USER MANUAL

DIR-456U

VERSION 1.0

D-Link®

MOBILE

Preface

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Package Contents

- D-Link DIR-456U Mobile Router
- Power Adapter
- Ethernet Cable
- RJ-11 Telephone Cable
- Manual and Warranty on CD

Note: Using a power supply with a different voltage rating than the one included with the DIR-456U will cause damage and void the warranty for this product.

System Requirements

- A compatible (U)SIM 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.

Introduction

DIR-456U allows users to access worldwide mobile broadband networks. Once connected, users can transfer data, stream media, send SMS messages, and make mobile phone calls. Simply insert your UMTS/HSUPA SIM card, and share your 3.5G Internet connection through a secure 802.11n wireless network or using any of the four 10/100 Ethernet ports.

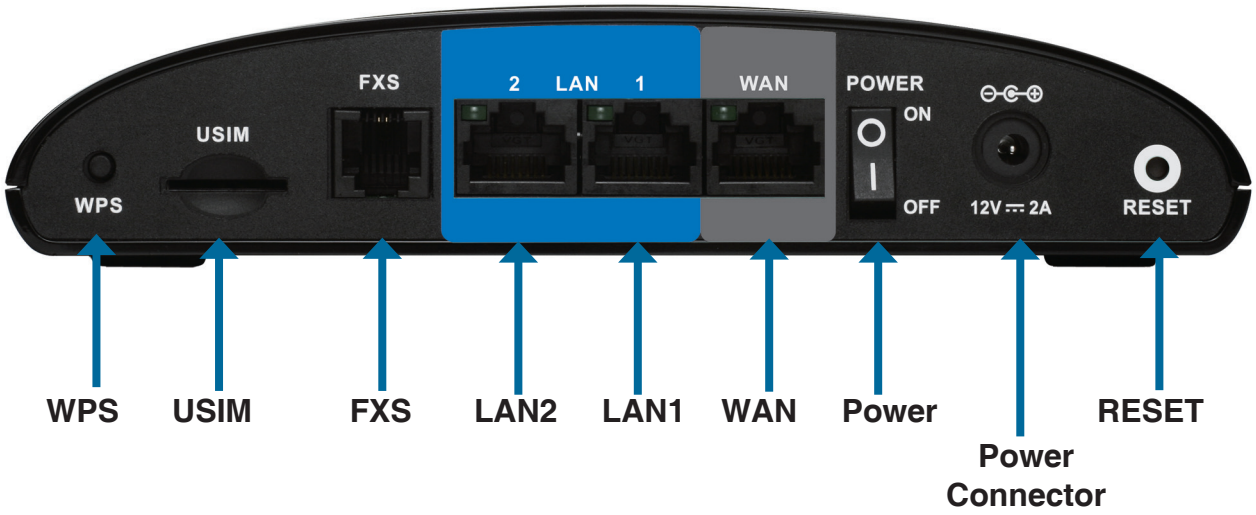
While accessing your 3.5G Internet connection, you will still have the ability to answer incoming mobile calls and respond to SMS messages. An RJ-11 jack allows you to attach a standard analog phone for high-quality mobile calls over a GSM network. Enjoy the comfort and convenience of your favorite office phone anywhere you go.

Keep your wireless network safe with WPA/WPA2 wireless encryption. The DIR-456U utilizes dual-active firewalls (SPI and NAT) to prevent potential attacks across the Internet.

DIR-456U can be installed quickly and easily almost anywhere. This router is great for situations where an impromptu wireless network must be set up, or wherever conventional network access is unavailable. The DIR-456U can even be installed in buses, trains, or boats, allowing passengers to check e-mail or chat online while commuting.

Hardware Overview

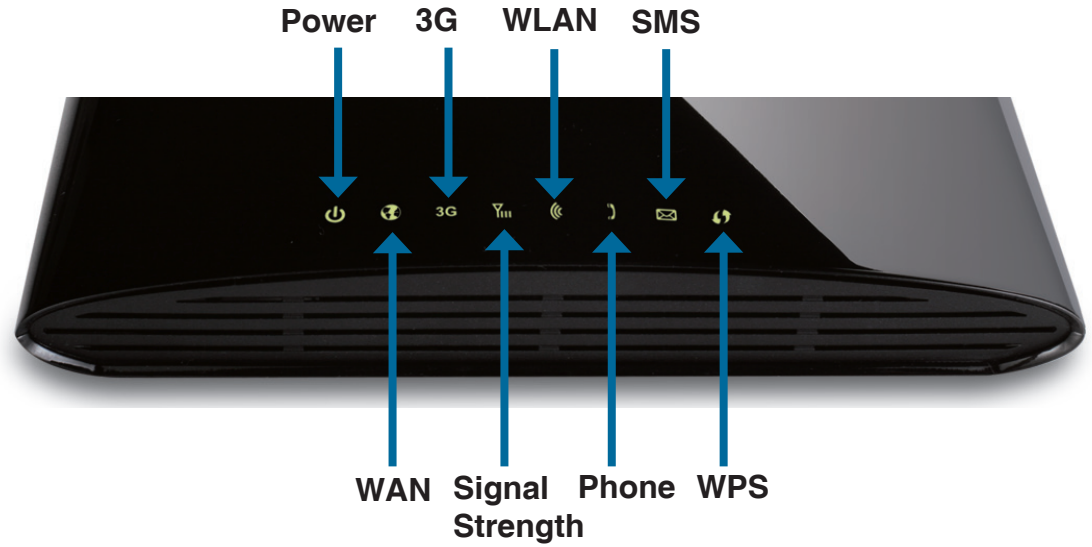
Rear Panel



Port	Function
LAN 1-2 (RJ-45)	Insert an Ethernet cable connected to a network device such as a desktop or notebook computer.
WAN (RJ-45)	Insert a standard CAT5 Ethernet cable connected to a DSL/ Cable modem or router.
SIM	Insert a standard (U)SIM card into this slot.
Power	Insert the provided DC power adapter into this socket.
Phone (RJ-11)	Insert an RJ-11 telephone cable connected to a standard landline telephone.
Reset	Hold this button down to reset the device.
WPS	Press this button to initiate a new WPS connection.

Hardware Overview

Front Panel



Hardware Overview

LEDs

LED Name	Function
WAN	**Solid Green:** Ethernet connection has been established **Blinking Green:** Data is being transferred
LAN 1-2	**Solid Green:** Ethernet connection has been established **Blinking Green:** Data is being transferred
Signal Strength	**OFF:** No signal **ON (Blinking Orange):** Signal is weak **ON (Solid Orange):** Signal strength is medium **ON (Solid Green):** Signal strength is strong
WPS	**Slow Blinking Green:** WPS is functioning normally **Fast Blinking Green:** WPS is functioning in PBC mode
3.5G	**Solid Green:** UMTS/HSDPA/HSUPA connection is established **Blinking:** Data is being transferred via 3G
SMS	**Solid Green:** Lights up when an SMS has been received
WLAN	**Solid Green:** WLAN is active and available **Blinking Green:** Data is being transferred via WLAN

Installation

This section will guide 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 an attic or garage.

Connect to Your Network

Note: Ensure that your DIR-456U Mobile Router is disconnected and powered **off** before performing the installation steps below.

1. Insert a standard (U)SIM card into the **SIM** card slot on the back of the router with the gold contacts facing downwards.

2. Insert your Internet/WAN network cable into the **INTERNET** port on the back of the router.

   Note: The 3.5G connection can also be used as a backup WAN. Once a backup is configured, the router will automatically use 3.5G for the Internet connection if the Ethernet WAN is not available.

3. Insert the Ethernet cable into the LAN Port 1 on the back panel of the DIR-456U Mobile Router, and an available Ethernet port on the network adapter in the computer you will use to configure the unit.

   Note: The DIR-456U Mobile Router LAN Ports are “Auto-MDI/MDIX.” Therefore, patch or crossover Ethernet cables can be used.

4. Connect the power adapter to the socket on the back panel of your DIR-456U Mobile Router. Plug the other end of the power adapter into a wall outlet or power strip.

   a. The **Status LED** will light up to indicate that power has been supplied to the router.

   b. The LEDs on the front panel will flash on and off as the DIR-456U Mobile Router performs initialization and Internet connection processes.

   c. After a few moments, if a connection has been established, the following LEDs will turn solid green: Power, Status, WAN, WLAN, and LAN Port 1 (or whichever port(s) your Ethernet cable has been connected to).

   Caution! Always unplug/power down the router before installing or removing the SIM card. Never insert or remove the SIM card while the router is in use.

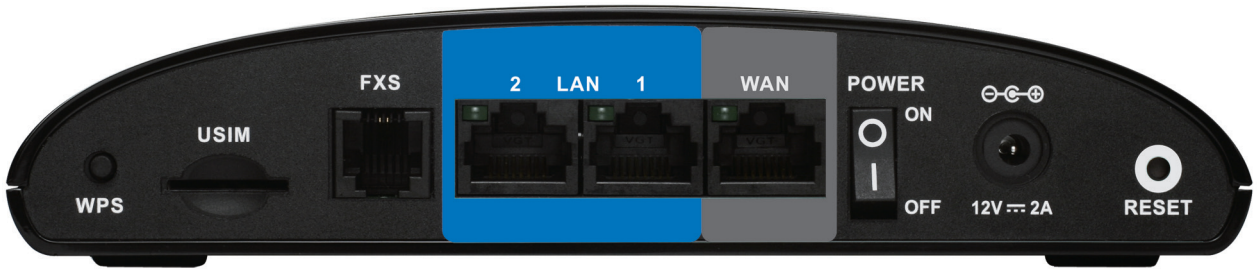
Connect a Telephone

A standard RJ-11 jack on the back of the router allows you to connect a standard analog telephone for voice calls.

Simply plug the phone cable into the jack labeled **FXS**.

You can then use your handset to dial out as you typically would with a standard landline.

Your attached phone will also ring for any incoming voice calls.



Wireless Installation Considerations

The DIR-456U can be accessed using a wireless connection from virtually anywhere within the operating range of your wireless network. Keep in mind, however, that the quantity, thickness and location of walls, ceilings, or other objects that the wireless signals must pass through, may limit the range. Ranges vary depending on the types of materials and background RF (radio frequency) noise in your home or office. The key to maximizing the wireless range is to follow these basic guidelines:

1. Minimize the number of walls and ceilings between the D-Link router and other network devices. Each wall or ceiling can reduce your adapter's range from 3 to 90 feet (1 to 30 meters).

2. Be aware of the direct line between network devices. A wall that is 1.5 feet thick (0.5 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. Try to position access points, wireless routers, and computers so that the signal passes through open doorways and drywall. Materials such as glass, metal, brick, insulation, concrete and water can affect wireless performance. Large objects such as fish tanks, mirrors, file cabinets, metal doors and aluminum studs may also have a negative effect on range.

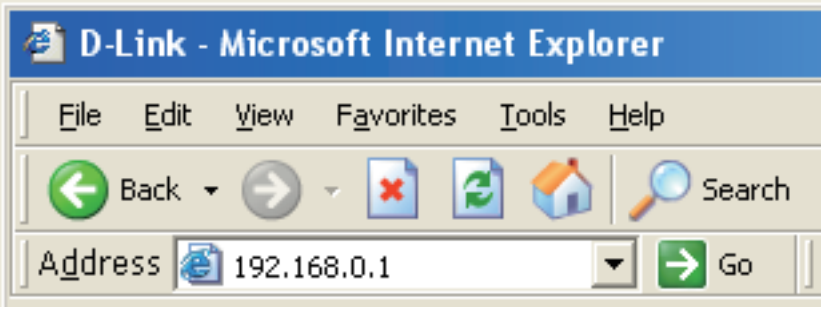
4. If you are using 2.4GHz cordless phones, make sure that the 2.4GHz phone base is as far away from your wireless device as possible. The base transmits a signal even if the phone in not in use. In some cases, cordless phones, X-10 wireless devices, and electronic equipment such as ceiling fans, fluorescent lights, and home security systems may dramatically degrade wireless connectivity.

Configuration

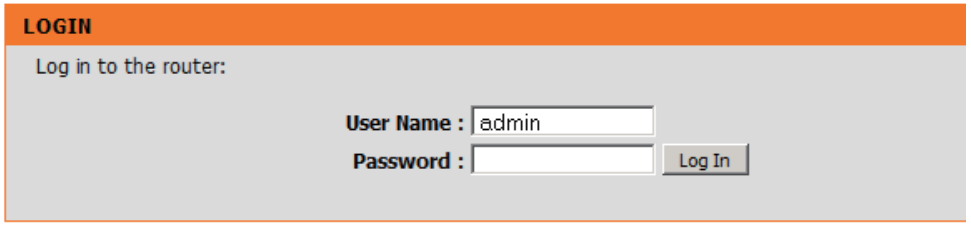
This section will show you how to configure your new D-Link mobile router using the web-based configuration utility.

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).



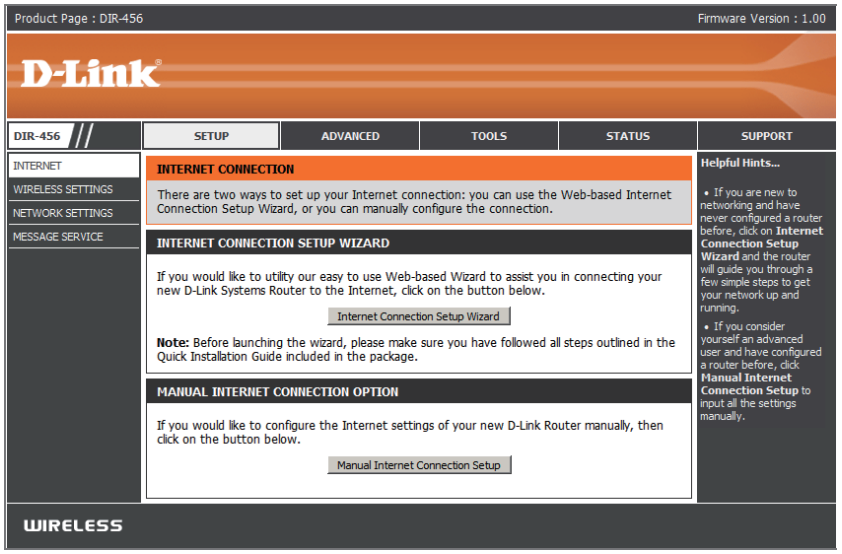
Type **Admin** and then enter the password. By default, the password is blank.



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

Setup Wizard

The setup wizard guides you through the initial setup of your router. There are two ways to setup your Internet connection. You can use the Web-based **Internet Connection Setup Wizard** or you can manually configure using the **Manual Internet Connection Setup** wizard.

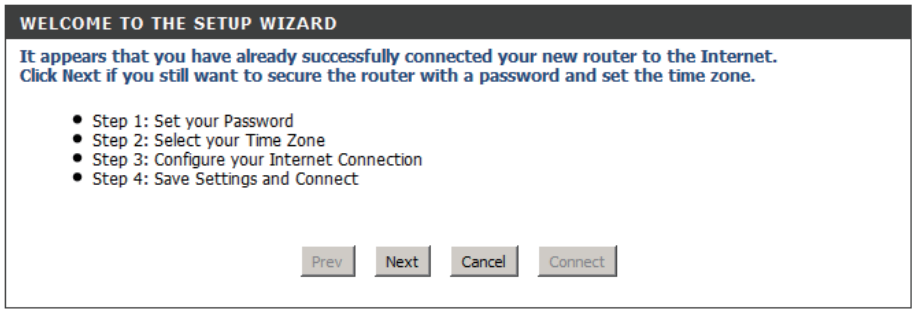


Click **Internet Connection Setup Wizard** to begin.

If you want to enter your settings without running the wizard, click **Manual Internet Connection Setup** and skip to page 14.

Internet Connection Setup Wizard

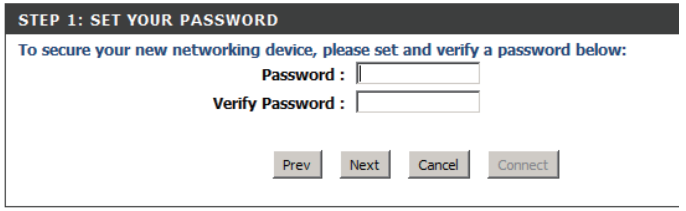
This wizard will guide you through a step-by-step process to configure your D-Link router to connect to the Internet.



Click **Next** to continue.

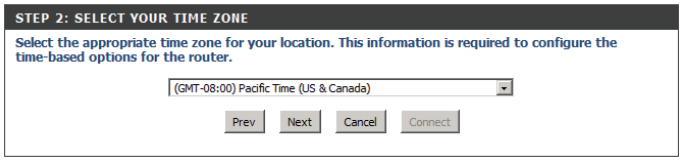
Create a new password and then click **Next** to continue.

Click **Prev** to go back to the previous page or click **Cancel** to close the wizard.



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

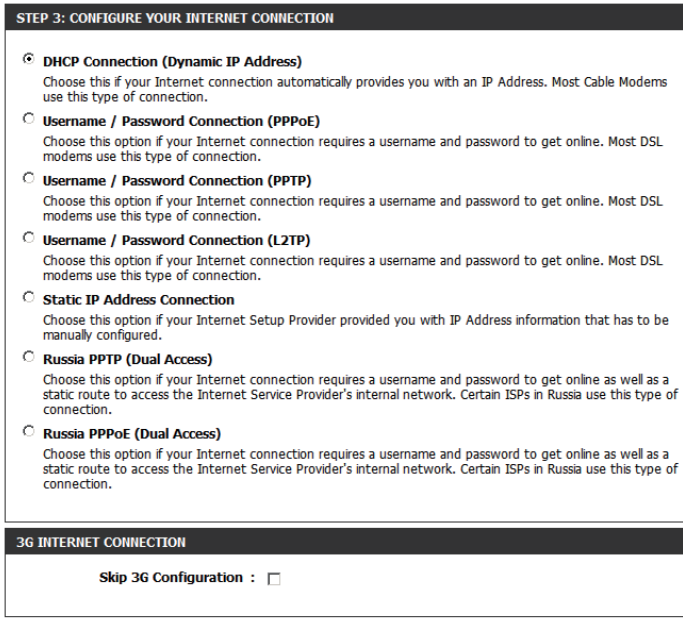
Click **Prev** to go back to the previous page or click **Cancel** to close the wizard.



Select the Internet connection type. The connection types are explained on the following page. If you are unsure of the correct connection type, you may have to contact your Internet Service Provider (ISP).

Click **Prev** to go back to the previous page or click **Cancel** to close the wizard.

Note: The DIR-456U supports several kinds of WAN interfaces, allowing you to assign either a WAN or a WWAN(3.5G) connection as the Backup WAN. If the Primary WAN is down or unavailable, configure the Backup WAN to **Enable**, and all the traffic will be routed through Backup WAN. This feature is called **WAN Failover**. You can use WAN Failover if you need redundancy to your Internet connection or any other network.



The subsequent configuration pages will differ depending on the selection you make on this page.

Static IP Address Connection: Choose this option if your Internet connection uses an IP address that does not change. Your ISP generally will provide you with this information. See page 16 for information about how to configure this type of connection.

DHCP Connection (Dynamic IP Address): Choose this if your Internet connection automatically provides you with an IP Address. Most cable modems use this type of connection. See page 17 for information about how to configure this type of connection.

Username / Password Connection (PPPoE): Choose this option if your Internet connection requires a username and password to connect. Most DSL modems use this style of connection. See page 18 for information about how to configure this type of connection.

Username / Password Connection (PPTP): Choose this option if your Internet connection requires Point-to-Point Tunneling Protocol (PPTP). See page 19 for information about how to configure this type of connection.

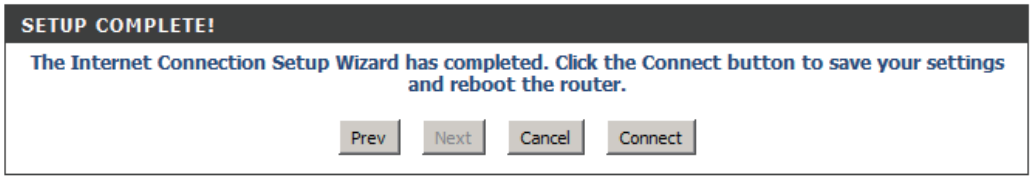
Username / Password Connection (L2TP): Choose this option if your Internet connection requires Layer 2 Tunneling Protocol (L2TP). See page 21 for information about how to configure this type of connection.

Russia PPTP (Dual Access): To configure a Russian PPTP Internet connection, configure as previously described for PPTP connections. See page 21 for information about how to configure this type of connection.

Russia PPPoE (Dual Access): Some PPPoE connections use a static IP route to the ISP in addition to the global IP settings for the connection. This requires an added step to define IP settings for the physical WAN port. To configure a Russian PPPoE Internet connection, configure as previously described for PPPoE connections and add the physical WAN IP settings as instructed by your ISP. See page 23 for information about how to configure this type of connection.

Skip 3G Configuration: Select this option if you do not need to configure 3G.

You have completed the **Setup Wizard**.



Click **Connect** to save your settings.

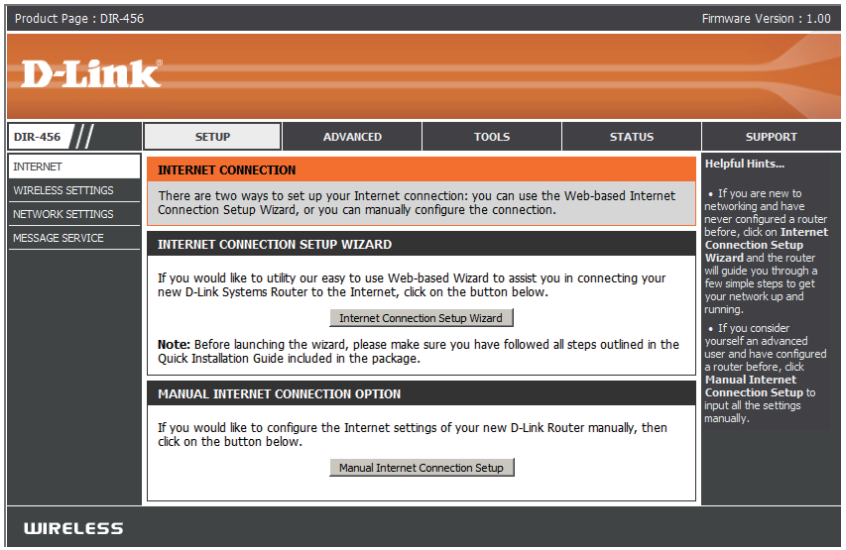
A popup will appear to confirm your settings.

Click **OK** to save your settings.

Manual Internet Connection Setup

Click **Manual Internet Connection Setup** to begin.

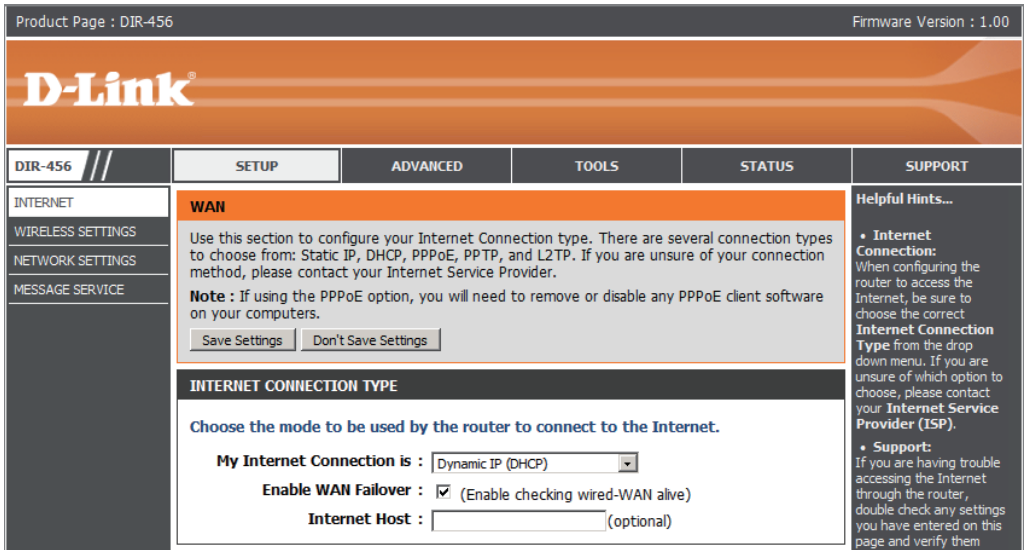
If you prefer to configure your router's Internet connection using the wizard, click **Internet Connection Setup Wizard** and refer to page 10.



Internet Connection
Internet Connection Type

Several different Internet Connection types can be selected depending upon the specifications of your Internet Service Provider (ISP).

My Internet Connection is: Select the Internet Connection type specified by your Internet Service Provider (ISP). The corresponding settings will be displayed below. Please see the following pages for details on how to configure these different connection types.

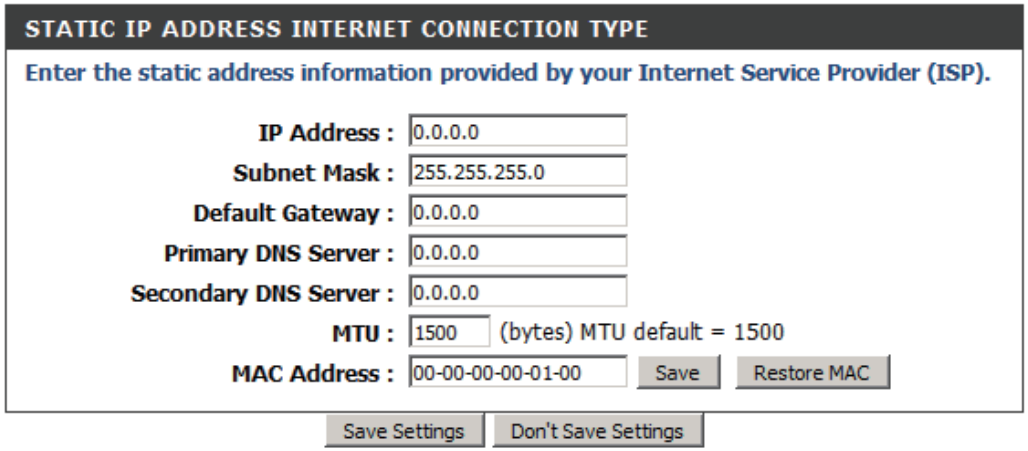


Enable WAN Failover: When this box is checked, the selected connection will act as a backup for the 3.5G connection. Select this box to enable checking wired-WAN alive. The router will test your connection status and connect to the 3G connection if your WAN connection goes down.

Internet Host: Enter the IP address of the Internet host to be used as the backup connection.

Static IP

Choose this Internet connection if your ISP assigns you a static IP address.



IP Address: Enter the IP address assigned to your network connection.

Subnet Mask: Enter the subnet mask.

Default Gateway: Enter the default gateway.

Primary DNS Server: Enter the primary DNS server.

Secondary DNS Server: Enter the secondary DNS server.

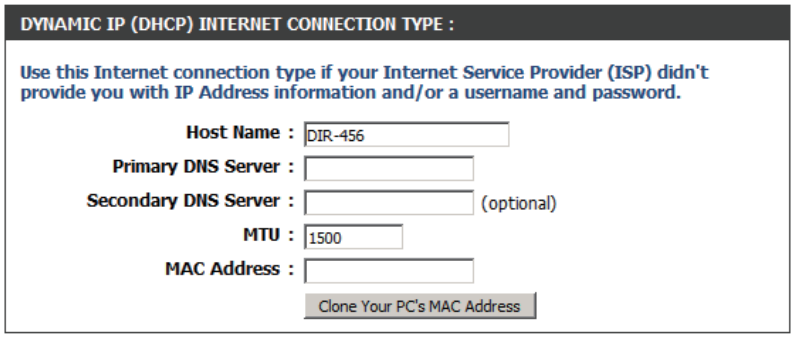
MTU: You may need to change the Maximum Transmission Unit (MTU) for optimal performance. The default value is 1500.

MAC Address: The default MAC Address is set to the Internet port's physical interface MAC address on the Broadband Router. It is not recommended that you change the default MAC address unless required by your ISP. You can use the **Clone Your PC's MAC Address** button to replace the Internet port's MAC address with the MAC address of your Ethernet card.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

Dynamic IP (DHCP)

This section will help you to obtain IP Address information automatically from your ISP. Use this option if your ISP didn't provide you with IP Address information and/or a username and password.



Host Name: (Optional) Required by some ISPs.

Primary DNS Server: (Optional) Fill in with IP address of primary DNS server.

Secondary DNS Server: (Optional) Fill in with IP address of secondary DNS server.

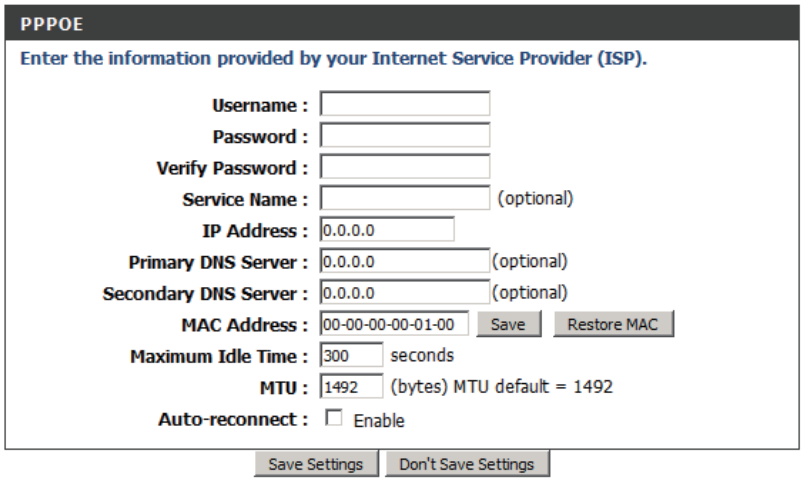
MTU (Maximum Transmission Unit): You may need to change the Maximum Transmission Unit (MTU) for optimal performance. The default value is 1500.

MAC Address: The default MAC Address is set to the Internet port's physical interface MAC address on the Broadband Router. It is not recommended that you change the default MAC address unless required by your ISP. You can use the **Clone Your PC's MAC Address** button to replace the Internet port's MAC address with the MAC address of your PC.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

PPPoE

Choose this Internet connection if your ISP provides you PPPoE account.



Username: The username/account name that your ISP provides to you for PPPoE dial-up.

Password: The password that your ISP provides to you for PPPoE dial-up.

Verify Password: Re-enter the password.

IP Address: (Optional) Fill in if provided by your ISP. If not, keep the default value.

Primary DNS Server: (Optional) Fill in if provided by your ISP. If not, keep the default value.

Secondary DNS Server: (Optional) Fill in if provided by your ISP. If not, keep the default value.

MAC Address: MAC address of WAN interface. You can also copy MAC address of your PC to its WAN interface by pressing **Clone Your PC's MAC** button. The **Restore MAC** button will reset the router to its default MAC address.

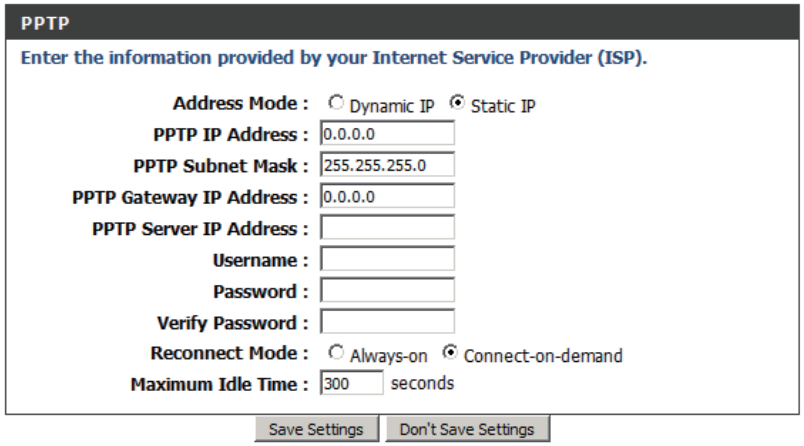
Maximum Idle Time: The amount of time of inactivity before disconnecting established PPPoE session. Set it to zero or enable Auto-reconnect will disable this feature.

Maximum Transmission Unit (MTU): The default setting of PPPoE is 1492.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

PPTP

Choose this Internet connection if your ISP provides you PPTP account.



Address Mode: Choose Static IP only if your ISP assigns you an IP address. Otherwise, please choose Dynamic IP.

PPTP IP Address: Enter the information provided by your ISP. (Only applicable for Static IP PPTP.)

PPTP Subnet Mask: Enter the information provided by your ISP. (Only applicable for Static IP PPTP.)

PPTP Gateway IP Address: Enter the information provided by your ISP. (Only applicable for Static IP PPTP.)

PPTP Server IP Address: Enter the IP address of the PPTP server.

Username: User/account name that your ISP provides to you for PPTP dial-up.

Password: Password that your ISP provides to you for PPTP dial-up.

Verify Password: Re-enter the password.

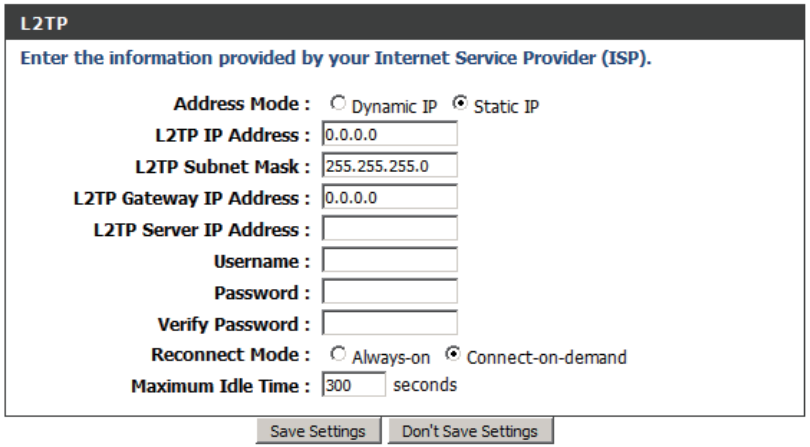
Reconnect Mode: Choose **Always-on** when you want to establish PPTP connection all the time. If you choose **Connect-on-demand**, the device will establish PPTP connection when local users want to surf Internet, and disconnect if no traffic after time period of Maximum Idle Time.

Maximum Idle Time: The time of no activity to disconnect your PPTP session. Set it to zero or choose Always-on to disable this feature.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

L2TP

Choose this Internet connection if your ISP provides you L2TP account.



Address Mode: Choose Static IP only if your ISP assigns you an IP address. Otherwise, please choose Dynamic IP.

L2TP IP Address: Enter the information provided by your ISP. (Only applicable for Static IP L2TP.)

L2TP Subnet Mask: Enter the information provided by your ISP. (Only applicable for Static IP L2TP.)

L2TP Gateway IP Address: Enter the information provided by your ISP. (Only applicable for Static IP L2TP.)

L2TP Server IP Address: IP address of L2TP server.

Username: User/account name that your ISP provides to you for L2TP dial-up.

Password: Password that your ISP provides to you for L2TP dial-up.

Verify Password: Re-enter the password.

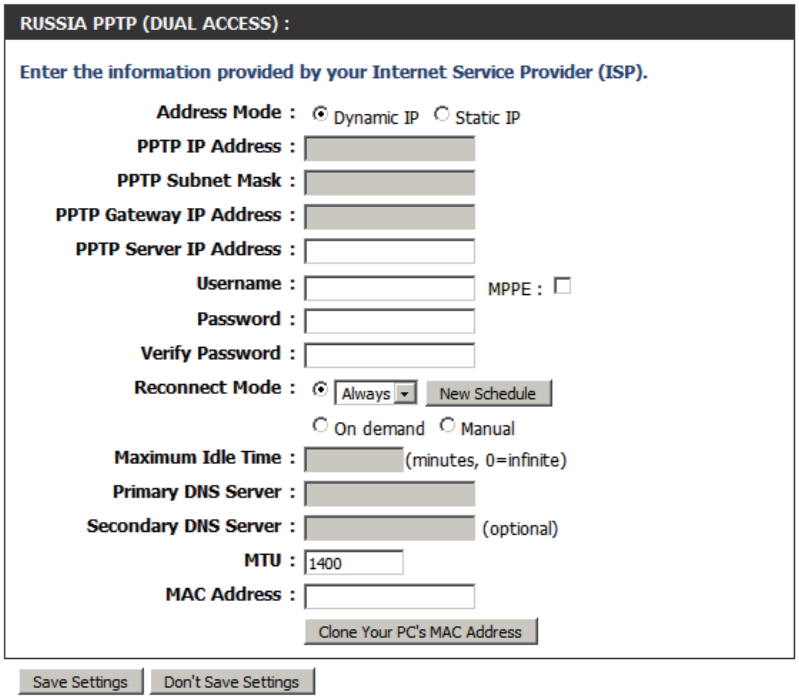
Reconnect Mode: Choose Always-on when you want to establish L2TP connection all the time. Choose Connect-on-demand the device will establish L2TP connection when local users want to surf Internet, and disconnect if no traffic after time period of Maximum Idle Time.

Maximum Idle Time: The time of no activity to disconnect your L2TP session. Set it to zero or choose Always-on to disable this feature.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

Russia PPTP (Dual Access)

Choose this Internet connection if you are using PPTP in Russia.



Address Mode: Choose Static IP only if your ISP assigns you an IP address. Otherwise, please choose Dynamic IP.

PPTP IP Address: Enter the information provided by your ISP. (Only applicable for Static IP PPTP.)

PPTP Subnet Mask: Enter the information provided by your ISP. (Only applicable for Static IP PPTP.)

PPTP Gateway IP Address: Enter the information provided by your ISP. (Only applicable for Static IP PPTP.)

PPTP Server IP Address: Enter the IP address of the PPTP server.

Username: User/account name that your ISP provides to you for PPTP dial-up.

Password: Password that your ISP provides to you for PPTP dial-up.

Verify Password: Re-enter the password.

Reconnect Mode: Choose **Always-on** when you want to establish PPTP connection all the time. If you choose **Connect-on-demand**, the device will establish PPTP connection when local users want to surf Internet, and disconnect if no traffic after time period of Maximum Idle Time.

Maximum Idle Time: The time of no activity to disconnect your PPTP session. Set it to zero or choose Always-on to disable this feature.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

Primary DNS Server: (Optional) Fill in with IP address of primary DNS server.

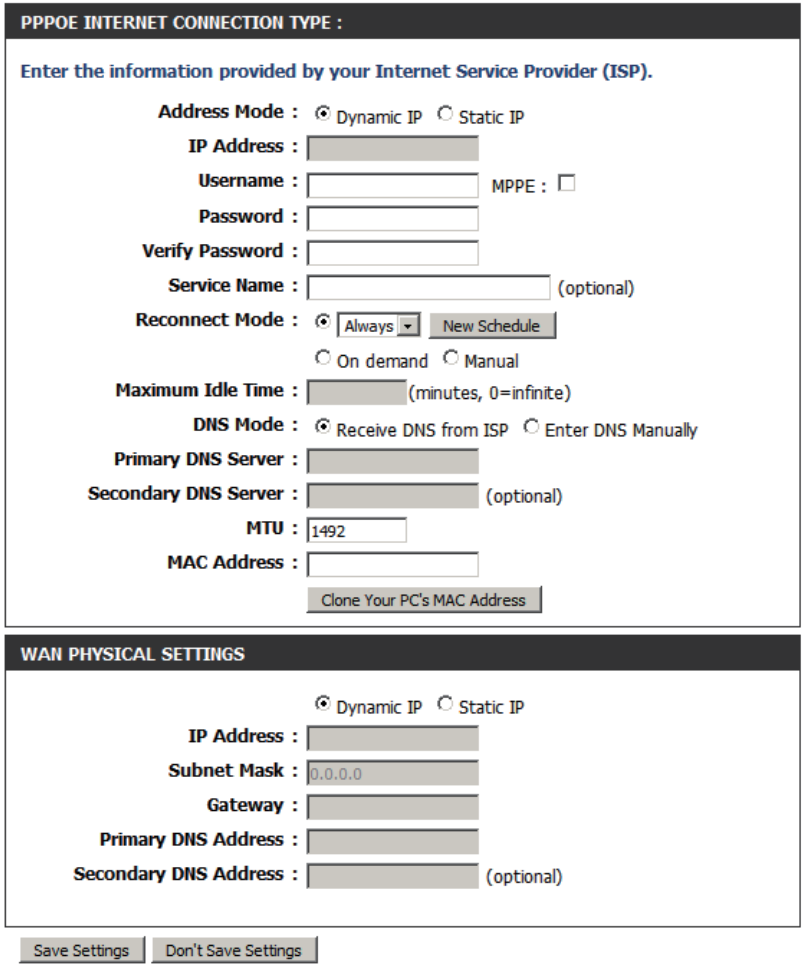
Secondary DNS Server: (Optional) Fill in with IP address of secondary DNS server.

Maximum Transmission Unit (MTU): You may need to change the Maximum Transmission Unit (MTU) for optimal performance. The default value is 1400.

MAC Address: The default MAC Address is set to the Internet port's physical interface MAC address on the Broadband Router. It is not recommended that you change the default MAC address unless required by your ISP. You can use the **Clone Your PC's MAC Address** button to replace the Internet port's MAC address with the MAC address of your PC.

Russia PPPoE (Dual Access)

Choose this Internet connection if you are using PPPoE in Russia.



Address Mode: Choose Static IP only if your ISP assigns you an IP address. Otherwise, please choose Dynamic IP.

IP Address: (Optional) Fill in if provided by your ISP. If not, keep the default value.

Username: The username/account name that your ISP provides to you for PPPoE dial-up.

Password:

Verify Password: Password that your ISP provides to you for PPPoE dial-up.

Service Name: (Optional) Enter the service name.

Reconnect Mode: **Always** - The connection will always be on.
Schedule - The connection run according to a specified schedule.
On demand - The router will reconnect when needed.
Manual - The router will reconnect only when the user initiates a connection.

Maximum Idle Time: The amount of time of inactivity before disconnecting established PPPoE session. Setting it to zero or enabling Auto-reconnect will disable this feature.

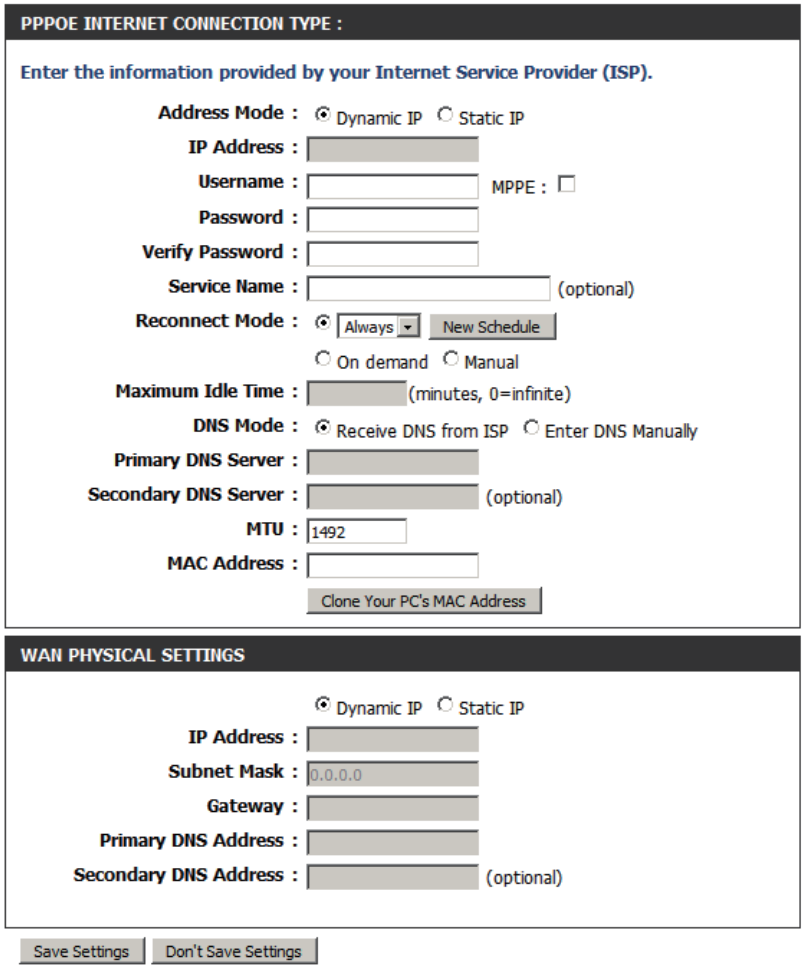
DNS Mode: You may choose **Receive DNS from ISP** or **Enter DNS Manually**.

Primary DNS Server: (Optional) Fill in with IP address of primary DNS server.

Secondary DNS Server: (Optional) Fill in with IP address of secondary DNS server.

Maximum Transmission Unit (MTU): You may need to change the Maximum Transmission Unit (MTU) for optimal performance. The default value is 1492.

MAC Address: The default MAC Address is set to the Internet port's physical interface MAC address on the Broadband Router. It is not recommended that you change the default MAC address unless required by your ISP. You can use the **Clone Your PC's MAC Address** button to replace the Internet port's MAC address with the MAC address of your PC.



WAN PHYSICAL SETTINGS

Address Mode: Choose Static IP only if your ISP assigns you an IP address. Otherwise, please choose Dynamic IP.

IP Address: (Optional) Fill in if provided by your ISP. If not, keep the default value.

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

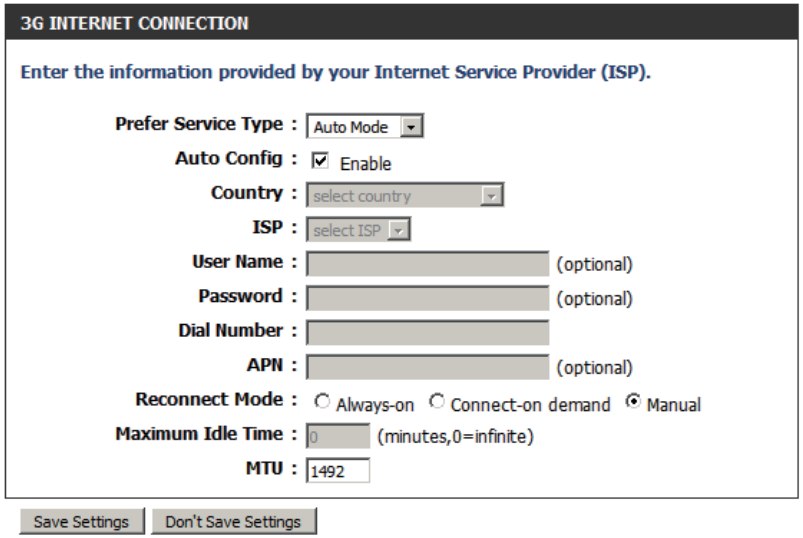
Gateway: Enter the default gateway.

Primary DNS Address: (Optional) Fill in with IP address of primary DNS server.

Secondary DNS Address: (Optional) Fill in with IP address of secondary DNS server.

3G Internet

Choose this Internet connection if you already apply a SIM card for 3G Internet service from Telecom company. The fields here may not be necessary for your connection. The information on this page is only be used when your service provider requires.



Prefer Service Type: You may select GPRS/EDGE or WCDMA as the preferred service type.

Auto Config: Select this box to enable automatic configuration.

Country: Select your country.

ISP: Select your ISP.

User Name: (Optional) Fill in only if requested by your ISP.

Password: (Optional) Fill in only if requested by your ISP.

Dial Number: Enter the number to be dialed.

APN: (Optional) Enter the APN information.

Reconnect Mode: You may select from the following option:

Always-on - The 3G connection will always be on.
Connect on demand - The router will reconnect when needed.
Manual - The router will reconnect only when the user initiates a connection.

MTU (Maximum Transmission Unit: The default value for 3G is 1492.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

Wireless Settings

This section will help you to manually configure the wireless settings of your router. Please note that changes made on this section may also need to be duplicated on your Wireless Client.

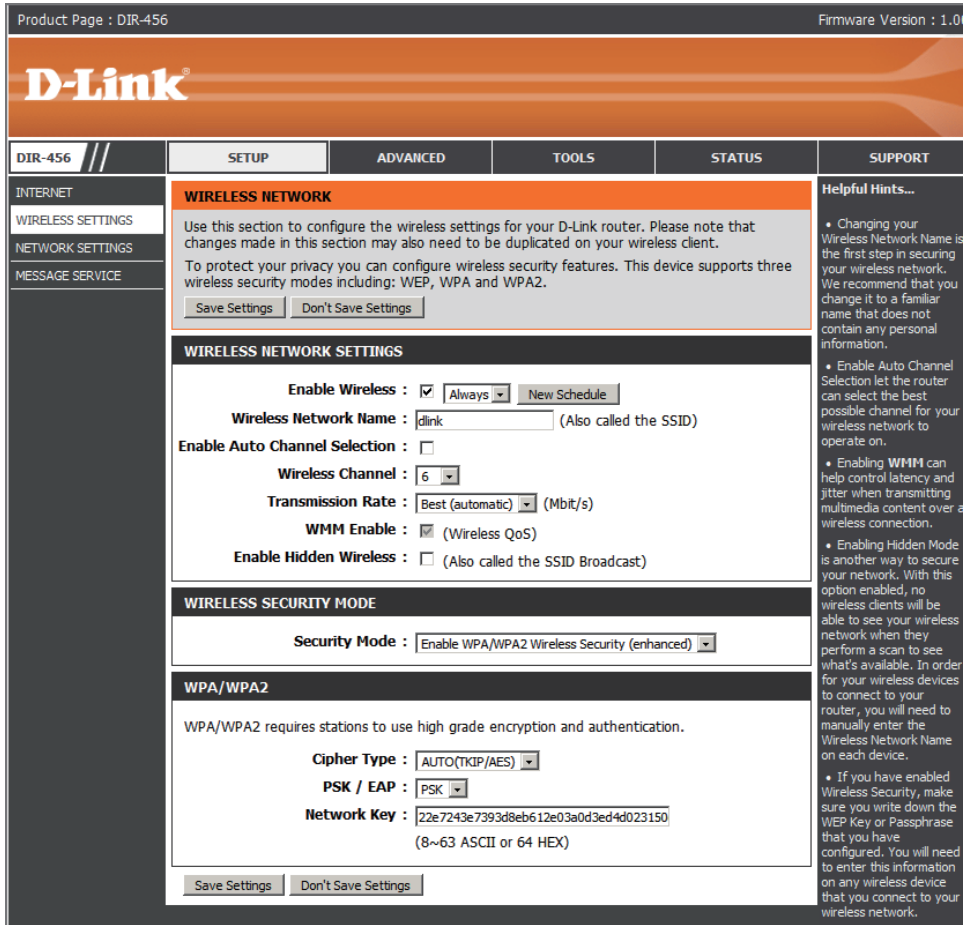
WIRELESS NETWORK SETTINGS

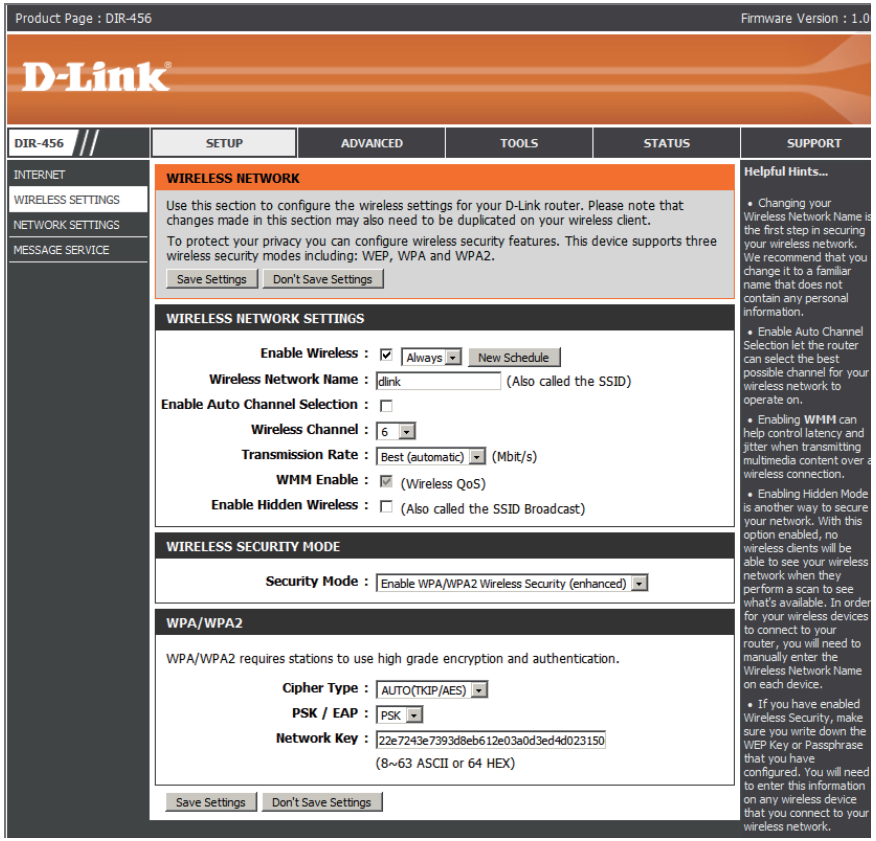
Enable Wireless: Select this checkbox to enable wireless access. When you set this option, the following parameters take effect.

Wireless Network Name: Also known as the SSID (Service Set Identifier), this is the name of your Wireless Local Area Network (WLAN). Enter a name using up to 32 alphanumeric characters. The SSID is case-sensitive.

Auto Channel Scan: A wireless network uses specific channels in the wireless spectrum to handle communication between clients. Some channels in your area may experience interference from other electronic devices. Choose the clearest channel to help optimize the performance and coverage of your wireless network.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.





Wireless Channel: Indicates the channel setting for the DIR-456U. By default the channel is set to 11. This can be changed to fit the channel setting for an existing wireless network or to customize your wireless network. Click **Auto Channel Scan** to automatically select the channel that it will operate on. This option is recommended because the router will choose the channel with the least amount of interference.

Visibility Status: Select **Invisible** if you do not want the SSID of your wireless network to be broadcasted by DIR-456U. The SSID of your router will not be seen by Site Survey utilities. Therefore while setting up your wireless clients, you will have to manually enter your SSID to connect to the router.

WIRELESS SECURITY MODE

Security Mode: This device supports three wireless security modes, **WEP**, **WPA-Personal**, **WPA-Enterprise** or **None**. WEP is the original wireless encryption standard. WPA provides a higher level of security and WPA-Personal does not require an authentication server. When WPA enterprise is enabled, the router uses EAP (802.1x) to authenticate clients via a remote RADIUS server.

Radius Server IP: IP address of RADIUS server.

Radius Port: The port used for RADIUS server. The default port is 1812.

Radius Shared Key: Key value shared by RADIUS server and this device.

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

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

Network Settings

Router Settings

This section will help you to change the internal network settings of your router and to configure the DHCP Server settings.

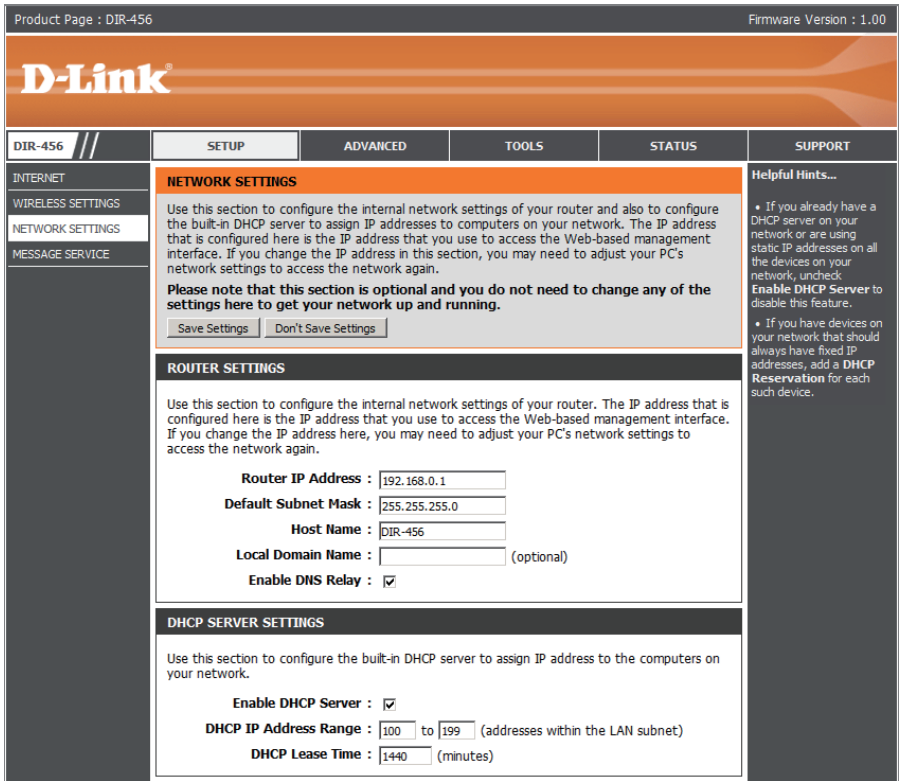
Router IP Address: Enter the IP address of the router. The default IP address is **192.168.0.1**.

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

Default Subnet Mask: Enter the **Subnet Mask** of the router. The default subnet mask is **255.255.255.0**.

Local Domain Name: Enter the local domain name for your network.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.



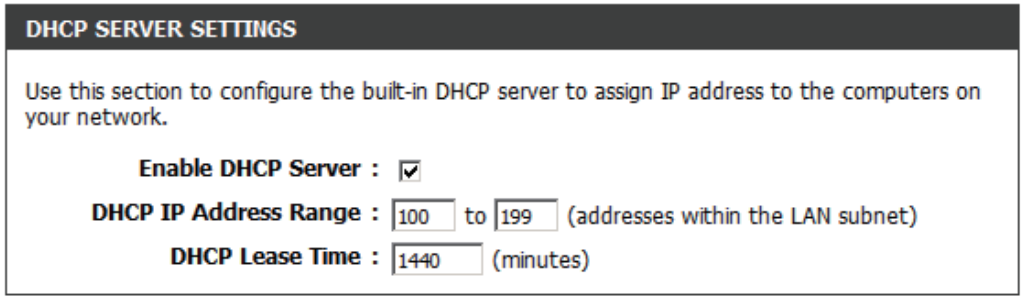
DHCP Server Settings

The DIR-456U has a built-in DHCP (Dynamic Host Control Protocol) server. The DHCP server assigns IP addresses to devices on the network that request them. By default, the DHCP Server is enabled on the device. The DHCP address pool contains a range of IP addresses, which is automatically assigned to the clients on the network.

Enable DHCP Server: Select this box to enable the DHCP server on your router.

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

DHCP Lease Time: The time period for the IP address lease. Enter the Lease time in minutes.



Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

DHCP Reservations

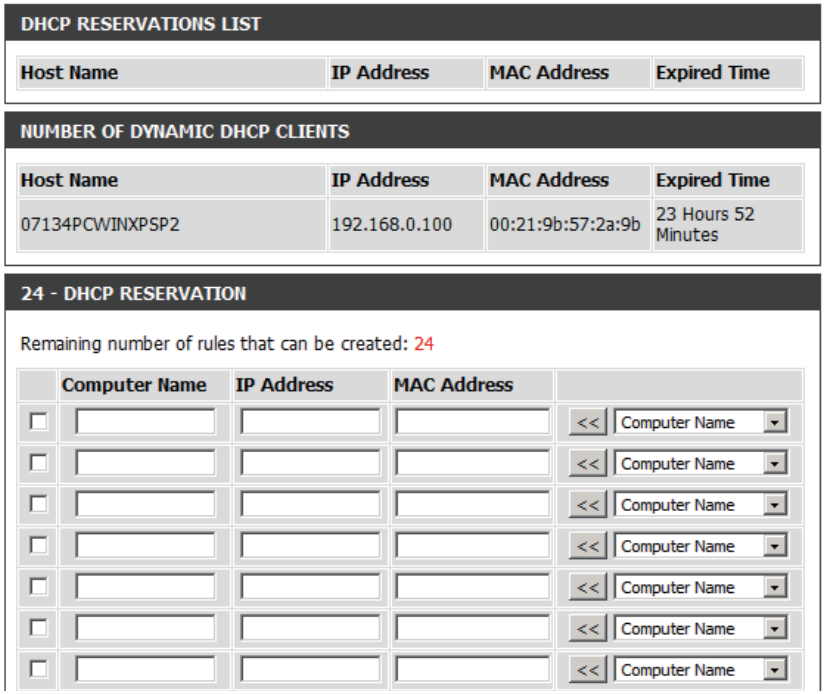
Enable: Select the box next to the computer name to enable the DHCP reservation.

Computer Name: Specifies the name of the workstation.

IP Address: Specifies IP Address of the workstation.

MAC Address: Specifies the MAC Address of workstation.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.



Message Service

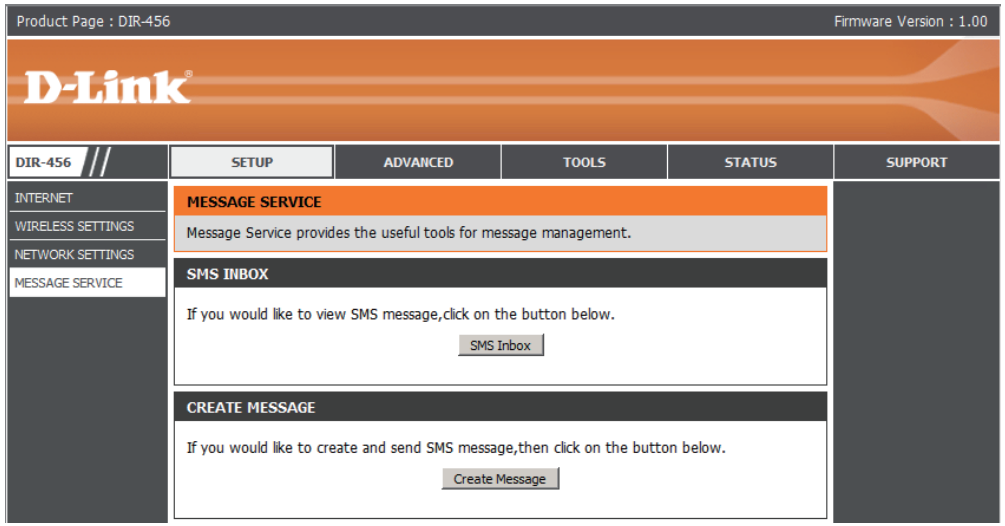
If your ISP provide **SMS** service, you can create new messages, and manage your messages from this page.

SMS INBOX

SMS Inbox: Click this button to view any SMS message that you may have received.

CREATE MESSAGE

Create Message: Click this button to create a message.



CREATE MESSAGE

This page allows you to send an SMS to your contacts. Just fill in the phone number of the recipient, and type the content of message. Then push the “Send Message” button to send out this message. If you would like to add more than one recipient, you must put a semicolon (;) between each of the phone numbers.

Receiver: Type the phone number of the recipient.

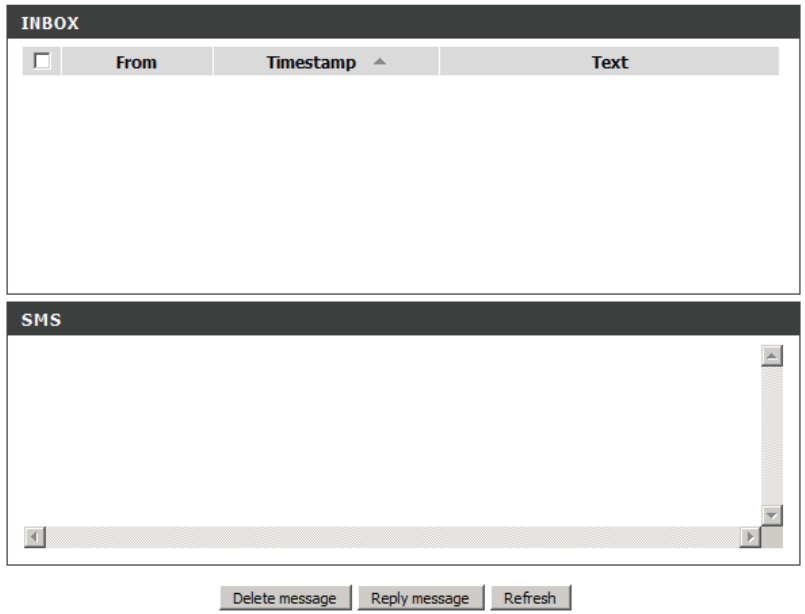
Text Message: Type the message that you would like to send.

Sent Message: Click this button to send the message.

Cancel: Click this button to cancel message input.

INBOX

This page shows all messages that are stored on the SIM card. Selecting a message, and the content will be shown in the SMS window. After you read it, you can delete it, or reply to the sender. Push the “Refresh” button to update the list.



SMS

Delete Message: Deletes the selected SMS message.

Reply Message: Replies to the selected SMS message.

Refresh: Click this button to check for new messages.

Virtual Server

The device can be configured as a virtual server so that users can access services such as Web or FTP via the public (WAN) IP address of the router.

Use schedule rule: You may select **Always On** or choose the number of a schedule rule that you have defined.

VIRTUAL SERVERS LIST

ID: Identifies the virtual server.

Server IP: Port: Enter the last digits of the IP address of the computer on your local network that you want to allow the incoming service. In the next box, enter the port number that you would like to open.

Enable: Select this box to enable the rule.

Schedule Rule #: Specify the schedule rule number.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

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). **Applications Rules** allow some of these applications work with the DIR-456U.

APPLICATION RULES

Enable: Select this box to enable the rule.

Name: Enter a name for the rule.

Applications: Select from a list of popular applications.

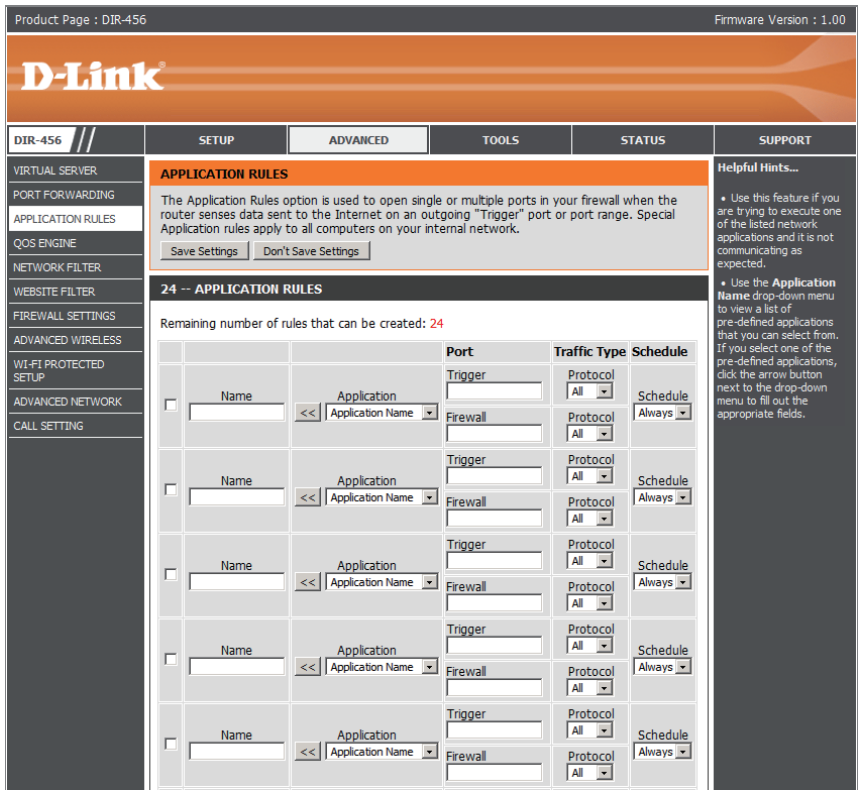
Trigger: The name of the trigger.

Trigger: The port that will be used on your internal network.

Firewall: The port that will be accessed from the Internet.

Protocol: Select TCP or UDP.

Schedule: Specify whether the rule should always be active, or active according a predefined schedule.



Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

QoS Engine

The **QoS Engine** improves your online gaming experience by ensuring that your game traffic is prioritized over other network traffic, such as FTP or Web. For best performance, use the Automatic Classification option to automatically set the priority for the applications.

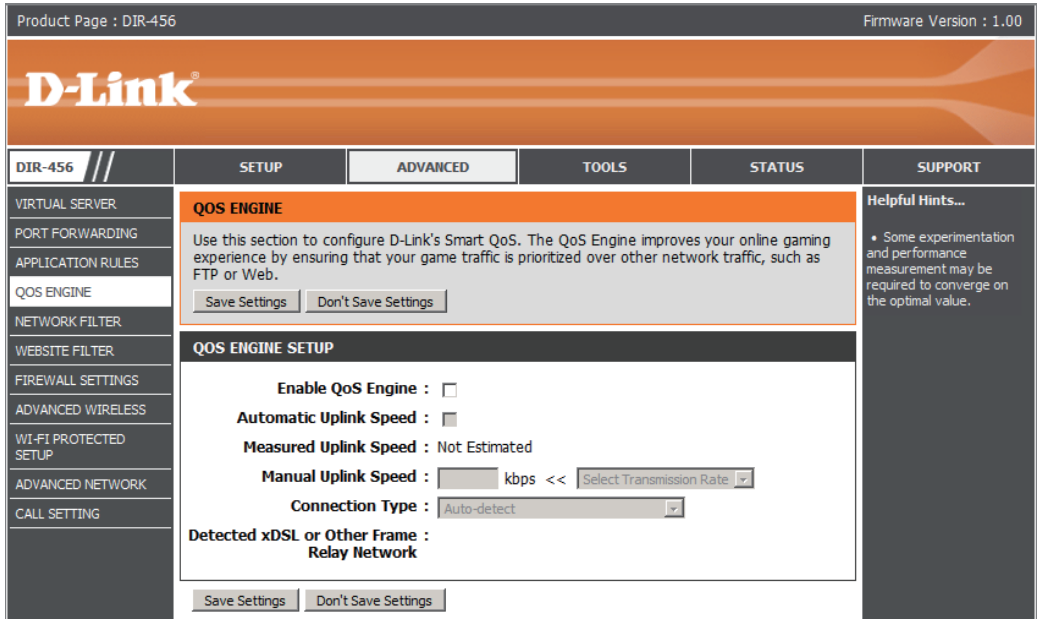
QoS ENGINE SETUP

Enable QoS Engine: Check this option if you want to enable the QoS function.

Automatic Uplink Speed: Check this option to automatically get the optimal performance.

Measured Uplink Speed: This field displays the current measured uplink speed here.

Manual Uplink Speed: If the measured uplink speed is not optimal, please disable the Automatic Uplink Speed and select the transmission rate from drop-down menu.



Connection Type: You can choose auto-detect for the known connection type. Or choose xDSL or cable etc if you know what connection type you use for the Internet network.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

Network Filter

The **MAC (Media Access Controller) Address Filter** option is used to control network access based on the MAC Address of the network adapter. A MAC address is a unique ID assigned by the manufacturer of the network adapter. This feature can be configured to ALLOW or DENY network/Internet access.

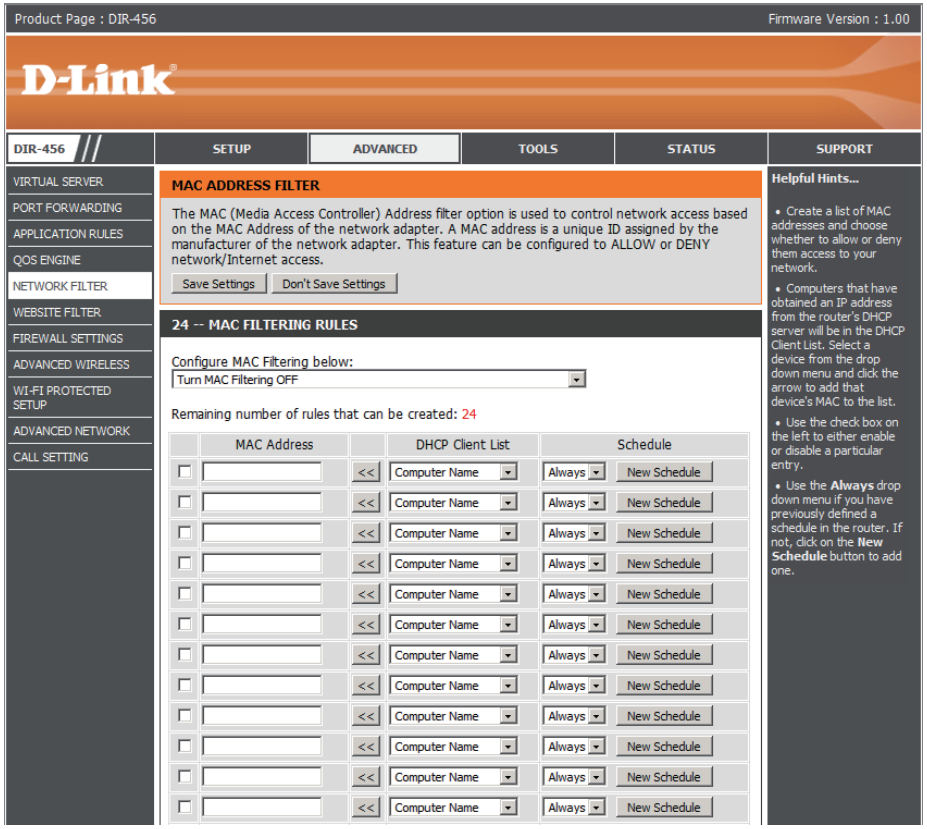
MAC FILTERING SETTINGS

Enable: Select this box to enable MAC Filtering.

MAC Address: The MAC address of the network device to be added to the MAC Filter List.

DHCP Client List: DHCP clients will have their hostname in the Computer Name drop down menu. You can select the client computer you want to add to the MAC Filter List and click arrow button. This will automatically add that computer's MAC address to the appropriate field.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.



Website Filter

URL Filter allows you to set up a list of Web-sites that will be blocked from users on your network.

WEBSITE FILTERING RULES

Configure Website Filter Below: Specify the way website filtering should operate. You may specify from the following:

- Turn OFF WEBSITE FILTERING
- ALLOW access to ONLY these sites
- DENY access to ONLY these sites

Website URL: Enter the URLs that you would like to filter. Select the checkbox next to the URL to enable the URL.

Schedule: Choose whether the filter should always be on, or specify a schedule to use. Select **New Schedule** to create a new schedule.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

Firewall Settings

Firewall rules can be used to allow or deny traffic passing through the router. You can specify a single port by utilizing the input box at the top or a range of ports by utilizing both input boxes. DMZ means “Demilitarized Zone.” DMZ allows computer behind the router firewall to be accessible to Internet traffic. Typically, your DMZ would contain Web servers, FTP servers and others.

FIREWALL SETTINGS

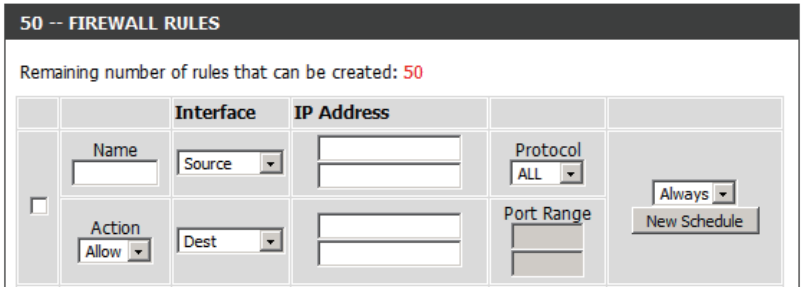
Enable SPI: Select this box to enable Stateful Packet Inspection (SPI).

DMZ HOST

Enable DMZ: Select this box to enable to the DMZ.

DMZ IP Address: Select a computer from the dropdown box and click the << button to display the IP address.

FIREWALL RULES



Name: Enter a name for the rule.

Interface: Specify the interface for the source and destination. You may select **LAN**, **WAN**, or **WAN(3G)**.

IP Address: Enter the starting and ending IP address that you wish to apply the rule to. If you are only applying this rule to one IP address, you may enter the same IP address in both boxes.

Protocol: Specify a protocol for the rule. You may select **TCP**, **UDP**, **ICMP**.

Action: Specify whether to **Allow** or **Deny** access.

Port Range: Specify the starting port and ending port.

Schedule: Specify when the rule should be active. You may choose: Always or specify a schedule. Click **New Schedule** to open the Schedules page.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

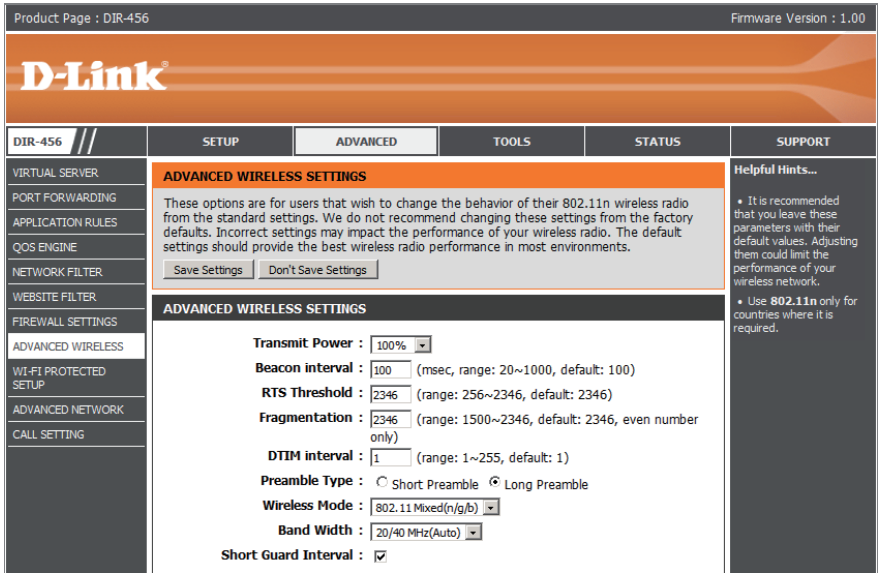
Advanced Wireless

Advanced Wireless contains settings which can negatively affect the performance of your router if configured improperly. Do not change these settings unless you are already familiar with them or have been instructed to make the change by one of our support personnel.

Transmit Power: You can lower the output power of the router by selecting lower percentage Transmit Power values from the drop down. Your choices are: 100%, 50%, 25%, and 12.5%.

Beacon Interval: Beacons are packets sent by an Access Point to synchronize a wireless network. Specify a Beacon interval value between 20 and 1000. The default value is set to 100 milliseconds.

RTS Threshold: 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. The default value for RTS Threshold is set to 2346.



Fragmentation: This value should remain at its default setting of 2346. If you experience a high packet error rate, you may slightly increase your “Fragmentation” value within the value range of 1500 to 2346. Setting the Fragmentation value too low may result in poor performance.

DTIM Interval: 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. When the Access Point has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value. AP clients hear the beacons and awaken to receive the broadcast and multicast messages. The default value for DTIM interval is set to 1.

Preamble Type: The Preamble Type defines the length of the CRC (Cyclic Redundancy Check) block for communication between the Access Point and roaming wireless adapters. Make sure to select the appropriate preamble type and click the Apply button.

Note: High network traffic areas should use the shorter preamble type. CRC is a common technique for detecting data transmission errors.

Wireless Mode: If all of the wireless devices you want to connect with this access point can connect in the same transmission mode, you can improve performance slightly by choosing the appropriate “Only” mode. If you have some devices that use a different transmission mode, choose the appropriate “Mixed” mode.

Band Width: The “Auto 20/40 MHz” option is usually best. The other options are available for special circumstances.

Short Guard Interval: Using a short guard interval can increase throughput. However, it can also increase error rate in some installations, due to increased sensitivity to radio-frequency reflections. Select the option that works best for your installation .

Wi-Fi Protected Setup

Wi-Fi Protected Setup (WPS) is used to easily add devices to a network using a PIN or button press. Devices must support Wi-Fi Protected Setup in order to be configured by this method.

If the PIN changes, the new PIN will be used in following Wi-Fi Protected Setup process. Clicking on “Don’t Save Settings” will not reset the PIN. However, if the new PIN is not saved, it will be lost when the device reboots or loses power.

WI-FI PROTECTED SETUP

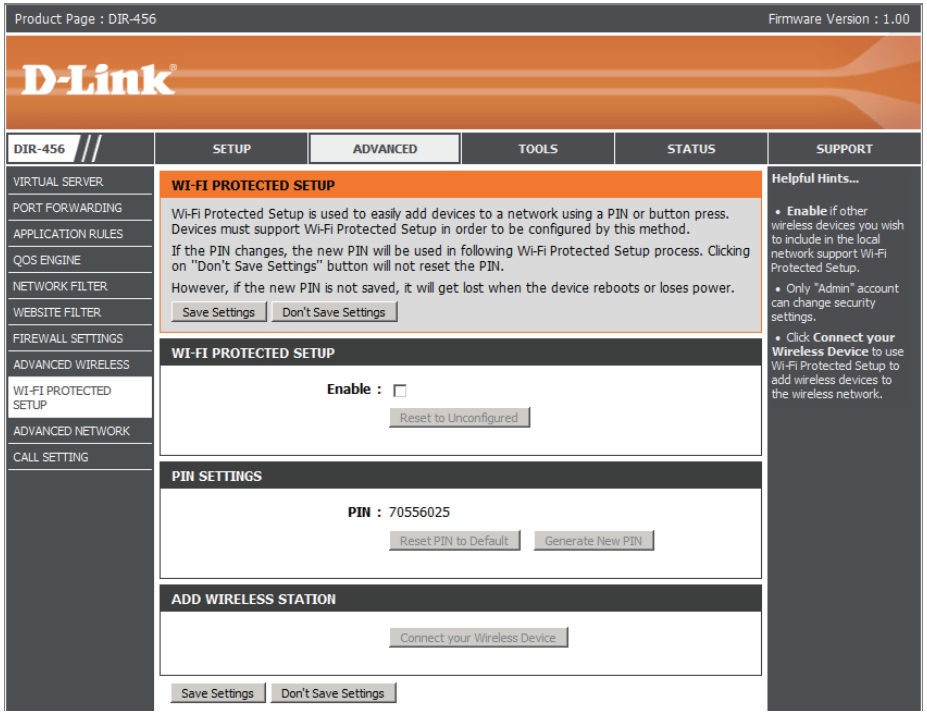
Enable: Select this box to enable the WPS if wireless devices you wish to include in the local network support Wi-Fi Protected Setup.

PIN Settings: Only the “Admin” account can change security settings.

Reset PIN to Default: Resets the PIN to the default number shown on the device.

Generate New PIN: Generates a new PIN number for the device.

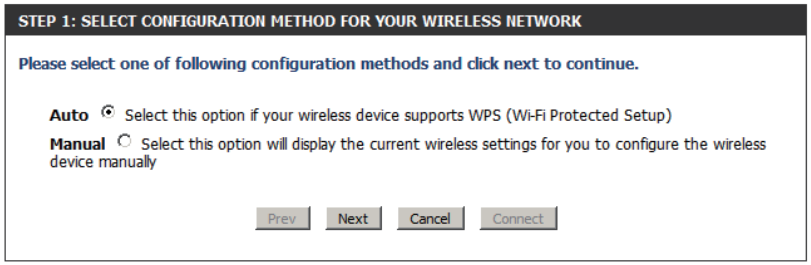
Add Wireless Station: Click **Connect your Wireless Device** to add wireless devices to the wireless network.



Click **Save Settings** to save your changes, or click **Don’t Save Settings** to discard your changes.

STEP 1: SELECT CONFIGURATION METHOD

You may select **Auto** if your device supports WPS. You may select **Manual** if you would like to view the current wireless setting for configuring your device manually.

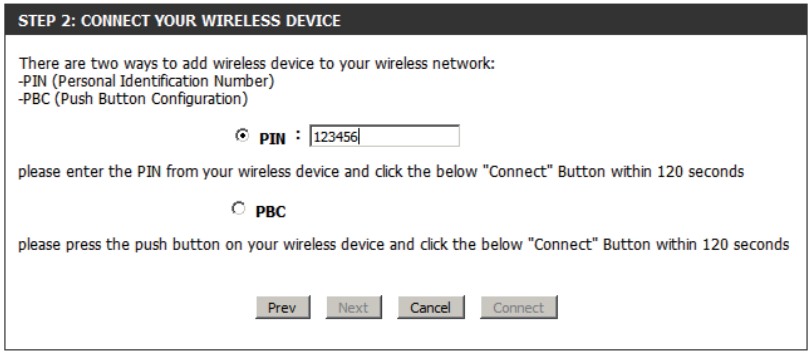


STEP 2: CONNECT YOUR WIRELESS DEVICE

If **Auto** configuration is chose, you will be given the option to add a wireless device using a PIN, or using the Push Button Configuration (PBC).

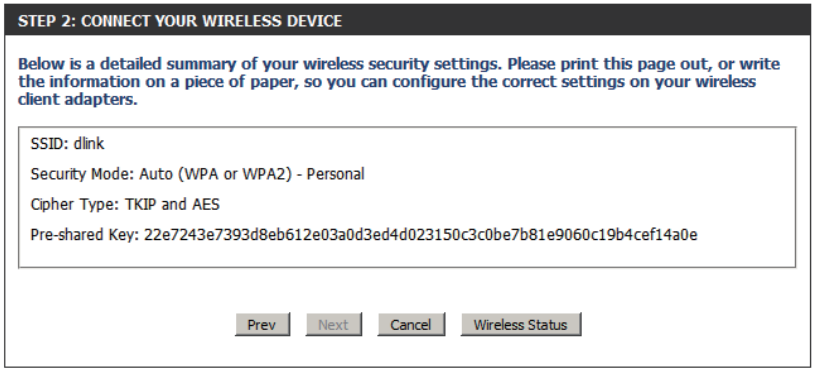
PIN: Enter the PIN from your wireless device and click the **Connect** button on your screen within 120 seconds.

PBC: Press the WPS button on your wireless device and click the **Connect** button on your screen within 120 seconds.



If **Manual** Configuration is chosen, you will see a screen like the one shown on the right.

Click **Next** to save your changes, or click **Cancel** to discard your changes.



Advanced Network

Advanced Network contains settings which can change the way the router handles certain types of traffic. We recommend that you do not change any of these settings unless you are already familiar with them or have been instructed to make the change by one of our support personnel.

Enable UPnP: UPnP is short for Universal Plug and Play which is a networking architecture that provides compatibility among networking equipment, software, and peripherals. The device is a UPnP enabled router, meaning it will work with other UPnP devices/software. If you do not want to use the UPnP functionality, it can be disabled by selecting “Disabled”.

Enable WAN Ping Respond: When you Enable WAN Ping respond, you are causing the public WAN (Wide Area Network) IP address on the device to respond to ping commands sent by Internet users. Pinging public WAN IP addresses is a common method used by hackers to test whether your WAN IP address is valid.

WAN Port Speed: This allows you to select the speed of the WAN interface of the router. You may select 100Mbps, 10Mbps, or 10/100Mbps Auto.

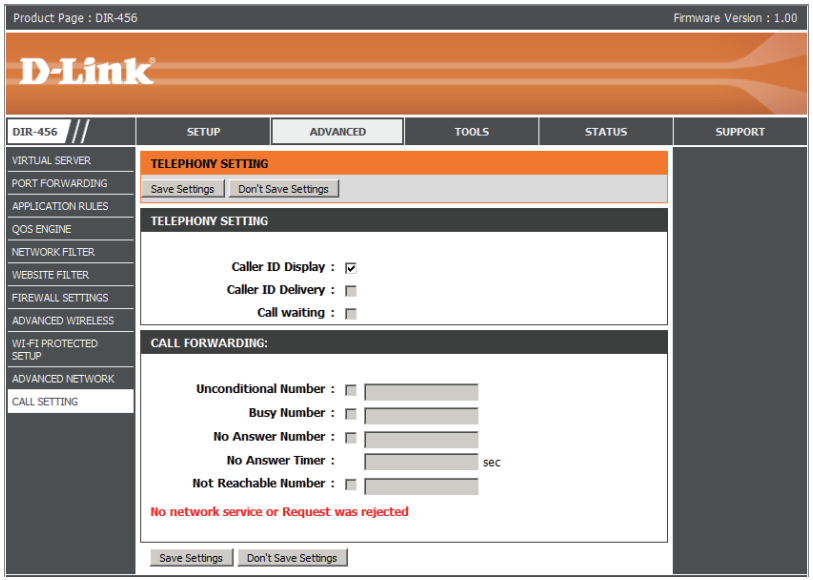
Multicast Streams: Enable this option to allow Multicast traffic to pass from the Internet to your network more efficiently.

Enable Multicast Streams: Enable this option if you are receiving video on demand type of service from the Internet. The router uses the IGMP protocol to support efficient multicasting -- transmission of identical content, such as multimedia, from a source to a number of recipients. This option must be enabled if any applications on the LAN participate in a multicast group. If you have a multimedia LAN application that is not receiving content as expected, try enabling this option.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

Call Setting

The **Call Setting** page allows you to configure the settings for incoming calls. The DIR-456U allows you to connect a standard landline telephone and receive calls to the mobile number associated with your SIM card.



TELEPHONY SETTING

Caller ID Display: Select this box to enable Caller ID display.

Caller ID Delivery: Select this box to enable Caller ID delivery.

Call Waiting: Select this box to enable call waiting.

CALL FORWARDING

Unconditional Number: Select this box to enable the **Unconditional Number**. Enter the number in the box provided.

Busy Number: Select this box to enable the **Busy Number**. Enter the number in the box provided.

No Answer Number: Select this box to enable the **No Answer Number**. Enter the number in the box provided.

No Answer Timer: Specify the **No Answer Time** in seconds.

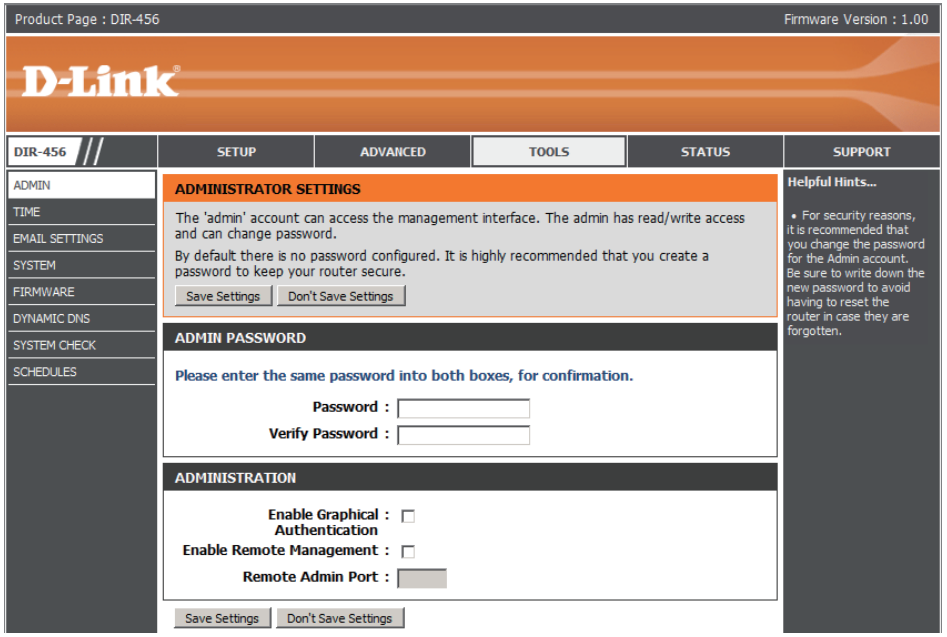
Not Reachable Number: Select this box to enable the **Not Reachable Number**. Enter the number in the box provided.

If your mobile service does not support these features, you will see a message at the bottom of the screen stating **No network service or Request was rejected**.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

Admin

The **Admin** page allows you to change the Administrator password and enable Remote Management. Admin has read/write access while the user has read-only access. Only the admin has the ability to change both admin and user account passwords.



ADMINISTRATOR

Admin Password: Enter and confirm the password that the admin account will use to access the router's management interface.

REMOTE MANAGEMENT

Enable Graphical Authentication: Enabling Graphical Authentication make you router more secure by helping to prevent against automated attacks.

Remote Management: Remote management allows the DIR-456U to be configured from the Internet using a web browser. A username and password is still required to access the Web-Management interface. Usually 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.

Remote Admin Port: This is the port number used to access the router.
Example: 8080 is the port used for the Web-Management interface.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

Time

This section will help you set the time zone that you are in and the NTP (Network Time Protocol) Server. Daylight Saving can also be configured to adjust the time when needed.

Time Zone: Select the appropriate **Time Zone** from the drop-down box.

Enable Daylight Saving: Select this checkbox to enter a start date and an end date for daylight saving time.

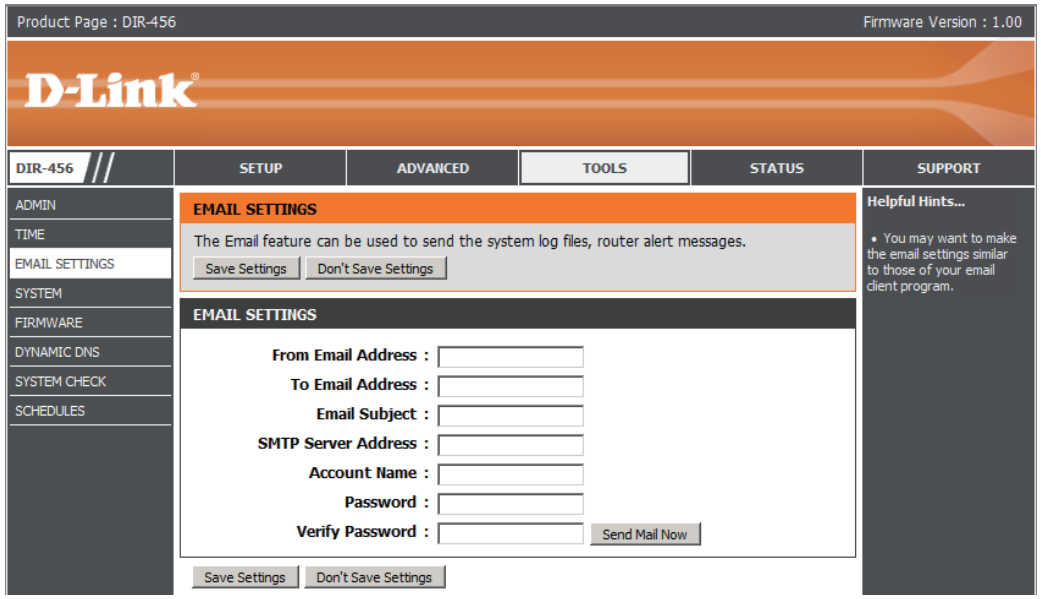
Automatic Time and Date Configuration: The Network Time Protocol (NTP) synchronizes the computer's clock over a network.

Set the Time and Date Manually: Manually enter the values for **Year**, **Month**, **Day**, **Hour**, **Minute**, and **Second**.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

Email Settings

The Email feature can be used to send the system log files and router alert messages.



From Email Address: Enter the e-mail address to be displayed in the from field of the e-mail that is send from the router.

To Email Address: Enter the e-mail address of the recipient.

Email Subject: Enter the subject of the e-mail to be sent.

SMTP Server Address: Enter the SMTP server address for your e-mail account.

Account Name: Enter the account name for your e-mail account.

Password: Enter the password associated with the account.

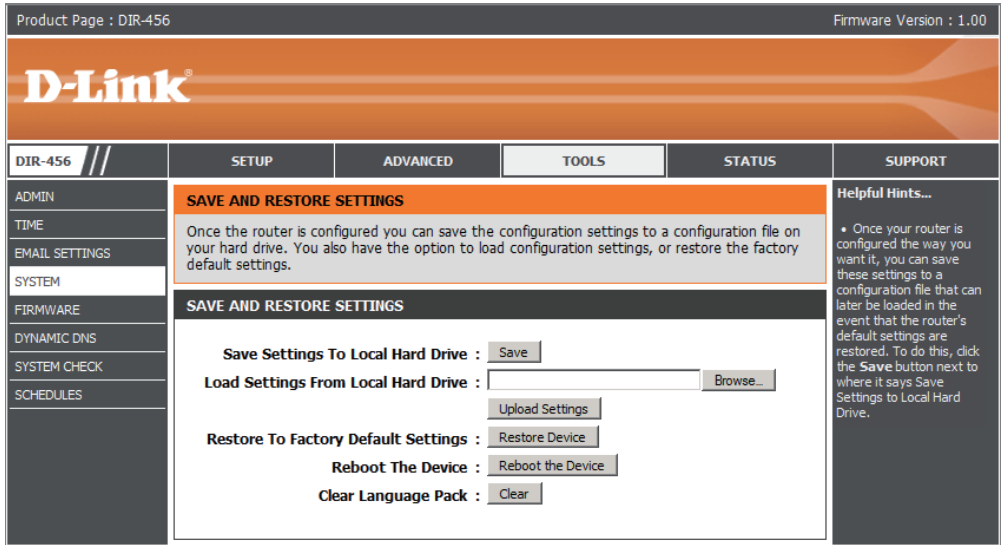
Verify Password: Re-enter the password associated with the account.

Send Mail Now: Click the **Send Mail Now** button to send a test message to e-mail address specified in the **To Email Address** field.

Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

System

Here, you can save the current system settings onto the local hard drive.



Save To Local Hard Drive: Use this option to save your current router configuration settings to a file and onto your computer. Click **Save** to open a file dialog, and then select a location and file name for the settings.

Load From Local Hard Drive: Use this option to load the previously saved router configuration settings. Browse to find the saved file and then click **Upload Settings** to transfer those settings to the router.

Restore To Factory Default Settings: This option will restore all settings back to their defaults. Any settings that have not been backed up will be lost, including any rules that you have created.

Reboot the Device: Click to reboot your router.

Clear Language Pack: Click **Clear** to clear the language pack that has been installed to the router and restore the default language.

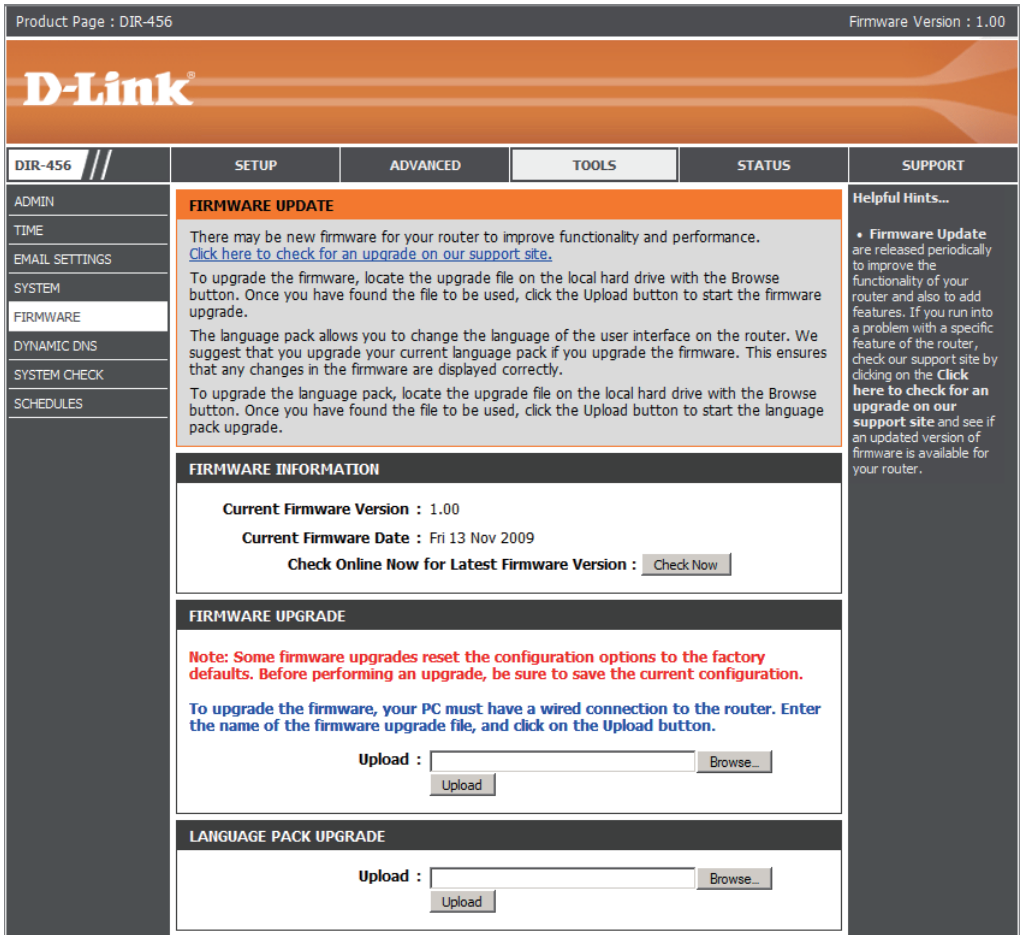
Firmware

Here, you can upgrade the firmware of your Router. Make sure the firmware you want to use is on the local hard drive of the computer and then click **Browse** to select the file to be uploaded. 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.

Current Firmware Version: Displays your current firmware version.

Browse: After you have downloaded the new firmware, click **Browse** to locate the firmware on your computer.

Click **Upload** to start the firmware upgrade.



Dynamic DNS

The DDNS feature allows you to host a server (Web, FTP, or Game Server) using a domain name that you have purchased (yourname.com) with your dynamically assigned IP address.

Sign up for D-Link's free DDNS service at **www.dlinkddns.com**.

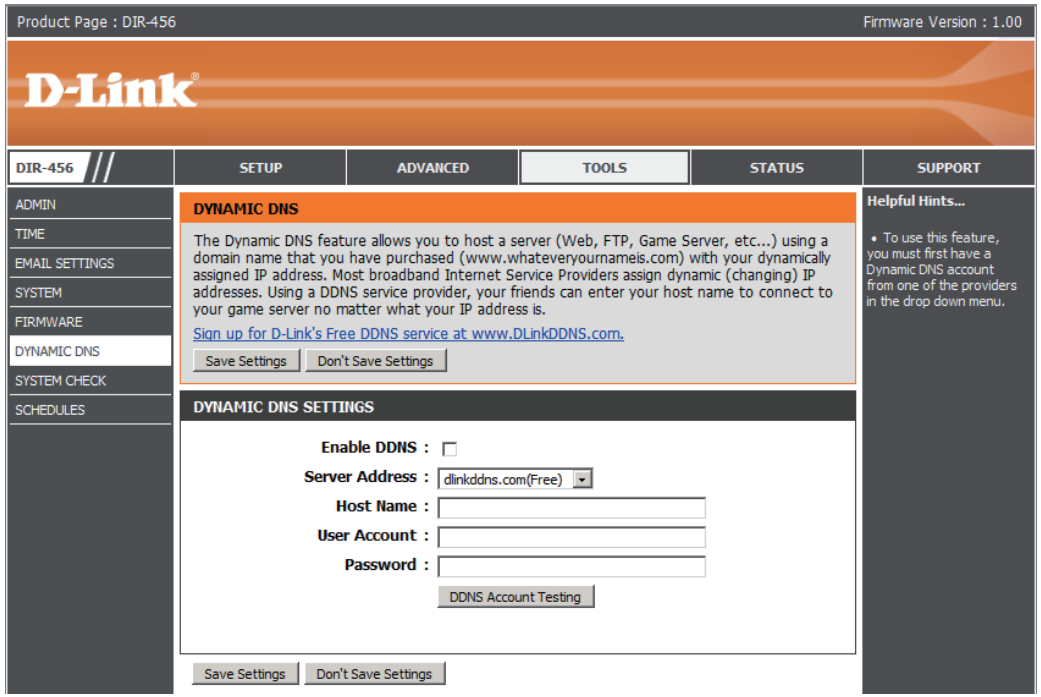
Enable Dynamic DNS: Dynamic Domain Name System is a method of keeping a domain name linked to a changing IP Address. Select this box to enable DDNS.

Provider: Select your DDNS provider from the drop-down box.

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

Username / E-mail: Enter the **Username** for your DDNS account.

Password / Key: Enter the **Password** for your DDNS account.



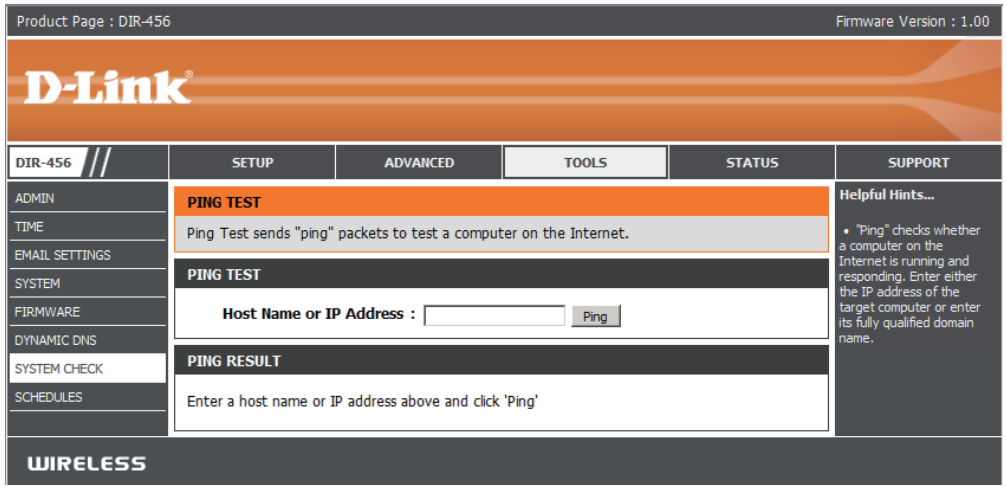
Click **Save Settings** to save your changes, or click **Don't Save Settings** to discard your changes.

System Check

This useful diagnostic utility can be used to check if a computer is connected to the network. It sends ping packets and listens for responses from the specific host.

Host Name or IP Address: Enter a host name or the IP address that you want to ping (Packet Internet Groper) and click **Ping**.

PING Result: The status of your Ping attempt will be displayed in the Ping Result box.



Schedules

This section allows you to manage schedule rules for various firewall and parental control features.

Name: The name of the schedule being defined.

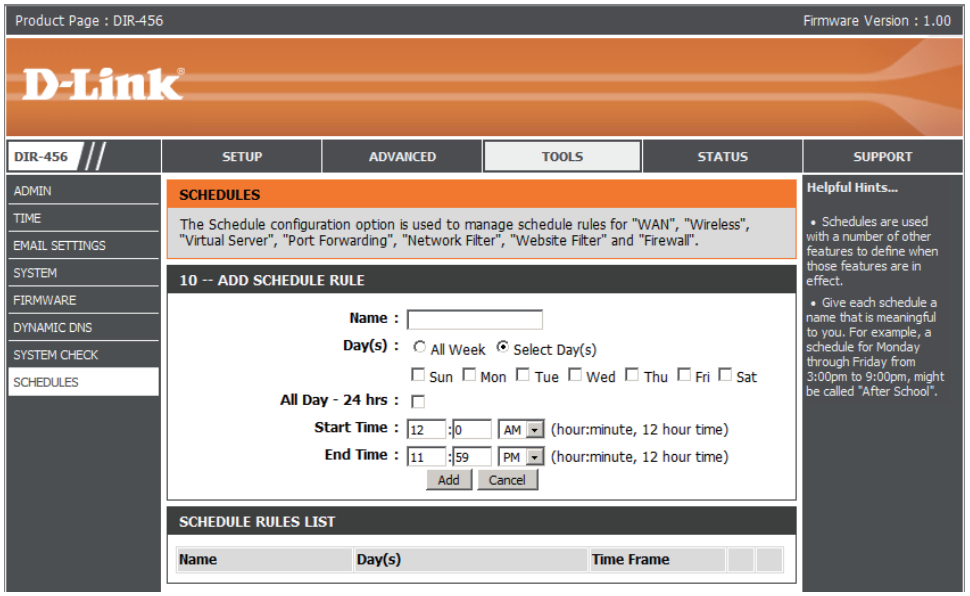
Day(s): Select a day, range of days, or select the All Week checkbox to have this schedule apply every day.

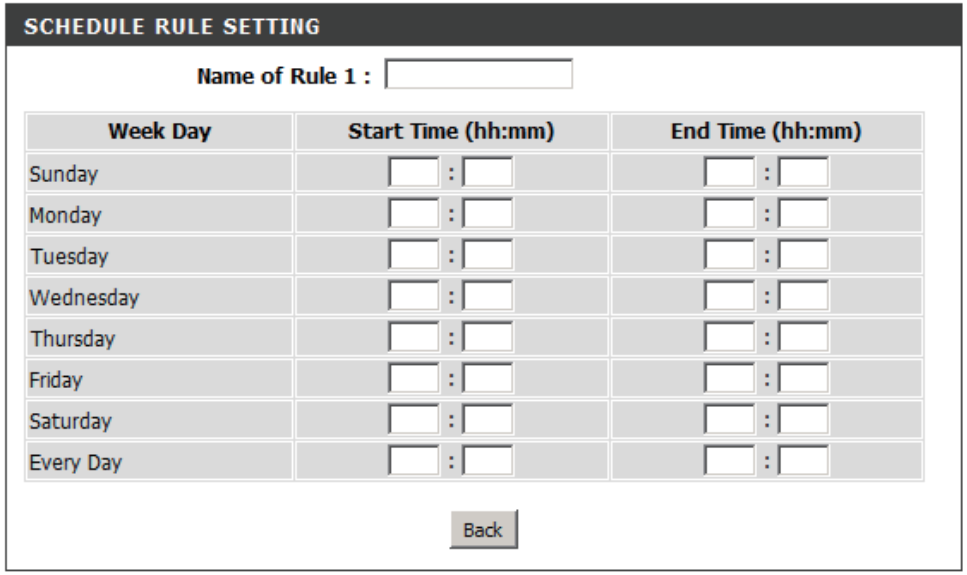
All Day - 24 hrs: Check this box to have the schedule active the entire 24 hours on the days specified.

Start Time: Select the time at which you would like the schedule being defined to become active.

End Time: Select the time at which you would like the schedule being defined to become inactive.

Schedule Rules List: This displays all the schedules that have been defined.





Device Information

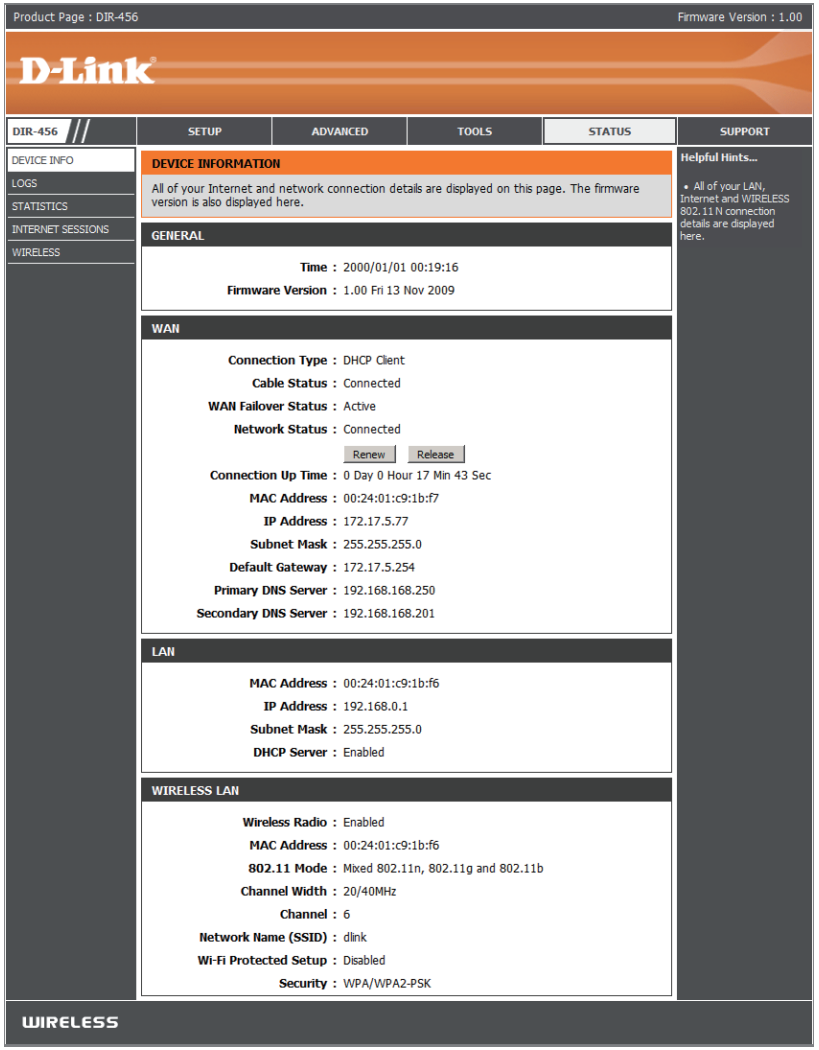
All of your Internet and network connection details are displayed on this page. The firmware version is also displayed here.

General: Displays the current time and firmware version.

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

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

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

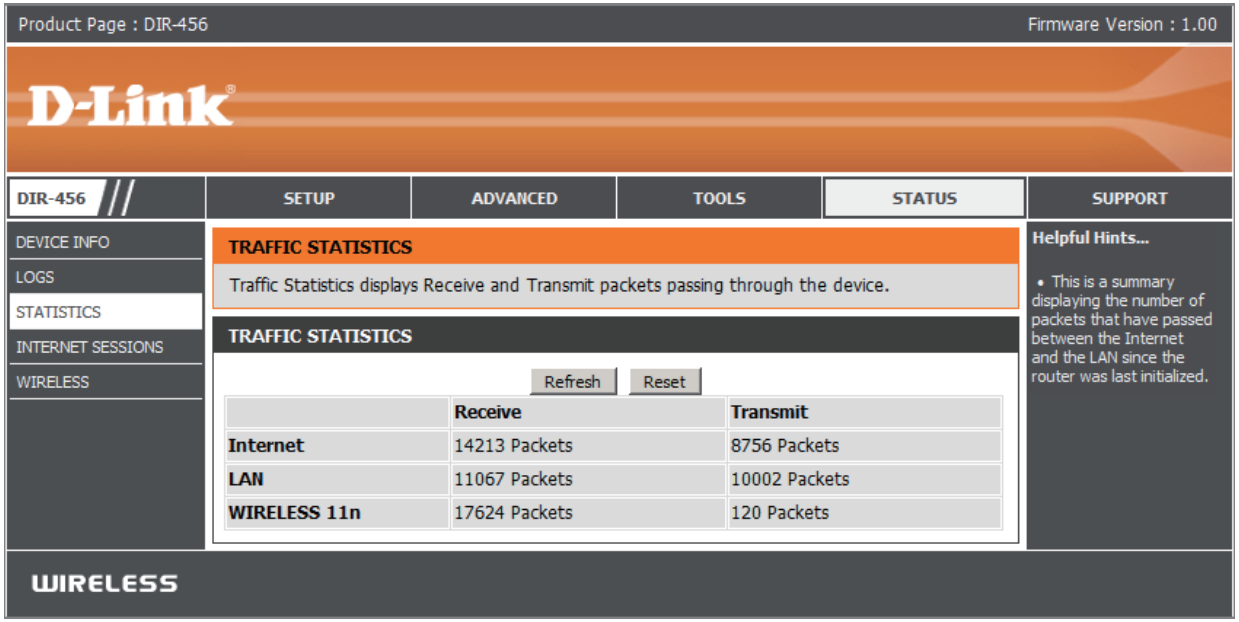


Logs

Here, you can view logs and define events that you would like to view.

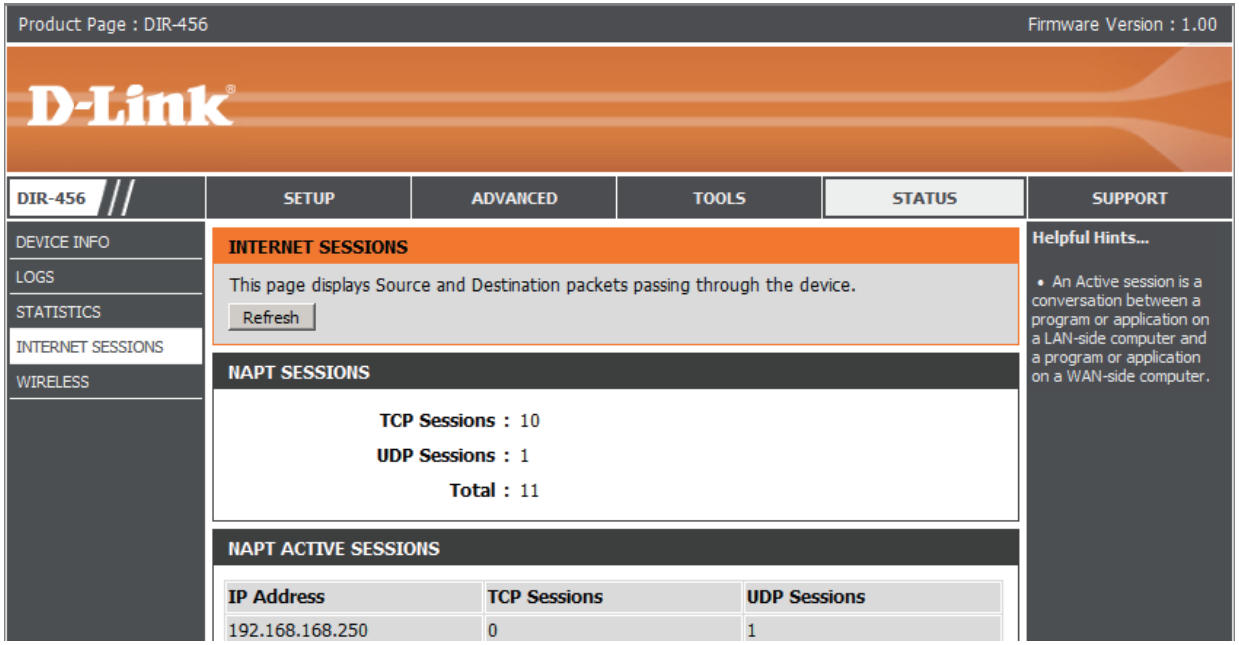
Statistics

Here you can view the packets transmitted and received passing through your router on both WAN and LAN ports. The traffic counter will reset if the device is rebooted.



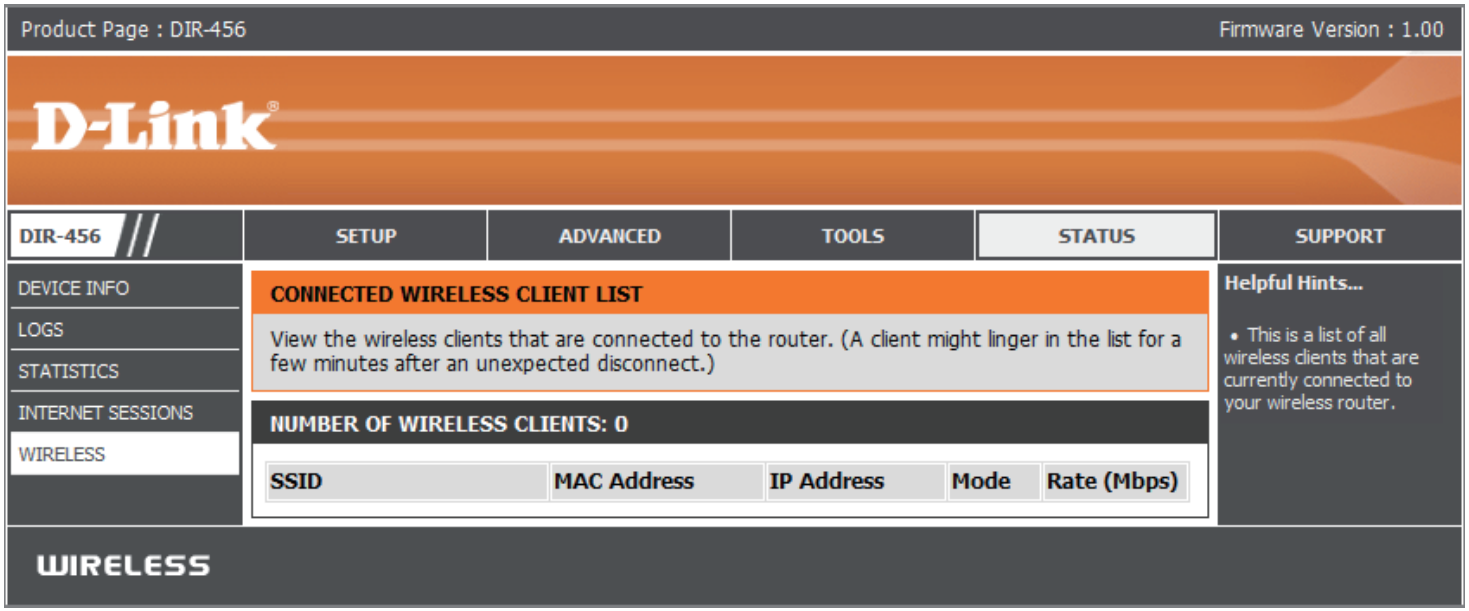
Internet Sessions

This page displays Source and Destination packets passing through the device.

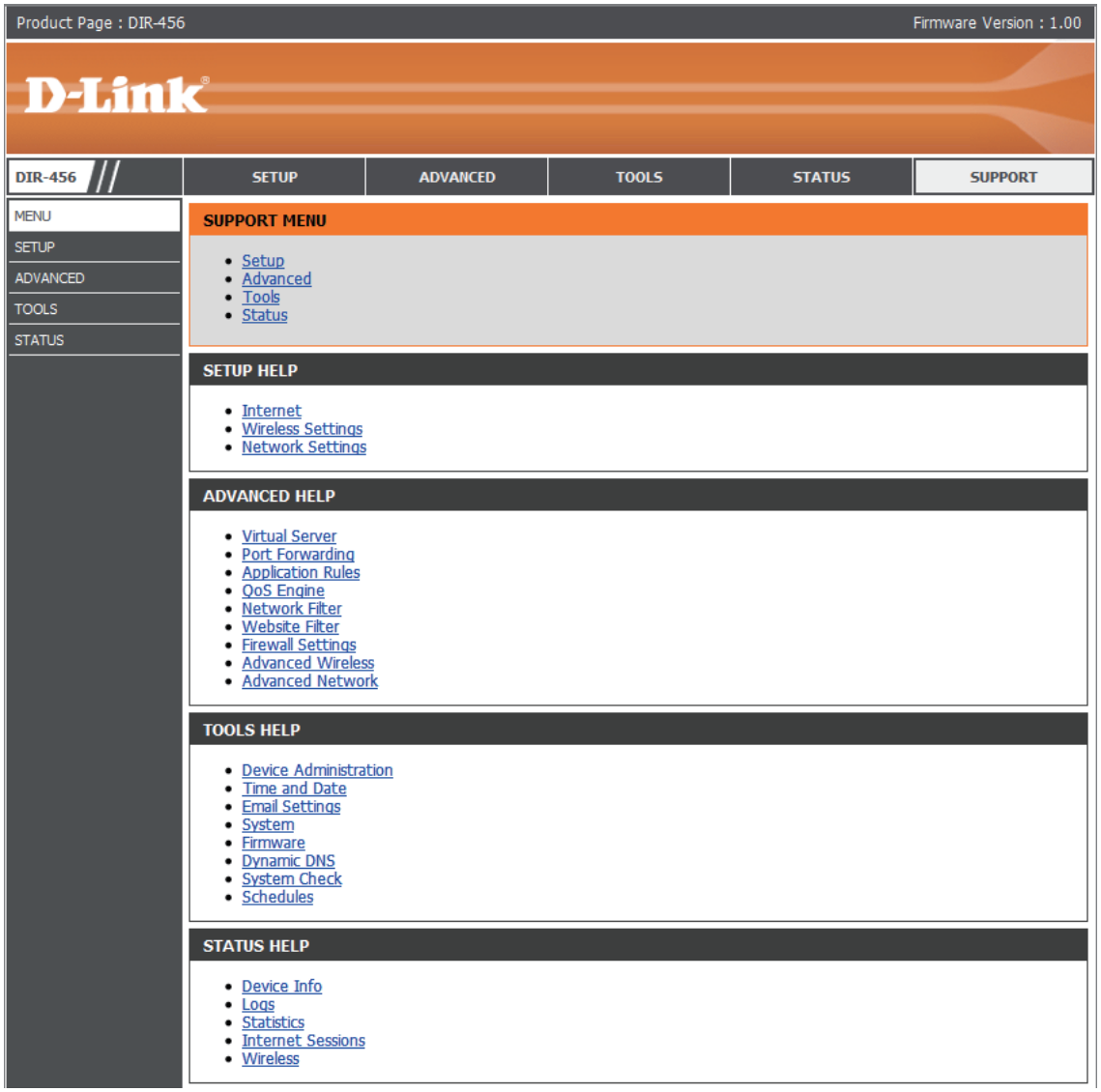


Wireless

This table displays a list of wireless clients that are connected to your wireless router. It also displays the connection time and MAC address of the connected wireless clients.



Support


Product Page : DIR-456
Firmware Version : 1.00
D-Link
DIR-456
SETUP
ADVANCED
TOOLS
STATUS
SUPPORT
MENU
SETUP
ADVANCED
TOOLS
STATUS
SUPPORT MENU
Setup
Advanced
Tools
Status
SETUP HELP
Internet
Wireless Settings
Network Settings
ADVANCED HELP
Virtual Server
Port Forwarding
Application Rules
QoS Engine
Network Filter
Website Filter
Firewall Settings
Advanced Wireless
Advanced Network
TOOLS HELP
Device Administration
Time and Date
Email Settings
System
Firmware
Dynamic DNS
System Check
Schedules
STATUS HELP
Device Info
Logs
Statistics
Internet Sessions
Wireless

Wireless Security

This section will show you the different levels of security you can use to protect your data from intruders. The

DIR-456U 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.

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**.

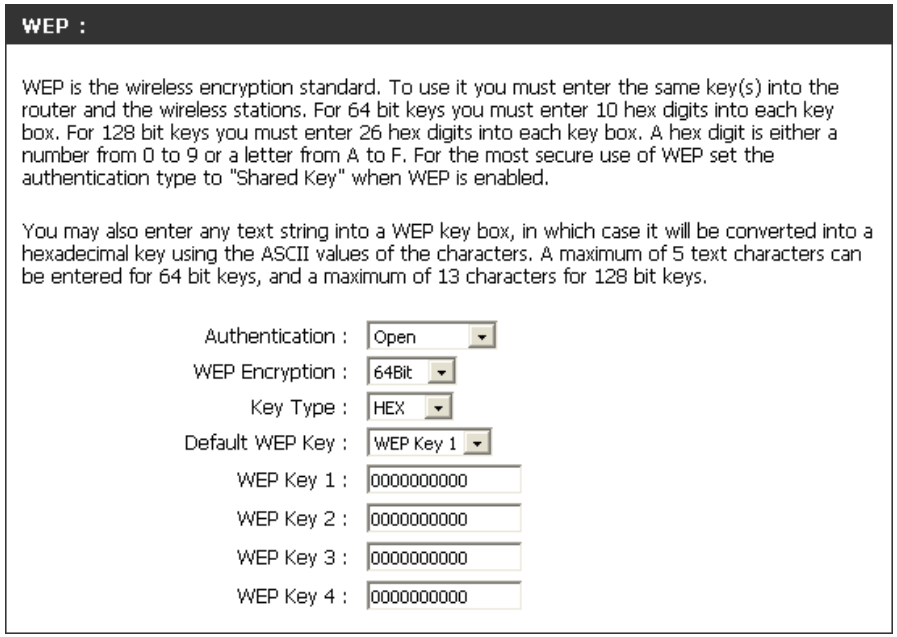
4. Select either **64-bit** or **128-bit** encryption from the drop-down box next to *WEP Encryption*.

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.

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.

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.

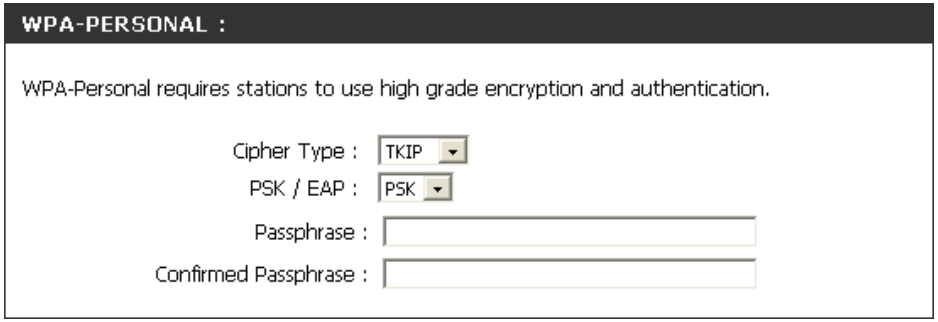
2. Next to *Security Mode*, select **Enable WPA-Personal Security** or **Enable WPA2-Personal Security**.

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.

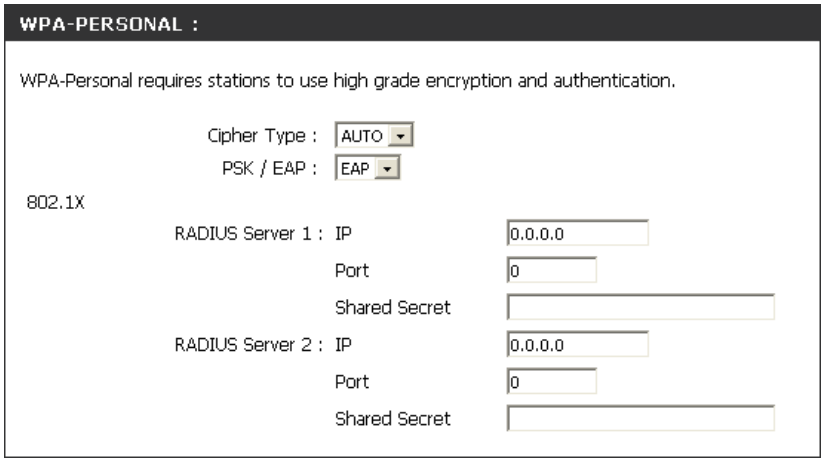
6. Enter the passphrase again next to *Confirmed Passphrase*.



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.

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.

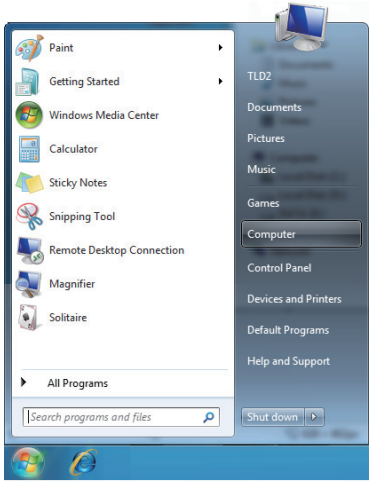
8. If you have a secondary RADIUS server, enter its IP address, port, and secret key.

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

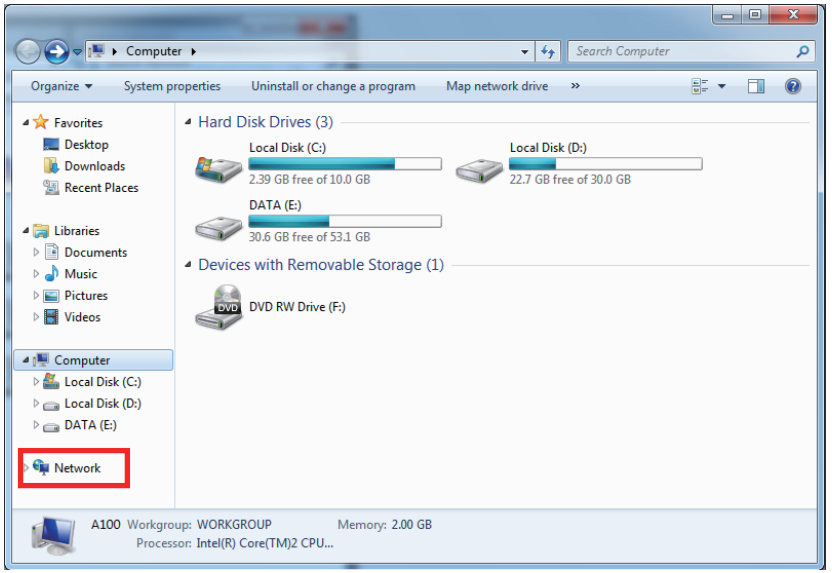
Using Windows® 7 and WPS for Wireless Configuration

The following steps allow you to configure your DIR-456U wireless network settings using Windows® 7 through WPS.

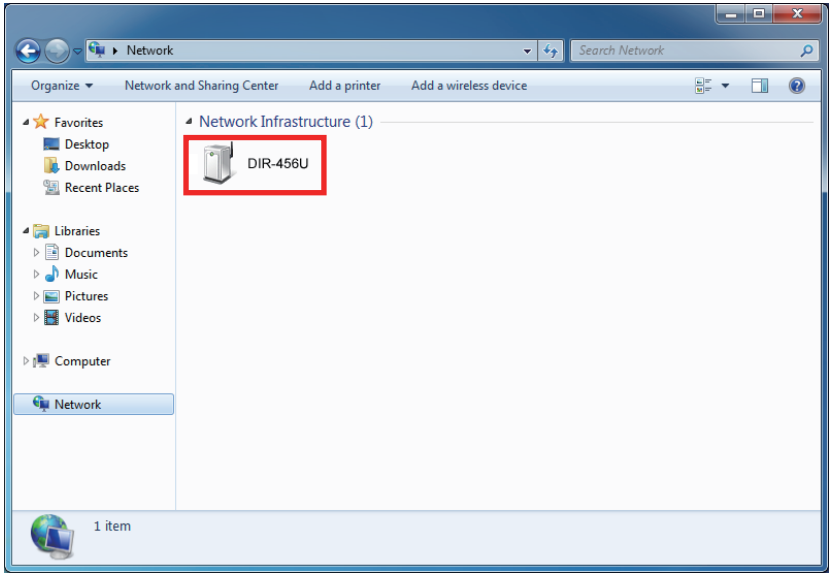
1. Click the **Start** button and select **Computer** from the Start menu.



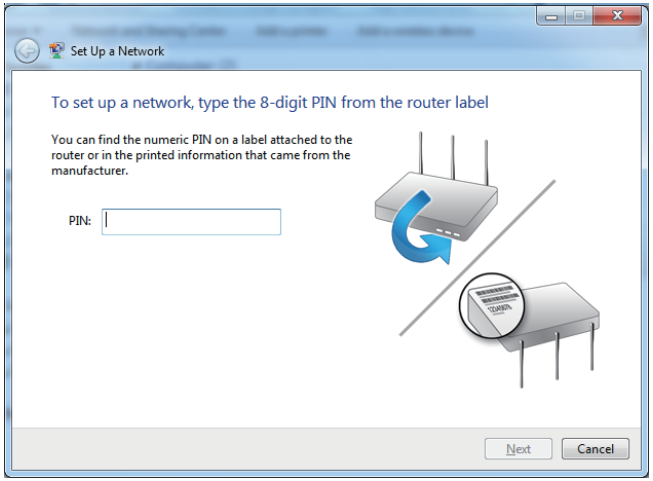
2. Click the **Network** option.



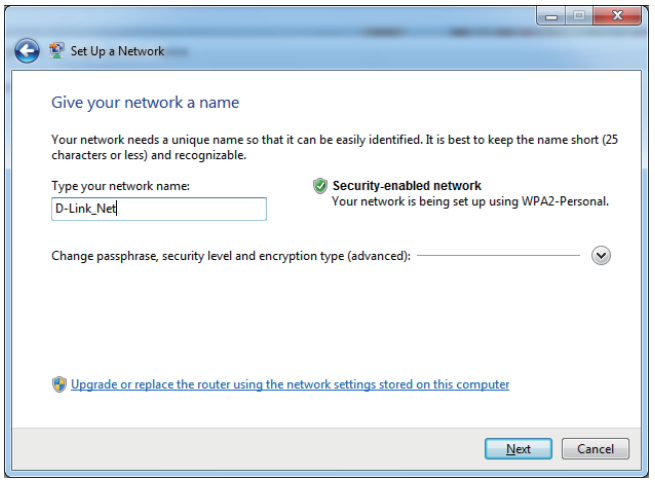
3. Double-click the DIR-456U router.



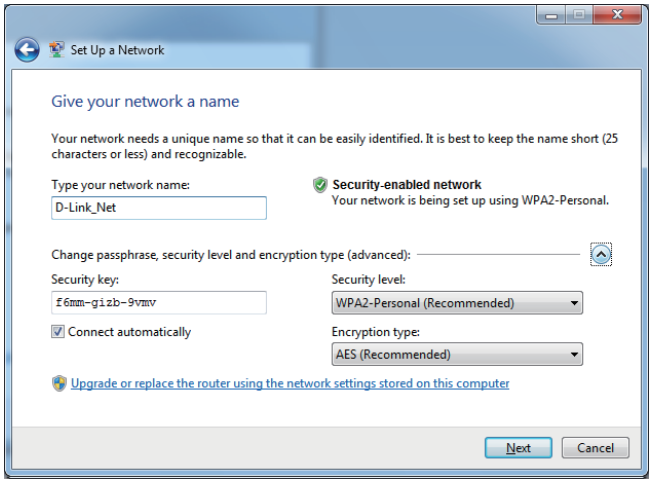
4. Input the WPS PIN number (displayed in the **Advanced > Wi-Fi Protected Setup** section in the Router's Web UI) and click **Next**.



5. Type a name for your wireless network.

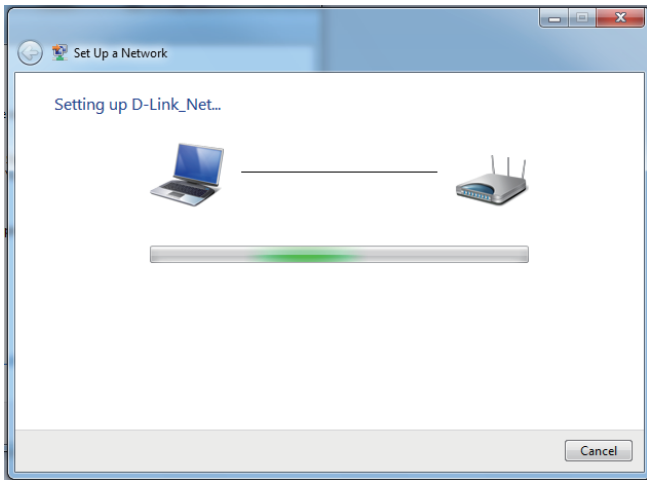


6. To configure advanced settings, click the icon.



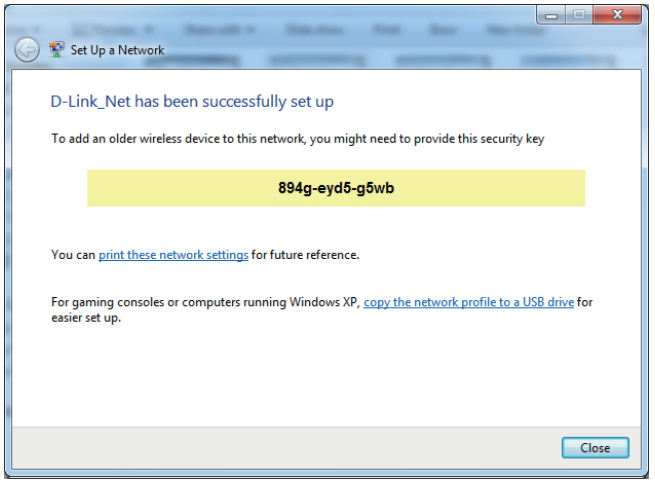
Click **Next** to continue.

7. The following window will appear while the Router is being configured.



Wait for the configuration to complete.

8. After configuration is complete, a window will appear that your wireless network has been set up successfully.



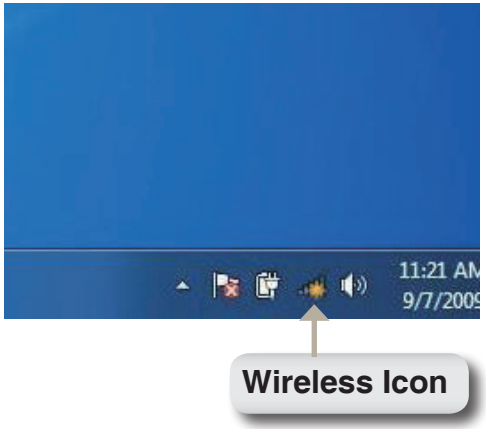
Make a note of the security key as you may need to provide this security key when adding an older wireless device to the network in the future.

Click **Close** to complete WPS setup.

Connecting to a Wireless Network Using Windows® 7

It is recommended that you enable wireless security (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.

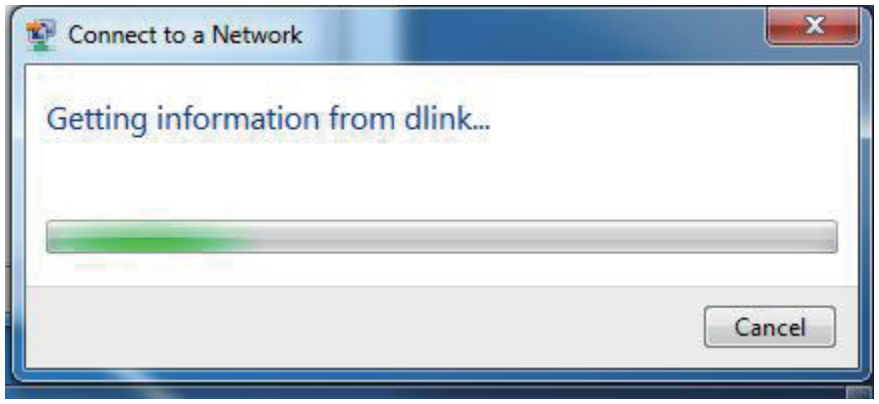
1. Click on the wireless icon in the system tray in the lower-right corner of your screen.



2. The utility will display any available wireless networks in your area.

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

4. The following window appears while your computer tries to connect to the router.



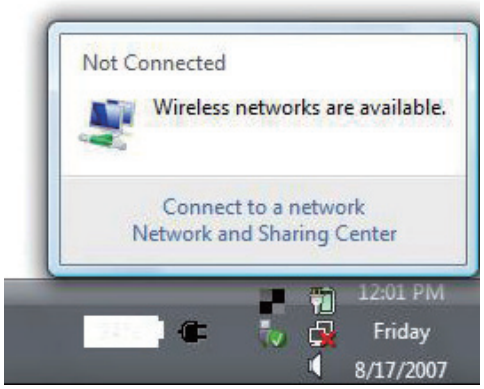
5. If your wireless network uses encryption such as WEP or WPA/WPA2, enter the encryption password/passphrase for your wireless network and click **Connect**.

It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the key or passphrase is exactly the same as on the wireless router.

Connecting to a Wireless Network Using Windows Vista®

It is recommended that you enable wireless security (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.

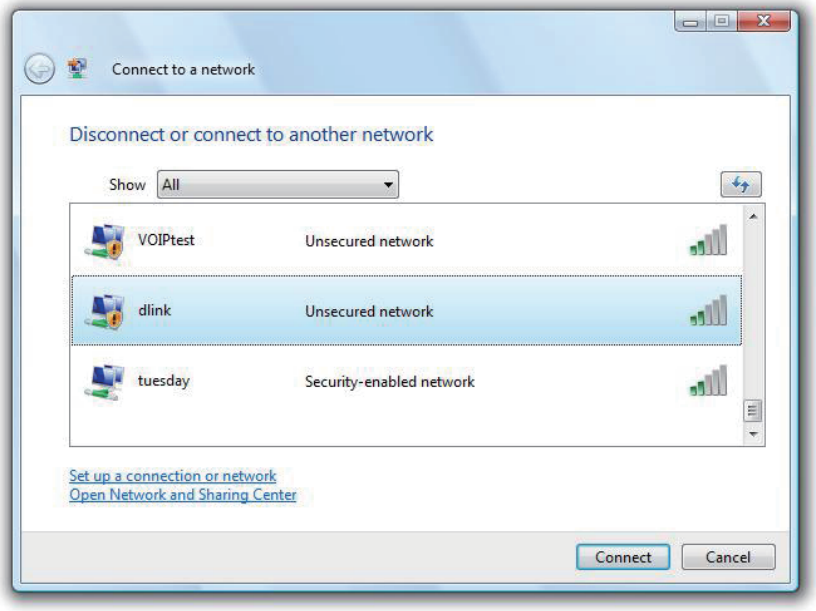
1. Open the Windows Vista® Wireless Utility by right-clicking on the wireless computer icon in the system tray in the lower right corner of the screen. Select **Connect to a network**.



2. The utility will display any available wireless networks in your area.

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

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



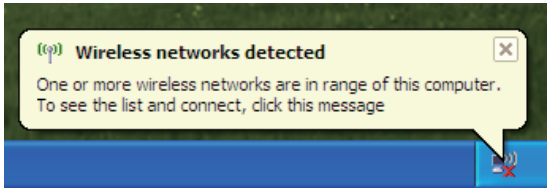
3. If your wireless network uses encryption such as WEP or WPA/WPA2, enter the encryption password/passphrase for your wireless network and click **Connect**.

It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the key or passphrase is exactly the same as on the wireless router.

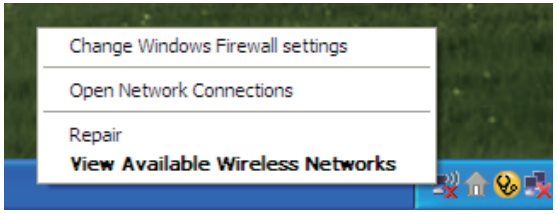
Connecting to a Wireless Network Using Windows® XP

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.

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

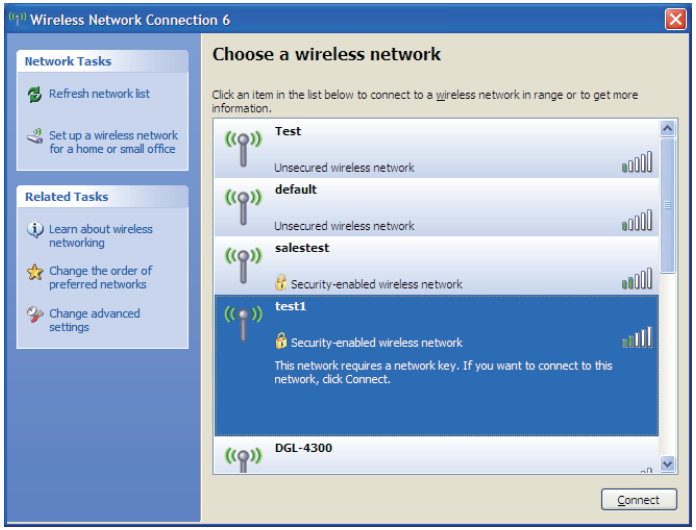


or



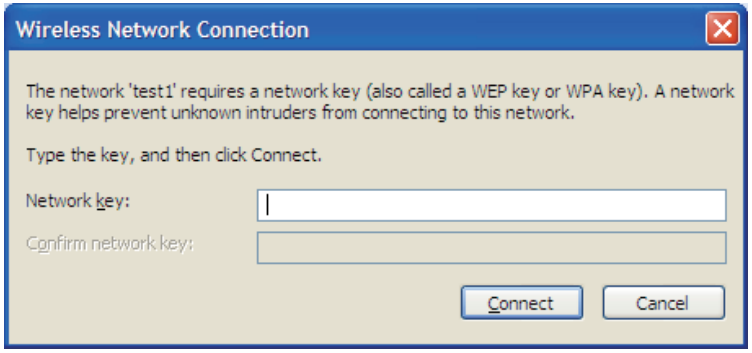
Right-click on the wireless computer icon in the system tray in the lower-right corner of the screen. Select **View Available Wireless Networks**.

2. 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.

3. If your wireless network uses encryption such as WEP or WPA/WPA2, enter the encryption password/passphrase for your wireless network and click **Connect**.



It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the key or passphrase is exactly the same as on the wireless router.

Troubleshooting

This chapter provides solutions to problems that can occur during the installation and operation of the DIR-456U. 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.

- 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.

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.

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.

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 e-mail, 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

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.

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.

Networking Basics

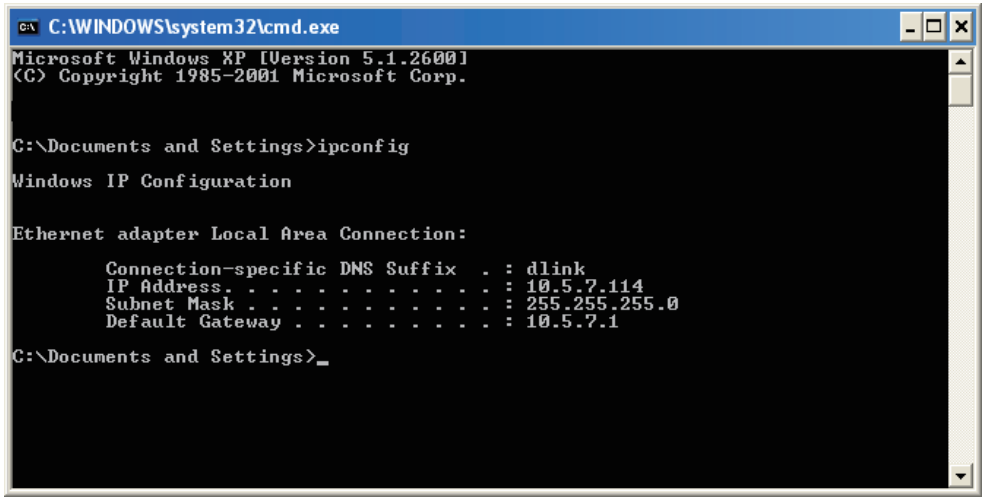
Check your IP address

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.

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**.

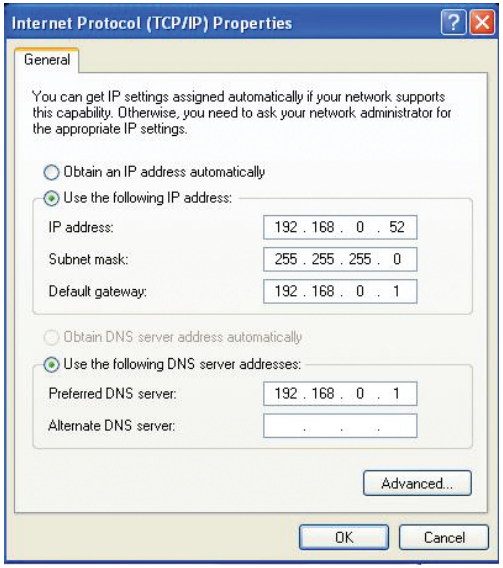
Windows® 2000 - From the desktop, right-click **My Network Places** > **Properties**.

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.

Technical Specifications

GSM Band (GSM/GPRS/EDGE)
- 850 / 900 / 1800 / 1900 MHz
- Power Class 4 (850 / 900 MHz)
- Power Class 1 (1800 / 1900 MHz)

UMTS/HSUPA Band *
- 850 / 1900 / 2100 MHz
- Power Class 3

Data Rates **
- 6/9/11/12/18/24/36/48/54Mbps in 802.11g mode
- 1/2/5.5/11Mbps in 802.11b mode

Standards
- 802.11g
- 802.11b
- 802.3
- 802.3u
- 150N

Wireless Security
- 64/128-bit WEP (Wired Equivalent Privacy)
- WPA & WPA2 (Wi-Fi Protected Access)

Firewall
- Network Address Translation (NAT)
- Stateful Packet Inspection (SPI)

VPN
- L2TP/PPTP/IPSEC VPN Pass-through
- 5 Dedicated IPSec tunnels

Antenna
- 3 Internal antennas

Ports
- 2 x LAN (RJ-45)
- 1 x WAN (RJ-45)
- 1 x Phone (RJ-11)

USIM Slot
- Standard 6-pin SIM card interface

LED Status Indicators
- WPS
- WAN
- LAN
- WLAN
- 2G/2.5G
- 3G/3.5G
- SMS
- Signal

Dimensions (L x W x H)
- 184 x 125 x 30 mm

Operating Temperature

- 0˚ to 40˚C (32˚ to 104˚F)

Operating Humidity

- 10%-90% (Non-condensing)

Certification

- CE
- FCC

* Supported frequency band is dependent upon regional hardware version.
** 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.