



# Wireless-N Business Notebook Adapter

USER GUIDE

BUSINESS SERIES

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## How to Use this User Guide

This user guide has been designed to make understanding networking with the Notebook Adapter easier than ever. Look for the following items when reading this User Guide:



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



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



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

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# Chapter 1: Introduction

## Welcome

Thank you for choosing the Wireless-N Business Notebook Adapter. Setting up your network and your Wireless-N Business Notebook Adapter is easier than ever.

How does the Adapter do this? Like all wireless products, the Adapter allows for greater range and mobility within your wireless network, whether it's using the Wireless-G (802.11g) or Wireless-B (802.11b) standard. But with Wireless-N (802.11n), it has even better range and speed.

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. So, networks are not only useful in homes and offices, they can also be fun.

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

The included Setup Wizard walks you through configuring the Adapter to your wireless network settings, step by step. Use the instructions in this Guide to help you set up and connect the Adapter using the Setup Wizard. These instructions should be all you need to get the most out of the Adapter.

## What's in this User Guide?

This user guide covers the steps for setting up and using the Wireless-N Business Notebook Adapter.

- **Chapter 1: Introduction**  
This chapter describes the 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-N Business Notebook Adapter**  
This chapter describes the physical features of the Adapter.
- **Chapter 4: Setting up and Connecting the Wireless-N Business Notebook Adapter**  
This chapter instructs you on how to install and configure the Adapter.

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

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

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

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

**802.11n:** a wireless networking standard that specifies a maximum data transfer rate of 540Mbps and offers a better operating distance than 802.11a or 802.11g.

**bit:** a binary digit.

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



## Wireless-N Business Notebook Adapter

- **Chapter 5: Using the Wireless Network Monitor**  
This chapter shows you how to use the Adapter's Wireless Network Monitor.
- **Chapter 6: Administration functions in the Network Monitor**  
This chapter shows you how to use the administration features of the Adapter's Wireless Network Monitor.
- **Appendix A: Troubleshooting**  
This appendix describes some problems and solutions, as well as frequently asked questions, regarding installation and use of the Adapter.
- **Appendix B: Windows XP Zero Configuration**  
This appendix describes how to use the Windows XP Zero Configuration.
- **Appendix C: Wireless Security**  
This appendix discusses security issues regarding wireless networking and measures you can take to help protect your wireless network.
- **Appendix D: Windows Help**  
This appendix describes how you can use Windows Help for instructions about networking, such as installing the TCP/IP protocol.
- **Appendix E: Glossary**  
This appendix gives a brief glossary of terms frequently used in networking.
- **Appendix F: Specifications**  
This appendix provides the Adapter's technical specifications.
- **Appendix G: Warranty Information**  
This appendix supplies the Adapter's warranty information.
- **Appendix H: Regulatory Information**  
This appendix supplies the Adapter's regulatory information.
- **Appendix I: 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 each 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, if they both share the same channel and SSID.

Before you consider roaming, choose a feasible radio channel and optimum access point position. Proper access point positioning combined with a clear radio signal will greatly enhance performance.

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

**access point:** a device that allows wireless-equipped computers and other devices to communicate with a wired network

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

**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.

## Network Layout

Linksys wireless access points and wireless routers have been designed for use with 802.11a, 802.11b, and 802.11g products. With 802.11g products communicating with the 802.11b standard and some products incorporating both “a” and “g”, products using these standards can communicate with each other.

Access points and wireless routers are compatible with 802.11a, 802.11b and 802.11g adapters, such as the PC Cards for your laptop computers, PCI Cards for your desktop PC, and USB Adapters for when you want to enjoy USB connectivity. The wireless-N Business Notebook Adapter uses 802.11n, the latest wireless networking technology. It will be backward compatible with previous 802.11g and 802.11b equipment. Wireless products will also communicate with the wireless PrintServer.

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

With these, and many other, Linksys products, your networking options are limitless. Go to the Linksys website at [www.linksys.com](http://www.linksys.com) for more information about wireless products.

# Chapter 3: Getting to Know the Wireless-N Business Notebook Adapter

## The LED Indicators

The Network Adapter's LEDs display information about network activity.



Figure 3-1: Front Panel

**Wireless** *Blue.* The Power LED lights up when the Adapter's wireless networking is enabled.

**Activity** *Blue.* The Link LED lights up when the Adapter has an active connection.

# Chapter 4: Setting up and Connecting the Wireless-N Business Notebook Adapter

## Starting the Setup

The Wireless-N Business Notebook Adapter Setup Wizard will guide you through the installation procedure. The Setup Wizard will install the driver and Wireless Network Monitor, as well as connect and configure the Adapter.



**IMPORTANT:** Do not connect the Adapter until you are instructed to do so or the setup will not work correctly.

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.

**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 Adapter, click the **Click Here to Start** button on the *Welcome* screen.
2. After reading the License Agreement, click the **Next** button if you agree and want to continue the installation, or click the **Cancel** button to end the installation.
3. Windows will begin copying the files onto your PC.



Figure 4-1: Setup Wizard's Welcome Screen

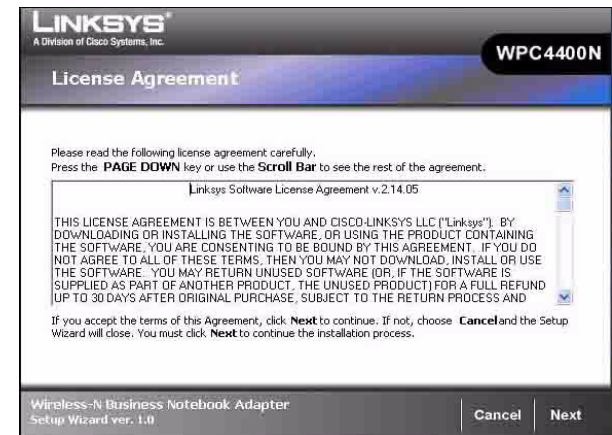


Figure 4-2: Setup Wizard's License Agreement

## Connecting the Adapter

1. Locate an available CardBus slot on your notebook PC.
2. With the connector pin end facing the CardBus slot and the label facing up, slide the Adapter into the CardBus slot until it locks in place.
3. Windows will begin copying the driver files to your computer. If Windows asks you for the original Windows CD-ROM, insert the CD-ROM, and direct Windows to its correct location (e.g., D:\).
4. Then, click **Next**.

## Setting up the Adapter

The next screen to appear will be the *Available Wireless Network* screen.

This screen provides two options for setting up the Adapter.

- **Available Wireless Network. (For most users.)** Use this option if you already have a network set up. The networks available to this Adapter will be listed on this screen. You can choose one of these networks and click the **Connect** button to connect to it. Click the **Refresh** button to update the Available Wireless Network list.
- **Manual Setup.** If your network is not listed on this screen, select **Manual Setup** to set up the adapter manually. This method of setting up the Adapter is intended for Advanced Users only.

The setup for each option is described, step by step, under the appropriate heading on the following pages.

Click **Exit** to close the Setup Wizard, if you wish to set up the Adapter later.

### Available Wireless Network

The available networks are listed in the table on the center of the screen by SSID. Select the wireless network you wish to connect to and click the **Connect** button. (If you do not see your network listed, you can click the **Refresh** button to bring the list up again.) If the network utilizes wireless security, you will need to configure security on the Adapter. If not, you will be taken directly to the *Congratulations* screen.

1. If you have wireless security enabled on your network, continue to step 2. Only *One* of these security screens will be shown. If you don't have wireless security enabled, continue to step 3.

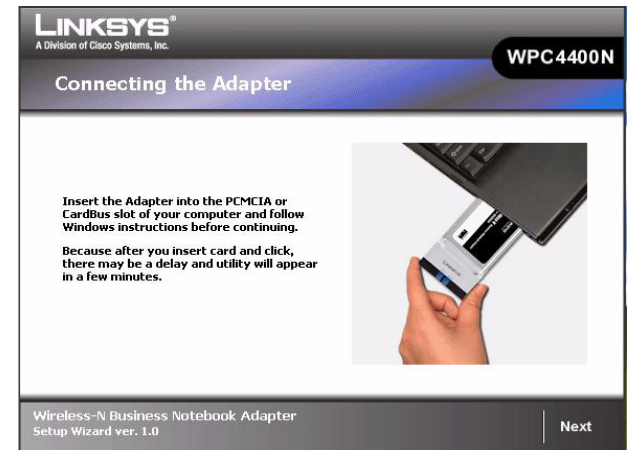


Figure 4-3: Connecting the Adapter

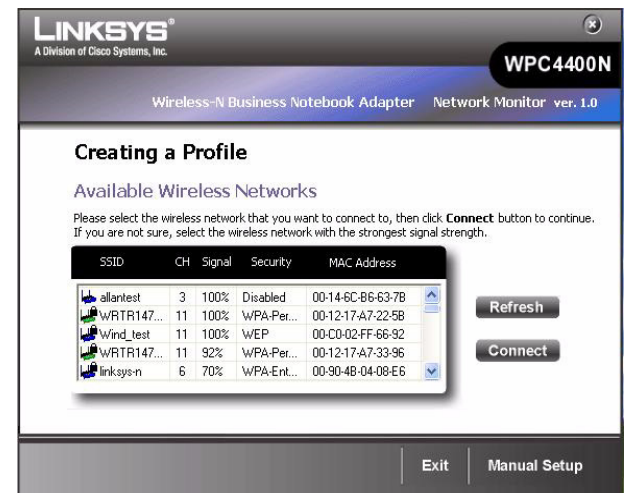


Figure 4-4: Available Wireless Network

2. **Wireless Security** If your network has WEP or WPA Personal wireless security enabled, then that security screen will appear. Continue to the screen for your wireless security.

### WEP

If your network has the wireless security WEP (Wired Equivalent Privacy), RADIUS or LEAP enabled, this screen will appear. For connecting with RADIUS or LEAP, click **Connect**, then continue to the next section “Manual Setup” on page 10.

**Security** - Select **WEP**.

**WEP** - Select **64-bit** or **128-bit**.

Then enter a passphrase or WEP key.

**Passphrase** - Enter a passphrase in the *Passphrase* field, so a WEP key is automatically generated. The passphrase is case-sensitive and should not be longer 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”.

Then click **Connect** and proceed to Step 3.

### WPA-Personal

If your network has the wireless security WPA Personal (Wi-Fi Protected Access) enabled, this screen will appear.

**Passphrase** - Enter a Passphrase, also called a Pre-shared Key, of 8-63 characters in the *Passphrase* field.

Then click **Connect** and proceed to Step 3.

If your network has the wireless security WPA2 Personal enabled, this screen will appear.

**Passphrase** - Enter a Passphrase, also called a Pre-shared Key, of 8-63 characters in the *Passphrase* field.

Then click **Connect** and proceed to Step 3.

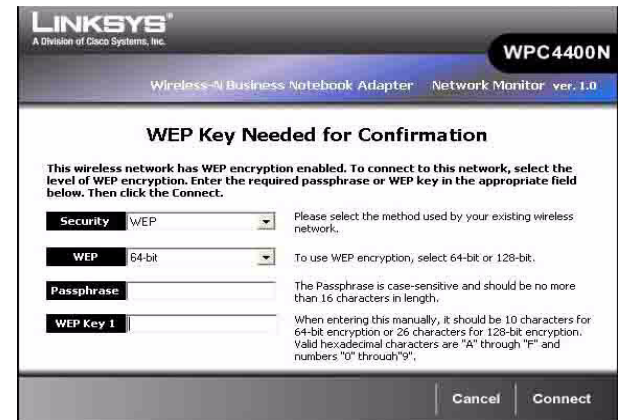


Figure 4-5: WEP Key Needed for Connection

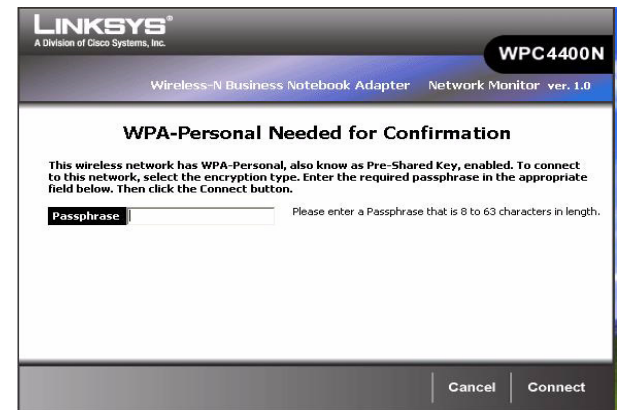


Figure 4-6: WPA - Personal Needed for Connection

## Wireless-N Business Notebook Adapter

3. After the software has been successfully installed, the *Congratulations* screen will appear. Click **Connect to Network** to connect to your network. For more information about the Wireless Network Monitor, refer to *Chapter 5: Using the Wireless Network Monitor*.

**Congratulations! The installation of the Wireless-N Business Notebook Adapter is complete.**

**To check the link information, search for available wireless networks, or make additional configuration changes, proceed to Chapter 5: Using the Wireless Network Monitor.**

**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.

**wpa** (*wi-fi protected access*): a wireless security protocol using TKIP (*Temporal Key Integrity Protocol*) encryption, which can be used in conjunction with a RADIUS server.



**Figure 4-7: Congratulations**



## Manual Setup

If your network is not listed with the available networks, you can use Manual Setup.

1. Click **Manual Setup** on the *Available Wireless Network* screen to set up the adapter manually.
2. The *Network Settings* screen from the Wireless Network Monitor will appear. If your network has a router or other DHCP server, click the radio button next to **Obtain network settings automatically (DHCP)**.

If your network does not have a DHCP server, click the radio button next to **Specify network settings**. Enter an IP Address, Subnet Mask, Default Gateway, and DNS addresses appropriate for your network. You must specify the IP Address and Subnet Mask on this screen. If you are unsure about the Default Gateway and DNS addresses, leave these fields empty.

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

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

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

**DNS 1** and **DNS 2** - Enter the DNS address of your wired Ethernet network here.

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

3. The *Wireless Mode* screen shows a choice of two wireless modes. Click the **Infrastructure Mode** radio button if you want to connect to a wireless router or access point. Click the **Ad-Hoc Mode** radio button if you want to connect to another wireless device directly without using a wireless router or access point. Enter the SSID for your network.

**Infrastructure Mode** - Use this mode if you want to connect to a wireless router or access point.

**Ad-Hoc Mode** - Use this mode if you want to connect to another wireless device directly without using a wireless router or access point.

**SSID** - This is the wireless network name that must be used for all the devices in your wireless network. It is case-sensitive and should be a unique name to help prevent others from entering your network.

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

Figure 4-8: Creating a Profile

Figure 4-9: Network Settings - Wireless Mode

- If you chose **Infrastructure Mode**, go to Step 5 now. If you chose **Ad-Hoc Mode**, the *Ad-Hoc Mode Settings* screen will appear.

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. If you are unsure about which channel to use, keep the default setting.

Click the **Next** button. Click the **Back** button to change any settings.

- If your wireless network does not have wireless security, select **Disabled** and then click the **Next** button to continue. Proceed to Step 6.

If your wireless network has wireless security, select the method of security used: **WEP**, **WPA/WPA2-Personal**, **WPA/WPA2-Enterprise**, **RADIUS**, or **LEAP**. WEP stands for Wired Equivalent Privacy, and WPA stands for Wi-Fi Protected Access. WPA uses a stronger security method than WEP and WPA2 defines an even stronger encryption, authentication, and key management than WPA. RADIUS stands for Remote Authentication Dial-In User Service. LEAP stands for Lightweight Extensible Authentication Protocol. It uses username and password-based authentication between a wireless client and a RADIUS server. Click the **Next** button to continue or the **Back** button to return to the previous screen.

Proceed to the appropriate section for your security method: WEP, WPA/WPA2-Personal, WPA/WPA2-Enterprise, RADIUS, or LEAP.

**WEP** - Select **64-bit** or **128-bit** encryption

**Passphrase** - Enter a passphrase in the *Passphrase* field, so a WEP key is automatically generated. It is case-sensitive and should not be longer than 16 alphanumeric characters. This passphrase 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".

#### Advanced Users

**TX Key** - The default transmit key number is 1. If your network's access point or wireless router uses transmit key number 2, 3, or 4, select the appropriate number from the *TX Key* drop-down box.



Figure 4-10: Ad-Hoc Mode Settings

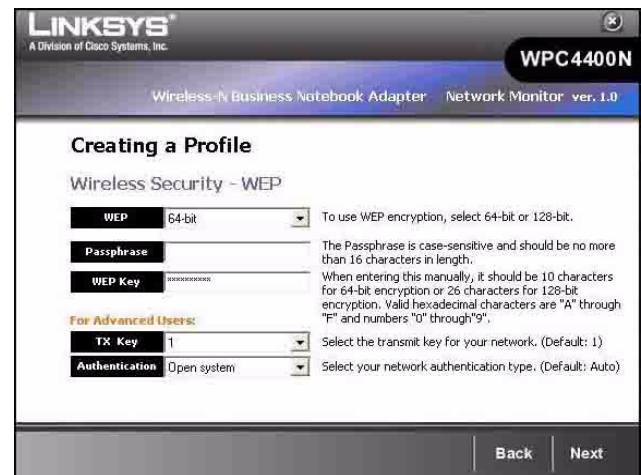


Figure 4-11: Wireless Security - WEP

## Wireless-N Business Notebook Adapter

**Authentication** -The default is set to **Auto**, so it will auto-detect for Shared Key or Open System authentication. For Shared Key authentication, both the sender and the recipient share a WEP key for authentication. For Open System authentication, the sender and the recipient do not share a WEP key for authentication. If you are not sure which authentication method to select, keep the default, **Auto**.

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

### WPA Personal

WPA Personal offers two encryption methods, TKIP and AES, with dynamic encryption keys. WPA2 only uses AES for encryption. Select **TKIP** or **AES** for encryption for WPA Personal. Then enter a Passphrase that is 8-63 characters in length.

**Encryption** - Select the type of algorithm you want to use, **TKIP** or **AES**, from the *Encryption* drop-down menu.

**Passphrase** - Enter a Passphrase, also called a Pre-shared Key, of 8-63 characters in the *Passphrase* field.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

### WPA2 Personal

Enter a Pre-shared Key that is 8-63 characters in length.

**Pre-shared Key** - Enter a Pre-shared Key of 8-63 characters in the *Pre-shared Key* field.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

**wpa2** offers a stronger encryption than wpa by using the **AES (Advanced Encryption Standard)** which is a block cipher with block sizes of 128, 192 or 256 bits.

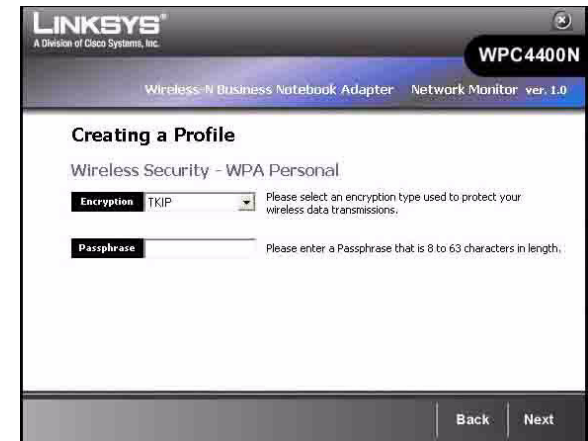
The screenshot shows the Linksys WPC4400N Network Monitor interface. At the top, it says 'LINKSYS A Division of Cisco Systems, Inc.' and 'WPC4400N'. Below that, it says 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main heading is 'Creating a Profile' and the sub-heading is 'Wireless Security - WPA Personal'. There are two fields: 'Encryption' with a dropdown menu set to 'TKIP' and a note 'Please select an encryption type used to protect your wireless data transmissions.', and 'Passphrase' with a text input field and a note 'Please enter a Passphrase that is 8 to 63 characters in length.'. At the bottom right, there are 'Back' and 'Next' buttons.

Figure 4-12: Wireless Security - WPA Personal

The screenshot shows the Linksys WPC4400N Network Monitor interface. At the top, it says 'LINKSYS A Division of Cisco Systems, Inc.' and 'WPC4400N'. Below that, it says 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main heading is 'Creating a Profile' and the sub-heading is 'Wireless Security - WPA2 Personal'. There is one field: 'Passphrase' with a text input field and a note 'Please enter a Passphrase that is 8 to 63 characters in length.'. At the bottom right, there are 'Back' and 'Next' buttons.

Figure 4-13: Wireless Security - WPA2 Personal

## WPA Enterprise

WPA Enterprise features WPA security used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) WPA Enterprise offers two authentication methods, EAP-TLS and PEAP, as well as two encryption methods, TKIP and AES, with dynamic encryption keys. WPA2 Enterprise offers two authentication methods, EAP-TLS and PEAP, but only AES encryption method can be used.

**Authentication** - Select the authentication method your network is using, **EAP-TLS** or **PEAP**.

### EAP-TLS

If you selected EAP-TLS, enter the login name of your wireless network in the *Login Name* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network. Select the type of encryption, **TKIP** or **AES**, from the *Encryption* drop-down menu.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

### PEAP

If you selected PEAP, enter the login name of your wireless network in the *Login Name* field. Enter the password of your wireless network in the *Password* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network; if you want to use any certificate, keep the default setting, **Trust Any**. Then select the authentication method used inside the PEAP tunnel. Select the type of encryption, **TKIP** or **AES**, from the *Encryption* drop-down menu.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

The screenshot shows the 'Creating a Profile' screen for 'Wireless Security - WPA Enterprise'. The interface includes the Linksys logo and 'WPC4400N' model number. The title bar reads 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main content area has the following fields and instructions:

- Authentication:** EAP-TLS (selected). Instruction: Please select the authentication method that you use to access your network.
- Login Name:** (empty). Instruction: Enter the Login Name used for authentication.
- Server Name:** (empty). Instruction: Enter the Server Name used for authentication. (Optional)
- Certificate:** (empty). Instruction: Please select the certificate used for authentication.
- Encryption:** AES (selected). Instruction: Please select the encryption type used to protect the wireless data transmissions.

At the bottom right, there are 'Back' and 'Next' buttons.

Figure 4-14: Wireless Security - WPA Enterprise-EAP-TLS

The screenshot shows the 'Creating a Profile' screen for 'Wireless Security - WPA Enterprise'. The interface includes the Linksys logo and 'WPC4400N' model number. The title bar reads 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main content area has the following fields and instructions:

- Authentication:** PEAP (selected). Instruction: Please select the authentication method that you use to access your network.
- Login Name:** (empty). Instruction: Enter the Login Name used for authentication.
- Password:** (empty). **Password Mode:** Static (selected).
- Server Name:** (empty). Instruction: Enter the Server Name used for authentication. (Optional)
- Certificate:** Trust Any (selected). Instruction: Please select the certificate used for authentication.
- Inner Authen.:** EAP-MSCHAPv2 (selected). Instruction: Please select the inner authentication method used inside the PEAP tunnel.
- Encryption:** AES (selected). Instruction: Please select the encryption type used to protect the wireless data transmissions.

At the bottom right, there are 'Back' and 'Next' buttons.

Figure 4-15: Wireless Security - WPA Enterprise-PEAP

## WPA2 Enterprise

WPA2 Enterprise features WPA2 security used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) WPA2 Enterprise offers two authentication methods, EAP-TLS and PEAP.

**Authentication** - Select the authentication method your network is using, EAP-TLS or PEAP.

### EAP-TLS

If you selected EAP-TLS, enter the login name of your wireless network in the *Login Name* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

### PEAP

If you selected PEAP, enter the login name of your wireless network in the *Login Name* field. Enter the password of your wireless network in the *Password* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network; if you want to use any certificate, keep the default setting, Trust Any. Then select the authentication method used inside the PEAP tunnel.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

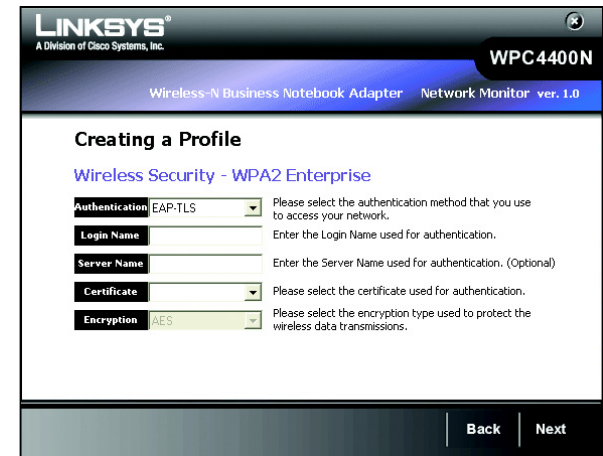


Figure 4-16: Wireless Security - WPA2 Enterprise-EAP

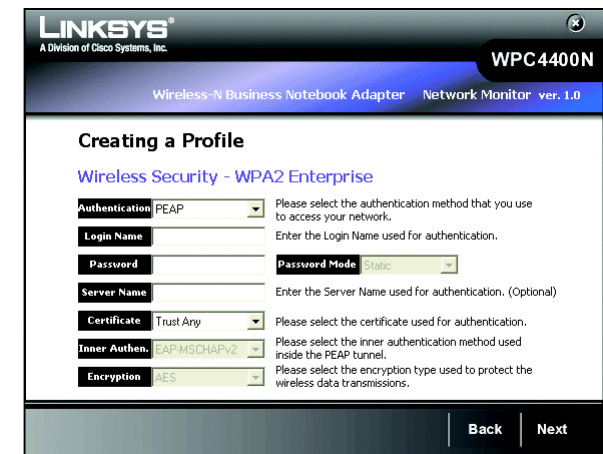


Figure 4-17: Wireless Security - WPA2 Enterprise-PEAP

## RADIUS

RADIUS features use of a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) RADIUS offers two authentication types: EAP-TLS and PEAP.

**Authentication** - Select the authentication method your network is using, **EAP-TLS** or **PEAP**.

### EAP-TLS

If you selected EAP-TLS, enter the login name of your wireless network in the *Login Name* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

### PEAP

If you selected PEAP, enter the login name of your wireless network in the *Login Name* field. Enter the password of your wireless network in the *Password* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network; if you want to use any certificate, keep the default setting, **Trust Any**. Then select the authentication method used inside the PEAP tunnel.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

The screenshot shows the Linksys WPC4400N Network Monitor interface. The title bar includes the Linksys logo, 'A Division of Cisco Systems, Inc.', and the model 'WPC4400N'. Below the title bar, it says 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main content area is titled 'Creating a Profile' and 'Wireless Security - RADIUS'. It contains the following fields and instructions:

- Authentication:** A dropdown menu set to 'EAP-TLS'. Instruction: 'Please select the authentication method that you use to access your network.'
- Login Name:** A text input field. Instruction: 'Enter the Login Name used for authentication.'
- Server Name:** A text input field. Instruction: 'Enter the Server Name used for authentication. (Optional)'
- Certificate:** A dropdown menu. Instruction: 'Please select the certificate used for authentication.'

At the bottom right, there are 'Back' and 'Next' buttons.

Figure 4-18: Wireless Security - RADIUS - EAP-TLS

The screenshot shows the Linksys WPC4400N Network Monitor interface. The title bar includes the Linksys logo, 'A Division of Cisco Systems, Inc.', and the model 'WPC4400N'. Below the title bar, it says 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main content area is titled 'Creating a Profile' and 'Wireless Security - RADIUS'. It contains the following fields and instructions:

- Authentication:** A dropdown menu set to 'PEAP'. Instruction: 'Please select the authentication method that you use to access your network.'
- Login Name:** A text input field. Instruction: 'Enter the Login Name used for authentication.'
- Password:** A text input field. Instruction: 'Please select the inner authentication method used inside the PEAP tunnel.'
- Password Mode:** A dropdown menu set to 'Static'. Instruction: 'Please select the inner authentication method used inside the PEAP tunnel.'
- Server Name:** A text input field. Instruction: 'Enter the Server Name used for authentication. (Optional)'
- Certificate:** A dropdown menu set to 'Trust Any'. Instruction: 'Please select the certificate used for authentication.'
- Inner Authen.:** A dropdown menu set to 'EAP-MSCHAPv2'. Instruction: 'Please select the inner authentication method used inside the PEAP tunnel.'

At the bottom right, there are 'Back' and 'Next' buttons.

Figure 4-19: Wireless Security - RADIUS - PEAP

## LEAP

Lightweight Extensible Authentication Protocol is a mutual authentication method that uses a user name and password based system.

**Login method** - Select the login method your network is using, **Manual Login** or **Windows Login**.

If you select manual login, enter the username and password in the username and password field accordingly. Enter the password again in the confirm field.

6. The *Congratulations* screen will appear next. Click **Connect to Network** to implement the new settings and return to the *Link Information* screen. Click **Return to Profile screen** to return to the Creating a Profile screen.

**Congratulations! Your manual setup through the Wireless Network Monitor is complete.**

**To check the link information, search for available wireless networks, or make additional configuration changes, proceed to Chapter 5: Using the Wireless Network Monitor.**



Figure 4-20: Wireless Security - LEAP



Figure 4-21: Congratulations Screen

# Chapter 5: Using the Wireless Network Monitor

Use the Wireless Network Monitor to check the link information, set up profiles of your wireless settings, search for available wireless networks, troubleshoot your wireless connections, or administer the accounts that hold privileges to access the Security Monitor.

## Accessing the Wireless Network Monitor

After installing the Adapter, the Wireless Network Monitor icon will appear in the system tray of your computer. If the Wireless Network Monitor is enabled, then the icon will be green. If the Wireless Network Monitor is disabled or the Adapter is not connected, then the icon will be gray.



Figure 5-1: Wireless Network Monitor Icon

## Using the Wireless Network Monitors

The opening screen of the Wireless Network Monitor is the **Link Information** screen. From this screen, you can find out how strong the current wireless signal is and how good the connection's quality is. You can also perform configuration changes or create connection profiles by clicking the **Profiles** tab. To view the available wireless networks, click the **Site Survey** tab. To troubleshoot the current connections or view the FAQ pages, click the **Troubleshooting** tab. To perform the administrative tasks of the account information or specify email alert addresses, click the **Administration** tab.

## Link Information

The *Connection* screen of Link Information Tab displays signal strength and link quality information about the current connection. It also provides tabs to click for additional connection information.

**Signal Strength** - The Signal Strength bar indicates signal strength with Red, Yellow, and Green colors to differentiate among low, medium and high strength.

**Link Quality** - The Link Quality bar indicates the quality of the wireless network connection with Red, Yellow, and Green colors to differentiate among low, medium and high quality.

Click the **Status** or **Statistics** tabs to view additional information about the wireless network connection on the *Link Information* tab.



Figure 5-2: Link Information - Connection



## Status

Click the **Status** tab to view the *Wireless Network Status* screen. The *Status* screen provides information on your current network settings.

**Radio Band** - This shows the radio band used on the wireless network.

**SSID** - Service Set Identifier, a 32-character unique identifier attached to the header of packets sent over a WLAN. This is the unique name of the wireless network which differentiates one wireless network to another.

**Wireless Mode** - The mode of the wireless network currently in use is displayed here.

**Wide Channel** - This displays the Wireless-N primary channel used with a 40 MHz radio band network.

**Standard Channel** - This displays the channel used by your wireless network.

**Security** - The status of the wireless security feature is displayed here.

**Authentication** - This is your wireless network's authentication method.

**Network Type** - The type of your network connection in either wireless-a, wireless-b, wireless-g or wireless-n is displayed here.

**IP Address** - The IP Address of the Adapter is displayed here.

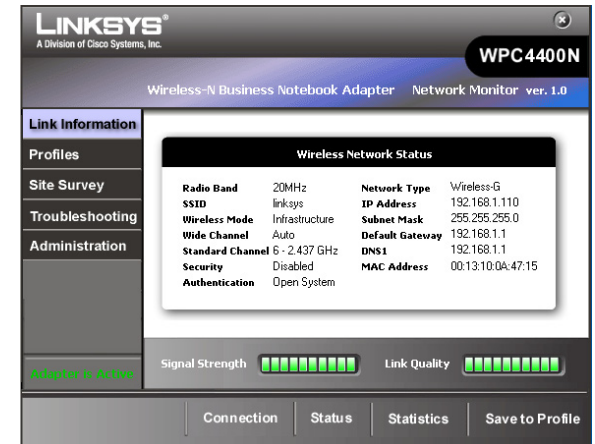
**Subnet Mask** - The Subnet Mask of the Adapter is shown here.

**Default Gateway** - The Default Gateway address of the Adapter is displayed here.

**DNS** - This is the DNS (Domain Name Service) address of the Adapter.

**MAC Address**- The MAC address of the wireless network's access point or wireless router is shown here.

Click the **Statistics** tab to view the *Wireless Network Statistics* screen. Click the **Connection** button to return to the initial *Link Information* screen. Click the **Save to Profile** button to save the currently active connection settings to a profile.



**Figure 5-3: Link Information- Wireless Network Status**

## Statistics

The *Statistics* screen provides statistics on your current network settings.

**Transmit Rate** - This is the data transfer rate of the current connection. (In Auto mode, the Adapter dynamically shifts to the fastest data transfer rate possible at any given time.)

**Receive Rate** - This is the rate at which data is received.

**Packets Received** - This shows the packets received by the Adapter, in real time, since connecting to the wireless network or since the *Clear Counters* button was last pressed.

**Packets Transmitted** - This shows the packets transmitted from the Adapter, in real time, since connecting to the wireless network or since the *Clear Counters* button was last pressed.

**Bytes Received** - This shows the bytes received by the Adapter, in real time, since connecting to the wireless network or since the *Clear Counters* button was last pressed.

**Bytes Transmitted** - This shows the bytes transmitted by the Adapter, in real time, since connecting to the wireless network or since the *Clear Counters* button was last pressed.

**Driver Version** - This shows the version of the Adapter's driver.

**Signal Strength** - This is the intensity of the wireless signal received by the Adapter.

**Transmit Power** - This is the power output at which the Adapter is transmitting. Transmit power is the amount of power used by a radio transceiver to send the signal out. It is generally measured in milliwatts, which you can convert to dBm. For a typical Wireless-N network, it is estimated to be at 10dBm in average. Here it states as auto to mean the network is transmitting at an average Wireless-N power output.

**Up Time** - This indicates the length of the most recent connection to a wireless network.

**Total Up Time** - This indicates the cumulative total of the Adapter's connection time.

**Signal Strength** - The Signal Strength bar indicates the signal strength.

**Link Quality** - The Link Quality bar indicates the quality of the wireless network connection.

Click the **Connection** button to return to the initial *Link Information* screen. Click the **Status** button to go to the *Wireless Network Status* screen. Click the **Save to Profile** button to save the currently active connection settings to a profile. Click the **Clear Counters** button to reset the statistics.

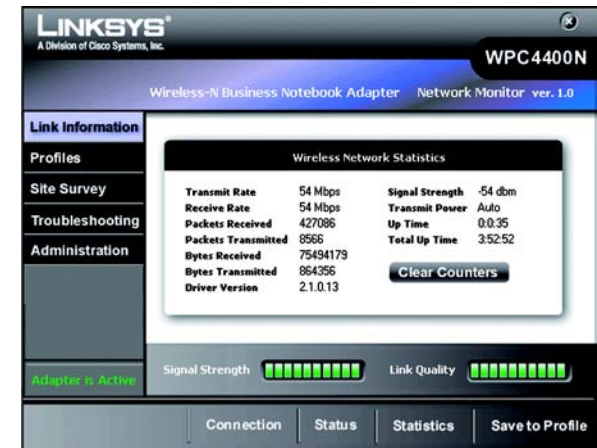


Figure 5-4: Link Information - Wireless Network Statistics

## Profiles

The *Profiles* screen lets you save different configuration profiles for different network setups. The table on the left displays a list of available profiles with their profile names and SSIDs.

**Profile** - The name of the profile is displayed here.

**SSID** - The SSID or unique name of the wireless network is displayed here.

### Profile Information

For each profile selected, the following are listed:

**Wireless Mode** - This is the mode of the wireless network currently in use.

**Transfer Rate** - The data transfer rate of the current connection is shown here.

**Channel** - This is the channel to which the wireless network devices are set.

**Security** - The status of the wireless security feature is displayed here.

**Authentication** - The authentication setting for the network is shown here.

**Connect** - To connect to a wireless network using a specific profile, select the profile, and click **Connect**.

**New** - Click the **New** button to create a new profile. See the next section, “Create a New Profile,” for detailed instructions.

**Edit** - Select the profile you want to change, and then click the **Edit** button. See the section, “Editing a New Profile,” for detailed instructions.

**Import** - Click the **Import** button to import a profile that has been saved in another location. Select the appropriate file, and click the **Open** button.

**Export** - Select the profile you want to save in a different location, and click the **Export** button. Direct Windows to the appropriate folder, and click the **Save** button.

**Delete** - Select the profile you want to delete, and then click the **Delete** button.



**NOTE:** If you want to export more than one profile, you have to export them one at a time.

**NOTE:** Default profile cannot be deleted.

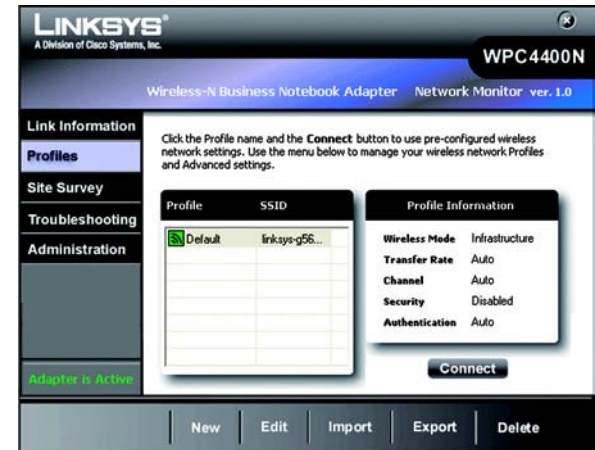


Figure 5-5: Profiles

## Create a New Profile

The next screen to appear will be the *Available Wireless Network* screen.

This screen provides two options for setting up the Adapter.

- **Available Wireless Network. (For most users.)** Use this option if you already have a network set up. The networks available to this Adapter will be listed on this screen. You can choose one of these networks and click the **Connect** button to connect to it. Click the **Refresh** button to update the Available Wireless Network list.
- **Manual Setup.** If your network is not listed on this screen, select **Manual Setup** to set up the adapter manually. This method of setting up the Adapter is intended for Advanced Users only.

The setup for each option is described, step by step, under the appropriate heading on the following pages.

Click **Back** to go back to the previous screen.

### Available Wireless Network

The available networks are listed in the table on the center of the screen by SSID. Select the wireless network you wish to connect to and click the **Connect** button. (If you do not see your network listed, you can click the **Refresh** button to bring the list up again.) If the network utilizes wireless security, you will need to configure security on the Adapter. If not, you will be taken directly to the *Congratulations* screen.

1. If you have wireless security enabled on your network, continue to step 2. One of these security screens will be shown. If you don't have wireless security enabled, continue to step 3.
2. If your network has the wireless security WEP (Wired Equivalent Privacy), this screen will appear.

Select **64-bit** or **128-bit**.

Then enter a passphrase or WEP key.

**Passphrase** - Enter a passphrase in the *Passphrase* field, so a WEP key is automatically generated. The passphrase is case-sensitive and should not be longer 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.)



Figure 5-6: Creating Profiles - Available Wireless Network

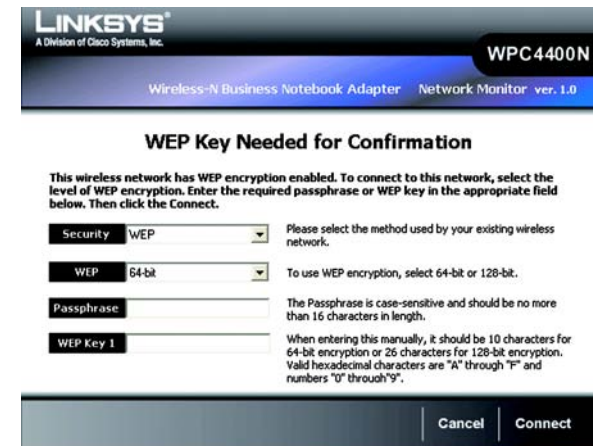


Figure 5-7: Creating Profiles - WEP Key Needed

**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".

Then click **Connect** and proceed to Step 3.

If your network has the wireless security WPA Personal (Wi-Fi Protected Access) enabled, this screen will appear.

**Passphrase** - Enter a Passphrase, also called a Pre-shared Key, of 8-63 characters in the *Passphrase* field.

Then click **Connect** and proceed to Step 3.

If your network has the wireless security WPA2 Personal enabled, this screen will appear.

**Passphrase** - Enter a Passphrase, also called a Pre-shared Key, of 8-63 characters in the *Passphrase* field.

Then click **Connect** and proceed to Step 3.

For connecting with other authentication method, please see the next section "Manual Setup" on page 23.

3. After the software has been successfully installed, the *Congratulations* screen will appear. Click **Connect to Network** to connect to your network, implement the new settings, and return to the *Link Information* screen.

**Congratulations! The profile has been successfully configured.**

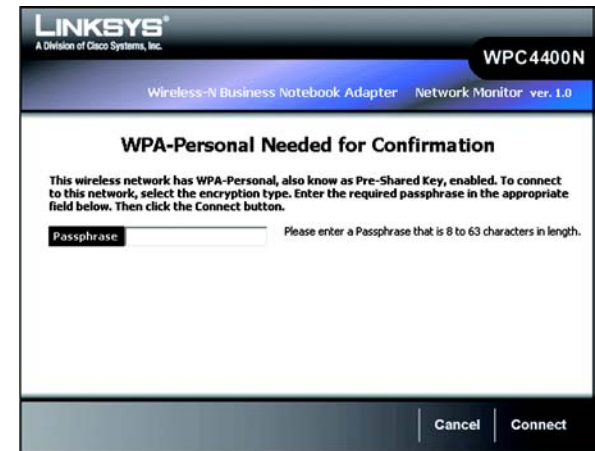


Figure 5-8: Creating Profiles - WPA-Personal Needed



Figure 5-9: Creating Profiles - Congratulations

## Manual Setup

If your network is not listed with the available networks, you can use Manual Setup.

1. Click **Manual Setup** on the *Available Wireless Network* screen to set up the adapter manually.

2. The *Network Settings* screen from the Wireless Network Monitor will appear. If your network has a router or other DHCP server, click the radio button next to **Obtain network settings automatically (DHCP)**.

If your network does not have a DHCP server, click the radio button next to **Specify network settings**. Enter an IP Address, Subnet Mask, Default Gateway, and DNS addresses appropriate for your network. You must specify the IP Address and Subnet Mask on this screen. If you are unsure about the Default Gateway and DNS addresses, leave these fields empty.

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

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

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

**DNS 1** and **DNS 2** - Enter the DNS address of your wired Ethernet network here.

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



Figure 5-10: Creating Profiles - Manual Setup - Network Settings

- The *Wireless Mode* screen shows a choice of two wireless modes. Click the **Infrastructure Mode** radio button if you want to connect to a wireless router or access point. Click the **Ad-Hoc Mode** radio button if you want to connect to another wireless device directly without using a wireless router or access point. Enter the SSID for your network.

**Infrastructure Mode** - Use this mode if you want to connect to a wireless router or access point.

**Ad-Hoc Mode** - Use this mode if you want to connect to another wireless device directly without using a wireless router or access point.

**SSID** - This is the wireless network name that must be used for all the devices in your wireless network. It is case-sensitive and should be a unique name to help prevent others from entering your network.

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

- If you chose **Infrastructure Mode**, go to Step 5 now. If you chose **Ad-Hoc Mode**, the *Ad-Hoc Mode Settings* screen will appear.

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. If you are unsure about which channel to use, keep the default setting.

Click the **Next** button. Click the **Back** button to change any settings.

- If your wireless network doesn't have wireless security, select **Disabled** and then click the **Next** button to continue. Proceed to Step 6.

If your wireless network has wireless security, select the method of security used: **WEP, WPA/WPA2-Personal, WPA/WPA2-Enterprise, RADIUS or LEAP**. WEP stands for Wired Equivalent Privacy, and WPA stands for Wi-Fi Protected Access. WPA uses a stronger security method than WEP and WPA2 defines an even stronger encryption, authentication, and key management than WPA. RADIUS stands for Remote Authentication Dial-In User Service. LEAP stands for Lightweight Extensible Authentication Protocol. It uses username and password-based authentication between a wireless client and a RADIUS server. Click the **Next** button to continue or the **Back** button to return to the previous screen.

Proceed to the appropriate section for your security method: WEP, WPA/WPA2-Personal, WPA/WPA2-Enterprise, RADIUS, or LEAP.



Figure 5-11: Creating Profiles - Manual Setup - Wireless Mode

**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.

**wpa** (wi-fi protected access): a wireless security protocol using TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.

**wpa2** offers a stronger encryption than wpa by using the AES (Advanced Encryption Standard) which is a block cipher with block sizes of 128, 192 or 256 bits.

## WEP

**WEP** - Select **64-bit** or **128-bit** encryption

**Passphrase** - Enter a passphrase in the *Passphrase* field, so a WEP key is automatically generated. It is case-sensitive and should not be longer than 16 alphanumeric characters. This passphrase 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”.

### Advanced Users

**TX Key** - The default transmit key number is 1. If your network’s access point or wireless router uses transmit key number 2, 3, or 4, select the appropriate number from the *TX Key* drop-down box.

**Authentication** -The default is set to **Auto**, so it will auto-detect for Shared Key or Open System authentication. For Shared Key authentication, both the sender and the recipient share a WEP key for authentication. For Open System authentication, the sender and the recipient do not share a WEP key for authentication. If you are not sure which authentication method to select, keep the default, **Auto**.

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

## WPA Personal

WPA Personal offers two encryption methods, TKIP and AES, with dynamic encryption keys. WPA2 only uses AES for encryption. Select **TKIP** or **AES** for encryption for WPA Personal. Then enter a Passphrase that is 8-63 characters in length.

**Encryption** - Select the type of algorithm you want to use, **TKIP** or **AES**, from the *Encryption* drop-down menu.

**Passphrase** - Enter a Passphrase, also called a Pre-shared Key, of 8-63 characters in the *Passphrase* field.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

The screenshot shows the 'Creating a Profile' screen for 'Wireless Security - WEP'. The interface includes the Linksys logo and 'WPC4400N' model number. The title bar indicates 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main content area has the following fields and options:

- WEP**: A dropdown menu set to '64-bit'. A note says: 'To use WEP encryption, select 64-bit or 128-bit.'
- Passphrase**: A text input field. A note says: 'The Passphrase is case-sensitive and should be no more than 16 characters in length.'
- WEP Key**: A text input field with asterisks. A note says: 'When entering this manually, it should be 10 characters for 64-bit encryption or 26 characters for 128-bit encryption. Valid hexadecimal characters are "A" through "F" and numbers "0" through "9".'
- For Advanced Users:**
  - TX Key**: A dropdown menu set to '1'. A note says: 'Select the transmit key for your network. (Default: 1)'
  - Authentication**: A dropdown menu set to 'Open system'. A note says: 'Select your network authentication type. (Default: Auto)'

At the bottom right, there are 'Back' and 'Next' buttons.

**Figure 5-12: Creating Profiles - Manual Setup - Wireless Security - WEP**

The screenshot shows the 'Creating a Profile' screen for 'Wireless Security - WPA Personal'. The interface includes the Linksys logo and 'WPC4400N' model number. The title bar indicates 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main content area has the following fields and options:

- Encryption**: A dropdown menu set to 'TKIP'. A note says: 'Please select an encryption type used to protect your wireless data transmissions.'
- Passphrase**: A text input field. A note says: 'Please enter a Passphrase that is 8 to 63 characters in length.'

At the bottom right, there are 'Back' and 'Next' buttons.

**Figure 5-13: Creating Profiles - Manual Setup - Wireless Security - WPA Personal**



## WPA2 Personal

Enter a Pre-shared Key that is 8-63 characters in length.

Pre-shared Key - Enter a Pre-shared Key of 8-63 characters in the *Pre-shared Key* field.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

## WPA Enterprise

WPA Enterprise features WPA security used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) WPA Enterprise offers two authentication methods, EAP-TLS and PEAP, as well as two encryption methods, TKIP and AES, with dynamic encryption keys. WPA2 Enterprise offers two authentication methods, EAP-TLS and PEAP, but only AES encryption method is used.

**Authentication** - Select the authentication method your network is using, **EAP-TLS** or **PEAP**.

### EAP-TLS

If you selected EAP-TLS, enter the login name of your wireless network in the *Login Name* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network. Select the type of encryption, **TKIP** or **AES**, from the *Encryption* drop-down menu.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

### PEAP

If you selected PEAP, enter the login name of your wireless network in the *Login Name* field. Enter the password of your wireless network in the *Password* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network; if you want to use any certificate, keep the default setting, **Trust Any**. Then select the authentication method used inside the PEAP tunnel. Select the type of encryption, **TKIP** or **AES**, from the *Encryption* drop-down menu.

Click the **Next** button to continue or the **Back** button to return to the previous screen.



Figure 5-14: Creating Profiles - Manual Setup - Wireless Security - WPA2 Personal



Figure 5-15: Creating Profiles - Manual Setup - Wireless Security - WPA Enterprise - EAP-TLS



Figure 5-16: Creating Profiles - Manual Setup - Wireless Security - WPA Enterprise - PEAP

## WPA2 Enterprise

WPA2 Enterprise features WPA2 security used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) WPA2 Enterprise offers two authentication methods, EAP-TLS and PEAP.

Authentication - Select the authentication method your network is using, EAP-TLS or PEAP.

### EAP-TLS

If you selected EAP-TLS, enter the login name of your wireless network in the *Login Name* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

### PEAP

If you selected PEAP, enter the login name of your wireless network in the *Login Name* field. Enter the password of your wireless network in the *Password* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network; if you want to use any certificate, keep the default setting, Trust Any. Then select the authentication method used inside the PEAP tunnel.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

The screenshot shows the Linksys WPC4400N Network Monitor interface. The title bar indicates 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main content area is titled 'Creating a Profile' and 'Wireless Security - WPA2 Enterprise'. It features several form fields: 'Authentication' (EAP-TLS), 'Login Name', 'Server Name', 'Certificate', and 'Encryption' (AES). Each field has a corresponding instruction. At the bottom right, there are 'Back' and 'Next' buttons.

Figure 5-17: Creating Profiles - Manual Setup - Wireless Security - WPA2 Enterprise - EAP-TLS

The screenshot shows the Linksys WPC4400N Network Monitor interface. The title bar indicates 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main content area is titled 'Creating a Profile' and 'Wireless Security - WPA2 Enterprise'. It features several form fields: 'Authentication' (PEAP), 'Login Name', 'Password', 'Password Mode' (Static), 'Server Name', 'Certificate' (Trust Any), 'Inner Authen.' (EAP-MSCHAPv2), and 'Encryption' (AES). Each field has a corresponding instruction. At the bottom right, there are 'Back' and 'Next' buttons.

Figure 5-18: Creating Profiles - Manual Setup - Wireless Security - WPA2 Enterprise - PEAP

## RADIUS

RADIUS features use of a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) RADIUS offers two authentication types: EAP-TLS and PEAP.

**Authentication** - Select the authentication method your network is using, EAP-TLS or PEAP.

## EAP-TLS

If you selected EAP-TLS, enter the login name of your wireless network in the *Login Name* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

## PEAP

If you selected PEAP, enter the login name of your wireless network in the *Login Name* field. Enter the password of your wireless network in the *Password* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network; if you want to use any certificate, keep the default setting, Trust Any. Then select the authentication method used inside the PEAP tunnel.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

## LEAP

Lightweight Extensible Authentication Protocol is a mutual authentication method that uses a username and password based system.

**Login method** - Select the login method your network is using, **Manual Login** or **Windows Login**.

If you select manual login, enter the username and password in the username and password field accordingly. Enter the password again in the confirm field.

The screenshot shows the 'Creating a Profile' screen for 'Wireless Security - RADIUS'. At the top, it says 'LINKSYS A Division of Cisco Systems, Inc.' and 'WPC4400N'. Below that, it says 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main heading is 'Creating a Profile' and the sub-heading is 'Wireless Security - RADIUS'. There are four fields: 'Authentication' (dropdown menu set to 'EAP-TLS'), 'Login Name' (text input), 'Server Name' (text input), and 'Certificate' (dropdown menu). To the right of each field is a small instruction: 'Please select the authentication method that you use to access your network.', 'Enter the Login Name used for authentication.', 'Enter the Server Name used for authentication. (Optional)', and 'Please select the certificate used for authentication.' At the bottom right, there are 'Back' and 'Next' buttons.

Figure 5-19: Creating Profiles - Manual Setup - Wireless Security - RADIUS

The screenshot shows the 'Creating a Profile' screen for 'Wireless Security - LEAP'. At the top, it says 'LINKSYS A Division of Cisco Systems, Inc.' and 'WPC4400N'. Below that, it says 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main heading is 'Creating a Profile' and the sub-heading is 'Wireless Security - LEAP'. There are four fields: 'Login Method' (dropdown menu set to 'Manual Login'), 'User Name' (text input), 'Password' (text input), and 'Confirm' (text input). To the right of each field is a small instruction: 'Select the login method you want to use.', 'Enter the Login Name used for authentication.', 'Enter the Password used for authentication.', and 'Re-enter the Password again.' At the bottom right, there are 'Back' and 'Next' buttons.

Figure 5-20: Creating Profiles - Manual Setup - Wireless Security - LEAP

## Wireless-N Business Notebook Adapter

- The *Confirm New Settings* screen will appear next and show the new settings. To save the new settings, click the **Save** button. To edit the new settings, click the **Back** button. To exit the Manual Setup through the Wireless Network Monitor, click **Exit**.



**Figure 5-21: Creating Profiles - Manual Setup - Confirm New Settings**

- The *Congratulations* screen will appear next. Click **Connect to Network** to implement the new settings immediately and return to the *Link Information* screen. Click **Return to Profile Screen** to keep the current settings active and return to the *Profiles* screen.

**Congratulations! The profile has been successfully configured.**



**Figure 5-22: Creating Profiles - Manual Setup - Congratulations**

## Editing a Profile

Select the profile that you would like to edit in the profile list and click on **Edit** button. The next screen would be the Wireless Mode. Following the steps below to complete the task:

1. The *Wireless Mode* screen shows a choice of two wireless modes. Click the **Infrastructure Mode** radio button if you want to connect to a wireless router or access point. Click the **Ad-Hoc Mode** radio button if you want to connect to another wireless device directly without using a wireless router or access point. Enter the SSID for your network.

**Infrastructure Mode** - Use this mode if you want to connect to a wireless router or access point.

**Ad-Hoc Mode** - Use this mode if you want to connect to another wireless device directly without using a wireless router or access point.

**SSID** - This is the wireless network name that must be used for all the devices in your wireless network. It is case-sensitive and should be a unique name to help prevent others from entering your network.

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

2. If you chose **Infrastructure Mode**, go to Step3 now. If you chose **Ad-Hoc Mode**, the *Ad-Hoc Mode Settings* screen will appear.

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. If you are unsure about which channel to use, keep the default setting.

Click the **Next** button. Click the **Back** button to change any settings.



Figure 5-23: Editing Profiles - Wireless Mode



Figure 5-24: Editing Profiles - Ad Hoc Mode

- If your wireless network doesn't have wireless security, select **Disabled** and then click the **Next** button to continue. Proceed to Step 4.

If your wireless network has wireless security, select the method of security used: **WEP, WPA/WPA2-Personal, WPA/WPA2-Enterprise, RADIUS or LEAP**. WEP stands for Wired Equivalent Privacy, and WPA stands for Wi-Fi Protected Access. WPA uses a stronger security method than WEP and WPA2 defines an even stronger encryption, authentication, and key management than WPA. RADIUS stands for Remote Authentication Dial-In User Service. LEAP stands for Lightweight Extensible Authentication Protocol. It uses username and password-based authentication between a wireless client and a RADIUS server. Click the **Next** button to continue or the **Back** button to return to the previous screen.

Proceed to the appropriate section for your security method: WEP, WPA/WPA2-Personal, WPA/WPA2-Enterprise, RADIUS, or LEAP.

## WEP

**WEP** - Select **64-bit or 128-bit** encryption

**Passphrase** - Enter a passphrase in the *Passphrase* field, so a WEP key is automatically generated. It is case-sensitive and should not be longer than 16 alphanumeric characters. This passphrase 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".

### Advanced Users

**TX Key** - The default transmit key number is 1. If your network's access point or wireless router uses transmit key number 2, 3, or 4, select the appropriate number from the *TX Key* drop-down box.

**Authentication** -The default is set to **Auto**, so it will auto-detect for Shared Key or Open System authentication. For Shared Key authentication, both the sender and the recipient share a WEP key for authentication. For Open System authentication, the sender and the recipient do not share a WEP key for authentication. If you are not sure which authentication method to select, keep the default, **Auto**.

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

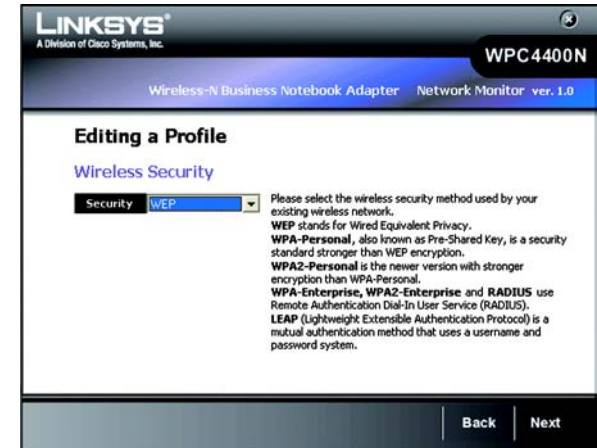


Figure 5-25: Editing Profiles - Wireless Security



Figure 5-26: Editing Profiles - Wireless Security-WEP

## WPA Personal

WPA Personal offers two encryption methods, TKIP and AES, with dynamic encryption keys. WPA2 only uses AES for encryption. Select **TKIP** or **AES** for encryption for WPA Personal. Then enter a Passphrase that is 8-63 characters in length.

**Encryption** - Select the type of algorithm you want to use, **TKIP** or **AES**, from the *Encryption* drop-down menu.

**Passphrase** - Enter a Passphrase, also called a Pre-shared Key, of 8-63 characters in the *Passphrase* field.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

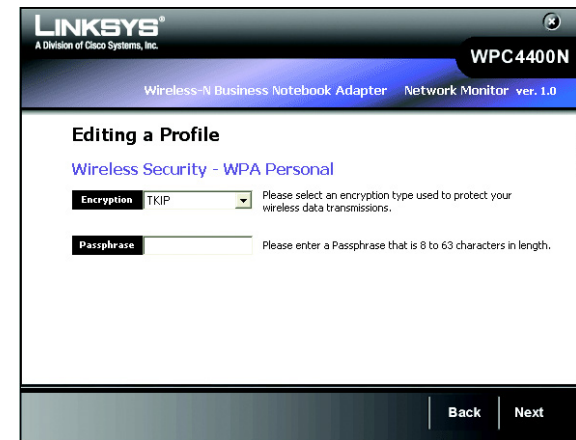


Figure 5-27: Editing Profiles - Wireless Security-WPA Personal

## WPA2 Personal

Enter a Pre-shared Key that is 8-63 characters in length.

**Pre-shared Key** - Enter a Pre-shared Key of 8-63 characters in the *Pre-shared Key* field.

Click the **Next** button to continue or the **Back** button to return to the previous screen.



Figure 5-28: Editing Profiles - Wireless Security - WPA2 Personal

## WPA Enterprise

WPA/WPA2 Enterprise features WPA security used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) WPA Enterprise offers two authentication methods, EAP-TLS and PEAP, as well as two encryption methods, TKIP and AES, with dynamic encryption keys. WPA2 Enterprise offers two authentication methods, EAP-TLS and PEAP, but only AES encryption method is used.

**Authentication** - Select the authentication method your network is using, **EAP-TLS** or **PEAP**.

### EAP-TLS

If you selected EAP-TLS, enter the login name of your wireless network in the *Login Name* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network. Select the type of encryption, **TKIP** or **AES**, from the *Encryption* drop-down menu.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

### PEAP

If you selected PEAP, enter the login name of your wireless network in the *Login Name* field. Enter the password of your wireless network in the *Password* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network; if you want to use any certificate, keep the default setting, **Trust Any**. Then select the authentication method used inside the PEAP tunnel. Select the type of encryption, **TKIP** or **AES**, from the *Encryption* drop-down menu.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

The screenshot shows the 'Editing a Profile' screen for 'Wireless Security - WPA Enterprise'. The interface includes a header with the Linksys logo and 'WPC4400N' model number. Below the header, it says 'Wireless-N Business Notebook Adapter Network Monitor ver. 1.0'. The main content area has a title 'Editing a Profile' and a subtitle 'Wireless Security - WPA Enterprise'. There are four dropdown menus: 'Authentication' set to 'EAP-TLS', 'Certificate' (empty), and 'Encryption' set to 'AES'. There are also text input fields for 'Login Name' and 'Server Name'. Instructions for each field are provided. At the bottom right, there are 'Back' and 'Next' buttons.

Figure 5-29: Editing Profiles - Wireless Security - WPA Enterprise - EAP-TLS

The screenshot shows the 'Editing a Profile' screen for 'Wireless Security - WPA2 Enterprise'. The interface is similar to the previous one but with different settings. The 'Authentication' dropdown is set to 'PEAP'. There is a 'Password' text input field and a 'Password Mode' dropdown set to 'Static'. The 'Certificate' dropdown is set to 'Trust Any'. The 'Inner Authen.' dropdown is set to 'GAPMSCHAPV2'. The 'Encryption' dropdown is set to 'AES'. There are also text input fields for 'Login Name' and 'Server Name'. Instructions for each field are provided. At the bottom right, there are 'Back' and 'Next' buttons.

Figure 5-30: Editing Profiles - Wireless Security - WPA Enterprise - PEAP



## WPA2 Enterprise

WPA2 Enterprise features WPA2 security used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) WPA2 Enterprise offers two authentication methods, EAP-TLS and PEAP.

Authentication - Select the authentication method your network is using, EAP-TLS or PEAP.

### EAP-TLS

If you selected EAP-TLS, enter the login name of your wireless network in the *Login Name* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

### PEAP

If you selected PEAP, enter the login name of your wireless network in the *Login Name* field. Enter the password of your wireless network in the *Password* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network; if you want to use any certificate, keep the default setting, Trust Any. Then select the authentication method used inside the PEAP tunnel.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

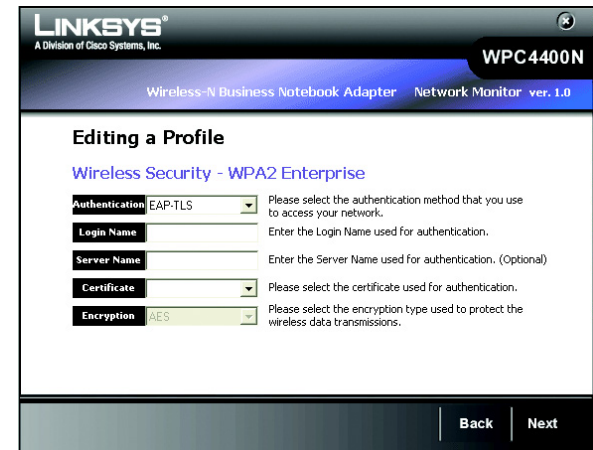


Figure 5-31: Editing Profiles - Wireless Security - WPA2 Enterprise - EAP-TLS



Figure 5-32: Editing Profiles - Wireless Security - WPA2 Enterprise - PEAP

## RADIUS

RADIUS features use of a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) RADIUS offers two authentication types: EAP-TLS and PEAP.

**Authentication** - Select the authentication method your network is using, EAP-TLS or PEAP.

## EAP-TLS

If you selected EAP-TLS, enter the login name of your wireless network in the *Login Name* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

## PEAP

If you selected PEAP, enter the login name of your wireless network in the *Login Name* field. Enter the password of your wireless network in the *Password* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network; if you want to use any certificate, keep the default setting, Trust Any. Then select the authentication method used inside the PEAP tunnel.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

## LEAP

Lightweight Extensible Authentication Protocol is a mutual authentication method that uses a username and password based system.

**Login method** - Select the login method your network is using, **Manual Login** or **Windows Login**.

If you select manual login, enter the username and password in the username and password field accordingly. Enter the password again in the confirm filed.

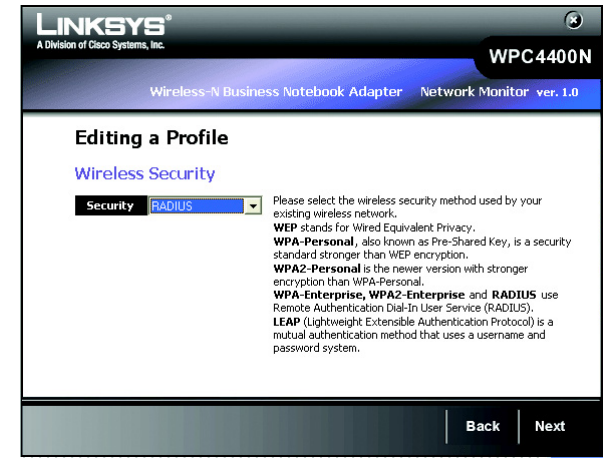


Figure 5-33: Editing Profiles - Wireless Security - RADIUS

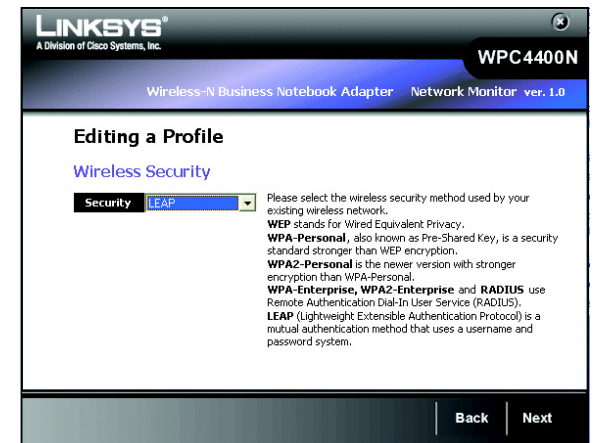


Figure 5-34: Editing Profiles - Wireless Security - LEAP

## Wireless-N Business Notebook Adapter

- The *Network Settings* screen from the Wireless Network Monitor will appear. If your network has a router or other DHCP server, click the radio button next to **Obtain network settings automatically (DHCP)**.

If your network does not have a DHCP server, click the radio button next to **Specify network settings**. Enter an IP Address, Subnet Mask, Default Gateway, and DNS addresses appropriate for your network. You must specify the IP Address and Subnet Mask on this screen. If you are unsure about the Default Gateway and DNS addresses, leave these fields empty.

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

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

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

**DNS 1** and **DNS 2** - Enter the DNS address of your wired Ethernet network here.

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

- The *Confirm New Settings* screen will appear next and show the new settings. To save the new settings, click the **Save** button. To edit the new settings, click the **Back** button. To exit the Manual Setup through the Wireless Network Monitor, click **Exit**.

- The *Congratulations* screen will appear next. Click **Connect to Network** to implement the new settings immediately and return to the *Link Information* screen. Click **Return to Profile Screen** to keep the current settings active and return to the *Profiles* screen.

**Congratulations! The profile has been successfully configured.**



Figure 5-35: Editing Profiles - Network Settings



Figure 5-36: Editing Profiles - Confirm New Settings



Figure 5-37: Editing Profiles - Congratulations

## Site Survey

The *Site Survey* screen displays a list of available networks in the table on the left. The table shows each network's SSID, Channel, and the quality of the wireless signal the Adapter is receiving. You may click **SSID**, **CH** (Channel), or **Signal**, to sort by that field.

**SSID** - The SSID or unique name of the wireless network is displayed here.

**CH** - This is the channel that the network uses.

**Signal** - This is the percentage of signal strength, from 0 to 100%.



The Access Points in the Site Survey list will be represented with different icons that will indicate Access Points in various states of classification. For instance, trusted Access Points are green, untrusted Access Points are red, and unclassified Access Points are blue. And if there is a lock next to it, it indicates the Access Point has a security method enabled.

For more information about classification of the Access Points, please see section "AP Classification" of Chapter 6.

### Site Information

For each network selected, the following settings for each SSID are listed:

**Wireless Mode** - This is the mode of the wireless network currently in use.

**Network Type** - The type of your network connection in either wireless-a, wireless-b, wireless-g or wireless-n is displayed here.

**Security** - The status of the wireless security feature is displayed here.

**MAC Address**- The MAC address of the wireless network's access point is displayed here.

**Refresh** - Click the **Refresh** button to perform a new search for wireless devices.

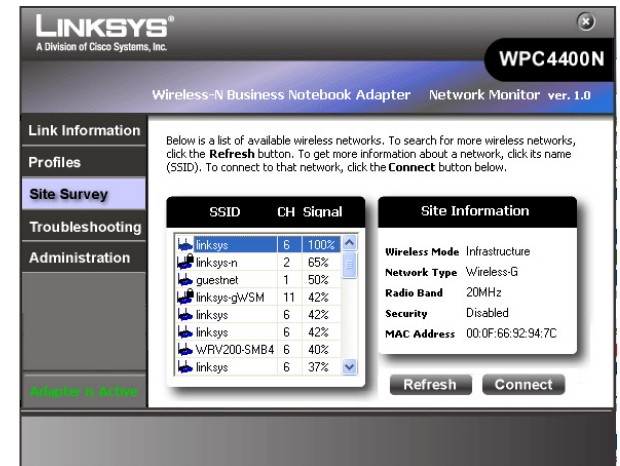


Figure 5-38: Site Survey

## Troubleshooting

The *Troubleshooting* screen lets you troubleshoot your wireless connection.

**Address Type** - This shows the addressing method of your station.

**IP Address** - This shows the current IP Address of your station.

**Subnet Mask** - This shows the subnet mask of your IP addressing.

**Default Gateway** - This shows the default gateway of your IP addressing.

You may click **Repair** to troubleshoot your connection to the wireless network. Repair will disconnect your station from the network and then reconnect, in order to re-establish an IP address. You may also click **FAQ** to view the FAQ pages from the Linksys website.

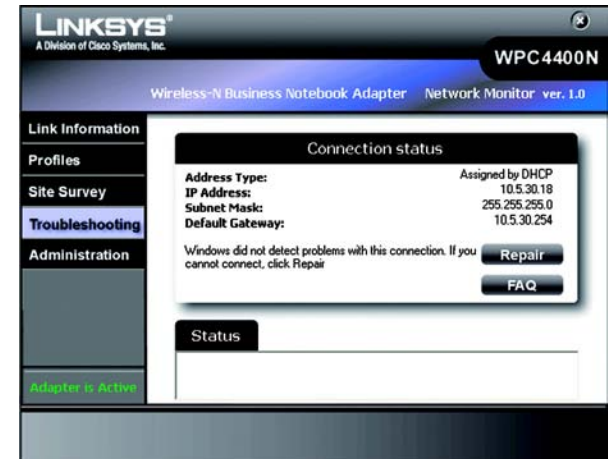


Figure 5-39: Troubleshooting

## Administration

The *Administration* screen lets you administer your Security Monitor account and modify your Access Point's username and password. Please select on a button to log in to either the Security Monitor account or Account Management as the Access Point's administrator.

**Log in as the Security Monitor account to access the classification and Security Monitor functions:**

Enter the Security Monitor's account name and password and retype the password in the confirm field. Click **Next** to proceed with more administrative options.

Once you have logged in successfully, the Classification and Security Monitor Tab appears. Please see the next chapter "The Administrative Functions in the Wireless Network Monitor" on page 41 for more information.



Figure 5-40: Administration