LINKSYS®

A Division of Cisco Systems, Inc.




Dual-Band

5GHz/2.4GHz

802.11a 802.11g

# Wireless A/G

## Game Adapter

# User Guide

WIRELESS

Model No. **WGA54AG (EU/LA/UK)**

CISCO SYSTEMS

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## This User Guide

The User Guide to the Wireless A/G Game Adapter has been designed to make understanding networking easier than ever. Look for the following items when reading this guide:



This checkmark means there is a note of interest and is something you should pay special attention to while using the Game Adapter.



This exclamation point means there is a caution or warning and is something that could damage your property or the Game Adapter.



This question mark provides you with a reminder about something you might need to do while using the Game Adapter.

In addition to these symbols, there are definitions for technical terms that are presented like this:

***word:*** *definition.*

Also, each figure (diagram, screenshot, or other image) is provided with a figure number and description, like this:

**Figure 0-1: Sample Figure Description**

Figure numbers and descriptions can also be found in the “List of Figures” section in the “Table of Contents”.

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# Chapter 1: Introduction

## Welcome

Thank you for choosing the Wireless A/G Game Adapter. With this Adapter, your wireless gaming experience will be faster and easier than ever.

How does the Game Adapter do this? Like all wireless products, the Game Adapter allows for greater range and mobility within your wireless network, whether it's using the Wireless-A (802.11a), Wireless-G (802.11g), or Wireless-B (802.11b) standard. Using this Adapter, your game console has the flexibility to communicate using any of the three wireless networking standards.

But what does all of this mean?

Networks are useful tools for sharing computer resources. You can access one printer from different computers and access data located on another computer's hard drive. Networks are even used for playing multiplayer video games. This is exactly what the Game Adapter is designed for—gaming over a wireless network. So, networks are not only useful in homes and offices, they can also be fun.

PCs and game consoles equipped with wireless cards or adapters can communicate without cumbersome cables. By sharing the same wireless settings, within their transmission radius, they form a wireless network.

In most cases, you can use the "Fast Setup" chapter to quickly install the Game Adapter. If you need to configure the Game Adapter's settings, run the included Setup Wizard, which will walk you through its configuration, step by step. Use the instructions in this Guide to help you connect and set up the Game Adapter for your PlayStation®2, GameCube™, or Xbox®.* These instructions should be all you need to get the most out of the Game Adapter.

*Your game console may require a network adapter that is sold separately.

***network:*** *a series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users.*

***adapter:*** *a device that adds network functionality to your PC.*

***802.11a:*** *an IEEE wireless networking standard that specifies a maximum data transfer rate of 54Mbps and an operating frequency of 5GHz.*

***802.11g:*** *an IEEE wireless networking standard that specifies a maximum data transfer rate of 54Mbps and an operating frequency of 2.4GHz.*

***802.11b:*** *an IEEE wireless networking standard that specifies a maximum data transfer rate of 11Mbps and an operating frequency of 2.4GHz.*

## What's in this Guide?

This user guide covers the steps for setting up and using the Wireless A/G Game Adapter.

- Chapter 1: Introduction
  This chapter describes the Game Adapter's applications and this User Guide.
- Chapter 2: Planning Your Wireless Network
  This chapter discusses a few of the basics about wireless networking.
- Chapter 3: Getting to Know the Wireless A/G Game Adapter
  This chapter describes the physical features of the Game Adapter.
- Chapter 4: Fast Setup
  If your wireless network uses no wireless security and has SSID broadcast enabled, then use this chapter to quickly install the Game Adapter.
- Chapter 5: Setting up the Wireless A/G Game Adapter for PlayStation®2 or GameCube™
  This chapter instructs you on how to connect and set up the Game Adapter for your PlayStation2 or GameCube.
- Chapter 6: Setting up the Wireless A/G Game Adapter for Xbox®
  This chapter instructs you on how to connect and set up the Game Adapter for your Xbox.
- Chapter 7: Using the Wireless A/G Game Adapter Web Configuration Utility
  This chapter explains how to use the Game Adapter's Utility to make configuration changes.
- Appendix A: Troubleshooting
  This appendix describes some potential problems and solutions, as well as frequently asked questions, regarding installation and use of the Game Adapter.
- Appendix B: Wireless Security
  This appendix discusses security issues regarding wireless networking and measures you can take to help protect your wireless network.
- Appendix C: Windows Help
  This appendix describes how you can use Windows Help for instructions about networking, such as installing the TCP/IP protocol.
- Appendix D: Glossary
  This appendix gives a brief glossary of terms frequently used in networking.

***ssid*** *(service set identifier): your wireless network's name.*

- Appendix E: Specifications
  This appendix provides the Game Adapter's technical specifications.

- Appendix F: Warranty Information
  This appendix supplies the Game Adapter's warranty information.

- Appendix G: Regulatory Information
  This appendix supplies the Game Adapter's regulatory information.

- Appendix H: Contact Information
  This appendix provides contact information for a variety of Linksys resources, including Technical Support.

# Chapter 2: Planning Your Wireless Network

## Network Topology

A wireless network is a group of computers, each equipped with one wireless adapter. Computers in a wireless network must be configured to share the same radio channel. Several PCs equipped with wireless cards or adapters can communicate with one another to form an ad-hoc network.

Linksys wireless adapters also provide users access to a wired network when using an access point or wireless router. An integrated wireless and wired network is called an infrastructure network. Each wireless PC in an infrastructure network can talk to any computer in a wired network infrastructure via the access point or wireless router.

An infrastructure configuration extends the accessibility of a wireless PC to a wired network, and can double the effective wireless transmission range for two wireless adapter PCs. Since an access point is able to forward data within a network, the effective transmission range in an infrastructure network can be doubled.

## Roaming

Infrastructure mode also supports roaming capabilities for mobile users. Roaming means that you can move your wireless PC within your network and the access points will pick up the wireless PC's signal, provided that they both share the same channel and SSID.

Choose a feasible radio channel and optimum access point position. Proper access point positioning combined with a clear radio signal will greatly enhance performance.

## Network Layout

Wireless A/G products offer the most flexibility, because they can connect to 802.11a networks, or they can connect to networks with 802.11g and/or 802.11b devices—depending on the settings you configure on the dual-band products.

The Wireless A/G Game Adapter is compatible with all 802.11a, 802.11b, and 802.11g routers, as well as access points. It will also communicate with other wireless notebook adapters for your laptop computers, wireless PCI adapters for your desktop PCs, and wireless USB adapters when you want to enjoy USB connectivity. Wireless products will also communicate with wireless print servers.

***topology**: the physical layout of a network.*

***network**: a series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users*

***adapter**: a device that adds network functionality to your PC*

***ad-hoc**: a group of wireless devices communicating directly with each other (peer-to-peer) without the use of an access point.*

***access point**: a device that allows wireless-equipped computers and other devices to communicate with a wired network. Also used to expand the range of a wireless network*

***infrastructure**: a wireless network that is bridged to a wired network via an access point.*

***roaming**: the ability to take a wireless device from one access point's range to another without losing the connection.*

***ssid**: your wireless network's name.*

When you wish to connect your wired network with your wireless network, network ports on access points and wireless routers can be connected to any of Linksys's switches or routers.

With these, and many other, Linksys products, your networking options are limitless. Go to the Linksys website at *www.linksys.com/international* for more information about products that work with the Wireless A/G Game Adapter.

# Chapter 3: Getting to Know the Wireless A/G Game Adapter

## The Game Adapter's LED Indicators

The Game Adapter's LEDs indicate the status of its power and connections.

**Power** *Green*. The **Power** LED lights up when the Game Adapter is powered on.

**Ethernet** *Green*. The **Ethernet** LED lights up when the Game Adapter has an active wired connection. It will flash when data is transmitted or received.

**Wireless** *Green*. The **Wireless** LED lights up when the Game Adapter has an active wireless connection. It will flash when data is transmitted or received.




**Figure 3-1: LED Indicators**

## The Game Adapter's Side Panel

The Game Adapter's mode switch, Reset button, and ports are located on the side panel of the Game Adapter.

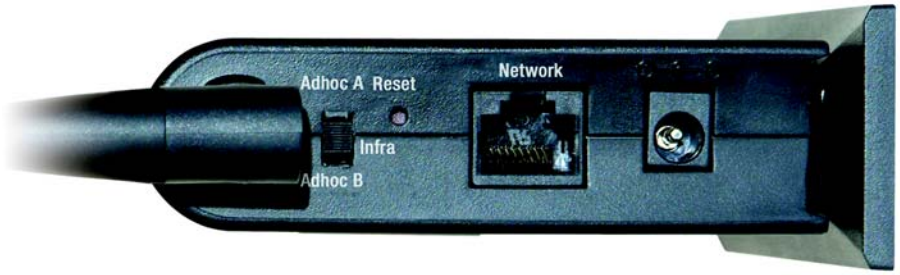



**Figure 3-2: Side Panel**

**Switch** The switch is used to set the Game Adapter's mode. If you will run the Setup Wizard or connect the Game Adapter directly to your Xbox, then set the switch to the **Infra** position. If you will follow the "Fast Setup" instructions, then set the switch to the **Adhoc A** position for Wireless-A (5GHz, 802.11a) networking, or set the switch to the **Adhoc B** position for Wireless-G (2.4GHz, 802.11g) or Wireless-B (2.4GHz, 802.11b) networking.

**Reset** The **Reset** button is used to reset the Game Adapter to its factory default settings. To restore the factory defaults, press this button for approximately five seconds.

**Network** The **Network** port is where you will connect the Ethernet network cable to your computer for setup or your game console for gaming.

**Power** The **Power** port is where you will connect the included power adapter.

# Chapter 4: Fast Setup for the Wireless A/G Game Adapter

## Overview

The Fast Setup directions are provided for any gamer playing over a wireless network with WEP encryption disabled and SSID broadcast enabled. If you need to change the Game Adapter's settings to match those of your wireless network, proceed to "Chapter 5: Setting up the Wireless A/G Game Adapter for PlayStation®2 or GameCube™." If you are connecting the Game Adapter directly to your Xbox, proceed to "Chapter 6: Setting up the Wireless A/G Game Adapter for Xbox®."

## Instructions

1. If the Game Adapter will be used for head-to-head play over a 5GHz, 802.11a network, move the back panel switch to the Adhoc A position.

   If the Game Adapter will be used for head-to-head play over a 2.4GHz, 802.11g and/or 802.11b network, move the back panel switch to the Adhoc B position.

   If the Game Adapter will be used for Internet play, move the back panel switch to the Infra position.

2. Plug the included Ethernet network cable into the Game Adapter's Network port.

3. Make sure your game console is powered off. Then plug the other end of the Ethernet network cable into the Ethernet network port of your game console.

4. Plug the included power adapter into the Game Adapter's Power port.

   Then plug the other end into an electrical outlet, preferably a surge protector.

5. Power on your game console, and set it for multiplayer gaming.

**Congratulations! The installation of the Wireless A/G Game Adapter is complete.**

***encryption:*** *encoding data transmitted in a network.*

***wep*** *(wired equivalent privacy): a method of encrypting network data transmitted on a wireless network for greater security.*

***ssid*** *(service set identifier): your wireless network's name.*

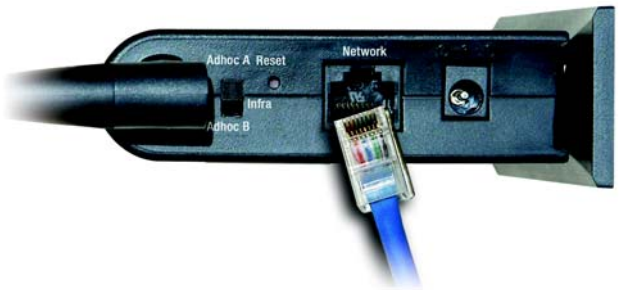



**Figure 4-1: Connect the Ethernet Network Cable**




**Figure 4-2: Connect the Power**

# Chapter 5: Setting up the Wireless A/G Game Adapter for PlayStation®2 or GameCube™

## Overview

This chapter provides instructions on how to connect the Game Adapter to your computer and then set up the Game Adapter for the kind of gaming you do. If you are connecting the Game Adapter directly to your Xbox, proceed to "Chapter 6: Setting up the Wireless A/G Game Adapter for Xbox®."

## Connecting the Game Adapter to Your Computer

1. Plug the included Ethernet network cable into the Game Adapter's Network port.

   Then plug the other end into the Ethernet network port of your router or computer.

   **NOTE:** For best results, plug the Game Adapter into a router for setup.

2. Plug the included power adapter into the Game Adapter's Power port.

   Then plug the other end into an electrical outlet, preferably a surge protector.

**Proceed to the next section, "Starting the Setup Wizard."**

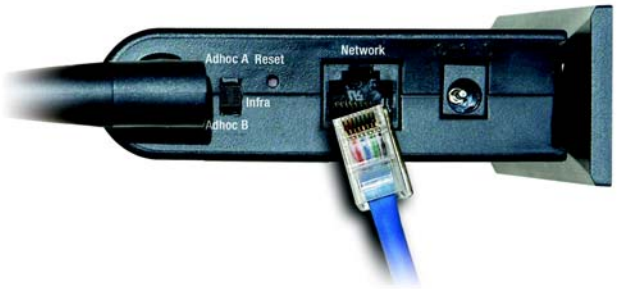



**Figure 5-1: Connect the Ethernet Network Cable**

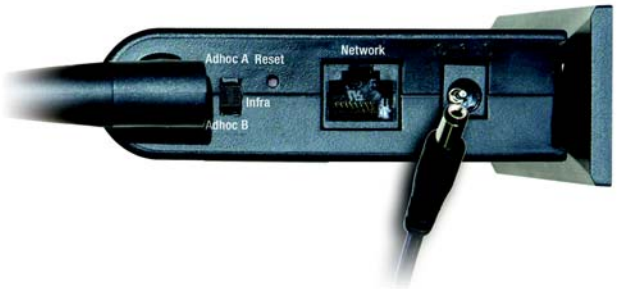



**Figure 5-2: Connect the Power**

## Starting the Setup Wizard

Insert the **Setup Wizard CD-ROM** into your CD-ROM drive. The Setup Wizard should run automatically, and the *Welcome* screen should appear. 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).

On the *Welcome* screen, you have the following choices:

**Click Here to Start** - Click the **Click Here to Start** button to begin the software installation process.

**Setup** - You can also click the **Setup** button to begin the software installation process.

**User Guide** - Click the **User Guide** button to open the PDF file of this User Guide.

**Exit** - Click the **Exit** button to exit the Setup Wizard.

1. To install the Game Adapter, click the **Click Here to Start** button on the *Welcome* screen.

   The Setup Wizard will search for the Game Adapter. If it cannot find it, you will be asked to check the Game Adapter's physical connections. Check the cable connections and click **Continue**. The Setup Wizard will resume its search.




**Figure 5-3: Setup Wizard's Welcome Screen**

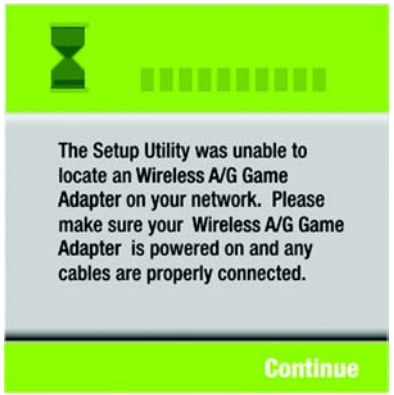



**Figure 5-4: Searching for the Game Adapter Screen**

2. When the Game Adapter has been located, enter its default password, **admin**. Then click **Enter**.

Follow the instructions in the appropriate section for your setup:

"Easy Setup Wizard Configuration for Head-to-Head Play" - a simple procedure to follow when you want to verify that the settings are correct

""Advanced Setup Wizard Configuration for Head-to-Head Play" - a procedure that lets you modify the Game Adapter's settings for head-to-head play

"Setup Wizard Configuration for Internet Play" - a procedure for configuring the Game Adapter to play games over a broadband Internet connection

After you have completed the appropriate instructions, refer to the instructions in the section, "Connecting the Game Adapter to Your Game Console."




**Figure 5-5: Setup Wizard's Password Screen**

## Easy Setup Wizard Configuration for Head-to-Head Play

Use these Easy Setup instructions when you want to verify that the Game Adapter's settings are correct.

1. Select the **Head to Head (Console to Console)** radio button. Then click the **Next** button.

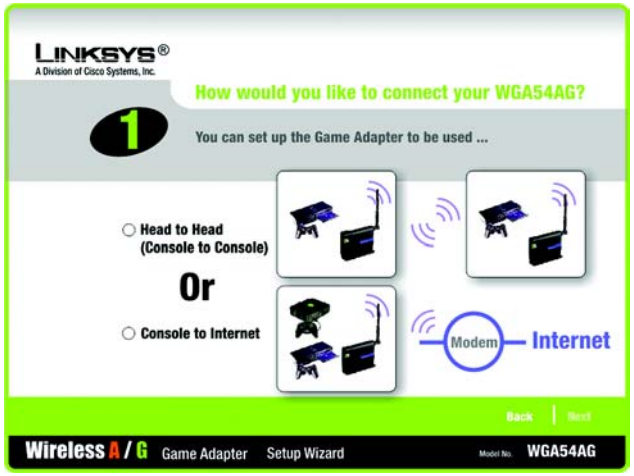



**Figure 5-6: Setup Wizard's Gaming Mode Screen**

2. Select one of the *Easy* settings. When setting up the first Game Adapter, click the **Adapter 1** radio button. When setting up the second Game Adapter, click the **Adapter 2** radio button. When Adapter 2 is selected, the Game Adapter's IP address will automatically change, so it won't conflict with the IP address of Adapter 1.

   Then click the **Next** button.




**Figure 5-7: Setup Wizard's Head to Head Setup Screen**

3. On the *Confirmation* screen, verify that the Game Adapter's settings are correct. Then click the **Yes** button to save these settings.

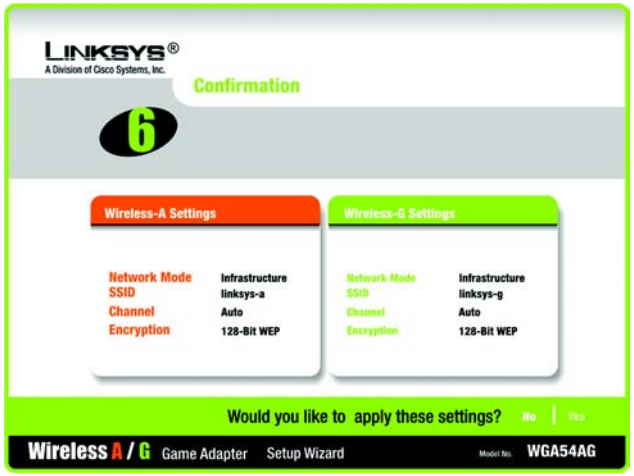



**Figure 5-8: Setup Wizard's Confirmation Screen**

4. Now that the settings have been confirmed, click the **Online Registration** button to register the Game Adapter, or click the **Exit** button to close the Setup Wizard.

**Proceed to the section, "Connecting the Game Adapter to Your Game Console."**




**Figure 5-9: Setup Wizard's Congratulations Screen**

## Advanced Setup Wizard Configuration for Head-to-Head Play

Use these Advanced Setup instructions to modify the Game Adapter's settings for head-to-head play.

1. Select the **Head to Head (Console to Console)** radio button. Then click the **Next** button.

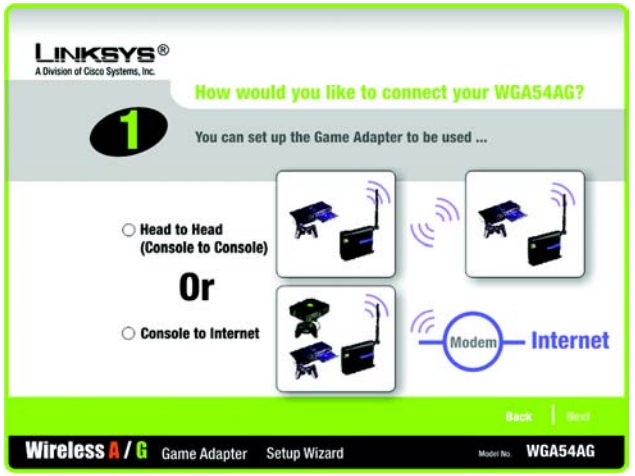



**Figure 5-10: Setup Wizard's Gaming Mode Screen**

2. Click the **Advanced | Manual Configuration** radio button. Then click the **Next** button.




**Figure 5-11: Setup Wizard's Head to Head Setup Screen**

3. In the *SSID* field, enter the SSID or network name for your Wireless-A (5GHz, 802.11a) network.



**NOTE:** An SSID is the network name shared by all devices in a wireless network. Your network's SSID should be unique to your network and identical for all devices within the network.

Select the correct operating channel for your wireless network. The channel you choose should match the channel set on the other devices in your wireless network.

Click the **Next** button.

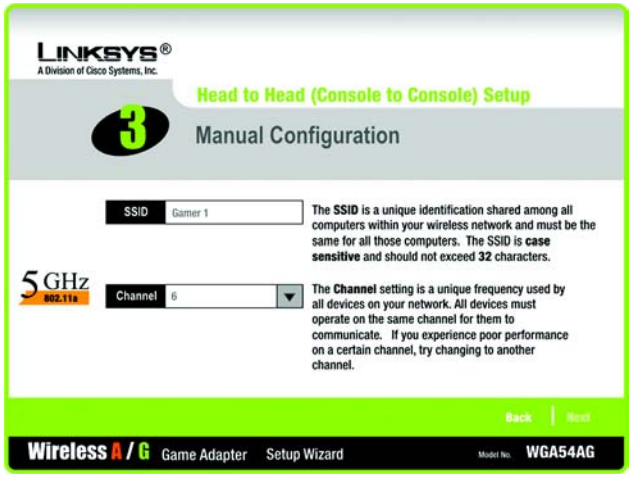



**Figure 5-12: Setup Wizard's 5GHz Manual Configuration Screen**

4. On the *Security Settings* screen for your Wireless-A network, select **64-bit** or **128-bit** encryption from the drop-down menu. Then enter a passphrase or WEP key. Click the **Next** button.

   If you don't want to use encryption, select **Disabled** and then click the **Next** button.

   **Passphrase** - Enter a passphrase in the *Passphrase* field, so a WEP key is automatically generated. The passphrase is case-sensitive and should not have more than 16 alphanumeric characters. It must match the passphrase of your other wireless network devices and is compatible with Linksys wireless products only. (If you have any non-Linksys wireless products, enter the WEP key manually on those products.)

   **WEP Key** - The WEP key you enter must match the WEP key of your wireless network. For 64-bit encryption, enter exactly 10 hexadecimal characters. For 128-bit encryption, enter exactly 26 hexadecimal characters. Valid hexadecimal characters are "0" to "9" and "A" to "F".

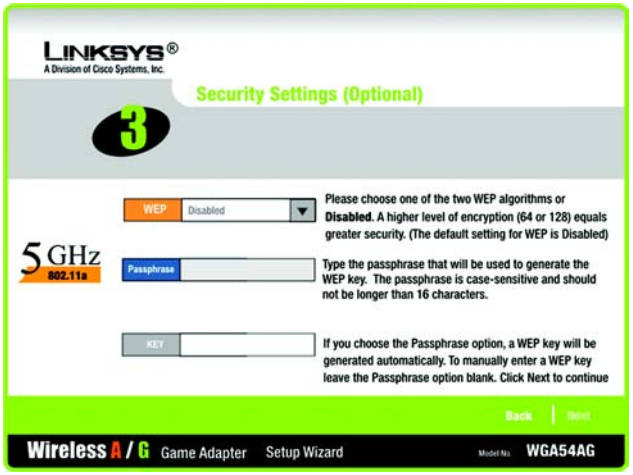



**Figure 5-13: Setup Wizard's 5GHz Security Settings Screen**

***encryption:*** *encoding data transmitted in a network.*

***wep*** *(wired equivalent privacy): a method of encrypting network data transmitted on a wireless network for greater security.*

5. In the *SSID* field, enter the SSID or network name for your Wireless-G (2.4GHz, 802.11g) and/or Wireless-B (2.4GHz, 802.11b) network.

   **NOTE:** An SSID is the network name shared by all devices in a wireless network. Your network's SSID should be unique to your network and identical for all devices within the network.

   Select the correct operating channel for your wireless network. The channel you choose should match the channel set on the other devices in your wireless network.

   Click the **Next** button.

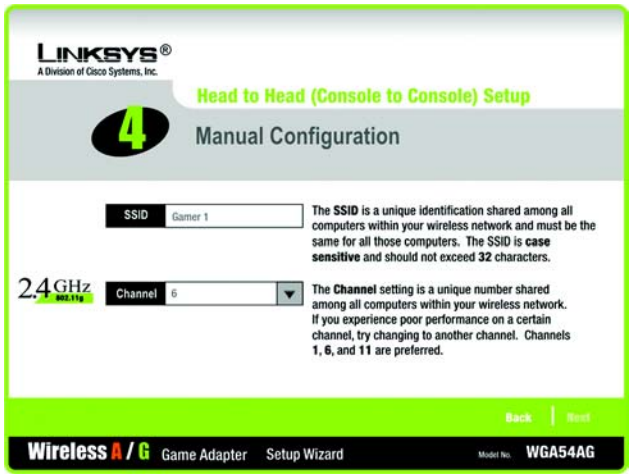



**Figure 5-14: Setup Wizard's 2.4GHz Manual Configuration Screen**

6. On the *Security Settings* screen for your Wireless-G and/or Wireless-B network, select **64-bit** or **128-bit** encryption from the drop-down menu. Then enter a passphrase or WEP key. Click the **Next** button.

   If you don't want to use encryption, select **Disabled** and then click the **Next** button.

   **Passphrase** - Enter a passphrase in the *Passphrase* field, so a WEP key is automatically generated. The passphrase is case-sensitive and should not have more than 16 alphanumeric characters. It must match the passphrase of your other wireless network devices and is compatible with Linksys wireless products only. (If you have any non-Linksys wireless products, enter the WEP key manually on those products.)

   **WEP Key** - The WEP key you enter must match the WEP key of your wireless network. For 64-bit encryption, enter exactly 10 hexadecimal characters. For 128-bit encryption, enter exactly 26 hexadecimal characters. Valid hexadecimal characters are "0" to "9" and "A" to "F".

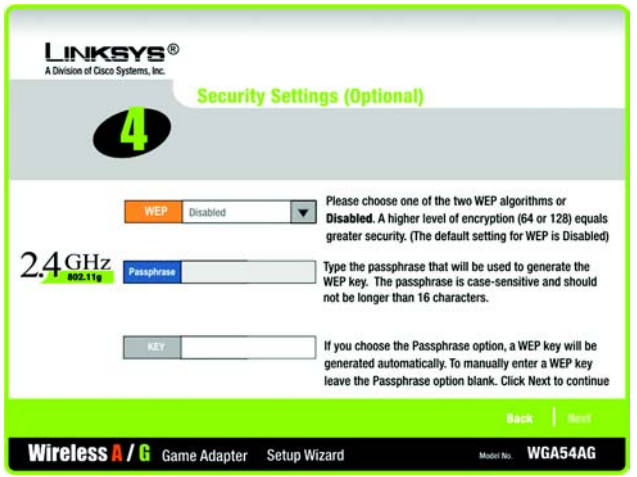



**Figure 5-15: Setup Wizard's 2.4 GHz Security Settings Screen**

7. The *Network Settings* screen will appear. Enter an IP Address, IP Mask (also known as Subnet Mask), and Gateway appropriate for your network setup. You must specify the IP Address on this screen. If you are unsure about the IP Mask and Gateway, do not change these fields. Click the **Next** button

   **IP Address** - This IP Address must be unique to your network.

   **IP Mask** - The Game Adapter's IP Mask must be the same as your wired network's IP or Subnet Mask.

   **Gateway** - Enter the IP address of your network's Gateway here.

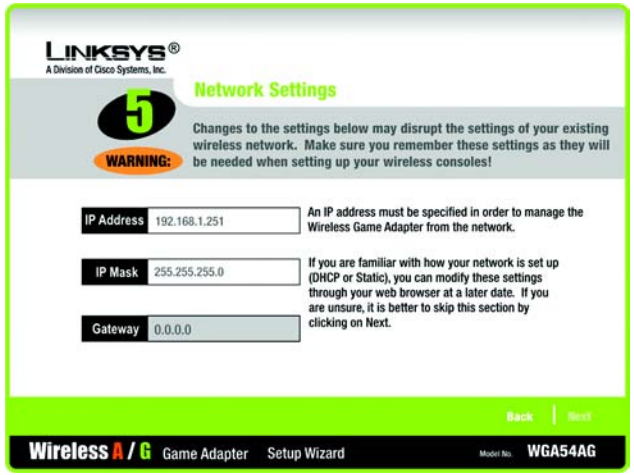



**Figure 5-16: Setup Wizard's Network Settings Screen**

***ip address**: the address used to identify a computer or device on a network*

***subnet mask**: an address code that determines the size of the network.*

***gateway**: a device that interconnects networks with different, incompatible communications protocols.*

8. On the *Confirmation* screen, verify that the Game Adapter's settings are correct. Then click the **Yes** button to save these settings.

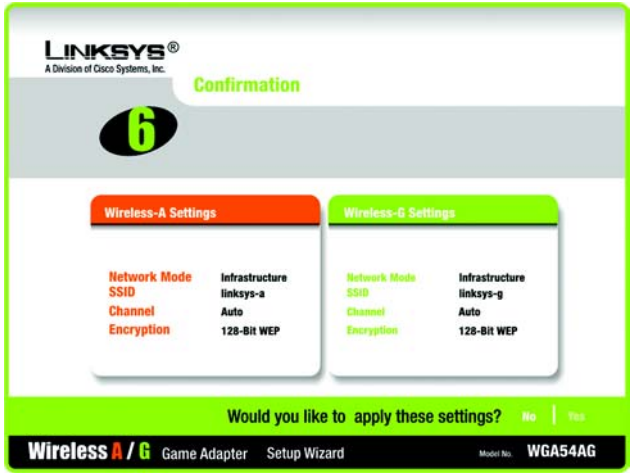



**Figure 5-17: Setup Wizard's Confirmation Screen**

9. Now that the settings have been confirmed, click the **Online Registration** button to register the Game Adapter, or click the **Exit** button to close the Setup Wizard.

**Proceed to the section, "Connecting the Game Adapter to Your Game Console."**




**Figure 5-18: Setup Wizard's Congratulations Screen**

## Setup Wizard Configuration for Internet Play

The Console to Internet Setup lets you configure the Game Adapter's settings for playing games over a broadband Internet connection.

1. Select the **Console to Internet** radio button. Then click the **Next** button.

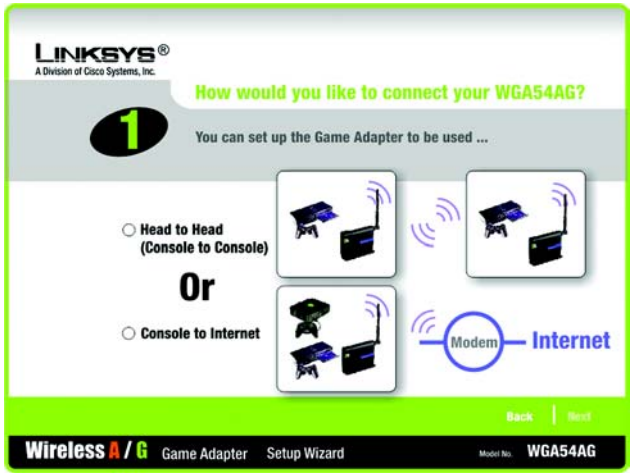



**Figure 5-19: Setup Wizard's Gaming Mode Screen**

2. In the first *SSID* field, enter the SSID or network name for your Wireless-A (5GHz, 802.11a) network. The SSID must be identical for all devices in the network.

   In the second *SSID* field, enter the SSID or network name for your Wireless-G (2.4GHz, 802.11g) and/or Wireless-G (2.4GHz, 802.11b) network.

   Click the **Next** button.



**NOTE:** An SSID is the network name shared by all devices in a wireless network. Your network's SSID should be unique to your network and identical for all devices within the network.

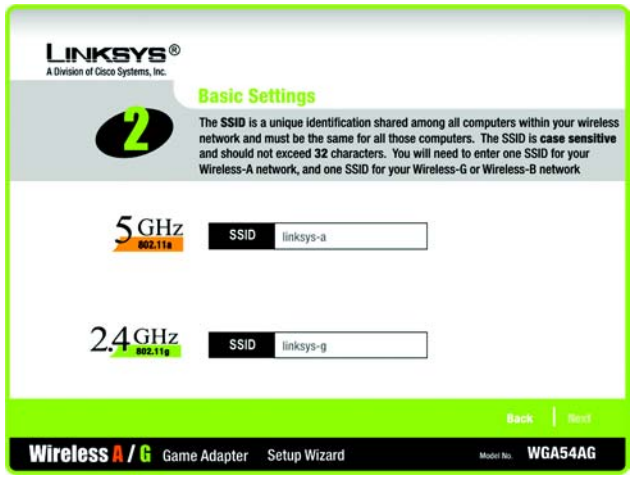



**Figure 5-20: Setup Wizard's Basic Settings Screen**

3. On the *Security Settings* screen for your Wireless-A (5GHz, 801.11a) network, select **64-bit** or **128-bit** encryption from the drop-down menu. Then enter a passphrase or WEP key. Click the **Next** button.

   If you don't want to use encryption, select **Disabled** and then click the **Next** button.

   **Passphrase** - Enter a passphrase in the *Passphrase* field, so a WEP key is automatically generated. The passphrase is case-sensitive and should not have more than 16 alphanumeric characters. It must match the passphrase of your other wireless network devices and is compatible with Linksys wireless products only. (If you have any non-Linksys wireless products, enter the WEP key manually on those products.)

   **WEP Key** - The WEP key you enter must match the WEP key of your wireless network. For 64-bit encryption, enter exactly 10 hexadecimal characters. For 128-bit encryption, enter exactly 26 hexadecimal characters. Valid hexadecimal characters are "0" to "9" and "A" to "F".

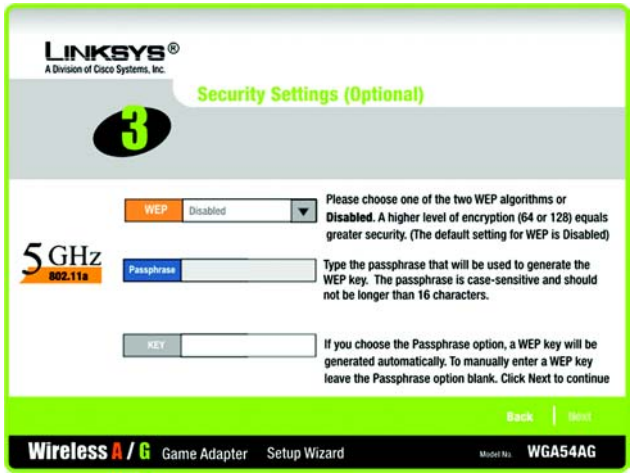



**Figure 5-21: Setup Wizard's 5GHz Security Settings Screen**

***encryption:*** *encoding data transmitted in a network.*

***wep*** *(wired equivalent privacy): a method of encrypting network data transmitted on a wireless network for greater security.*

4. On the *Security Settings* screen for your Wireless-G (2.4GHz, 801.11g) and/or Wireless-B (2.4GHz, 802.11b) network, select **64-bit** or **128-bit** encryption from the drop-down menu. Then enter a passphrase or WEP key. Click the **Next** button.

   If you don't want to use encryption, select **Disabled** and then click the **Next** button.

   **Passphrase** - Enter a passphrase in the *Passphrase* field, so a WEP key is automatically generated. The passphrase is case-sensitive and should not have more than 16 alphanumeric characters. It must match the passphrase of your other wireless network devices and is compatible with Linksys wireless products only. (If you have any non-Linksys wireless products, enter the WEP key manually on those products.)

   **WEP Key** - The WEP key you enter must match the WEP key of your wireless network. For 64-bit encryption, enter exactly 10 hexadecimal characters. For 128-bit encryption, enter exactly 26 hexadecimal characters. Valid hexadecimal characters are "0" to "9" and "A" to "F".

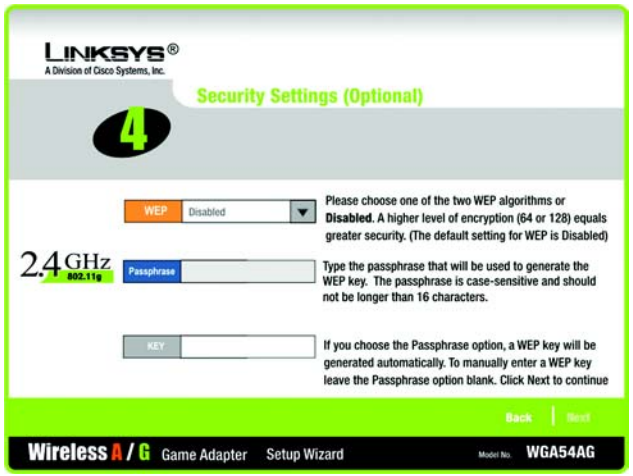



**Figure 5-22: Setup Wizard's 2.4GHz Security Settings Screen**

5. The *Network Settings* screen will appear. Enter an IP Address, IP Mask (also known as Subnet Mask), and Gateway appropriate for your network setup. You must specify the IP Address on this screen. If you are unsure about the IP Mask and Gateway, do not change these fields. Click the **Next** button

   **IP Address** - This IP Address must be unique to your network.

   **IP Mask** - The Game Adapter's IP Mask must be the same as your wired network's IP or Subnet Mask.

   **Gateway** - Enter the IP address of your network's Gateway here.

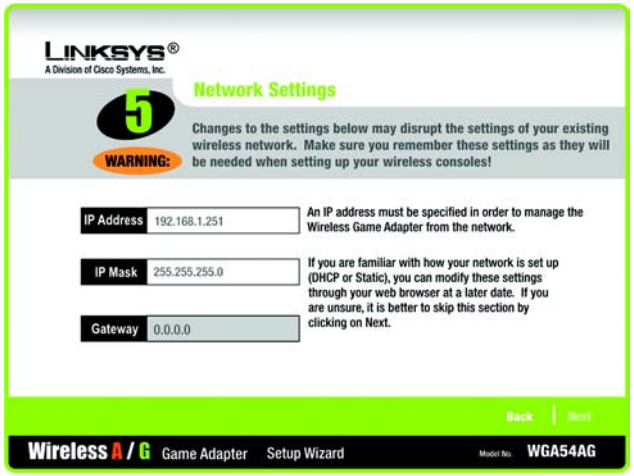



**Figure 5-23: Setup Wizard's Network Settings Screen**

***ip address****: the address used to identify a computer or device on a network*

***subnet mask****: an address code that determines the size of the network.*

***gateway****: a device that interconnects networks with different, incompatible communications protocols.*

6. On the *Confirmation* screen, verify that the Game Adapter's settings are correct. Then click the **Yes** button to save these settings.

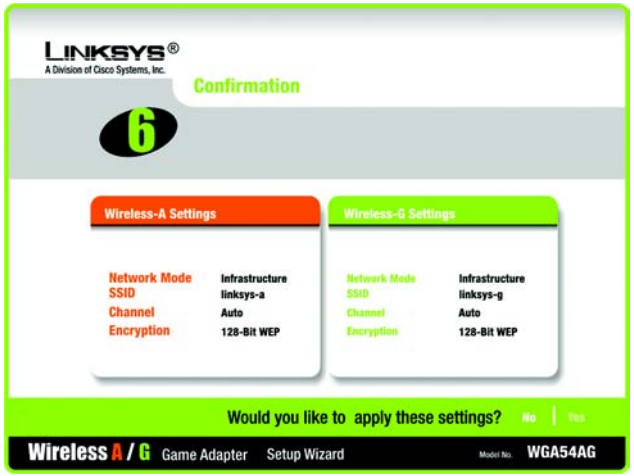



**Figure 5-24: Setup Wizard's Confirmation Screen**

7. Now that the settings have been confirmed, click the **Online Registration** button to register the Game Adapter, or click the **Exit** button to close the Setup Wizard.

**Proceed to the section, "Connecting the Game Adapter to Your Game Console."**




**Figure 5-25: Setup Wizard's Congratulations Screen**

## Connecting the Game Adapter to Your Game Console

Now that the Game Adapter is properly configured, you can connect the Game Adapter to your game console and play head-to-head or Internet gaming.

1. Unplug the Game Adapter's power adapter from the electrical outlet.
2. Unplug the Ethernet network cable from your computer.
3. Make sure your game console is powered off. Then plug the Ethernet network cable into the Ethernet network port of your game console.
4. Plug the Game Adapter's power adapter into an electrical outlet, preferably a surge protector.
5. Power on your game console, and set it for multiplayer gaming.

**Congratulations! The installation of the Wireless A/G Game Adapter is complete.**

**If you would like to make any advanced configuration changes, refer to "Chapter 7: Using the Wireless A/G Game Adapter Web-based Utility."**

# Chapter 6: Setting up the Wireless A/G Game Adapter for Xbox®

## Overview

This chapter provides instructions on how to connect and set up the Game Adapter for Xbox gaming. If you are using a different game console, refer to "Chapter 5: Setting up the Wireless A/G Game Adapter for PlayStation® or GameCube™."

## Connecting the Game Adapter to Your Xbox

1. Plug the included Ethernet network cable into the Game Adapter's Network port.
2. Make sure your Xbox is powered off and there is no game in the Xbox. Then plug the other end of the Ethernet network into the Ethernet port of your Xbox.
3. Plug the included power adapter into the Game Adapter's Power port.

   Then plug the other end into an electrical outlet, preferably a surge protector.
4. Power on your Xbox, and its main menu will appear.

**Proceed to the next section, "Setting up the Game Adapter Using Your Xbox."**

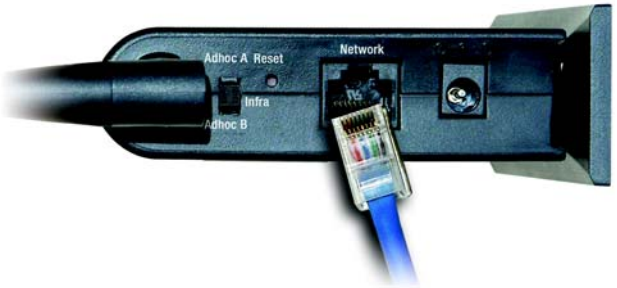



**Figure 6-1: Connect the Ethernet Network Cable**

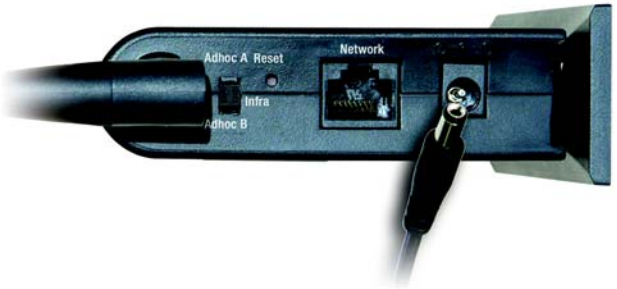



**Figure 6-2: Connect the Power**

## Setting up the Game Adapter Using Your Xbox

1. To set up the Game Adapter, select **SETTINGS** on the Xbox main menu.




**Figure 6-3: Xbox's Main Menu**

2. On the *SETTINGS* screen, select **Network Settings**.

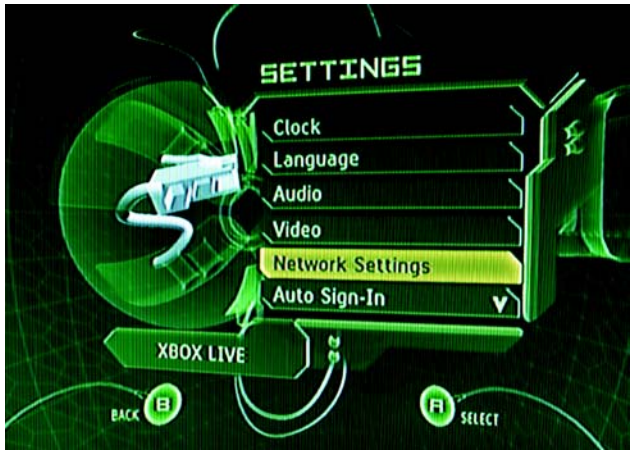



**Figure 6-4: Xbox's SETTINGS Screen**

3. On the *NETWORK SETTINGS* screen, select **ADVANCED**.

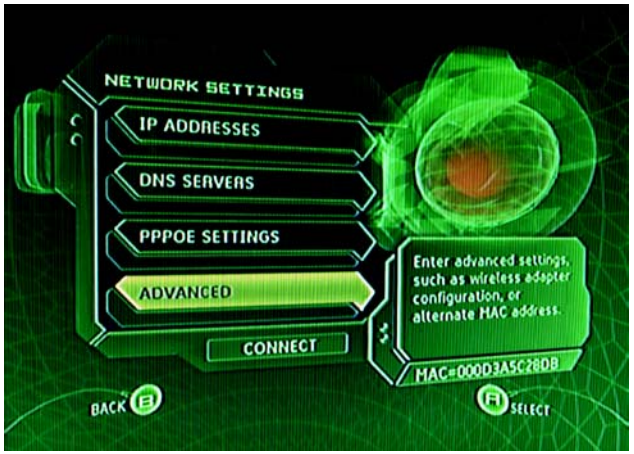



**Figure 6-5: Xbox's NETWORK SETTINGS Screen**

4. On the *ADVANCED* screen, select **WIRELESS**.

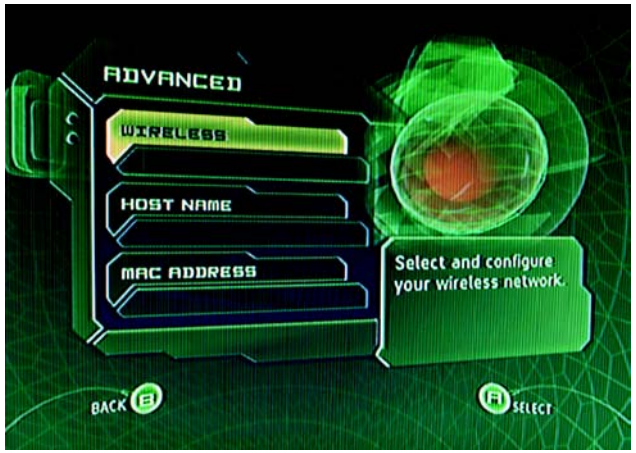



**Figure 6-6: Xbox's ADVANCED Screen**

5. On the *WIRELESS STATUS* screen, select **SETTINGS**.




**Figure 6-7: Xbox's WIRELESS STATUS Screen**

6. On the *WIRELESS SETTINGS* screen, select **NETWORK NAME**.




**Figure 6-8: Xbox's WIRELESS SETTINGS Screen**

7. On the *SELECT NETWORK* screen, select the name of the wireless network you want to use. (You may need to scroll down to see additional network names.)

   If you do not see the network you want to use, select **OTHER** and then enter the name of the wireless network you want to use. Select **DONE** to save the name of your wireless network.

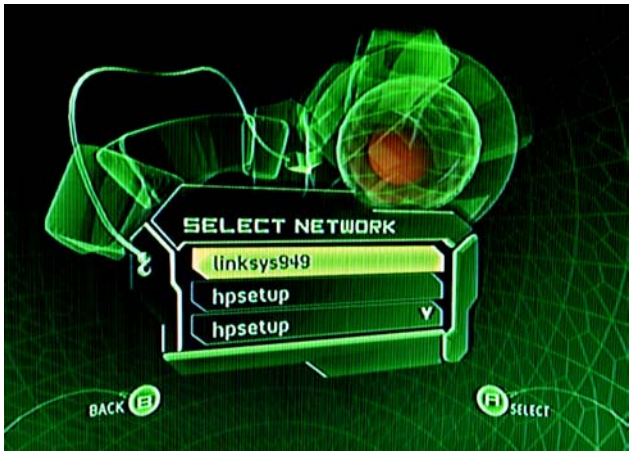



**Figure 6-9: Xbox's SELECT NETWORK Screen**

8. The Game Adapter will be automatically configured except for its security setting.

   If the wireless network uses WEP encryption, then select **SECURITY TYPE** on the *WIRELESS SETTINGS* screen.




**Figure 6-10: Xbox's WIRELESS SETTINGS Screen**

***wep*** *(wired equivalent privacy): a method of encrypting network data transmitted on a wireless network for greater security.*

***encryption:*** *encoding data transmitted in a network.*

9. On the *SECURITY TYPE* screen, select the appropriate level of WEP encryption, **64-BIT WEP** or **128-BIT WEP**.

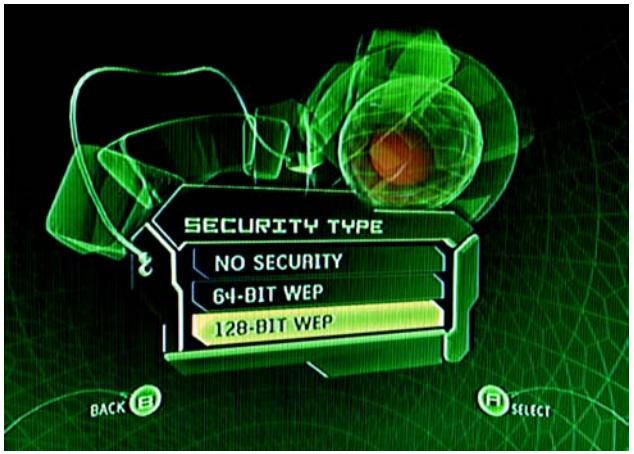



**Figure 6-11: Xbox's SECURITY TYPE Screen**

10. On the *SECURITY KEY* screen, enter the WEP key in hexadecimal characters and then select **DONE**. The WEP key you enter must match the WEP key of your wireless network. For 64-bit encryption, enter exactly 10 hexadecimal characters. For 128-bit encryption, enter exactly 26 hexadecimal characters. Valid hexadecimal characters are "0" to "9" and "A" to "F".




**Figure 6-12: Xbox's SECURITY KEY Screen**

11. On the *WIRELESS SETTINGS* screen, select **APPLY** to save your new settings.




**Figure 6-13: Xbox's WIRELESS SETTINGS Screen**

12. On the *WIRELESS STATUS* screen, click **MORE** to see additional details.

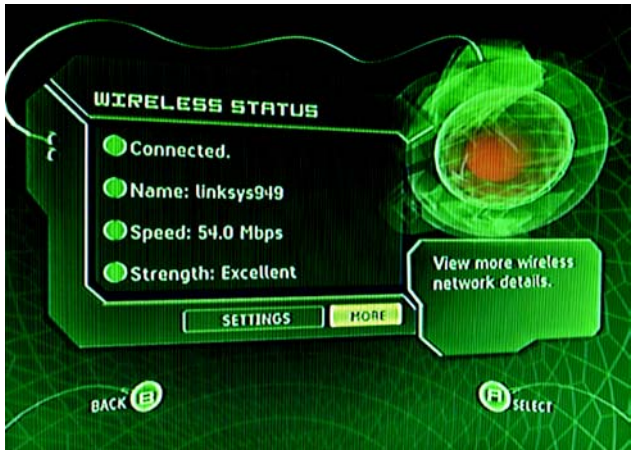



**Figure 6-14: Xbox's WIRELESS STATUS Screen**

13. After you have reviewed the network settings, click **OK** to exit this screen,

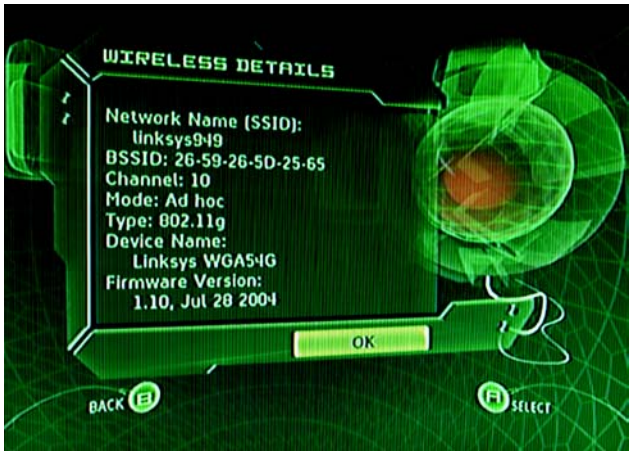



**Figure 6-15: Xbox's WIRELESS DETAILS Screen**

14. Go back to the Xbox main menu, and set your Xbox to multiplayer gaming.

**Congratulations! The installation of the Wireless A/G Game Adapter is complete.**

# Chapter 7: Using the Wireless A/G Game Adapter Web Configuration Utility

## Overview

This chapter will describe each web page of the Utility and each page's key functions. You can use the Utility to change the Game Adapter's settings. You can also restore the Game Adapter to its factory default settings, change the password used to access its Utility, and upgrade its firmware.

## Accessing the Web Configuration Utility

To access the Game Adapter's Utility, launch Internet Explorer or Netscape Navigator, and enter the Game Adapter's default IP address, **192.168.1.250**, in the *Address* field. Press the **Enter** key.

**NOTE:** If your network router automatically assigns IP addresses, then the Game Adapter's IP address may have changed. Refer to your router's documentation for instructions on how to find the Game Adapter's current IP address (you may need to view the router's DHCP client table).

A screen will appear asking you for your User Name and Password. Leave the *User Name* field blank, and enter **admin** in the *Password* field. Then click the **OK** button.

Make the necessary changes through the Utility. When you have finished making changes to a screen, click the **Apply** button to save the changes, or click the **Cancel** button to undo your changes. For help information on a tab, click **Help**.




**Figure 7-1: Utility's Enter Network Password Screen**

## The Setup Tab

The *Basic Setup* screen is the first screen you see when you access the Utility.

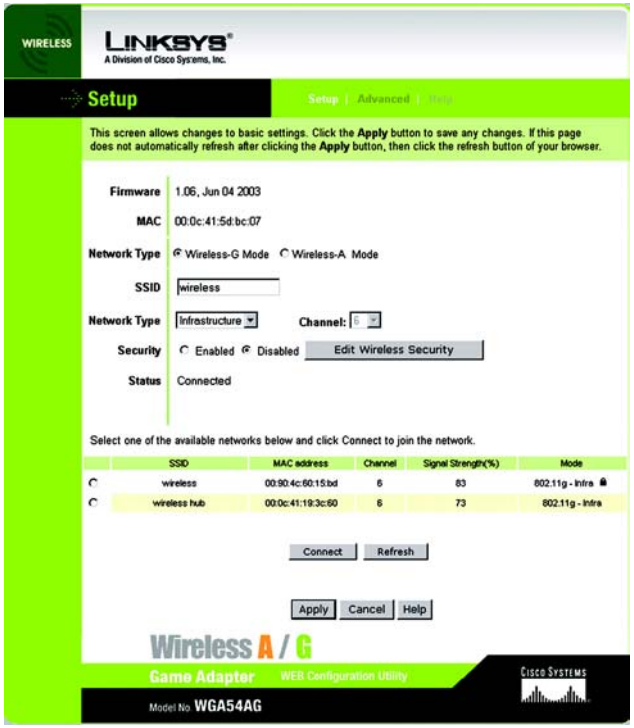



**Figure 7-2: Utility's Setup Screen**

**Firmware** - This shows the version number and date of the firmware that is currently installed.

**MAC** - The MAC address of the Game Adapter is displayed here.

**Network Type** - Select the type of network you are using, **Wireless-G Mode** (for 802.11g and/or 802.11b networking) or **Wireless-A Mode** (for 802.11a networking).

**SSID** - Enter the SSID or name of your wireless network. The SSID must be identical for all devices in the wireless network. It is case-sensitive and must not include more than 32 keyboard characters.

**Network Type** - Select the mode of your wireless network, **Infrastructure** or **Ad-Hoc**. Infrastructure mode is used when wireless and wired devices communicate using a wireless access point. Ad-Hoc mode is used when multiple wireless devices communicate directly with each other, such as when playing head-to-head games.

If you have selected Ad-Hoc for the Network Type, then select the channel of your wireless network from the *Channel* drop-down menu.

**Security** - If you do not want to use wireless security, keep the default setting, **Disabled**. If you want to use WEP encryption, select **Enabled** and click the **Edit Wireless Security** button. For instructions on how to configure the security settings, refer to the following section about the *WEP Encryption* screen.

**Status** - This indicates the status of the Game Adapter's connection to your wireless network.

A list of wireless networks is displayed at the bottom of the screen. Their SSIDs, MAC addresses, Channel settings, Signal Strength ratings, and Modes are shown.

**SSID** - This is the name of the wireless network.

**MAC Address** - This is the MAC address of the network's access point.

**Channel** - The Channel setting of the wireless network is shown here.

**Signal Strength (%)** - Displayed here is the percentage of wireless signal strength available.

**Mode** - Shown here are the wireless standard and mode used by the network. A lock is displayed if the network has its wireless security enabled.

To connect to one of these networks, select a network and then click the **Connect** button. If you want to update this list of wireless networks, click the **Refresh** button.

When you have finished making changes, click the **Apply** button to save your changes, or click the **Cancel** button to undo your changes. For help information, click **Help**.

## WEP Encryption

Use the *WEP Encryption* screen to change the Game Adapter's wireless security settings.

**Default Transmit Key** - The default transmit key number is 1. If your network's access point uses transmit key number 2, 3, or 4, select the appropriate radio button.

**WEP Encryption**- Select the level of WEP encryption, **64Bit (10 hex digits)** or **128Bit (26 hex digits)**, from the drop-down menu.

**Passphrase** - To automatically generate one or more WEP keys, enter a passphrase in the *Passphrase* field and click the **Generate** button. The passphrase is case-sensitive and should not have more than 16 alphanumeric characters. It must match the passphrase of your other wireless network devices and is compatible with Linksys wireless products only. (If you have any non-Linksys wireless products, enter the WEP key manually on those products.)

**Key 1-4** - If you want to manually enter the WEP key, enter it in the appropriate field. The WEP key you enter must match the WEP key of your wireless network. For 64-bit encryption, enter exactly 10 hexadecimal characters. For 128-bit encryption, enter exactly 26 hexadecimal characters. Valid hexadecimal characters are "0" to "9" and "A" to "F".

When you have finished making changes, click the **Apply** button to save your changes, or click the **Cancel** button to undo your changes. For help information, click **Help**.




**Figure 7-3: Utility's WEP Encryption Screen**

# The Advanced Settings Tab

Use the *Advanced Settings* screen to change the Game Adapter's advanced wireless settings, clone a MAC address onto the Game Adapter, change the password, or restore its default settings.

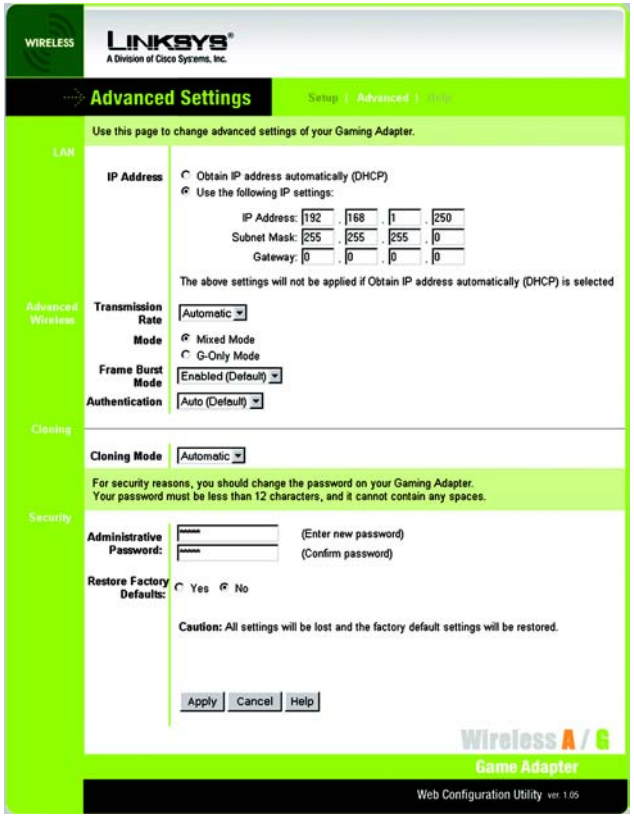



**Figure 7-4: Utility's Advanced Settings Screen**

## LAN

**IP Address** - Select **Obtain IP address automatically (DHCP)** if your network router automatically assigns IP addresses. Select **Use the following IP settings** if you want to assign a static or fixed IP address to the Game Adapter. Then enter the IP Address, Subnet Mask, and Gateway address in the fields provided.

**IP Address** - This IP Address must be unique to your network.

**Subnet Mask** - The Game Adapter's Subnet Mask must be the same as your wired network's Subnet Mask.

**Gateway** - Enter the IP address of your network's Gateway here.

## Advanced Wireless

**Transmission Rate** - The rate of data transmission should be set depending on the speed of your wireless network. You can select from a range of transmission speeds, or keep the default setting, **Automatic**, to have the Game Adapter automatically use the fastest possible data rate and enable the Auto-Fallback feature. Auto-Fallback will negotiate the best possible connection speed between the Game Adapter and your wireless router or access point.

**Mode** - This setting is available only for Wireless-G (2.4GHz, 802.11g) and/or Wireless-B (2.4GHz, 802.11b) networking. From this drop-down menu, you can select the wireless standards running on your network. If you have both Wireless-G and Wireless-B devices in your network, keep the default setting, **Mixed Mode**. If you have only Wireless-G devices in your network, select **G-Only Mode** for maximum network speeds.

**Frame Burst Mode** - Enabling this mode should improve your network's performance by reducing packet overhead, depending on which wireless products you are using. If you are not sure how to use this option, keep the default, **Enabled**. Otherwise, select **Disabled** if you do not want to use the Frame Burst Mode.

**Authentication** - The default is set to **Auto**, which allows either Open System or Shared Key authentication to be used. For Open System authentication, the sender and recipient do NOT use a WEP key for authentication. For Shared Key authentication, the sender and recipient use a WEP key for authentication. Select the authentication method your network is using, **Open System** or **Shared Key**. If you are not sure which method to select, keep the default, **Auto**.

## Cloning

**Cloning Mode** - The MAC cloning feature allows you to clone the MAC address of the device currently connected to the Game Adapter's Network port. The Game Adapter will actively scan for a new MAC address to be cloned whenever you disconnect and re-connect the Game Adapter through its Network port. The default setting, **Automatic**, enables the MAC cloning feature. To disable MAC address cloning, select **Disabled**.

## Security

**Administrative Password** - You should always change the Game Adapter's password from its factory default, **admin**. All users who try to access the Game Adapter's Utility will be prompted for the Game Adapter's password. Enter the new password in the first field, and then re-enter the password in the second field to confirm it.

**Restore Factory Defaults** - To clear all of the Game Adapter's settings and reset them to their factory defaults, click the **Yes** radio button. If you do not want to restore the factory defaults, keep the default setting, **No**.



**NOTE:** Before restoring the Game Adapter's factory defaults, write down its current settings in case you need these settings later.

When you have finished making changes, click the **Apply** button to save your changes, or click the **Cancel** button to undo your changes. For help information, click **Help**.

## The Help Tab

The *Help* screen offers links to the Linksys website, the online version of this User Guide, and the Adobe website. You can also use this screen to upgrade the Game Adapter's firmware.

**NOTE:** Firmware should be upgraded ONLY if you experience problems with the Game Adapter.

**Linksys Website** - Click this link to visit *www.linksys.com*.

**Online manual in PDF format** - Click this link to view the online version of this User Guide. It is in Adobe Acrobat Portable Document File (pdf) format, so you will need the free Adobe Acrobat Reader to view the pdf. If you do not have the Reader, click the **Adobe Website** link to download it.

**Adobe Website (to obtain a PDF reader if required)** - If you need to download the Adobe Acrobat Reader to view the pdf of the User Guide, then click this link.

**Firmware Upgrade** - Before upgrading the Game Adapter's firmware, write down its settings because they may be reset to their factory defaults when the firmware is upgraded.

To upgrade the Game Adapter's firmware, follow these instructions:

1. Download the Game Adapter's firmware upgrade zip file from *www.linksys.com/international.*
2. Extract the zip file on your computer.
3. On the *Help* screen, click the **Firmware Upgrade** button and follow the on-screen instructions.




**Figure 7-5: Utility's Help Screen**

# Appendix A: Troubleshooting

This appendix consists of two parts: "Common Problems and Solutions" and "Frequently Asked Questions." This appendix provides solutions to problems that may occur during the installation and operation of the Wireless A/G Game Adapter. Read the description below to solve your problems. If you can't find an answer here, check the Linksys website at *www.linksys.com/international.*

## Common Problems and Solutions

1. ***I cannot connect to the Game Adapter.***
   Follow these instructions:
   1. Open the Web Configuration Utility. (Refer to "Chapter 7: Using the Wireless A/G Game Adapter Web Configuration Utility" for more details.)
   2. On the *Setup* screen, make sure that the SSID is the same as the SSID of your wireless network.
   3. Click the **Edit Wireless Security** button.
   4. On the *WEP Encryption* screen, make sure that all of the WEP settings are the same as the WEP settings of your wireless network.

2. ***I don't know how to change the Game Adapter's IP address.***
   1. Open the Web Configuration Utility. (Refer to "Chapter 7: Using the Wireless A/G Game Adapter Web Configuration Utility" for more details.)
   2. On the *Advanced Settings* screen, select **Use the following IP settings**.
   3. Enter the Game Adapter's new IP address in the *IP Address* fields.
   4. Click the **Apply** button to save the new IP address.
   5. If you encounter problems, power the Game Adapter off and on again, or push the Reset button. Then try to change its IP address again.

3. ***The Setup Wizard doesn't seem to work properly.***
   Make sure that the Game Adapter's back panel switch is set the Infra position. Then run the Setup Wizard again.

4. ***I used the "Fast Setup" instructions for my two Adapters, but the multiplayer gaming doesn't work.***
   Follow these instructions:
   1. Unplug the power from both Adapters.
   2. Set the Game Adapter's back panel switch to the Adhoc A position if you are using a Wireless-A (802.11a) network, or set the switch to the Adhoc B position if you are using a Wireless-G and/or B (802.11g and/or 802.11b) network.
   3. Power on one Game Adapter.

4. Wait 30 seconds.
5. Set the second Game Adapter's back panel switch to the Adhoc A position if you are using a Wireless-A (802.11a) network, or set the switch to the Adhoc B position if you are using a Wireless-G and/or B (802.11g and/or 802.11b) network.
6. Power on the second Game Adapter.

The Game Adapter should now work properly.

## Frequently Asked Questions

***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 is the IEEE 802.11g standard?***
It is one of the IEEE standards for wireless networks. The 802.11g standard allows wireless networking hardware from different manufacturers to communicate, provided that the hardware complies with the 802.11g standard. The 802.11g standard states a maximum data transfer rate of 54Mbps and an operating frequency of 2.4GHz.

***mbps:*** *one million bits per second; a unit of measurement for data transmission.*

***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 IEEE 802.11g features are supported?***

The product supports the following IEEE 802.11g functions:

- CSMA/CA plus Acknowledge protocol
- OFDM 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.

***fragmentation:*** *breaking a packet into smaller units when transmitting over a network medium that cannot support the original size of the packet.*

***What is roaming?***
Roaming is the ability of a portable computer to communicate continuously while it and its user are moving freely throughout an area greater than that covered by a single access point. Before using the roaming function, the user must make sure that the workstation is set to the same channel number used by the access point of the dedicated coverage area.

To achieve true seamless connectivity, the wireless LAN must incorporate a number of different functions. Each node and access point, for example, must always acknowledge receipt of each message. Each node must maintain contact with the wireless network even when not actually transmitting data. Achieving these functions simultaneously requires a dynamic RF networking technology that links access points and nodes. In such a system, the user's end node undertakes a search for the best possible access to the system. First, it evaluates such factors as signal strength and quality, as well as the message load currently being carried by each access point and the distance of each access point to the wired backbone. Based on that information, the node next selects the right access point and registers its address. Communications between end node and host computer can then be transmitted up and down the backbone.

As the user moves on, the end node's RF transmitter regularly checks the system to determine whether it is in touch with the original access point or whether it should seek a new one. When a node no longer receives acknowledgment from its original access point, it undertakes a new search. Upon finding a new access point, it then re-registers, and the communication process continues.

***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.

***ism band:*** *radio bandwidth utilized in wireless transmissions.*

***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).

***spread spectrum:*** *wideband radio frequency technique used for more reliable and secure data transmission.*

***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-

***dsss:*** *Frequency transmission with a redundant bit pattern resulting in a lower probability of information being lost in transit.*

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.

***What is WEP?***

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a shared key algorithm, as described in the IEEE 802.11 standard. For more information, refer to “Appendix B: Wireless Security.”

# Appendix B: Wireless Security

Linksys wants to make wireless networking as safe and easy for you as possible. The current generation of Linksys products provide several network security features, but they require specific action on your part for implementation. So, keep the following in mind whenever you are setting up or using your wireless network.

## Security Precautions

The following is a complete list of security precautions to take (as shown in this User Guide) (at least steps 1 through 5 should be followed):

1. Change the default SSID.
2. Disable SSID Broadcast.
3. Change the default password for the Administrator account.
4. Enable MAC Address Filtering.
5. Change the SSID periodically.
6. Use the highest encryption algorithm possible. Use WPA if it is available. Please note that this may reduce your network performance.
7. Change the WEP encryption keys periodically.

To ensure network security, steps one through five should be followed, at least.



**Note:** Some of these security features are available only through the network router or access point. Refer to the router or access point's documentation for more information.

## Security Threats Facing Wireless Networks

Wireless networks are easy to find. Hackers know that in order to join a wireless network, wireless networking products first listen for "beacon messages". These messages can be easily decrypted and contain much of the network's information, such as the network's SSID (Service Set Identifier). Here are the steps you can take:

**Change the administrator's password regularly.** With every wireless networking device you use, keep in mind that network settings (SSID, WEP keys, etc.) are stored in its firmware. Your network administrator is the only person who can change network settings. If a hacker gets a hold of the administrator's password, he, too, can change those settings. So, make it harder for a hacker to get that information. Change the administrator's password regularly.

**SSID.** There are several things to keep in mind about the SSID:

1. Disable Broadcast
2. Make it unique
3. Change it often

Most wireless networking devices will give you the option of broadcasting the SSID. While this option may be more convenient, it allows anyone to log into your wireless network. This includes hackers. So, don't broadcast the SSID.

Wireless networking products come with a default SSID set by the factory. (The Linksys default SSID is "linksys".) Hackers know these defaults and can check these against your network. Change your SSID to something unique and not something related to your company or the networking products you use.

Change your SSID regularly so that any hackers who have gained access to your wireless network will have to start from the beginning in trying to break in.

**MAC Addresses.** Enable MAC Address filtering. MAC Address filtering will allow you to provide access to only those wireless nodes with certain MAC Addresses. This makes it harder for a hacker to access your network with a random MAC Address.

**WEP Encryption.** Wired Equivalent Privacy (WEP) is often looked upon as a cure-all for wireless security concerns. This is overstating WEP's ability. Again, this can only provide enough security to make a hacker's job more difficult.

There are several ways that WEP can be maximized:

1. Use the highest level of encryption possible
2. Use "Shared Key" authentication
3. Change your WEP key regularly

**WPA.** Wi-Fi Protected Access (WPA) is the newest and best available standard in Wi-Fi security. Two modes are available: Pre-Shared Key and RADIUS. Pre-Shared Key gives you a choice of two encryption methods: TKIP (Temporal Key Integrity Protocol), which utilizes a stronger encryption method and incorporates Message Integrity Code (MIC) to provide protection against hackers, and AES (Advanced Encryption System), which utilizes a symmetric 128-Bit block data encryption. RADIUS (Remote Authentication Dial-In User Service) utilizes a RADIUS server for authentication and the use of dynamic TKIP, AES, or WEP.



**Important:** Always remember that each device in your wireless network MUST use the same encryption method and encryption key or your wireless network will not function properly.

**WPA Pre-Shared Key**. If you do not have a RADIUS server, select the type of algorithm, TKIP or AES, enter a password in the Pre-Shared key field of 8-64 characters, and enter a Group Key Renewal period time between 0 and 99,999 seconds, which instructs the Router or other device how often it should change the encryption keys.

**WPA RADIUS**. WPA used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router or other device.) First, select the type of WPA algorithm, **TKIP** or **AES**. Enter the RADIUS server's IP Address and port number, along with a key shared between the device and the server. Last, enter a Group Key Renewal period, which instructs the device how often it should change the encryption keys.

**RADIUS**. WEP used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router or other device.) First, enter the RADIUS server's IP Address and port number, along with a key shared between the device and the server. Then, select a WEP key and a level of WEP encryption, and either generate a WEP key through the Passphrase or enter the WEP key manually.

Implementing encryption may have a negative impact on your network's performance, but if you are transmitting sensitive data over your network, encryption should be used.

These security recommendations should help keep your mind at ease while you are enjoying the most flexible and convenient technology Linksys has to offer.

# Appendix C: Glossary

**802.11a** - An IEEE wireless networking standard that specifies a maximum data transfer rate of 54Mbps and an operating frequency of 5GHz.

**802.11b** - An IEEE wireless networking standard that specifies a maximum data transfer rate of 11Mbps and an operating frequency of 2.4GHz.

**802.11g** - An IEEE wireless networking standard that specifies a maximum data transfer rate of 54Mbps, an operating frequency of 2.4GHz, and backward compatibility with 802.11b devices.

**Access Point** - A device that allows wireless-equipped computers and other devices to communicate with a wired network. Also used to expand the range of a wireless network.

**Adapter** - A device that adds network functionality to your PC.

**Ad-hoc** - A group of wireless devices communicating directly with each other (peer-to-peer) without the use of an access point.

**AES** (**A**dvanced **E**ncryption **S**tandard) - A method that uses up to 256-bit key encryption to secure data.

**Backbone** - The part of a network that connects most of the systems and networks together, and handles the most data.

**Bandwidth** - The transmission capacity of a given device or network.

**Beacon Interval** - Data transmitted on your wireless network that keeps the network synchronized.

**Bit** - A binary digit.

**Boot** - To start a device and cause it to start executing instructions.

**Bridge** - A device that connects different networks.

**Broadband** - An always-on, fast Internet connection.

**Browser** - An application program that provides a way to look at and interact with all the information on the World Wide Web.

**Buffer** - A shared or assigned memory area that is used to support and coordinate different computing and networking activities so one isn't held up by the other.

**Byte** - A unit of data that is usually eight bits long

**Cable Modem** - A device that connects a computer to the cable television network, which in turn connects to the Internet.

**CSMA/CA** (**C**arrier **S**ense **M**ultiple **A**ccess/**C**ollision **A**voidance) - A method of data transfer that is used to prevent data collisions.

**CTS** (**C**lear **T**o **S**end) - A signal sent by a wireless device, signifying that it is ready to receive data.

**Daisy Chain** - A method used to connect devices in a series, one after the other.

**Database** - A collection of data that is organized so that its contents can easily be accessed, managed, and updated.

**DDNS** (**D**ynamic **D**omain **N**ame **S**ystem) - Allows the hosting of a website, FTP server, or e-mail server with a fixed domain name (e.g., www.xyz.com) and a dynamic IP address.

**Default Gateway** - A device that forwards Internet traffic from your local area network.

**DHCP** (**D**ynamic **H**ost **C**onfiguration **P**rotocol) - A networking protocol that allows administrators to assign temporary IP addresses to network computers by “leasing” an IP address to a user for a limited amount of time, instead of assigning permanent IP addresses.

**DMZ** (**De**militarized **Z**one) - Removes the Router's firewall protection from one PC, allowing it to be “seen” from the Internet.

**DNS** (**D**omain **N**ame **S**erver) - The IP address of your ISP's server, which translates the names of websites into IP addresses.

**Domain** - A specific name for a network of computers.

**Download** - To receive a file transmitted over a network.

**DSL** (**D**igital **S**ubscriber **L**ine) - An always-on broadband connection over traditional phone lines.

**DSSS** (**D**irect-**S**equence **S**pread-**S**pectrum) - Frequency transmission with a redundant bit pattern resulting in a lower probability of information being lost in transit.

**DTIM** (**D**elivery **T**raffic **I**ndication **M**essage) - A message included in data packets that can increase wireless efficiency.

**Dynamic IP Address** - A temporary IP address assigned by a DHCP server.

**EAP** (**E**xtensible **A**uthentication **P**rotocol) - A general authentication protocol used to control network access. Many specific authentication methods work within this framework.

**EAP-PEAP** (**E**xtensible **A**uthentication **P**rotocol-**P**rotected **E**xtensible **A**uthentication **P**rotocol) - A mutual authentication method that uses a combination of digital certificates and another system, such as passwords.

**EAP-TLS** (**E**xtensible **A**uthentication **P**rotocol-**T**ransport **L**ayer **S**ecurity) - A mutual authentication method that uses digital certificates.

**Encryption** - Encoding data transmitted in a network.

**Ethernet** - IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium.

**Finger** - A program that tells you the name associated with an e-mail address.

**Firewall** - A set of related programs located at a network gateway server that protects the resources of a network from users from other networks.

**Firmware** - The programming code that runs a networking device.

**Fragmentation** -Breaking a packet into smaller units when transmitting over a network medium that cannot support the original size of the packet.

**FTP** (**F**ile **T**ransfer **P**rotocol) - A protocol used to transfer files over a TCP/IP network.

**Full Duplex** - The ability of a networking device to receive and transmit data simultaneously.

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

**Half Duplex** - Data transmission that can occur in two directions over a single line, but only one direction at a time.

**Hardware** - The physical aspect of computers, telecommunications, and other information technology devices.

**HTTP** (**H**yper**T**ext **T**ransport **P**rotocol) - The communications protocol used to connect to servers on the World Wide Web.

**IEEE** (The **I**nstitute of **E**lectrical and **E**lectronics **E**ngineers) - An independent institute that develops networking standards.

**Infrastructure** - A wireless network that is bridged to a wired network via an access point.

**IP** (**I**nternet **P**rotocol) - A protocol used to send data over a network.

**IP Address** - The address used to identify a computer or device on a network.

**IPCONFIG** - A Windows 2000 and XP utility that displays the IP address for a particular networking device.

**IPSec** (**I**nternet **P**rotocol **Sec**urity) - A VPN protocol used to implement secure exchange of packets at the IP layer.

**ISM band** - Radio bandwidth utilized in wireless transmissions.

**ISP** (**I**nternet **S**ervice **P**rovider) - A company that provides access to the Internet.

**LAN** - The computers and networking products that make up your local network.

**LEAP** (**L**ightweight **E**xtensible **A**uthentication **P**rotocol) - A mutual authentication method that uses a username and password system.

**MAC** (**M**edia **A**ccess **C**ontrol) **Address** - The unique address that a manufacturer assigns to each networking device.

**Mbps** (**M**ega**B**its **P**er **S**econd) - One million bits per second; a unit of measurement for data transmission.

**mIRC** - An Internet Relay Chat program that runs under Windows.

**Multicasting** - Sending data to a group of destinations at once.

**NAT** (**N**etwork **A**ddress **T**ranslation) - NAT technology translates IP addresses of a local area network to a different IP address for the Internet.

**Network** - A series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users.

**NNTP** (**N**etwork **N**ews **T**ransfer **P**rotocol) - The protocol used to connect to Usenet groups on the Internet.

**Node** - A network junction or connection point, typically a computer or work station.

**OFDM** (**O**rthogonal **F**requency **D**ivision **M**ultiplexing) - Frequency transmission that separates the data stream into a number of lower-speed data streams, which are then transmitted in parallel to prevent information from being lost in transit.

**Packet** - A unit of data sent over a network.

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

**Ping** (**P**acket **IN**ternet **G**roper) - An Internet utility used to determine whether a particular IP address is online.

**POP3** (**P**ost **O**ffice **P**rotocol **3**) - A standard mail server commonly used on the Internet.

**Port** - The connection point on a computer or networking device used for plugging in cables or adapters.

**P**ower **o**ver **E**thernet (**PoE**) - A technology enabling an Ethernet network cable to deliver both data and power.

**PPPoE** (**P**oint to **P**oint **P**rotocol **o**ver **E**thernet) - A type of broadband connection that provides authentication (username and password) in addition to data transport.

**PPTP** (**P**oint-to-**P**oint **T**unneling **P**rotocol) - A VPN protocol that allows the Point to Point Protocol (PPP) to be tunneled through an IP network. This protocol is also used as a type of broadband connection in Europe.

**Preamble** - Part of the wireless signal that synchronizes network traffic.

**RADIUS** (**R**emote **A**uthentication **D**ial-**I**n **U**ser **S**ervice) - A protocol that uses an authentication server to control network access.

**RJ-45** (**R**egistered **J**ack-**45**) - An Ethernet connector that holds up to eight wires.

**Roaming** - The ability to take a wireless device from one access point's range to another without losing the connection.

**Router** - A networking device that connects multiple networks together.

**RTS** (**R**equest **T**o **S**end) - A networking method of coordinating large packets through the RTS Threshold setting.

**Server** - Any computer whose function in a network is to provide user access to files, printing, communications, and other services.

**SMTP** (**S**imple **M**ail **T**ransfer **P**rotocol) - The standard e-mail protocol on the Internet.

**SNMP** (**S**imple **N**etwork **M**anagement **P**rotocol) - A widely used network monitoring and control protocol.

**Software** - Instructions for the computer. A series of instructions that performs a particular task is called a "program".

**SOHO** (**S**mall **O**ffice/**H**ome **O**ffice) - Market segment of professionals who work at home or in small offices.

**SPI** (**S**tateful **P**acket **I**nspection) **Firewall** - A technology that inspects every incoming packet of information before allowing it to enter the network.

**Spread Spectrum** - Wideband radio frequency technique used for more reliable and secure data transmission.

**SSID** (**S**ervice **S**et **ID**entifier) - Your wireless network's name.

**Static IP Address** - A fixed address assigned to a computer or device that is connected to a network.

**Static Routing** - Forwarding data in a network via a fixed path.

**Subnet Mask** - An address code that determines the size of the network.

**Switch** - 1. A data switch that connects computing devices to host computers, allowing a large number of devices to share a limited number of ports. 2. A device for making, breaking, or changing the connections in an electrical circuit.

**TCP** (**T**ransmission **C**ontrol **P**rotocol) - A network protocol for transmitting data that requires acknowledgement from the recipient of data sent.

**TCP/IP** (**T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol) - A set of instructions PCs use to communicate over a network.

**Telnet** - A user command and TCP/IP protocol used for accessing remote PCs.

**TFTP** (**T**rivial **F**ile **T**ransfer **P**rotocol) - A version of the TCP/IP FTP protocol that has no directory or password capability.

**Throughput** - The amount of data moved successfully from one node to another in a given time period.

**TKIP** (**T**emporal **K**ey **I**ntegrity **P**rotocol) - a wireless encryption protocol that provides dynamic encryption keys for each packet transmitted.

**Topology** - The physical layout of a network.

**TX Rate** - Transmission Rate.

**UDP** (**U**ser **D**atagram **P**rotocol) - A network protocol for transmitting data that does not require acknowledgement from the recipient of the data that is sent.

**Upgrade** - To replace existing software or firmware with a newer version.

**Upload** - To transmit a file over a network.

**URL** (**U**niform **R**esource **L**ocator) - The address of a file located on the Internet.

**VPN** (**V**irtual **P**rivate **N**etwork) - A security measure to protect data as it leaves one network and goes to another over the Internet.

**WAN** (**W**ide **A**rea **N**etwork)- The Internet.

**WEP** (**W**ired **E**quivalent **P**rivacy) - A method of encrypting network data transmitted on a wireless network for greater security.

**WINIPCFG** - A Windows 98 and Me utility that displays the IP address for a particular networking device.

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

**WPA** (**W**i-Fi **P**rotected **A**ccess) - A wireless security protocol using TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.

# Appendix D: Specifications

| | |
|---|---|
| Model | WGA54AG |
| Standards | IEEE 802.11a, 802.11b, 802.11g |
| Ports | Power, Network |
| Button/Switch | Reset, Network Mode (Infra, AdHoc-A, AdHoc-B) |
| Cabling Type | Category 5 |
| LEDs | Power, Ethernet, Wireless |
| Transmit Power | 14dBm ± 1dBm |
| Security Features | WEP |
| WEP Key Bits | 64, 128 |
| Warranty | 3 Years |
| Dimensions | 160 mm x 100 mm x 36 mm<br>(6,30" x 3,94" x 1,42") |
| Unit Weight | 0,20 kg (6,98 oz.) |
| Power | 12V 1A |
| Certifications | FCC, IC-03, CE |
| Operating Temp. | 0 ~ 40°C (32 ~ 104°F) |
| Storage Temp. | -20 ~ 70°C (-4 ~ 158°F) |

| | |
|---|---|
| Operating Humidity | 10~85% Non Condensing |
| Storage Humidity | 5~90% Non Condensing |

# Appendix E: Warranty Information

Linksys warrants to You that, for a period of three years (the "Warranty Period"), your Linksys Product will be substantially free of defects in materials and workmanship under normal use. Your exclusive remedy and Linksys' entire liability under this warranty will be for Linksys at its option to repair or replace the Product or refund Your purchase price less any rebates. This limited warranty extends only to the original purchaser.

If the Product proves defective during the Warranty Period call Linksys Technical Support in order to obtain a Return Authorization Number, if applicable. BE SURE TO HAVE YOUR PROOF OF PURCHASE ON HAND WHEN CALLING. If You are requested to return the Product, mark the Return Authorization Number clearly on the outside of the package and include a copy of your original proof of purchase. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE. You are responsible for shipping defective Products to Linksys. Linksys pays for UPS Ground shipping from Linksys back to You only. Customers located outside of the United States of America and Canada are responsible for all shipping and handling charges.

ALL IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE DURATION OF THE WARRANTY PERIOD. ALL OTHER EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF NON-INFRINGEMENT, ARE DISCLAIMED. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to You. This warranty gives You specific legal rights, and You may also have other rights which vary by jurisdiction.

This warranty does not apply if the Product (a) has been altered, except by Linksys, (b) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by Linksys, or (c) has been subjected to abnormal physical or electrical stress, misuse, negligence, or accident. In addition, due to the continual development of new techniques for intruding upon and attacking networks, Linksys does not warrant that the Product will be free of vulnerability to intrusion or attack.

TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT WILL LINKSYS BE LIABLE FOR ANY LOST DATA, REVENUE OR PROFIT, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, REGARDLESS OF THE THEORY OF LIABILITY (INCLUDING NEGLIGENCE), ARISING OUT OF OR RELATED TO THE USE OF OR INABILITY TO USE THE PRODUCT (INCLUDING ANY SOFTWARE), EVEN IF LINKSYS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT WILL LINKSYS' LIABILITY EXCEED THE AMOUNT PAID BY YOU FOR THE PRODUCT. The foregoing limitations will apply even if any warranty or remedy provided under this Agreement fails of its essential purpose. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to You.

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

Please direct all inquiries to: Linksys, P.O. Box 18558, Irvine, CA 92623.

# Appendix F: Regulatory Information

FCC STATEMENT

This product has been tested and complies with the specifications for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used 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 Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

INDUSTRY CANADA (CANADA)

This Class B digital apparatus complies with Canadian ICES-003, RSS210.
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.

EC DECLARATION OF CONFORMITY (EUROPE)

Refer to the insert for compliance information about Linksys Wireless A+G Products.

Disclaimer: This product is not intended for sale and use in all European countries.

SAFETY NOTICES

Caution: To reduce the risk of fire, use only No.26 AWG or larger telecommunication line cord.

Do not use this product near water, for example, in a wet basement or near a swimming pool.

Avoid using this product during an electrical storm.  There may be a remote risk of electric shock from lightning.

# Appendix G: Contact Information

Need to contact Linksys?
Visit us online for information on the latest products and updates to your existing products at:
http://www.linksys.com/international

If you experience problems with any Linksys product, you can e-mail us at:

| In Europe | E-mail Address |
|---|---|
| Austria | support.at@linksys.com |
| Belgium | support.be@linksys.com |
| Denmark | support.dk@linksys.com |
| France | support.fr@linksys.com |
| Germany | support.de@linksys.com |
| Italy | support.it@linksys.com |
| Netherlands | support.nl@linksys.com |
| Norway | support.no@linksys.com |
| Portugal | support.pt@linksys.com |
| Spain | support.es@linksys.com |
| Sweden | support.se@linksys.com |
| Switzerland | support.ch@linksys.com |
| United Kingdom & Ireland | support.uk@linksys.com |

| Outside of Europe | E-mail Address |
|---|---|
| Latin America | support.la@linksys.com |
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