might have been destroyed.

  1. Turn off the computer, and then turn it on again.
  2. If you still see only the cursor on the screen, do the following:
     – If you have used the partition software, examine the partition on the hard disk drive by using the software, and recover the partition if required.
     – Reset your computer to the factory state. For more information, see Chapter 5 “Recovery overview” on page 47.

     If the problem persists, have the computer serviced.

- **Problem**: My screen goes blank while the computer is on.

  Solution: Your screen saver or power management might have been enabled. Do either of the following:

  – Touch the TrackPoint pointing device or the touch pad, or press a key to exit the screen saver.
  – Press the power button to resume from sleep.

Beep errors

Table 5. Beep errors

Problem	Solution
One short beep, pause, three short beeps, pause, three more short beeps, and one short beep	Ensure that memory modules are installed correctly. If they are, and you still hear the beeps, have the computer serviced.
Three short beeps, pause, one short beep, pause, one more short beep, and three short beeps	PCI resource allocation failure. Power off the computer and remove the PCI devices. If the beeps persist, have the computer serviced.
One long and two short beeps	The video function has a problem. Have the computer serviced.
Four cycles of four short beeps	The Security Chip has a problem. Have the computer serviced.
Five short beeps	The system board has a problem. Have the computer serviced.
Five short beeps, pause, five short beeps, and pause	Continue to boot immediately when the error was detected.

Memory module problems

Print these instructions now and keep it with your computer for reference later.

If your memory module is not operating properly, check the following items:

1. Verify that the memory module is installed and seated correctly in your computer.

   It might be necessary to remove all added memory modules to test the computer with only the factory-installed memory modules, and then reinstall the memory module one at a time to ensure a proper connection.

2. Check for error messages during startup.

   Follow the appropriate corrective actions for power-on self-test (POST) error messages.

3. Verify that the latest UEFI BIOS for your model has been installed.
4. Verify the proper memory configuration and compatibility including the maximum memory size and the memory speed.
5. Run diagnostic programs. See “Diagnosing problems” on page 87.

Networking problems

The following are the most common networking problems:

Ethernet problems

- **Problem**: Your computer cannot connect to the network.

  Solution: Ensure that:

  – The cable is installed correctly.

    The network cable must be securely connected both to the Ethernet connector of your computer and to the RJ45 connector of the hub. The maximum allowable distance from the computer to hub is 100 meters. If the cable is connected and the distance is within acceptable limits but the problem persists, try a different cable.

  – You are using the correct device driver.

    1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
    2. Click **Hardware and Sound → Device Manager**. If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
    3. If the exclamation mark is displayed next to the adapter name under **Network adapters**, you might not be using the correct driver or the driver might have been disabled. To update the driver, right-click the highlighted adapter.
    4. Click **Update Driver Software**, and then follow the instructions on the screen.

  – The switch port and the adapter have the same duplex setting.

    If you configured the adapter for full duplex, ensure that the switch port also is configured for full duplex. Setting the wrong duplex mode can degrade performance, cause data loss, or result in lost connections.

  – You have installed all networking software that is necessary for your network environment.

    Check with your LAN administrator for the necessary networking software.

- **Problem**: The adapter stops working for no apparent reason.

  Solution: The network driver files might be corrupt or missing. Update the driver by referring to the above solution for the procedure to ensure that the correct device driver is installed.

- **Problem**: If your computer is a Gigabit Ethernet model and you use a speed of 1000 Mbps, the connection fails or errors occur.

  Solution:

- Use Category 5 wiring and ensure that the network cable is securely connected.
- Connect to a 1000 BASE-T hub/switch (not 1000 BASE-X).

- **Problem**: The Wake On LAN feature is not working.

  Solution:

  - Ensure that Wake On LAN is enabled in ThinkPad Setup.
  - If it has been enabled, check with your LAN administrator for the necessary settings.

- **Problem**: If your computer is a Gigabit Ethernet model, it cannot connect to the network at 1000 Mbps. Instead, it connects at 100 Mbps.

  Solution:

  - Try another cable.
  - Ensure that the link partner is set to auto-negotiate.
  - Ensure that the switch is 802.3ab-compliant (gigabit over copper).

A wireless LAN problem

Problem: You cannot connect to the network using the built-in wireless network card.

Solution: Ensure that:

- Your wireless LAN driver is the latest version.
- Your computer is within range of a wireless access point.
- The Airplane mode is turned off.

Check the Network Name (SSID) and your encryption information.

A wireless WAN problem

Problem: A message is displayed indicating that an unauthorized WAN card is installed.

Solution: The WAN card is not supported on this computer. Remove it.

Note: Depending on your computer, some models do not have a wireless WAN card.

Bluetooth problems

- **Problem**: Sound does not come from the Bluetooth headset/headphone but comes from the local speaker even though the Bluetooth headset/headphone is connected using a Headset profile or AV profile.

  Solution: Do the following:

  1. Exit the application that uses the sound device (for example, Windows Media Player).
  2. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
  3. Click **Hardware and Sound → Sound → Playback**.
  4. If you are using a Headset profile, select **Bluetooth Hands-free Audio** and click the **Set Default** button. If you are using an AV profile, select **Stereo Audio** and click the **Set Default** button.
  5. Click **OK** to close the Sound window.

- **Problem**: PIM items sent from the Windows 8 operating systems cannot be received correctly into the address book of any other Bluetooth-enabled device.

Solution: The Windows 8 operating system send PIM items in XML format, but most Bluetooth-enabled devices handle PIM items in vCard format. If another Bluetooth-enabled device can receive a file through Bluetooth, a PIM item sent from the Windows 8 might be saved as a file with the extension .contact.

Problems with the keyboard and other pointing devices

The following are the most common problems with keyboards and other pointing devices.

UltraNav pointing device problems

- **Problem**: The pointer drifts when the computer is turned on or after it resumes normal operation.

  Solution: The pointer might drift when you are not using the TrackPoint pointing device during normal operation. This is a normal characteristic of the TrackPoint pointing device and is not a defect. Pointer drifting might occur for several seconds under the following conditions:

  – When the computer is turned on
  – When the computer resumes normal operation
  – When the TrackPoint pointing device is kept pressed for a long time
  – When the temperature changes

- **Problem**: The TrackPoint pointing device or touch pad does not work.

  Solution: Ensure that the TrackPoint pointing device or touch pad is enabled in the UltraNav Device Setting window.

  Notes: To open the UltraNav Device Setting window, do the following:

  1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
  2. Click **Hardware and Sound → Mouse**, and then click the **UltraNav** tab.

Keyboard problems

- **Problem**: All or some keys on the keyboard do not work.

  Solution: If an external numeric keypad is connected:

  1. Turn off the computer.
  2. Remove the external numeric keypad.
  3. Turn on the computer and try using the keyboard again.

  If the keyboard problem is resolved, carefully reconnect the external numeric keypad and the external keyboard. Ensure that you have seated the connectors correctly.

  If the problem persists, ensure that the correct device driver is installed.

  1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
  2. Select **Large icons** or **Small icons** view.
  3. Click **Keyboard → Hardware**.
  4. Ensure that the **Device status** is **This device is working properly**.

  If keys on the keyboard still do not work, have the computer serviced.

- **Problem**: All or some keys on the external numeric keypad do not work.

  Solution: Ensure that the external numeric keypad is correctly connected to the computer.

Problems with the display and multimedia devices

This topic includes the most common problems with displays and multimedia devices, including the computer display, the external monitor, audio devices, and the optical drive.

Computer screen problems

- **Problem**: The screen is blank.

  Solution: Do the following:

  – Press F7 to bring up the image.
  – If you are not running out your battery power, press F6 to make the screen brighter.
  – If your computer is in sleep mode, press Fn to resume from the sleep mode.
  – If the problem persists, follow the solution for the following problem.

- **Problem**: The screen is unreadable or distorted.

  Solution: Ensure 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 the following:

  1. Right-click on the desktop, and click **Screen resolution**. Check whether the screen resolution is correctly set.
  2. Click **Advanced Settings**
  3. Click the **Adapter** tab. Ensure 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.
  4. 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 ensure that the device is working correctly. If not, click the **Troubleshoot** button and follow the instructions on the screen.
  5. Click the **Monitor** tab. Ensure 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 ensure that the device is working correctly. If not, click the **Troubleshoot** button and follow the instructions on the screen.
  7. Click the **Color Management** tab. Check whether the color quality is correctly set, and ensure that the other information also is correct. If you are prompted for an administrator password or confirmation, type the password or provide confirmation. Check the Device status box and ensure that the device is working correctly. If not, click the Troubleshoot button and follow the instructions on the screen.

- **Problem**: Incorrect characters are displayed 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**: The screen stays on even after you turn off your computer.

Solution: Press and hold the power button for four seconds or more to turn off your computer; then turn it on again.

- **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 display contains multiple thin-film transistors (TFTs). A small number of missing, discolored, or bright dots on the screen might exist all the time.

External monitor problems

- **Problem**: The external monitor is blank.

  Solution: To bring up the image, press F7 and select the desired monitor. If the problem persists, do the following:

  1. Connect the external monitor to another computer to ensure that it works.
  2. Reconnect the external monitor to your computer.
  3. Refer to the manual shipped with the external monitor to check the resolutions and refresh rates that are supported.
     - If the external monitor supports the same resolution as the computer display or a higher resolution, view output on the external monitor or on both the external monitor and the computer display.
     - If the external monitor supports a lower resolution than the computer display, view output on the external monitor only. (If you view output on both the computer display and the external monitor, the external monitor screen will be blank or distorted.)

- **Problem**: You cannot set a higher resolution than the present one on your external monitor.

  Solution:

  - Ensure that the monitor information is correct by doing the following:
    1. Right-click on the desktop, and click **Screen resolution**.

       Note: If your computer cannot detect the external monitor, click the **Detect** button.
    2. Click the icon for the desired monitor (the **Monitor-2** icon is for the external monitor).
    3. Click **Advanced Settings**.
    4. Click the **Adapter** tab.
    5. Ensure 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 **OK**.

    If the information is incorrect, reinstall the device driver.
  - Check the monitor type and, if necessary, update the driver by doing the following:
    1. Connect the external monitor to the monitor connector, and then connect the monitor to an electrical outlet.
    2. Turn on the external monitor and the computer.
    3. Right-click on the desktop, and click **Screen resolution**.

       Note: If your computer cannot detect the external monitor, click the **Detect** button.
    4. Click the icon for the desired monitor (the **Monitor-2** icon is for the external monitor).
    5. Click **Advanced Settings**.
    6. Click the **Monitor** tab. Check the monitor information window to ensure that the monitor type is correct. If it is, click **OK** to close the window; otherwise do the following.

7. If more than one monitor type is displayed, select **Generic PnP Monitor** or **Generic Non-PnP Monitor**.
8. Click **Properties**. If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
9. Click the **Driver** tab.
10. Click **Update Driver**.
11. Click **Browse my computer for driver software**, and then click **Let me pick from a list of device drivers on my computer**.
12. Clear the **Show compatible hardware** check box.
13. Select your monitor manufacturer and model.
14. After updating the driver, click **Close**.
15. Set **Resolution**.

    Note: To change the color settings, select the **Monitor** tab, then set **Colors**.
16. Click **OK**.

- **Problem**: The screen is unreadable or distorted.

  Solution: Ensure that:

  – The monitor information is correct and the appropriate monitor type is selected. Refer to the solution to the above problem.

  – Ensure that an appropriate refresh rate is selected by doing the following:

    1. Connect the external monitor to the monitor connector, and then connect the monitor to an electrical outlet.
    2. Turn on the external monitor and the computer.
    3. Right-click on the desktop, and click **Screen resolution**.

       Note: If your computer cannot detect the external monitor, click the **Detect** button.
    4. Click the icon for the desired monitor (the **Monitor-2** icon is for the external monitor).
    5. Click **Advanced Settings**.
    6. Click the **Monitor** tab.
    7. Select the correct screen refresh rate.

- **Problem**: Wrong characters are displayed on the screen.

  Solution: Did you follow the correct procedure when installing the operating system or application program? If you did, have the external monitor serviced.

- **Problem**: The Extend desktop function does not work.

  Solution: Enable the Extend desktop function by doing the following:

  1. Connect the external monitor to the monitor connector, and then connect the monitor to an electrical outlet.
  2. Turn on the external monitor and the computer.
  3. Right-click on the desktop, and click **Screen resolution**.
  4. Click the **Monitor-2** icon.
  5. Select **Extend these displays** for multiple displays.
  6. Click the **Monitor-1** icon (for the main display, the computer display).

7. Set the resolution for the main display.
8. Click the **Monitor-2** icon (for the external monitor).
9. Set the screen resolution for the secondary display.
10. Set the relative position of each monitor by dragging its icon. You can set the monitors in any relative position, but the icons must touch each other.
11. Click **OK** to apply the changes.

- **Problem**: If you use the Extend desktop function, you cannot set a higher resolution or higher refresh rate on the secondary display.

  Solution: Change the resolution and the color depth to lower settings for the main display. Refer to the solution to the above problem.

- **Problem**: Display switching does not work.

  Solution: If you use the Extend desktop function, disable it, and change the display output location. If a DVD movie or a video clip is playing, stop the playback, close the application, and then change the display output location.

- **Problem**: The screen position on the external monitor is incorrect when that monitor is set for a high resolution.

  Solution: Sometimes, when you use a high resolution such as 1600x1200, the image is shifted to left or right on the screen. To correct this, first ensure that your external monitor supports the display mode (the resolution and the refresh rate) that you have set. If it does not, set a display mode that the monitor supports. If it does support the display mode you have set, go to the setup menu for the monitor itself and adjust the settings there. Usually the external monitor has buttons for access to the setup menu. For details, see the documentation that comes with the monitor.

Audio problems

- **Problem**: Wave or MIDI sound does not play correctly.

  Solution: Ensure that the built-in audio device is configured correctly.

  1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
  2. Click **Hardware and Sound → Device Manager → Sound, video and game controllers**.
  3. Ensure that the Realtek High Definition Audio is enabled and configured correctly:

- **Problem**: Recordings made using the microphone input are not loud enough.

  Solution: Ensure that the Microphone Boost function is turned on and set by doing the following:

  1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
  2. Click **Hardware and Sound → Sound → Recording → Microphone → Properties → Levels**.
  3. Increase the microphone volume by moving the **Microphone Boost** slider right.
  4. Click **OK**.

  Note: For details about controlling volume, refer to your Windows online help.

- **Problem**: A volume or balance slider cannot be moved.

  Solution: The slider might be grayed out. This means that its position is fixed by the hardware and cannot be changed.

- **Problem**: The volume sliders do not stay in place when some audio applications are used.

Solution: It is normal for the sliders to change position when certain sound applications are used. The applications are aware of the settings in the Volume Mixer window and are allowed to change the settings themselves. An example is the Windows Media Player. Usually the application has sliders available to control the sound from within the application.

- **Problem**: The balance slider cannot completely mute one channel.

  Solution: The control is designed to compensate for minor differences in balance and does not completely mute either channel.

- **Problem**: There is no volume control for MIDI sound in the Volume Mixer window.

  Solution: Use the hardware volume control. This is because the built-in synthesizer software does not support the control.

- **Problem**: The sound cannot be turned off completely even if you set the Volume Mixer control at minimum.

  Solution: To turn off the sound completely, go to the Volume Mixer control by clicking the speaker icon in the Windows notification area, then click Mixer. Click the Mute Speaker icons.

- **Problem**: When you connect a headphone to your computer while playing sound, a speaker does not produce sound in the MULTI-STREAM mode at Realtek HD Audio Manager.

  Solution: Once the headphone is attached, the streaming is automatically redirected to it. If you want to listen to sound from the speakers again, be sure to set those speakers as the default device. The procedure is as follows:

  1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings** → **Control Panel** → **Hardware and Sound** → **Realtek HD Audio Manager**.
  2. Look at the tabs of playback devices. If you have attached a headphone, the headphone will be automatically set as the default device, and the headphone icon will be checked.
  3. To set a different device as the default, click **Set Default Device** on the **Speaker** tab, and select **Set Default Device**. Then, that speaker tab icon will now have a check mark.
  4. Play any sound by use of a music program such as Windows Media Player. Ensure that sound comes from the speakers.

  For details, refer to the help information system for Realtek HD Audio Manager.

Battery and power problems

This topic contains instructions on troubleshooting battery and power problems.

Battery problems

- **Problem**: The battery pack cannot be fully charged in the standard charge time when the computer is powered off.

  Solution: The battery pack might be over-discharged. Do the following:

  1. Turn off the computer.
  2. Ensure that the over-discharged battery pack is in the computer.
  3. Connect the ac power adapter to the computer and let it charge.

  If a quick charger is available, use it to charge the over-discharged battery pack.

  If the battery pack cannot be fully charged in 24 hours, use a new battery pack.

- **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 pack.

- **Problem**: The operating time for a fully charged battery pack is short.

  Solution: Discharge and recharge the battery pack. If your battery operating time is still short, use a new battery pack.

- **Problem**: The computer does not operate with a fully charged battery pack.

  Solution: The surge protector in the battery pack might be active. Turn off the computer for one minute to reset the protector; then turn on the computer again.

An ac power adapter problem

Problem: The ac power adapter is connected to the computer and the working electrical outlet, but the power adapter (power plug) icon is not displayed in the Windows notification area. Also the ac power indicator does not light up.

Solution: Do the following:

1. Ensure that the connection of the ac power adapter is correct. For instructions on connecting the ac power adapter, see *Safety, Warranty, and Setup Guide* that comes with your computer.
2. Reconnect the ac power adapter, then turn on the computer.
3. If the power adapter icon still is not displayed in the Windows notification area and the ac power indicator does not light up, have the ac power adapter and your computer serviced.

Note: To display the power adapter (power plug) icon, click **Show hidden icons** in the Windows notification area.

Power problems

Print these instructions now and keep it with your computer for reference later.

If your computer is getting no power at all, check the following items:

1. Verify the power button. Refer to “System status indicators” on page 6. The power button is lit whenever the computer is on.
2. Check all power connections. Remove any power strips and surge protectors to connect the ac power adapter directly to the ac power outlet.
3. Inspect the ac power adapter. Check for any physical damage, and ensure that the power cable is firmly attached to the adapter brick and the computer.
4. Verify the ac power source is working by attaching another device to the outlet.
5. Remove all devices and then test for system power with minimal devices attached.
   a. Disconnect the ac power adapter and all cables from the computer.
   b. Close the computer display, and turn the computer over.
   c. Remove the Mini PCI ExpressCard. Refer to “Replacing a Mini PCI ExpressCard for wireless LAN connection” on page 57 and “Installing or replacing the wireless WAN card” on page 60.
   d. Remove the hard disk drive. Refer to “Replacing the hard disk drive or solid-state drive” on page 51.
   e. Wait for 30 seconds, and then reinstall the memory module and the known good battery or the ac power adapter to test the computer with minimal devices attached first.
   f. Reinstall each device one at a time that you have removed in the earlier steps.

If your computer does not run on battery power, check the following items:

1. Verify the battery status indicator. See “Power status indicator” on page 7.

2. The battery status indicator is normally illuminated whenever the computer is on, or the ac power adapter is connected and the battery is charging. This indicator may be blinking or solid in either orange or green color depending on the status of the battery.

A power button problem

Problem: The system does not respond, and you cannot turn off the computer.

Solution: Turn off the computer by pressing and holding the power button for 4 seconds or more. If the system is still not reset, remove the ac power adapter and the restart the system.

Boot problems

Print these instructions now and keep them with your computer for reference later.

If you receive an error message before the operating system loads, follow the appropriate corrective actions for POST error messages.

If you receive an error message while the operating system is loading the desktop configuration after the POST is completed, check the following items:

1. Go to the Lenovo Support Web site at http://www.lenovo.com/support and search for the error message.
2. Go to the Microsoft Knowledge Base homepage at http://support.microsoft.com/ and search for the error message.

Sleep problems

- **Problem**: The computer enters sleep mode unexpectedly.

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

- **Problem**: The computer enters sleep mode (the sleep indicator turns on) immediately after the power-on self-test.

  Solution: Ensure that:

  – The battery is charged.

  – The operating temperature is within the acceptable range. Refer to “Operating environment” on page 11.

  If the battery is charged and the temperature is within range, have the computer serviced.

- **Problem**: A critical low-battery error occurs, and the computer immediately turns off.

  Solution: The battery power is getting low. Connect the ac power adapter to the computer and plug it into an electrical outlet.

- **Problem**: The computer display remains blank after you press Fn to return from sleep mode.

  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 F7 to bring up the computer display.

- **Problem**: The computer does not return from sleep mode, or the system status indicator (illuminated ThinkPad logo) blinks slowly and the computer does not work.

Solution: If the system does not return from sleep mode, it might have entered sleep mode automatically because the battery is depleted. Check the system status indicator (illuminated ThinkPad logo).

- If the system status indicator (illuminated ThinkPad logo) blinks slowly, your computer is in sleep mode. Connect the ac power adapter to the computer; then press Fn.
- If the system status indicator (illuminated ThinkPad logo) is off, your computer is in power-off state. Connect the ac power adapter to the computer; then press the power button to resume operation.

If the system still does not return from sleep mode, your system might stop responding and you might not be able to turn off the computer. In this case, you need to reset the computer. If you have not saved your data, it might be lost. To reset the computer, press and hold the power button for 4 seconds or more. If the system is still not reset, remove the ac power adapter.

- **Problem**: Your computer does not enter sleep mode.

  Solution: Check whether any option has been selected to disable your computer from entering sleep mode.

  If your computer tries to enter sleep mode but the request is rejected, the device attached to the USB connector might have been disabled. If this occurs, do a hot-unplug-and-plug operation for the USB device.

Problems with drives and other storage devices

This section includes hard disk drive problems, solid-state drive problems, and optical drive problems.

Hard disk drive problems

- **Problem**: The hard disk drive makes a rattling noise intermittently.

  Solution: The rattling noise might be heard:

  - When the hard disk drive begins or finishes getting access to data.
  - When you carry the hard disk drive.
  - When you carry your computer.

  This is a normal characteristic of a hard disk drive and is not a defect.

- **Problem**: The hard disk drive does not work.

  Solution: On the **Boot** menu of ThinkPad Setup, ensure that the hard disk drive is on the **Boot priority order** list. If it is on the **Excluded from boot order** list, it is disabled. Select the entry for it on the list and press the Shift+1 key. This moves the entry to the **Boot priority order** list.

- **Problem**: After setting a hard disk password on the hard disk drive of the computer, you moved the drive to another computer. Now you cannot unlock the hard disk password.

  Solution: Your computer supports an enhanced password algorithm. Computers older than yours might not support such a security function.

A solid-state drive problem

Problem: When you compress files or folders by use of the data compression function in Windows, and then decompress them, the process of writing to or reading from the files or folders is slow.

Solution: Apply the disk defragmentation tool in Windows for faster access to the data.

Optical drive problems

- **Problem**: The optical drive, such as a CD, DVD, or CD-RW drive, does not work.

  Solution: Ensure that:

- The computer is turned on and a CD, DVD, or CD-RW is properly loaded on the center pivot of the drive. (You should hear a click.)
- The drive connector is firmly connected to the computer. If you use an option that has a bay for installing the drive, ensure that the option is firmly connected to the computer and works properly.
- The drive tray is firmly closed.
- The device drivers are correctly installed.

- **Problem**: You hear a noise from the drive when the CD, DVD, or CD-RW disc is spinning.

  Solution: If the disc is not correctly loaded on the center pivot of the drive, it might rub against the drive cover and make a noise. Ensure that the disc is loaded correctly in the drive.

- **Problem**: The tray does not open even if you press the eject button.

  Solution: When your computer is not turned on, pressing the eject button does not cause the drive tray to open. Ensure that the computer is turned on and that the drive connector is firmly connected to the computer.

  If the tray still does not open, ensure that the computer is running, and insert the end of a straightened paper clip into the emergency eject hole. The tray will open.

- **Problem**: An optical medium, such as a CD, DVD, or CD-RW disc cannot be read.

  Solution: Ensure that the CD, DVD, or CD-RW disc is not dirty. If it is, clean it with a cleaner kit.

  Test another CD, DVD, or CD-RW disc. If the computer can read the other disc, the first disc might be defective.

  Ensure that the disc is loaded on the center pivot of the drive with the label side up. (You should hear a click.)

  Ensure that the disc is in one of the following formats:

  - Music CD
  - CD-ROM or CD-ROM XA
  - Multisession photo CD
  - Video CD
  - DVD-ROM (DVD-video)

- **Problem**: The computer cannot play a CD, or the sound quality is not good.

  Solution: Ensure that the disc meets the standards for your country. Usually, a disc that meets the local standards is marked with a CD logo on the label. If you use a disc that does not meet these standards, we cannot guarantee that it will play, or that, if it does play, the sound quality will be good.

- **Problem**: The **HD DVD** tab in the WinDVD8 program is dimmed and I cannot use it.

  Solution: Your computer does not support an HD DVD drive.

A software problem

Problem: An application does not run correctly.

Solution: Ensure that the problem is not being caused by the application.

Check that your computer has the minimum required memory to run the application. Refer to the manuals supplied with the application.

Check the following:

- The application is designed to operate with your operating system.
- Other applications run correctly on your computer.
- The necessary device drivers are installed.
- The application works when it is run on some other computer.

If an error message is displayed while you are using the application program, refer to the manuals supplied with the application.

If the application still does not run correctly, contact your place of purchase or a service representative for help.

Problems with ports and connectors

The following are the most common problems with ports and connectors.

A USB problem

Problem: A device connected to the USB connector does not work.

Solution: Ensure that the USB device setup is correct, and that the assignment of computer resource and the installation of the device driver are correct. Do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings** → **Control Panel**.
2. Click **Hardware and Sound** → **Device Manager** → **Universal Serial Bus controllers**. If you are prompted for an administrator password or confirmation, type the password or provide confirmation.

Refer to “Diagnosing problems” on page 87 for a diagnostic test of the USB connector.

Chapter 10. Getting support

This chapter provides information about getting help and support from Lenovo.

- “Before you contact Lenovo” on page 105
- “Getting help and service” on page 105
- “Purchasing additional services” on page 107

Before you contact Lenovo

Often, you can solve your computer problems by referring to the information in the explanations of error codes, running diagnostic programs, or by consulting the Lenovo Web site.

Registering your computer

To register your computer with Lenovo, click **Lenovo Support** from the Start screen. Click Registration. Then follow the instructions on the screen.

Downloading system updates

Downloading updated software might resolve problems you experience with your computer.

To download updated software, go to the following Web site and follow the instructions on the screen: http://www.lenovo.com/support

Recording information

Before you talk to a Lenovo representative, record the following important information about your computer.

Recording problem symptoms and details

Collect the answers to the questions below before you call for help. Then, you will be able to get help as quickly as possible.

- What is the problem? Is it continuous or intermittent?
- Is there an error message? What is the error code, if any?
- What operating system are you using? Which version?
- Which software applications were running at the time of the problem?
- Can the problem be reproduced? If so, how?

Recording system information

The serial number label is on the bottom of your computer. Record the machine type and the serial number.

- What is the name of your Lenovo product?
- What is the machine type?
- What is the serial number?

Getting help and service

If you need help, service, technical assistance, or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you. This section contains information

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about where to go for additional information about Lenovo and our products, what to do if you experience a problem with your computer, and whom to call for service should it be necessary.

Information about your computer and preinstalled software, if any, is available in the documentation that comes with your computer. That documentation includes printed books, online books, readme files, and help files. In addition, information about Lenovo products is available on the World Wide Web.

Microsoft Service Packs are the latest software source for Windows product updates. They are available through Web download (connection charges might apply) or through disc. For more specific information and links, go to http://www.microsoft.com. Lenovo offers technical assistance with installation of, or questions related to, Service Packs for your Lenovo-preloaded Microsoft Windows product. For information, contact the Customer Support Center.

Using diagnostic programs

Many computer problems can be solved without outside assistance. If you experience a problem with your computer, the first place to start is the troubleshooting information of your computer documentation. If you suspect a software problem, see the documentation, including readme files and help information systems, that comes with the operating system or application program.

ThinkPad notebook computers come with a set of diagnostic programs that you can use to help you identify hardware problems. See “Diagnosing problems” on page 87 for instructions on using the diagnostic programs.

The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. You can get the latest technical information and download device drivers and updates from the Lenovo Web site at http://www.lenovo.com/support.

Lenovo Support Web site

Technical support information is available on the Lenovo Support Web site at:
http://www.lenovo.com/support

This Web site is updated with the latest support information such as the following:

- Drivers and software
- Diagnostic solutions
- Product and service warranty
- Product and parts details
- User guides and manuals
- Knowledge base and frequently asked questions

Calling Lenovo

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) that apply to your hardware available.

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 UEFI 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

For the terms and conditions of the Lenovo Limited Warranty that applies to your Lenovo hardware product, see “Warranty information” in the *Safety, Warranty, and Setup Guide* that comes with your computer.

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. 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, 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

Telephone numbers

For a list of the Lenovo Support phone numbers for your country or region, go to http://www.lenovo.com/support/phone or refer to the *Safety, Warranty, and Setup Guide* that comes with your computer.

Note: Phone numbers are subject to change without notice. The latest phone numbers are available at http://www.lenovo.com/support/phone. If the number for your country or region is not provided, contact your Lenovo reseller or Lenovo marketing representative.

Finding ThinkPad options

If you want to expand the capabilities of your computer, Lenovo has a number of hardware accessories and upgrades to meet your needs. Options include memory modules, storage devices, network cards, port replicators, batteries, power adapters, printers, scanners, keyboards, mice, and more.

You can shop at Lenovo 24 hours a day, 7 days a week directly over the World Wide Web. All you need is an Internet connection and a credit card.

To shop at Lenovo, go to:
http://www.lenovo.com/accessories/services/index.html

Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for Lenovo and non-Lenovo hardware, operating systems, and application programs; network setup and configuration services; upgraded or extended hardware repair services; and custom installations services. Service availability and service name might vary by country.

For more information about these services, go to:
http://www.lenovo.com/accessories/services/index.html

Appendix A. Regulatory information

Wireless related information

Wireless interoperability

The Wireless LAN PCI Express Mini Card is designed to be interoperable with any wireless LAN product that is based on DSSS, CCK, and/or OFDM radio technology, and is compliant to:

- The 802.11b/g Standard, 802.11a/b/g or 802.11n draft 2.0 on Wireless LANs, as defined and approved by the Institute of Electrical and Electronics Engineers.
- The WiFi certification as defined by the Wi-Fi Alliance.

A Bluetooth device is designed to be interoperable with any Bluetooth product that is compliant to Bluetooth Specification 4.0 as defined by the Bluetooth SIG. The following profiles are supported by the Bluetooth devices:

- Advanced Audio Distribution Profile (A2DP)
- Audio/Video Control Transport Protocol (AVCTP)
- Audio/Video Distribution Transport Protocol (AVDTP)
- A/V Remote Control Profile (AVRCP)
- Basic Imaging Profile (BIP)
- Basic Printing Profile (BPP)
- Dial-Up Networking Profile (DUN)
- File Transfer Profile (FTP)
- Generic Access Profile (GAP)
- Generic A/V Distribution Profile (GAVDP)
- Hardcopy Cable Replacement Profile (HCRP)
- Headset Profile (HSP)
- Hands-Free Profile (HFP)
- Human Interface Device Profile (HID)
- Message Access Profile (MAP)
- Object Exchange Protocol (OBEX)
- Object Push Profile (OPP)
- Personal Area Networking Profile (PAN)
- Phone Book Access Profile (PBAP)
- Service Discovery Protocol (SDP)
- Synchronization Profile (SYNC)
- Video Distribution Profile (VDP)
- Generic Attribute Profile (GATT)
- Proximity Profile
- Find Me Profile
- Immediate Alert Profile

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- Battery Status Profile

Usage environment and your health

Integrated wireless cards emit radio frequency electromagnetic energy like other radio devices. However, the level of energy emitted is far much less than the electromagnetic energy emitted by wireless devices like for example mobile phones.

Due to the fact that integrated wireless cards operate within the guidelines found in radio frequency safety standards and recommendations, Lenovo believes they are safe for use by consumers. These standards and recommendations reflect the consensus of the scientific community and result from deliberations of panels and committees of scientists who continually review and interpret the extensive research literature.

In some situation or environment, the use of integrated wireless cards might be restricted by the proprietor of the building or responsible representatives of the organization. These situations and areas might for example include:

- Using the integrated wireless cards on board of airplanes, in hospitals or near petrol stations, blasting areas (with electro-explosive devices), medical implants or body-worn electronic medical devices, such as pace makers.
- In any other environment where the risk of interference to other devices or services is perceived or identified as harmful.

If you are uncertain of the policy that applies to the use of wireless devices in a specific organization (such as airport or hospital), you are encouraged to ask for authorization to use integrated wireless cards prior to turning on the computer.

Location of the UltraConnect wireless antennas

ThinkPad notebook computers feature an integrated UltraConnect™ wireless antenna system built into the display for optimal reception, enabling wireless communication wherever you are.



1 Wireless LAN antenna (main)

2 Wireless WAN antenna (auxiliary)

3 Wireless WAN antenna (main)

4 Wireless LAN antenna (auxiliary)

Locating wireless regulatory notices

For more information about the wireless regulatory notices, refer to the *Regulatory Notice* shipped with your computer.

If your computer is shipped without the *Regulatory Notice*, you can find it on the Web site at: http://www.lenovo.com/ThinkPadUserGuides

Export classification notice

This product is subject to the United States Export Administration Regulations (EAR) and has an Export Classification Control Number (ECCN) of 4A994.b. It can be re-exported except to any of the embargoed countries in the EAR E1 country list.

Electronic emission notices

The following information refers to the ThinkPad S230u, machine type 3347.

Federal Communications Commission Declaration of Conformity

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, uses, 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 that 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.

Lenovo is not responsible for any radio or television interference caused by using other than specified or recommended cables and 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 27560
Phone Number: 919-294-5900

Industry Canada Class B emission compliance statement

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

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

European Union - Compliance to the Electromagnetic Compatibility Directive

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC 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 non-recommended modification of the product, including the installation of option cards from other manufacturers.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

EU contact: Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

CE

German Class B compliance statement

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse B EU-Richtlinie zur Elektromagnetischen Verträglichkeit
Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse B ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

Deutschland:

Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmitteln
Dieses Produkt entspricht dem „Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln“ EMVG (früher „Gesetz über die elektromagnetische Verträglichkeit von Geräten“). Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EG Richtlinie 2004/108/EC (früher 89/336/EWG), für Geräte der Klasse B.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Gropiusplatz 10, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:
Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse B.

Korea Class B compliance statement

B급 기기(가정용 방송통신기자재)
이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다

Japan VCCI Class B compliance statement

この装置は, クラスB情報技術装置です。 この装置は, 家庭環境で使用することを目的としていますが, この装置がラジオやテレビジョン受信機に近接して使用されると, 受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。 VCCI-B

Japan compliance statement for products which connect to the power mains with rated current less than or equal to 20 A per phase

日本の定格電流が 20A/相 以下の機器に対する高調波電流規制
高調波電流規格 JIS C 61000-3-2 適合品

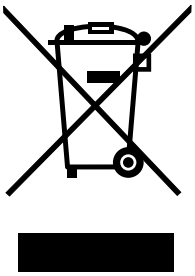
Lenovo product service information for Taiwan

台灣 Lenovo 產品服務資訊如下：
荷蘭商聯想股份有限公司台灣分公司
台北市信義區信義路五段七號十九樓之一
服務電話：0800-000-702

Appendix B. WEEE and recycling statements

Lenovo encourages owners of information technology equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. Information on product recycling offerings can be found on Lenovo's Internet site at http://www.lenovo.com/social_responsibility/us/en/.

Important WEEE information



The WEEE marking on Lenovo products applies to countries with WEEE and e-waste regulations (for example, European Directive 2002/96/EC, India E-Waste Management & Handling Rules, 2011). Appliances are labeled in accordance with local regulations concerning waste electrical and electronic equipment (WEEE). These regulations determine the framework for the return and recycling of used appliances as applicable within each geography. This label is applied to various products to indicate that the product is not to be thrown away, but rather put in the established collective systems for reclaiming these end of life products.

Users of electrical and electronic equipment (EEE) with the WEEE marking must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to them for the return, recycle, and recovery of WEEE and to minimize any potential effects of EEE on the environment and human health due to the presence of hazardous substances. For additional WEEE information go to: http://www.lenovo.com/recycling

Japan recycling statements

Collecting and recycling a disused Lenovo computer or monitor

If you are a company employee and need to dispose of a Lenovo computer or monitor that is the property of the company, you must do so in accordance with the Law for Promotion of Effective Utilization of Resources. Computers and monitors are categorized as industrial waste and should be properly disposed of by an industrial waste disposal contractor certified by a local government. In accordance with the Law for Promotion of Effective Utilization of Resources, Lenovo Japan provides, through its PC Collecting and Recycling Services, for the collecting, reuse, and recycling of disused computers and monitors. For details, visit the Lenovo Web site at: http://www.lenovo.com/services_warranty/jp/ja/recycle/pcrecycle/.

Pursuant to the Law for Promotion of Effective Utilization of Resources, the collecting and recycling of home-used computers and monitors by the manufacturer was begun on October 1, 2003. This service is provided free of charge for home-used computers sold after October 1, 2003. For details, go to http://www.lenovo.com/services_warranty/jp/ja/recycle/personal/.

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Disposing of Lenovo computer components

Some Lenovo computer products sold in Japan may have components that contain heavy metals or other environmental sensitive substances. To properly dispose of disused components, such as a printed circuit board or drive, use the methods described above for collecting and recycling a disused computer or monitor.

Disposing of disused lithium batteries from Lenovo computers

A button-shaped lithium battery is installed on the system board of your Lenovo computer to provide power to the computer clock while the computer is off or disconnected from the main power source. If you want to replace it with a new one, contact your place of purchase or ask for a repair service provided by Lenovo. If you use a Lenovo computer at home and need to dispose of a lithium battery, you must comply with local ordinances and regulations.

Disposing of a disused battery pack from Lenovo notebook computers

Your Lenovo notebook computer has a lithium ion battery pack or a nickel metal hydride battery pack. If you are a company employee who uses a Lenovo notebook computer and need to dispose of a battery pack, contact the proper person in Lenovo sales, service, or marketing, and follow that person's instructions. You also can refer to the instructions at http://www.lenovo.com/jp/ja/environment/recycle/battery/.
If you use a Lenovo notebook computer at home and need to dispose of a battery pack, you must comply with local ordinances and regulations. You also can refer to the instructions at http://www.lenovo.com/jp/ja/environment/recycle/battery/.

Recycling information for Brazil

Declarações de Reciclagem no Brasil

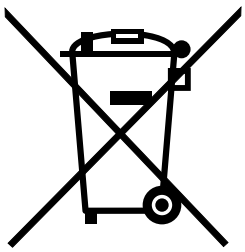
Descarte de um Produto Lenovo Fora de Uso

Equipamentos elétricos e eletrônicos não devem ser descartados em lixo comum, mas enviados à pontos de coleta, autorizados pelo fabricante do produto para que sejam encaminhados e processados por empresas especializadas no manuseio de resíduos industriais, devidamente certificadas pelos orgãos ambientais, de acordo com a legislação local.

A Lenovo possui um canal específico para auxiliá-lo no descarte desses produtos. Caso você possua um produto Lenovo em situação de descarte, ligue para o nosso SAC ou encaminhe um e-mail para: reciclar@lenovo.com, informando o modelo, número de série e cidade, a fim de enviarmos as instruções para o correto descarte do seu produto Lenovo.

Battery recycling information for the European Union

EU



Notice: This mark applies only to countries within the European Union (EU).

Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive.

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, go to:
http://www.lenovo.com/lenovo/environment

Battery recycling information for Taiwan



廢電池請回收

Battery recycling information for the United States and Canada



US & Canada Only

Appendix C. ENERGY STAR model information



ENERGY STAR® is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy aimed at saving money and protecting the environment through energy efficient products and practices.

Lenovo is proud to offer our customers products with the ENERGY STAR qualified designation. Lenovo computers of the following machine type, if the ENERGY STAR mark is affixed, have been designed and tested to conform to the ENERGY STAR program requirements for computers.

3347

By using ENERGY STAR qualified products and taking advantage of the power-management features of your computer, you can help reduce the consumption of electricity. Reduced electrical consumption can contribute to potential financial savings, a cleaner environment, and the reduction of greenhouse gas emissions.

For more information about ENERGY STAR, go to: http://www.energystar.gov

Lenovo encourages you to make efficient use of energy an integral part of your day-to-day operations. To help in this endeavor, Lenovo has preset the following power-management features to take effect when your computer has been inactive for a specified length of time:

Power plan: Energy Saver (settings when plugged into ac power)

- Turn off the display: After 10 minutes
- Put the computer into sleep: After 20 minutes
- Advanced power settings:
  - Turn off hard disks: After 15 minutes
  - Hibernate: Never

To awaken your computer from sleep mode, press the Fn key on your keyboard. For more information about these settings, see the Windows Help and Support information on your computer.

The Wake on LAN function is enabled when your Lenovo computer is shipped from the factory, and the setting remains valid even when the computer is in sleep mode. If you do not need to have Wake on LAN enabled while your computer is in sleep mode, you can reduce the power consumption and prolong the time in sleep mode, by disabling the setting of Wake on LAN for sleep mode. To disable the setting of Wake on LAN for sleep mode, do the following:

1. Move the cursor to the top-right or bottom-right corner of the screen to display the charms. Click **Settings → Control Panel**.
2. Click **Hardware and Sound → Device Manager → Network adapters**.
3. Right-click the network adapter device you want to configure, and click **Properties**.

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4. In the **Power Management** tab, clear the **Allow this device to wake the computer** check box.
5. Click **OK**.

Appendix D. Notices

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Lenovo (United States), Inc.
1009 Think Place - Building One
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing

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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

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ThinkPad
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TrackPoint
UltraConnect
UltraNav

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Appendix E. Restriction of Hazardous Substances Directive (RoHS)

China RoHS

产品中有毒有害物质或元素的名称及含量

部件名称	有毒有害物质或元素					
	铅(Pb)	汞(Hg)	镉(Cd)	六价铬 (Cr(VI))	多溴连苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板组件*	X	O	O	O	O	O
硬盘	X	O	O	O	O	O
光驱	X	O	O	O	O	O
内存	X	O	O	O	O	O
电脑I/O 附件	X	O	O	O	O	O
电源	X	O	O	O	O	O
键盘	X	O	O	O	O	O
鼠标	X	O	O	O	O	O
机箱/ 附件	X	O	O	O	O	O

○:表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下

×:表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求

表中标有"×"的所有部件都符合欧盟RoHS 法规.

印刷电路板组件*: 包括印刷电路板及其零部件、电容和连接器

根据型号的不同，可能不会含有以上的所有部件，请以实际购买机型为准



在中华人民共和国境内销售的电子信息产品必须标识此标志，标志内的数字代表在正常使用状态下的产品的环保使用期限

Turkish RoHS

The Lenovo product meets the requirements of the Republic of Turkey Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (EEE).

Türkiye EEE Yönetmeliğine Uygunluk Beyanı

Bu Lenovo ürünü, T.C. Çevre ve Orman Bakanlığı'nın “Elektrik ve Elektronik Eşyalarda Bazı Zararlı Maddelerin Kullanımının Sınırlandırılmasına Dair Yönetmelik (EEE)” direktiflerine uygundur.

EEE Yönetmeliğine Uygundur.

Ukraine RoHS

Цим підтверджуємо, що продукція Леново відповідає вимогам нормативних актів України, які обмежують вміст небезпечних речовин

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India RoHS

RoHS compliant as per E-Waste (Management & Handling) Rules, 2011.

ThinkPad®