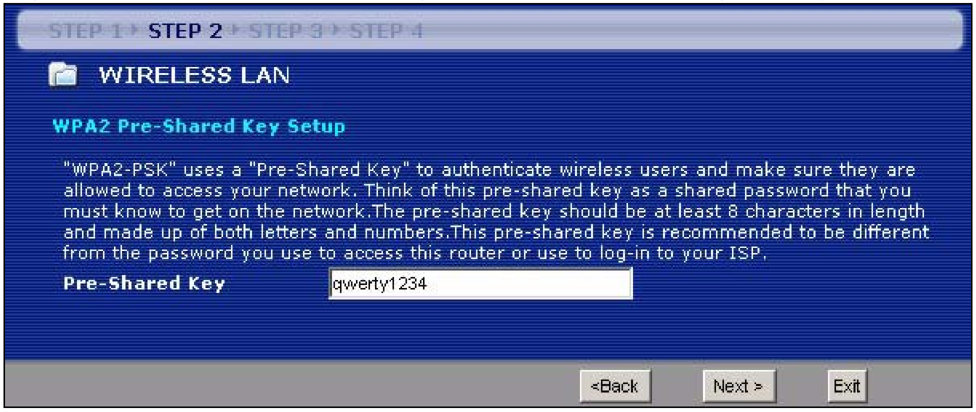
Table 11 Wizard Step 2: Basic (WEP) Security

LABEL	DESCRIPTION
Next	Click **Next** to proceed to the next screen.
Exit	Click **Exit** to close the wizard screen without saving.

3.3.2 Extend (WPA-PSK or WPA2-PSK) Security

Choose **Extend (WPA-PSK)** or **Extend (WPA2-PSK)** security in the Wireless LAN setup screen to set up a **Pre-Shared Key**.

Figure 17 Wizard Step 2: Extend (WPA-PSK or WPA2-PSK) Security



WPA2 Pre-Shared Key Setup

"WPA2-PSK" uses a "Pre-Shared Key" to authenticate wireless users and make sure they are allowed to access your network. Think of this pre-shared key as a shared password that you must know to get on the network.The pre-shared key should be at least 8 characters in length and made up of both letters and numbers.This pre-shared key is recommended to be different from the password you use to access this router or use to log-in to your ISP.

Pre-Shared Key qwerty1234

The following table describes the labels in this screen.

Table 12 Wizard Step 2: Extend (WPA-PSK or WPA2-PSK) Security

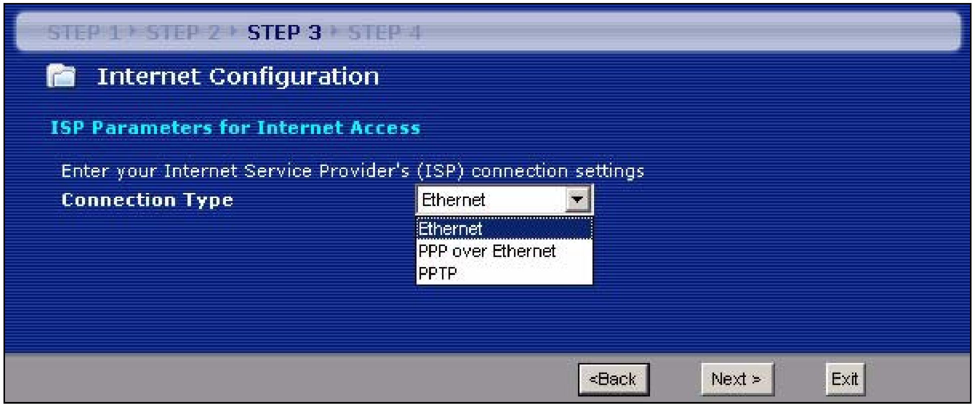
LABEL	DESCRIPTION
Pre-Shared Key	Type from 8 to 63 case-sensitive ASCII characters. You can set up the most secure wireless connection by configuring WPA in the wireless LAN screens. You need to configure an authentication server to do this.
Back	Click **Back** to display the previous screen.
Next	Click **Next** to proceed to the next screen.
Exit	Click **Exit** to close the wizard screen without saving.

3.4 Connection Wizard: STEP 3: Internet Configuration

The NBG334W offers three Internet connection types. They are **Ethernet**, **PPP over Ethernet** or **PPTP**. The wizard attempts to detect which WAN connection type you are using. 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.

This wizard screen varies according to the connection type that you select.

Figure 18 Wizard Step 3: ISP Parameters.


STEP 1 ▸ STEP 2 ▸ STEP 3 ▸ STEP 4
Internet Configuration
ISP Parameters for Internet Access
Enter your Internet Service Provider's (ISP) connection settings
Connection Type
Ethernet
Ethernet
PPP over Ethernet
PPTP
<Back
Next >
Exit

The following table describes the labels in this screen,

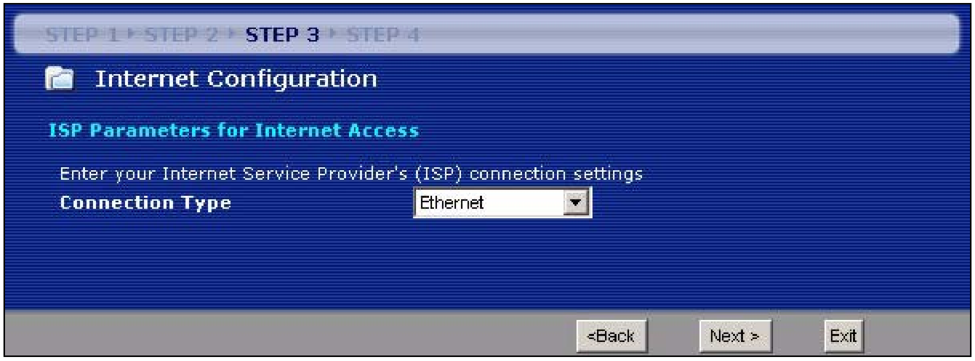
Table 13 Wizard Step 3: ISP Parameters

CONNECTION TYPE	DESCRIPTION
Ethernet	Select the **Ethernet** option when the WAN port is used as a regular Ethernet.
PPPoE	Select the **PPP over Ethernet** option for a dial-up connection. If your ISP gave you a an IP address and/or subnet mask, then select **PPTP**.
PPTP	Select the **PPTP** option for a dial-up connection.

3.4.1 Ethernet Connection

Choose **Ethernet** when the WAN port is used as a regular Ethernet.

Figure 19 Wizard Step 3: Ethernet Connection


STEP 1 ▸ STEP 2 ▸ STEP 3 ▸ STEP 4
Internet Configuration
ISP Parameters for Internet Access
Enter your Internet Service Provider's (ISP) connection settings
Connection Type
Ethernet
<Back
Next >
Exit

3.4.2 PPPoE Connection

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).

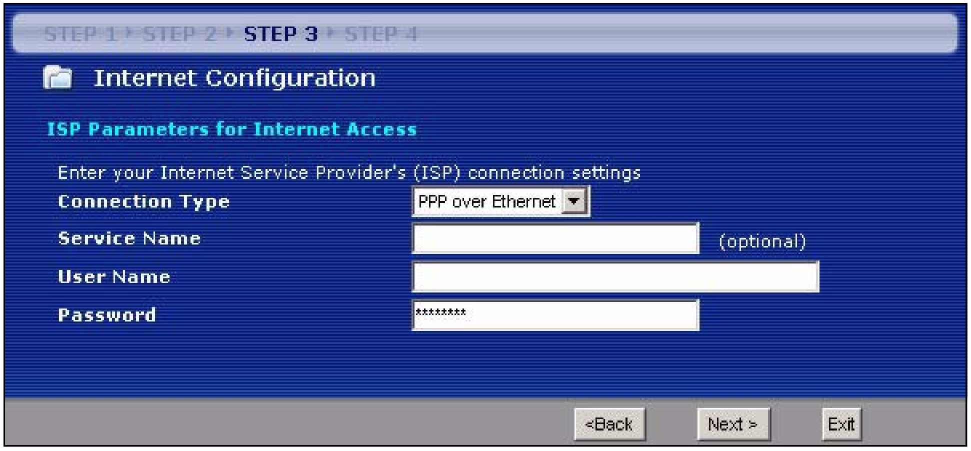
One of the benefits of PPPoE is the ability to let end users access one of multiple network services, a function known as dynamic service selection. This enables the service provider to easily create and offer new IP services for specific users.

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 NBG334W (rather than individual computers), the computers on the LAN do not need PPPoE software installed, since the NBG334W does that part of the task. Furthermore, with NAT, all of the LAN's computers will have Internet access.

Refer to the appendix for more information on PPPoE.

Figure 20 Wizard Step 3: PPPoE Connection



STEP 1 ▸ STEP 2 ▸ STEP 3 ▸ STEP 4

Internet Configuration

ISP Parameters for Internet Access

Enter your Internet Service Provider's (ISP) connection settings

Connection Type: PPP over Ethernet

Service Name: (optional)

User Name:

Password: ********

The following table describes the labels in this screen.

Table 14 Wizard Step 3: PPPoE Connection

LABEL	DESCRIPTION
ISP Parameter for Internet Access	
Connection Type	Select the **PPP over Ethernet** option for a dial-up connection.
Service Name	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.
Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

3.4.3 PPTP Connection

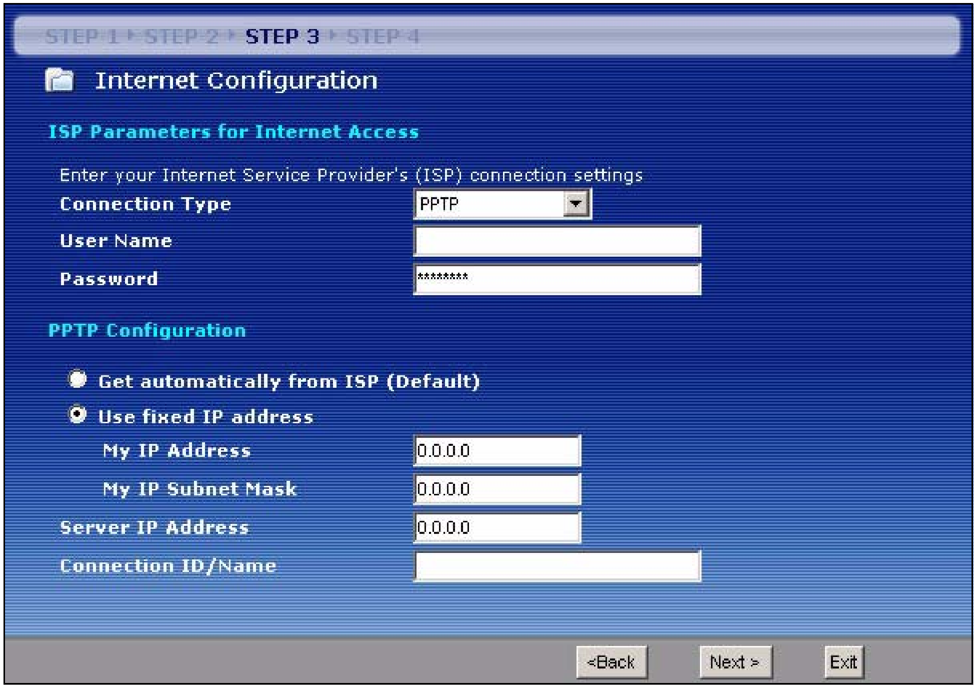
Point-to-Point Tunneling Protocol (PPTP) is a network protocol that enables transfers of data from a remote client to a private server, creating a Virtual Private Network (VPN) using TCP/IP-based networks.

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 NBG334W supports one PPTP server connection at any given time.

Figure 21 Wizard Step 3: PPTP Connection



Internet Configuration

ISP Parameters for Internet Access

Enter your Internet Service Provider's (ISP) connection settings

Connection Type	PPTP
User Name	
Password	********

PPTP Configuration

○ Get automatically from ISP (Default)

● Use fixed IP address

My IP Address	0.0.0.0
My IP Subnet Mask	0.0.0.0
Server IP Address	0.0.0.0
Connection ID/Name	

The following table describes the fields in this screen

Table 15 Wizard Step 3: PPTP Connection

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
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.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the User Name above.
PPTP Configuration	
Get automatically from ISP	Select this radio button if your ISP did not assign you a fixed IP address.
Use fixed IP address	Select this radio button, provided by your ISP to give the NBG334W a fixed, unique IP address.
My IP Address	Type the (static) IP address assigned to you by your ISP.
My IP Subnet Mask	Type the subnet mask assigned to you by your ISP (if given).
Server IP Address	Type the IP address of the PPTP server.
Connection ID/ Name	Enter the connection ID or connection name in this field. It must follow the "c:id" and "n:name" format. For example, C:12 or N:My ISP. This field is optional and depends on the requirements of your ISP.
Back	Click **Back** to return to the previous screen.

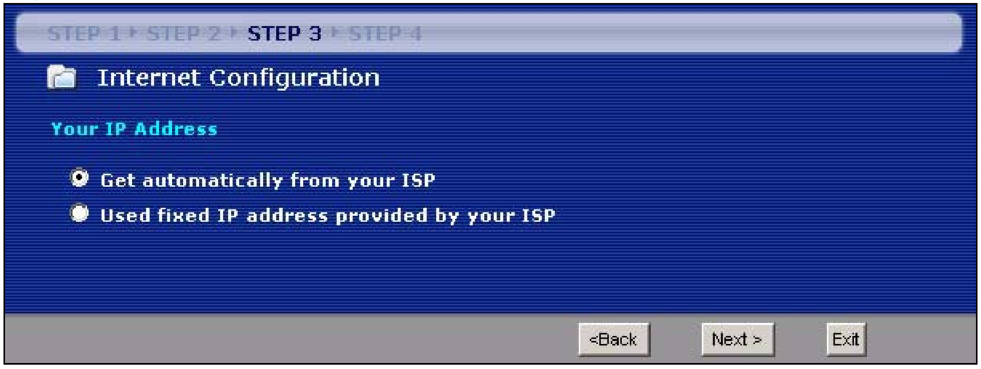
Table 15 Wizard Step 3: PPTP Connection

LABEL	DESCRIPTION
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

3.4.4 Your IP Address

The following wizard screen allows you to assign a fixed IP address or give the NBG334W an automatically assigned IP address depending on your ISP.

Figure 22 Wizard Step 3: Your IP Address



Internet Configuration

Your IP Address

● Get automatically from your ISP

○ Used fixed IP address provided by your ISP

The following table describes the labels in this screen

Table 16 Wizard Step 3: Your IP Address

LABEL	DESCRIPTION
Get automatically from your ISP	Select this option If your ISP did not assign you a fixed IP address. This is the default selection. If you choose this option, skip directly to section 3.4.9.
Use fixed IP address provided by your ISP	Select this option if you were given IP address and/or DNS server settings by the ISP. The fixed IP address should be in the same subnet as your broadband modem or router.
Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

3.4.5 WAN IP Address Assignment

Every computer on the Internet must have a unique IP address. If your networks are isolated from the Internet, for instance, only between your two branch offices, you can assign any IP addresses to the hosts without problems. However, the Internet Assigned Numbers Authority (IANA) has reserved the following three blocks of IP addresses specifically for private networks.

Table 17 Private IP Address Ranges

10.0.0.0	-	10.255.255.255
172.16.0.0	-	172.31.255.255
192.168.0.0	-	192.168.255.255

You can obtain your IP address from the IANA, from an ISP or have it assigned by a private network. If you belong to a small organization and your Internet access is through an ISP, the ISP can provide you with the Internet addresses for your local networks. On the other hand, if you are part of a much larger organization, you should consult your network administrator for the appropriate IP addresses.

Regardless of your particular situation, do not create an arbitrary IP address; always follow the guidelines above. For more information on address assignment, please refer to RFC 1597, Address Allocation for Private Internets and RFC 1466, Guidelines for Management of IP Address Space.

3.4.6 IP Address and Subnet Mask

Similar to the way houses on a street share a common street name, so too do computers on a LAN share one common network number.

Where you obtain your network number depends on your particular situation. If the ISP or your network administrator assigns you a block of registered IP addresses, follow their instructions in selecting the IP addresses and the subnet mask.

If the ISP did not explicitly give you an IP network number, then most likely you have a single user account and the ISP will assign you a dynamic IP address when the connection is established. The Internet Assigned Number Authority (IANA) reserved this block of addresses specifically for private use; please do not use any other number unless you are told otherwise. Let's say you select 192.168.1.0 as the network number; which covers 254 individual addresses, from 192.168.1.1 to 192.168.1.254 (zero and 255 are reserved). In other words, the first three numbers specify the network number while the last number identifies an individual computer on that network.

Once you have decided on the network number, pick an IP address that is easy to remember, for instance, 192.168.1.1, for your NBG334W, but make sure that no other device on your network is using that IP address.

The subnet mask specifies the network number portion of an IP address. Your NBG334W will compute the subnet mask automatically based on the IP address that you entered. You don't need to change the subnet mask computed by the NBG334W unless you are instructed to do otherwise.

3.4.7 DNS Server Address Assignment

Use DNS (Domain Name System) 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 NBG334W can get the DNS server addresses in the following ways.

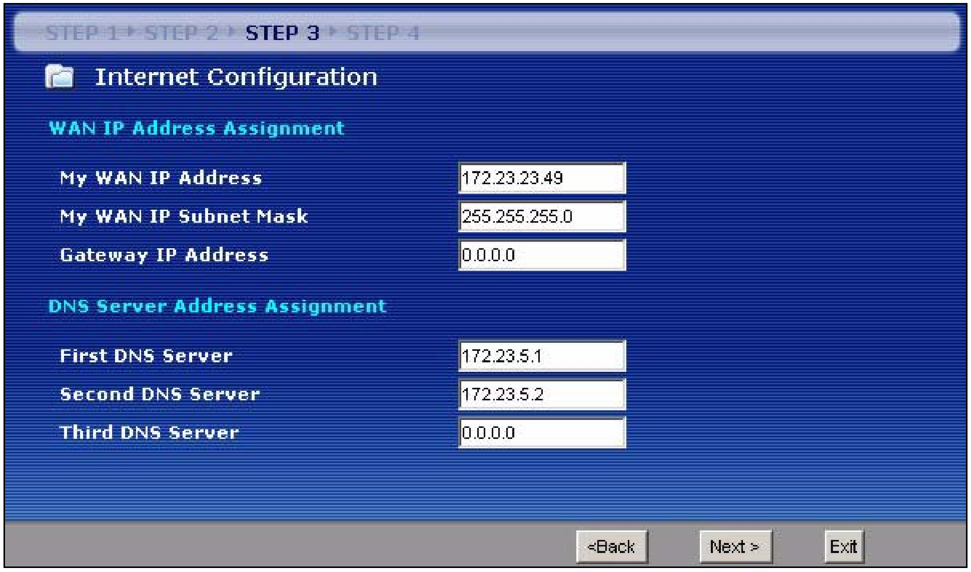
1 The ISP tells you the DNS server addresses, usually in the form of an information sheet, when you sign up. If your ISP gives you DNS server addresses, enter them in the **DNS Server** fields in the **Wizard** and/or **WAN > Internet Connection** screen.

2 If the ISP did not give you DNS server information, leave the **DNS Server** fields set to **0.0.0.0** in the **Wizard** screen and/or set to **From ISP** in the **WAN > Internet Connection** screen for the ISP to dynamically assign the DNS server IP addresses.

3.4.8 WAN IP and DNS Server Address Assignment

The following wizard screen allows you to assign a fixed WAN IP address and DNS server addresses.

Figure 23 Wizard Step 3: WAN IP and DNS Server Addresses



STEP 1 STEP 2 STEP 3 STEP 4
Internet Configuration
WAN IP Address Assignment
DNS Server Address Assignment
<Back
Next >
Exit

My WAN IP Address	172.23.23.49
My WAN IP Subnet Mask	255.255.255.0
Gateway IP Address	0.0.0.0
First DNS Server	172.23.5.1
Second DNS Server	172.23.5.2
Third DNS Server	0.0.0.0

The following table describes the labels in this screen

Table 18 Wizard Step 3: WAN IP and DNS Server Addresses

LABEL	DESCRIPTION
WAN IP Address Assignment	
My WAN IP Address	Enter your WAN IP address in this field. The WAN IP address should be in the same subnet as your DSL/Cable modem or router.
My WAN IP Subnet Mask	Enter the IP subnet mask in this field.
Gateway IP Address	Enter the gateway IP address in this field.
System DNS Server Address Assignment (if applicable) 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 NBG334W uses a system DNS server (in the order you specify here) to resolve domain names for DDNS and the time server.	
First DNS Server Second DNS Server Third DNS Server	Enter the DNS server's IP address in the fields provided. If you do not configure a system DNS server, you must use IP addresses when configuring DDNS and the time server.
Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

3.4.9 WAN MAC Address

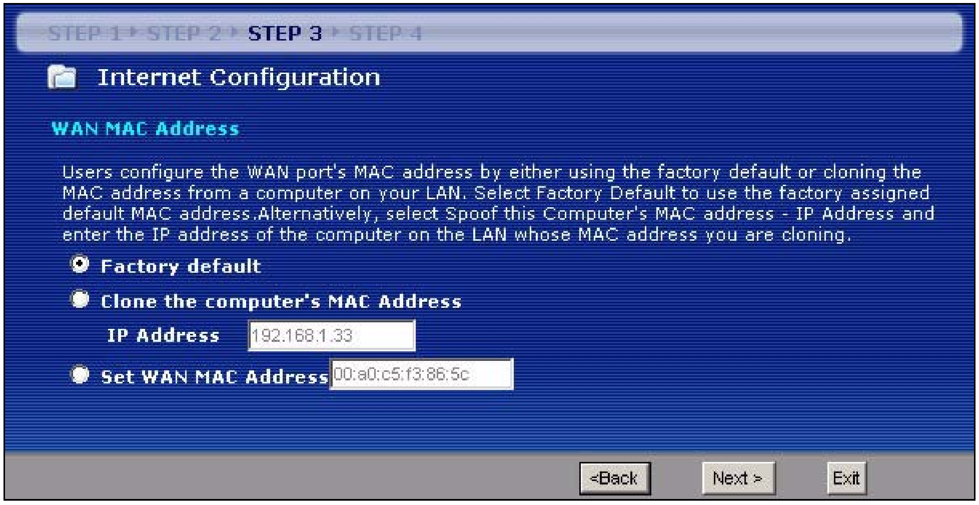
Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02.

Table 19 Example of Network Properties for LAN Servers with Fixed IP Addresses

Choose an IP address	192.168.1.2-192.168.1.32; 192.168.1.65-192.168.1.254.
Subnet mask	255.255.255.0
Gateway (or default route)	192.168.1.1(NBG334W LAN IP)

This screen allows users to configure the WAN port's MAC address by either using the NBG334W’s MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address. Once it is successfully configured, the address will be copied to the "rom" file (ZyNOS configuration file). It will not change unless you change the setting or upload a different "rom" file. It is advisable to clone the MAC address from a computer on your LAN even if your ISP does not presently require MAC address authentication.

Figure 24 Wizard Step 3: WAN MAC Address



Internet Configuration

WAN MAC Address

Users configure the WAN port's MAC address by either using the factory default or cloning the MAC address from a computer on your LAN. Select Factory Default to use the factory assigned default MAC address.Alternatively, select Spoof this Computer's MAC address - IP Address and enter the IP address of the computer on the LAN whose MAC address you are cloning.

● Factory default

○ Clone the computer's MAC Address

IP Address 192.168.1.33

○ Set WAN MAC Address 00:a0:c5:f3:86:5c

The following table describes the fields in this screen.

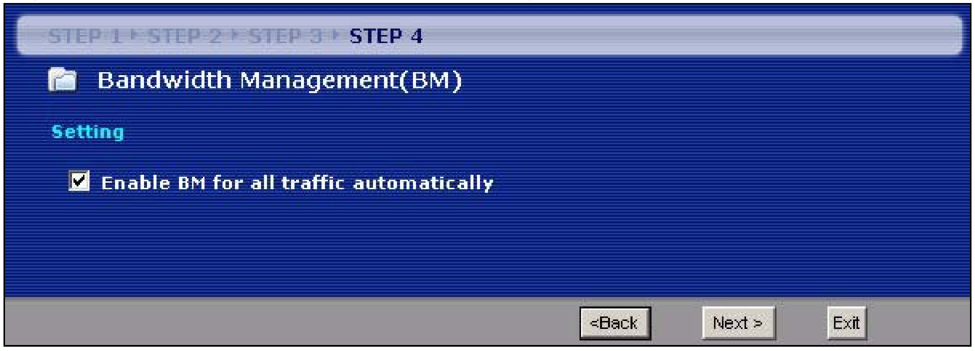
Table 20 Wizard Step 3: WAN MAC Address

LABEL	DESCRIPTION
Factory Default	Select **Factory Default** to use the factory assigned default MAC address.
Clone the computer’s MAC address	Select this option and enter the IP address of the computer on the LAN whose MAC you are cloning. It is advisable to clone the MAC address from a computer on your LAN even if your ISP does not presently require MAC address authentication.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

3.5 Connection Wizard: STEP 4: Bandwidth management

Bandwidth management allows you to control the amount of bandwidth going out through the NBG334W's WAN, LAN or WLAN port and prioritize the distribution of the bandwidth according to the traffic type. This helps keep one service from using all of the available bandwidth and shutting out other users.

Figure 25 Wizard Step 4: Bandwidth Management



Bandwidth Management(BM)

Setting

☑ Enable BM for all traffic automatically

The following fields describe the label in this screen.

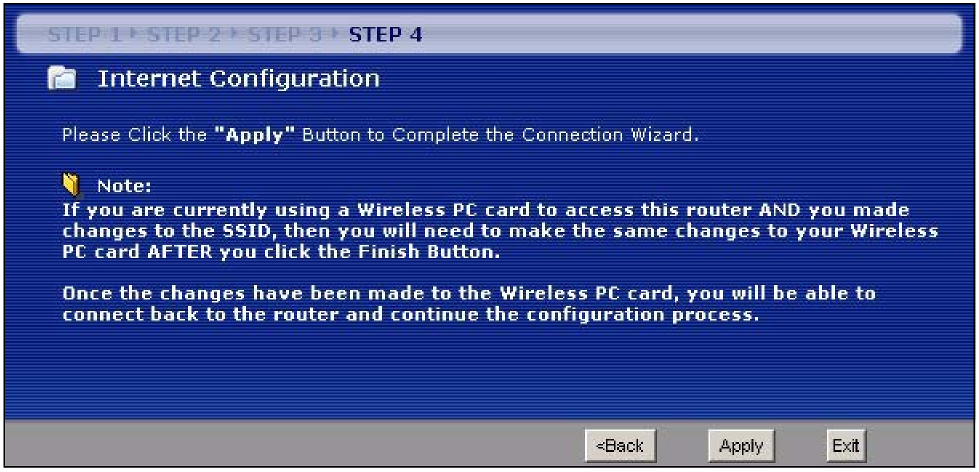
Table 21 Wizard Step 4: Bandwidth Management

LABEL	DESCRIPTION
Enable BM for all traffic automatically	Select the check box to have the NBG334W apply bandwidth management to traffic going out through the NBG334W's WAN, LAN, HomePlug AV or WLAN port. Bandwidth is allocated according to the traffic type automatically. Real-time packets, such as VoIP traffic always get higher priority.
Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

3.6 Connection Wizard Complete

Click **Apply** to save your configuration.

Figure 26 Connection Wizard Save



Internet Configuration

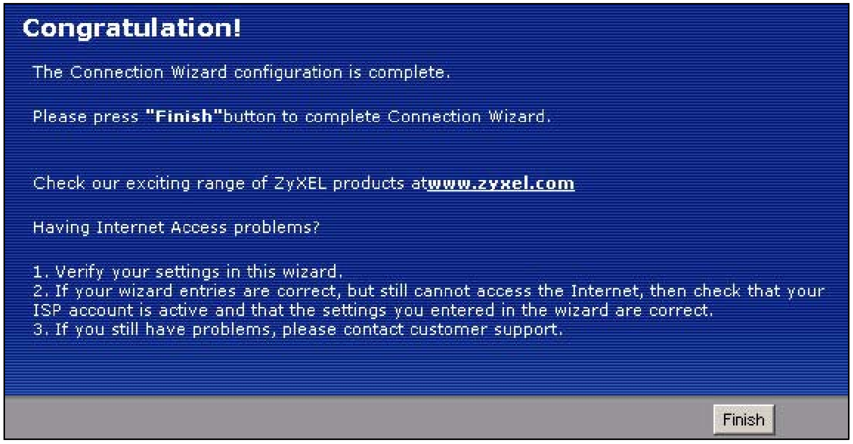
Please Click the **"Apply"** Button to Complete the Connection Wizard.

Note:
If you are currently using a Wireless PC card to access this router AND you made changes to the SSID, then you will need to make the same changes to your Wireless PC card AFTER you click the Finish Button.

Once the changes have been made to the Wireless PC card, you will be able to connect back to the router and continue the configuration process.

Follow the on-screen instructions and click **Finish** to complete the wizard setup.

Figure 27 Connection Wizard Complete



Congratulation!

The Connection Wizard configuration is complete.

Please press **"Finish"**button to complete Connection Wizard.

Check our exciting range of ZyXEL products at**www.zyxel.com**

Having Internet Access problems?

1. Verify your settings in this wizard.
2. If your wizard entries are correct, but still cannot access the Internet, then check that your ISP account is active and that the settings you entered in the wizard are correct.
3. If you still have problems, please contact customer support.

Well done! You have successfully set up your NBG334W to operate on your network and access the Internet.

4

AP Mode

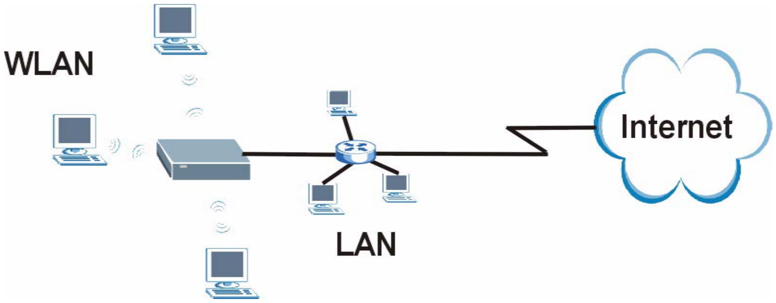
This chapter discusses how to configure settings while your NBG334W is set to **AP Mode**. Many screens that are available in **Router Mode** are not available in **AP Mode**.

See Chapter 6 on page 89 for an example of setting up a wireless network in AP mode.

4.1 AP Mode Overview

Use your NBG334W as an AP if you already have a router or gateway on your network. In this mode your device bridges a wired network (LAN) and wireless LAN (WLAN) in the same subnet. See the figure below for an example.

Figure 28 Wireless Internet Access in AP Mode

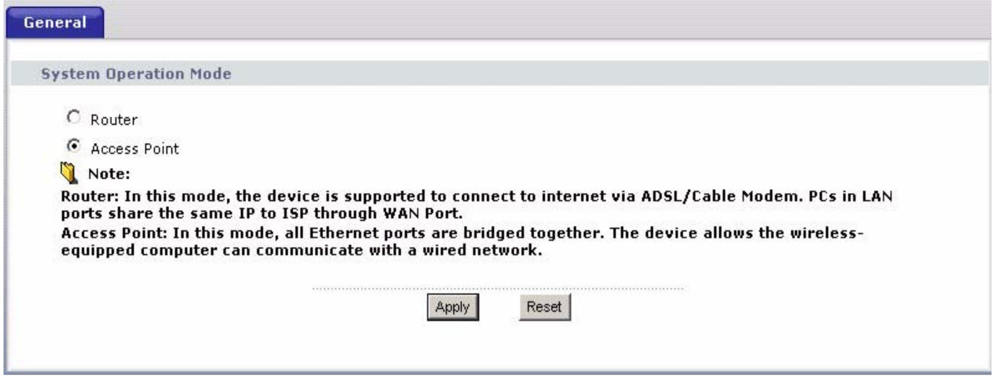


4.2 Setting your NBG334W to AP Mode

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 set your NBG334W to **AP Mode**, go to **Maintenance > Sys OP Mode > General** and select **Access Point.**

Figure 29 Maintenance > Sys OP Mode > General



System Operation Mode

○ Router

● Access Point

Note:

Router: In this mode, the device is supported to connect to internet via ADSL/Cable Modem. PCs in LAN ports share the same IP to ISP through WAN Port.

Access Point: In this mode, all Ethernet ports are bridged together. The device allows the wireless-equipped computer can communicate with a wired network.

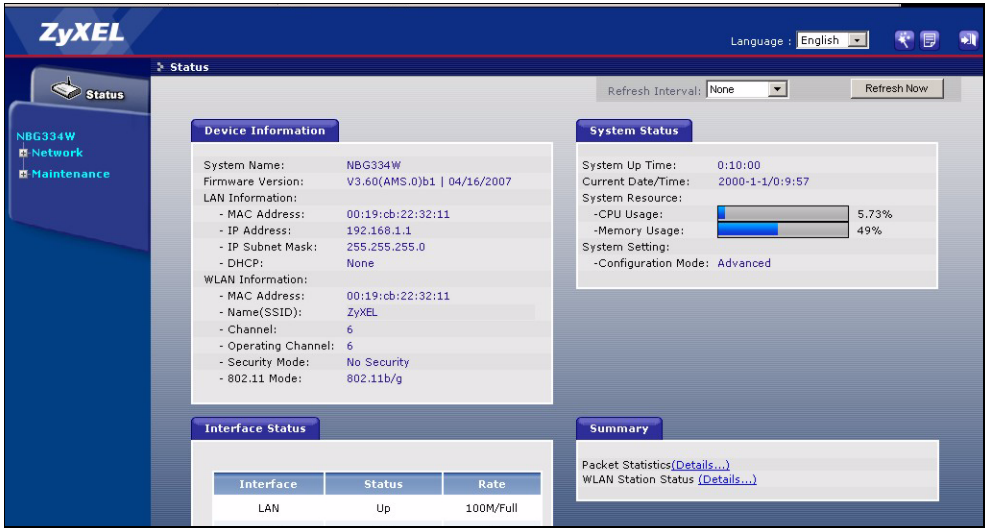
3 A pop-up appears providing information on this mode. Click **OK** in the pop-up message window. (See Section 22.2 on page 200 for more information on the pop-up.) Click **Apply**. Your NBG334W is now in **AP Mode**.

You do not have to log in again or restart your device when you change modes.

4.3 The Status Screen in AP Mode

Click on **Status**. The screen below shows the status screen in **AP Mode**.

Figure 30 Status: AP Mode



Refresh Interval: None

Device Information

System Name:	NBG334W
Firmware Version:	V3.60(AMS.0)b1 | 04/16/2007
LAN Information:	
- MAC Address:	00:19:cb:22:32:11
- IP Address:	192.168.1.1
- IP Subnet Mask:	255.255.255.0
- DHCP:	None
WLAN Information:	
- MAC Address:	00:19:cb:22:32:11
- Name(SSID):	ZyXEL
- Channel:	6
- Operating Channel:	6
- Security Mode:	No Security
- 802.11 Mode:	802.11b/g

System Status

System Up Time:	0:10:00
Current Date/Time:	2000-1-1/0:9:57
System Resource:	
-CPU Usage:	5.73%
-Memory Usage:	49%
System Setting:	
-Configuration Mode:	Advanced

Interface Status

Interface	Status	Rate
LAN	Up	100M/Full

Summary

Packet Statistics(Details...)
WLAN Station Status (Details...)

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

Table 22 Web Configurator Status Screen

LABEL	DESCRIPTION
Device Information	
System Name	This is the **System Name** you enter in the **Maintenance** > **System** > **General** screen. It is for identification purposes.
Firmware Version	This is the firmware version and the date created.
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 - **Client** or **None**.
WLAN Information	
- MAC Address	This shows the wireless adapter MAC Address of your device.
- Name (SSID)	This shows a descriptive name used to identify the NBG334W in the wireless LAN.
- Channel	This shows the channel number which you select manually.
- Operating Channel	This shows the channel number which the NBG334W is currently using over the wireless LAN.
- Security Mode	This shows the level of wireless security the NBG334W is using.
- 802.11 Mode	This shows the IEEE 802.11 standard that the NBG334W supports. Wireless clients must support the same standard in order to be able to connect to the NBG334W
System Status	
System Uptime	This is the total time the NBG334W has been on.
Current Date/Time	This field displays your NBG334W's present date and time.
System Resource	
- CPU Usage	This displays what percentage of the NBG334W's processing ability is currently used. When this percentage is close to 100%, the NBG334W 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 NBG334W is using. Heap memory refers to the memory that is not used by ZyNOS (ZyXEL Network Operating System) and is thus available for running processes like NAT and the firewall.
System Setting	
- Configuration Mode	This shows whether the advanced screens of each feature are turned on (**Advanced**) or not (**Basic**).
- System Operation Mode	This shows whether the system is configured to connect to the Internet in **Router** Mode or **Access Point** Mode.
Interface Status	
Interface	This displays the NBG334W port types. The port types are: **LAN** and **WLAN**.
Status	For the LAN port, 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 22 Web Configurator Status Screen (continued)

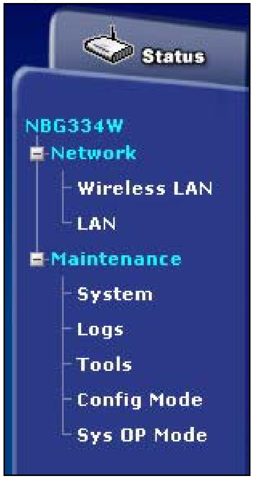
LABEL	DESCRIPTION
Rate	For the LAN ports, this displays the port speed and duplex setting or **N/A** when the line is disconnected. For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and **N/A** when the WLAN is disabled.
Summary	
Any IP Table	Use this screen to view details of IP addresses assigned to devices not in the same subnet as the NBG334W.
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 NBG334W.

4.3.1 Navigation Panel

Use the menu in the navigation panel to configure NBG334W features in **AP Mode**.

The following screen and table show the features you can configure in **AP Mode**.

Figure 31 Menu: AP Mode



The following table describes the sub-menus.

Table 23 Screens Summary

LINK	TAB	FUNCTION
Status		This screen shows the NBG334W's general device, system and interface status information. Use this screen to access the wizard, and summary statistics tables.
Network		
Wireless LAN	General	Use this screen to configure wireless LAN.
	MAC Filter	Use the MAC filter screen to configure the NBG334W to block access to devices or block the devices from accessing the NBG334W.
	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.

Table 23 Screens Summary

LINK	TAB	FUNCTION
LAN	IP	Use this screen to configure LAN IP address and subnet mask or to get the LAN IP address from a DHCP server.
Maintenance		
System	General	Use this screen to view and change administrative settings such as system and domain names, password and inactivity timer.
	Time Setting	Use this screen to change your NBG334W's time and date.
Logs	View Log	Use this screen to view the logs for the categories that you selected.
	Log Settings	Use this screen to change your NBG334W's log settings.
Tools	Firmware	Use this screen to upload firmware to your NBG334W.
	Configuration	Use this screen to backup and restore the configuration or reset the factory defaults to your NBG334W.
	Restart	This screen allows you to reboot the NBG334W without turning the power off.
Config Mode	General	This screen allows you to display or hide the advanced screens or features.

4.4 Configuring Your Settings

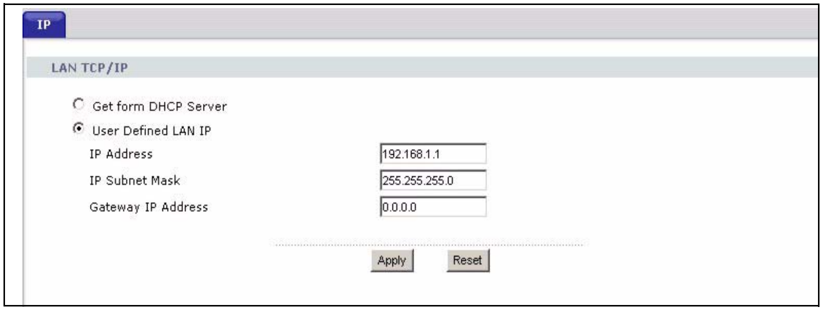
4.4.1 LAN Settings

Use this section to configure your LAN settings while in **AP Mode**.

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

If you change the IP address of the NBG334W in the screen below, you will need to log into the NBG334W again using the new IP address.

Figure 32 Network > LAN > IP



○ Get form DHCP Server

● User Defined LAN IP

IP Address	192.168.1.1
IP Subnet Mask	255.255.255.0
Gateway IP Address	0.0.0.0

The table below describes the labels in the screen.

Table 24 Network > LAN > IP

LABEL	DESCRIPTION
Get form DHCP Server	Select this option to allow the NBG334W to obtain an IP address from a DHCP server on the network. You must connect the WAN port to a device with a DHCP server enabled (such as a router or gateway). Without a DHCP server the NBG334W will have no IP address. You need to find out the IP address the DHCP server assigns to the NBG334W and use that address to log in to the NBG334W again.
User Defined LAN IP	Select this option to set the NBG334W's IP address. This setting is selected by default. Check the IP address is on the same domain as other devices on your network.
IP Address	Type the IP address in dotted decimal notation. The default setting is 192.168.1.1. 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 NBG334W 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 NBG334W.
Gateway IP Address	Type the IP address of the gateway. The gateway is an immediate neighbor of your NBG334W that will forward the packet to the destination. In **AP Mode**, the gateway must be a router on the same segment as your NBG334W.
Apply	Click **Apply** to save your changes to the NBG334W.
Reset	Click **Reset** to reload the previous configuration for this screen.

4.4.2 WLAN and Maintenance Settings

The configuration of wireless and maintenance settings in **AP Mode** is the same as for **Router Mode**.

- See Chapter 5 on page 69 for information on the configuring your wireless network.
- See Maintenance and Troubleshooting (171) for information on the configuring your Maintenance settings.

4.5 Logging in to the Web Configurator in AP Mode

1 Connect your computer to the LAN port of the NBG334W.

2 The default IP address if the NBG334W is “192.168.1.1”. In this case, your computer must have an IP address in the range between “192.168.1.2” and “192.168.1.255”.

3 Click **Start > Run** on your computer in Windows.

4 Type “cmd” in the dialog box.

5 Type “ipconfig” to show your computer’s IP address. If your computer’s IP address is not in the correct range then see Appendix D on page 231 for information on changing your computer’s IP address.

6 After you’ve set your computer’s IP address, open a web browser such as Internet Explorer and type “192.168.1.1” as the web address in your web browser.

See Chapter 6 on page 89 for a tutorial on setting up a network with an AP.

PART II
Network

Wireless LAN (69)

Wireless Tutorial (89)

WAN (93)

LAN (103)

DHCP (109)

Network Address Translation (NAT) (113)

Dynamic DNS (123)

5

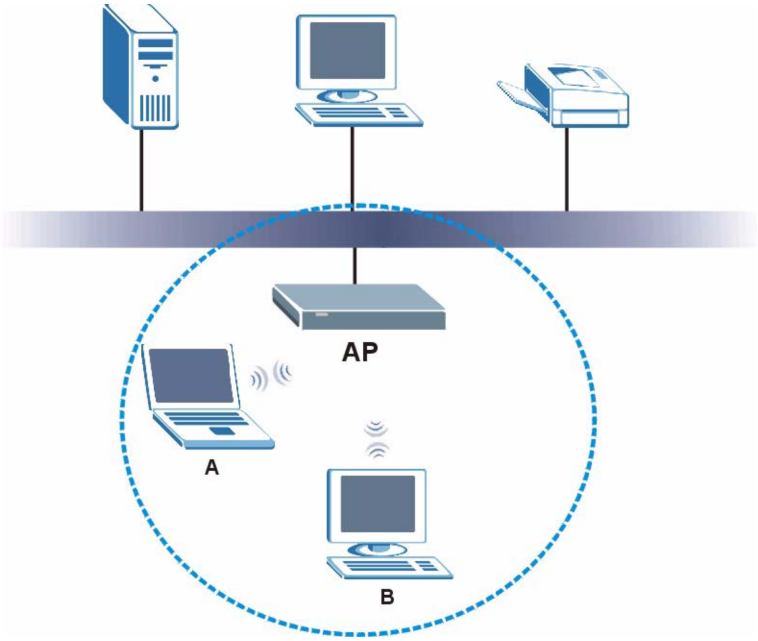
Wireless LAN

This chapter discusses how to configure the wireless network settings in your NBG334W. See the appendices for more detailed information about wireless networks.

5.1 Wireless Network Overview

The following figure provides an example of a wireless network.

Figure 33 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 NBG334W is the AP.

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.

Requirements

To add a wireless LAN to your existing network, make sure you have the following:

1 an access point (AP) or a router with the wireless feature

2 at least one wireless network card/adapter which varies according to your computer.

•If you have a desktop, use either a wireless USB adapter or a wireless PCI adapter.

•If you have a laptop, use either a wireless USB adapter or a wireless CardBus card.

3 a RADIUS server only if you want to use IEEE802.1x, WPA or WPA2

To have two or more computers communicate with each other wirelessly without an AP or wireless router, make sure you have the following:

1 two or more wireless network cards/adapters which vary according to your computers.

•If you have a desktop, use either a wireless USB adapter or a wireless PCI adapter.

•If you have a laptop, use either a wireless USB adapter or a wireless CardBus card.

Setup Information

To set up your wireless network using an AP or wireless router, make sure your AP or wireless router and wireless network card(s)/adapter(s) use the same following settings:

- SSID:_____________________
- Channel: auto or _________
- Network type of a wireless network card/adapter: Infrastructure
- wireless standard: IEEE 802.11b, g, b/g or a
- Security:

( ) None

( ) WEP (64bit, 128bit or 256bit key) (ASCII or Hex):________________

( ) IEEE 802.1x

( ) WPA-PSK (TKIP or AES):_______________

( ) WPA (TKIP or AES)

( ) WPA2-PSK (TKIP or AES):______________

( ) WPA2 (TKIP or AES)

- Preamble type (if available): auto, short or long

To set up your wireless network without an AP or wireless router, make sure wireless network cards/adapters use the same following settings:

- Network type: Ad-Hoc
- SSID:____________________
- Channel: ________________
- wireless standard: IEEE 802.11b, g, b/g or a
- Security:

( ) None

( ) WEP (64bit, 128bit or 256bit key) (ASCII or Hex):_______________

5.2 Wireless Security Overview

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

5.2.1 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.

5.2.2 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 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.

[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.

5.2.3 User Authentication

You can make every user log in to the wireless network before they can use it. This is called user authentication. However, every wireless client in the wireless network has to support IEEE 802.1x to do this.

For wireless networks, there are two typical places to store the user names and passwords for each user.

- In the AP: this feature is called a local user database or a local database.
- In a RADIUS server: this is a server used in businesses more than in homes.

If your AP does not provide a local user database and if you do not have a RADIUS server, you cannot set up user names and passwords for your users.

Unauthorized devices can still see the information that is sent in the wireless network, even if they cannot use the wireless network. Furthermore, there are ways for unauthorized wireless users to get a valid user name and password. Then, they can use that user name and password to use the wireless network.

Local user databases also have an additional limitation that is explained in the next section.

5.2.4 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. (See Section 5.2.3 on page 72 for information about this.)

Table 25 Types of Encryption for Each Type of Authentication

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

For example, if the wireless network has a RADIUS server, you can choose **WPA** or **WPA2**. If users do not log in to the wireless network, you can choose no encryption, **Static WEP**, **WPA-PSK**, or **WPA2-PSK**.

Usually, you should set up the strongest encryption that every wireless client in the wireless network supports. For example, suppose the AP does not have a local user database, and you do not have a RADIUS server. Therefore, there is no user authentication. Suppose the wireless network has two wireless clients. Device A only supports WEP, and device B supports WEP and WPA. Therefore, you should set up **Static WEP** in the wireless network.

It is recommended that wireless networks use **WPA-PSK**, **WPA**, 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.

It is not possible to use **WPA-PSK**, **WPA** or stronger encryption with a local user database. In this case, it is better to set up stronger encryption with no authentication than to set up weaker encryption with the local user database.

When you select **WPA2** or **WPA2-PSK** in your NBG334W, 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** or **WPA2** (depending on the type of wireless network login) and select the **WPA Compatible** option in the NBG334W.

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.

5.3 Roaming

A wireless station is a device with an IEEE 802.11a/b/g compliant wireless interface. An access point (AP) acts as a bridge between the wireless and wired networks. An AP creates its own wireless coverage area. A wireless station can associate with a particular access point only if it is within the access point's coverage area.

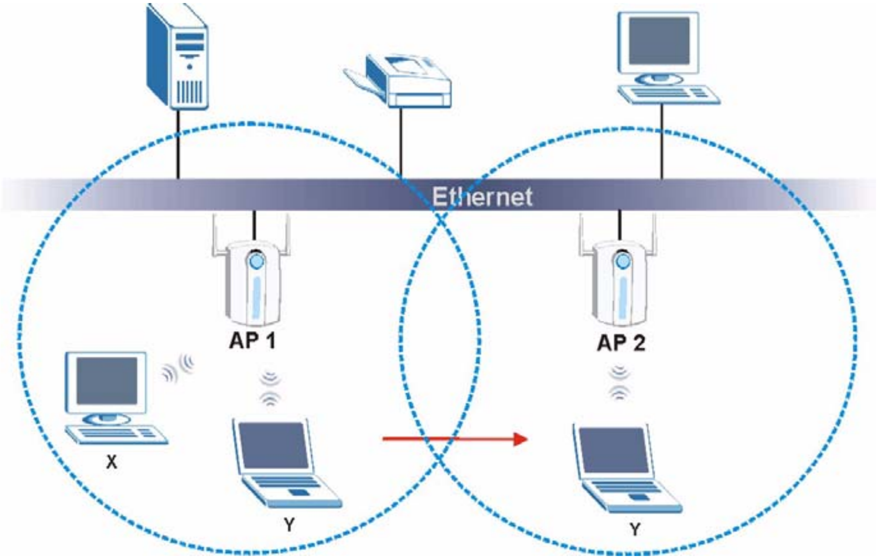
In a network environment with multiple access points, wireless stations are able to switch from one access point to another as they move between the coverage areas. This is known as roaming. As the wireless station moves from place to place, it is responsible for choosing the most appropriate access point depending on the signal strength, network utilization or other factors.

The roaming feature on the access points allows the access points to relay information about the wireless stations to each other. When a wireless station moves from a coverage area to another, it scans and uses the channel of a new access point, which then informs the other access points on the LAN about the change. An example is shown in Figure 34 on page 74.

With roaming, a wireless LAN mobile user enjoys a continuous connection to the wired network through an access point while moving around the wireless LAN.

Enable roaming to exchange the latest bridge information of all wireless stations between APs when a wireless station moves between coverage areas. Wireless stations can still associate with other APs even if you disable roaming. Enabling roaming ensures correct traffic forwarding (bridge tables are updated) and maximum AP efficiency. The AP deletes records of wireless stations that associate with other APs (Non-ZyXEL APs may not be able to perform this). 802.1x authentication information is not exchanged (at the time of writing).

Figure 34 Roaming Example



The steps below describe the roaming process.

1 Wireless station **Y** moves from the coverage area of access point **AP 1** to that of access point **AP 2**.

2 Wireless station **Y** scans and detects the signal of access point **AP 2**.

3 Wireless station **Y** sends an association request to access point **AP 2**.

4 Access point **AP 2** acknowledges the presence of wireless station **Y** and relays this information to access point **AP 1** through the wired LAN.

5 Access point **AP 1** updates the new position of wireless station **Y**.

5.3.1 Requirements for Roaming

The following requirements must be met in order for wireless stations to roam between the coverage areas.

1 All the access points must be on the same subnet and configured with the same ESSID.

2 If IEEE 802.1x user authentication is enabled and to be done locally on the access point, the new access point must have the user profile for the wireless station.

3 The adjacent access points should use different radio channels when their coverage areas overlap.

4 All access points must use the same port number to relay roaming information.

5 The access points must be connected to the Ethernet and be able to get IP addresses from a DHCP server if using dynamic IP address assignment.

5.4 Quality of Service

This section discusses the Quality of Service (QoS) features available on the NBG334W.

5.4.1 WMM QoS

WMM (Wi-Fi MultiMedia) QoS (Quality of Service) ensures quality of service in wireless networks. It controls WLAN transmission priority on packets to be transmitted over the wireless network.

WMM QoS prioritizes wireless traffic according to delivery requirements. WMM QoS is a part of the IEEE 802.11e QoS enhancement to certified Wi-Fi wireless networks.

On APs without WMM QoS, all traffic streams are given the same access priority to the wireless network. If the introduction of another traffic stream creates a data transmission demand that exceeds the current network capacity, then the new traffic stream reduces the throughput of the other traffic streams.

The NBG334W uses WMM QoS to prioritize traffic streams according to the IEEE 802.1q tag or DSCP information in each packet's header. The NBG334W automatically determines the priority to use for an individual traffic stream. This prevents reductions in data transmission for applications that are sensitive to latency (delay) and jitter (variations in delay).

5.4.1.1 WMM QoS Priorities

The following table describes the WMM QoS priority levels that the NBG334W uses.

Table 26 WMM QoS Priorities

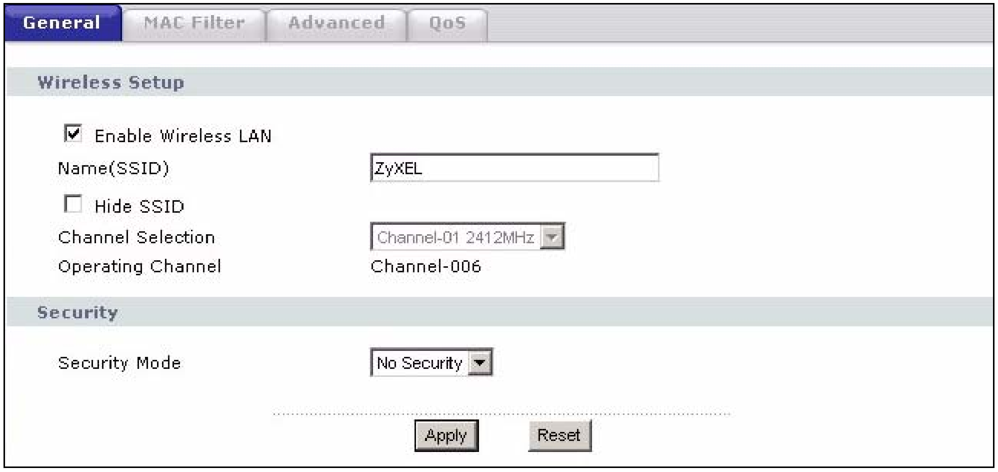
PRIORITY LEVEL	DESCRIPTION
voice (WMM_VOICE)	Typically used for traffic that is especially sensitive to jitter. Use this priority to reduce latency for improved voice quality.
video (WMM_VIDEO)	Typically used for traffic which has some tolerance for jitter but needs to be prioritized over other data traffic.
best effort (WMM_BEST_EFFORT)	Typically used for traffic from applications or devices that lack QoS capabilities. Use best effort priority for traffic that is less sensitive to latency, but is affected by long delays, such as Internet surfing.
background (WMM_BACKGROUND)	This is typically used for non-critical traffic such as bulk transfers and print jobs that are allowed but that should not affect other applications and users. Use background priority for applications that do not have strict latency and throughput requirements.

5.5 General Wireless LAN Screen

If you are configuring the NBG334W from a computer connected to the wireless LAN and you change the NBG334W'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 NBG334W's new settings.

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

Figure 35 Network > Wireless LAN > General



Wireless Setup

☑ Enable Wireless LAN

Name(SSID) ZyXEL

□ Hide SSID

Channel Selection Channel-01 2412MHz

Operating Channel Channel-006

Security

Security Mode No Security

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

Table 27 Network > Wireless LAN > General

LABEL	DESCRIPTION
Enable Wireless LAN	Click the check box to activate wireless LAN.
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 printable 7-bit ASCII 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.
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 whether you are using A or B/G frequency band and the country you are in. Refer to the Connection Wizard chapter for more information on channels.
Operating Channel	This displays the channel the NBG334W is currently using.
Apply	Click **Apply** to save your changes back to the NBG334W.
Reset	Click **Reset** to reload the previous configuration for this screen.

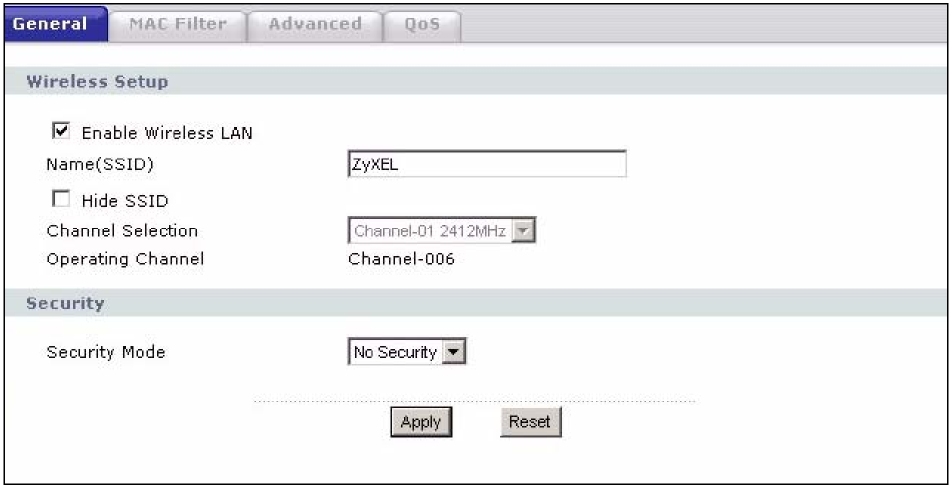
See the rest of this chapter for information on the other labels in this screen.

5.5.1 No Security

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

If you do not enable any wireless security on your NBG334W, your network is accessible to any wireless networking device that is within range.

Figure 36 Network > Wireless LAN > General: No Security



☑ Enable Wireless LAN

Name(SSID) ZyXEL

□ Hide SSID

Channel Selection Channel-01 2412MHz

Operating Channel Channel-006

Security Mode No Security

The following table describes the labels in this screen.

Table 28 Wireless 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 NBG334W.
Reset	Click **Reset** to reload the previous configuration for this screen.

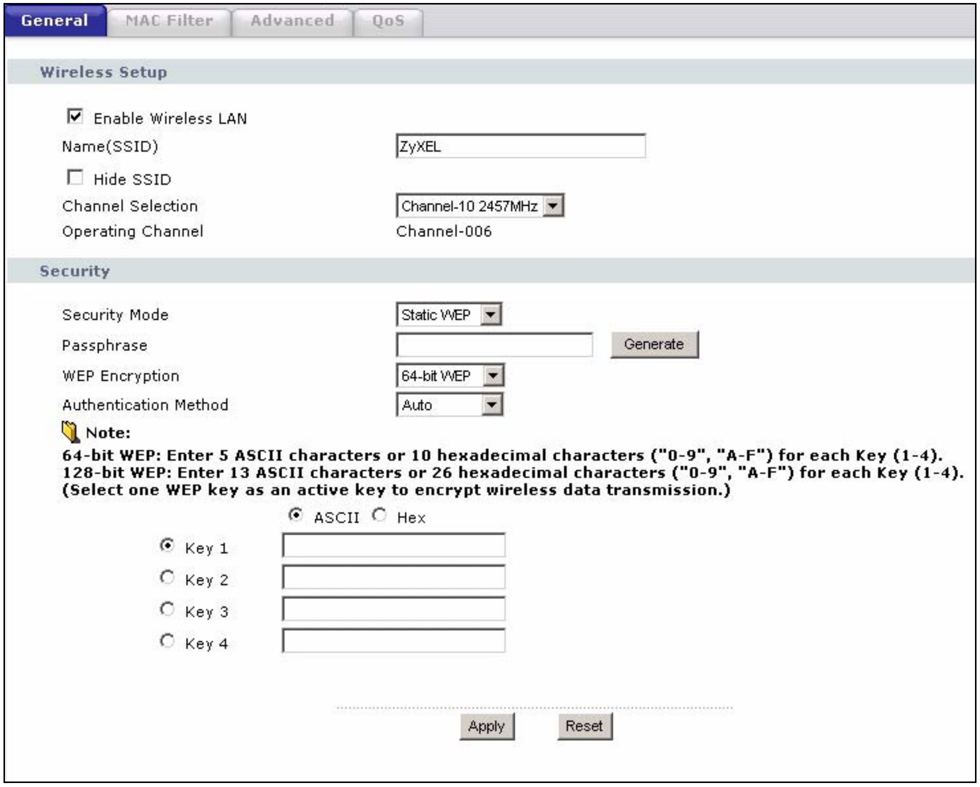
5.5.2 WEP Encryption

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 NBG334W 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 37 Network > Wireless LAN > General: Static WEP



Wireless Setup

☑ Enable Wireless LAN

Name(SSID): ZyXEL

□ Hide SSID

Channel Selection: Channel-10 2457MHz

Operating Channel: Channel-006

Security

Security Mode: Static WEP

Passphrase:

WEP Encryption: 64-bit WEP

Authentication Method: Auto

Note:

64-bit WEP: Enter 5 ASCII characters or 10 hexadecimal characters ("0-9", "A-F") for each Key (1-4).
128-bit WEP: Enter 13 ASCII characters or 26 hexadecimal characters ("0-9", "A-F") for each Key (1-4).
(Select one WEP key as an active key to encrypt wireless data transmission.)

● ASCII ○ Hex

● Key 1
○ Key 2
○ Key 3
○ Key 4

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

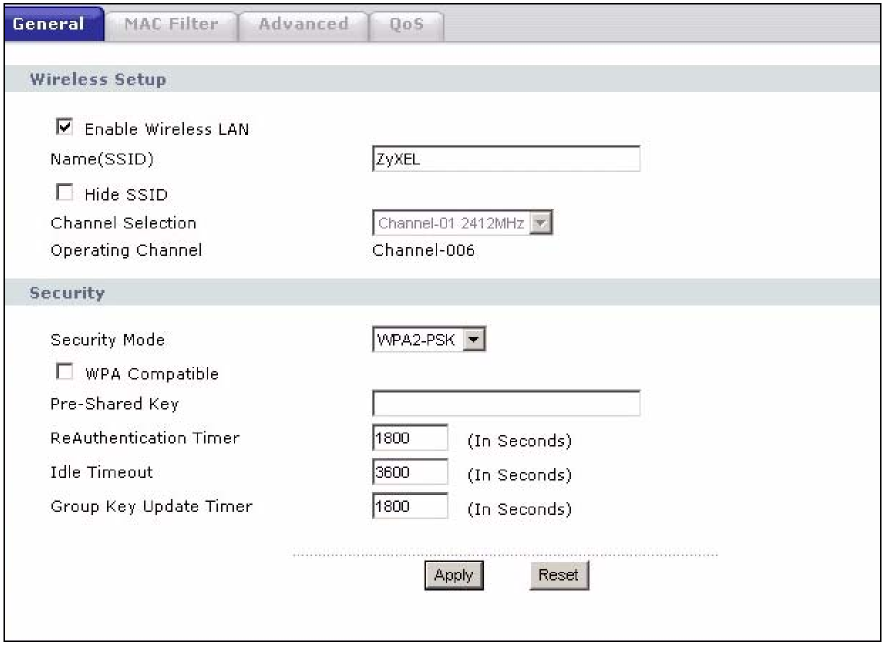
Table 29 Network > Wireless LAN > General: Static WEP

LABEL	DESCRIPTION
Passphrase	Enter a passphrase (password phrase) of up to 32 printable characters and click **Generate**. The NBG334W automatically generates four different WEP keys and displays them in the **Key** fields below.
WEP Encryption	Select **64-bit WEP** or **128-bit WEP** to enable data encryption.
Authentication Method	This field is activated when you select **64-bit WEP** or **128-bit WEP** in the **WEP Encryption** field. Select **Auto**, **Open System** or **Shared Key** from the drop-down list box.
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 NBG334W 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 NBG334W.
Reset	Click **Reset** to reload the previous configuration for this screen.

5.5.3 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 38 Network > Wireless LAN > General: WPA-PSK/WPA2-PSK



Wireless Setup

☑ Enable Wireless LAN

Name(SSID) ZyXEL

□ Hide SSID

Channel Selection Channel-01 2412MHz

Operating Channel Channel-006

Security

Security Mode WPA2-PSK

□ WPA Compatible

Pre-Shared Key

ReAuthentication Timer 1800 (In Seconds)

Idle Timeout 3600 (In Seconds)

Group Key Update Timer 1800 (In Seconds)

The following table describes the labels in this screen.

Table 30 Network > Wireless LAN > General: WPA-PSK/WPA2-PSK

LABEL	DESCRIPTION
WPA Compatible	This check box is available only when you select **WPA2-PSK** or **WPA2** in the **Security Mode** field. Select the check box to have both WPA2 and WPA wireless clients be able to communicate with the NBG334W even when the NBG334W is using WPA2-PSK or WPA2.
Pre-Shared Key	The encryption mechanisms used for **WPA/WPA2** and **WPA-PSK/WPA2-PSK** are the same. The only difference between the two is that **WPA-PSK/WPA2-PSK** uses a simple common password, instead of user-specific credentials. Type a pre-shared key from 8 to 63 case-sensitive ASCII characters (including spaces and symbols).
ReAuthentication Timer (in seconds)	Specify how often wireless stations have to resend usernames and passwords in order to stay connected. Enter a time interval between 10 and 9999 seconds. The default time interval is 1800 seconds (30 minutes). Note: If wireless station authentication is done using a RADIUS server, the reauthentication timer on the RADIUS server has priority.
Idle Timeout	The NBG334W automatically disconnects a wireless station from the wired network after a period of inactivity. The wireless station needs to enter the username and password again before access to the wired network is allowed. The default time interval is 3600 seconds (or 1 hour).

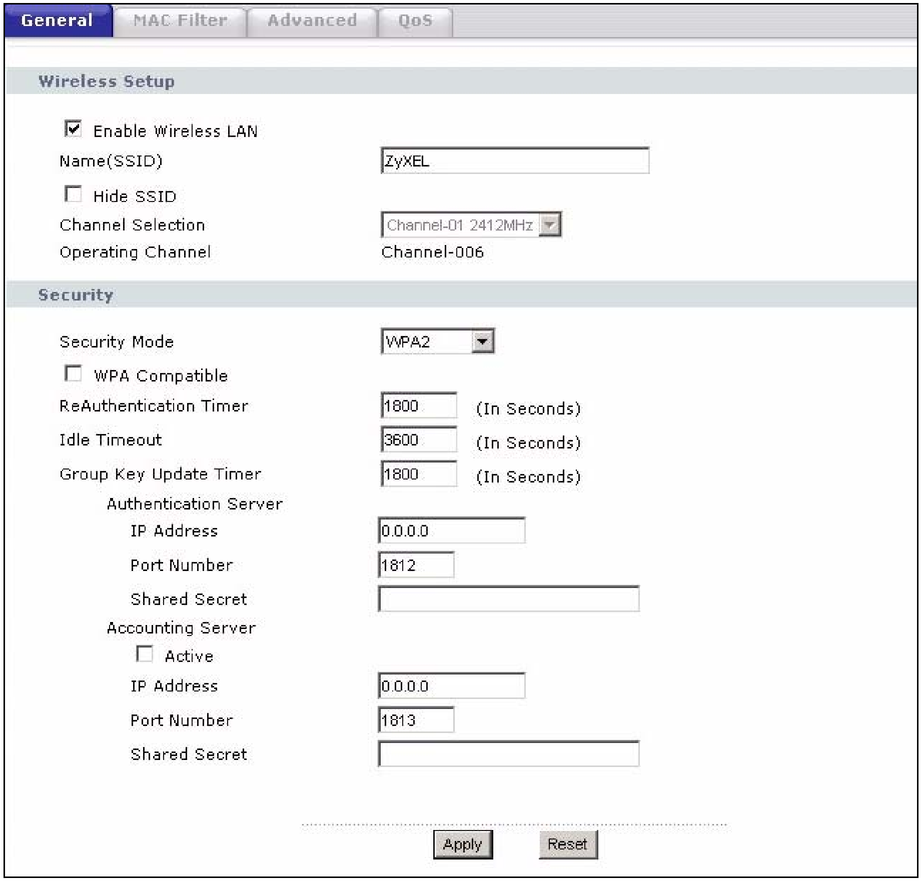
Table 30 Network > Wireless LAN > General: WPA-PSK/WPA2-PSK

LABEL	DESCRIPTION
Group Key Update Timer	The **Group Key Update Timer** is the rate at which the AP (if using **WPA-PSK/WPA2-PSK** key management) or RADIUS server (if using **WPA/WPA2** key management) sends a new group key out to all clients. The re-keying process is the WPA/WPA2 equivalent of automatically changing the WEP key for an AP and all stations in a WLAN on a periodic basis. Setting of the **Group Key Update Timer** is also supported in **WPA-PSK/WPA2-PSK** mode. The default is **1800** seconds (30 minutes).
Apply	Click **Apply** to save your changes back to the NBG334W.
Reset	Click **Reset** to reload the previous configuration for this screen.

5.5.4 WPA/WPA2

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

Figure 39 Network > Wireless LAN > General: WPA/WPA2



Wireless Setup

☑ Enable Wireless LAN

Name(SSID): ZyXEL

□ Hide SSID

Channel Selection: Channel-01 2412MHz

Operating Channel: Channel-006

Security

Security Mode: WPA2

□ WPA Compatible

ReAuthentication Timer: 1800 (In Seconds)

Idle Timeout: 3600 (In Seconds)

Group Key Update Timer: 1800 (In Seconds)

Authentication Server

IP Address: 0.0.0.0

Port Number: 1812

Shared Secret:

Accounting Server

□ Active

IP Address: 0.0.0.0

Port Number: 1813

Shared Secret:

The following table describes the labels in this screen.

Table 31 Network > Wireless LAN > General: WPA/WPA2

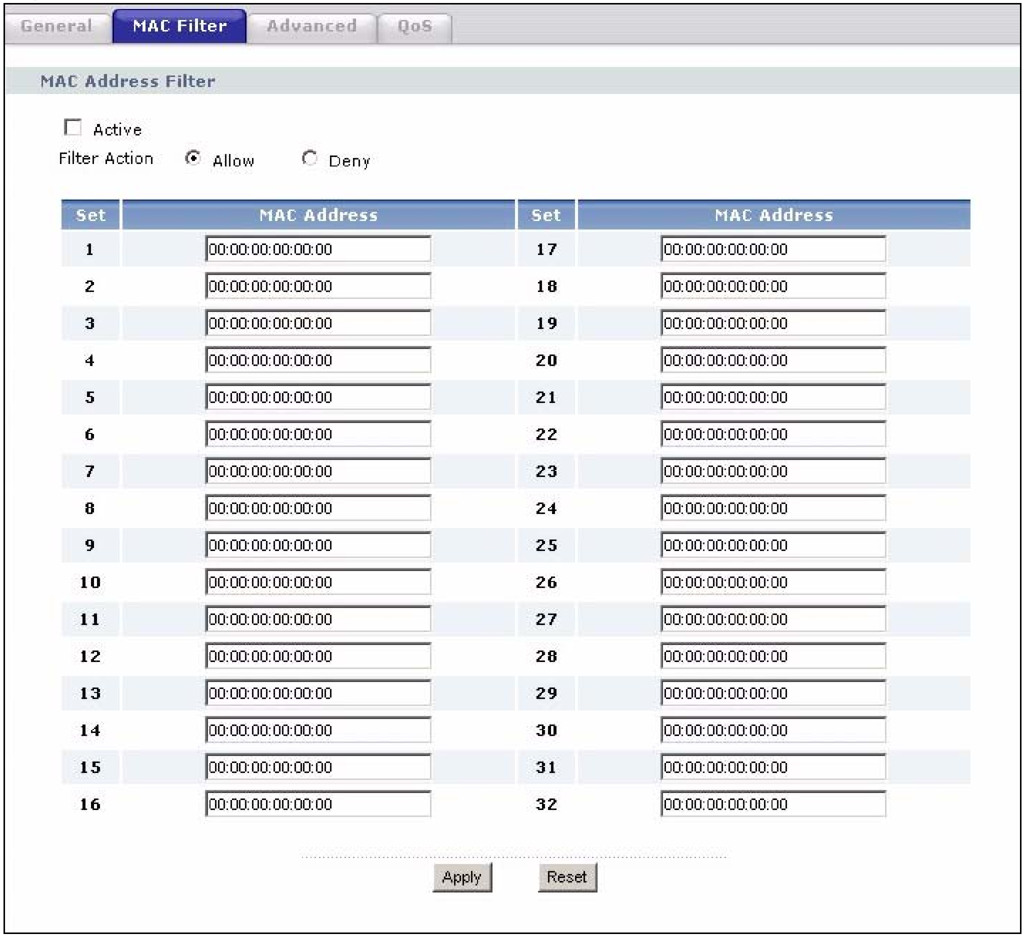
LABEL	DESCRIPTION
WPA Compatible	This check box is available only when you select **WPA2-PSK** or **WPA2** in the **Security Mode** field. Select the check box to have both WPA2 and WPA wireless clients be able to communicate with the NBG334W even when the NBG334W is using WPA2-PSK or WPA2.
ReAuthentication Timer (in seconds)	Specify how often wireless stations have to resend usernames and passwords in order to stay connected. Enter a time interval between 10 and 9999 seconds. The default time interval is 1800 seconds (30 minutes). Note: If wireless station authentication is done using a RADIUS server, the reauthentication timer on the RADIUS server has priority.
Idle Timeout	The NBG334W automatically disconnects a wireless station from the wired network after a period of inactivity. The wireless station needs to enter the username and password again before access to the wired network is allowed. The default time interval is 3600 seconds (or 1 hour).
Group Key Update Timer	The **Group Key Update Timer** is the rate at which the AP (if using **WPA-PSK/WPA2-PSK** key management) or RADIUS server (if using **WPA/WPA2** key management) sends a new group key out to all clients. The re-keying process is the WPA/WPA2 equivalent of automatically changing the WEP key for an AP and all stations in a WLAN on a periodic basis. Setting of the **Group Key Update Timer** is also supported in **WPA-PSK/WPA2-PSK** mode. The NBG334W default is **1800** seconds (30 minutes).
Authentication Server	
IP Address	Enter the IP address of the external authentication server in dotted decimal notation.
Port Number	Enter the port number of the external authentication server. The default port number is **1812**. You need not change this value unless your network administrator instructs you to do so with additional information.
Shared Secret	Enter a password (up to 31 alphanumeric characters) as the key to be shared between the external authentication server and the NBG334W. The key must be the same on the external authentication server and your NBG334W. The key is not sent over the network.
Accounting Server	
Active	Select **Yes** from the drop down list box to enable user accounting through an external authentication server.
IP Address	Enter the IP address of the external accounting server in dotted decimal notation.
Port Number	Enter the port number of the external accounting server. The default port number is **1813**. You need not change this value unless your network administrator instructs you to do so with additional information.
Shared Secret	Enter a password (up to 31 alphanumeric characters) as the key to be shared between the external accounting server and the NBG334W. The key must be the same on the external accounting server and your NBG334W. The key is not sent over the network.
Apply	Click **Apply** to save your changes back to the NBG334W.
Reset	Click **Reset** to reload the previous configuration for this screen.

5.6 MAC Filter

The MAC filter screen allows you to configure the NBG334W to give exclusive access to up to 32 devices (Allow) or exclude up to 32 devices from accessing the NBG334W (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 NBG334W's MAC filter settings, click **Network** > **Wireless LAN** > **MAC Filter**. The screen appears as shown.

Figure 40 Network > Wireless LAN > MAC Filter



MAC Address Filter

□ Active

Filter Action ● Allow ○ Deny

Set	MAC Address	Set	MAC Address
1	00:00:00:00:00:00	17	00:00:00:00:00:00
2	00:00:00:00:00:00	18	00:00:00:00:00:00
3	00:00:00:00:00:00	19	00:00:00:00:00:00
4	00:00:00:00:00:00	20	00:00:00:00:00:00
5	00:00:00:00:00:00	21	00:00:00:00:00:00
6	00:00:00:00:00:00	22	00:00:00:00:00:00
7	00:00:00:00:00:00	23	00:00:00:00:00:00
8	00:00:00:00:00:00	24	00:00:00:00:00:00
9	00:00:00:00:00:00	25	00:00:00:00:00:00
10	00:00:00:00:00:00	26	00:00:00:00:00:00
11	00:00:00:00:00:00	27	00:00:00:00:00:00
12	00:00:00:00:00:00	28	00:00:00:00:00:00
13	00:00:00:00:00:00	29	00:00:00:00:00:00
14	00:00:00:00:00:00	30	00:00:00:00:00:00
15	00:00:00:00:00:00	31	00:00:00:00:00:00
16	00:00:00:00:00:00	32	00:00:00:00:00:00

The following table describes the labels in this menu.

Table 32 Network > Wireless LAN > MAC Filter

LABEL	DESCRIPTION
Active	Select **Yes** from the drop down list box to enable MAC address filtering.
Filter Action	Define the filter action for the list of MAC addresses in the **MAC Address** table. Select **Deny** to block access to the NBG334W, MAC addresses not listed will be allowed to access the NBG334W Select **Allow** to permit access to the NBG334W, MAC addresses not listed will be denied access to the NBG334W.

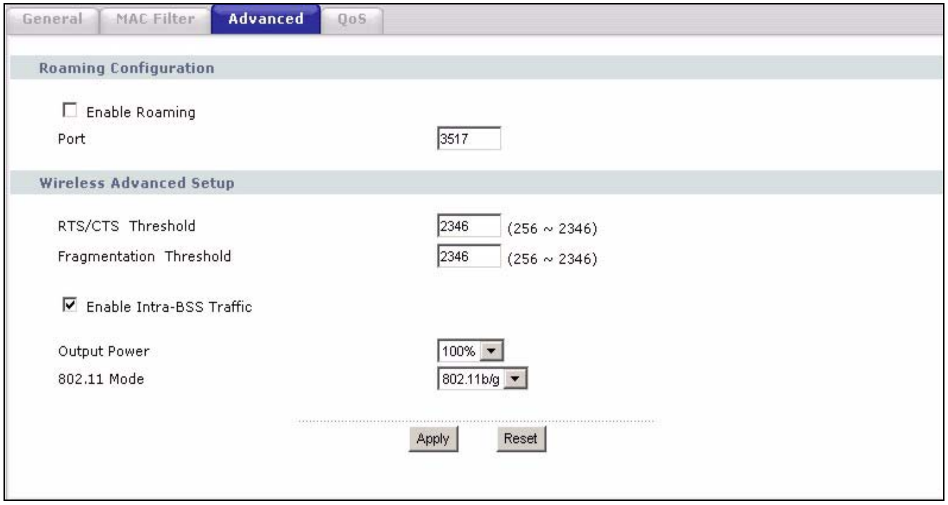
Table 32 Network > Wireless LAN > MAC Filter

LABEL	DESCRIPTION
Set	This is the index number of the MAC address.
MAC Address	Enter the MAC addresses of the wireless station that are allowed or denied access to the NBG334W 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.
Apply	Click **Apply** to save your changes back to the NBG334W.
Reset	Click **Reset** to reload the previous configuration for this screen.

5.7 Wireless LAN Advanced Screen

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

Figure 41 Network > Wireless LAN > Advanced



Roaming Configuration

☐ Enable Roaming

Port 3517

Wireless Advanced Setup

RTS/CTS Threshold 2346 (256 ~ 2346)

Fragmentation Threshold 2346 (256 ~ 2346)

☑ Enable Intra-BSS Traffic

Output Power 100%

802.11 Mode 802.11b/g

The following table describes the labels in this screen.

Table 33 Network > Wireless LAN > Advanced

LABEL	DESCRIPTION
Roaming Configuration	
Enable Roaming	Select this option if your network environment has multiple APs and you want your wireless device to be able to access the network as you move between wireless networks.
Wireless Advanced Setup	
RTS/CTS Threshold	Data with its frame size larger than this value will perform the RTS (Request To Send)/CTS (Clear To Send) handshake. If the RTS/CTS value is greater than the **Fragmentation Threshold** value, then the RTS/CTS handshake will never occur as data frames will be fragmented before they reach RTS/CTS size. Enter a value between 0 and 2432.
Fragmentation Threshold	It is the maximum data fragment size that can be sent. Enter a value between 256 and 2432.

Table 33 Network > Wireless LAN > Advanced

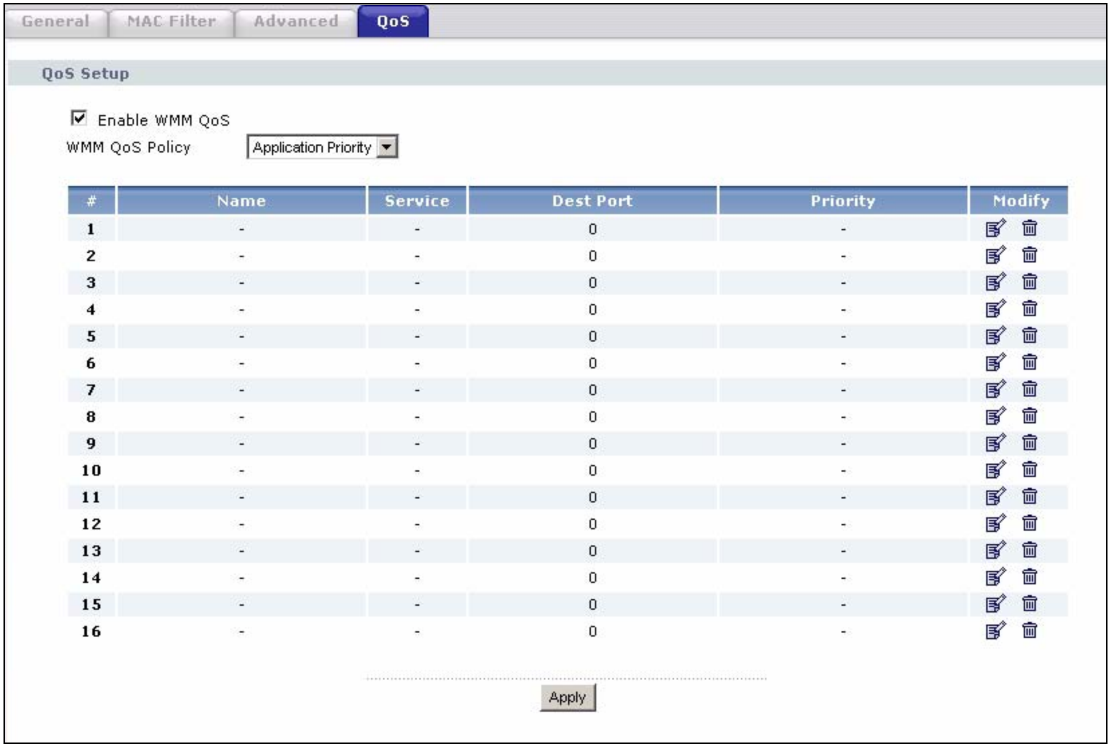
LABEL	DESCRIPTION
Enable Intra-BSS Traffic	A Basic Service Set (BSS) exists when all communications between wireless clients or between a wireless client and a wired network client go through one access point (AP). Intra-BSS traffic is traffic between wireless clients in the BSS. When Intra-BSS is enabled, 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 NBG334W in this field. If there is a high density of APs within an area, decrease the output power of the NBG334W to reduce interference with other APs.
802.11 Mode	Select **802.11b** to allow only IEEE 802.11b compliant WLAN devices to associate with the NBG334W. Select **802.11g** to allow only IEEE 802.11g compliant WLAN devices to associate with the NBG334W. Select **802.11b/g** to allow either IEEE802.11b or IEEE802.11g compliant WLAN devices to associate with the NBG334W. The transmission rate of your NBG334W might be reduced.
Apply	Click **Apply** to save your changes back to the NBG334W.
Reset	Click **Reset** to reload the previous configuration for this screen.

5.8 Quality of Service (QoS) Screen

The QoS screen allows you to automatically give a service (such as e-mail, VoIP or FTP) a priority level.

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

Figure 42 Network > Wireless LAN > QoS



QoS Setup

☑ Enable WMM QoS

WMM QoS Policy: Application Priority

#	Name	Service	Dest Port	Priority	Modify
1	-	-	0	-	✎ 🗑
2	-	-	0	-	✎ 🗑
3	-	-	0	-	✎ 🗑
4	-	-	0	-	✎ 🗑
5	-	-	0	-	✎ 🗑
6	-	-	0	-	✎ 🗑
7	-	-	0	-	✎ 🗑
8	-	-	0	-	✎ 🗑
9	-	-	0	-	✎ 🗑
10	-	-	0	-	✎ 🗑
11	-	-	0	-	✎ 🗑
12	-	-	0	-	✎ 🗑
13	-	-	0	-	✎ 🗑
14	-	-	0	-	✎ 🗑
15	-	-	0	-	✎ 🗑
16	-	-	0	-	✎ 🗑

The following table describes the labels in this screen.

Table 34 Network > Wireless LAN > QoS

LABEL	DESCRIPTION
Enable WMM QoS	Select this to turn on WMM QoS (Wireless MultiMedia Quality of Service). The NBG334W assigns priority to packets based on the 802.1q or DSCP information in their headers. If a packet has no WMM information in its header, it is assigned the default priority.
WMM QoS Policy	Select **Default** to have the NBG334W 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. Select **Application Priority** from the drop-down list box to display a table of application names, services, ports and priorities to which you want to apply WMM QoS.
	The table appears only if you select **Application Priority** in **WMM QoS Policy**.
#	This is the number of an individual application entry.
Name	This field displays a description given to an application entry.
Service	This field displays either **FTP**, **WWW**, **E-mail** or a **User Defined** service to which you want to apply WMM QoS.
Dest Port	This field displays the destination port number to which the application sends traffic.

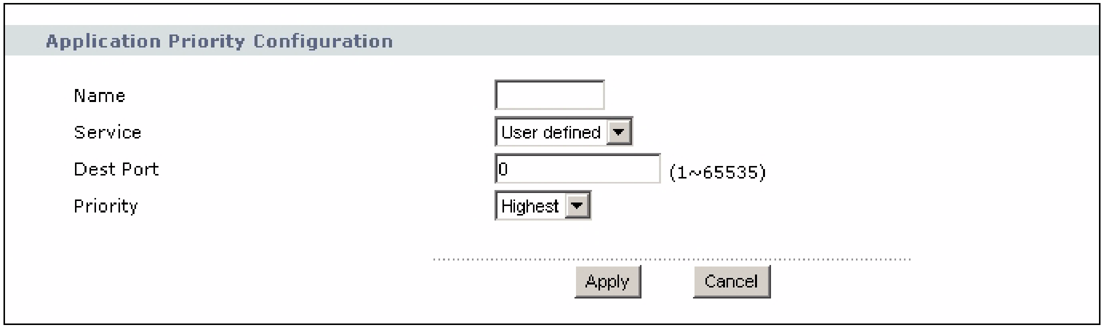
Table 34 Network > Wireless LAN > QoS (continued)

LABEL	DESCRIPTION
Priority	This field displays the priority of the application. **Highest** - Typically used for voice or video that should be high-quality. **High** - Typically used for voice or video that can be medium-quality. **Mid** - Typically used for applications that do not fit into another priority. For example, Internet surfing. **Low** - Typically used for non-critical "background" applications, such as large file transfers and print jobs that should not affect other applications.
Modify	Click the **Edit** icon to open the **Application Priority Configuration** screen. Modify an existing application entry or create a application entry in the **Application Priority Configuration** screen. Click the **Remove** icon to delete an application entry.
Apply	Click **Apply** to save your changes to the NBG334W.

5.8.1 Application Priority Configuration

Use this screen to edit a WMM QoS application entry. Click the edit icon under **Modify**. The following screen displays.

Figure 43 Network > Wireless LAN > QoS: Application Priority Configuration



Application Priority Configuration

Name:

Service: User defined

Dest Port: 0 (1~65535)

Priority: Highest

See Appendix F on page 259 for a list of commonly-used services and destination ports. The following table describes the fields in this screen.

Table 35 Network > Wireless LAN > QoS: Application Priority Configuration

LABEL	DESCRIPTION
Application Priority Configuration	
Name	Type a description of the application priority.

Table 35 Network > Wireless LAN > QoS: Application Priority Configuration (continued)

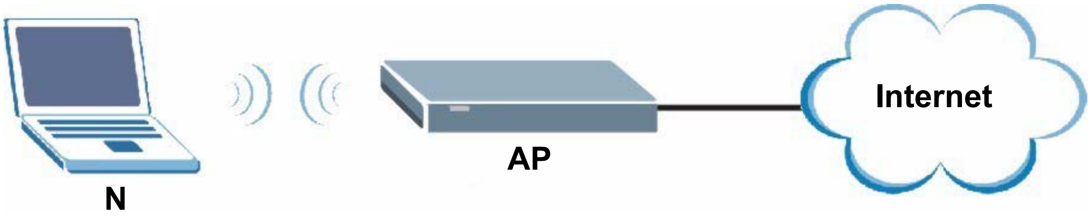
LABEL	DESCRIPTION
Service	The following is a description of the applications you can prioritize with WMM QoS. Select a service from the drop-down list box. • **E-Mail** Electronic mail consists of messages sent through a computer network to specific groups or individuals. Here are some default ports for e-mail: POP3 - port 110 IMAP - port 143 SMTP - port 25 HTTP - port 80 • **FTP** File Transfer Protocol enables fast transfer of files, including large files that it may not be possible to send via e-mail. FTP uses port number 21. • **WWW** The World Wide Web is an Internet system to distribute graphical, hyper-linked information, based on Hyper Text Transfer Protocol (HTTP) - a client/server protocol for the World Wide Web. The Web is not synonymous with the Internet; rather, it is just one service on the Internet. Other services on the Internet include Internet Relay Chat and Newsgroups. The Web is accessed through use of a browser. • **User-Defined** User-defined services are user specific services configured using known ports and applications.
Dest Port	This displays the port the selected service uses. Type a port number in the field provided if you want to use a different port to the default port.
Priority	Select a priority from the drop-down list box.
Apply	Click **Apply** to save your changes back to the NBG334W.
Cancel	Click **Cancel** to return to the previous screen.

Wireless Tutorial

6.1 How to Connect to the Internet from a Notebook

This section gives you an example of how to set up an access point and wireless client such as a notebook for wireless communication. The notebook (N) can access the Internet through an AP wirelessly.

Figure 44 Wireless AP Connection to the Internet



6.1.1 Example Parameters

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

An access point or wireless router is referred to as an "AP" and a computer with a wireless network card or USB/PCI adapter is referred to as a "wireless client" here.

6.2 Enable and Configure Wireless Security on your NBG334W

Follow the steps below to configure the wireless settings on your NBG334W.

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 2.2 on page 33).

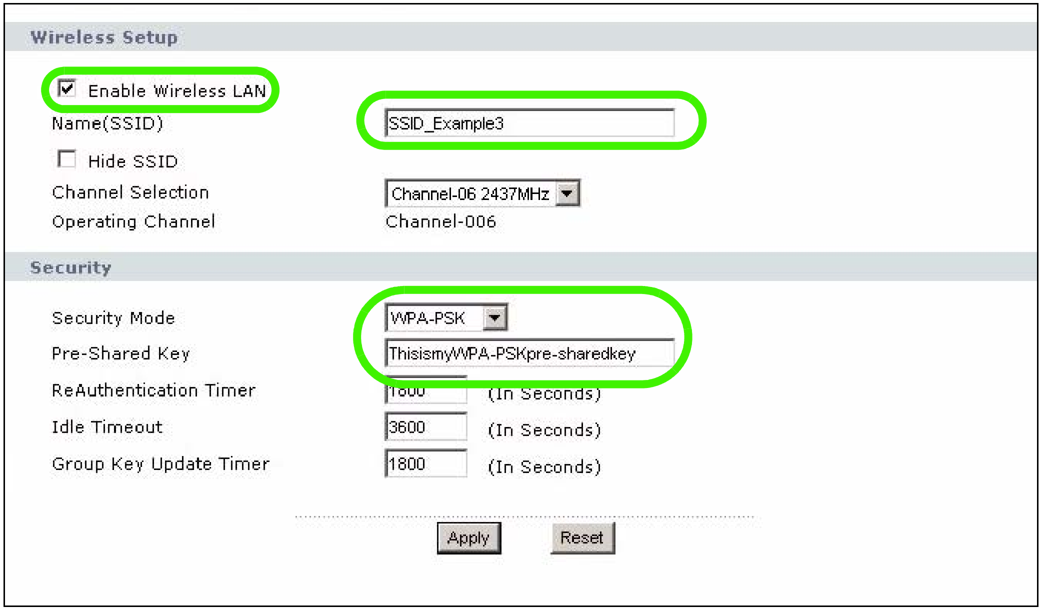
1 Open the **Wireless LAN** > **General** screen in the AP's web configurator.

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 45 Network > Wireless LAN > General



Wireless Setup

☑ Enable Wireless LAN

Name(SSID): SSID_Example3

□ Hide SSID

Channel Selection: Channel-06 2437MHz

Operating Channel: Channel-006

Security

Security Mode: WPA-PSK

Pre-Shared Key: ThisismyWPA-PSKpre-sharedkey

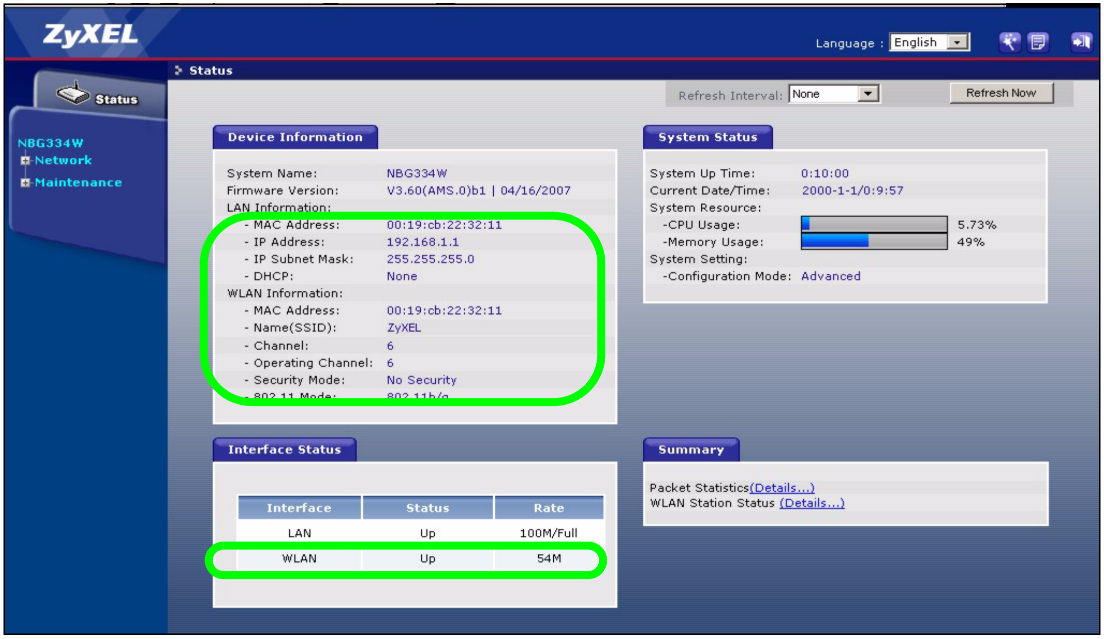
ReAuthentication Timer: 1800 (In Seconds)

Idle Timeout: 3600 (In Seconds)

Group Key Update Timer: 1800 (In Seconds)

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 46 Status: AP Mode



Device Information

System Name: NBG334W
Firmware Version: V3.60(AMS.0)b1 | 04/16/2007
LAN Information:
- MAC Address: 00:19:cb:22:32:11
- IP Address: 192.168.1.1
- IP Subnet Mask: 255.255.255.0
- DHCP: None
WLAN Information:
- MAC Address: 00:19:cb:22:32:11
- Name(SSID): ZyXEL
- Channel: 6
- Operating Channel: 6
- Security Mode: No Security
- 802.11 Mode: 802.11b/g

System Status

System Up Time: 0:10:00
Current Date/Time: 2000-1-1/0:9:57
System Resource:
-CPU Usage: 5.73%
-Memory Usage: 49%
System Setting:
-Configuration Mode: Advanced

Interface Status

Interface	Status	Rate
LAN	Up	100M/Full
WLAN	Up	54M

Summary

Packet Statistics(Details...)
WLAN Station Status (Details...)

6.3 Configure Your Notebook

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

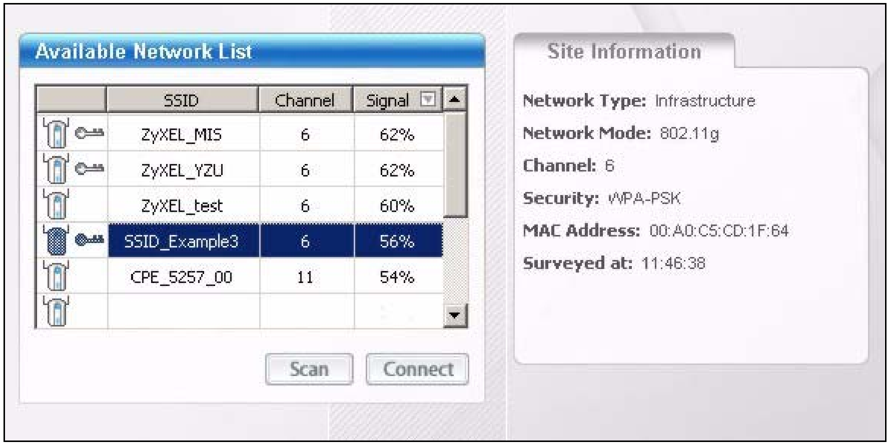
1 The NBG334W supports IEEE 802.11b and IEEE 802.11g wireless clients. Make sure that your notebook or computer's wireless adapter supports one of these standards.

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 47 Connecting a Wireless Client to a Wireless Network t



Available Network List

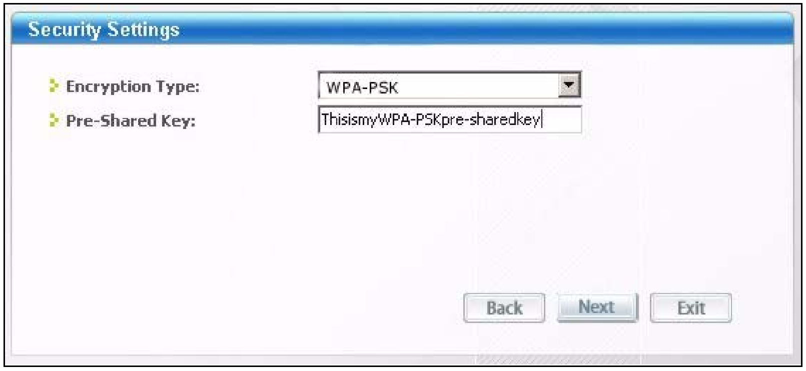
SSID	Channel	Signal
ZyXEL_MIS	6	62%
ZyXEL_YZU	6	62%
ZyXEL_test	6	60%
SSID_Example3	6	56%
CPE_5257_00	11	54%

Site Information

Network Type: Infrastructure
Network Mode: 802.11g
Channel: 6
Security: WPA-PSK
MAC Address: 00:A0:C5:CD:1F:64
Surveyed at: 11:46:38

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

Figure 48 Security Settings

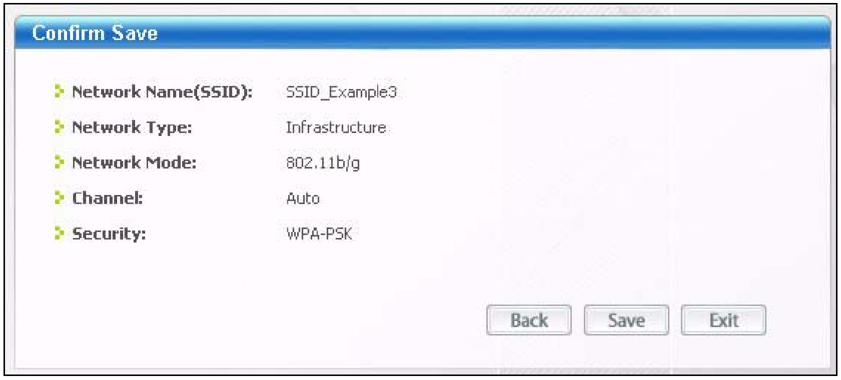


Security Settings

Encryption Type: WPA-PSK
Pre-Shared Key: ThisismyWPA-PSKpre-sharedkey

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

Figure 49 Confirm Save

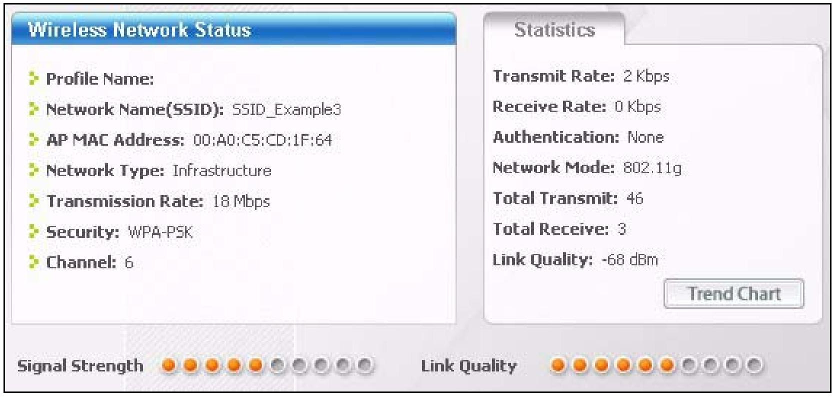


Confirm Save

- Network Name(SSID): SSID_Example3
- Network Type: Infrastructure
- Network Mode: 802.11b/g
- Channel: Auto
- Security: WPA-PSK

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 50 Link Status



Wireless Network Status

- Profile Name:
- Network Name(SSID): SSID_Example3
- AP MAC Address: 00:A0:C5:CD:1F:64
- Network Type: Infrastructure
- Transmission Rate: 18 Mbps
- Security: WPA-PSK
- Channel: 6

Statistics

Transmit Rate: 2 Kbps
Receive Rate: 0 Kbps
Authentication: None
Network Mode: 802.11g
Total Transmit: 46
Total Receive: 3
Link Quality: -68 dBm

8 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.

7

WAN

This chapter describes how to configure WAN settings.

7.1 WAN Overview

See the chapter about the connection wizard for more information on the fields in the WAN screens.

7.2 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 the rom file (ZyNOS configuration file). It will not change unless you change the setting or upload a different ROM file. It is recommended that you clone the MAC address prior to hooking up the WAN Port.

7.3 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.

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. IGMP version 2 (RFC 2236) is an improvement over version 1 (RFC 1112) but IGMP version 1 is still in wide use. If you would like to read more detailed information about interoperability between IGMP version 2 and version 1, please see sections 4 and 5 of RFC 2236. The class D IP address is used to identify host groups and can be in the range 224.0.0.0 to 239.255.255.255. The address 224.0.0.0 is not assigned to any group and is used by IP multicast computers. The address 224.0.0.1 is used for query messages and is assigned to the permanent group of all IP hosts (including gateways). All hosts must join the 224.0.0.1 group in order to participate in IGMP. The address 224.0.0.2 is assigned to the multicast routers group.

The NBG334W supports both IGMP version 1 (**IGMP-v1**) and IGMP version 2 (**IGMP-v2**). At start up, the NBG334W queries all directly connected networks to gather group membership. After that, the NBG334W periodically updates this information. IP multicasting can be enabled/disabled on the NBG334W LAN and/or WAN interfaces in the web configurator (**LAN**; **WAN**). Select **None** to disable IP multicasting on these interfaces.

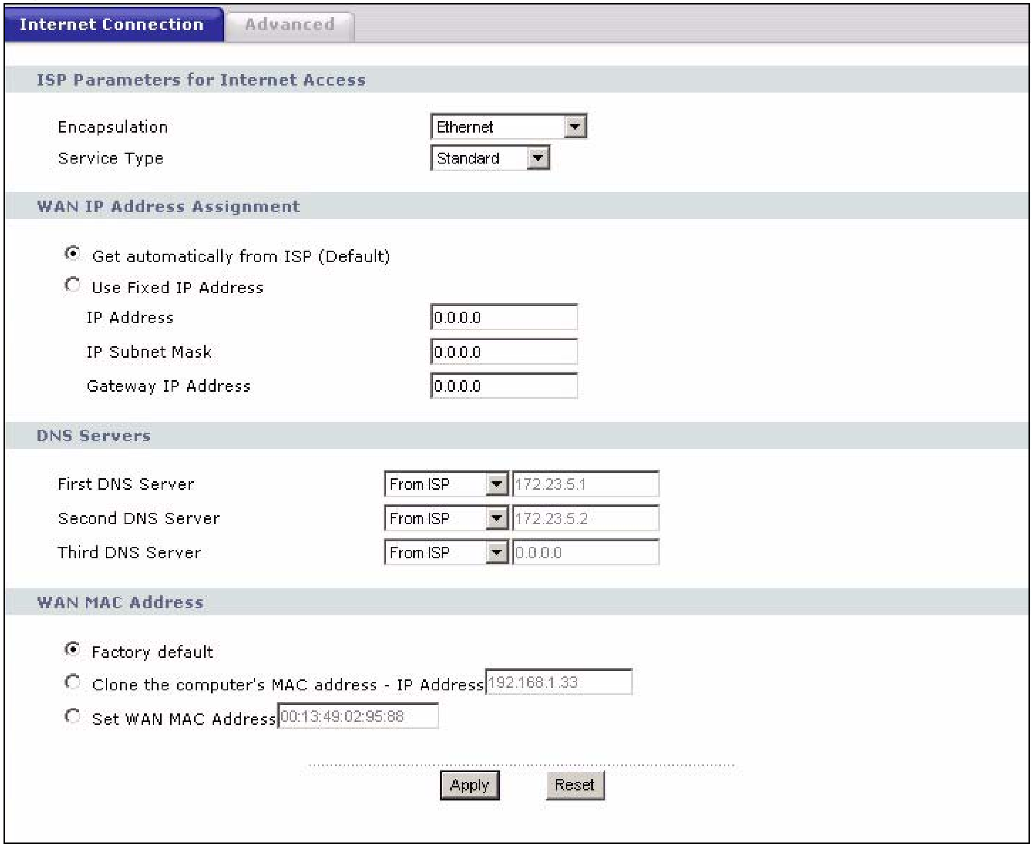
7.4 Internet Connection

Use this screen to change your NBG334W's Internet access settings. Click **Network** > **WAN**. The screen differs according to the encapsulation you choose.

7.4.1 Ethernet Encapsulation

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

Figure 51 Network > WAN > Internet Connection: Ethernet Encapsulation



ISP Parameters for Internet Access

Encapsulation: Ethernet

Service Type: Standard

WAN IP Address Assignment

● Get automatically from ISP (Default)

○ Use Fixed IP Address

IP Address: 0.0.0.0

IP Subnet Mask: 0.0.0.0

Gateway IP Address: 0.0.0.0

DNS Servers

First DNS Server: From ISP 172.23.5.1

Second DNS Server: From ISP 172.23.5.2

Third DNS Server: From ISP 0.0.0.0

WAN MAC Address

● Factory default

○ Clone the computer's MAC address - IP Address 192.168.1.33

○ Set WAN MAC Address 00:13:49:02:95:88

The following table describes the labels in this screen.

Table 36 Network > WAN > Internet Connection: Ethernet Encapsulation

LABEL	DESCRIPTION
Encapsulation	You must choose the Ethernet option when the WAN port is used as a regular Ethernet.
Service Type	Choose from **Standard**, **RR-Telstra** (RoadRunner Telstra authentication method), **RR-Manager** (Roadrunner Manager authentication method), **RR-Toshiba** (Roadrunner Toshiba authentication method) or **Telia Login**. The following fields do not appear with the **Standard** service type.
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.
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.
DNS Servers	
First DNS Server Second DNS Server Third DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the NBG334W'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 NBG334W'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	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. Once it is successfully configured, the address will be copied to the rom file (ZyNOS configuration file). It will not change unless you change the setting or upload a different ROM file.
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 NBG334W.
Reset	Click **Reset** to begin configuring this screen afresh.

7.4.2 PPPoE Encapsulation

The NBG334W 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).

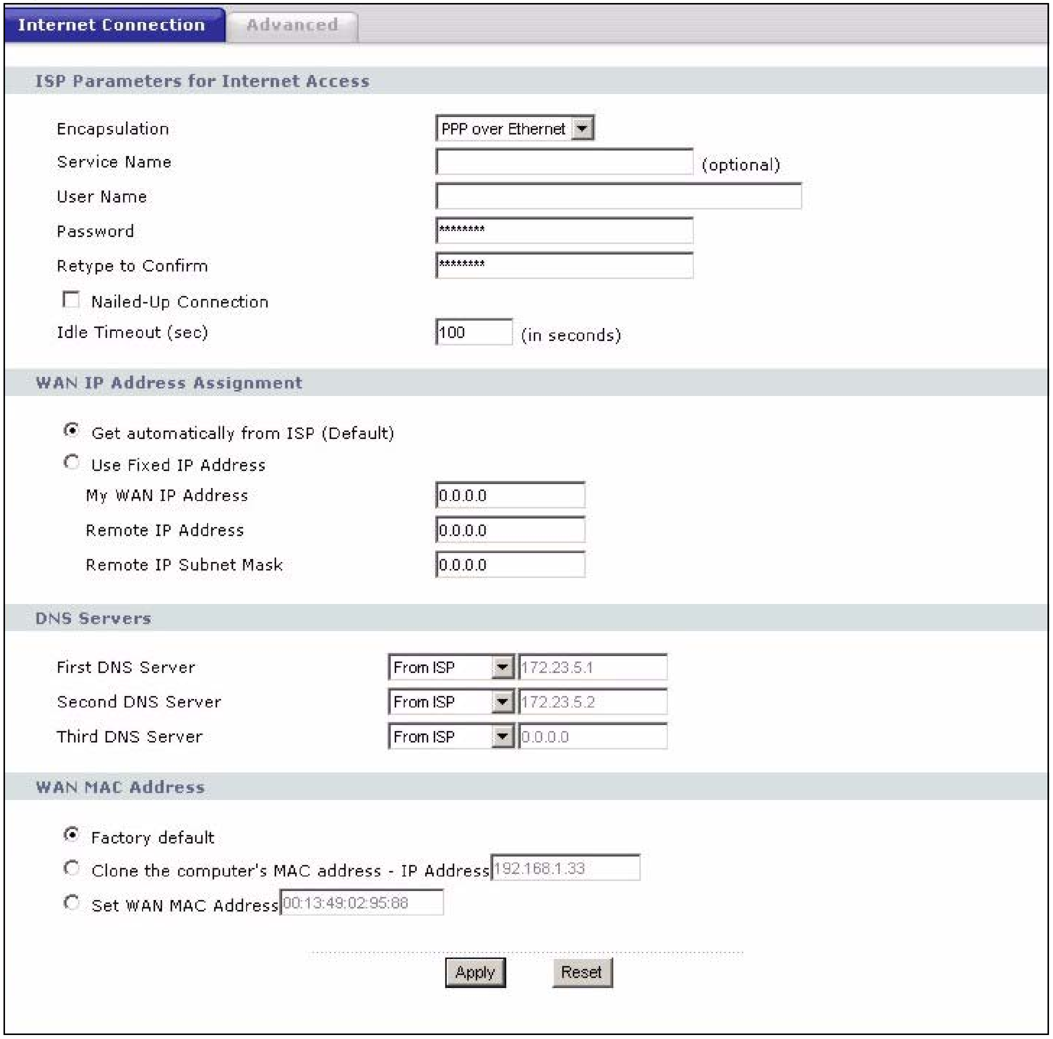
One of the benefits of PPPoE is the ability to let you access one of multiple network services, a function known as dynamic service selection. This enables the service provider to easily create and offer new IP services for individuals.

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 NBG334W (rather than individual computers), the computers on the LAN do not need PPPoE software installed, since the NBG334W 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 52 Network > WAN > Internet Connection: PPPoE Encapsulation



ISP Parameters for Internet Access

Encapsulation	PPP over Ethernet
Service Name	(optional)
User Name	
Password	********
Retype to Confirm	********
□ Nailed-Up Connection	
Idle Timeout (sec)	100 (in seconds)

WAN IP Address Assignment

● Get automatically from ISP (Default)
○ Use Fixed IP Address

My WAN IP Address	0.0.0.0
Remote IP Address	0.0.0.0
Remote IP Subnet Mask	0.0.0.0

DNS Servers

First DNS Server	From ISP	172.23.5.1
Second DNS Server	From ISP	172.23.5.2
Third DNS Server	From ISP	0.0.0.0

WAN MAC Address

● Factory default
○ Clone the computer's MAC address - IP Address 192.168.1.33
○ Set WAN MAC Address 00:13:49:02:95:88

The following table describes the labels in this screen.

Table 37 Network > WAN > Internet Connection: PPPoE Encapsulation

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Encapsulation	The **PPP over Ethernet** choice is for a dial-up connection using PPPoE. The NBG334W supports PPPoE (Point-to-Point Protocol over Ethernet). PPPoE is an IETF Draft standard (RFC 2516) specifying how a personal computer (PC) interacts with a broadband modem (i.e. xDSL, cable, wireless, etc.) connection. Operationally, PPPoE saves significant effort for both the end user and ISP/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. Further, with NAT, all of the LAN's computers will have access.
Service Name	Type the PPPoE service name provided to you. PPPoE uses a service name to identify and reach the PPPoE server.
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.
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 seconds 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.
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**.
Remote IP Address	Enter the remote IP address (if your ISP gave you one) in this field.
Remote IP Subnet Mask	Enter the remote IP subnet mask in this field.
DNS Servers	
First DNS Server Second DNS Server Third DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the NBG334W'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 NBG334W'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.

Table 37 Network > WAN > Internet Connection: PPPoE Encapsulation

LABEL	DESCRIPTION
Clone the computer's MAC 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. Once it is successfully configured, the address will be copied to the rom file (ZyNOS configuration file). It will not change unless you change the setting or upload a different ROM file.
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 NBG334W.
Reset	Click **Reset** to begin configuring this screen afresh.

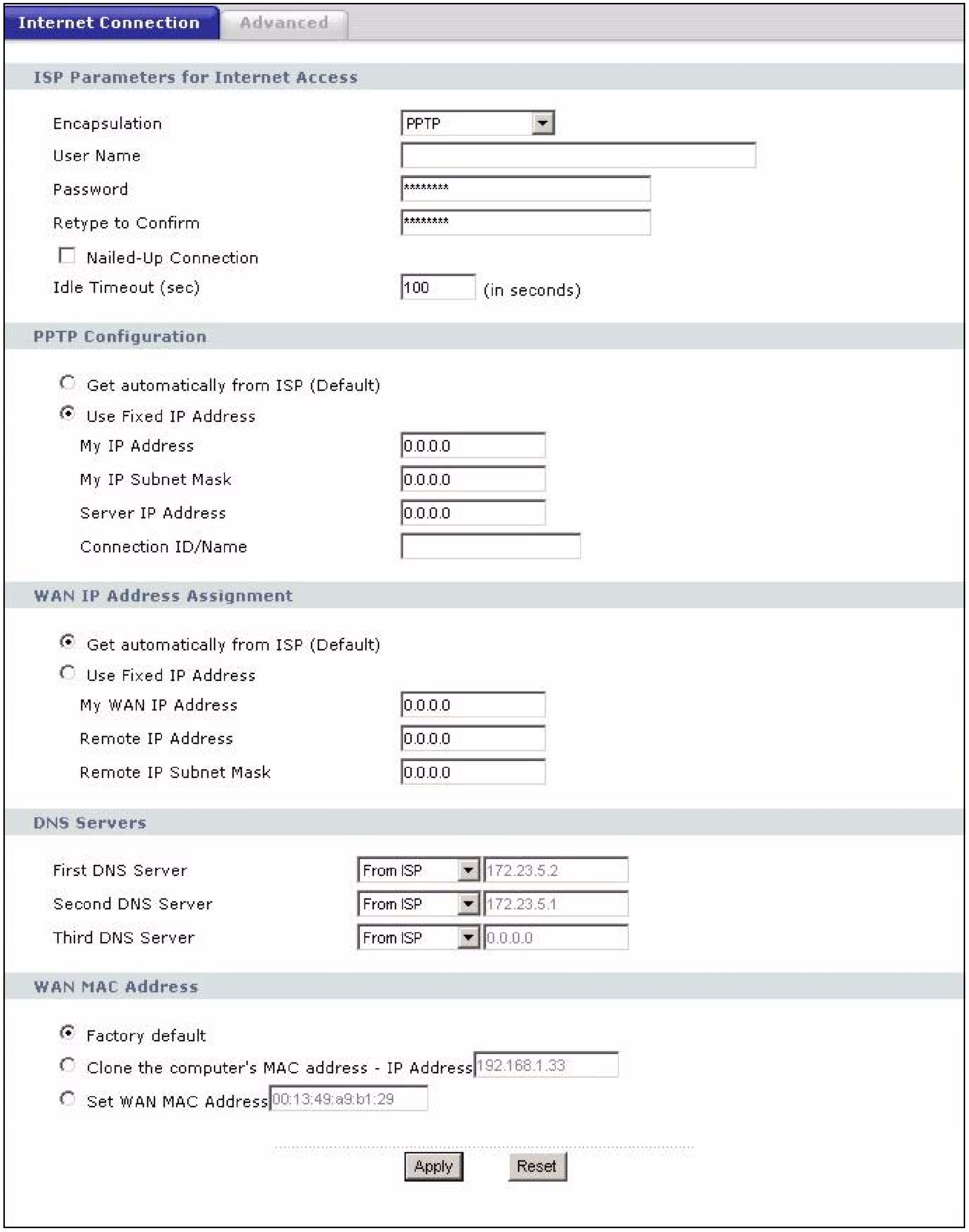
7.4.3 PPTP Encapsulation

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 53   Network > WAN > Internet Connection: PPTP Encapsulation



ISP Parameters for Internet Access

Encapsulation	PPTP
User Name	
Password	********
Retype to Confirm	********
□ Nailed-Up Connection	
Idle Timeout (sec)	100 (in seconds)

PPTP Configuration

○ Get automatically from ISP (Default)

● Use Fixed IP Address

My IP Address	0.0.0.0
My IP Subnet Mask	0.0.0.0
Server IP Address	0.0.0.0
Connection ID/Name	

WAN IP Address Assignment

● Get automatically from ISP (Default)

○ Use Fixed IP Address

My WAN IP Address	0.0.0.0
Remote IP Address	0.0.0.0
Remote IP Subnet Mask	0.0.0.0

DNS Servers

First DNS Server	From ISP	172.23.5.2
Second DNS Server	From ISP	172.23.5.1
Third DNS Server	From ISP	0.0.0.0

WAN MAC Address

● Factory default

○ Clone the computer's MAC address - IP Address 192.168.1.33

○ Set WAN MAC Address 00:13:49:a9:b1:29