CHAPTER 8 Home Networking

8.1 Home Networking Overview

A Local Area Network (LAN) is a shared communication system to which many networking devices are connected. It is usually located in one immediate area such as a building or floor of a building.

Use the LAN screens to help you configure a LAN DHCP server and manage IP addresses.



8.1.1 What You Can Do in this Chapter

- Use the LAN Setup screen to set the LAN IP address, subnet mask, and DHCP settings of your Zyxel Device (Section 8.2 on page 133).
- Use the **Static DHCP** screen to assign IP addresses on the LAN to specific individual computers based on their MAC addresses (Section 8.3 on page 137).
- Use the **UPnP** screen to enable UPnP and UPnP NAT traversal on the Zyxel Device (Section 8.4 on page 139).
- Use the Additional Subnet screen to configure IP alias and public static IP (Section 8.5 on page 144).
- Use the **STB Vendor ID** screen to configure the Vendor IDs of the connected Set Top Box (STB) devices, which have the Zyxel Device automatically create static DHCP entries for the STB devices when they request IP addresses (Section 8.6 on page 145).
- Use the Wake on LAN screen to remotely turn on a device on the network. (Section 8.7 on page 146).
- Use the **TFTP Server Name** screen to identify a TFTP server for configuration file download using DHCP option 66. (Section 8.8 on page 146).

8.1.2 What You Need To Know

8.1.2.1 About LAN

IP Address

IP addresses identify individual devices on a network. Every networking device (including computers, servers, routers, printers, and so on) needs an IP address to communicate across the network. These networking devices are also known as hosts.

Subnet Mask

Subnet masks determine the maximum number of possible hosts on a network. You can also use subnet masks to divide one network into multiple sub-networks.

DHCP

A DHCP (Dynamic Host Configuration Protocol) server can assign your Zyxel Device an IP address, subnet mask, DNS and other routing information when it is turned on.

DNS

DNS (Domain Name System) is for mapping a domain name to its corresponding IP address and vice versa. The DNS server is extremely important because without it, you must know the IP address of a networking device before you can access it.

RADVD (Router Advertisement Daemon)

When an IPv6 host sends a Router Solicitation (RS) request to discover the available routers, RADVD with Router Advertisement (RA) messages in response to the request. It specifies the minimum and maximum intervals of RA broadcasts. RA messages containing the address prefix. IPv6 hosts can be generated with the IPv6 prefix an IPv6 address.

8.1.2.2 About UPnP

Identifying UPnP Devices

UPnP hardware is identified as an icon in the Network Connections folder (Windows 10). Each UPnP compatible device installed on your network will appear as a separate icon. Selecting the icon of a UPnP device will allow you to access the information and properties of that device.

NAT Traversal

UPnP NAT traversal automates the process of allowing an application to operate through NAT. UPnP network devices can automatically configure network addressing, announce their presence in the network to other UPnP devices and enable exchange of simple product and service descriptions. NAT traversal allows the following:

- Dynamic port mapping
- Learning public IP addresses
- Assigning lease times to mappings

Windows Messenger is an example of an application that supports NAT traversal and UPnP.

See the Chapter 11 on page 179 for more information on NAT.

Cautions with UPnP

The automated nature of NAT traversal applications in establishing their own services and opening firewall ports may present network security issues. Network information and configuration may also be obtained and modified by users in some network environments.

When a UPnP device joins a network, it announces its presence with a multicast message. For security reasons, the Zyxel Device allows multicast messages on the LAN only.

All UPnP-enabled devices may communicate freely with each other without additional configuration. Disable UPnP if this is not your intention.

UPnP and Zyxel

Zyxel has achieved UPnP certification from the Universal Plug and Play Forum UPnP™ Implementers Corp. (UIC). Zyxel's UPnP implementation supports Internet Gateway Device (IGD) 1.0.

See Section 8.4.1 on page 140 for examples of installing and using UPnP.

Finding Out More

See Section 8.9 on page 147 for technical background information on LANs.

8.1.3 Before You Begin

Find out the MAC addresses of your network devices if you intend to add them to the DHCP Client List screen.

8.2 LAN Setup

Use this screen to set the Local Area Network IP address and subnet mask of your Zyxel Device. Configure DHCP settings to have the Zyxel Device or a DHCP server assign IP addresses to devices. Click **Network Setting > Home Networking** to open the **LAN Setup** screen.

Follow these steps to configure your LAN settings.

- 1 Enter an IP address into the **IP Address** field. The IP address must be in dotted decimal notation. This will become the IP address of your Zyxel Device.
- 2 Enter the IP subnet mask into the **IP Subnet Mask** field. Unless instructed otherwise it is best to leave this alone, the configurator will automatically compute a subnet mask based upon the IP address you entered.

3 Click **Apply** to save your settings.

Figure 69 Network Setting > Home Networking > LAN Setup

nterface Group								
Group Name	Default					•		
AN IP Setup								
IP Address	192	168		1		ж.		
Subred Mask	255	255		255		0		
CMB Secondar								
Arthur	-							
ICMP Mode DHCP Server State	 Standard Mode (Booking	g Mode					
DHCP	🔹 Enable 🔿 Disable	- dibik	CP Relay					
P Addressing Values								
beginning IP Address	192	3.68		10		2		
Ending IP Address	192	168	64.5	10	5	254		
Auto reserve IP for the same host	0>							
OHCP Server Lease Time								
1 dayı	0 hours		0		minutes			
DNS Values								
DNS	DNS Proxy 🔘 Stat	ic O fro	om 15P					
AN IPvé Mode Setup								
IPvil Activo	C							
and a second sec								
EUM4								
 E3/64 Manual 								
BM4 Manual Manual An Global Identifier Type								
E0144 Manuar Manuar AN Global Identifier Type E0164								
ESH4 Manual Manual ESH4 ESH4 Manual Manual Manual								
EUH4 Manuar Manuar EUH4 UH44 Manuar Manuar AN IPv6 Prefix Setup								
ESH4 Manual Manual EU64 Manual Manual North Profix Setup Delegate prefix Euron WAN Def	sut							
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Edit4 Manual AN Global Identifier Type Edit4 Manual An IPv6 Prefix Setup Desegate prefix Econ WAN State ALD Snooping Active	tu:							
EdM4 Monual Monual EDM4 United EdM6 EDM64 Monual An IPV6 Prefix Setup Econ WAN Def Static MLD Snooping Active MLD Mode	out Out	Bocking	g Mode		Ţ			
Edit4 Manual AN Global Identifier Type Edit4 Manual An Grobal Identifier Type Edita4 Defender prefix Setup Defender prefix Active NDD Snooping Active NDD Maae An IPv6 Address Assign 5	out Standard Mode etup	Bocking	g Mode		•			
Edit4 Manual AN Global Identifier Type Edit4 Manual AN IPv6 Prefix Setup Defeorement Defeorement Stanc Active NLD Snooping Active NLD Macie Stateles.	out O Standard Mode (etup	Booking	g Maas		ļ			
Edit4 Manual AN Global Identifier Type Edit4 Manual AN Flobal Identifier Type Editat Def State ALD Snooping Active MLD Mode AN IPv6 Address Assign S Stateless AN IPv6 DNS Assign Setup	ouf O Standard Mode (etup	e Bookry	g Mode		Ŧ			
ESH4 Manual AN Global Identifier Type EUI64 Manual AN IPv6 Prefix Setup Def State AN IPv6 Prefix Setup Active ALD Snooping Active AN IPv6 Address Assign S Statelets AN IPv6 DNS Assign Setup From RA & DHCPv6 Server	out Standard Mode elup	# Bocking	g Mode		•			
E0H4 Monual Monual E0H4 Monual E0H4 Monual Monual Monual Monual Monual State Eom WAN State MID Mode AN IPv6 DNS Assign Setup Inter RA & DHCPv6 Server From RA & DHCPv6 Server HCPv6 Configuration	out Continues of the second se	e Booker	g Maas					
EUH4 Manuar AN Global Identifier Type EUH4 Manuar Defectors Defectors AD Defectors AD Defectors AD Defectors AD Invé Address Assign S Statelers AN IPvé ANS Assign Setur From RA & DHCPvé Server HCPvé Configuration DHCPvé Active	out Standard Mode etup DHDPv6 Server	• Bocking	g Mode					
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EDI44 Manual AN Global Identifier Type EDI44 Manual Delegate prefix Enn WAN Manual Delegate prefix Enn WAN Dele	ouff Standard Mode etup DHCPv6 Server State Enable	Booking	a Maas					
EDH4 Manual Manual Manual Manual Euse Euse Euse Manual Ma	out out out out out out out out	e Booders	a Mode					
Edit4 Manual AN Global Identifier Type Edit4 Manual AN Global Identifier Type Edit4 Manual AN IPv6 Prefix Setup Defention State AN IPv6 Prefix Setup AD Mode AN IPv6 Address Assign S Stateless AN IPv6 Address Assign S Stateless AN IPv6 Configuration DFCPv6 Configuration DFCPv6 Active Pv6 Router Advertisement RADVD Active Pv6 DNS Values Pv6 DNS Values	ouit c) Standard Mode etup c) Standard Mode etup to C) Standard Mode etup	e Booding	g Mode					
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ESH4 Manuar AN Global Identifier Type EUR4 Manuar Childentifier Type Euro AN Global Identifier Type Euro AN IPv6 Prefix Setup Childentifier Type Childentif	Cut Standard Mode Standard Mode Etup	 Boolary The second s	a Node					

The following table describes the fields in this screen.

Table 32 Network Setting > Home Networking > LAN Setup

LABEL	DESCRIPTION
Interface Group	
Group Name	Select the interface group name for which you want to configure LAN settings. See Chapter 15 on page 206 for how to create a new interface group.
LAN IP Setup	
IP Address	Enter the LAN IPv4 IP address you want to assign to your Zyxel Device in dotted decimal notation, for example, 192.168.1.1 (factory default).
Subnet Mask	Type the subnet mask of your network in dotted decimal notation, for example 255.255.255.0 (factory default). Your Zyxel Device automatically computes the subnet mask based on the IP address you enter, so do not change this field unless you are instructed to do so.
IGMP Snooping	
Active	Select Enable to allow the Zyxel Device to passively learn multicast group.
IGMP Mode	Select Standard Mode to forward multicast packets to a port that joins the multicast group and broadcast unknown multicast packets from the WAN to all LAN ports.
	Select Blocking Mode to block all unknown multicast packets from the WAN.
DHCP Server State	9
DHCP	Select Enable to have the Zyxel Device act as a DHCP server or DHCP relay agent.
	Select Disable to stop the DHCP server on the Zyxel Device.
	Select DHCP Relay to have the Zyxel Device forward DHCP request to the DHCP server.
DHCP Relay Server Address	This field is only available when you select DHCP Relay in the DHCP field.
IP Address	Enter the IPv4 IP address of the actual remote DHCP server in this field.
IP Addressing Values	This field is only available when you select Enable in the DHCP field.
Beginning IP Address	This field specifies the first of the contiguous addresses in the IP address pool.
Ending IP Address	This field specifies the last of the contiguous addresses in the IP address pool.
Auto reserve IP for the same host	Click this switch to have the Zyxel Device record DHCP IP addresses with the MAC addresses the IP addresses are assigned to. When the switch goes to the right , the function is enabled. Otherwise, it is not.
	The Zyxel Device assigns the same IP address to the same MAC address when the host requests an IP address again through DHCP.
DHCP Server Lease Time	This is the period of time DHCP-assigned addresses is used. DHCP automatically assigns IP addresses to clients when they log in. DHCP centralizes IP address management on central computers that run the DHCP server program. DHCP leases addresses, for a period of time, which means that past addresses are "recycled" and made available for future reassignment to other systems.
	This field is only available when you select Enable in the DHCP field.
Days/Hours/ Minutes	Enter the lease time of the DHCP server.
DNS Values	This field is only available when you select Enable in the DHCP field.
DNS	Select the type of service that you are registered for from your DNS service provider (From ISP).
	Select DNS Proxy if you have the DNS proxy service. The Zyxel Device redirects clients' DNS queries to a DNS server for resolving domain names.
	Select Static if you have the static DNS service.

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LABEL	DESCRIPTION		
DNS Server 1/2	Enter the first and second DNS (Domain Name System) server IP addresses the Zyxel Device passes to the DHCP clients.		
LAN IPv6 Mode Setup			
IPv6 Active	Click this switch to enable or disable the IPv6 mode and configure IPv6 settings on the Zyxel Device. When the switch goes to the right, the function is enabled. Otherwise, it is not.		
Link Local Addres	s Type		
EUI64	Select this to have the Zyxel Device generate an interface ID for the LAN interface's link-local address using the EUI-64 format.		
Manual	Select this to manually enter an interface ID for the LAN interface's link-local address.		
LAN Global Identi	fier Type		
EUI64	Select this to have the Zyxel Device generate an interface ID using the EUI-64 format for its global address.		
Manual	Select this to manually enter an interface ID for the LAN interface's global IPv6 address.		
LAN IPv6 Prefix Se	tup		
Delegate prefix from WAN	Select this option to automatically obtain an IPv6 network prefix from the service provider or an uplink router.		
Static	Select this option to configure a fixed IPv6 address for the Zyxel Device's LAN IPv6 address.		
MLD Snooping	Multicast Listener Discovery (MLD) allows an IPv6 switch or router to discover the presence of MLD hosts who wish to receive multicast packets and the IP addresses of multicast groups the hosts want to join on its network.		
Active	Click this switch to enable or disable MLD Snooping on the Zyxel Device. When the switch goes to the right, the function is enabled. Otherwise, it is not.		
	This allows the Zyxel Device to check MLD packets passing through it and learn the multicast group membership. It helps reduce multicast traffic.		
MLD Mode	Select Standard Mode to forward multicast packets to a port that joins the multicast group and broadcast unknown multicast packets from the WAN to all LAN ports.		
	Select Blocking Mode to block all unknown multicast packets from the WAN.		
LAN IPv6	Select how you want to obtain an IPv6 address:		
Address Assign Setup	 Stateless: The Zyxel Device uses IPv6 stateless autoconfiguration. RADVD (Router Advertisement Daemon) is enabled to have the Zyxel Device send IPv6 prefix information in router advertisements periodically and in response to router solicitations. DHCPv6 server is disabled. Stateful: The Zyxel Device uses IPv6 stateful autoconfiguration. The DHCPv6 server is enabled to have the Zyxel Device act as a DHCPv6 server and pass IPv6 addresses to DHCPv6 clients. 		
LAN IPv6 DNS	Select how the Zyxel Device provide DNS server and domain name information to the clients:		
Assign Setup	 From Router Advertisement: The Zyxel Device provides DNS information through router advertisements. 		
	• From DHCPv6 Server: The Zyxel Device provides DNS information through DHCPv6.		
	 From RA & DHCPv6 Server: The Zyxel Device provides DNS information through both router advertisements and DHCPv6. 		
DHCPv6 Configur	ation		
DHCPv6 Active	This shows the status of the DHCPv6. DHCP Server displays if you configured the Zyxel Device to act as a DHCPv6 server which assigns IPv6 addresses and/or DNS information to clients.		
IPv6 Router Adve	rtisement State		
RADVD Active	This shows whether RADVD is enabled or not.		
IPv6 DNS Values			

Table 32	Netwo	rk Setting > H	lome Networking) > LA	N Setup	(continued)

LABEL	DESCRIPTION
IPv6 DNS Server	Select From ISP if your ISP dynamically assigns IPv6 DNS server information.
1-3	Select User-Defined if you have the IPv6 address of a DNS server. Enter the DNS server IPv6 addresses the Zyxel Device passes to the DHCP clients.
	Select None if you do not want to configure IPv6 DNS servers.
DNS Query	Select how the Zyxel Device handles clients' DNS information requests.
scenario	 IPv4/IPv6 DNS Server: The Zyxel Device forwards the requests to both the IPv4 and IPv6 DNS servers and sends clients the first DNS information it receives.
	 IPv6 DNS Server Only: The Zyxel Device forwards the requests to the IPv6 DNS server and sends clients the DNS information it receives.
	 IPv4 DNS Server Only: The Zyxel Device forwards the requests to the IPv4 DNS server and sends clients the DNS information it receives.
	• IPv6 DNS Server First: The Zyxel Device forwards the requests to the IPv6 DNS server first and then the IPv4 DNS server. Then it sends clients the first DNS information it receives.
	 IPv4 DNS Server First: The Zyxel Device forwards the requests to the IPv4 DNS server first and then the IPv6 DNS server. Then it sends clients the first DNS information it receives.
Cancel	Click Cancel to restore your previously saved settings.
Apply	Click Apply to save your changes.

Table 32 Network Setting > Home Networking > LAN Setup (continued)

8.3 LAN Static DHCP

This table allows you to assign IP addresses on the LAN to individual computers based on their MAC addresses.

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.

Use this screen to change your Zyxel Device's static DHCP settings. Click **Network Setting > Home Networking > Static DHCP** to open the following screen.

Figure 70	Network Setting >	Home Networking >	Static DHCP
-----------	-------------------	-------------------	-------------

When any need to kr	of the LAN clients on y now the clients' MAC a	our network want an assigned fixed IP ad ddresses in advance in order to process th	dress, add a static lease for each ne setup quickly.	LAN client. You may
			+	Static DHCP Configuration
#	Status	MAC Address	IP Address	Modify

Table 33 Network Setting > Home Networking > Static DHCP

LABEL	DESCRIPTION
Static DHCP Configuration	Click this to add a new static DHCP entry.
#	This is the index number of the entry.
Status	This field displays whether the client is connected to the Zyxel Device.

LABEL	DESCRIPTION
MAC Address	The MAC (Media Access Control) or Ethernet address on a LAN (Local Area Network) is unique to your computer (six pairs of hexadecimal notation).
	A network interface card such as an Ethernet adapter has a hardwired address that is assigned at the factory. This address follows an industry standard that ensures no other adapter has a similar address.
IP Address	This field displays the IP address relative to the # field listed above.
Modify	Click the Edit icon to have the IP address field editable and change it.
	Click the Delete icon to delete a static DHCP entry. A window displays asking you to confirm that you want to delete the selected entry.

 Table 33
 Network Setting > Home Networking > Static DHCP

If you click **Static DHCP Configuration** in the **Static DHCP** screen or the **Edit** icon next to a static DHCP entry, the following screen displays. Using a static DHCP means a client will always have the same IP address assigned to it by the DHCP server. Assign a fixed IP address to a device by selecting the interface group of this device and its IP address type and selecting the device/computer from a list or manually entering its MAC address and assigned IP address.

Active	
Group Name	Default
IP Туре	IPv4
Select Device Info	Sam Yu(192.168.1.13)
MAC Address	dc - 4a - 3e - 40 - ec - 5f
IP Address	192 168 1 13

Figure 71 Static DHCP: Static DHCP Configuration/Edit

Table 34	Static DHCP: Static DHCP Configuration/Edit
	oralle Brief : oralle Brief Berlingeralleri, Ean

LABEL	DESCRIPTION
Active	Click this switch to enable or disable the connection between the client and the Zyxel Device. When the switch goes to the right , the function is enabled. Otherwise, it is not.
Group Name	Select the interface group name for which you want to configure static DHCP settings. See Chapter 15 on page 206 for how to create a new interface group.
ІР Туре	This field displays IPv4 for the type of the DHCP IP address. At the time of writing, it is not allowed to select other type.
Select Device Info	Select a device or computer from the drop-down list or select Manual Input to manually enter a device's MAC address and IP address in the following fields.
MAC Address	If you select Manual Input , enter the MAC address of a computer on your LAN.
IP Address	If you select Manual Input , enter the IP address that you want to assign to the computer on your LAN with the MAC address that you will also specify.

T . I . O 4				11
Iable 34	Static DHCP: Static L	JHCP Contiguration	n/Ealt (continued	(ג

LABEL	DESCRIPTION
Cancel	Click Cancel to exit this screen without saving.
OK	Click OK to save your changes.

8.4 UPnP Settings

Universal Plug and Play (UPnP) is a distributed, open networking standard that uses TCP/IP for simple peer-to-peer network connectivity between devices. A UPnP device can dynamically join a network, obtain an IP address, convey its capabilities, and learn about other devices on the network. A device can then leave a network smoothly and automatically when it is no longer in use.

See Section 8.4.1 on page 140 for more information on UPnP.

Use the following screen to configure the UPnP settings on your Zyxel Device. Click **Network Setting > Home Networking > UPnP** to display the screen shown next.

Note: To use UPnP NAT-T, enable NAT in the Network Setting > Broadband > Edit/Add New WAN Interface screen.

softv	vare that also have UF	PnP enabled.	sy network connectivity	among nerworking a	
UPnP :	State				
UPnP					
UPnP I	NAT-T State				
UPnP	NAT-T				
Note					
JPnP N	AT-T only works when I	NAT is enable			
#	Description	Destination IP Address	External Port	Internal Port	Protocol
		Cancel	Apply		

Figure 72 Network Setting > Home Networking > UPnP

The following table describes the labels in this screen.

Table 35 Network Setting > Home Networking > UPnP

LABEL	DESCRIPTION
UPnP State	
UPnP	Click this switch to enable or disable UPnP. When the switch goes to the right, the function is enabled. Otherwise, it is not.
	Be aware that anyone could use a UPnP application to open the Web Configurator's login screen without entering the Zyxel Device's IP address (although you must still enter the password to access the Web Configurator).
UPnP NAT-T State	

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LABEL	DESCRIPTION
UPnP NAT-T	Click this switch to allow UPnP-enabled applications to automatically configure the Zyxel Device so that they can communicate through the Zyxel Device by using NAT traversal. When the switch goes to the right , the function is enabled. Otherwise, it is not.
	UPnP applications automatically reserve a NAT forwarding port in order to communicate with another UPnP enabled device; this eliminates the need to manually configure port forwarding for the UPnP enabled application.
	The table below displays the NAT port forwarding rules added automatically by UPnP NAT-T.
#	This is the index number of the UPnP NAT-T connection.
Description	This is the description of the UPnP NAT-T connection.
Destination IP Address	This is the IP address of the other connected UPnP-enabled device.
External Port	This is the external port number that identifies the service.
Internal Port	This is the internal port number that identifies the service.
Protocol	This is the transport layer protocol used for the service.
Cancel	Click Cancel to exit this screen without saving.
Apply	Click Apply to save your changes.

Table 35 Network Setting > Home Networking > UPnP (continued)

8.4.1 Turning on UPnP in Windows 7 Example

This section shows you how to use the UPnP feature in Windows 7. UPnP server is installed in Windows 7. Activate UPnP on the Zyxel Device.

Make sure the computer is connected to a LAN port of the Zyxel Device. Turn on your computer and the Zyxel Device.

1 Click the start icon, **Control Panel** and then the **Network and Sharing Center**.



2 Click Change Advanced Sharing Settings.



3 Select **Turn on network discovery** and click **Save Changes**. Network discovery allows your computer to find other computers and devices on the network and other computers on the network to find your computer. This makes it easier to share files and printers.

Change sharing options for different network profiles	
Windows creates a separate network profile for each network you use. You can choose specific options for each profile.	r
Home or Work	
Public	
Domain (current profile)	
Network discovery	
When network discovery is on, this computer can see other network computers and devices and visible to other network computers. <u>What is network discovery?</u>	is
File and printer sharing	
When file and printer sharing is on, files and printers that you have shared from this computer ca be accessed by people on the network.	an
 Turn on file and printer sharing Turn off file and printer sharing 	
Save changes Cancel	

8.4.2 Turning on UPnP in Windows 10 Example

This section shows you how to use the UPnP feature in Windows 10. UPnP server is installed in Windows 10. Activate UPnP on the Zyxel Device by clicking **Network Setting > Home Networking > UPnP**.

Make sure the computer is connected to the LAN port of the Zyxel Device. Turn on your computer and the Zyxel Device.

1 Click the start icon, **Settings** and then **Network & Internet**.

Settings								-	×
				Windows	s Settir	gs			
				Find a setting		٩			
	旦	System Display, sound, notifications, power		Devices Bluetooth, printers, mouse		Phone Link your Android, iPhone		Network & Internet Wi-Fi, airplane mode, VPN	
	<u> </u>	Personalization Background, lock screen, colors		Apps Uninstall, defaults, optional features	8	Accounts Your accounts, email, sync, work, other people	A ₽	Time & Language Speech, region, date	
	⊘	Gaming Game bar, DVR, broadcasting, Game Mode	Ģ	Ease of Access Narrator, magnifier, high contrast	ß	Privacy Location, camera	\mathbb{C}	Update & Security Windows Update, recovery, backup	
	Q	Search Language, permissions, history							

2 Click Network and Sharing Center.

← Settings		– 🗆 X
命 Home	Status	
Find a setting	Network status	Have a question?
Network & Internet		
🖨 Status	Ethernet 2 Private network	Make Windows better Give us feedback
문 Ethernet	You're connected to the Internet	
ଳ Dial-up	If you have a limited data plan, you can make this network a metered connection or change other properties.	
% VPN	Change connection properties	
🕒 Data usage	Show available networks	
Proxy	Change your network settings	
	Change adapter options View network adapters and change connection settings.	
	Sharing options For the networks you connect to, decide what you want to share.	
	Network troubleshooter Diagnose and fix network problems.	
	View your network properties	
	Windows Firewall	
	Network and Sharing Center	
	Network reset	

3 Click Change advanced sharing settings.

Network and Sharing Center				-	×
← → · · ↑ 👱 > Control Pa	anel > All Control Panel Items > Network and Sharing	Center	~ Ū	Search Control Panel	Q
Control Panel Home Change adapter settings	Control Panel Home View your basic network information and set up connections Change adapter settings View your active networks Change advanced sharing settings Network 2 Access type: Internet Private network Connections: Ethernet 2				
Change advanced sharing settings					
	Change your networking settings				
	Set up a new connection or network Set up a broadband, dial-up, or VPN con	ection; or set up a router or access point.			
	Troubleshoot problems Diagnose and repair network problems, o	r get troubleshooting information.			
See also					
Internet Options					
Windows Defender Firewall					

4 Under **Domain**, select **Turn on network discovery** and click **Save Changes**. Network discovery allows your computer to find other computers and devices on the network and other computers on the network to find your computer. This makes it easier to share files and printers.

• Advanced sharing settings		-	×
← → → ↑ 🔩 > Control Panel → All Control Panel Items → Network and Sharing Center → Advanced sharing settings	~ 0	Search Control Panel	,c
Change sharing options for different network profiles Windows creates a separate network profile for each network you use. You can choose specific options for each profile. Private (current profile) Guest or Public Domain Network discovery When network discovery When network discovery O Turn on network discovery File and printer sharing When file and printer sharing When file and printer sharing O Turn on file and printer sharing O Turn offile and printer sharing			
Save changes Cancel			

8.5 LAN Additional Subnet

Use this screen to configure IP alias and public static IP.

IP alias allows you to partition a physical network into different logical networks over the same Ethernet interface. The Zyxel Device supports multiple logical LAN interfaces via its physical Ethernet interface with the Zyxel Device itself as the gateway for the LAN network. When you use IP alias, you can also configure firewall rules to control access to the LAN's logical network (subnet).

If your ISP provides the **Public LAN** service, the Zyxel Device may use a LAN IP address that can be accessed from the WAN.

Click Network Setting > Home Networking > Additional Subnet to display the screen shown next.

Figure 73 Network Setting > Home Networking > Additional Subnet

P Alias Setup					
Group Name	Default				
Active					
IPv4 Address		2.1	<i>.</i> •	2	
Subnet Mask		32	84	3	
Public LAN					
Active					
IPv4 Address					
Subnet Mask	255	, 255	. 255	0	
Offer Public IP by DHCP					
Enable ARP Proxy					
		Carro		Amelia	

The following table describes the labels in this screen.

Table 36	Network Setting >	• Home	Networking >	Additional Subnet
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LABEL	DESCRIPTION		
IP Alias Setup			
Group Name	Select the interface group name for which you want to configure the IP alias settings. See Chapter 15 on page 206 for how to create a new interface group.		
Active	Click this switch to configure a LAN network for the Zyxel Device. When the switch goes to the right, the following fields will be configurable. Otherwise, they are not.		
IPv4 Address	Enter the IP address of your Zyxel Device in dotted decimal notation.		
Subnet Mask	Your Zyxel Device will automatically calculate the subnet mask based on the IPv4 address that you assign. Unless you are implementing subnetting, use this value computed by the Zyxel Device.		
Public LAN	•		

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LABEL	DESCRIPTION
Active	Click this switch to enable or disable the Public LAN feature. When the switch goes to the right, the function is enabled. Otherwise, it is not.
	Your ISP must support Public LAN and static IP.
IPv4 Address	Enter the public IP address provided by your ISP.
Subnet Mask	Enter the public IPv4 subnet mask provided by your ISP.
Offer Public IP by DHCP	Click this switch to enable or disable the Zyxel Device to provide public IP addresses by DHCP server. When the switch goes to the right , the function is enabled. Otherwise, it is not.
Enable ARP Proxy	Click this switch to enable or disable the ARP (Address Resolution Protocol) proxy. When the switch goes to the right, the function is enabled. Otherwise, it is not.
Cancel	Click Cancel to exit this screen without saving.
Apply	Click Apply to save your changes.

 Table 36
 Network Setting > Home Networking > Additional Subnet (continued)

8.6 STB Vendor ID

Use this screen to configure the Vendor IDs of connected Set Top Boxes (STBs) so the Zyxel Device can automatically create static DHCP entries for them when they request IP addresses.

Click Network Setting > Home Networking > STB Vendor ID to open this screen.

Modem can identify the STB bo	se on configured Vendor ID	
Please enter Vendor ID for STB		
Vendor ID 1		
Vendor ID 2		
Vendor ID 3		
Vendor ID 4		
Vendor ID 5		
	Cancel A	oply

Table 37 Network Setting > Home Networking > STB Vendor ID

LABEL	DESCRIPTION
Vendor ID 1~5	These are STB's Vendor Class Identifiers (DHCP option 60). A Vendor Class Identifier is usually used to inform the DHCP server a DHCP client's vendor and functionality.
Cancel	Click Cancel to exit this screen without saving.
Apply	Click Apply to save your changes.

8.7 Wake on LAN

Use this screen to remotely turn on a device on the LAN network. To use this feature, the remote device must also support Wake on LAN.

You need to know the MAC address of the LAN device. It may be on a label on the device or in its documentation.

Click **Network Setting > Home Networking > Wake on LAN** to open this screen.

Figure 75 Network Setting > Home Networking > Wake on LAN

Wake up your PC via LAN if your PC supports 'Wake on LAN' feature				
Wake by Address	Manual Input 🗸			
IP Address				
MAC Address	Wake Up			

The following table describes the labels in this screen.

LABEL	DESCRIPTION
Wake by Address	Select Manual and enter the IP address or MAC address of the device to turn it on remotely. The drop-down list also lists the IP addresses that can be found in the Zyxel Device's ARP table. Select an IP address and it will then automatically update the IP address and MAC address in the following fields.
IP Address	Enter the IPv4 IP address of the device to turn it on.
MAC Address	Enter the MAC address of the device to turn it on. A MAC address consists of six hexadecimal character pairs.
Wake up	Click this to send a wake up packet to wake up the specified device.

Table 38 Network Setting > Home Networking > Wake on LAN

8.8 TFTP Server Name

Use the **TFTP Server Name** screen to identify a TFTP server for configuration file download using DHCP option 66. RFC 2132 defines the option 66 open standard. DHCP option 66 supports the IP address or the host name of a single TFTP server.

Click **Network Setting > Home Networking > TFTP Server Name** to open this screen.

Figure 7/	6	Network	Setting >	Home	Networking >	TETP Server Na	me
rigule /	0	INCIMUN	sening /	TIOHE	NETWORKING /		I I I C

This option 66 is used to identify a TFTP server name.			
TFTP Server Name			
	Cancel	Apply	

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The following table describes the labels in this screen.

Table 39 Network Setting > Home Networking > TFTP Server Name

LABEL	DESCRIPTION		
TFTP Server Name	Enter the IP address or the host name of a single TFTP server.		
Cancel	Click Cancel to exit this screen without saving.		
Apply	Click Apply to save your changes.		

8.9 Technical Reference

This section provides some technical background information about the topics covered in this chapter.

8.9.1 LANs, WANs and the Zyxel Device

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



8.9.2 DHCP Setup

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

IP Pool Setup

The Zyxel Device is pre-configured with a pool of IP addresses for the DHCP clients (DHCP Pool). See the product specifications in the appendices. Do not assign static IP addresses from the DHCP pool to your LAN computers.

8.9.3 DNS Server Addresses

DNS (Domain Name System) maps a domain name to its corresponding IP address and vice versa. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it. The DNS server addresses you enter when you set up DHCP are passed to the client machines along with the assigned IP address and subnet mask.

There are two ways that an ISP disseminates the DNS server addresses.

- The ISP tells you the DNS server addresses, usually in the form of an information sheet, when you sign up. If your ISP gives you DNS server addresses, enter them in the **DNS Server** fields in the **DHCP Setup** screen.
- Some ISPs choose to disseminate the DNS server addresses using the DNS server extensions of IPCP (IP Control Protocol) after the connection is up. If your ISP did not give you explicit DNS servers, chances are the DNS servers are conveyed through IPCP negotiation. The Zyxel Device supports the IPCP DNS server extensions through the DNS proxy feature.

Please note that DNS proxy works only when the ISP uses the IPCP DNS server extensions. It does not mean you can leave the DNS servers out of the DHCP setup under all circumstances. If your ISP gives you explicit DNS servers, make sure that you enter their IP addresses in the **DHCP Setup** screen.

8.9.4 LAN TCP/IP

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

IP Address and Subnet Mask

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

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

If the ISP did not explicitly give you an IP network number, then most likely you have a single user account and the ISP will assign you a dynamic IP address when the connection is established. If this is the case, it is recommended that you select a network number from 192.168.0.0 to 192.168.255.0 and you must enable the Network Address Translation (NAT) feature of the Zyxel Device. 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 Zyxel Device, but make sure that no other device on your network is using that IP address.

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

Private IP Addresses

Every machine on the Internet must have a unique address. If your networks are isolated from the Internet, for example, 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:

- 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 it can be assigned from 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".

CHAPTER 9 Routing

9.1 Overview

The Zyxel Device usually uses the default gateway to route outbound traffic from computers on the LAN to the Internet. To have the Zyxel Device send data to devices not reachable through the default gateway, use static routes.

For example, the next figure shows a computer (**A**) connected to the Zyxel Device's LAN interface. The Zyxel Device routes most traffic from **A** to the Internet through the Zyxel Device's default gateway (**R1**). You create one static route to connect to services offered by your ISP behind router **R2**. You create another static route to communicate with a separate network behind a router **R3** connected to the LAN.





9.2 Routing Settings

Use this screen to view and configure the static route rules on the Zyxel Device. A static route is used to save time and bandwidth usage when LAN devices within an Intranet are transferring files or packets, especially when there are more than two Internet connections available in your home or office network. Click **Network Setting > Routing > Static Route** to open the following screen.



				Routing			
Static	Route DN	IS Route Po	blicy Route RIP	idth usage when LAN devices within an I	ntranet are transferri	ng files or packets	s, especially
when	n mere dre n	iore indri iwo	Internet connections dvc	and the in your nome of office network.		+ Add Ne	ew Static Route
#	Status	Name	Destination IP	Subnet Mask/Prefix Length	Gateway	Interface	Modify

The following table describes the labels in this screen.

LABEL	DESCRIPTION	
Add New Static Route	Click this to configure a new static route.	
#	This is the index number of the entry.	
Status	This field displays whether the static route is active or not. A yellow bulb signifies that this route is active. A gray bulb signifies that this route is not active.	
Name	This is the name that describes or identifies this route.	
Destination IP	This parameter specifies the IP network address of the final destination. Routing is always based on network number.	
Subnet Mask/ Prefix Length	This parameter specifies the IP network subnet mask of the final destination.	
Gateway	This is the IP address of the gateway. The gateway is a router or switch on the same network segment as the device's LAN or WAN port. The gateway helps forward packets to their destinations.	
Interface	This is the WAN interface used for this static route.	
Modify	Click the Edit icon to edit the static route on the Zyxel Device.	
	Click the Delete icon to remove a static route from the Zyxel Device. A window displays asking you to confirm that you want to delete the route.	

Table 40 Network Setting > Routing > Static Route

9.2.1 Add/Edit Static Route

Use this screen to add or edit a static route. Click **Add new static route** in the **Routing** screen or the **Edit** icon next to the static route you want to edit. The screen shown next appears.

Note: The Gateway IP Address must be within the range of the selected interface in Use Interface.

Figure 80	Routing: Add,	/Edit
-----------	---------------	-------

		Add Ne	ew Static R	oute		×
Active						
Route Name						
IP Туре	IPv4				•	
Destination IP Address			v			
Subnet Mask			×			
Use Gateway IP Address						
Gateway IP Address		100	81			
Use Interface	Default				•	
Note						
The input range of the Gatewa	y IP Addres	s must be i	n the same rang	ge of the Use	Interface.	
	C	ancel	C	OK .		

LABEL	DESCRIPTION
Active	Click this switch to enable or disable this static route. When the switch goes to the right 🤦 , the function is enabled. Otherwise, it is not.
Route Name	Enter a descriptive name for the static route.
ІР Туре	Select whether your IP type is IPv4 or IPv6.
Destination IP Address	Enter the IPv4 or IPv6 network address of the final destination.
Subnet Mask	If you are using IPv4 and need to specify a route to a single host, use a subnet mask of 255.255.255 in the subnet mask field to force the network number to be identical to the host ID. Enter the IP subnet mask here.
Use Gateway IP Address	The gateway is a router or switch on the same network segment as the device's LAN or WAN port. The gateway helps forward packets to their destinations.
	Click this switch to enable or disable the gateway IP address. When the switch goes to the right, the function is enabled. Otherwise, it is not.
Gateway IP Address	Enter the IP address of the gateway.
Use Interface	Select the WAN interface you want to use for this static route.
Cancel	Click Cancel to exit this screen without saving.
Apply	Click Apply to save your changes.

Table 41 Routing: Add/Edit

9.3 DNS Route

Use this screen to view and configure DNS routes on the Zyxel Device. A DNS route entry defines a policy for the Zyxel Device to forward a particular DNS query to a specific WAN interface.

Note: A maximum of 20 DNS routes can be added.

Click **Network Setting > Routing > DNS Route** to open the following screen.

Fiaure 81	Network Settina > Routina > DNS Route
	Received and a second second second

			Routing		
Static Re	oute D <mark>NS Ro</mark>	Dute Policy Route RIP			
A DNS	route entry defi	ines a policy for the device to f	orward particular DNS query to o	a specific WAN interface.	
				+ A	dd New DNS Route
#	Status	Domain Name	WAN Interface	Subnet Mask	Modify
Note					
Maximum	n of 20 entries co	an be added.			

The following table describes the labels in this screen.

LABEL	DESCRIPTION
Add New DNS Route	Click this to add a new DNS route.
#	This is the index number of a DNS route.
Status	This field displays whether the DNS route is active or not. A yellow bulb signifies that this DNS route is active. A gray bulb signifies that this DNS route is not active.
Domain Name	This is the host name or domain name of the DNS route entry.
WAN Interface	This is the WAN connection through which the Zyxel Device forwards DNS requests for this domain name.
Subnet Mask	This is the subnet mask of the DNS route entry.
Modify	Click the Edit icon to modify the DNS route.
	Click the Delete icon to delete the DNS route.

Table 42 Network Setting > Routing > DNS Route

9.3.1 Add DNS Route

You can manually add the Zyxel Device's DNS route entry. Click Add New DNS Route in the Network Setting > Routing > DNS Route screen. The screen shown next appears.

	Add New DNS Route		
Active			
Domain Name			
Subnet Mask			
WAN Interface	ETHWAN	-	
	Cancel O	< <u> </u>	

The following table describes the labels in this screen.

Table 43 DNS Route Add

LAREL	DESCRIPTION
Active	Click this switch to enable or disable the DNS route. When the switch goes to the right 🦲 , the function is enabled. Otherwise, it is not.
Domain Name	Enter the domain name of the DNS route entry.
Subnet Mask	Enter the subnet mask of the DNS route entry.
WAN Interface	Select the WAN connection through which the Zyxel Device forwards DNS requests for this domain name. ETHWAN means the wireless cellular interface.
Cancel	Click this to exit this screen without saving any changes.
ОК	Click this to save your changes.

9.4 Policy Route

Traditionally, routing is based on the destination address only and the Zyxel Device takes the shortest path to forward a packet. Policy routes allow the Zyxel Device to override the default routing behavior and alter the packet forwarding based on the policy defined by the network administrator. Policy-based routing is applied to outgoing packets, prior to the normal routing.

You can use source-based policy forwarding to direct traffic from different users through different connections or distribute traffic among multiple paths for load sharing.

The **Policy Route** screen let you view and configure routing policies on the Zyxel Device. Click **Network Setting > Routing > Policy Route** to open the following screen.

Figure 83	Network Setting > Routing > Policy Route
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LABEL	DESCRIPTION
Add New Policy Route	Click this to create a new policy forwarding rule.
#	This is the index number of the entry.
Status	This field displays whether the DNS route is active or not. A yellow bulb signifies that this DNS route is active. A gray bulb signifies that this DNS route is not active.
Name	This is the name of the rule.
Source IP	This is the source IP address.
Source Subnet Mask	This is the source subnet mask address.
Protocol	This is the transport layer protocol.
Source Port	This is the source port number.
Source MAC	This is the source MAC address.
Source Interface	This is the interface from which the matched traffic is sent.
WAN Interface	This is the WAN interface through which the traffic is routed.
Modify	Click the Edit icon to edit this policy.
	Click the Delete icon to remove a policy from the Zyxel Device. A window displays asking you to confirm that you want to delete the policy.

Table 44 Network Setting > Routing > Policy Route

9.4.1 Add/Edit Policy Route

Click **Add New Policy Route** in the **Policy Route** screen or click the **Edit** icon next to a policy. Use this screen to configure the required information for a policy route.

Figure 84	Policy Route	e Add/Edit
inguie 04		, Auu/Lun

	Add New Policy Route			
Active				
Route Name				
Source IP Address				
Source Subnet Mask				
Protocol	None 🗸			
Source Port	0			
Source MAC	· · · · ·			
Source Interface(ex: br0 or LAN1~LAN4)				
WAN Interface	ETHWAN -			
	Cancel OK			

Table 45 Policy Route: Add/Edit (Sheet 1 of 2)

LABEL	DESCRIPTION				
Active	Click this switch to enable or disable the policy route. When the switch goes to the right 🤦 , the function is enabled. Otherwise, it is not.				
Route Name	Enter a descriptive name of up to 8 printable English keyboard characters, not including spaces.				
Source IP Address	Enter the source IP address.				
Source Subnet Mask	Enter the source subnet mask address.				
Protocol	Select the transport layer protocol (TCP or UDP).				
Source Port	Enter the source port number.				
Source MAC	Enter the source MAC address.				
SourceInterface (ex: br0 or LAN1~LAN4)	Type the name of the interface from which the matched traffic is sent.				
WAN Interface	This field shows <u>ETHWAN, WWAN, ADSL, VDSL and MyDSLConnection</u> as the WAN interface through which the traffic is sent.				

Table 45 Policy Route: Add/Edit (Sheet 2 of 2)

LABEL	DESCRIPTION
Cancel	Click Cancel to exit this screen without saving.
ОК	Click OK to save your changes.

9.5 RIP Settings

Routing Information Protocol (RIP, RFC 1058 and RFC 1389) allows a device to exchange routing information with other routers.

Click Network Setting > Routing > RIP to open the RIP screen.

Figure 85 Network Setting > Routing > RIP

ŧ	Interface	Version	Operation	Enable	Disable Default Gateway
Û	Default	RIP∨2 ▼	Active •		
2	ETHWAN	RJP∨2 ▼	Active •		

LABEL	DESCRIPTION			
#	This is the index of the interface in which the RIP setting is used.			
Interface	This is the name of the interface in which the RIP setting is used.			
Version	The RIP version controls the format and the broadcasting method of the RIP packets that the Zyxel Device sends (it recognizes both formats when receiving). RIP version 1 is universally supported but RIP version 2 carries more information. RIP version 1 is probably adequate for most networks, unless you have an unusual network topology.			
Operation	Select Passive to have the Zyxel Device update the routing table based on the RIP packets received from neighbors but not advertise its route information to other routers in this interface.			
	Select Active to have the Zyxel Device advertise its route information and also listen for routing updates from neighboring routers.			
Enable	Select the check box to activate the settings.			
Disable Default Gateway	Select the check box to set the Zyxel Device to not send the route information to the default gateway.			
Cancel	Click Cancel to exit this screen without saving.			
Apply	Click Apply to save your changes back to the Zyxel Device.			

Table 46 Network Setting > Routing > RIP