

Instant Wireless™ Series

Wireless Network Access Point



Use this guide to install: WAP11

User Guide

 **LINKSYS**™

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Linksys guarantees that every Wireless Network Access Point is free from physical defects in material and workmanship under normal use for one year from the date of purchase. If the product proves defective during this warranty period, call Linksys Customer Support in order to obtain a Return Authorization Number. BE SURE TO HAVE YOUR PROOF OF PURCHASE AND A BARCODE FROM THE PRODUCT'S PACKAGING ON HAND WHEN CALLING. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE. When returning a product, mark the Return Authorization Number clearly on the outside of the package and include your original proof of purchase. All customers located outside of the United States of America and Canada shall be held responsible for shipping and handling charges.

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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 device
- Connect the equipment to an outlet other than the receiver's
- Consult a dealer or an experienced radio/TV technician for assistance

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Introduction

The Instant Wireless™ Wireless Network Access Point

Don't be bound by cabling restrictions any longer! The Instant Wireless™ Network Access Point from Linksys delivers the freedom to configure your network *your* way. Utilization of state-of-the-art wireless technology gives you the ability to set up workstations in ways you never thought possible; no cables to install means fewer expenses and fewer hassles.

The Instant Wireless™ Network Access Point's high-powered antennas offer a range of operation of up to 457 meters, providing seamless roaming throughout your LAN infrastructure. Advanced user authentication ensures a high level of security for wireless networking, while easy-to-use Windows-based diagnostics and statistic tools ensure that you'll always be in control. Best of all, the Instant Wireless Network Access Point features easy installation— just plug it in and you're ready to go!

When all these features come together in one compact, lightweight, and power-efficient unit, you have the ultimate in flexible networking—the Linksys Instant Wireless™ Network Access Point.

Features

- Highly Efficient Dipole Antennas Provide Extensive Range of Operation
- Enjoy Your Wireless Office Beyond the Range of Ethernet Networking
- Auto Fall-Back Data Rate for Long-Distance Communication and Noisy Environments
- High-Speed Data Transfer Rate Up to 11 Mbps
- Interoperable with IEEE 802.11b (DSSS) 2.4GHz-Compliant Equipment
- Features Roaming, Best Access Point Selection, Load Balancing, and Network Traffic Filtering
- Extensive Operating Range Supports 150m (Indoors) and 500m (Outdoors)
- 40-Bit Wired Equivalent Privacy
- Free Software Driver Upgrades
- Compatible with Virtually All Major Operating Systems
- Auto Fallback Data Rate for Long-Distance Communication and Noisy Environments
- Free Technical Support—24 Hours a Day, 7 Days a Week for North America Only
- 1-Year Limited Warranty



Package Contents

- One Instant Wireless™ Network Access Point
- One AC Power Adapter
- One Setup CD-ROM
- One User Guide and Registration Card
- Two Detachable Antennas
- One USB Cable

System Requirements

- A PC with USB Support or Ethernet Connection
- Windows 95, 98, Millennium, NT version 4.0, or 2000 Professional
- 500 Kbytes of free disk space for utility and driver installation
- A 10 mbps network RJ-45 connection

Planning Your Wireless Network

Network Topology

A wireless LAN is a group of computers, each equipped with one Instant Wireless™ Network Card. Computers in a wireless LAN must be configured to share the same radio channel.

The Instant Wireless™ Network Card provides access to a wired LAN for wireless workstations. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of Instant Wireless™ Network Card users and an Instant Wireless™ Network Access Point compose a Basic Service Set (BSS). Each Instant Wireless™ Network Card PC in a BSS can talk to any computer in a wired LAN infrastructure via the Instant Wireless™ Network Access Point.

An infrastructure configuration extends the accessibility of an Instant Wireless™ Network Card PC to a wired LAN, and doubles the effective wireless transmission range for two Instant Wireless™ Network Card PCs. Since the Wireless Network Access Point is able to forward data within its BSS, the effective transmission range in an infrastructure LAN is doubled.

The use of a unique ID in a BSS is essential. All Instant Wireless™ Network PC Card PCs configured without roaming options in an independent BSS must be configured with a BSS ID used in the BSS.

The wireless LAN Infrastructure configuration is appropriate for enterprise-scale wireless access to a central database, or as a wireless application for mobile users.

Roaming

Infrastructure mode also supports roaming capabilities for mobile users. More than one BSS can be configured as an Extended Service Set (ESS). This continuous network allows users to roam freely within an ESS. All Instant Wireless™ Network PC Card PCs within one ESS must be configured with the same ESS ID and use the same radio channel.

Before enabling an ESS with roaming capability, choosing a feasible radio channel and optimum Wireless Network Access Point position is recommended. Proper Wireless Network Access Point positioning combined with a clear radio signal will greatly enhance performance.

Getting to Know the Wireless Network Access Point

The Wireless Access Point's Rear Panel

Your Access Point's ports, where network cables are connected, are located on the rear panel of your Access Point.



The Wireless Network Access Point's Ports

Dipole Antenna Connectors

These two round connections are where the antennas are connected to the Access Point.

LAN

This **LAN** (Local Area Network) port connects to network devices, such as a hub, switch, or router.

Power

The **Power** port is where you will connect the power adapter. Be sure to connect the power cord to the power adapter before plugging it in.

Configuration Port

The **Configuration Port** is a USB port (Type B - slave) which connects to a USB-ready PC in order to configure the Access Point's settings. To work with USB ports, your PC must be running Windows 98, 2000, or Millennium.

Note: The **Configuration Port** *does not* connect your Access Point to your PC (or any other device) for networking purposes. Its only function is to allow you to configure your Access Point's settings. Once the Access Point is configured, you may remove the USB cable connecting the Access Point to your PC.

Wireless Network Access Point

Your Access Point comes with a USB cable that has two different types of connectors. Type A, the master connector, is shaped like a rectangle and plugs into your PC's

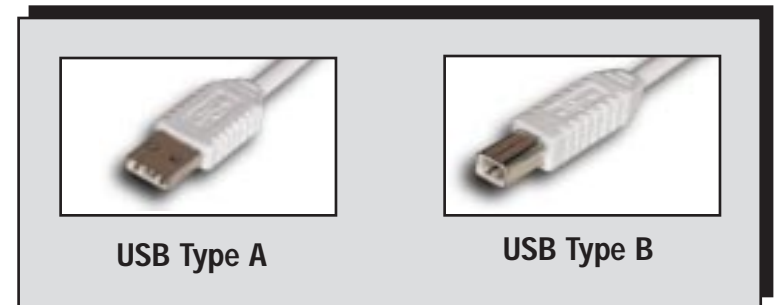
USB Compatibility with Your PC

To use the USB port on the Wireless Network Access Point, you must have Windows 98, 2000, or Millennium installed on your PC. USB is not supported in a Windows 95 or NT environment.

Also, your PC must have a USB port installed and enabled. Some PCs may have a disabled USB port. If your port doesn't seem to be working, there may be jumpers on the motherboard or a menu option in the BIOS to enable a PC's USB port.

Other motherboards have USB interfaces, but no ports. You can install your own USB port and attach it to your PC's motherboard using hardware purchased at retail computer stores. See your PC's User Guide for instructions.

USB port. Type B, the slave connector, resembles a square and connects to the USB port on the rear panel of your Wireless Network Access Point.



There is no USB Support on PCs running Windows 95 or Windows NT.

The Wireless Access Point's Front Panel



The LAN Indicators

Power	<i>Red.</i> The Power LED lights up when the Access Point is powered on.
Link	<i>Amber.</i> The Link LED serves two purposes. If the LED is continuously lit up, the Access Point is successfully connected to a device through the LAN port. If the LED is flickering, it is an indication of any network activity.
Act	<i>Green.</i> The Act LED is lit to show that other wireless devices are accessing the Access Point. If the LED is flickering, the Access Point is actively sending or receiving data to or from one of the wireless devices on the network.

Connecting the Wireless Network Access Point to Your Network

1. **Locate an optimum location for the Wireless Network Access Point.** The best place for your Wireless Network Access Point is usually at the center of your wireless network, with line of sight to all of your mobile stations.
2. **Fix the direction of the antenna.** Try to place it in a position which can best cover your wireless network. Normally, the higher you place the antenna, the better the performance will be. The antenna's position enhances the receiving sensitivity.
3. **Connect an RJ-45 connector to the Wireless Network Access Point.** Then, connect the other end of the Ethernet cable to a switch or hub. The Wireless Network Access Point will then be connected to your 10/100 Network.
4. **Connect the AC Power Adapter to the Wireless Network Access Point's Power Socket.** Only use the power adapter supplied with the Wireless Network Access Point. Use of a different adapter may result in product damage.
5. **Connect the appropriate end of the USB Cable to the Wireless Network Access Point's Configuration Port.** Connect the other end to the USB port on your PC. If your USB port is working properly, your system should immediately recognize the Access Point and attempt to install drivers for it. Continue on to the next section for instructions on how to install the drivers.

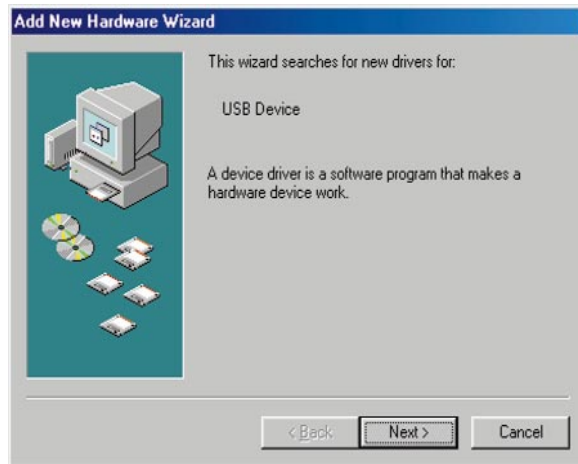
Note: Once your Access Point is installed and configured, the USB cable may be removed.

The Hardware Installation is complete.

Installing the USB Drivers for the Wireless Network Access Point

Installing the Driver Software for Windows 98

1. Windows 98 will automatically identify the Wireless Network Access Point, once it is connected to the PC, and prompt you to install the necessary driver. Make sure that the **Setup Utility CD** is inserted into your CD-ROM drive and click the **Next** button on the **Add New Hardware Wizard** screen to proceed.



2. Select **Search for the best driver...** and click the **Next** button. This will search for the Windows 98 driver.



Wireless Network Access Point

3. Windows will now ask you where to search for the driver software. Select **Specify a location** and type in the blank field **D:\USBDrv** (where "D" specifies your CD-ROM). Then, click the **Next** button.



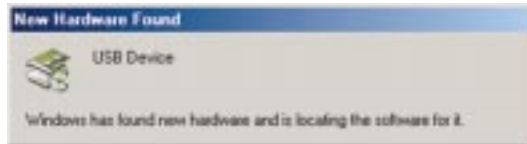
4. Windows will now search for the driver. After Windows has acknowledged finding the driver, click the **Next** button.



5. Windows will now install the driver files. Click the **Finish** button when completed.

Installing the Driver Software for Windows Millennium

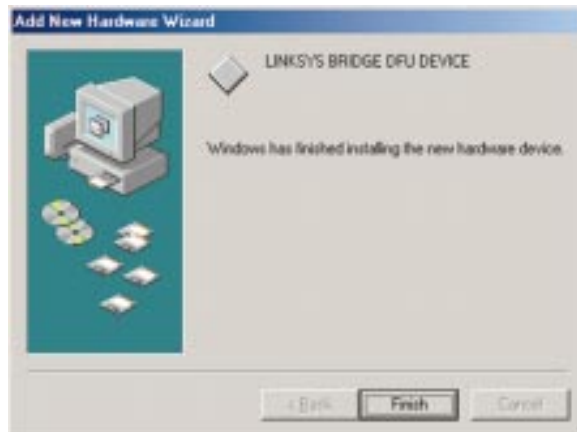
1. Windows Millennium will automatically identify the Wireless Network Access Point, once it is connected to the PC, and prompt you to install the necessary driver.



2. Select **Automatic Search for a better driver (Recommended)** and click the **Next** button. This will search for the Windows Millennium driver.



3. Windows will now install the driver files. Click the **Finish** button when completed.



Installing the Driver Software for Windows 2000

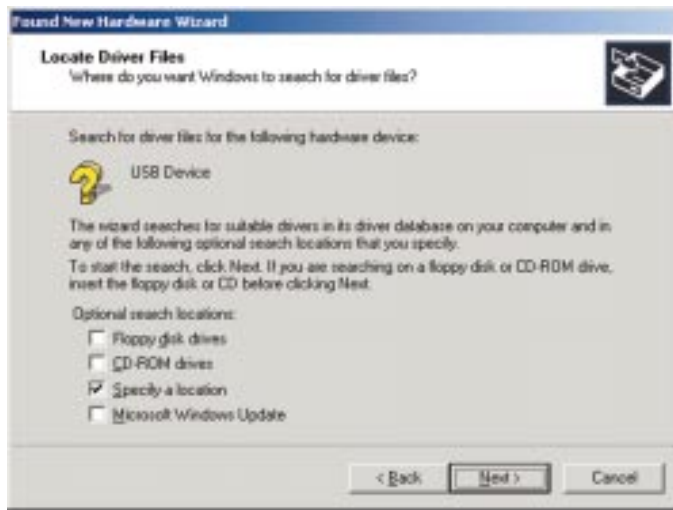
1. Windows 2000 will automatically identify the Wireless Network Access Point, once it is connected to the PC, and prompt you to install the necessary driver. Make sure that the **Setup Utility CD** is inserted into your CD-ROM drive and click the **Next** button on the **Found New Hardware Wizard** screen to proceed.



2. Select **Search for a suitable driver...** and click the **Next** button. This will search for the Windows 2000 driver.



- Under “Optional Search Locations”, select **CD-ROM drive** and click the **Next** button.



- Windows will now search for the driver. After Windows has acknowledged finding the driver, click the **Next** button.



- Windows will now install the driver files. Click the **Finish** button when completed.



Configuring the Wireless Network Access Point

The Wireless Network Access Point can be configured one of two ways, through the DFU Utility or the Access Point SNMP Manager.

DFU Utility

The DFU Utility can be used when configuring the Wireless Network Access Point through a USB connection and is compatible with Windows 98, Millennium, and 2000.

Access Point SNMP Manager

The Access Point SNMP Manager can be used when configuring the Wireless Network Access Point through an Ethernet connection and is compatible with all Windows Operating Systems.



DEFAULT SETTINGS:

The default IP Address is: **192.168.1.250**

The default SubNet Mask is: **255.255.255.0**

Note: In order for all other wireless devices to communicate with the Wireless Network Access Point, those devices must be operating in the **Infrastructure Mode**. If any wireless devices are configured in the **Ad Hoc Mode**, they *will not* be recognized by the Access Point.

The DFU Utility

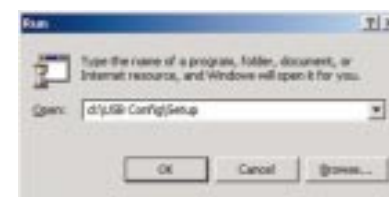
The **DFU Utility** is provided to allow you further customization of the Wireless Network Access Point and your wireless network through your USB port.



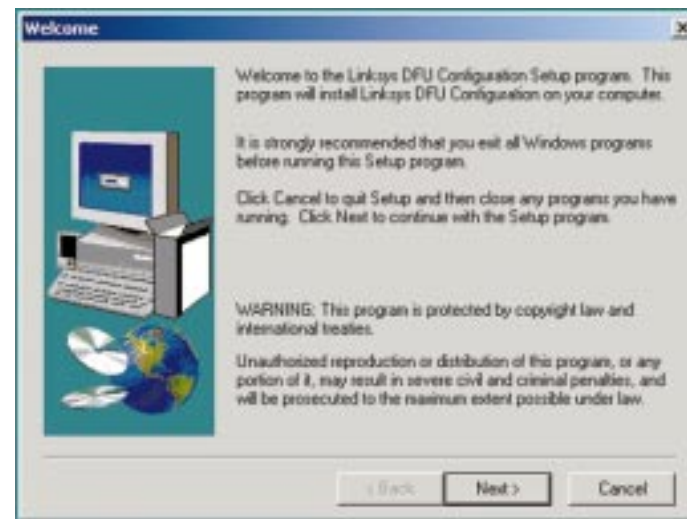
NOTE: Always check with your Network Administrator before making any changes to your network.

Installing the DFU Utility

1. To install the **DFU Utility**, first put the **Setup Utility CD** into your CD-ROM drive. Then, click the Windows Start button and select Run from the Start Menu. In the “Open” field, type **D:\USB Config\SETUP.EXE**.



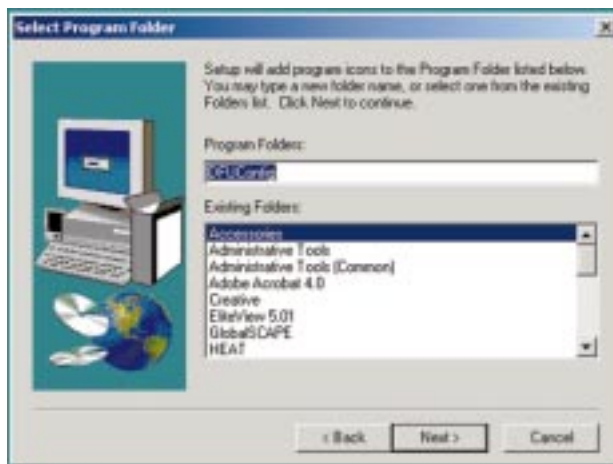
2. This will bring up the **Welcome** screen. After reading this screen, click the **Next** button to continue.



3. The **Destination** screen will show you the default destination chosen by the utility. If you should want to install this in another location, click the **Browse** button and select an alternate destination. When you are ready to continue, click the **Next** button.



4. The next screen will show the **Program Folder** that the utility will use. If you should want to put the utility in another Program Folder, double-click an Existing Folder or, if you don't want to run this out of a Program Folder, delete the Program Folder name. Then, click the **Next** button to continue.



5. The **DFU Utility** has now been installed. Click the **Finish** button to complete installation.

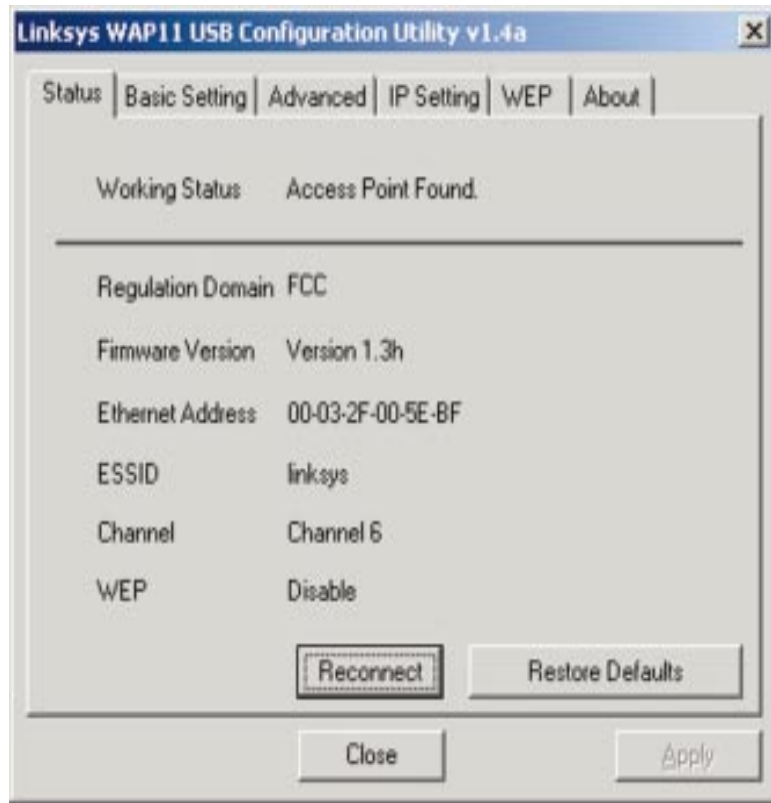


Configuring the Wireless Network Access Point with the DFU Utility

THE STATUS TAB

The Status tab will display the Wireless Network Access Point's current status. From this tab, you can view the status information along with reconnecting to the Wireless Network Access Point and restoring its default settings.

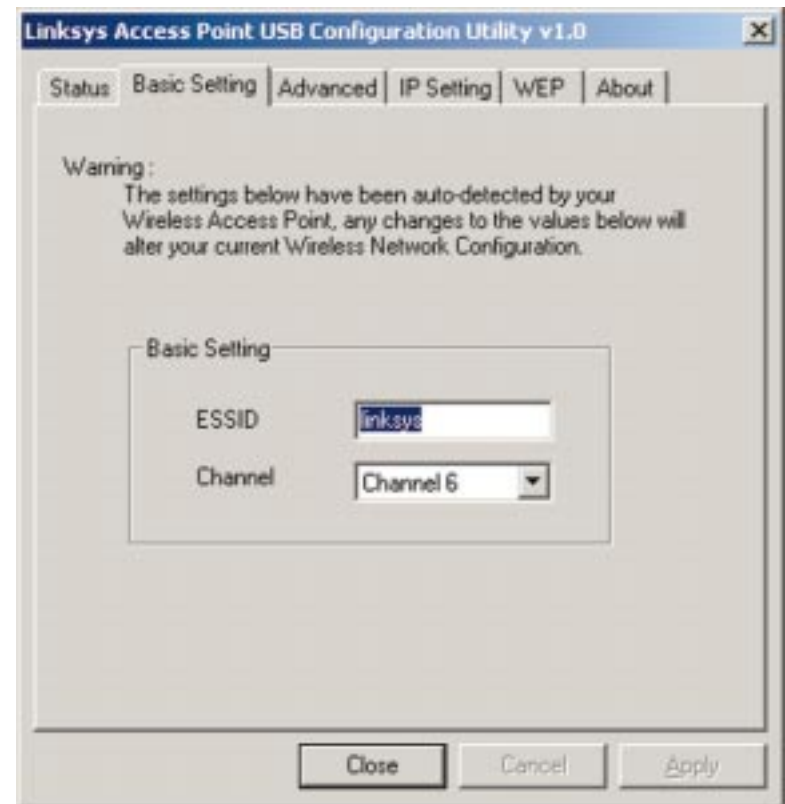
- **Working Status.** This will display your current connection status, notifying you of any problems with the connection.
- **Regulation Domain.** This status shows that the Access Point is operating under FCC guidelines.
- **Firmware Version.** This will display the present version of the Access Point's firmware.
- **Ethernet Address.** This will display the MAC Address of your current Ethernet connection.
- **ESSID.** The unique name shared among all points in your wireless network will be displayed here.
- **Channel.** The wireless channel shared by all of the points in your wireless network will be displayed here.



- **WEP.** If you have not enabled the WEP encryption protocol, this will read Disabled. It will read Enabled when the WEP encryption protocol is in use.
- **Reconnect.** If, for any reason, the USB connection to the Wireless Network Access Point is disconnected, you can reconnect the USB cable and click the **Reconnect** button here. This will retrieve all of the data from the Wireless Network Access Point so you will be ready to use the DFU Utility again.
- **Restore Defaults.** Click this button to restore the Wireless Network Access Point's default settings. Any setting you may have made through the DFU Utility will be lost if this button is clicked.

If you have not already clicked the **Apply** button, the **Close** button will close the DFU Utility without saving any changes. Clicking the **Cancel** button will cancel any changes.

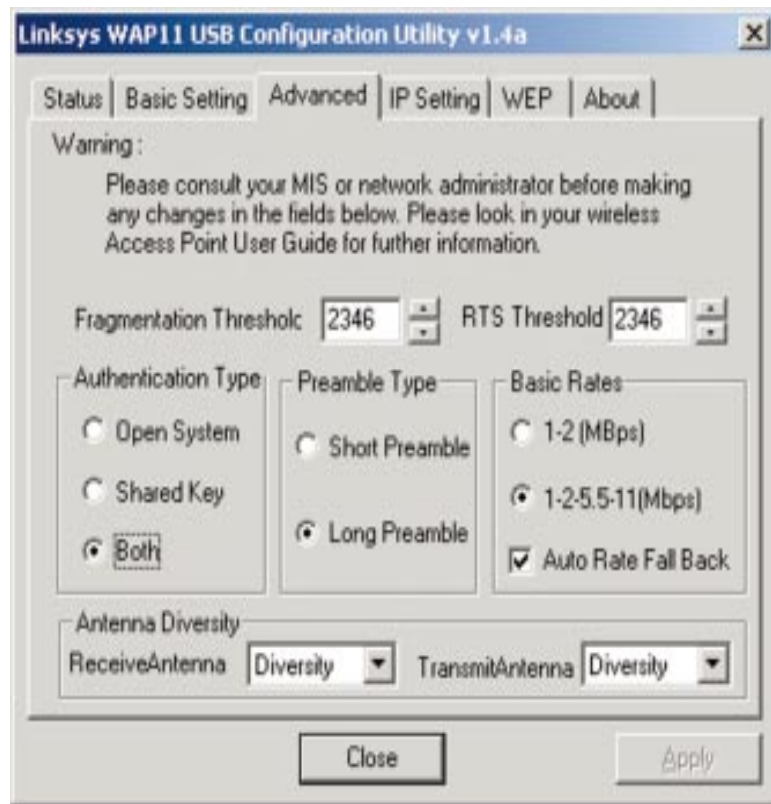
THE BASIC SETTING TAB



The Wireless Network Access Point will automatically detect the settings to your wireless network. Changing these values will alter your current wireless network configuration.

- **ESSID.** The ESSID is the unique name shared among all points in a wireless network. The ESSID must be identical for all points in the network. It is case sensitive and must not exceed 32 characters. Make sure that all points in the network are the same. Verify that you're using the correct ESSID and click the **Apply** button to set it.
- **Channel.** Select the appropriate channel from the list provided to correspond with your network settings, between 1 and 11. All points in your wireless network must use the same channel in order to function correctly. Verify that the correct channel is selected and click the **Apply** button to set it.

THE ADVANCED TAB



Before making any changes to the Advanced tab, please consult your MIS or network administrator as these changes will alter the effectiveness of the Wireless Network Access Point.

- **Fragmentation Threshold.** This value indicates how much of the network resources are devoted to recovering packet errors. The value should remain at its default setting of **2,432**. If you experience high packet error rates, you can increase this value, but it will likely decrease overall network performance. Only minor modifications of this value are recommended.
- **RTS Threshold.** This value should remain at its default setting of **2,432**. Should you encounter inconsistent data flow, only minor modifications are recommended.

- **Authentication Type.** The authentication type defines configuration options for the sharing of wireless networks to verify identity and access privileges of roaming Network Cards. Verify that you've set this to the correct authentication type and click the **Apply** button to set it.
- **Preamble Type.** The preamble defines the length of the CRC block for communication between the Wireless Network Access Point and the roaming Network Card. Verify that you've selected the appropriate preamble type and click the **Apply** button to set it.
- **Basic Rates.** The basic transfer rates should be set depending on the speed of your wireless network. Older, slower wireless networks should be set at 1-2 (Mbps) while a faster wireless network should be set at 1-2-5.5-11 (Mbps). Verify that you've set the correct basic rate for your wireless network and click the **Apply** button to set it.
- The **Auto Rate Fall Back** setting should be checked to make your wireless network flexible to roaming wireless devices. As wireless devices move away from the Wireless Network Access Point, the transfer rate will automatically fall back to the most optimum rate allowed.
- **Antenna Diversity.** These two settings determine whether either or both antennas will be used to transmit or receive. The default setting, **Diversity**, means that the antennas are set to both transmit and receive, which is the recommended setting.

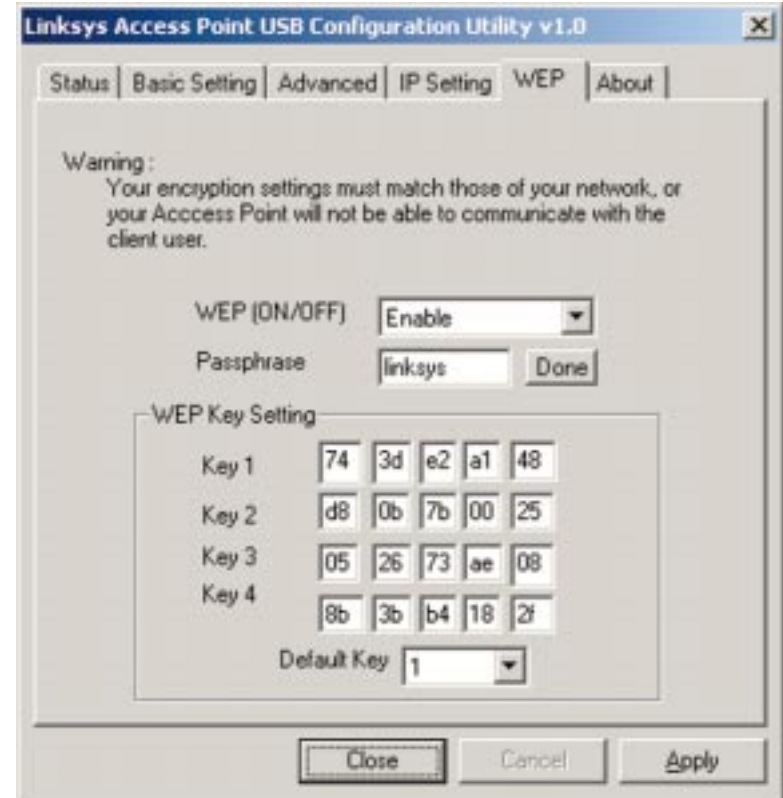
THE IP SETTING TAB



The IP settings for the Wireless Network Access Point are made from this tab.

- **IP Address.** Your IP Address must be set to a different IP Address for the Wireless Network Access Point than for your Ethernet Network. Verify that this is set to the correct IP Address or click the **Apply** button to set it.
- **IP Mask.** Your mask must be set to the same Subnet Mask for the Wireless Network Access Point as your Ethernet Network. Verify that this is set to the correct Subnet Mask and click the **Apply** button to set it.

THE WEP TAB



WEP (Wired Equivalent Privacy) is a data privacy mechanism based on a 40 bit shared key algorithm, as described in the IEEE 802.11b standard. In order to utilize WEP encryption, all points in your wireless network must have WEP enabled and be set to the same Key Setting.

- **WEP (ON/OFF).** In order to utilize WEP encryption, select **Enable** from this pull-down menu. If you do not wish to utilize WEP encryption, make sure **Disable** is selected.
- **Passphrase.** This is the code used when a point on the wireless network wishes to log on to the network. It is a text string with a maximum of 32 alphanumeric characters.

- **WEP Key Setting.** This setting will be the configuration key used in accessing the wireless network via WEP encryption. To generate an encryption key:

1. Type exactly the same case sensitive PassPhrase in the PassPhrase field.
2. Click the **Done** button to create the encryption keys. The Passphrase generates four unique keys.
3. Make sure that the Default Key is the same for each point on the wireless network.
4. Click the **Apply** button to store the information.

THE ABOUT TAB



The About tab displays general information about Linksys and the DFU Utility. The DFU's copyright date and version number are listed as well as the Utility's firmware version. At the bottom of the screen, you will find a button that will access Linksys' web page (once your internet connection is properly set up), the email address for technical support, and the phone number to call for technical support.

Note: Once your Access Point is installed and configured, the USB cable may be removed.

Access Point SNMP Manager

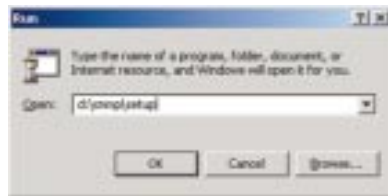
The **Access Point SNMP Manager** is provided to allow you further customization of the Wireless Network Access Point and your wireless network through your ethernet connection.



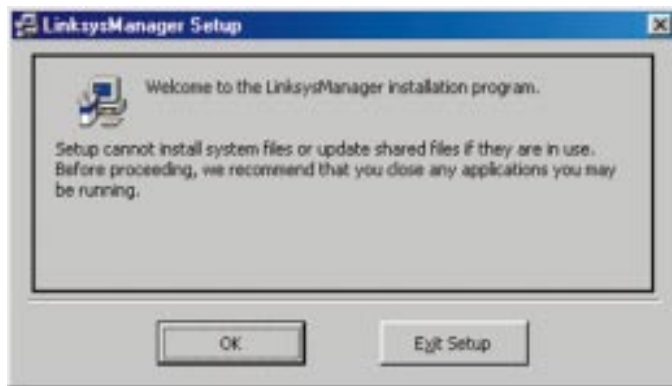
NOTE: Always check with your Network Administrator before making any changes to your network.

Installing the Access Point SNMP Manager

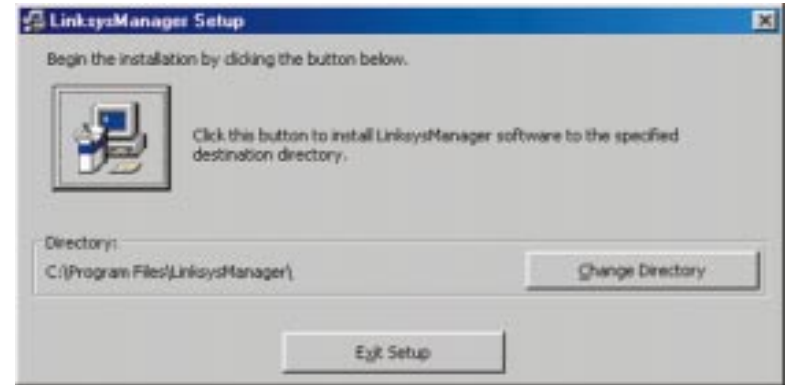
1. To install the **Access Point SNMP Manager**, first put the **Setup Utility CD** into your CD-ROM drive. Then, click the Windows Start button and select Run from the Start Menu. In the “Open” field, type **D:\SNMP\SETUPEXE**.



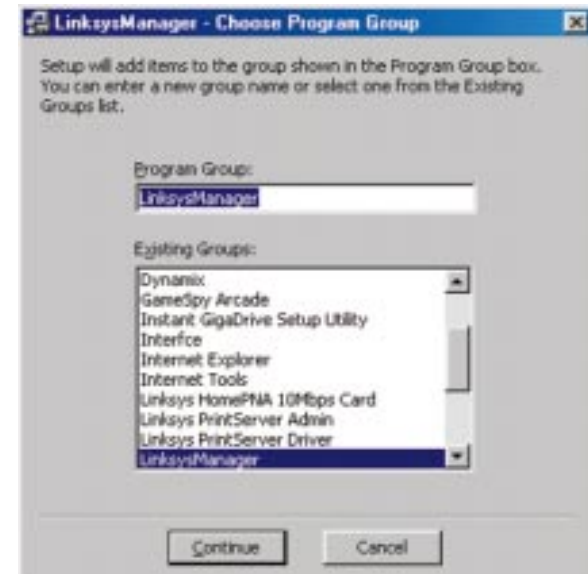
2. This will bring up the **Welcome** screen. After reading this screen, click the **Next** button to continue.



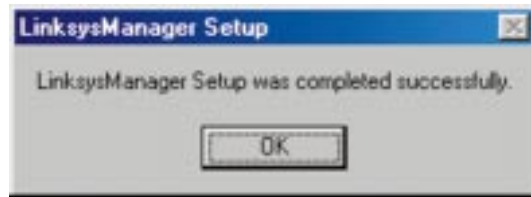
3. The **Destination** screen will show you the default destination chosen by the utility. If you should want to install this in another location, click the **Change Directory** button and select an alternate destination. When you are ready to continue, click the **Installation Icon**. Click the **Exit Setup** button to stop installing the Access Point SNMP Manager.



4. The next screen will show the **Program Folder** where the utility will be located. If you should want to put the utility in another Program Folder, double-click an Existing Folder or, if you don't want to run this out of a Program Folder, delete the Program Folder name. Then, click the **Continue** button to continue.

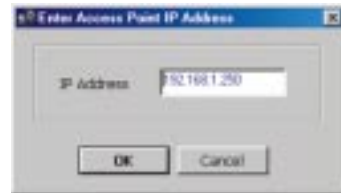


5. The **Access Point SNMP Manager** has now been installed. Click the **OK** button to complete installation.



Configuring the Wireless Network Access Point with the Access Point SNMP Manager

When you first start the Access Point SNMP Manager, a screen will appear, asking you to enter the Wireless Network Access Point's IP Address.

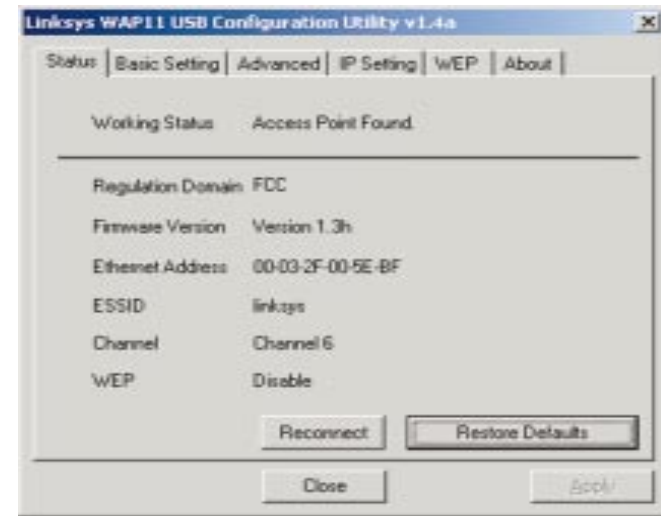


Enter the IP Address - 192.168.1.250 is the default setting - and click the **OK** button to continue.

THE STATUS TAB

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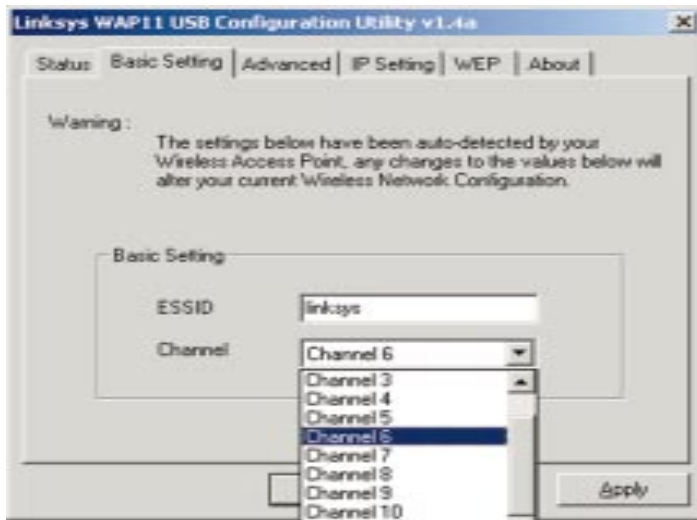
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- **Restore Defaults.** Click this button to restore the Wireless Network Access Point's default settings. Any setting you may have made through the Access Point SNMP Manager will be lost if this button is clicked.

The **Close** button will close the Access Point SNMP Manager without saving any of the changes made.

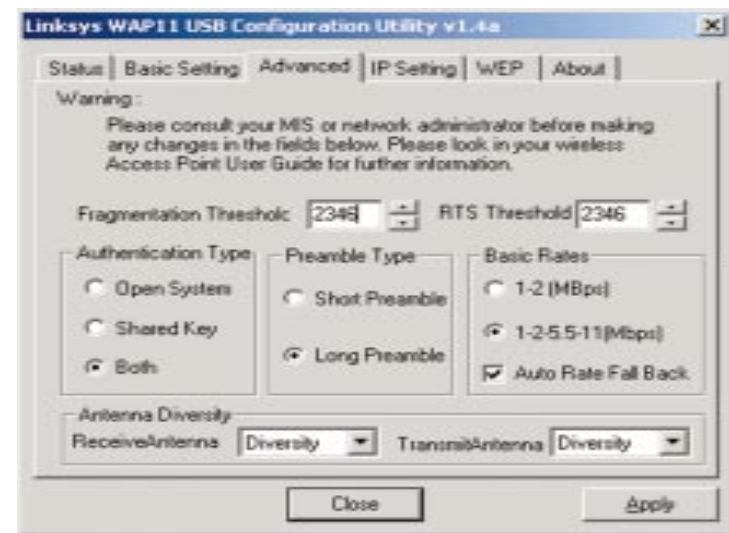
THE BASIC SETTING TAB



The Wireless Network Access Point will automatically detect the settings to your wireless network. Changing these values will alter your current wireless network configuration.

- **ESSID.** The ESSID is the unique name shared among all points in a wireless network. The ESSID must be identical for all points in the network. It is case sensitive and must not exceed 30 characters. Make sure that all points in the network are set the same. Verify that you're using the correct ESSID and click the **Apply** button to set it.
- **Channel.** Select the appropriate channel from the list provided to correspond with your network settings, between 1 and 11 (in North America). All points in your wireless network must use the same channel in order to work correctly. Verify that the correct channel is selected and click the **Apply** button to set it.

THE ADVANCED TAB

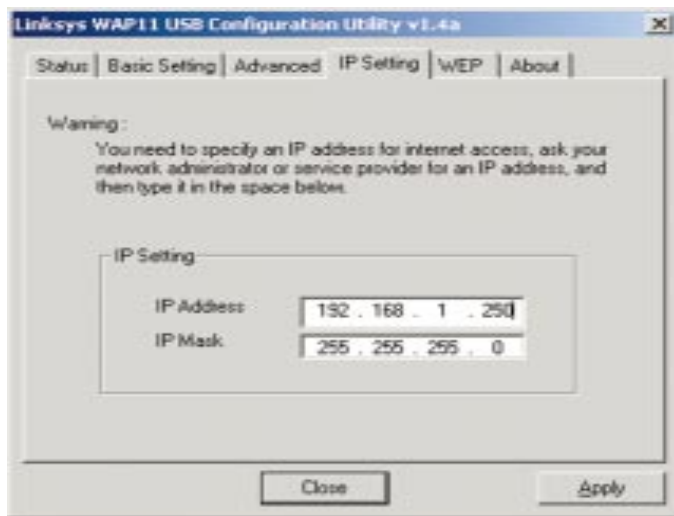


Before making any changes to the Advanced tab, please consult your MIS or network administrator as these changes will alter the effectiveness of the Wireless Network Access Point.

- **Fragmentation Threshold Value.** This value indicates how much of the network's resources are devoted to recovering packet errors. The value should remain at its default setting of **2,432**. If you experience high packet error rates, you can increase this value, but it will likely decrease overall network performance. Only minor modifications of this value are recommended.
- **RTS Threshold Value.** This value should remain at its default setting of **2,432**. Should you encounter inconsistent data flow, only minor modifications are recommended.
- **Authentication Type.** The authentication type defines configuration options for the sharing of wireless networks to verify identity and access privileges of roaming Network Cards. Verify that you've set this to the correct authentication type and click the **Apply** button to set it.
- **Preamble Type.** The preamble defines the length of the CRC block for communication between the Wireless Network Access Point and the roaming Network Card. Verify that you've selected the appropriate preamble type and click the **Apply** button to set it.

- **Basic Rates.** The basic transfer rates should be set depending on the speed of your wireless network. Older, slower wireless networks should be set at 1-2 (Mbps) while a faster wireless network should be set at 1-2-5.5-11 (Mbps). Verify that you've set the correct basic rate for your wireless network and click the **Apply** button to set it.
- The **Auto Rate Fall Back** setting should be checked to make your wireless network flexible to roaming wireless devices. As wireless devices move away from the Wireless Network Access Point, the transfer rate will automatically fall back to the most optimum rate allowed.
- **Antenna Diversity.** These two settings determine whether either or both antennas will be used to transmit or receive. The default setting, **Diversity**, means that the antennas are set to both transmit and receive, which is the recommended setting.

THE IP SETTING TAB

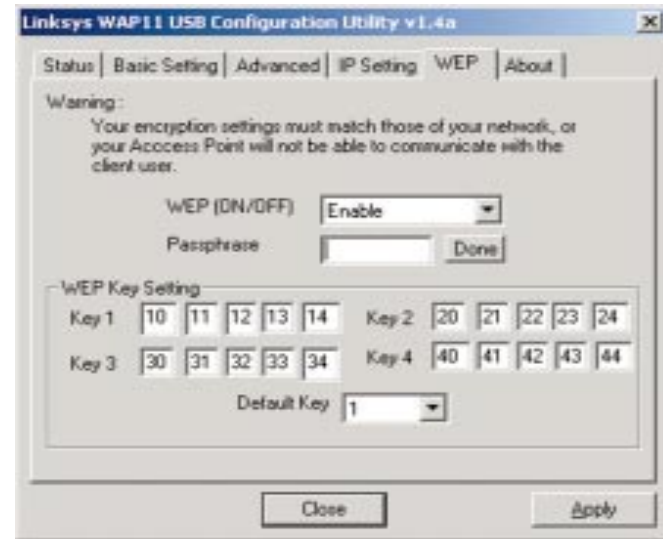


The IP settings for the Wireless Network Access Point are made from this tab.

- **IP Address.** Your IP Address must be set to a different IP Address for the Wireless Network Access Point than for your Ethernet Network. Verify that this is set to the correct IP Address or click the **Apply** button to set it.

- **IP Mask.** Your mask must be set to the same Subnet Mask for the Wireless Network Access Point as your Ethernet Network. Verify that this is set to the correct Subnet Mask or click the **Apply** button to set it.

THE WEP TAB



WEP (Wired Equivalent Privacy) is a data privacy mechanism based on a 40 bit shared key algorithm, as described in the IEEE 802.11 standard. In order to utilize WEP encryption, all points in your wireless network must have WEP enabled and be set to the same Key Setting.

- **WEP (ON/OFF).** In order to utilize WEP encryption, select **Enable** from this pull-down menu. If you do not wish to utilize WEP encryption, make sure **Disable** is selected.
- **Passphrase.** This is the code used when a point on the wireless network wishes to log on to the network. It is a text string with a maximum of 32 alphanumeric characters.
- **WEP Key Setting.** This setting will be the configuration key used in accessing the wireless network via WEP encryption. To generate an encryption key:

1. Type exactly the same case sensitive **PassPhrase** in the PassPhrase field.
2. Click the **Done** button to create the encryption keys. The Passphrase generates four unique keys.
3. Make sure that the Default Key is the same for each point on the wireless network.
4. Click the **Apply** button to store the information.

THE ABOUT TAB



The About tab displays general information about Linksys and the Access Point SNMP Manager. The SNMP Configuration Utility's copyright date and version number are listed as well as the Utility's firmware version. At the bottom of the screen, you will find a button that will access Linksys' web page (once your internet connection is properly set up), the email address for technical support, and the phone number to call for technical support.

Troubleshooting

Common Problems and Solutions

This chapter provides solutions to problems usually encountered during the installation and operation of the Wireless Network Access Point. Read the description below to solve your problems. If you can't find an answer here, check the Linksys website at www.linksys.com.

1. What is the purpose of antenna diversity and when should it be used? When used, how should it be set-up?

The dual antennas on the Access Point are probably best explained using this example.... Take television, if you have ever had the old "rabbit ear type of antenna" and saw a reflection on TV (called "ghosts") and then moved the antenna and it "went away" (Using two antenna's allow us to "MOVE AWAY" from reflections that cause us to lose or have to retransmit data. It should be used indoors as outdoor reflections are rare. As long as both antenna's cover roughly the same area this is fine.

Frequently Asked Questions

Can the Wireless Network Access Point act as my DHCP Server?

No. The Access Point is nothing more than a wireless hub, and as such, cannot be configured to handle DHCP capabilities.

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 cordless 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 802.11b standard?

The IEEE 802.11b Wireless LAN standards subcommittee, which is formulating a standard for the industry. The objective is to enable wireless LAN hardware from different manufacturers to communicate.

What IEEE 802.11 features are supported?

The product supports the following IEEE 802.11 functions:

- CSMA/CA plus Acknowledge protocol
- Multi-Channel Roaming
- Automatic Rate Selection
- RTS/CTS feature
- Fragmentation
- Power Management

What is Ad-hoc?

An Ad-hoc wireless LAN is a group of computers, each with a WLAN adapter, connected as an independent wireless LAN. Ad hoc wireless LAN is applicable at a departmental scale for a branch or SOHO operation.

What is Infrastructure?

An integrated wireless and wired LAN is called an Infrastructure configuration. Infrastructure is applicable to enterprise scale for wireless access to central database, or wireless application for mobile workers.

What is Roaming?

Roaming is the ability of a portable computer user to communicate continuously while moving freely throughout an area greater than that covered by a single Wireless Network Access Point. Before using the roaming function, the workstation must make sure that it is the same channel number with the Wireless Network Access Point of dedicated coverage area.

To achieve true seamless connectivity, the wireless LAN must incorporate a number of different functions. Each node and Wireless Network 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 Wireless Network 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 Wireless Network Access Point and the distance of each Wireless Network Access Point to the wired backbone. Based on that information, the node next selects the right Wireless Network 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 nodes RF transmitter regularly checks the system to determine whether it is in touch with the original Wireless Network Access Point or whether it should seek a new one. When a node no longer receives acknowledgment from its original Wireless Network Access Point, it undertakes a new search. Upon finding a new Wireless Network Access Point, it then re-registers, and the communication process continues.

What is BSS ID?

A specific Ad hoc LAN is called a Basic Service Set (BSS). Computers in a BSS must be configured with the same BSS ID.

What is ESS ID?

An Infrastructure configuration could also support roaming capability for mobile workers. More than one BSS can be configured as an Extended Service Set (ESS). Users within an ESS could Roam freely between BSSs while served as a continuous connection to the network wireless stations and Wireless Network Access Points within an ESS must be configured with the same ESS ID and the same radio channel.

What is ISM band?

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

What is Spread Spectrum?

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

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

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

Would the information be intercepted while transmitting on air?

WLAN features two-fold protection in security. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent security feature of scrambling. On the software side, WLAN series offer the encryption function (WEP) to enhance security and Access Control. Users can set it up depending upon their needs.

Can Instant Wireless™ products support printer sharing?

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

What is WEP?

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

Glossary

Ad-hoc Network - An ad-hoc network is a wireless network or other small network in which some of the network devices are part of the network only for the duration of a communications session while in some close proximity to the rest of the network.

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

DHCP (Dynamic Host Configuration Protocol) - A protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Using the Internet's set of protocol (TCP/IP), each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

DHCP uses the concept of a "lease" or amount of time that a given IP address will be valid for a computer. The lease time can vary depending on how long a user is likely to require the Internet connection at a particular location. It's especially useful in education and other environments where users change frequently. Using very short leases, DHCP can dynamically reconfigure networks in which there are more computers than there are available IP addresses.

DHCP supports static addresses for computers containing Web servers that need a permanent IP address.

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

DSSS - Also known as "Direct Sequence Spread Spectrum", this is a variety of radio transmission methods that continuously change frequencies or signal patterns. Direct sequence spread spectrum (DSSS), which is used in CDMA, multiplies the data bits by a very fast pseudo-random bit pattern (PN sequence) that

"spreads" the data into a large coded stream that takes the full bandwidth of the channel

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

ESS - More than one BSS in a network.

FHSS - Also known as "Frequency Hopping Spread Spectrum". Frequency hopping spread spectrum (FHSS) continuously changes the center frequency of a conventional carrier several times per second according to a pseudo-random set of channels, while chirp spread spectrum changes the carrier frequency. Because a fixed frequency is not used, illegal monitoring of spread spectrum signals is extremely difficult, if not downright impossible depending on the particular method.

Firmware - Programming that is inserted into programmable read-only memory (programmable read-only memory), thus becoming a permanent part of a computing device.

IEEE - The Institute of Electrical and Electronics Engineers. The IEEE describes itself as "the world's largest technical professional society -- promoting the development and application of electrotechnology and allied sciences for the benefit of humanity, the advancement of the profession, and the well-being of our members."

The IEEE fosters the development of standards that often become national and international standards. The organization publishes a number of journals, has many local chapters, and several large societies in special areas, such as the IEEE Computer Society.

Infrastructure - An infrastructure network is a wireless network or other small network in which the wireless network devices are made a part of the network through the Access Point which connects them to the rest of the network.

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

Protocol part of TCP/IP includes your IP address in the message (actually, in each of the packets if more than one is required) and sends it to the IP address that is obtained by looking up the domain name in the Uniform Resource Locator you requested or in the e-mail address you're sending a note to. At the other end, the recipient can see the IP address of the Web page requestor or the e-mail sender and can respond by sending another message using the IP address it received.

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

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

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

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

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

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

PCMCIA - The PCMCIA (Personal Computer Memory Card International Association) is an industry group organized in 1989 to promote standards for a credit card-size memory or I/O device that would fit into a personal computer, usually a notebook or laptop computer.

Ping - (Packet INternet Groper) An Internet utility used to determine whether a particular IP address is online. It is used to test and debug a network by sending out a packet and waiting for a response.

RJ-45 - A connector similar to a telephone connector that holds up to eight wires, used for connecting Ethernet devices.

Roaming - The ability to use a wireless device and be able to move from one access point's range to another without losing the connection.

Static IP Address - A permanent IP address that is assigned to a node in a TCP/IP network.

Subnet Mask - The method used for splitting IP networks into a series of sub-groups, or subnets. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets.

TCP (Transmission Control Protocol) - A method (protocol) used along with the Internet Protocol (Internet Protocol) to send data in the form of message units between computers over the Internet. While IP takes care of handling the actual delivery of the data, TCP takes care of keeping track of the individual units of data (called packet) that a message is divided into for efficient routing through the Internet.

TCP/IP - Transmission Control Protocol/Internet Protocol (TCP/IP) is the basic communication language or protocol of the Internet. It can also be used as a communications protocol in a private network (either an intranet or an extranet). When you are set up with direct access to the Internet, your computer is provided with a copy of the TCP/IP program just as every other computer that you may send messages to or get information from also has a copy of TCP/IP.

UDP (User Datagram Protocol) - A communications method (protocol) that offers a limited amount of service when messages are exchanged between computers in a network that uses the Internet Protocol (IP). UDP is an alternative to the Transmission Control Protocol (TCP) and, together with IP, is sometimes referred to as UDP/IP. Like the Transmission Control Protocol, UDP uses the Internet Protocol to actually get a data unit (called a datagram) from one computer to another. Unlike TCP, however, UDP does not provide the service of dividing a message into packets (datagrams) and reassembling it at the other end. Specifically, UDP doesn't provide sequencing of the packets that the data arrives in. This means that the application program that uses UDP must be able to make sure that the entire message has arrived and is in the right order. Network applications that want to save processing time because they have very small data units to exchange (and therefore very little message reassembling to do) may prefer UDP to TCP.

UTP - Unshielded twisted pair is the most common kind of copper telephone wiring. Twisted pair is the ordinary copper wire that connects home and many business computers to the telephone company. To reduce crosstalk or electromagnetic induction between pairs of wires, two insulated copper wires are twisted around each other. Each signal on twisted pair requires both wires. Since some telephone sets or desktop locations require multiple connections, twisted pair is sometimes installed in two or more pairs, all within a single cable.

WEP (Wired Equivalent Privacy) - A data privacy mechanism based on a 64-bit shared key algorithm, as described in the IEEE 802.11 standard.

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

Specifications

Standards:	IEEE 802.3 (10BaseT), IEEE 802.3u (100BaseTX), IEEE 802.11b (Wireless)
Channels:	11 Channels (US, Canada) 13 Channels (Europe) 14 Channels (Japan)
Ports:	One 10BaseT RJ-45 Port, One USB Port
Cabling Type:	10BaseT: UTP Category 3 or Better USB: USB Cable
Operating Range (Wireless):	Indoors: 30M (100 ft.) up to 11 Mbps 50M (165 ft.) up to 5.5 Mbps 70M (230 ft.) up to 2 Mbps 91M (300 ft.) up to 1 Mbps Outdoors: 152M (500 ft.) up to 11 Mbps 270M (885ft.) up to 5.5 Mbps 396M (1300 ft.) up to 2 Mbps 457M (1500 ft.) up to 1 Mbps
Data Rate:	Up to 11Mbps (Wireless), 10Mbps (Ethernet),
LEDs:	Power, Act, Link (Wired - Link/Activity)

Environmental

Dimensions:	7.31" x 6.16" x 1.88" (186mm x 154mm x 48mm)
Unit Weight:	20.5 oz. (0.58 Kg)
Power:	5V, 550mA TX, 230mA RX
Certifications:	FCC Class B, CE Mark Commercial
Operating Temp.:	0°C to 55°C (32°F to 131°F)
Storage Temp.:	0°C to 70°C (32°F to 158°F)
Operating Humidity:	0% to 70% Non-Condensing
Storage Humidity:	0% to 95% Non-Condensing

Warranty Information

BE SURE TO HAVE YOUR PROOF OF PURCHASE AND A BARCODE FROM THE PRODUCT'S PACKAGING ON HAND WHEN CALLING. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE.

IN NO EVENT SHALL LINKSYS' LIABILITY EXCEED THE PRICE PAID FOR THE PRODUCT FROM DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT, ITS ACCOMPANYING SOFTWARE, OR ITS DOCUMENTATION. LINKSYS DOES NOT OFFER REFUNDS FOR ANY PRODUCT.

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Contact Information

For help with the installation or operation of this product, contact Linksys Customer Support at one of the phone numbers or Internet addresses below.

Information 800-546-5797 (LINKSYS)

Tech Support and RMA Issues 800-326-7114

Fax 949-261-8868

Email support@linksys.com

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FTP Site <ftp.linksys.com>



<http://www.linksys.com>

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