Dlink

**IEEE802.11g 2.4GHz
WIRELESS LAN ACCESS POINT**

DWL-2100AP

Manual

Contents

Package Contents

Contents of Package:

- n **IEEE 802.11g** 2.4GHz Wireless LAN Access Point

- n Power Adapter – 5.0V DC, 2A

- n Quick Installation Guide on CD

- n Ethernet Cable

Note: Using a power supply with a different voltage rating than the one included with the 11G WIRELESS LAN ACCESS POINT will cause damage and void the warranty for this product. *If any of the above items are missing, please contact your reseller.*

System Requirements For Configuration:

- n Computer with Windows, Macintosh, or Linux-based operating system with an installed Ethernet adapter
- n Internet Explorer or Netscape Navigator version 6.0 or above, with JavaScript enabled
- n At least 128 MB of memory and a 500 MHz processor

Introduction

The *11g WIRELESS LAN ACCESS POINT* provides the most expanded user bandwidth available in an AP. Wireless clients can connect to this AP using any of its channels to transfer data at speeds never achievable before in a wireless device. The 11g WIRELESS LAN ACCESS POINT operates seamlessly and simultaneously in the 2.4GHz frequency spectrums supporting the 802.11b and the newer, faster 802.11g wireless standards. For offices, schools or public hotspots that already use 802.11b devices, the 11g WIRELESS LAN ACCESS POINT is a great way to expand an existing network and enable even more users to communicate with one another, access data and the Internet. Now, you can have an AP that will compliment your existing network and protect the investment you made when you provided the convenience of wireless networking.

The 11g WIRELESS LAN ACCESS POINT offers transfer rates up to 54Mbps in the 2.4GHz band, large data packets travel from the router to a remote desktop or roaming laptop PC at up to five times the speed of previous wireless devices. Everyone can work faster and more efficiently or watch a streaming video smoothly. Network administrators can partition the usage of the 11g WIRELESS LAN ACCESS POINT by segmenting the users on the wireless network by frequency band. Users who require special networking privileges — access to sensitive information, specific departments or videoconferencing — may use just the 802.11b and 802.11g channels. This type of user segmentation optimizes the AP's performance and delivers the best network experience to each set of users.

The 11g WIRELESS LAN ACCESS POINT is ideal for network administrators who require additional management, firewall, and other network security features. All of the AP's settings are easily accessible in the operating system independent, Web-based software user interface that also features a step-by-step Setup Wizard to get your router up and running in just a matter of minutes. The 11g WIRELESS LAN ACCESS POINT incorporates the WPA* (Wi-Fi Protected Access) which dynamically encrypts data as it's being sent.

Connections

n **Straight-Through** cable is required when connecting to a router or switch

n **Cross-Over** cable is required when connecting directly to an Ethernet adapter on a computer

Features & Benefits

n **Up to 54 Mbps** - Means you can transfer large files up to 5 times more quickly than was previously possible without signal interference

n **802.11b and 802.11g Compliant -** Means you can mix devices from different standards without sacrificing connectivity

n **Better Security with WPA -** Other 802.11g devices can connect securely using WPA (Wi-Fi Protected Access)

LED stands for Light-Emitting Diode. The **11g WIRELESS LAN ACCESS POINT** has 3 **Green** LEDs as shown below:

LED	LED Activity
Power	A steady light indicates a connection to a power source
LAN (10/100)	A steady light indicates a connection to the Ethernet port; a blinking light indicates activity
WLAN (802.11b or 802.11g)	A blinking light indicates activity in the respective wireless mode: 802.11b or 802.11g

Wireless Basics

11g WIRELESS LAN ACCESS POINT is based on industry standards to provide easy-to use and compatible high-speed wireless connectivity within your home, business or public access wireless networks. Strictly adhering to the IEEE standard, the 11g WIRELESS LAN ACCESS POINT will allow you to securely access the data you want, when and where you want it. You will be able to enjoy the freedom that wireless networking delivers.

A wireless local area network (WLAN) is a cellular computer network that transmits and receives data with radio signals instead of wires. Wireless LANs are used increasingly in both home and office environments, and public areas such as airports, coffee shops and universities. Innovative ways to utilize WLAN technology are helping people to work and communicate more efficiently. Increased mobility and the absence of cabling and other fixed infrastructure have proven to be beneficial for many users.

Wireless users can use the same applications they use on a wired network. Wireless adapter cards used on laptop and desktop systems support the same protocols as Ethernet adapter cards.

Under many circumstances, it may be desirable for mobile network devices to link to a conventional Ethernet LAN in order to use servers, printers or an Internet connection supplied through the wired LAN. A Wireless Access Point (AP) is a device used to provide this link.

People use wireless LAN technology for many different purposes:

Mobility - Productivity increases when people have access to data in any location within the operating range of the WLAN. Management decisions based on real-time information can significantly improve worker efficiency.

Low Implementation Costs – WLANs are easy to set up, manage, change and relocate. Networks that frequently change can benefit from WLANs ease of implementation. WLANs can operate in locations where installation of wiring may be impractical.

Installation and Network Expansion - Installing a WLAN system can be fast and easy and can eliminate the need to pull cable through walls and ceilings. Wireless technology allows the network to go where wires cannot go - even outside the home or office.

Inexpensive Solution – Wireless network devices are as competitively priced as conventional Ethernet network devices.

Scalability – WLANs can be configured in a variety of ways to meet the needs of specific applications and installations. Configurations are easily changed and range from peer-to-peer networks suitable for a small number of users to larger infrastructure networks to accommodate hundreds or thousands of users, depending on the number of wireless devices deployed.

Wireless Basics (continued)

- **n** *The 11g WIRELESS LAN ACCESS POINT is compatible with the IEEE802.11g wireless products*: 802.11g Wireless Cardbus Adapters used with laptop computers
- **n** 802.11g Wireless PCI cards used with desktop computers

Standards-Based Technology

The 11g WIRELESS LAN ACCESS POINT utilizes the **802.11b** and **802.11g** standards.

The IEEE **802.11g** standard is an extension of the **802.11b** standard. It increases the data rate up to 54 Mbps within the 2.4GHz band. 802.11g utilize **OFDM** technology.

This means that in most environments, within the specified range of this device, you will be able to transfer large files quickly or even watch a movie in MPEG format over your network without noticeable delays. This technology works by transmitting high-speed digital data over a radio wave utilizing **OFDM** (**O**rthogonal **F**requency **D**ivision **M**ultiplexing) technology. **OFDM** works by splitting the radio signal into multiple smaller sub-signals that are then transmitted simultaneously at different frequencies to the receiver. **OFDM** reduces the amount of **crosstalk** (interference) in signal transmissions.

The 11g WIRELESS LAN ACCESS POINT offers the most advanced network security features available today, including: *WPA*.

In addition to its compatibility with 802.11g devices, the 11g WIRELESS LAN ACCESS POINT is compatible with 802.11b devices. This means that if you have an existing 802.11b network, or a network with a mixture of 802.11g and 802.11b, the devices in that network will be compatible with the 11g WIRELESS LAN ACCESS POINT.

Wireless Basics *(continued)*

Installation Considerations

Desktop and laptop computers with wireless network adapters installed can access the 11g WIRELESS LAN ACCESS POINT from virtually anywhere within its operating range. Keep in mind, however, that the number, thickness and location of walls, ceilings, or other objects that the wireless signals must pass through, may limit the range. Typical ranges vary depending on the types of materials and background RF (radio frequency) noise in your home or business. The key to maximizing wireless range is to follow these basic guidelines:

1

Keep the number of walls and ceilings between the 11g WIRELESS LAN ACCESS POINT and other network devices to a minimum - each wall or ceiling can reduce your wireless product's range from 3-90 feet (1-30 meters.) Position your devices so that the number of walls or ceilings is minimized.

2

Be aware of the direct line between network devices. A wall that is 1.5 feet thick (.5 meters), at a 45-degree angle appears to be almost 3 feet (1 meter) thick. At a 2-degree angle it looks over 42 feet (14 meters) thick! Position devices so that the signal will travel straight through a wall or ceiling (instead of at an angle) for better reception.

3

Building materials can impede the wireless signal - a solid metal door or aluminum studs may have a negative effect on range. Try to position wireless devices and computers with wireless adapters so that the signal passes through drywall or open doorways and not other materials.

4

Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that may generate extreme RF noise.

Getting Started

IP ADDRESS

Note: If you are using a DHCP-capable router in your network setup you will not need to assign a static IP Address.

If you need to assign IP Addresses to the computers on the network, please remember that the **IP Address for each computer must be in the same IP Address range as all the computers in the network**, and the Subnet mask must be exactly the same for all the computers in the network.

For example: If the first computer is assigned an IP Address of 10.0.0.2 with a Subnet Mask of 255.0.0.0, then the second computer can be assigned an IP Address of 10.0.0.3 with a Subnet Mask of 255.0.0.0, etc.

IMPORTANT: If computers or other devices are assigned the same IP Address, one or more of the devices may not be visible on the network.

An **Infrastructure** wireless network contains an Access Point or Router. The **Infrastructure Network** example, shown here, contains the following network devices:

For a typical wireless setup (as shown above,) please do the following:

1. You will need a broadband Internet access (Cable/DSL) subscription

2. Consult with your Cable/DSL provider for proper installation of the modem

3. Connect the modem to an Ethernet broadband router.

4. Connect the router to the 11g WIRELESS LAN ACCESS POINT.

5. If you are connecting a desktop computer in your network, you can install any 11g compliant wireless PCI adapter into an available PCI slot.

6. Install a WLAN 11g CardBus card into the Notebook PC.

Using the Web Configuration Menu

Whenever you want to configure your network or the 11g WIRELESS LAN ACCESS POINT, you can access the Configuration Menu by opening the web-browser and typing in the IP Address of the 11g WIRELESS LAN ACCESS POINT. The 11g WIRELESS LAN ACCESS POINT default IP Address is shown below:

n   Open the web browser

n   Type in the **IP Address** of the Access Point

Note: if you have changed the default IP Address assigned to the 11g WIRELESS LAN ACCESS POINT, make sure to enter the correct IP Address.

n   Type **admin** in the **User Name** field

n   Leave the **Password** blank

n   Click **OK**

Once entered, the **Current Status sc**reen will appear. If your Access Point is an 11g only device, there will be only WLAN 802.11g Status available for your viewing. If you are going to use the option, Setup Wizard, please refer to the *Quick Installation Guide* for more information.

Current Status:

Using the Configuration Menu (continued)

Advanced Setup>Access Point>Configuration>IP Address

This window displays the default settings of the 11g WIRELESS LAN ACCESS POINT.

Get IP From: Choose **Manual** or **Auto**. If you select **Manual** you will manually input the IP Address. If you select **Auto** the DHCP server on your network will automatically assign an IP Address.

IP Address: The default IP Address is 10.0.0.1.

Subnet Mask: The **Subnet Mask** is 255.0.0.0

Default Gateway: Input the IP Address of the Default Gateway (the router in the network).

Click **Apply** if you have made any changes.

> Note: In the Configuration screens that follow, you will be able to configure settings for 802.11g devices in your network. Settings that you input for 802.11g devices will also apply to 802.11b devices in your network.

Using the Configuration Menu (continued)

Advanced Setup>Access Point>Configuration>Device Information:

Clicking on the "**Device Information**" menu will bring out the above menu. It allows you to modify for the AP System Name and System Contact information. Just type in your new information on whiteout fields, and click on "**Apply**" button to save the information.

Using the Configuration Menu (continued)

Wireless Band: Select the 802.11b or 802.11g.

SSID: (**Service Set Identifier**) **"default" is the default setting for 802.11g.** The SSID is a unique name that identifies a network. All devices on a network must share the same SSID name in order to communicate on the network. If you choose to change the SSID from the default setting, input your new SSID name in this field. The SSID can be up to 32 characters in length.

SSID Broadcast: "Enable" will allow all WLAN clients to observe its Wireless LAN network presence. "Disable" will make the Access Point invisible to any client scanning.

Channel: Channel 6 is the default channel for 802.11b and 802.11g. Select a different channel if you want to change the default setting. All devices on the network must be set to the same channel to communicate on the network. *(Current wireless network adapters will automatically scan for the channel to establish connection with the access point.)*

Frequency: The frequency range will be displayed.

Data Rate: Select the transmission rate for the network

Beacon Interval: Beacons are packets sent by an Access Point to synchronize a wireless network. Specify a Beacon interval value (20-1000.) Default (100) is recommended.

DTIM: (**D**elivery **T**raffic **I**ndication **M**essage) Enter a value between 1 and 255 for the Delivery Traffic Indication Message (DTIM.) A DTIM is a countdown informing clients of the next window for listening to broadcast and multicast messages.

Fragment Length: This value should remain at its default setting of 2346. If you experience a high packet error rate, you may slightly increase your Fragmentation Threshold within the value range of 256 to 2346. Setting the Fragmentation Threshold too low may result in poor performance.

RTS Length: This value should remain at its default setting of 2346. If you encounter inconsistent data flow, only minor modifications to the value range between 256 and 2346 are recommended.

Transmit Power: Adjust the transmission range here. This tool can be helpful for security purposes if you wish to limit the transmission range.

Please click on "**Apply**" button to have the Access Point saving the new options once you have completed the modification.

Using the Configuration Menu (continued)

Advanced Setting> Access Point>Configuration>WLAN partition

WLAN Partition is used to allow/disallow traffic among users or transmission media.

Wireless Band: For 11g only AP, there is only **IEEE802.11g** selection for the field.

Internal Station Connection: When "**Enabled**", every WLAN station connected to the Access Point can see each other through PING, FTP, TELNET or Network Neighborhood Search. Otherwise, any station probing will be cut off. The default setting is "**Enabled**".

Ethernet to WLAN Access: When "**Enabled**", Ethernet broadcast packets are allowed to penetrate the Access Point to the WLAN client(s). By disabling the option, no one from the Ethernet side can initiate any probing action on the WLAN client(s). The broadcast packets from the WLAN client(s) into the Ethernet LAN side will not be affected by this option setting.

Please click on the "**Apply**" button to save the options once you have completed the changes.

Using the Configuration Menu (continued)

Advanced Setup>Access Point>Configuration>Access Control Settings

Control:

> **Disabled - Disable** the Access Control feature
>
> **Accept - Accept** the MAC Addresses in the list into the network
>
> **Reject - Reject** the MAC Addresses in the list from participating in the network

Input MAC Address: Input the MAC Addresses into the list. Click "**Save**" to add the address into the Current Access Control List.

> **MAC Address** (**M**edia **A**ccess **C**ontrol Address)
> A unique hardware address that identifies a device on a network. It is assigned at the factory and cannot be changed. Usually you will find this address on a sticker on the device or on the packaging. *(Please use the following format when entering the MAC address- xx:xx:xx:xx:xx:xx)*

Current Access Control List: An administrator can view or delete any of the added item from the table shown here.

Using the Configuration Menu (continued)

Advanced Setup>Access Point>Configuration>Security Settings

Wireless Band: If the access point is an 11g device, IEEE 802.11g will be the only choice here.

Authentication: Select from one of the following:

n **Open System:** the 11g WIRELESS LAN ACCESS POINT will be visible to all devices on the network. **Open System** is the **default** setting.

n **Shared Key:** in order to access the 11g WIRELESS LAN ACCESS POINT on the network, the device must be listed in the **Access Control List**

n **Shared Key/Open System:** click here to select both options

WEP: Select **Enabled** or **Disabled** (the **default** setting is **Disabled**)

WEP Key Type: Select **HEX** (Hexadecimal) or **ASCII**

> *Hexadecimal digits consist of the numbers 0-9 and the letters A-F **ASCII** (American Standard Code for Information Interchange) is a code for representing English letters as numbers from 0-127*

WEP Key Size: Select **64, 128 or 256 bit for 802.11b and 802.11g**

Valid Key: Select the key that you will use from one of the four keys in the Key Table.

Key Table: Input up to 4 keys using the format that you have selected in *Wep Key Type.*

Using the Management Menu

Advanced Setup>Access Point>Management> Admininstration

User Name: The default User Name is admin

Old Password: To change your password, first enter the old password

New Password: Enter the new password

Confirm New Password: Re-enter the new password

To save changes, click "**Apply".**

Using the Management Menu (Continued)

**Advanced Setup>Access Point>Management> Misc**

Telnet Service: When enabled, Administrator can access the device configuration via Telnet operation.

Timeout: Under the Telnet session, the device will log off the administrator if he is inactive for more than the timeout period specified here.

Using the Maintenance Menu (Continued)

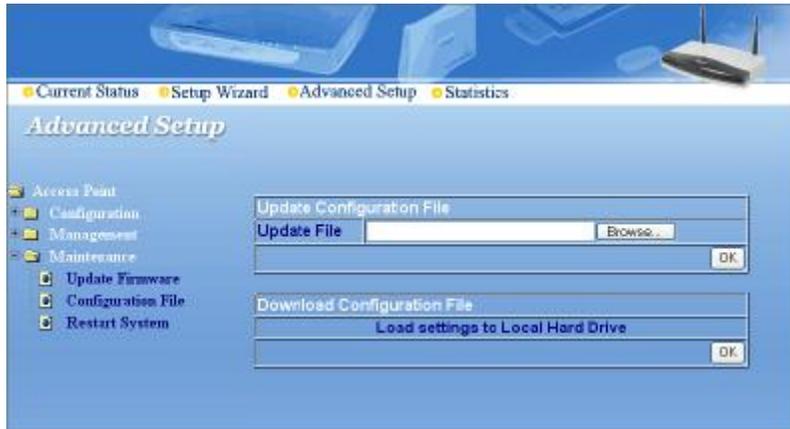**Advanced Setup>Access Point>Maintenance> Update Firmware**
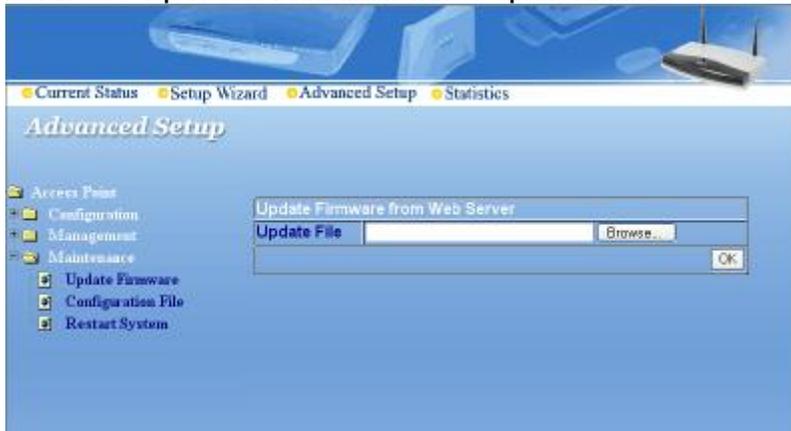
Update File: Click on **Browse** to find the new firmware file from your hard drive.

After you find the updated firmware file located on your hard drive, click '**OK**' to start the firmware update process.

Using the Maintenance Menu (Continued)
Advanced Setup>Access Point>Maintenance > Configuration File

Update File: Click on '**Browse**' to find the new configuration file from your hard drive.

After you have found the configuration file located on your hard drive, click '**OK**' to start the up loading process to the device.

Using the Maintenance Menu (Continued)

Advanced Setup>Access Point>Maintenance>Restart System

Apply Settings and Restart: If you have made any changes to the configuration settings, click **Restart** to apply the changes.

Using the Statistics Menu

Statistics>Type>Throughput>WLAN 802.11g

Displays the WLAN 11g throughput statistics for received, transmitted and RTS communications.

Statistics>Type>Transmitted>WLAN 802.11g

Displays the 11g WLAN Tx Fragment Count, Multicast Tx Frame Count, Tx Error Count, Total Tx Retry Count, Tx Multiple Retry Count.

Using the Statistics Menu (Continued)

Statistics>Type>Received>WLAN 802.11g

Displays the 11g WLAN Rx Fragment Count, Multicast Rx Frame Count, Rx Frame FCS Error Count, Rx Frame Duplicate Count and Ack Rx Failure Count.

Statistic> WEP Frame Error>WLAN 802.11g

This statistics page displays the counting for:
  l   WEP excluded Frames Count
  l   WEP ICV Error Count

Troubleshooting

This Chapter provides solutions to problems that can occur during the installation and operation of the 11g WIRELESS LAN ACCESS POINT. We cover various aspects of the network setup, including the network adapters. Please read the following if you are having problems.

> **Note: It is recommended that you use an Ethernet connection to configure the 11g WIRELESS LAN ACCESS POINT.**

1. **The computer used to configure the 11g WIRELESS LAN ACCESS POINT cannot access the Configuration menu.**

n Check that the **Ethernet LED** on the 11g WIRELESS LAN ACCESS POINT is **ON**. If the **LED** is not **ON**, check that the cable for the Ethernet connection is securely inserted.

n Check that the Ethernet Adapter is working properly. Please see item 3 (**Check that the drivers for the network adapters are installed properly**) in this **Troubleshooting** section to check that the drivers are loaded properly.

n Check that the **IP Address** is in the same range and subnet as the 11g WIRELESS LAN ACCESS POINT. Please see **Checking the IP Address in Windows XP** in the **Networking Basics** section of this manual.

Note: The IP Address of the 11g WIRELESS LAN ACCESS POINT is 10.0.0.1 All the computers on the network must have a unique IP Address in the same range, e.g., 10.0.0.x. Any computers that have identical IP Addresses will not be visible on the network. They must all have the same subnet mask, e.g., 255.0.0.0

n Do a **Ping test** to make sure that the 11g WIRELESS LAN ACCESS POINT is responding. Go to **Start>Run>**Type **Command>**Type **ping 10.0.0.1**   A successful ping will show four replies.
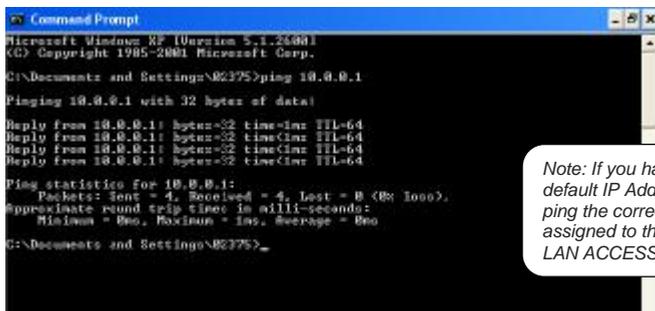
Note: If you have changed the default IP Address, make sure to ping the correct IP Address assigned to the 11g WIRELESS LAN ACCESS POINT

Troubleshooting (continued)

2. The wireless client cannot access the Internet in the Infrastructure mode.

Make sure the wireless client is associated and joined with the correct Access Point. To check this connection: **Right-click** on the **Local Area Connection icon** in the taskbar> select **View Available Wireless Networks**. The **Connect to Wireless Network** screen will appear. Please make sure you have selected the correct available network, as shown in the illustrations below.

- **n** Check that the **IP Address** assigned to the wireless adapter is within the same **IP Address range** as the access point and gateway. *(Since the 11g WIRELESS LAN ACCESS POINT has an IP Address of 10.0.0.1, wireless adapters must have an IP Address in the same range, e.g., 10.0.0.x. Each device must have a unique IP Address; no two devices may have the same IP Address. The subnet mask must be the same for all the computers on the network.)* To check the **IP Address** assigned to the wireless adapter, **double-click** on the **Local Area Connection icon** in the taskbar > select the **Support tab** and the **IP Address** will be displayed. *(Please refer to Checking the IP Address in the Networking Basics section of this manual.)*

- **n** If it is necessary to assign a **Static IP Address** to the wireless adapter, please refer to the appropriate section in **Networking Basics**. If you are entering a **DNS Server address** you must also enter the **Default Gateway Address.** *(Remember that if you have a DHCP-capable router, you will not need to assign a Static IP Address. See Networking Basics: Assigning a Static IP Address.)*

Troubleshooting (continued)

3. **Check that the drivers for the network adapters are installed properly.**

You may be using different network adapters than those illustrated here, but this procedure will remain the same, regardless of the type of network adapters you are using.

n   Go to **Start**

n   Right-click on **My Computer**

n   Click **Properties**

n   **Select** the **Hardware Tab**

n   Click **Device Manager**

28
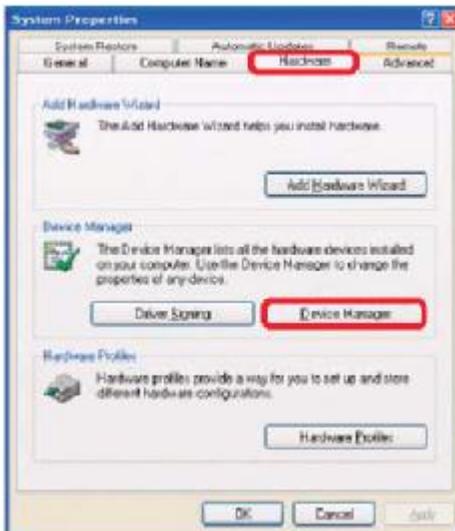
Troubleshooting (continued)

n   Double-click on
    **Network
    Adapters**

n   Right-click on
    **IEEE 802.11g
    Wireless Cardbus
    Network Adapter**
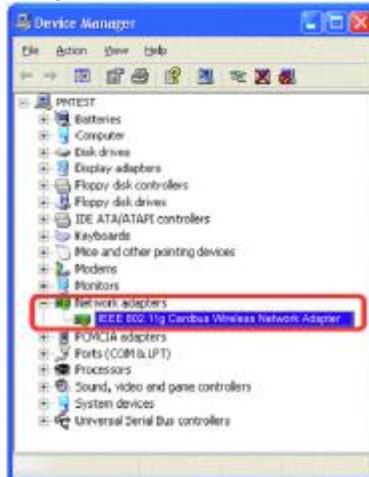
n   Select **Properties**
    to check that the
    drivers are
    installed properly

n   Look under **Device
    Status** to check
    that the device is
    working properly

n   Click **OK**

Troubleshooting (continued)

4. What variables may cause my wireless products to lose reception?

Wireless products let you access your network from virtually anywhere you want. However, the positioning of the products within your environment will affect the wireless range. Please refer to **Installation Considerations** in the **Wireless Basics** section of this manual for further information about the most advantageous placement of your wireless products.

5. Why does my wireless connection keep dropping?

- n Antenna Orientation- Try different antenna orientations for the 11g WIRELESS LAN ACCESS POINT. Try to keep the antenna at least 6 inches away from the wall or other objects.
- n If you are using 2.4GHz cordless phones, X-10 equipment or other home security systems, ceiling fans, and lights, your wireless connection will degrade dramatically or drop altogether. Try changing the Channel on your Access Point and Wireless adapter to a different Channel to avoid interference.
- n Keep your product away (at least 3-6 feet) from electrical devices that generate RF noise, like microwaves, Monitors, electric motors, etc.

6. Why can't I get a wireless connection?

To establish a wireless connection, while enabling Encryption on the 11g WIRELESS LAN ACCESS POINT, you must also enable encryption on the wireless client.

- n For 802.11b and 802.11g, the Encryption settings are: 64, 128, or 256 bit. Make sure that the encryption bit level is the same on the Access Point and the Wireless Client.

Make sure that the SSID on the Access Point and the Wireless Client are exactly the same. If they are not, wireless connection will not be established. Please note that there are SSIDs for 802.11b. The default SSID for 802.11b is **default**.

Technical Specifications

Standards

- n   IEEE 802.11g
- n   IEEE 802.11b
- n   IEEE 802.3
- n   IEEE 802.3u

Device Management

- n   Web-Based - Internet Explorer v6 or later; Netscape Navigator v6 or later; or other Java-enabled browsers
- n   DHCP Client

Network Architecture

- n   Supports Infrastructure Mode

LEDs

- n   Power
- n   WLAN
- n   LAN (10/100)

Wireless Operating Range*

- n   Indoors - up to 328 feet (100 meters)
- n   Outdoors – up to 1,312 feet (400 meters)

Temperature

- n   Operating: 32ºF to 149ºF (0ºC to 50ºC)
- n   Storing: 4ºF to 167ºF (-20ºC to 75ºC)

Humidity:

- n   95%maximum, non-condensing

* Environmental Conditions may adversely affect wireless signal range

Technical Specifications (continued)

Safety and Emissions:

- n   FCC

Physical Dimensions:

- n   L = 140mm
- n   W = 110mm
- n   H = 30mm

Wireless Data Rates with Automatic Fallback:

- n   54 Mbps 48Mbps 36Mbps
- n   24Mbps 18Mbps 12Mbps
- n   11Mbps 9Mbps 6Mbps
- n   5Mbps 2Mbps 1Mbps

Security:

- n   64, 128, 152-bit WEP (Wired Equivalent Privacy)
- n   WPA - Wi-Fi Protected Access (64,128-bit WEP with TKIP, MIC, IV Expansion, Shared Key Authentication)
- n   Supports Advanced Encryption Standard (AES)

External Antenna Type:

- n   Detachable Dipole Antenna, Reversed SMA connectors

Wireless Frequency Range:

- n   2.4 – 2.4835 GHz

Modulation Technology:

- n   Orthogonal Frequency Division Multiplexing (OFDM)
- n   PBCC
- n   Complementary Code Keying (CCK)

Technical Specifications (continued)

Media Access Control:

- **n** CSMA/CA with ACK

Wireless Transmit Power:

- **n** 20dBm(32mW)±2dB

Power Adapter:

- **n** Ext. Power Supply DC 5V, 2.0A
- **n** 100V - 240V ~ 50-60Hz

Weight:

- **n** 190g

Receiver Sensitivity:

- **n** 54Mbps OFDM, 10% PER,-73dBm
- **n** 48Mbps OFDM, 10% PER,-76dBm
- **n** 36Mbps OFDM, 10% PER,-82dBm
- **n** 24Mbps OFDM, 10% PER,-85dBm
- **n** 18Mbps OFDM, 10% PER,-88dBm
- **n** 12Mbps OFDM, 10% PER,-89dBm
- **n** 11Mbps CCK, 8% PER,-91dBm
- **n** 9Mbps OFDM, 10% PER,-90dBm
- **n** 6Mbps OFDM, 10% PER,-91dBm
- **n** 5Mbps CCK, 8% PER,-92dBm
- **n** 2Mbps QPSK, 8% PER,-93dBm
- **n** 1Mbps BPSK, 8% PER,-94dBm

Technical Support

You can find software updates and user documentation on the D-Link website.

D-Link provides free technical support for customers within the United States and within Canada for the duration of the warranty period on this product.

U.S. and Canadian customers can contact D-Link technical support through our website, or by phone.

Tech Support for customers within the United States:

D-Link Technical Support over the Telephone:
(877) 453-5465
24 hours a day, seven days a week.

D-Link Technical Support over the Internet:
http://support.dlink.com
email:support@dlink.com

Tech Support for customers within Canada:

D-Link Technical Support over the Telephone:
(800) 361-5265
Monday to Friday 8:30am to 9:00pm EST

D-Link Technical Support over the Internet:
http://support.dlink.ca
email:support@dlink.ca

Warranty and Registration
(USA only)

Subject to the terms and conditions set forth herein, D-Link Systems, Inc. ("D-Link") provides this Limited warranty for its product only to the person or entity that originally purchased the product from:

- D-Link or its authorized reseller or distributor and
- Products purchased and delivered within the fifty states of the United States, the District of Columbia, U.S. Possessions or Protectorates, U.S. Military Installations, addresses with an APO or FPO.

Limited Warranty: D-Link warrants that the hardware portion of the D-Link products described below will be free from material defects in workmanship and materials from the date of original retail purchase of the product, for the period set forth below applicable to the product type ("Warranty Period"), except as otherwise stated herein.

3-Year Limited Warranty for the Product(s) is defined as follows:

- Hardware (excluding power supplies and fans) Three (3) Years
- Power Supplies and Fans One (1) Year
- Spare parts and spare kits Ninety (90) days

D-Link's sole obligation shall be to repair or replace the defective Hardware during the Warranty Period at no charge to the original owner or to refund at D-Link's sole discretion. Such repair or replacement will be rendered by D-Link at an Authorized D-Link Service Office. The replacement Hardware need not be new or have an identical make, model or part. D-Link may in its sole discretion replace the defective Hardware (or any part thereof) with any reconditioned product that D-Link reasonably determines is substantially equivalent (or superior) in all material respects to the defective Hardware. Repaired or replacement Hardware will be warranted for the remainder of the original Warranty Period from the date of original retail purchase. If a material defect is incapable of correction, or if D-Link determines in its sole discretion that it is not practical to repair or replace the defective Hardware, the price paid by the original purchaser for the defective Hardware will be refunded by D-Link upon return to D-Link of the defective Hardware. All Hardware (or part thereof) that is replaced by D-Link, or for which the purchase price is refunded, shall become the property of D-Link upon replacement or refund.

Limited Software Warranty: D-Link warrants that the software portion of the product ("Software") will substantially conform to D-Link's then current functional specifications for the Software, as set forth in the applicable documentation, from the date of original retail purchase of the Software for a period of ninety (90) days ("Warranty Period"), provided that the Software is properly installed on approved hardware and operated as contemplated in its documentation. D-Link further warrants that, during the Warranty Period, the magnetic media on which D-Link delivers the Software will be free of physical defects. D-Link's sole obligation shall be to replace the non-conforming Software (or defective media) with software that substantially conforms to D-Link's functional specifications for the Software or to refund at D-Link's sole discretion. Except as otherwise agreed by D-Link in writing, the replacement Software is provided only to the original licensee, and is subject to the terms and conditions of the license granted by D-Link for the Software. Software will be warranted for the remainder of the original Warranty Period from the date or original retail purchase. If a material non-conformance is incapable of correction, or if D-Link determines in its sole discretion that it is not practical to replace the non-conforming Software, the price paid by the original licensee for the non-conforming Software will be refunded by D-Link; provided that the non-conforming Software (and all copies thereof) is first returned to D-Link. The license granted respecting any Software for which a refund is given automatically terminates.

Non-Applicability of Warranty: The Limited Warranty provided hereunder for hardware and software of D-Link's products will not be applied to and does not cover any refurbished product and any product purchased through the inventory clearance or liquidation sale or other sales in which D-Link, the sellers, or the liquidators expressly disclaim their warranty obligation pertaining to the product and in that case, the product is being sold "As-Is" without any warranty whatsoever including, without limitation, the Limited Warranty as described herein, notwithstanding anything stated herein to the contrary.

Submitting A Claim: The customer shall return the product to the original purchase point based on its return policy. In case the return policy period has expired and the product is within warranty, the customer shall submit a claim to D-Link as outlined below:

- The customer must submit with the product as part of the claim a written description of the Hardware defect or Software nonconformance in sufficient detail to allow D-Link to confirm the same.

- The original product owner must obtain a Return Material Authorization ("RMA") number from the Authorized D-Link Service Office and, if requested, provide written proof of purchase of the product (such as a copy of the dated purchase invoice for the product) before the warranty service is provided.

- After an RMA number is issued, the defective product must be packaged securely in the original or other suitable shipping package to ensure that it will not be damaged in transit, and the RMA number must be prominently marked on the outside of the package. Do not include any manuals or accessories in the shipping package. D-Link will only replace the defective portion of the Product and will not ship back any accessories.

- The customer is responsible for all in-bound shipping charges to D-Link. No Cash on Delivery ("COD") is allowed. Products sent COD will either be rejected by D-Link or become the property of D-Link. Products shall be fully insured by the customer. D-Link will not be held responsible for any packages that are lost in transit to D-Link. The repaired or replaced packages will be shipped to the customer via UPS Ground or any common carrier selected by D-Link, with shipping charges prepaid. Expedited shipping is available if shipping charges are prepaid by the customer and upon request.

- Return Merchandise Ship-To Address
USA: 53 Discovery Drive, Irvine, CA 92618
Canada: 2180 Winston Park Drive, Oakville, ON, L6H 5W1 (Visit http://www.dlink.ca for detailed warranty information within Canada)

D-Link may reject or return any product that is not packaged and shipped in strict compliance with the foregoing requirements, or for which an RMA number is not visible from the outside of the package. The product owner agrees to pay D-Link's reasonable handling and return shipping charges for any product that is not packaged and shipped in accordance with the foregoing requirements, or that is determined by D-Link not to be defective or non-conforming.

What Is Not Covered: This limited warranty provided by D-Link does not cover: Products, if in D-Link's judgment, have been subjected to abuse, accident, alteration, modification, tampering, negligence, misuse, faulty installation, lack of reasonable care, repair or service in any way that is not contemplated in the documentation for the product, or if the model or serial number has been altered, tampered with, defaced or removed; Initial installation, installation and removal of the product for repair, and shipping costs; Operational adjustments covered in the operating manual for the product, and normal maintenance; Damage that occurs in shipment, due to act of God, failures due to power surge, and cosmetic damage; Any hardware, software, firmware or other products or services provided by anyone other than D-Link; Products that have been purchased from inventory clearance or liquidation sales or other sales in which D-Link, the sellers, or the liquidators expressly disclaim their warranty obligation pertaining to the product. Repair by anyone other than D-Link or an Authorized D-Link Service Office will void this Warranty.

Disclaimer of Other Warranties: EXCEPT FOR THE LIMITED WARRANTY SPECIFIED HEREIN, THE PRODUCT IS PROVIDED "AS-IS" WITHOUT ANY WARRANTY OF ANY KIND WHATSOEVER INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT. IF ANY IMPLIED WARRANTY CANNOT BE DISCLAIMED IN ANY TERRITORY WHERE A PRODUCT IS SOLD, THE DURATION OF SUCH IMPLIED WARRANTY SHALL BE LIMITED TO NINETY (90) DAYS. EXCEPT AS EXPRESSLY COVERED UNDER THE LIMITED WARRANTY PROVIDED HEREIN, THE ENTIRE RISK AS TO THE QUALITY, SELECTION AND PERFORMANCE OF THE PRODUCT IS WITH THE PURCHASER OF THE PRODUCT.

Limitation of Liability: TO THE MAXIMUM EXTENT PERMITTED BY LAW, D-LINK IS NOT LIABLE UNDER ANY CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHER LEGAL OR EQUITABLE THEORY FOR ANY LOSS OF USE OF THE PRODUCT, INCONVENIENCE OR DAMAGES OF ANY CHARACTER, WHETHER DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL (INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF GOODWILL, LOSS OF REVENUE OR PROFIT, WORK STOPPAGE, COMPUTER FAILURE OR MALFUNCTION, FAILURE OF OTHER EQUIPMENT OR COMPUTER PROGRAMS TO WHICH D-LINK'S PRODUCT IS CONNECTED WITH, LOSS OF INFORMATION OR DATA CONTAINED IN, STORED ON, OR INTEGRATED WITH ANY PRODUCT RETURNED TO D-LINK FOR WARRANTY SERVICE) RESULTING FROM THE USE OF THE PRODUCT, RELATING TO WARRANTY SERVICE, OR ARISING OUT OF ANY BREACH OF THIS LIMITED WARRANTY, EVEN IF D-LINK HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE SOLE REMEDY FOR A BREACH OF THE FOREGOING LIMITED WARRANTY IS REPAIR, REPLACEMENT OR REFUND OF THE DEFECTIVE OR NON-CONFORMING PRODUCT. THE MAXIMUM

LIABILITY OF D-LINK UNDER THIS WARRANTY IS LIMITED TO THE PURCHASE PRICE OF THE PRODUCT COVERED BY THE WARRANTY. THE FOREGOING EXPRESS WRITTEN WARRANTIES AND REMEDIES ARE EXCLUSIVE AND ARE IN LIEU OF ANY OTHER WARRANTIES OR REMEDIES, EXPRESS, IMPLIED OR STATUTORY.

Governing Law: This Limited Warranty shall be governed by the laws of the State of California. Some states do not allow exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the foregoing limitations and exclusions may not apply. This limited warranty provides specific legal rights and the product owner may also have other rights which vary from state to state.

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CE Mark Warning: This is a Class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

FCC Statement: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. 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 can be determined 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 and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

For detailed warranty outside the United States, please contact corresponding local D-Link office.

FCC Caution:
The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment; such modifications could void the user' s authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:
FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this equipment must be installed to provide a separation distance of at least eight inches (20 cm) from all persons.

This equipment must not be operated in conjunction with any other antenna.

Register your D-Link product online at http://support.dlink.com/register/

(10/10/2003)