

# User Guide

Compaq Integrated Wireless LAN 54g Network Adapter-Quick Start

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# Introduction

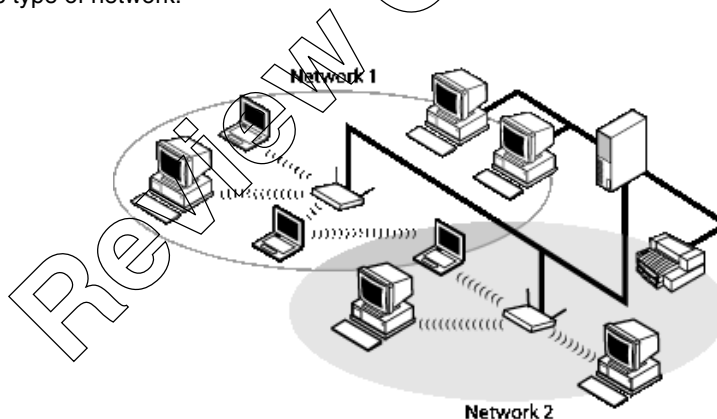
## THE INTEGRATED 54g SOLUTION

The **Integrated 54g** solution accesses wireless local area networks (WLANs), enables the sharing of a local printer and files with others in the network, enables Internet connection sharing, and enables roaming about the office—wire free. This wireless LAN solution is designed for both the home user and small businesses—and it is scalable so that users can be added and new network features can be enabled as networking needs grow.

The WEP (Wired Equivalent Privacy) protocol is a security protocol for wireless local area networks (defined in IEEE Std 802.11, 1999 Edition) that encrypts data sent over radio waves. The use of the WEP key is optional and can be enabled or disabled. If the network being connecting to has enabled WEP, WEP must also be enabled in the network profile and the WEP key in the computer must be set to match the WEP key used by the network. Otherwise, it is impossible to connect to the network.

The **Integrated 54g** enabled notebook makes a wireless connection to a network, as illustrated on the following figure. Upon startup, the **Integrated 54g** enabled notebook detects certain WLANs (wireless networks) that are within range. Before connecting to these and other wireless networks, a user must configure a profile for each network. See "Completing the Setup" on page 3.

Networks 1 and 2 are infrastructure types of networks. The two notebook computers connected by radio waves form an ad hoc type of network.



**Figure 1: Types of Networks**

## ENTERPRISE USERS

Obtain the following information from the network administrator:

- Network names (SSID) of the specific wireless networks to connect to
- WEP (Wired Equivalent Privacy) key information (if any) for the networks to connect to
- For Microsoft Windows networking, the customer name and workgroup name
- For a network account, a user name and password
- An IP address (if not using a DHCP server)
- If any of the networks are connected to an authentication server

### HOME USERS

The AP (access point) that communicates with the **Integrated 54g** enabled notebook has a preassigned network name (SSID) that the notebook recognizes upon startup. To enable WEP, use any string of numbers for the WEP key.

## USING THE INTEGRATED 54g ENABLED NOTEBOOK

The **Integrated 54g** enabled notebook is an IEEE 802.11g based wireless LAN device. A LAN is composed of two or more computers that are connected to each other to share files or common equipment such as a printer or an Internet connection. A wireless LAN provides the same functionality of a wired network, but it eliminates the need to install networking cables and other networking equipment. Not only is a wireless LAN easier to deploy, but it also allows for roaming. For example, when using the **Integrated 54g** enabled notebook, it is possible to roam from one room in the house to another, or from a conference room to an office without being disconnected from the network.

## FEATURES AND REQUIREMENTS

The **Integrated 54g** solution is an IEEE 802.11 based wireless LAN that includes the following features:

- Support for IEEE 802.11g draft specification
- Support for IEEE 802.11b standard
- 2.4-GHz band operation
- Network data rate of up to 54 Mbit/s
- Wired Equivalent Privacy (WEP) encryption

The following items are needed for participating in a wireless LAN:

- **Integrated 54g** enabled notebook computer running on a Microsoft Windows XP operating system
- Software drivers, software reference guide, and Help file

The **Integrated 54g** enabled notebook works with any IEEE 802.11b Wi-Fi CERTIFIED or IEEE 802.11g access point or wireless client network adapter.

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# Completing the Setup

NOTE—Before starting, obtain the required network information from the network administrator or the wireless access point installer (see “The Integrated 54g Solution” on page 1).

## MODES OF OPERATION

A wireless LAN can be configured for two different modes of operation: infrastructure mode and ad hoc mode (an ad hoc network is also known as a peer-to-peer network or a computer-to-computer network). Whereas each mode has its advantages, one mode may be more appropriate than the other, depending on the location and type of network connection.

### INFRASTRUCTURE MODE

The key difference between the infrastructure type of network and an ad hoc network is that the infrastructure network includes a base station (host) computer that has a built-in wireless network adapter and is connected to a wireless access point (AP). This functionality allows computers on the infrastructure wireless LAN to access the resources and tools of the wired LAN, including Internet access, e-mail, file sharing, and printer sharing.

#### Characteristics

Networked computers communicate with each other through a dedicated AP. All data transmitted between the computers on this wireless LAN passes through the AP.

#### Advantages

- **Extended range.** The access point extends the range of the wireless LAN. Each computer can communicate with other computers equipped by wireless networks that are within the range of the access point.
- **Roaming.** As the user moves around the home or office, the **Integrated 54g** enabled notebook determines the best access point to use to ensure continuous communication with the network.
- **Network connectivity.** An access point can provide wireless LAN access to an existing wired network by bridging the two networks together. This gives users of the wireless LAN access to all the functions of a wired network—from file server access to access to e-mail and the Internet.

#### Disadvantages

Because the infrastructure mode offers more features, it requires additional components and setup time to deploy.

#### Requirements

- A base station computer having a wired connection to the Internet
- A wireless network adapter
- A connection to an AP (access point)

### AD HOC MODE

An ad hoc network is the easiest to deploy and is ideal for home use or in small offices. This mode allows the sharing of files with other employees, printing to a shared office printer, and access to the Internet through a shared modem. With ad hoc networking, however, the computer is only able to communicate with other wireless networks that are within a certain range and are in the same wireless workgroup.

#### Characteristics

Networked computers send data directly to each other without the need of an access point.

#### Advantages

- Simple setup
- Cost efficiency

#### Disadvantages

- Communication is limited to those who are located within a certain range.
- IEEE 802.1x security is not available.

#### Requirements

There are no other equipment requirements for operating in the ad hoc mode besides 2 WLAN enabled notebooks or desktop PCs.

## CONFIGURING A NETWORK PROFILE

To connect to a wireless network, a network profile for that network must be configured on the **Integrated 54g** enabled notebook. If the **Integrated 54g** enabled notebook computer came with the **Integrated 54g** network adapter already installed and set up at the factory, follow the network profile configuration instructions provided below.

**NOTE**—For more information on how to configure a network profile and IEEE 802.1x authentication, click **Learn about setting up wireless network configuration** on the **Wireless Networks** tab of **Wireless Network Connection Properties**.

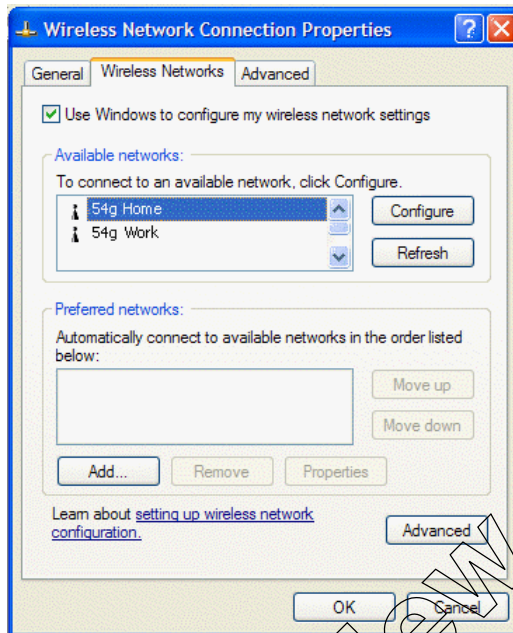
You can configure a network profile for networks that are listed under **Available networks** as well as those that are not listed. When you have completed configuring a network profile, the network name and icon appear at the top of the list under **Preferred networks**. The computer automatically connects to the network at the top of the list. Follow the applicable instruction set below, based on whether or not the network is listed, whether or not the network requires a WEP key, and whether or not the network is connected to an authentication server (check with the network administrator to see if a WEP key is required and if the network is connected to an authentication server).

**NOTE**—Both the network name and the network key are case-sensitive.

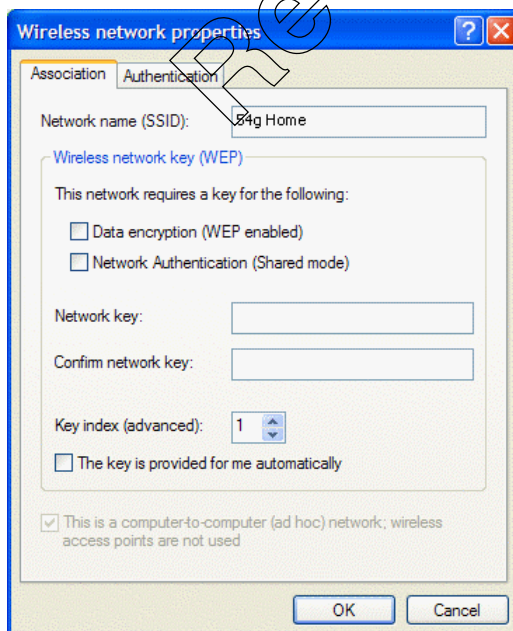
- “Configuring a Profile for a Listed Network That Does Not Require a WEP Key” on page 5
- “Configuring a Profile for a Listed Network That Requires a WEP Key” on page 7
- “Configuring a Profile for a Network That Is Not Listed and Does Not Require a WEP Key” on page 9
- “Configuring a Profile for a Network That Is Not Listed and Requires a WEP Key” on page 11

## CONFIGURING A PROFILE FOR A LISTED NETWORK THAT DOES NOT REQUIRE A WEP KEY

- 1 Click **Start**, then click **Control Panel** (Category View).
- 2 Click **Network and Internet Connections**.
- 3 Click **Network Connections**.
- 4 Right-click **Wireless Network Connection**, and then click **Properties**.

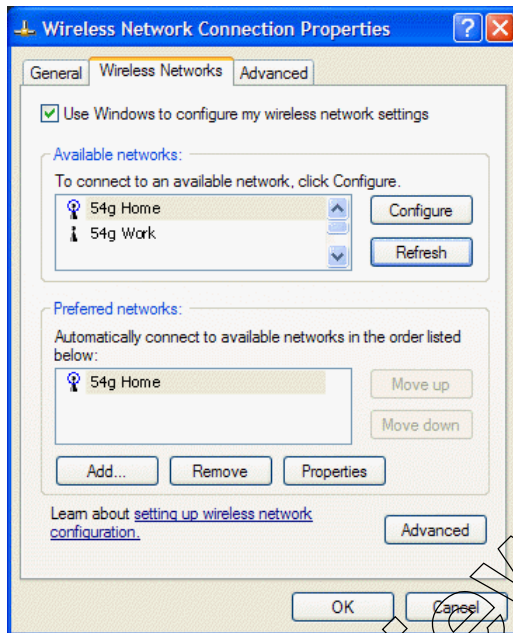


- 5 Click the **Wireless Networks** tab.
- 6 Under **Available networks**, click the network name, and then click **Configure**.



## Completing the Setup

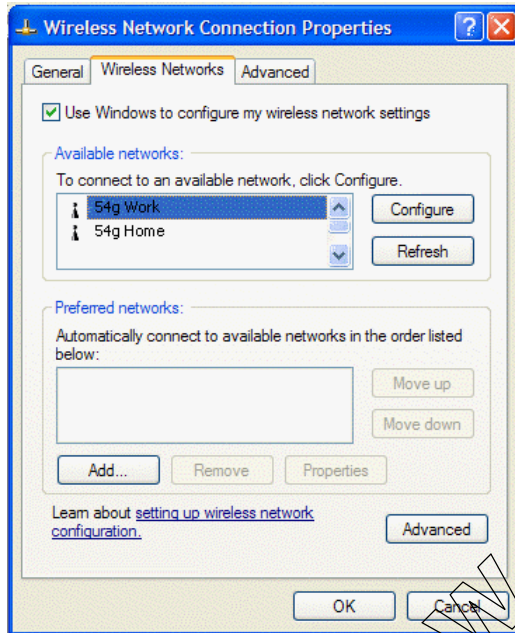
- 7 The default settings in Microsoft Windows XP Service Pack 1 require IEEE 802.1x authentication. With IEEE 802.1x authentication enabled, connecting to a network requires a connection with an authentication server. If the network has no authentication server, the connection is disabled every 3 minutes. Therefore, when connecting to a network that has no authentication server, disable IEEE 802.1x authentication by doing the following (if the network does have an authentication server, ignore this step):
  - Click the **Authentication** tab.
  - Clear the **Enable network access control using IEEE 802.1x** check box.
- 8 Click **OK**. The network name and icon appear at the top of the list under **Preferred networks**.



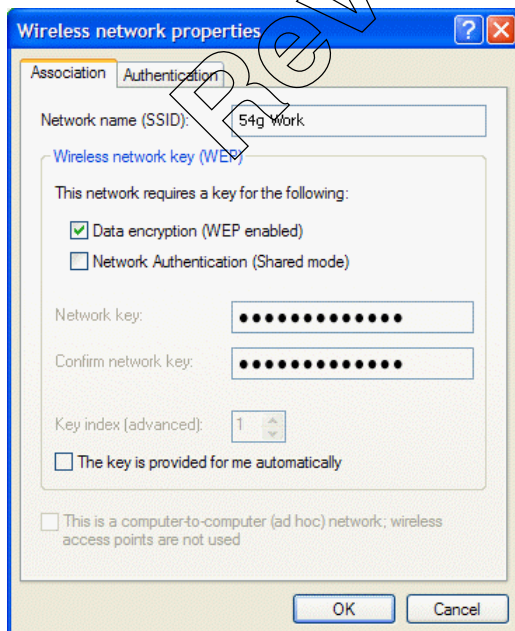
- 9 Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties** for that wireless network and click the **Wireless Networks** tab. The computer is connected to the selected network when a blue bubble appears on top of the icon  for that network. If the bubble does not appear, click **Refresh**. If it still does not appear, try to access a Web page to verify that an Internet connection exists.

## CONFIGURING A PROFILE FOR A LISTED NETWORK THAT REQUIRES A WEP KEY

- 1 Click **Start**, then click **Control Panel** (Category View).
- 2 Click **Network and Internet Connections**.
- 3 Click **Network Connections**.
- 4 Right-click **Wireless Network Connection**, and then click **Properties**.



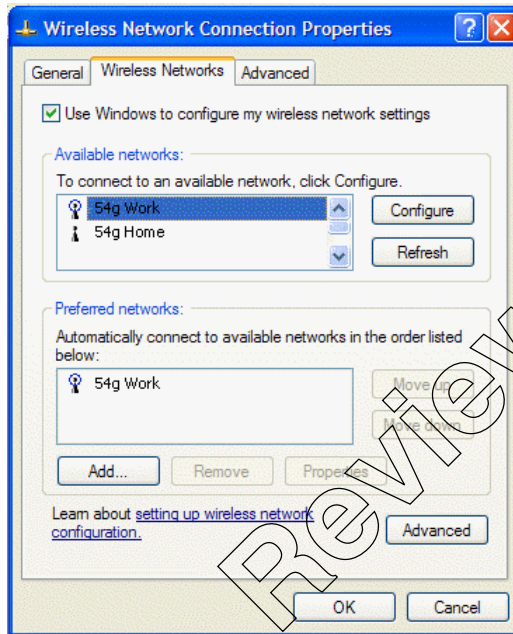
- 5 Click the **Wireless Networks** tab.
- 6 Under **Available networks**, click the network name, and then click **Configure**.



- 7 Select the **Data encryption (WEP enabled)** check box.
- 8 Clear the **The key is provided for me automatically** check box.
- 9 Type the network key in the **Network key** box and again in the **Confirm network key** box.

NOTE—It is not necessary to select the **Key format** or the **Key length** before typing the network key. These settings automatically change to the appropriate setting as the network key is typed.

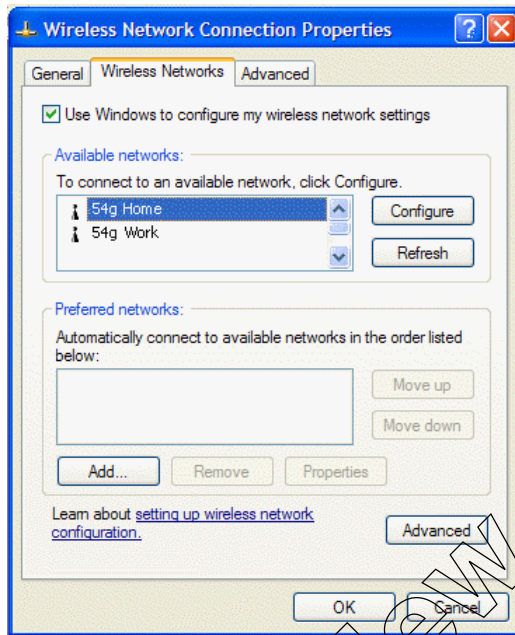
- 10 The default settings in Microsoft Windows XP Service Pack 1 require IEEE 802.1x authentication. With IEEE 802.1x authentication enabled, connecting to a network requires a connection with an authentication server. If the network has no authentication server, the connection is disabled every 3 minutes. Therefore, when connecting to a network that has no authentication server, disable IEEE 802.1x authentication by doing the following (if the network does have an authentication server, ignore this step):
  - Click the **Authentication** tab.
  - Clear the **Enable network access control using IEEE 802.1x** check box.
- 11 Click **OK**. The network name and icon appear at the top of the list under **Preferred networks**.



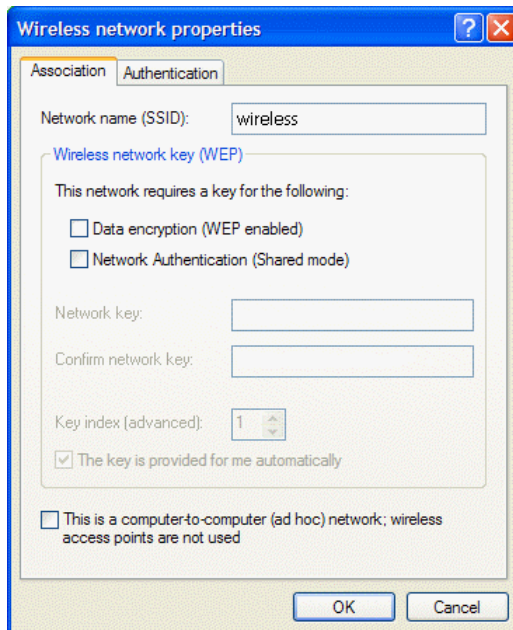
- 12 Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties** for that wireless network and click the **Wireless Networks** tab. The computer is connected to the selected network when a blue bubble appears on top of the icon  for that network. If the bubble does not appear, click **Refresh**. If it still does not appear, try to access a Web page to verify that an Internet connection exists.

## CONFIGURING A PROFILE FOR A NETWORK THAT IS NOT LISTED AND DOES NOT REQUIRE A WEP KEY

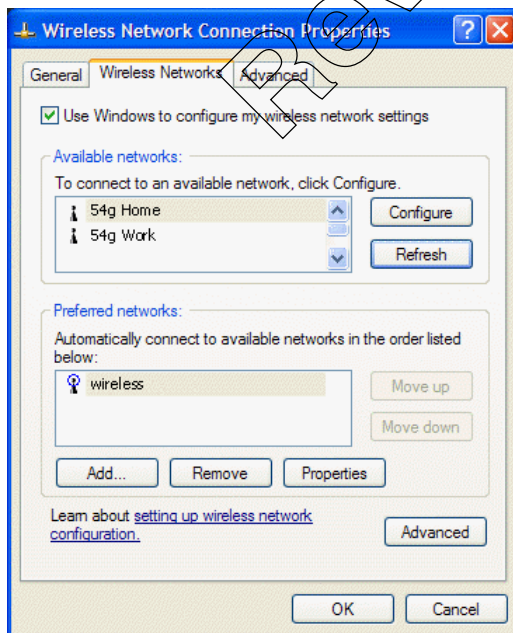
- 1 Click **Start**, then click **Control Panel** (Category View).
- 2 Click **Network and Internet Connections**.
- 3 Click **Network Connections**.
- 4 Right-click **Wireless Network Connection**, and then click **Properties**.



- 5 Click the **Wireless Networks** tab.
- 6 Click **Add**.



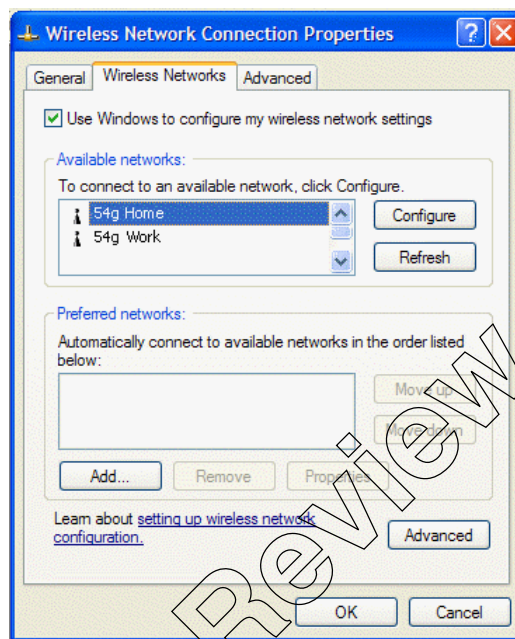
- 7 Type the network name in the **Network name (SSID)** box.
- 8 The default settings in Microsoft Windows XP Service Pack 1 require IEEE 802.1x authentication. With IEEE 802.1x authentication enabled, connecting to a network requires a connection with an authentication server. If the network has no authentication server, the connection is disabled every 3 minutes. Therefore, when connecting to a network that has no authentication server, disable IEEE 802.1x authentication by doing the following (if the network does have an authentication server, ignore this step):
  - Click the **Authentication** tab.
  - Clear the **Enable network access control using IEEE 802.1x** check box.
- 9 Click **OK**. The network name and icon appear at the top of the list under **Preferred networks**.



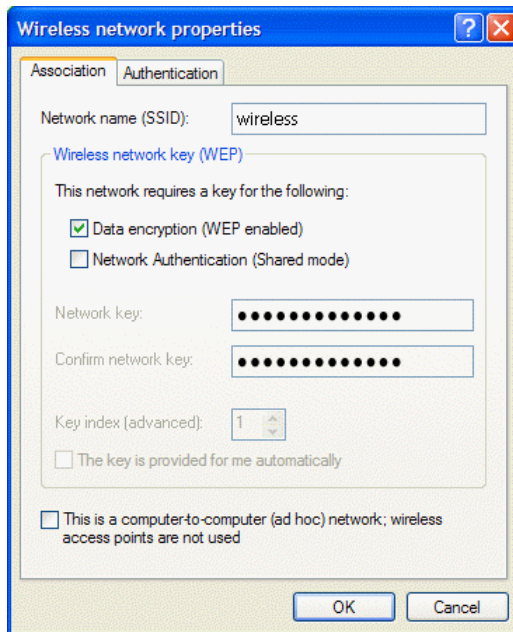
- 10 Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties** for that network and click the **Wireless Networks** tab. The computer is connected to the selected network when a blue bubble appears on top of the icon  for that network. If the bubble does not appear, click **Refresh**. If it still does not appear, try to access a Web page to verify that an Internet connection exists.

## CONFIGURING A PROFILE FOR A NETWORK THAT IS NOT LISTED AND REQUIRES A WEP KEY

- 1 Click **Start**, then click **Control Panel** (Category View).
- 2 Click **Network and Internet Connections**.
- 3 Click **Network Connections**.
- 4 Right-click **Wireless Network Connection**, and then click **Properties**.



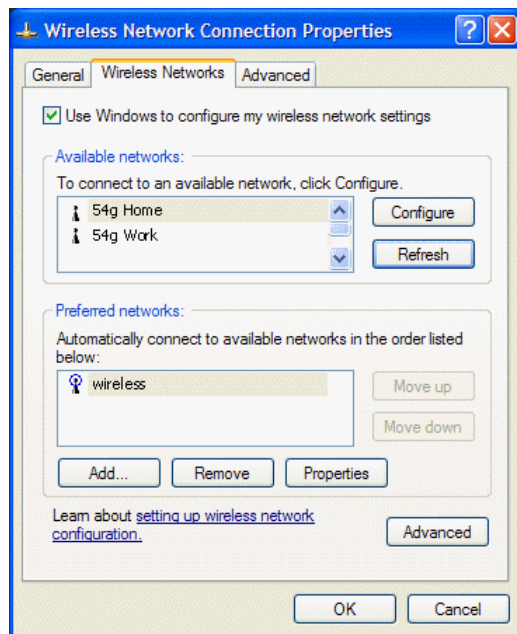
- 5 Click the **Wireless Networks** tab.
- 6 Click **Add**.



- 7 Type the network name in the **Network name (SSID)** box.
- 8 Select the **Data encryption (WEP enabled)** check box.
- 9 Clear the **The key is provided for me automatically** check box.
- 10 Type the network key in the **Network key** box and again in the **Confirm network key** box.

NOTE—It is not necessary to select the **Key format** or the **Key length** before typing the network key. These settings automatically change to the appropriate setting as the network key is typed.

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- 12 Click **OK**. The network name and icon appear at the top of the list under **Preferred networks**.



- 13 Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties** for that wireless network and click the **Wireless Networks** tab. The computer is connected to the selected network when a blue bubble appears on top of the icon  for that network. If the bubble does not appear, click **Refresh**. If it still does not appear, try to access a Web page to verify that an Internet connection exists.

# Specifications

## PHYSICAL CHARACTERISTICS

| <i>Characteristic</i>      | <i>Description</i>                                      |
|----------------------------|---------------------------------------------------------|
| Form Factor                | Mini PCI specification, May 2002. Type IIIA form factor |
| Dimensions (length, width) | 59.6 mm × 50.95 mm                                      |

## TEMPERATURE AND HUMIDITY LIMITATIONS

| <i>Condition</i>      | <i>Description</i>                    |
|-----------------------|---------------------------------------|
| Operating Temperature | 0 to 70°C                             |
| Operating Humidity    | 95% maximum (no condensation allowed) |
| Storage Temperature   | –40 to 90°C                           |
| Storage Humidity      | 95% maximum (no condensation allowed) |

## POWER CHARACTERISTICS

| <i>Characteristic</i> | <i>Values</i>                 |                               |
|-----------------------|-------------------------------|-------------------------------|
|                       | <i>IEEE 802.11g Operation</i> | <i>IEEE 802.11b Operation</i> |
| Doze Mode             | 40 mA                         | 40 mA                         |
| Receive Mode          | 400 mA                        | 220 mA                        |
| Transmit Mode         | 600 mA                        | 330 mA                        |
| Power Supply          | 3.3 V                         | 3.3 V                         |

## NETWORKING CHARACTERISTICS

| <i>Characteristic</i>           | <i>Description</i>                                                                                                                                          |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Compatibility                   | IEEE Std 802.11b and IEEE Draft Std 802.11g for wireless LAN                                                                                                |
| Network Operating System        | Microsoft Windows Networking                                                                                                                                |
| Host Operating System           | Microsoft Windows XP                                                                                                                                        |
| Medium Access Protocol          | CSMA/CA (collision avoidance) with acknowledgment (ACK)                                                                                                     |
| Data Rate (Mbit/s) <sup>a</sup> | <ul style="list-style-type: none"> <li>IEEE Draft Std 802.11g: 1, 2, 5.5, 6, 11, 12, 18, 24, 36, 48, 54</li> <li>IEEE Std 802.11b: 1, 2, 5.5, 11</li> </ul> |

a The **Integrated 54g** solution uses an automated rate select mechanism

## RADIO CHARACTERISTICS

| <i>Characteristic<sup>a</sup></i> | <i>Description</i>                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency Band                    | 2.4 GHz (IEEE 802.11b, IEEE Draft Std 802.11g)                                                                                                                                                                                                                                                                                                                                                                                                   |
| Modulation Technique              | Direct sequence spread spectrum (DSSS) <ul style="list-style-type: none"><li>• CCK for high and medium transmit rate</li><li>• DQPSK for standard transmit rate</li><li>• DBPSK for low transmit rate</li></ul> Orthogonal frequency division multiplexing (OFDM) <ul style="list-style-type: none"><li>• 52 subcarriers with BPSK, QPSK, 16-QAM or 64-QAM</li><li>• Forward error correction convolutional coding rate: 1/2, 2/3, 3/4</li></ul> |
| Spreading                         | 11-chip Barker sequence                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Bit Error Rate (BER)              | Better than $10^{-5}$ ppm                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Nominal Output Power              | <ul style="list-style-type: none"><li>• IEEE Std 802.11b: 14 dBm</li><li>• IEEE Draft Std 802.11g: 15 dBm</li></ul>                                                                                                                                                                                                                                                                                                                              |

a See "Regulatory Information" on page 16 for country-specific performance characteristics and use restrictions.

# Regulatory Information

## OPERATIONAL INFORMATION

### WIRELESS INTEROPERABILITY

The **Integrated 54g** enabled notebook is designed to be interoperable with any wireless LAN product that is based on direct sequence spread spectrum (DSSS) and orthogonal frequency division multiplexing (OFDM) radio technology and to comply with the following standards:

- IEEE Std 802.11b-1999. Standard on 2.4 GHz Wireless LAN
- IEEE Std 802.11g-2002. Draft standard on 2.4 GHz Wireless LAN

### SAFETY

The **Integrated 54g** enabled notebook, like other radio devices, emits radio frequency electromagnetic energy. The level of energy emitted by this devices, however, is less than the electromagnetic energy emitted by other wireless devices such as mobile phones. The **Integrated 54g** enabled notebook operates within the guidelines found in radio frequency safety standards and recommendations. 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 situations or environments, the use of a **Integrated 54g** enabled notebook may be restricted by the proprietor of the building or responsible representatives of the applicable organization. Examples of such situations include the following:

- Using the **Integrated 54g** enabled notebook onboard airplanes, or
- Using the **Integrated 54g** enabled notebook in any other environment where the risk of interference with other devices or services is perceived or identified as being harmful.

If uncertain of the policy that applies to the use of wireless devices in a specific organization or environment (in an airplane, for example), ask for authorization to use the **Integrated 54g** enabled notebook before turning it on.

## REGULATORY INFORMATION

The **Integrated 54g** enabled notebook must be used in strict accordance with this manual. For country-specific approvals, see "Radio Approvals" on page 21. The computer manufacturer is not responsible for any radio or television interference caused by unauthorized modification of the devices included with this **Integrated 54g** enabled notebook kit, or the substitution or attachment of connecting cables and equipment other than that specified by the computer manufacturer. The correction of interference caused by such unauthorized modification, substitution, or attachment is the responsibility of the user. The computer manufacturer and its authorized resellers or distributors are not liable for any damage or violation of government regulations that may arise from the user's failing to comply with these guidelines.

### CANADA—INDUSTRY CANADA (IC)

This device complies with RSS210 of Industry Canada.

**EUROPE—EU DECLARATION OF CONFORMITY**

This equipment complies with the essential requirements of the European Union directive 1999/5/EC.

Cet équipement est conforme aux principales caractéristiques définies dans la Directive européenne RTTE 1999/5/CE.

Die Geräte erfüllen die grundlegenden Anforderungen der RTTE-Richtlinie 1999/5/EG.

Questa apparecchiatura è conforme ai requisiti essenziali della Direttiva Europea R&TTE 1999/5/CE.

Este equipo cumple los requisitos principales de la Directiva 1999/5/CE de la UE, "Equipos de Terminales de Radio y Telecomunicaciones".

Este equipamento cumpre os requisitos essenciais da Directiva 1999/5/CE do Parlamento Europeu e do Conselho (Directiva RTT).

O exoplismos autos plhroi tis basikes apaitis tis koinotikhs odhgias EU R&TTE 1999/5/E.

Deze apparatuur voldoet aan de noodzakelijke vereisten van EU-richtlijn betreffende radioapparatuur en telecommunicatie-eindapparatuur 1999/5/EG.

Dette udstyr opfylder de Væsentlige krav i EU's direktiv 1999/5/EC om Radio- og teleterminaludstyr.

Dette utstyret er i overensstemmelse med hovedkravene i R&TTE-direktivet (1999/5/EC) fra EU.

Utrustningen uppfyller kraven för EU-direktivet 1999/5/EC om ansluten teleutrustning och ömsesidigt erkännande av utrustningens överensstämmelse (R&TTE).

Tämä laite vastaa EU:n radio- ja telepäätelaitedirektiivin (EU R&TTE Directive 1999/5/EC) vaatimuksia.

This product is intended to be used in all countries of the European Economic Area when operating in IEEE 802.11b and/or IEEE 802.11g mode at 2.4 GHz (see "France" below).

**FRANCE**

Some areas of France have a restricted frequency band for operation in the IEEE 802.11b mode and the IEEE 802.11g mode at 2.4 GHz. The following information describes this restriction. Please check ART's Web site (<http://www.art-telecom.fr>) for more up-to-date information.

Autorité de régulation des télécommunications (ART) has made decisions that will allow users to install WLAN (wireless LAN) systems to provide high-speed Internet services primarily in high-traffic areas (called hot spots). ART recently released guidelines that establish the conditions for experimenting with the installation of public WLANs, such as for high-speed Internet access in locations that are currently being poorly served by existing networks. Such public WLANs would operate in the 2.4-GHz frequency band. This series of measures answers many of the concerns expressed during Art's public consultation on this topic.

Decisions allowing the installation of wireless terminals in hot spots (train stations, airports, business centers, and the like): In agreement with the Ministry of Defense, ART has made two decisions setting the conditions for using wireless LANs in the 2.4-GHz band. One of these decisions has been submitted to the Minister of Telecommunications for approval. These decisions will allow the installation of WLAN access points to provide public services in high-traffic public places. This will allow service providers and licensed operators to install access points using 2.4 GHz band technologies without authorization, under the following technical conditions:

- In 38 départements (see "Metropolitan Departments" on page 19 for listing):
  - The 2400–2454 MHz band can be used both indoors and outdoors using systems (access points and devices) with less than 300 milliwatts (mW) of power.
  - The 2454–2483.5 MHz band can be used indoors using devices with less than 100 mW of power and can be used outdoors using devices with less than 10 mW of power. When the devices are being used outdoors on private property, the power may be increased to 100 mW after approval from the Ministry of Defense.
- For the time being, in all other metropolitan départements, the conditions remain unchanged. The list of the first 38 départements will be progressively added to after 1 January 2003.
- For the overseas départements (DOM), as well as Saint Pierre and Miquelon and Mayotte, the entire 2400–2483.5 MHz band may be used indoors and outdoors using devices with less than 100 mW of power, except for the Reunion Islands and Guyana, where the 2420–2483.5 MHz band may be used only outdoors using devices with less than 100 mW of power. ART reminds operators that these frequencies are used with no guarantee of nondisruption, and that the installations must respect all measures applying to radio installations (such as urban planning regulations). These decisions also allow the development of private uses. In particular, private networks (such as indoor corporate networks) can be established using these technologies.

These conditions are tabulated in Table 2 on page 20.

### **Guidelines for Public WLAN Experimentation**

- Networks using WLAN technology will be granted a free authorization for up to 18 months under article L.33-1 of the Post and Telecommunications Code. These networks may use systems with 100 mW of power (effective isotropic radiated power (EIRP)) on the entire band, indoors and outdoors. Moreover, in the 2.4 GHz band (and providing this power limit is respected), fixed point-to-point links can be established for these networks needs, or frequencies can be requested in other ad hoc bands.
- Private and public persons may submit applications to ART, provided that legislation and regulations allow them to do so.
- Applications will be processed in a simplified way, in the spirit of the new "Authorization" Directive.
- ART will send completed applications to the Ministry of Defense. The Ministry will then check that the projects are not located near any sensitive area and that they are not likely to cause disruptions to military equipment. For each application, ART will then submit its report and the draft authorization to the Minister of Telecommunications.
- Applications can be sent from 12 November 2002 so that the first experiments may be launched as soon as early 2003. Full reviews are to be sent to ART at the end of the temporary authorizations to determine whether the technology guarantees quality and security to users.

## Metropolitan Departments

Table 1 lists the 38 metropolitan départements that permit the use of WLAN systems using less than 100 mW of power (EIRP) indoors across the entire 2400–2483.5 MHz band and outdoors on the 2400–2454 MHz band.

**Table 1: 38 Metropolitan Départements**

|    |                |    |                     |    |                       |
|----|----------------|----|---------------------|----|-----------------------|
| 01 | Ain Orientales | 36 | Indre               | 66 | Pyrénées              |
| 02 | Aisne          | 37 | Indre et Loire      | 67 | Bas Rhin              |
| 03 | Allier         | 41 | Loir et Cher        | 68 | Haut Rhin             |
| 05 | Hautes Alpes   | 42 | Loire               | 70 | Haute Saône           |
| 08 | Ardennes       | 45 | Loiret              | 71 | Saône et Loire        |
| 09 | Ariège         | 50 | Manche              | 75 | Paris                 |
| 11 | Aude           | 55 | Meuse               | 82 | Rarn et Garonne       |
| 12 | Aveyron        | 58 | Nièvre              | 84 | Vaucluse              |
| 16 | Charente       | 59 | Nord                | 88 | Vosges                |
| 24 | Dordogne       | 60 | Cise                | 89 | Yonne                 |
| 25 | Doubs          | 61 | Orne                | 90 | Territoire de Belfort |
| 26 | Drôme          | 63 | Puy du Dôme         | 94 | Val de Marne          |
| 32 | Gers           | 64 | Pyrénées Atlantique |    |                       |

Conditions of use for WLANs in hot spots in these 38 départements:

- The 2400–2454 MHz band may be used both indoors and outdoors using devices with power (EIRP) of less than 100 milliwatts (mW).
- The 2454–2483.5 MHz band may be used indoors using devices with power (EIRP) of less than 100 mW and outdoors using devices with power of less than 10 mW. On private property outdoors, the power may be 100 mW with the approval of the Ministry of Defense.

Conditions of use for WLANs in hot spots in other metropolitan départements: The conditions of use currently remain unchanged, that is,

- The 2400–2446.5 MHz band may be used indoors using devices with power (EIRP) of less than 10 mW.

- The 2446.5–2483.5 MHz band may be used indoors using devices with power (EIRP) of less than 100 mW. On private property outdoors, the power may be 100 mW with the approval of the Ministry of Defense.

**Table 2: Authorized EIRP**

| In the 38 Départements                                          |                      |                                                                  |                                                           |
|-----------------------------------------------------------------|----------------------|------------------------------------------------------------------|-----------------------------------------------------------|
| Frequency (MHz)                                                 | Authorized EIRP (mW) |                                                                  |                                                           |
|                                                                 | Indoors              | Outdoors: Decisions <sup>a</sup>                                 | Outdoors: Guidelines <sup>b</sup>                         |
|                                                                 | 100                  | 100                                                              | 100                                                       |
|                                                                 |                      | 10 and 100 on private property with Ministry of Defense approval | 100 with Ministry of Defense approval                     |
| In Other Metropolitan Départements                              |                      |                                                                  |                                                           |
| Frequency (MHz)                                                 | Authorized EIRP (mW) |                                                                  |                                                           |
|                                                                 | Indoors              | Outdoors: Decisions <sup>*</sup>                                 | Outdoors: Guidelines <sup>**</sup>                        |
|                                                                 | 10                   | Not permitted                                                    | 100 with Ministry of Defense approval                     |
|                                                                 |                      | 100                                                              | 100 on private property with Ministry of Defense approval |
| In Guadeloupe, Martinique, St. Pierre, and Miquelon and Mayotte |                      |                                                                  |                                                           |
| Frequency (MHz)                                                 | Authorized EIRP (mW) |                                                                  |                                                           |
|                                                                 | Indoors              | Outdoors: Decisions and Guidelines                               |                                                           |
|                                                                 | 100                  | 100                                                              |                                                           |
|                                                                 |                      |                                                                  |                                                           |
| In Reunion Islands and Guyana                                   |                      |                                                                  |                                                           |
| Frequency (MHz)                                                 | Authorized EIRP (mW) |                                                                  |                                                           |
|                                                                 | Indoors              | Outdoors: Decisions <sup>*</sup>                                 | Outdoors: Guidelines <sup>**</sup>                        |
|                                                                 | 100                  | Not permitted                                                    | 100 with Ministry of Defense approval                     |
|                                                                 |                      | 100                                                              | 100                                                       |

a Concernent les réseaux indépendants et les hot spots

b Concernent les expérimentations de réseaux ouverts au public

**NOTE**—The **Integrated 54g** enabled notebook transmits less than 100 mW of power, but more than 10 mW.

## USA—FEDERAL COMMUNICATIONS COMMISSION (FCC)

This device complies with Part 15 of the FCC Rules. Operation of the device is subject to the following two conditions:

- The device may not cause harmful interference.
- The device must accept any interference that may cause undesired operation.

**NOTE**—The radiated output power of the **Integrated 54g** enabled notebook is far below the FCC radio frequency exposure limits. Nevertheless, the **Integrated 54g** enabled notebook should be used in such a

manner that the potential for human contact during normal operation is minimized. To avoid the possibility of exceeding the FCC radio frequency exposure limits, keep a distance of at least 20 cm between the user (or any other person in the vicinity) and the antenna that is built into the computer. To determine the location of the antenna within the notebook, refer to the operating manual for the **Integrated 54g** enable notebook.

### Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If the equipment is not installed and used in accordance with the instructions, the equipment may cause harmful interference to radio communications. There is no guarantee, however, that such 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 taking one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**NOTE**—This **Integrated 54g** enabled notebook must be used in strict accordance with the computer manufacturer's instructions. Any other installation or use violates FCC Part 15 regulations. Modifications not expressly approved by the computer manufacturer could void the user's authority to operate the equipment.

### RADIO APPROVALS

Only use this radio device in countries where the device is approved for use.

# Troubleshooting

## CANNOT CONNECT TO THE NETWORK

If the **Integrated 54g** enabled notebook appears to be functioning properly but does not connect to the network, the problem may be that there is a mismatch between the **Network name (SSID)** and **Wireless network key (WEP)** settings in **Wireless Network Properties** and the name and WEP key of the network it is trying to connect to. As explained in "Completing the Setup" on page 3, the network name and WEP key are case sensitive. Verify that the spelling and case of these parameters are correct and that the settings are exactly the same on all computers on the network.

If the spelling and case of these parameters are correct and the settings are exactly the same on all computers on the network, and the computer is still unable to connect to the network, see "Performance and Connectivity Problems".

## PERFORMANCE AND CONNECTIVITY PROBLEMS

| <i>Problem or Symptom</i>                                                                              | <i>Possible Solution</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The computers seem to be communicating, but they do not appear in My Computer or in My Network Places. | <p>Verify that <b>File and Printer Sharing</b> is enabled on all the computers on the network.</p> <ol style="list-style-type: none"> <li>1 Click <b>Start</b>, then click <b>Control Panel</b> (Category View).</li> <li>2 Click <b>Network and Internet Connections</b>.</li> <li>3 Click <b>Network Connections</b>.</li> <li>4 Right-click <b>Wireless Network Connections</b>, then click <b>Properties</b>.</li> <li>5 On the <b>General</b> tab, under <b>This connection uses the following items</b>, verify that the <b>File and Printer Sharing for Microsoft Networks</b> check box is selected. If the check box is cleared, select it. If this item is not present, click <b>Install</b>. In the <b>Select Network Component Type</b> box, select <b>Service</b> and click <b>Add</b>. In the <b>Select Network Service</b> box, select <b>File and Printer Sharing for Microsoft Networks</b> and click <b>OK</b>. In <b>Wireless Network Connection Properties</b>, click <b>OK</b>.</li> </ol>                                                                                      |
| Data transfer is sometimes very slow.                                                                  | Microwave ovens and some cordless phones operate at the same radio frequency as the <b>Integrated 54g</b> enabled notebook. When the microwave oven or cordless phone is in use, it interferes with the operation of the wireless network. Therefore, keep the <b>Integrated 54g</b> enabled notebook at least 20 feet away from microwave ovens and any cordless telephone that operates at a frequency of 2.4 GHz.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Data transfer is always very slow.                                                                     | Some homes and most offices are steel-framed structures. The steel in such buildings may interfere with the network's radio signals, thus causing a slowdown in the data transmission rate. Try moving the <b>Integrated 54g</b> enabled notebook to different locations in the building to see if performance improves.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Computers are not communicating with the network.                                                      | If the network has an access point (AP), check all of the cables and make sure the power LED on the front of the AP is green. Verify that all of the wireless network properties values are correct. Also, make sure the computer is receiving a good signal from the access point.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| The network was enabled, but now it is disabled.                                                       | <p>The default settings in Microsoft Windows XP Service Pack 1 require IEEE 802.1x authentication. With IEEE 802.1x authentication enabled, connecting to a network requires a connection with an authentication server. If the network has no authentication server, the connection is disabled every 3 minutes. Therefore, when connecting to a network that has no authentication server, disable IEEE 802.1x authentication by doing the following:</p> <ol style="list-style-type: none"> <li>1 Click <b>Start</b>, then click <b>Control Panel</b> (Category View).</li> <li>2 Click <b>Network and Internet Connections</b>.</li> <li>3 Click <b>Network Connections</b>.</li> <li>4 Right-click <b>Wireless Network Connection</b>, then click <b>Properties</b>.</li> <li>5 Click the <b>Wireless Networks</b> tab.</li> <li>6 Click the network name under <b>Preferred networks</b>, then click <b>Properties</b>.</li> <li>7 Click the <b>Authentication</b> tab.</li> <li>8 Clear the <b>Network access control using IEEE 802.1x</b> check box.</li> <li>9 Click <b>OK</b>.</li> </ol> |

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| <b><i>Problem or Symptom</i></b>                                                             | <b><i>Possible Solution</i></b>                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| In the ad hoc mode, I am unable to communicate with another user on the same ad hoc network. | By default, Windows XP uses a dynamic IP address in ad hoc mode. If you are not able to communicate with other users on the same ad hoc network, assigning a static IP address may correct the problem. Search the <b>Windows Help Center</b> for instructions on assigning a static IP address. |

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# Glossary

|                                                   |                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>access point</b>                               | A stand-alone wireless hub that allows any computer that has a wireless network adapter to communicate with another computer and to connect to the Internet.                                                                                                                                                                                 |
| <b>ad hoc network</b>                             | A communication configuration in which every computer has the same capabilities and any computer can initiate a communication session. Also known as a peer-to-peer network or a computer-to-computer network.                                                                                                                               |
| <b>available network</b>                          | One of the networks listed in the <b>Available networks</b> list under <b>Wireless Network Connection Properties</b> . Any wireless network that is broadcasting and is within receiving range of the <b>Integrated 54g</b> enabled notebook appears on the list.                                                                            |
| <b>BER</b>                                        | bit error rate. The ratio of errors to the total number of bits being sent in a data transmission from one location to another.                                                                                                                                                                                                              |
| <b>client computer</b>                            | The computer that gets its Internet connection by sharing either the host computer's connection or the access point's connection.                                                                                                                                                                                                            |
| <b>dBm</b>                                        | Unit of expression of power level in decibels with reference to a power of 1 milliwatt.                                                                                                                                                                                                                                                      |
| <b>DBPSK</b>                                      | differential-binary-phase-shift keying.                                                                                                                                                                                                                                                                                                      |
| <b>DQSPK</b>                                      | differential-quadrature-phase-shift keying. A compression technique that transmits only the differences between the values of the phase of the sine wave rather than the full absolute value.                                                                                                                                                |
| <b>DSSS</b>                                       | direct sequence spread spectrum. A type of radio transmission technology used in wireless networking and cellular communications.                                                                                                                                                                                                            |
| <b>Dynamic Host Configuration Protocol (DHCP)</b> | A mechanism for allocating IP addresses dynamically so that addresses can be reused when hosts no longer need them.                                                                                                                                                                                                                          |
| <b>file and printer sharing</b>                   | A capability that allows a number of people to view, modify, and print the same file(s) from different computers.                                                                                                                                                                                                                            |
| <b>GHz</b>                                        | gigahertz. A unit of frequency equal to 1 000 000 000 cycles per second.                                                                                                                                                                                                                                                                     |
| <b>host computer</b>                              | The computer that is directly connected to the Internet via a modem or network adapter.                                                                                                                                                                                                                                                      |
| <b>IEEE</b>                                       | Institute of Electrical and Electronics Engineering                                                                                                                                                                                                                                                                                          |
| <b>IEEE 802.11g</b>                               | The IEEE draft standard for wireless LAN operations in the 2.4 GHz frequency band with a maximum data rate of 54 Mbit/s. This draft standard is expected to be finalized in the summer of 2003.                                                                                                                                              |
| <b>IEEE 802.11b</b>                               | The IEEE standard for wireless LAN operations in the 2.4 GHz frequency band with a maximum data rate of 11 Mbit/s.                                                                                                                                                                                                                           |
| <b>Internet Protocol (IP) address</b>             | The address of a computer that is attached to a network. Part of the address designates which network the computer is on, and the other part represents the host identification.                                                                                                                                                             |
| <b>LAN</b>                                        | local area network                                                                                                                                                                                                                                                                                                                           |
| <b>m</b>                                          | meter                                                                                                                                                                                                                                                                                                                                        |
| <b>Mbit/s</b>                                     | megabits per second. Transmission speed of 1 000 000 bits per second.                                                                                                                                                                                                                                                                        |
| <b>MHz</b>                                        | megahertz. A unit of frequency equal to 1 000 000 cycles per second.                                                                                                                                                                                                                                                                         |
| <b>ns</b>                                         | nanosecond. 1 billionth (1/1 000 000 000) of a second.                                                                                                                                                                                                                                                                                       |
| <b>OFDM</b>                                       | orthogonal frequency division multiplexing. An emerging signal modulation technology for achieving higher data rates in wireless communications.                                                                                                                                                                                             |
| <b>peer-to-peer network</b>                       | See <i>ad hoc network</i> . Also known as a computer-to-computer network.                                                                                                                                                                                                                                                                    |
| <b>preferred network</b>                          | One of the networks that has been configured. Such networks appear under <b>Preferred networks</b> on the <b>Wireless Networks</b> tab of <b>Wireless Network Connection Properties</b> .                                                                                                                                                    |
| <b>Service Set Identifier (SSID)</b>              | A value that controls access to a wireless network. The SSID for your wireless network card must match the SSID for any access point that you want to connect with. If the value does not match, you are not granted access to the network. You can have up to three SSIDs. Each SSID can be up to 32 characters long and is case-sensitive. |
| <b>Wired Equivalent Privacy (WEP)</b>             | A form of data encryption. The WEP key information in the client computer must match the WEP key used by the access point or host computer. The WEP key can be enabled or disabled. The WEP key is case-sensitive.                                                                                                                           |

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