

User's Manual

The attachment hereafter is the user's manual of the specific Lenovo host PC devices in this application, which indicates the regulatory notice concerning the FCC Part 2, 15B, 22H and 24E.

In addition, some electronic information referred to in the user's manual is installed in each host PC device, and it is displayed on the LCD screen.

ThinkPad® Regulatory Notice for Wireless WAN adapter

Read first — regulatory information

Please read this document before you use the ThinkPad computer. Be sure to also read *ThinkPad Regulatory Notice*, included with your computer. ThinkPad computer complies with the radio frequency and safety standards of any country or region in which it has been approved for wireless use. You must install and use your computer in strict accordance with the instructions as described hereafter.

Note: You cannot use the Wireless WAN adapter (Model: UNDP-1) and a Wireless LAN/WiMAX adapter simultaneously. If one of the adapters has established the connection to the network, the other will be disconnected automatically. To confirm the status of the network connection, check the power status indicators of your computer. For more information about the power status indicators, see the “Power-status indicators” section in *Access Help*.

Veillez lire ce document avant d'utiliser l'ordinateur ThinkPad. Veillez à lire également la consigne réglementaire *ThinkPad Regulatory Notice*, fournie avec votre ordinateur. L'ordinateur ThinkPad est conforme aux normes de sécurité et de radiofréquence du pays ou de la région où son utilisation sans fil est agréée. Vous devez installer et utiliser votre ordinateur en respectant scrupuleusement les instructions décrites ci-après.

Remarque: Vous ne pouvez pas utiliser simultanément la carte de réseau étendu sans fil (Modèles: UNDP-1) et la carte de réseau local sans fil. Si l'une de ces cartes a établi la connexion avec le réseau, l'autre carte sera automatiquement déconnectée. Pour confirmer l'état de la connexion réseau, contrôlez les voyants d'état d'alimentation. Pour plus d'informations, reportez-vous à la section “Voyants d'état de l'alimentation” dans l'aide Access.

USA — Federal Communications Commission (FCC)

If your computer integrates the Wireless WAN adapter (Model: UNDP-1), you may connect it to the radiocommunication Public Network in the USA.

I. FCC ID of wireless module

The Wireless WAN adapter (Model: UNDP-1) was certified under the FCC ID: J9CUNDP-1L, but there is no FCC ID for the card shown on the enclosure of your ThinkPad computer. Instead you will find an indicator pointing to the location of the FCC ID on the bottom side of your computer. For the location of the FCC ID indicator, see the "Location of the FCC ID and IC Certification number label" section in *Access Help*. The FCC ID is affixed on the approved module installed in the Mini PCI Express Card slot. For the location of the slot, see the "PCI Express Mini Card slot for wireless WAN" section in *Access Help*.

II. Installation of approved wireless module

If no integrated wireless WAN Mini PCI Express Card has been preinstalled in your ThinkPad computer, you can install one, provided by Lenovo as an option. Plug the wireless card option into the Mini PCI Express Card slot. For the installation procedure, see the "Installing and replacing the PCI Express Mini Card for wireless WAN connection" section in *Access Help*.

Attention: The ThinkPad computers contain an authentication mechanism. If you install an unauthorized wireless WAN Mini PCI Express Card that is not approved for use in your computer, the computer will not start, but only displays an error message and emits audible beeps.

III. RF safety compliance

The radiated energy from the antenna connected to the Wireless WAN adapter (Model: UNDP-1, FCC ID: J9CUNDP-1L) conforms to the FCC limit of the SAR (Specific Absorption Rate) requirement regarding 47 CFR Part 2 section 1093 when the ThinkPad computer was tested in either conventional notebook or tablet computer orientations.

The transmission antenna is located at the upper right portion of the LCD screen. See the "Location of the UltraConnect wireless antennas" section in *Access Help*.

IV. Emergency Calls

The Wireless WAN adapters embedded in the ThinkPad computer do not support voice calls, hence their use for essential communication is not possible, including emergency calls regarding the E911 rule.

V. Simultaneous use of RF transmitters

If your ThinkPad computer contains the Bluetooth module (Model: BCM92046MD_GEN, FCC ID: QDS-BRCM1033) or the WirelessUSB Card (Model: 3480MPe-US, FCC ID: V4EUWB3480MPE), the Wireless WAN adapter (Model: UNDP-1) is approved for simultaneous use with these radio devices.

Please make sure of the following conditions on use of these wireless features:

1. When you use any other RF option device, all other wireless features including the above integrated devices in your ThinkPad computer are required to be turned off.
2. Users must follow the RF Safety instructions on wireless option devices that are included in the RF option device's user's manual.

Electronic emission notices

Federal Communications Commission (FCC) Statement

- Model: UNDP-1

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 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
Telephone: 1-919-294-5900

 Tested To Comply
With FCC Standards
FOR HOME OR OFFICE USE

Canada — Industry Canada (IC)

IC Certification number

User installable Wireless WAN module:

- IC: 2723A-UNDP1 (Model: UNDP-1)

There is no certification number of Industry Canada for Mini PCI Express Card shown on the enclosure of your ThinkPad computer. Instead you will find an indicator pointing to the location of the certification number on the bottom side of your ThinkPad computer. For the location of the certification number indicator, see the "Location of the FCC ID and IC certification number label" section in *Access Help*. The certification number of Industry Canada is affixed on the approved module installed in the Mini PCI Express Card slot. For the location of the slot, see the "PCI Express Mini Card slot for wireless WAN" section in *Access Help*.

Attention: The ThinkPad computer contains an authentication mechanism. You can install or remove each wireless feature by yourself. If you install an unauthorized wireless adapter that is not approved for use in the ThinkPad computer, the computer will not start, but only displays an error message and emits audible beeps.

Exposure of humans to RF fields (RSS-102)

ThinkPad computers employ low gain integral antennas that do not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's Web site at www.hc-sc.gc.ca/rpb

The radiated energy from the antenna connected to the Wireless WAN adapter (Model: UNDP-1, IC: 2723A-UNDP1) conforms to the IC limit of the SAR (Specific Absorption Rate) requirement regarding IC RSS-102, Issue 2 clause 4.1.

Industry Canada Class B Emission Compliance Statement

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

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Numéro d'homologation IC

Module sans fil installable par l'utilisateur:

- IC: 2723A-UNDP1 (Model: UNDP-1)

Le boîtier de votre ordinateur ThinkPad ne comporte pas de numéro d'homologation IC (Industry Canada) pour la carte mini-PCI Express ; mais sous votre ThinkPad, vous trouverez un indicateur pointant vers l'emplacement du numéro d'homologation IC. Pour connaître l'emplacement du numéro d'homologation, consultez la section "Emplacement de l'étiquette d'identification FCC et du label du numéro de certification" dans *Access Help*. Le numéro d'homologation délivré par Industrie Canada est apposé sur le module homologué installé dans l'emplacement de carte mini-PCI Express. Pour savoir où se trouve cet emplacement, consultez la section "Logement de cartes mini-PCI Express pour réseau étendu sans fil" dans *Access Help*.

Attention: L'ordinateur ThinkPad renferme un mécanisme d'authentification. Vous pouvez installer ou retirer chaque carte sans fil vous-même. Si vous installez une carte sans fil qui n'est pas homologuée dans votre ordinateur ThinkPad, l'ordinateur ne démarrera pas mais affichera un message d'erreur et générera des bips sonores.

Exposition des êtres humains aux champs radioélectriques (RF) (CNR-102)

L'ordinateur ThinkPad utilise des antennes intégrales à faible gain qui n'émettent pas un champ électromagnétique supérieur aux normes imposées par le Ministère de la santé canadien pour la population. Consultez le Safety Code 6 sur le site Web du Ministère de la santé canadien à l'adresse www.hc-sc.gc.ca/rpb.

L'énergie émise par l'antenne reliée à la carte pour réseau étendu sans fil (modèle : UNDP-1, IC : 2723A-UNDP1) respecte la limite concernant le débit d'absorption spécifique (DAS) telle que définie par Industrie Canada dans la clause 4.1 du document CNR-102.

Avis de conformité à la réglementation d'Industrie Canada

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

Le fonctionnement de ce type d'appareil est soumis aux deux conditions suivantes: (1) Cet appareil ne doit pas perturber les communications radio, et (2) cet appareil doit supporter toute perturbation, y compris les perturbations qui pourraient provoquer son dysfonctionnement.

Trademarks

The following terms are trademarks of Lenovo in the United States, other countries, or both:

Lenovo
ThinkPad

Other company, product, and service names may be trademarks or service marks of others.

Printed in China

For Barcode Position Only

The screen copies of electronic user's guidance are extracted hereafter.

ThinkPad tour

Click a view to see the location of ThinkPad® features and hardware.

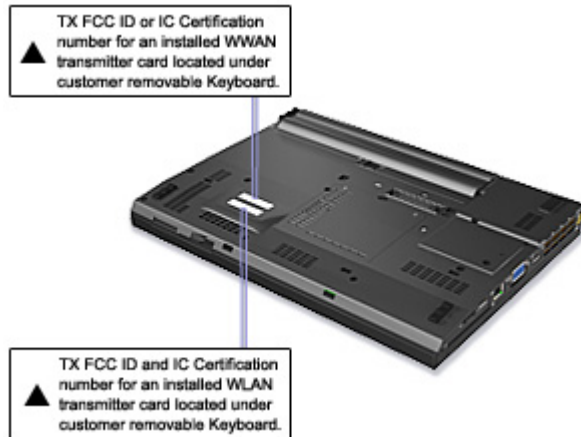
- ▶ [Front](#)
- ▶ [Right side](#)
- ▶ [Left side](#)
- ▶ [Bottom](#)

ThinkPad

Location of the 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 ThinkPad® computer. Instead you will find an indicator pointing to the location of the FCC ID and the IC Certification number for the installed transmitter card on the bottom side of your ThinkPad as shown below. The FCC ID and IC Certification number label is affixed on the card installed in the Mini PCI Express Card slot of your ThinkPad computer.

*** Note:** The wording of the label may vary depending on the model.



If no integrated wireless PCI Express Mini Card has been preinstalled in your ThinkPad computer, you can install one. To do this, follow the procedure in [Installing and replacing the PCI Express Mini Card for wireless LAN/WiMAX connection](#) or [Installing and replacing the PCI Express Mini Card for wireless WAN connection](#).

Location of the UltraConnect wireless antennas

ThinkPad® models feature an integrated diversity antenna system built into the display for optimal reception, enabling wireless communication wherever you are.

The following shows the location of each built-in wireless antenna.



1. Wireless WAN antenna (Auxiliary)

If your computer comes with a wireless WAN feature, its auxiliary antenna is located at the top left side of the computer display.

2. Wireless LAN and WiMAX combo antenna (Auxiliary)

The auxiliary antenna connected to the wireless LAN or WiMAX feature is located at the top left portion of the computer display, near the center.

3. Wireless USB antenna

If your computer comes with a wireless USB feature, the antenna is located at the top right portion of the computer display, near the center.

4. Wireless WAN antenna (Main)

If your computer comes with a wireless WAN feature, its main transmitter antenna is located at the top right side of the computer display.

5. Wireless LAN and WiMAX combo antenna (Main)

The main antenna connected to the wireless LAN or WiMAX feature is located at the right top portion of the computer display.

6. Wireless LAN antenna (Third)

If your computer has the Multiple Input Multiple Output (MIMO) wireless LAN feature, the third wireless antenna is located at the right bottom portion of the computer display.

Location: *Bluetooth* antenna



Front



Right



Left



Bottom



8. Bluetooth antenna

Some ThinkPad® models have Integrated Bluetooth features.

Location: PCI Express Mini Card slot for Wireless LAN/WiMAX



Front



Right



Left



Bottom



15. PCI Express Mini Card slot for Wireless LAN/WiMAX

Your computer might include a PCI Express Mini Card in the PCI Express Mini Card slot for Wireless LAN/WiMAX which enable wireless LAN communications.

Location: PCI Express Mini Card slot for Wireless WAN



Front



Right



Left



Bottom



14. PCI Express Mini Card slot for Wireless WAN

Some computers have a PCI Express Mini Card in the PCI Express Mini Card slot for Wireless WAN which enable wireless WAN communications.

Location: PCI Express Half Mini Card slot for Wireless USB



Front



Right



Left



Bottom



4. PCI Express Half Mini Card slot for Wireless USB

Some models have the Wireless USB features.

This slot also accepts an [Intel® Turbo Memory Card](#).

Installing and replacing the PCI Express Mini Card for wireless LAN/WiMAX connection

Before you start, print these instructions.

Your computer has a PCI Express Mini Card for wireless LAN/WiMAX. To replace the PCI Express Mini Card with a new one, follow the procedure below.



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 module, touch a metal table or a grounded metal object. This action reduces any static electricity from your body. The static electricity could damage the PCI Express Mini Card.



Note: Use the PCI Express Mini Card provided by Lenovo.

▼ [Replacing a PCI Express Mini Card with two connectors](#)

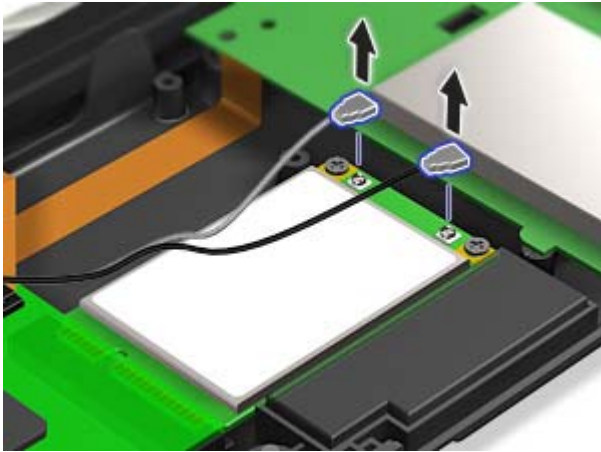
▼ [Replacing a PCI Express Mini Card with three connectors](#)

Replacing a PCI Express Mini Card with two connectors

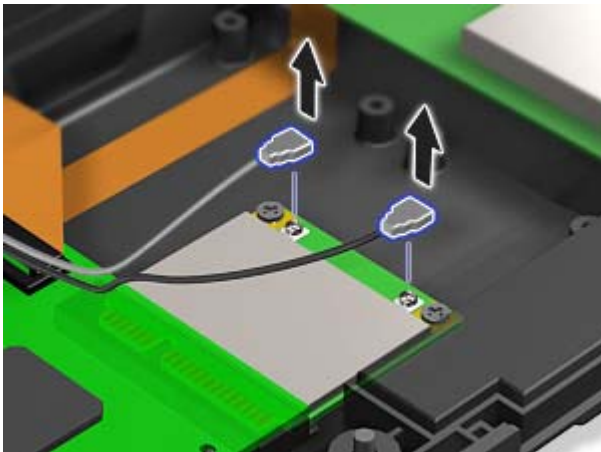
To replace the PCI Express Mini Card with two connectors, do as follows:

1. Turn off the computer; then disconnect the AC adapter and all cables from the computer. Wait for a few minutes, till the inside of the computer cools, before you start the following procedures.
2. Close the computer display, and turn the computer over.
3. [Remove the battery.](#)
4. [Remove the keyboard.](#)
5. [Remove the palm rest.](#)
6. 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 from the card by picking up the connectors with your fingers and gently unplugging them.

PCI Express Mini Card

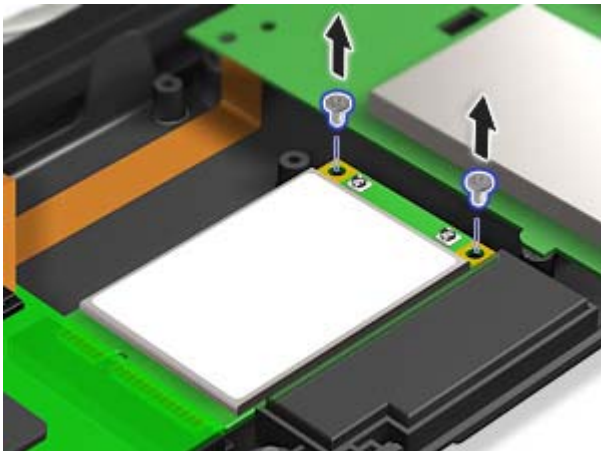


PCI Express Half Mini Card

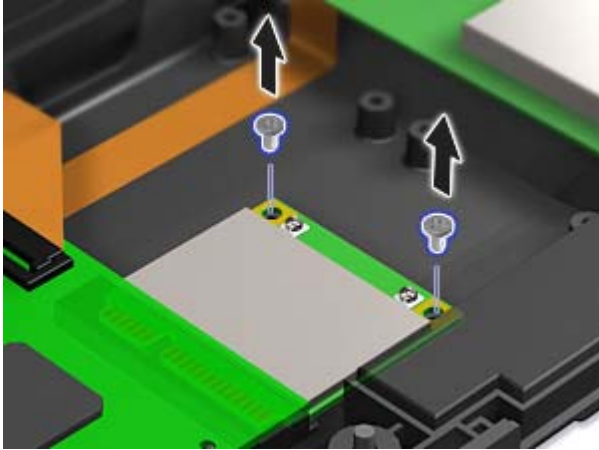


7. Remove the screws.

PCI Express Mini Card

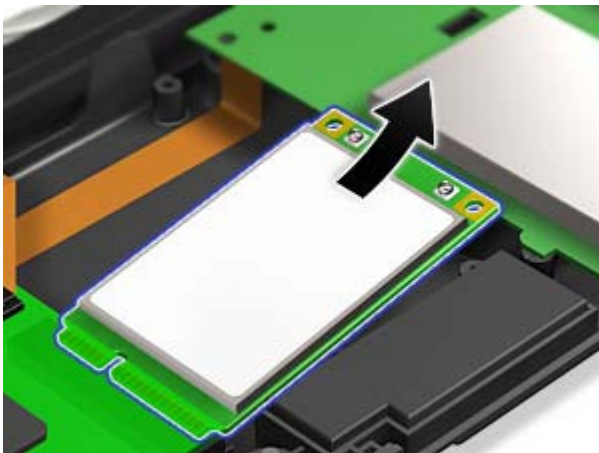


PCI Express Half Mini Card

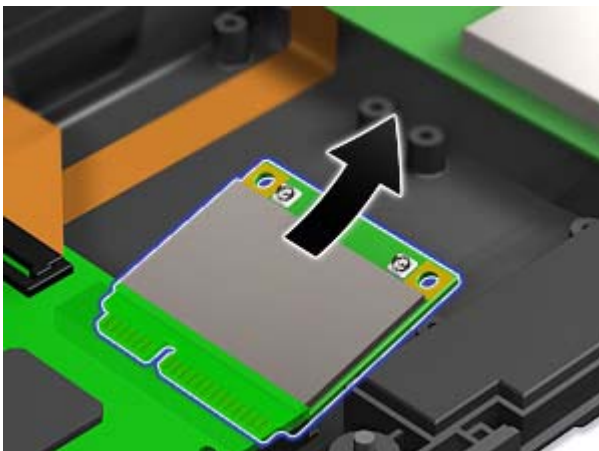


8. Remove the card.

PCI Express Mini Card



PCI Express Half Mini Card



9. Align the contact edge of the PCI Express Mini Card with the corresponding socket contact of the computer.
10. Pivot the card until you can snap it into place by pressing the upper side of the connectors; then secure the card with the two screws.
11. Connect the cables to the new PCI Express Mini Card.

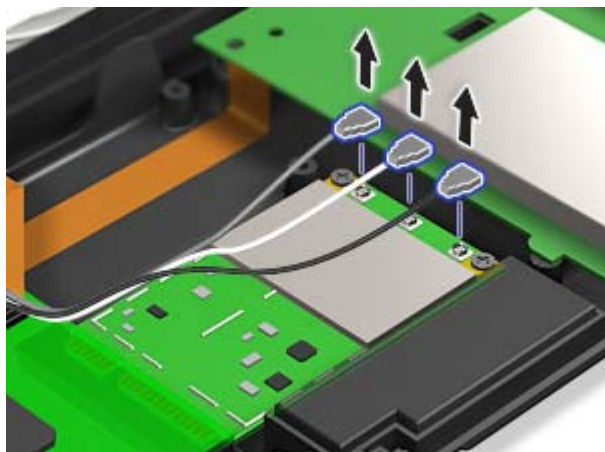
*** Note:** If the new PCI Express Mini Card has three connectors, you must attach the cables to the right and left connectors. If you attach either cable to the center connector, the connection speed will be lower.

12. [Reinstall the palm rest.](#)
13. [Reinstall the keyboard.](#)
14. [Reinstall the battery.](#)
15. Turn the computer over again. Connect the AC adapter and cables to the computer; then turn it on.

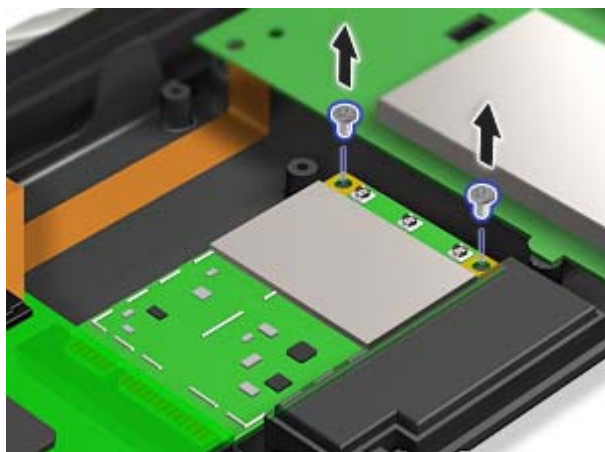
Replacing a PCI Express Mini Card with three connectors

If your computer has a Multiple Input Multiple Output (MIMO) or WiMAX feature, the PCI Express Mini Card with three connectors comes with the computer. To replace the card for the MIMO or WiMAX feature, do as follows:

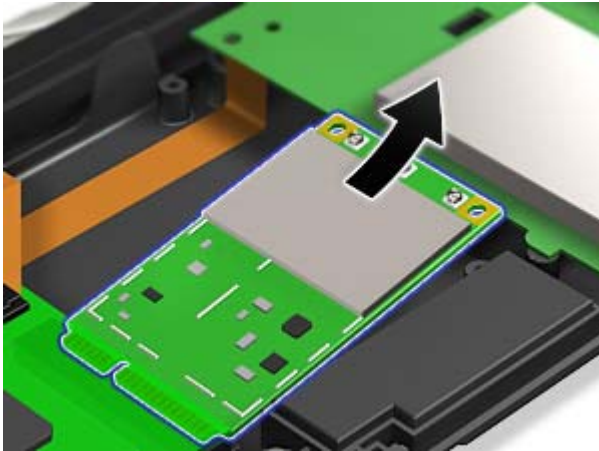
1. Turn off the computer; then disconnect the AC adapter and all cables from the computer. Wait for a few minutes, till the inside of the computer cools, before you start the following procedures.
2. Close the computer display, and turn the computer over.
3. [Remove the battery.](#)
4. [Remove the keyboard.](#)
5. [Remove the palm rest.](#)
6. 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 from the card by picking up the connectors with your fingers and gently unplugging them.



7. Remove the screws.



8. Remove the card.





9. Align the contact edge of the new card with the corresponding socket contact of the computer.
10. Pivot the card until you can snap it into place by pressing the upper side of the connectors; then secure the card with the two screws.
11. Connect the black cable (AUX) to the right connector, the white cable (MIMO third) to the center connector and the gray cable to the left connector on the new card.
*** Note:** If the new PCI Express Mini Card has two connectors, you must attach the gray cable to the left connector and the black cable to the right connector.
12. [Reinstall the palm rest.](#)
13. [Reinstall the keyboard.](#)
14. [Reinstall the battery.](#)
15. Turn the computer over again. Connect the AC adapter and cables to the computer; then turn it on.


Installing and replacing the PCI Express Mini Card for wireless WAN connection

Before you start, print these instructions.

Some ThinkPad® models have a PCI Express Mini Card slot for wireless WAN connection. To replace the PCI Express Mini Card with a new one, follow the procedure below.

 **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.

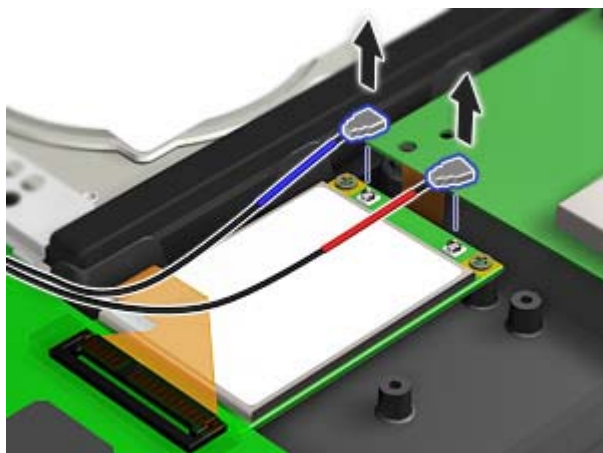
 **Attention:** Before you start installing a PCI Express Mini Card, touch a metal table or a grounded metal object. This action reduces any static electricity from your body. The static electricity could damage the card.

Replacing the PCI Express Mini Card

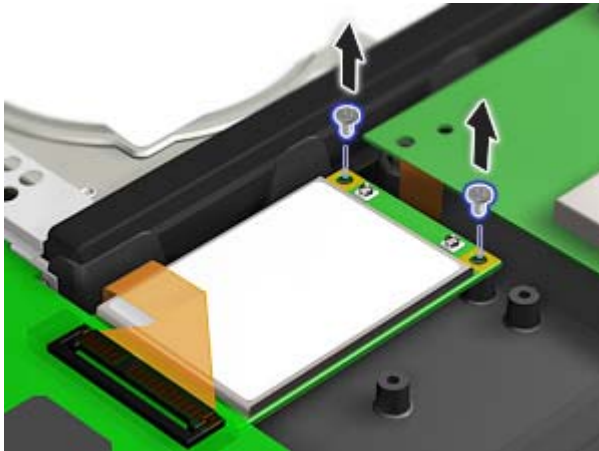
To replace the PCI Express Mini Card, do as follows:

1. Turn off the computer; then disconnect the AC adapter and all cables from the computer. Wait for a few minutes, till the inside of the computer cools, before you start the following procedures.
2. Close the computer display, and turn the computer over.
3. [Remove the battery.](#)
4. [Remove the keyboard.](#)
5. [Remove the palm rest.](#)
6. 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 from the card by picking up the connectors with your fingers and gently unplugging them.

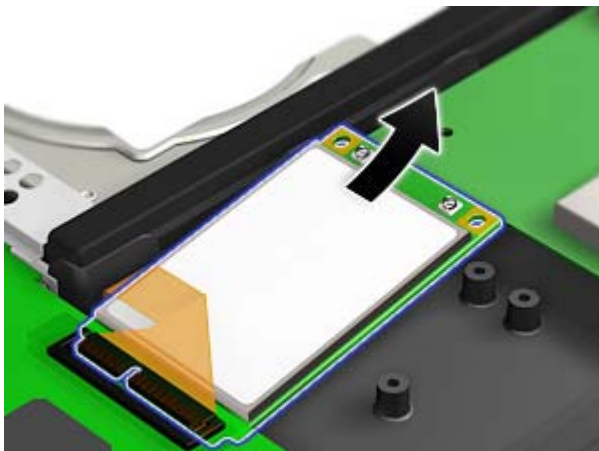
 **Note:** Depending on the system configuration of your computer, the card may have only one connector.



7. Remove the screws that secure the card.



8. Remove the card.



9. Align the contact edge of the new Wireless WAN Card with the corresponding socket contact of the computer.
10. Pivot the card until you can snap it into place by pressing the upper side of the connectors; then secure the card with the two screws. Connect the cables to the new card.

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

11. [Reinstall the palm rest.](#)
12. [Reinstall the keyboard.](#)
13. [Reinstall the battery.](#)
14. Turn the computer over again. Connect the AC adapter and cables to the computer; then turn it on.

Power-status indicators

The computer has status indicators that show the mode (sleep/standby, hibernation, or normal), AC power status, and the status of the battery. The following shows the location and the meaning of the indicators:

For models with *Bluetooth*



For models with *Wireless USB*



1. Sleep (standby in Windows® XP) status

- **Green:** The computer is in sleep (standby) mode.
- **Blinking green:** The computer is entering sleep (standby) or hibernation mode, or is resuming normal operation.

2. AC power status

- **Green:** The AC adapter is connected and the computer is operating on AC power. If a battery is installed in the computer, it is charged when this indicator is green.
- **Off:** The computer is operating on battery power.

3. Battery status

- **Green:** The battery has more than 20% charge.
- **Orange:** The battery has between 5% and 20% charge.
- **Fast blinking orange:** The battery has less than 5% charge.

*** Note:** The battery may be charging.

- **Slow blinking orange:** The battery is being charged. When it reaches 20%, the blinking color changes to green.
- **Slow blinking green:** The battery has between 20% and 80% charge, and charging is continuing. When the battery reaches 80% charge, blinking stops, but the charging may continue until the battery is 100% charged.

*** Note:** If the computer is operating on battery power, the Battery status indicator does not work while the computer is turned off or it is in sleep (standby) mode or hibernation mode.

If your computer is shipped with a wireless WAN feature, a *Bluetooth* feature, a *Wireless USB* feature, a wireless LAN feature, and a WiMAX feature, you can use the following indicators:

4. Wireless WAN/WiMAX status

- **Green:** The wireless WAN feature or WiMAX feature is on, and the radio link is ready for use.
- **Blinking green:** Data is being transmitted.

5. *Bluetooth* or *Wireless USB* status

- **Green:** The *Bluetooth* feature or *Wireless USB* feature is on, and the radio link is ready for use.
- **Blinking green:** Data is being transmitted.

6. Wireless LAN status

- **Green:** The wireless feature (the IEEE 802.11 standard) is on, and the radio link is ready for use.
- **Blinking green:** Data is being transmitted.

Location: wireless radio switch



[Front](#)



[Right](#)



Left



[Bottom](#)



2. [Wireless radio switch](#)

You can quickly turn the wireless features of your ThinkPad computer on and off using this switch.

Wireless connections

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

Depending on the frequency used for data transmission, the area covered, or the type of the device used for data transfer, the following categories of wireless networks may be available to you:

Wireless LAN

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

Wireless WAN

A wireless wide area network covers a broader geographic area. Cellular networks are used for data transmission, and access is provided by a wireless service carrier.

Bluetooth

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 PC, or remotely controlling and communicating with devices such as mobile phones.

Wireless USB

This wireless analog of the USB standard can create a wireless personal area network by implementing short-range large-bandwidth radio transmissions. It is used primarily for connecting a PC to peripherals that are no more than a short distance from the host.


WiMAX (Worldwide Interoperability for Microwave Access)

This long-range wireless data transmission technology based on the IEEE 802.16 standard, is expected to provide the user a "last mile" broadband connectivity similar to that provided by cable or ADSL, but without the need to physically connect a cable to the PC.

- ▶ [Using wireless LAN connections](#)
- ▶ [Using wireless WAN connections](#)
- ▶ [Using *Bluetooth*](#)
- ▶ [Using Wireless USB](#)
- ▶ [Using WiMAX](#)
- ▶ [Checking wireless connection status](#)
- ▶ [Enabling or disabling the wireless feature](#)

Using wireless LAN connections

Your computer comes with a built-in wireless networking 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.

 **Attention:** If you carry your ThinkPad® computer with the wireless LAN feature into an airplane, you need to disable it before boarding. To disable it, refer to the instructions in [Enabling or disabling the wireless feature](#).

 **Note:** You can purchase a wireless networking card as an option. For more information, refer to [Finding ThinkPad options](#).

 **Note:** If you use the computer in tablet mode, do not cover the UltraConnect™ wireless antennas built into the display.

Tips for using the wireless LAN feature

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

▶ [Wireless networking setup](#)

▶ [Wireless security features](#)

▶ [Wireless upgradeable ThinkPad models](#)

Using WiMAX

Some ThinkPad® computers come with a built-in wireless LAN card integrating WiMAX technology.

WiMAX -- a long-range wireless data transmission technology based on the IEEE 802.16 standard -- provides you with a "last mile" broadband connectivity similar to that offered by cable or ADSL, but without the need to physically connect a cable to the PC.

To use the WiMAX feature, start [Access Connections™](#).

To start the Access Connections wizard, click **Start --> All Programs --> ThinkVantage --> Access Connections**, and follow the instructions on the screen.

Using wireless WAN connections

Wireless Wide Area Network (wireless WAN) enables you to establish wireless connections over remote public or private networks. These connections can be maintained over a large geographical area, such a city or an entire country, by use of multiple antenna sites or satellite systems maintained by wireless service providers.

Some ThinkPad® computers come with a built-in wireless WAN card integrating some wireless WAN technologies, such as 1xEV-DO or HSPA. You can connect to the Internet or your company network with the built-in wireless WAN card and the configuration utility to make a wireless WAN connection and monitor its status.

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

*** Note:** When the wireless WAN connection is enabled, you cannot set the screen orientation of your computer to Secondary Landscape.

For maximum performance from your wireless WAN connection, please keep the following best usage guidelines in mind:

- Keep your notebook away from your body.
- Place your notebook on a flat surface and keep the lid open at a 105 degree angle.
- If your notebook has a retractable antenna, ensure that the antenna is fully extended.
- Place your notebook away from concrete or brick walls that may dampen cellular signals.
- Best reception will be available near windows and other locations where cellular phone reception is the strongest.

To use a wireless WAN connection with built-in wireless WAN features, start [Access Connections™](#).

To start the Access Connections wizard, click **Start -> All Programs -> ThinkVantage -> Access Connections**, and follow the instructions on the screen.

Using Wireless USB

*** Note:** For Japanese models, when you use the Wireless USB feature, use AC power to run your computer. If you do not use AC adapter, the Wireless USB feature will not work.

If your computer is equipped with Wireless USB features, you can enable or disable those features by pressing Fn+F5. If you press Fn+F5, a list of wireless features is displayed. You can enable or disable the Wireless USB radio with a single click.

*** Note:** Only a Certified Wireless USB device can be connected to your ThinkPad® computer.

Using a Wireless USB device with your computer for the first time

When a Wireless USB device is used for the first time, you must associate it with your computer, by doing the following:

1. Open the Wireless USB Connection Manager by double-clicking its icon in the task tray.
2. Connect the Wireless USB device to your computer, using a USB cable.
3. Wait until the Wireless USB device is listed in the Wireless USB Connection Manager and the balloon message "Wireless USB device associated" appears.
4. Remove the USB cable.
5. Wait until the status of the Wireless USB device in the Wireless USB Connection Manager changes to "Connected."

Once the device is associated, it will automatically connect without a USB cable as long as it is within a range of availability. For more details, refer to the manual provided with the device.

*** Note:** The Wireless USB device may reconnect automatically even after you click the "Disconnect" button in the USB Connection Manager. To completely disconnect the Wireless USB device, press Fn + F5 keys.

Using *Bluetooth*

▼ [For Windows Vista®](#)

▼ [For Windows® XP](#)

For Windows Vista:

If your computer is equipped with the Integrated *Bluetooth* features, you can enable or disable the features by pressing Fn+F5. If you press Fn+F5, a list of wireless features is displayed. You can enable or disable the *Bluetooth* features with a single click.

To connect to a *Bluetooth* device, start [Access Connections™](#). Access Connections enables you to easily pair your computer with the available devices, take advantage of their functions, or transfer files.

To use a *Bluetooth* device, do the following:

Click **Start --> All Programs --> ThinkVantage --> Access Connections**, and then select the Connect to Devices tab.

Click the **Find** button to find the *Bluetooth* devices in your vicinity. Double-click the device or drag and drop it within the circle surrounding your computer to pair them, and then click the device again to select the task from the task list.


To configure a *Bluetooth* device or manage connection settings, you can also use ***Bluetooth Devices*** in Control Panel.

1. Click **Start --> Control Panel**.
2. Click **Hardware and Sound**.
3. Click ***Bluetooth Devices***.

To send data to a *Bluetooth*-enabled device, do as follows:

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

For details, refer to the Windows online help.

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

For Windows XP:

If your computer is equipped with the Integrated *Bluetooth* features, you can enable or disable the features by pressing Fn+F5.

If you press Fn+F5, a list of wireless features is displayed. You can enable or disable the *Bluetooth* features with a single click.

In Windows XP, you can use either ThinkPad® *Bluetooth* with Enhanced Data Rate Software, or the Microsoft® *Bluetooth* software. By default, ThinkPad *Bluetooth* with Enhanced Data Rate Software is installed on your computer.

Using *Bluetooth* for the first time on your computer

If this is the first time *Bluetooth* has been used on your computer, use either of the following procedures:

1. Double-click the **My *Bluetooth* Places** icon on the desktop, or the ***Bluetooth*** icon in the task bar. The Start Using *Bluetooth* window opens, and some virtual device drivers are installed automatically.
2. Wait until the installation of the drivers is complete.

OR

1. Right-click the **My *Bluetooth* Places** icon on the desktop, or the ***Bluetooth*** icon in the task bar.
2. Select **Start Using *Bluetooth***. The Start Using *Bluetooth* window opens, and some virtual device drivers are installed automatically.
3. Wait until the installation of the drivers is complete.

Some other virtual device drivers will be installed on demand when you use certain *Bluetooth* profiles for the first time.

Using the Microsoft *Bluetooth* software

If you are using Windows XP and want to use the Microsoft standard *Bluetooth* features, install the software by following the instructions in [Installing the Microsoft *Bluetooth* software in Windows XP](#).

For information about how to use the *Bluetooth* function, do as follows:

1. Press Fn+F5 to turn on *Bluetooth*.
2. Click **Start --> Control Panel**.
3. Click **Printers and Other Hardware**.
4. Click ***Bluetooth* Devices**.
5. Click the **Options** tab.
6. Click **Learn more about *Bluetooth* Settings**.

Using ThinkPad *Bluetooth* with Enhanced Data Rate Software

If ThinkPad *Bluetooth* with Enhanced Data Rate Software is installed on your computer, two icons are displayed on the screen:

- **My *Bluetooth* Places** on the desktop
- ***Bluetooth* Configuration** in the system tray of the taskbar

My *Bluetooth* Places

To use the *Bluetooth* features, do the following:

1. Double-click the **My *Bluetooth* Places** icon on the desktop.
2. For Windows XP, go to *Bluetooth* Tasks and double-click **View devices in range**. A list of the devices on which *Bluetooth* has been enabled appears.
3. Click the device to which you want access. A list of the services available on that device appears, as follows:
 - *Bluetooth* keyboard and mouse (Human interface devices)
 - Printer (HCRP)
 - Audio gateway
 - Headset
 - PIM synchronization
 - Fax
 - File transfer
 - PIM item transfer
 - Dial-up networking
 - Network access
 - *Bluetooth* serial port
 - *Bluetooth* Imaging
 - Hands Free
 - AV profile
4. Click the service you want.

For more information, press the F1 key to open the online help for *Bluetooth*.

Bluetooth Configuration

To use the configuration features of *Bluetooth*, right-click the icon. A pop-up menu appears. Select **Bluetooth Setup Wizard** or **Advanced Configuration**.

The *Bluetooth Setup Wizard* has the following capabilities:

- Finding all *Bluetooth*-enabled devices that can provide services
- Finding a specific *Bluetooth*-enabled device that you want to use, and configuring the services on that device
- Configuring the *Bluetooth*-enabled services on your computer that are provided for remote devices
- Configuring the name and device type of your computer

The *Advanced Configuration* has the following functions:

- Configuring the name and device type of your computer
- Configuring your computer settings so that remote *Bluetooth*-enabled devices can find your computer
- Configuring your computer settings so that your computer can find remote *Bluetooth*-enabled devices
- Configuring, on your computer, the *Bluetooth*-enabled services provided for remote devices
- Configuring the services on remote *Bluetooth*-enabled devices
- Displaying information about *Bluetooth* hardware

For details, refer to the help for *Bluetooth*. To see the help, double-click **My Bluetooth Places**, and click **Help** and then **Bluetooth help**. Another way to start the help is to right-click **Bluetooth Configuration** in the system tray of the taskbar, and click **Advanced Configuration** and then **Help**.

Installing the Microsoft Bluetooth software in Windows XP

If you want to use the Microsoft *Bluetooth* software, do as follows:

First uninstall the ThinkPad *Bluetooth with Enhanced Data Rate Software*.

1. Turn *Bluetooth* power off.
2. Click **Start-->Control Panel**.
3. Click **Add/Remove Programs**.
4. Select **ThinkPad Bluetooth with Enhanced Data Rate Software**; then click **Change/Remove** to uninstall the software.

5. Follow the instructions on the screen.

Next install the Microsoft *Bluetooth* software, as follows:

1. Turn *Bluetooth* power on. Microsoft *Bluetooth* software is loaded automatically.
2. If the Found New Hardware Wizard window pops up, do the following:
 1. Select **No, not this time**, and then click **Next**.
 2. Select **Install from a list or specific location (Advanced)**; then click **Next**.
 3. Select **Search for the best driver in those locations**.
 4. Select **Include this location in the search:**, and type "C:\SWTOOLS\Drivers\MSBTooth," or specify the location in which you placed the extracted INF file. Then click **Next**.
3. Click **Finish**.


Installing ThinkPad *Bluetooth* with Enhanced Data Rate Software in Windows XP

If you are using the Microsoft *Bluetooth* software and want to use ThinkPad *Bluetooth* with Enhanced Data Rate Software instead, replace the Microsoft *Bluetooth* software with ThinkPad *Bluetooth* with Enhanced Data Rate Software as follows:

1. Press Fn+F5 to turn the *Bluetooth* power on.
2. Click **Start** -> **Run**.
3. Type "C:\SWTOOLS\Drivers\TPBTooth\Setup.exe" (or specify the full path to the setup.exe file you have downloaded from <http://www.lenovo.com/think/support>); then click **OK**.
4. Click **Next**.
5. Select **I accept the terms in the license agreement**; then click **Next**.
6. Click **Next** to select the default destination folder.
If you need to change the destination folder, click **Change**, select or enter the name of the destination folder in the Change current destination folder window, and click **OK**.
7. Click **Install** to begin installation.
8. Click **OK** to accept the driver signature.
9. Click **Finish**.
10. Restart the computer if necessary.

replace the *Bluetooth* driver, as follows:


1. Click **Start-->Control Panel**.
2. Click **Performance and Maintenance**; then click **System**.
3. Click the **Hardware** tab; then click **Device Manager**.
4. Double-click **Bluetooth Radios** to extract the *Bluetooth* Radios device tree.
5. Double-click the **ThinkPad Bluetooth with Enhanced Data Rate** icon to open the Properties window.
6. Click the **Driver** tab; then click **Update Driver**.
7. Click **No, not this time**, and then click **Next**.
8. Select **Install from a list or specific location (Advanced)**, and then click **Next**.
9. Select **Don't search. I will choose the driver to install**; then click **Next**.
10. Select the driver that has no "Digital Signed" icon; then click **Next**.
11. Click **Finish**.

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

Wireless networking setup

To use the built-in wireless networking card (the IEEE 802.11 standard) to communicate, start [Access Connections™](#).

To start the Access Connections wizard, click **Start -> All Programs -> ThinkVantage -> Access Connections**, and follow the instructions on the screen.

 **Note:** Before you start setting up wireless networking connections by using Access Connections, obtain a Network Name (SSID) and your encryption information from your network administrator.

Access Connections, a connectivity assistant program, can easily enable one network adapter and disable the other adapters on demand. After setting up your wireless networking connection, you can use the program to quickly switch the network settings.

Wireless security features

Advances in wireless technology require that we manage your security more reliably than ever. Therefore, Lenovo has extended its Embedded Security Subsystem to encompass virtually all of our ThinkPad® and desktop computer lines. This security subsystem helps protect data, hardware, network access and communications - both wired and wireless - on select ThinkPad and desktop PCs.

The Embedded Security Subsystem provides hardware-based protection of critical security information, including passwords, encryption keys, and electronic credentials. It also helps identify computer users involved in transactions, and helps establish that data transmissions are authentic, confidential and intact.

Security and Privacy Services for wireless risk assessment and wireless solution design can help you assess the risks based on your business needs, identify your information risk position, and integrate security strategies, policies, and architectures to help you achieve your wireless e-business objectives. To effectively manage risk on an ongoing basis, organizations must have a sound security strategy. By understanding threats and vulnerabilities at an early stage, we can help define the necessary scope and features of your wireless e-business security infrastructure.

For more information on wireless security offerings, click the following link:

<http://www.pc.ibm.com/us/think/thinkvantagetech/security.html>

Checking wireless connection status

You can check the signal strength and status of your wireless connection either by opening Access Connections™, or by double-clicking the **Access Connections wireless status** icon in the system tray.

The Access Connections wireless status icon displays the signal strength and status of your wireless connection.

Wireless status icon states: wireless LAN



No link or a very poor one



Usable but weak link



Strong link



Wireless radio is disabled

 **Note:** If you have trouble in making a connection, try moving your computer closer to your wireless access point.

Wireless status icon states: wireless WAN



Power to the WAN radio is off.



No association



No signal



Signal level 1



Signal level 2

Enabling or disabling the wireless feature

To enable or disable the wireless feature, press Fn+F5. A list of wireless features is displayed. You can turn the feature on and off with a single click.

You can also enable or disable the feature by the following procedures.

To enable the wireless feature, do as follows:

1. Click the Wireless Icon in the system tray.
2. Click **Power On Wireless Radio**.

To disable the wireless feature, do as follows:

1. Click the Wireless Icon in the system tray.
2. Click **Power Off Wireless Radio**.

*** Note:** To enable the wireless radio, do as follows:

1. Select **On** for the Wireless LAN Radio Frequency in the [BIOS Setup Utility](#).
2. Select the On position of the wireless radio switch on the computer.
3. Click the Wireless Icon in the system tray and select **Power On Wireless Radio**. Or press Fn+F5, and then turn the feature on.

*** Note:** You can use the wireless radio switch to disable the wireless radio of all the wireless devices on your computer.

*** Note:** You can also use the [Tablet Shortcut Menu](#) to enable or disable the wireless feature if you are using your computer in tablet mode.

Wireless upgradeable ThinkPad models

Depending on the model, your ThinkPad® computer might be wireless upgradeable. This means that your computer has an antenna that can support wireless LAN access when wireless LAN access points are available. Wireless devices are available from Lenovo: [Finding ThinkPad options](#).

Wireless related information

Wireless interoperability

Wireless LAN PCI Express Mini Card is designed to be interoperable with any wireless LAN product that is based on Direct Sequence Spread Spectrum (DSSS), Complementary Code Keying (CCK), and/or Orthogonal Frequency Division Multiplexing (OFDM) radio technology, and is compliant to:

- The IEEE 802.11a/b/g Standard on Wireless LANs, as defined and approved by the Institute of Electrical and Electronics Engineers.
- The Wireless Fidelity (WiFi) certification as defined by the Wi-Fi Alliance.

Bluetooth Daughter Card is designed to be interoperable with any *Bluetooth* product that is compliant to *Bluetooth* Specification 2.0 + EDR as defined by the *Bluetooth* SIG. Following profiles are supported by *Bluetooth* Daughter Card:

- Generic Access
- Service Discovery
- Serial Port
- Dial-up Networking
- FAX
- LAN Access using PPP
- Personal Area Network
- Generic Object Exchange
- Generic Object Push
- File Transfer
- Synchronization
- Audio Gateway
- Headset
- Printer

- Basic Image
- Handsfree
- AV

Usage environment and your health

Wireless LAN PCI Express Mini Card and *Bluetooth* Daughter Card 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.

Because Wireless LAN PCI Express Mini Card and *Bluetooth* Daughter Card operate within the guidelines found in radio frequency safety standards and recommendations, Lenovo believes the integrated wireless cards 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 Wireless LAN PCI Express Mini Card or *Bluetooth* Daughter Card may be restricted by the proprietor of the building or responsible representatives of the organization. These situations may for example include:

- Using the integrated wireless cards on board of airplanes, or in hospitals
- 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 on the use of wireless devices in a specific organization (e.g. airport or hospital), you are encouraged to ask for authorization to use Wireless LAN PCI Express Mini Card or *Bluetooth* Daughter Card prior to turning on the computer.