G-470

802.11g Wireless Ethernet Adapter

User's Guide

Version 1.00
Edition 1
8/2006

ZyXEL

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Certifications

Federal Communications Commission (FCC) Interference Statement

The device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operations.

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

If this equipment does cause harmful interference to radio/television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and the receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

Caution

1. The equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment, under 47 CFR 2.1091 paragraph (d)(2).
2. To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.
3. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Notice 1

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

This product has been designed for the WLAN 2.4 GHz network throughout the EC region and Switzerland, with restrictions in France.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

注意！

依據 低功率電波輻射性電機管理辦法

第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

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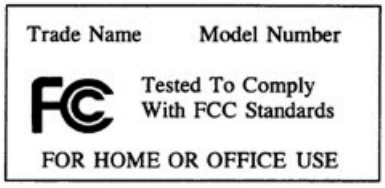
Viewing Certifications

1. Go to http://www.zyxel.com.
2. Select your product from the drop-down list box on the ZyXEL home page to go to that product's page.
3. Select the certification you wish to view from this page.



ZyXEL declares that US model of G-470 (FCC ID: 188G470) is limited in CH1 - CH11 for 2.4G band by specific firmware controlled by the manufacturer and is not user changeable.

ZyXEL Limited Warranty

ZyXEL warrants to the original end user (purchaser) that this product is free from any defects in materials or workmanship for a period of up to two (2) years from the date of purchase. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, ZyXEL will, at its discretion, repair or replace the defective products or components without charge for either parts or labor, and to whatever extent it shall deem necessary to restore the product or components to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal or higher value, and will be solely at the discretion of ZyXEL. This warranty shall not apply if the product has been modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions.

Note

Repair or replacement, as provided under this warranty, is the exclusive remedy of the purchaser. This warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular use or purpose. ZyXEL shall in no event be held liable for indirect or consequential damages of any kind to the purchaser.

To obtain the services of this warranty, contact ZyXEL's Service Center for your Return Material Authorization number (RMA). Products must be returned Postage Prepaid. It is recommended that the unit be insured when shipped. Any returned products without proof of purchase or those with an out-dated warranty will be repaired or replaced (at the discretion of ZyXEL) and the customer will be billed for parts and labor. All repaired or replaced products will be shipped by ZyXEL to the corresponding return address, Postage Paid. This warranty gives you specific legal rights, and you may also have other rights that vary from country to country.

Online Registration

Register your product online to receive e-mail notices of firmware upgrades and information at www.zyxel.com for global products, or at www.us.zyxel.com for North American products.

Safety Warnings

For your safety, be sure to read and follow all warning notices and instructions.

- Do NOT open the device or unit. Opening or removing covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel can service the device. Please contact your vendor for further information.
- Connect the power cord to the right supply voltage (110V AC in North America or 230V AC in Europe).
- Place connecting cables carefully so that no one will step on them or stumble over them. Do NOT allow anything to rest on the power cord and do NOT locate the product where anyone can walk on the power cord.
- If you wall mount your device, make sure that no electrical, gas or water pipes will be damaged.
- Do NOT install nor use your device during a thunderstorm. There may be a remote risk of electric shock from lightning.
- Do NOT expose your device to dampness, dust or corrosive liquids.
- Do NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Make sure to connect the cables to the correct ports.
- Do NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.
- Do NOT store things on the device.
- Connect ONLY suitable accessories to the device.

This product is recyclable. Dispose of it properly.

Customer Support

Please have the following information ready when you contact customer support.

- Product model and serial number.
- Warranty Information.
- Date that you received your device.
- Brief description of the problem and the steps you took to solve it.

METHOD / LOCATION	SUPPORT E-MAIL / SALES E-MAIL	TELEPHONE[A] / FAX	WEB SITE / FTP SITE	REGULAR MAIL
CORPORATE HEADQUARTERS (WORLDWIDE)	support@zyxel.com.tw	+886-3-578-3942	www.zyxel.com www.europe.zyxel.com	ZyXEL Communications Corp. 6 Innovation Road II Science Park Hsinchu 300 Taiwan
	sales@zyxel.com.tw	+886-3-578-2439	ftp.zyxel.com ftp.europe.zyxel.com	
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	info@cz.zyxel.com	+420-241-091-359		
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	sales@zyxel.dk	+45-39-55-07-07		
FINLAND	support@zyxel.fi	+358-9-4780-8411	www.zyxel.fi	ZyXEL Communications Oy Malminkaari 10 00700 Helsinki Finland
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	sales@zyxel.de	+49-2405-6909-99		
HUNGARY	support@zyxel.hu	+36-1-3361649	www.zyxel.hu	ZyXEL Hungary 48, Zoldlomb Str. H-1025, Budapest Hungary
	info@zyxel.hu	+36-1-3259100		
KAZAKHSTAN	http://zyxel.kz/support	+7-3272-590-698	www.zyxel.kz	ZyXEL Kazakhstan 43, Dostyk ave.,Office 414 Dostyk Business Centre 050010, Almaty Republic of Kazakhstan
	sales@zyxel.kz	+7-3272-590-689		
NORTH AMERICA	support@zyxel.com	1-800-255-4101 +1-714-632-0882	www.us.zyxel.com	ZyXEL Communications Inc. 1130 N. Miller St. Anaheim CA 92806-2001 U.S.A.
	sales@zyxel.com	+1-714-632-0858	ftp.us.zyxel.com	
NORWAY	support@zyxel.no	+47-22-80-61-80	www.zyxel.no	ZyXEL Communications A/S Nils Hansens vei 13 0667 Oslo Norway
	sales@zyxel.no	+47-22-80-61-81		

METHOD / LOCATION	SUPPORT E-MAIL / SALES E-MAIL	TELEPHONE[A] / FAX	WEB SITE / FTP SITE	REGULAR MAIL
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SWEDEN	support@zyxel.se sales@zyxel.se	+46-31-744-7700 +46-31-744-7701	www.zyxel.se	ZyXEL Communications A/S Sjöporten 4, 41764 Göteborg Sweden
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a. "+" is the (prefix) number you enter to make an international telephone call.

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Preface

Congratulations on your purchase of the G-470 802.11g Wireless Ethernet Adapter.

Note: Register your product online to receive e-mail notices of firmware upgrades and information at www.zyxel.com for global products, or at www.us.zyxel.com for North American products.

Your ZyXEL Device is easy to install and configure. This User's Guide is designed to guide you through the configuration of your ZyXEL Device using the web configurator.

Related Documentation

- Supporting Disk

  Refer to the included CD for support documents.

- Quick Start Guide

  The Quick Start Guide is designed to help you get up and running right away. It contains hardware installation/connection information.

- ZyXEL Glossary and Web Site

  Please refer to www.zyxel.com for an online glossary of networking terms and additional support documentation.

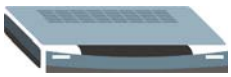
User's Guide Feedback

Help us help you. E-mail all User Guide-related comments, questions or suggestions for improvement to techwriters@zyxel.com.tw or send regular mail to The Technical Writing Team, ZyXEL Communications Corp., 6 Innovation Road II, Science-Based Industrial Park, Hsinchu, 300, Taiwan. Thank you.

Syntax Conventions

- "Enter" means for you to type one or more characters. "Select" or "Choose" means for you to use one predefined choice.
- Mouse action sequences are denoted using a comma. For example, "In Windows, click **Start**, **Settings** and then **Control Panel**" means first click the **Start** button, then point your mouse pointer to **Settings** and then click **Control Panel**.
- "e.g.," is a shorthand for "for instance", and "i.e.," means "that is" or "in other words".
- The G-470 802.11g Wireless Ethernet Adapter may be referred to as the ZyXEL Device in this user's guide.

Graphics Icons Key

Wireless Access Point 	Computer 	Notebook Computer 
Server 	Modem 	Wireless Signal 
Internet Cloud 	Printer 	

CHAPTER 1
Getting Started

This chapter introduces the ZyXEL Device and prepares you to use the Web Configurator.

1.1 About Your ZyXEL Device

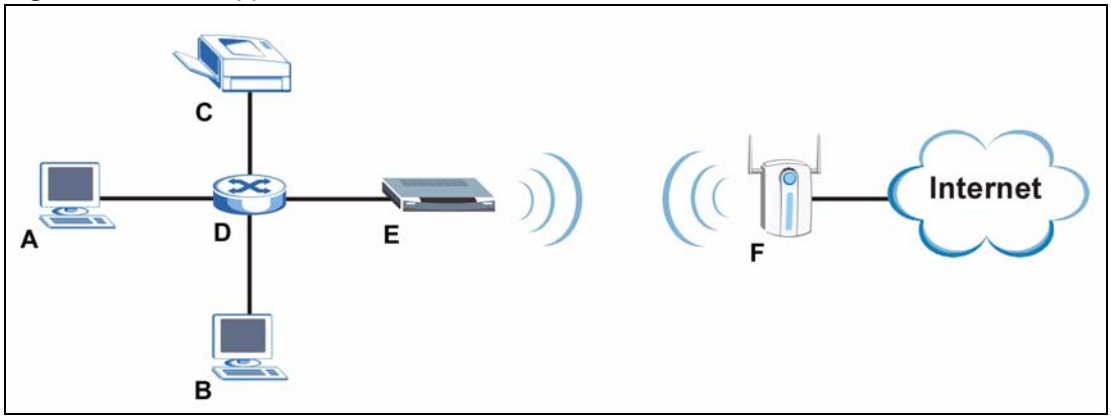
The G-470 is an IEEE 802.11g compliant wireless LAN Ethernet adapter.

It acts as a bridge between your computer and a wireless network access point (AP) as in the following diagram, where **A** is your computer, **B** is the ZyXEL Device and **C** is the access point.

Figure 1 Device application: Basic

You can also use the ZyXEL Device to connect your home or small office network to a wireless network access point (AP) as in the following diagram, where **A** and **B** are your computers, **C** is your network printer, **D** is your Ethernet switch, **E** is the ZyXEL Device and **F** is the access point. When using a switch or router, up to sixteen network devices can access the Internet through the ZyXEL Device at any one time.

Figure 2 Device Application: Home Network



With the ZyXEL Device, you can enjoy wireless mobility within the coverage area.

The following lists the main features of your ZyXEL Device. See the product specifications in the appendix for detailed features.

- Hardware

  An external antenna.

  Lights to indicate power, device status, LAN status, WLAN status and link quality.

  Easy, driver-free installation.

- Wireless LAN

  Your device can communicate with other IEEE 802.11b/g compliant wireless devices.

  Automatic data rate selection.

  Roaming capability.

- Ethernet

  A built-in RJ-45 Ethernet port that connects to any Ethernet device.

  DHCP client support.

  Power over Ethernet (PoE) support.

- Management

  The ZyXEL Device allows you to locate and configure the device from any computer on the network.

  Embedded web-based configurator.

  Firmware upgradeable.

- Security

  Offers 64-bit and 128-bit WEP (Wired Equivalent Privacy) data encryption for network security.

  Supports IEEE802.1x, Wi-Fi Protected Access (WPA) and WPA2.

  Password-protected management interface.

1.1.1 ZyXEL Device Hardware Installation

- Follow the instructions in the Quick Start Guide to make hardware connections.

Figure 3 The ZyXEL Device: Front Panel

The following table describes the front panel of the ZyXEL Device.

Table 1 The ZyXEL Device: Front Panel Lights.

LIGHT	STATUS	DESCRIPTION
POWER	The light is on.	The power is on.
	The light is off.	The power is off.
STATUS	The light is off.	The device is ready.
	The light is blinking orange.	The device is not ready, or is rebooting.
LAN	The light is on.	Ethernet is connected.
	The light is blinking.	Ethernet is connected, and is sending or receiving data.
	The light is off.	Ethernet is not connected.
WLAN	The light is on.	The device is connected to the wireless network.
	The light is blinking.	The device is scanning for an access point (AP).
	The light is off.	The device is not connected to the wireless network.
SIGNAL	The blinking frequency of the SIGNAL light indicates the quality of the wireless signal.	
	The light is steady on.	Signal strength is 80% or more.
	The light is blinking once a second.	Signal strength is between 60 and 79%.
	The light is blinking twice a second.	Signal strength is between 30 and 59%.
	The light is blinking four times a second.	Signal strength is below 29%.
	The light is off.	The wireless network is not connected.

Figure 4 The ZyXEL Device: Rear Panel

The following table describes the rear panel of the ZyXEL Device.

Table 2 The ZyXEL Device: Rear Panel Connections

LABEL	DESCRIPTION
1	External antenna connector (R-SMA type)
2	Reset button
3	ETHERNET port
4	POWER socket

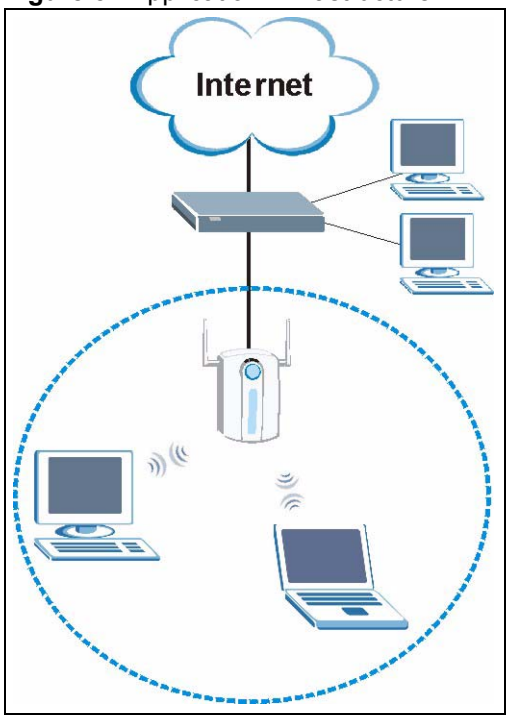
1.1.2 Application Overview

This section describes some network applications for the ZyXEL Device.

1.1.2.1 Infrastructure

Infrastructure mode allows your ZyXEL Device to connect to a network via an access point (AP). Through the AP, you can access the Internet or the wired network behind the AP.

Figure 5 Application: Infrastructure

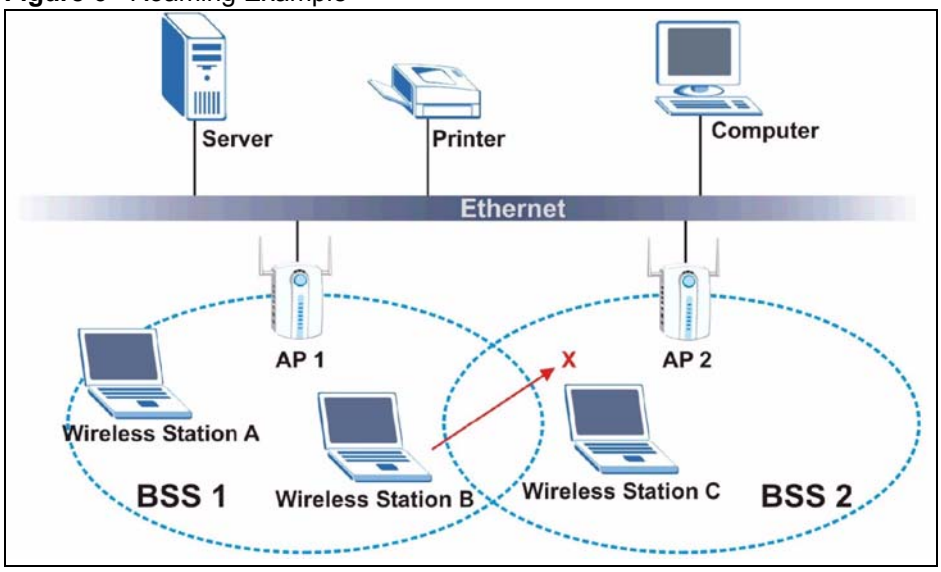


1.1.2.2 Roaming

In an infrastructure network, wireless stations are able to switch from one BSS to another as they move between the coverage areas. During this period, the wireless stations maintain uninterrupted connection to the network. This is known as roaming. As the wireless station moves from place to place, it is responsible for choosing the most appropriate AP depending on the signal strength, network utilization or other factors.

The following figure depicts a roaming example. When Wireless Station **B** moves to position **X**, its wireless device automatically switches the channel to the one used by access point **AP 2** in order to stay connected to the network.

Figure 6 Roaming Example



CHAPTER 2
Tutorial

2.1 Connecting to an Access Point

This example shows you how to connect your ZyXEL Device to an access point (AP) configured for WPA-PSK security, in order to access the Internet.

In the following diagram, your computer is labeled **A**, the ZyXEL Device is labeled **B** and the access point is labeled **C**.

2.1.1 Before You Start

Before you connect to the AP, you must know its Service Set IDentity (SSID) and WPA-PSK pre-shared key.

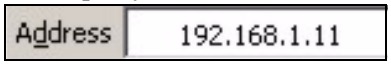
In this example, the AP's SSID is "AP6" and its pre-shared key is "ThisismyWPA-PSKpre-sharedkey".

Connect your ZyXEL Device to your computer's Ethernet port and set your computer's IP address as shown in the Quick Start Guide.

2.1.2 The Web Configurator

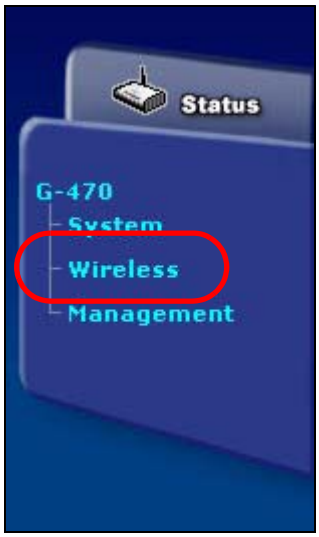
Use the following steps to set up your Internet connection using the Web Configurator.

1 Open your Internet browser and enter 192.168.1.11 in the Address (URL) bar.

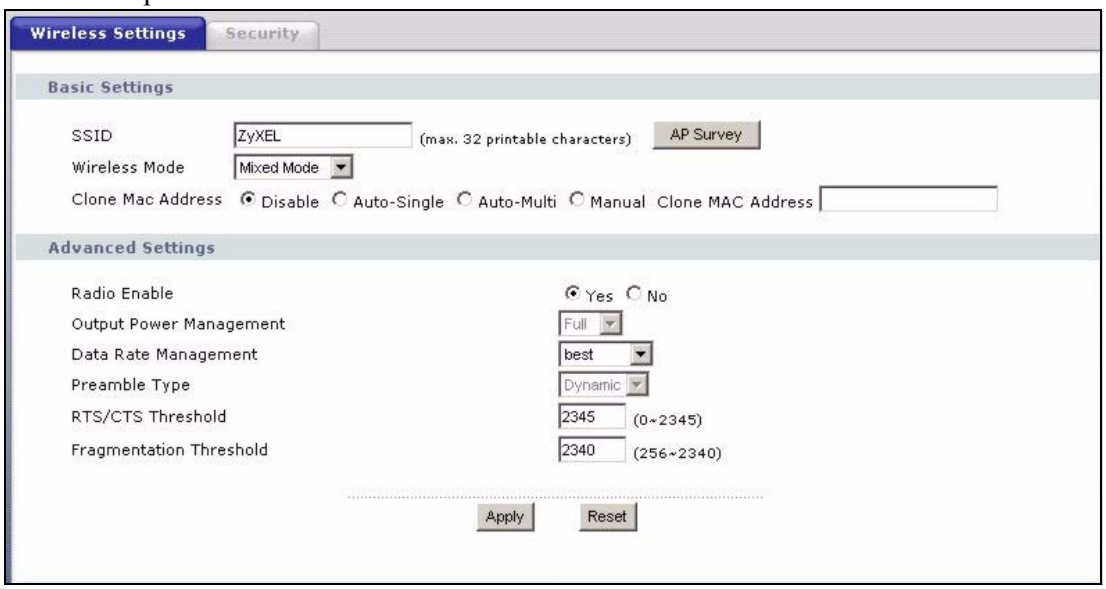


2 The **Login** screen appears. Enter **admin** as the username and **1234** as the password, then click **Login**.

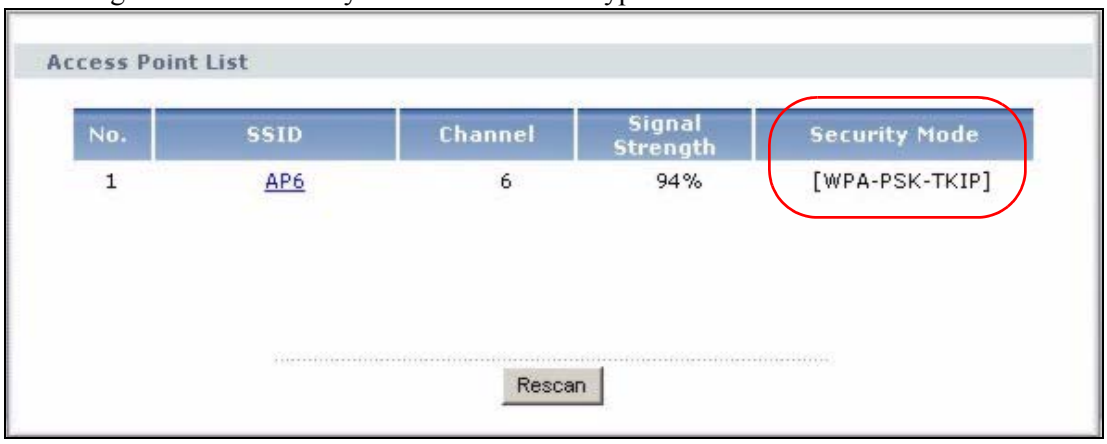
3 In the **Status** screen, click on **Wireless**.



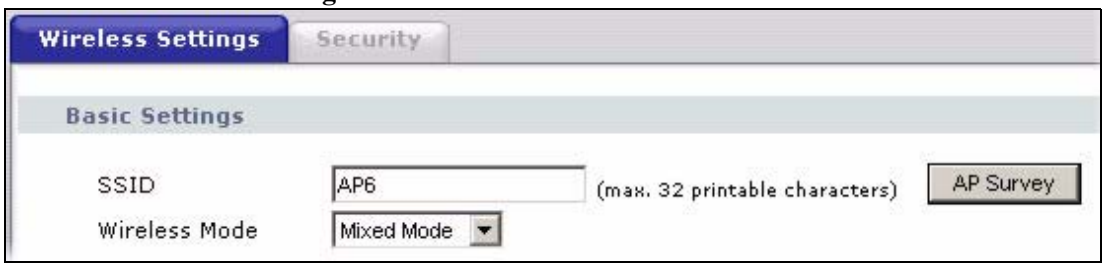
4 The **Wireless Settings** screen appears. Click **AP Survey** to search for available wireless access points.



The **Access Point List** screen displays. The **Security Mode** entry shows that AP6 is using WPA-PSK security with TKIP data encryption.



5 Click on the **AP6** entry. The **AP Survey** window closes, and the entry **AP6** now appears in the **Wireless Settings** screen's **SSID** field.

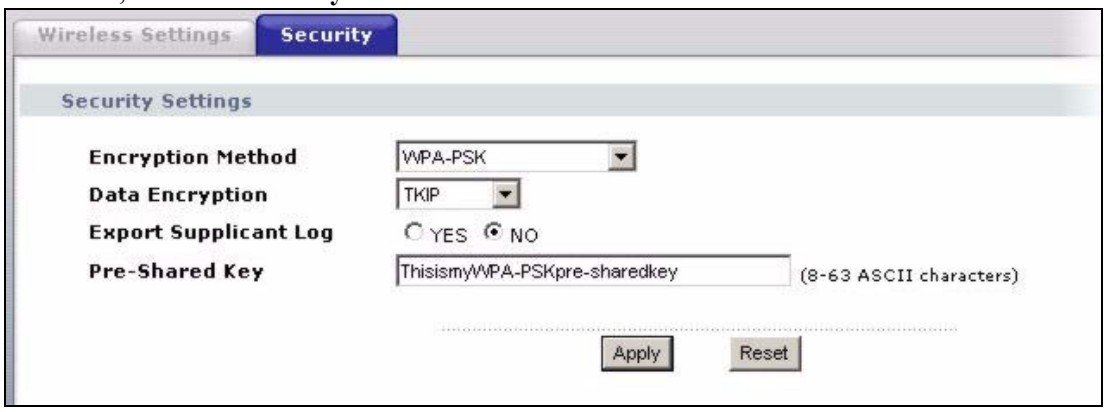


6 In the **Wireless Settings** screen's **Advanced Settings** section, ensure that **Radio Enable** is checked **Yes**.

7 Click **Apply** to save your wireless settings.

The following message appears in the **Status** bar.

8 Next, click the **Security** tab.

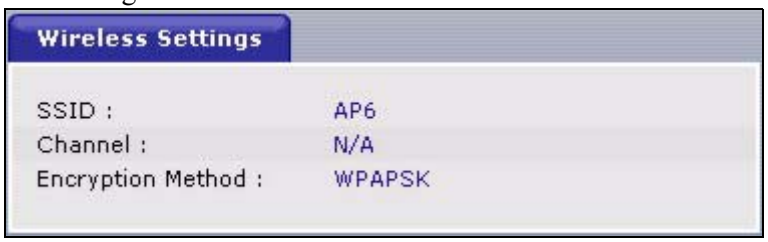


In the **Security** screen, select **WPA-PSK** from the **Encryption Method** menu. Select **TKIP** from the **Data Encryption** menu. Enter your PSK "ThisismyWPA-pre-sharedkey" in the **Pre-Shared Key** box and click **Apply**.

The following message appears in the **Status** bar.

The ZyXEL Device automatically tries to connect to the AP using your settings. The following message then appears in the **Link Status** bar.

9 Go back to the **Status** screen, and check that your wireless settings are correctly configured.



Enter a web site's URL in your Internet browser's address bar.

If you are able to access the web site, your wireless connection is successfully configured. Go back to the Web Configurator and log out ( ).

If you cannot access the web site, check the Troubleshooting section of this User's Guide or contact your network administrator.

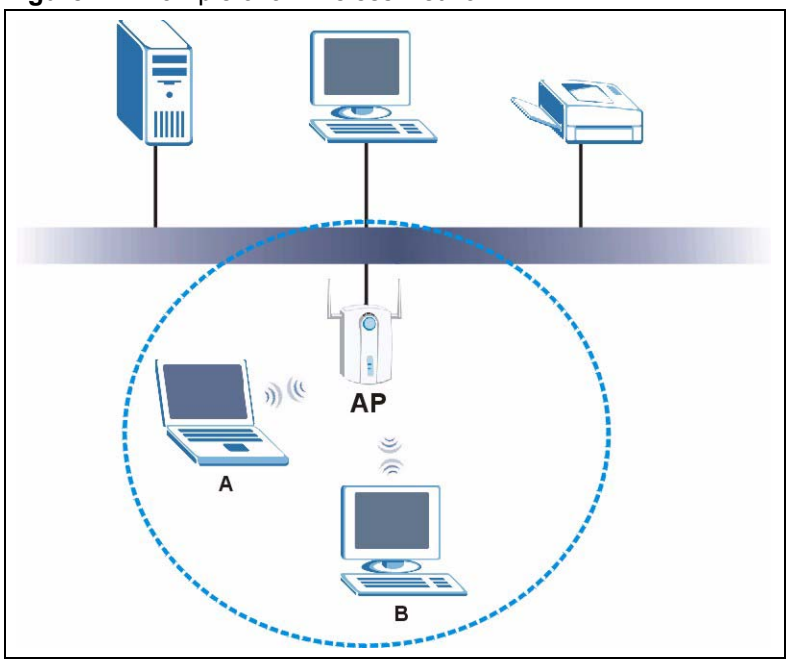
CHAPTER 3
Wireless LAN Network

This chapter provides background information on wireless LAN networks.

3.1 Wireless LAN Overview

The following figure provides an example of a wireless network with an AP.

Figure 7 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

Every wireless network must follow these basic guidelines.

- Every device 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 a different channel.

  Like radio stations or television channels, each wireless network uses a specific channel, or frequency, to send and receive information.

- Every device in the same wireless network must use security compatible with the AP or peer computer.

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

3.2 Wireless LAN Security

Wireless LAN security is vital to your network to protect wireless communications.

If you do not enable any wireless security on your ZyXEL Device, the ZyXEL Device's wireless communications are accessible to any wireless networking device that is in the coverage area. See Section 6.4 on page 61 for more information on configuring wireless security for your device.

3.2.1 User Authentication and Encryption

User authentication is when every user must log in to the wireless network before they can use it. However, every wireless client in the wireless network has to support IEEE 802.1x to do this.

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.

3.2.1.1 Certificates

Your ZyXEL Device can use certificates (also called digital IDs) for user authentication. Certificates are based on public-private key pairs. A certificate contains the certificate owner's identity and public key. Certificates provide a way to exchange public keys for use in authentication.

A Certification Authority (CA) issues certificates and guarantees the identity of each certificate owner. There are commercial certification authorities like CyberTrust or VeriSign and government certification authorities.

In public-key encryption and decryption, each host has two keys. One key is public and can be made openly available; the other key is private and must be kept secure. Public-key encryption in general works as follows.

1. Tim wants to send a private message to Jenny. Tim generates a public key pair. What is encrypted with one key can only be decrypted using the other.
2. Tim keeps the private key and makes the public key openly available.
3. Tim uses his private key to encrypt the message and sends it to Jenny.
4. Jenny receives the message and uses Tim's public key to decrypt it.

5 Additionally, Jenny uses her own private key to encrypt a message and Tim uses Jenny's public key to decrypt the message.

The certification authority uses its private key to sign certificates. Anyone can then use the certification authority's public key to verify the certificates.

3.2.1.2 WEP

3.2.1.2.1 Data Encryption

WEP (Wired Equivalent Privacy) encryption scrambles all data packets transmitted between the ZyXEL Device and the AP or other wireless stations to keep network communications private. Both the wireless stations and the access points must use the same WEP key for data encryption and decryption.

There are two ways to create WEP keys in your ZyXEL Device.

- Automatic WEP key generation based on a "password phrase" called a passphrase. The passphrase is case sensitive. You must use the same passphrase for all WLAN adapters with this feature in the same WLAN.

  For WLAN adapters without the passphrase feature, you can still take advantage of this feature by writing down the four automatically generated WEP keys from the Security Settings screen of the ZyXEL utility and entering them manually as the WEP keys in the other WLAN adapter(s).
- Enter the WEP keys manually.

  Your ZyXEL Device allows you to configure up to four 64-bit or 128-bit WEP keys. Only one key is used as the default key at any one time.

3.2.1.2.2 Authentication Type

The IEEE 802.11b/g standard describes a simple authentication method between the wireless stations and AP. Three authentication types are defined: **Auto**, **Open System** and **Shared Key**.

- Open System mode is implemented for ease-of-use and when security is not an issue. The wireless station and the AP or peer computer do not share a secret key (WEP key). Thus the wireless stations can associate with any AP or peer computer and listen to any transmitted data that is not encrypted.
- Shared Key mode involves a shared secret key (WEP key) to authenticate the wireless station to the AP or peer computer. This requires you to enable the wireless LAN security and use same settings on both the wireless station and the AP or peer computer.
- Auto authentication mode allows the ZyXEL Device to switch between the open system and shared key modes automatically. Use the auto mode if you do not know the authentication mode of the other wireless stations.

3.2.1.3 IEEE 802.1x

The IEEE 802.1x standard outlines enhanced security methods for both the authentication of wireless stations and encryption key management. Authentication can be done using an external RADIUS server.

3.2.1.3.1 EAP Authentication

EAP (Extensible Authentication Protocol) is an authentication protocol that runs on top of the IEEE 802.1x transport mechanism in order to support multiple types of user authentication. By using EAP to interact with an EAP-compatible RADIUS server, an access point helps a wireless station and a RADIUS server perform authentication.

The type of authentication you use depends on the RADIUS server and an intermediary AP(s) that supports IEEE 802.1x. The ZyXEL Device supports EAP-TLS, EAP-TTLS and EAP-PEAP. Refer to the Wireless Security appendix for descriptions.

For EAP-TLS authentication type, you must first have a wired connection to the network and obtain the certificate(s) from a certificate authority (CA). A certificate (also called a digital ID) can be used to authenticate users, and a CA issues certificates and guarantees the identity of each certificate owner.

3.2.1.4 WPA

Wi-Fi Protected Access (WPA) is a subset of the IEEE 802.11i standard.

WPA improves data encryption by using Temporal Key Integrity Protocol (TKIP), Message Integrity Check (MIC) and IEEE 802.1x. WPA and WPA2 use Advanced Encryption Standard (AES) in the Counter mode with Cipher block chaining Message authentication code Protocol (CCMP) to offer stronger encryption than TKIP.

Select WEP only when the AP does not support WPA. WEP is less secure than WPA.

3.2.1.5 WPA2

WPA 2 (IEEE 802.11i) is a wireless security standard that defines stronger encryption, authentication and key management than WPA.

CHAPTER 4
Introducing the Web Configurator

This chapter shows you how to configure the ZyXEL Device using the embedded web configurator.

4.1 Web Configurator Overview

The embedded web configurator allows you to manage the ZyXEL Device from anywhere through a browser such as Microsoft Internet Explorer or Netscape Navigator. Use Internet Explorer 6.0 and later or Netscape Navigator 7.0 and later versions with JavaScript enabled. It is recommended that you set your screen resolution to 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.
- JavaScripts (enabled by default).
- Java permissions (enabled by default).

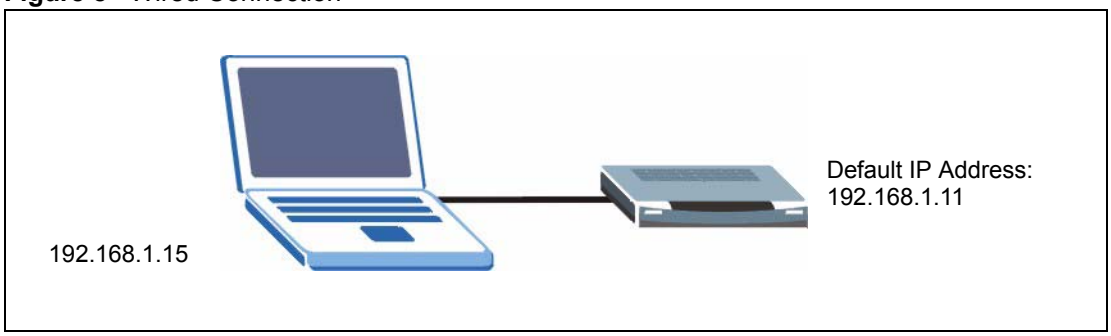
See the chapter on troubleshooting if you need to make sure these functions are allowed in Internet Explorer.

4.1.1 Setting Up Your Computer's IP Address

You must prepare your computer / computer network to connect to the ZyXEL Device. Your computer's IP address and subnet mask must be on the same subnet as the ZyXEL Device. This can be done by setting up your computer's IP address.

The following figure shows you an example of accessing your ZyXEL Device via a wired connection with an Ethernet cable.

Figure 8 Wired Connection



Note: Skip this section if your computer's IP address is already between 192.168.1.12 and 192.168.1.254 with subnet mask 255.255.255.0.

Your computer must have a network card and TCP/IP installed. TCP/IP should already be installed on computers using Windows NT/2000/XP, Macintosh OS 7 and later operating systems. Refer to the appendix about setting up your computer's IP address for other operating systems.

4.1.1.1 Windows 2000/NT/XP

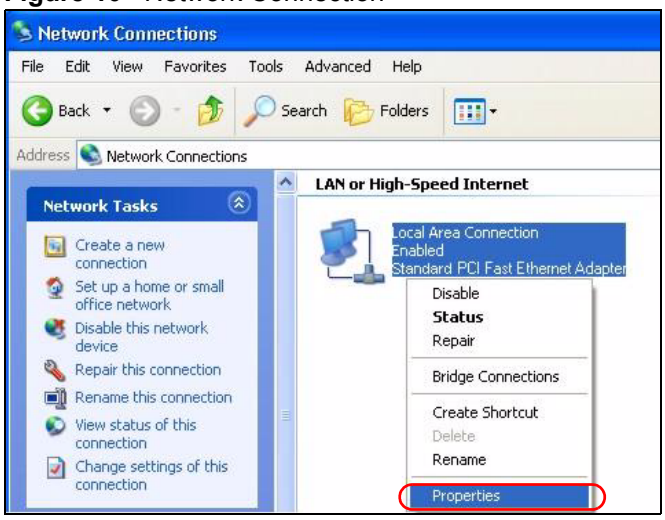
The following example figures use the default Windows XP GUI theme. For details on setting up your computer's IP address using other operating systems, refer to the appendices.

1. Click **start** (**Start** in Windows 2000/NT) > **Settings** > **Control Panel**.
2. In the **Control Panel**, double-click **Network Connections** (**Network and Dial-up Connections** in Windows 2000/NT).

Figure 9 Control Panel

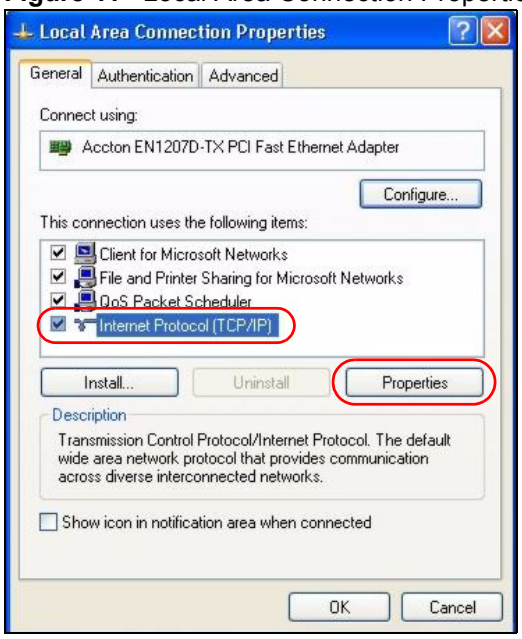
3. Right-click **Local Area Connection** and then **Properties**.

Figure 10 Network Connection



4 Select **Internet Protocol (TCP/IP)** and then click **Properties**.

Figure 11 Local Area Connection Properties

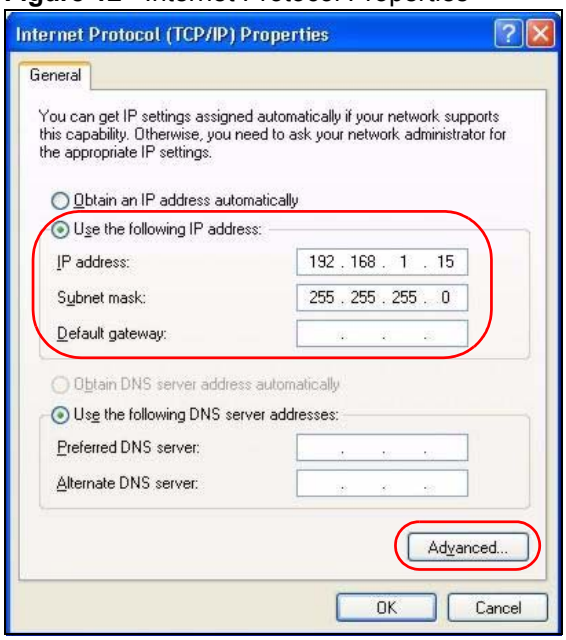


5 Select **Use the following IP Address** and fill in an **IP address** (between 192.168.1.12 and 192.168.1.254).

- Type 255.255.255.0 as the **Subnet mask**.
- Click **Advanced**[1].

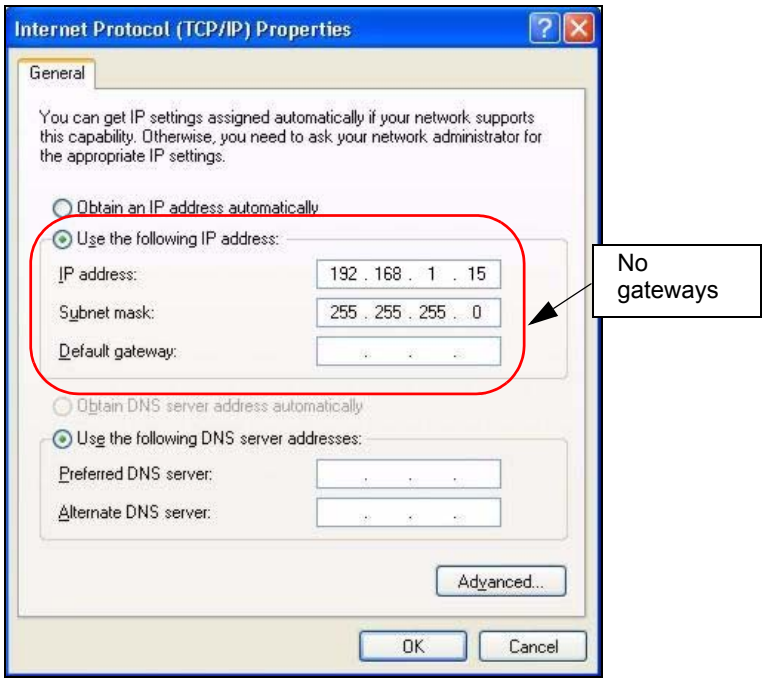
1. See the appendices for information on configuring DNS server addresses.

Figure 12 Internet Protocol Properties



6 Remove any previously installed gateways in the **IP Settings** tab and click **OK** to go back to the **Internet Protocol TCP/IP Properties** screen.

Figure 13 Advanced TCP/IP Settings



7 Click **OK** to close the **Internet Protocol (TCP/IP) Properties** window.

8 Click **Close** (**OK** in Windows 2000/NT) to close the **Local Area Connection Properties** window.

Close the **Network Connections** window (**Network and Dial-up Connections** in Windows 2000/NT).

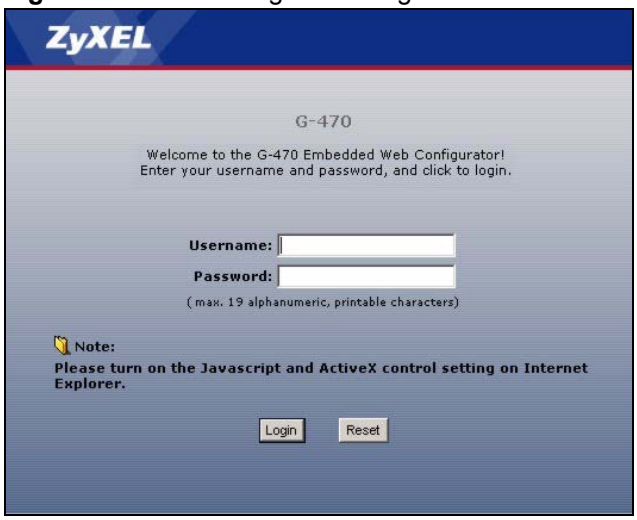
4.2 Accessing the Web Configurator

Follow the steps below to access the web configurator using a web browser.

1. Make sure your ZyXEL Device is properly connected and prepare your computer/ network to connect to the G-470.
2. Launch your web browser.
3. Type http://192.168.1.11 (default) as the URL and press [ENTER].

4. A login screen displays as shown.

Figure 14 Web Configurator: Login Screen



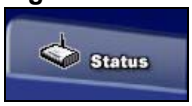
5. Enter **admin** (default) as the username and **1234** (default) as the password and click **Login**.

The **Status** screen displays.

4.2.1 The Status Screen

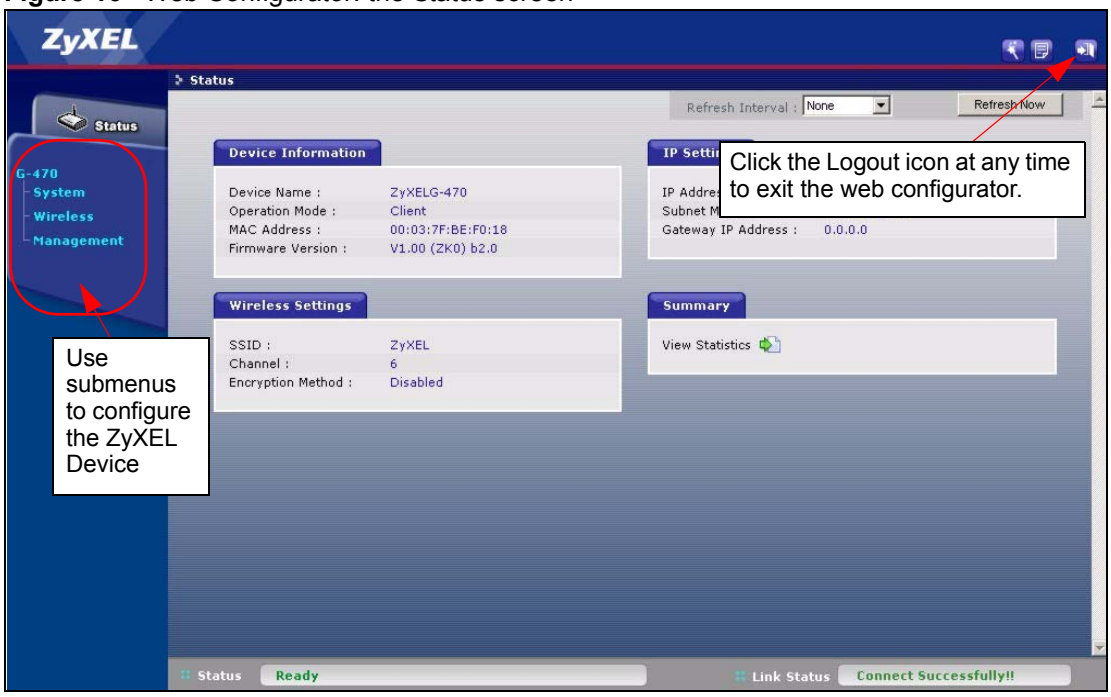
The **Status** screen displays every time you access the web configurator and can also be accessed by clicking on the **Status** icon. The Status screen displays a snapshot of your device's settings. You can also view network statistics and a list of wireless stations currently associated with your device. Note that these labels are READ-ONLY and are meant to be used for diagnostic purposes.

Figure 15 Web Configurator: the Status icon



This screen shows the current configuration of your ZyXEL Device.

Figure 16 Web Configurator: the Status screen



The following table describes the labels in this screen.

Table 3 Web Configurator: the Status screen

LINK/ICON		FUNCTION
Wizard		Use these screens for initial configuration including general setup, wireless and security settings.
About		Click this icon to see details about your ZyXEL Device.
Logout		Click this icon to exit the web configurator.
Status		Use this screen to look at the ZyXEL Device's general device, system and interface status information.
System		Use this screen to change the name of the device and change IP address settings.
Wireless	Wireless Settings	Use this screen to check for available access points and configure basic and advanced wireless network setup.
	Security	Use this screen to configure encryption settings.
Management	Password	Use this screen to change your password.
	Configuration File	Use this screen to backup and restore configuration files and reset the ZyXEL Device to its factory default settings.
	F/W Upload	Use this screen to upload new firmware.
Device Information	Device Name	This is the same as the device name you entered in the first wizard screen if you entered one there. It is for identification purposes.

LINK/ICON		FUNCTION
	MAC Address	This field displays the MAC address of the device. The MAC (Media Access Control) or Ethernet address on a LAN (Local Area Network) is unique to your computer. A network interface device such as an Ethernet adapter has a hardwired address that is assigned at the factory. This address follows an industry standard that ensures no other adapter has a similar address.
	Firmware Version	This is the ZyNOS Firmware version and the date created. ZyNOS is ZyXEL's proprietary Network Operating System design.
Wireless Settings	SSID	This is the name used to identify the ZyXEL Device in the wireless LAN. The default SSID is "ZyXEL".
	Channel	This is the channel number used by the ZyXEL Device now.
	Encryption Method	This displays the type of wireless security used by the ZyXEL Device now.
IP Settings	IP Address	This field displays the IP address of the device.
	Subnet Mask	This field displays the subnet mask of the device.
	Gateway IP Address	This field displays the IP address of the gateway device.
Summary	View Statistics	Click **View Statistics** to see performance statistics such as number of packets sent and number of packets received.
Status		This field shows messages about the ZyXEL Device's current condition.
Link Status		This field shows messages about the quality of the ZyXEL Device's wireless connection.
Refresh Interval		Use the drop-down list box to select how often you want the device to renew the information on this screen.
Refresh Now		Click this button to have the device renew the information on this screen.

4.3 Navigating the Web Configurator

The following section summarizes how to navigate the web configurator from the **Status** screen.

4.3.1 Change Your Password

After you log in for the first time, it is strongly recommended that you change the default administrator password.

Click **Management** on the left of the **Status** screen to access the following screen.

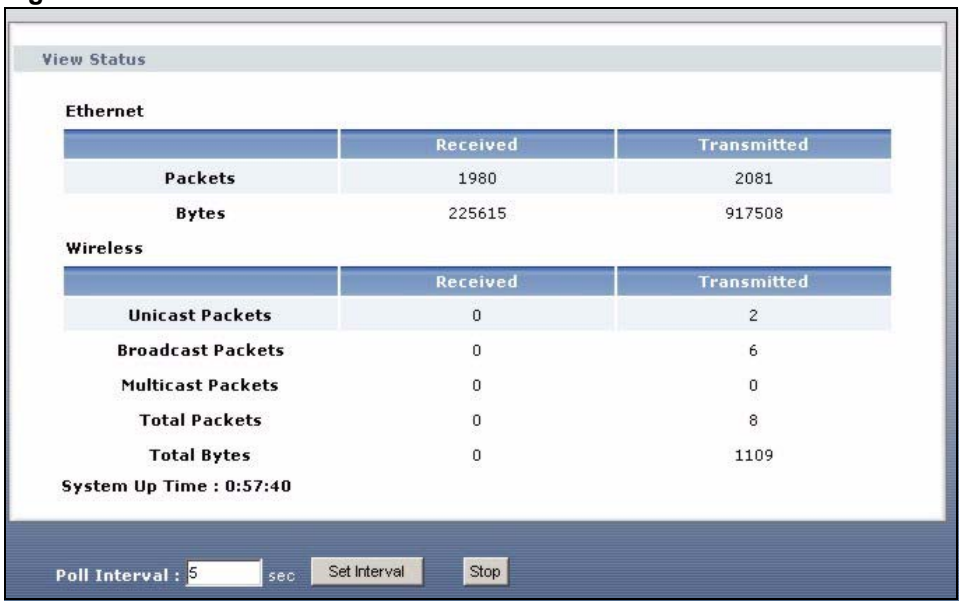
Figure 17 Web Configurator: Change Administrator Login Password

Enter a new password between 1 and 19 characters, retype it to confirm and click **Apply**. Click on **Reset** to clear all fields.

4.3.2 Statistics

Click **View Statistics** in the **Status** screen. This screen displays read-only information including port status and packet specific statistics. Also provided are "system up time" and "poll interval". The **Poll Interval** field is configurable.

Figure 18 View Statistics



The following table describes the labels in this screen.

Table 4 Status: View Statistics

LABEL	DESCRIPTION
Ethernet	
Packets	This row displays the numbers of packets received and transmitted by the Ethernet port.

Table 4 Status: View Statistics

LABEL		DESCRIPTION
Bytes		This row displays the numbers of bytes received and transmitted by the Ethernet port.
Wireless		
	Unicast Packets	This row displays the numbers of unicast packets received and transmitted by the wireless adapter.
	Broadcast Packets	This row displays the numbers of broadcast packets received and transmitted by the wireless adapter.
	Multicast Packets	This row displays the numbers of multicast packets received and transmitted by the wireless adapter.
	Total Packets	This row displays the numbers of all types of packets received and transmitted by the wireless adapter.
	Total Bytes	This row displays the numbers of bytes received and transmitted by the wireless adapter.
System Up Time		This is the total time the device has been on.
Poll Interval(s)		Enter the time interval for refreshing statistics.
Set Interval		Click this button to apply the new poll interval you entered above.
Stop		Click this button to stop refreshing statistics.

4.4 Configuring the ZyXEL Device Using the Wizard

The wizard consists of a series of screens to help you configure your ZyXEL Device to access the wireless network.

Use the following buttons to navigate the Wizard:

Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue to the next screen.

No configuration changes will be saved to the ZyXEL Device until you click **Finish**.

4.4.1 Wizard: Basic Settings

Click on the **Wizard** icon in the **Status** screen to start the setup wizard (). The **Basic Settings** screen appears.

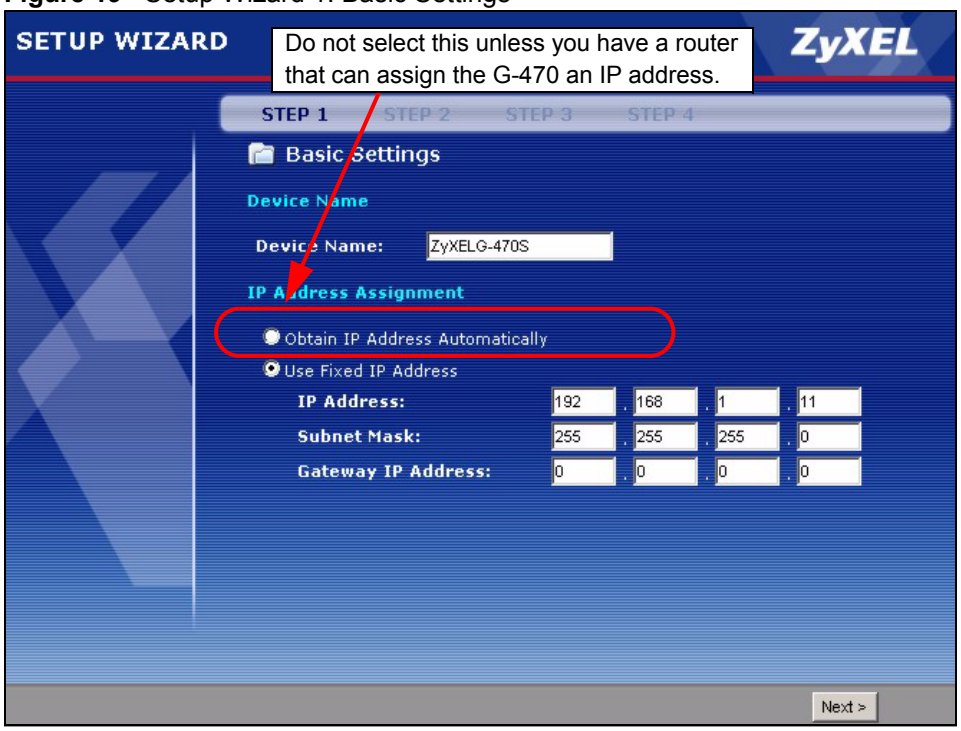
1. Enter a descriptive name to identify the device in the Ethernet network.
2. Select **Obtain IP Address Automatically** only if you want to put the device behind a router that assigns an IP address.

Warning: If you select **Obtain IP Address Automatically** you will not be able to access the ZyXEL Device through the Web Configurator unless you have a router that assigns an IP address. If you select this by mistake, use the **RESET** button to restore the factory default IP address.

3 Select **Use fixed IP Address** to give the device a static IP address. The IP address you configure here is used for management of the device (accessing the web configurator).

4 Enter a **Subnet Mask** appropriate to your network and the **Gateway IP Address** of the neighboring device, if you know it. If you do not, leave the **Gateway IP Address** field as **0.0.0.0**.

Figure 19 Setup Wizard 1: Basic Settings



Click **Next** to continue.

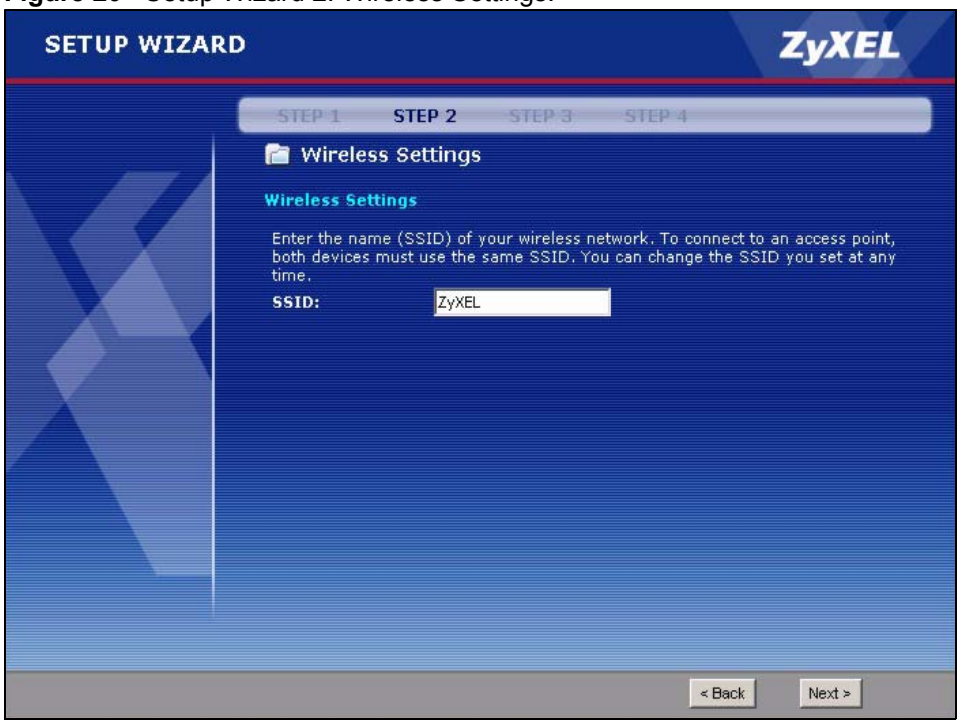
4.4.2 Wizard: Wireless Settings

Use this wizard screen to set up the wireless LAN. See the chapter on the wireless screens for background information.

1 The SSID is a unique name to identify the device in a wireless network. Enter up to 32 printable characters. Spaces are allowed. If you change the SSID on the device, make sure all wireless stations use the same SSID in order to access the network.

Note: The wireless AP and your ZyXEL Device must use the same SSID, channel and wireless security settings for wireless communication.

Figure 20 Setup Wizard 2: Wireless Settings.



Click **Next** to continue, or **Back** to return to the **Basic Settings** screen.

4.4.3 Wizard: Security Settings

Use this screen to configure security for your wireless LAN connection. The screen varies depending on what you select in the **Encryption Method** field. Select **Disable** to have no wireless security configured, select **WEP,** or select **WPA-PSK** if your wireless AP supports WPA-PSK.

In the **Status** page, go to **Wireless > Security** if you want to use WPA2, WPA or 802.1x. See Chapter 6 on page 55 for background information.

4.4.3.1 Disable

Select **Disable** to have no wireless LAN security configured. If you do not enable any wireless security on your device, your network is accessible to any wireless networking device that is within range.

Note: With no wireless security a neighbor can access and see traffic in your network.

Figure 21 Setup Wizard 3: Disable

4.4.3.2 WEP

1 WEP (Wired Equivalent Privacy) encrypts data frames before transmitting them over the wireless network. Select **64-bit** or **128-bit** from the **WEP Encryption** drop-down list box and then follow the on-screen instructions to set up the WEP keys.

2 Choose an encryption level from the drop-down list. The higher the WEP encryption, the higher the security but the slower the throughput.

3 You can generate or manually enter a WEP key.

- If you selected 64-bit or 128-bit WEP, you can enter a **Passphrase** (up to 16 printable characters) and click **Generate**. The device automatically generates WEP keys. One key displays in the **Key 1** field. Go to **Wireless** > **Security** if you want to see the other WEP keys.

  or

- Enter a manual key in the **Key 1** field.

Figure 22 Wizard 3: WEP

4.4.3.3 WPA-PSK

Select **WPA-PSK** only if your wireless AP supports it.

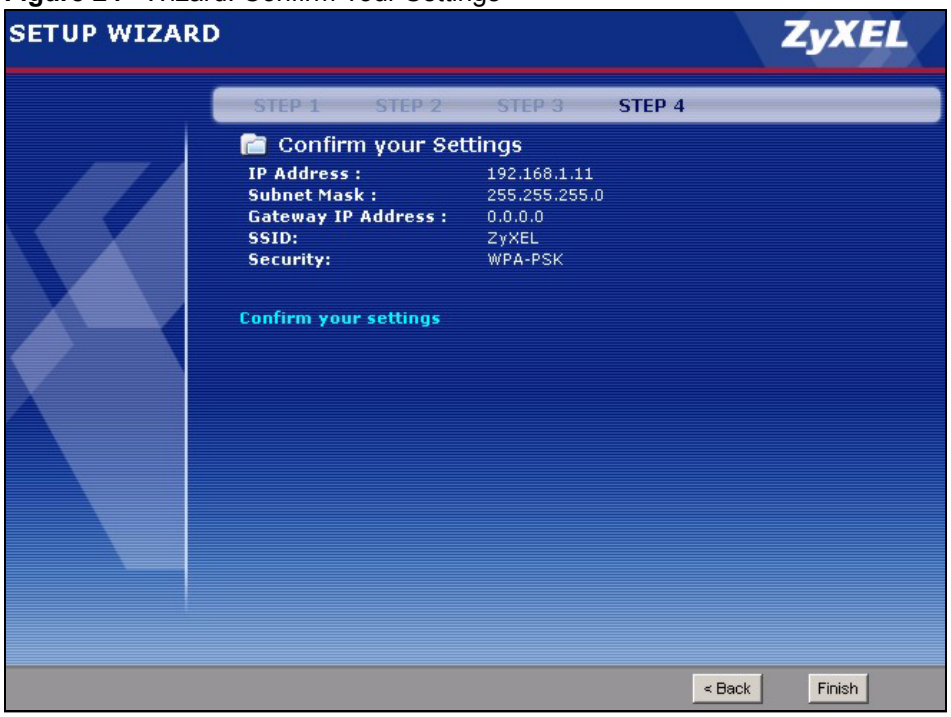
Type a pre-shared key from 8 to 63 ASCII characters (including spaces and symbols). This field is case-sensitive.

Figure 23 Wizard 3: WPA(2)-PSK

4.4.4 Wizard: Confirm Your Settings

This read-only screen shows the status of the current settings. Use the summary table to check whether what you have configured is correct. Click **Finish** to complete the wizard configuration and save your settings.

Figure 24 Wizard: Confirm Your Settings



4.5 Using the AP Survey tool

To scan for available wireless access points in your network, click **AP Survey** in the **Wireless** screen. Wait for the scan process to complete. A screen displays showing the scan results. Click on an entry in the **SSID** column to select that device for the **Basic Settings SSID** field in your **Wireless** page. See Section 6.3.1 on page 60 for more information on using the AP Survey screen.

4.6 Resetting the ZyXEL Device

If you forget your password or cannot access the ZyXEL Device you will need to reset the ZyXEL Device to the factory defaults. This means that you will lose all configurations that you had previously saved. The username will be reset to **admin** and the password to **1234**.

4.6.1 Restoring Factory Defaults

You can erase the current configuration and restore factory defaults in two ways:

- Use the RESET button on the ZyXEL Device to reset to the factory defaults. Use this method for cases when the password or IP address of the ZyXEL Device is not known.
- Use the web configurator to restore defaults.

4.6.1.1 Using the RESET Button

Make sure the POWER light is steady on.

1. Press the RESET button for about 10 seconds, then release it and press the button in once.
2. If the POWER light begins to blink, the defaults have been restored and the ZyXEL Device restarts.

Wait for the ZyXEL Device to finish restarting before accessing it again.

CHAPTER 5
System Screen

This chapter provides information on the **System** screen.

5.1 TCP/IP Parameters

5.1.1 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 5 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.

Note: 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.

5.1.2 IP Address and Subnet Mask

Similar to the way houses on a street share a common street name, 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 (in this case, 192, 168 and 1) specify the network number while the last number identifies an individual computer on that network.

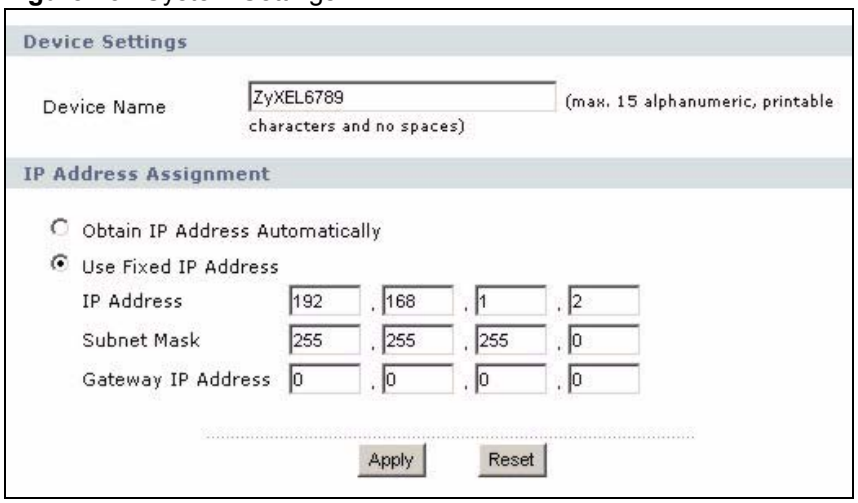
Once you have decided on the network number, pick an IP address that is easy to remember, for instance, 192.168.1.2, for your device, but make sure that no other device on your network is using that IP address.

The subnet mask specifies the network number portion of an IP address. Your device 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 device unless you are instructed to do otherwise.

5.2 System Settings

Click **System** to open the **System Settings** screen.

Figure 25 System Settings



The following table describes the labels in this screen.

Table 6 System Settings

LABEL	DESCRIPTION
Device Name	This name can be up to 15 printable characters long. Spaces are allowed.
IP Address Assignment	

Table 6 System Settings

LABEL	DESCRIPTION
Obtain IP Address Automatically	Select this option to have your device use a dynamically assigned IP address from a router each time. **Warning:** If you select **Obtain IP Address Automatically** you will not be able to access the ZyXEL Device through the Web Configurator unless you have a router that assigns an IP address. If you select this by mistake, use the **RESET** button to restore the factory default IP address.
Use fixed IP address	Select this option to have your device use a static IP address. When you select this option, fill in the fields below.
IP Address	Enter the IP address of your device in dotted decimal notation.
Subnet Mask	Enter the subnet mask.
Gateway IP Address	Type the IP address of the gateway. The gateway is a router or switch on the same network segment as the device. The gateway helps forward packets to their destinations. Leave this field as **0.0.0.0** if you do not know it.
Apply	Click **Apply** to save your changes to the device. The ZyXEL Device will restart using the new settings and you will need to log in again. **Note:** If you have changed the IP address, you will need to use the new address to log in to the ZyXEL Device.
Reset	Click **Reset** to clear any unsaved changes to this screen.