Instant Wireless® Series

Wireless A/G USB Network Adapter

Use this guide to install:
WUSB54AG

User Guide

LINKSYS®

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Linksys guarantees that every Instant Wireless® Dual-Band Wireless A+G PCI Adapter will be free from physical defects in material and workmanship for three year from the date of purchase, when used within the limits set forth in the Specifications chapter of this User Guide.

This Warranty is valid and may be processed only in the country of purchase.

If the product proves defective during this warranty period, go to the Linksys website at www.linksys.com for complete RMA (Return Merchandise Authorization) assistance. You can also call Linksys Technical Support in order to obtain a RMA Number. BE SURE TO HAVE YOUR PROOF OF PURCHASE AND A BARCODE FROM THE PRODUCT'S PACKAGING ON HAND WHEN CALLING. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE. When returning a product, mark the RMA Number clearly on the outside of the package and include a copy of your original proof of purchase.

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Please direct all inquiries to:

Linksys P.O. Box 18558, Irvine, CA 92623.

SAFETY AND REGULATORY NOTICES

Cisco-Linksys, LLC declares that WUSB55AG (FCC ID: Q87-WUSB54AG)
is limited in CH1~CH11 for 2.4GHz by specified firmware controlled in U.S.A.

FCC STATEMENT

The Instant Wireless Wireless A/G USB Network Adapter has been tested and found to comply with the specifications for a Class B digital device, pursuant to 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.

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 according to 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 is found 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 or devices

• Connect the equipment to an outlet other than the receiver's

• Consult a dealer or an experienced radio/TV technician for assistance

FCC Caution: Any change or modification to the product not expressly approved by Linksys could void the user's authority to operate the device.

FCC Caution: Operation within the 5150 to 5250GHz band is restricted to indoor use only.

FCC RF Radiation Exposure Statement

To comply with the FCC and ANSI C95.1 RF exposure limits, the antenna(s) for this device must comply with the following:

• Access points with 2.4 GHz or 5 GHz integrated antenna must operate with a separation distance of at least 20 cm from all persons using the cable provided and must not be co-located or operating in conjunction with any other antenna or transmitter.

End-users must be provided with specific operations for satisfying RF exposure compliance.

Note: Dual antennas used for diversity operation are not considered co-located.

INDUSTRY CANADA (CANADA)

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

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

The use of this device in a system operating either partially or completely outdoors may require the user to obtain a license for the system according to the Canadian regulations.

To prevent radio interference to the licensed service (i.e. co-channel Mobile Satellite systems) this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing. Because high power radars are allocated as primary users (meaning they have priority) in 5250-5350 MHz, these radars could cause interference and/or damage to license exempt LAN devices.

EC DECLARATION OF CONFORMITY (EUROPE)

Linksys Group declares that the Instant Wireless® Series products included in the Instant Wireless® Series conform to the specifications listed below, following the provisions of the European R&TTE directive 1999/5/EC, EMC directive 89/336/EEC, and Low Voltage directive 73/23/EEC:

For 11Mbps, 2.4 GHz devices with 100 mW radios, the following standards were applied:

• ETS 300-826, 301 489-1 General EMC requirements for Radio equipment.

• EN 609 50 Safety

• ETS 300-328-2 Technical requirements for Radio equipment.

For 54Mbps, 5 GHz devices with 40 mW radios, the following standards were applied:

• ETS 301 489-1, 301 489-17 General EMC requirements for Radio equipment.

• EN 609 50 Safety

• ETS 301-893 Technical requirements for Radio equipment.

Caution: The frequencies used by 802.11a wireless LAN devices are not yet harmonized within the European community, 802.11a products are designed for use only in specific countries, and are not allowed to be operated in countries other than those of designated use. Contact local Authority for procedure to follow.

Caution: This equipment is intended to be used in all EU and EFTA countries. Outdoor use may be restricted to certain frequencies and/or may require a license for operation.

Contact local Authority for procedure to follow.

Note: Combinations of power levels and antennas resulting in a radiated power level of above 100 mW equivalent isotropic radiated power (EIRP) are considered as not compliant with the above mentioned directive and are not allowed for use within the European community and countries that have adopted the European R&TTE directive 1999/5/EC and/or the CEPT recommendation Rec 70.03.

For more details on legal combinations of power levels and antennas, contact Linksys Corporate Compliance.

• Linksys Group vakuuttaa täten että Instant Wireless Wireless A/G USB Network Adapter tyyppinen laite on direktiivin 1999/5/EY, direktiivin 89/336/EEC ja direktiivin 73/23/EEC oleellisten vaatimusten ja sitä koskevien näiden direktiivien muiden ehtojen mukainen.

• Linksys Group déclare que la Instant Wireless Wireless A/G USB Network Adapter est conforme aux conditions essentielles et aux dispositions relatives à la directive 1999/5/EC, la directive 89/336/EEC, et à la directive 73/23/EEC.

• Belgique B L'utilisation en extérieur est autorisé sur le canal 11 (2462 MHz), 12 (2467 MHz), et 13 (2472 MHz). Dans le cas d'une utilisation privée, à l'extérieur d'un bâtiment, au-dessus d'un espace public, aucun enregistrement n'est nécessaire pour une distance de moins de 300m. Pour une distance supérieure à 300m un enregistrement auprès de l'IBPT est requise. Pour une utilisation publique à l'extérieur de bâtiments, une licence de l'IBPT est requise. Pour les enregistrements et licences, veuillez contacter l'IBPT.

• France F:

2.4 GHz Bande : les canaux 10, 11, 12, 13 (2457, 2462, 2467, et 2472 MHz respectivement)

sont complétement libres d'utilisation en France (en utilisation intérieur).

Pour ce qui est des autres canaux, ils peuvent être soumis à autorisation selon le départment. L'utilisation en extérieur est soumis à autorisation préalable et très restreint.

5 GHz Bande: Conformément aux décisions de la CEPT, l'utilisation des fréquences de la bande 5150 MHz - 5350 MHz est autorisée à l'intérieur des bâtiments avec une puissance maximale de 200 mW, et interdite en extérieur. La bande 5470 MHz - 5725 MHz n'est pas ouverte aujourd'hui.

Vous pouvez contacter l'Autorité de Régulation des Télécommunications (http://www.art-telecom.fr) pour de plus amples renseignements.

2.4 GHz Band: only channels 10, 11, 12, 13 (2457, 2462, 2467, and 2472 MHz respectively) may be used freely in France for indoor use. License required for outdoor installations.

5 GHz Band: frequencies in the 5150 MHz - 5350 MHz band may be used indoor with maximum power of 200 mW. Their use is forbidden outdoors. The 5470 MHz - 5725 MHz band is not currently open.

Please contact ART (http://www.art-telecom.fr) for procedure to follow.

• Deutschland D: Anmeldung im Outdoor-Bereich notwending, aber nicht genehmigungspflichtig.

Bitte mit Händler die Vorgehensweise abstimmen.

• Germany D: License required for outdoor installations. Check with reseller for procedure to follow.

• Italia I: E' necessaria la concessione ministeriale anche per l'uso interno. Verificare con i rivenditori la procedura da seguire. L'uso per installazione in esterni non e' permessa.

• Italy I: License required for indoor use. Use with outdoor installations not allowed.

• The Netherlands NL License required for outdoor installations. Check with reseller for

procedure to follow.

• Nederlands NL Licentie verplicht voor gebruik met buitenantennes. Neem contact op met verkoper voor juiste procedure.

Table of Contents

Chapter 1: Introduction

The Linksys Wireless A/G USB Network Adapter installs in most desktops and lets you put your computer almost anywhere in the building, without the cost and hassle of running network cables. Now you don't have to drill holes in your walls and climb through the attic or cellar to get connected to the network. Once you're connected, you can keep in touch with your e-mail, access the Internet, use instant messaging to chat with friends, and share files and other resources such as printers and network storage with other computers on the network.

The Wireless A/G USB Network Adapter connects you with Wireless-A (802.11a) and Wireless-G (draft 802.11g) networks at an incredible 54Mbps! And for added versatility, it can also interoperate with all the 11Mbps Wireless-B (802.11b) products found in homes, businesses, and public wireless hotspots around the country. And whichever mode you choose, your wireless communications are protected by up to 152-bit encryption, so your data stays secure.

So don't hassle with running cables through your house—get your desktop connected the easy way with the versatile Linksys Wireless A/G USB Network Adapter .

• One Adapter Connects to Either 2.4GHz (802.11b or Draft 802.11g) or
5GHz (802.11a) Networks

• Advanced Security Features with up to 152-Bit WEP Encryption

• Easy-to-Use Setup Wizard

• Detailed Monitoring and Performance Utility

• IEEE 802.11a, 802.11b, and Draft 802.11g Compliant

• Free Technical Support—24 Hours a Day, 7 Days a Week, Toll-Free US
Calls

• 1-Year Limited Warranty

Chapter 2: Planning Your Wireless Network

A wireless local area network (WLAN) is exactly like a regular local area network
(LAN), except that each computer in the WLAN uses a wireless device to
connect to the network. Computers in a WLAN share the same frequency channel
and SSID, which is an identification name for wireless devices.
Unlike wired networks, wireless networks have two different modes in which
they may be set up: **infrastructure** and **ad-hoc**. An infrastructure configuration
is a WLAN and wired LAN communicating to each other through an
access point. An ad-hoc configuration is wireless-equipped computers communicating
directly with each other. Choosing between these two modes
depends on whether or not the wireless network needs to share data or peripherals
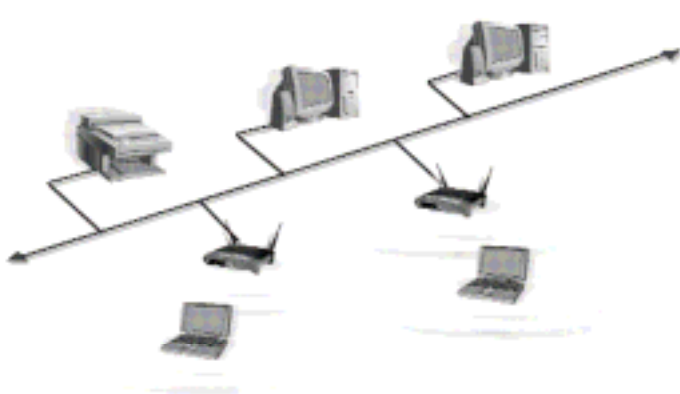with a wired network or not.

Figure 2-1.

If the computers on the wireless network need to be accessed by a wired network or need to share a
peripheral, such as a printer, with the wired network computers, the wireless network should be set up
in **infrastructure** mode. (See Figure 2-1.) The basis of infrastructure mode centers around an
access point, which serves as the main point of communications in a wireless network. Access points
transmit data to PCs equipped with wireless network cards, which can *roam* within a certain radial

range of the access point. Multiple access points can be arranged to work in succession to extend the roaming range, and can be set up to communicate with your Ethernet (wired) hardware as well.

If the wireless network is relatively small and needs to share resources only with the other computers on the wireless network, then the **ad-hoc** mode can be used. (See Figure 2-2.) Ad-hoc mode allows computers equipped with wireless transmitters and receivers to communicate directly with each other, eliminating the need for an access point. The drawback of this mode is that, in Ad-Hoc mode, wireless-equipped computers are not able to communicate with computers on a wired network. And, of course, communication between the wireless-equipped computers is limited by the distance and interference directly between them.

Figure 2-2

Chapter 3: Getting to Know the Wireless A/G USB Network Adapter

The Network Adapter is connected to your PC through its USB port. All power is provided through the USB connection, making a power adapter unnecessary.

The Network Adapter's LEDs show you how the Adapter is functioning.

Power *Green.* This LED will light up to let you know that the Adapter is adequately powered over the USB connection.

Link *Green.* The Link LED will be lit steadily when the Network Adapter is connected to your wireless network. The LED will blink when there is wireless network traffic.

Chapter 4: Software Installation and Configuration for Windows 2000

The Wireless A/G USB Network Adapter Setup Wizard will guide you through the installation procedure. The Setup Wizard will install the WLAN Monitor and driver, as well as configure the Adapter.

1. Insert the **Setup Wizard CD-ROM** into your CD-ROM drive. The Setup Wizard should run automatically. If it does not, click the **Start** button and choose **Run**. In the field that appears, enter

D:\setup.exe (if "D" is the letter of your CD-ROM drive).

2. Read the License Agreement and click the **Next** button to continue the installation. If you click the **Cancel** button, you will end the installation.

3. The following screen will ask for some information about your wireless network. In the *SSID* field, enter your network's **SSID** (Service Set Identifier). The SSID is your network name and must be identical for all devices in the network. The default setting is **linksys** (all lowercase).

Next, choose a wireless mode. Click the **Infrastructure Mode** radio button if you want your wireless computers to network with computers on your wired network using a wireless access point. Click the **Ad-Hoc Mode** radio button if you want multiple wireless computers to network directly with each other.

Click the **Next** button to continue, or click the **Back** button to return to the previous page.

4. If you chose I n f r a s t r u c t u r e

Mode, go to *Step 5* now. If you chose Ad-Hoc Mode, select the correct operating channel for your network from the *Channel* dropdown menu.

Then, select the *Network Mode* from the dropdown

menu. Click the **Next** button, and go to *Step 5*. Click the **Back** button to change any settings.

Channel - The channel you choose should match the channel set on the other devices in your wireless network. If you are unsure about which channel to use, select the default channel (Channel 6).

Network Mode - Keep the default setting, **Mixed**, if you have Wireless-A and Wireless-G devices in your network.

5. The Setup Wizard will ask you to review your settings before it starts to copy files. Click the **Next** button to save these settings, or click the **Back** button to change any settings.

6. At this point, you may see a warning screen, such as that asking if you'd like to

cease installation. You can click the Yes button to continue; the Adapter will function properly.

7. After the files have been successfully copied. Click the **Exit** button.

Proceed to "Chapter 5: Hardware Installation."

Chapter 5: Hardware Installation

Important for Windows 2000 users: You must run the Setup Wizard to install the software before installing the hardware.

Important for Windows XP users: You must install the Adapter's hardware before installing the software.

1. The Adapter comes with the USB cable you will use to connect the Adapter

to your PC. (See Figure 5-1.)

 Figure 5-1

2. Connect one end of the USB cable to the USB port of the Adapter.

3. Connect the other end of the USB cable to one of the USB

ports on your computer (see Figure 5-2).

 Figure 5-2

4. When Windows 2000 begins installing the Network Adapter's driver file, a

screen similar to that shown in Figure 5-3 will appear, stating that a digital

signature was not found. This software has been tested and found to work

properly with Windows 2000. Click the **Yes** button to continue installation.

Figure 5-3

If your PC is running Windows XP, proceed to "Chapter 6: Driver

Installation for Windows XP."

If your PC is running Windows 2000, the installation of the Wireless-B

USB Network Adapter is complete. If you want to check the link information,

search for available wireless networks, or make additional configuration

changes, proceed to "Chapter 7: Using the WLAN Monitor."

Chapter 6: Driver Installation for Windows XP

After connecting the Adapter to your PC, as shown in Chapter 5, you'll need to install the driver.

1. Windows XP will automatically detect the Adapter.

Insert the Setup CD-ROM into the CD-ROM drive.

Click the radio button next to

Install the software automatically

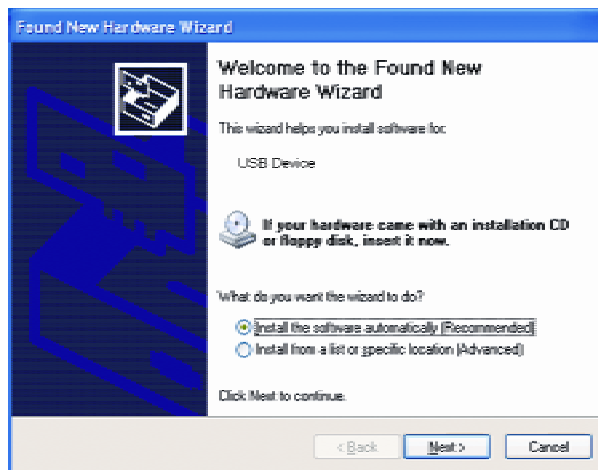**(Recommended)**

(as shown in Figure 6-1).

Figure 6-1

Then click the **Next** button.

2. A screen similar to that shown asking if you wish to discontinue installation.

This software has been tested and found to work properly with Windows XP. Click the

Continue Anyway button to continue installation.

 Figure 6-2

3. The next screen shows that the Wizard is complete. Click the

Finish button. The drivers are now installed.

Windows XP Wireless Configuration

Note for Windows XP users: Windows XP has a built-in configuration tool. Use Windows XP

Wireless Zero Configuration (in the system tray at the bottom of your screen) to configure the Adapter.

1. After installing the Adapter, the Windows XP Wireless Zero Configuration icon will appear in your

computer's   system tray (see Figure 6-3). Double-click the icon.
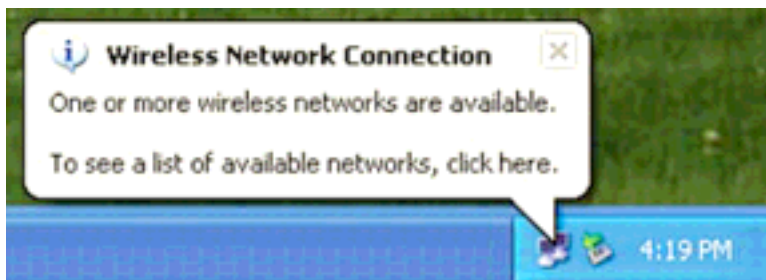
 Figure 6-3

Note: Steps 2 and 3 are the instructions and screenshots for Windows XP with Service Pack 1 installed.

If you have not installed Service Pack 1, select the network you want, and click the **Connect** button. If

the network has WEP encryption enabled, enter the WEP key in the *Network key* field, and then click

the **Connect** button.

2. The screen that appears will show any available wireless network. Select the network you want.

If this network has WEP encryption enabled, go to step 3.

If this network does not have WEP encryption enabled, then Figure 6-4 will appear. Make sure the

box next to *Allow me to connect to the selected wireless network, even though it is not secure* is

checked. Then click the **Connect** button, and go to step 4.

Figure 6-4

3. If WEP is enabled, the screen in Figure 6-5 will appear. Enter the WEP key of your wireless network in the *Network key* field, and re-enter it in the *Confirm network key* field. Then click the **Connect** button, and go to step 4.

Figure 6-5

Note: Windows XP Wireless Zero Configuration does not support the use of a passphrase. Enter the exact WEP key used by your access point.

4. The screen in Figure 6-6 will appear if your connection is active.

Figure 6-6

For more information about wireless networking on a Windows XP computer, click **Start** and then **Help and Support**. Enter the keyword **wireless** in the field provided, and press the **Enter** key.

Congratulations! The installation of the Wireless-G USB Network

Adapter is complete.

Appendix A: Troubleshooting

This chapter provides solutions to problems that may occur during the installation and operation of the Wireless A/G USB Network Adapter. Read thedescriptions below to solve your problems. If you can't find an answer here, check the Linksys website at *www.linksys.com.*

1. The Wireless A/G USB Network Adapter does not work properly.

• Reinsert the Adapter into the PC's USB slot.

• For Windows 98 or Me, right-click **My Computer**, and select **Properties**.

Select the **Device Manager** tab, and select the Adapter. You will find the

Adapter if it has been installed successfully. If you see a yellow exclamation

mark, the resources may be in conflict, and you must follow the steps below:

• Uninstall the driver software from your PC.

• Restart your PC and repeat the hardware and software installation as specified

in this User Guide.

2. I cannot communicate with a wired computer linked via an access point in the

infrastructure configuration.

• Make sure that the PC is powered on.

• Make sure that the Wireless A/G USB Network Adapter is configured with the same SSID and WEP

encryption as the other computers in your wireless network.

Can I run an application from a remote computer over the wireless network?

This will depend on whether or not the application is designed to be used over

a network. Consult the application's user guide to determine if it supports operation

over a network.

Can I play computer games with other members of the wireless network?

Yes, as long as the game supports multiple players over a LAN (local area network).

Refer to the game's user guide for more information.

What is the IEEE 802.11a standard?

It is one of the IEEE standards for wireless networks. The 802.11a standard

allows wireless networking hardware from different manufacturers to communicate,

provided that the hardware complies with the 802.11a standard. The 802.11a standard states a

maximum data transfer rate of 54Mbps and an operating

frequency of 5GHz.

What is the IEEE 802.11b standard?

It is one of the IEEE standards for wireless networks. The 802.11b standard

allows wireless networking hardware from different manufacturers to communicate,

provided that the hardware complies with the 802.11b standard. The 802.11b standard states a

maximum data transfer rate of 11Mbps and an operating frequency of 2.4GHz.

What IEEE 802.11a features are supported?

The product supports the following IEEE 802.11a functions:

• OFDM protocol

• Multi-Channel Roaming

• Automatic Rate Selection

• RTS/CTS feature

• Fragmentation

What IEEE 802.11b features are supported?

The product supports the following IEEE 802.11b functions:

• CSMA/CA plus Acknowledge protocol

• Multi-Channel Roaming

• Automatic Rate Selection

• RTS/CTS feature

• Fragmentation

• Power Management

What is ad-hoc mode?

When a wireless network is set to ad-hoc mode, the wireless-equipped computers
are configured to communicate directly with each other. The ad-hoc wireless network will not
communicate with any wired network.

What is infrastructure mode?

When a wireless network is set to infrastructure mode, the wireless network is
configured to communicate with a wired network through a wireless access point.

What is ISM band?

The FCC and their counterparts outside of the U.S. have set aside bandwidth
for unlicensed use in the ISM (Industrial, Scientific and Medical) band.
Spectrum in the vicinity of 2.4 GHz, in particular, is being made available
worldwide. This presents a truly revolutionary opportunity to place convenient
high-speed wireless capabilities in the hands of users around the globe.

What is Spread Spectrum?

Spread Spectrum technology is a wideband radio frequency technique developed
by the military for use in reliable, secure, mission-critical communications
systems. It is designed to trade off bandwidth efficiency for reliability,
integrity, and security. In other words, more bandwidth is consumed than in the
case of narrowband transmission, but the trade-off produces a signal that is, in
effect, louder and thus easier to detect, provided that the receiver knows the
parameters of the spread-spectrum signal being broadcast. If a receiver is not

tuned to the right frequency, a spread-spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

What is DSSS? What is FHSS? And what are their differences?

Frequency-Hopping Spread-Spectrum (FHSS) uses a narrowband carrier that changes frequency in a pattern that is known to both transmitter and receiver. Properly synchronized, the net effect is to maintain a single logical channel. To an unintended receiver, FHSS appears to be short-duration impulse noise. Direct-Sequence Spread-Spectrum (DSSS) generates a redundant bit pattern for each bit to be transmitted. This bit pattern is called a chip (or chipping code). The longer the chip, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

Would the information be intercepted while transmitting on air?

WLAN features two-fold protection in security. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent security feature of scrambling. On the software side, WLAN offers the encryption function (WEP) to enhance security and access control.

Can Instant Wireless products support printer sharing?

Instant Wireless products perform the same function as LAN products. Therefore, Instant Wireless products can work with NetWare, Windows NT/2000, or other network operating systems to support printer or file sharing.

What is WEP?

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 40/64 bit shared key algorithm, as described in the IEEE 802.11 standard.

Appendix B: Glossary

802.11a - One of the IEEE standards for wireless networking hardware. Products that adhere to a specific IEEE standard will work with each other, even if they are manufactured by different companies. It specifies a maximum data transfer rate of 54Mbps and an operating frequency of 5GHz. The 802.11a standard uses the Orthogonal Frequency Division Multiplexing (OFDM) transmission method. Additionally, the 802.11a standard supports 802.11 features such as WEP encryption for security.

802.11b - One of the IEEE standards for wireless networking hardware.

Products that adhere to a specific IEEE standard will work with each other, even if they are manufactured by different companies. The 802.11b standard specifies a maximum data transfer rate of 11Mbps, an operating frequency of 2.4GHz, and WEP encryption for security. 802.11b networks are also referred to as Wi-Fi networks.

802.11g - A proposed, but as yet unratified extension of the IEEE 802.11 standard for wireless networking hardware. The draft 802.11g specifications used by Linksys specify a maximum data transfer rate of 54Mbps using OFDM modulation, an operating frequency of 2.4GHz, backward compatibility with IEEE 802.11b devices, and WEP encryption for security.

Adapter - Printed circuit board that plugs into a PC to add to capabilities or connectivity to a PC. In a networked environment, a network interface card (NIC) is the typical adapter that allows the PC or server to connect to the intranet and/or Internet.

Ad-hoc Network - An ad-hoc network is a group of computers, each with a wireless adapter, connected as an independent 802.11 wireless LAN. Ad-hoc wireless computers operate on a peer-to-peer basis, communicating directly with each other without the use of an access point. Ad-hoc mode is also referred to as an Independent Basic Service Set (IBSS) or as peer-to-peer mode, and is useful at a departmental scale or SOHO operation.

Bit - A binary digit. The value - 0 or 1-used in the binary numbering system. Also, the smallest form of data.

Boot - To cause the computer to start executing instructions. Personal computers contain built-in instructions in a ROM chip that are automatically executed on startup. These instructions search for the operating system, load it and pass control to it.

CTS (**C**lear **T**o **S**end) - An RS-232 signal sent from the receiving station to the transmitting station that indicates it is ready to accept data.

Default Gateway - The router used to forward all traffic that is not addressed to a station within the local subnet.

DHCP (**D**ynamic **H**ost **C**onfiguration **P**rotocol) - A protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Using the Internet's set of protocol (TCP/IP), each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP

address must be entered. DHCP lets a network administrator supervise and distribute
IP addresses from a central point and automatically sends a new IP
address when a computer is plugged into a different place in the network.
DHCP uses the concept of a "lease" or amount of time that a given IP address
will be valid for a computer. The lease time can vary depending on how long a
user is likely to require the Internet connection at a particular location. It's especially
useful in education and other environments where users change frequently.
Using very short leases, DHCP can dynamically reconfigure networks
in which there are more computers than there are available IP addresses.
DHCP supports static addresses for computers containing Web servers that
need a permanent IP address.

DNS - The domain name system (DNS) is the way that Internet domain name
are located and translated into Internet Protocol (IP) addresses. A domain name
is a meaningful and easy-to-remember "handle" for an Internet address.

Driver - A workstation or server software module that provides an interface
between a network interface card and the upper-layer protocol software running
in the computer; it is designed for a specific NIC, and is installed during the
initial installation of a network-compatible client or server operating system.

DSSS (**D**irect-**S**equence **S**pread **S**pectrum) - DSSS generates a redundant bit
pattern for all transmitted data. This bit pattern is called a chip (or chipping
code). Even if one or more bits in the chip are damaged during transmission,
statistical techniques embedded in the receiver can recover the original data
without the need for retransmission. To an unintended receiver, DSSS appears
as low power wideband noise and is rejected (ignored) by most narrowband
receivers. However, to an intended receiver (i.e., another wireless LAN endpoint),
the DSSS signal is recognized as the only valid signal, and interference
is inherently rejected (ignored).

Dynamic IP Address - An IP address that is automatically assigned to a client
station in a TCP/IP network, typically by a DHCP server. Network devices that
serve multiple users, such as servers and printers, are usually assigned static IP
addresses.

Encryption - A security method that applies a specific algorithm to data in
order to alter the data's appearance and prevent other devices from reading the
information.

FHSS (**F**requency **H**opping **S**pread **S**pectrum) - FHSS continuously changes
(hops) the carrier frequency of a conventional carrier several times per second
according to a pseudo-random set of channels. Because a fixed frequency is not
used, and only the transmitter and receiver know the hop patterns, interception

of FHSS is extremely difficult.

Firmware - Code that is written onto read-only memory (ROM) or programmable read-only memory (PROM). Once firmware has been written onto the ROM or PROM, it is retained even when the device is turned off.

Gateway - A device that interconnects networks with different, incompatible communications protocols.

Hardware - Hardware is the physical aspect of computers, telecommunications, and other information technology devices. The term arose as a way to distinguish the "box" and the electronic circuitry and components of a computer from the program you put in it to make it do things. The program came to be known as the software.

IEEE - The Institute of Electrical and Electronics Engineers. The IEEE describes itself as "the world's largest technical professional society—promoting the development and application of electrotechnology and allied sciences for the benefit of humanity, the advancement of the profession, and the wellbeing of our members."
The IEEE fosters the development of standards that often become national and international standards. The organization publishes a number of journals, has many local chapters, and several large societies in special areas, such as the IEEE Computer Society.

Infrastructure Network - An infrastructure network is a group of computers or other devices, each with a wireless adapter, connected as an 802.11 wireless LAN. In infrastructure mode, the wireless devices communicate with each other and to a wired network by first going through an access point. An infrastructure wireless network connected to a wired network is referred to as a Basic Service Set (BSS). A set of two or more BSS in a single network is referred to as an Extended Service Set (ESS). Infrastructure mode is useful at a corporation scale, or when it is necessary to connect the wired and wireless networks.

IP (**I**nternet **P**rotocol) - The method or protocol by which data is sent from one computer to another on the Internet. It is a standard set of rules, procedures, or conventions relating to the format and timing of data transmission between two computers that they must accept and use to be able to understand each other.

IP Address - In the most widely installed level of the Internet Protocol (IP) today, an IP address is a 32-binary digit number that identifies each sender or receiver of information that is sent in packet across the Internet. When you request an HTML page or send e-mail, the Internet Protocol part of TCP/IP includes your IP address in the message (actually, in each of the packets if more

than one is required) and sends it to the IP address that is obtained by looking up the domain name in the Uniform Resource Locator you requested or in the e-mail address you're sending a note to. At the other end, the recipient can see the IP address of the Web page requester or the e-mail sender and can respond by sending another message using the IP address it received.

IPCONFIG - A utility that provides for querying, defining and managing IP addresses within a network. A commonly used utility, under Windows NT and 2000, for configuring networks with static IP addresses.

ISP - An ISP (Internet service provider) is a company that provides individuals and companies access to the Internet and other related services such as Web site building and virtual hosting.

LAN - A local area network (LAN) is a group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area (for example, within an office building).

MAC Address - The MAC (Media Access Control) address is your computer's unique hardware number.

Mbps (**M**ega**b**its **p**er **s**econd) - One million bits per second; unit of measurement for data transmission.

mIRC - mIRC runs under Windows and provides a graphical interface for logging onto IRC servers and listing, joining and leaving channels.

Motherboard - A motherboard is the physical arrangement in a computer that contains the computer's basic circuitry and components.

Network - A system that transmits any combination of voice, video and/or data between users.

Network Mask - also known as the "Subnet Mask."

NIC (**N**etwork **I**nterface **C**ard) - A board installed in a computer system, usually a PC, to provide network communication capabilities to and from that computer system. Also called an adapter.

OFDM - Developed for wireless applications, Orthogonal Frequency Division Multiplexing (OFDM) technology offers superior performance-increased data rates and more reliable transmissions-than previous technologies, such as DSSS. OFDM is a scheme in which numerous signals of different frequencies are combined to form a single signal for transmission on the medium. OFDM works by breaking one high-speed data stream into a number of lowerspeed data streams, which are then transmitted in parallel. Each lower speed stream is used to modulate a subcarrier. Essentially, this creates a multi-carrier transmission by dividing a wide frequency band or channel into a number of

narrower frequency bands or sub-channels. OFDM is also used for other applications, including powerline networking.

Passphrase - Used much like a password, a passphrase simplifies the WEP encryption process by automatically generating the WEP encryption keys for Linksys products.

PCI (**P**eripheral **C**omponent **I**nterconnect) - A peripheral bus commonly used in PCs, Macintoshes and workstations. It was designed primarily by Intel and first appeared on PCs in late 1993. PCI provides a high-speed data path between the CPU and peripheral devices (video, disk, network, etc.). There are typically three or four PCI slots on the motherboard. In a Pentium PC, there is generally a mix of PCI and ISA slots or PCI and EISA slots. Early on, the PCI bus was known as a "local bus."

PCI provides "plug and play" capability, automatically configuring the PCI cards at startup. When PCI is used with the ISA bus, the only thing that is generally required is to indicate in the CMOS memory which IRQs are already in use by ISA cards. PCI takes care of the rest.

PCI allows IRQs to be shared, which helps to solve the problem of limited IRQs available on a PC. For example, if there were only one IRQ left over after ISA devices were given their required IRQs, all PCI devices could share it. In a PCIonly machine, there cannot be insufficient IRQs, as all can be shared.

Plug-and-Play - The ability of a computer system to configure expansion boards and other devices automatically without requiring the user to turn off the system during installation.

Roaming - In an infrastructure mode wireless network, this refers to the ability to move out of one access point's range and into another and transparently reassociate and reauthenticate to the new access point. This reassociation and reauthentication should occur without user intervention and ideally without interruption to network connectivity. A typical scenario would be a location with multiple access points, where users can physically relocate from one area to another and easily maintain connectivity.

Spread Spectrum - Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread-spectrum signal looks

like background noise. There are two main alternatives, Direct Sequence

Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

SSID (**S**ervice **S**et **ID**entifier) - A unique name shared among all points in a

wireless network. The SSID must be identical for each point in the wireless network

and is case-sensitive.

Static IP Address - A permanent IP address that is assigned to a node in a

TCP/IP network.

Subnet Mask - The method used for splitting IP networks into a series of subgroups,

or subnets. The mask is a binary pattern that is matched up with the IP

address to turn part of the host ID address field into a field for subnets.

TCP (**T**ransmission **C**ontrol **P**rotocol) - A method (protocol) used along with

the IP (Internet Protocol) to send data in the form of message units (datagram)

between network devices over a LAN or WAN. While IP takes care of handling

the actual delivery of the data (routing), TCP takes care of keeping track of the

individual units of data (called packets) that a message is divided into for efficient

delivery over the network. TCP is known as a "connection oriented" protocol

due to requiring the receiver of a packet to return an acknowledgment of

receipt to the sender of the packet resulting in transmission control.

TCP/IP (**T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol) - The basic communication

language or set of protocols for communications over a network

(developed specifically for the Internet). TCP/IP defines a suite or group of

protocols and not only TCP and IP.

Topology - A network's topology is a logical characterization of how the

devices on the network are connected and the distances between them. The

most common network devices include hubs, switches, routers, and gateways.

Most large networks contain several levels of interconnection, the most important

of which include edge connections, backbone connections, and wide-area

connections.

USB (**U**niversal **S**erial **B**us) - A "plug-and-play" interface between a computer

and peripherals, such as digital cameras, scanners, game controllers, speakers,

keyboards, portable data storage, or printers. With USB, you can add a new

peripheral to your computer without having to add an adapter card or powering

down the computer. USB also supports hot-swapping, the addition or removal

of devices while the computer is running.

USB 1.1-compliant devices support data rates of 1.5Mbps (low-speed) and up

to 12Mbps (full-speed). USB 2.0-compliant devices are backward compatible

with earlier USB devices, and they support data rates of 1.5Mbps (low-speed),

12Mbps (full-speed), and up to 480Mbps (high-speed).

UDP (**U**ser **D**atagram **P**rotocol) - A method (protocol) used along with the IP (Internet Protocol) to send data in the form of message units (datagram) between network devices over a LAN or WAN. While IP takes care of handling the actual delivery of the data (routing), UDP takes care of keeping track of the individual units of data (called packets) that a message is divided into for efficient delivery over the network. UDP is known as a "connection-less" protocol due to NOT requiring the receiver of a packet to return an acknowledgment of receipt to the sender of the packet (as opposed to TCP).

WEP (**W**ired **E**quivalent **P**rivacy) - A data privacy mechanism based on a 64-bit shared key algorithm, as described in the IEEE 802.11b standard.

WINIPCFG - Configuration utility based on the Win32 API for querying, defining and managing IP addresses within a network. A commonly used utility under Windows 95, 98, and Me.

WLAN (**W**ireless **L**ocal **A**rea **N**etwork) - A group of computers and associated devices that communicate with each other wirelessly.

Appendix C: Specifications

Standards IEEE 802.11a, 802.11b, draft 802.11g

Interface USB Port

LEDs LINK, POWER

Transmit Power 11 dBm to 17 dBm

Modulation

802.11a and

draft 802.11g: OFDM

802.11b: CCK, DQPSK, DBPSK

Security Feature WEP

WEP Key Bits 64, 128, 152 Bits

Protocols TCP/IP

Environmental

Dimensions 3.58" x 2.8" x 0.91"

(91 mm x 71 mm x 23 mm)

Unit Weight .18 lbs. (.08 kg)

Certifications FCC,IC,CE,UL

Operating Temp. 32ºF to 104ºF (0ºC to 40ºC)

Storage Temp. 0ºF to 70ºF (-40ºC to 185ºC)

Operating Humidity 10% to 85%, Non-Condensing

Storage Humidity 5% to 90%, Non-Condensing

Appendix D: Warranty Information

BE SURE TO HAVE YOUR PROOF OF PURCHASE AND A BARCODE

FROM THE PRODUCT'S PACKAGING ON HAND WHEN CALLING.

RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF

PURCHASE.

IN NO EVENT SHALL LINKSYS' LIABILITY EXCEED THE PRICE PAID

FOR THE PRODUCT FROM DIRECT, INDIRECT, SPECIAL, INCIDENTAL,

OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE

OF THE PRODUCT, ITS ACCOMPANYING SOFTWARE, OR ITS DOCUMENTATION.

LINKSYS DOES NOT OFFER REFUNDS FOR ANY PRODUCT.

LINKSYS OFFERS CROSS SHIPMENTS, A FASTER PROCESS FOR PROCESSING

AND RECEIVING YOUR REPLACEMENT. LINKSYS PAYS

FOR UPS GROUND ONLY. ALL CUSTOMERS LOCATED OUTSIDE OF

THE UNITED STATES OF AMERICA AND CANADA SHALL BE HELD

RESPONSIBLE FOR SHIPPING AND HANDLING CHARGES. PLEASE

CALL LINKSYS FOR MORE DETAILS.

Appendix E: Contact Information

For help with the installation or operation of the Dual-Band Wireless A+G PCI

Adapter, contact Linksys Technical Support at one of the phone numbers or

Internet addresses below.

Sales Information 800-546-5797 (LINKSYS)

Technical Support 800-326-7114

RMA (Return Merchandise

Authorization) Issues www.linksys.com (or call 949-271-5461)

Fax 949-265-6655

E-mail support@linksys.com

Web http://www.linksys.com

FTP Site ftp.linksys.com

http://www.linksys.com