NBG-419N v2

Wireless N NetUSB Router

User's Guide

Default Login Details

LAN IP Address	http://192.168.1.1
Password	1234

Version 1.00
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ZyXEL

www.zyxel.com

IMPORTANT!

READ CAREFULLY BEFORE USE.

KEEP THIS GUIDE FOR FUTURE REFERENCE.

Graphics in this book may differ slightly from the product due to differences in operating systems, operating system versions, or if you installed updated firmware/software for your device. Every effort has been made to ensure that the information in this manual is accurate.

Related Documentation

- Quick Start Guide

  The Quick Start Guid shows how to connect the NBG-419N v2 and access the Web Configurator .

Contents Overview

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PART I
User's Guide

1

Getting to Know Your Router

1.1 Overview

This chapter introduces the main features and applications of the Router.

The Router extends the range of your existing wired network without additional wiring, providing easy network access to mobile users. You can set up a wireless network with other IEEE 802.11b/g/n compatible devices.

A range of services such as a firewall and content filtering are also available for secure Internet computing. You can use media bandwidth management to efficiently manage traffic on your network. Bandwidth management features allow you to prioritize time-sensitive or highly important applications such as Voice over the Internet (VoIP).

There is one USB 2.0 port on your Router. You can connect a USB (version 2.0 or lower) memory stick, USB hard drive, or USB device for file sharing. The Router automatically detects the USB device.

Note: For the USB function, it is strongly recommended to use version 2.0 or lower USB storage devices (such as memory sticks, USB hard drives) and/or USB devices (such as USB printers). Other USB products are not guaranteed to function properly with the Router.

Note: Be sure to install the ZyXEL NetUSB™ Share Center Utility (for NetUSB functionality) from the included disc, or download the latest version from the zyxel.com website.

1.2 Applications

Your can create the following networks using the Router:

- **Wired**. You can connect network devices via the Ethernet ports of the Router so that they can communicate with each other and access the Internet.
- **Wireless**. Wireless clients can connect to the Router to access network resources.
- **WAN**. Connect to a broadband modem/router for Internet access.

1.3 Ways to Manage the Router

Use any of the following methods to manage the Router.

- Web Configurator. This is recommended for everyday management of the Router using a (supported) web browser.
- Wireless switch. You can use the built-in switch of the Router to turn the wireless function on and off without opening the Web Configurator.
- WPS (Wi-Fi Protected Setup) button. You can use the WPS button or the WPS section of the Web Configurator to set up a wireless network with your Router.

1.4 Good Habits for Managing the Router

Do the following things regularly to make the Router more secure and to manage the Router more effectively.

- Change the password. Use a password that's not easy to guess and that consists of different types of characters, such as numbers and letters.
- Write down the password and put it in a safe place.
- Back up the configuration (and make sure you know how to restore it). Restoring an earlier working configuration may be useful if the device becomes unstable or even crashes. If you forget your password, you will have to reset the Router to its factory default settings. If you backed up an earlier configuration file, you would not have to totally re-configure the Router. You could simply restore your last configuration.

1.5 LEDs

Figure 1 Front Panel

The following table describes the LEDs and the WPS button.

Table 1 Front Panel LEDs and WPS Button

LED	COLOR	STATUS	DESCRIPTION
POWER	Green	On	The Router is receiving power and functioning properly.
		Off	The Router is not receiving power.
LAN 1-4	Green	On	The Router has a successful 10/100MB Ethernet connection.
		Blinking	The Router is sending/receiving data through the LAN.
		Off	The LAN is not connected.
WAN	Green	On	The Router has a successful 10/100MB WAN connection.
		Blinking	The Router is sending/receiving data through the WAN.
		Off	The WAN connection is not ready, or has failed.
WLAN	Green	On	The Router is ready, but is not sending/receiving data through the wireless LAN.
		Blinking	The Router is sending/receiving data through the wireless LAN.
		Off	The wireless LAN is not ready or has failed.
WPS	Green	On	WPS is enabled.
		Blinking	The Router is negotiating a WPS connection with a wireless client.
		Off	The wireless LAN is not ready or has failed.

Table 1 Front Panel LEDs and WPS Button (continued)

LED	COLOR	STATUS	DESCRIPTION
USB	Green	On	The Router has a USB device installed.
		Blinking	The Router is transmitting and/or receiving data from routers through an installed USB device.
		Off	There is no USB device connected to the Router.

1.6 Wall-mounting Instructions

Complete the following steps to hang your Router on a wall.

1 Select a position free of obstructions on a sturdy wall.

2 Drill two holes for the screws.

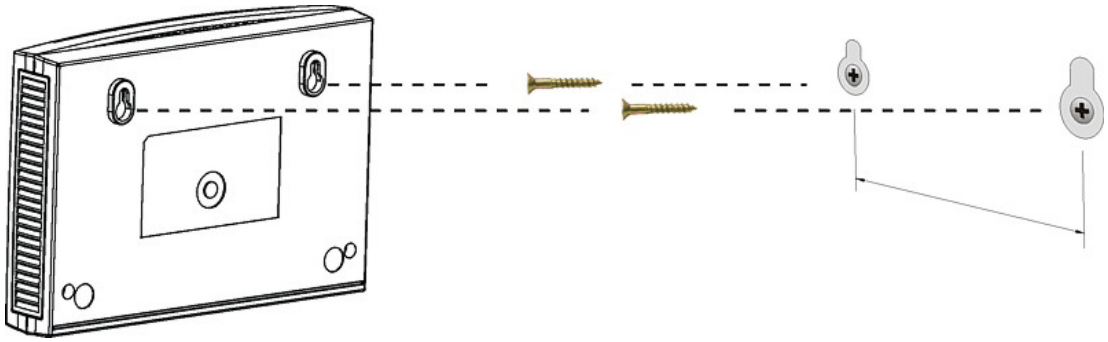
Be careful to avoid damaging pipes or cables located inside the wall when drilling holes for the screws.

3 Do not insert the screws all the way into the wall. Leave a small gap of about 0.5 cm between the heads of the screws and the wall.

4 Make sure the screws are snugly fastened to the wall. They need to hold the weight of the Router with the connection cables.

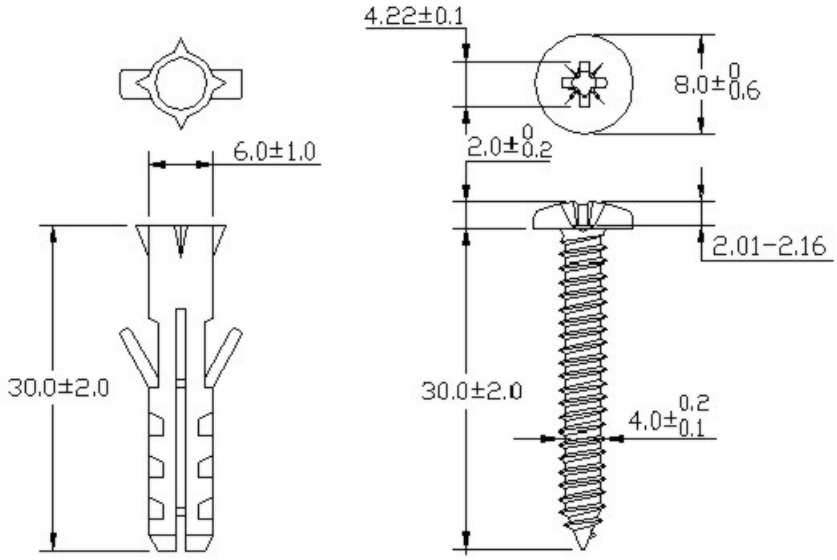
5 Align the holes on the back of the Router with the screws on the wall. Hang the Router on the screws.

Figure 2 Wall-mounting Example



The following are dimensions of an M4 tap screw and masonry plug used for wall mounting. All measurements are in millimeters (mm).

Figure 3 Masonry Plug and M4 Tap Screw



2

The WPS Button

2.1 Overview

Your Router supports WiFi Protected Setup (WPS), which is an easy way to set up a secure wireless network. WPS is an industry standard specification, defined by the WiFi Alliance.

WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Each WPS connection works between two devices. Both devices must support WPS (check each device's documentation to make sure).

Depending on the devices you have, you can either press a button (on the device itself, or in its configuration utility) or enter a PIN (a unique Personal Identification Number that allows one device to authenticate the other) in each of the two devices. When WPS is activated on a device, it has two minutes to find another device that also has WPS activated. Then, the two devices connect and set up a secure network by themselves.

For more information on using WPS, see Section 12.3 on page 89.

3

ZyXEL NetUSB Share Center Utility

3.1 Overview

The ZyXEL NetUSB Share Center Utility allows you to work with the USB devices that are connected directly to the Router as if they are connected directly to your computer. This allows you to easily share USB-based devices such as printers, scanners, portable hard disks, MP3 players, faxes, and digital cameras (to name a few) with all the other people in your home or office as long as they are connected to the Router and have the ZyXEL NetUSB Share Center Utility installed.

Note: Be sure to install the ZyXEL NetUSB Share Center Utility (for NetUSB functionality) from the included disc, or download the latest version from the zyxel.com website.

3.1.1 Quick Setup

This section shows you how to get started using the ZyXEL NetUSB Share Center Utility.

1 Install the ZyXEL NetUSB Share Center Utility on each computer connected to the Router.

2 Connect a USB device to the USB port on the Router.

Note: If you are connecting multiple devices to the Router, first connect a USB hub to the Router then connect your other USB devices to it.

3 Run the ZyXEL NetUSB Share Center Utility to display a list of all connected USB devices, then use it to connect your computer to them.

3.1.2 Installing ZyXEL NetUSB Share Center Utility

Before you can access USB devices connected to the Router, you must first install the ZyXEL NetUSB Share Center Utility on any computer on your LAN to which you want to allow access to these devices.

Note: In order to properly use the utility with your Router, ensure that the Router firmware is version v1.00(BWQ.0) or higher. See Chapter 26 on page 184 for information on updating your device's firmware.

To install the ZyXEL NetUSB Share Center Utility:

1 Insert the disc that came with your Router into your computer's disc drive.

2 Run the **Setup** program by double-clicking it and then follow the on-screen instructions for installing it on your computer.

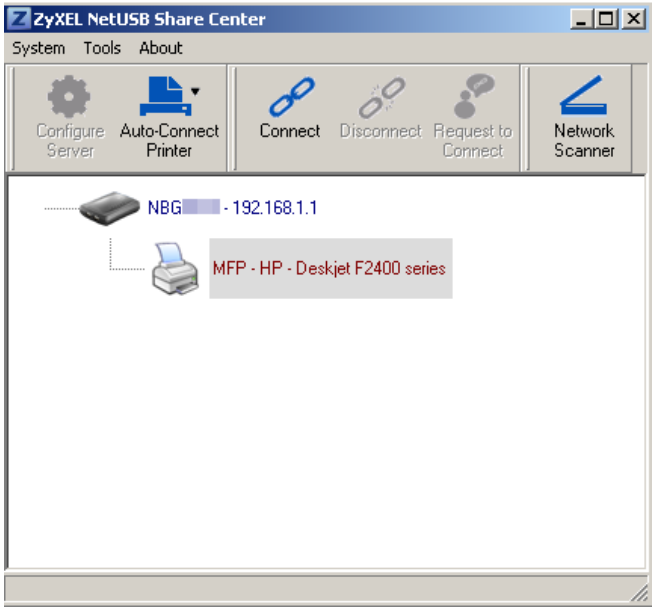
Note: The following operating systems are supported: Windows XP/Vista/7 (32 and 64-bit versions), and Mac OS X 10.6.

3 To open the ZyXEL NetUSB Share Center Utility, double-click its system tray icon.

3.2 The ZyXEL NetUSB Share Center Utility

This section describes the ZyXEL NetUSB Share Center Utility main window.

Figure 4 ZyXEL NetUSB Share Center Utility Main Window



The following table describes the icons in this window.

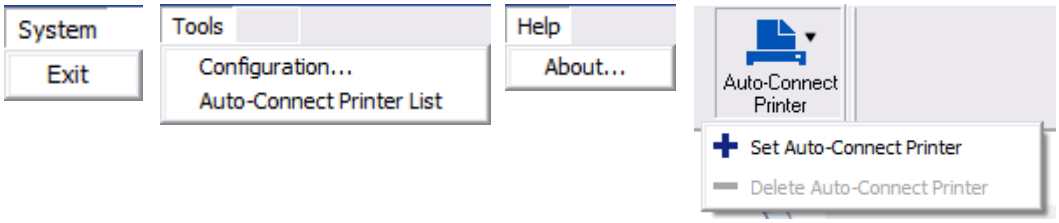
Table 2 ZyXEL NetUSB Share Center Utility Main Window Icons

ICON	DESCRIPTION
	Configure Server Click to open the Router's built-in Web Configurator, which you can use to set up the Router (see Chapter 5 on page 39 for details).
	Auto-Connect Printer You can set the selected printer to 'auto-connect' after you have connected it to your computer during inital connection. If the printer is auto-connected to your computer, they will always be connected over the network. You do not need to configure it manually each time. Note: If the computer is connecting to the shared USB printer for the first time, you need to click **Connect** and setup the printer before you can use the **Auto-Connect Printer** function. See Chapter 12 on page 89 for more details. Note: You first must install the appropriate drivers for the printer that you intend to use.
	Connect Select a USB device and then click this button to connect to it. Your computer can connect to as many USB devices as are connected to the Router.
	Disconnect Select a device to which your computer is connected and then click this button to disconnect from it.
	Request to Connect Some USB devices may not allow automatic connections over the network. If so, select the device in question and click this button to issue a request to connect to it.
	Network Scanner Click this to open the scanner options on your computer for working with a scanner connected to the network.

3.2.1 The Menus

This section describes the utility's menus.

Figure 5 ZyXEL NetUSB Share Center Utility Menus



The following table describes the menus in this screen.

Table 3 ZyXEL NetUSB Share Center Utility Main Screen Menus

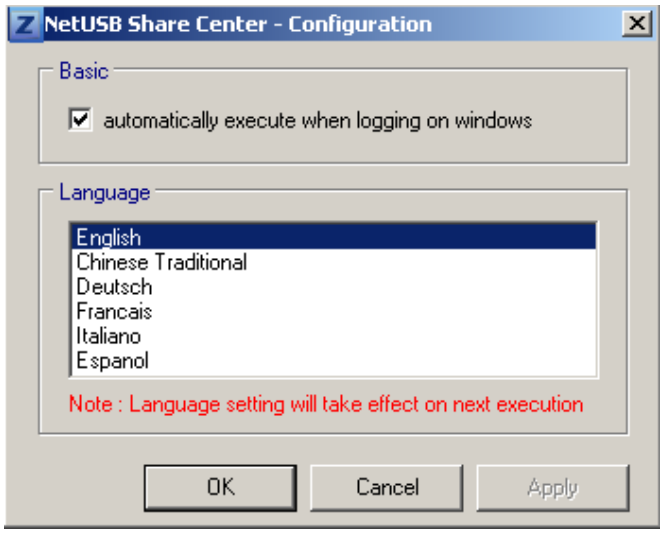
MENU	ITEM	DESCRIPTION
System	Exit	This closes the ZyXEL NetUSB Share Center Utility.
Tools	Configuration	This opens the ZyXEL NetUSB Share Center Utility configuration window.
	Auto-Connect Printer List	This opens the list window that displays all of the printing devices connected to the Router.
Help	About	This opens the about window, which provides information of the utility software and driver versions.
Auto-Connect Printer	Set Auto-Connect Printer	You can set the selected printer to 'auto-connect' after you have connected it to your computer during inital connection. If the printer is auto-connected to your computer, they will always be connected over the network. You do not need to configure it manually each time. Click this to show your installed printer list and select the one you want to set as auto-connected. Note: If the computer is connecting to the shared USB printer for the first time, you need to click **Connect** and setup the printer before you can use the **Auto-Connect Printer** function. See Chapter 12 on page 89 for more details. Note: You first must install the appropriate drivers for the printer that you intend to use.
	Delete Auto-Connect Printer	This removes the auto-connect option from the selected printer.

3.2.2 The ZyXEL NetUSB Share Center Configuration Window

This section describes the utility's configuration window, which allows you to set certain options for the utility. These options do not apply to the USB devices connected to the Router.

You can open it by clicking the **Tools > Configuration** menu command.

Figure 6 ZyXEL NetUSB Share Center Utility Configuration Window



The following table describes the labels in this window.

Table 4 ZyXEL NetUSB Share Center Utility Configuration Window

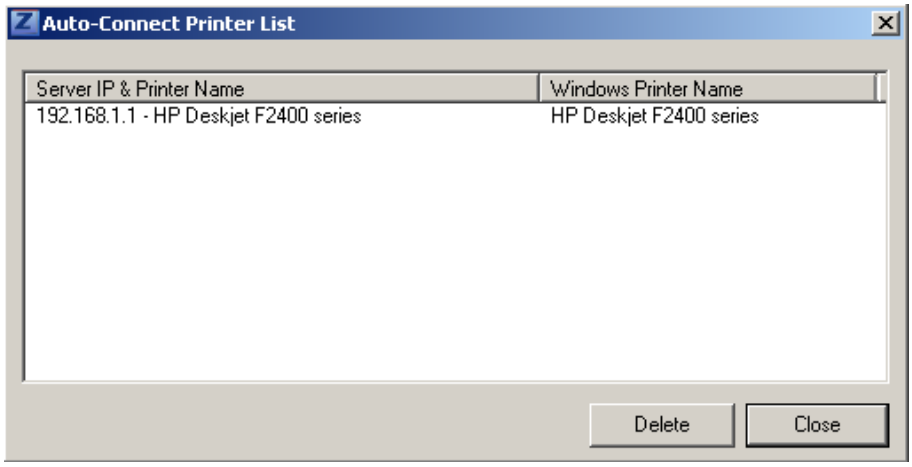
LABEL	DESCRIPTION
Basic	Select this to run the utility automatically when you log into or start up Windows.
Language	Select a language for the ZyXEL NetUSB Share Center Utility. You must restart the utility for the change to take effect.
OK	Click this to save your changes and close the window.
Cancel	Click this cancel to close the window without saving.
Apply	Click this to save your changes without closing the window.

3.2.3 The Auto-Connect Printer List Window

This section describes the utility's auto-connect printer list window. You can open it by clicking the **Tools > Auto-Connect Printer List** menu command.

Note: If the computer is connecting to the shared USB printer for the first time, you need to click **Connect** and setup the printer before you can use the **Auto-Connect Printer** function. See Chapter 12 on page 89 for more details.

Figure 7 ZyXEL NetUSB Share Center Utility Auto-Connect Printer List Window



The following table describes the labels in this screen.

Table 5 ZyXEL NetUSB Share Center Utility Auto-Connect Printer List Window

LABEL	DESCRIPTION
Server IP & Printer Name	Displays a list of print server IPs and printer names connected to this Router.
Windows Printer Name	Displays a corresponding list of Windows printer names connected to this devices listed in the other list.
Delete	Select an printer from the list and click this to remove it.
Close	Click this to close the window.

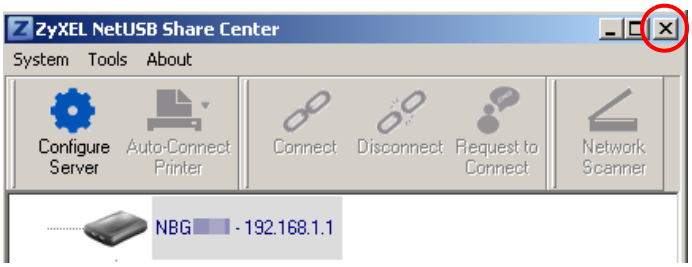
3.2.4 Exit the ZyXEL NetUSB Share Center Utility

If you want to exit the ZyXEL NetUSB Share Center Utility when your computer is not connected to any USB device, follow the steps below:

1 Click **System > Exit** on the Utility screen. The Utility will automatically close.

Or you can close the Utlity screen first, then exit:

1 Click the **X** on the upper-right corner of the Utility:



2 This will close the Utility screen to an icon at the system tray of your computer. Right-click on the Utility's icon and click **Exit**.

4

Connection Wizard

4.1 Overview

This chapter provides information on the wizard setup screens in the Web Configurator.

The Web Configurator's wizard setup helps you configure your device to access the Internet. Refer to your ISP for your Internet account information. Leave a field blank if you don't have that information.

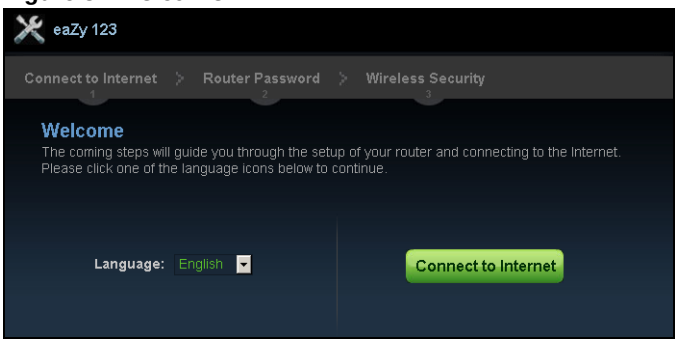
4.2 Accessing the Wizard

Launch your web browser and type "http://192.168.1.1" as the website address. Type "1234" (default) as the password and click **Login**.

Note: The Wizard appears when the Router is accessed for the first time or when you reset the Router to its default factory settings.

The Wizard screen opens. Choose your **Language** and click **Connect to Internet.**

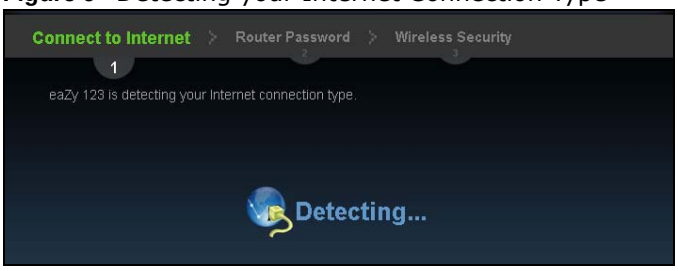
Figure 8 Welcome



4.3 Connect to Internet

The Router offers five Internet connection types. They are **Static IP**, **DHCP**, **PPPoE**, **PPTP** or **L2TP**. The wizard attempts to detect which WAN connection type you are using.

Figure 9 Detecting your Internet Connection Type



If the wizard does not detect a connection type, you must select one from the drop-down list box. Check with your ISP to make sure you use the correct type.

Note: If you get an error message, check your hardware connections. Make sure your Internet connection is up and running.

The following screen depends on your Internet connection type. Enter the details provided by your Internet Service Provider (ISP) in the fields (if any).

Figure 10 Internet Connection Type

Your Router detects the following Internet Connection type.

Table 6 Internet Connection Type

CONNECTION TYPE	DESCRIPTION
Static IP	Select the **Static IP** if an administrator assigns the IP address of your computer.
DHCP	Select the **DHCP** (Dynamic Host Configuration Protocol) option when the WAN port is used as a regular Ethernet.
PPPoE	Select the **PPPoE** (Point-to-Point Protocol over Ethernet) option for a dial-up connection.
PPTP	Select the **PPTP** (Point-to-Point Tunneling Protocol) option for a dial-up connection, and your ISP gave you an IP address and/or subnet mask.
L2TP	Select the **L2TP** (Layer 2 Tunnel Protocol) if you are connecting to another device over another network (like the Internet or VPN).

4.3.1 Connection Type: DHCP

Choose **DHCP** as the **Internet Connection Type** when the WAN port is used as a regular Ethernet. Click **Next**.

Figure 11 Internet Connection Type: DHCP

Note: If you get an error screen after clicking **Next**, you might have selected the wrong Internet Connection type. Click **Back**, make sure your Internet connection is working and select the right Connection Type. Contact your ISP if you are not sure of your Internet Connection type.

4.3.2 Connection Type: Static IP

Choose **Static IP** as the **Internet Connection Type** if your ISP assigned an IP address for your Internet connection. Click **Next**.

Figure 12 Internet Connection Type: Static IP

The following table describes the labels in this screen.

Table 7 Internet Connection Type: Static IP

LABEL	DESCRIPTION
Internet Connection Type	Select the **Static IP** option.
IP Address	Enter the IP address provided by your ISP.

Table 7 Internet Connection Type: Static IP (continued)

LABEL	DESCRIPTION
Subnet Mask	Enter the IP subnet mask in this field.
Default Gateway	Enter the gateway IP address in this field.
Primary DNS	DNS (Domain Name System) is for mapping a domain name to its corresponding IP address and vice versa. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it. The Router uses a system DNS server (in the order you specify here) to resolve domain names for DDNS and the time server. Enter the primary DNS server's IP address in the fields provided.
Secondary DNS	Enter the secondary DNS server's IP address in the fields provided.
Exit	Click this to close the wizard screen without saving.
Back	Click this to return to the previous screen.
Next	Click this to continue.

4.3.3 Connection Type: PPPoE

Point-to-Point Protocol over Ethernet (PPPoE) functions as a dial-up connection. PPPoE is an IETF (Internet Engineering Task Force) standard specifying how a host personal computer interacts with a broadband modem (for example DSL, cable, wireless, etc.) to achieve access to high-speed data networks.

For the service provider, PPPoE offers an access and authentication method that works with existing access control systems (for instance, RADIUS).

One of the benefits of PPPoE is the ability to let end users access one of multiple network services, a function known as dynamic service selection. This enables the service provider to easily create and offer new IP services for specific users.

Operationally, PPPoE saves significant effort for both the subscriber and the ISP/carrier, as it requires no specific configuration of the broadband modem at the subscriber's site.

By implementing PPPoE directly on the Router (rather than individual computers), the computers on the LAN do not need PPPoE software installed, since the Router does that part of the task. Furthermore, with NAT, all of the LAN's computers will have Internet access.

Figure 13 Internet Connection Type: PPPoE

The following table describes the labels in this screen.

Table 8 Internet Connection Type: PPPoE

LABEL	DESCRIPTION
Internet Connection Type	Select the **PPPoE** option for a dial-up connection.
Dynamic IP	Select this radio button if your ISP did not assign you a fixed IP address.
Static IP	Select this radio button, provided by your ISP to give the Router a fixed, unique IP address.
IP Address	Type the name of your service provider.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the user name above.
Exit	Click this to close the wizard screen without saving.
Back	Click this to return to the previous screen.
Next	Click this to continue.

4.3.4 Connection Type: PPTP

Point-to-Point Tunneling Protocol (PPTP) is a network protocol that enables transfers of data from a remote client to a private server, creating a Virtual Private Network (VPN) using TCP/IP-based networks.

PPTP supports on-demand, multi-protocol, and virtual private networking over public networks, such as the Internet.

Refer to the appendix for more information on PPTP.

The Router supports one PPTP server connection at any given time.

Figure 14 Internet Connection Type: PPTP

The following table describes the fields in this screen

Table 9 Internet Connection Type: PPTP

LABEL	DESCRIPTION
Internet Connection Type	Select **PPTP** from the drop-down list box. To configure a PPTP client, you must configure the **User Name** and **Password** fields for a PPP connection and the PPTP parameters for a PPTP connection.
Dynamic IP	Select this radio button if your ISP did not assign you a fixed IP address.
Static IP	Select this radio button, provided by your ISP to give the Router a fixed, unique IP address.
PPTP Address	Type the (static) IP address assigned to you by your ISP.
PPTP Subnet Mask	Type the subnet mask assigned to you by your ISP (if given).
PPTP Gateway IP Address	Type the gateway IP address of the PPTP server.
PPTP Server IP Address	Type the server IP address of the PPTP server.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the User Name above.
Exit	Click this to close the wizard screen without saving.
Back	Click this to return to the previous screen.
Next	Click this to continue.

4.3.5 Connection Type: L2TP

The Layer 2 Tunneling Protocol (L2TP) works at layer 2 (the data link layer) to tunnel network traffic between two peer devices over another network (like the Internet).

Figure 15 Internet Connection Type: L2TP

The following table describes the fields in this screen

Table 10 Internet Connection Type: L2TP

LABEL	DESCRIPTION
Internet Connection Type	Select **L2TP** from the drop-down list box.
Dynamic IP	Select this radio button if your ISP did not assign you a fixed IP address.

Table 10 Internet Connection Type: L2TP (continued)

LABEL	DESCRIPTION
Static IP	Select this radio button, provided by your ISP to give the Router a fixed, unique IP address.
L2TP Address	Type the (static) IP address assigned to you by your ISP.
L2TP Subnet Mask	Type the subnet mask assigned to you by your ISP (if given).
L2TP Gateway IP Address	Type the gateway IP address of the L2TP server.
L2TP Server IP Address	Type the server IP address of the L2TP server.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the User Name above.
Exit	Click this to close the wizard screen without saving.
Back	Click this to return to the previous screen.
Next	Click this to continue.

The Router connects to the Internet.

Figure 16 Connecting to the Internet

Note: If the Wizard successfully connects to the Internet, it proceeds to the next step. If you get an error message, go back to the previous screen and make sure you have entered the correct information provided by your ISP.

4.4 Router Password

Change the login password in the following screen. Enter the new password and retype it to confirm. Click **Next** to proceed with the **Wireless Security** screen**.**

Figure 17 Router Password

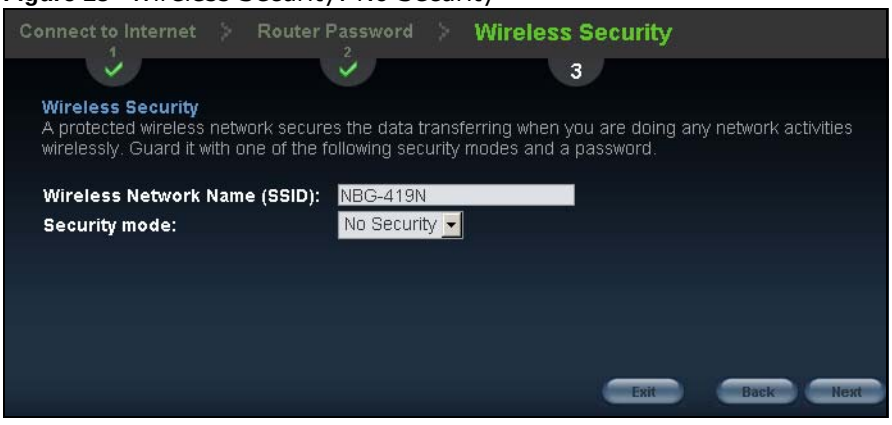
4.5 Wireless Security

Configure Wireless Settings. Configure the wireless network settings on your Router in the following screen. The fields that show up depend on the kind of security you select.

4.5.1 Wireless Security: No Security

Choose **No Security** in the Wireless Security screen to let wireless devices within range access your wireless network.

Figure 18 Wireless Security: No Security



The following table describes the labels in this screen.

Table 11 Wireless Security: No Security

LABEL	DESCRIPTION
Wireless Network Name (SSID)	Enter a descriptive name (up to 32 printable 7-bit ASCII characters) for the wireless LAN. If you change this field on the Router, make sure all wireless stations use the same SSID in order to access the network.
Security mode	Select a **Security** level from the drop-down list box. Choose **None** to have no wireless LAN security configured. If you do not enable any wireless security on your Router, your network is accessible to any wireless networking device that is within range.
Exit	Click this to close the wizard screen without saving.
Back	Click this to return to the previous screen.
Next	Click this to continue.

4.5.2 Wireless Security: WPA-PSK/WPA2-PSK

Choose **WPA-PSK** or **WPA2-PSK** security in the Wireless Security screen to set up a password for your wireless network.

Figure 19 Wireless Security: WPA-PSK/WPA2-PSK

The following table describes the labels in this screen.

Table 12 Wireless Security: WPA-PSK/WPA2-PSK

LABEL	DESCRIPTION
Wireless Network Name (SSID)	Enter a descriptive name (up to 32 printable 7-bit ASCII characters) for the wireless LAN. If you change this field on the Router, make sure all wireless stations use the same SSID in order to access the network.
Security mode	Select a **Security** level from the drop-down list box. Choose **WPA-PSK** or **WPA2-PSK** security to configure a Pre-Shared Key. Choose this option only if your wireless clients support WPA-PSK or WPA2-PSK respectively.
Wireless password	Type from 8 to 63 case-sensitive ASCII characters. You can set up the most secure wireless connection by configuring WPA in the wireless LAN screens.
Verify Password	Retype the password to confirm.
Exit	Click this to close the wizard screen without saving.

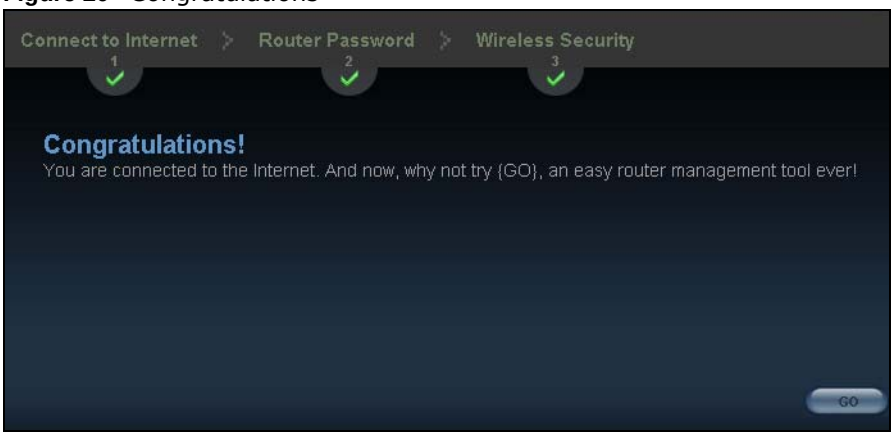
Table 12 Wireless Security: WPA-PSK/WPA2-PSK (continued)

LABEL	DESCRIPTION
Back	Click this to return to the previous screen.
Next	Click this to continue.

Congratulations! Open a web browser, such as Internet Explorer, to visit your favorite website.

Note: If you cannot access the Internet when your computer is connected to one of the Router's LAN ports, check your connections. Then turn the Router off, wait for a few seconds then turn it back on. If that does not work, log in to the web configurator again and check you have typed all information correctly. See the User's Guide for more suggestions.

Figure 20 Congratulations



You can also click **ZyGO** to open the **Easy Mode** Web Configurator of your Router.

You have successfully set up your Router to operate on your network and access the Internet. You are now ready to connect wirelessly to your Router and access the Internet.

5

Introducing the Web Configurator

5.1 Overview

This chapter describes how to access the Router Web Configurator and provides an overview of its screens.

The Web Configurator is an HTML-based management interface that allows easy setup and management of the Router via Internet browser. Use Internet Explorer 6.0 and later or Netscape Navigator 7.0 and later versions or Safari 2.0 or later versions. The recommended screen resolution is 1024 by 768 pixels.

In order to use the Web Configurator you need to allow:

- Web browser pop-up windows from your device. Web pop-up blocking is enabled by default in Windows XP SP (Service Pack) 2.
- JavaScript (enabled by default).
- Java permissions (enabled by default).

Refer to the Troubleshooting chapter (Chapter 27 on page 191) to see how to make sure these functions are allowed in Internet Explorer.

5.2 Accessing the Web Configurator

1. Make sure your Router hardware is properly connected and prepare your computer or computer network to connect to the Router (refer to the Quick Start Guide).
2. Launch your web browser.
3. Type "http://192.168.1.1" as the website address.

   Your computer must be in the same subnet in order to access this website address.

5.2.1 Login Screen

Note: If this is the first time you are accessing the Web Configurator, you may be redirected to the Wizard. Refer to Chapter 4 on page 29 for the Connection Wizard screens.

The Web Configurator initially displays the following login screen.

Figure 21 Login screen

The following table describes the labels in this screen.

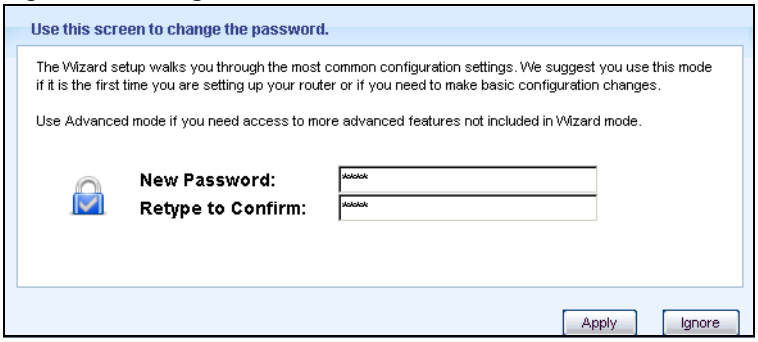
Table 13 Login screen

LABEL	DESCRIPTION
Password	Type "1234" (default) as the password.
Language	Select the language you want to use to configure the Web Configurator. Click **Login**.
	This shows the current weather, either in celsius or fahrenheit, of the city you specify in Section 5.2.3.1 on page 42.
	This shows the time (hh:mm:ss) and date (yyyy:mm:dd) of the timezone you select in Section 5.2.3.2 on page 42 or Section 26.5 on page 183. The time is in 24-hour format, for example 15:00 is 3:00 PM.

5.2.2 Password Screen

You should see a screen asking you to change your password (highly recommended) as shown next.

Figure 22 Change Password Screen



The following table describes the labels in this screen.

Table 14 Change Password Screen

LABEL	DESCRIPTION
New Password	Type a new password.
Retype to Confirm	Retype the password for confirmation.
Apply	Click **Apply** to save your changes back to the Router.
Ignore	Click **Ignore** if you do not want to change the password this time.

Note: The management session automatically times out when the time period set in the **Administrator Inactivity Timer** field expires (default five minutes; go to Chapter 26 on page 181 to change this). Simply log back into the Router if this happens.

5.2.3 Home Screen

If you have previously logged into the Web Configurator but did not click **Logout**, you may be redirected to the Home screen.

You can also open this screen by clicking **Home** ( or ) in the Easy Mode or Expert mode screens.

The Home screen displays as follows.

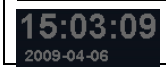
Figure 23 Home Screen

The following table describes the labels in this screen.

Table 15 Home Screen

LABEL	DESCRIPTION
Go	Click this to open the Easy mode Web Configurator.
Language	Select a language to go to the Easy mode Web Configurator in that language and click **Login**.

Table 15 Home Screen (continued)

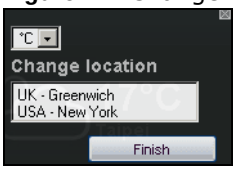
LABEL	DESCRIPTION
	(This is just an example). This shows the current weather, either in celsius or fahrenheit, of the city you specify in Section 5.2.3.1 on page 42.
	(This is just an example). This shows the time (hh:mm:ss) and date (yyyy:mm:dd) of the timezone you select in Section 5.2.3.2 on page 42 or Section 26.5 on page 183.

5.2.3.1 Weather Edit

You can change the temperature unit and select the location for which you want to know the weather.

Click the  icon to change the Weather display.

Figure 24 Change Weather



The following table describes the labels in this screen.

Table 16 Change Weather

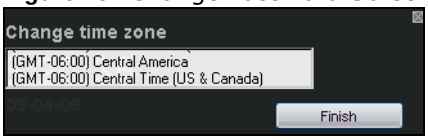
LABEL	DESCRIPTION
°C or °F	Choose which temperature unit you want the Router to display.
Change Location	Select the location for which you want to know the weather. If the city you want is not listed, choose one that is closest to it.
Finish	Click this to apply the settings and refresh the date and time display.

5.2.3.2 Time/Date Edit

One timezone can cover more than one country. You can choose a particular country in which the Router is located and have the Router display and use the current time and date for its logs.

Click the  icon to change the Weather display.

Figure 25 Change Password Screen



The following table describes the labels in this screen.

Table 17 Change Password Screen

LABEL	DESCRIPTION
Change time zone	Select the specific country whose current time and date you want the Router to display.
Finish	Click this to apply the settings and refresh the weather display.

Note: You can also edit the timezone in Section 26.5 on page 183.

5.3 Resetting the Router

If you forget your password or IP address, or you cannot access the Web Configurator, you will need to use the **RESET** button at the back of the Router to reload the factory-default configuration file. This means that you will lose all configurations that you had previously saved, the password will be reset to "1234" and the IP address will be reset to "192.168.1.1".

5.3.1 Procedure to Use the Reset Button

1. Make sure the power LED is on.
2. Press the **RESET** button for longer than 1 second to restart/reboot the Router.
3. Press the **RESET** button for longer than five seconds to set the Router back to its factory-default configurations.

6

Monitor

6.1 Overview

This chapter discusses read-only information related to the device state of the Router.

Note: To access the Monitor screens, you can also click the links in the Summary table of the Status screen to view the bandwidth consumed, packets sent/received as well as the status of clients connected to the Router.

6.2 What You Can Do

- Use the **Log** (Section 6.3 on page 45) screen to see the logs for the activity on the Router.
- Use the **BW MGMT Monitor** screen (Section 6.4 on page 47) to view the amount of network bandwidth that applications running in the network are using.
- Use the **DHCP Table** screen (Section 6.5 on page 47) to view information related to your DHCP status.
- use the **Packet Statistics** screen (Section 6.6 on page 48) to view port status, packet specific statistics, the "system up time" and so on.
- Use the **WLAN Station Status** screen (Section 6.7 on page 49) to view the wireless stations that are currently associated to the Router.

6.3 The Log Screen

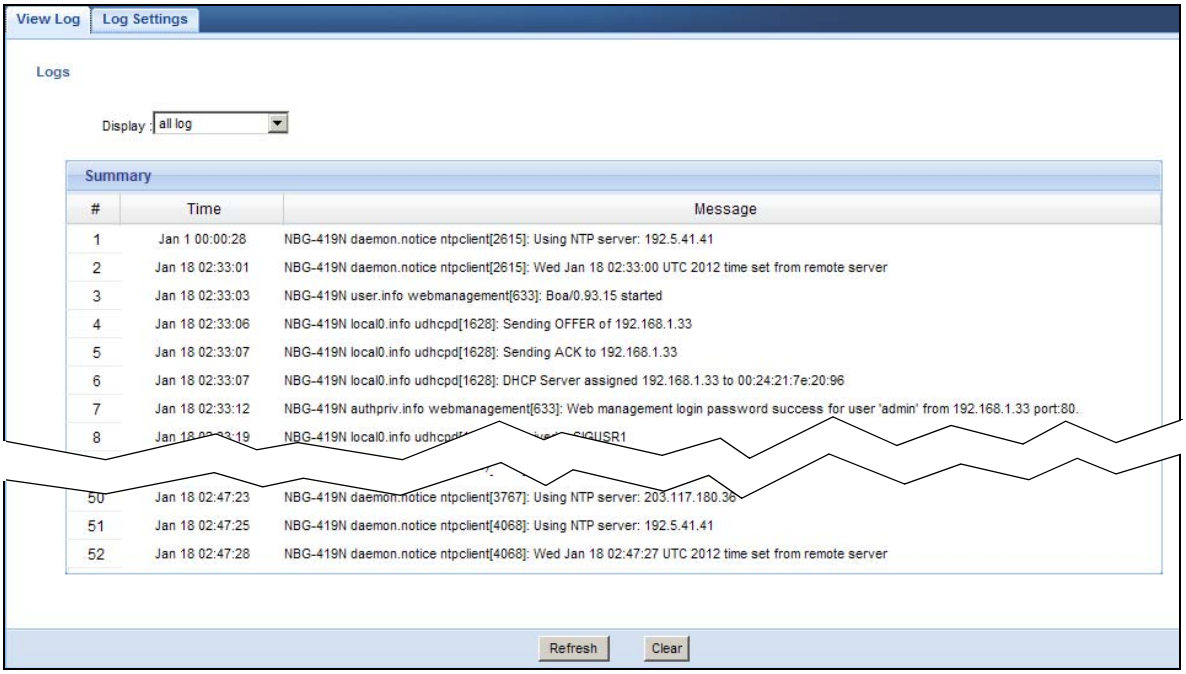
The Web Configurator allows you to look at all of the Router's logs in one location.

6.3.1 View Log

Use the **View Log** screen to see the logged messages for the Router. The log wraps around and deletes the old entries after it fills. Select what logs you want to see from the **Display** drop list. The

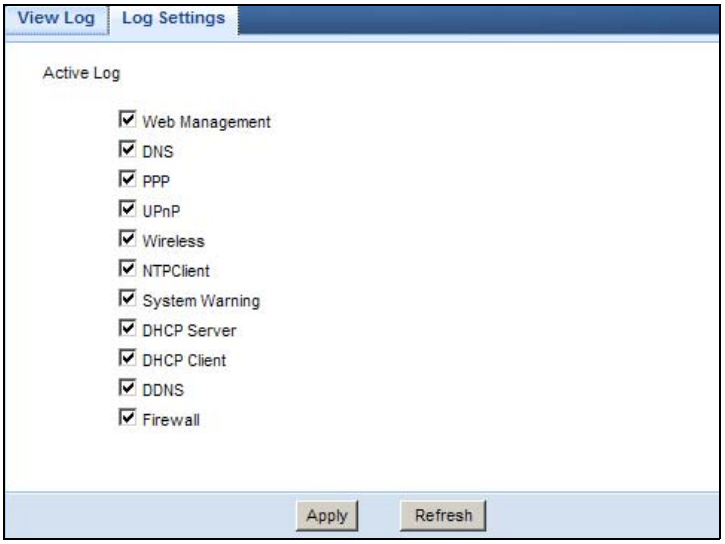
log choices depend on your settings in the **Log Settings** screen. Click **Refresh** to renew the log screen. Click **Clear** to delete all the logs.

Figure 26 View Log



You can configure which logs to display in the **View Log** screen. Go to the **Log Settings** screen and select the logs you wish to display. Click **Apply** to save your settings. Click **Refresh** to start the screen afresh.

Figure 27 Log Settings



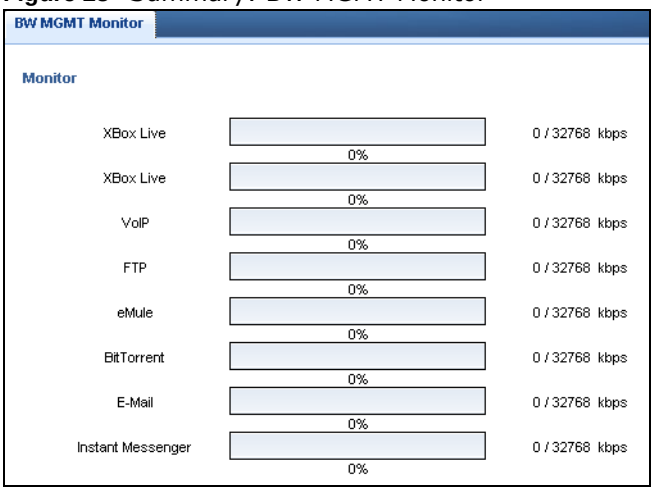
6.4 BW MGMT Monitor

The Bandwidth Management (BW MGMT) Monitor allows you to view the amount of network bandwidth that applications running in the network are using.

The bandwidth is measured in kilobits per second (kbps).

The monitor shows what kinds of applications are running in the network, the maximum kbps that each application can use, as well as the percentage of bandwidth it is using.

Figure 28 Summary: BW MGMT Monitor

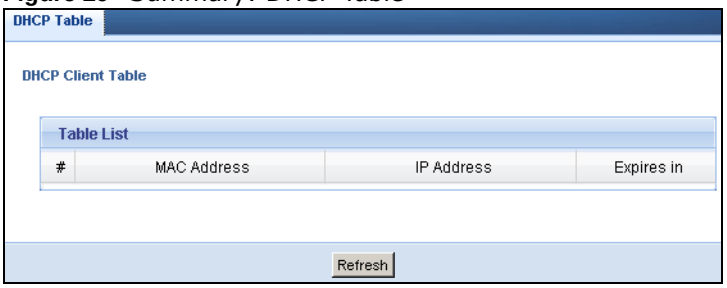


6.5 DHCP Table

DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients to obtain TCP/IP configuration at start-up from a server. You can configure the Router's LAN as a DHCP server or disable it. When configured as a server, the Router provides the TCP/IP configuration for the clients. If DHCP service is disabled, you must have another DHCP server on that network, or else the computer must be manually configured.

Click the **DHCP Table (Details...)** hyperlink in the **Status** screen. Read-only information here relates to your DHCP status. The DHCP table shows current DHCP client information (including **IP Address**, **Host Name** and **MAC Address**) of all network clients using the Router's DHCP server.

Figure 29 Summary: DHCP Table



The following table describes the labels in this screen.

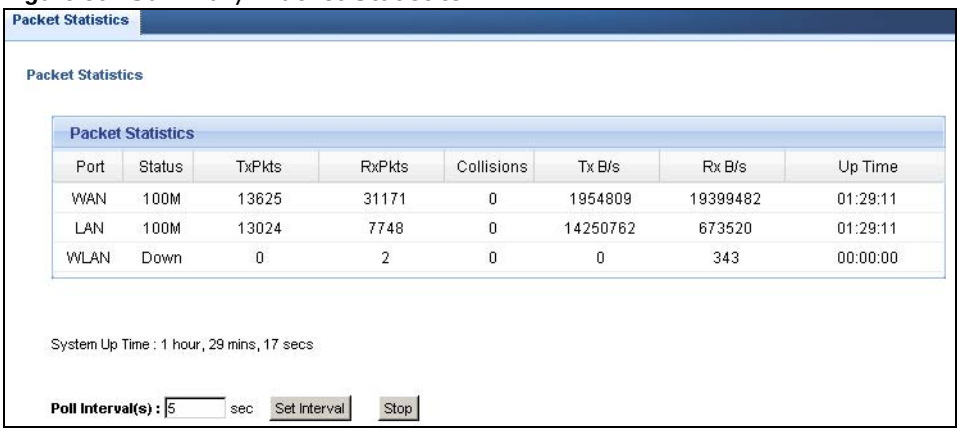
Table 18 Summary: DHCP Table

LABEL	DESCRIPTION
#	This is the index number of the host computer.
MAC Address	This field shows the MAC address of the computer with the name in the **Host Name** field. Every Ethernet device has a unique MAC (Media Access Control) address which uniquely identifies a device. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02.
IP Address	This field displays the IP address relative to the # field listed above.
Expires in	This field displays the time when the IP address and MAC address association ends.
Refresh	Click **Refresh** to renew the screen.

6.6 Packet Statistics

Click the **Packet Statistics (Details...)** hyperlink in the **Status** screen. Read-only information here includes port status, packet specific statistics and the "system up time". The **Poll Interval(s)** field is configurable and is used for refreshing the screen.

Figure 30 Summary: Packet Statistics



The following table describes the labels in this screen.

Table 19 Summary: Packet Statistics

LABEL	DESCRIPTION
Port	This is the Router's port type.
Status	For the LAN ports, this displays the port speed and duplex setting or **Down** when the line is disconnected. For the WAN port, it displays the port speed and duplex setting if you're using Ethernet encapsulation and **Idle** (line (ppp) idle), **Dial** (starting to trigger a call) and **Drop** (dropping a call) if you're using PPPoE or PPTP encapsulation. This field displays **Down** when the line is disconnected. For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and **Down** when the WLAN is disabled.
TxPkts	This is the number of transmitted packets on this port.
RxPkts	This is the number of received packets on this port.

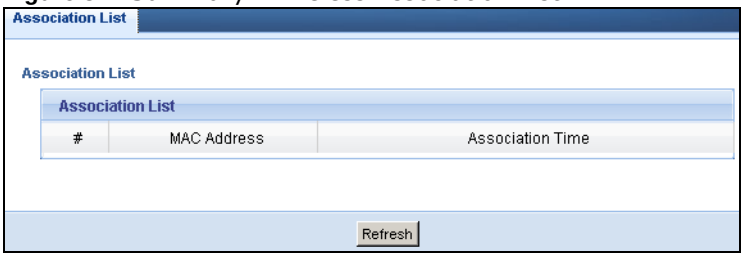
Table 19 Summary: Packet Statistics (continued)

LABEL	DESCRIPTION
Collisions	This is the number of collisions on this port.
Tx B/s	This displays the transmission speed in bytes per second on this port.
Rx B/s	This displays the reception speed in bytes per second on this port.
Up Time	This is the total time the Router has been for each session.
System Up Time	This is the total time the Router has been on.
Poll Interval(s)	Enter the time interval in seconds for refreshing statistics in this field.
Set Interval	Click this button to apply the new poll interval you entered in the **Poll Interval(s)** field.
Stop	Click **Stop** to stop refreshing statistics.

6.7 WLAN Station Status

Click the **WLAN Station Status (Details...)** hyperlink in the **Status** screen. View the wireless stations that are currently associated to the Router in the **Association List**. Association means that a wireless client (for example, your network or computer with a wireless network card) has connected successfully to the AP (or wireless router) using the same SSID, channel and security settings.

Figure 31 Summary: Wireless Association List



The following table describes the labels in this screen.

Table 20 Summary: Wireless Association List

LABEL	DESCRIPTION
#	This is the index number of an associated wireless station.
MAC Address	This field displays the MAC address of an associated wireless station.
Association Time	This field displays the time a wireless station first associated with the Router's WLAN network.
Refresh	Click **Refresh** to reload the list.

7

Router Modes

7.1 Overview

This chapter introduces the different modes available on your Router. First, the term "mode" refers to two things in this User's Guide.

- **Web Configurator mode**. This refers to the Web Configurator interface you want to use for editing Router features.
- **Device mode**. This is the operating mode of your Router, or simply how the Router is being used in the network.

7.1.1 Web Configurator Modes

This refers to the configuration interface of the Web Configurator, which has two modes:

- **Easy**. The Web Configurator shows this mode by default. Refer to Chapter 8 on page 53 for more information on the screens in this mode. This interface may be sufficient for users who just want to use the device.
- **Expert**. Advanced users can change to this mode to customize all the functions of the Router. Click **Expert Mode** after logging into the Web Configurator. The User's Guide Chapter 5 on page 39 through Chapter 26 on page 181 discusses the screens in this mode.

7.1.2 Device Modes

This refers to the operating mode of the Router, which can act as a:

- **Router**. This is the default device mode of the Router. Use this mode to connect the local network to another network, like the Internet. Go to Section 9.3 on page 65 to view the **Status** screen in this mode.
- **Access Point**. Use this mode if you want to extend your network by allowing network devices to connect to the Router wirelessly. Go to Section 10.4 on page 74 view the **Status** screen in this mode.
- **WISP** mode. Use this mode if there is an existing wireless router or access point in the network to which you want to connect your local network. Go to Section 11.4 on page 80 to view the **Status** screen in this mode.

For more information on these modes and to change the mode of your Router, refer to Section 26.10 on page 189.

The menu for changing device modes is available in **Expert** mode only.

Note: Choose your Device Mode carefully to avoid having to change it later.

When changing to another mode, the IP address of the Router changes. The running applications and services of the network devices connected to the Router can be interrupted.

In WISP mode, you should know the SSID and wireless security details of the access point to which you want to connect.

8

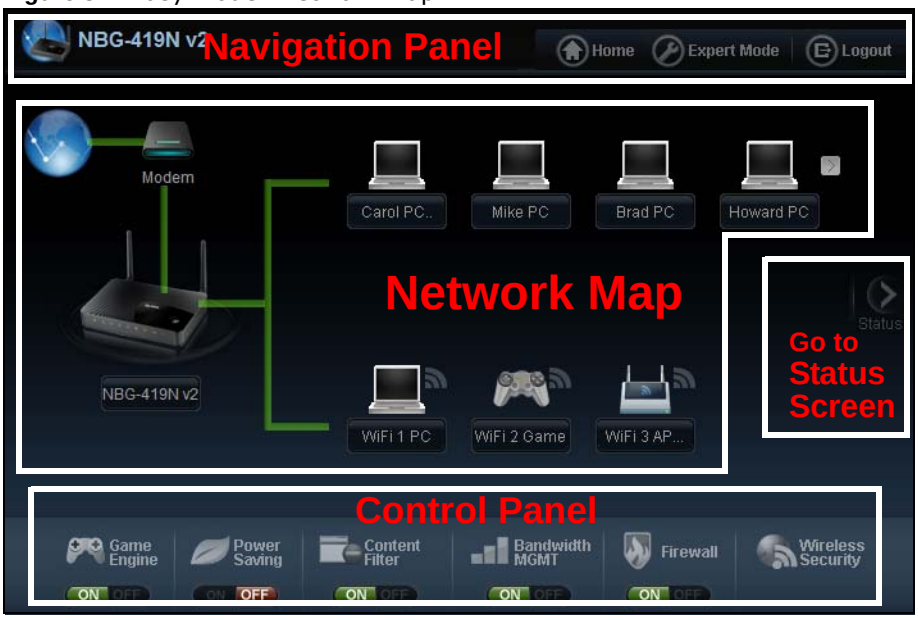
Easy Mode

8.1 Overview

The Web Configurator is set to **Easy Mode** by default. You can configure several key features of the Router in this mode. This mode is useful to users who are not fully familiar with some features that are usually intended for network administrators.

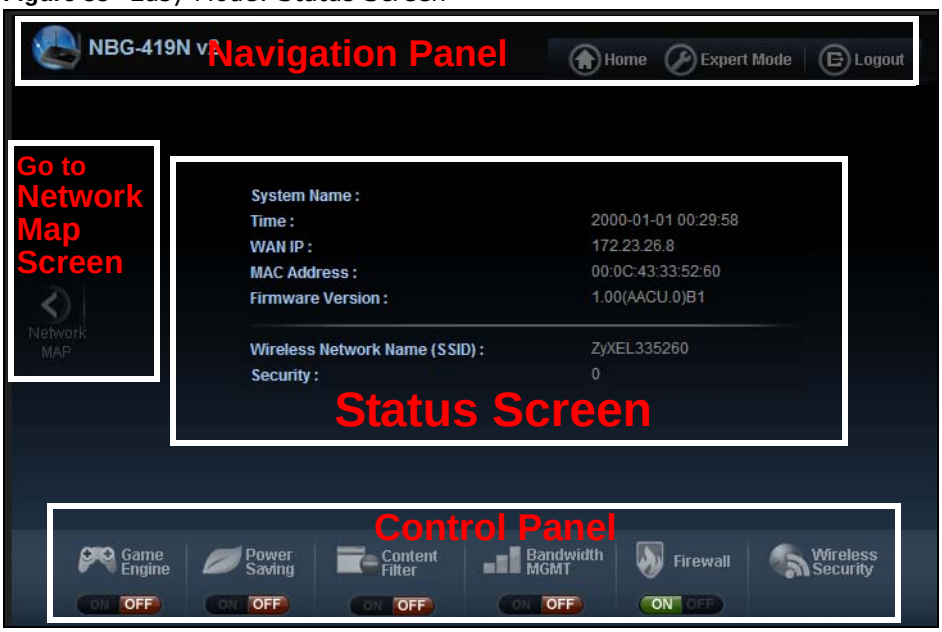
When you log in to the Web Configurator, the following screen opens.

Figure 32 Easy Mode: Network Map



Click **Status** to open the following screen screen.

Figure 33 Easy Mode: Status Screen



8.2 What You Can Do

You can do the following in this mode:

- Use this **Navigation Panel** (Section 8.4 on page 55) to opt out of the **Easy** mode.
- Use the **Network Map** screen (Section 8.5 on page 55) to check if your Router can ping the gateway and whether it is connected to the Internet.
- Use the **Control Panel** (Section 8.6 on page 56) to configure and enable Router features, including wireless security, wireless scheduling and bandwidth management and so on.
- Use the **Status Screen** screen (Section 8.7 on page 63) to view read-only information about the Router, including the WAN IP, MAC Address of the Router and the firmware version.

8.3 What You Need to Know

Between the different device modes, the Control Panel (Section 8.6 on page 56) changes depending on which features are applicable to the mode:

- **Router Mode**: All Control Panel features are available.
- **Access Point Mode**: Only **Power Saving** and **Wireless Security** are available.
- **WISP Mode**: The available features for this mode are **Game Console**, **Content Filter**, **Bandwidth MGMT**, and **Firewall**.

8.4 Navigation Panel

Use this navigation panel to opt out of the **Easy** mode.

Figure 34 Control Panel

The following table describes the labels in this screen.

Table 21 Control Panel

ITEM	DESCRIPTION
Home	Click this to go to the **Login** page.
Expert Mode	Click this to change to **Expert** mode and customize features of the Router.
Logout	Click this to end the Web Configurator session.

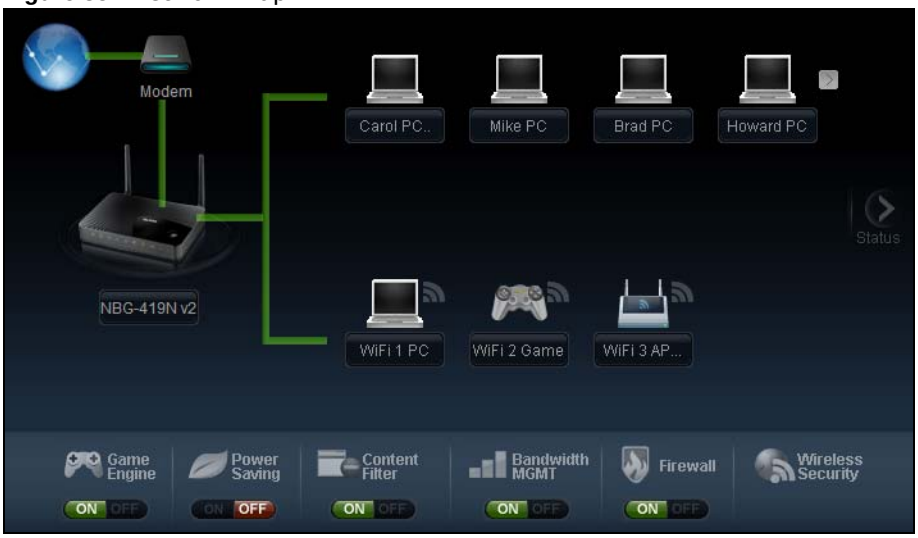
8.5 Network Map

Note: The Network MAP is viewable by Windows XP (need to install patch), Windows Vista and Windows 7 users only. For Windows XP (Service Pack 2) users, you can see the network devices connected to the Router by downloading the LLTD (Link Layer Topology Discovery) patch from the Microsoft Website.

Note: Don't worry if the Network Map does not display in your web browser. This feature may not be supported by your system. You can still configure the Control Panel (Section 8.6 on page 56) in the Easy Mode and the Router features that you want to use in the Expert Mode.

When you log into the Network Configurator, the Network Map is shown as follows.

Figure 35 Network Map



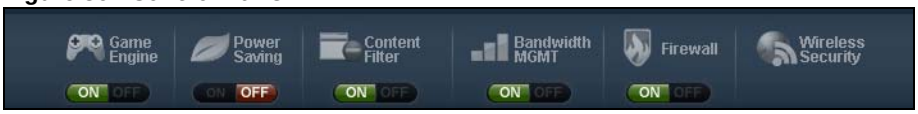
The line connecting the Router to the gateway becomes green when the Router is able to ping the gateway. It becomes red when the ping initiating from the Router does not get a response from the gateway. The same rule applies to the line connecting the gateway to the Internet.

You can also view the devices (represented by icons indicating the kind of network device) connected to the Router, including those connecting wirelessly. Right-click on the Router icon to refresh the network map and go to the Wizard. Right click on the other icons to view information about the device.

8.6 Control Panel

The features configurable in **Easy Mode** are shown in the **Control Panel**.

Figure 36 Control Panel



Switch **ON** to enable the feature. Otherwise, switch **OFF**. If the feature is turned on, the green light flashes. If it is turned off, the red light flashes.

Additionally, click the feature to open a screen where you can edit its settings.

The following table describes the labels in this screen.

Table 22 Control Panel

ITEM	DESCRIPTION
Game Engine	Switch **ON** to maximize bandwidth for gaming traffic in your network. Otherwise, switch **OFF**. Refer to Section 8.6.1 on page 57 to see this screen.
Power Saving	Click this to schedule the wireless feature of the Router. Disabling the wireless function helps lower the energy consumption of the Router. Switch **ON** to apply wireless scheduling. Otherwise, switch **OFF**. Refer to Section 8.6.2 on page 57 to see this screen.
Content Filter	Click this to restrict access to certain websites, based on keywords contained in URLs, to which you do not want users in your network to open. Switch **ON** to apply website filtering. Otherwise, switch **OFF**. Refer to Section 8.6.3 on page 59 to see this screen.
Bandwidth MGMT	Click this to edit bandwidth management for predefined applications. Switch **ON** to have the Router management bandwidth for uplink and downlink traffic according to an application or service. Otherwise, switch **OFF**. Refer to Section 8.6.4 on page 59 to see this screen.

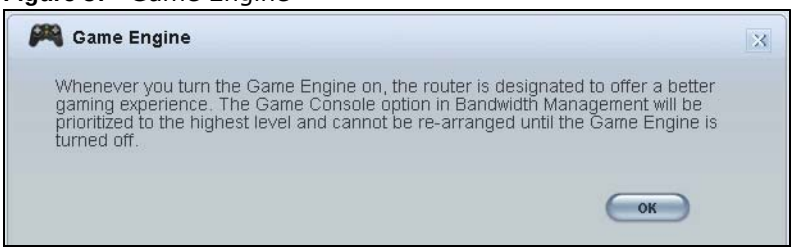
Table 22 Control Panel (continued)

ITEM	DESCRIPTION
Firewall	Switch **ON** to ensure that your network is protected from Denial of Service (DoS) attacks. Otherwise, switch **OFF**. Refer to Section 8.6.5 on page 60 to see this screen.
Wireless Security	Click this to configure the wireless security, such as SSID, security mode and WPS key on your Router. Refer to Section 8.6.6 on page 60 to see this screen.

8.6.1 Game Engine

When this feature is enabled, the Router maximizes the bandwidth for gaming traffic that it forwards out through an interface.

Figure 37 Game Engine



Note: When this is switched on, the **Game Console** tab in the **Bandwidth MGMT** screen is automatically positioned on top.

Turn this off if your network is not using gaming.

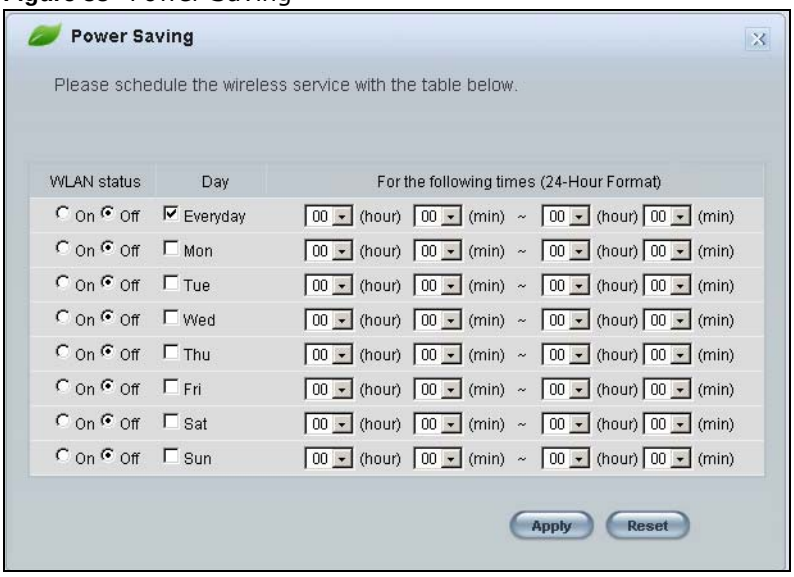
Click **OK** to close this screen.

8.6.2 Power Saving

Use this screen to set the day of the week and time of the day when your wireless LAN is turned on and off. Wireless LAN scheduling is disabled by default.

Disabling the wireless capability lowers the energy consumption of the of the Router.

Figure 38 Power Saving



The following table describes the labels in this screen.

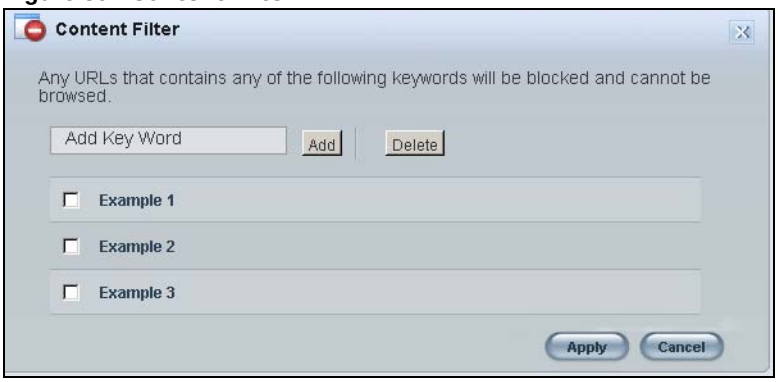
Table 23 Power Saving

LABEL	DESCRIPTION
WLAN Status	Select **On** or **Off** to specify whether the Wireless LAN is turned on or off (depending on what you selected in the **WLAN Status** field). This field works in conjunction with the **Day** and **Except for the following times** fields.
Day	Select **Everyday** or the specific days to turn the Wireless LAN on or off. If you select **Everyday** you can not select any specific days. This field works in conjunction with the **Except for the following times** field.
For the following times (24-Hour Format)	Select a begin time using the first set of **hour** and minute (**min**) drop down boxes and select an end time using the second set of **hour** and minute (**min**) drop down boxes. If you have chosen **On** earlier for the WLAN Status the Wireless LAN will turn on between the two times you enter in these fields. If you have chosen **Off** earlier for the WLAN Status the Wireless LAN will turn off between the two times you enter in these fields. In this time format, midnight is 00:00 and progresses up to 24:00. For example, 6:00 PM is 18:00.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to begin configuring this screen afresh.

8.6.3 Content Filter

Use this screen to restrict access to certain websites, based on keywords contained in URLs, to which you do not want users in your network to open.

Figure 39 Content Filter



The following table describes the labels in this screen.

Table 24 Content Filter

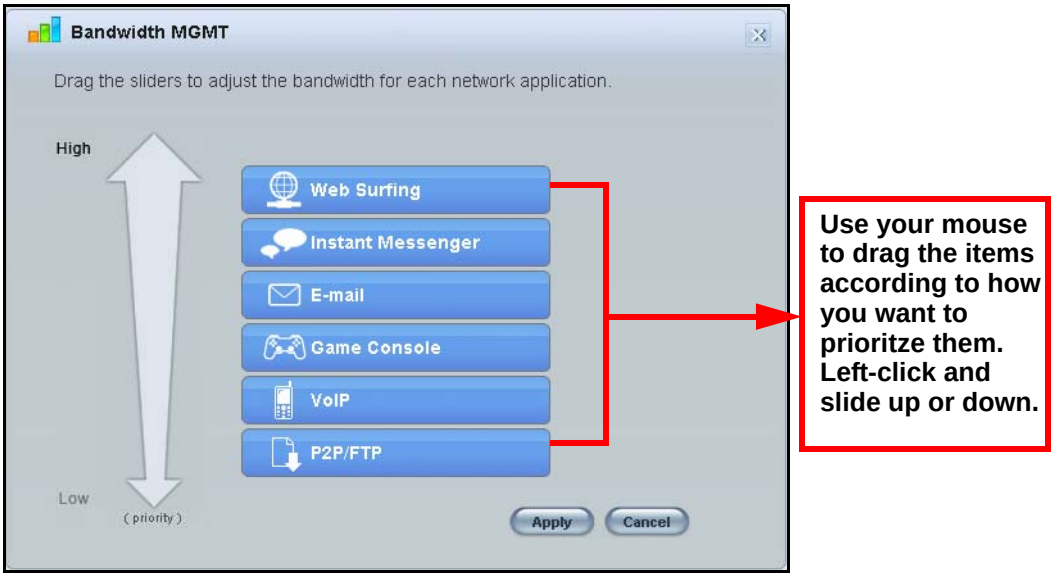
LABEL	DESCRIPTION
Add	Click **Add** after you have typed a keyword. Repeat this procedure to add other keywords. Up to 64 keywords are allowed. Note: The Router does not recognize wildcard characters as keywords. When you try to access a web page containing a keyword, you will get a message telling you that the content filter is blocking this request.
Delete	Highlight a keyword in the text box and click **Delete** to remove it. The keyword disappears from the text box after you click **Apply**.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to close this screen without saving any changes.

8.6.4 Bandwidth MGMT

Use this screen to set bandwidth allocation to pre-defined services and applications for bandwidth allocation.

The Router uses bandwidth management for incoming and outgoing traffic. Rank the services and applications by dragging them accordingly from **High** to **Low** and click **Apply**. Click **Cancel** to close the screen.

Figure 40 Bandwidth MGNT



8.6.5 Firewall

Enable this feature to protect the network from Denial of Service (DoS) attacks. The Router blocks repetitive pings from the WAN that can otherwise cause systems to slow down or hang.

Figure 41 Firewall

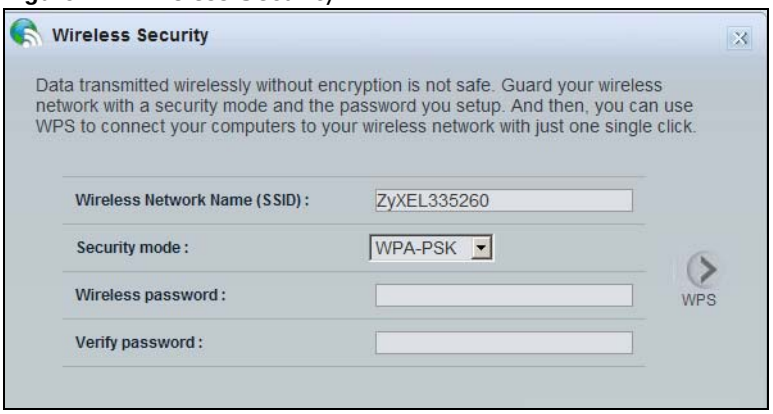
Click **OK** to close this screen.

8.6.6 Wireless Security

Use this screen to configure security for your the Wireless LAN. You can enter the SSID and select the wireless security mode in the following screen.

Note: You can enable the Wireless function of your Router by first turning on the switch in the back panel.

Figure 42 Wireless Security



The following table describes the general wireless LAN labels in this screen.

Table 25 Wireless Security

LABEL	DESCRIPTION
Wireless Network Name (SSID)	(Service Set IDentity) The SSID identifies the Service Set with which a wireless station is associated. Wireless stations associating to the access point (AP) must have the same SSID. Enter a descriptive name (up to 32 keyboard characters) for the wireless LAN.
Security mode	Select **WPA-PSK** or **WPA2-PSK** to add security on this wireless network. The wireless clients which want to associate to this network must have same wireless security settings as this device. After you select to use a security, additional options appears in this screen. Select **No Security** to allow any client to connect to this network without authentication.
Wireless password	This field appears when you choose wither **WPA-PSK** or **WPA2-PSK** as the security mode. Type a pre-shared key from 8 to 63 case-sensitive keyboard characters.
Verify password	Type the password again to confirm.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to close this screen.
WPS	Click this to configure the WPS screen. You can transfer the wireless settings configured here (**Wireless Security** screen) to another wireless device that supports WPS.

8.6.7 WPS

Use this screen to add a wireless station to the network using WPS. Click **WPS** in the **Wireless Security** to open the following screen.

Figure 43 Wireless Security: WPS

The following table describes the labels in this screen.

Table 26 Wireless Security: WPS

LABEL	DESCRIPTION
Wireless Security	Click this to go back to the Wireless Security screen.
WPS	Create a secure wireless network simply by pressing a button. The Router scans for a WPS-enabled device within the range and performs wireless security information synchronization. Note: After you click the **WPS** button on this screen, you have to press a similar button in the wireless station utility within 2 minutes. To add the second wireless station, you have to press these buttons on both device and the wireless station again after the first 2 minutes.
Register	Create a secure wireless network simply by entering a wireless client's PIN (Personal Identification Number) in the Router's interface and pushing this button. Type the same PIN number generated in the wireless station's utility. Then click **Register** to associate to each other and perform the wireless security information synchronization.
Exit	Click **Exit** to close this screen.

8.7 Status Screen in Easy Mode

In the Network Map screen, click **Status** to view read-only information about the Router.

Figure 44 Status Screen in Easy Mode

The following table describes the labels in this screen.

Table 27 Status Screen in Easy Mode

ITEM	DESCRIPTION
Name	This is the name of the Router in the network. You can change this in the **Maintenance > General** screen in Section 26.3 on page 181.
Time	This is the current system date and time. The date is in YYYY:MM:DD (Year-Month-Day) format. The time is in HH:MM:SS (Hour:Minutes:Seconds) format.
WAN IP	This is the IP address of the WAN port.
MAC Address	This is the MAC address of the Router.
Firmware Version	This shows the firmware version of the Router. The firmware version format shows the trunk version, model code and release number.
Wireless Network Name	This shows the SSID of the wireless network. You can configure this in the Wireless Security screen (Section 8.6.6 on page 60; Section 13.3.1.1 on page 104).
Security	This shows the wireless security used by the Router.

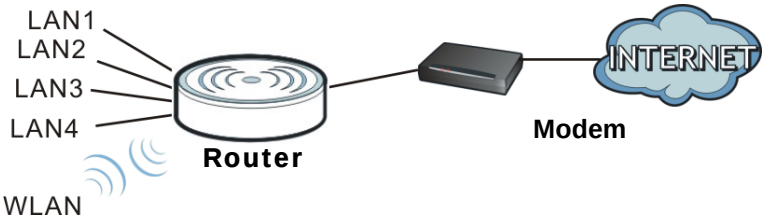
9

Router Mode

9.1 Overview

The Router is set to router mode by default. Routers are used to connect the local network to another network (for example, the Internet). In the figure below, the Router connects the local network (**LAN1** ~ **LAN4**) to the Internet.

Figure 45 Router Network



Note: The Status screen is shown after changing to the Expert mode of the Web Configurator. It varies depending on the device mode of your Router.

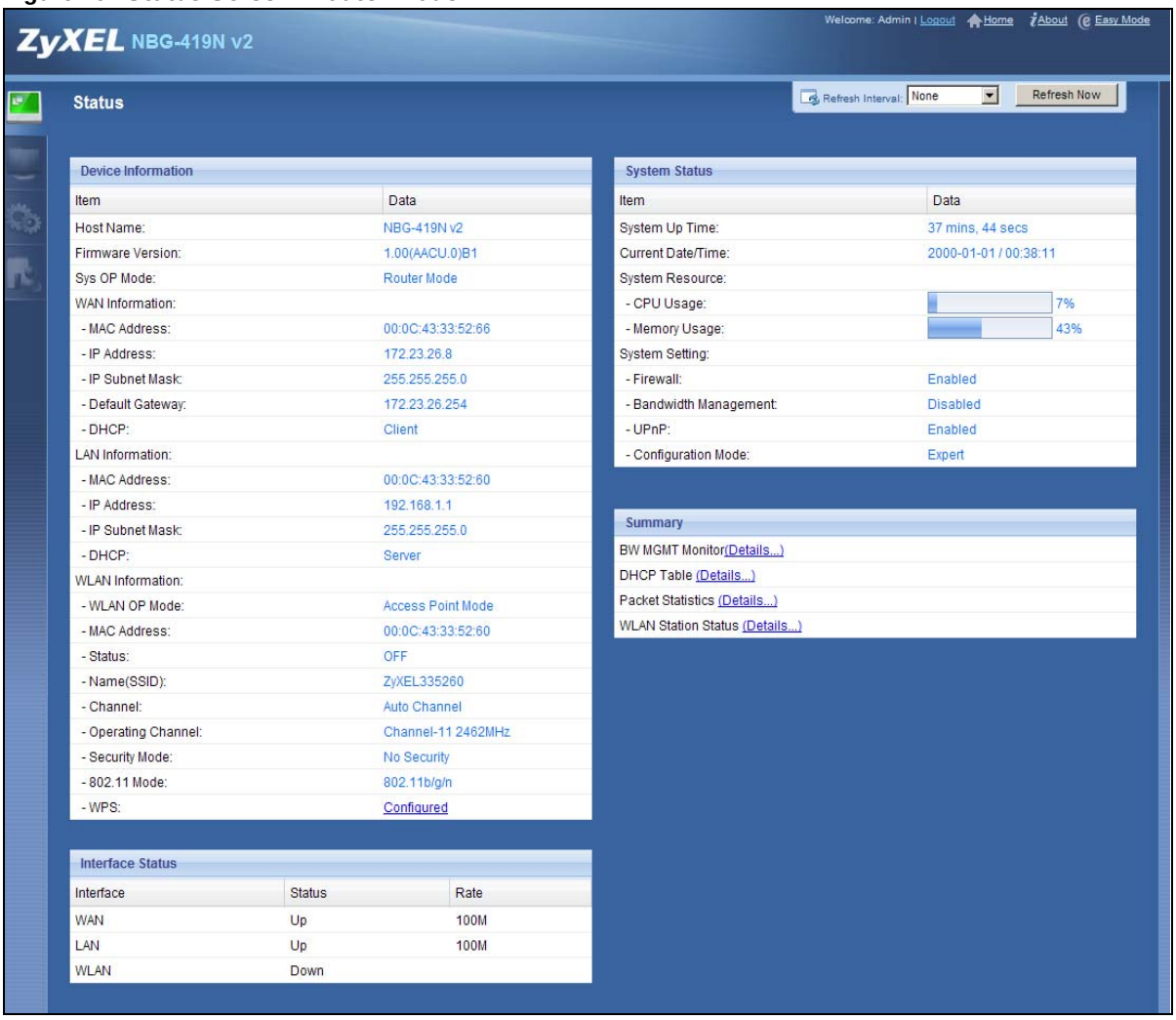
9.2 What You Can Do

Use the **Status** screen (Section 9.3 on page 65) to view read-only information about your Router.

9.3 Status Screen

Click  to open the status screen.

Figure 46 Status Screen: Router Mode



The following table describes the icons shown in the **Status** screen.

Table 28 Status Screen Icon Key: Router Mode

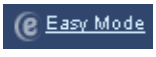
ICON	DESCRIPTION
	Click this icon to view copyright and a link for related product information.
	Click this icon to go to Easy Mode. See Chapter 8 on page 53.
	Click this to go to the Home page. See Chapter 6 on page 45.
	Select a number of seconds or **None** from the drop-down list box to refresh all screen statistics automatically at the end of every time interval or to not refresh the screen statistics.

Table 28 Status Screen Icon Key: Router Mode (continued)

ICON	DESCRIPTION
Refresh Now	Click this button to refresh the status screen statistics.
	Click this icon to see the Status page. The information in this screen depends on the device mode you select.
	Click this icon to see the **Monitor** navigation menu.
	Click this icon to see the **Configuration** navigation menu.
	Click this icon to see the **Maintenance** navigation menu.

The following table describes the labels shown in the **Status** screen.

Table 29 Status Screen: Router Mode

LABEL	DESCRIPTION
Logout	Click this at any time to exit the Web Configurator.
Device Information	
Host Name	This is the **System Name** you enter in the **Maintenance** > **General** screen. It is for identification purposes.
Firmware Version	This is the firmware version and the date created.
Sys OP Mode	This is the device mode (Section 7.1.2 on page 51) to which the Router is set - **Router Mode**.
WAN Information	
- MAC Address	This shows the WAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the WAN port's IP address.
- IP Subnet Mask	This shows the WAN port's subnet mask.
- Default Gateway	This shows the WAN port's gateway IP address.
- DHCP	This shows the LAN port's DHCP role - **Client** or **Server**.
LAN Information	
- MAC Address	This shows the LAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the LAN port's IP address.
- IP Subnet Mask	This shows the LAN port's subnet mask.
- DHCP	This shows the LAN port's DHCP role - **Server** or **None**.
WLAN Information	
- WLAN OP Mode	This is the device mode (Section 7.1.2 on page 51) to which the Router's wireless LAN is set - **Access Point Mode**.
- MAC Address	This shows the wireless adapter MAC Address of your device.
- Status	This shows the current status of the Wireless LAN - **ON** or **OFF**.
- Name (SSID)	This shows a descriptive name used to identify the Router in the wireless LAN.
- Channel	This shows the channel number which you select manually.
- Operating Channel	This shows the channel number which the Router is currently using over the wireless LAN.
- Security Mode	This shows the level of wireless security the Router is using.
- 802.11 Mode	This shows the wireless standard.

Table 29 Status Screen: Router Mode (continued)

LABEL	DESCRIPTION
- WPS	This displays **Configured** when the WPS has been set up. This displays **Unconfigured** if the WPS has not been set up. Click the status to display **Network > Wireless LAN > WPS** screen.
System Status	
Item	This column shows the type of data the Router is recording.
Data	This column shows the actual data recorded by the Router.
System Up Time	This is the total time the Router has been on.
Current Date/Time	This field displays your Router's present date and time.
System Resource	
- CPU Usage	This displays what percentage of the Router's processing ability is currently used. When this percentage is close to 100%, the Router is running at full load, and the throughput is not going to improve anymore. If you want some applications to have more throughput, you should turn off other applications (for example, using bandwidth management.)
- Memory Usage	This shows what percentage of the heap memory the Router is using.
System Setting	
- Firewall	This shows whether the firewall is enabled or not.
- Bandwidth Management	This shows whether the bandwidth management is enabled or not.
- UPnP	This shows whether UPnP is enabled or not.
- Configuration Mode	This shows the web configurator mode you are viewing - **Expert**.
Interface Status	
Interface	This displays the Router port types. The port types are: **WAN**, **LAN** and **WLAN**.
Status	For the LAN and WAN ports, this field displays **Down** (line is down) or **Up** (line is up or connected). For the WLAN, it displays **Up** when the WLAN is enabled or **Down** when the WLAN is disabled.
Rate	For the LAN ports, this displays the port speed and duplex setting or **N/A** when the line is disconnected. For the WAN port, it displays the port speed and duplex setting if you're using Ethernet encapsulation and **Idle** (line (ppp) idle), **Dial** (starting to trigger a call) and **Drop** (dropping a call) if you're using PPPoE or PPTP encapsulation. This field displays **N/A** when the line is disconnected. For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and **N/A** when the WLAN is disabled.
Summary	
BW MGMT Monitor	Click **Details...** to go to the **Monitor > BW MGMT Monitor** screen (Section 6.4 on page 47). Use this screen to view the amount of network bandwidth that applications running in the network are using.
DHCP Table	Click **Details...** to go to the **Monitor > DHCP Table** screen (Section 6.5 on page 47). Use this screen to view current DHCP client information.
Packet Statistics	Click **Details...** to go to the **Monitor > Packet Statistics** screen (Section 6.6 on page 48). Use this screen to view port status and packet specific statistics.
WLAN Station Status	Click **Details...** to go to the **Monitor > WLAN Station Status** screen (Section 6.7 on page 49). Use this screen to view the wireless stations that are currently associated to the Router.

9.3.1 Navigation Panel

Use the sub-menus on the navigation panel to configure Router features.

Figure 47 Navigation Panel: Router Mode

The following table describes the sub-menus.

Table 30 Navigation Panel: Router Mode

LINK	TAB	FUNCTION
Status		This screen shows the Router's general device, system and interface status information. Use this screen to access the wizard, and summary statistics tables.
MONITOR		
Log		Use this screen to view the list of activities recorded by your Router.
BW MGMT		Use this screen to view the amount of network bandwidth that applications running in the network are using.
DHCP Table		Use this screen to view current DHCP client information.
Packet Statistics		Use this screen to view port status and packet specific statistics.
WLAN Station Status		Use this screen to view the wireless stations that are currently associated to the Router.
CONFIGURATION		
Network		

Table 30 Navigation Panel: Router Mode (continued)

LINK	TAB	FUNCTION
Wireless LAN	General	Use this screen to configure wireless LAN.
	MAC Filter	Use the MAC filter screen to configure the Router to block access to devices or block the devices from accessing the Router.
	Advanced	This screen allows you to configure advanced wireless settings.
	QoS	Use this screen to configure Wi-Fi Multimedia Quality of Service (WMM QoS). WMM QoS allows you to prioritize wireless traffic according to the delivery requirements of individual services.
	WPS	Use this screen to configure WPS.
	WPS Station	Use this screen to add a wireless station using WPS.
	Scheduling	Use this screen to schedule the times the Wireless LAN is enabled.
	WDS	Use this screen to set up Wireless Distribution System (WDS) on your Router.
WAN	Internet Connection	This screen allows you to configure ISP parameters, WAN IP address assignment, DNS servers and the WAN MAC address.
	Advanced	Use this screen to configure other advanced properties.
	IGMP Snooping	Use this screen to enable IGMP snooping if you have LAN users that subscribe to multicast services.
LAN	IP	Use this screen to configure LAN IP address and subnet mask.
	IP Alias	Use this screen to have the Router apply IP alias to create LAN subnets.
DHCP Server	General	Use this screen to enable the Router's DHCP server.
	Advanced	Use this screen to assign IP addresses to specific individual computers based on their MAC addresses and to have DNS servers assigned by the DHCP server.
NAT	General	Use this screen to enable NAT.
	Application	Use this screen to configure servers behind the Router.
	Advanced	Use this screen to change your Router's port triggering settings.
DDNS	General	Use this screen to set up dynamic DNS.
Static Route	IP Static Route	Use this screen to configure IP static routes.
RIP		Use this screen to enable RIPv1 or RIPv2, which are LAN broadcast protocols.
Security		
Firewall	General	Use this screen to activate/deactivate the firewall.
	Services	This screen shows a summary of the firewall rules, and allows you to edit/ add a firewall rule.
Content Filter		Use this screen to block certain web features and sites containing certain keywords in the URL.
Management		
Bandwidth Management	General	Use this screen to enable bandwidth management.
	Advanced	Use this screen to set the upstream bandwidth and edit a bandwidth management rule.
	Monitor	Use this screen to view the amount of network bandwidth that applications running in the network are using.
Remote Management	WWW	Use this screen to be able to access the Router from the LAN, WAN or both.
UPnP	General	Use this screen to enable UPnP on the Router.

Table 30 Navigation Panel: Router Mode (continued)

LINK	TAB	FUNCTION
MAINTENANCE		
General		Use this screen to view and change administrative settings such as system and domain names.
Password	Password Setup	Use this screen to change the password of your Router.
Time	Time Setting	Use this screen to change your Router's time and date.
Remote Management	WWW	Use this screen to configure through which interface(s) and from which IP address(es) users can use HTTP to manage the Router.
Firmware Upgrade		Use this screen to upload firmware to your Router.
Backup/ Restore		Use this screen to backup and restore the configuration or reset the factory defaults to your Router.
Reset/ Restart	Restart	This screen allows you to reboot the Router without turning the power off.
Sys OP Mode		This screen allows you to select whether your device acts as a Router or a Access Point.

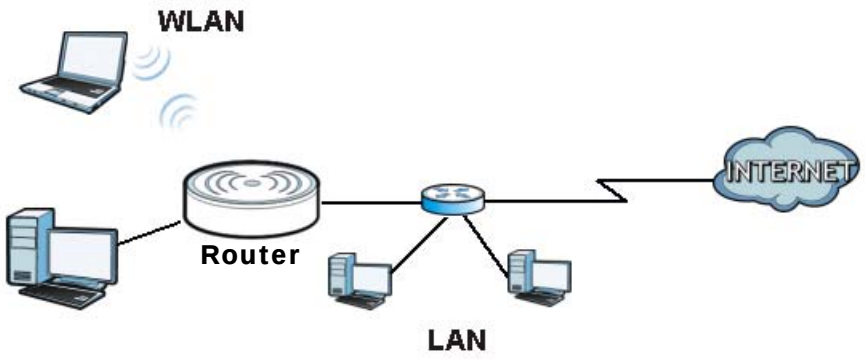
10

Access Point Mode

10.1 Overview

Use your Router as an access point (AP) if you already have a router or gateway on your network. In this mode your Router bridges a wired network (LAN) and wireless LAN (WLAN) in the same subnet. See the figure below for an example.

Figure 48 Wireless Internet Access in Access Point Mode



Many screens that are available in Router mode are not available in Access Point mode, such as bandwidth management and firewall.

Note: See Chapter 12 on page 89 for an example of setting up a wireless network in Access Point mode.

10.2 What You Can Do

- Use the **Status** screen (Section 10.4 on page 74) to view read-only information about your Router.
- Use the **LAN** screen (Section 10.5 on page 76) to set the IP address for your Router acting as an access point.

10.3 What You Need to Know

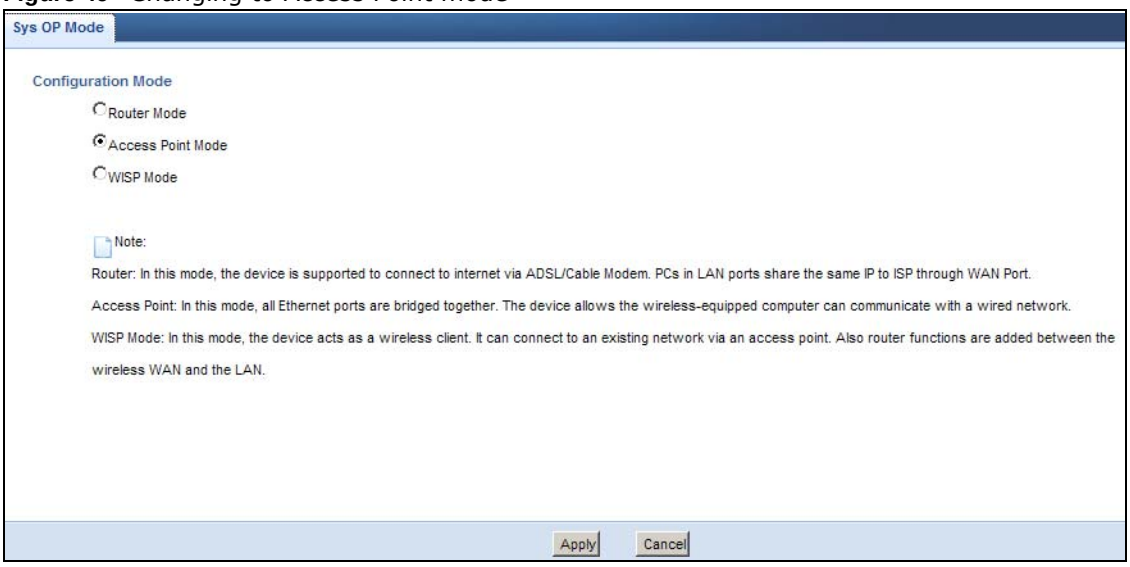
See Chapter 12 on page 89 for a tutorial on setting up a network with the Router as an access point.

10.3.1 Setting your Router to AP Mode

1 Log into the Web Configurator if you haven't already. See the Quick start Guide for instructions on how to do this.

2 To use your Router as an access point, go to **Maintenance > Sys OP Mode > General** and select **Access Point mode.**

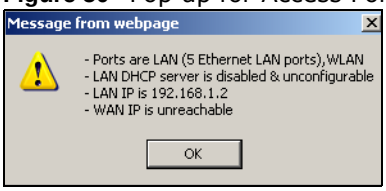
Figure 49 Changing to Access Point mode



Note: You have to log in to the Web Configurator again when you change modes. As soon as you do, your Router is already in Access Point mode.

3 When you select **Access Point Mode**, the following pop-up message window appears.

Figure 50 Pop up for Access Point mode



Click **OK**. The Web Configurator refreshes once the change to Access Point mode is successful.

10.3.2 Accessing the Web Configurator in Access Point Mode

Log in to the Web Configurator in Access Point mode, do the following:

1 Connect your computer to the LAN port of the Router.

2 The default IP address of the Router is "192.168.1.2". In this case, your computer must have an IP address in the range between "192.168.1.3" and "192.168.1.254".

3 Click **Start > Run** on your computer in Windows. Type "cmd" in the dialog box. Enter "ipconfig" to show your computer's IP address. If your computer's IP address is not in the correct range then see Appendix C on page 221 for information on changing your computer's IP address.

4 After you've set your computer's IP address, open a web browser such as Internet Explorer and type "192.168.1.2" as the web address in your web browser.

Note: After clicking Login, the Easy mode appears. Refer to page 53 for the Easy mode screens. Change to Expert mode to see the screens described in the sections following this.

10.3.3 Configuring your WLAN, Bandwidth Management and Maintenance Settings

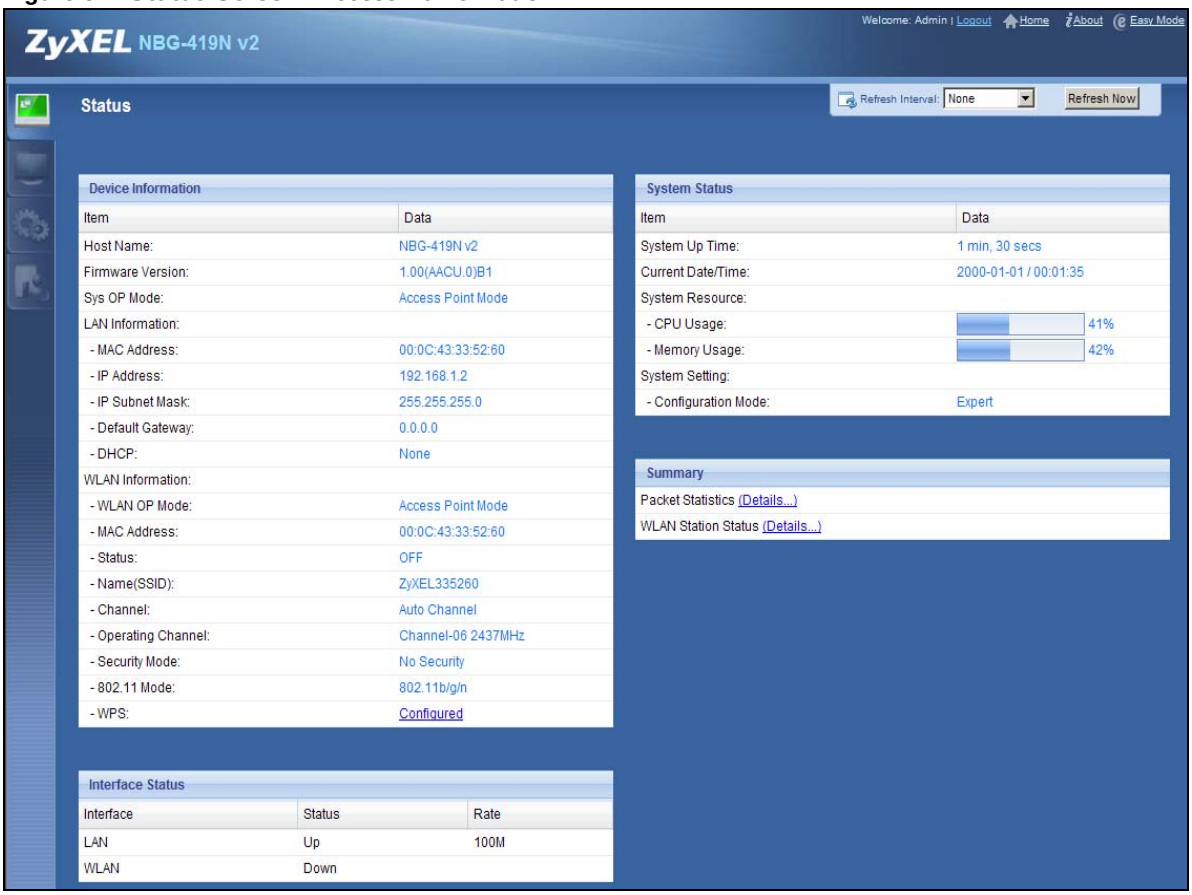
The configuration of wireless, bandwidth management and maintenance settings in **Access Point** mode is the same as for **Router Mode**.

- See Chapter 13 on page 103 for information on the configuring your wireless network.
- See Chapter 23 on page 163 for information on configuring your Bandwidth Management screen.
- See Chapter 26 on page 181 to Chapter 26 on page 181 for information on configuring your Maintenance settings.

10.4 AP Mode Status Screen

Click  to open the **Status** screen.

Figure 51 Status Screen: Access Point Mode



The following table describes the labels shown in the **Status** screen.

Table 31 Status Screen: Access Point Mode

LABEL	DESCRIPTION
Logout	Click this at any time to exit the Web Configurator.
Device Information	
Host Name	This is the **System Name** you enter in the **Maintenance** > **General** screen. It is for identification purposes.
Firmware Version	This is the firmware version and the date created.
Sys OP Mode	This is the device mode (Section 7.1.2 on page 51) to which the Router is set - **Access Point Mode**.
LAN Information	
- MAC Address	This shows the LAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the LAN port's IP address.
- IP Subnet Mask	This shows the LAN port's subnet mask.
- DHCP	This shows the LAN port's DHCP role - **Server, Client or None.**
WLAN Information	

Table 31 Status Screen: Access Point Mode (continued)

LABEL	DESCRIPTION
- WLAN OP Mode	This is the device mode (Section 7.1.2 on page 51) to which the Router's wireless LAN is set - **Access Point Mode**.
- MAC Address	This shows the wireless adapter MAC Address of your device.
- Status	This shows the current status of the Wireless LAN - **ON** or **OFF**.
- Name (SSID)	This shows a descriptive name used to identify the Router in the wireless LAN.
- Channel	This shows the channel number which you select manually.
- Operating Channel	This shows the channel number which the Router is currently using over the wireless LAN.
- Security Mode	This shows the level of wireless security the Router is using.
- 802.11 Mode	This shows the wireless standard.
- WPS	This displays **Configured** when the WPS has been set up. This displays **Unconfigured** if the WPS has not been set up. Click the status to display **Network > Wireless LAN > WPS** screen.
System Status	
Item	This column shows the type of data the Router is recording.
Data	This column shows the actual data recorded by the Router.
System Up Time	This is the total time the Router has been on.
Current Date/Time	This field displays your Router's present date and time.
System Resource	
- CPU Usage	This displays what percentage of the Router's processing ability is currently used. When this percentage is close to 100%, the Router is running at full load, and the throughput is not going to improve anymore. If you want some applications to have more throughput, you should turn off other applications (for example, using bandwidth management.
- Memory Usage	This shows what percentage of the heap memory the Router is using.
System Setting	
- Configuration Mode	This shows the web configurator mode you are viewing - **Expert**.
Interface Status	
Interface	This displays the Router port types. The port types are: **LAN** and **WLAN**.
Status	For the LAN and WAN ports, this field displays **Down** (line is down) or **Up** (line is up or connected). For the WLAN, it displays **Up** when the WLAN is enabled or **Down** when the WLAN is disabled.
Rate	For the LAN ports, this displays the port speed and duplex setting or **N/A** when the line is disconnected. For the WAN port, it displays the port speed and duplex setting if you're using Ethernet encapsulation and **Idle** (line (ppp) idle), **Dial** (starting to trigger a call) and **Drop** (dropping a call) if you're using PPPoE or PPTP encapsulation. This field displays **N/A** when the line is disconnected. For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and **N/A** when the WLAN is disabled.
Summary	
Packet Statistics	Click **Details...** to go to the **Monitor > Packet Statistics** screen (Section 6.6 on page 48). Use this screen to view port status and packet specific statistics.
WLAN Station Status	Click **Details...** to go to the **Monitor > WLAN Station Status** screen (Section 6.7 on page 49). Use this screen to view the wireless stations that are currently associated to the Router.

10.4.0.1 Navigation Panel

Use the menu in the navigation panel to configure Router features in Access Point mode.

The following screen and table show the features you can configure in Access Point mode.

Figure 52 Menu: Access Point Mode

Refer to Table 30 on page 68 for descriptions of the labels shown in the **Navigation** panel.

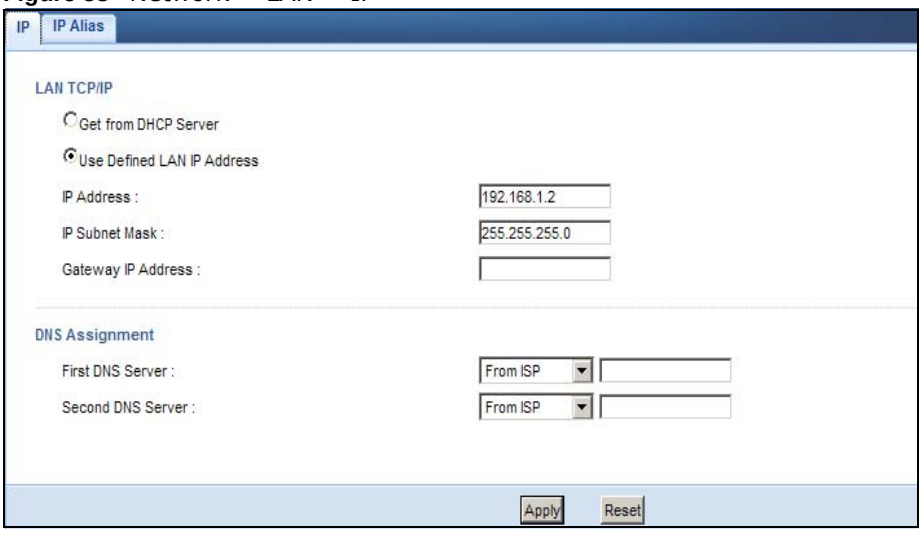
10.5 LAN Screen

Use this section to configure your LAN settings while in **Access Point** mode.

Click **Network > LAN** to see the screen below.

Note: If you change the IP address of the Router in the screen below, you will need to log into the Router again using the new IP address.

Figure 53 Network > LAN > IP



The table below describes the labels in the screen.

Table 32 Network > LAN > IP

LABEL	DESCRIPTION
Get from DHCP Server	Click this to deploy the Router as an access point in the network. When you enable this, the Router gets its IP address from the network's DHCP server (for example, your ISP). Users connected to the Router can now access the network (i.e., the Internet if the IP address is given by the ISP). The Web Configurator may no longer be accessible unless you know the IP address assigned by the DHCP server to the Router. You need to reset the Router to be able to access the Web Configurator again (see Section 26.7 on page 186 for details on how to reset the Router). Also when you select this, you cannot enter an IP address for your Router in the field below.
Use Defined LAN IP Address	Click this if you want to specify the IP address of your Router. Or if your ISP or network administrator gave you a static IP address to access the network or the Internet.
IP Address	Type the IP address in dotted decimal notation. The default setting is 192.168.1.2. If you change the IP address you will have to log in again with the new IP address.
IP Subnet Mask	The subnet mask specifies the network number portion of an IP address. Your Router will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the Router.
Gateway IP Address	Enter a **Gateway IP Address** (if your ISP or network administrator gave you one) in this field.
DNS Assignment	
First DNS Server Second DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the Router's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.
Apply	Click **Apply** to save your changes to the Router.
Reset	Click **Reset** to reload the previous configuration for this screen.

11

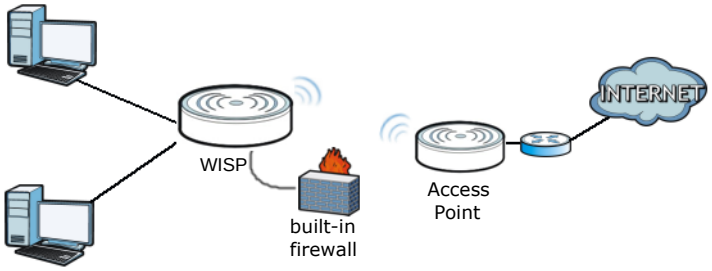
WISP Mode

11.1 Overview

Your Router can act as a wireless client. In wireless client mode, it can connect to an existing network via an access point. Use this mode if you already have an access point or router in your network.

In the example below, one Router (**A**) is configured as a wireless client and another is used as an access point (**B**). The wireless client has two clients that need to connect to the Internet. The Router wirelessly connects to the available access point (**B**).

Figure 54 Wireless Client Mode



After the Router and the access point connect, the Router acquires its WAN IP address from the access point. The clients of the Router can now surf the Internet.

11.2 What You Can Do

- Use the **Status** screen (Section 11.4 on page 80) to view read-only information about your Router.
- Use the **LAN** screen (Chapter 15 on page 133) to set the IP address for your Router acting as an access point.
- Use the **Wireless LAN** screen (Section 11.5 on page 82) to associate your Router (acting as a wireless client) with an existing access point.

11.3 What You Need to Know

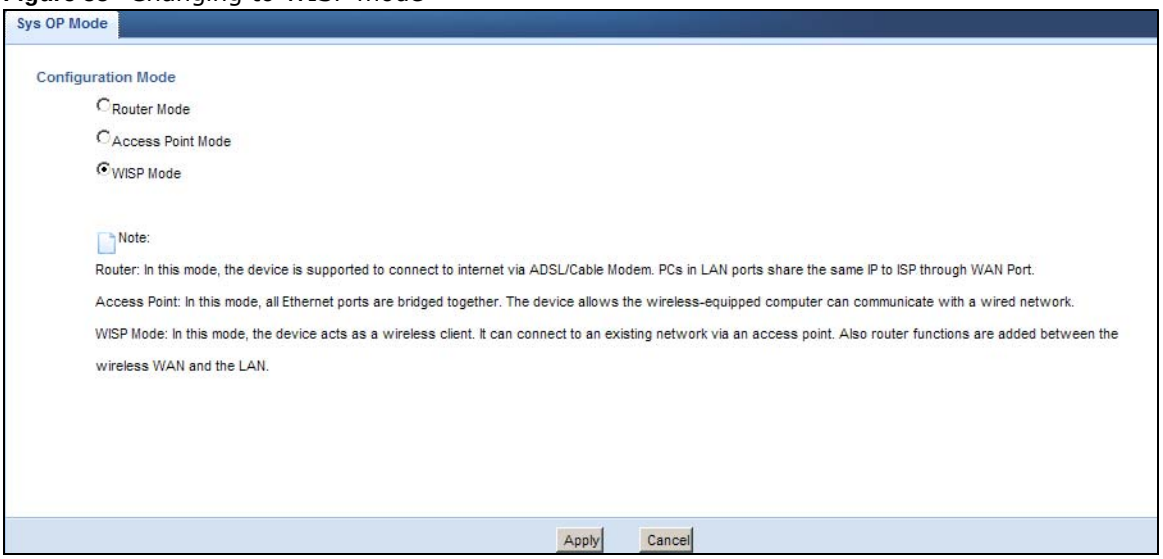
With the exception of the **LAN** screen, the **Monitor**, **Configuration** and **Maintainance** screens in WISP mode are similar to the ones in Router Mode. See Chapter 13 on page 103 through Chapter 26 on page 189 of this User's Guide.

11.3.1 Setting your Router to WISP Mode

1 Log into the Web Configurator if you haven't already. See the Quick start Guide for instructions on how to do this.

2 To set your Router to **AP Mode**, go to **Maintenance > Sys OP Mode > General** and select **WISP Mode.**

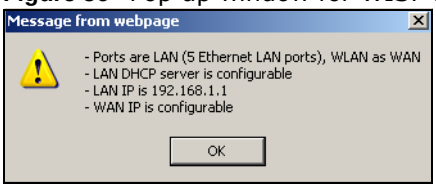
Figure 55 Changing to WISP mode



Note: You have to log in to the Web Configurator again when you change modes.As soon as you do, your Router is already in WISP mode.

3 When you select **WISP Mode**, the following pop-up message window appears.

Figure 56 Pop up window for WISP mode



Click **OK**. The Web Configurator refreshes once the change to WISP mode is successful.

11.3.2 Accessing the Web Configurator in WISP Mode

To login to Web Configurator in WISP mode, do the following:

1 Connect your computer to the LAN port of the Router.

2 The default IP address of the Router is "192.168.1.1". If you did not change this, you can use the same IP address in WISP mode. Open a web browser such as Internet Explorer and type "192.168.1.1" as the web address in your web browser.

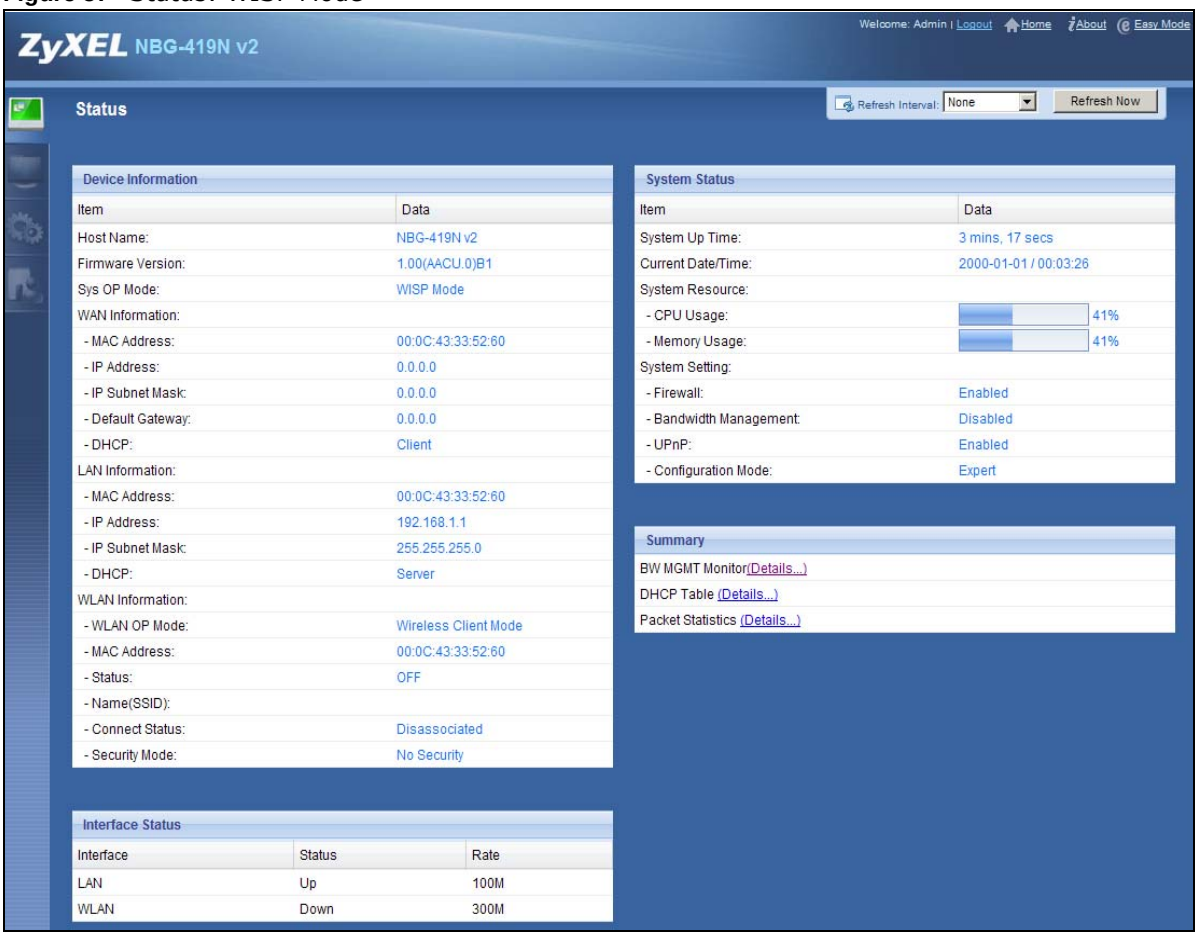
If you changed the IP address of your Router while in Router Mode, use this IP address in WISP mode. The WISP mode IP address is always the same as the Router mode IP adderss.

Note: After clicking Login, the Easy mode appears. Refer to Section on page 53 for the Easy mode screens. Click Expert mode to see the screens described in the sections following this.

11.4 WISP Mode Status Screen

Click  to open the status screen.

Figure 57 Status: WISP Mode



The following table describes the labels shown in the **Status** screen.

Table 33 Status Screen: WISP Mode

LABEL	DESCRIPTION
Logout	Click this at any time to exit the Web Configurator.
Device Information	
Host Name	This is the **System Name** you enter in the **Maintenance** > **General** screen. It is for identification purposes.
Firmware Version	This is the firmware version and the date created.
Sys OP Mode	This is the device mode (Section 7.1.2 on page 51) to which the Router is set - **WISP Mode**.
WAN Information	

Table 33 Status Screen: WISP Mode (continued)

LABEL	DESCRIPTION
- MAC Address	This shows the WAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the WAN port's IP address.
- IP Subnet Mask	This shows the WAN port's subnet mask.
- Default Gateway	This shows the WAN port's gateway IP address.
- DHCP	This shows the LAN port's DHCP role - **Client** or **Server**.
LAN Information	
- MAC Address	This shows the LAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the LAN port's IP address.
- IP Subnet Mask	This shows the LAN port's subnet mask.
- DHCP	This shows the LAN port's DHCP role - **Server** or **None**.
WLAN Information	
- WLAN OP Mode	This is the device mode (Section 7.1.2 on page 51) to which the Router's wireless LAN is set - **Access Point Mode**.
- MAC Address	This shows the wireless adapter MAC Address of your device.
- Status	This shows the current status of the Wireless LAN - **ON** or **OFF**.
- Name (SSID)	This shows a descriptive name used to identify the Router in the wireless LAN.
- Connect Status	This shows whether or not the Router has successfully associated with an access point - **Connected** or **Disassociated**.
- Security Mode	This shows the level of wireless security the Router is using.
- 802.11 Mode	This shows the wireless standard.
System Status	
Item	This column shows the type of data the Router is recording.
Data	This column shows the actual data recorded by the Router.
System Up Time	This is the total time the Router has been on.
Current Date/Time	This field displays your Router's present date and time.
System Resource	
- CPU Usage	This displays what percentage of the Router's processing ability is currently used. When this percentage is close to 100%, the Router is running at full load, and the throughput is not going to improve anymore. If you want some applications to have more throughput, you should turn off other applications (for example, using bandwidth management.
- Memory Usage	This shows what percentage of the heap memory the Router is using.
System Setting	
- Firewall	This shows whether the firewall is enabled or not.
- Bandwidth Management	This shows whether the bandwidth management is enabled or not.
- UPnP	This shows whether UPnP is enabled or not.
- Configuration Mode	This shows the web configurator mode you are viewing - **Expert**.
Interface Status	
Interface	This displays the Router port types. The port types are: **LAN** and **WLAN**.
Status	For the LAN and WAN ports, this field displays **Down** (line is down) or **Up** (line is up or connected). For the WLAN, it displays **Up** when the WLAN is enabled or **Down** when the WLAN is disabled.

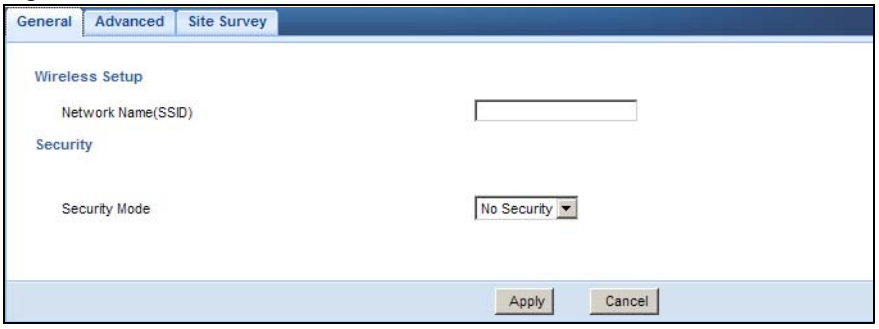
Table 33 Status Screen: WISP Mode (continued)

LABEL	DESCRIPTION
Rate	For the LAN ports, this displays the port speed and duplex setting or **N/A** when the line is disconnected. For the WAN port, it displays the port speed and duplex setting if you're using Ethernet encapsulation and **Idle** (line (ppp) idle), **Dial** (starting to trigger a call) and **Drop** (dropping a call) if you're using PPPoE or PPTP encapsulation. This field displays **N/A** when the line is disconnected. For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and **N/A** when the WLAN is disabled.
Summary	
BW MGMT Monitor	Click **Details...** to go to the **Monitor > BW MGMT Monitor** screen (Section 6.4 on page 47). Use this screen to view the amount of network bandwidth that applications running in the network are using.
DHCP Table	Click **Details...** to go to the **Monitor > DHCP Table** screen (Section 6.5 on page 47). Use this screen to view current DHCP client information.
Packet Statistics	Click **Details...** to go to the **Monitor > Packet Statistics** screen (Section 6.6 on page 48). Use this screen to view port status and packet specific statistics.

11.5 Wireless LAN General Screen

Use this screen to configure the wireless LAN settings of your Router. Go to **Configuration > Wireless LAN > General** to open the following screen.

Figure 58 WISP Mode: LAN > General Screen



The following table describes the labels in this screen.

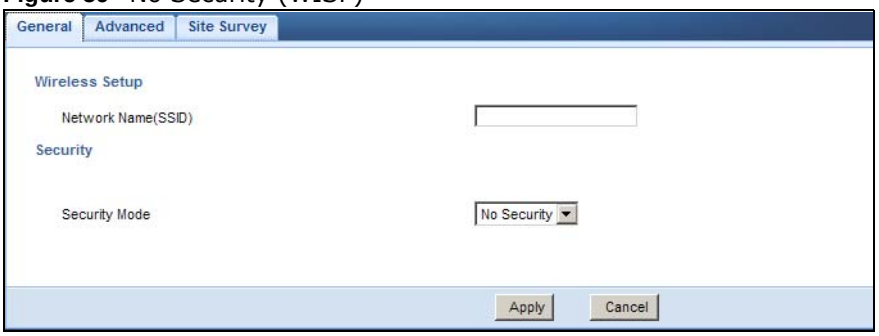
Table 34 WISP Mode: LAN > General Screen

LABEL	DESCRIPTION
Wireless Setup	
Network Name (SSID)	Enter the name of the access point to which you are connecting.
Security	
Security Mode	Select the security mode of the access point to which you want to connect.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to reload the previous configuration for this screen.

11.5.0.1 No Security

Use this screen if the access point to which you want to connect does not use encryption.

Figure 59 No Security (WISP)



The following table describes the labels in this screen.

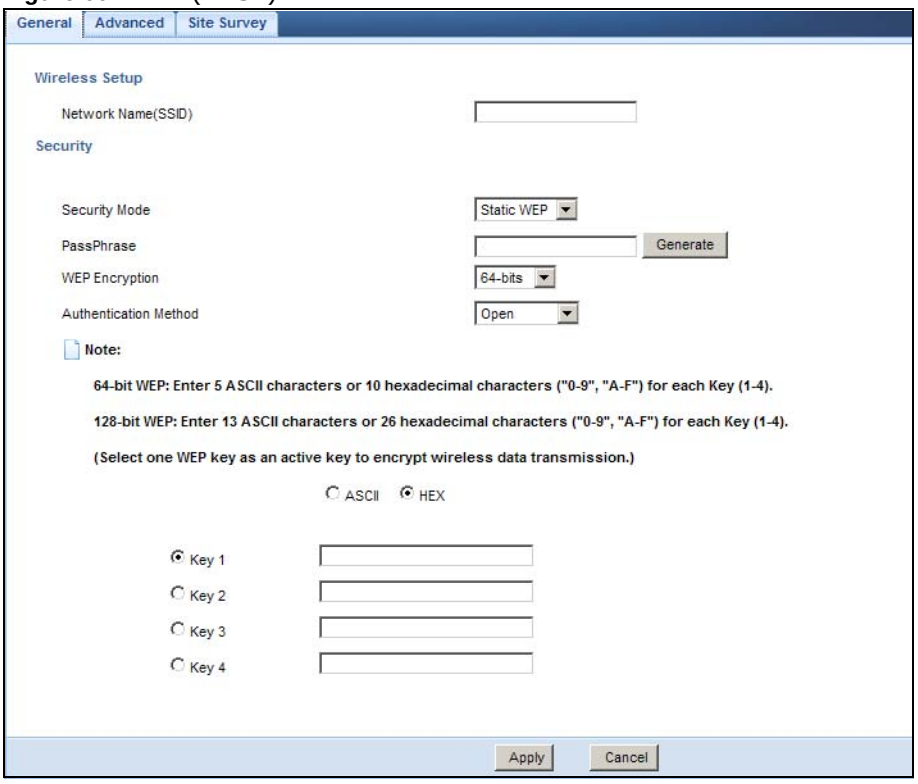
Table 35 No Security (WISP)

LABEL	DESCRIPTION
Wireless Setup	
Network Name (SSID)	Enter the name of the access point to which you are connecting.
Security	
Security Mode	Select **No Security** in this field.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

11.5.1 Static WEP

Use this screen if the access point to which you want to connect to uses WEP security mode.

Figure 60 WEP (WISP)



The following table describes the labels in this screen..

Table 36 WEP (WISP)

LABEL	DESCRIPTION
Wireless Setup	
Network Name (SSID)	Enter the name of the access point to which you are connecting.
Security	
Security Mode	Select **Static WEP** to enable data encryption.
PassPhrase	Enter a Passphrase (up to 26 printable characters) and click **Generate**. A passphrase functions like a password. In WEP security mode, it is further converted by the Router into a complicated string that is referred to as the "key". This key is requested from all devices wishing to connect to a wireless network.
WEP Encryption	Select **64-bit WEP** or **128-bit WEP**. This dictates the length of the security key that the network is going to use.
Authentication Method	Select **Auto** or **Shared Key** from the drop-down list box. This field specifies whether the wireless clients have to provide the WEP key to login to the wireless client. Keep this setting at **Auto** unless you want to force a key verification before communication between the wireless client and the Router occurs. Select **Shared Key** to force the clients to provide the WEP key prior to communication.
ASCII	Select this option in order to enter ASCII characters as WEP key.

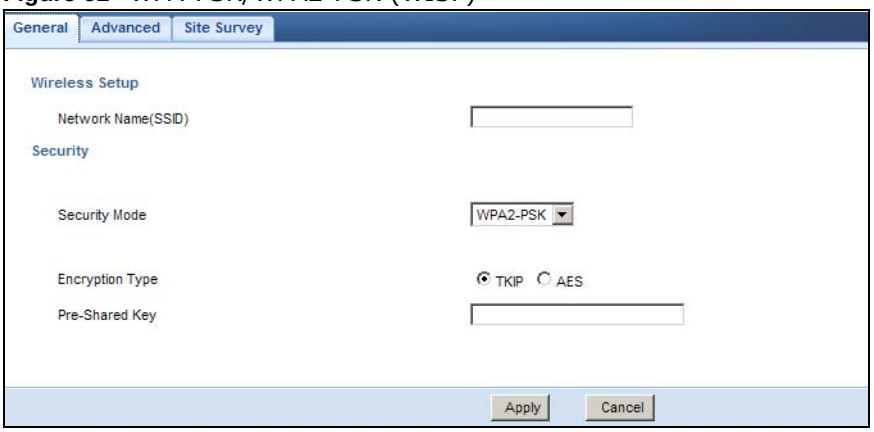
Table 36 WEP (WISP) (continued)

LABEL	DESCRIPTION
Hex	Select this option in order to enter hexadecimal characters as a WEP key. The preceding "0x", that identifies a hexadecimal key, is entered automatically.
Key 1 to Key 4	The WEP keys are used to encrypt data. Both the Router and the wireless stations must use the same WEP key for data transmission. If you chose **64-bit WEP**, then enter any 5 ASCII characters or 10 hexadecimal characters ("0-9", "A-F"). If you chose **128-bit WEP**, then enter 13 ASCII characters or 26 hexadecimal characters ("0-9", "A-F"). You must configure at least one key, only one key can be activated at any one time. The default key is key 1.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

11.5.2 WPA(2)-PSK

Use this screen if the access point to which you want to connect uses WPA(2)-PSK security mode.

Figure 61 WPA-PSK/WPA2-PSK (WISP)



The following table describes the labels in this screen. .

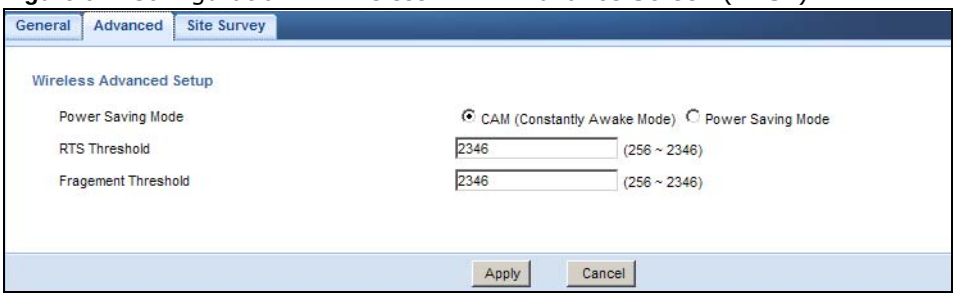
Table 37 WPA-PSK/WPA2-PSK (WISP)

LABEL	DESCRIPTION
Wireless Setup	
Network Name (SSID)	Enter the name of the access point to which you are connecting.
Security	
Encryption Type	Select the type of wireless encryption employed by the access point to which you want to connect.
Pre-Shared Key	**WPA-PSK / WPA2-PSK** uses a simple common password for authentication. Type the pre-shared key employed by the access point to which you want to connect.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

11.5.3 Advance Screen

Use this screen to enable the power saving mode of your Router. Go to **Configuration > Wireless LAN** to open the following screen.

Figure 62 Configuration > Wireless LAN > Advance Screen (WISP)



The following table describes the labels in this screen.

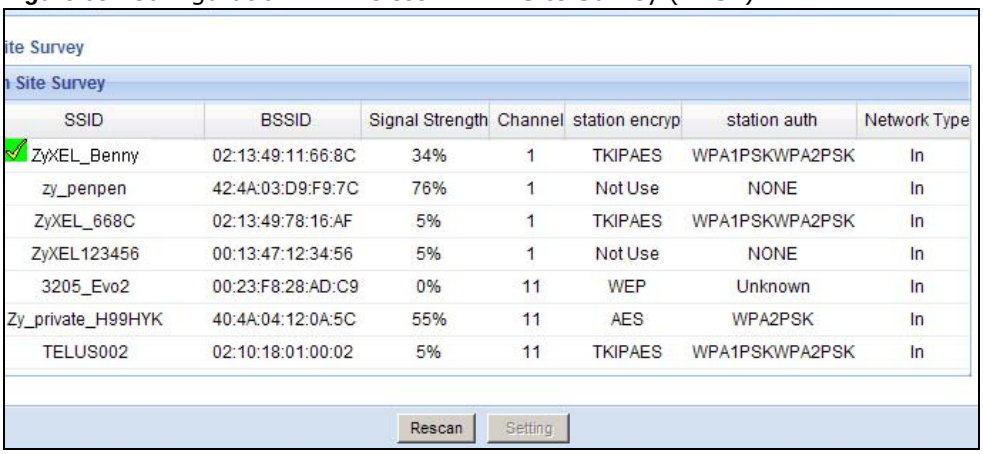
Table 38 Configuration > Wireless LAN > Advance Screen (WISP)

LABEL	DESCRIPTION
Power Saving Mode	Select **CAM (Constantly Awake Mode)** if you do not want your Router to go to "sleep" when no wireless activity is detected in the Wireless LAN. Select **Power Saving Mode** if you want the Router to go to sleep when no wireless connection is needed for a period of time. This means the Router consumes less electrical power.
RTS Threshold	This is the maximum data fragment size that can be sent in a wireless network before the AP fragments the packet into smaller data frames.
Fragment Threshold	This value controls how often wireless clients must get permission to send information to the AP. The lower the value, the more often the wireless clients must get permission. If this value is greater than the fragmentation threshold value, then wireless clients never have to get permission to send information to the AP.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

11.5.4 Site Survey Screen

Use this screen to scan for and connect to a wireless network automatically. Go to **Configuration > Site Survey** to open the following screen.

Figure 63 Configuration > Wireless LAN > Site Survey (WISP)



The following table describes the labels in this screen.

Table 39 Configuration > Wireless LAN > Site Survey (WISP)

LABEL	DESCRIPTION
Station Site Survey	
#	Select a wireless device and click **Add Profile** to open a configuration screen where you can add the selected wireless device to a profile and then enable it.
SSID	This displays the SSID of the wireless device. indicates the wireless device is added to an activated profile and the Router is connecting to it.
BSSID	This displays the MAC address of the wireless device.
Signal Strength	This displays the strength of the wireless signal. The signal strength mainly depends on the antenna output power and the distance between your Router and this device.
Channel	This displays the channel number used by this wireless device.
station encryp	This displays the data encryption method used by this wireless device.
station auth	This displays the authentication method used by this wireless device.
Network Type	This displays the network type (**In** (Infrastructure) or **Ad** (Ad Hoc) of this wireless device.
Rescan	Click this button to search for available wireless devices within transmission range and update this table.
Setting	Select a wireless device and click this button to add it to a profile.

12 Tutorials

12.1 Overview

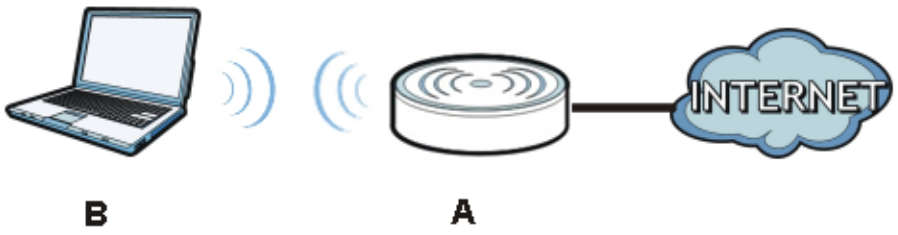
This chapter provides tutorials for your Router as follows:

- Connecting to the Internet from an Access Point
- Configuring Wireless Security Using WPS
- Enabling and Configuring Wireless Security (No WPS)
- Connecting to USB Storage with the ZyXEL NetUSB Share Center Utility
- Automatically Connecting to a USB Printer

12.2 Connecting to the Internet from an Access Point

This section gives you an example of how to set up an access point (**AP**) and wireless client (a notebook (**B**), in this example) for wireless communication. **B** can access the Internet through the access point wirelessly.

Figure 64 Wireless Access Point Connection to the Internet



12.3 Configuring Wireless Security Using WPS

This section gives you an example of how to set up wireless network using WPS. This example uses the Router as the AP and NWD210N as the wireless client which connects to a notebook.

Note: The wireless client must be a WPS-aware device (for example, a WPS USB adapter or PCI card).

There are two WPS methods for creating a secure connection. This tutorial shows you how to do both.

- **Push Button Configuration (PBC)** - create a secure wireless network simply by pressing a button. See Section 12.3.1 on page 90.This is the easier method.
- **PIN Configuration** - create a secure wireless network simply by entering a wireless client's PIN (Personal Identification Number) in the Router's interface. See Section 12.3.2 on page 91. This is the more secure method, since one device can authenticate the other.

12.3.1 Push Button Configuration (PBC)

1. Make sure that your Router is turned on and that it is within range of your computer.
2. Make sure that you have installed the wireless client (this example uses the NWD210N) driver and utility in your notebook.
3. In the wireless client utility, find the WPS settings. Enable WPS and press the WPS button (**Start** or **WPS** button)
4. Log into Router's Web Configurator and press the **Push Button** button in the **Network** > **Wireless Client** > **WPS Station** screen.

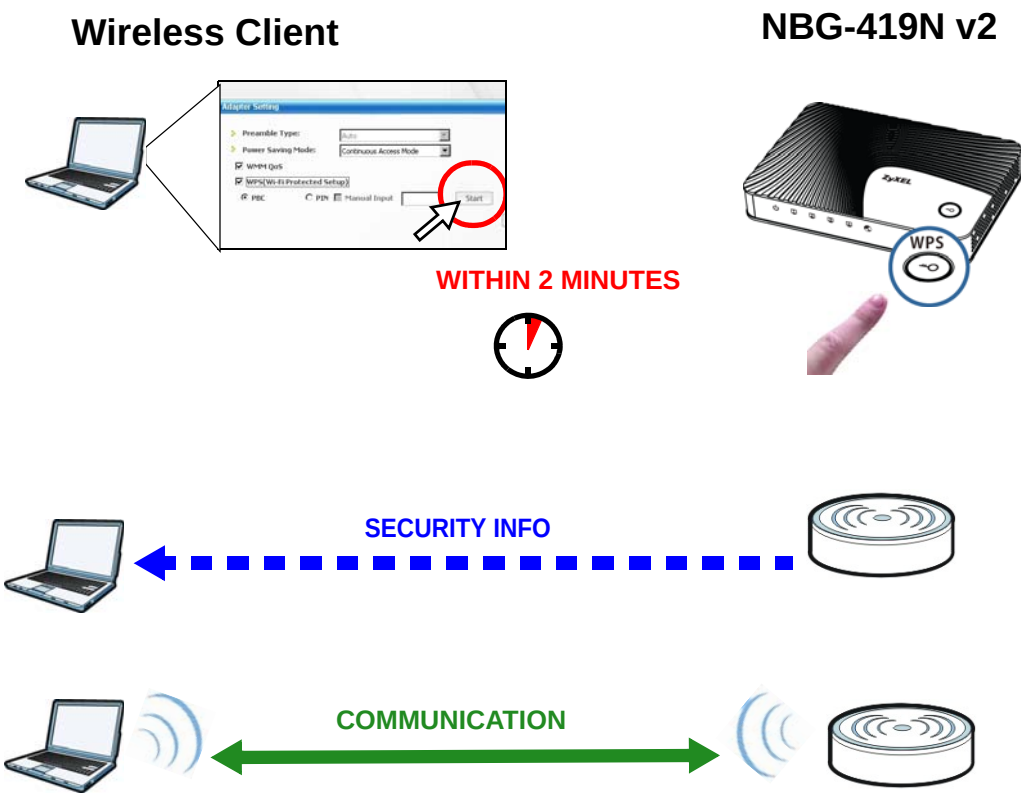
   Note: Your Router has a WPS button located on its panel, as well as a WPS button in its configuration utility. Both buttons have exactly the same function; you can use one or the other.

   Note: It doesn't matter which button is pressed first. You must press the second button within two minutes of pressing the first one.

   The Router sends the proper configuration settings to the wireless client. This may take up to two minutes. Then the wireless client is able to communicate with the Router securely.

The following figure shows you an example to set up wireless network and security by pressing a button on both Router and wireless client (the NWD210N in this example).

Figure 65 Example WPS Process: PBC Method



12.3.2 PIN Configuration

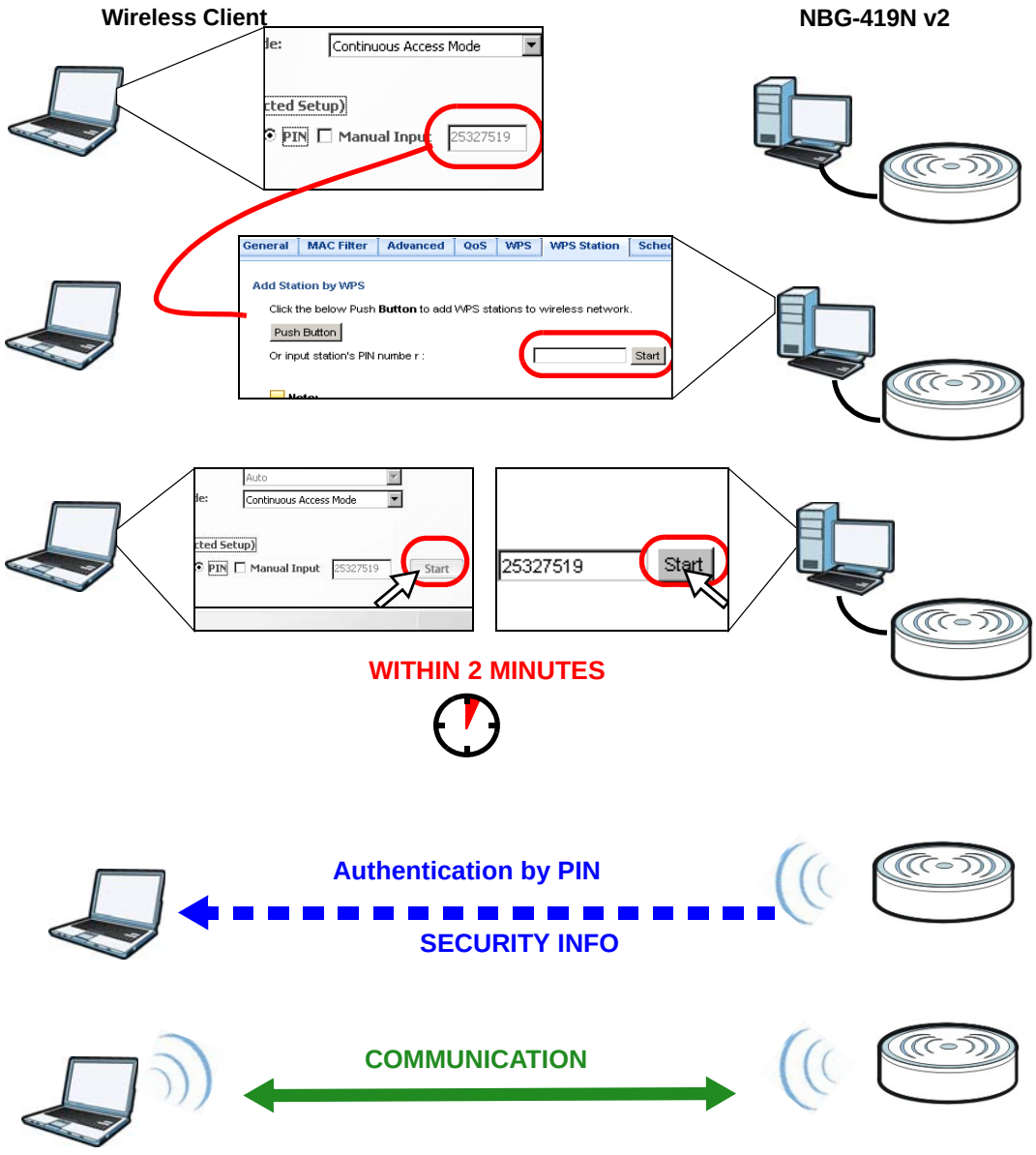
When you use the PIN configuration method, you need to use both Router's configuration interface and the client's utilities.

1. Launch your wireless client's configuration utility. Go to the WPS settings and select the PIN method to get a PIN number.
2. Enter the PIN number to the **PIN** field in the **Network** > **Wireless LAN** > **WPS Station** screen on the Router.
3. Click **Start** buttons (or button next to the PIN field) on both the wireless client utility screen and the Router's **WPS Station** screen within two minutes.

   The Router authenticates the wireless client and sends the proper configuration settings to the wireless client. This may take up to two minutes. Then the wireless client is able to communicate with the Router securely.

The following figure shows you the example to set up wireless network and security on Router and wireless client (ex. NWD210N in this example) by using PIN method.

Figure 66 Example WPS Process: PIN Method



12.4 Enabling and Configuring Wireless Security (No WPS)

This example shows you how to configure wireless security settings with the following parameters on your Router.

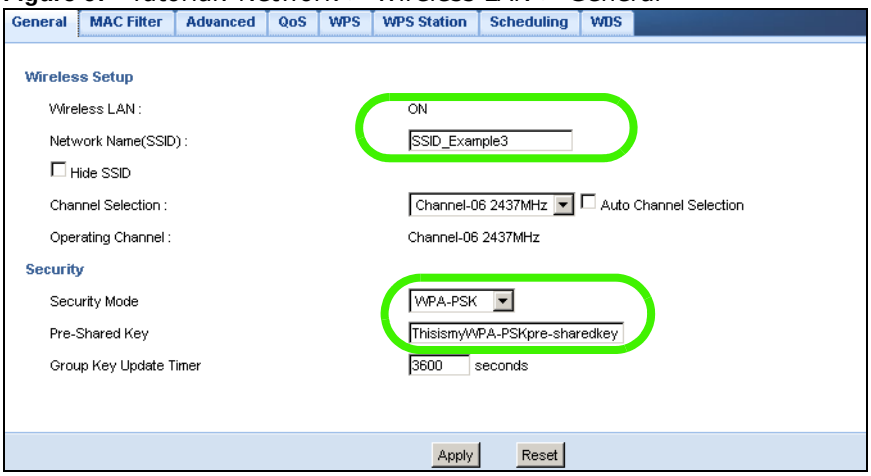
SSID	SSID_Example3
Channel	6
Security	WPA-PSK (Pre-Shared Key: ThisismyWPA-PSKpre-sharedkey)

Follow the steps below to configure the wireless settings on your Router.

The instructions require that your hardware is connected (see the Quick Start Guide) and you are logged into the Web Configurator through your LAN connection (see Section 5.2 on page 39).

1. Open the **Wireless LAN > General** screen in the AP's Web Configurator.
2. Make sure the **Enable Wireless LAN** check box is selected.
3. Enter **SSID_Example3** as the SSID and select a channel.
4. Set security mode to **WPA-PSK** and enter **ThisismyWPA-PSKpre-sharedkey** in the **Pre-Shared Key** field. Click **Apply**.

Figure 67 Tutorial: Network > Wireless LAN > General



5 Open the **Status** screen. Verify your wireless and wireless security settings under **Device Information** and check if the WLAN connection is up under **Interface Status**.

Figure 68 Tutorial: Checking Wireless Settings

12.4.1 Configure Your Notebook

Note: We use the ZyXEL M-302 wireless adapter utility screens as an example for the wireless client. The screens may vary for different models.

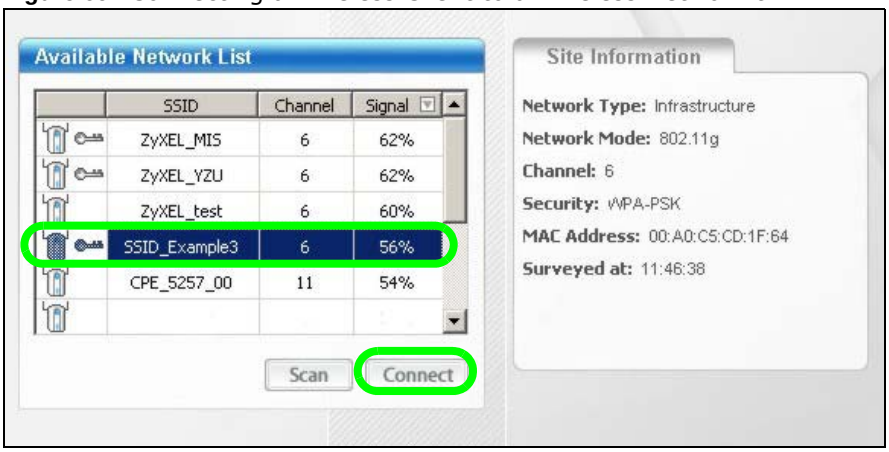
1 The Router supports IEEE 802.11b, IEEE 802.11g and IEEE 802.11n wireless clients. Make sure that your notebook or computer's wireless adapter supports one of these standards.

2 Wireless adapters come with software sometimes called a "utility" that you install on your computer. See your wireless adapter's User's Guide for information on how to do that.

3 After you've installed the utility, open it. If you cannot see your utility's icon on your screen, go to **Start > Programs** and click on your utility in the list of programs that appears. The utility displays a list of APs within range, as shown in the example screen below.

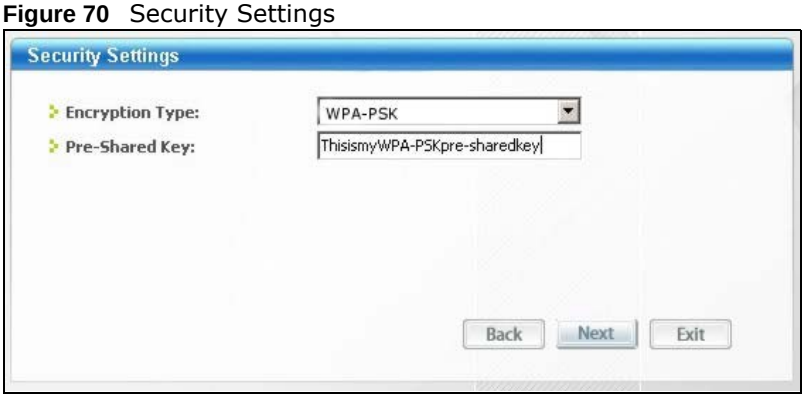
4 Select SSID_Example3 and click **Connect**.

Figure 69 Connecting a Wireless Client to a Wireless Network t



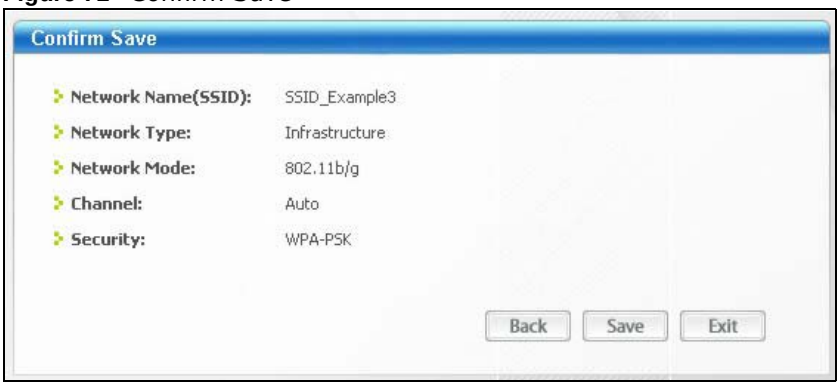
5 Select WPA-PSK and type the security key in the following screen. Click **Next**.

Figure 70 Security Settings



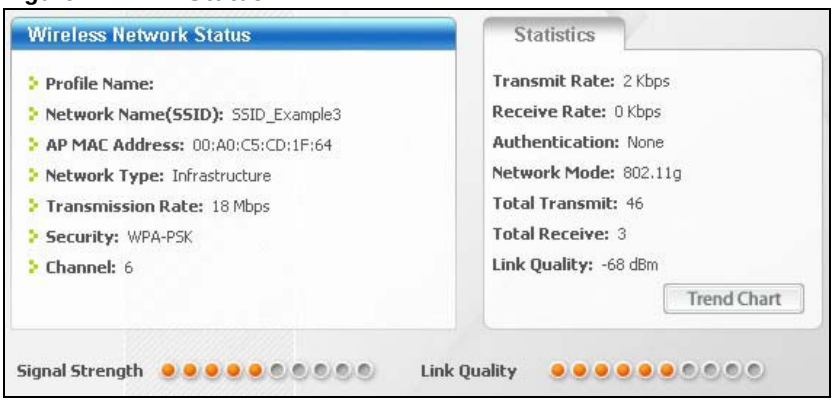
6 The **Confirm Save** window appears. Check your settings and click **Save** to continue.

Figure 71 Confirm Save



7 Check the status of your wireless connection in the screen below. If your wireless connection is weak or you have no connection, see the Troubleshooting section of this User's Guide.

Figure 72 Link Status



If your connection is successful, open your Internet browser and enter http://www.zyxel.com or the URL of any other web site in the address bar. If you are able to access the web site, your wireless connection is successfully configured.

12.5 Connecting to USB Storage with the ZyXEL NetUSB Share Center Utility

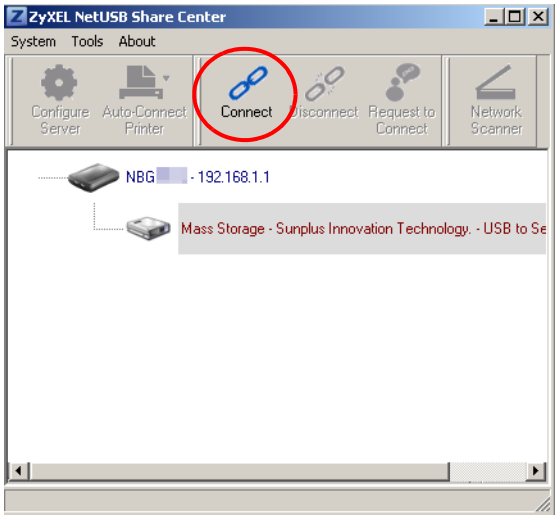
This tutorial shows you how to connect to a USB device over your Router network by using the ZyXEL NetUSB Share Center Utility.

1 Install the ZyXEL NetUSB Share Center Utility on the computer to which you want to connect the USB device. See Chapter 3 on page 21 for details on the installation.

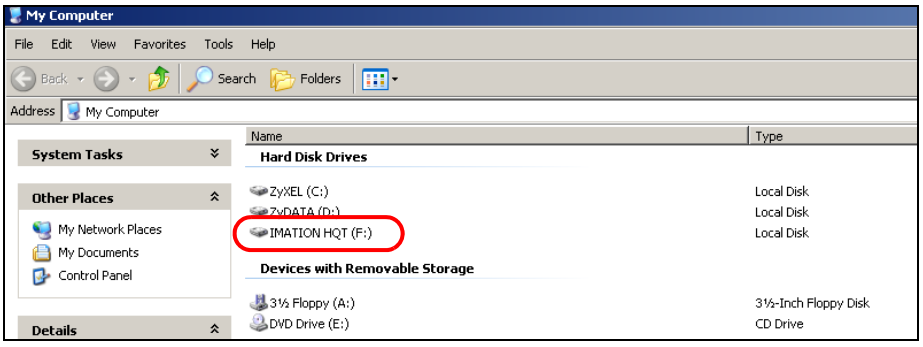
2 Connect a USB device to one of the USB ports of the Router.

3 Open the **ZyXEL NetUSB Sharing Center Utility** on your computer. The name of the USB device automatically shows in the Utility screen.

4 Click on the USB device's name. Then click **Connect**.



5 The device mounts on your system.



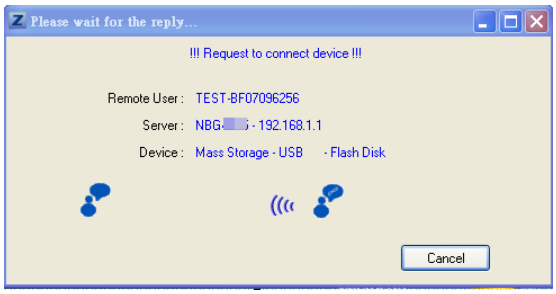
12.5.1 Multiple Connections to the USB Device

The Utility supports one connection to the Router's USB device at a time. If more than one computer want to connect to the USB device, follow the steps below:

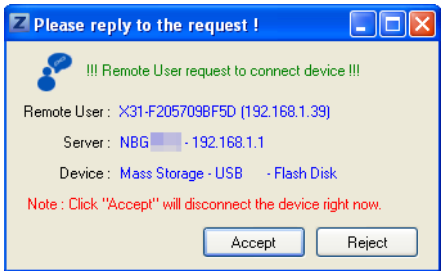
1 After the first computer (**A**) finishes using the USB device, click **Disconnect** on the Utilty to unmount it.

2 Click **Connect** on the Utility of the second computer (**B**) to mount the USB device on **B**.

3 If **A** does not disconnect from the USB device, **B** cannot use it. **B** can click the **Request to Connect** button to request **A** to disconnect. B will see the following message on its Utility:

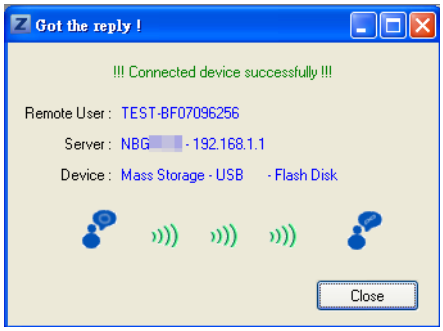


4 **A** will receive the following message on its Utility screen.



5 **A** should click **Accept** to disconnect to the USB device.

6 After **A** is disconnected from USB device, **B** will see the following message on its Utility. Now **B** can access the USB device.



Note: If your computer is connected to a USB device, you must disconnect it and use **Exit** to close the Utility. If you use the X on the Utility screen, it only closes the Utility window. The Utility is still connected. Do not exit the Utility until the USB device is disconnected via the Utility or until you receive a request to disconnect. See Chapter 3 on page 21 for details on how to exit the Utility.

12.6 Automatically Connecting to a USB Printer

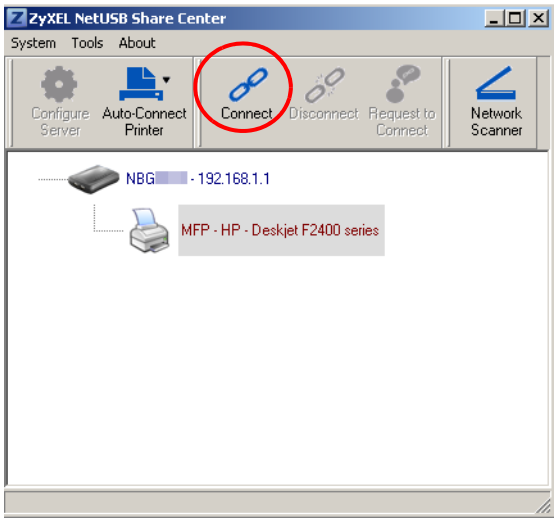
Your computer can connect to a shared USB printer by using the ZyXEL NetUSB Share Center Utility. This tutorial shows you how to set your computer to automatically connect to a shared USB printer over your Router network each time you log into your computer.

1 Install the ZyXEL NetUSB Share Center Utility to your computer. See Chapter 3 on page 21 for details on the installation.

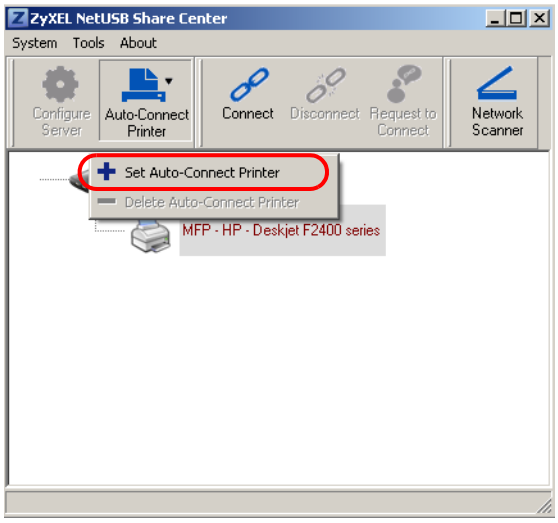
2 Connect a USB printer to one of the USB ports of the Router.

3 Open the **ZyXEL NetUSB Sharing Center Utility** on your computer. The name of the USB printer automatically shows in the Utility screen.

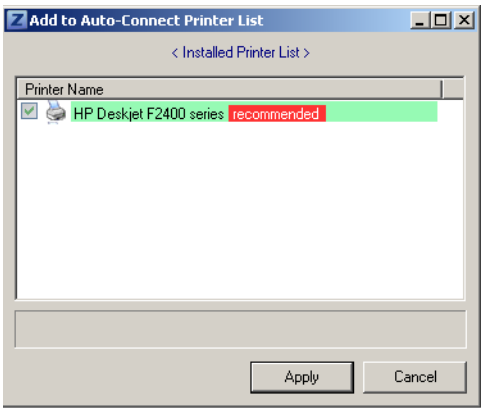
4 Click on the printer name. Then click **Connect**. Your computer will search for the printer driver. You may be prompted to install the driver. Follow the driver's installation steps to finish installing.



5 Click the **Auto-Connect Printer** menu and select **Set Auto-Connect Printer** from the menu.



6 Select the USB printer you want to connect to and click **Apply**.



7 Now your computer can automatically connect to this shared USB printer over your Router network each time you log into your computer. The printer will be automatically added to your printer list.

8 The Utility supports one connection to the Router's USB device at a time. If more than one computer is using the printer and are all auto-connected to the USB device, the second computer automatically starts printing after the first computer finishes its printing task.

PART II
Technical Reference

13

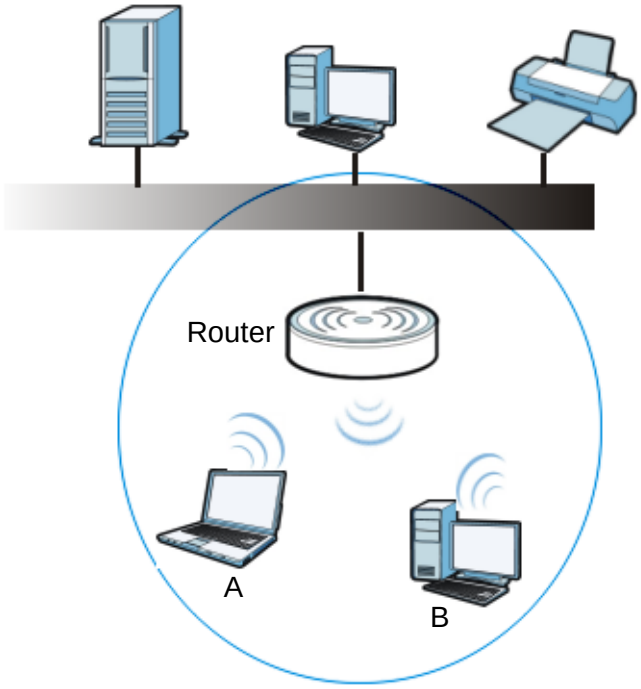
Wireless LAN

13.1 Overview

This chapter discusses how to configure the wireless network settings in your Router. See the appendices for more detailed information about wireless networks.

The following figure provides an example of a wireless network.

Figure 73 Example of a Wireless Network



The wireless network is the part in the blue circle. In this wireless network, devices A and B are called wireless clients. The wireless clients use the access point (AP) to interact with other devices (such as the printer) or with the Internet. Your Router is the AP.

13.2 What You Can Do

- Use the **General** screen (Section 13.4 on page 106) to enable the Wireless LAN, enter the SSID and select the wireless security mode.
- Use the **MAC Filter** screen (Section 13.5 on page 110) to allow or deny wireless stations based on their MAC addresses from connecting to the Router.

- Use the **Advanced** screen (Section 13.6 on page 111) to allow wireless advanced features, such as intra-BSS networking and set the RTS/CTS Threshold.
- Use the **QoS** screen (Section 13.7 on page 113) to set priority levels to services, such as e-mail, VoIP, chat, and so on.
- Use the **WPS** screen (Section 13.8 on page 114) to quickly set up a wireless network with strong security, without having to configure security settings manually.
- Use the **WPS Station** screen (Section 13.9 on page 115) to add a wireless station using WPS.
- Use the **Scheduling** screen (Section 13.10 on page 116) to set the times your wireless LAN is turned on and off.
- Use the **WDS** screen (Section 13.11 on page 117) to configure Wireless Distribution System on your Router.

13.3 What You Should Know

Every wireless network must follow these basic guidelines.

- Every wireless client in the same wireless network must use the same SSID.

  The SSID is the name of the wireless network. It stands for Service Set IDentity.
- If two wireless networks overlap, they should use different channels.

  Like radio stations or television channels, each wireless network uses a specific channel, or frequency, to send and receive information.
- Every wireless client in the same wireless network must use security compatible with the AP.

  Security stops unauthorized devices from using the wireless network. It can also protect the information that is sent in the wireless network.

13.3.1 Wireless Security Overview

The following sections introduce different types of wireless security you can set up in the wireless network.

13.3.1.1 SSID

Normally, the AP acts like a beacon and regularly broadcasts the SSID in the area. You can hide the SSID instead, in which case the AP does not broadcast the SSID. In addition, you should change the default SSID to something that is difficult to guess.

This type of security is fairly weak, however, because there are ways for unauthorized devices to get the SSID. In addition, unauthorized devices can still see the information that is sent in the wireless network.

13.3.1.2 MAC Address Filter

Every wireless client has a unique identification number, called a MAC address.[1] A MAC address is usually written using twelve hexadecimal characters[2]; for example, 00A0C5000002 or

1. Some wireless devices, such as scanners, can detect wireless networks but cannot use wireless networks. These kinds of wireless devices might not have MAC addresses.
2. Hexadecimal characters are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F.

00:A0:C5:00:00:02. To get the MAC address for each wireless client, see the appropriate User's Guide or other documentation.

You can use the MAC address filter to tell the AP which wireless clients are allowed or not allowed to use the wireless network. If a wireless client is allowed to use the wireless network, it still has to have the correct settings (SSID, channel, and security). If a wireless client is not allowed to use the wireless network, it does not matter if it has the correct settings.

This type of security does not protect the information that is sent in the wireless network. Furthermore, there are ways for unauthorized devices to get the MAC address of an authorized wireless client. Then, they can use that MAC address to use the wireless network.

13.3.1.3 Encryption

Wireless networks can use encryption to protect the information that is sent in the wireless network. Encryption is like a secret code. If you do not know the secret code, you cannot understand the message.

The types of encryption you can choose depend on the type of user authentication.

Table 40 Types of Encryption for Each Type of Authentication

	NO AUTHENTICATION
Weakest	No Security
↕	WEP
	WPA-PSK
Strongest	WPA2-PSK

Usually, you should set up the strongest encryption that every wireless client in the wireless network supports. Suppose the wireless network has two wireless clients. Device A only supports WEP, and device B supports WEP and WPA-PSK. Therefore, you should set up **WEP** in the wireless network.

Note: It is recommended that wireless networks use **WPA-PSK** or stronger encryption. IEEE 802.1x and WEP encryption are better than none at all, but it is still possible for unauthorized devices to figure out the original information pretty quickly.

When you select **WPA2-PSK** in your Router, you can also select an option (**WPA Compatible**) to support WPA as well. In this case, if some wireless clients support WPA and some support WPA2, you should set up **WPA2-PSK** (depending on the type of wireless network login) and select the **WPA Compatible** option in the Router.

Many types of encryption use a key to protect the information in the wireless network. The longer the key, the stronger the encryption. Every wireless client in the wireless network must have the same key.

13.3.1.4 WPS

WiFi Protected Setup (WPS) is an industry standard specification, defined by the WiFi Alliance. WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Depending on the devices in your network, you can either press a button (on the device itself, or in its configuration utility) or enter a PIN (Personal Identification Number) in the devices. Then, they connect and set up a secure network by themselves. See how to set up a secure wireless network using WPS in the Section 12.3 on page 89.

13.3.1.5 WDS

Wireless Distribution System or WDS security is used between bridged APs. It is independent of the security between the wired networks and their respective APs. If you do not enable WDS security, traffic between APs is not encrypted. When WDS security is enabled, both APs must use the same pre-shared key.

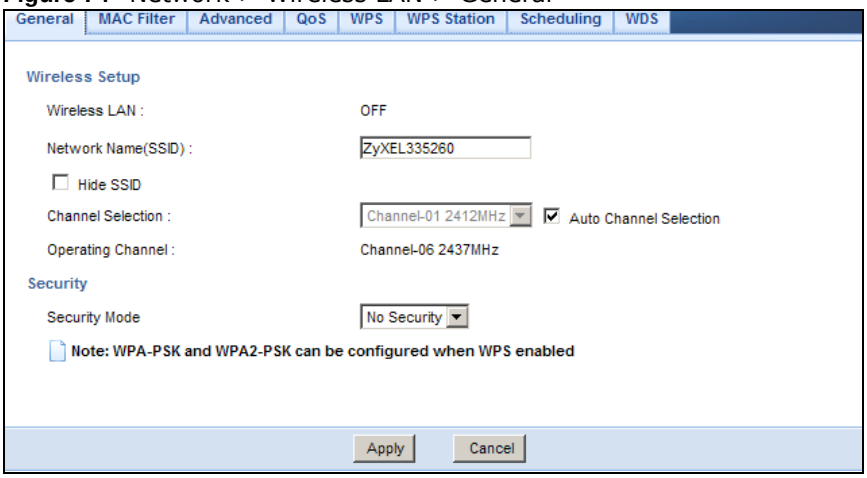
13.4 General Wireless LAN Screen

Use this screen to enable the Wireless LAN, enter the SSID and select the wireless security mode.

Note: If you are configuring the Router from a computer connected to the wireless LAN and you change the Router's SSID, channel or security settings, you will lose your wireless connection when you press **Apply** to confirm. You must then change the wireless settings of your computer to match the Router's new settings.

Click **Network** > **Wireless LAN** to open the **General** screen.

Figure 74 Network > Wireless LAN > General



The following table describes the general wireless LAN labels in this screen.

Table 41 Network > Wireless LAN > General

LABEL	DESCRIPTION
Wireless Setup	
Wireless LAN	This is turned on by default. You can turn the wireless LAN on or off using the switch at the rear panel of the Router. The current wireless state is reflected in this field.
Network Name(SSID)	(Service Set IDentity) The SSID identifies the Service Set with which a wireless station is associated. Wireless stations associating to the Router must have the same SSID. Enter a descriptive name (up to 32 keyboard characters) for the wireless LAN.
Hide SSID	Select this check box to hide the SSID in the outgoing beacon frame so a station cannot obtain the SSID through scanning using a site survey tool.

Table 41 Network > Wireless LAN > General (continued)

LABEL	DESCRIPTION
Channel Selection	Set the operating frequency/channel depending on your particular region. Select a channel from the drop-down list box. The options vary depending on the frequency band and the country you are in. Refer to the Connection Wizard chapter for more information on channels. This option is only available if **Auto Channel Selection** is disabled.
Operating Channel	This displays the channel the Router is currently using.
Security	
Security Mode	Select **WEP**, **WPA-PSK** or **WPA2-PSK** to add security on this wireless network. The wireless clients which want to associate to this network must have same wireless security settings as the Router. After you select to use a security, additional options appears in this screen. See 13.4.2 and 13.4.3 sections. Or you can select **No Security** to allow any client to associate this network without authentication. Note: If you enable the WPS function, only **No Security**, **WPA-PSK** and **WPA2-PSK** are available in this field.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to reload the previous configuration for this screen.

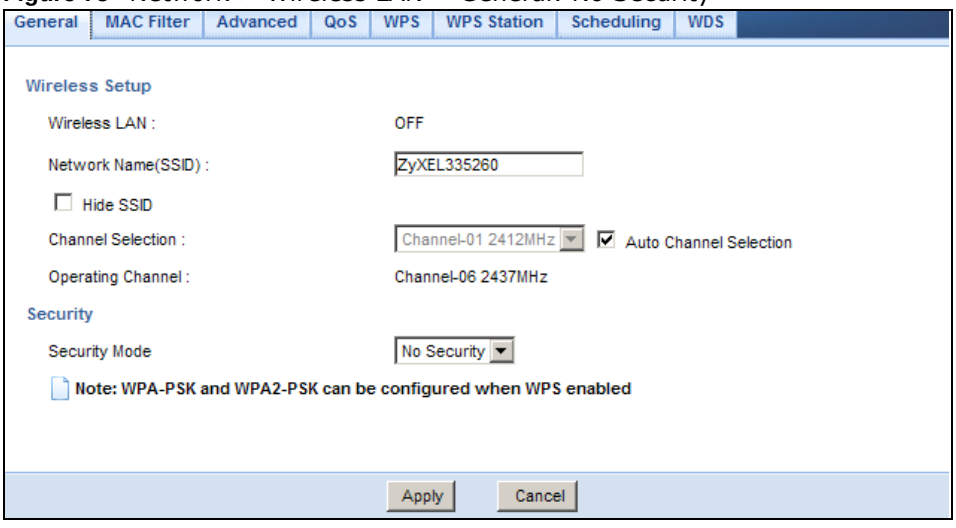
See the rest of this chapter for information on the other labels in this screen.

13.4.1 No Security

Select **No Security** to allow wireless stations to communicate with the access points without any data encryption.

Note: If you do not enable any wireless security on your Router, your network is accessible to any wireless networking device that is within range.

Figure 75 Network > Wireless LAN > General: No Security



The following table describes the labels in this screen.

Table 42 Network > Wireless LAN > General: No Security

LABEL	DESCRIPTION
Security Mode	Choose **No Security** from the drop-down list box.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

Refer to Table 41 on page 106 for descriptions of the other labels in this screen.

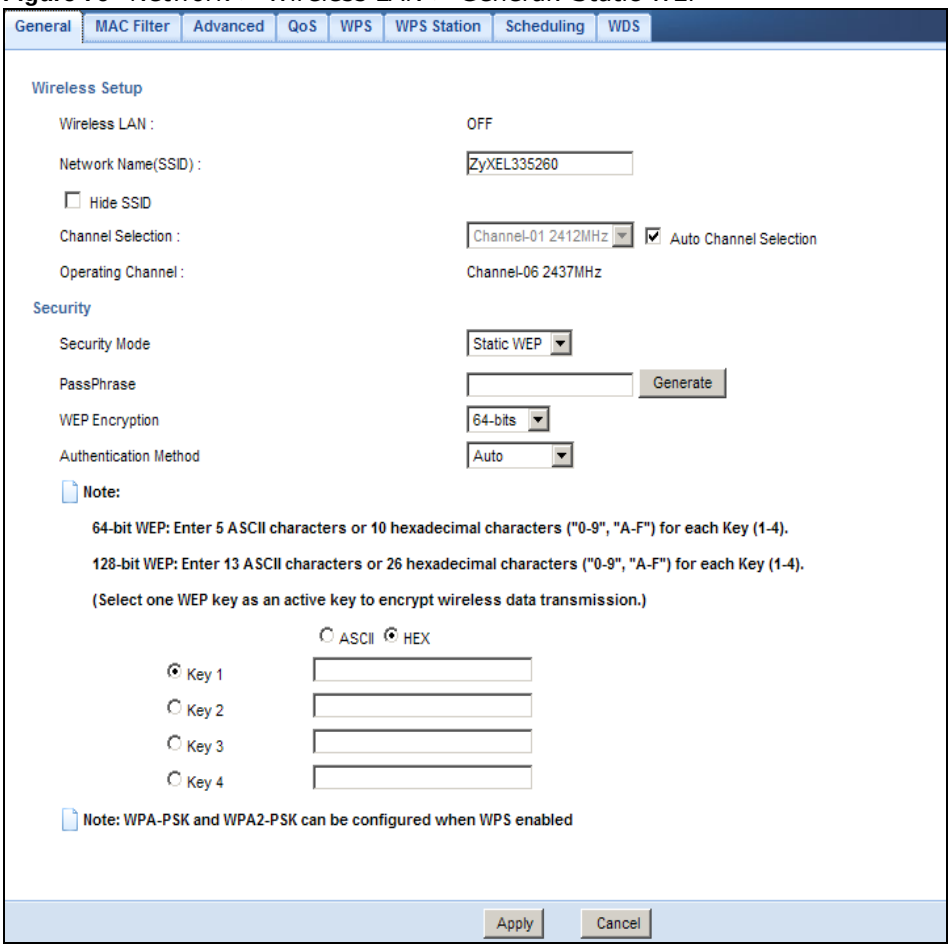
13.4.2 WEP Encryption

WEP encryption scrambles the data transmitted between the wireless stations and the access points to keep network communications private. It encrypts unicast and multicast communications in a network. Both the wireless stations and the access points must use the same WEP key.

Your Router allows you to configure up to four 64-bit or 128-bit WEP keys but only one key can be enabled at any one time.

In order to configure and enable WEP encryption, click **Network** > **Wireless LAN** to display the **General** screen. Select **Static WEP** from the **Security Mode** list.

Figure 76 Network > Wireless LAN > General: Static WEP



The following table describes the wireless LAN security labels in this screen.

Table 43 Network > Wireless LAN > General: Static WEP

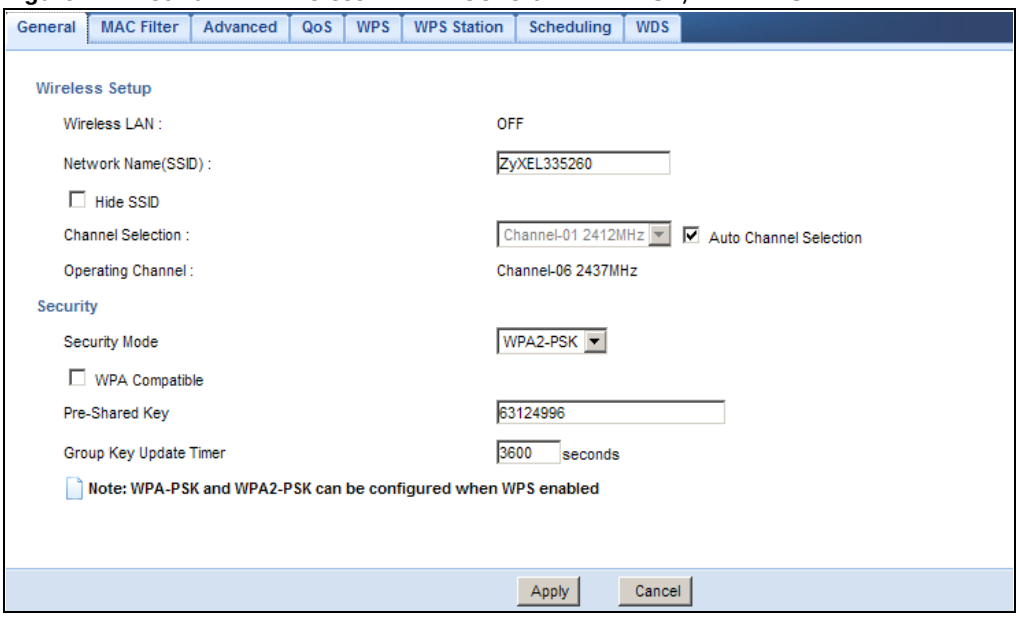
LABEL	DESCRIPTION
Security Mode	Select **Static WEP** to enable data encryption.
PassPhrase	Enter a Passphrase (up to 26 printable characters) and click Generate. A passphrase functions like a password. In WEP security mode, it is further converted by the Router into a complicated string that is referred to as the "key". This key is requested from all devices wishing to connect to a wireless network.
WEP Encryption	Select **64-bit WEP** or **128-bit WEP**. This dictates the length of the security key that the network is going to use.
Authentication Method	Select **Auto** or **Shared Key** from the drop-down list box. This field specifies whether the wireless clients have to provide the WEP key to login to the wireless client. Keep this setting at **Auto** unless you want to force a key verification before communication between the wireless client and the Router occurs. Select **Shared Key** to force the clients to provide the WEP key prior to communication.
ASCII	Select this option in order to enter ASCII characters as WEP key.
Hex	Select this option in order to enter hexadecimal characters as a WEP key. The preceding "0x", that identifies a hexadecimal key, is entered automatically.
Key 1 to Key 4	The WEP keys are used to encrypt data. Both the Router and the wireless stations must use the same WEP key for data transmission. If you chose **64-bit WEP**, then enter any 5 ASCII characters or 10 hexadecimal characters ("0-9", "A-F"). If you chose **128-bit WEP**, then enter 13 ASCII characters or 26 hexadecimal characters ("0-9", "A-F"). You must configure at least one key, only one key can be activated at any one time.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

Refer to Table 41 on page 106 for descriptions of the other labels in this screen.

13.4.3 WPA-PSK/WPA2-PSK

Click **Network** > **Wireless LAN** to display the **General** screen. Select **WPA-PSK** or **WPA2-PSK** from the **Security Mode** list.

Figure 77 Network > Wireless LAN > General: WPA-PSK/WPA2-PSK



The following table describes the labels in this screen.

Table 44 Network > Wireless LAN > General: WPA-PSK/WPA2-PSK

LABEL	DESCRIPTION
Security Mode	Select **WPA-PSK** or **WPA2-PSK** to enable data encryption.
WPA-PSK Compatible	This field appears when you choose **WPA-PSK2** as the **Security Mode**. Check this field to allow wireless devices using **WPA-PSK** security mode to connect to your Router.
Pre-Shared Key	**WPA-PSK / WPA2-PSK** uses a simple common password for authentication. Type a pre-shared key from 8 to 63 case-sensitive keyboard characters.
Group Key Update Timer	The **Group Key Update Timer** is the rate at which the AP sends a new group key out to all clients.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

Refer to Table 41 on page 106 for descriptions of the other labels in this screen.

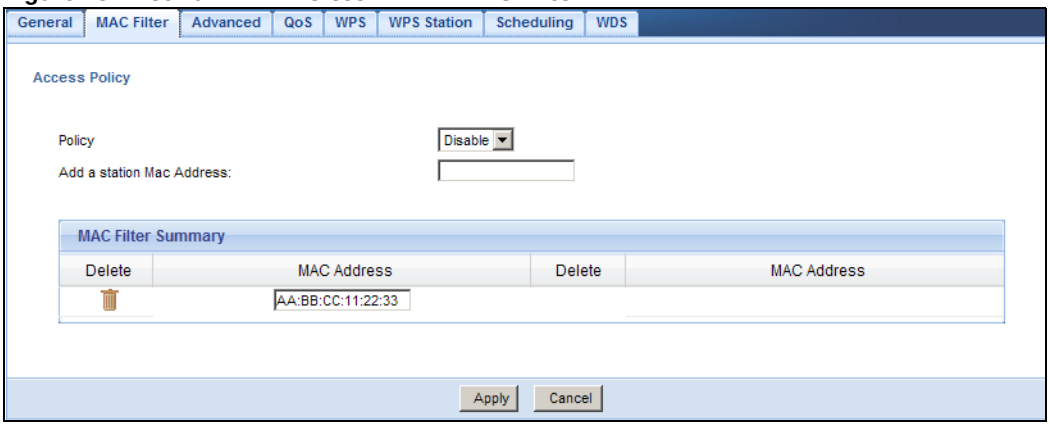
13.5 MAC Filter

The MAC filter screen allows you to configure the Router to give exclusive access to devices (Allow) or exclude devices from accessing the Router (Deny). Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six

pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02. You need to know the MAC address of the devices to configure this screen.

To change your Router's MAC filter settings, click **Network** > **Wireless LAN** > **MAC Filter**. The screen appears as shown.

Figure 78 Network > Wireless LAN > MAC Filter



The following table describes the labels in this menu.

Table 45 Network > Wireless LAN > MAC Filter

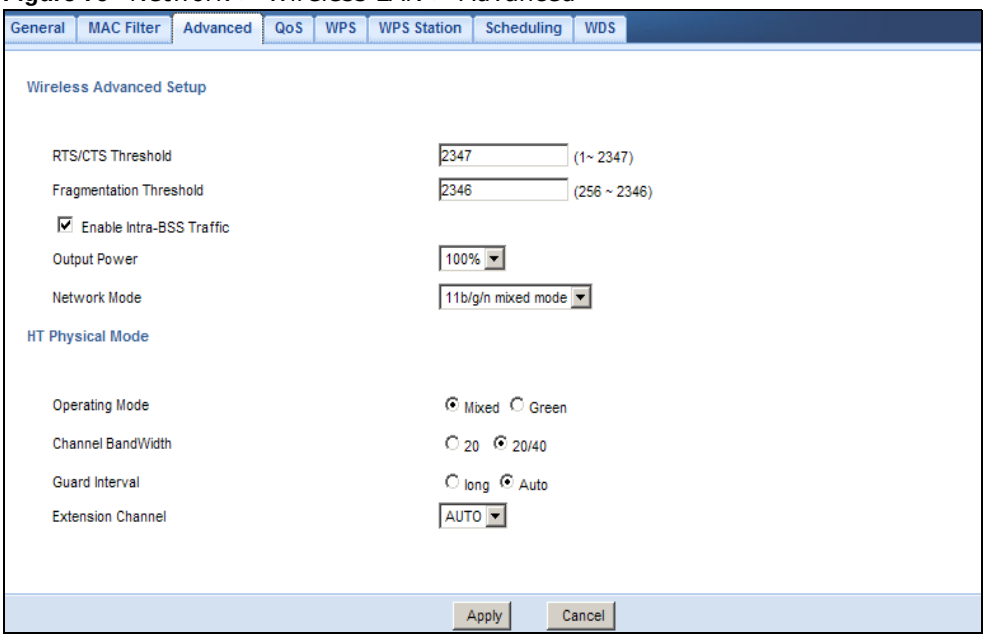
LABEL	DESCRIPTION
Access Policy	
Policy	Define the filter action for the list of MAC addresses in the **MAC Address** table. Select **Allow** to permit access to the Router, MAC addresses not listed will be denied access to the Router. Select **Reject** to block access to the Router, MAC addresses not listed will be allowed to access the Router
Add a station Mac Address	Enter the MAC addresses of the wireless station that are allowed or denied access to the Router in these address fields. Enter the MAC addresses in a valid MAC address format, that is, six hexadecimal character pairs, for example, 12:34:56:78:9a:bc. Click **Add**.
MAC Filter Summary	
Delete	Click the delete icon to remove the MAC address from the list.
MAC Address	This is the MAC address of the wireless station that are allowed or denied access to the Router.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

13.6 Wireless LAN Advanced Screen

Use this screen to allow wireless advanced features, such as intra-BSS networking and set the RTS/CTS Threshold

Click **Network** > **Wireless LAN** > **Advanced**. The screen appears as shown.

Figure 79 Network > Wireless LAN > Advanced



The following table describes the labels in this screen.

Table 46 Network > Wireless LAN > Advanced

LABEL	DESCRIPTION
RTS/CTS Threshold	Data with its frame size larger than this value will perform the RTS (Request To Send)/CTS (Clear To Send) handshake.
Fragmentation Threshold	The threshold (number of bytes) for the fragmentation boundary for directed messages. It is the maximum data fragment size that can be sent. Enter an even number.
Enable Intra-BSS Traffic	A Basic Service Set (BSS) exists when all communications between wireless clients or between a wireless client and a wired network client go through one access point (AP). Intra-BSS traffic is traffic between wireless clients in the BSS. When Intra-BSS is enabled, wireless client **A** and **B** can access the wired network and communicate with each other. When Intra-BSS is disabled, wireless client **A** and **B** can still access the wired network but cannot communicate with each other.
Output Power	Set the output power of the Router in this field. If there is a high density of APs in an area, decrease the output power of the Router to reduce interference with other APs. Select one of the following **100%**, **90%**, **75%**, **50%**, **25%**, **10%** or **Minimum**. See the product specifications for more information on your Router's output power.
Network Mode	Select **11b/g mixed mode** to allow IEEE802.11b and IEEE802.11g compliant WLAN devices to associate with the Router. Select **802.11b only** to allow only IEEE 802.11b compliant WLAN devices to associate with the Router. Select **802.11g only** to allow only IEEE 802.11g compliant WLAN devices to associate with the Router. Select **802.11n only** to allow only IEEE 802.11n compliant WLAN devices to associate with the Router. Select **11b/g/n mixed mode** to allow IEEE802.11b, IEEE802.11g and IEEE802.11n compliant WLAN devices to associate with the Router.

Table 46 Network > Wireless LAN > Advanced (continued)

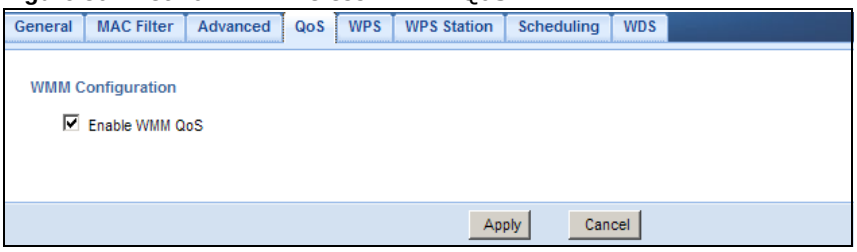
LABEL	DESCRIPTION
HT (High Throughput) Physical Mode - Use the fields below to configure the 802.11 wireless environment of your Router.	
Operating Mode	Choose this according to the wireless mode(s) used in your network. **Mixed Mode** - Select this if the wireless clients in your network use different wireless modes (for example, IEEE 802.11b/g and IEEE 802.1n modes) **Green Mode** - Select this if the wireless clients in your network uses only one type of wireless mode (for example, IEEEE 802.11 n only)
Channel Bandwidth	Select the channel bandwidth you want to use for your wireless network. It is recommended that you select **20/40** (20/40 MHz). Select 20 MHz if you want to lessen radio interference with other wireless devices in your neighborhood.
Guard Interval	Select **Auto** to increase data throughput. However, this may make data transfer more prone to errors. Select **Long** to prioritize data integrity. This may be because your wireless network is busy and congested or the Router is located in an environment prone to radio interference.
Extension Channel	This is set to **Auto** by default. If you select **20/40** as your **Channel Bandwidth**, the extension channel enables the Router to get higher data throughput. This also lowers radio interference and traffic.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

13.7 Quality of Service (QoS) Screen

The QoS screen allows you to automatically give a service (such as VoIP and video) a priority level.

Click **Network** > **Wireless LAN** > **QoS**. The following screen appears.

Figure 80 Network > Wireless LAN > QoS



The following table describes the labels in this screen.

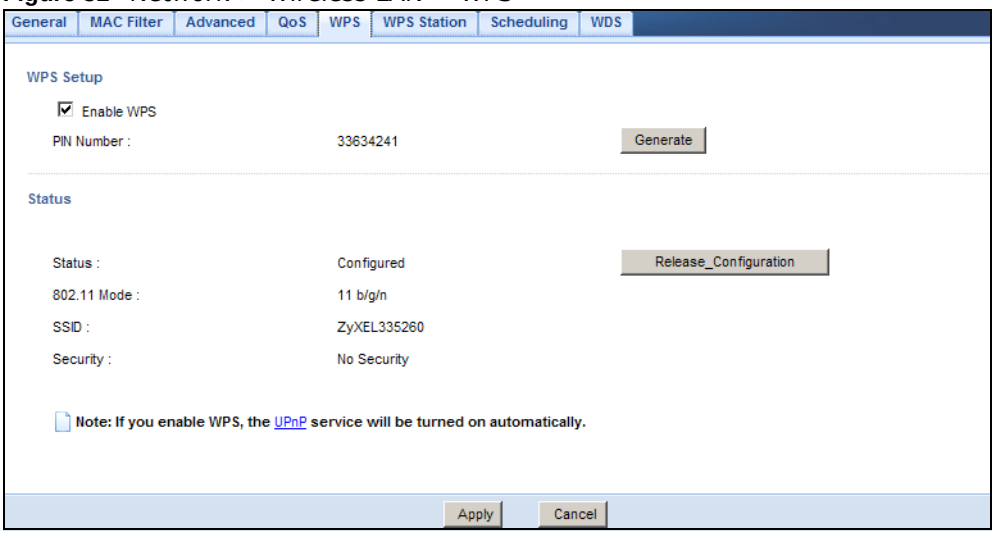
Table 47 Network > Wireless LAN > QoS

LABEL	DESCRIPTION
Enable WMM QoS	Check this to have the Router automatically give a service a priority level according to the ToS value in the IP header of packets it sends. WMM QoS (Wifi MultiMedia Quality of Service) gives high priority to voice and video, which makes them run more smoothly.
Apply	Click **Apply** to save your changes to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

13.8 WPS Screen

Use this screen to enable/disable WPS, view or generate a new PIN number and check current WPS status. To open this screen, click **Network** > **Wireless LAN** > **WPS** tab.

Figure 81 Network > Wireless LAN > WPS



The following table describes the labels in this screen.

Table 48 Network > Wireless LAN > WPS

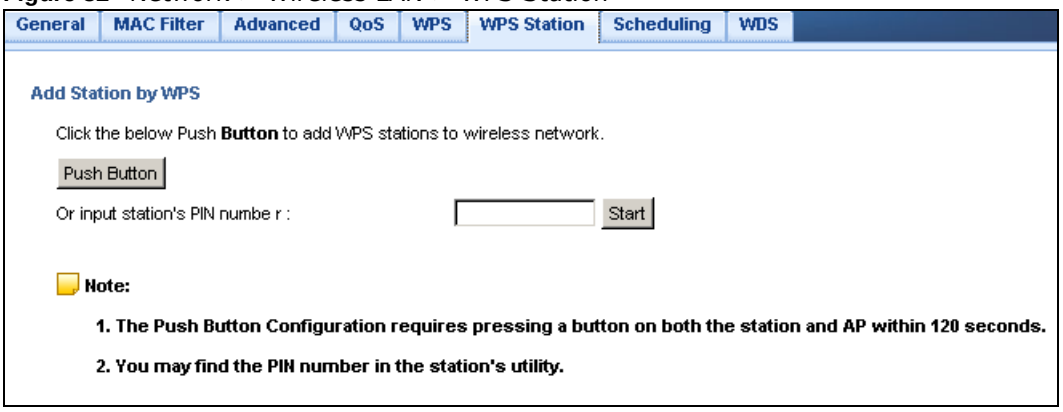
LABEL	DESCRIPTION
WPS Setup	
Enable WPS	Select this to enable the WPS feature.
PIN Number	This displays a PIN number last time system generated. Click **Generate** to generate a new PIN number.
Status	
Status	This displays **Configured** when the Router has connected to a wireless network using WPS or when **Enable WPS** is selected and wireless or wireless security settings have been changed. The current wireless and wireless security settings also appear in the screen. This displays **Unconfigured** if WPS is disabled and there are no wireless or wireless security changes on the Router or you click **Release_Configuration** to remove the configured wireless and wireless security settings.
Release Configuration	This button is only available when the WPS status displays **Configured**. Click this button to remove all configured wireless and wireless security settings for WPS connections on the Router.
802.11 Mode	This is the 802.11 mode used. Only compliant WLAN devices can associate with the Router.
SSID	This is the name of the wireless network.
Security	This is the type of wireless security employed by the network.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

13.9 WPS Station Screen

Use this screen when you want to add a wireless station using WPS. To open this screen, click **Network** > **Wireless LAN** > **WPS Station** tab.

Note: Note: After you click **Push Button** on this screen, you have to press a similar button in the wireless station utility within 2 minutes. To add the second wireless station, you have to press these buttons on both device and the wireless station again after the first 2 minutes.

Figure 82 Network > Wireless LAN > WPS Station



The following table describes the labels in this screen.

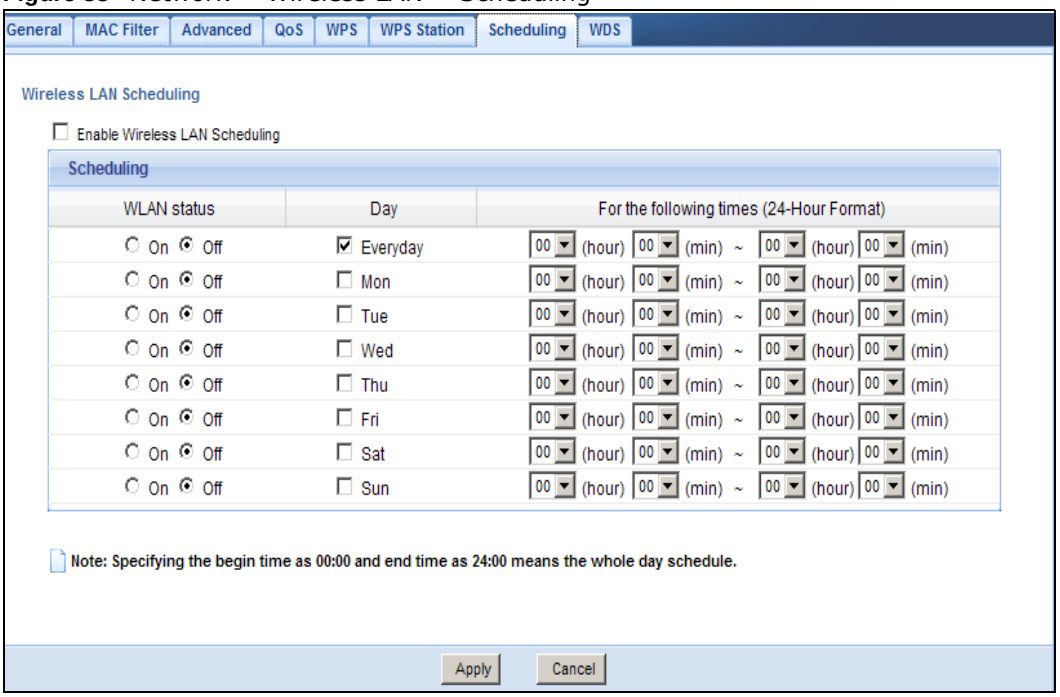
Table 49 Network > Wireless LAN > WPS Station

LABEL	DESCRIPTION
Push Button	Use this button when you use the PBC (Push Button Configuration) method to configure wireless stations's wireless settings. See Section 12.3.1 on page 90. Click this to start WPS-aware wireless station scanning and the wireless security information synchronization.
Or input station's PIN number	Use this button when you use the PIN Configuration method to configure wireless station's wireless settings. See Section 12.3.2 on page 91. Type the same PIN number generated in the wireless station's utility. Then click **Start** to associate to each other and perform the wireless security information synchronization.

13.10 Scheduling Screen

Use this screen to set the times your wireless LAN is turned on and off. Wireless LAN scheduling is disabled by default. The wireless LAN can be scheduled to turn on or off on certain days and at certain times. To open this screen, click **Network** > **Wireless LAN** > **Scheduling** tab.

Figure 83 Network > Wireless LAN > Scheduling



The following table describes the labels in this screen.

Table 50 Network > Wireless LAN > Scheduling

LABEL	DESCRIPTION
Wireless LAN Scheduling	
Enable Wireless LAN Scheduling	Select this to enable Wireless LAN scheduling.
Scheduling	
WLAN Status	Select **On** or **Off** to specify whether the Wireless LAN is turned on or off. This field works in conjunction with the **Day** and **Except for the following times** fields.
Day	Select **Everyday** or the specific days to turn the Wireless LAN on or off. If you select **Everyday** you can not select any specific days. This field works in conjunction with the **Except for the following times** field.
For the following times (24-Hour Format)	Select a begin time using the first set of **hour** and minute (**min**) drop down boxes and select an end time using the second set of **hour** and minute (**min**) drop down boxes. If you have chosen **On** earlier for the WLAN Status the Wireless LAN will turn on between the two times you enter in these fields. If you have chosen **Off** earlier for the WLAN Status the Wireless LAN will turn off between the two times you enter in these fields.
Apply	Click **Apply** to save your changes back to the Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

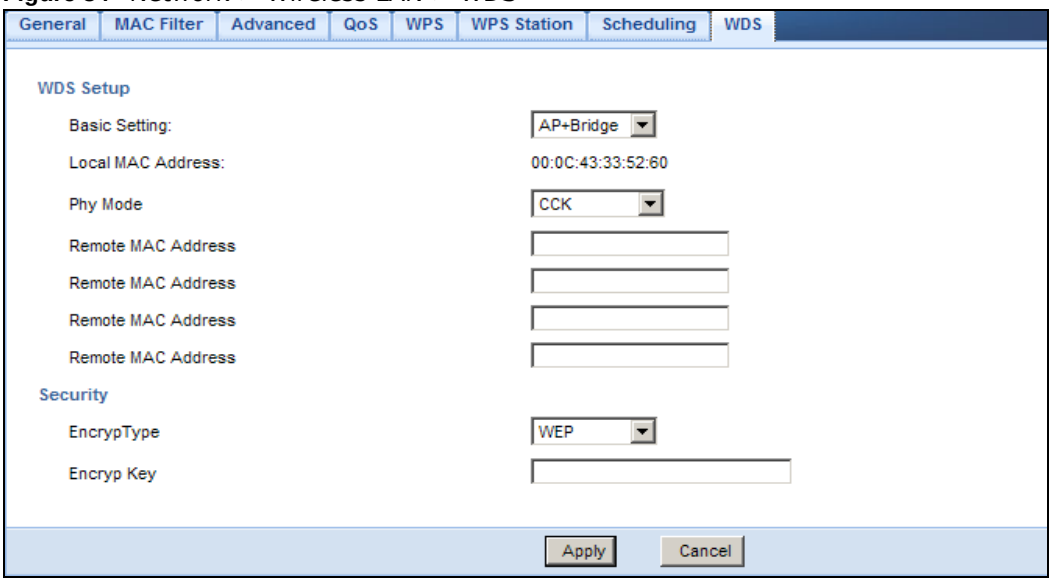
13.11 WDS Screen

A Wireless Distribution System is a wireless connection between two or more APs. Use this screen to set the operating mode of your Router to **AP + Bridge** or **Bridge Only** and establish wireless links with other APs. You need to know the MAC address of the peer device, which also must be in bridge mode.

Note: You must enable the same wireless security settings on the Router and on all wireless clients that you want to associate with it.

Click **Network** > **Wireless LAN** > **WDS** tab. The following screen opens with the **Basic Setting** set to **Disabled**, and **Security Mode** set to **No Security**.

Figure 84 Network > Wireless LAN > WDS



The following table describes the labels in this screen.

Table 51 Network > Wireless LAN > WDS

LABEL	DESCRIPTION
WDS Setup	
Basic Settings	Select the operating mode for your Router. • **AP + Bridge -** The Router functions as a bridge and access point simultaneously. • **Bridge** - The Router acts as a wireless network bridge and establishes wireless links with other APs. You need to know the MAC address of the peer device, which also must be in bridge mode. The Router can establish up to five wireless links with other APs.
Local MAC Address	This is the MAC address of your Router.
Phy Mode	Select the Phy mode you want the Router to use. This dictates the maximum size of packets during data transmission.
Remote MAC Address	This is the MAC address of the peer device that your Router wants to make a bridge connection with. You can connect to up to 4 peer devices.
Security	

Table 51 Network > Wireless LAN > WDS (continued)

LABEL	DESCRIPTION
EncrypType	Select whether to use **WEP**, **TKIP** or **AES** encryption for your WDS connection in this field. Otherwise, select **No Security**.
EncrypKey	The Encryp key is used to encrypt data. Peers must use the same key for data transmission.
Apply	Click **Apply** to save your changes to Router.
Cancel	Click **Cancel** to reload the previous configuration for this screen.

14

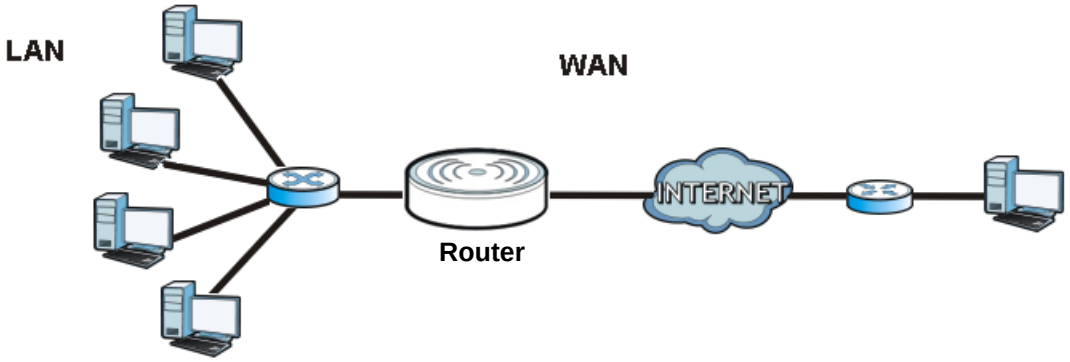
WAN

14.1 Overview

This chapter discusses the Router's **WAN** screens. Use these screens to configure your Router for Internet access.

A WAN (Wide Area Network) connection is an outside connection to another network or the Internet. It connects your private networks such as a LAN (Local Area Network) and other networks, so that a computer in one location can communicate with computers in other locations.

Figure 85 LAN and WAN



14.2 What You Can Do

- Use the **Internet Connection** screen (Section 14.4 on page 121) to enter your ISP information and set how the computer acquires its IP, DNS and WAN MAC addresses.
- Use the **Advanced** screen (Section 14.5 on page 130) to enable multicasting, configure Windows networking and bridge.
- Use **IGMP Blocking** screen (Section 14.6 on page 131) to enable IGMP blocking in the LAN ports.

14.3 What You Need To Know

The information in this section can help you configure the screens for your WAN connection, as well as enable/disable some advanced features of your Router.

14.3.1 Configuring Your Internet Connection

Encapsulation Method

Encapsulation is used to include data from an upper layer protocol into a lower layer protocol. To set up a WAN connection to the Internet, you need to use the same encapsulation method used by your ISP (Internet Service Provider). If your ISP offers a dial-up Internet connection using PPPoE (PPP over Ethernet) or PPTP (Point-to-Point Tunneling Protocol), they should also provide a username and password (and service name) for user authentication.

WAN IP Address

The WAN IP address is an IP address for the Router, which makes it accessible from an outside network. It is used by the Router to communicate with other devices in other networks. It can be static (fixed) or dynamically assigned by the ISP each time the Router tries to access the Internet.

If your ISP assigns you a static WAN IP address, they should also assign you the subnet mask and DNS server IP address(es) (and a gateway IP address if you use the Ethernet or ENET ENCAP encapsulation method).

DNS Server Address Assignment

Use Domain Name System (DNS) to map a domain name to its corresponding IP address and vice versa, for instance, the IP address of www.zyxel.com is 204.217.0.2. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it.

The Router can get the DNS server addresses in the following ways.

1. The ISP tells you the DNS server addresses, usually in the form of an information sheet, when you sign up. If your ISP gives you DNS server addresses, manually enter them in the DNS server fields.
2. If your ISP dynamically assigns the DNS server IP addresses (along with the Router's WAN IP address), set the DNS server fields to get the DNS server address from the ISP.

WAN MAC Address

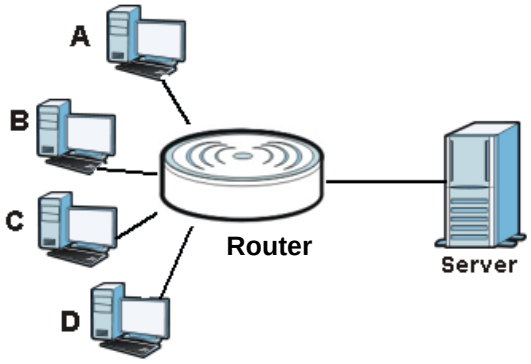
The MAC address screen allows users to configure the WAN port's MAC address by either using the factory default or cloning the MAC address from a computer on your LAN. Choose **Factory Default** to select the factory assigned default MAC Address.

Otherwise, click **Clone the computer's MAC address - IP Address** and enter the IP address of the computer on the LAN whose MAC you are cloning. Once it is successfully configured, the address will be copied to configuration file. It is recommended that you clone the MAC address prior to hooking up the WAN Port.

14.3.2 Multicast

Traditionally, IP packets are transmitted in one of either two ways - Unicast (1 sender - 1 recipient) or Broadcast (1 sender - everybody on the network). Multicast delivers IP packets to a group of hosts on the network - not everybody and not just 1.

Figure 86 Multicast Example



In the multicast example above, systems A and D comprise one multicast group. In multicasting, the server only needs to send one data stream and this is delivered to systems A and D.

IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a multicast group - it is not used to carry user data. The Router supports both IGMP version 1 (**IGMP-v1**) and IGMP version 2 (**IGMP-v2**).

At start up, the Router queries all directly connected networks to gather group membership. After that, the Router periodically updates this information. IP multicasting can be enabled/disabled on the Router LAN and/or WAN interfaces in the Web Configurator (**LAN**; **WAN**). Select **None** to disable IP multicasting on these interfaces.

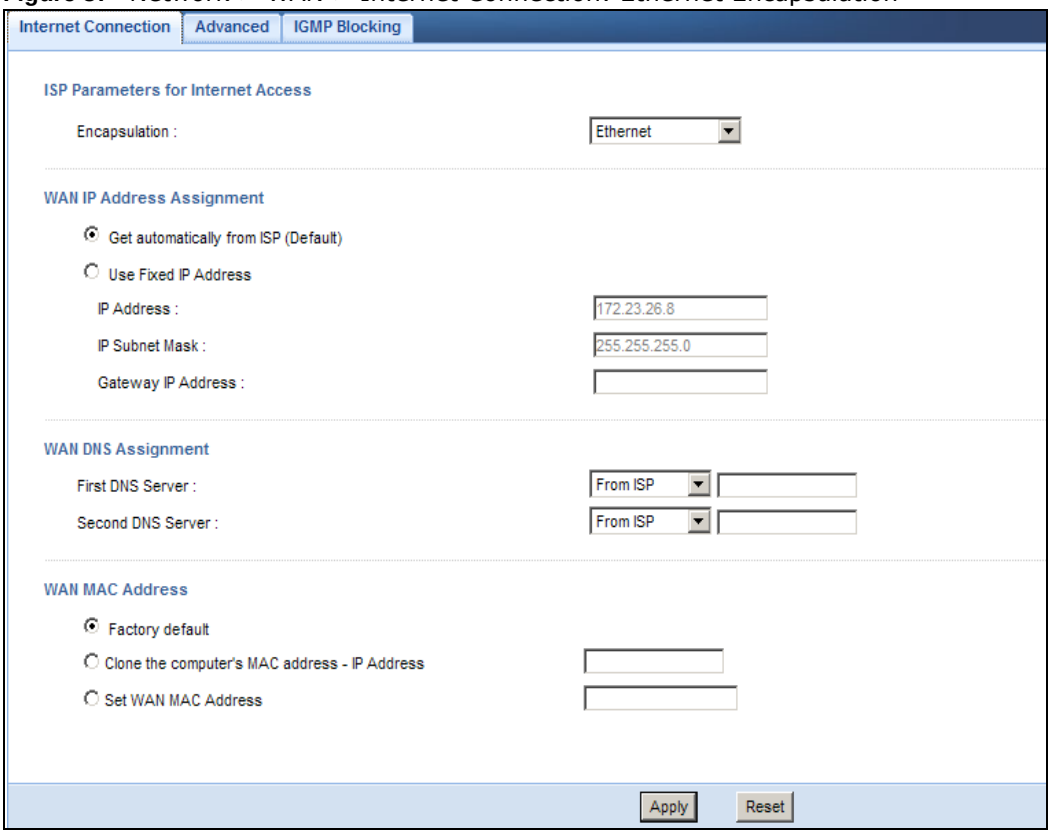
14.4 Internet Connection

Use this screen to change your Router's Internet access settings. Click **WAN** from the Configuration menu. The screen differs according to the encapsulation you choose.

14.4.1 Ethernet Encapsulation

This screen displays when you select **Ethernet** encapsulation.

Figure 87 Network > WAN > Internet Connection: Ethernet Encapsulation



The following table describes the labels in this screen.

Table 52 Network > WAN > Internet Connection: Ethernet Encapsulation

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Encapsulation	You must choose the **Ethernet** option when the WAN port is used as a regular Ethernet.
WAN IP Address Assignment	
Get automatically from ISP (Default)	Select this option If your ISP did not assign you a fixed IP address. This is the default selection.
Use Fixed IP Address	Select this option If the ISP assigned a fixed IP address.
IP Address	Enter your WAN IP address in this field if you selected **Use Fixed IP Address**.
IP Subnet Mask	Enter the **IP Subnet Mask** in this field.
Gateway IP Address	Enter a **Gateway IP Address** (if your ISP gave you one) in this field.
WAN DNS Assignment	

Table 52 Network > WAN > Internet Connection: Ethernet Encapsulation (continued)

LABEL	DESCRIPTION
First DNS Server Second DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the Router's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.
WAN MAC Address	The MAC address section allows users to configure the WAN port's MAC address by either using the Router's MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address.
Factory default	Select **Factory default** to use the factory assigned default MAC Address.
Clone the computer's MAC address - IP Address	Select **Clone the computer's MAC address - IP Address** and enter the IP address of the computer on the LAN whose MAC you are cloning.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to begin configuring this screen afresh.

14.4.2 PPPoE Encapsulation

The Router supports PPPoE (Point-to-Point Protocol over Ethernet). PPPoE is an IETF standard (RFC 2516) specifying how a personal computer (PC) interacts with a broadband modem (DSL, cable, wireless, etc.) connection. The **PPP over Ethernet** option is for a dial-up connection using PPPoE.

For the service provider, PPPoE offers an access and authentication method that works with existing access control systems (for example Radius).

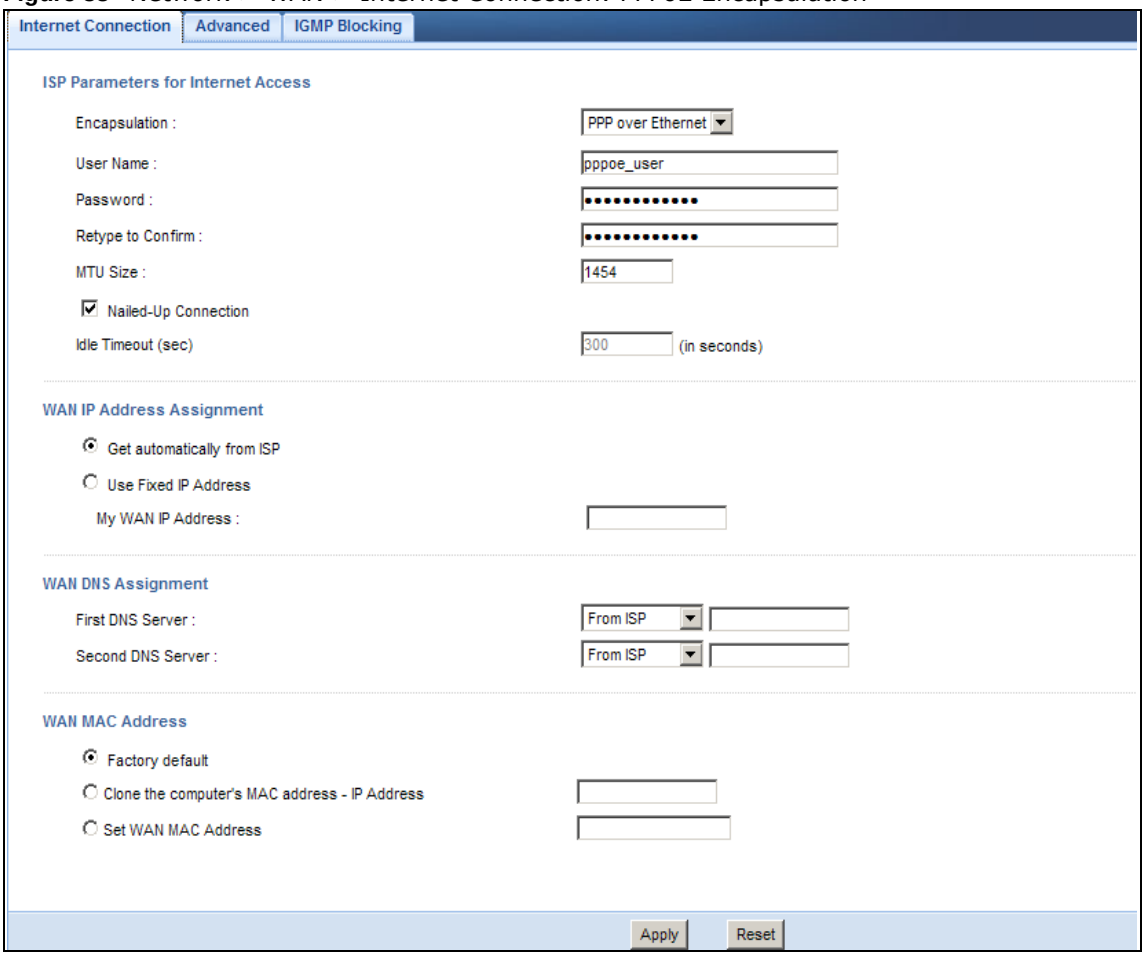
One of the benefits of PPPoE is the ability to let you access one of multiple network services, a function known as dynamic service selection. This enables the service provider to easily create and offer new IP services for individuals.

Operationally, PPPoE saves significant effort for both you and the ISP or carrier, as it requires no specific configuration of the broadband modem at the customer site.

By implementing PPPoE directly on the Router (rather than individual computers), the computers on the LAN do not need PPPoE software installed, since the Router does that part of the task. Furthermore, with NAT, all of the LANs' computers will have access.

This screen displays when you select **PPPoE** encapsulation.

Figure 88 Network > WAN > Internet Connection: PPPoE Encapsulation



The following table describes the labels in this screen.

Table 53 Network > WAN > Internet Connection: PPPoE Encapsulation

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Encapsulation	Select **PPP over Ethernet** if you connect to your Internet via dial-up.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the user name above.
Retype to Confirm	Type your password again to make sure that you have entered is correctly.
MTU Size	Enter the Maximum Transmission Unit (MTU) or the largest packet size per frame that your Router can receive and process.
Nailed-Up Connection	Select **Nailed-Up Connection** if you do not want the connection to time out.
Idle Timeout (sec)	This value specifies the time in minutes that elapses before the router automatically disconnects from the PPPoE server.
WAN IP Address Assignment	
Get automatically from ISP	Select this option If your ISP did not assign you a fixed IP address. This is the default selection.

Table 53 Network > WAN > Internet Connection: PPPoE Encapsulation (continued)

LABEL	DESCRIPTION
Use Fixed IP Address	Select this option If the ISP assigned a fixed IP address.
My WAN IP Address	Enter your WAN IP address in this field if you selected **Use Fixed IP Address**.
WAN DNS Assignment	
First DNS Server Second DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the Router's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.
WAN MAC Address	The MAC address section allows users to configure the WAN port's MAC address by using the Router's MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address.
Factory default	Select **Factory default** to use the factory assigned default MAC Address.
Clone the computer's MAC address - IP Address	Select **Clone the computer's MAC address - IP Address** and enter the IP address of the computer on the LAN whose MAC you are cloning.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to begin configuring this screen afresh.

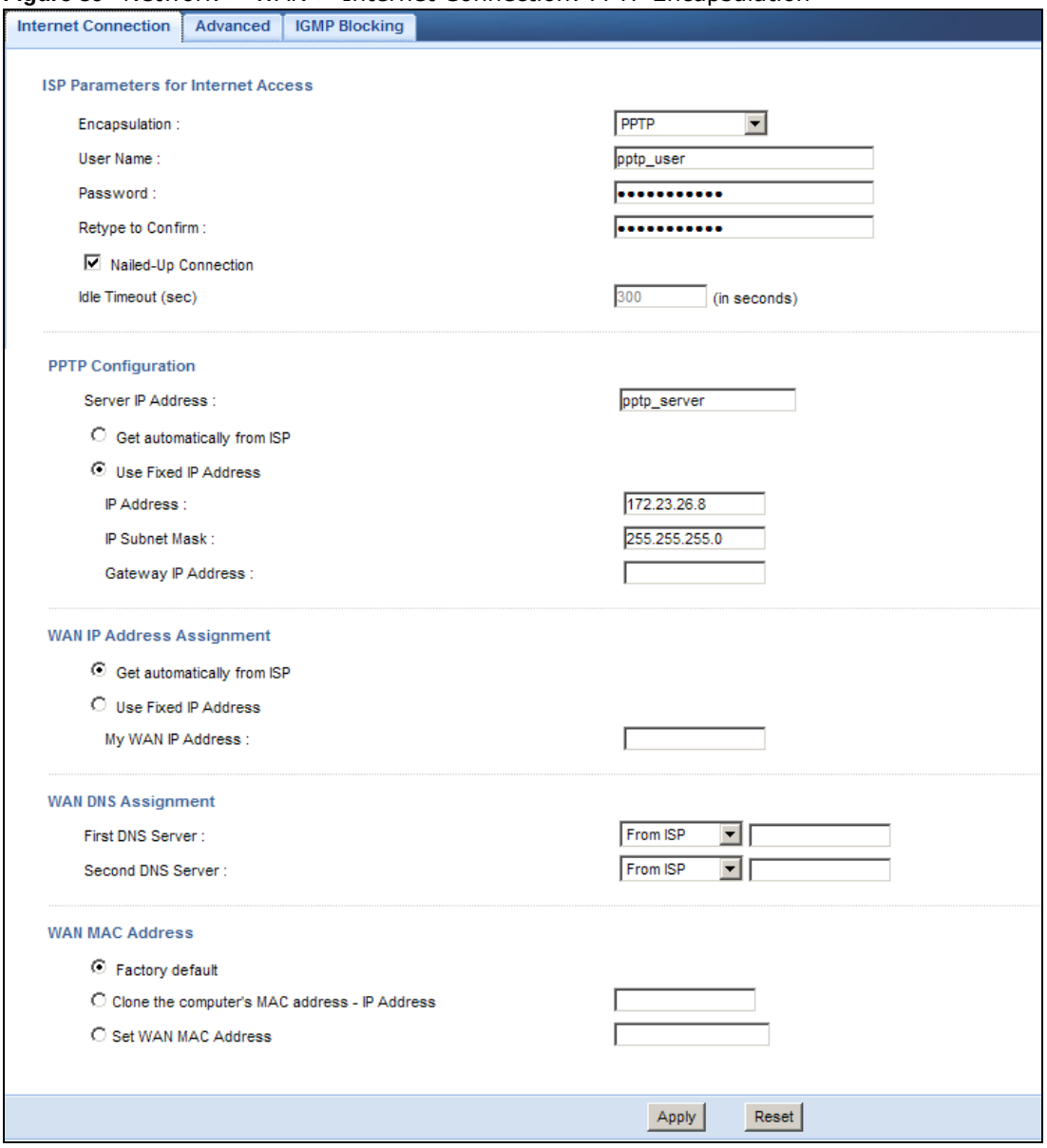
14.4.3 PPTP Encapsulation

Point-to-Point Tunneling Protocol (PPTP) is a network protocol that enables secure transfer of data from a remote client to a private server, creating a Virtual Private Network (VPN) using TCP/IP-based networks.

PPTP supports on-demand, multi-protocol and virtual private networking over public networks, such as the Internet.

This screen displays when you select **PPTP** encapsulation.

Figure 89 Network > WAN > Internet Connection: PPTP Encapsulation



The following table describes the labels in this screen.

Table 54 Network > WAN > Internet Connection: PPTP Encapsulation

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Connection Type	To configure a PPTP client, you must configure the **User Name** and **Password** fields for a PPP connection and the PPTP parameters for a PPTP connection.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the User Name above.
Retype to Confirm	Type your password again to make sure that you have entered is correctly.

Table 54 Network > WAN > Internet Connection: PPTP Encapsulation (continued)

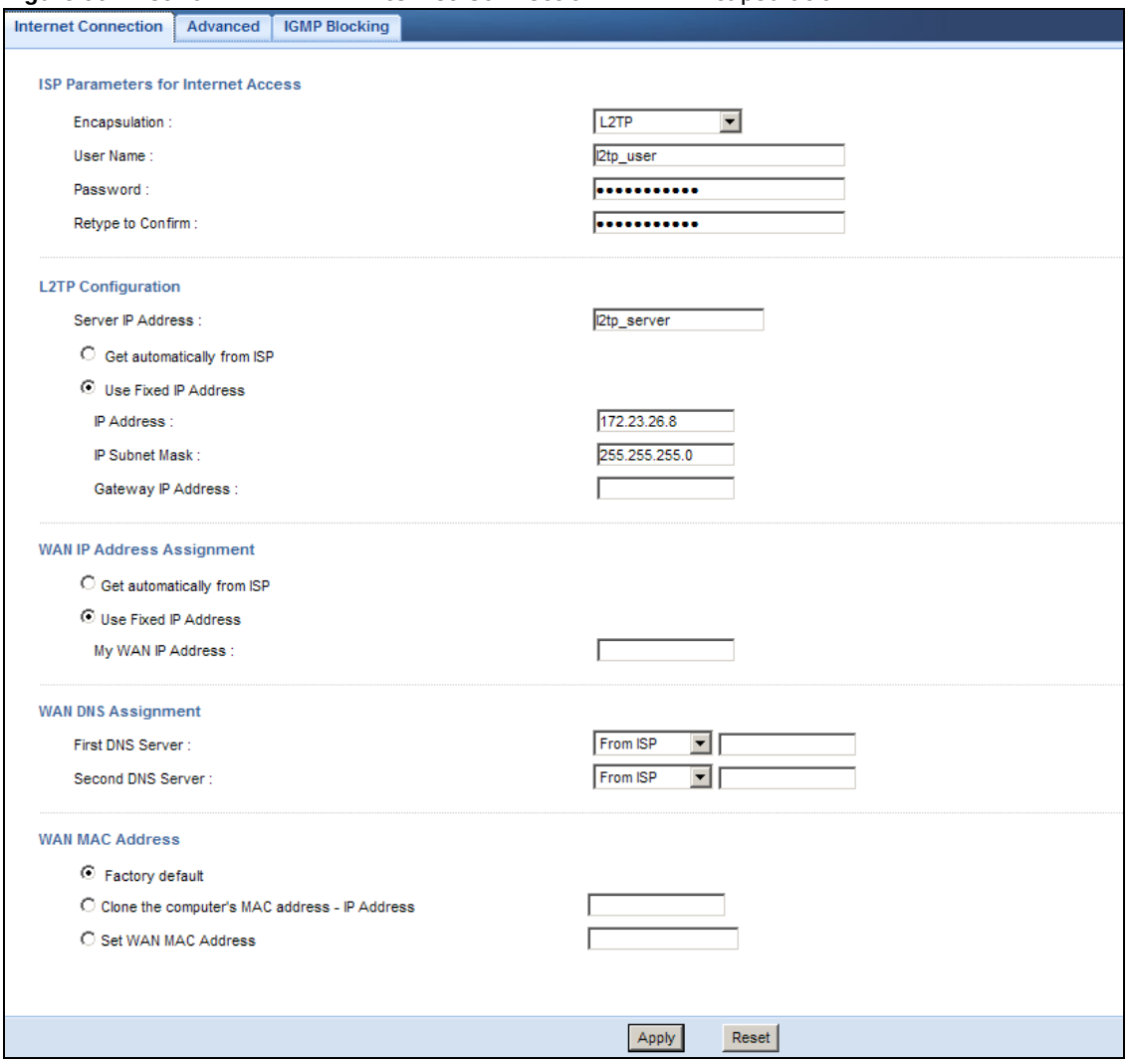
LABEL	DESCRIPTION
Nailed-up Connection	Select **Nailed-Up Connection** if you do not want the connection to time out.
Idle Timeout	This value specifies the time in minutes that elapses before the Router automatically disconnects from the PPTP server.
PPTP Configuration	
Server IP Address	Type the IP address of the PPTP server.
Get automatically from ISP	Select this option If your ISP did not assign you a fixed IP address. This is the default selection.
Use Fixed IP Address	Select this option If the ISP assigned a fixed IP address.
IP Address	Enter your WAN IP address in this field if you selected **Use Fixed IP Address**.
IP Subnet Mask	Your Router will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the Router.
Gateway IP Address	Enter a **Gateway IP Address** (if your ISP gave you one) in this field.
WAN IP Address Assignment	
Get automatically from ISP	Select this to get your WAN IP address from your ISP.
Use Fixed IP Address	Select this option If the ISP assigned a fixed IP address.
My WAN IP Address	Enter your WAN IP address in this field if you selected **Use Fixed IP Address**.
WAN DNS Assignment	
First DNS Server Second DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the Router's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.
WAN MAC Address	The MAC address section allows users to configure the WAN port's MAC address by either using the Router's MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address.
Factory default	Select **Factory default** to use the factory assigned default MAC Address.
Clone the computer's MAC address - IP Address	Select **Clone the computer's MAC address - IP Address** and enter the IP address of the computer on the LAN whose MAC you are cloning.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to begin configuring this screen afresh.

14.4.4 L2TP Encapsulation

The Layer 2 Tunneling Protocol (L2TP) works at layer 2 (the data link layer) to tunnel network traffic between two peer devices over another network (like the Internet).

This screen displays when you select **L2TP** encapsulation.

Figure 90 Network > WAN > Internet Connection: L2TP Encapsulation



The following table describes the labels in this screen.

Table 55 Network > WAN > Internet Connection: L2TP Encapsulation

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Connection Type	To configure a L2TP client, you must configure the **User Name** and **Password** fields for a layer-2 connection and the L2TP parameters for an L2TP connection.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the User Name above.
Retype to Confirm	Type your password again to make sure that you have entered is correctly.

Table 55 Network > WAN > Internet Connection: L2TP Encapsulation (continued)

LABEL	DESCRIPTION
L2TP Configuration	
Server IP Address	Type the IP address of the L2TP server.
Get automatically from ISP	Select this option If your ISP did not assign you a fixed IP address. This is the default selection.
Use Fixed IP Address	Select this option If the ISP assigned a fixed IP address.
IP Address	Enter your WAN IP address in this field if you selected **Use Fixed IP Address**.
IP Subnet Mask	Your Router will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the Router.
Gateway IP Address	Enter a **Gateway IP Address** (if your ISP gave you one) in this field.
WAN IP Address Assignment	
Get automatically from ISP	Select this to get your WAN IP address from your ISP.
Use Fixed IP Address	Select this option If the ISP assigned a fixed IP address.
My WAN IP Address	Enter your WAN IP address in this field if you selected **Use Fixed IP Address**.
WAN DNS Assignment	
First DNS Server Second DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the Router's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.
WAN MAC Address	The MAC address section allows users to configure the WAN port's MAC address by either using the Router's MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address.
Factory default	Select **Factory default** to use the factory assigned default MAC Address.
Clone the computer's MAC address - IP Address	Select **Clone the computer's MAC address - IP Address** and enter the IP address of the computer on the LAN whose MAC you are cloning.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to begin configuring this screen afresh.

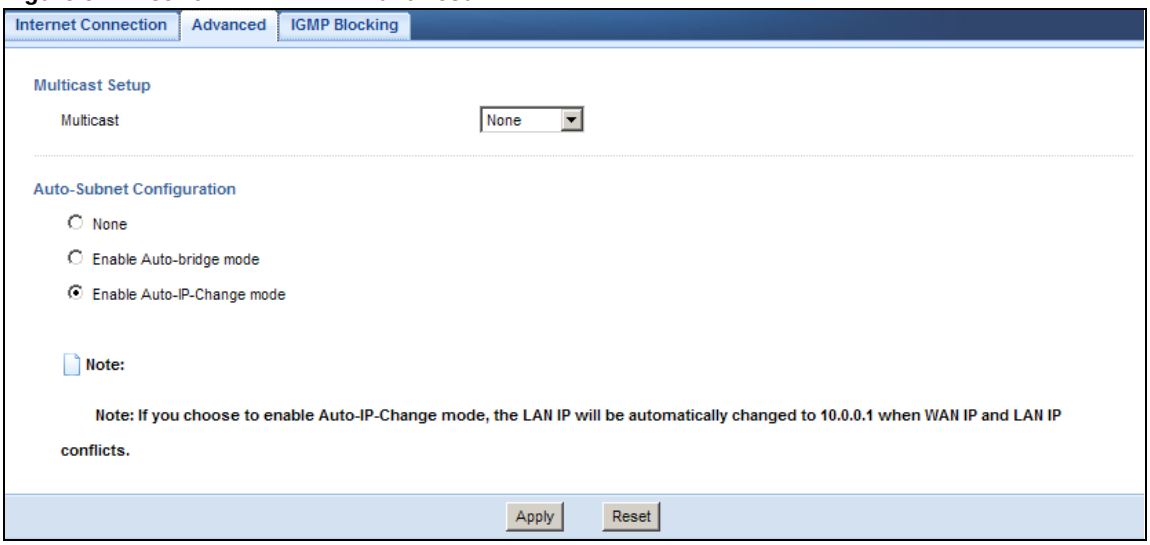
14.5 Advanced WAN Screen

Use this screen to enable **Multicast** and enable **Auto-bridge**.

Note: The categories shown in this screen are independent of each other.

To change your Router's advanced WAN settings, click **Network** > **WAN** > **Advanced**. The screen appears as shown.

Figure 91 Network > WAN > Advanced



The following table describes the labels in this screen.

Table 56 Network > WAN > Advanced

LABEL	DESCRIPTION
Multicast Setup	
Multicast	Select **IGMPv1 / v2** to enable multicasting. This applies to traffic routed from the WAN to the LAN. Select **None** to disable this feature. This may cause incoming traffic to be dropped or sent to all connected network devices.
Auto-Subnet Setup	
None	Select this option to have the Router do nothing when it gets a WAN IP address in the range of 192.168.x.y (where x and y are from zero to nine) or in the same subnet as the LAN IP address.
Enable Auto-bridge mode	Select this option to have the Router switch to bridge mode automatically when the Router gets a WAN IP address in the range of 192.168.x.y (where x and y are from zero to nine) no matter what the LAN IP address is.
Enable Auto-IP-Change mode	Select this option to have the Router change its LAN IP address to 10.0.0.1 or 192.168.1.1 accordingly when the Router gets a dynamic WAN IP address in the same subnet as the LAN IP address 192.168.1.1 or 10.0.0.1. The NAT, DHCP server and firewall functions on the Router are still available in thismode.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to begin configuring this screen afresh.

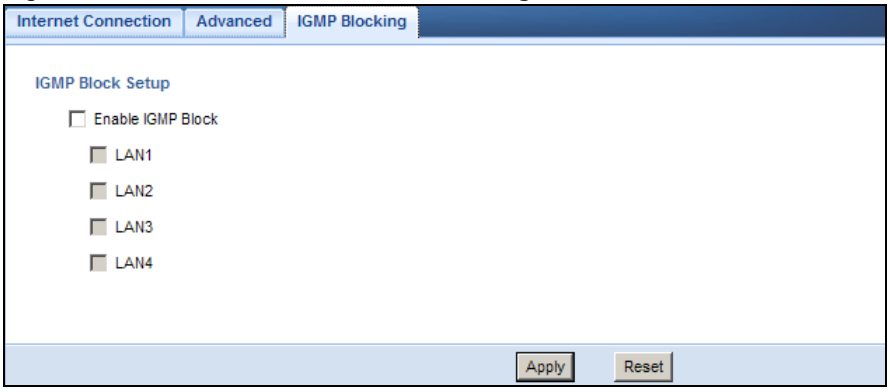
14.6 IGMP Blocking Screen

Use this screen to enable IGMP blocking (snooping) if you have LAN users that subscribe to multicast services.

IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a multicast group - it is not used to carry user data.

Click **Network > WAN > IGMP Blocking**. The screen appears as shown.

Figure 92 Network > WAN > IGMP Blocking



The following table describes the labels in this screen.

Table 57 Network > WAN > IGMP Blocking

LABEL	DESCRIPTION
IGMP Block Setup	
Enable IGMP Block	Select this option to have the Router use IGMP blocking (snooping). Check the LAN port/s to which IGMP snooping applies.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to begin configuring this screen afresh.

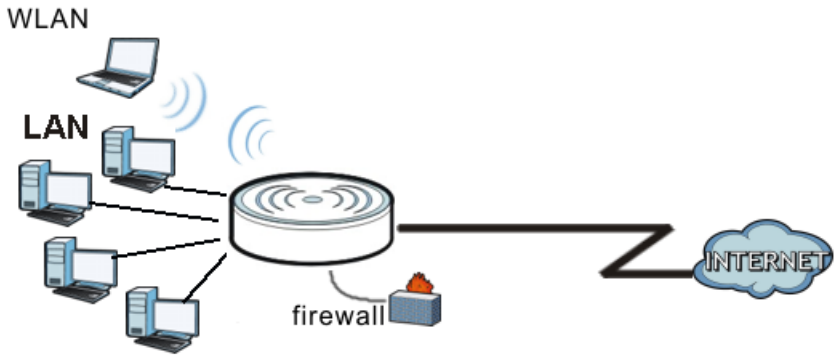
15 LAN

15.1 Overview

This chapter describes how to configure LAN settings.

A Local Area Network (LAN) is a shared communication system to which many computers are attached. A LAN is a computer network limited to the immediate area, usually the same building or floor of a building. The LAN screens can help you configure a LAN DHCP server, manage IP addresses, and partition your physical network into logical networks.

Figure 93 LAN Example



The LAN screens can help you manage IP addresses.

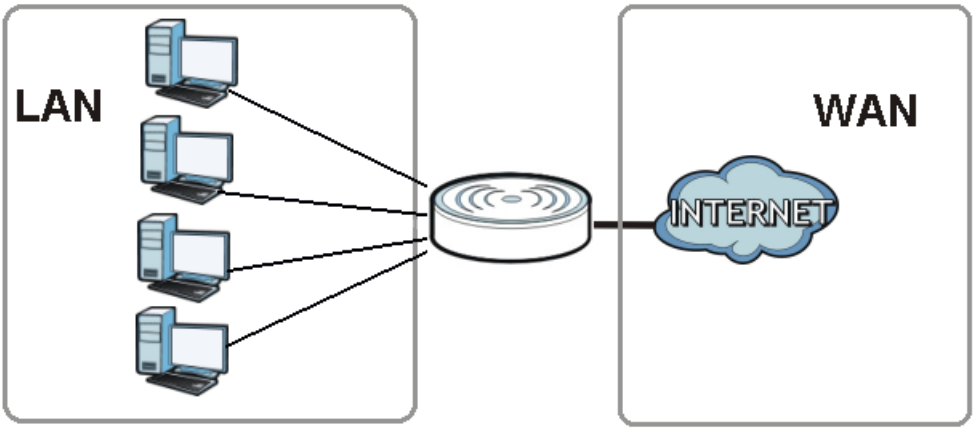
15.2 What You Can Do

- Use the **IP** screen (Section 15.4 on page 135) to change the IP address for your Router.
- Use the **IP Alias** screen (Section 15.5 on page 135) to have the Router apply IP alias to create LAN subnets.

15.3 What You Need To Know

The actual physical connection determines whether the Router ports are LAN or WAN ports. There are two separate IP networks, one inside the LAN network and the other outside the WAN network as shown next.

Figure 94 LAN and WAN IP Addresses



The LAN parameters of the Router are preset in the factory with the following values:

- IP address of 192.168.1.1 with subnet mask of 255.255.255.0 (24 bits)
- DHCP server enabled with 32 client IP addresses starting from 192.168.1.33.

These parameters should work for the majority of installations. If your ISP gives you explicit DNS server address(es), read the embedded Web Configurator help regarding what fields need to be configured.

15.3.1 IP Pool Setup

The Router is pre-configured with a pool of 32 IP addresses starting from 192.168.1.33 to 192.168.1.64. This configuration leaves 31 IP addresses (excluding the Router itself) in the lower range (192.168.1.2 to 192.168.1.32) for other server computers, for instance, servers for mail, FTP, TFTP, web, etc., that you may have.

15.3.2 LAN TCP/IP

The Router has built-in DHCP server capability that assigns IP addresses and DNS servers to systems that support DHCP client capability.

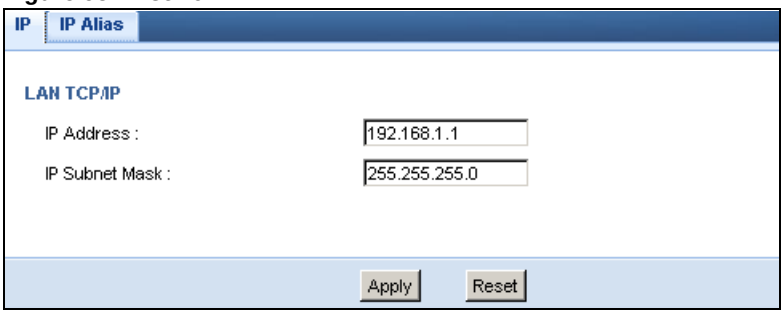
15.3.3 IP Alias

IP alias allows you to partition a physical network into different logical networks over the same Ethernet interface. The Router supports three logical LAN interfaces via its single physical Ethernet interface with the Router itself as the gateway for each LAN network.

15.4 LAN IP Screen

Use this screen to change the IP address for your Router. Click **Network > LAN > IP**.

Figure 95 Network > LAN > IP



The following table describes the labels in this screen.

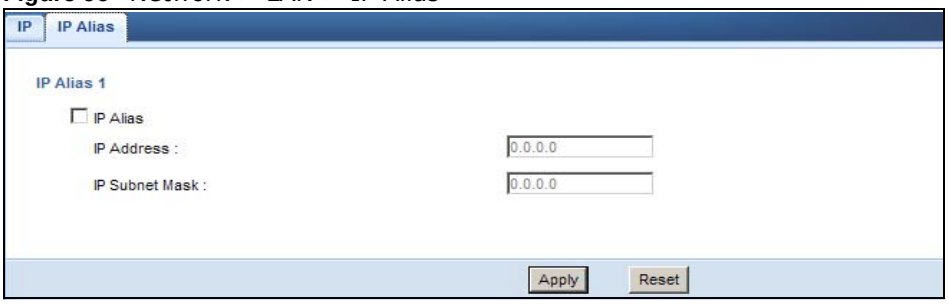
Table 58 Network > LAN > IP

LABEL	DESCRIPTION
IP Address	Type the IP address of your Router in dotted decimal notation.
IP Subnet Mask	The subnet mask specifies the network number portion of an IP address. Your Router will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the Router.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to begin configuring this screen afresh.

15.5 IP Alias Screen

Use this screen to have the Router apply IP alias to create LAN subnets. Click **LAN** > **IP Alias**.

Figure 96 Network > LAN > IP Alias



The following table describes the labels in this screen.

Table 59 Network > LAN > IP Alias

LABEL	DESCRIPTION
IP Alias	Check this to enable IP alias.
IP Address	Type the IP alias address of your Router in dotted decimal notation.

Table 59 Network > LAN > IP Alias (continued)

LABEL	DESCRIPTION
IP Subnet Mask	The subnet mask specifies the network number portion of an IP address. Your Router will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the Router.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to begin configuring this screen afresh.

16

DHCP Server

16.1 Overview

DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients to obtain TCP/IP configuration at start-up from a server. You can configure the Router's LAN as a DHCP server or disable it. When configured as a server, the Router provides the TCP/IP configuration for the clients. If DHCP service is disabled, you must have another DHCP server on your LAN, or else the computer must be manually configured.

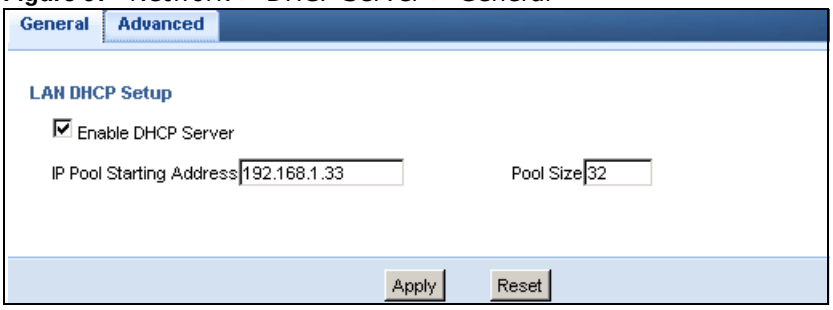
16.2 What You Can Do

- Use the **General** (Section 16.3 on page 137) screen to enable the DHCP server.
- Use the **Advanced** (Section 16.4 on page 138) screen to assign IP addresses on the LAN to specific individual computers based on their MAC Addresses.

16.3 General Screen

Use this screen to enable the DHCP server. Click **Network** > **DHCP Server**. The following screen displays.

Figure 97 Network > DHCP Server > General



The following table describes the labels in this screen.

Table 60 Network > DHCP Server > General

LABEL	DESCRIPTION
Enable DHCP Server	Enable or Disable DHCP for LAN.
IP Pool Starting Address	This field specifies the first of the contiguous addresses in the IP address pool for LAN.

Table 60 Network > DHCP Server > General (continued)

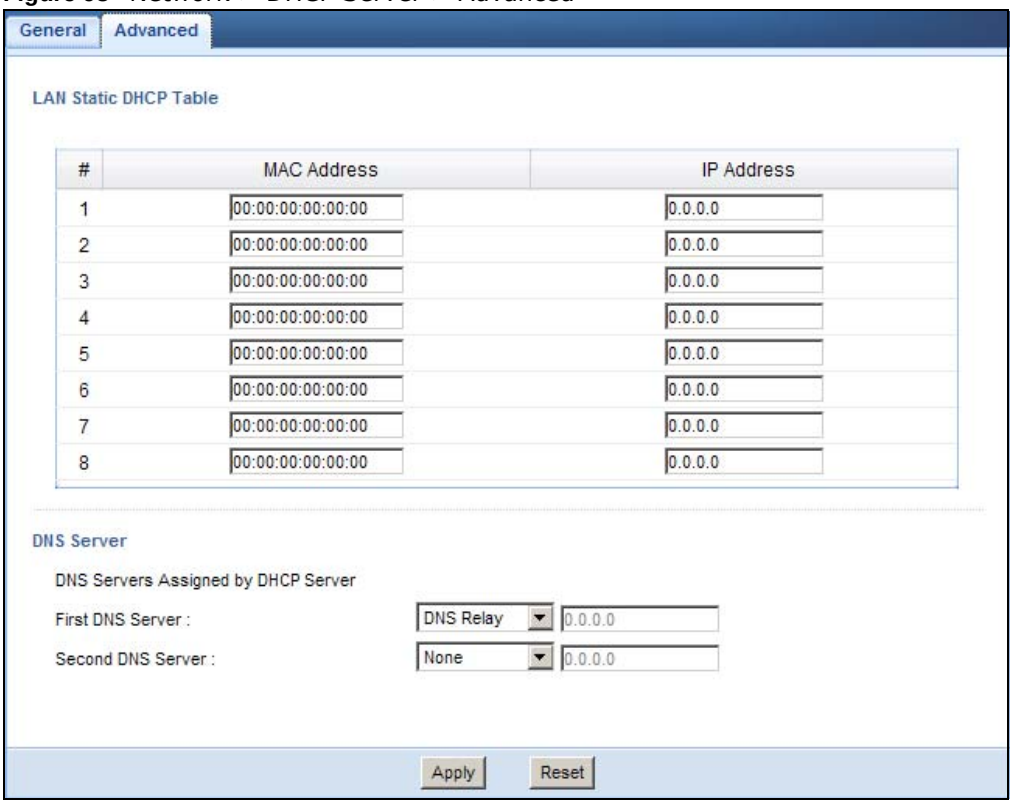
LABEL	DESCRIPTION
Pool Size	This field specifies the size, or count of the IP address pool for LAN.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to begin configuring this screen afresh.

16.4 Advanced Screen

This screen allows you to assign IP addresses on the LAN to specific individual computers based on their MAC addresses. You can also use this screen to configure the DNS server information that the Router sends to the DHCP clients.

To change your Router's static DHCP settings, click **Network** > **DHCP Server** > **Advanced**. The following screen displays.

Figure 98 Network > DHCP Server > Advanced



The following table describes the labels in this screen.

Table 61 Network > DHCP Server > Advanced

LABEL	DESCRIPTION
LAN Static DHCP Table	
#	This is the index number of the static IP table entry (row).
MAC Address	Type the MAC address (with colons) of a computer on your LAN.

Table 61 Network > DHCP Server > Advanced (continued)

LABEL	DESCRIPTION
IP Address	Type the LAN IP address of a computer on your LAN.
DNS Server	
DNS Servers Assigned by DHCP Server	The Router passes a DNS (Domain Name System) server IP address (in the order you specify here) to the DHCP clients. The Router only passes this information to the LAN DHCP clients when you select the **Enable DHCP Server** check box. When you clear the **Enable DHCP Server** check box, DHCP service is disabled and you must have another DHCP sever on your LAN, or else the computers must have their DNS server addresses manually configured.
First DNS Server Second DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the Router's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **DNS Relay** to have the Router act as a DNS proxy. The Router's LAN IP address displays in the field to the right (read-only). The Router tells the DHCP clients on the LAN that the Router itself is the DNS server. When a computer on the LAN sends a DNS query to the Router, the Router forwards the query to the Router's system DNS server (configured in the **WAN > Internet Connection** screen) and relays the response back to the computer. You can only select **DNS Relay** for one of the three servers; if you select **DNS Relay** for a second or third DNS server, that choice changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.
Apply	Click **Apply** to save your changes back to the Router.
Reset	Click **Reset** to begin configuring this screen afresh.