



DSL-G624M
Wireless 108G MIMO ADSL2/2+ Router
User's Guide

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Table Of Contents

About This User's Guide	iii
BEFORE YOU START	III
Installation Overview	iii
Packing List	iv
Installation Requirements	iv
Introduction	1
Router Description and Operation	1
Standards Compatibility and Compliance	4
Front Panel Display	5
Rear Panel Connections	6
Wireless LAN Basics	7
About 802.11g Wireless	8
HARDWARE INSTALLATION	9
Choosing the Best Location for Wireless Operation	9
Power on Router	10
Factory Reset Button	10
Wired Network Connections	10
BASIC ROUTER CONFIGURATION	11
Configuring IP Settings on Your Computer	12
Access the Configuration Manager	16
Login to Home Page	16
Configure the Router	17
HOME	18
Wireless LAN Setup	18
Configure Basic Wireless Settings	19
Wireless Security	20
WEP Encryption	22
Configure the WAN Connection	24
PPPoE and PPPoA Connections for WAN	25
Dynamic IP Address Connection for WAN	26
Bridged Connection for WAN	27
Static IP Address for Connection WAN	28
LAN IP Settings	29
DHCP Server Settings for the LAN	30
DNS Server Settings	32
Save Settings and Reboot	32
ADVANCED ROUTER MANAGEMENT	33
Virtual Server	34
Filters	36
Routing	38
DMZ	39
Firewall	41

TOOLS42

Change System Password 43

System 44

Firmware..... 45

Ping Test (Miscellaneous) 46

Diagnostics 47

Time..... 48

Status Information 49

Device Information Display..... 50

Log..... 51

Stats 52

ADSL Line 53

TECHNICAL SPECIFICATIONS54

IP ADDRESS SETUP56

IP CONCEPTS58

About This User's Guide

This user's guide provides instructions on how to install the DSL-G624M Wireless ADSL Router with 2XR and use it to provide Internet access for an Ethernet or 802.11g/802.11b wireless LAN.

If you are using a computer with a functioning Ethernet port, the quickest and easiest way to set up the DSL-G624M is to insert the Installation CD into the CD-ROM drive of your computer and follow the instructions provided in the **Quick Installation Guide**, which is also provided in print.

Before You Start

Please read and make sure you understand all the prerequisites for proper installation of your new Wireless 108G MIMO ADSL2/2+ Router. Have all the necessary information and equipment on hand before beginning the installation.

Installation Overview

The procedure to install the Router can be described in general terms in the following steps:

1. Gather information and equipment needed to install the device. Before you begin the actual installation make sure you have all the necessary information and equipment.
2. Install the hardware, connect the cables to the device and connect the power adapter.
3. Check the IP settings on your computer and change them if necessary so the computer can access the web-based software built into the Router.
4. Use the web-based management software to configure the device to suit the requirements of your ADSL service and wireless LAN.

Packing List

Open the shipping carton and carefully remove all items. Make sure that you have the items listed here.

1. One DSL-G624M Wireless 108G MIMO ADSL2/2+ Ethernet Router
2. One CD-ROM containing the User's Guide
3. One twisted-pair telephone cable used for ADSL connection
4. One straight-through Ethernet cable
5. One AC power adapter suitable for your electric service
6. One Quick Installation Guide



Compatible 2XR Solutions

To achieve the amazing performance of the D-Link 2XR range make sure you obtain the following client adapters.

DWL-G650M Wireless 108G MIMO Cardbus Adapter

DWL-G520M Wireless 108G MIMO PCI Desktop Adapter

Installation Requirements

In order to establish a connection to the Internet it will be necessary to provide information to the Router that will be stored in its memory. For some users, only their account information (Username and Password) is required. For others, various parameters that control and define the Internet connection will be required. You can print out the two pages below and use the tables to list this information. This way you have a hard copy of all the information needed to setup the Router. If it is necessary to reconfigure the device, all the necessary information can be easily accessed. Be sure to keep this information safe and private.

Microfilter or Low Pass Filters

Since ADSL and telephone services share the same copper wiring to carry their respective signals, a filtering mechanism may be necessary to avoid mutual interference. A microfilter or low pass filter device can be installed for each telephone that shares the line with the ADSL line. These filters are easy to install passive devices that connect to the ADSL device and/or telephone using standard telephone cable. Ask your service provider for more information about the use of low pass filters with your installation.

Operating Systems

The DSL-G624M uses an HTML-based web interface for setup and management. The web configuration manager may be accessed using any operating system capable of running web browser software, including Windows 98 SE, Windows ME, Windows 2000, and Windows XP.

Web Browser

Any common web browser can be used to configure the Router using the web configuration management software. The program is designed to work best with more recently released browsers such as Microsoft Internet Explorer® version 6.0, Netscape Navigator® version 7.0, or later versions. The web browser must have JavaScript enabled. JavaScript is enabled by default on many browsers. Make sure JavaScript has not been disabled by other software (such as virus protection or web user security packages) that may be running on your computer.

Ethernet Port (NIC Adapter)

Any computer that uses the Router must be able to connect to it through the Ethernet port on the Router. This connection is an Ethernet connection and therefore requires that your computer be equipped with an Ethernet port as well. Most notebook computers are now sold with an Ethernet port already installed. Likewise, most fully assembled desktop computers come with an Ethernet NIC adapter as standard equipment. If your computer does not have an

Ethernet port, you must install an Ethernet NIC adapter before you can use the Router. If you must install an adapter, follow the installation instructions that come with the Ethernet NIC adapter.

Wireless LAN Configuration

Wireless LAN settings for 802.11g and 802.11b wireless operation must be enabled using the Setup Wizard before it can be configured. Basic wireless settings including the Channel and SSID can be configured through the Setup Wizard. Advanced wireless security settings can also be configured with the Setup Wizard.

Security for wireless communication can be accomplished in a number of ways. The DSL-G624M supports WEP, WPA and WPA -PSK.

Additional Software

It may be necessary to install software on your computer that enables the computer to access the Internet. Additional software must be installed if you are using the device a simple bridge. For a bridged connection, the information needed to make and maintain the Internet connection is stored on another computer or gateway device, not in the Router itself.

If your ADSL service is delivered through a PPPoE, PPPoA or Static IP connection, the information needed to establish and maintain the Internet connection can be stored in the Router. In this case, it is not necessary to install software on your computer. It may however be necessary to change some settings in the device, including account information used to identify and verify the connection.

Information you will need from your ADSL service provider:

Username	This is the Username used to log on to your ADSL service provider's network. It is commonly in the form – user@isp.com. Your ADSL service provider uses this to identify your account.	Record info here
Password	This is the Password used, in conjunction with the Username above, to log on to your ADSL service provider's network. This is used to verify the identity of your account.	
WAN Setting / Connection Type	These settings describe the method your ADSL service provider uses to transport data between the Internet and your computer. Most users will use the default settings. You may need to specify one of the following WAN Setting and Connection Type configurations (Connection Type settings listed in parenthesis): PPPoE/PPPoA (PPPoE LLC, PPPoA LLC or PPPoA VC-MUX) Bridge Mode (1483 Bridged IP LLC or 1483 Bridged IP VC-MUX) Static IP Address (Bridged IP LLC, 1483 Bridged IP VC-MUX, 1483 Routed IP LLC, 1483 Routed IP VC-MUX or IPoA) Dynamic IP Address (1483 Bridged IP LLC or 1483 Bridged IP VC-MUX) Default = PPPoE/PPPoA (PPPoE LLC)	
VPI	Most users will not be required to change this setting. The Virtual Path Identifier (VPI) is used in conjunction with the Virtual Channel Identifier (VCI) to identify the data path between your ADSL service provider's network and your computer. If you are setting up the Router for multiple virtual connections, you will need to configure the VPI and VCI as instructed by your ADSL service provider for the additional connections. This setting can be changed in the WAN menu of the web management interface.	
VCI	Most users will not be required to change this setting. The Virtual Channel Identifier (VCI) used in conjunction with the VPI to identify the data path between your ADSL service provider's network and your computer. If you are setting up the Router for multiple virtual connections, you will need to configure the VPI and VCI as instructed by your ADSL service provider for the additional connections. This setting can be changed in the WAN menu of the web management interface.	



Note

The Setup Wizard can be used to configure the Internet connection for most users. If you are using a PPPoA or PPPoE type connection use the Setup Wizard to establish the Internet connection.

Information you will need about your DSL-G624M ADSL Router:

Username	This is the Username needed access the Router's management interface. When you attempt to connect to the device through a web browser you will be prompted to enter this Username. The default Username for the Router is admin . The user cannot change this.	Record info here
Password	This is the Password you will be prompted to enter when you access the Router's management interface. The default Password is admin . The user may change this.	
LAN IP addresses for the DSL-G624M	This is the IP address you will enter into the Address field of your web browser to access the Router's configuration graphical user interface (GUI) using a web browser. The default IP address is 192.168.1.1 . This may be changed to suit any IP address scheme the user desires. This address will be the base IP address used for DHCP service on the LAN when DHCP is enabled.	
LAN Subnet Mask for the DSL-G624M	This is the subnet mask used by the DSL-G624M, and will be used throughout your LAN. The default subnet mask is 255.255.255.0 . This can be changed later.	

Information you will need about your LAN or computer:

Ethernet NIC	If your computer has an Ethernet NIC, you can connect the DSL-G624M to this Ethernet port using an Ethernet cable. You can also use the Ethernet ports on the DSL-G624M to connect to other computer or Ethernet devices.	Record info here
DHCP Client status	Your DSL-G624M ADSL Router is configured, by default, to be a DHCP server. This means that it can assign an IP address, subnet mask, and a default gateway address to computers on your LAN. The default range of IP addresses the DSL-G624M will assign are from 192.168.1.2 to 192.168.1.33 . Your computer (or computers) needs to be configured to Obtain an IP address automatically (that is, they need to be configured as DHCP clients.)	

It is recommended that you collect and record this information here, or in some other secure place, in case you have to re-configure your ADSL connection in the future.

Once you have the above information, you are ready to setup and configure your DSL-G624M ADSL Router.

Introduction

This section provides a brief description of the Device, its associated technologies and a list of features.

Device Description and Operation

The DSL-G624M is designed to provide a simple and cost-effective ADSL Internet connection for a private Ethernet or 802.11g/802.11b wireless network. The Router combines high-speed ADSL2/2+ Internet connection, IP routing for the LAN and Wireless 108G MIMO connectivity in one package.

The device is easy to install and use. The DSL-G624M connects to an Ethernet LAN or computers via standard Ethernet ports. The ADSL connection is made using ordinary telephone line with standard connectors. Multiple workstations can be networked and connected to the Internet using a single Wide Area Network (WAN) interface and single global IP address. The advanced security enhancements, packet filtering and port redirection, can help protect your network from potentially devastating intrusions by malicious agents from outside your network.

The D-Link DSL-G624M Wireless 108G MIMO ADSL2/2+ Router is an 802.11g high-performance, wireless router that supports high-speed wireless networking at home, at work or in public places.

Unlike most routers, the DSL-G624M provides data transfers at up to 108 Mbps (compared to the standard 54 Mbps) when used with other D-Link Wireless 108G MIMO and AirPlus Xtreme G Products. The 802.11g standard is backwards compatible with 802.11b products. This means that you do not need to change your entire network to maintain connectivity. You may sacrifice some of 802.11g's speed when you mix 802.11b and 802.11g devices, but you will not lose the ability to communicate when you incorporate the 802.11g standard into your 802.11b network. You may choose to slowly change your network by gradually replacing the 802.11b devices with 802.11g devices .

In addition to offering faster data transfer speeds when used with other 802.11g products, the DI-634M has the newest, strongest, most advanced security features available today. When used with other 802.11g WPA (WiFi Protected Access) compatible products in a network, the security features include:

ADSL

Asymmetric Digital Subscriber Line (ADSL) is a broadband network technology that utilizes standard twisted-pair copper wire telephone lines to enable broadband high-speed digital data transmission and bandwidth hungry applications for business and residential customers. With the DSL-G624M you have the very latest in ADSL technology thus future proofing your investment.

ADSL routers and modems provide faster downloads and more reliable connectivity to the user without loss of quality or disruption of voice/fax telephone capabilities.

ADSL service operates at speeds of up to 8 Mbps downstream and up to 640 Kbps upstream. A secure dedicated point-to-point connection is established between the user and the central office of the service provider.

ADSL 2 service operates at speeds of up to 12 Mbps downstream and up to 1 Mbps upstream.

ADSL 2+ service operates at speeds of up to 24 Mbps downstream and up to 1 Mbps upstream.

802.11g Wireless

The embedded 802.11g wireless access point provides Internet access and connectivity to the Ethernet for 802.11g and 802.11b wireless workstations. IEEE 802.11g is fully compatible with IEEE 802.11b wireless devices. The 802.11g standard supports data transfer rates of up to 54 Mbps. The Router's wireless access point supports common security protocols used for wireless LAN including WEP encryption, 802.1x and WPA.

Features

The DSL-G624M Wireless ADSL Router utilizes the latest ADSL enhancements to provide a reliable Internet portal suitable for most small to medium sized offices. DSL-G624M advantages include:

- **Super G 108G Wireless MIMO** – This router uses D-Link's latest 2XR MIMO (Multiple Input Multiple Output) technology to provide better radio signal coverage. Combined with wireless speeds of up to 108Mbps, this router allows you to effectively implement high-bandwidth applications such as audio and video streaming; on-line gaming and large file transfer over a wireless network.
- **802.11g**. Fully compatible with the 802.11g standard to provide a wireless data rate of up to 108Mbps*
- **802.11b** Backwards compatible with the 802.11b standard to provide a wireless data rate of up to 11Mbps
- **WPA** (Wi Fi Protected Access) authorises and identifies users based on a secret key that changes automatically at a regular interval, for example:
- **Pre Shared Key** mode means that the home user, without a RADIUS server, will obtain a new security key every time the he or she connects to the network, vastly improving the safety of communications on the network
- **Utilizes OFDM** technology (Orthogonal Frequency Division Multiplexing)
- Operates in the 2.4GHz frequency range
- **Advanced Firewall** features: Supports NAT with VPN pass-through, providing added security, MAC Filtering, URL Filtering, and Scheduling
- **DHCP server** enables all networked computers to automatically receive IP addresses
- **Web-based interface** for Managing and Configuring
- **Access Control** to manage users on the network
- **Supports special applications** that require multiple connections
- **PPP (Point-to-Point Protocol) Security** – The DSL-G624M ADSL Router supports PAP (Password Authentication Protocol) and CHAP (Challenge Handshake Authentication Protocol) for PPP connections.
- **DHCP Support** – Dynamic Host Configuration Protocol automatically and dynamically assigns al LAN IP settings to each host on your network. This eliminates the need to reconfigure every host whenever changes in network topology occur.
- **Network Address Translation (NAT)** – For small office environments, the DSL-G624M allows multiple users on the LAN to access the Internet concurrently through a single Internet account. This provides Internet access to everyone in the office for the price of a single user.
- NAT improves network security in effect by hiding the private network behind one global and visible IP address. NAT address mapping can also be used to link two IP domains via a LAN-to-LAN connection.
- **TCP/IP (Transfer Control Protocol/Internet Protocol)** – The DSL-G624M supports TCP/IP protocol, the language used for the Internet. It is compatible with access servers manufactured by major vendors.
- **RIP-1/RIP-2** – The DSL-G624M supports both RIP-1 and RIP-2 exchanges with other routers. Using both versions lets the Router to communicate with all RIP enabled devices.
- **Static Routing** – This allows you to select a data path to a particular network destination that will remain in the routing table and never “age out”. If you wish to define a specific route that will always be used for data traffic from your LAN to a specific destination within your LAN (for example to another router or a server) or outside your network (to a ISP defined default gateway for instance).
- **Default Routing** – This allows you to choose a default path for incoming data packets for which the destination address is unknown. This is particularly useful when if the Router functions as the sole connection to the Internet.

- **ATM (Asynchronous Transfer Mode)** – The DSL-G624M supports Bridged Ethernet over ATM (RFC1483), IP over ATM (RFC1577) and PPP over ATM (RFC 2364).
- **Full Network Management** – The DSL-G624M incorporates SNMP (Simple Network Management Protocol) support for web-based management and text-based network management via an RS-232 or Telnet connection.
- **G.hs (Auto-handshake)** – This allows the Router to automatically choose either the G.lite or G.dmt ADSL connection standards
- **Telnet Connection** – The Telnet enables a network manager to access the Router's management software and help aid diagnostics.
- **Easy Installation** – The DSL-G624M uses a web-based graphical user interface program for convenient management access and easy set up. Any common web browser software can be used to manage the Router.

Standards Compatibility and Compliance

The DSL-G624M complies with or is compatible with the following standards as recognized by their respective agencies.

- ITU G.992.2 (G.lite) compliant
- ITU G.992.1 (G.dmt) compliant
- ANSI T1.413 issue 2 (Full Rate DMT Over Analog POTS) Annex A
- ITU G.992.3 (G.dmt.bis) Annex A (ADSL2 over POTS)
- ITU G.992.5 (G.dmt.bis plus) Annex A (ADSL2+ over POTS)
- ITU-T Rec. I.361 compliant
- RFC 791 Internet Protocol compliant
- RFC 792 UDP compliant
- RFC 826 Address Resolution Protocol compliant (ARP) compliant
- RFC 1058 Routing Information Protocol (RIP) compliant
- RFC 1213 MIB II for IP compliant
- RFC 1334 PPP Authentication Protocol compliant
- RFC 1389 Routing Information Protocol 2 (RIP2) compliant
- RFC 1483 IP over AAL5/ Bridged Ethernet over AAL5 compliant
- RFC 1557 Classical IP over ATM (IPoA) compliant
- RFC 1661 Point to Point Protocol (PPP) compliant
- RFC 1877 Automatic IP assignment compliant
- RFC 1994 Challenge Handshake Authentication Protocol compliant
- Supports RFC 2131 and RFC 2132 DHCP functions including: automatic assignment of IP address, use of subnet mask and default gateway and provision of DNS server address for all hosts
- RFC 2364 PPP over ATM compliant (PPPoA) compliant
- RFC 2516 PPP over Ethernet compliant (PPPoE) compliant
- RFC 2684 Bridged/Routed Ethernet over ATM compliant
- IEEE 802.3 compliant
- IEEE 802.3u compliant
- IEEE 802.1d compliant
- IEEE 802.11g compliant
- IEEE 802.3x compliant
- Embedded web server support
- Supports Dynamic Learning
- Supports Static Routing
- Supports NAT for up to 4096 connections
- Supports DHCP for up to 253 hot connections
- Supports IGMP
- Supports ATM Forum UNI 3.1/4.0
- Supports ATM VCC (Virtual Channel Circuit) 8 with Firmware upgrade
- Supports TELNET and TFTP
- Supports back pressure for half-duplex

Front Panel Display

Place the DSL-G624M in a location that permits an easy view of the LED indicators on the front panel.

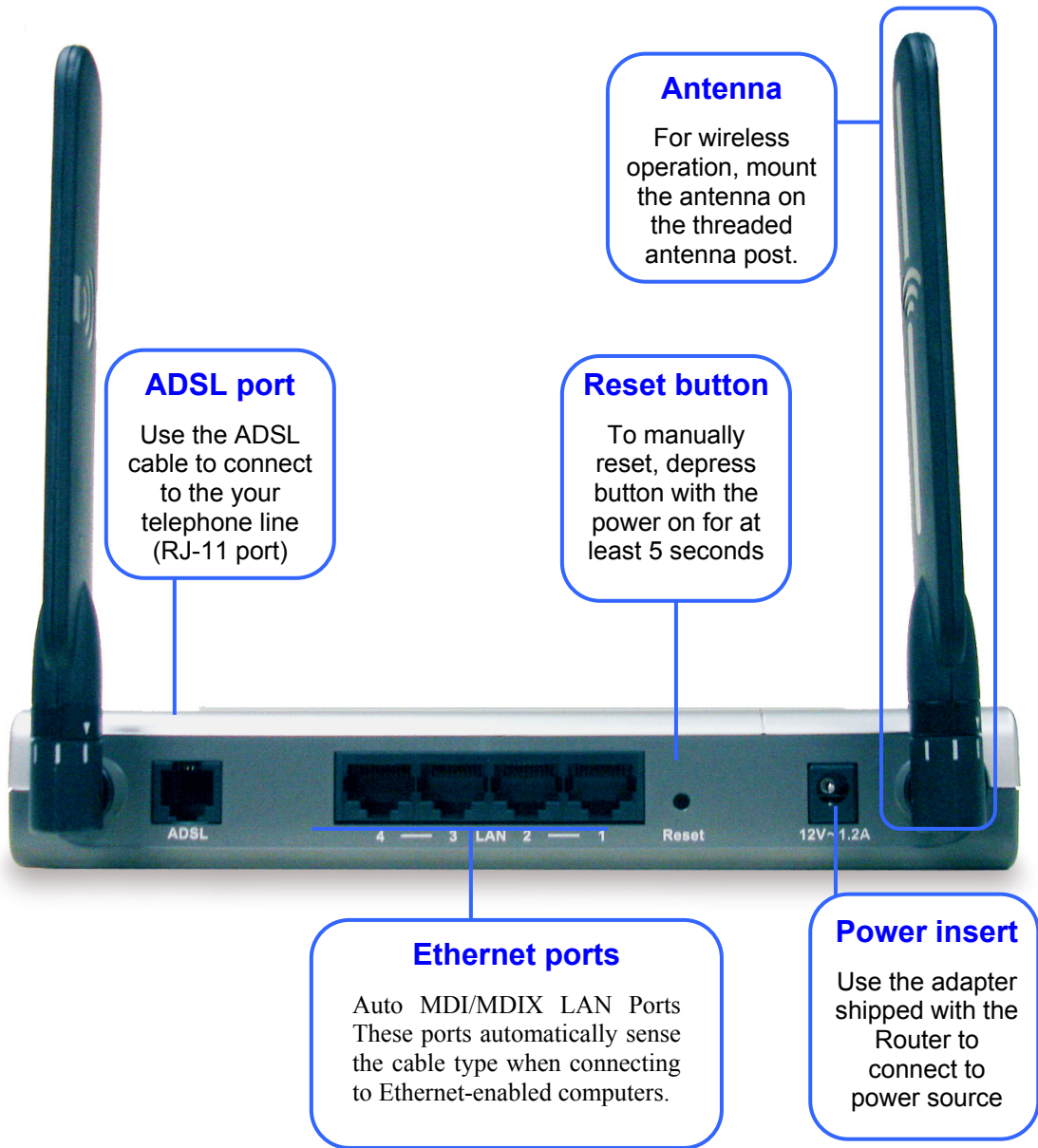
The LED indicators on the front panel include the **Power**, **Status**, **ADSL** and **WLAN** and **Ethernet (1-4) Link/Act** indicators. The ADSL, WLAN and Ethernet indicators monitor link status and activity (Link/Act).



Power	Steady green light indicates the unit is powered on. When the device is powered off this remains dark.
Status	Lights steady green during power on self-test (POST). Once the connection status has been settled, the light will blink steadily green. If the indicator lights steady green after the POST, the system has failed and the device should be rebooted.
ADSL (Link/Act)	Steady green light indicates a valid ADSL connection. This will light after the ADSL negotiation process has been settled. A blinking green light indicates activity on the WAN (ADSL) interface.
WLAN (Link/Act)	Steady green light indicates a wireless connection. A blinking green light indicates activity on the WLAN interface.
Ethernet (Link/Act) 1 - 4	A solid green light indicates a valid link on startup. This light will blink when there is activity currently on the Ethernet ports.

Rear Panel Connections

All cable connections to the Router are made at the rear panel. Connect the power adapter here to power on the Router. Use the Reset button to restore the settings to the factory default values in the next chapter for instructions on using the reset button).



Note

To manually reboot the Router, disconnect wait 10 seconds and then reconnect the power.

Wireless LAN Basics

Some basic understanding of 802.11b/g wireless technology and terminology is useful when you are setting up the Router or any wireless access point. If you are not familiar with wireless networks please take a few minutes to learn the basics.

Radio Transmission

Wireless LAN or WLAN devices use electromagnetic waves within a broad, unlicensed range of the radio spectrum to transmit and receive radio signals. When a wireless access point is present, it becomes a base station for the WLAN nodes in its broadcast range. WLAN nodes transmit digital data using FM (frequency modulation) radio signals. WLAN devices generate a carrier wave and modulate this signal using various techniques. Digital data is superimposed onto the carrier signal. This radio signal carries data to WLAN devices within range of the transmitting device. The antennae of WLAN devices listen for and receive the signal. The signal is demodulated and the transmitted data extracted. The transmission method used by the access point is called Direct Sequence Spread Spectrum (DSSS) and operates in a range of the radio spectrum between 2.4GHz and 2.5GHz for transmission. See the technical specifications for more details on wireless operation.

Range

Range should not be a problem in most homes or small offices. If you experience low or no signal strength in some areas, consider positioning the Router in a location between the WLAN devices that maintains a roughly equal straight-line distance to all devices that need to access the Router through the wireless interface. Adding more 802.11g access points to rooms where the signal is weak can improve signal strength. Read the section about placement of the Router titled Location in the next chapter, Hardware Installation, for more information.

SSID

Wireless networks use an SSID (Service Set Identifier) to allow wireless devices to roam within the range of the network. Wireless devices that wish to communicate with each other must use the same SSID. Several access points can be set up using the same SSID so that wireless stations can move from one location to another without losing connection to the wireless network.

The DSL-G624M operates in *Infrastructure* mode. It controls network access on the wireless interface in its broadcast area. It will allow access to the wireless network to devices using the correct SSID after a negotiation process takes place. By default the DSL-G624M broadcasts its SSID so that any wireless station in range can learn the SSID and ask permission to associate with it. Many wireless adapters are able to survey or scan the wireless environment for access points. An access point in Infrastructure mode allows wireless devices to survey that network and select an access point with which to associate. You may disable SSID broadcasting in the web manager's wireless menu.

Wireless Security

Various security options are available on the DSL-G624M including open or WEP and WPA (including WPA-PSK). Authentication may use an open system or a shared key. For details on these methods and how to use them, please read the wireless LAN configuration information in chapters 3 (Basic Router Configuration) and 4 (Advanced Router Configuration) below.

About 802.11g Wireless

Today's 54-megabits-per-second 802.11g wireless networks are fine for broadband Internet access (which typically tops out at about 1 mbps) but rather slow for large internal file transfers or streaming video. However, 54-mbps, corporate-oriented 802.11a is expensive--and because its radio uses the 5-GHz band and 802.11b uses the 2.4-GHz band, upgrading to an 802.11a network means either scrapping 802.11b gear or buying even-pricier hardware that can support both standards.

But 802.11g and D-Link's Wireless 108G MIMO promises better speed than standard 802.11g and the ability to coexist with 802.11g equipment on one network, since it too uses the 2.4-GHz band.

802.11g is an extension to 802.11b, the basis of many wireless LANs in existence today. 802.11g will broaden 802.11b's data rates to 54 Mbps within the 2.4 GHz band using OFDM (orthogonal frequency division multiplexing) technology. Because of backward compatibility, an 802.11b radio card will interface directly with an 802.11g access point (and vice versa) at 11 Mbps or lower depending on range. You should be able to upgrade the newer 802.11b access points to be 802.11g compliant via relatively easy firmware upgrades.

Similar to 802.11b, 802.11g operates in the 2.4GHz band, and the transmitted signal uses approximately 30MHz, which is one third of the band. This limits the number of non-overlapping 802.11g access points to three, which is the same as 802.11b.

Hardware Installation

The DSL-G624M maintains three separate interfaces, an Ethernet LAN, a wireless LAN and an ADSL (WAN) interface. Place the Router in a location where it can be connected to the various devices as well as to a power source. The Router should not be located where it will be exposed to moisture or excessive heat. Make sure the cables and power cord are placed safely out of the way so they do not create a tripping hazard. As with any electrical appliance, observe common sense safety procedures.

The Router can be placed on a shelf or desktop, ideally you should be able to see the LED indicators on the front if you need to view them for troubleshooting.

Choosing the Best Location for Wireless Operation

Many environmental factors can affect the effective wireless function of the DSL-G624M. If this is your first time setting up a wireless network device, read and consider the points listed below.

The access point can be placed on a shelf or desktop, ideally you should be able to see the LED indicators on the front if you need to view them for troubleshooting.

Designed to go up to 100 meters indoors and up to 300 meters outdoors, Wireless LAN lets you access your network from anywhere you want. However, the number of walls, ceilings, or other objects that the wireless signals must pass through can limit signal range. Typical ranges vary depending on the types of materials and background RF noise in your home or business. For optimum range and signal strength, use these basic guidelines:

1. **Minimize the number of walls and ceilings between access points and clients:**
The signal emitted from Wireless LAN devices can penetrate through ceilings and walls. However, each wall or ceiling can reduce the range of Wireless LAN devices from 1 to 30M. Position your wireless devices so that the number of walls or ceilings obstructing the signal path is minimized.
2. **Consider the direct line between access points and workstations:** A wall that is 0.5 meters thick, at a 45-degree angle appears to be almost 1 meter thick. At a 2-degree angle, it is over 14 meters thick. Be careful to position access points and client adapters so the signal can travel straight through (90° angle) a wall or ceiling for better reception.
3. **Building Materials make a difference:** Buildings constructed using metal framing or doors can reduce effective range of the device. If possible, position wireless devices so that their signal can pass through drywall or open doorways, avoid positioning them so that their signal must pass through metallic materials. Poured concrete walls are reinforced with steel while cinderblock walls generally have little or no structural steel.
4. **Position the antennas for best reception.** Play around with the antenna position to see if signal strength improves. Some adapters or access points allow the user to judge the strength of the signal.
5. **Keep your product away (at least 1-2 meters) from electrical devices:**
Position wireless devices away from electrical devices that generate RF noise such as microwave ovens, monitors, electric motors, etc.

Power on Router



CAUTION: The Router must be used with the power adapter included with the device.

To power on the Router:

1. Insert the AC Power Adapter cord into the power receptacle located on the rear panel of the Router and plug the adapter into a suitable nearby power source.
2. You should see the Power LED indicator light up and remain lit. The Status LED should light solid green and begin to blink after a few seconds.
3. If the Ethernet port is connected to a working device, check the Ethernet Link/Act LED indicators to make sure the connection is valid. The Router will attempt to establish the ADSL connection, if the ADSL line is connected and the Router is properly configured this should light up after several seconds. If this is the first time installing the device, some settings may need to be changed before the Router can establish a connection.

Factory Reset Button

The Router may be reset to the original factory default settings by depressing the reset button for a few (5) seconds while the device is powered on. Use a ballpoint or paperclip to gently push down the reset button. Remember that this will wipe out any settings stored in flash memory including user account information and LAN IP settings. The device settings will be restored to the factory default IP address 192.168.1.1 and the subnet mask is 255.255.255.0, the default management Username is **admin** and the default Password is **admin**.

Wired Network Connections

Wired network connections are provided through the ADSL port and the four Ethernet ports on the back of the Router. See the Rear Panel diagram above and the illustrations below for examples.

Connect ADSL Line

Use the ADSL cable included with the Router to connect it to a telephone wall socket or receptacle. Plug one end of the cable into the ADSL port (RJ-11 receptacle) on the rear panel of the Router and insert the other end into the RJ-11 wall socket. If you are using a Microfilter or low pass filter device, follow the instructions included with the device or given to you by your service provider. The ADSL connection represents the WAN interface, the connection to the Internet. It is the physical link to the service provider's network backbone and ultimately to the Internet.

Connect Router to Ethernet

The Router may be connected to a single computer or Ethernet device through the 10/100 BASE-TX Ethernet port on the rear panel. Any connection to an Ethernet concentrating device such as a switch or hub must operate at a speed of 10/100 Mbps only. When connecting the Router to any Ethernet device that is capable of operating at speeds between 0~100Mbps, be sure that the device has auto-negotiation (NWay) enabled for the connecting port.

Use standard twisted-pair cable with RJ-45 connectors. The RJ-45 port on the Router is a crossed port (MDI-X). Follow standard Ethernet guidelines when deciding what type of cable to use to make this connection. When connecting the Router directly to a PC or server use a normal straight-through cable. You should use a crossed cable when connecting the Router to a normal (MDI-X) port on a switch or hub. Use a normal straight-through cable when connecting it to an uplink (MDI-II) port on a hub or switch.

The rules governing Ethernet cable lengths apply to the LAN to Router connection. Be sure that the cable connecting the LAN to the Router does not exceed 100 meters.

Basic Router Configuration

The first time you setup the Router it is recommended that you configure the WAN connection using a single computer making sure that both the computer and the Router are not connected to the LAN. Once the WAN connection is functioning properly, you may continue to make changes to Router configuration including IP settings and DHCP setup. This chapter is concerned mainly with using your computer to configure the WAN connection. Instructions are also provided for basic Wireless LAN configuration. The following chapter describes how to set up the advanced features of the Router.

Configuration Summary

1. **Connect to the Router** To configure various settings used by the Router for Internet and Wireless LAN access it is first necessary to access the Router's management HTML-based interface. This is done using an ordinary web browser. Your computer must be able to "see" the Router before it can manage it using a browser. If the Router is in the same "neighborhood" or subnet as the Router, you should be able to access the management software. Therefore you must first make sure your computer has IP settings that place it in the same subnet as the Router. The easiest way to make sure your computer has the correct IP settings is to configure it to use the DHCP server in the Router. The DHCP server will automatically enable your computer to use a browser to manage the Router. The next section describes how to change the IP configuration for a computer running a Windows operating system to be a DHCP client. If you are running another operating system, make sure your computer is configured as a DHCP client so it can automatically obtain IP settings from the Router. Some operating systems will automatically select the best IP settings. Consult the user manual for the operating system (OS) if you are unsure.
2. **Configure the Internet (WAN) Connection** Most users will be able to complete this process using the **Setup Wizard**. The Setup Wizard can be launched once you have successfully connected with the Router's management software. There are different methods used to establish the WAN connection to the service provider's network and ultimately to the Internet. Your Router may already have most of the settings configured by default. However you will probably at least have to type in a user name and password given to you by your ISP. You may also need to know the encapsulation and connection type required to use for your ADSL service. Your service provider should provide all the information needed to configure the WAN connection.
3. **Configure the Wireless Connection** Use the Wireless Settings menu to configure the SSID, Channel and Security settings for your 802.11g wireless LAN.

Configuring IP Settings on Your Computer

In order to configure your system to receive IP settings from the Router it must first have the TCP/IP protocol installed. If you have an Ethernet port on your computer, it probably already has TCP/IP protocol installed. If you are using Windows XP the TCP/IP is enabled by default for standard installations. Below is an illustrated example of how to configure a Windows XP system to automatically obtain IP settings from the Router. Following this example is a step-by-step description of the procedures used on the other Windows operating systems to first check if the TCP/IP protocol has been installed; if it is not, instructions are provided for installing it. Once the protocol has been installed you can configure the system to receive IP settings from the Router.

For computers running non-Windows operating systems, follow the instructions for your OS that configure the system to receive an IP address from the Router, that is, configure the system to be a DHCP client.

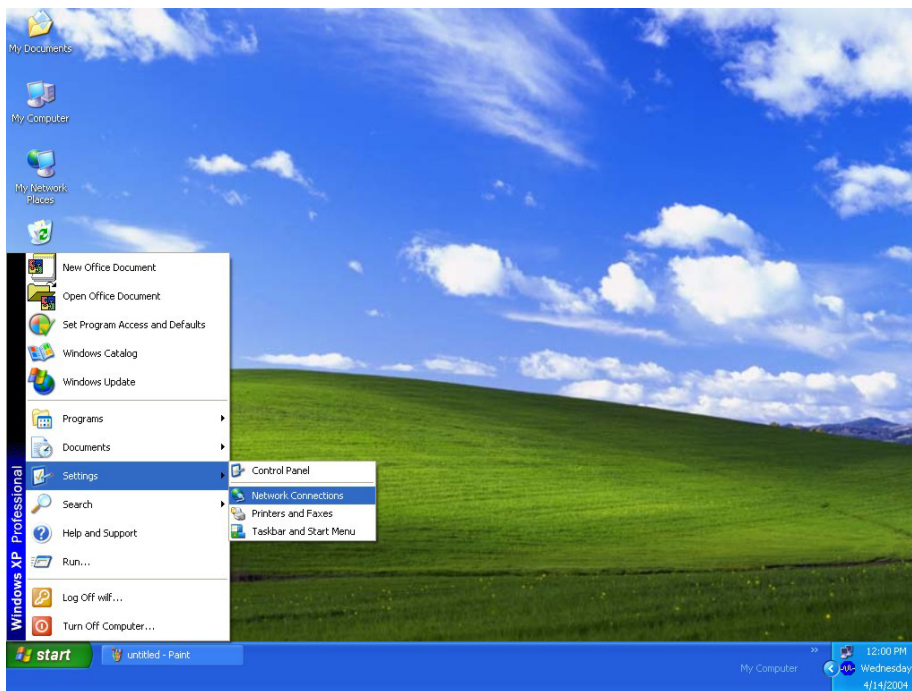


If you are using this Router to provide Internet access for more than one computer, you can use these instructions later to change the IP settings for the other computers. However, you cannot use the same IP address since every computer must have its own IP address that is unique on the local network.

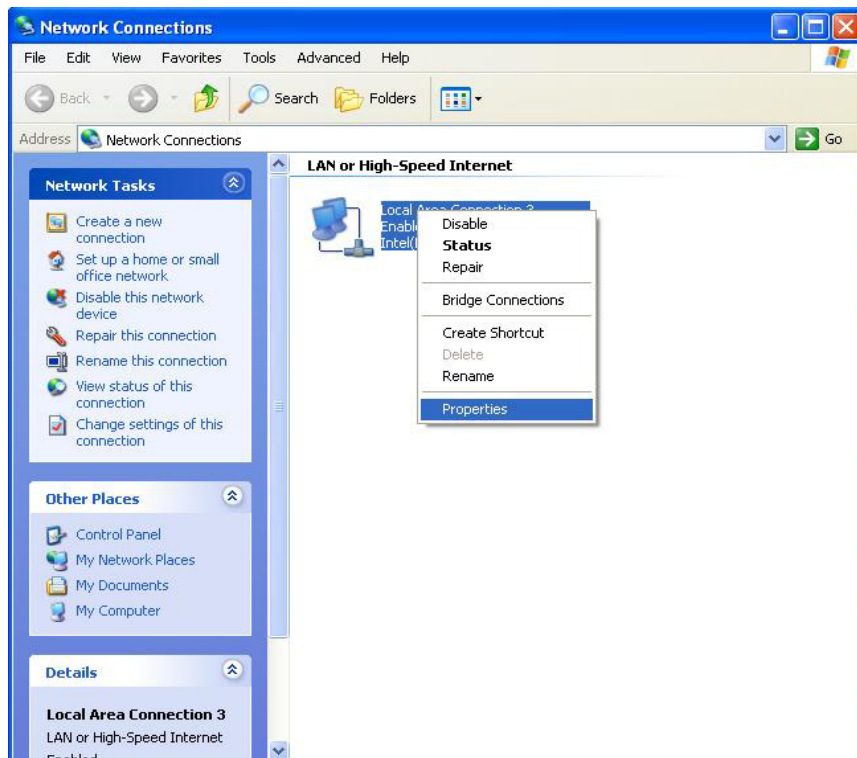
Configure Windows XP for DHCP

Use the following steps to configure a computer running Windows XP to be a DHCP client.

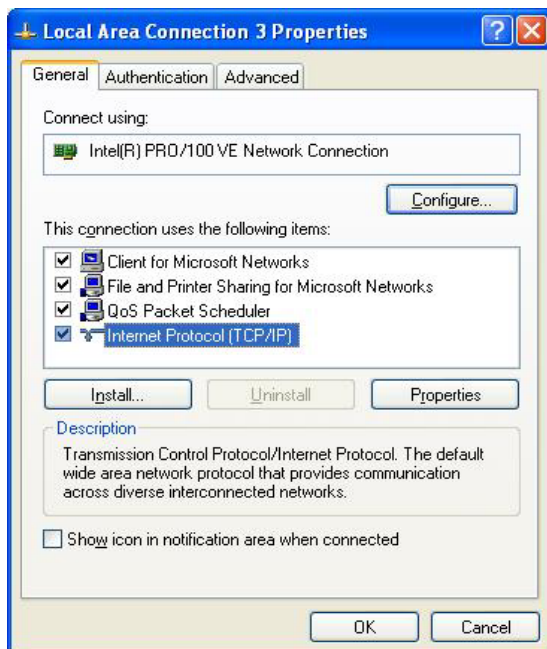
1. From the **Start** menu on your desktop, go to **Settings**, then click on **Network Connections**.



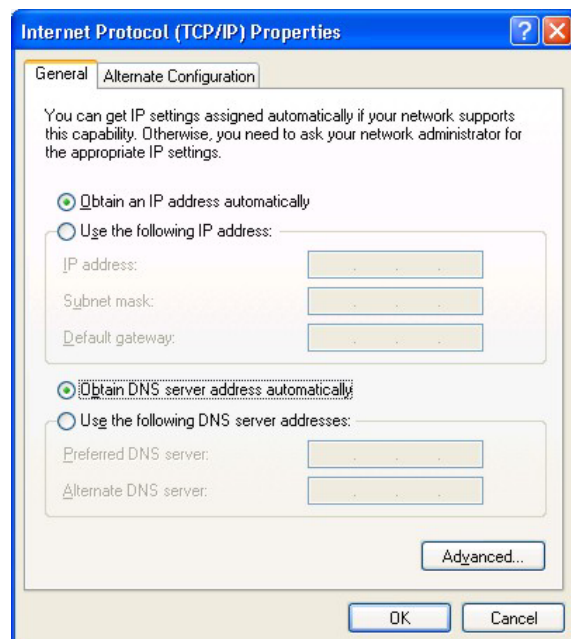
2. In the **Network Connections** window, right-click on **LAN (Local Area Connection)**, then click **Properties**.



3. In the **General** tab of the **Local Area Connection Properties** menu, highlight **Internet Protocol (TCP/IP)** under “This connection uses the following items:” by clicking on it once. Click on the **Properties** button.



4. Select “Obtain an IP address automatically” by clicking once in the circle. Click the **OK** button. Your computer is now ready to use the Router’s DHCP server.



Windows 2000

First, check for the IP protocol and, if necessary, install it:

1. In the **Windows** task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Network and Dial-up Connections** icon.
3. In the **Network and Dial-up Connections** window, right-click the **Local Area Connection** icon, and then select **Properties**.
4. The **Local Area Connection Properties** dialog box displays with a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled, skip ahead to *Configure Windows 2000 for DHCP*.
5. If Internet Protocol (TCP/IP) does not display as an installed component, click **Install**.
6. In the **Select Network Component Type** dialog box, select **Protocol**, and then click **Add**.
7. Select **Internet Protocol (TCP/IP)** in the Network Protocols list, and then click **OK**.
8. You may be prompted to install files from your Windows 2000 installation CD or other media. Follow the instructions to install the files.
9. If prompted, click **OK** to restart your computer with the new settings.

Configure Windows 2000 for DHCP

1. In the Control Panel, double-click the **Network and Dial-up Connections** icon.
2. In **Network and Dial-up Connections** window, right-click the **Local Area Connection** icon, and then select **Properties**.
3. In the **Local Area Connection Properties** dialog box, select **Internet Protocol (TCP/IP)**, and then click **Properties**.
4. In the **Internet Protocol (TCP/IP) Properties** dialog box, click the button labeled **Obtain an IP address automatically**.
5. Double-click **OK** to confirm and save your changes, and then close the Control Panel.

Your computer is now ready to use the Router's DHCP server.

Windows 95 and Windows 98

First, check for the IP protocol and, if necessary, install it:

1. In the **Windows** task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**. Double-click the **Network** icon.
2. The **Network** dialog box displays with a list of currently installed network components. If the list includes TCP/IP, and then the protocol has already been enabled, skip to *Configure IP Information Windows 95, 98*.
3. If TCP/IP does not display as an installed component, click **Add**. The **Select Network Component Type** dialog box displays.
4. Select **Protocol**, and then click **Add**. The **Select Network Protocol** dialog box displays.
5. Click on **Microsoft** in the Manufacturers list box, and then click **TCP/IP** in the Network Protocols list box.
6. Click **OK** to return to the Network dialog box, and then click **OK** again. You may be prompted to install files from your Windows 95/98 installation CD. Follow the instructions to install the files.
7. Click **OK** to restart the PC and complete the TCP/IP installation.

Configure Windows 95 and Windows 98 for DHCP

1. Open the **Control Panel** window, and then click the **Network** icon.
2. Select the network component labeled TCP/IP, and then click **Properties**.
3. If you have multiple TCP/IP listings, select the listing associated with your network card or adapter.
4. In the **TCP/IP Properties** dialog box, click the **IP Address** tab.
5. Click the **Obtain an IP address automatically** option.

6. Double-click **OK** to confirm and save your changes. You will be prompted to restart Windows.
7. Click **Yes**.

When it has restarted, your computer is ready to use the Router's DHCP server.

Windows Me

First, check for the IP protocol and, if necessary, install it:

1. In the **Windows** task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Network and Dial-up Connections** icon.
3. In the **Network and Dial-up Connections** window, right-click the **Network** icon, and then select **Properties**.
4. The **Network Properties** dialog box displays with a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled. Skip ahead to *Configure Windows ME for DHCP*.
5. If Internet Protocol (TCP/IP) does not display as an installed component, click **Add**.
6. In the **Select Network Component Type** dialog box, select **Protocol**, and then click **Add**.
7. Select **Microsoft** in the Manufacturers box.
8. Select **Internet Protocol (TCP/IP)** in the Network Protocols list, and then click **OK**.
9. You may be prompted to install files from your Windows Me installation CD or other media. Follow the instructions to install the files.
10. If prompted, click **OK** to restart your computer with the new settings.

Configure Windows Me for DHCP

1. In the **Control Panel**, double-click the **Network and Dial-up Connections** icon.
2. In the **Network and Dial-up Connections** window, right-click the **Network** icon, and then select **Properties**.
3. In the **Network Properties** dialog box, select **TCP/IP**, and then click **Properties**.
4. In the **TCP/IP Settings** dialog box, click the **Obtain an IP address automatically** option.
5. Double-click **OK** twice to confirm and save your changes, and then close the Control Panel.

Your computer is now ready to use the Router's DHCP server.

Windows NT 4.0 Workstations

First, check for the IP protocol and, if necessary, install it:

1. In the **Windows NT** task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. In the **Control Panel** window, double-click the **Network** icon.
3. In the **Network** dialog box, click the **Protocols** tab.
4. The **Protocols** tab displays a list of currently installed network protocols. If the list includes TCP/IP, then the protocol has already been enabled. Skip to "Configure IP Information"
5. If TCP/IP does not display as an installed component, click **Add**.
6. In the **Select Network Protocol** dialog box, select **TCP/IP**, and then click **OK**. You may be prompted to install files from your Windows NT installation CD or other media. Follow the instructions to install the files.
7. After all files are installed, a window displays to inform you that a TCP/IP service called DHCP can be set up to dynamically assign IP information.
8. Click **Yes** to continue, and then click **OK** if prompted to restart your computer.

Configure Windows NT 4.0 for DHCP

1. Open the **Control Panel** window, and then double-click the **Network** icon.
2. In the **Network** dialog box, click the **Protocols** tab.
3. In the **Protocols** tab, select **TCP/IP**, and then click **Properties**.
4. In the **Microsoft TCP/IP Properties** dialog box, click the **Obtain an IP address automatically** option.

- Click **OK** twice to confirm and save your changes, and then close the Control Panel.

Your computer is now ready to use the Router's DHCP server.

Access the Configuration Manager

Now that your computer's IP settings allow it to communicate with the Router, you can access the configuration software.



Note

Be sure that the web browser on your computer is not configured to use a proxy server in the Internet settings. In Windows Internet Explorer, you can check if a proxy server is enabled using the following procedure:

- In Windows, click on the **Start** button, go to **Settings** and choose **Control Panel**.
- In the **Control Panel** window, double-click on the **Internet Options** icon.
- Click the **Connections** tab and click on the **LAN Settings** button.
- Verify that the "Use proxy server" option is NOT checked. If it is checked, click in the checked box to deselect the option and click OK.

*Alternatively, you can access this **Internet Options** menu using the **Tools** pull-down menu in Internet Explorer.*

Login to Home Page

To use the web-based management software, launch a suitable web browser and direct it to the IP address of the Router. Type in **http://** followed by the default IP address, **192.168.1.1** in the address bar of the browser. The URL in the address bar should read: **http://192.168.1.1**.

A dialog box prompts for the User Name and Password. Type in the default User Name **admin** and default Password **admin** and click the **OK** button to access the web-based manager.



Enter Password

You should change the web-based manager access user name and password once you have verified that a connection can be established. The user name and password allows any PC within the same subnet as the Router to access the web-based manager.

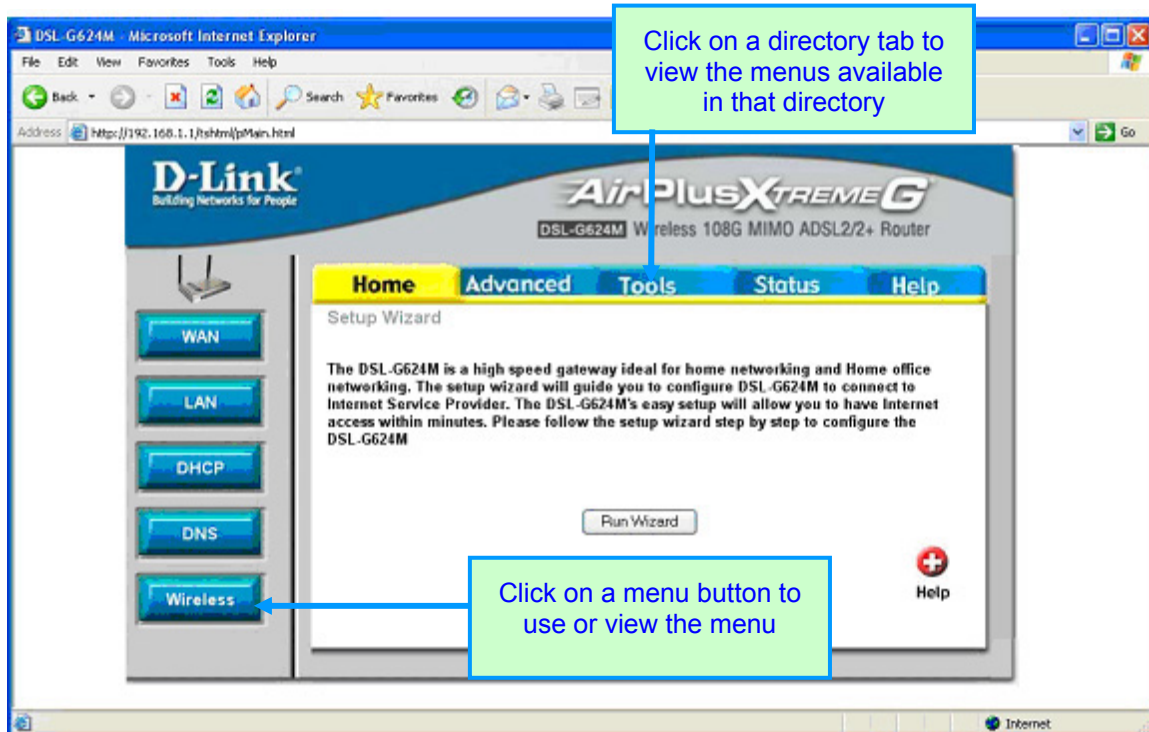


Note

The user name and password used to access the web-based manager is NOT the same as the ADSL account user name and password needed for PPPoA/PPPoE connections to access the Internet.

Configure the Router

When you successfully connect to the web manager, the **Home** directory tab will display the **Setup Wizard** menu. You can launch the Setup Wizard from this page or use the menu buttons located in the left panel of the web page to view other menus used for basic configuration.



Web Manager – First Time Log On

All configuration and management of the Router is done using the web-based management interface pictured in the above example. The various menus are accessed by clicking on one of the directory tabs, **Home**, **Advanced**, **Tools**, **Status** and **Help**.

Each tab displays menu buttons located in the left hand panel of the web interface. Basic setup of the Router can be completed in the menus accessed from the Home directory. The menus accessed from the Home directory include the following: **Setup Wizard**, **Wireless** Settings used to configure the 802.11g wireless access point, **WAN** Settings used to configure the Internet connection, **LAN** Settings used to configure the **Management IP** address for the Router, **DHCP** Settings for automatic assignment of IP addresses used by workstations or servers on your LAN, and the **DNS** Configuration menu used for setting up DNS relay.

Home

This tab in the Web Manager will allow the user to set up various configurations in order to connect your Router to the Internet. Much of the information necessary in these screens must be supplied to you by your ISP. Remember to use the key words in bold when asking your ISP for information. This will make your ISP's job easier and therefore your configuration of the modem, much simpler and quicker. Screens to configure under the **Home** tab include **Wizard**, **Wireless**, **WAN**, **LAN**, **DHCP**, **DNS** and **Dynamic DNS**.

Wireless LAN Setup

The two essential settings for wireless LAN operation are the SSID and Channel Number. The SSID (Service Set Identifier) is used to identify a group of wireless LAN components. Use the Wireless Settings menu to configure these basic settings. Wireless security using encryption (WEP) or access limitation (WPA-PSK) are also configured with the Wireless Settings menu. Read more below about setting up security for your wireless LAN.

D-Link
Building Networks for People

AirPlus Xtreme G
DSL-G624M Wireless 108G MIMO ADSL2/2+ Router

Home Advanced Tools Status Help

Wireless LAN Settings
These are the wireless settings for the AP (Access Point) Portion.

Wireless Radio ☒ Enabled ☐ Disabled

SSID

Channel

SSID Hidden ☐ Enabled ☒ Disabled

SuperG Mode

Security ☒ None ☐ WEP ☐ WPA-PSK

☒ Apply ☐ Cancel ☐ Help

Wireless Settings menu

Configure Basic Wireless Settings

Follow the instructions below to change basic wireless settings.

1. **To disable the Wireless Radio:** click **Disabled** beside the **Wireless Radio** field and click the **Apply** button. This will immediately disable the wireless access point, it is not necessary to restart the access point to make this change.
2. **If the Wireless Radio has been disabled:** click the **Enabled** beside the **Wireless Radio** field and click the **Apply** button. It is not necessary to restart the access point unless you have also changed the channel or SSID.
3. The **SSID** can be changed to suit your wireless network. Remember that any wireless device using the access point must have the same SSID and use the same wireless channel number. The SSID can be a continuous character string (i.e. no spaces) of up to 16 characters in length. To disable SSID sharing (SSID broadcast), click to select **Enabled** beside the **SSID Hidden** field. Click the **Apply** button to save any change to the SSID. A hidden SSID makes it more difficult for wireless clients to join or leave the SSID as they must have the identical SSID manually entered to be able to join your wireless LAN.
4. The **Channel** drop-down menu may be changed to channels that are available in your region 1-13 in Europe. Channels available for wireless LAN communication are subject to regional and national regulation. Click the **Apply** button to save any change to the Channel. D-Link recommend that you select a channel that is not in use. By of factory default Channel 6 is used . If you find it is already being used in your neighborhood we would suggest either channel 1 or 13 as the are the next non-overlapping channels.

Note in Super G Mode you will not be able to select a channel, the 2XR MIMO technology will select the best channel.

5. **Super G mode** – please choose the wireless mode you wish to transmit and receive at.

802.11b Only mode – Use this mode if you only have 11b devices.

802.11g Only Mode - Use this mode if you only have 11g devices.

SuperG With Dynamic Turbo – Super G, D-Link 108G* High performance mode, 2XR functions are enabled. The transmitter will increase the signal if other devices are not broadcasting a same time on the same channel. Use this mode in areas where there is a higher Wireless network density to maintain maximum performance.

Capable of Packet Bursting, FastFrames, Compression, and Dynamic Turbo. This setting is backwards compatible with non-Turbo (legacy) devices. Dynamic Turbo mode is only enabled when all nodes on the wireless network is Super G with Dynamic Turbo enabled.

SuperG With Static Turbo – Super G, D-Link 108G* High performance MIMO mode, all 2XR functions are enabled. The transmitter will send a signal over the frequencies for wireless networks to achieve maximum performance for your network. Use this mode only in areas where there is a low Wireless network density to achieve optimum performance.

Capable of Packet Bursting, FastFrames, Compression, and Static Turbo. This setting is not backwards compatible with non-Turbo (legacy) devices. Static turbo mode is always on and is only enabled when all nodes on the wireless network is Super G with Static Turbo enabled.

B and G Compatible - Use this mode if you only have 11b and 11g device in use at the same time.

* 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

6. Make sure you save the new wireless settings. Use the System Settings menu to save the new settings.

The Origins of MIMO

MIMO concepts have been under development for many years for both wireless and wireline systems.

One of the earliest **MIMO** to wireless communications applications came in 1984 with groundbreaking developments by Jack Winters of Bell Laboratories. This **MIMO** pioneer described ways to send data from multiple users on the same frequency/time channel using multiple antennas at the transmitter and receiver. Since then, several academics and engineers have made significant contributions in the field of **MIMO**.

Wireless Security

The wireless LAN interface of the DSL-G624M has various security features used to limit access to the device or to encrypt data and shared information. The available standardized security for wireless LAN includes WEP and WPA. Wireless security is configured with the **Wireless Settings** menu located in the **Home** directory.



Note

Before enabling any security function for wireless operation, it is recommended to be sure the access point is working effectively. If possible, test the wireless interface to be sure stations are able to associate with the DSL-G624M before changing security settings. When you have successfully tested the AP, change the wireless security settings on the DSL-G624M before making the changes to clients.

Security Options for your Wireless LAN

In the **Wireless** settings menu, select the type of security you want to configure. The menu will change to present the settings specific to the method being configured. The Router's wireless security options include three levels of **WEP** encryption and **WPA-PSK** for WPA with a user configured Pre Shared Key (PSK).

The screenshot shows the D-Link configuration interface for the DSL-G624M router. The top navigation bar includes tabs for Home, Advanced, Tools, Status, and Help. The left sidebar contains buttons for WAN, LAN, DHCP, DNS, and Wireless. The main content area is titled "Wireless LAN Settings" and includes a sub-header "These are the wireless settings for the AP (Access Point) Portion." The settings are as follows:

Setting	Value
Wireless Radio	☒ Enabled ☐ Disabled
SSID	D-Link
Channel	6
SSID Hidden	☐ Enabled ☒ Disabled
SuperG Mode	SuperG with Static Turbo
Security	☐ None ☒ WEP ☐ WPA-PSK
WEP	128bit ASCII
WEP Key 1	☒ []
WEP Key 2	☐ []
WEP Key 3	☐ []
WEP Key 4	☐ []

At the bottom right, there are three buttons: Apply (green checkmark), Cancel (orange X), and Help (red plus).

Configure WEP Wireless Security

WEP Encryption

WEP (Wireless Encryption Protocol or Wired Equivalent Privacy) encryption can be enabled for security and privacy. WEP encrypts the data portion of each frame transmitted from the wireless adapter using one of the predefined keys. Decryption of the data contained in each packet can only be done if the both the receiver and transmitter have the same key.

WEP is disabled by default. To enable **WEP**, select the **WEP** option. Configure the Encryption Keys as desired and click the **Apply** button. The encryption key setup is described below.

WEP can use open or shared keys, or may be configured to allow the clients to use either type of key. Use the **WEP** or **WPA-PSK** click-boxes beside the **WEP Method** field to select the method.

- Select **None** to allow any wireless station to associate with each other through the access point. Wireless devices will be able to communicate with all devices on a network unless they require the a Shared key.
- Select **WEP** to only allow stations using a shared key encryption to associate with each other through the access point. That is, only devices with the same key are allowed to communicate over a network with devices that share the same key. Shared key requires additional configuration of the keys to be used. Follow the instructions below to configure the Shared Keys.
- Select **WPA-PSK** if you want to allow Wireless clients to specify using a pre-shared key.

Setup Encryption Keys

WEP Keys may be configured using **Hex** or **ASCII** characters. In addition there are three levels of encryption available, each level requires a different number of characters. Select **Hex** or **ASCII** from the **Key Type** drop-down menu. Hex or Hexadecimal digits are defined as the numerical digits 0 – 9 and the letters A – F (upper and lower case are recognized as the same digit). ASCII characters include numbers and letters but no spaces. An upper case ASCII character is NOT recognized as the same lower case character, and therefore must be configured exactly as typed for all wireless nodes using the access point. The length of the key depends on the level of encryption used.

Select the **Key Length** from the drop-down menu beside the **WEP** field. The available key lengths are 64, 128 or 152-bit encryption. In the spaces provided, type in **Key 1**, **Key 2**, **Key 3** and **Key 4**. The length of the character string used of the keys depends on the level (Key Length) of encryption selected. Only one key can be active at any one time. The active key is selected by clicking the radio button for the key you want to use as the first active key.

Click the **Apply** button when you have configured WEP as desired to put the changes into effect.

**Note**

Keep in mind that encryption, particularly at higher levels (i.e. 128-bit) can adversely affect throughput. If your network has very high volume wireless traffic you may want to consider adding more carrying capacity or decreasing the level of encryption.

Configure WPA-PSK Settings

WPA security for wireless communication has been developed to overcome some of the shortcomings of WEP. WPA uses an improved encryption method combined with simpler authentication procedure.

WPA-PSK requires a shared key but does not use a separate server for authentication. PSK keys can be ASCII or Hex type.

The screenshot shows the D-Link configuration interface for the DSL-G624M router. The top navigation bar includes 'Home', 'Advanced', 'Tools', 'Status', and 'Help'. The left sidebar contains buttons for 'WAN', 'LAN', 'DHCP', 'DNS', and 'Wireless'. The main content area is titled 'Wireless LAN Settings' and contains the following fields:

- Wireless Radio:** ☒ Enabled ☐ Disabled
- SSID:** Text box containing 'D-Link'
- Channel:** Dropdown menu showing '6'
- SSID Hidden:** ☐ Enabled ☒ Disabled
- SuperG Mode:** Dropdown menu showing '802.11B'
- Security:** ☐ None ☐ WEP ☒ WPA-PSK
- Cipher:** Dropdown menu showing 'PSK:TKIP'
- WPA-PSK Key:** Password field with 25 dots

At the bottom right of the settings area are three buttons: 'Apply' (green checkmark), 'Cancel' (orange X), and 'Help' (red plus).

Configure WPA-PSK Security for WLAN

To use WPA with a PSK key:

1. Select the **PSK:TKIP** or **PSK:AES** (ASCII key of between 8 to 63 characters) option.
2. Type in the key in the appropriate **WPA-PSK Key** entry field.
3. Click the **Apply** button to put the changes into effect. Remember to save the settings using the System Settings menu.

Configure the WAN Connection

To configure the Router's basic configuration settings without running the Setup Wizard, you can access the menus used to configure WAN, LAN, DHCP and DNS settings directly from the **Home** directory. To access the WAN Settings menu, click on the **WAN** link button on the left side of the first window that appears when you successfully access the web manager.

The screenshot shows the D-Link AirPlus Xtreme G web interface. The left sidebar contains buttons for WAN, LAN, DHCP, DNS, and Wireless. The main content area is titled 'WAN Setting' and includes a tabbed menu with 'Home', 'Advanced', 'Tools', 'Status', and 'Help'. The 'Home' tab is active. The settings are as follows:

- PVC Number: PVC-0 (dropdown)
- Wan Type: ☐ RFC2684Bridged ☐ RFC2684Routed ☒ PPP
- Connection Type: ☒ PPPoA ☐ PPPoE
- VPI/VCI: 0 / 35
- Encap.: ☒ LLC ☐ VcMux
- PPP section (shaded):
 - User Name: [text box]
 - Password: [text box]
 - MTU: 1400
 - Use DNS: ☒ Enabled ☐ Disabled

At the bottom right are 'Apply' and 'Cancel' buttons with green and red checkmark icons respectively.

WAN Settings Menu – PPPoA

This screenshot is identical to the previous one, but the 'Connection Type' is set to PPPoE. The 'Wan Type' remains PPP, and the 'Encap.' remains LLC. The 'PPP' section settings (User Name, Password, MTU, Use DNS) are the same.

WAN Settings Menu – PPPoE

Select the connection type used for your account. The menu will display settings that are appropriate for the connection type you select. Follow the instruction below according to the type of connection you select in the WAN Settings menu.

PPPoE and PPPoA Connections for WAN

Follow the instructions below to configure the Router to use a PPPoA (For most United Kindgom Users) or PPPoE (For most mainland European Users) for the Internet connection. Make sure you have all the necessary information before you configure the WAN connection.

1. Select the **PPP** option under the **Wan Type** field and then choose the **PPPoE** or **PPPoA** option from the **Connection Type** field. PPPoE/PPPoA is selected by default if you are configuring the Router for the first time.
2. The **VPI/VCI** settings at the top of the menu should not be changed unless you have been instructed to change them. However, if you are instructed to change the **VPI** or **VCI** values, type in the values assigned for your account.
3. If you selected **PPPoA** as the connection type, you can choose **LLC** or **VcMux** as the encapsulation type by clicking the click-box beside the **Encap.** field – as instructed by your ISP.
4. Under the **PPP** heading, type the **User Name** and **Password** used for your ADSL account. A typical User Name will be in the form user1234@isp.co.uk, the Password may be assigned to you by your ISP or you may have selected it when you set up the account with your ISP.
5. The default valus of **MTU** (Maximum Transmission Unit) is 1400 Bytes for compatibility. If your ISP supports a higher value you can change it for better performance (Maximum useable value of 1500 Bytes). An incorrect **MTU** will cause your Internet browser to lose connection.
6. Most users will not need to change **Use DNS** settings Default Enabled.
7. When you are satisfied that all the WAN settings are configured correctly, click on the **Apply** button.

Dynamic IP Address Connection for WAN

A Dynamic IP Address connection configures the Router to automatically obtain its global IP address from a DHCP server on the ISP's network. The service provider assigns a global IP address from a pool of addresses available to the service provider. Typically the IP address assigned has a long lease time, so it will likely be the same address each time the Router requests an IP address.

To configure a Dynamic IP Address connection, perform the steps listed below. Some of the settings do not need to be changed the first time the device is set up, but can be changed later if you choose. See the table below for a description of all the settings available in this menu.

The screenshot shows the D-Link AirPlus Xtreme G DSL-G624M router's web interface. The 'WAN' button is selected in the left sidebar. The 'WAN Setting' section is active, showing the following configuration:

- PVC Number:** PVC-0
- Wan Type:** ☒ RFC2684Bridged, ☐ RFC2684Routed, ☐ PPP
- Connection Type:** ☐ Pure Bridged, ☐ Static IP, ☒ DHCP
- VPI/VCI:** 0 / 35
- Encap.:** ☒ LLC, ☐ VcMux

The 'Apply' button is highlighted with a green checkmark, and the 'Cancel' button is highlighted with a red X.

WAN Settings for Dynamic IP Address Connection

1. Choose the **RFC2684Bridged** option from the click-boxes beside the **WAN Type** field.
2. Under the **VPI/VCI** at the top of the menu should not be changed unless you have been instructed to change them. However, if you are instructed to change the **VPI** or **VCI** values, type in the values assigned for your account. Leave the **PVC Number** setting at the default (*Pcv0*) values for now. This can be used later if you are configuring multiple virtual circuits for your ADSL service.
3. Under the **Connection Type** field, you can choose from **Pure Bridged**, **Static IP**, or **DHCP** from the click-boxes. This defines both the connection type used for your ADSL service. These instructions are for the **DHCP** (Dynamic IP Address assignment from your ISP) option. The other options are discussed below. The menu will change entry fields to allow the entry of the necessary information based upon your selection.
4. In the **Encap.** field, you can choose **LLC** or **VcMux** as the encapsulation type by clicking the click-box beside the **Encap.** field – as instructed by your ISP..
5. When you are satisfied that all the WAN settings are configured correctly, click on the **Apply** button.

Bridged Connection for WAN

For Bridged connections it will be necessary for most users to install additional software on any computer that will connect to the Router for Internet access. The additional software is used for the purpose of identifying and verifying your account, and then granting Internet access to the computer requesting the connection. The connection software requires the user to enter the User Name and Password for the ISP account. This information is stored on the computer, not in the Router.

Follow the instructions below to configure a Bridged connection for the WAN interface.

To configure a Dynamic IP Address connection, perform the steps listed below. Some of the settings do not need to be changed the first time the device is set up, but can be changed later if you choose. See the table below for a description of all the settings available in this menu.

The screenshot shows the D-Link AirPlus Xtreme G DSL-G624M router's web interface. The 'WAN' tab is selected in the sidebar. The main configuration area is titled 'WAN Setting'. It includes the following fields and options:

- PVC Number:** A dropdown menu showing 'PVC-0'.
- Wan Type:** Radio buttons for 'RFC2684Bridged' (selected), 'RFC2684Routed', and 'PPP'.
- Connection Type:** Radio buttons for 'Pure Bridged' (selected), 'Static IP', and 'DHCP'.
- VPI/VCI:** Two input fields showing '0' and '35'.
- Encap.:** Radio buttons for 'LLC' (selected) and 'VcMux'.
- Buttons:** 'Apply' (with a green checkmark icon) and 'Cancel' (with a red X icon) buttons.

WAN Settings Menu – Bridge Mode

1. Choose the **RFC2684Bridged** option from the click-boxes beside the **WAN Type** field.
2. Under the **VPI/VCI** at the top of the menu should not be changed unless you have been instructed to change them. However, if you are instructed to change the **VPI** or **VCI** values, type in the values assigned for your account. Leave the **PVC Number** setting at the default (*Pcv0*) values for now. This can be used later if you are configuring multiple virtual circuits for your ADSL service.
3. Under the **Connection Type** field, you can choose from **Pure Bridged**, **Static IP**, or **DHCP** from the click-boxes. This defines both the connection type used for your ADSL service. These instructions are for the **Pure Bridged** option. The other options are discussed below. The menu will change entry fields to allow the entry of the necessary information based upon your selection.
4. In the **Encap.** field, you can choose **LLC** or **VcMux** as the encapsulation type by clicking the click-box beside the **Encap.** field – as instructed by your ISP.
5. When you are satisfied that all the WAN settings are configured correctly, click on the **Apply** button.

Static IP Address for Connection WAN

When the Router is configured to use Static IP Address assignment for the WAN connection, you must manually assign a global IP Address, Subnet Mask and Gateway IP Address used for the WAN connection. Most users will also need to configure DNS server IP settings in the DNS Settings configuration menu (see below). Follow the instruction below to configure the Router to use Static IP Address assignment for the WAN connection.

To configure a Dynamic IP Address connection, perform the steps listed below. Some of the settings do not need to be changed the first time the device is set up, but can be changed later if you choose. See the table below for a description of all the settings available in this menu.

WAN Settings -

Static IP

1. Choose the **RFC2684Bridged** option from the click-boxes beside the **WAN Type** field.
2. Under the **VPI/VCI** at the top of the menu should not be changed unless you have been instructed to change them. However, if you are instructed to change the **VPI** or **VCI** values, type in the values assigned for your account. Leave the **PVC Number** setting at the default (*Pvc0*) values for now. This can be used later if you are configuring multiple virtual circuits for your ADSL service.
3. Under the **Connection Type** field, you can choose from **Pure Bridged**, **Static IP**, or **DHCP** from the click-boxes. This defines both the connection type used for your ADSL service. These instructions are for the **Static IP** option. The other options are discussed below. The menu will change entry fields to allow the entry of the necessary information based upon your selection.
4. In the **Encap.** field, you can choose **LLC** or **VcMux** as the encapsulation type by clicking the click-box beside the **Encap.** field – as instructed by your ISP.
5. Change the **IP Address**, **Subnet Mask**, **Gateway Address** as instructed by your ISP. These are the global IP settings for the WAN interface. This is the “visible” IP address of your account. Your ISP should have provided these IP settings to you.
6. When you are satisfied that all the WAN settings are configured correctly, click on the **Apply** button.



Note

*The settings and menus for the **RFC2684Bridged – Static IP** and the **RFC2684Routed** connection types are identical. Follow the instructions above for both connection types.*

LAN IP Settings

You can configure the LAN IP address to suit your preference. Many users will find it convenient to use the default settings together with DHCP service to manage the IP settings for their private network. The IP address of the Router is the base address used for DHCP. In order to use the Router for DHCP on your LAN, the IP address pool used for DHCP must be compatible with the IP address of the Router. The IP addresses available in the DHCP IP address pool will change automatically if you change the IP address of the Router. See the next section for information on DHCP setup.

To access the **LAN Settings** menu, click the **LAN** button in the **Home** directory.

The screenshot displays the D-Link AirPlus Xtreme G DSL-G624M router's web interface. The top navigation bar includes 'Home', 'Advanced', 'Tools', 'Status', and 'Help'. The 'Home' tab is active, showing the 'LAN Settings' section. On the left sidebar, there are buttons for 'WAN', 'LAN' (highlighted), 'DHCP', 'DNS', and 'Wireless'. The main content area for 'LAN Settings' includes the text 'The IP address of the device.' followed by input fields for 'IP Address' (192.168.1.1), 'Subnet Mask' (255.255.255.0 (/24)), and 'Local Domain Name' (optional). At the bottom right of the settings area are three buttons: 'Apply' (with a green checkmark icon), 'Cancel' (with an orange X icon), and 'Help' (with a red plus icon).

Configure LAN IP settings

To change the **LAN IP Address** or **LAN Network Mask**, type in the desired values and click the **Apply** button. Your web browser should automatically be redirected to the new IP address. You will be asked to login again to the Router's web manager.

DHCP Server Settings for the LAN

The DHCP server is enabled by default for the Router's Ethernet LAN interface. DHCP service will supply IP settings to workstations configured to automatically obtain IP settings that are connected to the Router through the Ethernet port. When the Router is used for DHCP it becomes the default gateway for DHCP client connected to it. Keep in mind that if you change the IP address of the Router the range of IP addresses in the pool used for DHCP on the LAN will also be changed. The IP address pool can be up to 253 IP addresses.

To display the **DHCP Server** menu, click the **DHCP** button in the **Home** directory. Any active DHCP Clients appear listed in the **DHCP Client Table** below the configuration menu. The IP address and MAC address for active DHCP clients are displayed in the list.

To fix a static IP address to a specific device, use the Static IP Assignment menu. Read more about this feature below.

The two options for DHCP service are as follows:

- You may use the Router as a DHCP server for your LAN.
- You can disable DHCP service and manually configure IP settings for workstations.

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DSL-G624M Wireless 108G MIMO ADSL2/2+ Router

Home **Advanced** **Tools** **Status** **Help**

DHCP Server
The Device can be setup as a DHCP Server to distribute IP addresses to the LAN network.

DHCP Server ☒ Enabled ☐ Disabled
The DHCP server should be enabled. You will need to manually input IP's if you disable DHCP server.

Starting IP Address 192 . 168 . 1 . 2

Ending IP Address 192 . 168 . 1 . 33

Lease Time 1 week

DHCP Client Table

NOTE: After rebooting the device, DHCP Client informations will no longer exist.

Host Name	IP Address	MAC Address	Expired Time
berett	192.168.1.3	00:0c:6e:aa:b9:c0	9052 min(s)

Configure DHCP server settings for the LAN

You may also configure DNS settings for the LAN when using the Router in DHCP mode. In **Auto DNS Mode**, the Router will automatically relay DNS settings to properly configured DHCP clients. To manually enter DNS IP addresses, select the **Manual DNS Mode** option and type in a **Primary** and **Secondary DNS** IP Address in the field provided. The manually configured DNS settings will be supplied to clients that are configured to request them from the Router.

Follow the instructions below according to which of the above DHCP options you want to use. When you have configured the DHCP Settings as you want them, click the **Apply** button to commit the new settings. The new settings must be saved and the Router must be restarted for the settings to go into effect. To save the new settings and restart the Router, click on the **Tools** directory tab and then click the **System** menu button. Click the **Reboot** button under **Force the DSL-G624M to system restart**. The Router

will save the new DHCP settings and restart.

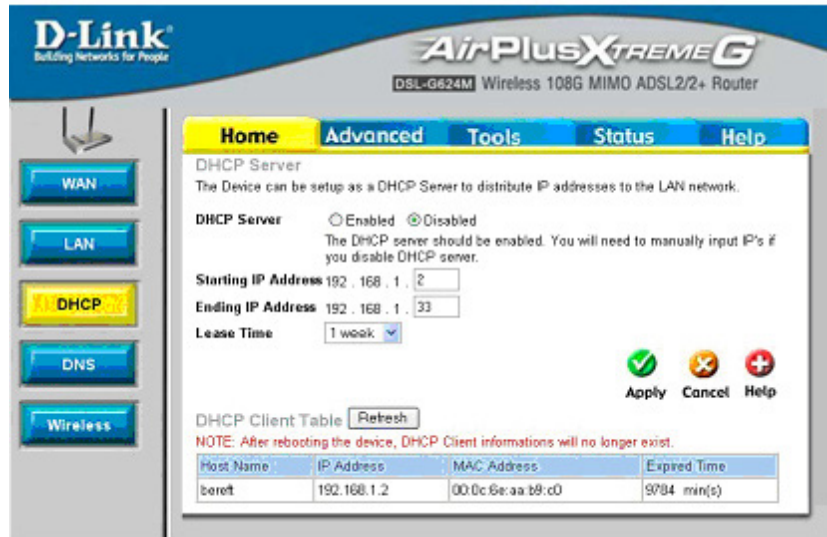
Use the Router for DHCP

To use the built-in DHCP server, click to select the **DHCP Server** option if it is not already selected. The IP Address Pool settings can be adjusted. The **Starting IP Address** is the lowest available IP address (default = 192.168.1.2). If you change the IP address of the Router this will change automatically to be 1 more than the IP address of the Router. The **Ending IP Address** is the highest IP address number in the pool. Type in the **Lease Time** in the entry field provided. This is the amount of time in seconds that a workstation is allowed to reserve an IP address in the pool if the workstation is disconnected from the network or powered off.

Disabling the DHCP Server

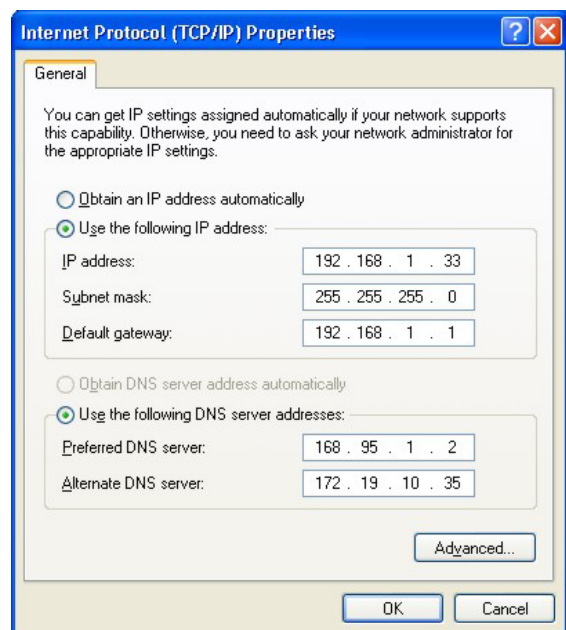
To disable DHCP, click to select the **Disabled** option and click on the **Apply** button. Choosing this option requires that workstations on the local network must be configured manually or use another DHCP server to obtain IP settings.

If you configure IP settings manually, make sure to use IP addresses in the subnet of the Router. You will need to use the Router's IP address as the Default Gateway for the workstation in order to provide Internet access.



DHCP Settings menu with DHCP disabled

To manually configure IP settings on Windows workstations, open the TCP/IP Properties menu and select the "Use the following IP address" option. You will need to supply the IP address, Subnet mask and Default gateway for each workstation. The example here also uses manually configured DNS settings.



DNS Server Settings

The Router can be configured to relay DNS settings from your ISP or another available service to workstations on your LAN. When using DNS relay, the Router will accept DNS requests from hosts on the LAN and forward them to the ISP's, or alternative DNS servers. DNS relay can use auto discovery or the DNS IP address can be manually entered by the user. Alternatively, you may also disable the DNS relay and configure hosts on your LAN to use DNS servers directly. Most users who are using the Router for DHCP service on the LAN and are using DNS servers on the ISP's network, will leave DNS relay enabled (either auto discovery or user configured).

The screenshot shows the D-Link AirPlus Xtreme G DSL-G624M router's web interface. The 'DNS Configuration' page is displayed, with the 'DNS Status' set to 'Enabled'. The 'Primary DNS Address' and 'Secondary DNS Address' fields are both set to '0.0.0.0'. The 'Secondary DNS Address' field is marked as '(optional)'. The 'Apply' and 'Cancel' buttons are visible at the bottom right.

Configure DNS Settings

If you have not been given specific DNS server IP addresses or if the Router is not pre-configured with DNS server information, select the **Disabled** option for **DNS Status**. This instructs the Router to automatically obtain the DNS IP address from the ISP through DHCP. If your WAN connection uses a Static IP address, auto discovery for DNS cannot be used.

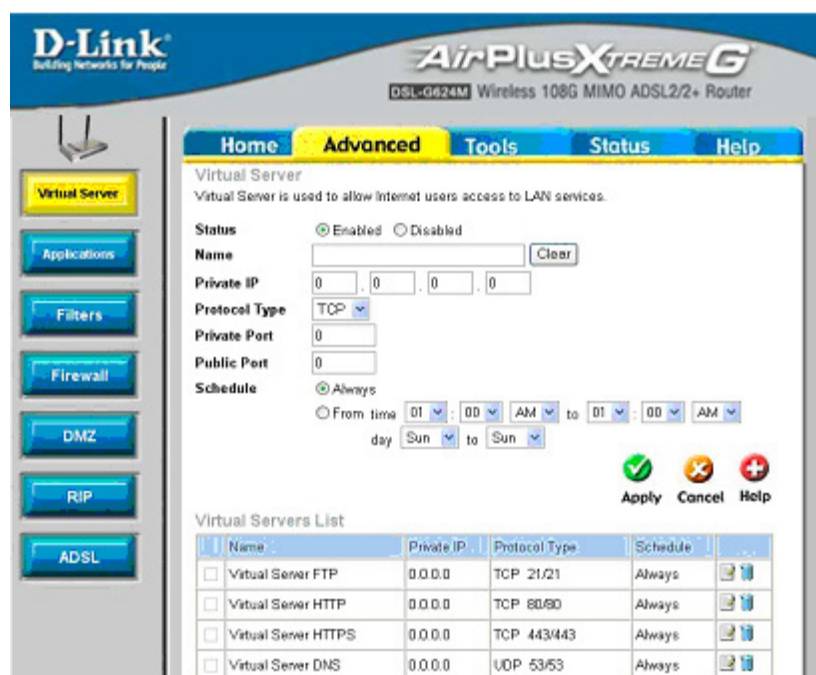
When you have configured the DNS settings as desired, click the **Apply** button.



Note

*To use DNS Relay for computers on your local network, DNS Service Filtering must be disabled. See the **Firewall** section in the next chapter.*

Advanced Router Management



This chapter introduces and describes the management features that have not been presented in the previous chapter. These include the more advanced features used for network management and security as well as administrative tools to manage the Router, view statistics and other information used to examine performance and for troubleshooting.

Use your mouse to click the directory tabs and menu buttons in order to display the various configuration and read-only menus discussed below. The table below summarizes again the directories and menus available in the management web interface. In this chapter you will find descriptions for the menus located in the Advanced, Tools and Status directories.

Directory	Configuration and Read-only Menus
Home	Click the Home tab to access the Setup Wizard , Wireless Settings, WAN Configuration, LAN IP Configuration, DHCP for the LAN Setup, and DNS Configuration menus. See the previous chapter for a description of the Home directory menus.
Advanced	Click the Advanced tab to access the Virtual Server , Applications , Filters , Firewall , DMZ , and RIP menus.
Tools	Click the Tools tab to access the Administrator Settings (used to set the system user name and password, backup and load settings), System , Firmware , Diagnostics and Time menus.
Status	Click the Status tab to view the Device Info , Log , Stats and ADSL Line information windows.
Help	The Help menu presents links to pages that explain various functions and services provided by the Router.

Virtual Server

Use the Virtual Server menu to set up port forwarding rules in the Router. The Virtual Server function allows remote users to access services on your LAN such as FTP for file transfers or SMTP and POP3 for e-mail. The DSL-G624M will accept remote requests for these services at your Global IP Address, using the specified TCP or UDP protocol and port number, and then redirect these requests to the server on your LAN with the Private IP address you specify. Remember that the specified Private IP Address must be within the useable range of the subnet occupied by the Router.

UDP/TCP port redirection is used to direct traffic through the WAN port to the specified servers or workstations on your private network. Port redirection can also be used to direct potentially hazardous packets to a proxy server outside your firewall. For example, you can configure the Router to direct HTTP packets to a designated HTTP server in the DMZ. You can define a set of instructions for a specific incoming port or for a range of incoming ports. Each set of instructions or rule is indexed and can be modified or deleted later as needed.

Virtual server rules can be set up with complimentary features such as Firewall Rules, DMZ devices and IP Filters to improve efficiency and security. Be sure to consider how these other functions will effect the virtual server rules you have configured and enabled.

The table below describes the configuration settings presented in the Virtual Server menu.

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Home **Advanced** Tools Status Help

Virtual Server

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

Status ☒ Enabled ☐ Disabled

Name

Private IP . . .

Protocol Type

Private Port

Public Port

Schedule ☒ Always

☐ From time : AM to : AM

day to

☒ Apply ☐ Cancel ☐ Help

Virtual Servers List

	Name	Private IP	Protocol Type	Schedule	
☐	Virtual Server FTP	0.0.0.0	TCP 21/21	Always	
☐	Virtual Server HTTP	0.0.0.0	TCP 80/80	Always	
☐	Virtual Server HTTPS	0.0.0.0	TCP 443/443	Always	
☐	Virtual Server DNS	0.0.0.0	UDP 53/53	Always	

Virtual Server Menu and List

To modify virtual server settings for any previously created rule, click the appropriate **Category** to the left for the set you want to configure. There are six categories, which maybe configured for each PVC. Five categories, **Games**, **VPN**,

Audio/Video, **Apps** and **Servers** have pre-defined rules which may be added to the selected **Connection** by clicking it and then clicking the **Add** button. Any of these rules may be removed by selecting it and clicking the **Remove** button. The **User** category is for user-defined rules that may be configured by selecting the **User** category and then clicking the **Add** button, which will reveal a new screen to configure, as seen below.

To configure this window, enter a **Rule Name**, the **Protocol** (TCP, UDP or both), a range of virtual ports to be used in the **Port Start** and **Port End** fields and the Port for which this rule is to be applied. Click **Apply** to set the new rule. These rules may be edited or deleted in the screen prior to the one above by clicking the **Edit** or **Delete** button. See the following window for more information.

Parameter	Description
Name	Provide a name for the rule. This name will not appear in the list below, however it may be useful if you later need to edit the settings for the rule. Rule names are optional.
Private IP	This is the IP address of the server on your LAN that will provide the service to remote users. The Private IP address is used to direct the service to a specific computer on your private network such as an FTP, Email or public web server. Type in the IP address of the server used for the service being configured here.
Protocol Type	You can select the transport protocol (TCP or UDP) that the application on the virtual server will use for its connections. Select one of the following options from the pull-down menu to define a <i>TCP</i> , <i>UDP</i> or <i>Both</i> . The choice of this protocol is dependent on the application that is providing the service. If you do not know which protocol to choose, check your application's documentation.
Private Port	This is the local port being forwarded to from the Public Port entered below. Keep in mind that if you use a non-standard port number for an application with a reserved UDP/TCP port, some additional configuration may be required for the servers or workstations using the application on the LAN side.
Public Port	This is the local port being forwarded to from the ISP. Keep in mind that most applications use a reserved UDP/TCP port number that must be entered correctly here.

Click the **Apply** button to put the new virtual server configuration set or modification into effect. Any server sets configured in the menu will appear in the Virtual Server List with the new settings.

To remove any configuration set from the Virtual Server List, click on the **Delete** button after selecting the option for set you want to delete.

Filters

Filter rules in the Router are put in place to allow or block specified traffic. The Filter Rules however can be used in a single direction to examine and then Allow or Deny traffic for Inbound (WAN to LAN) or Outbound (LAN to WAN) routed data. The rules based on IP address and TCP/UDP port.

Configure the filter rules as desired and click the **Apply** button to create the rule. The newly created rule appears listed in the Outbound Filter List at the bottom of the menu. The table below describes the various parameters that are configured for the filter rules.

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Home **Advanced** Tools Status Help

Filters

Filters are used to allow or deny LAN users from accessing the Internet.

☒ IP Filters ☐ URL Blocking
☐ MAC Filters ☐ Domain Blocking

IP Filters

Use IP Filters to deny LAN IP addresses access to the Internet.

Status ☐ Enabled ☒ Disabled

Name

IP Range -

Port Range :

Protocol Type

Schedule ☒ Always
☐ From time : AM to : AM
day to

IP Filters List

	Name	IP Range	Protocol Type	Schedule	
☐		0.0.0.0-255.255.255.255	TCP 20-21	Always	
☐		0.0.0.0-255.255.255.255	TCP 80-80	Always	

Filters Configuration Menu

To modify any previously created filter rule, click on the note pad icon in the right hand column of the Filter List for the set you want to configure. Adjust the settings as desired and click the **Apply** button to put the new settings into effect.

First determine the direction of the traffic you want the rule to filter. To filter WAN to LAN traffic, select the **Inbound Filter** option. Any new Inbound Filter rules created will appear in the list. Likewise, should you to filter LAN to WAN traffic, create an **Outbound Filter** rule.



Note

The Service Filtering feature of the Firewall may interfere rules configured in the Filters menu. For example, FTP packets are not allowed through from the external network by default. See the Firewall section below for details.

The parameters described below are used to set up filter rules.

Parameter	Description
Source IP	For an Outbound Filter, this is the IP address or IP addresses on your LAN for which you are creating the filter rule. For an Inbound Filter, this is the IP address or IP addresses for which you are creating the filter rule. You can opt to indicate a <i>Mask Range</i> , a <i>Single IP</i> , an <i>IP Range</i> or <i>Any IP</i> from the pull-down menu. Choosing Any IP will apply the rule to all WAN or all LAN IP addresses depending on which type of rule (Inbound or Outbound) is being configured.
Destination IP	Where the Destination IP address resides also depends on if you are configuring an Inbound or Outbound filter rule. You can opt to indicate a <i>Mask Range</i> , a <i>Single IP</i> , an <i>IP Range</i> or <i>Any IP</i> from the pull-down menu.
Port Range	This is the range of TCP/UDP for the current Filter rule. Enter the range of TCP/UDP ports to be filtered.
Protocol Type	Select the transport protocol (<i>TCP</i> , <i>UDP</i> or <i>Both</i>) that will be used for the filter rule.

Click the **Apply** button to put the new rule into effect. Any filter rule configured in the menu will appear in the Filters List with the new settings. The Router must save the new settings and reboot before the new rules are applied.

Routing

Use the **Routing Table** to specify a route used for data traffic within your Ethernet LAN or to route data on the WAN. This is used to specify that all packets destined for a particular network or subnet use a predetermined gateway.

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Home Advanced Tools Status Help

RIP System Wide Configuration

RIP is an internet protocol you can set up to share routing table information with other routing devices on your LAN, at your ISP's location, or on remote networks connected to your network via the ADSL line.

Interface Name: PVC-0

RIP 1 Received: ☒ Enabled ☐ Disabled

RIP 1 Send: ☒ Enabled ☐ Disabled

RIP 2 Received: ☒ Enabled ☐ Disabled

RIP 2 Received: ☒ Enabled ☐ Disabled

Send MultiCast: ☒ Enabled ☐ Disabled

Interface Name	RIP 1 Received	RIP 1 Send	RIP 2 Received	RIP 2 Send	Send MultiCast	Edit
PVC-0	Enabled	Enabled	Enabled	Enabled	Enabled	

Routing Table

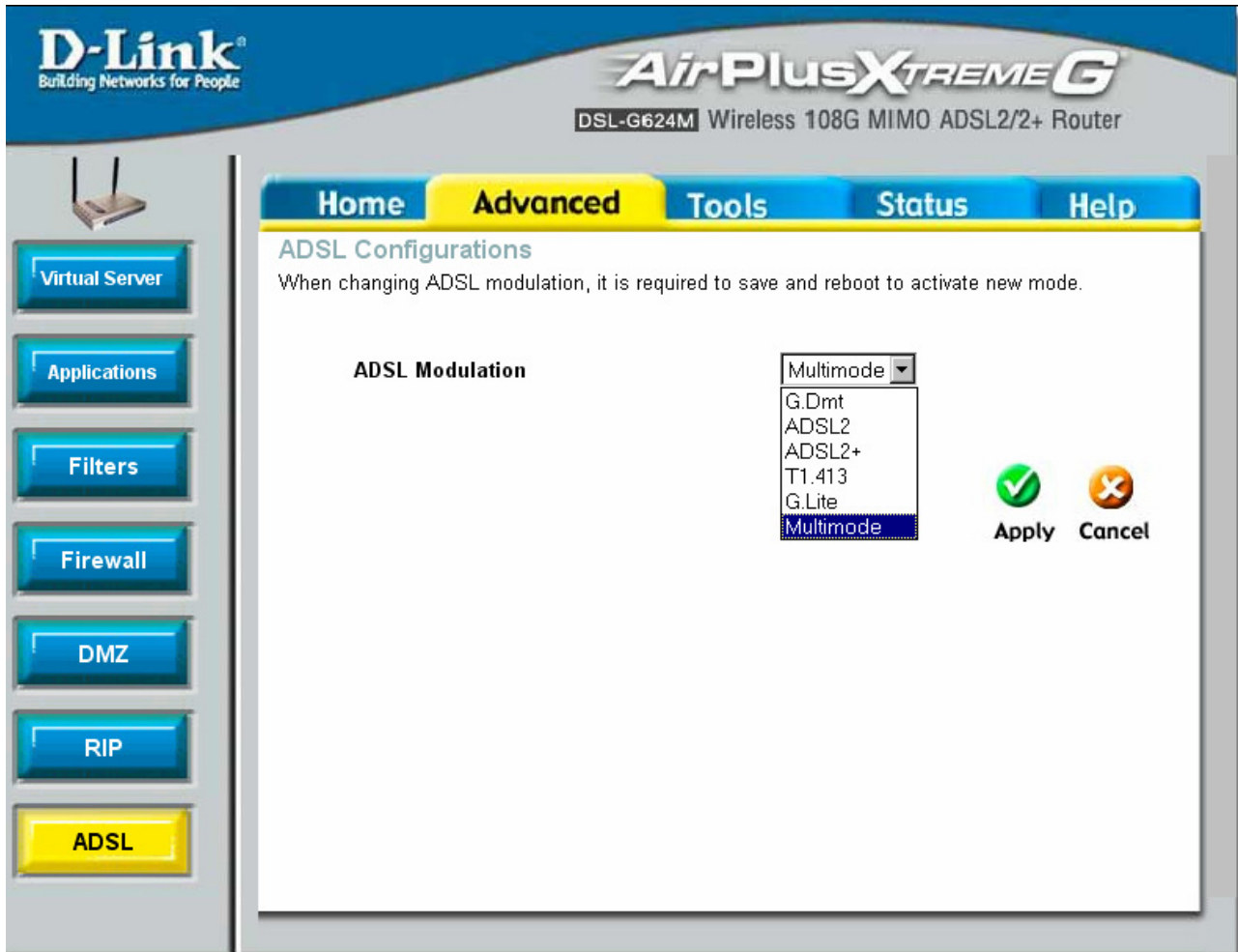
ADSL

For setting the best type of ADSL connection please refer to the ISP package you have purchased. You can check the Line Speed in **Status > ADSL Line**

Default setting is Multimode (The DSL-G624M will automatically detect if you have a “ADSL1” G.Lite, G.dmt or T1.413 connect)

If you have an ADSL2 service please select “ADSL2” click the Apply button and wait as the device saves and reboots with the new configuration.

If you have an ADSL2+ service please select “ADSL2+” click the Apply button and wait as the device saves and reboots with the new configuration.



DMZ

Since some applications are not compatible with NAT, the Router supports use of a DMZ IP address for a single host on the LAN. This IP address is not protected by NAT and will therefore be visible to agents on the Internet with the right type of software. Keep in mind that any client PC in the DMZ will be exposed to various types of security risks. If you use the DMZ, take measures (such as client-based virus protection) to protect the remaining client PCs on your LAN from possible contamination through the DMZ.



DMZ IP address configuration

To designate a DMZ IP address, select the **Enabled** radio button, type in the **IP Address** of the server or device on your LAN, and click the **Apply** button. To remove DMZ status from the designated IP address, select the Disabled radio button and click Apply.

Firewall

The Firewall Configuration menu allows the Router to enforce specific predefined policies intended to protect against certain common types of attacks. There are two general types of protection (DoS, Port Scan) that can be enabled on the Router, as well as filtering for specific packet types sometimes used by hackers.

You can choose to **Enable** or **Disable** protection against a customized basket of attack and scan types. To enable **DoS Protection** or **Port Scan Protection**, select the **Enable** radio button for the protection type and click in the selection boxes for the various types of protection listed under each.



Note

Service Filtering may interfere with other configurations such as DHCP Relay or Remote Management via Telnet.

Action	Name	Source	Destination	Protocol
☒ Allow	Allow to Ping WAN Port	WAN, 0.0.0.0-255.255.255.255	LAN, 192.168.1.1-192.168.1.1	ICMP 8-B
☒ Allow	Multicast Allow	Both, 0.0.0.0-255.255.255.255	LAN, 224.0.0.0-239.255.255.255	Any 0-65535
☒ Allow	Default Allow	LAN, 0.0.0.0-255.255.255.255	Both, 0.0.0.0-255.255.255.255	Any 0-65535

Firewall Configuration Menu

F

When DoS, Port Scan, or Service Filtering Protection is enabled, it will create a firewall policy to protect your network against the following:

Dos Protection	Port Scan Protection	Service Filtering
SYN Flood check ICMP Redirection check	FIN/URG/PSH attack Xmas Tree Scan Null Scan attack SYN/RST attack SYN/FIN Scan	Ping from External Network Telnet from External Network FTP from External Network DNS from External Network

A DoS "denial-of-service" attack is characterized by an explicit attempt by attackers to prevent legitimate users of a service from using that service. Examples include: attempts to "flood" a network, thereby preventing legitimate network traffic, attempts to disrupt connections between two machines, thereby preventing access to a service, attempts to prevent a particular individual from accessing a service, or, attempts to disrupt service to a specific system or person.

Port scan protection is designed to block attempts to discover vulnerable ports or services that might be exploited in an attack from the WAN.

The Service Filtering options allow you to block FTP, Telnet response, Pings, etc, from the external network. Check the category you want to block to enable filtering of that type of packet.

When you have selected the desired Firewall policies, click the **Apply** button to enforce the policies. Remember to save any configuration changes.

Tools

Click the **Tools** tab to reveal the menu buttons for various functions located in this directory. The **Administrator Settings** is the first menu that appears in the Tools directory. This menu is used to change the system password used to access the web manager, to save or load Router configuration settings and to restore default settings. The functions in this and the other Tools menus are described below.

The screenshot displays the web interface of a D-Link AirPlus Xtreme G DSL-G624M router. The top header features the D-Link logo and the product name. Below the header, a navigation bar includes tabs for Home, Advanced, Tools (which is highlighted in yellow), Status, and Help. On the left side, there is a vertical menu with buttons for Admin, System, Firmware, Misc., Diagnostics, and Time. The main content area is titled 'Administrator Settings' and contains instructions to change the administrator password. It includes three password input fields: Old Password, New Password, and Confirm Password. Below these fields is a 'Remote Management' section with radio buttons for 'Enabled' and 'Disabled' (the latter is selected), an 'IP Address' input field, and a 'Port' dropdown menu set to 8080. At the bottom right of the settings area are three buttons: 'Apply' (with a green checkmark icon), 'Cancel' (with an orange X icon), and 'Help' (with a red plus icon).

System Tools administrative functions

Change System Password

To change the password used to access the Router web manager, click the **Admin** button in the **Tools** directory to display the Administrator Settings menu. Under the Administrator heading, type the **New Password** and **Confirm Password** to be certain you have typed it correctly. Click the **Apply** button to activate the new password. The System User Name remains “admin”, this cannot be changed using the web manager interface. Be sure to save the new setting.

The screenshot displays the D-Link web manager interface for the DSL-G624M router. The top header features the D-Link logo and the product name 'AirPlus Xtreme G DSL-G624M Wireless 108G MIMO ADSL2/2+ Router'. A navigation bar includes tabs for Home, Advanced, Tools (highlighted), Status, and Help. On the left, a sidebar contains buttons for Admin, System, Firmware, Misc., Diagnostics, and Time. The main content area is titled 'Administrator Settings' and contains the following elements:

- A message: 'Please change the administrator account password for personal security and privacy. You may change it by entering a new password.'
- A heading: 'Administrator (The Login Name is 'admin')'
- Three password input fields: 'Old Password', 'New Password', and 'Confirm Password', each masked with dots.
- A 'Remote Management' section with radio buttons for 'Enabled' and 'Disabled' (selected).
- An 'IP Address' input field with a small 'x' icon.
- A 'Port' dropdown menu showing '8080'.
- Three action buttons at the bottom right: 'Apply' (green checkmark), 'Cancel' (orange X), and 'Help' (red plus).

Administrator Settings change password menu

System

Once you have configured the Router to your satisfaction, it is a good idea to back up the configuration file to your computer. To save the current configuration settings to your computer, click the **Admin** button in the **Tools** directory to display the Administrator Settings menu. Click the **Save** button to **Save Settings to Local Hard Drive**. You will be prompted to select a location on your computer to put the file. The file type is .xml (HTML) and may be named anything you wish.

To load a previously saved configuration file, click the **Browse** button and locate the file on your computer. Click the **Load** button to **Load Settings From Local Hard Drive**. Confirm that you want to load the file when prompted and the process is completed automatically. The Router will reboot and begin operating with the configuration settings that have just been loaded.



Save System Settings and Restore Defaults

Restore Factory Default Settings

To reset the Router to its factory default settings, click the **Restore** button in the Administrator Settings menu. You will be prompted to confirm your decision to reset the Router. The Router will reboot with the factory default settings including IP settings and Administrator password. A Restore Factory Default setting is recommended after conducting a firmware update; please remember to backup your Configuration by using the Save System settings.

Firmware

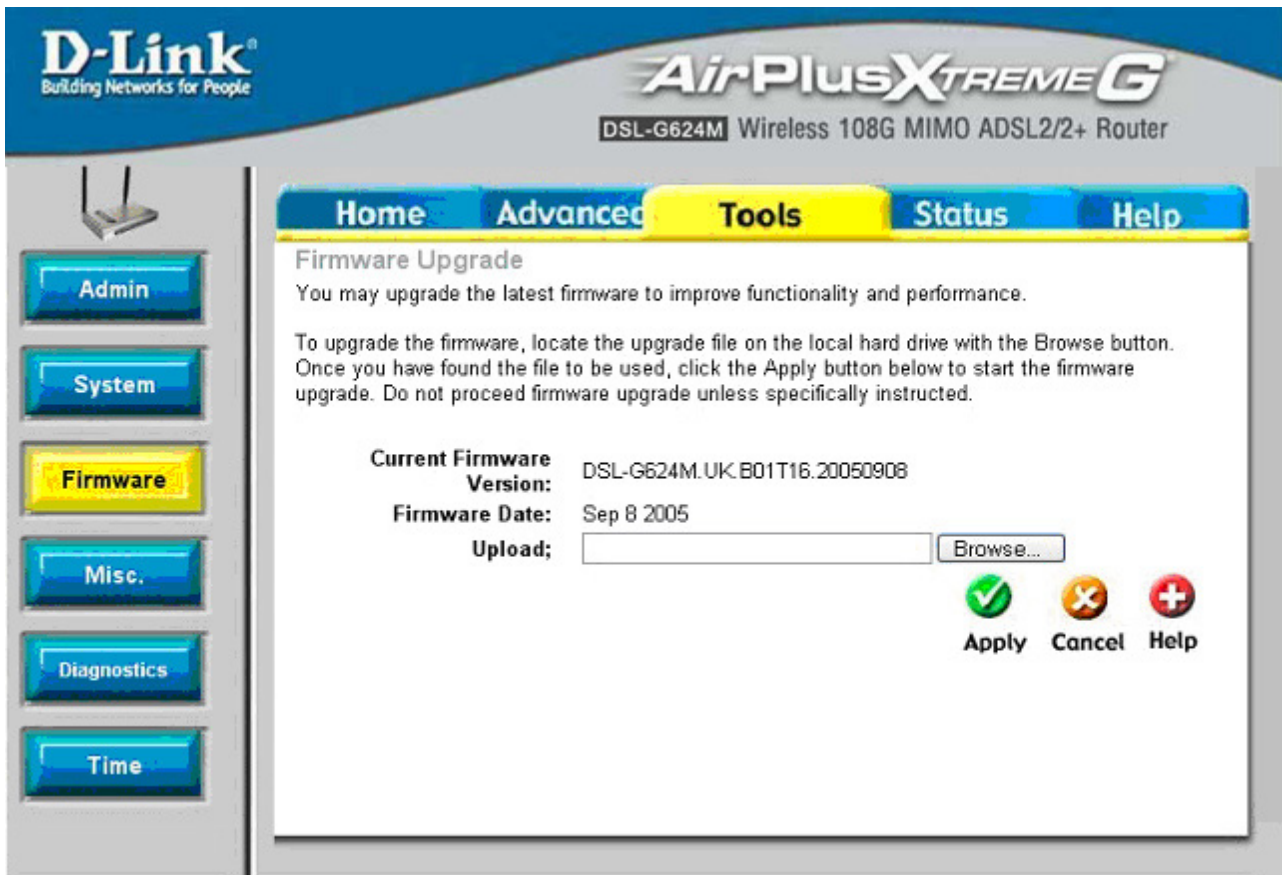


Note

Performing a Firmware Upgrade can sometimes change the configuration settings. Be sure to back-up the Router's configuration settings before upgrading the firmware.

Use the Firmware Upgrade menu to load the latest firmware for the device. Note that the device configuration settings may return to the factory default settings, so make sure you save the configuration settings with the System Settings menu described above. Firmware should only be upgrade when requested to do so by D-Link Service Personnel or you require an additional advanced user feature.

Warning - Firmware Upgrades can be risky and could lead to your device becoming unusable if unsuccessful.



Firmware Upgrade

To upgrade firmware, type in the name and path of the file or click on the **Browse** button to search for the file. Click the **Apply** button to begin copying the file. The file will load and restart the Router automatically. This process will take a few minutes depending on the size of the file. Please be patient as this may take up to 5-10 minutes depending on your environment.

A Restore Factory Default setting is recommended after conducting a firmware update; please remember to backup your Configuration by using the Save System settings beforehand.

Warning – Never disconnect the power during a firmware upgrade as this will lead to a device failure.

Miscellaneous

To perform a standard Ping test for network connectivity, click the **Misc.** menu button in the Tools directory to view the **Miscellaneous Configuration** menu. The Ping test functions on the WAN and LAN interfaces. Type the IP address you want to check in the space provided and click the **Ping** button. Read the Ping test result in the space immediately below.

Save and Restart Device will reboot the device with the new configuration saved.

Block WAN Ping. To increase the security of your network you can **Block** your IP address from responding from an **PING** command.

UPnP Settings. The DSL-G624M supports advanced network functions such as the UPnP™ architecture for zero-configuration networking. Enable it if you have UPnP devices in your network you wish to connect.

PPTP & IPSec VPN. The DSL-G624M supports VPN (Virtual Private Network) **Pass-Through** connections for your client server VPN sessions.

The screenshot shows the web interface of a D-Link AirPlus Xtreme G DSL-G624M router. The top navigation bar includes 'Home', 'Advanced', 'Tools' (highlighted), 'Status', and 'Help'. On the left, a sidebar contains buttons for 'Admin', 'System', 'Firmware', 'Misc.' (highlighted), 'Diagnostics', and 'Time'. The main content area is titled 'Ping Test' and contains several sections: 'Ping Test' with a description and a 'Ping' button; 'Save and Restart Device' with a 'Restart' button; 'Block WAN Ping' with a description and radio buttons for 'Enabled' and 'Disabled' (selected); 'UPNP Settings' with radio buttons for 'Enabled' (selected) and 'Disabled'; 'VPN Pass-Through' with a description; and 'PPTP' and 'IPSec' settings, each with radio buttons for 'Enabled' (selected) and 'Disabled'. At the bottom right, there are three buttons: 'Apply' (green checkmark), 'Cancel' (orange X), and 'Help' (red plus).

Miscellaneous Configuration menu

Diagnostics

The Test menus are used to test connectivity of the Router. A Ping test may be done through the local or external interface to test connectivity to known IP addresses. The diagnostics feature executes a series of test of your system software and hardware connections. Use this Test menu when working with your ISP to troubleshoot problems.

The screenshot shows the D-Link router's web interface. The top header includes the D-Link logo and the model name 'AirPlus Xtreme G DSL-G624M Wireless 108G MIMO ADSL2/2+ Router'. The navigation bar has tabs for Home, Advanced, Tools (selected), Status, and Help. On the left sidebar, there are buttons for Admin, System, Firmware, Misc., Diagnostics (highlighted in yellow), and Time. The main content area is titled 'Diagnostics' and contains a description: 'The diagnostics feature executes a series of test of your system software and hardware connections. Use the feature when your ISP to troubleshoot problems.' Below this is a 'Virtual Circuits' dropdown menu set to 'PVC-0'. A note states: 'This page is used for performing diagnostics on this system.' The interface then displays three test sections: 'Modem Connection Test' with three rows (Testing Ethernet connection, Testing ADSL line for sync, Testing Ethernet connection to ATM), 'ATM Connection Test' with two rows (Testing ATM OAM segment ping, Testing ATM OAM end to end ping), and 'Internet Connection Test' with two rows (Ping default gateway, Ping Primary Domain Name Server). All test results are indicated by '---'. At the bottom right, there is a green checkmark icon and an 'Apply' button.

Modem Connection Test	
Testing Ethernet connection	---
Testing ADSL line for sync	---
Testing Ethernet connection to ATM	---

ATM Connection Test	
Testing ATM OAM segment ping	---
Testing ATM OAM end to end ping	---

Internet Connection Test	
Ping default gateway	---
Ping Primary Domain Name Server	---

Diagnostics Test Menu

Time

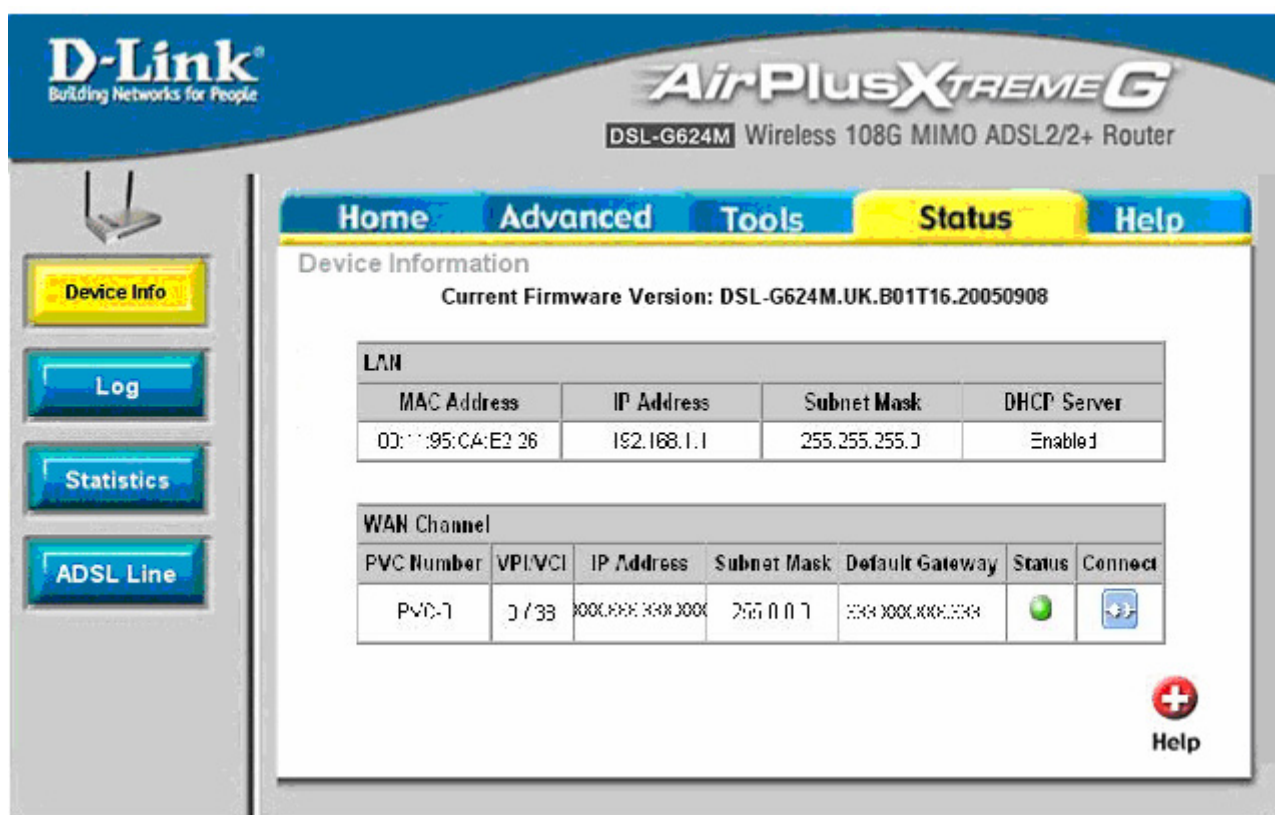
The router allows you to select between three methods of setting the system time. You can enter the address of an NTP Server (or use the default address). You can set the time manually, or you can use the time settings on the PC that you are using to configure the router.

The screenshot shows the 'Time' configuration page of a D-Link AirPlus Xtreme G DSL-G624M router. The page has a blue header with the D-Link logo and the product name. A left sidebar contains navigation buttons: Admin, System, Firmware, Misc., Diagnostics, and Time (highlighted in yellow). The main content area has tabs for Home, Advanced, Tools (selected), Status, and Help. Under the 'Tools' tab, the 'Time' section is active, showing options to set the system time. It includes input fields for Date (2001/12/31) and Time (17:04:48). The 'Time Mode' section has three radio buttons: 'Use NTP Server', 'Set time Manually' (selected), and 'Use PC Time'. Below this is a 'Time Zone' dropdown menu set to '(GMT-08:00) Pacific Time (US & Canada)'. The 'Default NTP Server' is shown as a dotted IP address (62.119.40.99). The 'Set the Time' section contains dropdown menus for Year (2002), Month (Jan), Day (01), Hour (00), Minute (00), and Second (00). At the bottom right of the configuration area are three buttons: 'Apply' (green checkmark), 'Cancel' (orange X), and 'Help' (red plus).

System Time Menu

Status Information

Use the various read-only menus to view system information and monitor performance.



The screenshot displays the D-Link AirPlus Xtreme G DSL-G624M router's web interface. The 'Status' tab is selected, showing 'Device Information'. The current firmware version is DSL-G624M.UK.B01T16.20050908. The LAN section shows a single interface with MAC address 00:11:95:04:E2:26, IP address 192.168.1.1, subnet mask 255.255.255.0, and DHCP server enabled. The WAN Channel section shows a single PVC with number 1, VPI/VCID 0/33, IP address 100.0.0.1, subnet mask 255.0.0.0, default gateway 100.0.0.1, and a green status icon.

D-Link
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AirPlus Xtreme G
DSL-G624M Wireless 108G MIMO ADSL2/2+ Router

Home Advanced Tools **Status** Help

Device Information
Current Firmware Version: DSL-G624M.UK.B01T16.20050908

LAN

MAC Address	IP Address	Subnet Mask	DHCP Server
00:11:95:04:E2:26	192.168.1.1	255.255.255.0	Enabled

WAN Channel

PVC Number	VPI/VCID	IP Address	Subnet Mask	Default Gateway	Status	Connect
PVC-1	0/33	100.0.0.1	255.0.0.0	100.0.0.1		

 Help

Device Information display

Device Information Display

Use the Device Information window to quickly view basic current information about the LAN and WAN interfaces and device information including Firmware Version and MAC address. The IP provided by your ISP will be displayed this screen when a successful login has been made. When the Status graphic is coloured Green you have a valid PPP login. If it remains Red, you should recheck your ISP login details.

Clicking **Connect** will either Disconnect or Connect a PPP active session.

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AirPlus Xtreme G
DSL-G624M Wireless 108G MIMO ADSL2/2+ Router

Home Advanced Tools **Status** Help

Device Information
Current Firmware Version: DSL-G624M.UK.B01T16.20050908

LAN

MAC Address	IP Address	Subnet Mask	DHCP Server
03:11:95:CA:E2:26	192.168.1.1	255.255.255.0	Enabled

WAN Channel

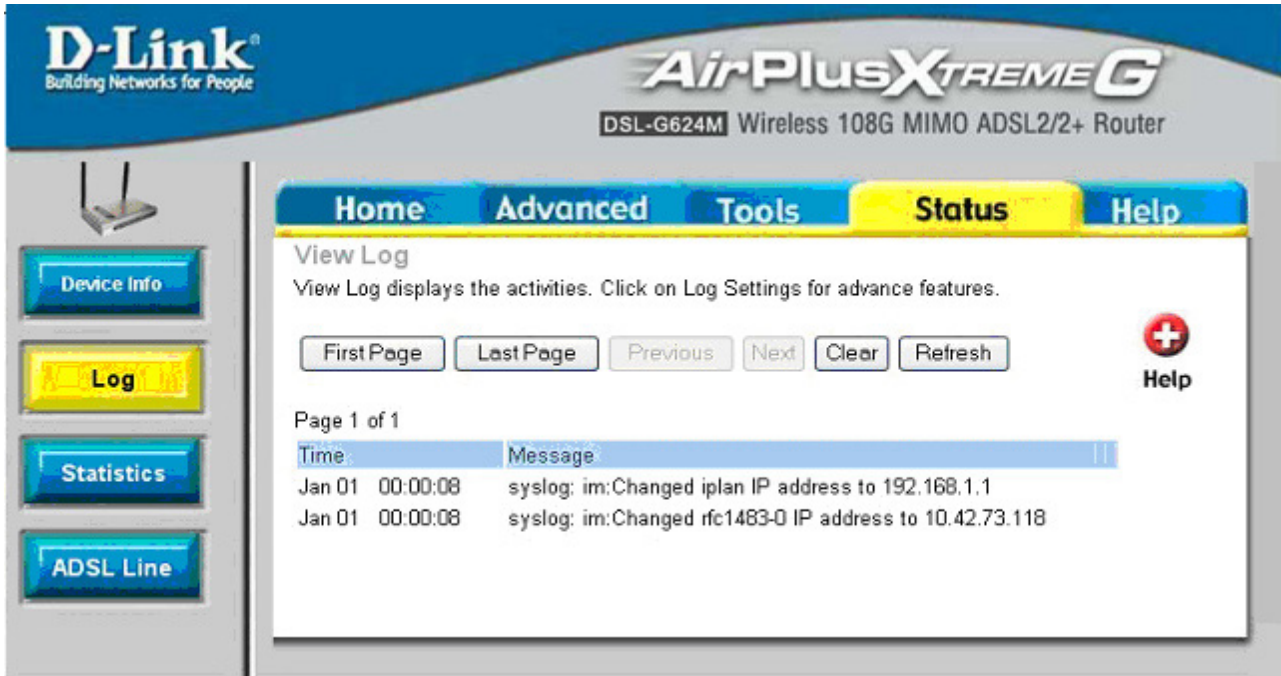
PVC Number	VPI/VCI	IP Address	Subnet Mask	Default Gateway	Status	Connect
PVC-1	0/33	XXX.XXX.XXX.XXX	255.0.0.0	XXX.XXX.XXX.XXX		

Help

Device Information display

Log

The system log displays chronological event log data. Use the navigation buttons to view or scroll log pages. You may also save a simple text file containing the log to your computer. Click the Save Log button and follow the prompts to save the file.

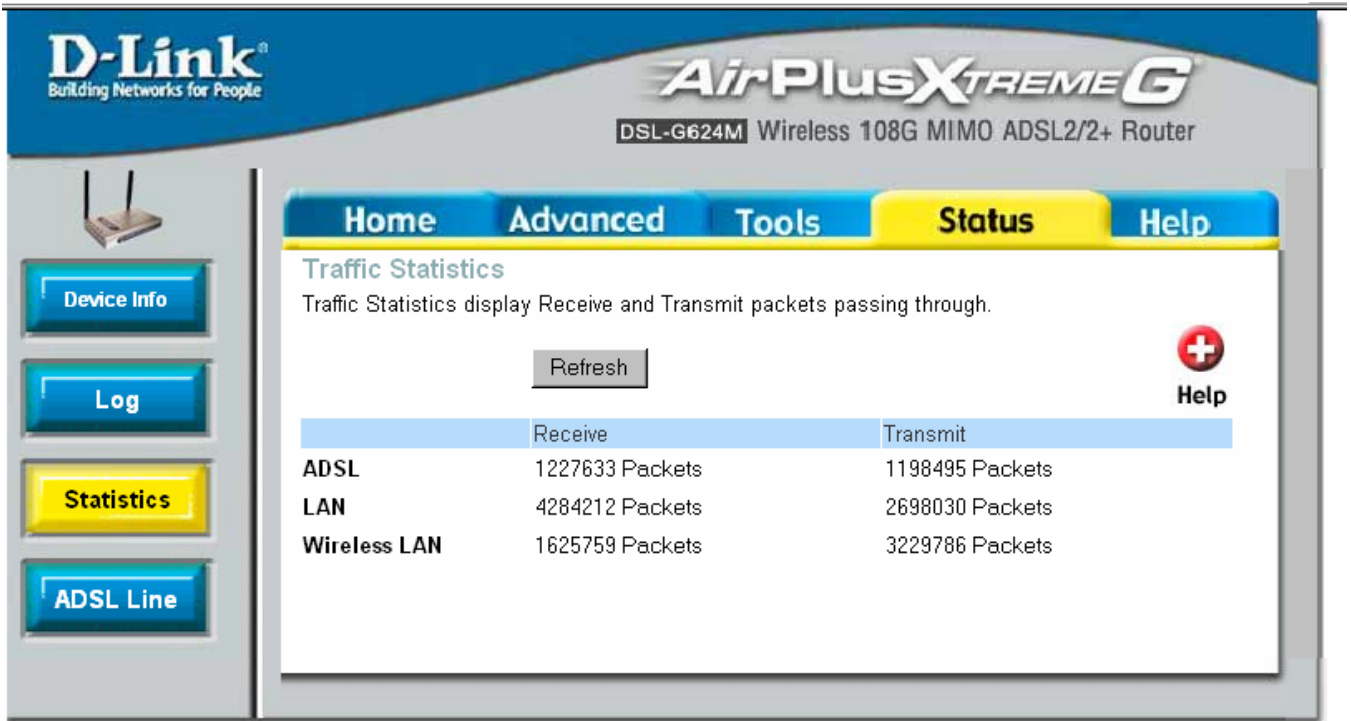


View Log window

Click **Clear Log** delete the current log information.

Stats

Use the Traffic Statistics window to monitor traffic on the Ethernet, ADSL or Wireless Internet connection. Select the interface for which you want to view packet statistics and the information will appear below.



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AirPlus Xtreme G
DSL-G624M Wireless 108G MIMO ADSL2/2+ Router

Home Advanced Tools **Status** Help

Traffic Statistics
Traffic Statistics display Receive and Transmit packets passing through.

Refresh

Help

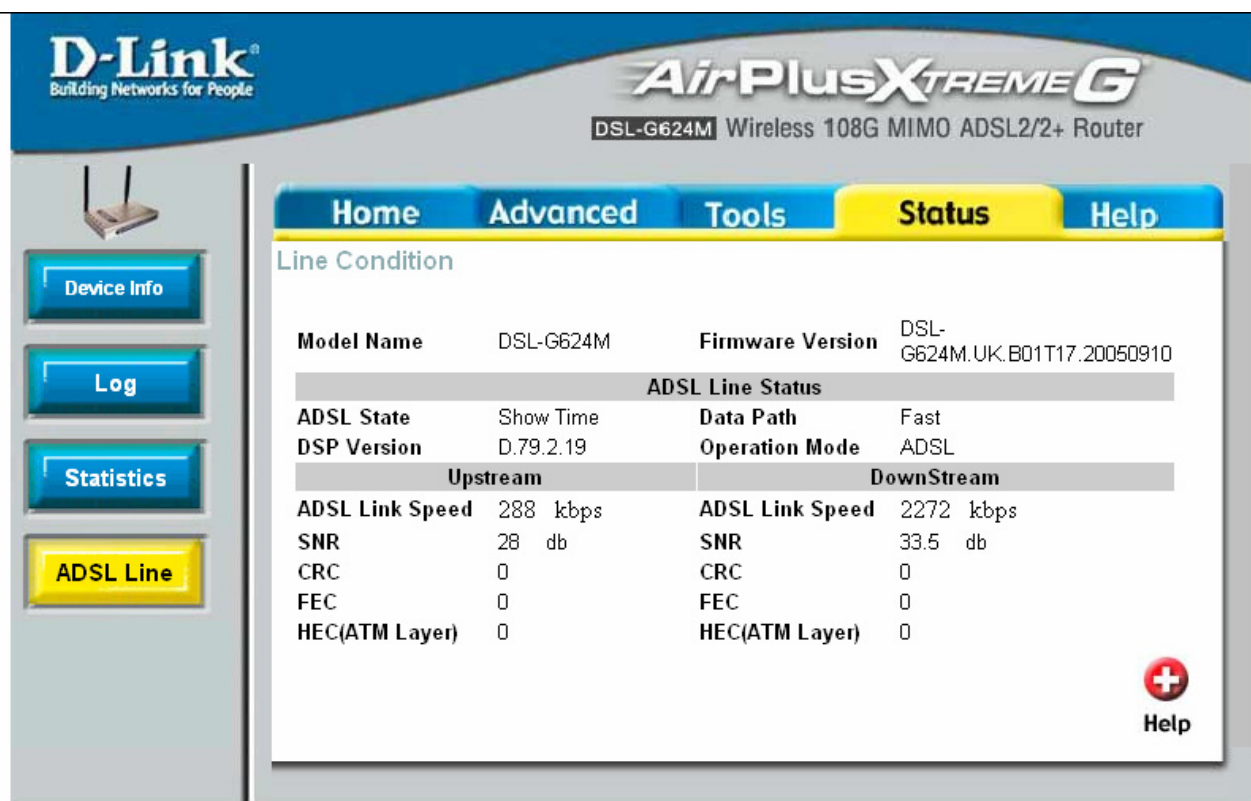
	Receive	Transmit
ADSL	1227633 Packets	1198495 Packets
LAN	4284212 Packets	2698030 Packets
Wireless LAN	1625759 Packets	3229786 Packets

Traffic Statistics information

Click **Refresh** to view traffic information.

ADSL Line

Use the ADSL Status information and the Test page for troubleshooting the ADSL connection.



The screenshot displays the D-Link AirPlus Xtreme G DSL-G624M Web UI. The interface includes a left sidebar with navigation buttons: Device Info, Log, Statistics, and ADSL Line (highlighted in yellow). The main content area is titled 'Line Condition' and shows the following information:

ADSL Line Status			
Model Name	DSL-G624M	Firmware Version	DSL-G624M.UK.B01T17.20050910
ADSL State	Show Time	Data Path	Fast
DSP Version	D.79.2.19	Operation Mode	ADSL
Upstream		DownStream	
ADSL Link Speed	288 kbps	ADSL Link Speed	2272 kbps
SNR	28 db	SNR	33.5 db
CRC	0	CRC	0
FEC	0	FEC	0
HEC(ATM Layer)	0	HEC(ATM Layer)	0

A red circular icon with a white plus sign and the word 'Help' is located in the bottom right corner of the main content area.

ADSL Status information

Technical Specifications

General		
Standards	IEEE 802.11b/ 802.11g	RFC 2364 (PPP over ATM)
	IEEE 802.3/ 802.3u	RFC 1631 (NAT)
	IEEE 802.1d	RFC 1877 (Automatic IP assignment)
	RFC 791 (IP Routing)	RFC 2516 (PPP over Ethernet)
	RFC 792 (UDP)	RFC 2131 (DHCP)
	RFC 826 (ARP)	ANSI T1.413 issue 2
	RFC 1058 (RIP 1)	ITU G.992.1 (G.dmt)
	RFC 1389 (RIP 2)	ITU G.992.2 (G.lite)
	RFC 1483 (Bridged Ethernet)	ITU G.992.3 (G.dmt bis)
	RFC 1577 (IP over ATM)	ITU G.992.5(G.dmt.bis plus)
	RFC 1661 (PPP)	ITU G.994.1 (G.Hs)
	RFC 1994 (CHAP)	ITU-T Rec. I.361
	RFC 1334 (PAP)	Supports ATM Forum UNI V3.1/4.0 PVC

Physical and Environmental	
DC Inputs:	Input: 110 ~ 230V AC 50 ~ 60Hz (per region)
Power Adapter	Output: 12V AC, 1.2A
Power Consumption	12 Watts (max)
Operating Temperature	5° to 40° C (41° - 104° F)
Humidity	5 to 95% (non-condensing)
Dimensions	198 x 155 x 34 mm
Weight	450 g
EMI	FCC Class B, CE EN301489 SMA
Safety:	CSA International

Wireless	
Modulation	IEEE 802.11b: DQPSK, DBPSK, DSSS, and CCK IEEE 802.11g: BPSK, QPSK, 16QAM, 64QAM, OFDM
Frequency	2400 ~ 2484.5MHz ISM band
Channels	11 channels for United States 13 channels for European Countries 13 channels for Japan
Wireless Data Rates	IEEE 802.11b: 11, 5.5, 2, and 1Mbps IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps
Media Access Protocol	CSMA/CA with ACK
WEP WPA	64/128/152 bits WiFi Protected Access
Wireless Certification	Wi-Fi WPA
ADSL Data Rates	G.dmt full rate: Downstream up to 8 Mbps Upstream up to 640 Kbps G.lite: Downstream up to 1.5 Mbps Upstream up to 512 Kbps G.dmt.bis: ADSL2 Downstream up to 12 Mbps Upstream up to 1.0 Mbps G.dmt.bis plus: ADSL2+ Downstream up to 24 Mbps Upstream up to 1.0 Mbps
Media Interface	RJ-11 port ADSL telephone line connection 4 x MDI/MDIX RJ-45 ports for 10/100BASET Ethernet connection

IP Address Setup

The DSL-G624M is designed to provide network administrators maximum flexibility for IP addressing on the Ethernet LAN. The easiest IP setup choice in most cases is to let the Router do it using DHCP, which is enabled by default. This appendix briefly describes various options including DHCP, used for IP setup on a LAN. If you are new to IP networking, the next appendix provides some background information on basic IP concepts.

Assigning Network IP Addresses

The IP address settings, which include the IP address, subnet mask and gateway IP address are the first and most important internal network settings that need to be configured. The Router is assigned a default LAN IP address and subnet mask. If you do not have a preexisting IP network and are setting one up now, using the factory default IP address settings can greatly ease the setup process. If you already have a preexisting IP network, you can adjust the IP settings for the Router to fit within your existing scheme.

Using the Default IP Address

The Router is shipped with a preset default IP address setting of 192.168.1.1 for the LAN port. There are two ways to use this default IP address, you can manually assign an IP address and subnet mask for each PC on the LAN or you can instruct the Router to automatically assign them using DHCP. The simplest method is to use DHCP. The DHCP function is active by default.

Manual IP Address Assignment

Manually configuring IP settings for the LAN means you must manually set an IP address, subnet mask and IP address of the default gateway (the Router's IP address) on each networked computer. The example listed below describes IP configuration for computers running Windows 95 or Windows 98. Regardless of what operating system is used on each workstation, the three network IP settings must be defined so the network interface used by each workstation can be identified by the Router, and vice versa. For detailed information about configuring your workstations IP settings, consult the user's guide included with the operating system or the network interface card (NIC).

1. In Windows 95/98, click on the **Start** button, go to **Settings** and choose **Control Panel**.
2. In the window that opens, double-click on the **Network** icon.
3. Under the Configuration tab, select the **TCP/IP** component and click *Properties*.
4. Choose the *Specify an IP address* option and edit the address settings accordingly. Consult the table below for IP settings on a Class C network.

Using Default IP without DHCP			
Host	IP Address	Subnet Mask	Gateway IP
Router	192.168.1.1	255.255.255.0	
Computer #1	192.168.1.2	255.255.255.0	192.168.1.1
Computer #2	192.168.1.3	255.255.255.0	192.168.1.1
Computer #3	192.168.1.4	255.255.255.0	192.168.1.1

IP Setup - Example #1

Please note that when using the default IP address as in the above example, the first number in the IP address must always be the same with only the second, third and fourth number changing. The first number defines the network IP address (all machines must belong to the same IP network), while the last three numbers denote the host IP address (each computer must have a unique address to distinguish it on the network). The IP address scheme used in Example

#1 can be used for any LAN that requires up to 253 separate IP addresses (excluding the Router). Notice that the subnet mask is the same for all machines and the default gateway address is the LAN IP address of the Router.

It is a good idea to make a note of each device's IP address for reference during troubleshooting or when adding new stations or devices.

Using DHCP

The second way to use the default settings is to allow the Router to automatically assign IP settings for workstation using DHCP. To do this, simply make sure your computers' IP addresses are set to 0.0.0.0 (under Windows, choose the option Obtain an IP address automatically in the TCP/IP network component described above). When the computers are restarted, their IP settings will automatically be assigned by the Router. The Router is set by default to use DHCP. See the discussion in Chapter 3 for information on how to use configure the Router for DHCP.

Changing the IP Address of the Router

When planning your LAN IP address setup, you may use any scheme allowed by rules that govern IP assignment. It may be more convenient or easier to remember an IP scheme that use a different address for the Router. Or you may be installing the Router on a network that has already established the IP settings. Changing the IP address is a simple matter and can be done using the web manager (see *LAN IP Address* in Chapter 5). If you are incorporating the Router into a LAN with an existing IP structure, be sure to disable the DHCP function. Also, consider the effects of NAT (Network Address Translation). This is enabled by default but may be disabled in the NAT menu of the Advanced directory.

An IP addressing scheme commonly used for Ethernet LANs establishes 10.0.0.1 as the base address for the network. Using Example #2 below, the Router is assigned the base address 10.0.0.1 and the remaining addresses are assigned manually or using DHCP.

Alternative IP Assignment			
Host	IP Address	Subnet Mask	Gateway IP
Router	10.0.0.1	255.0.0.0	
Computer #1	10.0.0.2	255.0.0.0	10.0.0.1
Computer #2	10.0.0.3	255.0.0.0	10.0.0.1
Computer #3	10.0.0.4	255.0.0.0	10.0.0.1

IP Setup - Example #2

These two examples are only examples you can use to help you get started. Other common private network IP addressing schemes use a base address of 192.168.0.1 or 10.1.1.1. If you are interested in more advanced information on how to use IP addressing on a LAN there are numerous resources freely available on the Internet. There are also many books and chapters of books on the subject of IP address assignment, IP networking and the TCP/IP protocol suite.

IP Concepts

This appendix describes some basic IP concepts, the TCP/IP addressing scheme and shows how to assign IP Addresses.

When setting up the Router, you must make sure it has a valid IP address. Even if you will not use the WAN port (ADSL port), you should, at the very least, make sure the Ethernet LAN port is assigned a valid IP address. This is required for telnet, in-band SNMP management, and related functions such as “trap” handling and TFTP firmware download.

IP Addresses

The Internet Protocol (IP) was designed for routing data between network sites all over the world, and was later adapted for routing data between networks within any site (often referred to as “subnetworks” or “subnets”). IP includes a system by which a unique number can be assigned to each of the millions of networks and each of the computers on those networks. Such a number is called an IP address.

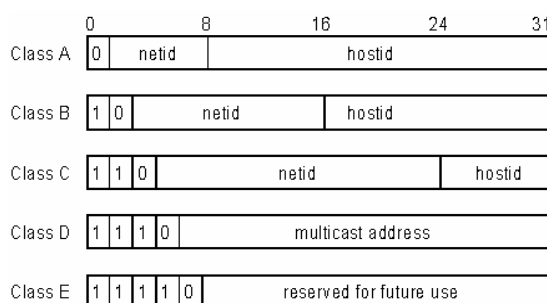
To make IP addresses easy to understand, the originators of IP adopted a system of representation called “dotted decimal” or “dotted quad” notation. Below are examples of IP addresses written in this format:

201.202.203.204 189.21.241.56 125.87.0.1

Each of the four values in an IP address is the ordinary decimal (base 10) representation of a value that a computer can handle using eight “bits” (binary digits — 1s and 0s). The dots are simply convenient visual separators.

Zeros are often used as placeholders in dotted decimal notation; 189.21.241.56 can therefore also appear as 189.021.241.056.

IP networks are divided into three classes on the basis of size. A full IP address contains a network portion and a “host” (device) portion. The network and host portions of the address are different lengths for different classes of networks, as shown in the table below.



Networks attached to the Internet are assigned class types that determine the maximum number of possible hosts per network. The previous figure illustrates how the net and host portions of the IP address differ among the three classes. Class A is assigned to networks that have more than 65,535 hosts; Class B is for networks that have 256 to 65534 hosts; Class C is for networks with less than 256 hosts.

IP Network Classes			
Class	Maximum Number of Networks in Class	Network Addresses (Host Portion in Parenthesis)	Maximum Number of Hosts per Network
A	126	1(.0.0.0) to 126 (.0.0.0)	16,777,214
B	16,382	128.1(.0.0) to 191.254(.0.0)	65,534
C	2,097,150	192.0.1(.0) to 223.255.254(.0)	254

**Note**

All network addresses outside of these ranges (Class D and E) are either reserved or set aside for experimental networks or multicasting.

When an IP address's host portion contains only zero(s), the address identifies a network and not a host. No physical device may be given such an address.

The network portion must start with a value from 1 to 126 or from 128 to 223. Any other value(s) in the network portion may be from 0 to 255, except that in class B the network addresses 128.0.0.0 and 191.255.0.0 are reserved, and in class C the network addresses 192.0.0.0 and 223.255.255.0 are reserved.

The value(s) in the host portion of a physical device's IP address can be in the range of 0 through 255 as long as this portion is not all-0 or all-255. Values outside the range of 0 to 255 can never appear in an IP address (0 to 255 is the full range of integer values that can be expressed with eight bits).

The network portion must be the same for all the IP devices on a discrete physical network (a single Ethernet LAN, for example, or a WAN link). The host portion must be different for each IP device — or, to be more precise, each IP-capable port or interface — connected directly to that network.

The network portion of an IP address will be referred to in this manual as a **network number**; the host portion will be referred to as a **host number**.

To connect to the Internet or to any private IP network that uses an Internet-assigned network number, you must obtain a registered IP network number from an Internet-authorized network information center. In many countries you must apply through a government agency, however they can usually be obtained from your Internet Service Provider (ISP).

If your organization's networks are, and will always remain, a closed system with no connection to the Internet or to any other IP network, you can choose your own network numbers as long as they conform to the above rules.

If your networks are isolated from the Internet, e.g. only between your two branch offices, you can assign any IP Addresses to hosts without problems. However, the Internet Assigned Numbers Authority (IANA) has reserved the following three blocks of IP Addresses specifically for private (stub) networks:

Class	Beginning Address	Ending Address
A	10.0.0.0	10.255.255.255
B	172.16.0.0	172.31.255.255
C	192.168.0.0	192.168.255.255

It is recommended that you choose private network IP Addresses from the above list. For more information on address assignment, refer to RFC 1597, *Address Allocation for Private Internets* and RFC 1466, *Guidelines for Management of IP Address Space*.

Subnet Mask

In the absence of subnetworks, standard TCP/IP addressing may be used by specifying subnet masks as shown below.

IP Class	Subnet Mask
Class A	255.0.0.0
Class B	255.255.0.0
Class C	255.255.255.0

Subnet mask settings other than those listed above add significance to the interpretation of bits in the IP address. The bits of the subnet mask correspond directly to the bits of the IP address. Any bit in a subnet mask that is to correspond to a net ID bit in the IP address must be set to 1.