

Making wireless connections

You can stay connected to your network while you are in the office, a meeting room, or at home without the need for a wired connection. Your ThinkPad (R) computer comes with a built-in wireless networking card and Client Manager software to help you make wireless connections and monitor your connection status.

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Wireless networking setup

Before you communicate using the built-in wireless networking card (the 802.11b standard), you need to take a moment to set up a configuration profile.

To set up your configuration profile, do the following:

1. Open the Client Manager program by double-clicking the **Client Manager** icon on your desktop or by clicking **Start --> Programs --> IBM Wireless LAN --> Client Manager**.
2. The first time you open the Client Manager tool the Add/Edit Configuration Profile window will open. Within the Add/Edit Configuration window you can create up to four network configuration profiles to use in your office, on the road, or at home.
3. Within the Add/Edit Configuration window, click the button next to the default Configuration Profile. You can customize the name of the profile by deleting the word *default* and typing your preferred profile name in the text box.
4. From the drop-down menu, select the type of configuration that you would like to use with that profile. You can choose from one of the following configuration types:
 - Access Point: Enables you to make a wireless connection to a defined network, at work or while traveling.
 - Residential Gateway: Enables you to set up a simple wireless connection at home using a residential gateway and your Internet Service Provider (ISP).
 - Peer-to-Peer Group: Enables you to wirelessly communicate with other computers to form a small workgroup.
5. After selecting a configuration, click **Edit Profile** to edit the selected profile.
6. Click the **Basic** tab of the Edit Configuration window. Enter a network name. If applicable, enter your encryption information by clicking the **Encryption** tab or typing in the field provided.
7. Close both windows by clicking **OK**. The Client Manager window opens and the **Client Manager** icon is added to your icon tray, located in the bottom right corner of your screen. Your configuration profile and signal strength are displayed.

 **Note:** If you plan to use an access point wireless configuration, visit your network administrator to verify that the built-in wireless networking card has been correctly registered. You will need to provide your administrator with the MAC address of the card. To find the MAC address from within the **Client Manager** window, click **Advanced --> Card Diagnostics**.

For more information about your wireless connection and the Client Manager program, refer to Client Manager help.

 **Note:** When you close the Client Manager window, you will not be disconnected and your wireless networking antenna will remain enabled. To disconnect from your network, click **File --> Disable Radio**

or right-click the **Client Manager** icon in the icon tray and click **Disable Radio**.

- Related topics**
- Checking connection status
 - Wireless LAN range
 - Resolve wireless problems

Wireless LAN range

Range (100 bytes user data) / transmit range	High speed 11 Mbps	Medium speed 5.5 Mbps	Standard speed 2 Mbps	Low speed 1 Mbps
Open office environment ¹	160 m (525 ft.)	270 m (886 ft.)	400 m (1312 ft.)	550 m (1805 ft.)
Semi-open office environment ²	50 m (164 ft.)	70 m (230 ft.)	90 m (295 ft.)	115 m (377 ft.)
Closed office ³	25 m (82 ft.)	35 m (115 ft.)	40 m (131 ft.)	50 m (165 ft.)
Receiver sensitivity	-83 dBm	-87 dBm	-91 dBm	-94 dBm
Delay spread (at FER of <1%)	65 ns	225 ns	400 ns	500 ns

¹In an open office environment, PCs can "see" each other. There are no physical obstructions between them.

²In a semi-open office environment, work space is dividide by shoulder-height, hollow wall elements. PCs are at desktop level.

³In a closed office environment, work space is separated by floor-to-ceiling brick walls.

The range of the wireless signal is related to the transmit rate of the wireless communication. Communications at lower transmit rate may travel large distances.

 **Note:** The range values listed in the table are typical distances as measured at the IBM High-Rate Wireless LAN laboratories. These values may vary according to the actual radio conditions at the location where the PC will be installed.

- The range of your wireless devices can be affected when the PCs are placed near metal surfaces and solid high-density materials.
- Range is also impacted due to obstacles in the signal path of the radio that may either absorb or reflect the radio signal.

- Related topic**
- Supported frequency sub-bands

Check connection status

You can check the signal strength and status of your wireless connection by opening the Client Manager program or by looking at the **Client Manager** icon. This icon is located in the icon tray, at the bottom

Supported frequency sub-bands

This wireless LAN PC is certified by FCC (US only).

The following table lists the channel sets in the 2400 to 2500 MHz range.

Channel ID	Megahertz (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462
12	n/a
13	n/a
14	n/a

right corner of your screen.

The **Client Manager** icon is displayed when the Client Manager program is open. If you do not see the icon in the icon tray, open the Client Manager program by clicking **Start --> Programs --> IBM Wireless LAN --> Client Manager**.

The **Client Manager** icon displays the signal strength and status of your wireless connection as follows:

 Peer-to-Peer wireless connection

 Excellent wireless connection

 Good wireless connection

 Marginal wireless connection

 Poor wireless connection

 No wireless connection

 **Note:** If you are experiencing connection difficulties, try moving your computer closer to your wireless access point or residential gateway.

Related topics

- [Wireless networking setup](#)
- [Wireless LAN range](#)
- [Resolve wireless problems](#)

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. Look for your problem at the left; then click the topic. Each troubleshooting chart addresses problems in general, and some descriptions may not apply to your particular computer or suit your situation. Compare the features or options of your computer with this online help or the list shipped with your computer.

- [Error codes and messages](#)
- [Errors without codes or messages](#)
- [Resolving input problems](#)
- [Resolving power problems](#)
- [Resolving drive problems](#)
- [Resolving video problems](#)
- [Resolving PC card problems](#)
- [Resolving modem problems](#)
- [Resolving ethernet problems](#)
- [Resolving audio problems](#)
- [Resolving printer problems](#)
- [Resolving USB problems](#)
- [Resolving software problems](#)
- [Resolving wireless problems](#)
- [Resolving other problems](#)

Resolve wireless problems

- You cannot connect using the built-in wireless networking card.
- An error message appears when you try to open Client Manager software.

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

Solution:

Make sure that your computer is within range of a wireless access point or residential gateway.

Make sure that power to the wireless networking card is enabled in the Client Manager program by clicking **File --> Enable Radio**.

Check the name of your network, and your encryption information. Use Client Manager to verify this case-sensitive information.

- If you are using an access point, verify that you are using the correct network name and encryption information. This information is provided by the network administrator.
- If you are using a peer-to-peer configuration, verify that all users have entered the same network name and encryption information.
- If you are using a residential gateway configuration, verify that the network name is correct and that the encryption information is the same as the last five characters of the residential gateway name. The residential gateway name is printed on a sticker located on the bottom of the residential gateway.

If you are using an access point wireless configuration, check with your network administrator to verify that the wireless networking card has been correctly registered.

Problem: An error message appears when you try to open Client Manager software.

Solution: This error occurs when the **Client Manager** icon is displayed in the icon tray, indicating that you have not exited the Client Manager program. Closing or minimizing the Client Manager window will not automatically exit you from the program.

To re-open Client Manager without exiting the program, click the **Client Manager** icon.

To exit the program, right-click the **Client Manager** icon and click **Exit**. You will then be able to re-open Client Manager from the Start menu without receiving this error message.

Install Windows^(R) 2000

This section describes the procedures for installing Windows^(R) 2000 and its device drivers from the Software Selections CD.

Overall procedure

1. Have the Windows 2000 installation package available.
2. Back up your software and personal data files on the hard disk.
3. Install Windows 2000 according to the instructions provided with the installation package.
4. Insert the Software Selections CD into the CD-ROM drive. The Software Selections program main window appears.
5. Click **Install Programs**.
6. A list of all application programs in the Software Selections CD appears.
7. Mark the check box for the application programs that you wish to install. You can select multiple application programs at a time.
8. Click the **Install** button at the bottom right of the window, and follow the instructions on the screen.

If you are restoring your ThinkPad^(R) computer to its original state at the time of purchase, you need to install at least the following device drivers:

- NoteBook Manager
- Display Driver
- Audio device driver
- TrackPoint driver
- ThinkPad Modem Driver
- Easy Launch Buttons
- Media Control Buttons
- Intel SpeedStep Technology

For details on how to use the Software Selections CD, refer to the help for it.

Installing Microsoft Windows 2000

Before installing Windows 2000, read the Windows 2000 installation guide.

To install Windows 2000 using an external CD-ROM drive, do the following:

 **Note:** If you have an external CD-ROM drive that connects under a DOS environment, you can install Windows 2000 in DOS.

1. Insert the Windows 2000 CD into the external CD-ROM.
2. Open a directory for the CD; then go to the \I386 directory

For example, if your CD-ROM drive letter is D, go to D:\I386

3. At the command prompt, type WINNT and then press **Enter**.

For example, D:\I386>WINNT

4. Follow the instructions on the screen.

If your computer does not have a CD-ROM drive, you can use a network server. You can install Windows 2000 on multiple computers by first copying the Windows 2000 master source files to a shared drive on a network server. After connecting your computer to a network, such as with the DOS LAN requester, you can install the files from the network server to your computer at the DOS command prompt.

After you install Windows 2000, you will need to install the following patches and updates.

- Windows 2000 Service Pack 1

The Windows 2000 Service Pack 1 can be downloaded from the [Windows 2000 Service Pack 1 Web site](#).

- Windows 2000 Supplement Packages for IEEE802.11b

The Windows 2000 Supplement Packages for IEEE802.11b is available on the Software Selections CD. Follow the instructions below to install the package.

After you install the Windows 2000 Service Pack 1, you need to install the Windows 2000 Supplement Packages for IEEE802.11b. Do as follows:

1. Insert the Software Selections CD for Windows 2000 in the CD-ROM or DVD-ROM drive. A list of the programs appears.
2. Search for and extract the package (KWWS01WW.ZIP) to local drive. (e.g. C:\PCMCIA)
3. Click **Start -> Run....**
4. Click **Browse....**, then point to the location of the extracted package.
5. Click **OK**.
6. A "Registry Editor" window with the message "Are you sure you want to add..." appears.
7. Select "Yes". A successful registry addition information window appears.
8. Click **OK**.
9. Restart the system.

To confirm the registry addition, do as follows:

1. Click **Start -> Run....**
2. Type **regedit**, then click **OK**.
3. Find the directory:
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Pcmcia\Parameters.
4. Verify that the "DisableIslaToPciRouting" value is present.

After you install the patches and updates to Windows 2000, you will need to install the application software, which is provided on the Software Selections CD for Windows 2000.

To install an application, do as follows:

1. Insert the Software Selections CD for Windows 2000 in the CD-ROM or DVD-ROM drive. A list of the programs appears.
2. Install one program at a time. Select each one in turn, and follow the instructions on the screen.

The latest information on these applications is posted on the Web site:

<http://www.ibm.com/thinkpad/>

Notices

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Year 2000 readiness and instructions

This is a Year 2000 Readiness Disclosure.

A product is Year 2000 Ready if the product, when used in accordance with its associated documentation, is capable of correctly processing, providing and/or receiving date data within and between the 20th and 21st centuries, provided all other products (for example, software, hardware, and firmware) used with the product properly exchange date data with it.

This IBM PC hardware product has been designed to process four-digit date information correctly within and between the 20th and 21st centuries. If your IBM computer is on when the century changes, you should turn it off and then back on again once, or restart the operating system, to ensure that the internal clock resets itself for the new century.

This IBM PC product cannot prevent errors that might occur if software you use or exchange data with is not ready for the Year 2000. IBM software that comes with this product is Year 2000 Ready. However, software from other companies might come with this IBM PC product. IBM cannot take responsibility for the readiness of that software. You should contact the software developers directly if you wish to verify readiness, understand limitations, or look for any software updates.

To learn more about IBM PC products and the Year 2000, visit our Web site at <http://www.pc.ibm.com/year2000>. The information and tools there can help you with your Year 2000 transition plan, especially if you have multiple IBM PCs. IBM encourages you to check periodically for updated information.

Electronic emission notices

Federal Communications Commission (FCC) Statement

ThinkPad i Series 1200/1300, model number 1161, or 1171

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 IBM authorized dealer or service representative for help.

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

International Business Machines Corporation
New Orchard Road
Armonk, NY 10504
Telephone 1-919-543-2193

Industry Canada Class B Emission Compliance Statement

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

Avis de conformite a la re glementation d'Industrie Canada

Cet appareil numerique de la classe B est conform a la norme NMB-003 du Canada.

European Community Directive Conformance Statement

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

A declaration of Conformity with the requirements of the Directive has been signed by IBM United Kingdom Limited, PO BOX 30 Spango Valley Greenock Scotland PA160AH.

This product satisfies the Class B limits of EN 55022.

Telecommunication notice

Federal Communications Commission (FCC) and telephone company requirements

1. This device complies with Part 68 of the FCC rules. A label is affixed to the device that contains, among other things, the FCC registration number, USOC, and Ringer Equivalency Number (REN) for this equipment. If these numbers are requested, provide this information to your telephone company.

 **Note:** If the device is an internal modem, a second FCC registration label is also provided. You may attach the label to the exterior of the computer in which you install the IBM modem, or you may attach the label to the external DAA, if you have one. Place the label in a location that is easily accessible, should you need to provide the label information to the telephone company.

2. The REN is useful to determine the quantity of devices you may connect to your telephone line and still have those devices ring when your number is called. In most, but not all areas, the sum of the RENs of all devices should not exceed five (5). To be certain of the number of devices you may connect to your line, as determined by the REN, you should call your local telephone company to determine the maximum REN for your calling area.
3. If the device causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance; if advance notice is not practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.
4. Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be given advance notice to give you an opportunity to maintain uninterrupted service.
5. If you experience trouble with this product, contact your authorized reseller, or call IBM. In the United States, call IBM at **1-800-772-2227**. In Canada, call IBM at **1-800-565-3344**. You may be required to present proof of purchase.

The telephone company may ask you to disconnect the device from the network until the problem has been corrected, or until you are sure the device is not malfunctioning.

6. No customer repairs are possible to the device. If you experience trouble with the device, contact your Authorized Reseller or see the Diagnostics section of this manual for information.
7. This device may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. Contact your state public utility commission or corporation commission for information.
8. When ordering network interface (NI) service from the local Exchange Carrier, specify service arrangement USOC RJ11C.

Canadian Department of Communications certification label

NOTICE: The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements documents. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

NOTICE: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

etiquette d'homologation du ministere des Communications du Canada

AVIS : L'etiquette d'Industrie Canada identifie le materiel homologue. Cette etiquette certifie que le materiel est conforme aux normes de protection, d'exploitation et de securite des reseaux de telecommunications, comme le prescrivent les documents concernant les exigences techniques relatives au materiel terminal. Le ministere n'assure toutefois pas que le materiel fonctionnera a la satisfaction de l'utilisateur.

Avant d'installer ce materiel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de telecommunications. Le materiel doit egalement etre installe en suivant une methode acceptee de raccordement. L'abonne ne doit pas oublier qu'il est possible que la conformite aux conditions enoncees ci-dessus n'empêche pas la degradation du service dans certaines situations.

Les reparations de materiel homologue doivent etre coordonnees par un representant designe par le fournisseur. L'entreprise de telecommunications peut demander a l'utilisateur de debrancher un appareil a la suite de reparations ou de modifications effectuees par l'utilisateur ou a cause de mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise a la terre de la source d'energie electrique, des lignes telephoniques et des canalisations d'eau metalliques, s'il y en a, sont raccordes ensemble. Cette precaution est particulierement importante dans les regions rurales.

Avertissement : L'utilisateur ne doit pas tenter de faire ces raccordements lui-meme; il doit avoir recours a un service d'inspection des installations electriques ou a un electricien, selon le cas.

AVIS : L'indice d'equivalence de la sonnerie (IES) assigne a chaque dispositif terminal indique le nombre maximal de terminaux qui peuvent etre raccordes a une interface. La terminaison d'une interface telephonique peut consister en une combinaison de quelques dispositifs, a la seule condition que la somme d'indices d'equivalence de la sonnerie de tous les dispositifs n'excede pas 5.

Product notice requirements

The following notice applies to machines equipped with both a DVD and a TV-out function:

This product incorporates copyright protection technology that is protected by method claims of U.S. patent numbers 4631603, 4577216, 4819098, 4907093, and other intellectual property rights owned by Macrovision Corporation and other rights owners. Use of this copyright protection technology must be authorized by Macrovision Corporation and is intended for home and other limited viewing use only, unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.

Notice for Australia

The following notice applies when using the telephony functions:

WARNING:
FOR SAFETY REASONS, ONLY CONNECT EQUIPMENT WITH A TELECOMMUNICATIONS COMPLIANCE LABEL. THIS INCLUDES CUSTOMER EQUIPMENT PREVIOUSLY LABELLED PERMITTED OR CERTIFIED.

Notice for Users in New Zealand

The modem in this ThinkPad is set up for Tone Dialing. Users should only select Pulse Dialing if they are connecting to the Telecom NZ network via a PBX or other systems which requires Pulse Dialing. Pulse Dialing is required only for a small number of obsolescent PBX or similar systems.

The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Telecom's network services.

This equipment is not capable, under all operating conditions, of correct operation at the higher speeds for which it is designed. Telecom will accept no responsibility should difficulties arise in such circumstances.

This device is equipped with pulse dialling while the Telecom standard is DTMF tone dialling. There is no guarantee that Telecom lines will always continue to support pulse dialling.

Use of pulse dialling, when this equipment is connected to the same line as other equipment, may give rise to bell tinkle or noise and may also cause a false answer condition. Should such problems occur, the user should NOT contact the Telecom Faults Service.

This equipment shall not be set to make automatic calls to the Telecom '111' Emergency Service.

This equipment should not be used under any circumstances which may constitute a nuisance to other Telecom customers.

Notice for European Union countries

The equipment described here has been approved in accordance with Council Decision 98/482/EC for pan-European single-terminal connection to the Public Switched Telephone Network (PSTN). However, because of differences between the individual PSTNs provided in different countries, the approval does not, of itself, give an unconditional assurance that the equipment will operate successfully on every PSTN network termination point. In the event of problems, you should contact your equipment supplier first. The modem integrated in this equipment is designed to work on the following country or regional networks: Austria, Belgium, Denmark, France, Finland, Germany, Greece, Iceland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Republic of Ireland, United Kingdom. Operation in pulse dialing mode is supported only for PBXs. To operate with the networks listed above, the modem should be set as explained in the chapter headed "Use the built-in modem" in the online user's guide.

For Spain: A change in the polarity of the dc voltage can cause the connection to be broken.

Trademarks