# Prestige 2000W

VoIP Wi-Fi Phone

## User's Guide

Version WJ.00.10 3/2005



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#### Notice 1

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- **2** Select the certification you wish to view from this page.

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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.
- Use ONLY the dedicated power supply for your device. Connect the power cord or power adaptor to the right supply voltage (110V AC in North America or 230V AC in Europe).
- Do NOT use the device if the power supply is damaged as it might cause electrocution.
- If the power supply is damaged, remove it from the power outlet.
- Do NOT attempt to repair the power supply. Contact your local vendor to order a new power supply.
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## **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.

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	sales@zyxel.com.tw	+886-3-578-2439	ftp.zyxel.com ftp.europe.zyxel.com	Science Park Hsinchu 300 Taiwan	
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a. "+" is the (prefix) number you enter to make an international telephone call.

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## Preface

#### **About Your Prestige**

Congratulations on your purchase of the Prestige 2000W VoIP Wi-Fi Phone.

#### **About This User's Manual**

This manual is designed to provide background information on some of the Prestige's features.

**Note:** You may use the keypad and the LCD screen menus or the web configurator to configure your Prestige.

#### **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. They contain connection information and instructions on getting started.

• ZyXEL Glossary and Web Site

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

#### Syntax Conventions

"Enter" means for you to type one or more characters and press the carriage return. "Select" or "Choose" means for you to use one of the predefined choices.

The choices of a menu item are in **Bold Arial** font.

A single keystroke is in Arial font and enclosed in square brackets, for instance, [ENTER] means the Enter, or carriage return, key; [ESC] means the escape key and [SPACE BAR] means the space bar. [UP] and [DOWN] are the up and down arrow keys.

Mouse action sequences are denoted using a comma. For example, "click the Apple icon, **Control Panels** and then **Modem**" means first click the Apple icon, then point your mouse pointer to **Control Panels** and then click **Modem**.

For brevity's sake, we will use "e.g." as a shorthand for "for instance" and "i.e." for "that is" or "in other words" throughout this manual.

#### **User 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.

#### **Graphics Icons Key**

Prestige	Computer	Notebook Computer
Server	Switch	Router
Telephone	Trunking Gateway	Wireless Signal
		シ

# CHAPTER 1 Getting To Know Your Prestige

This chapter describes the key features and applications of your Prestige.

The Prestige 2000W is a wireless telephone that operates over the Internet. It gives users the benefits of Internet telephony, for example cheaper calls, without the physical restrictions of a fixed Internet connection (it provides mobility).

Sending compressed voice signals over the Internet is called Voice over IP or VoIP. The Prestige is a Session Initiated Protocol (SIP) - based wireless VoIP telephone. SIP is an internationally recognized standard for implementing VoIP.

The Prestige allows you to make and receive VoIP calls as long you are within range of an IEEE802.11b enabled wireless network.

The Prestige is easy to use and configure via the LCD display and keypad. You can even manage your settings over the Internet using the Prestige's web configurator.

### 1.1 Features

#### **Dynamic Jitter Buffer**

The Prestige has a built-in adaptive, buffer that helps to smooth out the variations in delay (jitter) for voice traffic. This helps ensure good voice quality for your conversations.

#### QoS (Quality of Service)

Quality of Service (QoS) mechanisms help to provide better service on a per-flow basis. The Prestige supports Type of Service (ToS) and Differentiated Services (DiffServ). This allows the Prestige to tag voice frames so they can be prioritized over the network.

#### **Comfort Noise Generation**

Background noise is generated for a more natural and continuous telephone connection.

#### Auto-provisioning

Auto-provisioning automatically updates your Prestige's configurable settings via a HTTP server.

#### **Software Upgrades**

Use the Web Configurator to upload updated software to your Prestige.

#### STUN

Simple Traversal of User Datagram Protocol (UDP) through Network Address Translators (STUN) allows SIP to pass through NAT routers.

#### **Outbound Proxy**

Some VoIP service providers use a SIP outbound server to handle voice calls. This allows the Prestige to work from behind any type of NAT router and eliminates the need for STUN or a SIP ALG (Application Layer Gateway).

#### **Voice Coding**

The Prestige can use the following voice codecs (coder/decoders).

- G.711
- G.729

#### Voice Activity Detection/Silence Suppression

Voice Activity Detection (VAD) reduces the bandwidth that a call uses by not transmitting "silent packets" when you are not speaking. This also helps increase the battery lifetime.

#### **Comfort Noise Generation**

When the Prestige uses VAD, it generates and sends comfort (background) noise when you are not speaking.

#### PPPoE

PPPoE (Point-to-Point Protocol over Ethernet) facilitates the interaction of a host with an Internet modem to achieve access to high-speed data networks via a familiar "dial-up networking" user interface.

#### **Firmware Upgrades**

Use the web configurator to upload updated firmware to your Prestige.

## **1.2 Applications**

Here are some examples of how you can use your Prestige.

### 1.2.1 Place a Call via "SIP Proxy Server" (SIP Call Server)

When you have a (IEEE 802.11b) wireless connection to the Internet, you can use the Prestige to make and receive VoIP telephone calls through an Internet Telephony Service Provider's (ITSP) call server.

You don't need to know if the recipient's connection type is an IP, cellular or landline based service. Your Prestige can call any landline or mobile telephone that a traditional PSTN telephone can connect to as well the IP telephone network. Calls received from IP telephones works exactly as you would expect from the traditional telephone service.





The Prestige registers with a SIP proxy server in the following circumstances:

- Your connection uses an IP Telephony Service.
- Your connection is based in a corporate VoIP environment.

### 1.2.2 Direct IP to IP Calling

Use the Prestige to make a call direct to the recipients IP address without using a SIP proxy server.

Figure 2 IP to IP Calling



### 1.2.3 Ad-Hoc (Wireless Intercom)

Ad-hoc mode does not require an AP or a wired network. Two or more wireless clients communicate directly with each other.

- There is no intermediate SIP proxy server
- Use the phone book to directly call to the recipient's IP address.
- The wireless mode is set to "Ad-hoc", with the same SSID and channel

Figure 3 Ad-Hoc Mode



# CHAPTER 2 Using the LCD Screen Menus

This section introduces the Prestige's LCD screen menu system.

**Note:** See the web configurator section of this guide for background information on the Prestige's features.

## 2.1 LCD Main Screen

The Prestige initializes after you turn it on.

Figure 4 Initialization

Initializing.... >>Please Wait!<<

The main screen displays after initialization. Hold down the # key for two seconds if the keypad is locked.

Figure 5 LCD Main Screen



 Table 1
 LCD Main Screen

LABEL	DESCRIPTION
¶.utl	This icon shows the strength of the wireless LAN signal.
12:00	The time displays in the top center.
	This icon shows the battery's current charge.

LABEL	DESCRIPTION
Not registered/ Registered	This the Prestige's current connection status. <b>Not registered</b> displays before the menu settings are properly configured and the Prestige connects to the SIP proxy server.
	<b>Registered</b> displays after the menu settings are properly configured and the Prestige connects to the SIP proxy server (the settings may have already been configured for you).
Menu	This is the function of the <b>Left</b> key. Press the <b>Left</b> key from the main screen to open the menus.
Names	This is the function of the <b>Right</b> key. Press the <b>Right</b> key from the main screen to open the phonebook.

 Table 1
 LCD Main Screen

## 2.2 Keypad and Front Panel

The following figure and table describe the Prestige's keypad and front panel.



#### Table 2 Front Panel

NAME	DESCRIPTION
Left key	Use the Left key to select on-screen menu options.
Right key	Use the <b>Right</b> key to return to the previous menu. You can also use this key as a shortcut to the Prestige's built-in phone book.
Arrow keys	Use the arrow keys to navigate between menus and move the cursor. Use the left arrow key to clear text in an editable field.
Off/On	Use the <b>Off/On</b> key to reject or cancel calls. Press and hold it for approximately 2 seconds to turn the Prestige on or off.
Call	Use the <b>Call</b> key to make and receive calls.
1~#	Use the numerical keypad to enter numbers and characters.

## 2.3 Navigating the LCD Screen Menus

Press the Left button to enter the menus.

After you enter the menus, use the Up or Down arrow keys to scroll through the menu items.

Figure 7 LCD Screen Menu Navigation



- Press the Left key to access the selected menu item.
- Press the **Right** key to return to the previous screen.

**Note:** The Prestige restarts when you return to the main screen after configuring the wireless LAN, network or SIP settings.

#### 2.3.1 Text Input

Figure 8 Text Input

WEP	key 1	
*****	****	
Ok	Aa1@	Clear

- When you need to enter text or numbers in a screen, use the **Off** key to clear the default text or backspace.
- Use the up and down arrows to select the type of characters (capital letters, lower-case letters, numbers or symbols).

# CHAPTER 3 **Wireless LAN Setup Menus**

First you need to associate your Prestige with a Wireless LAN Access Point (AP). This provides your Prestige with the basic services for communication.

When you turn the Prestige on, it searches for available wireless LAN Access Points (APs). It selects the AP with the best signal and restarts and attempts to connect to it.

Use the following sections if you want to enter a WEP key or manually specify other wireless settings.

## 3.1 Site Survey

Do the following to browse the APs available in your area and select one.

1	Select <b>Wireless</b> in the first menu screen (use the up or down arrow to highlight it and then press the <b>Left</b> key).	7. Wireless 8. Restart 1. Information	
		Select	Back
2	Select Site Survey.	1. Site Survey	
3	The Prestige checks for and displays a list of available APs.	2. SSID 3. Network Mode	
		Select	Back
4	An AP's SSID is followed by a number describing its relative	AP1 99	
	signal strength. The higher the number, the better the signal. Select an AP to use.	AP2 90 AP3 85	
		Select	Back

### 3.2 Channel

A radio frequency used by a wireless device is called a channel. The Prestige determines which channel to use when you do the site survey and select the AP. Do the following to display the channel that the Prestige is using.

- 1 Select Wireless in the first menu screen (use the up or down arrow to highlight it and then press the Left key).
- 2 Select Channel.
- **3** The Prestige displays the channel that it is currently using.

7. Wireless	
8. Restart	
1. Information	
Select	Back
4. Channel	
5. Rate	
6 WEP Select	
Select	Back
Channel	
6	
ОК	Back

### 3.3 Rate

Do the following to set the transfer rate of the Prestige's wireless connection to the AP.

1	Select <b>Wireless</b> in the first menu screen (use the up or down arrow to highlight it and then press the <b>Left</b> key).	7. Wireless 8. Restart 1. Information	
		Select	Back
2	Select Rate.	5. Rate	
		6. WEP Select 7. Profiles	
		Select	Back
3	Select <b>Auto</b> to have the Prestige automatically use the highest	[1] Auto	
	Select another rate to have the Prestige connect to the AP at only that rate.	[2] 1M [3] 2M	
		Select	Back

## 3.4 WEP Encryption

WEP (Wired Equivalent Privacy) encryption scrambles all communications transmitted between the Prestige and the AP to keep them private.

1 Select Wireless in the first menu screen (use the up or down	7. Wireless	
arrow to highlight it and then press the Leit key).	8. Restart 1. Information	
	Select	Back
<b>2</b> Use the up or down arrow and the <b>Left</b> key to select <b>WEP</b>	6. WEP Select	
Select.	7. Profiles 8. Auth Type	
	Select	Back
<b>3</b> Select the same length of WEP keys as the AP (64-bit or 128-	[1] None	
bit).	[2] 64bit [3] 128bit	
	Select	Back
<b>4</b> Select a WEP key to configure.	7. WEP key 1	
	8. WEP key 2 9. WEP key 3	
	Select	Back
<b>5</b> The WEP key must be the same as on the AP. Use the left arrow button to clear the default text. Use the up and down arrows to	WEP key 1 *******	
<ul> <li>select the type of characters. Enter the WEP key.</li> <li>If you chose 64-bit WEP, then enter 5 ASCII characters or 10 hexadecimal characters ("0-9", "A-F").</li> <li>If you chose 128-bit WEP, then enter 13 ASCII characters or 26 hexadecimal characters ("0-9", "A-F").</li> <li>Use the Left key to select Ok when you are done.</li> </ul>	Ok Aa1@	Clear
<b>6</b> You can configure up to four WEP keys (in the same manner as the first) but only one key can be selected (enabled) at any one time.	8. WEP key 2 9. WEP key 3 10. WEP key 4	
	Select	Back

7 Select Key Select.

**8** Select the key that the AP is using.

11. Key Select	
12. Profiles	
13. Auth Type	
Select	Back
Kev 1	
Kan 0	
Key 2	
Key 3	
Select	Back

## 3.5 Authentication Type

Some APs require the wireless clients to send the WEP key to the AP for authentication.

**Note:** Only set the authentication type to shared key if the wireless clients are required to send the WEP key to the AP for authentication (not just for encryption). Many networks use an open system where you would only use WEP for encryption, not for authentication.

1	Select <b>Wireless</b> in the first menu screen (use the up or down arrow to highlight it and then press the <b>Left</b> key).	7. Wireless 8. Restart 1. Information	
		Select	Back
2	Use the up or down arrow and the <b>Left</b> key to select <b>Auth</b>	8. Auth Type	
	Туре.	1. Site Survey 2. SSID	
		Select	Back
3	Select Shared Key if the wireless clients need to send the WEP	[2] Shared Key	
	key to the AP for authentication.	[1] Open System	
	Select <b>Open System</b> if the wireless clients do not need to send the WEP key to the AP for authentication.	Select	Back
4	The Prestige restarts when you return to the main screen.		

## 3.6 Profiles

Use a profile to save your wireless settings for future use.

1 Select Wireless in the first menu screen (use the up or down arrow to highlight it and then press the Left key).	7. Wireless 8. Restart 1. Information	
	Select	Back
<b>2</b> Use the up or down arrow and the <b>Left</b> key to select <b>Profiles</b> .	7. Profiles	
	8. Auth Type	
	1. Site Survey	
	Select	Back
2 Salast Create to make a new profile		
Select Create to make a new prome.	1. Create	
Select Activate to use an existing profile.	1. Create 2. Activate	
Select <b>Activate</b> to use an existing profile. Select <b>Remove</b> to delete a profile.	<ol> <li>Create</li> <li>Activate</li> <li>Remove</li> </ol>	
Select <b>Activate</b> to use an existing profile. Select <b>Remove</b> to delete a profile.	1. Create 2. Activate 3. Remove Select	Back
<ul> <li>Select Create to make a new prome. Select Activate to use an existing profile. Select Remove to delete a profile.</li> <li>4 When creating a profile, select a number for the profile and</li> </ul>	1. Create2. Activate3. RemoveSelect1:	Back
<ul> <li>Select Create to make a new prome. Select Activate to use an existing profile. Select Remove to delete a profile.</li> <li>4 When creating a profile, select a number for the profile and press the Left key. The profile uses the name of the AP that you are using</li> </ul>	1. Create 2. Activate 3. Remove Select 1: 2: AP 1	Back
<ul> <li>Select Create to make a new profile. Select Activate to use an existing profile. Select Remove to delete a profile.</li> <li>4 When creating a profile, select a number for the profile and press the Left key. The profile uses the name of the AP that you are using. When activating or removing a profile, select the profile.</li> </ul>	1. Create2. Activate3. RemoveSelect1:2: AP 13: AP 2	Back

# CHAPTER 4 Network Settings

Use this chapter to configure your Prestige to access the Internet. The Prestige restarts when you return to the main screen after changing the network settings.

If you were given a user name and password for Internet access, go to Section 4.3 on page 38.

If you were given an IP address and subnet mask, go to Section 4.1 on page 35.

If you were not given an IP address and subnet mask, go to Section 4.2 on page 36.

### 4.1 Fixed IP

With this option you have to manually enter an IP address, subnet mask and gateway IP address. These are given to you by the network administrator.

<b>1</b> Select <b>Net Settings</b> in the first menu screen (use the up or down	4. Net Settings	
arrow to highlight it and then press the Left key).	5. SIP Settings	
	6. Settings	
	Select	Back
2 Select Network Mode.	1. Network Mode	
	2. IP Address 3. Subnet Mask	
	Select	Back
<b>3</b> Select <b>Fixed IP</b> .	[1] Fixed IP	
	[2] DHCP	
	[3] PPPoE	
	Select	Back
4 Select IP Address.	2. IP Address	
	3. Subnet Mask	
	4. Gateway	
	Select	Back

<ul><li>5 Use the left arrow button to clear the IP address. Use the up and down arrows to select the type of characters. Enter your IP address. Use the Left key to select Ok when you are done.</li></ul>	IP Add 192.16	IP Address 192.168.1.3	
	Ok	Aa1@	Clear
6 Select Subnet Mask.	3. Sub	onet Mask	
	4. Gat 1. Net	eway work Mode	)
	Select	t	Back
7 Clear the subnet mask and enter your's. The subnet mask specifies the network number portion of an IP address. Type the	Subne 255.25	et Mask 55.255.0	
subnet mask given to you by your network administrator. See the appendix for information on subnetting.	Ok	Aa1@	Clear
8 Select Gateway.	4. Gat	eway	
	1. Net	work Mode	)
	2. IP A	ddress	
	Select	t	Back
<b>9</b> Clear the gateway IP address and enter your's.	Gatew 192.16	/ay 68.1.1	
	Ok	Aa1@	Clear

### 4.2 DHCP

If you were not assigned a specific IP address for your Prestige, use the following directions to set your Prestige to get it automatically via DHCP (Dynamic Host Control Protocol).

**1** Select **Net Settings** in the first menu screen (use the up or down arrow to highlight it and then press the **Left** key).

4. Net Settings	
5. SIP Settings	
6. Settings	
Select	Back
1. Network Mode	
-----------------	------
2. IP Address	
3. Subnet Mask	
Select	Back
[2] DHCP	
[3] PPPoE	
[1] Fixed IP	
Select	Back

2	Select	Network	Mode.
---	--------	---------	-------

**3** Select **DHCP**.

#### 4.3 PPPoE

Point-to-Point Protocol over Ethernet (**PPPoE**) functions as a dial-up connection. You need a user name (PPPoE name) and password from your ISP.

	F			
1	Select <b>Net Settings</b> in the first menu screen (use the up or down arrow to highlight it and then press the <b>Left</b> key).	4. Net Se 5. SIP Se 6. Settin	ettings ettings igs	
		Select		Back
2	Select Network Mode.	1. Netwo 2. IP Ado 3. Subne	ork Mode dress et Mask	
		Select		Back
3	Select <b>PPPoE</b> .	[3] PPPc	ÞΕ	
		[1] Fixed	J IP	
		[2] DHCF	2	
		Select		Back
4	Select <b>PPPoE Name</b> .	2. PPPo	E Name	
		3. PPPoF 1. Netwo	E Pwd ork Mode	
		Select		Back
5	Use the left arrow button to clear the PPPoE name. Use the up		lame	
	and down arrows to select the type of characters. Enter your PPPoE name. Use the <b>Left</b> key to select <b>Ok</b> when you are done.	pppoe_u	isername	ļ
	,	Ok	Aa1@	Clear
6	Select <b>PPPoE Pwd</b> .	3. PPPo	E Pwd	
		1. Netwo 2. PPPol	ork Mode E Name	
		Select		Back
7	Clear the PPPoE password and enter your's.	PPPoE P *********	<b>'wd</b>	:***
		Ok	Aa1@	Clear

# CHAPTER 5 SIP Settings

The Prestige uses Session Initiated Protocol (SIP), an internationally recognized standard for implementing VoIP.

You must register your Prestige with your voice service provider's SIP server.

Note: You should have a voice account already set up.

#### 5.1 Registrar Server

Configure the **Registrar** settings to have the Prestige register with your provider's SIP registrar server.

**Note:** If you have no registrar server information, use the SIP server IP address and port number.

1	Select <b>SIP Settings</b> in the first menu screen.	5. SIP S	ettings	
		6. Settin 7. Wirele	igs ess	
		Select		Back
2	Select <b>Registrar</b> .	1. Regis	trar	
		2. Outbo 3. Proxy	oundProx Server	хy
		Select		Back
3	Select Registrar IP.	1. Regis	trar IP	
		2. Port 3. Expiry	y Time	
		Select		Back
4	Use the left arrow button to clear the default text. Use the up and down arrows to select the type of characters. Enter the registrar server's IP address or domain name. Use the Left key	Registra sip.prox	ar IP sy.net	
	to select <b>Ok</b> when you are done.	Ok	Aa1@	Clear

5 Select Port.	2. Port		
	3. Expir 1. Regi	ry Time strar IP	
	Select		Back
<b>6</b> Clear the port and enter the registrar server's listening port number. Leave the default port number if you were not given one to use.	Port 5061		
	Ok	Aa1@	Clear
7 Select Expiry Time if you were given a specific expiration time	3. Expi	ry Time	
period to use. Otherwise leave it set to the default.	1. Regi	strar IP	
	2. Port		
	Select		Back
<b>8</b> Clear the expiration time and enter the expiration time you were given.	Expiry 300	Time	
<b>9</b> The Prestige restarts when you return to the main screen.	Ok	Aa1@	Clear

# 5.2 Outbound Proxy Server

Configure the Prestige to use an **Outbound Proxy** server if your LAN is behind a NAT router that does not support SIP. If your voice service provider gave you an outbound proxy server address and port, then enter them here.

1 Select SIP Settings in the first menu screen. 5. SIP Settings 6. Settings 7. Wireless Select Back 2 Select Outbound Proxy. 2. OutboundProxy 3. Proxy Server 4. User Account Select Back 3 Select Proxy IP. 1. Proxy IP 2. Port Select Back

- 4 Use the left arrow button to clear the default text. Use the up and down arrows to select the type of characters. Enter the outbound proxy server's IP address or domain name. Use the Left key to select Ok when you are done.
- **5** Select **Port**.
- 6 Clear the port and enter the SIP outbound proxy server's listening port number. Leave the default port number if you were not given one to use.

5.3	Proxy	Server
-----	-------	--------

Configure **Proxy Server** settings to have the Prestige use your voice service provider's SIP-server.

- 1 Select SIP Settings in the first menu screen.5. SIP Settings6. Settings7. Wireless2 Select Proxy Server.3. Proxy Server4. User Account1. Registrar3 Select Proxy IP.1. Proxy IP2. Port2. Port
- **4** Use the left arrow button to clear the default text. Use the up and down arrows to select the type of characters. Enter the SIP server's IP address or domain name. Use the **Left** key to select **Ok** when you are done.

Proxy sip.pr	oxy.net	
Ok	Aa1@	Clear
2. Por	t	
1. Pro	xy IP	
Select	t	Back
Port		
5061		
Ok	Aa1@	Clear

	6. Settir	ngs	
	7. Wirel	ess	
	0 - 1 +		Deals
i	Select		васк
	3. Proxy	/ Server	
	4. User	Account	
	1. Regis	strar	
			_
	Select		Back
	1. Proxy	/ IP	
	1. Proxy 2. Port	/ IP	
	1. Proxy 2. Port	/ IP	
	1. Proxy 2. Port	/ IP	
	1. Proxy 2. Port Select	/ IP	Back
	1. Proxy 2. Port Select Proxy IF	ı IP	Back
P	1. Proxy 2. Port Select Proxy IF sip.proy	/ IP	Back
P ct	1. Proxy 2. Port Select Proxy If sip.prox	y IP cy.net	Back

5	Select <b>Port</b> .	2. Port		
		1. Proxy	/ IP	
		Select		Back
6	Clear the port and enter the SIP server's listening port number. Leave the default port number if you were not given one to use.	Port 5061		
		Ok	Aa1@	Clear

### 5.4 User Account

Configure the Prestige to use your User Account for registering with the SIP server.

When you registered for your voice account, you should have been given a telephone number, user name and password for connecting to the SIP proxy server. Do the following to set up your Prestige to use your telephone number, user name and password when connecting to the SIP server.

<b>1</b> Select <b>SIP Settings</b> in the first menu screen.	5. SIP Settings	
	6. Settings 7. Wireless	
	Select	Back
2 Select User Account.	4. User Account	
	1. Registrar 2. OutboundProxy	,
	Calaat	Deals
	Select	васк
<b>3</b> Select <b>Phone Number</b> .	1. Phone Number	васк
<b>3</b> Select <b>Phone Number</b> .	1. Phone Number 2. Username 3. User Pwd	Васк
<b>3</b> Select <b>Phone Number</b> .	1. Phone Number 2. Username 3. User Pwd Select	Back
<ul> <li>3 Select Phone Number.</li> <li>4 Use the left arrow button to clear the default text. Use the up and down arrows to select the type of characters. Enter your SIP number. For a SIP account like 1234@VoIP-provider.com</li> </ul>	1. Phone Number 2. Username 3. User Pwd Select Phone Number 100	Back

5 Select Username.	2. Username		
	3. User Pwd		
	1. Phon	e Numbe	r
	Select		Back
6 Clear the user name and enter yours exactly as it was given to	Userna	me	
you.	username		
	Ok	Aa1@	Clear
7 Select User Pwd.	3. User Pwd		
			-
	1. Phon	ie Numbe	
	1. Phon 2. Useri	ie Numbei name	
	1. Phon 2. Useri Select	ie Numbe name	Back
<b>8</b> Clear the password and enter yours.	1. Phon 2. Usern Select User Pv	name	Back
<ul><li>8 Clear the password and enter yours.</li><li>9 The Prestige restarts when you return to the main screen.</li></ul>	1. Phon 2. Userr Select User Pv	vd	Back

# CHAPTER 6 Phonebook

Use the phonebook feature to store and later retrieve names and corresponding telephone numbers.

The following sections describe how to create and erase phonebook entries.

#### 6.1 Calling Methods

There are two ways the Prestige can dial a telephone number; either by using the SIP proxy server or an IP address.

Select **Proxy** to have the SIP server make the connection. The SIP proxy server assigns the telephone number or ITSP and therefore you can leave this field blank.

Select **P2P** to an IP address to place a call without first going through the SIP proxy server. This is called an IP to IP (or peer to peer) call. You need to enter the IP address of the callee or another SIP proxy server and the callee's telephone number in the Prestige's phonebook.

### 6.2 Adding a Phonebook Entry

Use the following instructions to add an entry to your phonebook.

**Note:** Only enter the IP address when there is no SIP proxy server and/or you want to place a direct IP to IP call. Otherwise the telephone number is sufficient to make your call.

You must use a phonebook entry to make an IP to IP call.

<b>1</b> Select <b>Phonebook</b> in the first menu.	3. Phon	ebook	
	4. Net S 5. SIP S	Settings Settings	
	Select		Back
2 Select Add Entry.	2. Add	Entry	
	3. Erase	9	
	1. Searc	ch	
	Select		Back
<b>3</b> Enter the callee's name. Use the up and down arrows to select the type of characters. Use the <b>Left</b> key to select <b>Ok</b> when you are done	Display	Name:	
	Ok	Aa1@	Clear
<b>4</b> Enter the telephone number.	User In	fo:	
	Ok	Aa1@	Clear
<b>5</b> Enter the SIP server's or the callee's IP address or domain name. Leave this blank if you will use the SIP proxy server to call this number	Host IP	:	
	Ok	Aa1@	Clear
<b>6</b> Enter the callee's listening port number. Leave this blank if you were not given one.	Port:		
	Ok	Aa1@	Clear
<ul><li>7 Select P2P if calls to this party use a different SIP server or go directly to the callee's VoIP phone (peer-to-peer). Select Proxy if calls to this party use your SIP account.</li></ul>	P2P Proxy		
	Select		Back

### 6.3 Editing Phonebook Entries

Use the following instructions to locate and edit an existing entry in your phonebook.

<b>1</b> Select <b>Phonebook</b> in the first menu.	3. Phonebook	
	4. Net Settings 5. SIP Settings	
	Select	Back
2 Select Search.	1. Search	
	2. Add Entry	
	3. Erase	
	Select	Back
<b>3</b> Select an entry.	Alan	
Note: An ampty mailbox icon diaplays if there are no aptrice in	Amy	
the phonebook.	Ann	
	Select	Back
4 Select Edit. Then edit the entry in the same manner that you	1. Edit	
add one (see Section 6.2 on page 45).	2. Erase	
	3. Speed Dial	
	Select	Back

### 6.4 Erasing Phonebook Entries

Use the following instructions to remove an existing entry from your phonebook.



4 If you chose <b>One by One</b> , select an entry.	Alan	
<b>Note:</b> An empty mailbox icon displays if there are no entries in the phonebook.	Amy Ann	
	Select	E
5 Press the Left key to confirm that you want to delete the entry or press the Right key to keep the entry.	Are you	u sure?
	Select	E

## 6.5 Speed Dial Phonebook Entries

Use the following instructions to make an existing phonebook entry into a speed dial entry.

<b>1</b> Select <b>Phonebook</b> in the first menu.	3. Phonebook	
	4. Net Settings 5. SIP Settings	
	Select	Back
2 Select Search.	1. Search	
	2. Add Entry 3. Erase	
	Select	Back
<b>3</b> Select an entry.	Alan	
<b>Note:</b> An empty mailbox icon displays if there are no entries in the phonebook.	Amy Ann	
	Select	Back
4 Select Speed Dial.	3. Speed Dial	
	1. Edit 2. Erase	
	Select	Back
<b>5</b> Select a key to use for the speed dial entry.	Key 1	
	Key 2	
	Key 3	
	Select	Back

Back

Back

# CHAPTER 7 Call History

The call history feature is useful for checking missed, received, and dialed calls.

### 7.1 Missed Calls

Follow these directions to use the missed calls list to check for missed calls and then edit and save (or erase) the telephone numbers.

1 Select Call History in the first menu.	2. Call F	listory	
	3. Phon 4. Net S	ebook ettings	
	Select		Back
2 Select Missed.	1. Misse	ed	
	2. Recei 3. Dialeo	ived d	
	Select		Back
<b>3</b> Select an entry.	1234		
<b>Note:</b> An empty mailbox icon displays if there are no entries in the phonebook.	5678 2222		
	Select		Back
4 Select Edit Missed to save the number.	1. Edit M	lissed	
Select <b>Erase Missed</b> to delete the number. "Are you sure?" displays. Press the <b>Left</b> key to delete the entry or press the <b>Right</b> key to keep the entry.	2. Erase	e Missed	
	Select		Back
<ul><li>5 If you selected Edit Missed, edit the number or just press the Left key if the number does not need editing.</li></ul>	Number 1234	:	
	Ok	Aa1@	Clear
<b>6</b> Enter the caller's name.	Name:		
	Ok	Aa1@	Clear

### 7.2 Received Calls

Follow these directions to use the received calls list to check for received calls and then edit or erase the telephone numbers.

1 Select Call History in the first menu.	2. Call F	listory	
	3. Phon 4. Net S	ebook ettings	
	Select		Back
2 Select Missed.	2. Recei	ved	
	3. Dialeo 1. Misse	d ed	
	Select		Back
<b>3</b> Select an entry.	1234		
<b>Note:</b> An empty mailbox icon displays if there are no entries in the phonebook.	5678 2222		
	Select		Back
4 Select Edit Received to save the number. Select Erase Received to delete the number. "Are you sure?" displays. Press the Left key to delete the entry or press the Right key to keep the entry.	1. Edit F 2. Erase	Received Receive	d
	Select		Back
<ul><li>5 If you selected Edit Received, edit the number or just press the Left key if the number does not need editing.</li></ul>	Number 1234	:	
	Ok	Aa1@	Clear
<b>6</b> Enter the caller's name.	Name:		
	Ok	Aa1@	Clear

#### 7.3 Dialed Calls

Follow these directions to use the list of dialed calls to check for dialed calls and then edit or erase the telephone numbers.

1 Select Call History in the first menu.	2. Call H	listory	
	3. Phone 4. Net S	ebook ettings	
	Select		Back
2 Select Dialed.	3. Dialeo	d	
	4. Erase 1. Misse	Calls d	
	Select		Back
<b>3</b> Select an entry.	1234		
<b>Note:</b> An empty mailbox icon displays if there are no entries in the phonebook.	5678 2222		
	Select		Back
4 Select Edit Dialed to save the number. Select Erase Dialed to delete the number. "Are you sure?" displays. Press the Left key to delete the entry or press the Right key to keep the entry.	1. Edit D 2. Erase	Dialed Dialed	
	Select		Back
<ul><li>5 If you selected Edit Dialed, edit the number or just press the Left key if the number does not need editing.</li></ul>	Number 1234	:	
	Ok	Aa1@	Clear
6 Enter the caller's name.	Name:		
	Ok	Aa1@	Clear

### 7.4 Erasing Calls

Follow these directions to erase entries from the call history list. You can choose to erase all call records, the missed calls, the received calls, or the dialed calls.

1 Select Call History in the first menu.	2. Call History	
	3. Phonebook 4. Net Settings	
	Select	Back
2 Select Erase Calls.	4. Erase Calls	
	1. Missed 2. Received	
	Select	Back
<b>3</b> Select <b>Erase All</b> to remove all entries from the call history.	1. Erase All	
Select <b>Missed</b> to remove the missed call entries.	2. Missed	
Select <b>Dialed</b> to remove the dialed call entries.	3. Received	
	Select	Back
<b>4</b> Press the <b>Left</b> key to confirm that you want to delete the entry or press the <b>Right</b> key to keep the entry.	Are you sure?	
	Select	Back

# CHAPTER 8 Miscellaneous Settings

These sections detail how to change the Prestige's other settings.

# 8.1 Setting the Ring Melody

Follow these directions to change the Prestige's ring melody.

**1** Select **Settings** in the first menu screen.

**2** Select Melody.

- **3** Select a melody.
- 4 Press the Left key to save your setting.

6. Settings	
7. Wireless	
8. Restart	
Select	Back
1. Melody	
2. Vibrator	
3. Ringer Volume	
Select	Back
Default	
Melody 1	
Melody 2	
Select	Back

#### 8.2 Setting the Vibration Mode

You can have the Prestige vibrate to alert you to incoming calls. Follow these directions to turn the Prestige's vibration mode on or off.

- 1 Select Settings in the first menu screen.
- **2** Select Vibrator.
- Select Back 2. Vibrator 3. Ringer Volume 4. Edit Time Select **3** Select **Ring Only** to have the Prestige not vibrate for **Ring Only** incoming calls. Vibrate Only Select Vibrate Only to have the Prestige only vibrate and Vibrate -> Ring not ring for incoming calls. Select Vibrate -> Ring to have the Prestige vibrate first and Select then ring for incoming calls.

### 8.3 Adjusting the Ring Volume

Follow these directions to adjust the Prestige's ring volume.

- 1 Select Settings in the first menu screen.
- 2 Select Ringer Volume.
- **3** Use the arrow keys to set the volume level.
- 4 Press the Left key to save your setting.





6. Settings 7. Wireless 8. Restart

6. Settings

### 8.4 Setting the Time

Follow these directions to change the Prestige's time settings.

**1** Select **Settings** in the first menu screen.

	7. Wireless	
	8. Restart	
	Select	Back
2 Select Edit Time.	4. Edit Time	
	5. Edit Date	
6 S	6. Banner	
	Select	Back
<b>3</b> Use the left arrow to move the cursor in front of the number you	Edit Time	
want to edit and use the keypad to change the number.	16:47	
<b>4</b> Press the Left key to save your setting.	Ok	Back

## 8.5 Setting the Date

Follow these directions to change the Prestige's time settings.

1	Select Settings in the first menu screen.	6. Settings	
		7. Wireless	
		8. Restart	
		Select	Back
2	Select Edit Date.	5. Edit Date	
		6. Banner	
		7. Key Lock	
		Select	Back
3	Use the left arrow to move the cursor in front of the number you	Edit Date	
	want to edit and use the keypad to change the number.	2004.01.11	
4	Press the Left key to save your setting.	Ok	Back

#### 8.6 Setting the Banner

Follow these directions to change the text that displays in the Prestige's main screen.

- 1 Select Settings in the first menu screen.
- 2 Select Banner.
- **3** Enter the text that you want to display in the main screen.
- **4** Press the Left key to save your setting.

6. Setti	ngs	
7. Wire	less	
8. Rest	art	
Select		Back
6. Banr	ner	
7. Key	Lock	
8. Don'	t Disturb	
Select		Back
Banner		
ZyXEL		
Ok	Aa1@	Clear

#### 8.7 Setting the Key Lock

The Prestige's key lock function automatically locks the keypad if the Prestige is in standby mode for more than one minute (press and hold the # key for approximately 2 seconds to lock or unlock the keypad). Follow these directions to enable or disable the key lock function.

<b>1</b> Select <b>Settings</b> in the first menu screen.	6. Settings	
	7. Wireless 8. Restart	
	Select	Back
2 Select Ley Lock.	7. Key Lock	
	8. Don't Disturb	
	1. Melody	
	Select	Back
<b>3</b> Select <b>Off</b> to disable the key lock function or <b>On</b> to enable it.	Off	
<b>4</b> Press the <b>Left</b> key to save your setting.	On	
	Select	Back

### 8.8 Setting the Don't Disturb

Enable the Prestige's don't disturb function, to not receive any incoming calls. Anyone calling the Prestige gets a busy signal when you enable the don't disturb function. Follow these directions to enable or disable the don't disturb function.

- 1 Select Settings in the first menu screen.
- 2 Select Don't Disturb.
- **3** Select **Off** to disable the don't disturb function or **On** to enable it.
- 4 Press the Left key to save your setting.

6. Settings	
7. Wireless	
8. Restart	
Select	Back
8. Don't Disturb	
1. Melody	
2. Vibrator	
Select	Back
Off	
On	
Select	Back

Information
 Call History
 Phonebook

Back

Back

Back

Back

Back

Back

# **CHAPTER 9** Information Menus

These sections detail how to use the information menus.

## 9.1 Displaying Information

Follow these directions to display important Prestige information.

- **1** Select **Information** in the first menu screen.
- Select 2 Select Phone Number. 1. Phone Number 2. IP Address 3. MAC Address Select **3** The screen displays the Prestige's current SIP phone number. **Phone Number** 100 **4** Press the **Right** key to return to the main information menu. οκ 5 Select IP Address. 2. IP Address 3. MAC Address 4. Firmware Ver. Select **IP Address 6** The screen displays the Prestige's current IP address. 192.168.1.3 7 Press the **Right** key to return to the main information menu. ΟΚ 8 Select MAC Address. 3. MAC Address 4. Firmware Ver. 1. Phone Number Select

<b>9</b> The screen displays the Prestige's MAC address.	MAC	Address
<b>10</b> Press the <b>Right</b> key to return to the main information menu.	00a0c	5b76249
	ок	Back
11Select Firmware Ver.	4. Firmwar	e Ver.
	1. Phone N 2. IP Addre	lumber ess
	Select	Back
<b>12</b> The screen displays the Prestige's current firmware version.	Firmw Wj.	vare Ver. 00.10
	ок	Back

# CHAPTER 10 Prestige Usage

This chapter describes how to use your Prestige for basic tasks.

#### 10.1 Dialing a Telephone Number

Use the following instructions to call a number that is not already in your Prestige's phonebook.

- **1** When the Prestige is in standby mode, use the numerical keys to enter the telephone number.
- **2** If you enter an incorrect number, press the **Right** key to backspace.
- **3** Press the **Call** key to make your call.

#### 10.2 Using the Phonebook to Dial a Telephone Number

Use the following instructions to use one of the Prestige's existing phonebook entries to make a call.

- **1** Press the **Right** key to enter the Prestige book.
- **2** Use the up or down arrow button to choose the name.
- **3** Press the **Call** key to dial the number.

### 10.3 Using Speed Dial to Dial a Telephone Number

Use the following instructions to use an existing speed dial entry.

- **1** Press the entry's speed dial key.
- **2** Hold the speed dial key down for about two seconds.

#### **10.4 Redialing a Telephone Number**

- **3** In the standby mode, press the **Call** key.
- **4** A list of recently called telephone numbers displays.
- **5** Use the up or down arrow button to scroll through the list of Telephone numbers.

6 Press the Call key to make the call.

## 10.5 Answering a Call

Press the **Call** key to answer a call.

## 10.6 Rejecting a Call

Press the **Off** key to reject a call.

#### 10.6.1 Changing the Volume

Press the left or right arrow button to decrease or increase the volume during a call.

Use the web configurator's administrator account if you want to change the Prestige's default volume. See the web configurator sections for details.

# CHAPTER 11 Using the Web Configurator Screens

This chapter describes how to use the Prestige's web configurator to view and configure the Prestige's settings.

#### 11.1 Introduction to the Web Configurator

The embedded web configurator allows you to configure or view the Prestige's settings through Microsoft Internet Explorer. Use Internet Explorer 6.0 and later versions.

It is recommended that you set your screen resolution to 1024 by 768 pixels.

#### 11.2 Accounts

The Prestige has two pre-configured accounts to access the web configurator. The first is the user account that provides normal functionality of the Prestige and configurable settings. The second is an administrator's account that allows you to alter the way the Prestige makes and receives calls, for example selecting a voice codec.

**Note:** Do not attempt to change the administrator settings unless you know what you are doing. These settings affect the way your Prestige makes and receives calls and are already configured for best performance.

#### 11.2.1 Login

- **1** Make sure your Prestige is connected to the wireless LAN and record its IP address (you can use the **Information** menu to check your phone's IP address).
- **2** Launch your web browser.
- **3** Type "http://<IP address>" as the URL (where "IP address" is the Prestige's IP address).

#### Figure 9 Browser Address



4 Enter your user name and password and click **OK** to login.

- For user access: Type the default user name: **admin** and password: **1234** for user-level access, the first time you login.
- For administrator access: Type the default user name: **zyxeladmin** and password: **1234** for administrator access, the first time you login.

Figure 10 Login Screen

Enter Netw	vork Passwo	rd	<u>?</u> ×
<b>?</b>	Please type y	our user name and password.	
IJ	Site:	192.168.1.3	
	Realm	1	
	<u>U</u> ser Name		
	<u>P</u> assword		
	□ <u>S</u> ave this	password in your password list	
		OK Car	icel

**Note:** It is strongly advised that you change the passwords for both the user and administrator accounts the first time you login.

#### 11.3 Navigating the Prestige Web Configurator

The following screen displays first when you use the user account.

ZYXEL TOTAL INTERNET ACCESS SOLUTION	_	
Information Network	DEVICE INFORMATION	
<u>SIP</u> NAT TRVSL	Software Version Bootrom Version	Wj.00.10 B.00.16
<u>PHONE BOOK</u> <u>Wireless</u> System	Release Date	Feb 05 2005
S/W Update		
RESTART		

Figure 11 Web Configurator First User Screen

The web configurator is divided into several screens. Click a link in the navigation panel (on the left side of the screen) to go to the corresponding screen.

The following table introduces the screens that are available with the user account.

LINK	FUNCTION	
Information	This screen contains firmware version information.	
Network	Use this screen to configure your Internet access settings.	
SIP	Use this screen to configure your Prestige's Session Initiation Protocol settings.	
NAT TRVSL	Use this screen to configure your Prestige's NAT traversal settings.	
PHONE BOOK	Use this screen to store and later retrieve names and corresponding telephone numbers.	
Wireless	Use this screen to configure the wireless LAN settings.	
System	Use this screen to change your password.or the Prestige's time.	
S/W Update	Use this screen to upload an auto-provisioning configuration file or firmware to your Prestige.	

 Table 3
 Web Configurator User Screens Summary

The following screen displays first with administrator access.

Figure 12	Web Configurator First Administrator Screen

ZvXEL		
TOTAL INTERNET ACCESS SOLUTION		
Information	DEVICE INFORMATION	
<u>Network</u>		
<u>SIP</u>	Software Version	W/i 00 10
NAT TRVSL	Bootrom Version	B 00 16
PHONE BOOK	Release Date	Feb 05 2005
Mireless		
TOS/DS		
<u>System</u>		
S/W Update		
RESTART		
1320174101		

The following screens are available with administrator access (in addition to the screens available with user access).

The following table introduces the screens that are available with user access.

LINK	FUNCTION	
PHONE	Use this screen to configure your Prestige's phone settings.	
TOS/DS	Use this screen to configure your Prestige's Type of Service and Differentiated Services settings.	

 Table 4
 Web Configurator Administrator Screens Summary

# CHAPTER 12 User Web Configurator Screens

This chapter details the settings that you can configure in the web configurator using the user account.

# **12.1 Device Information**

Use this screen to view read-only information about your Prestige.

Figure 1	<b>I3</b> [	Device	Information
----------	-------------	--------	-------------

DEVICE INFORMATION	
Software Version	Wj.00.10
Bootrom Version	B.00.16
Release Date	Feb 05 2005

Table 5Device Information

LABEL	DESCRIPTION
Software Version	This is the firmware version that the Prestige is using.
Bootrom Version	This is the boot ROM (Read Only Memory) firmware version that the Prestige is using.
Release Date	This is the date that the Prestige's firmware was released.

# 12.2 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 6	Private IP Address Range
---------	--------------------------

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.

#### 12.3 IP Address and Subnet Mask

Similar to the way houses on a street share a common street name, so too do computers on a network 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 Prestige, 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 Prestige 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 Prestige unless you are instructed to do otherwise.

#### 12.4 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.

#### 12.5 DNS Server

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 Prestige can get the DNS server addresses in the following ways.

- **1** The ISP tells you the DNS server addresses, usually in the form of an information sheet, when you sign up. If your ISP gives you DNS server addresses, manually enter them in the DNS server fields.
- **2** You can manually enter the IP addresses of other DNS servers. These servers can be public or private.

#### **12.6 Network Configuration: STATIC**

If you were assigned a specific IP address for your Prestige, use the following directions to set your Prestige to use it.

•	
NETWORK CONFIGURATION	
Get IP Address	STATIC DHCP PPPoE
Network Mode	STATIC
Network IP	192.168.1.3
Network Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
MAC Address	00a0c5b76249
DNS Server IP	168.95.1.1
Second DNS Server IP	139.175.55.244
	APPLY CANCEL

Figure 14 STATIC Network Configuration

|--|

LABEL	DESCRIPTION
Get IP Address	Click <b>STATIC</b> to manually enter a fixed IP address.
Network Mode	Click <b>DHCP</b> to have the Prestige automatically obtain network settings at startup from a Dynamic Host Configuration Protocol server. These settings are not configurable.
	Click <b>PPPoE</b> if your ISP uses Point-to-Point Protocol over Ethernet.
Network IP	This is the IP address your Prestige uses to connect to the wireless LAN. Type the address given to you by your network administrator.
Network Subnet Mask	The subnet mask specifies the network number portion of an IP address. Type the subnet mask given to you by your network administrator. See the appendix for information on subnetting.
Default Gateway	Type the gateway IP address of the device to which you want to connect your Prestige.
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.
	This field is read only and cannot be configured.
DNS Server IP	Type the DNS' IP address for translating readable domain names into valid computer IP addresses.
Second DNS Server IP	Type a backup DNS IP address for the Prestige to use in the event that the Prestige cannot connect to the preferred DNS.
APPLY	Click <b>APPLY</b> to save your changes without restarting the Prestige. Your wireless LAN, Internet and SIP settings changes do not take affect until you use <b>RESTART</b> (in the navigation panel).
CANCEL	Click CANCEL to begin configuring this screen afresh.

# 12.7 Network Configuration: DHCP

If you were not assigned a specific IP address for your Prestige, use the following directions to set your Prestige to get it automatically via DHCP (Dynamic Host Control Protocol).

#### Figure 15 DHCP Network Configuration

NETWORK CONFIGURATION	
Get IP Address	STATIC DHCP PPPoE
Network Mode	DHCP
Network IP	192.168.1.3
Network Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
MAC Address	00a0c5b76249
DNS Server IP	168.95.1.1
Second DNS Server IP	139.175.55.244
	APPLY CANCEL

#### Table 8 DHCP

LABEL	DESCRIPTION
Get IP Address	Click STATIC to manually enter a fixed IP address.
Network Mode	Click <b>DHCP</b> to have the Prestige automatically obtain network settings at startup from a Dynamic Host Configuration Protocol server. These settings are not configurable.
	Click <b>PPPoE</b> if your ISP uses Point-to-Point Protocol over Ethernet.
Network IP	This is the IP address your Prestige uses to connect to the wireless LAN.
Network Subnet Mask	The subnet mask specifies the network number portion of an IP address.
Default Gateway	This field displays the gateway IP address for your Prestige to connect.
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.
	This field is read only and cannot be configured.
DNS Server IP	Type the DNS' IP address for translating readable domain names into valid computer IP addresses.
Second DNS Server IP	Type a backup DNS IP address for the Prestige to use in the event that the Prestige cannot connect to the preferred DNS.
APPLY	Click <b>APPLY</b> to save your changes without restarting the Prestige. Your wireless LAN, Internet and SIP settings changes do not take affect until you use <b>RESTART</b> (in the navigation panel).
CANCEL	Click <b>CANCEL</b> to begin configuring this screen afresh.

#### 12.8 Network Configuration: PPPoE

Point-to-Point Protocol over Ethernet (PPPoE) functions as a dial-up connection. PPPoE is an IETF (Internet Engineering Task Force) draft 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. It preserves the existing Microsoft Dial-Up Networking experience and requires no new learning or procedures.

Use the following screen to set your Prestige to use PPPoE for your Internet connection. You must have a user name (PPPoE username) and password from you ISP.

NETWORK CONFIGURATION	
Get IP Address	STATIC DHCP PPPoE
Network Mode	PPPoE
Network IP	192.168.1.3
Network Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
PPPoE Username	pppoe_username
PPPoE Password	pppoe_password
MAC Address	00a0c5b76249
DNS Server IP	168.95.1.1
Second DNS Server IP	139.175.55.244
	APPLY CANCEL

Figure 16 PPPoE Network Configuration

Table 9	PPPoE
---------	-------

LABEL	DESCRIPTION
Get IP Address	Click STATIC to manually enter a fixed IP address.
Network Mode	Click <b>DHCP</b> to have the Prestige automatically obtain network settings at startup from a Dynamic Host Configuration Protocol server. These settings are not configurable.
	Click <b>PPPoE</b> if your ISP uses Point-to-Point Protocol over Ethernet.
Network IP	This is IP address your Prestige uses to connect to the wireless LAN.
Network Subnet Mask	The subnet mask specifies the network number portion of an IP address.
Default Gateway	This field displays the gateway IP address for your Prestige to connect.
PPPoE Username	Type the username given to you by your network administrator.
PPPoE Password	Type the password associated with the username above.
LABEL	DESCRIPTION
-------------------------	--
MAC Address	Every Ethernet device has a unique MAC (Media Access Control) address.
	Your Prestige's MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02.
	This field is read only and cannot be configured.
DNS Server IP	Type the DNS' IP address for translating readable domain names into valid computer IP addresses.
Second DNS Server IP	Type a backup DNS IP address for the Prestige to use in the event that the Prestige cannot connect to the preferred DNS.
APPLY	Click <b>APPLY</b> to save your changes without restarting the Prestige. Your wireless LAN, Internet and SIP settings changes do not take affect until you use <b>RESTART</b> (in the navigation panel).
CANCEL	Click <b>CANCEL</b> to begin configuring this screen afresh.

Table 9	PPPoE	(continued)
		(

### **12.9 VoIP Introduction**

VoIP (Voice over IP) is the sending of voice signals over the Internet Protocol. This allows you to make phone calls and send faxes over the Internet at a fraction of the cost of using the traditional circuit-switched telephone network. You can also use servers to run telephone service applications like PBX services and voice mail. Internet Telephony Service Provider (ITSP) companies provide VoIP service. A company could alternatively set up an IP-PBX and provide it's own VoIP service.

Circuit-switched telephone networks require 64 kilobits per second (kbps) in each direction to handle a telephone call. VoIP can use advanced voice coding techniques with compression to reduce the required bandwidth.

#### 12.9.1 SIP

The Session Initiation Protocol (SIP) is an application-layer control (signaling) protocol that handles the setting up, altering and tearing down of voice and multimedia sessions over the Internet.

SIP signaling is separate from the media for which it handles sessions. The media that is exchanged during the session can use a different path from that of the signaling. SIP handles telephone calls and can interface with traditional circuit-switched telephone networks.

#### 12.9.1.1 SIP Identities

A SIP account uses an identity (sometimes referred to as a SIP address). A complete SIP identity is called a SIP URI (Uniform Resource Identifier). A SIP account's URI identifies the SIP account in a way similar to the way an e-mail address identifies an e-mail account. The format of a SIP identity is SIP-Number@SIP-Service-Domain.

#### 12.9.1.1.1 SIP Number

The SIP number is the part of the SIP URI that comes before the "@" symbol. A SIP number can use letters like in an e-mail address (johndoe@your-ITSP.com for example) or numbers like a telephone number (1122334455@VoIP-provider.com for example).

#### 12.9.1.1.2 SIP Service Domain

The SIP service domain of the VoIP service provider is the domain name in a SIP URI. For example, if the SIP address is <u>1122334455@VoIP-provider.com</u>, then "VoIP-provider.com" is the SIP service domain.

#### 12.9.1.2 SIP Call Progression

The following figure displays the basic steps in the setup and tear down of a SIP call. A calls B.

Α		В
1. INVITE		
		2. Ringing
		3. OK
4. ACK		
	5.Dialogue (voice traffic)	
6. BYE		
		7. OK

 Table 10
 SIP Call Progression

- **1** A sends a SIP INVITE request to B. This message is an invitation for B to participate in a SIP telephone call.
- **2** B sends a response indicating that the telephone is ringing.
- **3** B sends an OK response after the call is answered.
- 4 A then sends an ACK message to acknowledge that B has answered the call.
- **5** Now A and B exchange voice media (talk).
- 6 After talking, A hangs up and sends a BYE request.
- **7** B replies with an OK response confirming receipt of the BYE request and the call is terminated.

#### 12.9.1.3 SIP Client Server

SIP is a client-server protocol. A SIP client is an application program or device that sends SIP requests. A SIP server responds to the SIP requests.

When you use SIP to make a VoIP call, it originates at a client and terminates at a server. A SIP client could be a computer or a SIP phone. One device can act as both a SIP client and a SIP server.

#### 12.9.1.3.1 SIP User Agent

A SIP user agent can make and receive VoIP telephone calls. This means that SIP can be used for peer-to-peer communications even though it is a client-server protocol. In the following figure, either A or B can act as a SIP user agent client to initiate a call. A and B can also both act as a SIP user agent to receive the call.





#### 12.9.1.3.2 SIP Proxy Server

A SIP proxy server receives requests from clients and forwards them to another server. In the following example, you want to use client device A to call someone who is using client device C.

- 1 The client device (A in the figure) sends a call invitation to the SIP proxy server (B).
- **2** The SIP proxy server forwards the call invitation to C.





#### 12.9.1.3.3 SIP Redirect Server

A SIP redirect server accepts SIP requests, translates the destination address to an IP address and sends the translated IP address back to the device that sent the request. Then the client device that originally sent the request can send requests to the IP address that it received back from the redirect server. Redirect servers do not initiate SIP requests.

In the following example, you want to use client device A to call someone who is using client device C.

- 1 Client device A sends a call invitation for C to the SIP redirect server (B).
- **2** The SIP redirect server sends the invitation back to A with C's IP address (or domain name).
- **3** Client device A then sends the call invitation to client device C.



#### 12.9.1.3.4 SIP Register Server

A SIP register server maintains a database of SIP identity-to-IP address (or domain name) mapping. The register server checks your user name and password when you register.

#### 12.9.1.4 RTP

When you make a VoIP call using SIP, the RTP (Real time Transport Protocol) is used to handle voice data transfer. See RFC 1889 for details on RTP.

### 12.10 NAT

NAT (Network Address Translation - NAT, RFC 1631) is the translation of the IP address of a host in a packet. For example, the source address of an outgoing packet, used within one network is changed to a different IP address known within another network.

In the simplest form, NAT changes the source IP address of a packet received from a device to another IP address before forwarding the packet towards the destination. When the response comes back, NAT translates the destination address back to the device's IP address and forwards it to the device.

NAT routers are commonly used to translate private (or internal) IP addresses in packet headers to public (or external) IP addresses and vice versa. A NAT router maps a private IP address and port pair to a public IP address and port, and whenever the NAT router receives a packet with that public IP address and port, it knows how to reroute the packet back to the private IP address and port.

### 12.10.1 NAT Example

See the following figure. The Prestige (X) sends packets to the Internet. The Prestige's IP address is 10.0.0.3 (a private IP address). The NAT router maps the private source IP address to a public source IP address (a.b.c.d).

**Note:** The NAT figures in this chapter use lower-case letters (like a.b.c.d for example) to represent public IP addresses.

#### Figure 20 NAT: Outgoing



When the NAT router receives packets with destination address IP address a.b.c.d, the NAT router changes a.b.c.d back to the private IP address 10.0.0.3 and sends it to the Prestige.

#### Figure 21 NAT: Incoming



#### 12.10.2 NAT Types

This section discusses the following NAT types:

- Full Cone
- Restricted Cone
- Port Restricted Cone
- Symmetric

The examples in this section describe NAT translation between private and public IP addresses.

"SA" is used in this section's figures to represent the Source Address. The SA consists of the source IP address and port number.

"DA" is used in this section's figures to represent the Destination Address. The DA consists of the destination IP address and port number.

In the figures, a SA or DA is written as the IP address followed by a colon and then the port number. "10.0.0.3:80" for example is IP address 10.0.0.3 and port number 80.

#### 12.10.2.1 Full Cone NAT

In full cone NAT, the NAT router maps the source address of all outgoing packets to one IP address and port on another network. The NAT router also maps packets coming to that address and port on the other network back to the original source address.

#### 12.10.2.1.1 Full Cone NAT: Outgoing

See the following figure. The Prestige (X) uses port 80 to send some packets to server Y. The Prestige's IP address is 10.0.0.3 (a private IP address). The NAT router receives the packets from the Prestige with the private source address 10.0.0.3:80 and changes them to use public source address a.b.c.d:30080 before forwarding them on to Y.





#### 12.10.2.1.2 Full Cone NAT: Incoming

Servers Y and Z can both send packets to IP address a.b.c.d and port 30080. The NAT router changes the destination address to the private IP address 10.0.0.3 and port 80 and sends it to the Prestige.





#### 12.10.2.2 Restricted Cone NAT

For all outgoing packets, restricted cone NAT maps the source address to one IP address and port on another network. This is the same as full cone NAT (see Section 12.10.2.1.1 on page 78 for an example).

However, packets can only be sent back through NAT from an IP address to which packets have been sent from the original source address.

In the following example, X already sent a packet to Y, so Y can send a packet to X. X did not send a packet to Z, so Z cannot send packets to X.





#### 12.10.2.3 Port Restricted Cone NAT

For all outgoing packets, port restricted cone NAT maps the source address to one IP address and port on another network. This is the same as full cone NAT (see Section 12.10.2.1.1 on page 78 for an example).

However, packets can only be sent back through NAT from an IP address and port number to which packets have been sent from the original source address.

In the following example, X already sent a packet to Y at e.f.g.h:20202. This means that Y can send a packet to X from e.f.g.h:20202.

X did not send a packet to Y at e.f.g.h:10101, so Y cannot send a packet to X from e.f.g.h:10101.

X did not send a packet to Z, so Z cannot send packets to X.





#### 12.10.2.4 Symmetric NAT

The full, restricted and port restricted cone NAT types use the same mapping for an outgoing packet's source address regardless of the destination IP address and port.

In symmetric NAT, the mapping of a outgoing packet's source address to a source address in another network is different for each different destination IP address.

In the following figure, X sends a packet to Y from IP address 10.0.0.3:80. The NAT router maps the packet's SA to a.b.c.d:1234 (see 1 in the figure). X also sends a packet to Z, but this time the NAT router maps the SA to a.b.c.d:5678 (see 2 in the figure).





In the following figure, Y can send packets to a.b.c.d:1234 (see 1 in the figure) since that mapping was used when X sent a packet to Y. Y cannot send packets to a.b.c.d:5678 (2 in the figure).

Z can send packets to IP address a.b.c.d:45678 (2 in the figure) since that mapping was used when X sent a packet to Z. Z cannot send packets to a.b.c.d:1234 (1 in the figure).

#### Figure 27 Symmetric NAT: Incoming



### 12.11 NAT and SIP

Some NAT routers are not SIP-friendly and will stop your voice sessions.

The Prestige must register its public IP address with a SIP register server. If there is a NAT router between the Prestige and the SIP register server, the Prestige probably has a private IP address. The Prestige lists its IP address in the SIP message that it sends to the SIP register server. NAT does not translate this IP address in the SIP message. The SIP register server gets the Prestige's IP address from inside the SIP message and maps it to your SIP identity. If the Prestige has a private IP address listed in the SIP message, the SIP server cannot map it to your SIP identity.

A SIP ALG (Application Layer Gateway) or the Fake WAN Address on SIP and RTP, STUN, and outbound proxy features allow the Prestige to list its public IP address in the SIP messages.

#### 12.11.1 SIP ALG

Some NAT routers may include a SIP Application Layer Gateway (ALG). A SIP ALG allows SIP calls to pass through NAT by examining and translating IP addresses embedded in the data stream. When the Prestige registers with the SIP register server, the SIP ALG translates the Prestige's private IP address inside the SIP data stream to a public IP address. You do not need to use STUN or an outbound proxy if your Prestige is behind a SIP ALG.

### 12.11.2 Fake WAN Address on SIP and RTP

If you know the NAT router's public IP address and SIP port number, you can use the Use NAT feature to manually configure the Prestige to use a them in the SIP messages. This eliminates the need for STUN or a SIP ALG.

You must also configure the NAT router to forward traffic with this port number to the Prestige.

#### 12.11.3 STUN

STUN (Simple Traversal of User Datagram Protocol (UDP) through Network Address Translators) allows the Prestige to find the presence and types of NAT routers and/or firewalls between it and the public Internet. STUN also allows the Prestige to find the public IP address that NAT assigned, so the Prestige can embed it in the SIP data stream. STUN does not work with symmetric NAT routers (see Section 12.10.2.4 on page 79) or firewalls. See RFC 3489 for details on STUN.

The following figure shows how STUN works.

- **1** The Prestige (A) sends SIP packets to the STUN server (B).
- **2** The STUN server (B) finds the public IP address and port number that the NAT router used on the Prestige's SIP packets and sends them to the Prestige.
- **3** The Prestige uses the public IP address and port number in the SIP packets that it sends to the SIP server (C).





### 12.11.4 Outbound Proxy

Your VoIP service provider may host a SIP outbound proxy server to handle all of the Prestige's VoIP traffic. This allows the Prestige to work with any type of NAT router and eliminates the need for STUN or a SIP ALG. Turn off a SIP ALG on a NAT router in front of the Prestige to keep it from retranslating the IP address (since this is already handled by the outbound proxy server).

### 12.12 NAT Traversal Configuration

Click **NAT TRVSL** to open the following screen where you can configure your Prestige to operate through a NAT router that is not SIP-friendly.

The following screen displays the IP address and port number of an outbound proxy server the Prestige uses to connect to the outbound proxy server.

Figure 29	NAT	Traversal	Configuration
-----------	-----	-----------	---------------

NAT TRAVERSAL	
Select Type	Disable NAT
Outbound Proxy	
Outbound Proxy Server Address	192.168.0.191
Outbound Proxy Server Port	5060
STUN (RFC3489)	
STUN Server IP	192.168.0.191 : 3478
STUN Interval(sec.)	200
Fake WAN Address on SIP and RTP	
WAN IP Address	192.168.0.3
WAN SIP Port	5060
	APPLY CANCEL

#### Table 11 NAT Traversal Configuration

LABEL	DESCRIPTION
Select Type	Select <b>Disable NAT</b> if the Prestige is not behind a NAT router or the NAT router is a SIP ALG.
	Select <b>By Outbound Proxy</b> if your VoIP service provider has a SIP outbound server to handle voice calls. This allows the Prestige to work with any type of NAT router. Turn off a SIP ALG on a NAT router in front of the Prestige to keep it from retranslating the IP address (since this is already handled by the outbound proxy server).
	Select <b>STUN</b> if there is a NAT router between the Prestige and the VoIP service provider's SIP server and your VoIP service provider hosts a STUN server.
	Select <b>Fake WAN Address on SIP and RTP</b> to use a NAT router's public IP address and SIP port number in the Prestige's SIP messages. You must also configure the NAT router to forward traffic with this port number to the Prestige.
Outbound Proxy	·
Outbound Proxy Server Address	This field displays the IP address or domain name of your outbound proxy server.
Outbound Proxy Server Port	This field displays the port number to access proxy services.
STUN (RFC3489)	

LABEL	DESCRIPTION
STUN Server IP	Type the IP address or domain name of the STUN server in the first field. You can use up to 127 ASCII characters.
	Enter the STUN server's listening port for STUN requests in the second field. Leave this field set to the default if your VoIP service provider did not give you a server port number for STUN.
STUN Interval(sec.)	Type how often the Prestige should check the STUN server to determine the correct public IP address to use.
Fake WAN Address	on SIP and RTP
WAN IP Address	Enter the NAT router's public IP address or domain name (up to 127 ASCII characters) in this field.
WAN SIP Port	Enter the port number that your SIP sessions use with the public IP address of the NAT router.
APPLY	Click <b>APPLY</b> to save your changes without restarting the Prestige. Your wireless LAN, Internet and SIP settings changes do not take affect until you use <b>RESTART</b> (in the navigation panel).
CANCEL	Click <b>CANCEL</b> to begin configuring this screen afresh.

 Table 11
 NAT Traversal Configuration (continued)

### 12.13 SIP Configuration

Your Prestige is a SIP client and must connect to a SIP server. The SIP proxy server receives your Prestige's SIP requests and forwards them to the next SIP server in the network.

Fiaure	30	SIP
iguic	50	011

SIP PROXY	
Proxy IP Address	192.168.0.3
User Account	
Registrar Username	username
Local Name	NULL
Phone Number	100
Registration Status	Not Registered

#### Table 12 SIP

LABEL	DESCRIPTION
SIP PROXY	
Proxy IP Address	This field displays the IP address or domain name of your SIP proxy server.
User Account	
Registrar Username	This field displays the username as supplied by your VoIP provider to access the SIP server.

LABEL	DESCRIPTION
Local Name	This field displays the name used to interoperate with other SIP devices and identify your Prestige on a network.
Phone Number	This field displays your telephone number as your VoIP provider gave you.
Registration Status	This field displays either <b>Registered</b> or <b>Not Registered</b> depending on the success of your Prestige's connection to the SIP-Server.

Table 12SIP (continued)

### 12.14 Phone Book

Use the phone book feature to store and later retrieve names and corresponding telephone numbers.

### 12.14.1 Calling Methods

There are two ways the Prestige can dial a telephone number; either by using the SIP proxy server or an IP address.

Select **Proxy** to have the SIP server make the connection. The SIP proxy server assigns the telephone number or ITSP and therefore you can leave this field blank.

Select **P2P** to an IP address to place a call without first going through the SIP proxy server. This is called an IP to IP (or peer to peer) call. You need to enter the IP address of the callee or another SIP proxy server and the callee's telephone number in the Prestige's phonebook.

### 12.15 Phone Book Configuration

Click **PHONE BOOK** to open the following screen.

#### Figure 31 Phonebook

dd New Er	ntry			
Speed Dial	Display Name	User Info Host IP	Po	ort Service
None 💌		sip:	:	© Proxy C P2P ADD
honebook				
Speed Dial	Name	Phone No.	Service	
None	А	<sip:1234@192.168.0.3:5060></sip:1234@192.168.0.3:5060>	Proxy	DELETE EDIT
None	в	<sin:5678@1111></sin:5678@1111>	P2P	DELETE EDIT

#### Table 13 Phonebook

LABEL	DESCRIPTION
Add New Entry	
Speed Dial	Select a speed dial key combination from the drop-down list box if you want to use the speed dial function with this phone book entry.
Display Name.	Enter a descriptive name to identify the party that you will use this entry to call.
User Info	Enter the SIP number of the party that you will call (use the number or text that comes before the @ symbol in a full SIP URI).
Host IP	Enter the SIP server's or the callee's IP address or domain name. Leave this blank if you will use the SIP proxy server to call this number.
Port	Enter the SIP server's or the callee's listening port for SIP in this field.
Destination	Select <b>Proxy</b> if calls to this party use your SIP account.
	Select <b>P2P</b> if calls to this party use a different SIP server or go directly to the callee's VoIP phone (peer-to-peer).
Add	Click this button to add a new entry into the Prestige's phone book.
Phonebook	
Speed Dial	This is the entry's speed dial key combination (if it has one). Press this key combination on the Prestige to call the party named in this entry.
Name.	This field displays the name associated with a telephone number.
Phone No.	This field displays the telephone number of each contact in your telephone book.
Service	This displays <b>Proxy</b> for an entry that uses your SIP account. <b>P2P</b> displays for an entry that uses a different SIP server or goes directly to the callee's VoIP phone (peer-to-peer).
DELETE	Click this button to remove a phone book entry.

Table 13	Phonebook	(continued)
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LABEL	DESCRIPTION
EDIT	Click this button to change the phone book entry. The entry displays in the <b>Add New Entry</b> section of the screen where you can edit it.
CLEAR	Click CLEAR to erase all of your phone book entries.

### **12.16 Wireless Introduction**

A wireless LAN can be as simple as two wireless devices communicating in a peer-to-peer network or as complex as a number of wireless devices communicating through access points which bridge network traffic to the wired LAN.

Note: See the WLAN appendix for more detailed information on WLANs.

### 12.16.1 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 Prestige 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 **Wireless LAN** and **Wireless** to the display the **Wireless** screen.

### 12.17 Wireless Settings

When you turn the Prestige on, it searches for available wireless LAN Access Points (APs). It selects the AP with the best signal and restarts and attempts to connect to it.

Click **Wireless** to open the following screen if you want to enter a WEP key or manually specify other wireless settings.

WIRELESS SETTINGS	
Wireless Mode	802.11b_AdHoc Infrastructure
SSID	Steve
Channel(1-11)	6
Rate	
WEP	128bits 💌
Authentication Type	Open System O Shared Key
Key1	kolosolok
Key2	NORION .
Кеу3	Manageria Angelia
Кеу4	Marcala and a state of the stat
Default Key	Key1 💌
	APPLY CANCEL

Figure 32 Wireless Setting

#### Table 14 Wireless Setting

LABEL	DESCRIPTION
Wireless Mode	An <b>802.11b_AdHoc</b> network is the simplest WLAN configuration, defined as two or more wireless devices within range of each other that from an independent network without the need of an access point (AP).
	Select Infrastructure to access an AP.
SSID	(Service Set ID) 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. You can think of the SSID as being similar to a workgroup name in a Microsoft network.
Channel(1-11)	A channel is a radio frequency used by IEEE 802.11b wireless devices. Channels available depend on the AP you are connected to. The channel is determined automatically using the site survey feature.
Rate	The closer you are to an AP the stronger the signal and the faster the connection. Choose <b>Auto</b> to have the Prestige determine the best setting for your connection type.
WEP	If you are using a public AP, select <b>None</b> .
	Select an encryption level of <b>64bits</b> or <b>128bits</b> according to the encryption settings at your AP site.
	You must configure a WEP encryption key if the AP uses WEP.
Key 1 ~ 4	The WEP keys are used to encrypt data. Both the Prestige and the AP must use the same WEP key.
	If you chose 64-bit WEP, then enter 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 all four keys, but only one key can be activated at any one time. The default key is <b>Key 1</b> .

LABEL	DESCRIPTION
Default Key	Choose from the available WEP keys. Unless advised to do so by your VoIP provider, leave the default key as <b>Key 1</b>
APPLY	Click <b>APPLY</b> to save your changes without restarting the Prestige. Your wireless LAN, Internet and SIP settings changes do not take affect until you use <b>RESTART</b> (in the navigation panel).
CANCEL	Click <b>CANCEL</b> to begin configuring this screen afresh.

Table 14	Wireless Setting	(continued)
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### 12.18 System

Use this screen to set up the user account's user name and password, and configure the Prestige's time setting.

#### Figure 33 System

SYSTEM	
Login Username	admin
New Password	
Confirm Password	
Edit Time	04 : 15 (HH: 00~23 MM: 00~59 )
	APPLY CANCEL

#### Table 15 System

LABEL	DESCRIPTION
Login Username	Type in a name for regular user access. The default setting for this is "admin"
New Password	Type in a password. The default password for this setting is "1234"
Confirm Password	Type the new password again in this field.
Edit Time	Type the new time for the Prestige to display.
SUBMIT	Click SUBMIT to have the Prestige update to your new settings.
APPLY	Click <b>APPLY</b> to save your changes without restarting the Prestige.
CANCEL	Click CANCEL to begin configuring this screen afresh.

### 12.19 S/W Update

Click **S/W Update** to upload a new configuration or firmware file to your Prestige.

#### Figure 34 S/W Update

UPDATE	
Auto-provisioning by HTTP	http://10.1.1.254/ APPLY
Update Firmware	
Update Firmware by Web Browser	Browse Update
Update firmware by Web Server	http://10.1.1.254/ggsip_i_Update

#### Table 16 S/W Update

LABEL	DESCRIPTION
Auto-provisioning by HTTP	If there is an HTTP server set up to update the Prestige's configuration through auto-provisioning, type its IP address or domain name in this field. Click <b>APPLY</b> to have the Prestige check the server for the latest auto-provisioning file.
Update Firmware	<b>Note:</b> Remember that you must decompress compressed (.zip) files before you can upload them.
Update Firmware by Web Browser	Type in the location of the firmware file you want to upload in this field or click <b>Browse</b> to find it.
Update Firmware by Web Server	Type the location of a firmware file (on an HTTP server) that you want to upload in this field. Your network administrator or service provider must have an HTTP server set up with the firmware file in order for you to use this.
Browse	Click <b>Browse</b> to find the file you want to upload. Remember that you must decompress compressed (.zip) files before you can upload them.
Update	Click this button to begin the upload process. This process may take up to two minutes. The Prestige automatically restarts after you update the firmware.
	<b>Note:</b> Do not turn off the device or change it's configuration while firmware upload is in progress!

# CHAPTER 13 Administrator Web Configurator Screens

This chapter details the Prestige's administrator-accessible web configurator settings. Only edit these settings if you understand the technology involved.

**Note:** See Chapter 12 on page 67 for information on the fields that can be configured through the user account.

### **13.1 NAT Traversal Configuration**

Click **NAT TRVSL** to open the following screen. Administrator access allows you to configure the outbound proxy server address and port. If your ISP gave you an outbound proxy server address and port then enter them here.

Figure 35	NAT Traversal Configuration
-----------	-----------------------------

NAT TRAVERSAL		
Select Type	Disable NAT	
Outbound Proxy		
Outbound Proxy Server Address	192.168.0.191	
Outbound Proxy Server Port	5060	
STUN (RFC3489)		
STUN Server IP	192.168.0.191 : 3478	
STUN Interval(sec.)	200	
Fake WAN Address on SIP and RTP		
WAN IP Address	192.168.0.3	
WAN SIP Port	5060	
	APPLY CANCEL	

Table 17 NAT Traversal Configuration

LABEL	DESCRIPTION
Outbound Proxy	<b>Note:</b> If you were not given outbound proxy server details, then type the SIP proxy server settings.
Outbound Proxy Server Address	Type in the URL or IP address of your main outbound proxy server. This field is the destination address where your Prestige's SIP traffic is sent.
Outbound Proxy Server Port	Type in the port number to access proxy services.
APPLY	Click <b>APPLY</b> to save your changes without restarting the Prestige. Your wireless LAN, Internet and SIP settings changes do not take affect until you use <b>RESTART</b> (in the navigation panel).
CANCEL	Click <b>CANCEL</b> to begin configuring this screen afresh.

### **13.2 SIP Proxy Configuration**

Your Prestige is a SIP client and must connect to a SIP server. The SIP proxy server receives your Prestige's SIP requests and forwards them to the next SIP server in the network.

Use the following screen to set up your Prestige to connect to the SIP server.

Note: Enter either the IP address of your SIP server or the URL domain name as given to you by your ITSP.

SIP PROXY		
SIP URI	sip: 100	@ 192.168.0.3 : 5060
SIP Server Address	192.168.0.3	
SIP Server Port	5060	
Registrar Server Address	192.168.0.3	
Registrar Server Port	5060	
Register Expiry Time(sec.)	300	
OPTIONS Interval Timer	0	
Session Expiry Time(sec.)	0	
Display Name	NULL	
Authentication		
Registrar Username	username	
Registrar Password	Jelebelevek	
Registration Status	Not Registered	
	APPLY CANCE	L

#### 26 SID Config uratio

#### Table 18 IP Configuration

LABEL	DESCRIPTION
SIP Proxy	
SIP URI	Type the SIP telephone number assigned to your Prestige by your ITSP then the corresponding telephone IP address or URL, and finally a port number with which to make a telephone connection. Note that a URL can be used or domain name can be used instead of an IP address. Your incoming server supplies the rest of the address.
SIP Server Address	Type the IP address or domain name of the SIP server in this field. It doesn't matter whether the SIP server is a proxy, redirect or register server. You can use up to 95 ASCII characters.
SIP Server Port	Enter the SIP server's listening port for SIP in this field. Leave this field set to the default if your VoIP service provider did not give you a server port number for SIP.

LABEL	DESCRIPTION
Registrar Server Address	Enter the SIP register server's IP address or domain name in this field. You can use up to 95 ASCII characters.
	If you were not given a register server address, then enter the address from the SIP Server Address field again here.
Registrar Server Port	Enter the SIP register server's listening port for SIP in this field.
	If you were not given a register server port, then enter the port from the SIP Server Port field again here.
Register Expiry Time (sec.)	This field sets how long an entry remains registered with the SIP register server. After this time period expires, the SIP register server deletes the Prestige's entry from the database of registered SIP numbers. The register server can use a different time period. The Prestige sends another registration request after half of this configured time period has expired.
OPTIONS Interval Timer	The OPTIONS Interval Timer periodically sends a signal to the SIP Proxy Server to maintain the connection.
	Type a time in minutes to send a KeepAlive signal to the SIP Proxy Server. The default is 0, which disables this feature.
Session Expiry Time (sec.)	Use this field to set the longest time that the Prestige will allow a SIP session to remain idle (without traffic) before dropping it.
Display Name	Type a name to interoperate with other SIP devices. It is recommend to leave the default setting for this field.
SIP Service Domain	Enter the SIP service domain name in this field (the domain name that comes after the @ symbol in a full SIP URI). You can use up to 127 ASCII Extended set characters.
Authentication	
Registrar Username	Type in the username as supplied by your VoIP provider to access the SIP-Server.
Registrar Password	Type in the password to associate with the username above.
Registration Status	This displays either <b>Registered</b> or <b>Not Registered</b> depending on the success of your Prestige's connection to the SIP-Server.
APPLY	Click <b>APPLY</b> to save your changes without restarting the Prestige. Your wireless LAN, Internet and SIP settings changes do not take affect until you use <b>RESTART</b> (in the navigation panel).
CANCEL	Click <b>CANCEL</b> to begin configuring this screen afresh.

Table 18IP Configuration	(continued)
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### 13.3 Voice Coding

A codec (coder/decoder) codes analog voice signals into digital signals and decodes the digital signals back into voice signals. The Prestige supports the following codecs.

### 13.3.1 G.711

G.711 is a Pulse Code Modulation (PCM) waveform codec. G.711 provides very good sound quality but requires 64kbps of bandwidth.

Pulse Code Modulation (PCM) measures analog signal amplitudes at regular time intervals and converts them into bits.

#### 13.3.2 G.729

G.729 is an Analysis-by-Synthesis (AbS) hybrid waveform codec that uses a filter based on information about how the human vocal tract produces sounds. G.729 provides good sound quality and reduces the required bandwidth to 8kbps.

### 13.4 PSTN Call Setup Signaling

PSTNs (Public Switched Telephone Network)s use DTMF or pulse dialing to set up telephone calls.

(Dual-Tone MultiFrequency (DTMF) signaling uses pairs of frequencies (one lower frequency and one higher frequency) to set up calls. It is also known as Touch Tone®. Each of the keys on a DTMF telephone corresponds to a different pair of frequencies.

Pulse dialing sends a series of clicks to the local phone office in order to dial numbers.<sup>1</sup>

### 13.5 Phone Setting

Use this screen to configure the way your prestige handles telephone connections and codes voice-data.

#### Figure 37 PHONE

PHONE SETTINGS	
Default Voice Codec	G.729, 8k
Speaking Volume(-14~14)	5 💌
Listening Volume(-14~14)	-5 💌
RTP Port	2070
Jitter Buffer	⊂ Small ⊂ Medium . © Large
Voice Frames per Packet	⊂ Small ⊂ Medium . © Large
DTMF Relay	disable 💌
DTMF Payload(0~127)	0
	APPLY CANCEL

<sup>1.</sup> The Prestige supports DTMF at the time of writing.

LABEL	DESCRIPTION
Default Voice Codec	A voice codec (coder/decoder) converts voice data to electrical signals for transmission over a network.
	Use this field to select the type of voice coder/decoder (codec) that you want the Prestige to use. Choosing a voice codec depends on a tradeoff between transmission speed, sound quality and desired bandwidth usage. G.711 provides higher voice quality than G.729 but requires 64kbps of bandwidth while G.729 only requires 8kbps. The Prestige can only connect to other phones that use the same codec as the Prestige.
	If you want to use G.711, G.711u is used mainly in North America and G.711a is used in most of the rest of the world.
Speaking Volume(-14~14)	Select the default gain for the Prestige's microphone, where –14 is the minimum (least sensitive) and 14 is the maximum (most responsive).
	The callee may hear an echo if you set the microphone's volume to the maximum.
Listening Volume(-14~14)	Select the default speaker volume on the Prestige, where –14 is the minimum (quietest) and 14 is the maximum (loudest).
RTP Port	Real time Transport Protocol is used to handle voice data transfer. Use this field to configure the Prestige's listening port for RTP traffic. Leave this field set to the defaults if you were not given a RTP port to use.
Jitter Buffer	A larger receiving buffer allows the Prestige to rearrange data packets that arrive in the wrong order.
	Packets are dropped if they arrive out of order and the receiving buffer is full.
	Increasing the buffer size introduces latency. Too large and a significant delay could be introduced over a slow connection, too small and the signal may distort.
Voice Frames per Packet	Use smaller packet sizes to reduce the number of speech frames sent per packet. If a small packet does not reach its destination is it less significant than if the packet contained many speech frames.
DTMF Relay	Dual Tone Multi-Frequency signals are generated when you press a key on the Keypad and communicate information (such as telephone numbers) to the VoIP gateway.
	Select <b>disable</b> to send the DTMF digits uncompressed from the remaining protocols to use a compression method to match that of your ITSP's.
	Select <b>Inband(RFC 2833)</b> to send the DTMF tones in RTP packets.
DTMF Payload (0-127)	This field allows you to set the DTMF payload type. It is recommended to leave the default setting for this field.
APPLY	Click <b>APPLY</b> to save your changes without restarting the Prestige. Your wireless LAN, Internet and SIP settings changes do not take affect until you use <b>RESTART</b> (in the navigation panel).
CANCEL	Click <b>CANCEL</b> to begin configuring this screen afresh.

### 13.6 System

Administrator access allows you to use this screen to set up the Prestige's administrator user name and password.



SYSTEM	
Login Username	admin
New Password	
Confirm Password	
Admin Login username	zyxeladmin
Admin New Password	
Admin Confirm Password	
Edit Time	04 : 47 (HH: 00~23 MM: 00~59 )
	APPLY CANCEL

#### Table 20 System

LABEL	DESCRIPTION
Admin Login username	The default setting for this is "zyxeladmin".
Admin New Password	Type in a password. The default password is "1234"
Admin Confirm Password	Type the new password again in this field.
APPLY	Click <b>APPLY</b> to save your changes without restarting the Prestige. Your wireless LAN, Internet and SIP settings changes do not take affect until you use <b>RESTART</b> (in the navigation panel).
CANCEL	Click CANCEL to begin configuring this screen afresh.

### 13.7 Quality of Service

Quality of Service refers to both a network's ability to deliver data with minimum delay, and the networking methods used to provide bandwidth for real-time multimedia applications. Network traffic can be classified by setting the TOS (Type Of Service) values at the data source (for example, at the Prestige) so a server can decide the best method of delivery i.e. least cost, fastest route etc.

### 13.8 ToS

The second byte in an IPv4 packet is the Type of Service (ToS) byte. The first three bits (by themselves) of the ToS byte are referred to as the IP Precedence bits and refer to a priority from 0 to 7. The next three bits are used in conjunction with the IP Precedence bits to define the Diffserv Code Point protocol (DSCP bits). The last two bits are reserved for future use.

### **13.9 Introduction to DiffServ**

Quality of Service (QOS) mechanisms provides the best service on a per-flow guarantee. To fine-tune the levels of services on the priority of the traffic flow using QoS places a heavy burden on the network infrastructure.

DiffServ is a class of service (CoS) model that marks packets so that they receive specific perhope treatment at DiffServ-compliant network devices along the route based on the application types and traffic flow. Packets are marked with DiffServ Code Points (DSCPs) indicating the level of service desired. This allows the intermediary DiffServ-compliant network devices to handle the packets differently depending on the code points without the need to negotiate paths or remember state information for every flow. In addition, applications do not have to request a particular service or give advanced notice of where the traffic is going.

**Note:** It is strongly recommended for better network performance that the settings are left as per their defaults.

ToS/DIFFSERV	
ToS/DiffServ (00~ff)	00
	APPLY CANCEL

#### Figure 39 TOS/DIFFSERV

#### Table 21TOS/DIFFSERV

LABEL	DESCRIPTION	
ToS/DiffServ (00~FF)	Type the HEX code that represents the best method for data transmission.	
APPLY	Click <b>APPLY</b> to save your changes without restarting the Prestige. Your wireless LAN, Internet and SIP settings changes do not take affect until you use <b>RESTART</b> (in the navigation panel).	
CANCEL	Click CANCEL to begin configuring this screen afresh.	

# **CHAPTER 14** Troubleshooting

This chapter covers potential problems and the corresponding remedies.

### 14.1 Problems Starting Up the Prestige

 Table 22
 Troubleshooting the Start-Up of Your Prestige

PROBLEM	CORRECTIVE ACTION	
The Prestige	Make sure you have the battery installed and charged.	
does not turn on.	Remove the Prestige's battery and reinstall it.	
	If the error persists, you may have a hardware problem. In this case, you should contact your vendor.	

### 14.2 Warning Message Troubleshooting

The Prestige displays warning messages when it detects a condition that may disrupt your Prestige service.

Warning Message	CORRECTIVE ACTION
Battery Low ( 🔲 is blinking)	The battery's power is low. Recharge the battery.
Weak Signal (	The signal quality is low or the Prestige cannot find the AP. Connect to another AP. Move your Prestige closer to the AP. There may be too much radio interference (for example a microwave or another AP using the same channel) around your wireless network. Relocate or reduce the radio interference.

 Table 23
 Warning Message Troubleshooting

### 14.3 Error Message Troubleshooting

The Prestige displays error messages to let you know that an error has occurred. An error may prevent you from connecting to the network or from using the Prestige. For some of the error messages, you may need to contact the system administrator to resolve the problem.

Error Message	CORRECTIVE ACTION		
Battery Low (	The battery's power is low. Recharge the battery.		
No AP Found ( 🚽 is blinking)	The SSID set on the Prestige does not match any of the Service Set Identifiers (SSIDs) of the APs that are within range of the Prestige.		
3 <b>1</b>	Set the Prestige to a different SSID (you can use the site survey feature).		
	Move your Prestige closer to the AP.		
"Net Fail!	The Prestige failed to obtain an IP address from a DHCP server.		
(DHCP)"	Make sure your wireless LAN settings are correct.		
	Make sure the DHCP server is operating properly.		
	Restart the Prestige.		
"Net Fail!	The Prestige failed to obtain an IP address from the ISP.		
(PPPoE)"	Make sure your PPPoE settings are correct.		
	Restart the Prestige.		
"Not	The Prestige failed to register with the SIP proxy server.		
Registered"	It is still possible to place a direct IP to IP call without the SIP proxy server. You must create and use a phonebook entry (see Section 12.14 on page 85).		
	Check your SIP settings.		
	Contact your voice service provider.		

 Table 24
 Error Message Troubleshooting

### 14.4 Loading the Default IP Address

Do the following to return the Prestige to it's factory default IP address.

- **1** Turn the Prestige off.
- 2 Press the Call key and hold it down while you press the On key.
- **3** A message displays (see the following figure) indicating the Prestige has returned to the default IP address (192.168.1.3)

Figure 40 Load IP Address

Load Default IP <<Release Key!>>

### 14.5 Restoring the Factory Default Settings

Follow these directions to set the Prestige back to the factory default settings.

- **1** Turn the Prestige off.
- 2 Press the Left key and hold it down while you press the On
- **3** A message displays (see the following figure) indicating the Prestige has returned to the factory default settings.

Figure 41 Load Factory Default Settings

<<Load Default>> << Factory >>

## Appendix A Product Specifications

See also the Introduction chapter for a general overview of the key features.

### **Specification Tables**

Default IP Address	192.168.1.3	
Default Subnet Mask	255.255.255.0 (24 bits)	
Default User Account User name and Password	admin, 1234	
Default Administrator Account Password	zyxeladmin, 1234	
Dimensions	40 (W) x 128 (L) x 0.8(H) mm	
LCD Module	112x64 Graphic Mode	
LCD Backlight	4 blue LED	
Keypad	12 number key, 8 function key	
Keypad Light	Blue LED	
Antenna	2.4GHz dipole, Gain: 1.3 dBi	
Receiver & Speaker	Speaker: 85dB, 8 ohm Receiver: 116dB, 8 ohm	
MIC	Sensitivity: -42dB ± 3 dB, 100 HZ ~ 10K HZ	
Codec	G.711/G.729a	
Ear Jack	Jack for connecting a mono earphone and microphone headset (not included)	
Operating Temperature	0° C ~ 40° C	
Operating Voltage	3.03V ± 5%, 1.8V ± 5%	
Battery	Li-ion 1350 mAh, UL and CE certifications	
Charger	Seat type charger	
Power Adaptor of Charger Seat	DC 5V 2A	

#### Table 25 Hardware Specifications

Network	IP address assignment: Fixed IP, DHCP, PPPoE HTTP, TFTP, TCP, UDP, DNS, ARP, ICMP		
Management	LCD screen menus Embedded Web Configurator Auto-provisioning: The Prestige acts as a HTTP client to receive configuration file from HTTP server automatically when booting up		
Wireless	ESSID Channel ID configurable IEEE 802.11b Frequency Range: 2.4 GHz Wired Equivalent Privacy (WEP) Data Encryption 64/128 bit Site Survey Feature (Scan AP) Data Rates: 11 Mbps and Auto Fallback		
Voice Features	SIP (Session Initiating Protocol, RFC 3261) version 2 SDP (Session Description Protocol, RFC2327) RTP (RFP1889) RTCP (RFC1890) G711, G.729a/b codecs (G.729a recommended) G.168 echo cancellation Silence Suppression / Voice Activity Detection (VAD) Comfort Noise Generation (CNG) Phone book· Volume adjustable during calls Dialing Tone, Ring Back Tone, Busy Tone, Ring Tone, Holding Tone and Howler Ton Dynamic Jitter Butter. DTMF Detection and Generation DTMF: In-band and Out-band traffic (RFC2833),(PCM), (SIP INFO) Point-to-point call establishment between two Prestiges Quick dialing through predefined phone book, which maps the phone dialing number and destination URL. Caller ID support.		
Other Features	QoS Support SNTP server to update date and time SSL log in (option) MD5 support for SIP account Watchdog timer with automatic restart function		

 Table 26
 Firmware Features

## Appendix B IP Subnetting

### **IP Addressing**

Routers "route" based on the network number. The router that delivers the data packet to the correct destination host uses the host ID.

### **IP Classes**

An IP address is made up of four octets (eight bits), written in dotted decimal notation, for example, 192.168.1.1. IP addresses are categorized into different classes. The class of an address depends on the value of its first octet.

- Class "A" addresses have a 0 in the left most bit. In a class "A" address the first octet is the network number and the remaining three octets make up the host ID.
- Class "B" addresses have a 1 in the left most bit and a 0 in the next left most bit. In a class "B" address the first two octets make up the network number and the two remaining octets make up the host ID.
- Class "C" addresses begin (starting from the left) with 1 1 0. In a class "C" address the first three octets make up the network number and the last octet is the host ID.
- Class "D" addresses begin with 1 1 1 0. Class "D" addresses are used for multicasting. (There is also a class "E" address. It is reserved for future use.)

IP ADDRESS:		OCTET 1	OCTET 2	OCTET 3	OCTET 4
Class A	0	Network number	Host ID	Host ID	Host ID
Class B	10	Network number	Network number	Host ID	Host ID
Class C	110	Network number	Network number	Network number	Host ID

Table 27 Classes of IP Addresses

Note: Host IDs of all zeros or all ones are not allowed.

Therefore:

A class "C" network (8 host bits) can have  $2^8 - 2$  or 254 hosts.

A class "B" address (16 host bits) can have  $2^{16}$  –2 or 65534 hosts.

A class "A" address (24 host bits) can have 2<sup>24</sup> –2 hosts (approximately 16 million hosts).

Since the first octet of a class "A" IP address must contain a "0", the first octet of a class "A" address can have a value of 0 to 127.

Similarly the first octet of a class "B" must begin with "10", therefore the first octet of a class "B" address has a valid range of 128 to 191. The first octet of a class "C" address begins with "110", and therefore has a range of 192 to 223.

CLASS	ALLOWED RANGE OF FIRST OCTET (BINARY)	ALLOWED RANGE OF FIRST OCTET (DECIMAL)
Class A	<b>0</b> 0000000 to <b>0</b> 1111111	0 to 127
Class B	<b>10</b> 000000 to <b>10</b> 111111	128 to 191
Class C	<b>110</b> 00000 to <b>110</b> 11111	192 to 223
Class D	<b>1110</b> 0000 to <b>1110</b> 1111	224 to 239

Table 28 Allowed IP Address Range By Class

### **Subnet Masks**

A subnet mask is used to determine which bits are part of the network number, and which bits are part of the host ID (using a logical AND operation). A subnet mask has 32 is a "1" then the corresponding bit in the IP address is part of the network number. If a bit in the subnet mask is "0" then the corresponding bit in the IP address is part of the host ID.

Subnet masks are expressed in dotted decimal notation just as IP addresses are. The "natural" masks for class A, B and C IP addresses are as follows.

CLASS	NATURAL MASK
А	255.0.0.0
В	255.255.0.0
С	255.255.255.0

Table 29 "Natural" Masks

### Subnetting

With subnetting, the class arrangement of an IP address is ignored. For example, a class C address no longer has to have 24 bits of network number and 8 bits of host ID. With subnetting, some of the host ID bits are converted into network number bits. By convention, subnet masks always consist of a continuous sequence of ones beginning from the left most bit of the mask, followed by a continuous sequence of zeros, for a total number of 32 bits.

Since the mask is always a continuous number of ones beginning from the left, followed by a continuous number of zeros for the remainder of the 32 bit mask, you can simply specify the number of ones instead of writing the value of each octet. This is usually specified by writing a "/" followed by the number of bits in the mask after the address.

For example, 192.1.1.0 /25 is equivalent to saying 192.1.1.0 with mask 255.255.255.128.

The following table shows all possible subnet masks for a class "C" address using both notations.

SUBNET MASK IP ADDRESS	SUBNET MASK "1" BITS	LAST OCTET BIT VALUE
255.255.255.0	/24	0000 0000
255.255.255.128	/25	1000 0000
255.255.255.192	/26	1100 0000
255.255.255.224	/27	1110 0000
255.255.255.240	/28	1111 0000
255.255.255.248	/29	1111 1000
255.255.255.252	/30	1111 1100

Table 30 Alternative Subnet Mask Notation

The first mask shown is the class "C" natural mask. Normally if no mask is specified it is understood that the natural mask is being used.

### **Example: Two Subnets**

As an example, you have a class "C" address 192.168.1.0 with subnet mask of 255.255.255.0.

	NETWORK NUMBER	HOST ID
IP Address	192.168.1.	0
IP Address (Binary)	11000000.10101000.00000001.	0000000
Subnet Mask	255.255.255.	0
Subnet Mask (Binary)	11111111.1111111.11111111.	0000000

 Table 31
 Two Subnets Example

The first three octets of the address make up the network number (class "C"). You want to have two separate networks.

Divide the network 192.168.1.0 into two separate subnets by converting one of the host ID bits of the IP address to a network number bit. The "borrowed" host ID bit can be either "0" or "1" thus giving two subnets; 192.168.1.0 with mask 255.255.255.128 and 192.168.1.128 with mask 255.255.255.128.

**Note:** In the following charts, shaded/bolded last octet bit values indicate host ID bits "borrowed" to form network ID bits. The number of "borrowed" host ID bits determines the number of subnets you can have. The remaining number of host ID bits (after "borrowing") determines the number of hosts you can have on each subnet.

Table 32	Subnet 1
----------	----------

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	0
IP Address (Binary)	11000000.10101000.00000001.	<b>0</b> 000000
Subnet Mask	255.255.255.	128
Subnet Mask (Binary)	11111111.1111111.11111111.	1000000
Subnet Address: 192.168.1.0	Lowest Host ID: 192.168.1.1	
Broadcast Address: 192.168.1.127	Highest Host ID: 192.168.1.126	

#### Table 33 Subnet 2

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	128
IP Address (Binary)	11000000.10101000.00000001.	1000000
Subnet Mask	255.255.255.	128
Subnet Mask (Binary)	11111111.1111111.11111111.	1000000
Subnet Address: 192.168.1.128	Lowest Host ID: 192.168.1.129	
Broadcast Address: 192.168.1.255	Highest Host ID: 192.168.1.254	

The remaining 7 bits determine the number of hosts each subnet can have. Host IDs of all zeros represent the subnet itself and host IDs of all ones are the broadcast address for that subnet, so the actual number of hosts available on each subnet in the example above is  $2^7 - 2$  or 126 hosts for each subnet.

192.168.1.0 with mask 255.255.255.128 is the subnet itself, and 192.168.1.127 with mask 255.255.255.128 is the directed broadcast address for the first subnet. Therefore, the lowest IP address that can be assigned to an actual host for the first subnet is 192.168.1.1 and the highest is 192.168.1.126. Similarly the host ID range for the second subnet is 192.168.1.129 to 192.168.1.254.
## **Example: Four Subnets**

#### Table 34 Subnet 1

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	0
IP Address (Binary)	11000000.10101000.00000001.	<b>00</b> 000000
Subnet Mask (Binary)	11111111.1111111.11111111.	11000000
Subnet Address: 192.168.1.0	Lowest Host ID: 192.168.1.1	
Broadcast Address: 192.168.1.63	Highest Host ID: 192.168.1.62	

#### Table 35 Subnet 2

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	64
IP Address (Binary)	11000000.10101000.00000001.	<b>01</b> 000000
Subnet Mask (Binary)	11111111.1111111.11111111.	<b>11</b> 000000
Subnet Address: 192.168.1.64	Lowest Host ID: 192.168.1.65	
Broadcast Address: 192.168.1.127	Highest Host ID: 192.168.1.126	

#### Table 36 Subnet 3

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	128
IP Address (Binary)	11000000.10101000.00000001.	<b>10</b> 000000
Subnet Mask (Binary)	11111111.1111111.11111111.	<b>11</b> 000000
Subnet Address: 192.168.1.128	Lowest Host ID: 192.168.1.129	
Broadcast Address: 192.168.1.191	Highest Host ID: 192.168.1.190	

#### Table 37 Subnet 4

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	192
IP Address (Binary)	11000000.10101000.00000001.	11000000
Subnet Mask (Binary)	11111111.1111111.11111111.	11000000
Subnet Address: 192.168.1.192	Lowest Host ID: 192.168.1.193	
Broadcast Address: 192.168.1.255	Highest Host ID: 192.168.1.254	

# **Example Eight Subnets**

Similarly use a 27-bit mask to create 8 subnets (001, 010, 011, 100, 101, 110).

The following table shows class C IP address last octet values for each subnet.

SUBNET	SUBNET ADDRESS	FIRST ADDRESS	LAST ADDRESS	BROADCAST ADDRESS
1	0	1	30	31
2	32	33	62	63
3	64	65	94	95
4	96	97	126	127
5	128	129	158	159
6	160	161	190	191
7	192	193	222	223
8	224	225	254	255

Table 38	Eight Subnets
----------	---------------

The following table is a summary for class "C" subnet planning.

 Table 39
 Class C Subnet Planning

NO. "BORROWED" HOST BITS	SUBNET MASK	NO. SUBNETS	NO. HOSTS PER SUBNET
1	255.255.255.128 (/25)	2	126
2	255.255.255.192 (/26)	4	62
3	255.255.255.224 (/27)	8	30
4	255.255.255.240 (/28)	16	14
5	255.255.255.248 (/29)	32	6
6	255.255.255.252 (/30)	64	2
7	255.255.255.254 (/31)	128	1

# Subnetting With Class A and Class B Networks.

For class "A" and class "B" addresses the subnet mask also determines which bits are part of the network number and which are part of the host ID.

A class "B" address has two host ID octets available for subnetting and a class "A" address has three host ID octets (see Table 27 on page 105) available for subnetting.

The following table is a summary for class "B" subnet planning.

NO. "BORROWED" HOST BITS	SUBNET MASK	NO. SUBNETS	NO. HOSTS PER SUBNET
1	255.255.128.0 (/17)	2	32766
2	255.255.192.0 (/18)	4	16382
3	255.255.224.0 (/19)	8	8190
4	255.255.240.0 (/20)	16	4094
5	255.255.248.0 (/21)	32	2046
6	255.255.252.0 (/22)	64	1022
7	255.255.254.0 (/23)	128	510
8	255.255.255.0 (/24)	256	254
9	255.255.255.128 (/25)	512	126
10	255.255.255.192 (/26)	1024	62
11	255.255.255.224 (/27)	2048	30
12	255.255.255.240 (/28)	4096	14
13	255.255.255.248 (/29)	8192	6
14	255.255.255.252 (/30)	16384	2
15	255.255.255.254 (/31)	32768	1

Table 40 Class B Subnet Planning

# Appendix C PPPoE

# **PPPoE in Action**

An ADSL modem bridges a PPP session over Ethernet (PPP over Ethernet, RFC 2516) from your computer to an ATM PVC (Permanent Virtual Circuit) which connects to a DSL Access Concentrator where the PPP session terminates (see Figure 42 on page 114). One PVC can support any number of PPP sessions from your LAN. PPPoE provides access control and billing functionality in a manner similar to dial-up services using PPP.

# **Benefits of PPPoE**

PPPoE offers the following benefits:

It provides you with a familiar dial-up networking (DUN) user interface.

It lessens the burden on the carriers of provisioning virtual circuits all the way to the ISP on multiple switches for thousands of users. For GSTN (PSTN and ISDN), the switching fabric is already in place.

It allows the ISP to use the existing dial-up model to authenticate and (optionally) to provide differentiated services.

# **Traditional Dial-up Scenario**

The following diagram depicts a typical hardware configuration where the computers use traditional dial-up networking.



#### Figure 42 Single-Computer per Router Hardware Configuration

#### **How PPPoE Works**

The PPPoE driver makes the Ethernet appear as a serial link to the computer and the computer runs PPP over it, while the modem bridges the Ethernet frames to the Access Concentrator (AC). Between the AC and an ISP, the AC is acting as a L2TP (Layer 2 Tunneling Protocol) LAC (L2TP Access Concentrator) and tunnels the PPP frames to the ISP. The L2TP tunnel is capable of carrying multiple PPP sessions.

With PPPoE, the VC (Virtual Circuit) is equivalent to the dial-up connection and is between the modem and the AC, as opposed to all the way to the ISP. However, the PPP negotiation is between the computer and the ISP.

# Prestige as a PPPoE Client

When using the Prestige as a PPPoE client, the computers on the LAN see only Ethernet and are not aware of PPPoE. This alleviates the administrator from having to manage the PPPoE clients on the individual computers.





# Appendix D Wireless LANs

# **Wireless LAN Topologies**

This section discusses ad-hoc and infrastructure wireless LAN topologies.

#### **Ad-hoc Wireless LAN Configuration**

The simplest WLAN configuration is an independent (Ad-hoc) WLAN that connects a set of computers with wireless stations (A, B, C). Any time two or more wireless adapters are within range of each other, they can set up an independent network, which is commonly referred to as an Ad-hoc network or Independent Basic Service Set (IBSS). The following diagram shows an example of notebook computers using wireless adapters to form an Ad-hoc wireless LAN.



Figure 44 Peer-to-Peer Communication in an Ad-hoc Network

#### BSS

A Basic Service Set (BSS) exists when all communications between wireless stations or between a wireless station and a wired network client go through one access point (AP).

Intra-BSS traffic is traffic between wireless stations in the BSS. When Intra-BSS is enabled, wireless station A and B can access the wired network and communicate with each other. When Intra-BSS is disabled, wireless station A and B can still access the wired network but cannot communicate with each other.





#### ESS

An Extended Service Set (ESS) consists of a series of overlapping BSSs, each containing an access point, with each access point connected together by a wired network. This wired connection between APs is called a Distribution System (DS).

This type of wireless LAN topology is called an Infrastructure WLAN. The Access Points not only provide communication with the wired network but also mediate wireless network traffic in the immediate neighborhood.

An ESSID (ESS IDentification) uniquely identifies each ESS. All access points and their associated wireless stations within the same ESS must have the same ESSID in order to communicate.



Figure 46 Infrastructure WLAN

# Channel

A channel is the radio frequency(ies) used by IEEE 802.11a/b/g wireless devices. Channels available depend on your geographical area. You may have a choice of channels (for your region) so you should use a different channel than an adjacent AP (access point) to reduce interference. Interference occurs when radio signals from different access points overlap causing interference and degrading performance.

Adjacent channels partially overlap however. To avoid interference due to overlap, your AP should be on a channel at least five channels away from a channel that an adjacent AP is using. For example, if your region has 11 channels and an adjacent AP is using channel 1, then you need to select a channel between 6 or 11.

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