USER MANUAL

DIR-451

VERSION 1.3

D-Link®

MOBILE

Preface

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Package Contents

- D-Link DIR-451 Mobile Router
- Power Adapter
- Ethernet Cable
- Manual and Warranty on CD

Note: Using a power supply with a different voltage rating than the one included with the DIR-451 will cause damage and void the warranty for this product.

System Requirements

- A compatible 32-bit PCMCIA (UMTS or HSDPA) card with service*.
- Computers with Windows®, Macintosh®, or Linux-based operating systems with an installed Ethernet adapter
- Internet Explorer Version 6.0 or Netscape Navigator™ Version 6.0 and above (for configuration)

*** Subject to services and service terms available from your carrier.**

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Introduction

D-Link announces a fast, mobile network router which allows you to share a high speed Internet connection virtually anywhere by connecting an UMTS or HSDPA notebook adapter or USB-enable phone. You can get a high speed Internet connection just about anywhere within your wireless broadband network. This router is extremely useful in situations where a wired broadband connection is not available. Quickly set up a Wi-Fi hotspot and provide your workgroup with an Internet connection to check email and browse the web or share file. Maximize your investment in your mobile Internet access subscription by using this router as a fixed broadband Internet solution for the home instead of paying additional fees for cable or DSL.

ADVANCED NETWORK SECURITY

The 3G Mobile Router creates a secure Wi-Fi® network by supporting the latest wireless security features to prevent unauthorized access. Support for WEP, WPA, and WPA2 ensure that you will be able to secure your Wi-Fi network, regardless of your client devices. In addition, the 3G Mobile Router utilizes dual active firewalls (SPI and NAT) to prevent potential attacks from across the Internet.

EASY TO INSTALL AND USE

The D-Link 3G Mobile Router sets up in minutes, making it easy to use while on–the-go. Remaining backward compatible with 802.11b devices, this router ensures that it will work with legacy wireless equipment you already own. This eliminates the necessity of incurring additional expenses with upgrading your current wireless equipment. You can also directly connect Ethernet-based devices to its built-in 4-port full-duplex 10/100 switch.

Set up a wireless network with the D-Link 3G Mobile Router DIR-451 and provide your users with a secure, high-speed connection to the Internet anytime, anywhere*.

* Requires third party mobile Internet access subscription. Check with your service provider for service coverage and applicable fees. D-Link does not guarantee compatibility with all UMTS or HSDPA wireless networks or third party Internet PC cards.

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Features

Device Interfaces

- LAN Ethernet Support
  - 4 Port 10/100 Mbps switch
  - Complies with IEEE 802.3u specification
  - Supports Auto-Negotiation
  - Supports Auto-MDI/MDIX
  - Supports IEEE 802.3x Flow Control in Full Duplex mode

- 3G Module Slot
  - Connecting an UMTS or HSDPA Notebook Adapter

Function support

- Network Address Translation
- Stateful Packet Inspection
  - TCP Connection state & sequence number validation

- Virtual Server
  - Virtual Server is used to allow Internet users access to LAN services.

- Port Triggering / Special Applications support
  - Special Application is used to run applications that require multiple connections.

- MAC Address Filtering
  - Apply to WLAN and/or LAN. Select type of filter - Allow list or Deny list 20 Entries.

- DHCP Server
  - Set up as a DHCP Server to distribute IP addresses to the LAN.

- DNS Relay
  - WAN DNS Servers if available OR DNS requests directed to the Gateway IP address.

- Access Control
  - Allow Policy Based on Schedule & IP Address
  - Allow all WEB access OR Allow access to a specified list of domain names (40 Domains)

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- Web base setup wizard
    - Step by step setting procedure

- L2TP Pass Through
- PPTP Pass Through
- IPsec Pass Through

CONFIGURATION & ADMINISTRATION

- Web based interface
- Web Based Configuration Wizard
- Dynamic DNS
- E-mail Reporting
- Statistics
- Firmware upgrade
- Current Time & Daylight savings adjustment
- Configuration Save & Restore
- Remote management
- Device Manager

WIRELESS FEATURES

- SuperG & Turbo (108 Mbps) modes
- Wireless Security:
    - WEP 64/128 bit
    - WPA
    - WPA-PSK
- Channel Select
- SSID Broadcast
- Tx Power Adjust
- WMM
- WCN 1.0

* Maximum wireless signal rate derived from IEEE Standard 802.11g specifications. Actual data throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead, lower actual data throughput rate. Environmental conditions will adversely affect wireless signal range.

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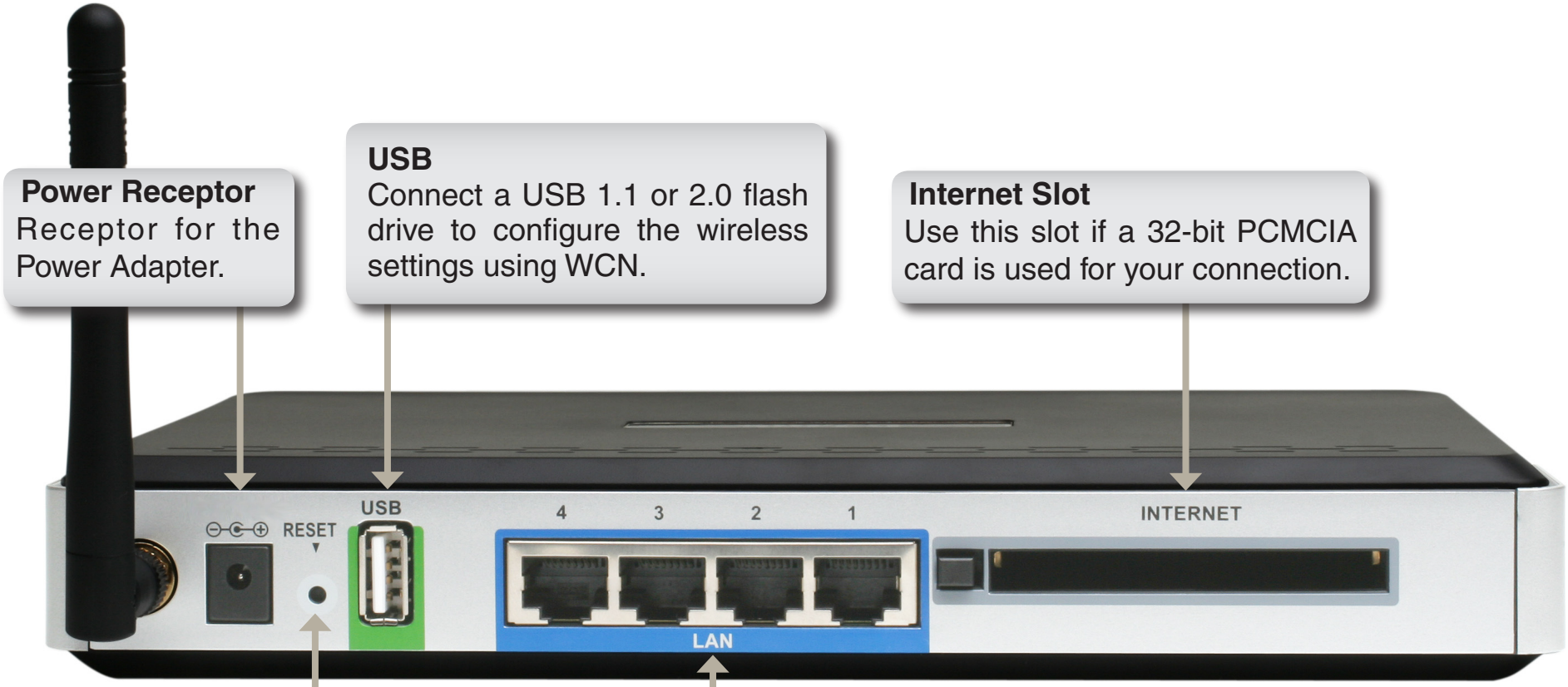
Hardware Overview
Connections



Power Receptor
Receptor for the Power Adapter.

USB
Connect a USB 1.1 or 2.0 flash drive to configure the wireless settings using WCN.

Internet Slot
Use this slot if a 32-bit PCMCIA card is used for your connection.

Reset Button
Pressing the Reset Button restores the router to its original factory default settings.

LAN Ports
These ports automatically sense the cable type when connecting to Ethernet-enabled computers. These are Auto MDI/MDIX ports.

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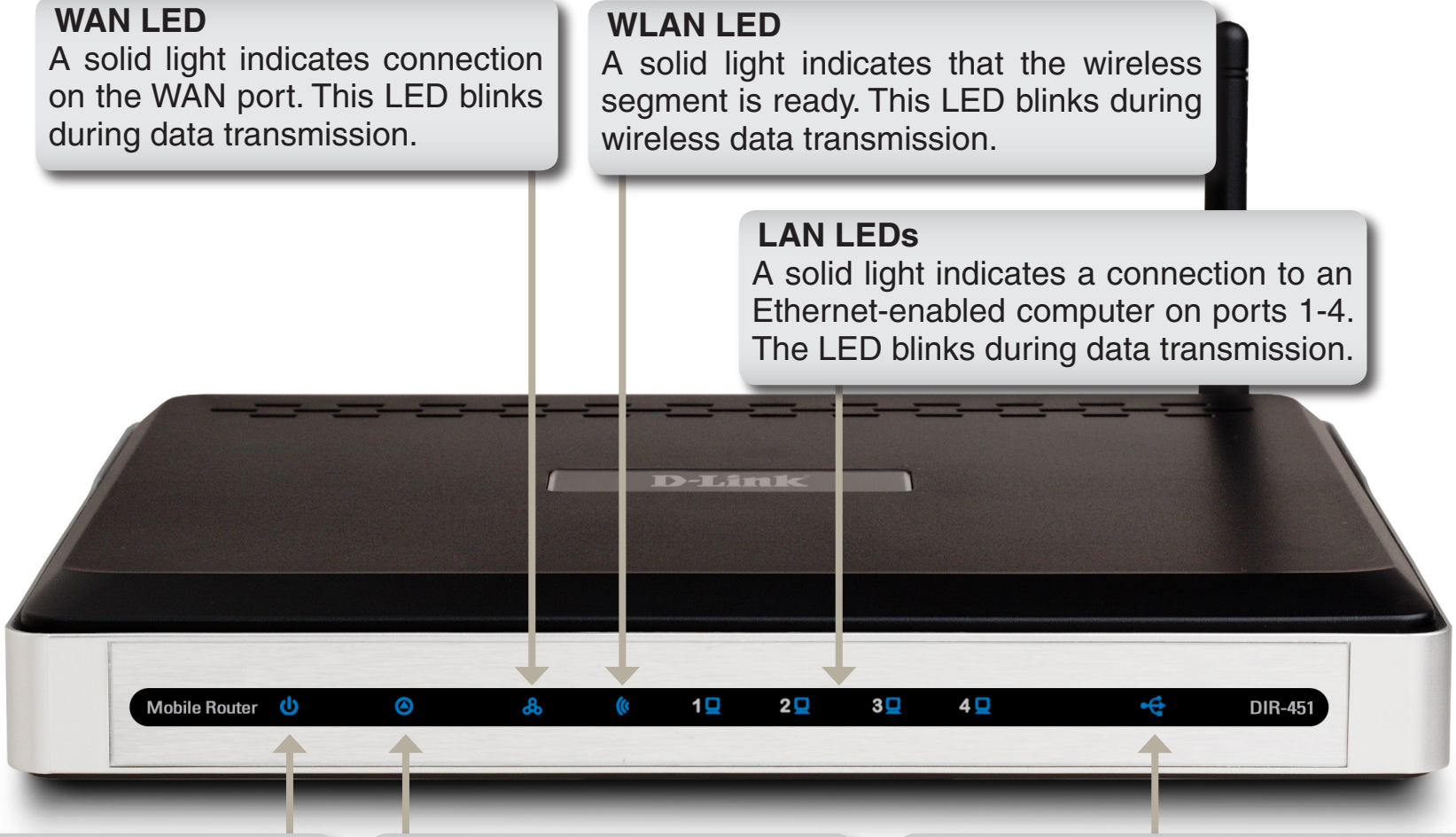
Hardware Overview
LEDs

WAN LED
A solid light indicates connection on the WAN port. This LED blinks during data transmission.

WLAN LED
A solid light indicates that the wireless segment is ready. This LED blinks during wireless data transmission.

LAN LEDs
A solid light indicates a connection to an Ethernet-enabled computer on ports 1-4. The LED blinks during data transmission.



Power LED
A solid light indicates a proper connection to the power supply.

Status LED
A blinking blue light indicates that the DIR-451 is functioning properly.

USB LED
Insert a USB flash drive with WCN information. The LED will blink 3 times if it successfully transfers the wireless settings.

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Installation

This section will walk you through the installation process. Placement of the router is very important. Do not place the router in an enclosed area such as a closet, cabinet, or in the attic or garage.

Connect to your Network

Note: Ensure that the power to your DIR-451 Mobile Router is not connected before performing the installation steps below.

32-bit PCMCIA (UMTS or HSDPA) Card Connection

Note: To preserve the life of your phone's battery, it is recommended that you use your phone's charging cradle when connected to the DIR-451 Mobile Router.

1. Attach the antenna.
    a. Remove the antenna from its plastic wrapper.
    b. Screw the antenna in a clockwise direction to the back panel of the unit.
    c. Once secured, position the antenna upward at its connecting joint. This will ensure optimal reception.

2. Insert your wireless 32-bit PCMCIA (UMTS or HSDPA) card into the internet 32-bit PCMCIA Card Slot.

3. Insert the Ethernet cable into LAN Port 1 on the back panel of the DIR-451 Mobile Router, and an available Ethernet port on the network adapter in the computer you will use to configure the unit.

Note: The DIR-451 Mobile Router LAN Ports are "Auto-MDI/MDIX." This provides either patch or crossover Ethernet cable LAN Port access.

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4. Connect the power adapter to the receptor on the back panel of your DIR-451 Mobile Router. Then plug the other end of the power adapter into the wall outlet or power strip.

   a. The Power LED will turn ON to indicate power has been applied.
   b. Other LEDs will flash ON and OFF as the DIR-451 Mobile Router performs initialization and Internet connection processes. This will take a few minutes.
   c. When complete, the following LEDs will illuminate blue: Power, Status, WAN, WLAN, and LAN Port 1 (or your specific LAN Port connection).

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Wireless Installation Considerations

The D-Link mobile router lets you access your network using a wireless connection from virtually anywhere within the operating range of your wireless network. 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 D-Link router and other network devices to a minimum - each wall or ceiling can reduce your adapter'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 make a difference. A solid metal door or aluminum studs may have a negative effect on range. Try to position access points, wireless routers, and computers so that the signal passes through drywall or open doorways. Materials and objects such as glass, steel, metal, walls with insulation, water (fish tanks), mirrors, file cabinets, brick, and concrete will degrade your wireless signal.

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

5. If you are using 2.4GHz cordless phones or X-10 (wireless products such as ceiling fans, lights, and home security systems), your wireless connection may degrade dramatically or drop completely. Make sure your 2.4GHz phone base is as far away from your wireless devices as possible. The base transmits a signal even if the phone in not in use.

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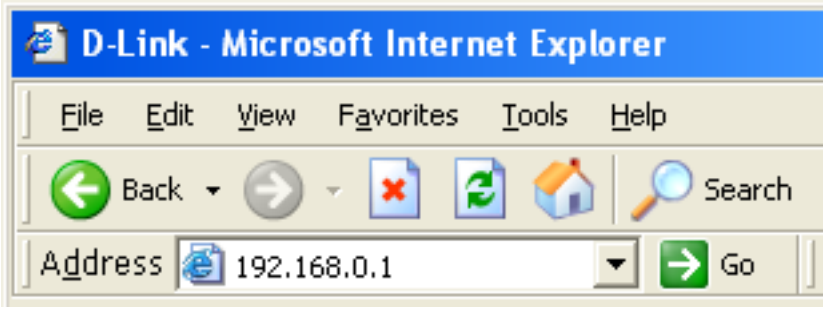
Configuration

This section will show you how to configure your new D-Link mobile router using the web-based configuration utility.

Web-based Configuration Utility

To access the configuration utility, open a web-browser such as Internet Explorer and enter the IP address of the router (192.168.0.1).



Type **admin** for the username and leave the password blank.

If you get a **Page Cannot be Displayed** error, please refer to the **Troubleshooting** section for assistance.

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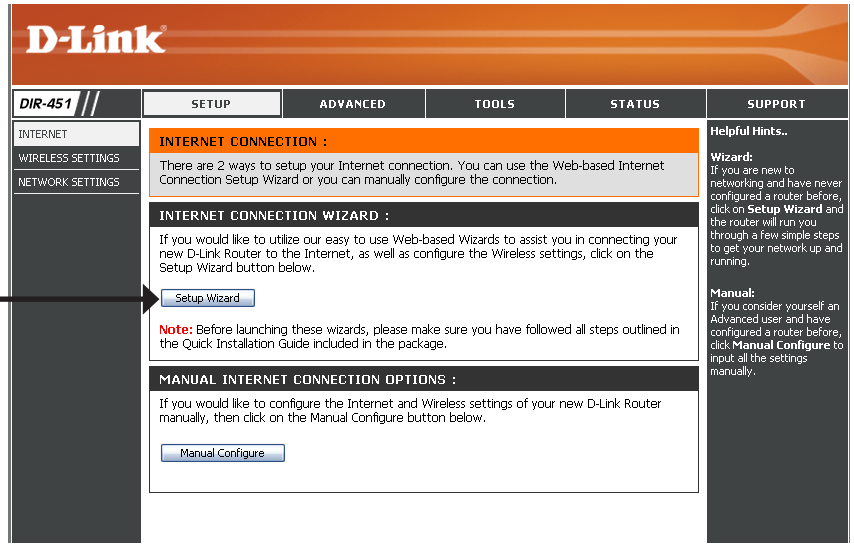
Setup Wizard

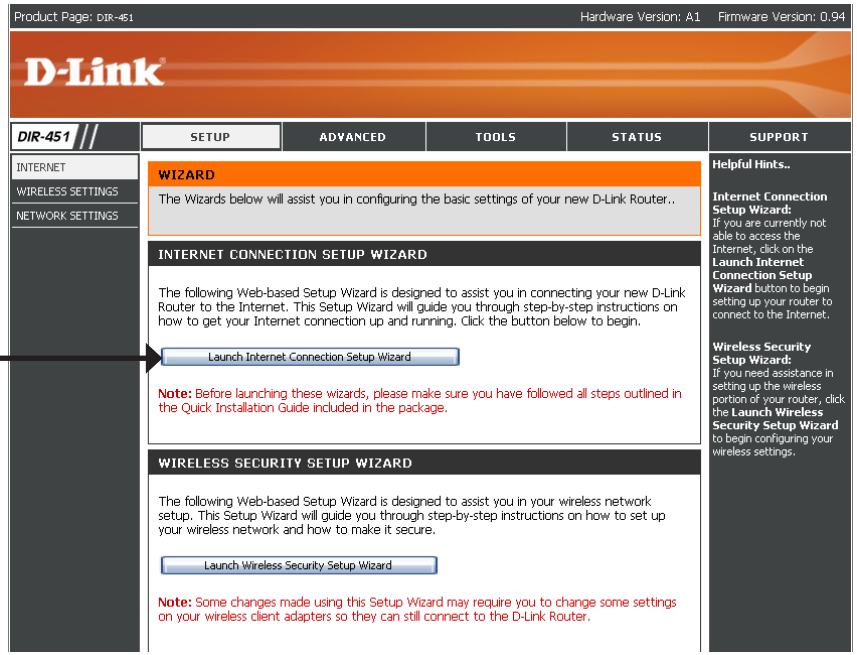
You may run the setup wizard to quickly setup your router. Click **Setup Wizard** to launch the wizard.

Click **Setup Wizard**



Click **Launch Internet Connection Setup Wizard** to begin.

Click **Launch Internet Connection Setup Wizard** to begin.



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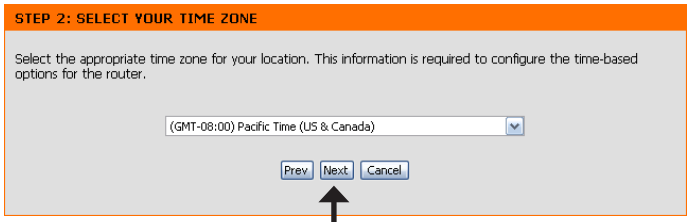
Click **Next** to continue.

Click **Next**

Create a new password and then click **Next** to continue.

Click **Next**

Select your time zone from the drop-down menu and then click **Next** to continue.



Click **Next**

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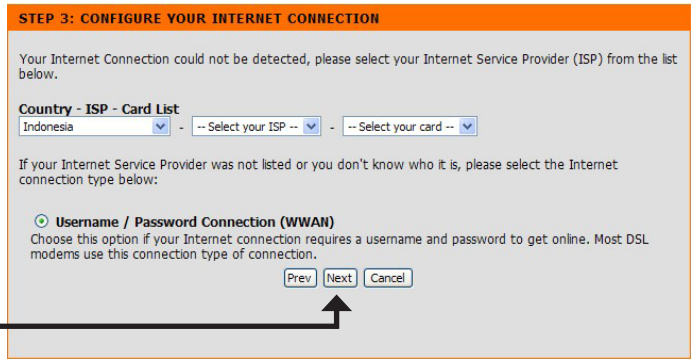
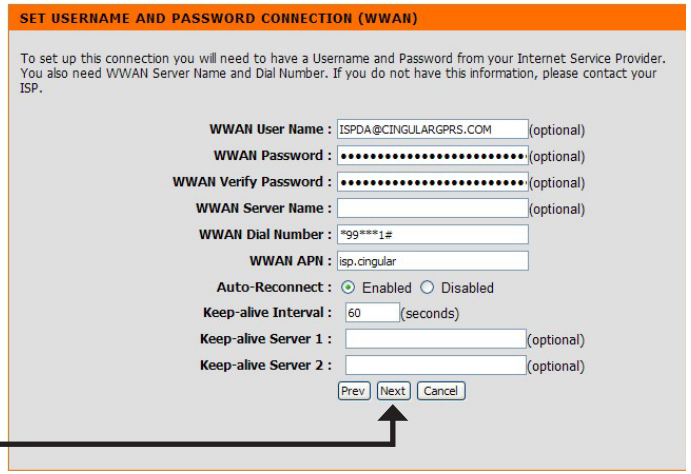
Select the Country, ISP and Card from the drop-down list and then click **Username / Password Connection (WWAN)**. Click **Next** to continue.



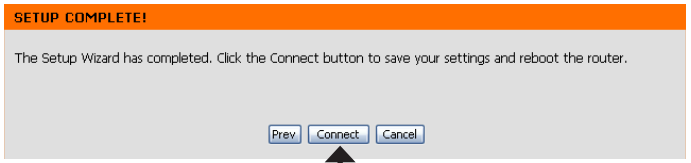
Click **Next**

Enter your WWAN user name, password, and server information. If you do not have this information, please contact your ISP. For other information, you can look at the *UMTS/HSDPA Setup* section on the next page.



Click **Next**

Click Connect to save your settings. Once the router is finished rebooting, click **Continue**. Please allow 1-2 minutes to connect.



Click **Continue**

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UMTS/HSDPA Setup

Country-ISP-Card: This will divide connection into following three types.
Country: Select the card issue country from the first drop-down menu.
ISP: Select the card issue provider from the second drop-down menu.
Card: Select the card name from the third drop-down menu.

User Name: Enter your username for your UMTS/HSDPA connection.

Password: Enter your Password for your UMTS/HSDPA connection.

Retype Password: Enter your Password again for confirmation.

Server Name: Enter the name of your network server (optional).

Dial Number: The default is ***99***1#**. This field should not be altered except when required by your service provider.

APN: Enter the access point name (APN).

Auto-Reconnect: Select Enable to have the router automatically reconnect to the Internet if the connection is dropped.

Keep Alive Interval: Enter the time to send keep alive package. If user does not input any keep alive sever at below, it will keep send keep alive package to the default server. (www.dlinkddns.com, ntp1.dlink.com, www.dlink.com, www.dlink.com, www.d-link.com.tw). If all servers fail to response, the 3G router will hang up 3G connection and re-dial to carrier/operation.

Keep Alive Servers: Enter the IP address(es) of keep alive server(s). If user inputs keep alive servers, this router will send keep alive package to those servers. If those servers fail to response, the 3G router will hang up 3G connection and re-dial to carrier/operation.

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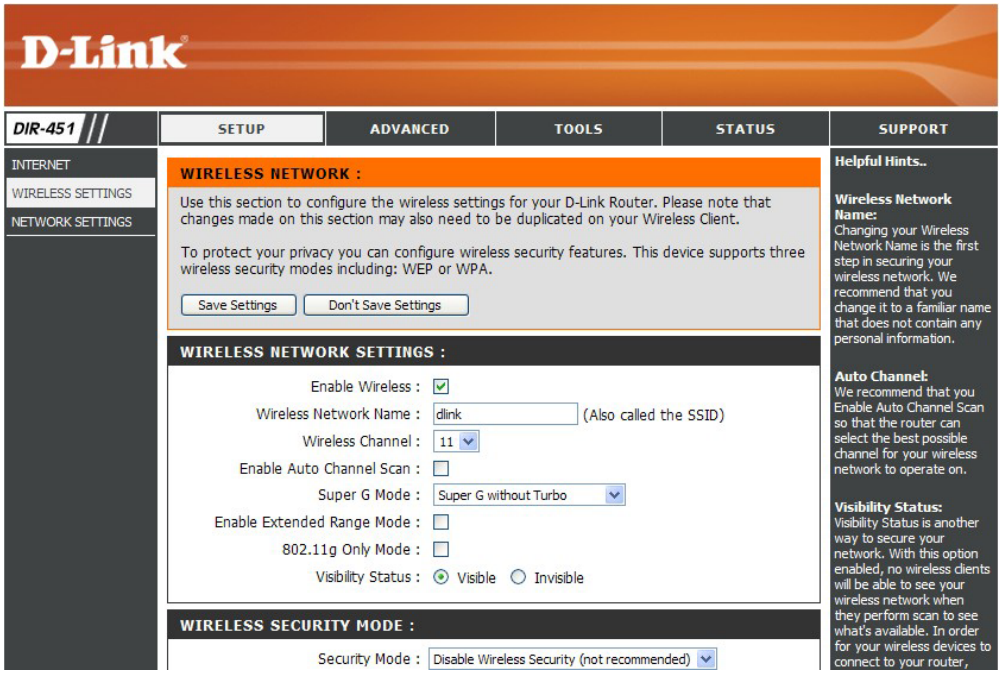
Wireless Settings

Enable Wireless: Check the box to enable the wireless function. If you do not want to use wireless, uncheck the box to disable all the wireless functions.

Wireless Network Name: Service Set Identifier (SSID) is the name of your wireless network. Create a name using up to 32 characters. The SSID is case-sensitive.

Wireless Channel: Indicates the channel setting for the DIR-451. By default the channel is set to 6. The Channel can be changed to fit the channel setting for an existing wireless network or to customize the wireless network. The **Auto Channel Scan** setting can be selected to allow the DIR-451 to choose the channel with the least amount of interference.



Super G Mode: Super G is a group of performance enhancement features that increase end user application throughput in an 802.11g network. Super G is backwards compatible to standard 802.11g devices. For top performance, all wireless devices on the network should be Super G capable. Select either **Disabled**, **Super G without Turbo**, or **Super G with Dynamic Turbo**.

- **Disabled** - Standard 802.11g support, no enhanced capabilities.
- **Super G without turbo** - Capable of Packet Bursting, FastFrames, Compression, but no Turbo mode.
- **Super G with Dynamic Turbo** - Capable of Packet Bursting, FastFrames, Compression, and Dynamic Turbo. This setting is backwards compatible with non-Turbo (legacy) devices. Dynamic Turbo mode is only enabled when all devices on the wireless network are Super G with Dynamic Turbo enabled.

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Extended Range Mode: Extended Range Mode helps reduce dead spots by improving the reception algorithm, which allows your wireless clients to associate with the DIR-451 at farther distances. Select either **Enabled** or **Disabled**.

802.11g Only Mode: Enable this mode if your network is made up of purely 802.11g devices. If you have both 802.11b and 802.11g wireless clients, uncheck the box.

Visibility status: Select **Invisible** if you do not want the SSID of your wireless network to be broadcasted by the DIR-451. If Invisible is selected, the SSID of the DIR-451 will not be seen by Site Survey utilities so your wireless clients will have to know the SSID of your DIR-451 in order to connect to it.

Please refer to **Section 4 - Wireless Security** for information on setting up security and encryption.

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Network Settings

This section will allow you to change the local network settings of the router and to configure the DHCP settings.

IP Address: Enter the IP address of the router. The default IP address is 192.168.0.1.

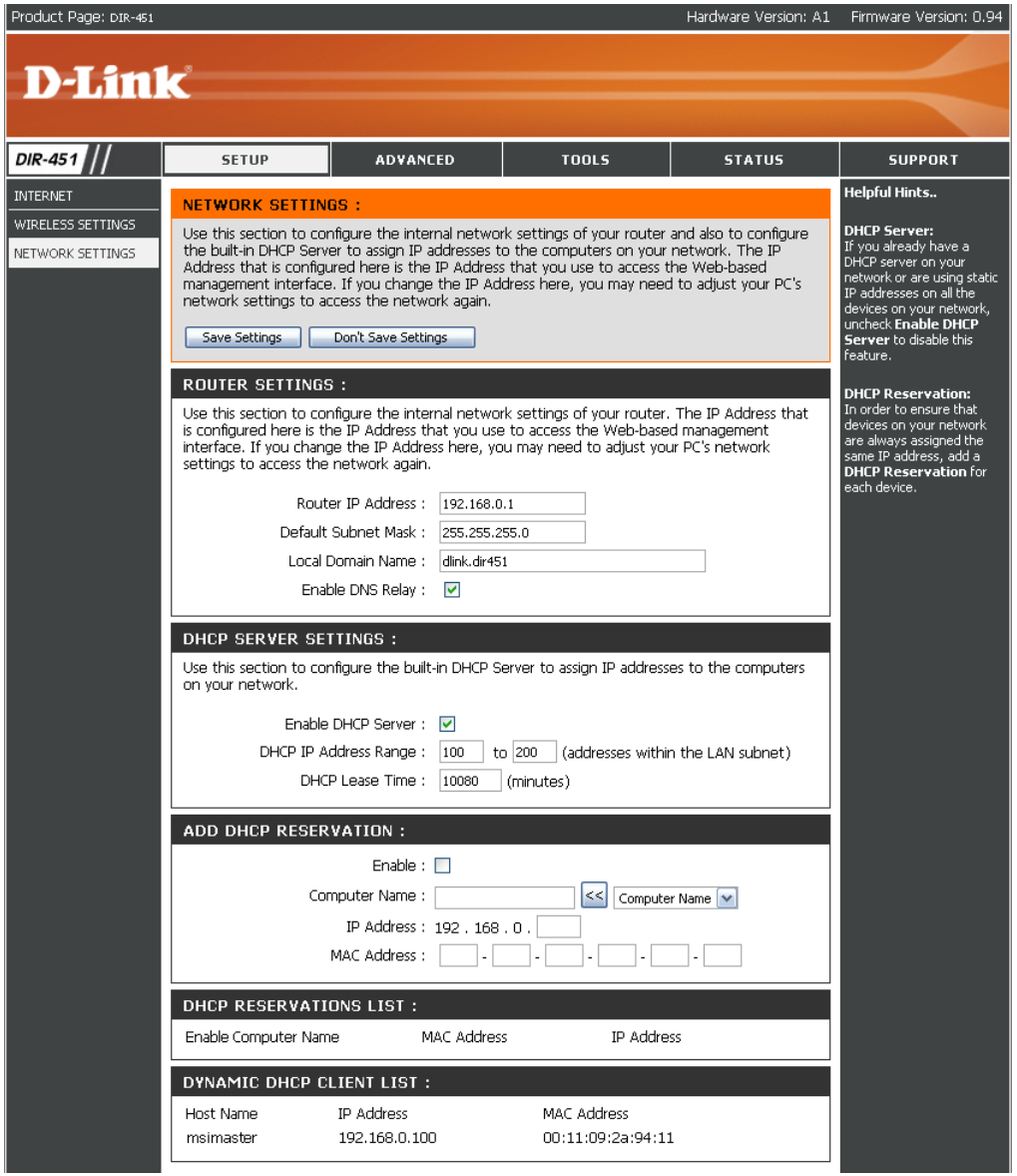
If you change the IP address, once you click Apply, you will need to enter the new IP address in your browser to get back into the configuration utility.

Subnet Mask: Enter the Subnet Mask. The default subnet mask is 255.255.255.0.

Local Domain: Enter the Domain name (Optional).

Enable DNS Relay: Check the box to transfer the DNS server information from your ISP to your computers. If unchecked, your computers will use the router for a DNS server.

Refer to the next page for DHCP information.



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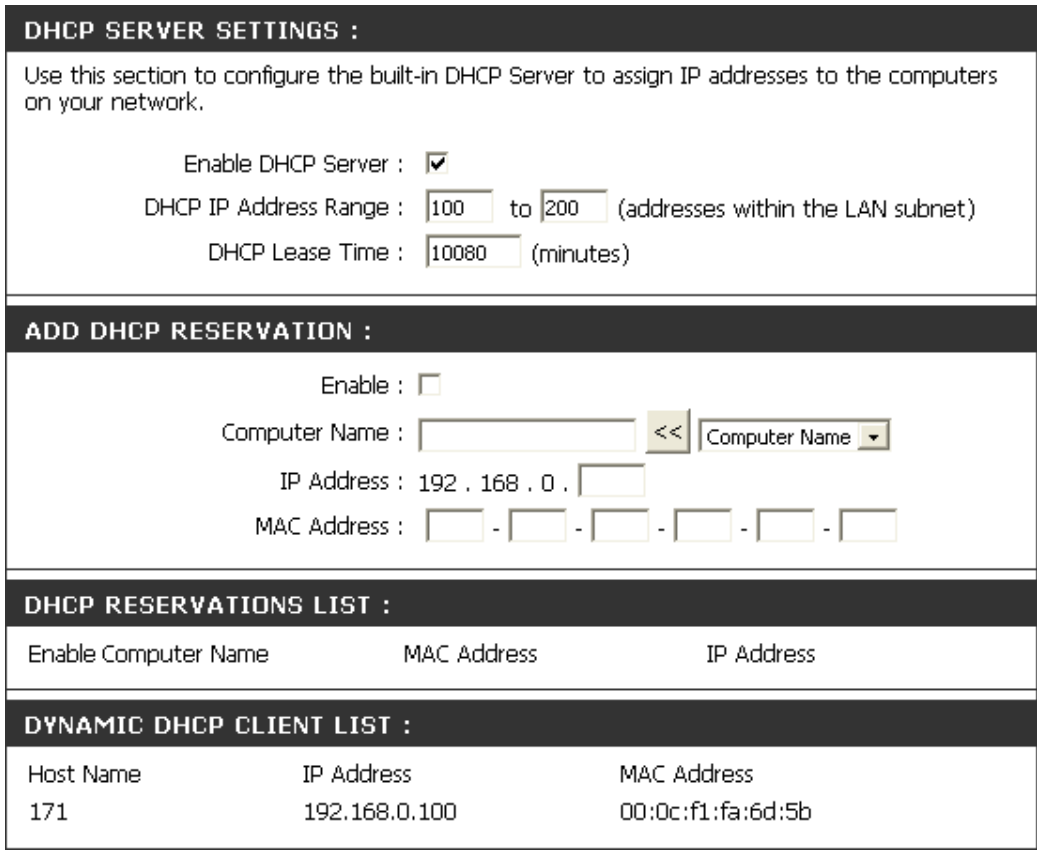
DHCP Server Settings

DHCP stands for Dynamic Host Control Protocol. The DIR-451 has a built-in DHCP server. The DHCP Server will automatically assign an IP address to the computers on the LAN/private network. Be sure to set your computers to be DHCP clients by setting their TCP/IP settings to "Obtain an IP Address Automatically." When you turn your computers on, they will automatically load the proper TCP/IP settings provided by the DIR-451. The DHCP Server will automatically allocate an unused IP address from the IP address pool to the requesting computer. You must specify the starting and ending address of the IP address pool.

Enable DHCP Server: Check the box to enable the DHCP server on your router. Uncheck to disable this function.

DHCP IP Address Range: Enter the starting and ending IP addresses for the DHCP server's IP assignment.

Lease Time: The length of time for the IP address lease. Enter the Lease time in minutes.



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Virtual Server

This will allow you to open and redirect a single port.

Rule: Check the box to enabled the rule.

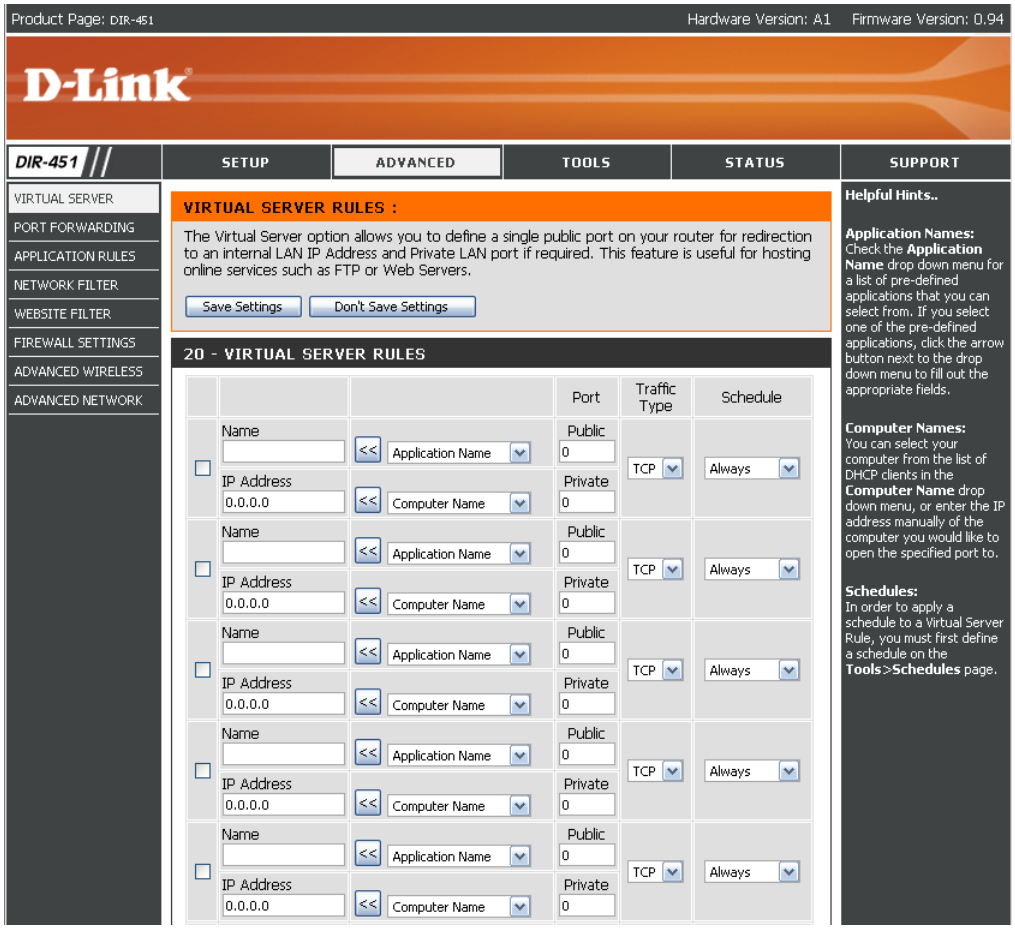
Name: Enter a name for the rule. You may select an application from the drop-down menu and click << to fill in the fields automatically.

IP Address: Enter the IP address of the computer on your local network that you want to allow the incoming service to. You may select a computer from the drop-down menu and click <<.

Public Port/ Private Port: Enter the port that you want to open. In most cases, the public and private will be the same port.

Traffic Type: Select **TCP**, **UDP**, or **ANY**.

Schedule: Select Always or a created schedule from the drop-down menu.



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Port Forwarding

This will allow you to open a single port or a range of ports.

Rule: Check the box to enabled the rule.

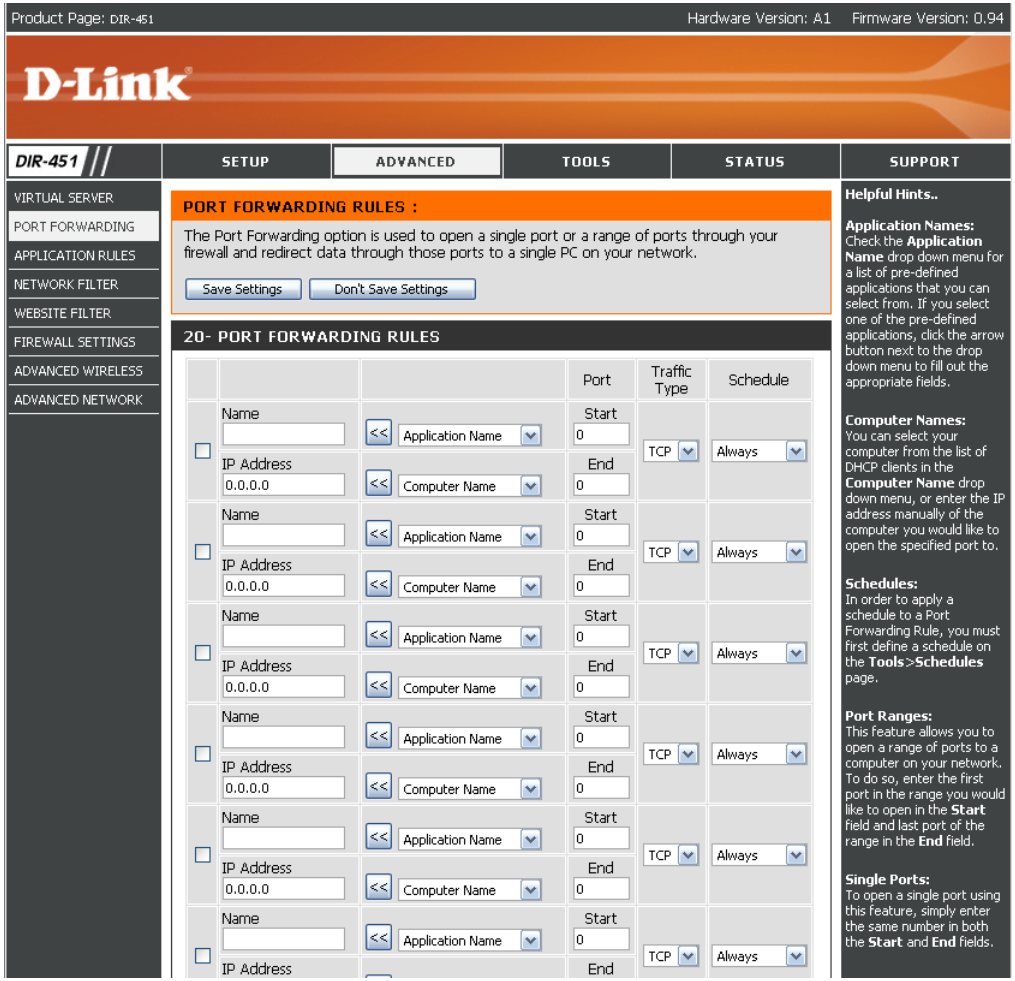
Name: Enter a name for the rule. You may select an application from the drop-down menu and click << to fill in the fields automatically.

IP Address: Enter the IP address of the computer on your local network that you want to allow the incoming service to. You may select a computer from the drop-down menu and click <<.

Start Port/ End Port: Enter the range of ports that you want to open. If you want to open 1 port, enter the same port in both boxes.

Traffic Type: Select **TCP**, **UDP**, or **ANY**.

Schedule: Select Always or a created schedule from the drop-down menu.



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Application Rules

Some applications require multiple connections, such as Internet gaming, video conferencing, Internet telephony and others. These applications have difficulties working through NAT (Network Address Translation). Special Applications makes some of these applications work with the DIR-451.

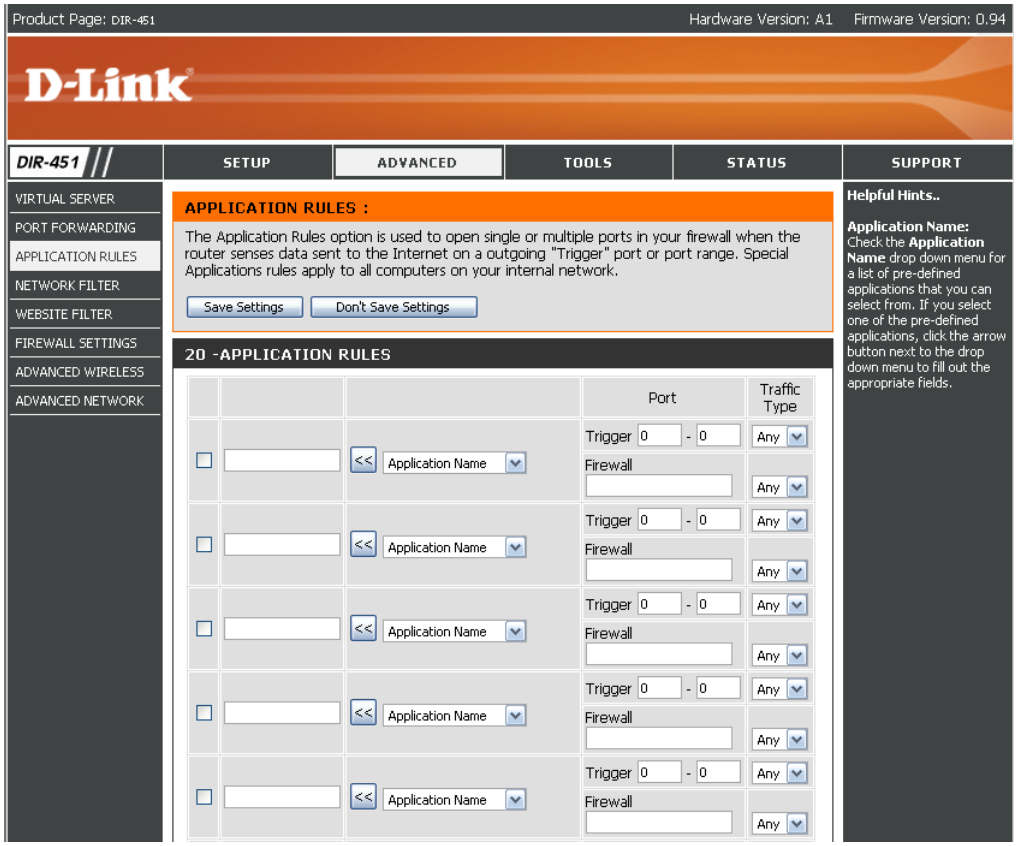
Rule: Check the box to enabled the rule.

Name: Enter a name for the rule.

Trigger Port: This is the port used to trigger the application. It can be either a single port or a range of ports.

Firewall Port: This is the port number on the WAN side that will be used to access the application. You may define a single port or a range of ports. You can use a comma to add multiple ports or port ranges.

Traffic Type: Select **TCP**, **UDP**, or **ANY**.



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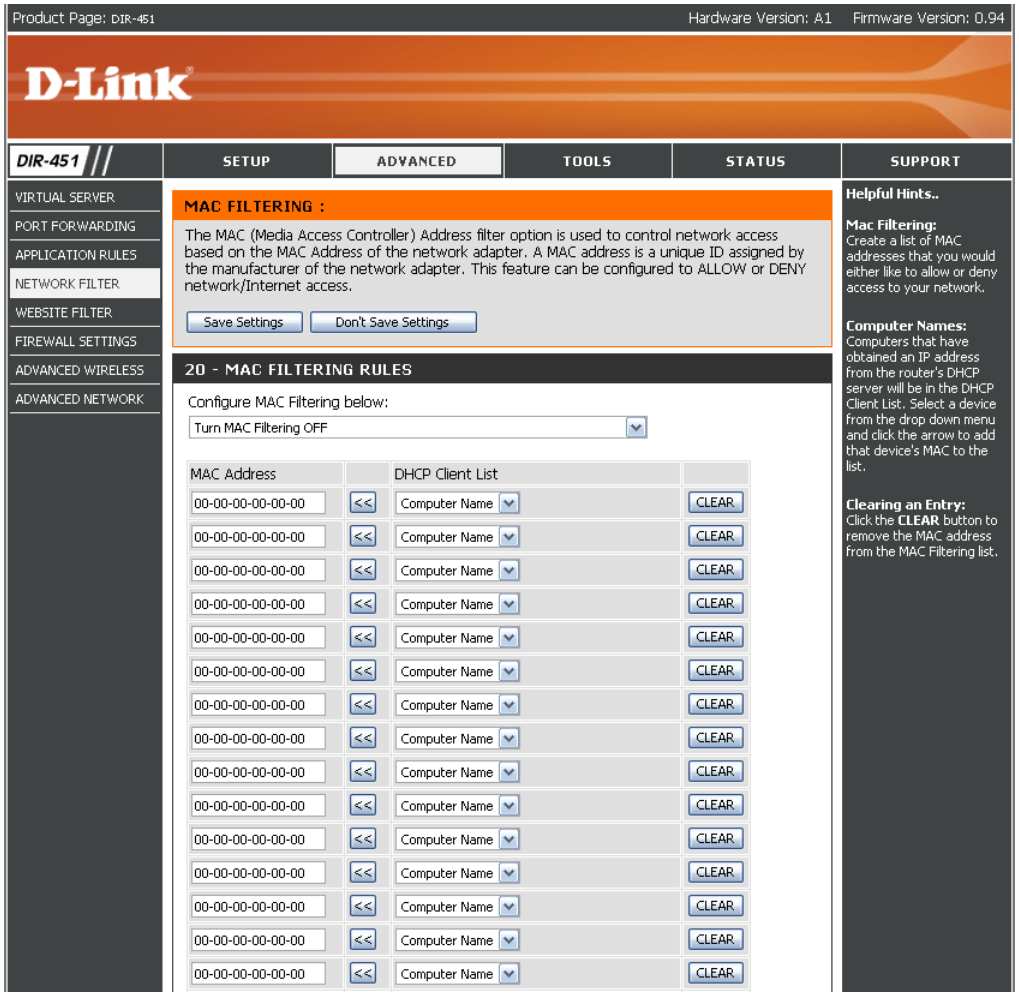
Network Filter

Use MAC (Media Access Control) Filters to allow or deny LAN (Local Area Network) computers by their MAC addresses from accessing the Network. You can either manually add a MAC address or select the MAC address from the list of clients that are currently connected to the Broadband Router.

Configure MAC Filter: Select **Turn MAC Filtering OFF**, **Turn MAC Filtering ON and ALLOW computers listed to access the network**, or T**urn MAC Filtering ON and DENY computers listed on the network.**

MAC Address: Enter the MAC address you would like to filter. To find the MAC address on a computer, please refer to the Networking Basics section in this manual.

DHCP Client: Select a DHCP client from the drop-down menu and click << to copy that MAC Address.



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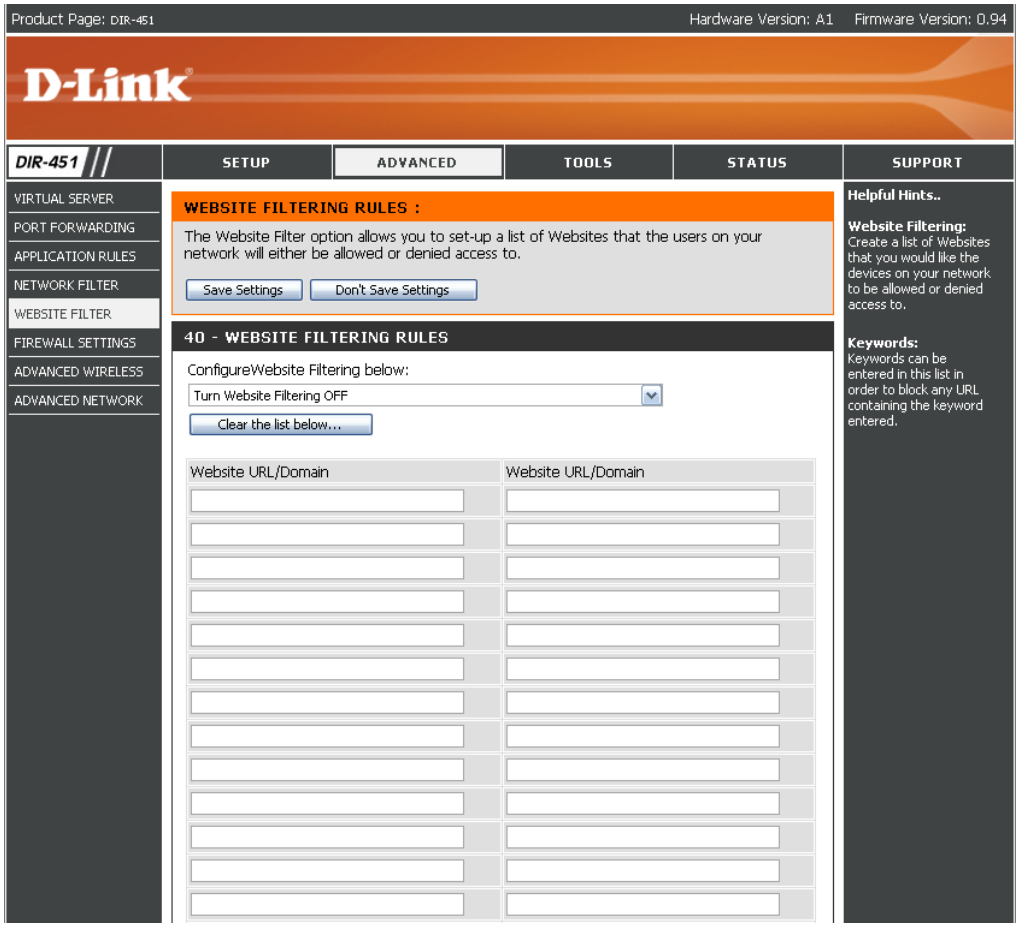
Website Filter

URL and domain blocking are used to deny LAN computers from accessing specific web sites by the URL or domain. A URL is a specially formatted text string that defines a location on the Internet. If any part of the URL contains the blocked word, the site will not be accessible and the web page will not display. To use this feature, enter the text string to be blocked and click **Apply**. The text to be blocked will appear in the list. To delete the text, just highlight it and click **Delete**.

Configure Website Filter: Select **Turn Website Filtering OFF**, **Turn Website Filtering ON and ALLOW computers access to ONLY these sites**, or **Turn Website Filtering ON and DENY computers access to ONLY these sites**.

Website URL/ Domain: Enter the keywords or URLs that you want to block (or allow). Any URL with the keyword in it will be blocked.

Clear the List Below: Click to remove all the entries.



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Firewall Settings

This section will allow you to setup a DMZ host and to enable VPN passthrough.

If you have a client PC that cannot run Internet applications properly from behind the DIR-451, then you can set the client up for unrestricted Internet access. It allows a computer to be exposed to the Internet. This feature is useful for gaming purposes. Enter the IP address of the internal computer that will be the DMZ host. Adding a client to the DMZ (Demilitarized Zone) may expose your local network to a variety of security risks, so only use this option as a last resort.

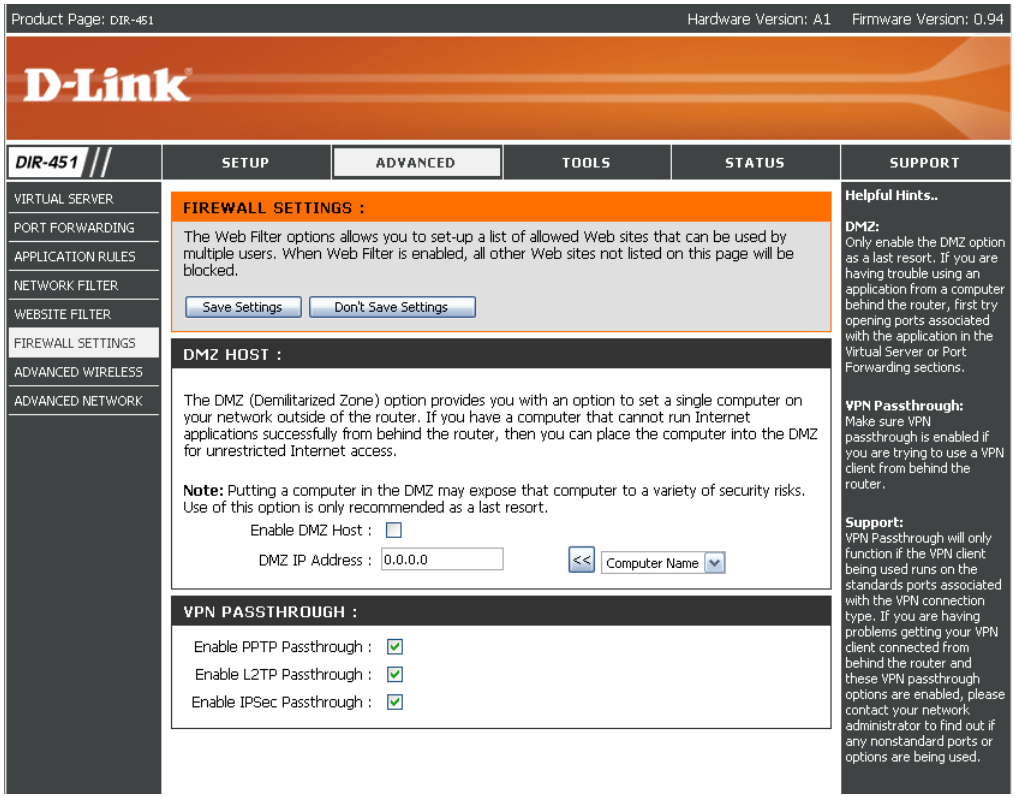
Enable DMZ Host: Check this box to enable DMZ.

DMZ IP Address: Enter the IP address of the computer you would like to open all ports to.

Enable PPTP Passthrough: Check this box to allow PPTP VPN traffic to pass through the router.

Enable L2TP Passthrough: Check this box to allow L2TP VPN traffic to pass through the router.

Enable IPSec Passthrough: Check this box to allow IPSec VPN traffic to pass through the router.



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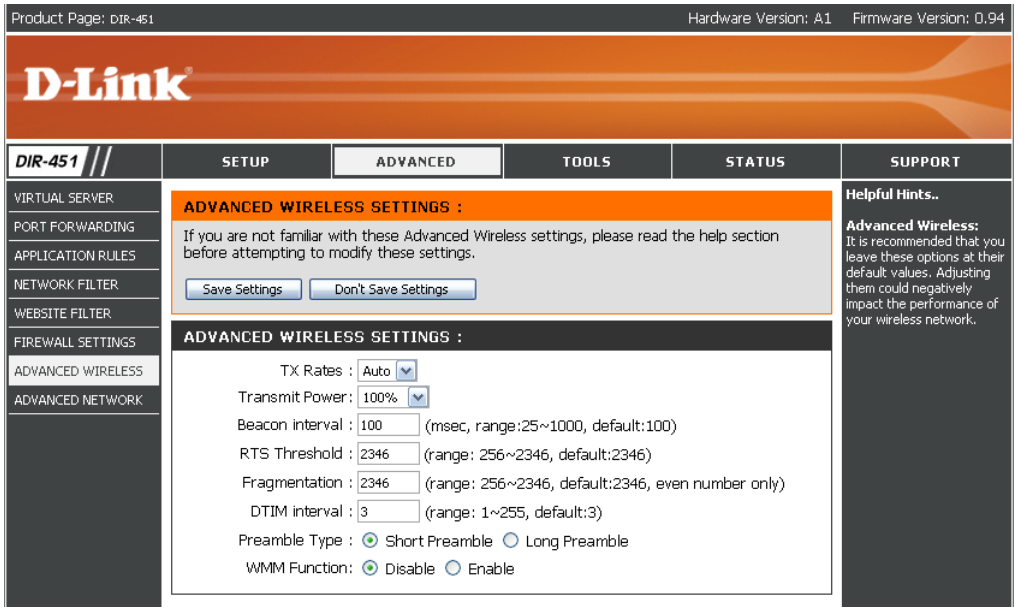
Advanced Wireless Settings



TX Rate: Select the basic transfer rates based on the speed of wireless adapters on your wireless network. It is strongly recommended to keep this setting to **Auto**.

Transmit Power: Set the transmit power of the antennas.

Beacon Interval: Beacons are packets sent by an Access Point to synchronize a wireless network. Specify a value. 100 is the default setting and is recommended.

RTS Threshold: This value should remain at its default setting of 2346. If inconsistent data flow is a problem, only a minor modification should be made.

Fragmentation: The fragmentation threshold, which is specified in bytes, determines whether packets will be fragmented. Packets exceeding the 2346 byte setting will be fragmented before transmission. 2346 is the default setting.

DTIM Interval: (Delivery Traffic Indication Message) 3 is the default setting. A DTIM is a countdown informing clients of the next window for listening to broadcast and multicast messages.

Preamble Type: Select Short or Long Preamble. The Preamble defines the length of the CRC block (Cyclic Redundancy Check is a common technique for detecting data transmission errors) for communication between the wireless router and the roaming wireless network adapters. Auto is the default setting. Note: High network traffic areas should use the shorter preamble type.

WMM Function: WMM (Wi-Fi Multimedia) is QoS (Quality of Service) for your wireless network. Enable this option to improve the quality of video and voice applications for your wireless clients.

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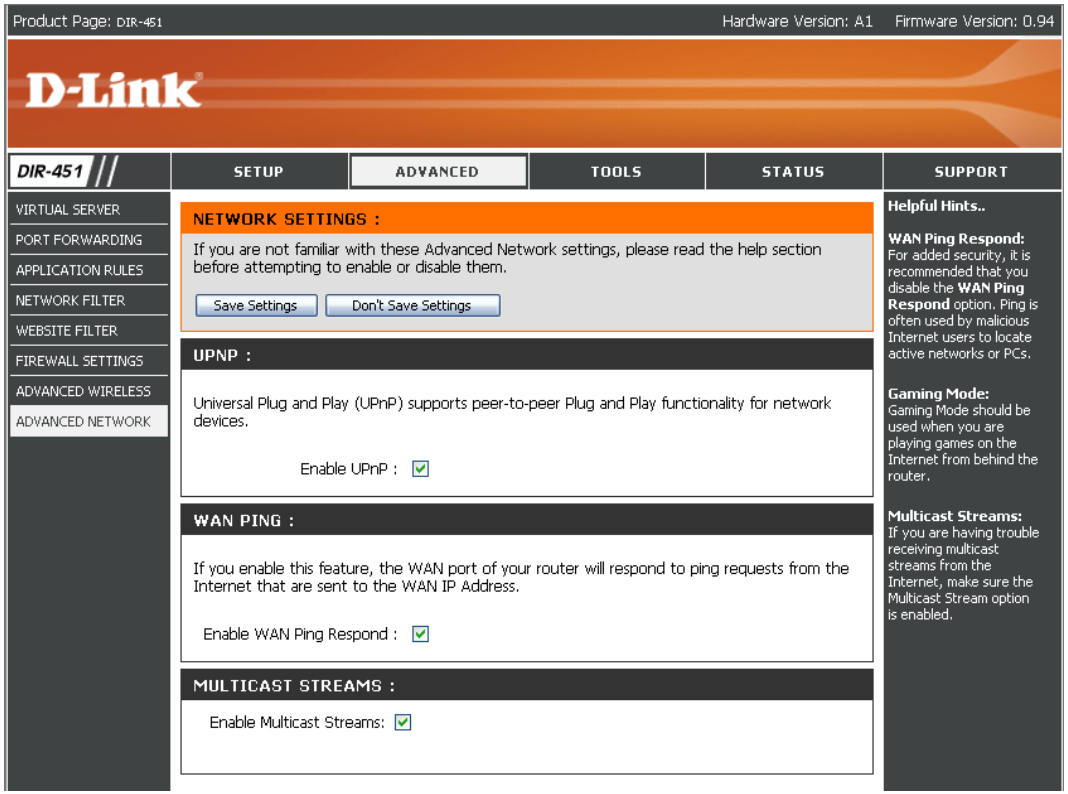
Advanced Network Settings

UPnP Settings: To use the Universal Plug and Play (UPnP™) feature click on **Enabled UPNP**. UPNP provides compatibility with networking equipment, software and peripherals.

WAN Ping: Unchecking the box will not allow the DIR-451 to respond to pings. Blocking the Ping may provide some extra security from hackers. Check the box to allow the WAN port to be "pinged".

Multicast streams: Check the box to allow multicast traffic to pass through the router from the Internet.



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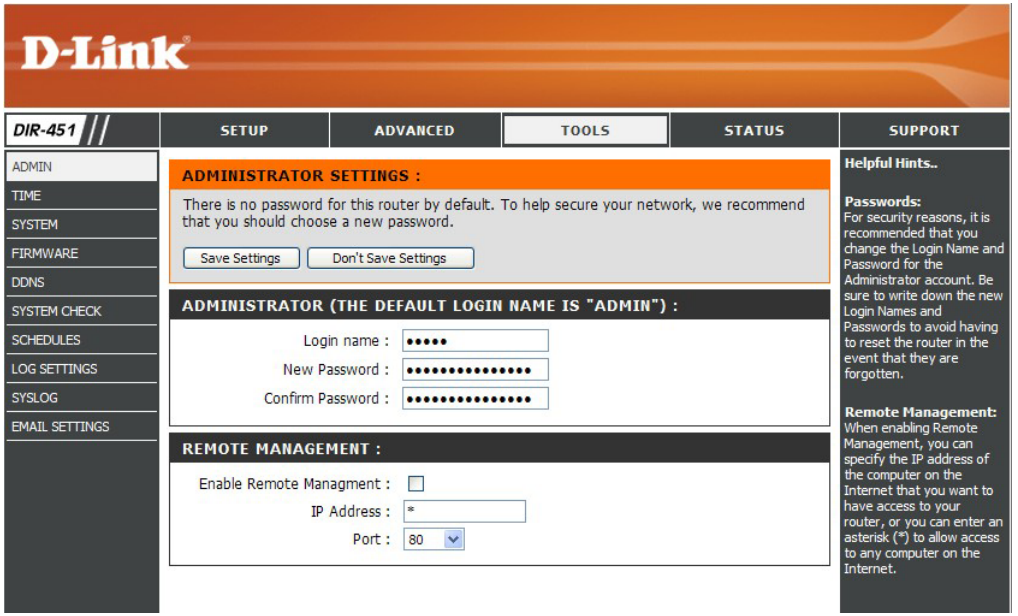
Administrator Settings

This page will allow you to change the Administrator and User passwords. You can also enable Remote Management. There are two accounts that can access the management interface through the web browser. The accounts are admin and user. Admin has read/write access while user has read-only access. User can only view the settings but cannot make any changes. Only the admin account has the ability to change both admin and user account passwords.



Administrator Login Name: Enter a new Login Name for the Administrator account.

Administrator Password: Enter a new password for the Administrator Login Name. The administrator can make changes to the settings.

Remote Management: Remote management allows the DIR-451 to be configured from the Internet by a web browser. A username and password is still required to access the Web-Management interface. In general, only a member of your network can browse the built-in web pages to perform Administrator tasks. This feature enables you to perform Administrator tasks from the remote (Internet) host.

IP Address: The Internet IP address of the computer that has access to the Broadband Router. If you input an asterisk (*) into this field, then any computer will be able to access the Router. Putting an asterisk (*) into this field would present a security risk and is not recommended.

Port: The port number used to access the DIR-451.
Example: http://x.x.x.x:8080 whereas x.x.x.x is the WAN IP address of the DIR-451 and 8080 is the port used for the Web-Management interface.

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Time Settings

Time Zone: Select the Time Zone from the drop-down menu.

Daylight Saving: To select Daylight Saving time manually, select enabled or disabled, and enter a start date and an end date for daylight saving time.

Automatic: NTP is short for Network Time Protocol. NTP synchronizes computer clock times in a network of computers. This field is optional.

Manual: To manually input the time, enter the values in these fields for the Year, Month, Day, Hour, Minute, and Second. Click **Set Time**. You can also click **Copy Your Computer's Time Settings**.

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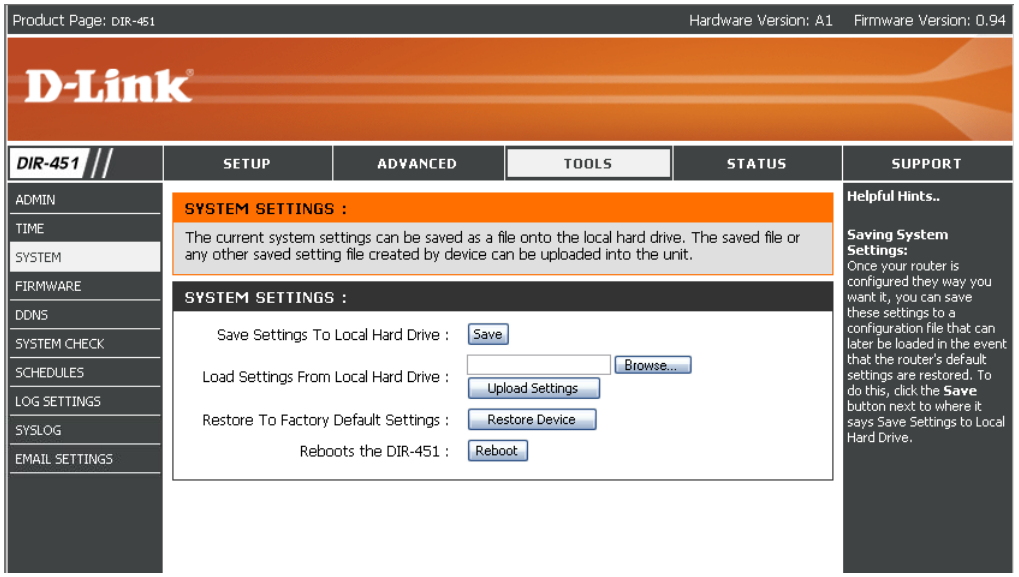
System Settings

Save Settings to Local Hard Drive: Use this option to save the current router configuration settings to a file on the hard disk of the computer you are using. First, click the **Save** button. You will then see a file dialog, where you can select a location and file name for the settings.

Load Settings from Local Hard Drive: Use this option to load previously saved router configuration settings. First, use the Browse control to find a previously save file of configuration settings. Then, click the **Load** button to transfer those settings to the router.

Restore to Factory Default Settings: This option will restore all configuration settings back to the settings that were in effect at the time the router was shipped from the factory. Any settings that have not been saved will be lost, including any rules that you have created. If you want to save the current router configuration settings, use the **Save** button above.

Reboot: Click to reboot the router.



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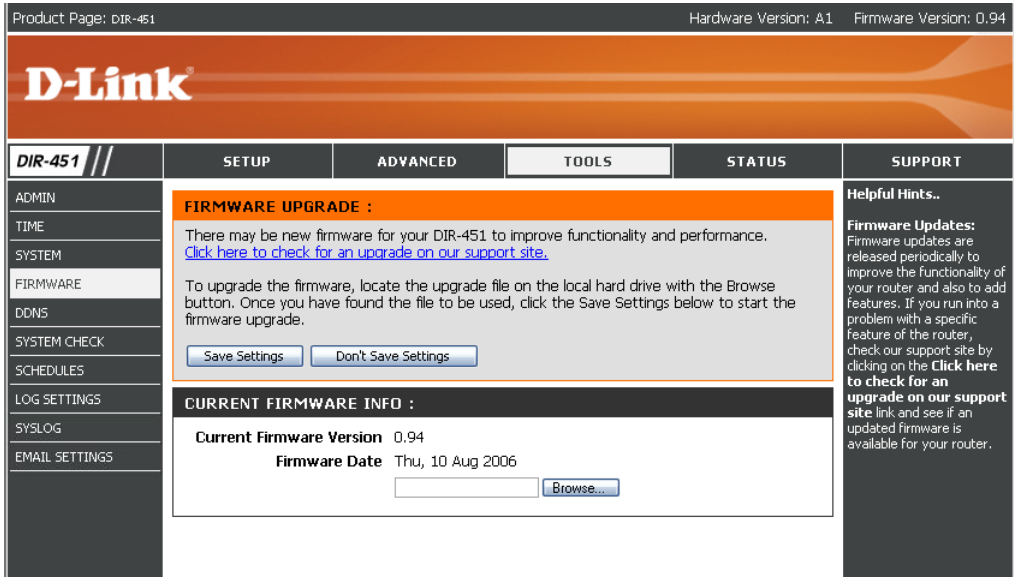
Firmware Upgrade

You can upgrade the firmware of the Router here. Make sure the firmware you want to use is on the local hard drive of the computer. Click on **Browse** to locate the firmware file to be used for the update. Please check the D-Link support site for firmware updates at http://support.dlink.com. You can download firmware upgrades to your hard drive from the D-Link support site.

Firmware Upgrade: Click on the link in this screen to find out if there is an updated firmware; if so, download the new firmware to your hard drive.

Browse: After you have downloaded the new firmware, click **Browse** in this window to locate the firmware update on your hard drive. Click **Save Settings** to complete the firmware upgrade.



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DDNS

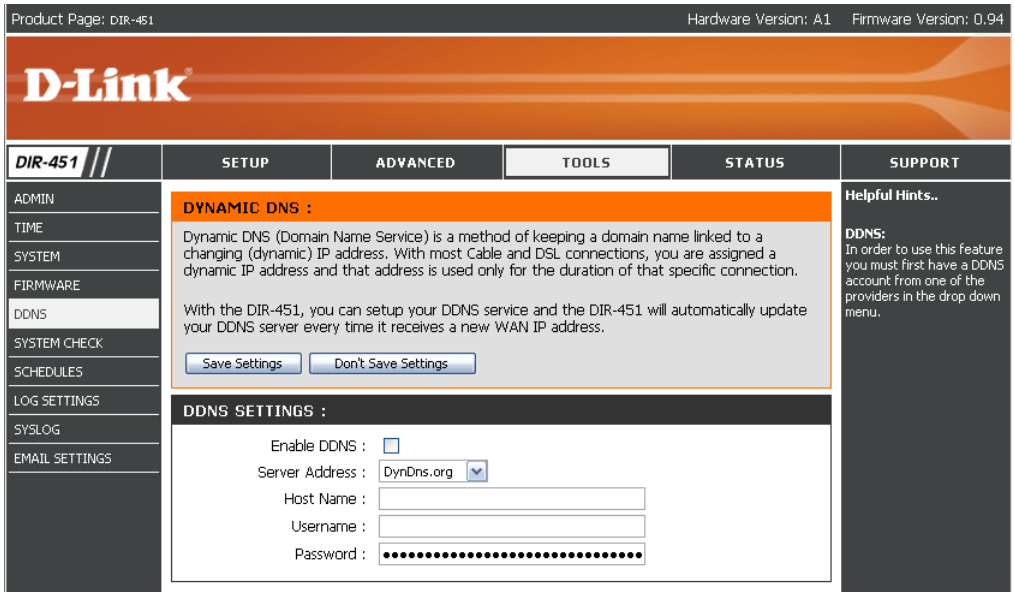
DDNS: Dynamic Domain Name System is a method of keeping a domain name linked to a changing IP Address. Check the box to enable DDNS.

Server Address: Select your DDNS provider from the drop-down menu.

Host Name: Enter the Host Name that you registered with your DDNS service provider.

Username: Enter the Username for your DDNS account.

Password: Enter the Password for your DDNS account.



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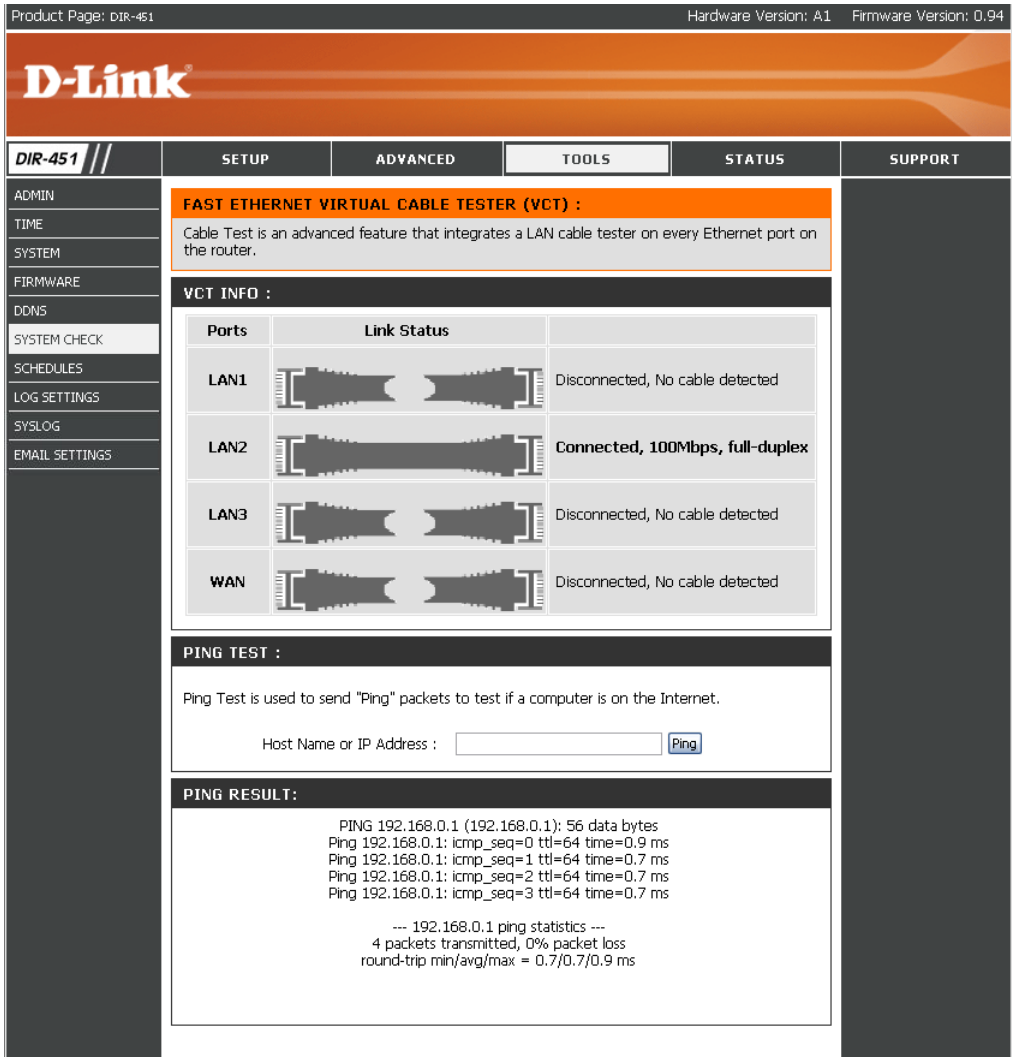
System Check

Virtual Cable Tester (VCT) Info: VCT is an advanced feature that integrates a LAN cable tester on every Ethernet port on the router. Through the graphical user interface (GUI), VCT can be used to remotely diagnose and report cable faults such as opens, shorts, swaps, and impedance mismatch. This feature significantly reduces service calls and returns by allowing users to easily troubleshoot their cable connections.

Ping Test: The Ping Test is used to send Ping packets to test if a computer is on the Internet. Enter the IP Address that you wish to Ping, and click **Ping**.



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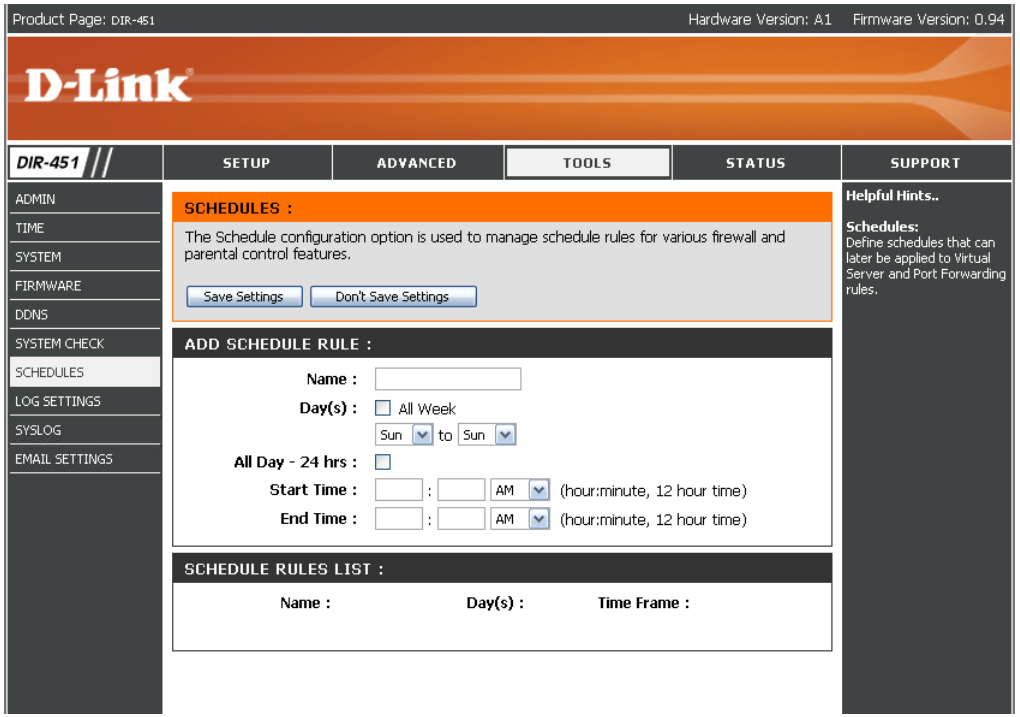
Schedules

Name: Enter a name for your new schedule.

Day(s): Select a day, a range of days, or all week to include every day.

Time: Check **All Day - 24hrs** or enter a start and end time for your schedule.



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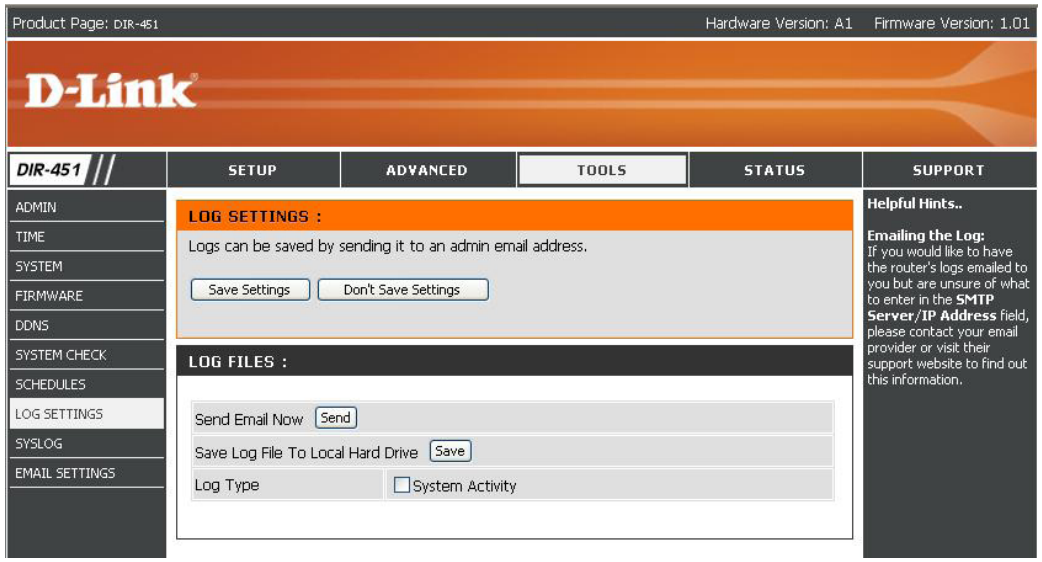
Log Settings

Send Email Now: This option will send a copy of the router log to the email address configured in the **Tools** > **Email Settings** screen. Refer to page 39.

Save Log File to Local Hard Drive: Click to save the router logs to your hard drive.

Log Type: Check **System Activity** to enable logging.



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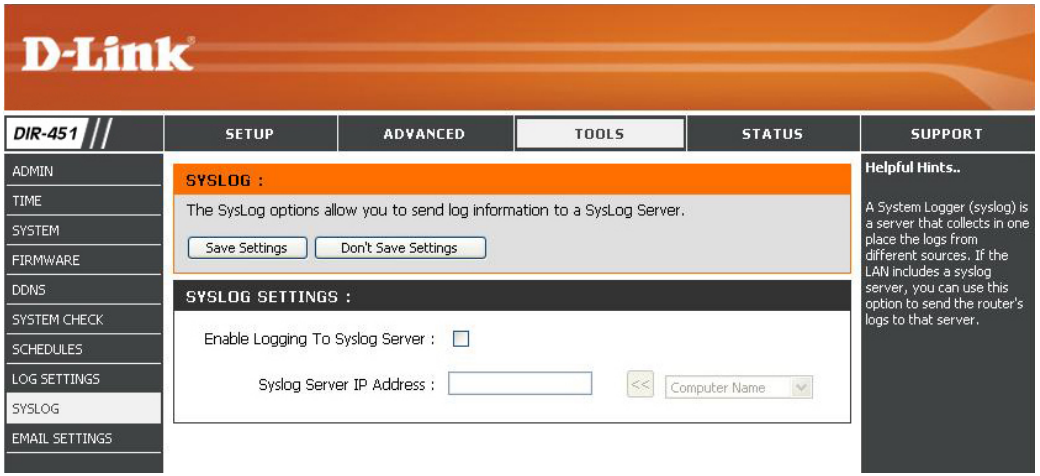
Syslog

The DIR-451 router keeps a running log of events and activities occurring on the router. You may send these logs to a SysLog server on your network.

Enable Logging to Syslog Server: Check this box to send the router logs to a SysLog Server.

Syslog Server IP Address: The address of the SysLog server that will be used to send the logs. You may also select your computer from the drop-down menu (only if receiving an IP address from the router via DHCP).



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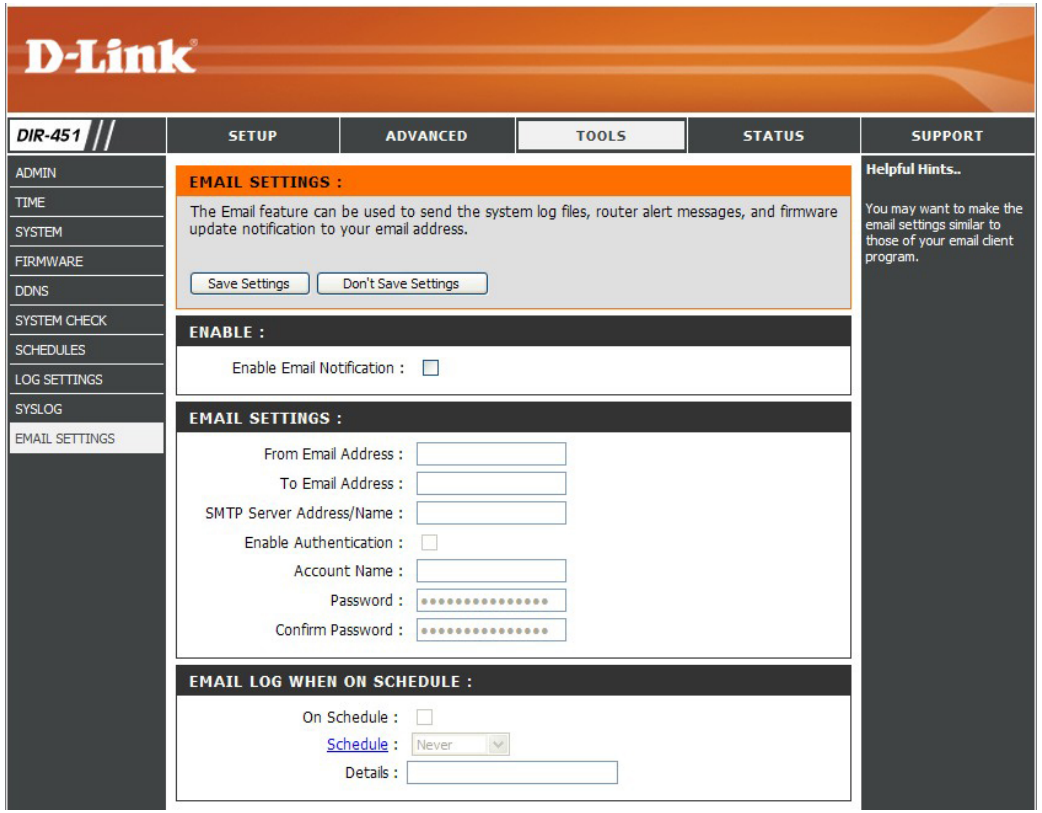
Email Settings

The Email feature can be used to send the system log files, router alert messages, and firmware update notification to your email address.



Enable Email Notification: When this option is enabled, router activity logs are e-mailed to a designated email address.

From Email Address: This email address will appear as the sender when you receive a log file or firmware upgrade notification via email.

To Email Address: Enter the email address where you want the email sent.

SMTP Server Address/Name: Enter the SMTP server address for sending email. If your SMTP server requires authentication, select this option.

Enable Authentication: Check this box if your SMTP server requires authentication.

Account Name: Enter your account for sending email.

Password: Enter the password associated with the account.

Confirm Password: Re-type the password associated with the account.

On Schedule: Selecting this option will send the logs via email according to schedule.

Schedule: This option is enabled when **On Schedule** is selected. You can select a schedule from the list of defined schedules. To create a schedule, go to **Tools** > **Schedules**.

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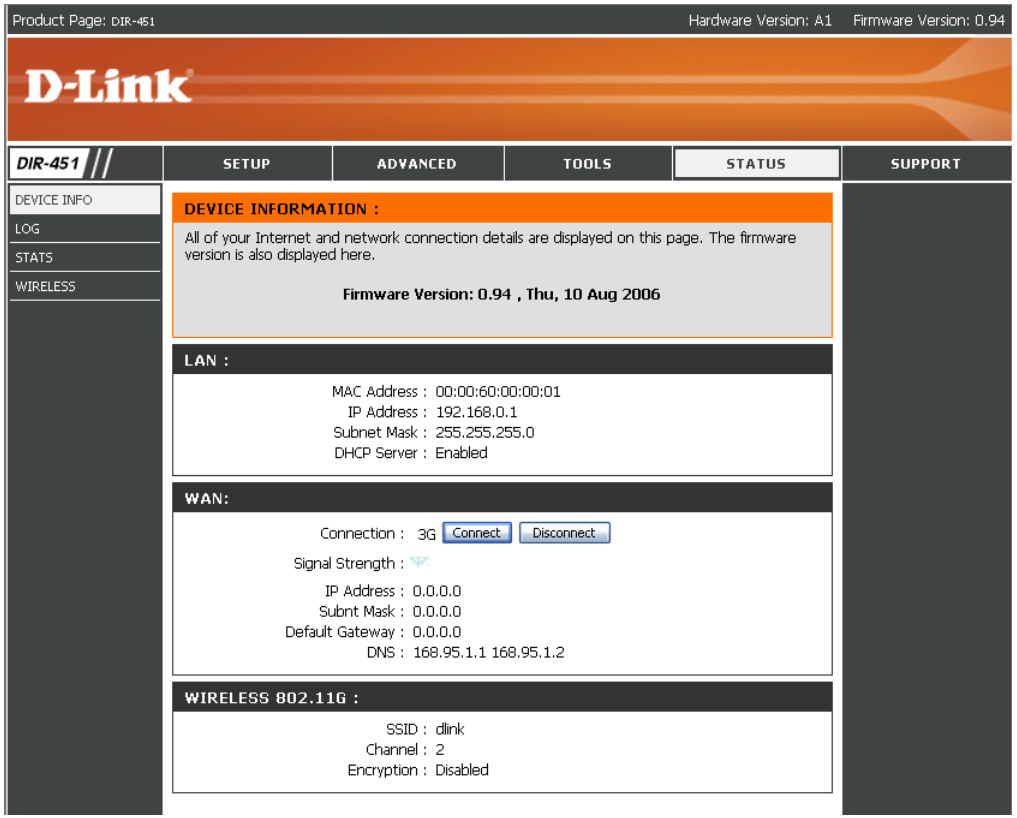
Device Information

This page displays the current information for the DIR-451. It will display the LAN, WAN, and Wireless information.

LAN: Displays the MAC address and the private (local) IP settings for the router.

WAN: Displays the MAC address and the public IP settings for the router.

Wireless: Displays the wireless MAC address and your wireless settings such as SSID, Channel, and Encryption type.



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Log

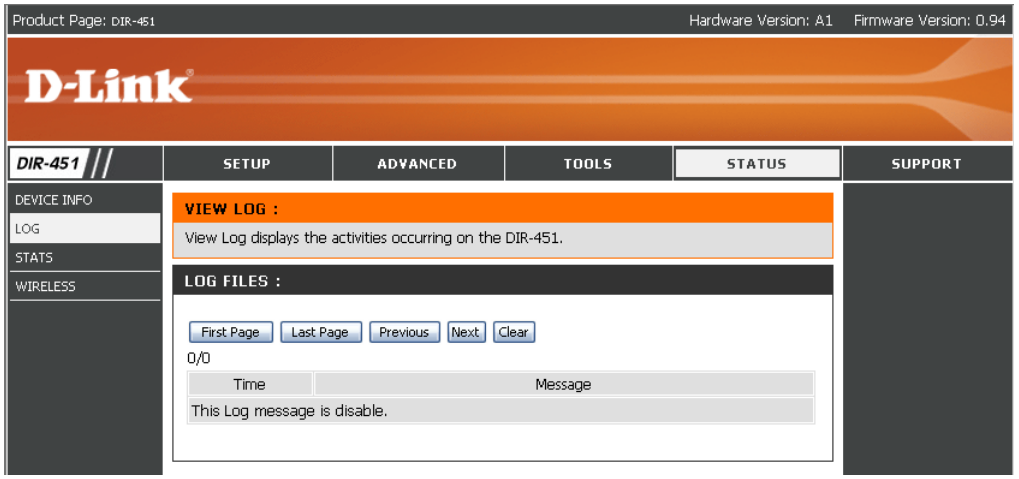
First Page: View the first page of the log.

Last Page: View the last page of the log.

Previous: View the previous page.

Next: View the next page.

Clear: Clear the log.



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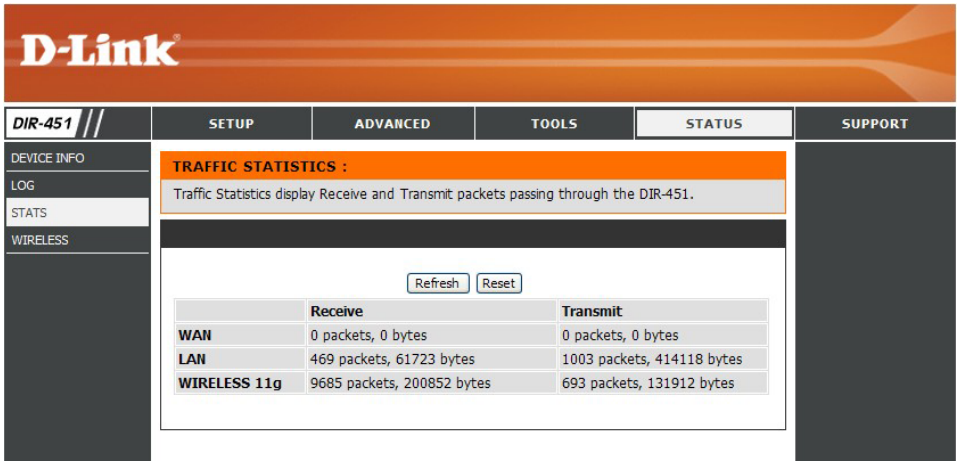
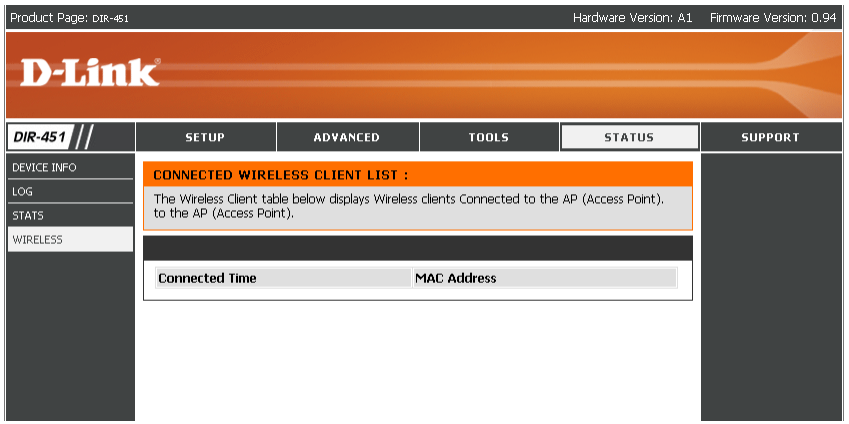
Stats

The screen below displays the Traffic Statistics. Here you can view the amount of packets that pass through the DIR-451 on both the WAN and the LAN ports. The traffic counter will reset if the device is rebooted.



Wireless Stats

The wireless client table displays a list of current connected wireless clients. This table also displays the connection time and MAC address of the connected wireless client.



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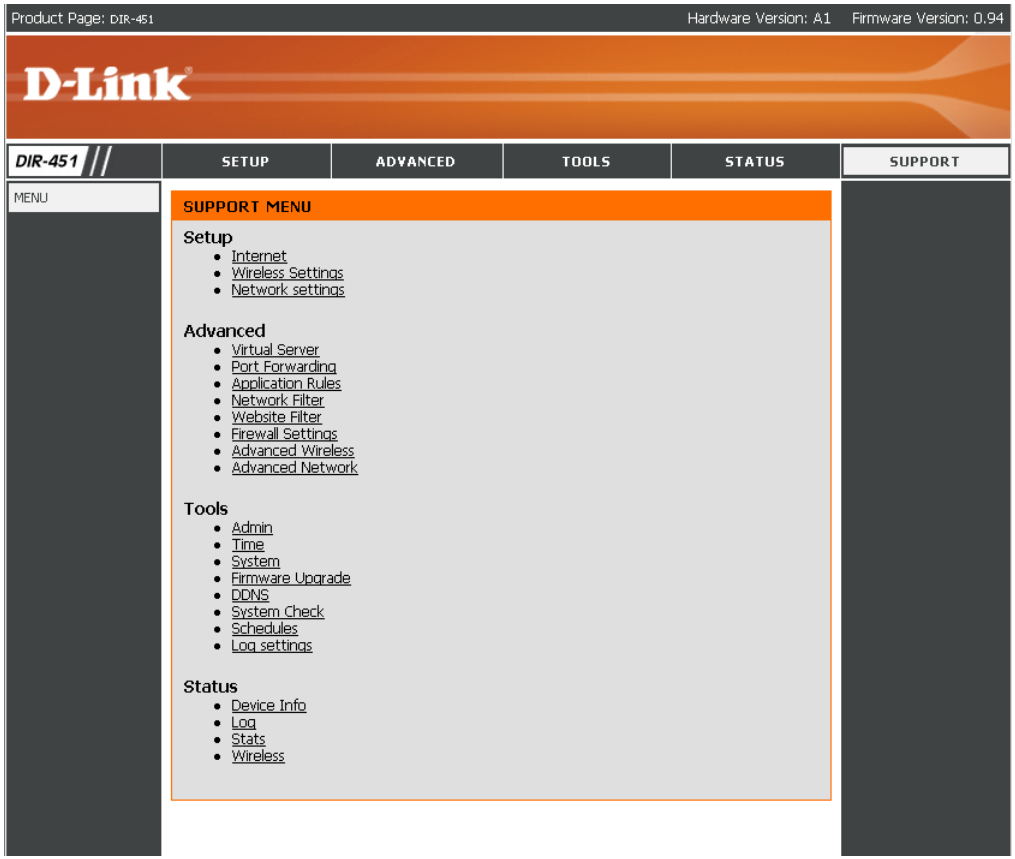
Support



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Wireless Security

This section will show you the different levels of security you can use to protect your data from intruders. The DIR-451 offers the following types of security:

- WPA2 (Wi-Fi Protected Access 2)
- WPA (Wi-Fi Protected Access)
- WEP (Wired Equivalent Privacy)
- WPA2-PSK (Pre-Shared Key)
- WPA-PSK (Pre-Shared Key)

What is WEP?

WEP stands for Wired Equivalent Privacy. It is based on the IEEE 802.11 standard and uses the RC4 encryption algorithm. WEP provides security by encrypting data over your wireless network so that it is protected as it is transmitted from one wireless device to another.

To gain access to a WEP network, you must know the key. The key is a string of characters that you create. When using WEP, you must determine the level of encryption. The type of encryption determines the key length. 128-bit encryption requires a longer key than 64-bit encryption. Keys are defined by entering in a string in HEX (hexadecimal - using characters 0-9, A-F) or ASCII (American Standard Code for Information Interchange – alphanumeric characters) format. ASCII format is provided so you can enter a string that is easier to remember. The ASCII string is converted to HEX for use over the network. Four keys can be defined so that you can change keys easily.

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Configure WEP

It is recommended to enable encryption on your wireless router before your wireless network adapters. Please establish wireless connectivity before enabling encryption. Your wireless signal may degrade when enabling encryption due to the added overhead.

1. Log into the web-based configuration by opening a web browser and entering the IP address of the router (192.168.0.1). Click on **Wireless Settings** on the left side.

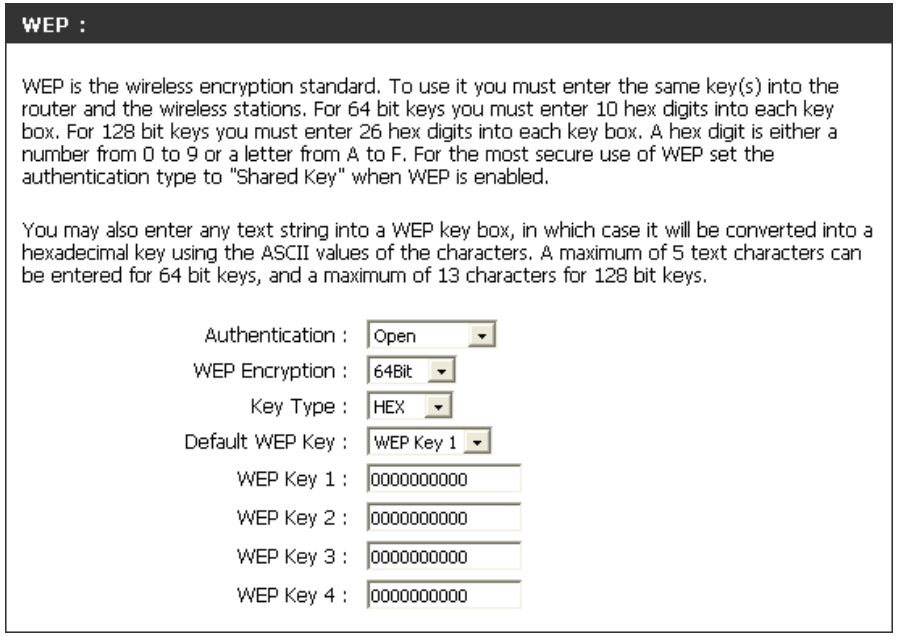
2. Next to *Security Mode*, select **Enable WEP Security**.

3. Next to *Authentication*, select **Open** or **Shared Key**.

4. Select either **64-bit** or **128-bit** encryption from the drop-down menu next to *WEP Encryption*.

5. Next to *Key Type*, select either **Hex** or **ASCII**.
   Hex (recommended) - Letters A-F and numbers 0-9 are valid.
   ASCII - All numbers and letters are valid.

6. Next to *Key 1*, enter a WEP key that you create. Make sure you enter this key exactly on all your wireless devices. You may enter up to 4 different keys.



7. Click **Save Settings** to save your settings. If you are configuring the router with a wireless adapter, you will lose connectivity until you enable WEP on your adapter and enter the same WEP key as you did on the router.

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What is WPA?

WPA, or Wi-Fi Protected Access, is a Wi-Fi standard that was designed to improve the security features of WEP (Wired Equivalent Privacy).

The 2 major improvements over WEP:

- Improved data encryption through the Temporal Key Integrity Protocol (TKIP). TKIP scrambles the keys using a hashing algorithm and, by adding an integrity-checking feature, ensures that the keys haven't been tampered with. WPA2 is based on 802.11i and uses Advanced Encryption Standard (AES) instead of TKIP.

- User authentication, which is generally missing in WEP, through the extensible authentication protocol (EAP). WEP regulates access to a wireless network based on a computer's hardware-specific MAC address, which is relatively simple to be sniffed out and stolen. EAP is built on a more secure public-key encryption system to ensure that only authorized network users can access the network.

WPA-PSK/WPA2-PSK uses a passphrase or key to authenticate your wireless connection. The key is an alpha-numeric password between 8 and 63 characters long. The password can include symbols (!?*&_) and spaces. This key must be the exact same key entered on your wireless router or access point.

WPA/WPA2 incorporates user authentication through the Extensible Authentication Protocol (EAP). EAP is built on a more secure public key encryption system to ensure that only authorized network users can access the network.

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Configure WPA-PSK

It is recommended to enable encryption on your wireless router before your wireless network adapters. Please establish wireless connectivity before enabling encryption. Your wireless signal may degrade when enabling encryption due to the added overhead.

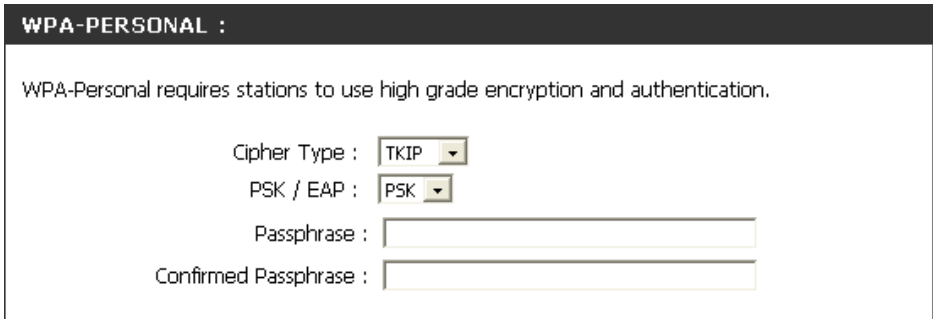
1. Log into the web-based configuration by opening a web browser and entering the IP address of the router (192.168.0.1). Click on **Wireless Settings** on the left side.

2. Next to *Security Mode*, select **Enable WPA-Personal Security** or **Enable WPA2-Personal Security**.

3. Next to *Cipher Mode*, select **TKIP, AES,** or **Auto**.

4. Next to *PSK/EAP*, select **PSK**.

5. Next to *Passphrase*, enter a key (passphrase). The key is an alpha-numeric password between 8 and 63 characters long. The password can include symbols (!?*&_) and spaces. Make sure you enter this key exactly the same on all other wireless clients.



6. Enter the passphrase again next to *Confirmed Passphrase*.

7. Click **Save Settings** to save your settings. If you are configuring the router with a wireless adapter, you will lose connectivity until you enable WPA-PSK (or WPA2-PSK) on your adapter and enter the same passphrase as you did on the router.

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Configure WPA (RADIUS)

It is recommended to enable encryption on your wireless router before your wireless network adapters. Please establish wireless connectivity before enabling encryption. Your wireless signal may degrade when enabling encryption due to the added overhead.

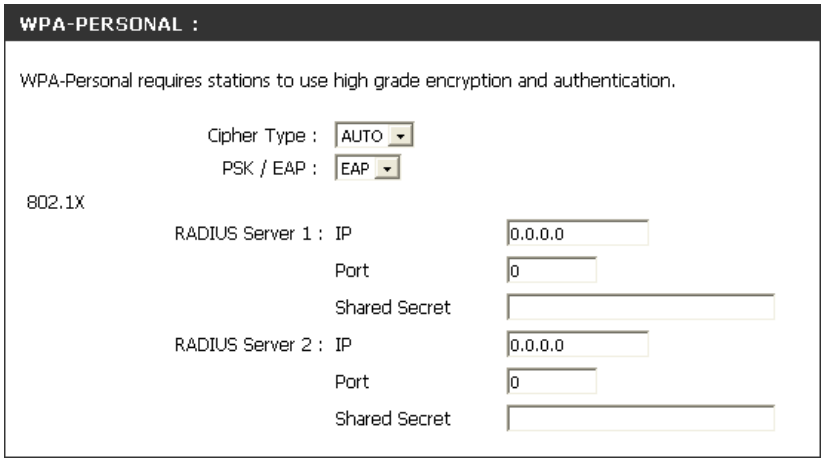
1. Log into the web-based configuration by opening a web browser and entering the IP address of the router (192.168.0.1). Click on **Wireless Settings** on the left side.

2. Next to *Security Mode*, select **Enable WPA-Personal Security** or **Enable WPA2-Personal Security**.

3. Next to *Cipher Mode*, select **TKIP, AES,** or **Auto**.

4. Next to *PSK/EAP*, select **EAP**.

5. Next to *RADIUS Server 1* enter the IP Address of your RADIUS server.



6. Next to *Port*, enter the port you are using with your RADIUS server. 1812 is the default port.

7. Next to *Shared Secret*, enter the security key.

8. If you have a secondary RADIUS server, enter its IP address, port, and secret key.

9. Click **Apply Settings** to save your settings.

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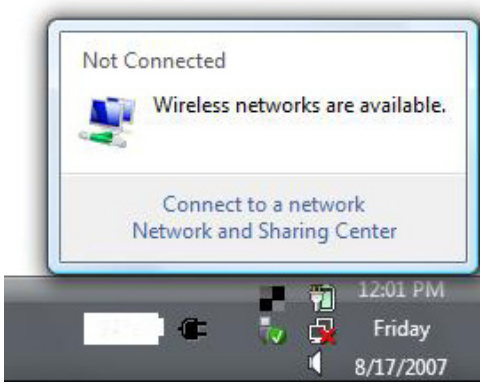
Connect to a Wireless Network
Using Windows Vista™

Windows® Vista™ users may use the built-in wireless utility. If you are using another company's utility or Windows® 2000, please refer to the user manual of your wireless adapter for help with connecting to a wireless network. Most utilities will have a "site survey" option similar to the Windows® Vista™ utility as seen below.

If you receive the **Wireless Networks Detected** bubble, click on the center of the bubble to access the utility.

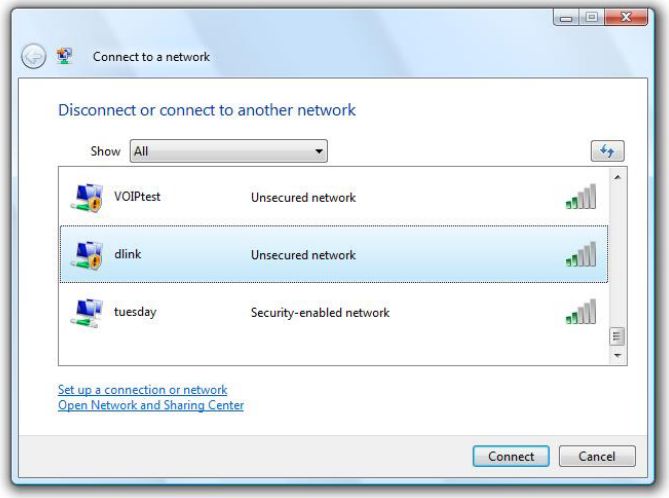
or

Right-click on the wireless computer icon in your system tray (lower-right corner next to the time). Select **Connect to a network**.



The utility will display any available wireless networks in your area. Click on a network (displayed using the SSID) and click the **Connect** button.

If you get a good signal but cannot access the Internet, check you TCP/IP settings for your wireless adapter. Refer to the **Networking Basics** section in this manual for more information.



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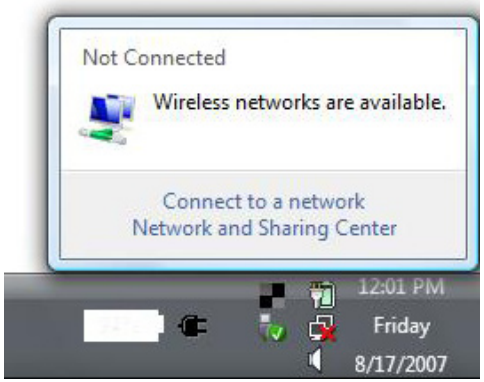
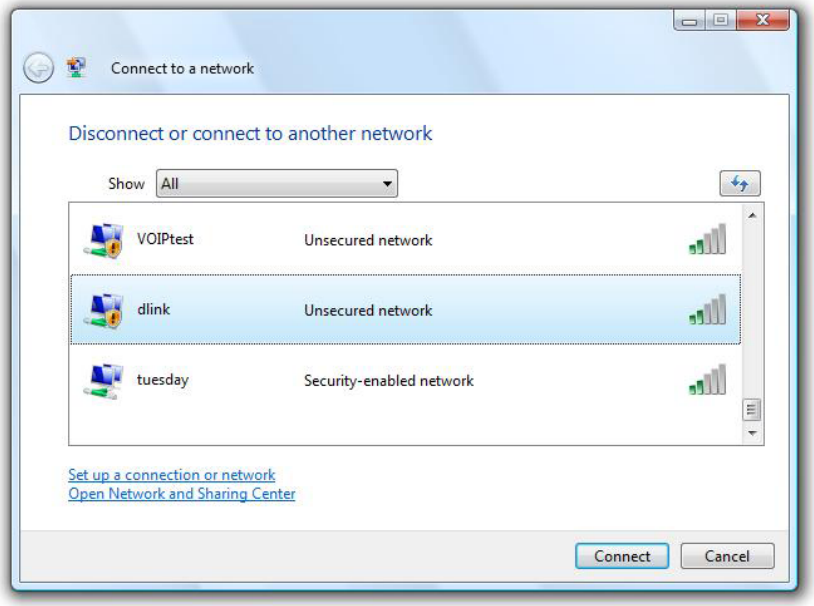
Configure Wireless Security

It is recommended to enable wireless security (WEP/WPA/WPA2) on your wireless router or access point before configuring your wireless adapter. If you are joining an existing network, you will need to know the security key or passphrase being used.

1. Open the Windows® Vista™ Wireless Utility by right-clicking on the wireless computer icon in your system tray (lower right corner of screen). Select **Connect to a network**.



2. Highlight the wireless network (SSID) you would like to connect to and click **Connect**.



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3. Enter the same security key or passphrase that is on your router and click **Connect**.

It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the security settings are correct. The key or passphrase must be exactly the same as on the wireless router.

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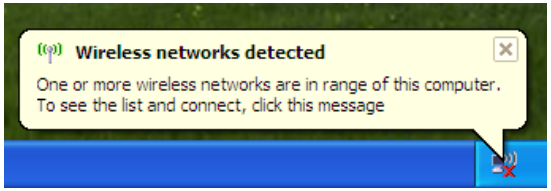
Connect to a Wireless Network Using Windows® XP

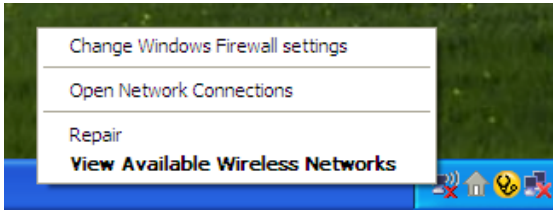
Windows® XP users may use the built-in wireless utility (Zero Configuration Utility). The following instructions are for Service Pack 2 users. If you are using another company's utility or Windows® 2000, please refer to the user manual of your wireless adapter for help with connecting to a wireless network. Most utilities will have a "site survey" option similar to the Windows® XP utility as seen below.

If you receive the **Wireless Networks Detected** bubble, click on the center of the bubble to access the utility.



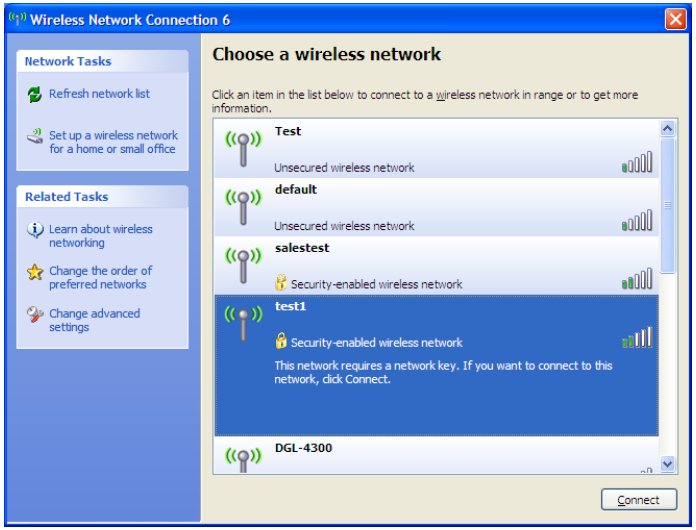
or

Right-click on the wireless computer icon in your system tray (lower-right corner next to the time). Select **View Available Wireless Networks**.



The utility will display any available wireless networks in your area. Click on a network (displayed using the SSID) and click the **Connect** button.

If you get a good signal but cannot access the Internet, check you TCP/IP settings for your wireless adapter. Refer to the **Networking Basics** section in this manual for more information.



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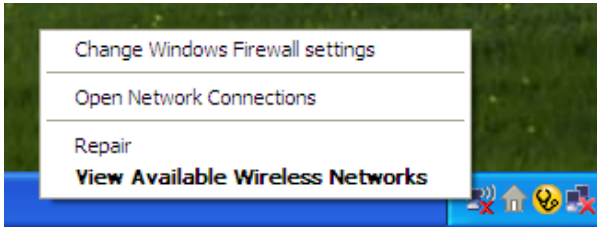
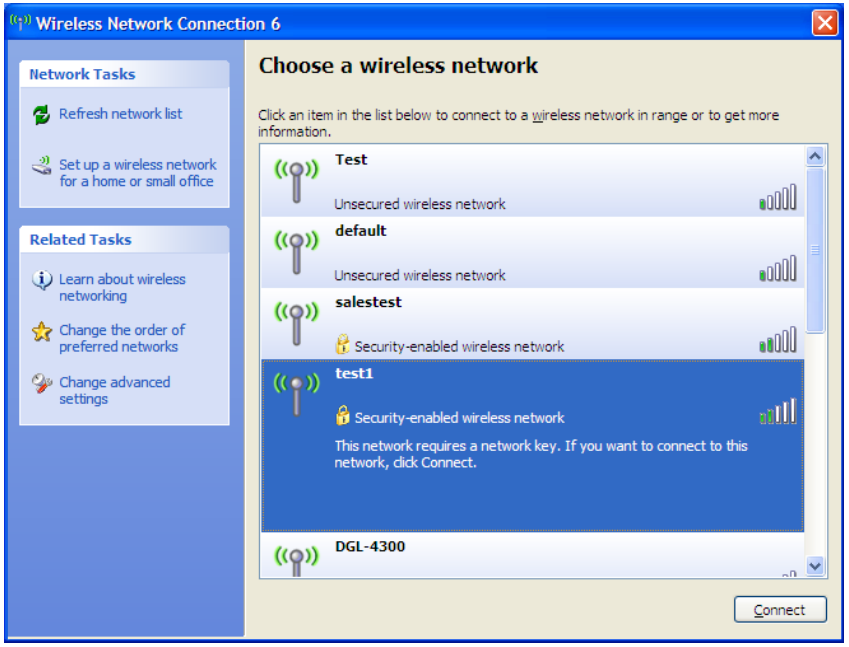
Configure WEP

It is recommended to enable WEP on your wireless router or access point before configuring your wireless adapter. If you are joining an existing network, you will need to know the WEP key being used.

1. Open the Windows® XP Wireless Utility by right-clicking on the wireless computer icon in your system tray (lower-right corner of screen). Select **View Available Wireless Networks**.



2. Highlight the wireless network (SSID) you would like to connect to and click **Connect**.



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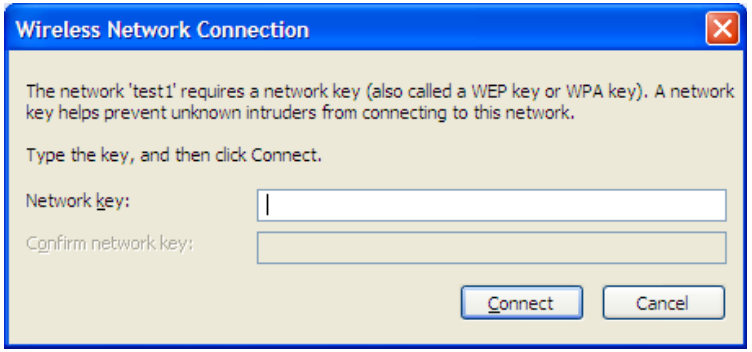
3. The **Wireless Network Connection** box will appear. Enter the same WEP key that is on your router and click **Connect**.



It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the WEP settings are correct. The WEP key must be exactly the same as on the wireless router.

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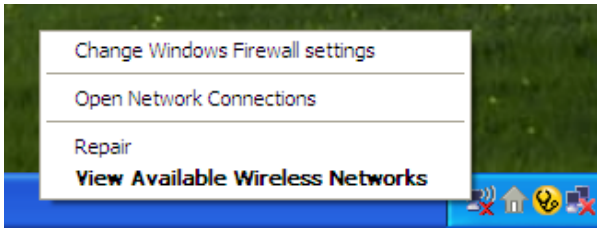
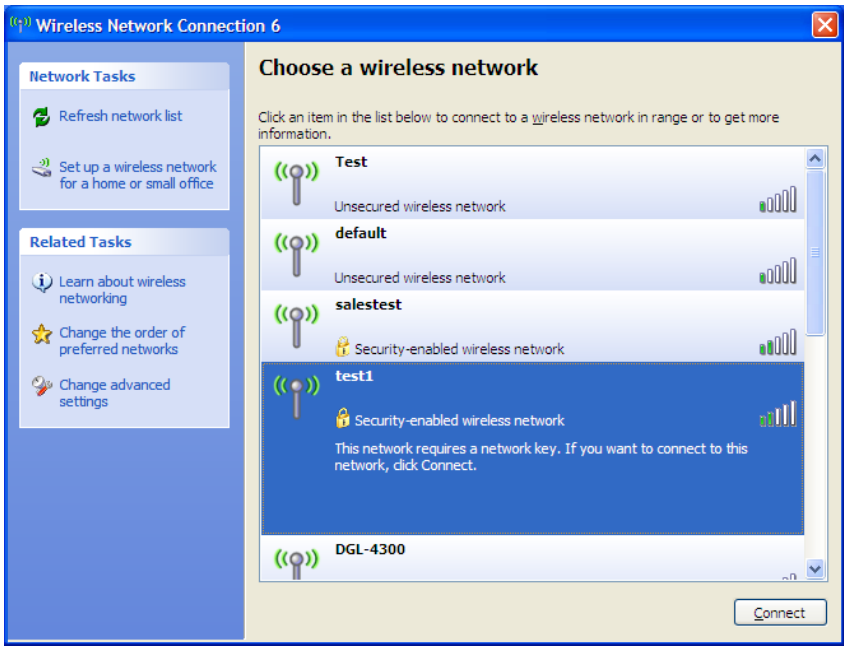
Configure WPA-PSK

It is recommended to enable WPA on your wireless router or access point before configuring your wireless adapter. If you are joining an existing network, you will need to know the WPA key being used.

1. Open the Windows® XP Wireless Utility by right-clicking on the wireless computer icon in your system tray (lower-right corner of screen). Select **View Available Wireless Networks**.



2. Highlight the wireless network (SSID) you would like to connect to and click **Connect**.



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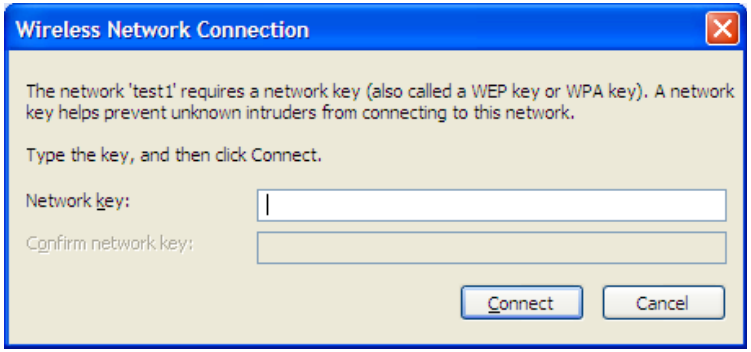
3. The **Wireless Network Connection** box will appear. Enter the WPA-PSK passphrase and click **Connect**.



It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the WPA-PSK settings are correct. The WPA-PSK passphrase must be exactly the same as on the wireless router.

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Troubleshooting

This chapter provides solutions to problems that can occur during the installation and operation of the DIR-451. Read the following descriptions if you are having problems. (The examples below are illustrated in Windows® XP. If you have a different operating system, the screenshots on your computer will look similar to the following examples.)

1. Why can't I access the web-based configuration utility?

When entering the IP address of the D-Link router (192.168.0.1 for example), you are not connecting to a website on the Internet or have to be connected to the Internet. The device has the utility built-in to a ROM chip in the device itself. Your computer must be on the same IP subnet to connect to the web-based utility.

- Make sure you have an updated Java-enabled web browser. We recommend the following:
  - Internet Explorer 6.0 or higher
  - Netscape 8 or higher
  - Mozilla 1.7.12 (5.0) or higher
  - Opera 8.5 or higher
  - Safari 1.2 or higher (with Java 1.3.1 or higher)
  - Camino 0.8.4 or higher
  - Firefox 1.5 or higher

- Verify physical connectivity by checking for solid link lights on the device. If you do not get a solid link light, try using a different cable or connect to a different port on the device if possible. If the computer is turned off, the link light may not be on.

- Disable any internet security software running on the computer. Software firewalls such as Zone Alarm, Black Ice, Sygate, Norton Personal Firewall, and Windows® XP firewall may block access to the configuration pages. Check the help files included with your firewall software for more information on disabling or configuring it.

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- Configure your Internet settings:

    - Go to **Start** > **Settings** > **Control Panel**. Double-click the **Internet Options** Icon. From the **Security** tab, click the button to restore the settings to their defaults.

    - Click the **Connection** tab and set the dial-up option to Never Dial a Connection. Click the LAN Settings button. Make sure nothing is checked. Click **OK**.

    - Go to the **Advanced** tab and click the button to restore these settings to their defaults. Click **OK** three times.

    - Close your web browser (if open) and open it.

- Access the web management. Open your web browser and enter the IP address of your D-Link router in the address bar. This should open the login page for your the web management.

- If you still cannot access the configuration, unplug the power to the router for 10 seconds and plug back in. Wait about 30 seconds and try accessing the configuration. If you have multiple computers, try connecting using a different computer.

2. What can I do if I forgot my password?

If you forgot your password, you must reset your router. Unfortunately this process will change all your settings back to the factory defaults.

To reset the router, locate the reset button (hole) on the rear panel of the unit. With the router powered on, use a paperclip to hold the button down for 10 seconds. Release the button and the router will go through its reboot process. Wait about 30 seconds to access the router. The default IP address is 192.168.0.1. When logging in, the username is **admin** and leave the password box empty.

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Wireless Basics

D-Link wireless products are 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 D-Link wireless family of products 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 Router is a device used to provide this link.

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What is Wireless?

Wireless or Wi-Fi technology is another way of connecting your computer to the network without using wires. Wi-Fi uses radio frequency to connect wirelessly, so you have the freedom to connect computers anywhere in your home or office network.

Why D-Link Wireless?

D-Link is the worldwide leader and award winning designer, developer, and manufacturer of networking products. D-Link delivers the performance you need at a price you can afford. D-Link has all the products you need to build your network.

How does wireless work?

Wireless works similar to how cordless phone work, through radio signals to transmit data from one point A to point B. But wireless technology has restrictions as to how you can access the network. You must be within the wireless network range area to be able to connect your computer. There are two different types of wireless networks Wireless Local Area Network (WLAN), and Wireless Personal Area Network (WPAN).

Wireless Local Area Network (WLAN)

In a wireless local area network, a device called an Access Point (AP) connects computers to the network. The access point has a small antenna attached to it, which allows it to transmit data back and forth over radio signals. With an indoor access point as seen in the picture, the signal can travel up to 300 feet. With an outdoor access point the signal can reach out up to 30 miles to serve places like manufacturing plants, industrial locations, college and high school campuses, airports, golf courses, and many other outdoor venues.

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Wireless Personal Area Network (WPAN)

Bluetooth is the industry standard wireless technology used for WPAN. Bluetooth devices in WPAN operate in a range up to 30 feet away.

Compared to WLAN the speed and wireless operation range are both less than WLAN, but in return it doesn't use nearly as much power which makes it ideal for personal devices, such as mobile phones, PDAs, headphones, laptops, speakers, and other devices that operate on batteries.

Who uses wireless?

Wireless technology as become so popular in recent years that almost everyone is using it, whether it's for home, office, business, D-Link has a wireless solution for it.

Home

- Gives everyone at home broadband access
- Surf the web, check email, instant message, and etc
- Gets rid of the cables around the house
- Simple and easy to use

Small Office and Home Office

- Stay on top of everything at home as you would at office
- Remotely access your office network from home
- Share Internet connection and printer with multiple computers
- No need to dedicate office space

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Where is wireless used?

Wireless technology is expanding everywhere not just at home or office. People like the freedom of mobility and it's becoming so popular that more and more public facilities now provide wireless access to attract people. The wireless connection in public places is usually called "hotspots".

Using a D-Link Cardbus Adapter with your laptop, you can access the hotspot to connect to Internet from remote locations like Airports, Hotels, Coffee Shops, Libraries, Restaurants, and Convention Centers.

Wireless network is easy to setup, but if you're installing it for the first time it could be quite a task not knowing where to start. That's why we've put together a few setup steps and tips to help you through the process of setting up a wireless network.

Tips

Here are a few things to keep in mind, when you install a wireless network.

Centralize your router or Access Point

Make sure you place the router/access point in a centralized location within your network for the best performance. Try to place the router/access point as high as possible in the room, so the signal gets dispersed throughout your home. If you have a two-story home, you may need a repeater to boost the signal to extend the range.

Eliminate Interference

Place home appliances such as cordless telephones, microwaves, and televisions as far away as possible from the router/access point. This would significantly reduce any interference that the appliances might cause since they operate on same frequency.

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Security

Don't let you next-door neighbors or intruders connect to your wireless network. Secure your wireless network by turning on the WPA or WEP security feature on the router. Refer to product manual for detail information on how to set it up.

Wireless Modes

There are basically two modes of networking:

- **Infrastructure** – All wireless clients will connect to an access point or wireless router.
- **Ad-Hoc** – Directly connecting to another computer, for peer-to-peer communication, using wireless network adapters on each computer, such as two or more WNA-2330 wireless network Cardbus adapters.

An Infrastructure network contains an Access Point or wireless router. All the wireless devices, or clients, will connect to the wireless router or access point.

An Ad-Hoc network contains only clients, such as laptops with wireless cardbus adapters. All the adapters must be in Ad-Hoc mode to communicate.

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Networking Basics

Check your IP address

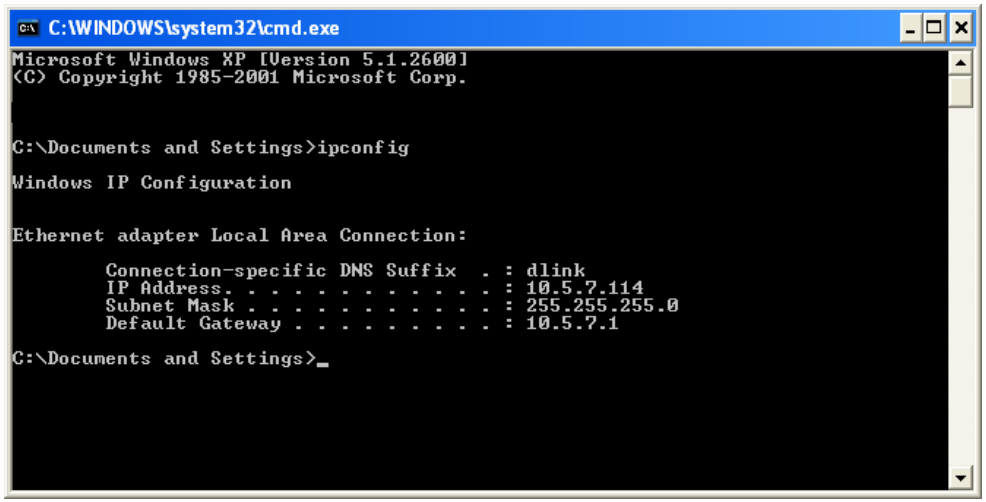
After you install your new D-Link adapter, by default, the TCP/IP settings should be set to obtain an IP address from a DHCP server (i.e. wireless router) automatically. To verify your IP address, please follow the steps below.

Click on **Start** > **Run**. In the run box type ***cmd*** and click **OK.** (Windows® Vista™ users type *cmd* in the **Start Search** box.)

At the prompt, type ***ipconfig*** and press **Enter**.

This will display the IP address, subnet mask, and the default gateway of your adapter.

If the address is 0.0.0.0, check your adapter installation, security settings, and the settings on your router. Some firewall software programs may block a DHCP request on newly installed adapters.



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Statically Assign an IP address

If you are not using a DHCP capable gateway/router, or you need to assign a static IP address, please follow the steps below:

Step 1

Windows® Vista™ - Click on **Start** > **Control Panel** > **Network and Internet** > **Network and Sharing Center** > **Manage Network Connections.**

Windows® XP - Click on **Start** > **Control Panel** > **Network Connections**.

Windows® 2000 - From the desktop, right-click **My Network Places** > **Properties**.

Step 2

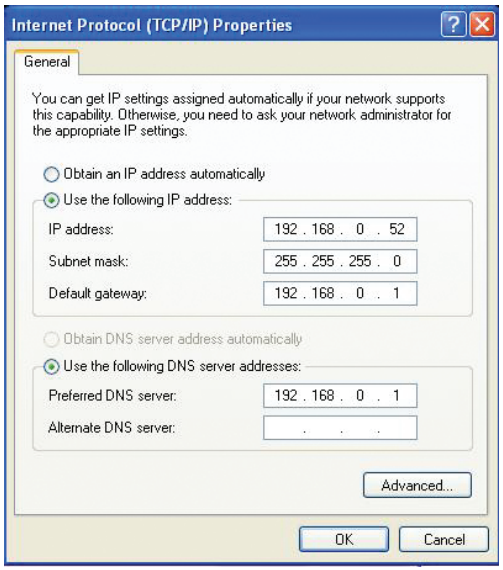
Right-click on the **Local Area Connection** which represents your network adapter and select **Properties**.

Step 3

Highlight **Internet Protocol (TCP/IP)** and click **Properties**.

Step 4

Click **Use the following IP address** and enter an IP address that is on the same subnet as your network or the LAN IP address on your router.



Example: If the router´s LAN IP address is 192.168.0.1, make your IP address 192.168.0.X where X is a number between 2 and 99. Make sure that the number you choose is not in use on the network. Set Default Gateway the same as the LAN IP address of your router (192.168.0.1).

Set Primary DNS the same as the LAN IP address of your router (192.168.0.1). The Secondary DNS is not needed or you may enter a DNS server from your ISP.

Step 5

Click **OK** twice to save your settings.

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Technical Specifications

Standards

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

Wireless Signal Rates*

- 54Mbps
- 48Mbps
- 36Mbps
- 24Mbps
- 18Mbps
- 12Mbps
- 11Mbps
- 9Mbps
- 6Mbps
- 5.5Mbps
- 2Mbps
- 1Mbps

Security

- WPA - Wi-Fi Protected Access (TKIP, MIC, IV Expansion, Shared Key Authentication)
- 802.1x
- 64/128-bit WEP
- WPA/WPA2
- WPA/PSK
- WPA2/PSK

Modulation Technology

Orthogonal Frequency Division Multiplexing (OFDM)

Receiver Sensitivity

- 54Mbps OFDM, 10% PER,-68dBm)
- 48Mbps OFDM, 10% PER,-68dBm)
- 36Mbps OFDM, 10% PER,-75dBm)
- 24Mbps OFDM, 10% PER,-79dBm)
- 18Mbps OFDM, 10% PER,-82dBm)
- 12Mbps OFDM, 10% PER,-84dBm)
- 11Mbps CCK, 8% PER,-82dBm)
- 9Mbps OFDM, 10% PER,-87dBm)
- 6Mbps OFDM, 10% PER,-88dBm)
- 5.5Mbps CCK, 8% PER,-85dBm)
- 2Mbps QPSK, 8% PER,-86dBm)
- 1Mbps BPSK, 8% PER,-89dBm)

VPN Pass Through/ Multi-Sessions

- PPTP
- L2TP
- IPSec

Device Management

- Web-based Internet Explorer v6 or later; Netscape Navigator v6 or later; or other Java-enabled browsers
- DHCP Server and Client

Wireless Frequency Range

2.4GHz to 2.462GHz

Wireless Operating Range

- Indoors - up to 328 ft. (100 meters)
- Outdoors- up to 1312 ft. (400 meters)

Wireless Transmit Power

15dBm ± 2dBm

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External Antenna Type
Single detachable reverse SMA

Advanced Firewall Features
- NAT with VPN Pass-through (Network Address Translation)
- MAC Filtering
- URL Filtering
- Domain Blocking
- Scheduling

Operating Temperature
32°F to 131°F (0°C to 55°C)

Humidity
95% maximum (non-condensing)

Safety and Emissions
FCC

LEDs
- Power
- Status
- WAN
- WLAN (Wireless Connection)
- LAN (10/100)
- USB

Dimensions
- L = 5.6 (142mm)
- W = 4.3 (109mm)
- H = 1.2 inches (31mm)

Weight
7.8 oz (0.22kg)

Warranty
1 Year

* Maximum wireless signal rate derived from IEEE Standard 802.11g specifications. Actual data throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead, lower actual data throughput rate. Environmental factors will adversely affect wireless signal range.

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Contacting Technical Support

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

Before you contact technical support, please have the following ready:

- Model number of the product (e.g. DIR-451)
- Hardware Revision (located on the label on the bottom of the router (e.g. rev A1))
- Serial Number (s/n number located on the label on the bottom of the router).

You can find software updates and user documentation on the D-Link website as well as frequently asked questions and answers to technical issues.

For customers within the United States:

Phone Support:
(877) 45-DLink
(877) 453-5465

Internet Support:
http://support.dlink.com

For customers within Canada:

Phone Support:
(800) 361-5265

Internet Support:
http://support.dlink.com

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Warranty

Subject to the terms and conditions set forth herein, D-Link Systems, Inc. (“D-Link”) provides this Limited Warranty:

- Only to the person or entity that originally purchased the product from D-Link or its authorized reseller or distributor, and
- Only for 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, or addresses with an APO or FPO.

Limited Warranty:

D-Link warrants that the hardware portion of the D-Link product described below (“Hardware”) will be free from material defects in workmanship and materials under normal use from the date of original retail purchase of the product, for the period set forth below (“Warranty Period”), except as otherwise stated herein.

- Hardware (excluding power supplies and fans): One (1) year
- Power supplies and fans: One (1) year
- Spare parts and spare kits: Ninety (90) days

The customer’s sole and exclusive remedy and the entire liability of D-Link and its suppliers under this Limited Warranty will be, at D-Link’s option, to repair or replace the defective Hardware during the Warranty Period at no charge to the original owner or to refund the actual purchase price paid. Any 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, at its option, 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 or ninety (90) days, whichever is longer, and is subject to the same limitations and exclusions. If a material defect is incapable of correction, or if D-Link determines that it is not practical to repair or replace the defective Hardware, the actual 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.

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Limited Software Warranty:

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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.

Federal Communication Commission Interference 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 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 can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one 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.

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.

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

IEEE 802.11b or 802.11g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

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Industry Canada Statement

Operation is subject to the following two conditions:
1) this device may not cause interference and
2) this device must accept any interference, including interference that may cause undesired operation of the device

This device has been designed to operate with an antenna having a maximum gain of 2dBi.
Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the EIRP is not more than required for successful communication.

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