# USER MANUAL

## X8821e / X8821m
## X8824e / X8824m

Broadband Gateway

ADSL/ ADSL2+ Bridge/Router

With one Ethernet port

or one Ethernet port plus

one USB 1.1 device port

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# Table of Contents

# 1 Introduction

Congratulations on becoming the owner of the ***X8821e/X8821m or X8824e/X8824m***, ADSL router. You will now be able to access the Internet using your high-speed DSL connection.

This User Guide will show you how to connect your ***X8821e/X8821m/X8824e/X8824m*** DSL Modem, and how to customize its configuration to get the most out of your new product.

These four models are covered by this user manual:

***X8821e/X8821m***: ADSL2+ and 1 Ethernet port .

***X8824e/X8824m***: ADSL2+, 1 Ethernet port and 1 USB port.

X8821m and X8824m support additional features for remote management.

## Features

The list below contains the main features of the device and may be useful to users with knowledge of networking protocols. If you are not an experienced user, the chapters throughout this guide will provide you with enough information to get the most out of your device.

The features include:

- High Speed Asymmetrical Data Transmission on Twisted Copper Pair Wire
- Service providers can deploy ADSL rapidly over existing wire infrastructure (POTS or ISDN line)
- Compatible and interoperable with most central office site ADSL DSLAM or Multi-service Access Systems.
- RFC 1483 Bridge and Routing over ATM over ADSL
- PPPoE and PPPoA Routing over ADSL
- Interchangeable between Bridge and Router mode
- Network address translation (NAT) functions to provide security for your LAN
- Network configuration through DHCP Server and DHCP Client
- Services including IP route and DNS configuration, RIP, and IP and DSL performance monitoring
- Support IP QoS for multiple services and bandwidth sensitive applications
- Configuration and management with Telnet through the Ethernet interface, and remote Telnet through ADSL interface
- Firmware upgradeable through TFTP, HTTP
- User-friendly configuration program accessed via a web browser

## Device Requirements

In order to use the ***X8821e/X8821m*** *or* ***X8824e/X8824m***, you must have the following:

- DSL service up and running on your telephone line
- Instructions from your ISP on what type of Internet access you will be using, and the addresses needed to set up access
- One or more computers, each containing an Ethernet card (10Base-T/100Base-T network interface card (NIC)).
- For system configuration using the supplied web-based program: a web browser such as Internet Explorer v4 or later, or Netscape v4 or later. Note that version 4 of each browser is the minimum version requirement – for optimum display quality, use Internet Explorer v5, or Netscape v6.1


Note

*You do need to use a hub or switch in order to connect more than one Ethernet PC to the DSL device. You may also use the USB port of DSL device connecting to the PC (**X8824e/X8824m** only).*

## Using this Document

### Notational conventions

- Acronyms are defined the first time they appear in the text and also in the glossary.
- For brevity, the ***X8821e/X8824m/X8824e/X8824m*** is referred to as "**the device**".
- The term LAN refers to a group of Ethernet-connected computers at one site.

### Typographical conventions

- Italic text is used for items you select from menus and drop-down lists and the names of displayed web pages.
- Bold text is used for text strings that you type when prompted by the program, and to emphasize important points.

### Special messages

This document uses the following icons to draw your attention to specific instructions or explanations.


Note

*Provides clarifying or non-essential information on the current topic.*


Definition

*Explains terms or acronyms that may be unfamiliar to many readers. These terms are also included in the Glossary.*


WARNING

*Provides messages of high importance, including messages relating to personal safety or system integrity.*

# 2 Getting to know the device

## Parts Check

In addition to this document, your package should arrive containing the following:

- ***X8821e/X8821m*** or ***X8824e/X8824m*** DSL Modem
- Standard phone/DSL line cable
- Ethernet cable
- USB cable (for ***X8824e/X8824m*** only)
- Power adapter
- User Manual CD

| | |
|---|---|
|  | ***X8821e*** or ***X8821m*** or ***X8824e*** or ***X8824m*** ADSL device unit |
|  | RJ-11 Cable |
|  | RJ-45 Cable |
|  | USB cable (***X8824e/X8824m only***) |
|  | Power adapter |
|   | User's Manual CD |

***Figure 1: DSL Modem Package Contents***

## X8821e/X8821m Front Panel

The front panel contains lights called Light Emitting Diodes (LEDs) that indicate the status of the unit.


***Figure 2: X8821e/X8821m Front Panel and LEDs***

| Label | Color | Function |
|---|---|---|
| PWR (power) | green | On: device is powered on<br>Off: device is powered off |
| WAN | green | On: DSL link reaches showtime, which means that your device has successfully connected to your ISP's DSL network.<br>Off: DSL link not in showtime, your device has not successfully connected to your ISP's DSL network.<br>Blink: Try to connect to ISP's DSL network |
| PPP | green | On: PPP SYNC UP<br>Off: NO PPP link<br>Blink: Valid IP packet being transmitted |
| LAN | green | On: LAN link established and active<br>Off: No LAN link<br>Blink: Data being transmitted |
| ALM | red | On: Error occurred<br>Blink: booting up |

## X8821e/X8821m Rear Panel

The ***X8821e/X8821m*** rear panel contains the ports for the unit's data and power connections.


***Figure 3: X8821e/X8821m Rear Panel***

| Label | Function |
|---|---|
| WAN | Connects to the ISP DSL network Connects to the supplied power adapter |
| RESET | A reset button to reset the device or reset to default settings |
| ETHERNET | Connects the device via Ethernet to your devices (PC or switch) in LAN |
| POWER | Connects to the supplied power adapter |

## X8824e/X8824m Front Panel

The front panel contains lights called Light Emitting Diodes (LEDs) that indicate the status of the unit.


***Figure 4: X8824e/X8824m Front Panel and LEDs***

| Label | Color | Function |
|---|---|---|
| Power | green | On: device is powered on<br>Off: device is powered off |
| WAN | green | On: DSL link reaches showtime, which means that your device has successfully connected to your ISP's DSL network.<br>Off: DSL link not in showtime, your device has not successfully connected to your ISP's DSL network.<br>Blink: Try to connect to ISP's DSL network |
| PPP | green | On: PPP SYNC UP<br>Off: NO PPP link<br>Blink: Valid IP packet being transmitted |
| LAN | green | On: LAN link established and active<br>Off: No LAN link<br>Blink: Data being transmitted |
| USB | green | On: USB link established and active<br>Off: No LAN link<br>Blink: Data being transmitted |

## X8824e/X8824m Rear Panel

The ***X8824e/X8824m*** rear panel contains the ports for the unit's data and power connections.


***Figure 5: X8824e/X8824m Rear Panel***

| Label | Function |
|---|---|
| WAN | Connects to the ISP DSL network Connects to the supplied power adapter |
| USB | Connects to PC |
| RESET | A reset button to reset the device or reset to default settings |
| ETHERNET | Connects the device via Ethernet to your devices (PC or switch) in LAN |
| Power Jack | Connects to the supplied power adapter |

# 3 Connecting your device

This chapter provides basic instructions for connecting the device to a computer or LAN and to the Internet.

In addition to configuring the device, you need to configure the Internet properties of your computer(s). For more details, see the following sections in Appendix A:

- Configuring Ethernet PCs section
- Configuring USB PCs section

This chapter assumes that you have already established a DSL service with your Internet service provider (ISP). These instructions provide a basic configuration that should be compatible with your home or small office network setup. Refer to the subsequent chapters for additional configuration instructions.

## Connecting the Hardware

This section describes how to connect the device to the power outlet and your computer(s) or network.

WARNING

***Before you begin, turn the power off for all devices.*** *These include your computer(s), your LAN hub/switch (if applicable), and the device.*

The diagram below illustrates the hardware connections. The layout of the ports on your device may vary from the layout shown. Refer to the steps that follow for specific instructions.

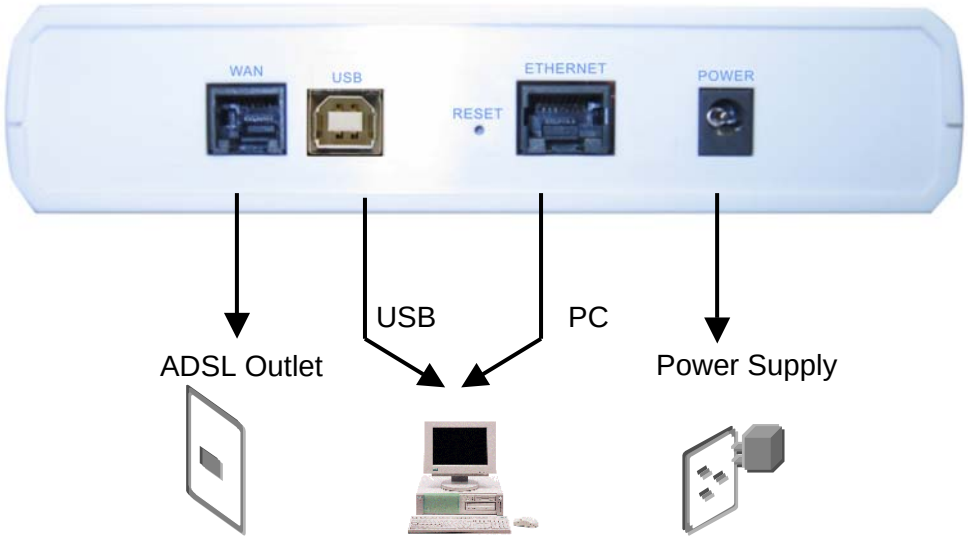



***Figure 6: Overview of Hardware Connections for X8824e/X8824m***

### Step 1. Connect the DSL cable

Connect the DSL cable to the port labeled DSL on the rear panel of the device. Connect the other end to ADSL spliter.

### Step 2. Connect the Ethernet cable

Connect to computer or to a HUB/Switch directly to the device via Ethernet cable(s).

### Step 3. Attach the power connector

Connect the AC power adapter to the Power connector on the back of the device and plug the adapter into a wall outlet or power strip. Turn on and boot up your computer(s) and any LAN devices such as hubs or switches.

### Step 4. Configure your Ethernet PCs

You must also configure the Internet properties on your Ethernet PCs. See *Configuring Ethernet PCs* section.

### Step 5. Install an USB driver (for *X8824e/X8824m* only)

You can attach a single computer to the device using a USB cable. The USB port is useful if you have an USB-enabled PC that does not have a network interface card for attaching to your Ethernet network.

Before attaching the USB cable, you must install an USB driver on your PC and configure the computer. For complete instructions, see *Configuring an USB PC* section.

### Next step

After setting up and configuring the device and PCs, you can log on to the device by following the instructions in "*Getting Started with the Web pages"* on chapter 4. The chapter includes a section called *Testing your Setup*, which enables you to verify that the device is working properly.

# 4 Getting Started with the Web pages

The DSL Modem includes a series of Web pages that provide an interface to the software installed on the device. It enables you to configure the device settings to meet the needs of your network. You can access it through a web browser on a PC connected to the device.

## Accessing the Web pages

To access the web pages, you need the following:

A laptop or PC connected to the LAN or WLAN port on the device.

A web browser installed on the PC. The minimum browser version requirement is Internet Explorer v4 or Netscape v4. For the best display quality, use latest version of Internet Explorer, Netscape or Mozilla Firefox from any of the LAN computers, launch your web browser, type the URL, **http://192.168.1.1** in the web address (or location) box, and press [Enter]. Then enter the default username and password: admin/admin to access the configuration web page, if you have not changed the username and password.


The home page opens displaying the overview of device:

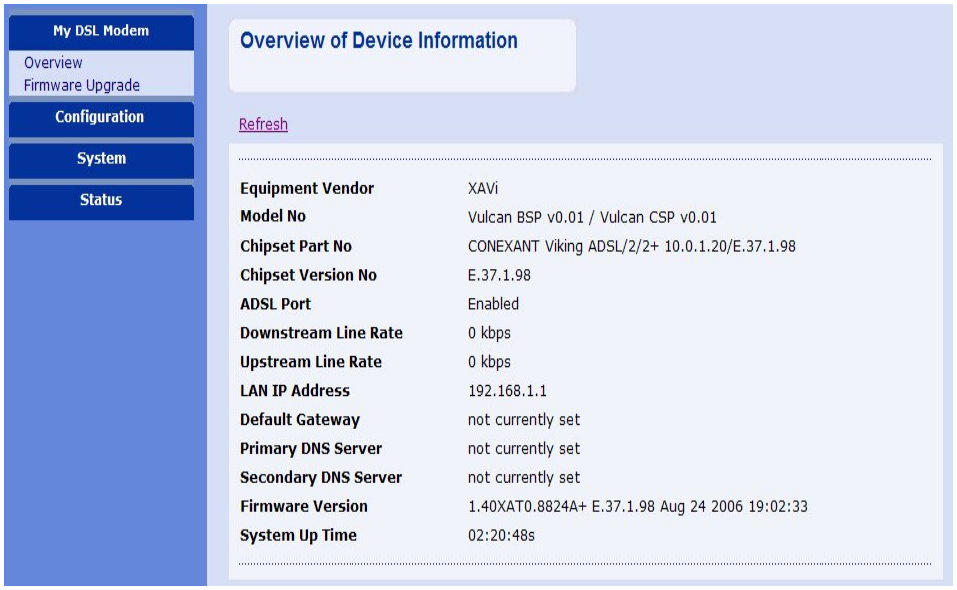



***Figure 7: Overview –Home***

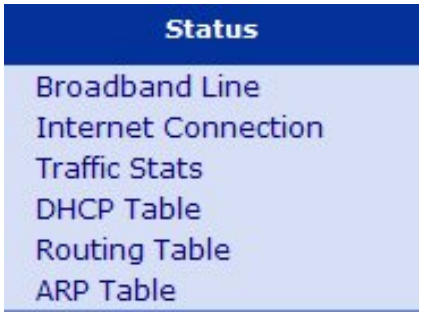
The Menu comprises:

***My DSL Modem (home menu)*:** provides overview of the system and options to upgrade the firmware of the system. By default, the page Overview is displayed after the login.


***Configuration***: provides information about the current configuration of various system features with options to change the configuration. It includes the sub menus Quick Setup, Local Network, Internet, Security, Advanced Security, IP Routing, Dns Client, IGMP Proxy, Dns Relay, SNTP and Quality of Service.

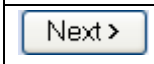
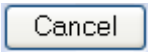
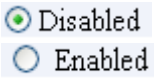
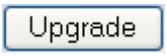

***System***: provides the administration utilities (sub menus) such as change password, Reset & Restart, Backup configuration profile, and Remote Access.


***Status:*** provides the current status of the devices. It includes Broadband Line, Internet Connection, Traffic Stats, DHCP Table, Routing Table, and ARP Table.



## Commonly used buttons

The following buttons are used throughout the web pages:

| Button | Function |
|---|---|
|  | You may need to configure the default settings on more than one Web page. Click on this button once you have changed the configuration on your current page and are ready to move on to the next. |
|  | This button appears on every configuration page. Click on this button if at any time you decide that you do not want to change the existing settings. |
|  | Radio buttons – these appear on many configuration pages. You will be asked to select one radio button from the selection of two or more available. You cannot select more than one radio button at a time. |
|  | This button appears on every configuration page. Click on this button once you are through with the changes and decide to apply the made changes. |
|  | You may need to browse to find a file which needs to be uploaded for new configuration. |
|  | This button allows you to upgrade to the new configuration file attached using the Browse button. |

The following terms are used throughout this guide in association with these buttons:

*Click* – point the mouse arrow over the button, menu entry or link on the screen and click the left mouse button. This performs an action, such as displaying a new page or performing the action specific to the button on which left mouse button is clicked.

*Select* – usually used when describing which radio button to select from a list, or which entry to select from a drop-down list. Point the mouse arrow over the entry and left-click to select it. This does not perform an action – you will also be required to click on a button, menu entry or link in order to proceed.

## Help information

To view the help, click the desired menu or submenu. The related help information appears in the screen.

## Testing your Setup

Once you have connected your hardware and configured your PCs, any computer on your LAN should be able to use the device's DSL connection to access the Internet.

To test the connection, turn on the device, wait for 30 seconds and then verify that the LEDs are illuminated as follows:

| LED | Behavior |
|---|---|
| Power | Solid green to indicate that the device is turned on. If this light is not on, check the power cable attachment. |
| LAN | Solid green to indicate that the device can communicate with your LAN. |
| WAN (ADSL) | Flashing on/off while trying to SYNC UP with ISP CO site. Solid green to indicate that the device has successfully established a connection with your ISP. |
| PPP (Internet) | When it turns solid ON that means the device establish a PPP link with ISP. |

If the LEDs illuminate as expected, test your Internet connection from a LAN computer. To do this, open your web browser, and type the URL of any external website (such as *http://www.yahoo.com*).

If the LEDs do not illuminate as expected, you may need to configure your Internet access settings using the information provided by your ISP. If the LEDs still do not illuminate as expected or the web page is not displayed, see *Troubleshooting* section or contact your ISP for assistance.

## Default device settings

In addition to handling the DSL connection to your ISP, the DSL Modem can provide a variety of services to your network. The device is preconfigured with default settings for use with a typical home or small office network.

The table below lists some of the most important default settings; these and other features are described fully in the subsequent chapters. If you are familiar with network configuration, review these settings to verify that they meet the needs of your network. Follow the instructions to change them if necessary. If you are unfamiliar with these settings, try using the device without modification, or contact your ISP for assistance.

WARNING

*We strongly recommend that you contact your ISP prior to changing the default configuration.*

| Option | Default Setting | Explanation/Instructions |
|---|---|---|
| User/Password | admin/admin | User name and password to access the device |
| DSL Port IP Address | Unnumbered interface:<br>192.168.1.1<br><br>Subnet mask:<br>255.255.255.255 | This is the temporary public IP address of the WAN port on the device. It is an unnumbered interface that is replaced as soon as your ISP assigns a 'real' IP address. See *Quick Setup* section. |
| *LAN Port IP Address* | Assigned static IP address:<br>192.168.1.1<br><br>Subnet mask:<br>255.255.255.0 | This is the IP address of the LAN port on the device. The LAN port connects the device to your Ethernet network. Typically, you will not need to change this address. See *Local Network* section. |
| DHCP (Dynamic Host Configuration Protocol) | DHCP server enabled with the following pool of addresses:<br>192.168.1.2 through 192.168.1.21<br>(Please be noted that the default DHCP IP address pool may be different in each firmware version.) | The device maintains a pool of private IP addresses for dynamic assignment to your LAN computers. To use this service, you must have set up your computers to accept IP information dynamically, as described in *Local Network -> DHCP Server* section. |

# 5 Home

The Home web page menu includes the following submenus:

- Overview
- Firmware Upgrade

## Overview Page

The overview of the device contains most of the basic information like

**System information** (equipment vendor, model number, chipset part number, chipset version number),

**Internet information** (ADSL port, downstream rate, upstream rate, Gateway, Primary DNS Server, Secondary DNS server),

**Device information** (LAN IP address, firmware version, release date, system up time).

### Basic Overview

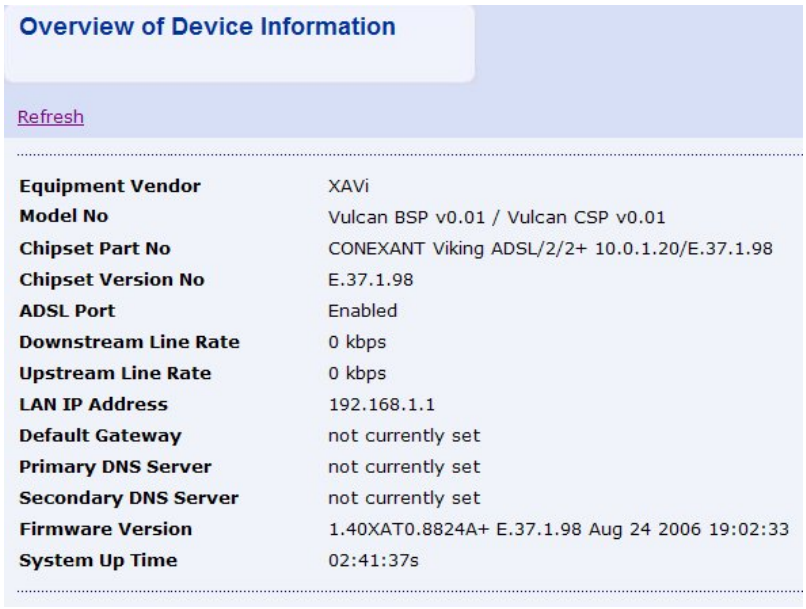



***Figure 8: Overview - basic***

- Click the *Refresh* to get the latest information from the device.

## Firmware Upgrade

This page displays the current version of the firmware and lets you upgrade to the latest version.

### Upgrading the firmware


***Figure 9: Upgrading firmware***

To upgrade the firmware, you have two options:

- Automatically check for the updates – Click *Check for Updates* button to pick up the latest updates.
- Specify the location of firmware file – Click *Browse* to specify the path where the firmware files are located and click *Upgrade*.

# 6 Configuration

The Configuration web page menu comprises:

- Quick Setup
- Local Network
- Internet
- Security
- Advanced Security
- IP Routing
- Dns Client
- IGMP Proxy
- Dns Relay
- SNTP
- Quality of Service

## Quick Setup

The Quick Setup page available under *Configuration* menu option is required to setup your device if it is not yet connected to internet. Before accessing quick setup, you should ask for the following information from your ISP:

- VPI/VCI
- Protocol: PPPoA, PPPoE, RFC1483 (Routed), or Bridging
- IP settings: Dynamic or Fixed. If fixed, then your ISP should also provide you an IP address
- NAT: Disabled or Enabled
- Add Default Route: Disabled or Enabled
- PPP User Name and Password (also known as Broadband User Name and Password)

To display quick setup page:

Click *Quick Setup* under Configuration. Configure ATM PVC page opens:

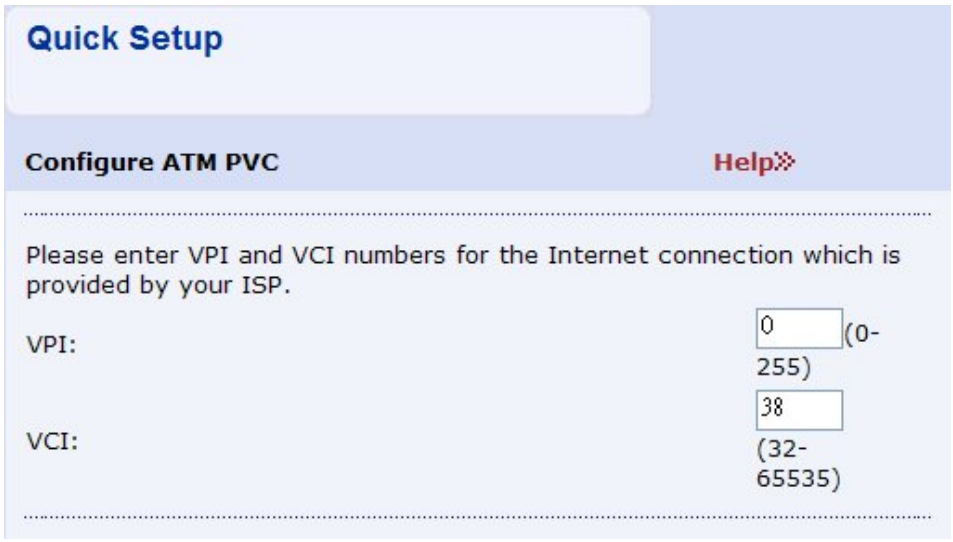



***Figure 10: Quick setup***

The information displayed on this page and the pages that follow are explained in detail in the following sub sections.

**Configuring ATM PVC**

To configure ATM PVC:

- Configure the ATM PVC by entering the *VPI* and *VCI* values provided by the ISP.
- Click *Next*.

**Configuring the Connection Type**

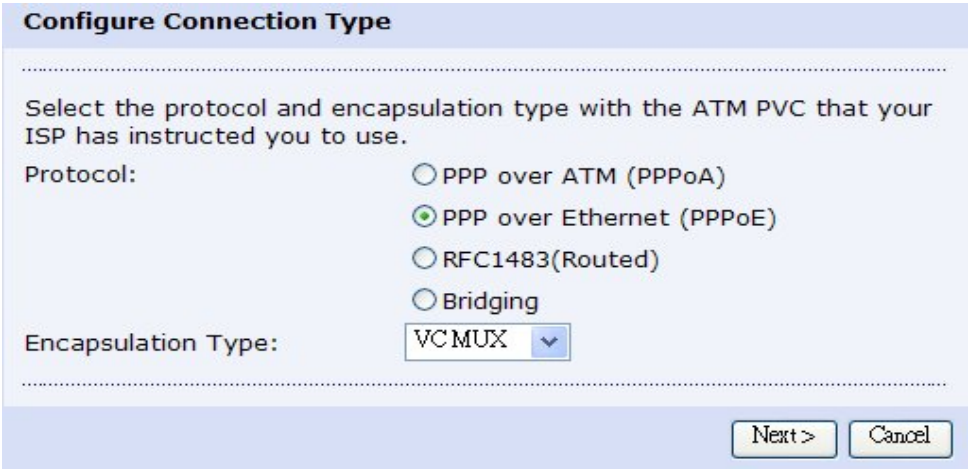



***Figure 11: Configuring the Connection Type***

To configure the connection type:

- Select the *Protocol* by selecting the radio button for the desired protocol type.
- Select the *Encapsulation Type* from the drop down list (VCMUX or LLC/SNAP).

**Configuring the WAN IP Settings if PPP over ATM (PPPoA) or PPP over Ethernet (PPPoE)**

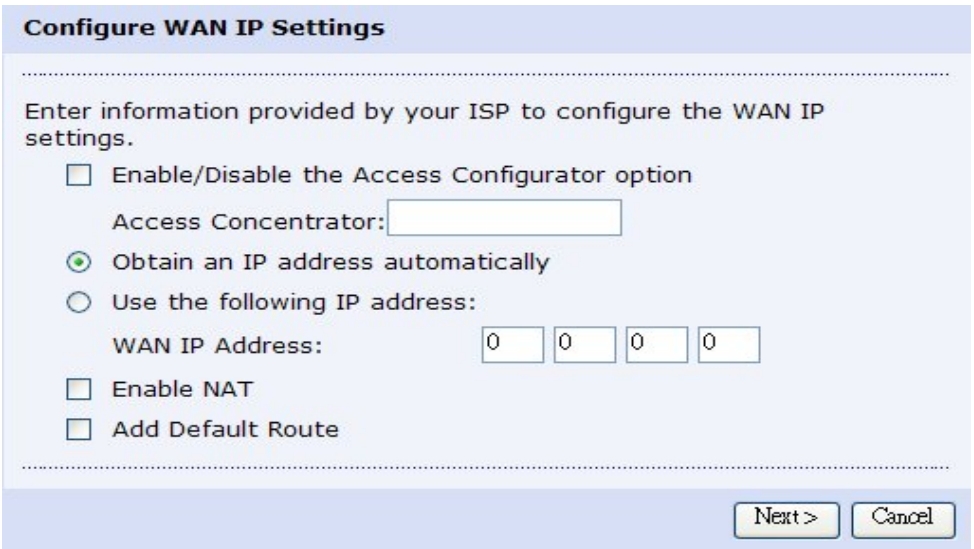



***Figure 12: Configuring WAN IP Settings***

To configure the WAN IP settings:

- Select/Unselect to enable or disable the Access Configurator option. In case, you enable the access configurator, enter the value in *Access Concentrator*.
- Select one of the following options:
  - Obtain an IP address automatically.
  - Use the following IP address: specify the *WAN IP Address*.
- Click to Enable NAT.
- Click to Add Default Route
- Click *Next*.

**Configuring the Broadband User Name and Password**


***Figure 13: Configuring Broadband User Name and Password***

To configure the broadband user name and password:

- Enter the user name in *Broadband User Name*.
- Enter the password in *Password* and confirm it by entering again in *Confirm Password*.
- Specify the network session by selecting *Always On*, *Dial on Demand* or *Manually Connect* option. You can also opt to disconnect after a specified period when no user activity is detected. By default, the option *Always On* is selected.
- Click *Next*.

### Configure LAN side settings

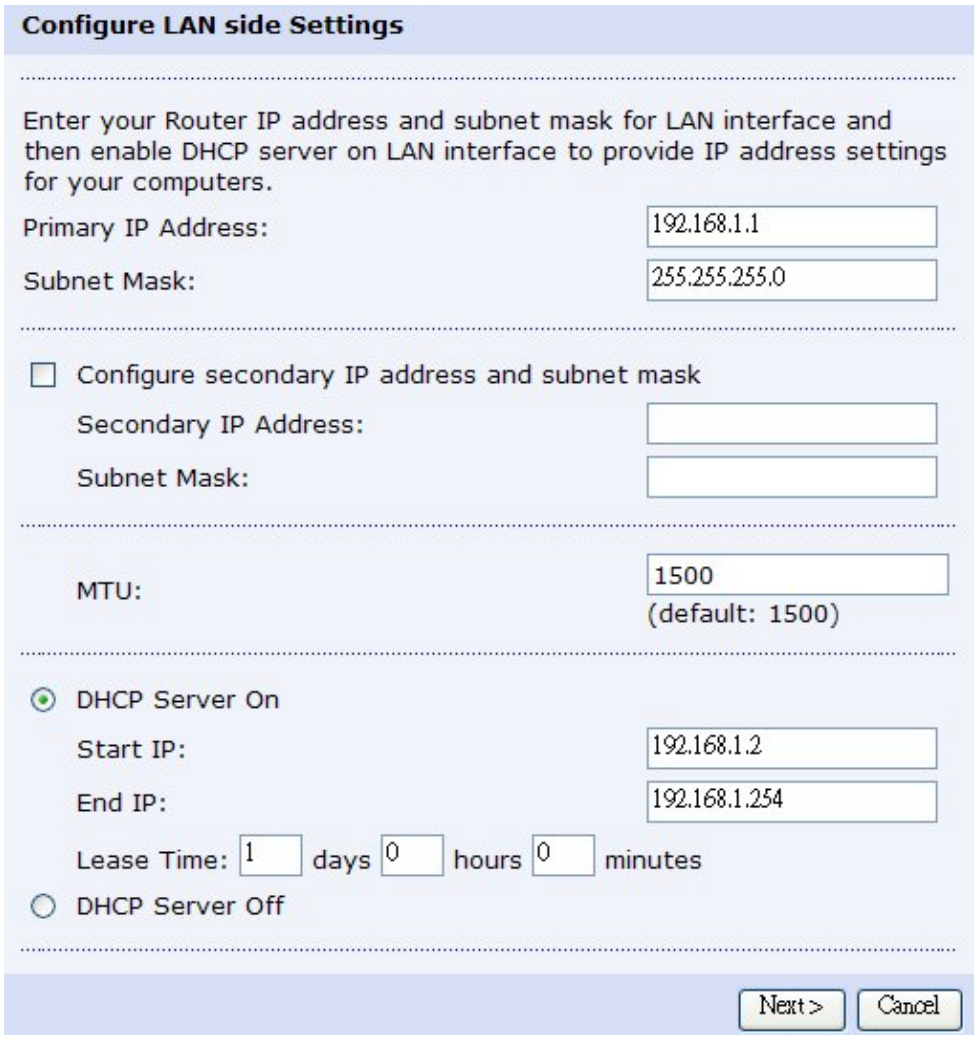



***Figure 14: Configuring LAN***

To configure LAN:

- Enter the primary IP address. For example, enter 192.168.1.1
- Enter the subnet mask. For example, enter 255.255.255.0
- You have the option to set up the secondary IP address. Enter the IP address and subnet mask in *Secondary IP Address* and *Subnet Mask* respectively.
- Enter the value of MTU. The default value is 1500.
- Select on one of the option: *DHCP Server On* or *DHCP Server Off*. In case, you selected the option *DHCP Server On*, then specify the *Start IP*, *End IP*, and *Lease Time* in *Days:Hours:Minutes* format. The DHCP server ON feature will enable this device to assign IP address automatically to PC in LAN if PC requests an IP address by DHCP client protocol.
- Click *Next*.

The following page opens to confirm the settings:

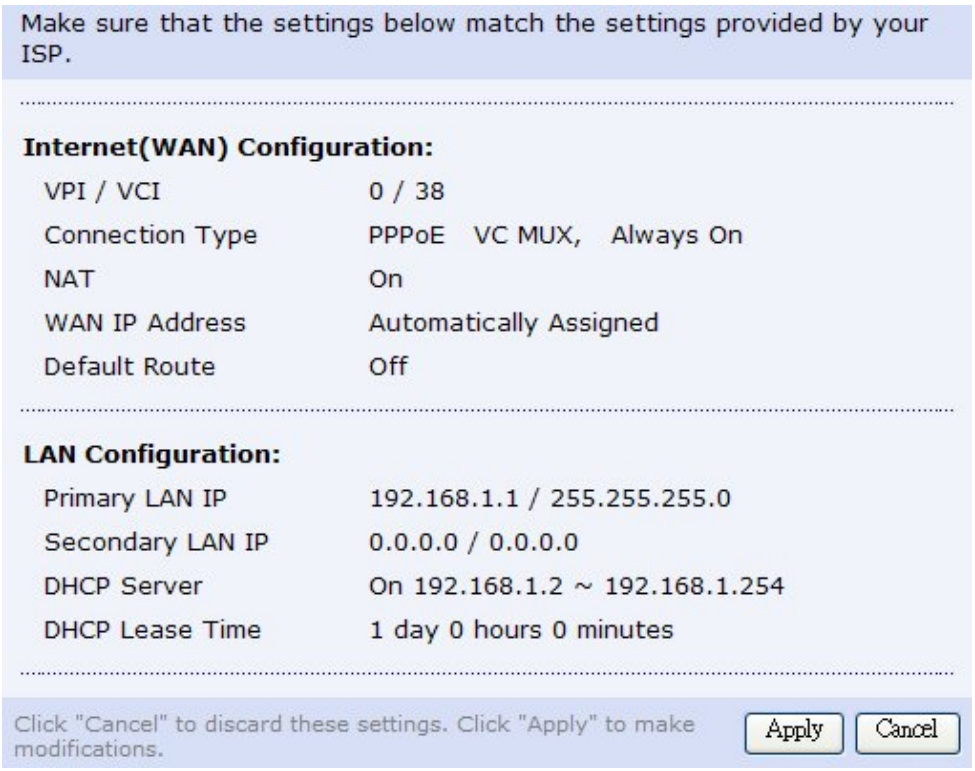



***Figure 15: Configuring LAN - Confirm Settings***

A summary of the WAN and LAN configuration is displayed. Click *Apply* to make the changes else click *Cancel* to discard the changes.

**Configuring the WAN IP Settings if RFC1483 (Routed)**

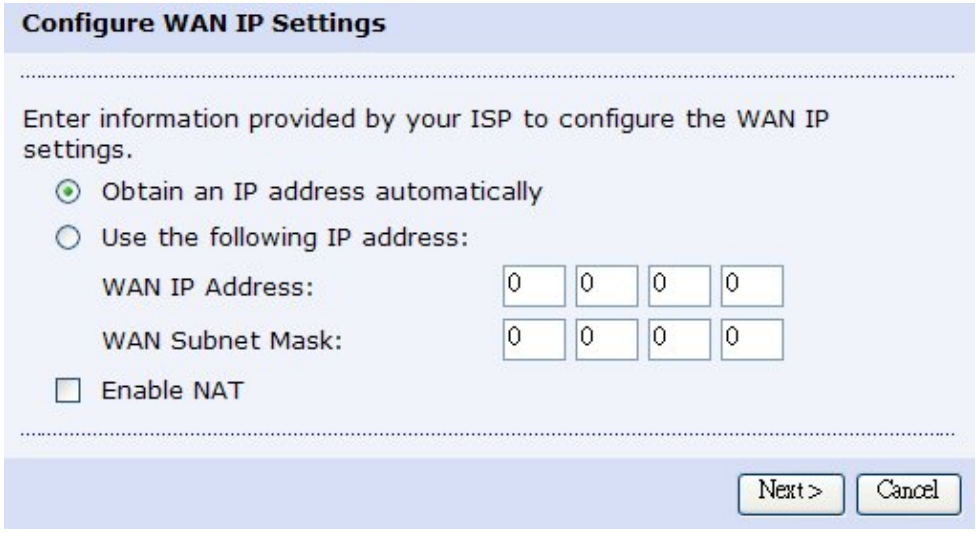



***Figure 16: Configuring WAN IP Settings***

To Configure WAN IP settings,

- select one of the following options:
  - Obtain an IP address automatically.
  - Use the following IP address: specify the *WAN IP Address and subnet mask*.
- Click to Enable NAT.
- Click *Next*.

The same procedure as configuring PPPoA or PPPoE, the configuring the LAN site settings and confirming setting pages will be shown, please follow up above descriptions to finish the settings.

**Configuring the WAN IP Settings if Bridging**

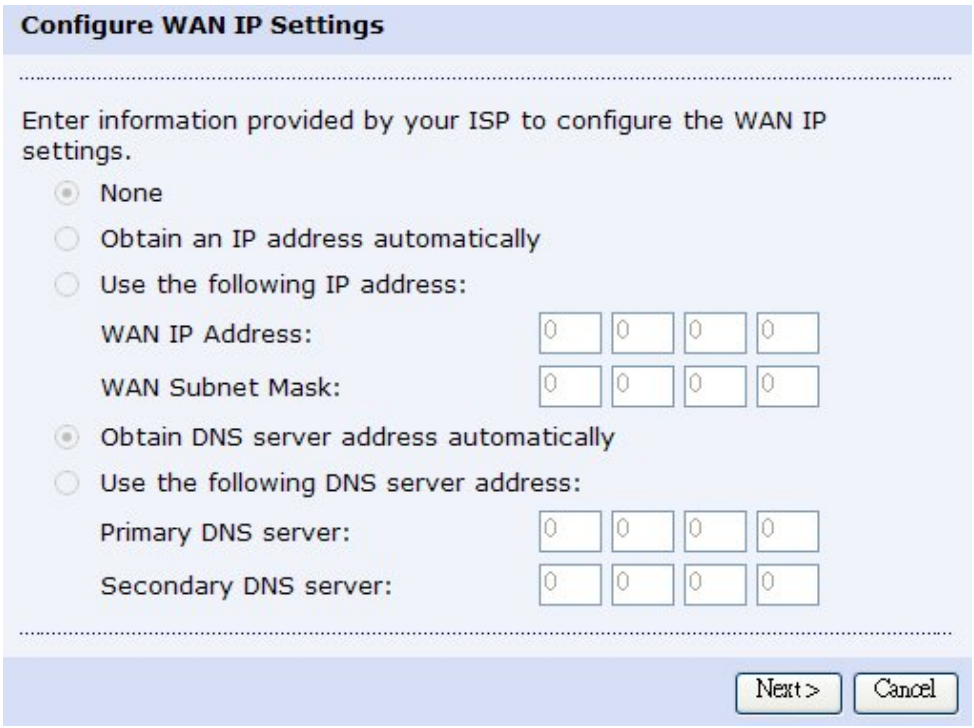



***Figure 17: Configuring WAN IP Settings***

In this mode, the device is a bridge and passes all raw data traffic between WAN and LAN ports. There is no need for any settings.

- Click *Next.*

The same procedure as configuring PPPoA or PPPoE, the configuring the LAN site settings and confirming setting pages will be shown, please follow up above descriptions to finish the settings. But be noted, the IP addresses in the PC of LAN side are visible to the WAN site in the bridging mode, those IP addresses are not blocked by NAT feature.

The information displayed on this page and the pages that follow are explained in detail in the following sub sections.

## Local Network (LAN) Page

This page allows you to setup the Local Network (LAN) connection. The following are the types of settings allowed:

- IP Address
- DHCP Server

Click on *Local Network* under Configuration from the left-hand side pane. The following page opens:

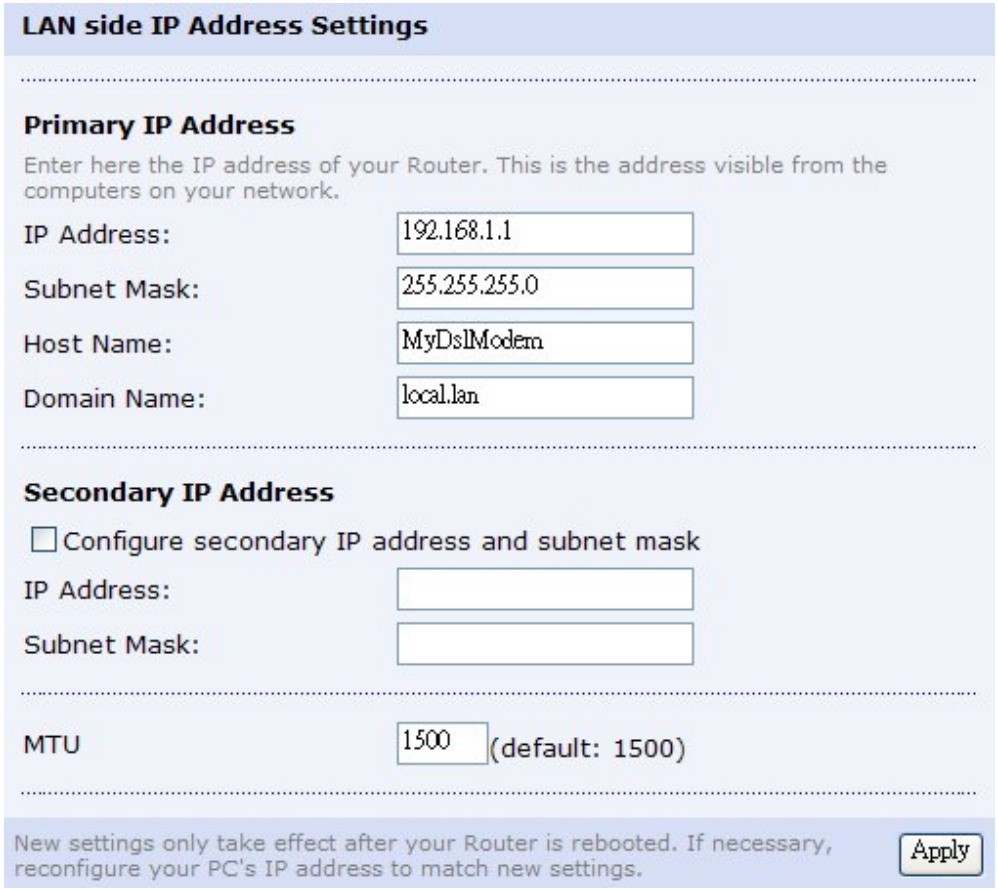



***Figure 18: Local network configuration - IP address***

**IP Address**

This page displays the local network configuration allowing you to configure:

- IP Address
- Subnet Mask
- Host Name
- Domain Name
- Secondary IP Address
- MTU

### DHCP server

This page displays the DHCP server configuration allowing you to configure:

- Enable DHCP server feature ON or OFF
- An IP addresses pool

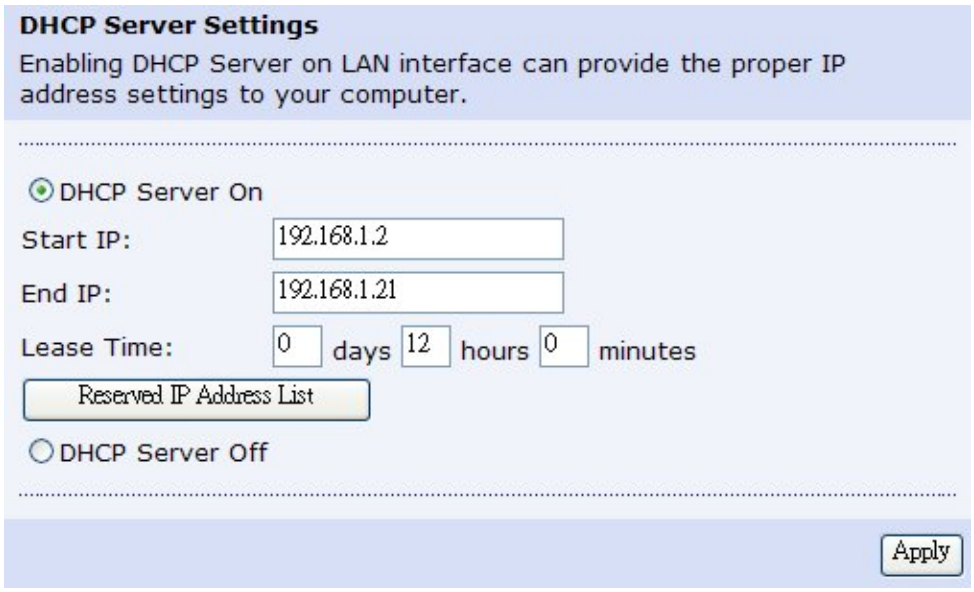



***Figure 19: DHCP server configuration***

- Click DHCP server On or OFF
- Enter the start IP address of DHCP pool
- Enter the end IP address of DHCP pool
- Enter the lease Time in DAYS/HOURS/MINUTES format
- Reserved IP Address List. You can reserve one specific IP address for a certain PC by adding the mapping entry between MAC address and IP address.

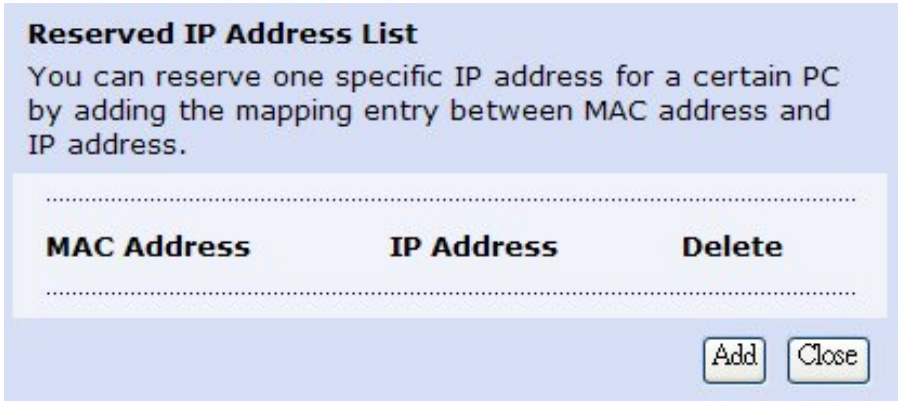



***Figure 20: DHCP server – Reserved IP Address List***

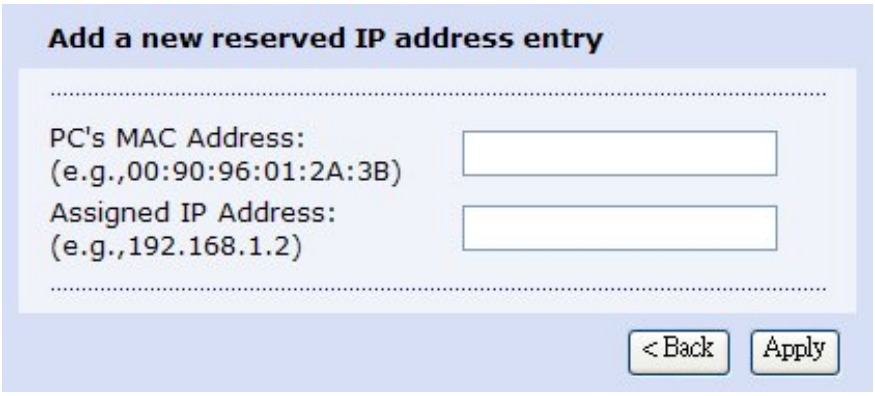



***Figure 21: DHCP server – reserved IP address entry***

## Internet Connection Page

You can configure your internet connection from this page. This page displays the details of existing internet connection, if any. You can perform the following functions from this page:

- Configure internet connection
- Configure ADSL
- Specify MAC Spoofing

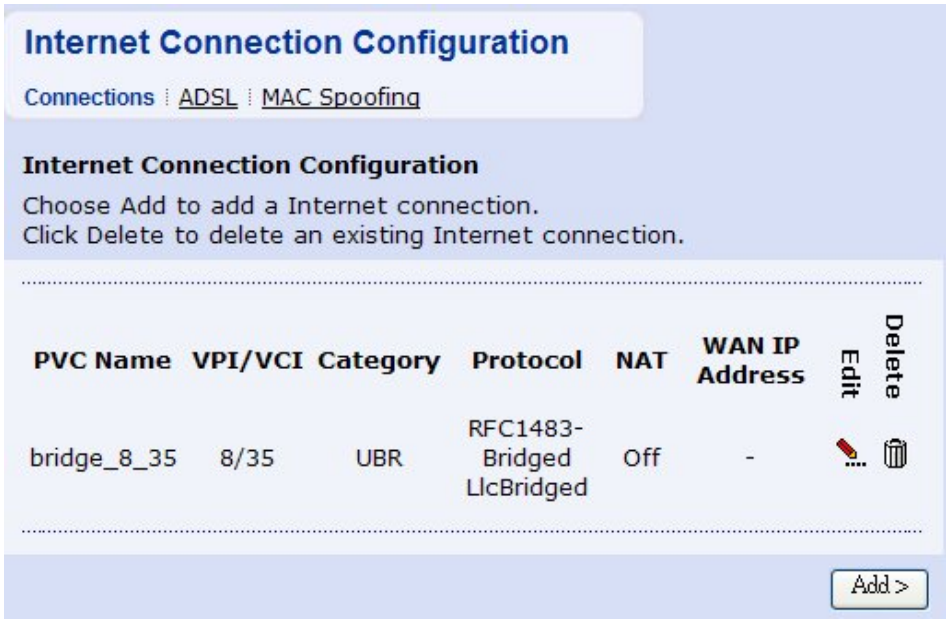



***Figure 22: Internet connection configuration***

**Connections**

To configure the internet connection:

- Click *Add*. Follow the steps described under ***Quick Setup*** section to setup the internet connection. If there is existing Internet connection, you may use the *Edit* or *Delete* to edit the connection profile or delete it.

### ADSL Configuration

In this web page, you can configure the basic ADSL parameters like enable/disable ADSL port, ADSL mode and some specific values.

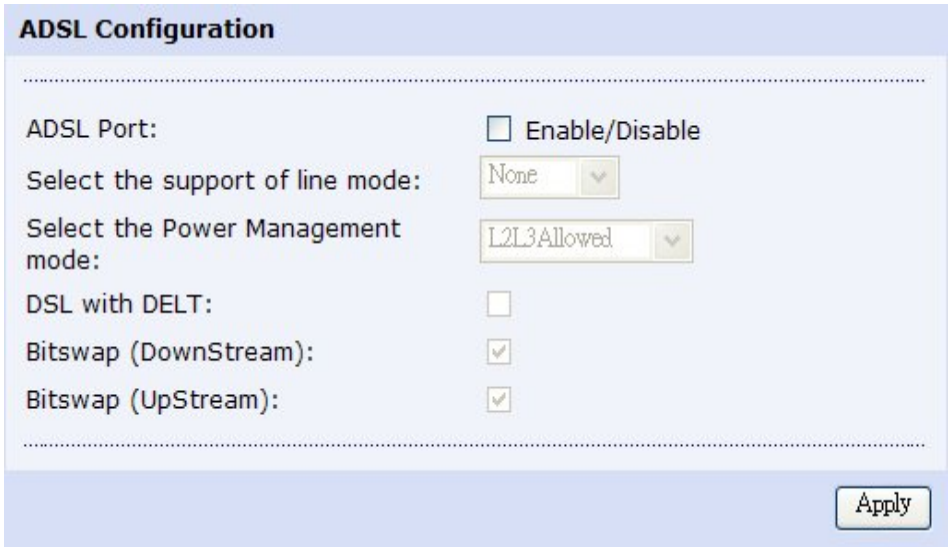



***Figure 23: ADSL configuration***

To configure ADSL:

- Click to enable the *ADSL Port*.
- Select the support of line mode from the drop down list. You have the option to select from ADSL 2, ADSL2PlusAuto, ADSL2Plus Only.
- You can enable/disable DSL with DELT, Bitswap (Downstream), and Bitswap (UpStream).
- Click *Apply*.

### MAC Spoofing

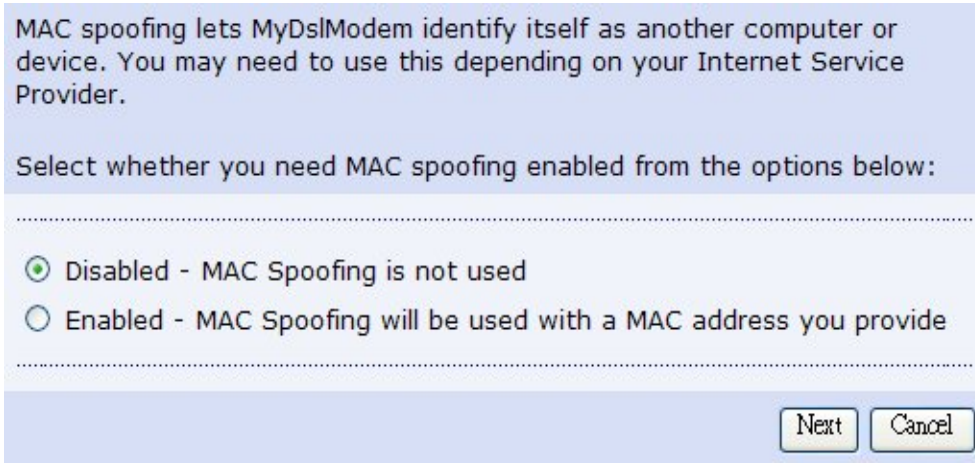



***Figure 25: Internet connection - MAC spoofing***

MAC spoofing lets the MyDslModem identify itself as another computer or device. You may need to use this depending on your Internet Service Provider.

To specify MAC Spoofing:

- Select either Disabled - MAC Spoofing is not used or Enabled - MAC Spoofing will be used with a MAC address you provide. MAC Spoofing Setup/Confirm page opens based on the option you selected earlier.
- Specify the MAC address in case you enabled the MAC Spoofing.

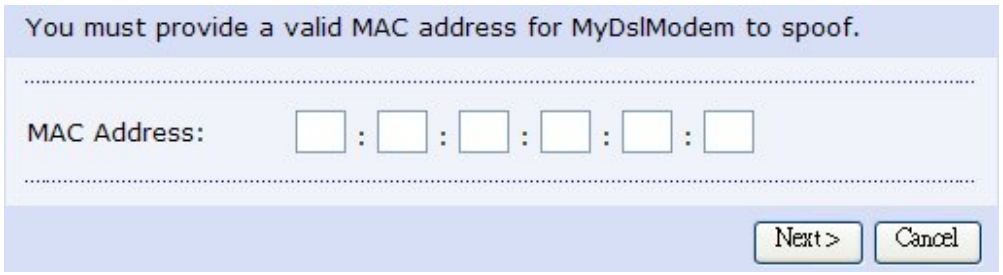



***Figure 26: MAC spoofing setup***

- Click *Confirm* to confirm the specified MAC Spoofing settings.

## Security Configuration

There are two following functions from this page which can be configured:

- Configure IP filter rules
- Configure Domain filter rules

### IP Filter

You can configure the IP filtering feature in the web page including port number or IP address filtering for inbound, outbound or both direction traffic.

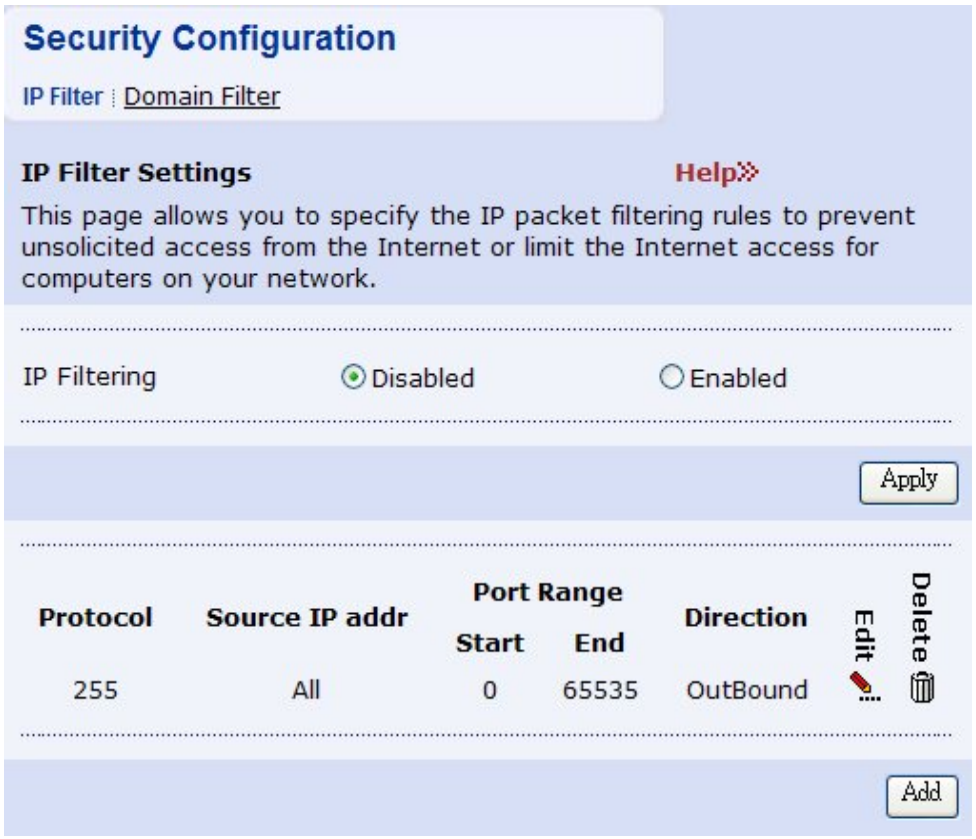



***Figure 27: Security Configuration***

Global settings:

- To enable or disable IP filtering function
- Click *Add* to create the rule for IP filtering policy

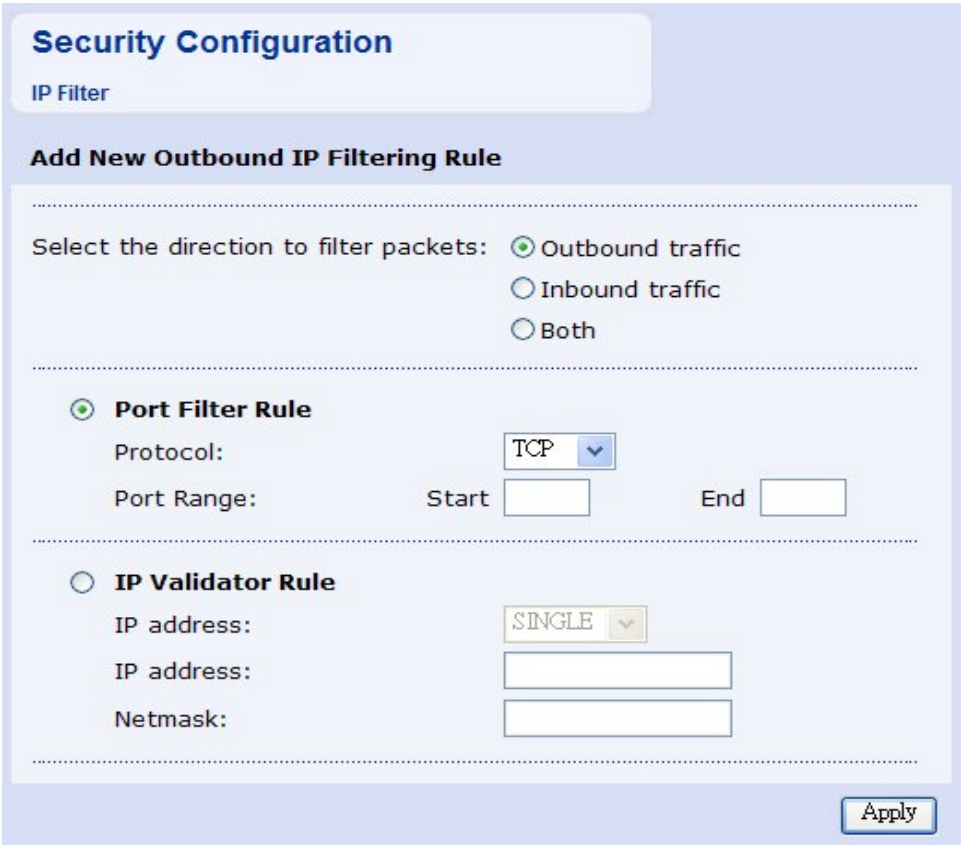



***Figure 28: Security Configuration – IP filter***

IP filtering global settings:

- Select the direction to filter packets, outbound (outgoing) traffic, inbound (incoming) traffic, or both
- Select the Port Filter Rule or IP Validator Rule. The port fitter rule needs the packet type (protocol: TCP, UDP, ICMP, GRE) and also the port range. The IP validator rule needs the IP address which can be a single IP address or a subnet.

### Domain Filter

You can configure the Domain filtering feature in the web page including Rule Action: Allow or Deny, domain name, and time schedule.

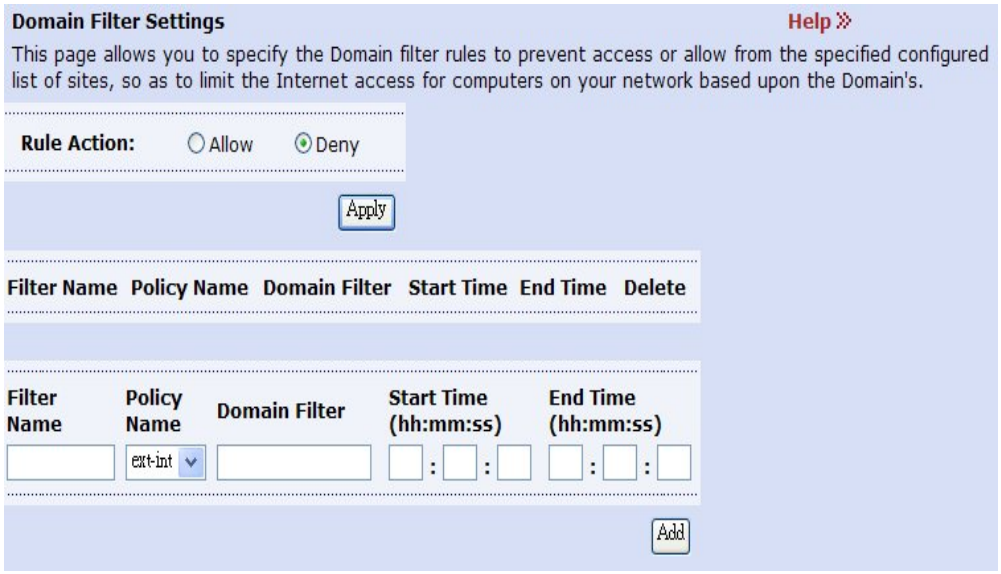



***Figure 29: Domain Filter Configuration***

To specify domain filter settings:

- Specify the rule action as *Allow* or *Deny* and click *Apply*.
- Enter the filter details such as *Filter Name*, *Policy Name* (refer the description in IP Filtering), *Domain Filter* (enter the domain name that you want to allow or deny user to surf it), *Start Time (hh:mm:ss)*, *End Time (hh:mm:ss)*.
- Click *Add*.

## Advanced Security Configuration

There are two following functions from this page which can be configured:

- DMZ Host
- Port Forwarding

### DMZ Host

You can configure DMZ host to provide better security for your local network if you enable the NAT function.


***Figure 30: Advanced Security Configuration – DMZ Host -1***

The DMZ host is related to the Internet connection interface. You could click the *EDIT* to set the DMZ host. This DMZ host is the computer on your local network that can be accessed from the Internet regarding of port forwarding and firewall settings.

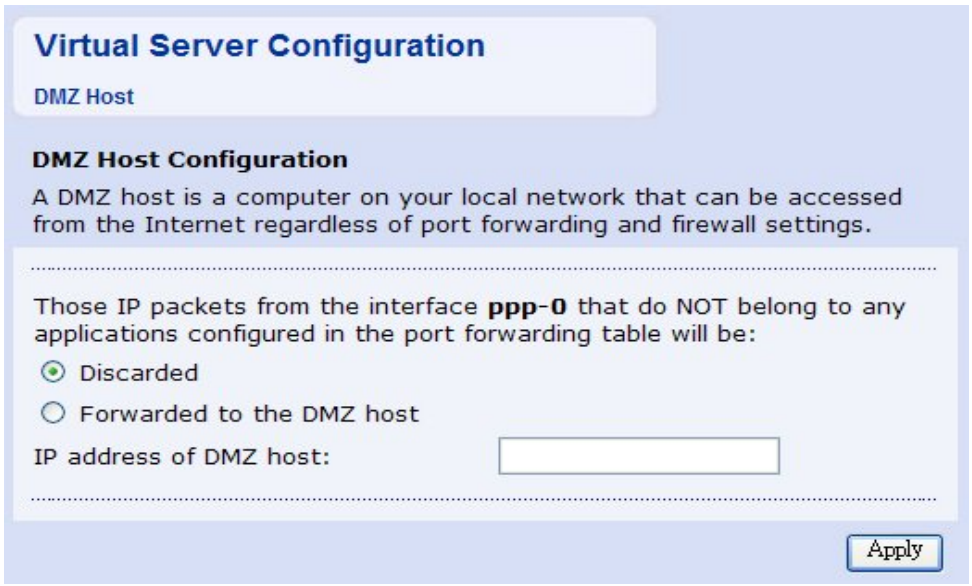



***Figure 31: Advanced Security Configuration – DMZ Host-2***

Global Settings:

- Enable or disable the DMZ host function

- If enabled, enter the IP address of DMZ host

**Port Forwarding**

Port forwarding enables you to run a server on your local network that can be accessed from the Internet. You need to set up port forwarding to tell the device on which computer the server is held. When port forwarding is enabled, your router (the device) routes all the inbound traffic on a particular port to the chosen computer on your network.

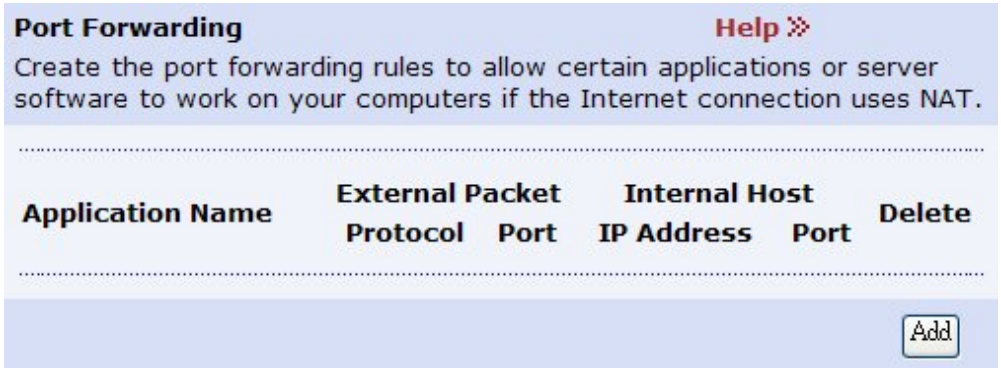



***Figure 32: Port Forwarding Configuration***

To configure port forwarding:

- Click *Add*.

Add New Part Forwarding Rule page opens:

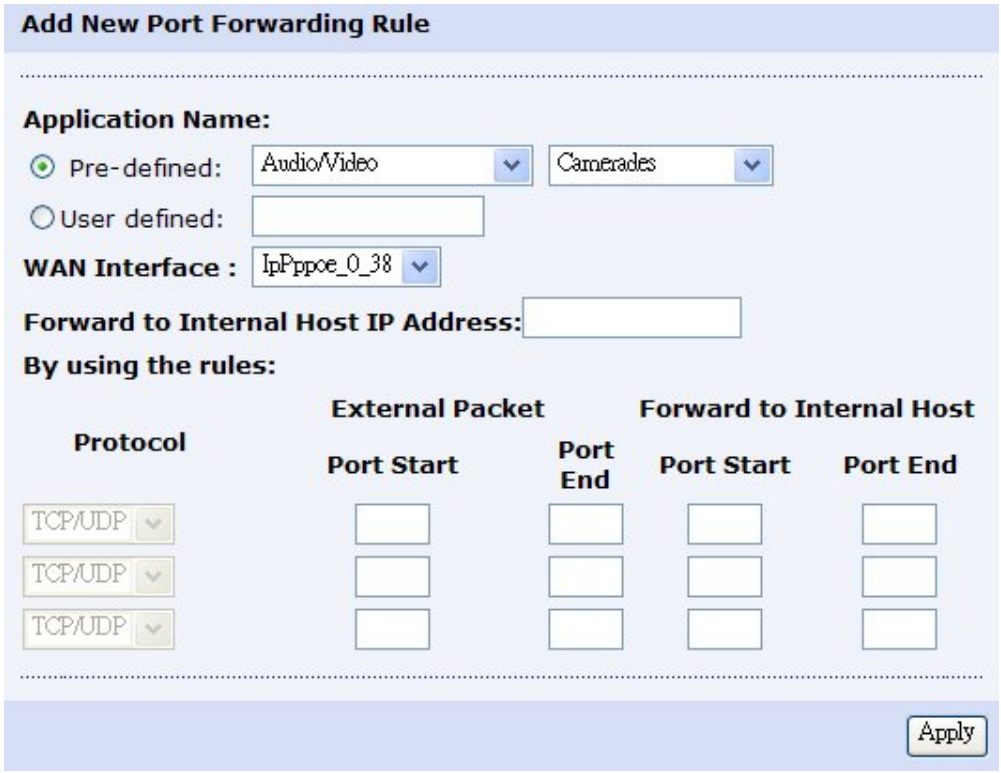



***Figure 33: Port Forwarding Configuration – Add New Rule***

- Specify the new port forwarding rule name either by selecting from the *Pre-defined* drop down lists or typing a name in *User defined* text box.
- Select the *WAN Interface* from the drop down list where the incoming packet coming from.
- Enter the IP address in Forward to Internal Host IP Address which the server is held.
- Specify the rules by specifying the information such as Protocol/Type, External Packet (Port Start, Port End), and Forward to Internal Host (Port Start, Port End).
- Click *Apply*.

## IP Routing

You can configure the packet routing table by static routing or dynamic routing.

- Static Routing
- Dynamic Routing

### Static Routing

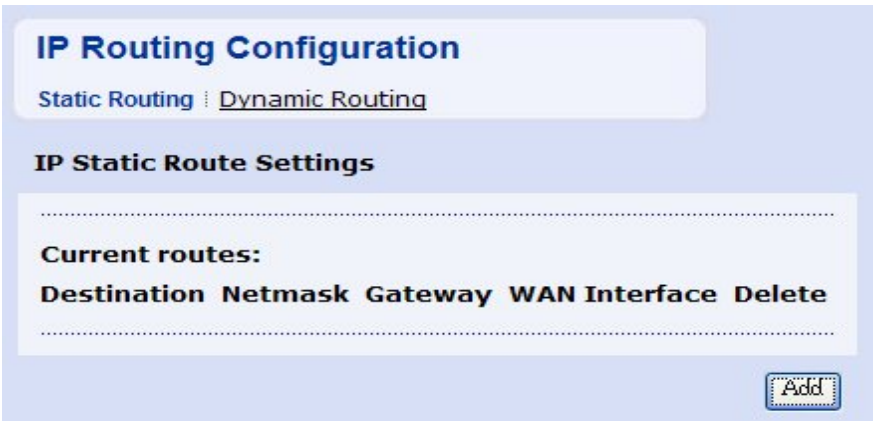



***Figure 34: IP Routing Configuration***

Under static routing web page, click the *ADD* button to add the static routing table.

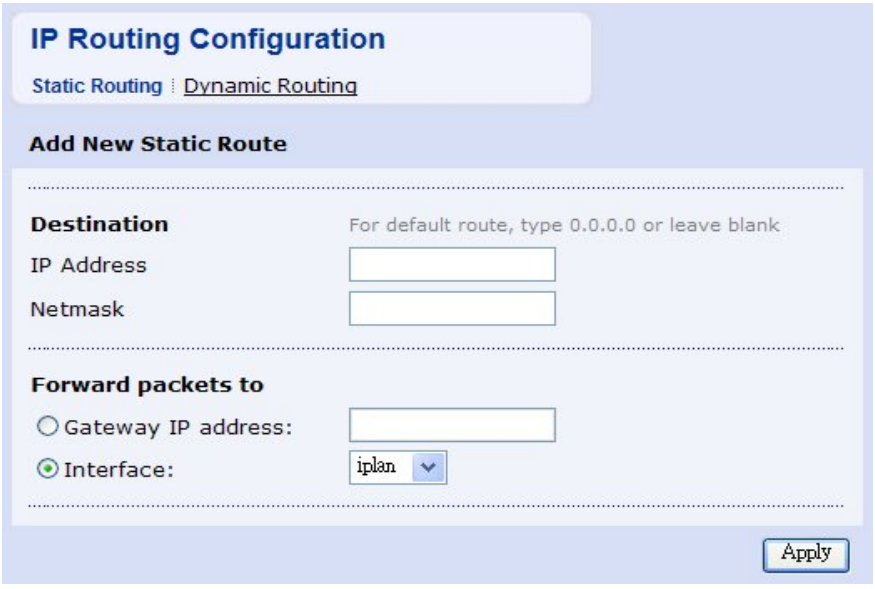



***Figure 35: Static IP Routing Configuration***

Global settings:

- Specify the destination IP address and its subnet
- Specify the gateway IP address or the interface (LAN or WAN port) where above

**Dynamic Routing**

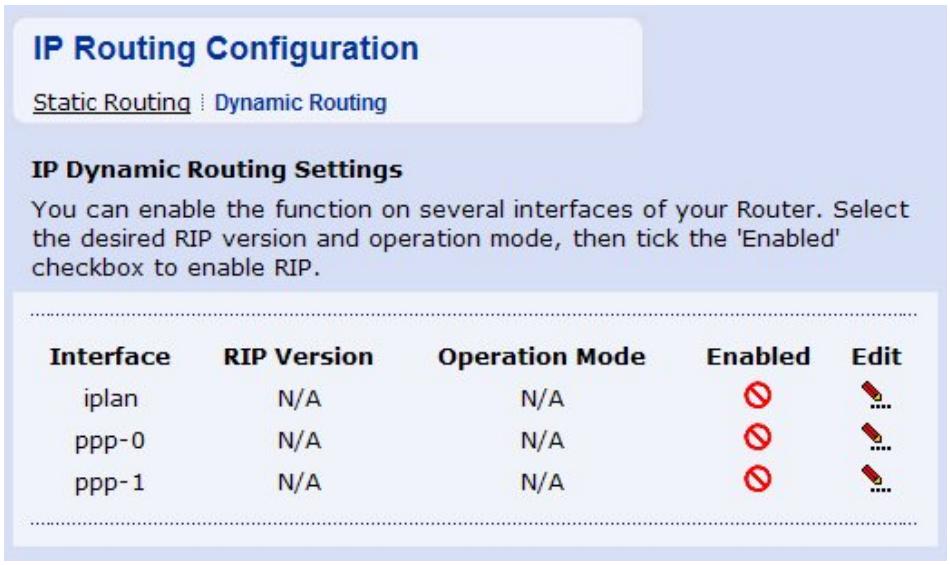



***Figure 36: Dynamic IP Routing Configuration***

To enable the dynamic routing:

- Select the Interface where to share and exchange the routing table. Click *Edit*.
- Select the *RIP Version* as *1*, *2* or *both*.
- Select the Operation Mode as Active, Passive, or Send Only.
- Select *Enabled*.
- Click *Apply*.

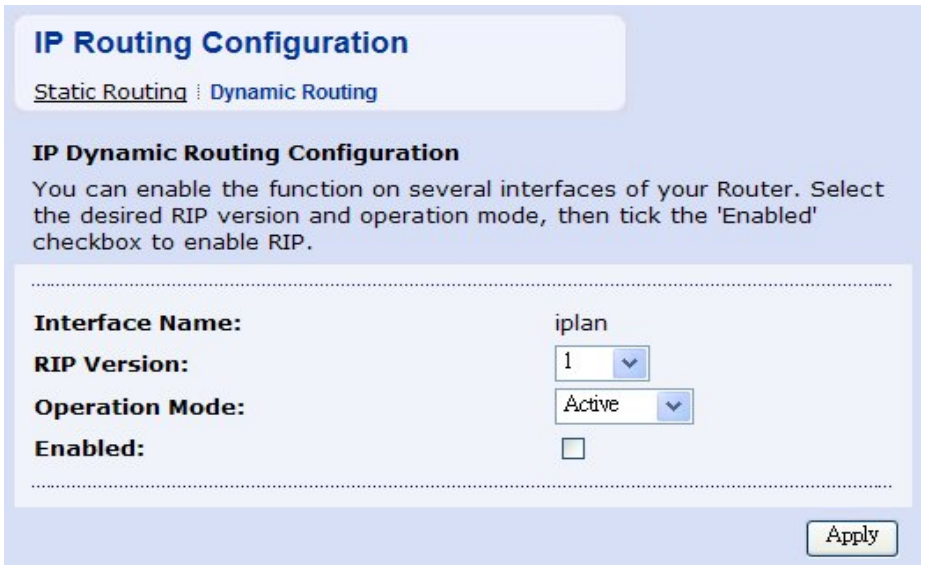



***Figure 37: Dynamic IP Routing Configuration***

## DNS Client

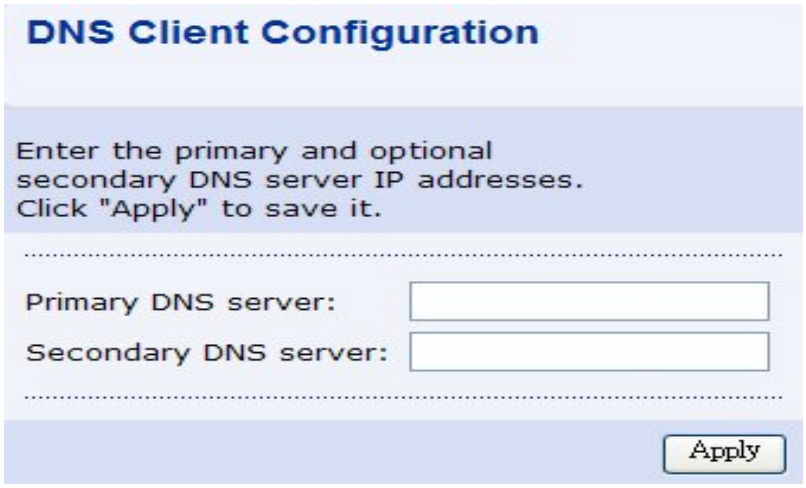



***Figure 38: DNS Client Configuration***

To specify DNS Client:

- Configure the DNS client by specifying the primary and secondary DNS server.
- Click *Apply*.

## IGMP Proxy

Configure this proxy to run a server on your local network that can be accessed from the Internet. See Help for more information

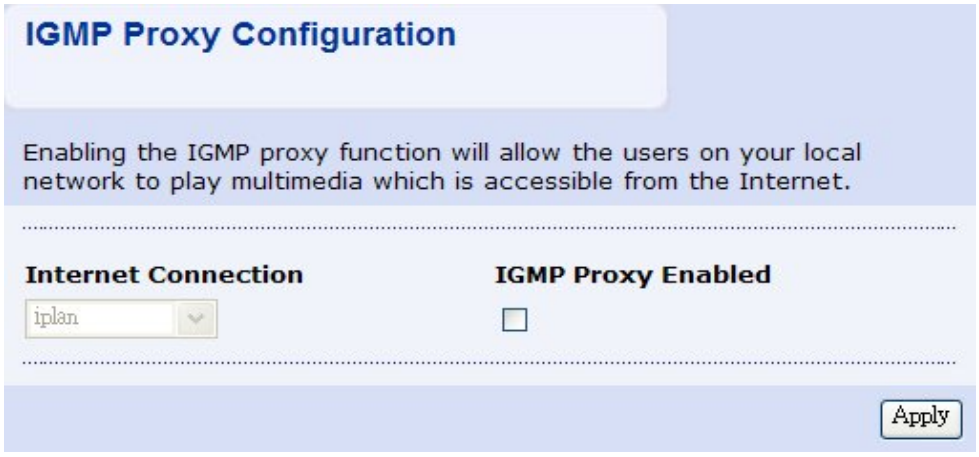



***Figure 39: IGMP proxy configuration***

To enable IGMP proxy:

- Select the connection from *Internet Connection* drop down list.
- Select IGMP Proxy Enabled.
- Click *Apply*.

## DNS Relay

The device can relay DNS query packets to the real DNS server and feedback back the IP address to the PC.

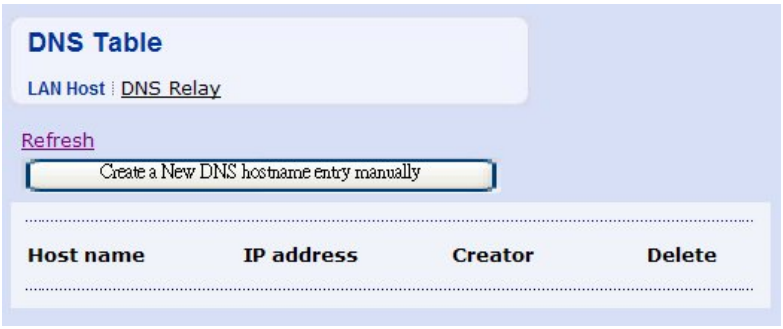



***Figure 40: Local network configuration - DNS relay***

Existing DNS relay details, if created before are displayed on the DNS Relay page. You can refresh the details by clicking *Refresh*.

To create a new DNS Hostname, click Create a New DNS Hostname entry manually.

DNS Table page opens:

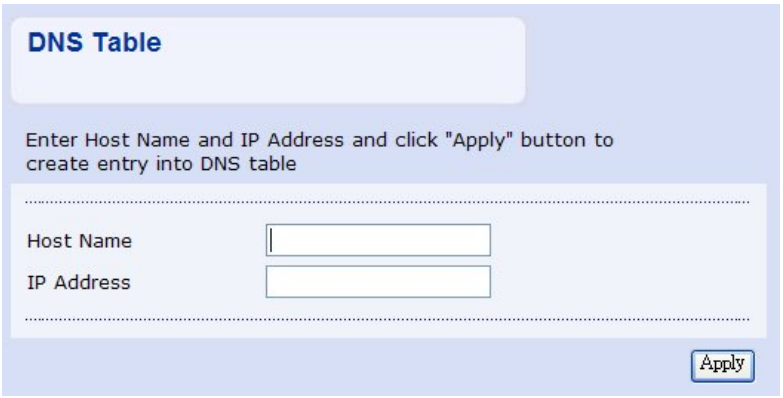



***Figure 41: DNS relay – Create a DNS host***

- Enter the Host Name and IP Address.
- Click *Apply*.

## SNTP

The device use simple time timer protocol (SNTP) to get the real time clock from the Internet. You can configure the SNTP server and SNTP client in this page.

- SNTP Server
- SNTP Client

### SNTP Server

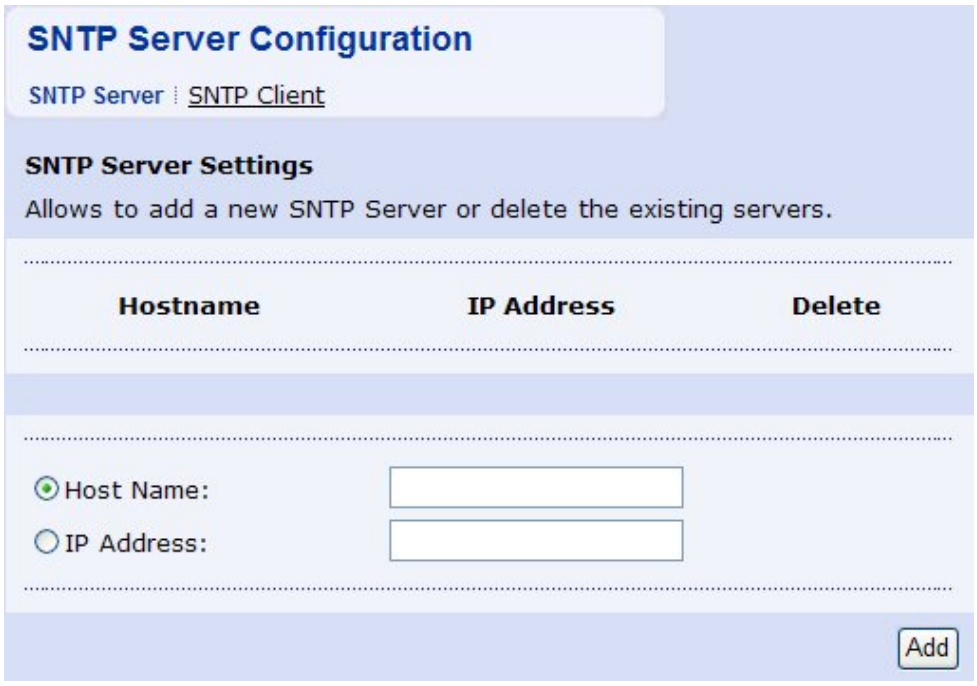



***Figure 42: SNTP Server Configuration***

To configure SNTP server:

- Select to enter host name or IP address
- Enter the SNTP host name or IP address
- Click *Add*

You could add multiple SNTP servers to make sure to get the real time clock from Internet.

### SNTP client

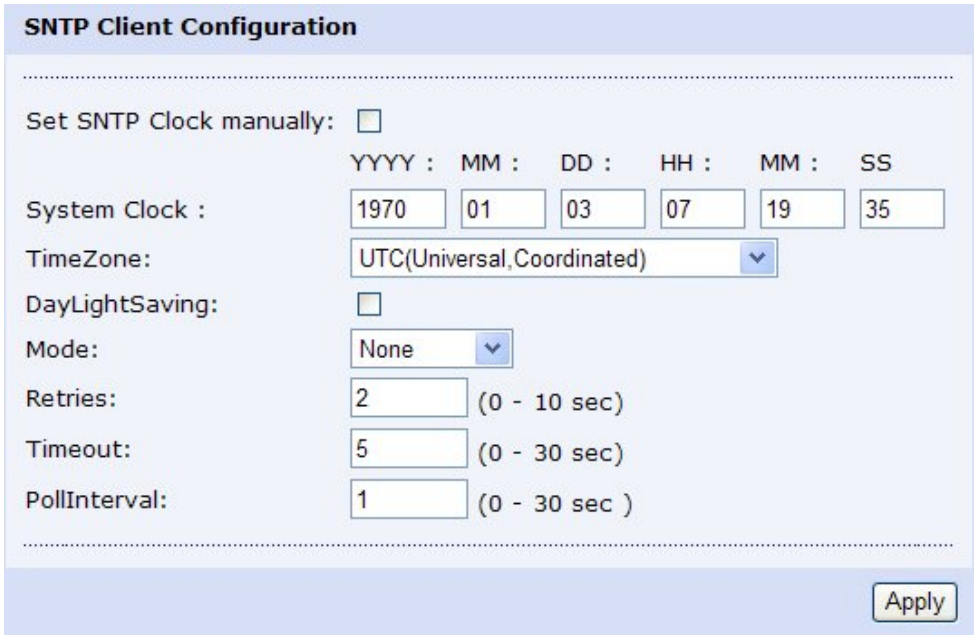



***Figure 43: SNTP Client Configuration***

In case, the SNTP server does not reply the real time clock, you can set the system clock too. Even you do not check "set the SNTP clock manually", you still need to configure parameters in this page.

To configure SNTP client:

- Check if you need to set the SNTP clock manually
- Enter system clock the device will use it as default if there is no SNTP server found.
- Enter your time zone and check day light saving if necessary
- Enter the parameters for SNTP module including retry timer, timeout value and polling interval.
- Click *Apply*

## Quality of Service

You can configure the priority of packets through this web page.

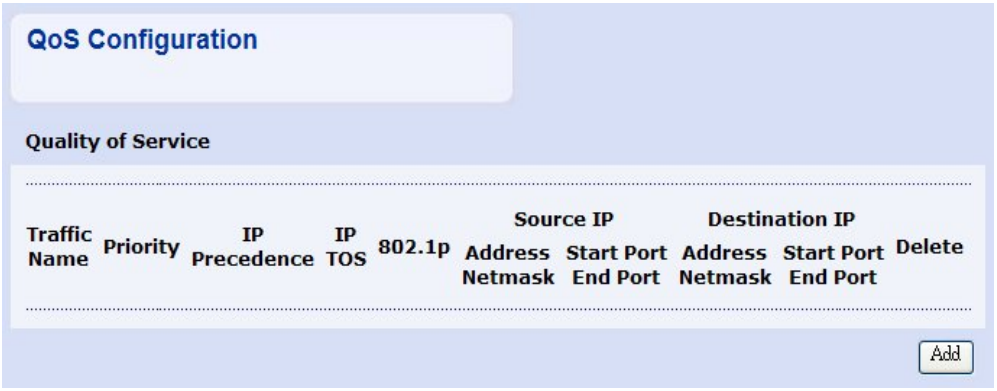



***Figure 44: Quality of Service***

Click *Add* to create the packet classifier.

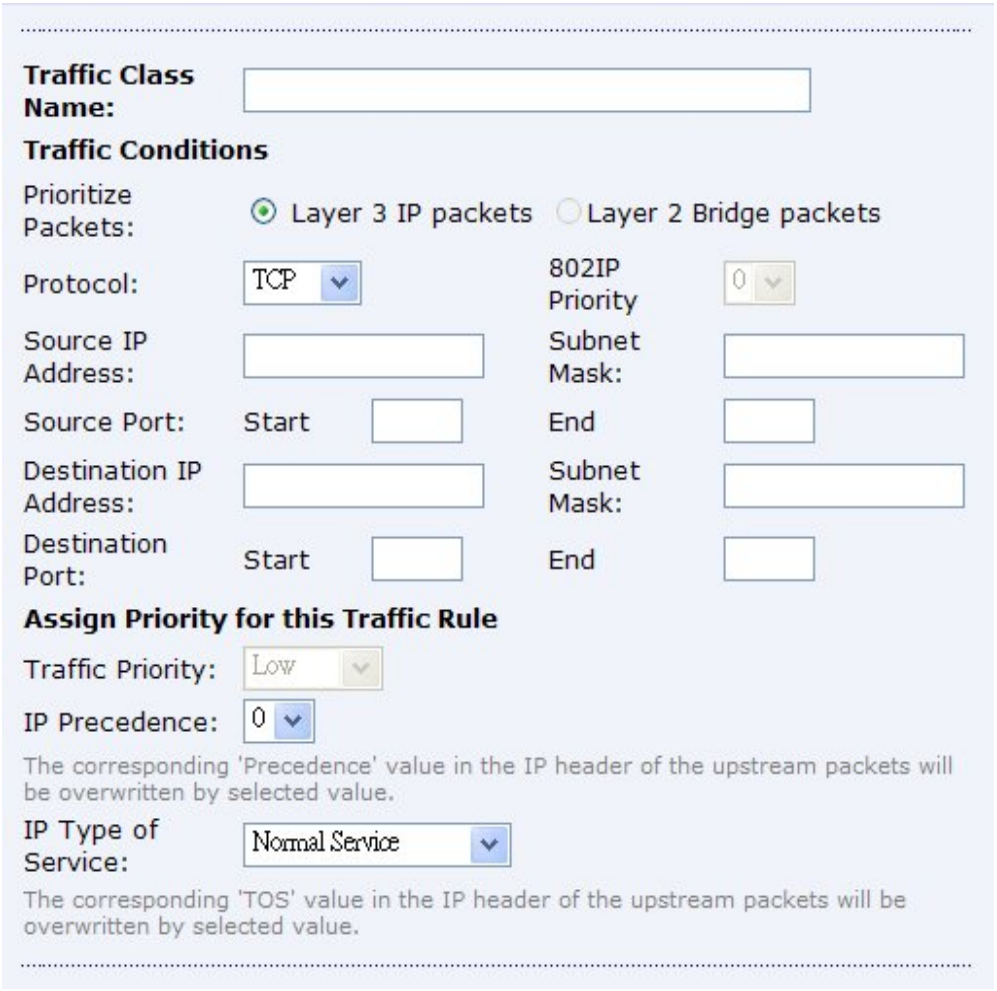



***Figure 45: Rule of Quality of Service***

Quality of Service, global settings:

- Enter the name for this classifier (rule)
- Select the packet layer (layer 3 or layer 2) to prioritize packets

- Packet type which is prioritized
- Source IP address and subnet
- Source port range from start to end
- Destination IP address and subnet
- Destination port range from start to end
- Assign the traffic priority, IP precedence and the IP type of service.
- Click *Apply* to add this QoS rule.

# 7 System

The System web page menu comprises:

- Admin Password
- Reset & Restart
- Backup Configuration
- Remote Access

## Admin Password

This web page lets you change the user name and password.


***Figure 46: Administration Password***

To change the password:

- Enter the user name in *User name*.
- Enter the new password in *New password*.
- Confirm the password by retyping it in *Confirm New password*.
- Click *Apply*.

A window opens prompting you re-login with your new username or password:


- Click *OK*.

## Reset & Restart

This web page allows you to restart your device or reset all settings to factory default settings.

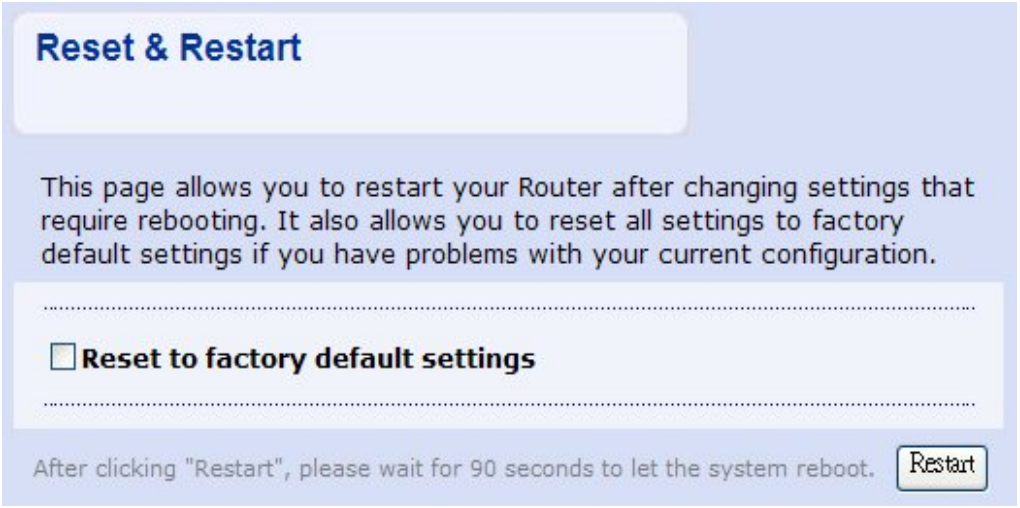



***Figure 47: Reset & Restart***

- Click the *Restart* button without the check of "Reset to factory default settings" to restart the device with current settings.
- Click the *Restart* button with the check of "Reset to factory default settings" to restore the factory settings back to the device.

## Backup Configuration

This web page allows you to restart your device or reset all settings to factory default settings.

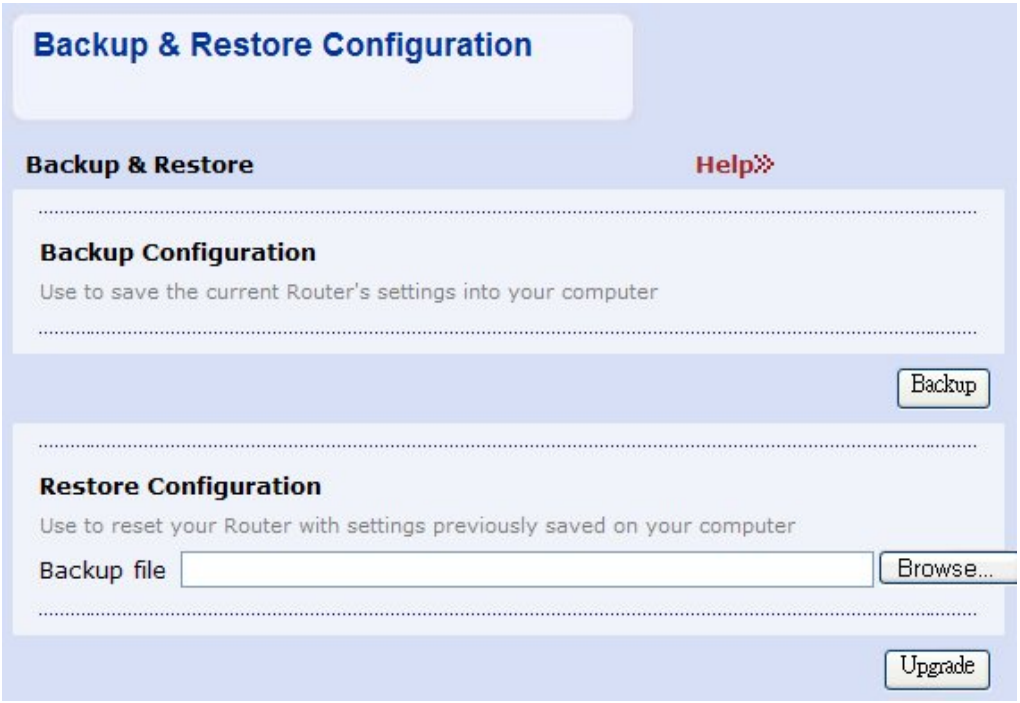


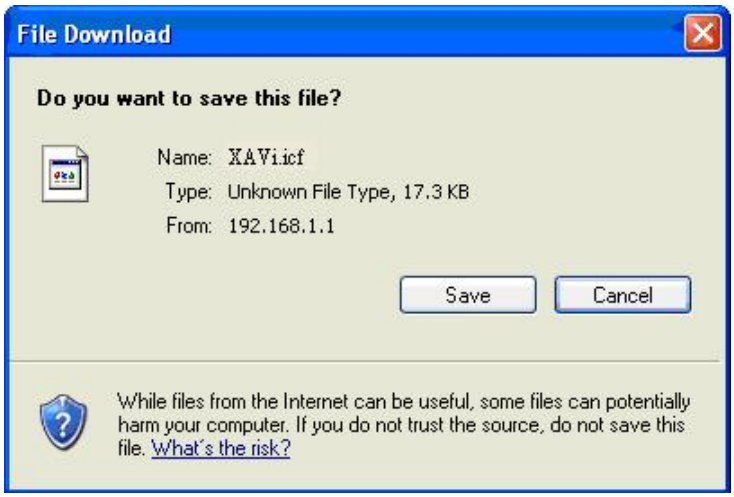

***Figure 48: Backup & Restore Configuration***

### Backup Configuration

To save the backup configuration file:

- Click *Backup*.

A message window opens prompting you to save the file:




- Click *Save*.
- Specify the path where the file is to be saved and click *Save*.

### Restore Configuration

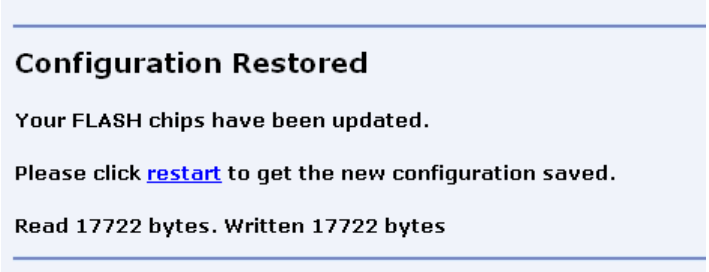
To restore the previously saved configuration:

- Click *Browse* to specify the path of the saved configuration file and click *Open*.
- Click *Upgrade*.

WARNING

*Do not restart your router during configuration restore process.*

A message appears indicating the status of restoration:




- Click *restart* to save new configuration.

## Remote Access

This submenu provides you remote access to a router. This may help the IT support staff to configure the router remotely.

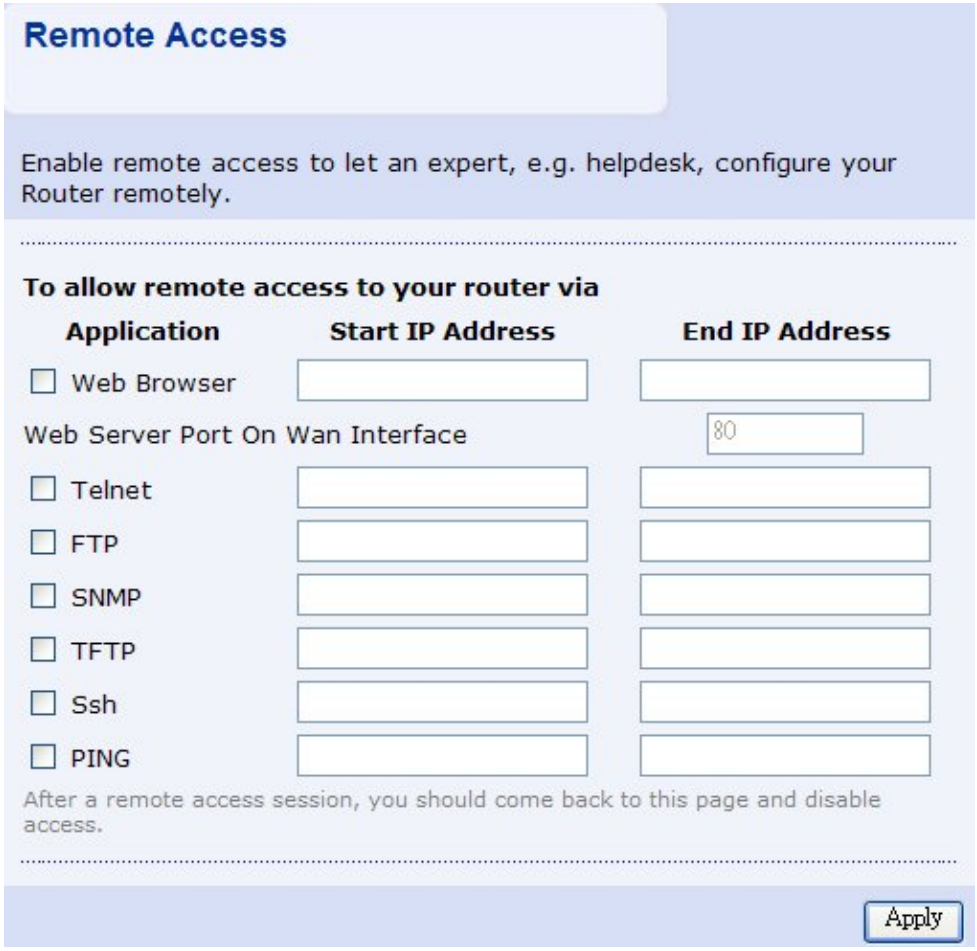



***Figure 49: Remote access***

To enable the remote access:

- Specify the method by which you wish to access the router remotely by selecting it. The following are the methods available for remote access:
  - Web Browser
  - Telnet
  - FTP
  - SNMP
  - TFTP
  - Ssh
  - PING
- Specify the *Start IP Address* and *End IP Address* for the selected method.

# 8 Status

You can see the following statuses from the status menu:

- Broadband Line
- Internet Connection
- Traffic Status
- DHCP Table
- Routing Table
- ARP Table

## Broadband Line

This web page shows the ADSL status in details. If you are interesting in the parameters, please contact technical support to get the description..

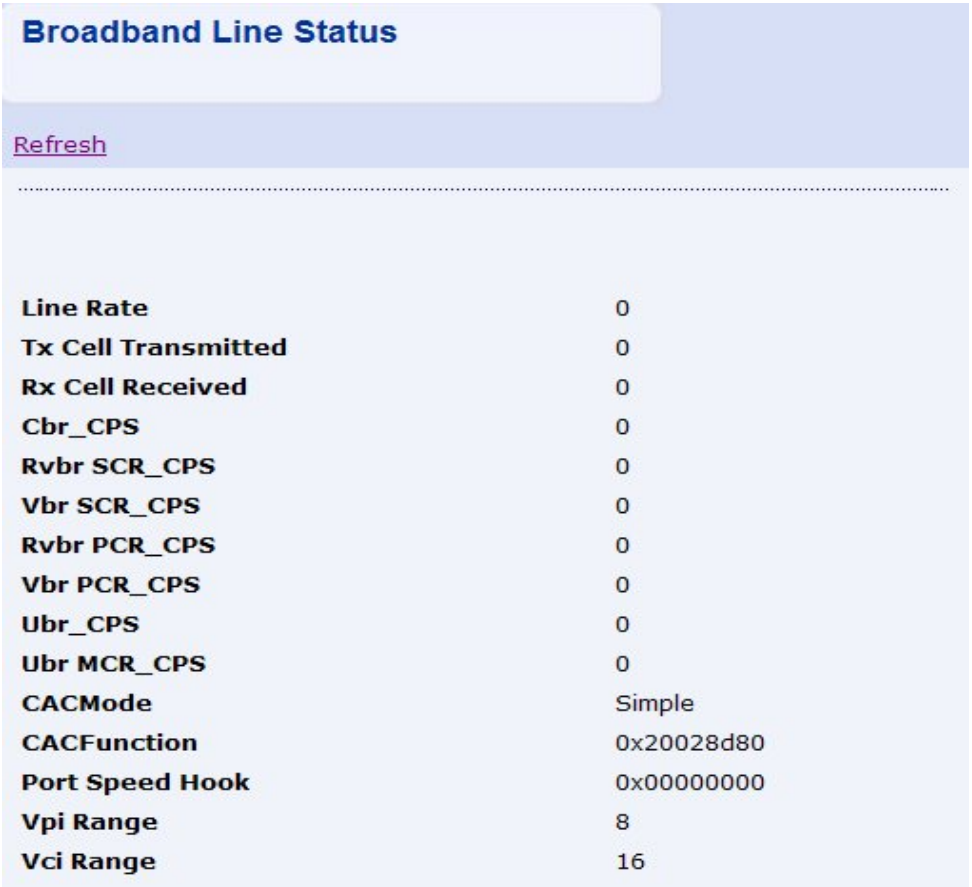



***Figure 50: Status of Broadband Line***

## Internet Connection

This web page shows current defined PVC profiles and its connection status including PVC name, VPI/VCI values, ATM QoS, Internet connection protocol, NAT, WAN IP address and connection online time.

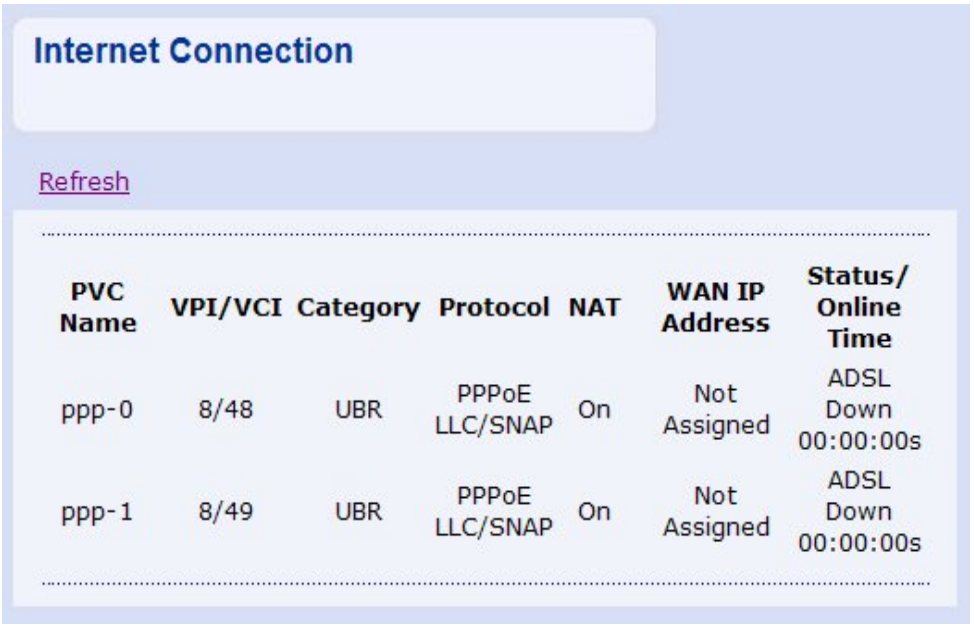



***Figure 51: Status of Internet Connection***

## Traffic Status

This web page shows traffic statistics of TX&RX both directions including Ethernet ports, USB port and WAN ports.

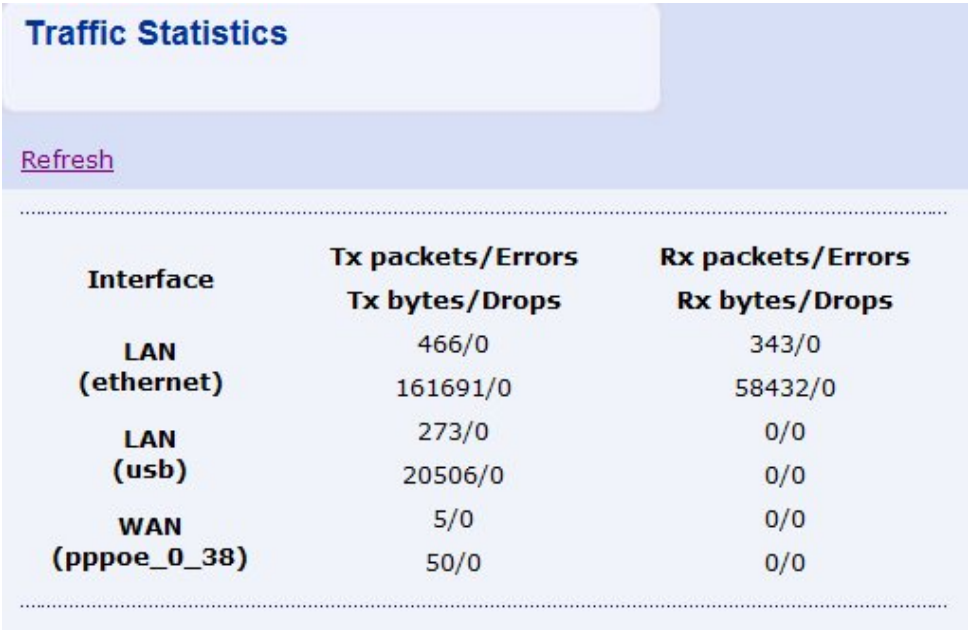



***Figure 52: Traffic Status***

## DHCP Table

This web page shows all the PCs who request an IP address from the device. Those messages show in the web page, MAC address of PC, assigned IP address, Lease Time and the host name of PC.


***Figure 53: DHCP Table***

## Routing Table

This web page shows the routing table of the device which shows the packet flow when the device receives incoming packets from WAN port and LAN port.


***Figure 54: Routing Table***

## ARP Table

This web page shows the relationship between MAC address and IP address where the device learns from the data traffic. Besides, it also record the interface where the device learns this information.


***Figure 64: ARP Table***

# A Appendix A - Configuring the Internet Settings

This appendix provides instructions for configuring the Internet settings on your computers to work with the device.

## Configuring Ethernet PCs

### Before you begin

By default, the device automatically assigns the required Internet settings to your PCs. You need to configure the PCs to accept this information when it is assigned.


Note

*In some cases, you may want to assign Internet information manually to some or all of your computers rather than allow the device to do so. See*

*Assigning static Internet information to your PCs section.*

- If you have connected your LAN PCs via Ethernet to the device, follow the instructions that correspond to the operating system installed on your PC:
- Windows® XP PCs
- Windows 2000 PCs
- Windows Me PCs
- Windows 95, 98 PCs
- Windows NT 4.0 workstations

### Windows® XP PCs

In the Windows task bar, click the *Start* button, and then click *Control Panel*.

Double-click the Network Connections icon.

In the *LAN or High-Speed Internet* window, right-click on the icon corresponding to your network interface card (NIC) and select *Properties*. (Often, this icon is labeled *Local Area Connection*).The *Local Area Connection* dialog box is displayed with a list of currently installed network items.

Ensure that the check box to the left of the item labelled *Internet Protocol TCP/IP* is checked and click *Properties*.

In the Internet Protocol (TCP/IP) Properties dialog box, click the radio button labelled Obtain an IP address automatically. Also click the radio button labelled Obtain DNS server address automatically.

Click *OK* twice to confirm your changes, and then close the Control Panel.

### Windows 2000 PCs

First, check for the IP protocol and, if necessary, install it:

In the Windows task bar, click the *Start* button, point to *Settings*, and then click *Control Panel*.

Double-click the Network and Dial-up Connections icon.

In the *Network and Dial-up Connections* window, right-click the Local Area Connection icon, and then select *Properties*. The *Local Area Connection Properties*

dialog box is displayed with a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled. Skip to step 10.

If Internet Protocol (TCP/IP) does not display as an installed component, click *Install.*

In the *Select Network Component* Type dialog box, select *Protocol*, and then click *Add.*

Select *Internet Protocol (TCP/IP)* in the Network Protocols list, and then click *OK*. You may be prompted to install files from your Windows 2000 installation CD or other media. Follow the instructions to install the files.

If prompted, click *OK* to restart your computer with the new settings. Next, configure the PCs to accept IP information assigned by the device.

In the *Control Panel*, double-click the Network and Dial-up Connections icon.

In the *Network and Dial-up Connections* window, right-click the Local Area Connection icon, and then select *Properties*.

In the Local Area Connection Properties dialog box, select *Internet Protocol (TCP/IP),* and then click *Properties*.

In the Internet Protocol (TCP/IP) Properties dialog box, click the radio button labelled Obtain an IP address automatically. Also click the radio button labelled Obtain DNS server address automatically.

Click *OK* twice to confirm and save your changes, and then close the Control Panel.

#### Windows Me PCs

In the Windows task bar, click the Start button, point to Settings, and then click Control Panel.

Double-click the Network and Dial-up Connections icon.

In the Network and Dial-up Connections window, right-click the Network icon, and then select Properties. The Network Properties dialog box displays with a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled. Skip to step 11.

If Internet Protocol (TCP/IP) does not display as an installed component, click Add.

In the Select Network Component Type dialog box, select Protocol, and then click Add.

Select Microsoft in the Manufacturers box.

Select Internet Protocol (TCP/IP) in the Network Protocols list, and then click OK. You may be prompted to install files from your Windows Me installation CD or other media. Follow the instructions to install the files.

If prompted, click OK to restart your computer with the new settings. Next, configure the PCs to accept IP information assigned by the device.

In the Control Panel, double-click the Network and Dial-up Connections icon.

In Network and Dial-up Connections window, right-click the Network icon, and then select Properties.

In the Network Properties dialog box, select TCP/IP, and then click Properties.

In the TCP/IP Settings dialog box, click the radio button labelled Server assigned IP address. Also click the radio button labelled Server assigned name server address.

Click OK twice to confirm and save your changes, and then close the Control Panel.

#### Windows 95, 98 PCs

First, check for the IP protocol and, if necessary, install it:

In the Windows task bar, click the *Start* button, point to *Settings*, and then click *Control Panel*.

Double-click the Network icon. The *Network* dialog box displays with a list of currently installed network components. If the list includes TCP/IP, and then the protocol has already been enabled. Skip to step 9.

If TCP/IP does not display as an installed component, click *Add.* The Select Network Component Type dialog box displays.

Select *Protocol*, and then click *Add…*The Select Network Protocol dialog box displays.

Click on *Microsoft* in the Manufacturers list box, and then click *TCP/IP* in the Network Protocols list box.

Click *OK* to return to the Network dialog box, and then click *OK* again. You may be prompted to install files from your Windows 95/98 installation CD. Follow the instructions to install the files.

Click *OK* to restart the PC and complete the TCP/IP installation. Next, configure the PCs to accept IP information assigned by the device.

Open the Control Panel window, and then click the Network icon.

Select the network component labeled TCP/IP, and then click *Properties*. If you have multiple TCP/IP listings, select the listing associated with your network card or adapter.

In the TCP/IP Properties dialog box, click the IP Address tab.

Click the radio button labeled Obtain an IP address automatically.

Click the DNS Configuration tab, and then click the radio button labelled *Obtain an IP address automatically*.

Click *OK* twice to confirm and save your changes. You will be prompted to restart Windows.

Click *Yes*.

**Windows NT 4.0 workstations**

First, check for the IP protocol and, if necessary, install it:

In the Windows NT task bar, click the *Start* button, point to *Settings*, and then click *Control Panel*.

In the Control Panel window, double click the Network icon.

In the *Network dialog* box, click the *Protocols* tab. The *Protocols* tab displays a list of currently installed network protocols. If the list includes TCP/IP, then the protocol has already been enabled. Skip to step 9.

If TCP/IP does not display as an installed component, click *Add.*

In the *Select Network Protocol* dialog box, select *TCP/IP*, and then click *OK*. You may be prompted to install files from your Windows NT installation CD or other media. Follow the instructions to install the files. After all files are installed, a window displays to inform you that a TCP/IP service called DHCP can be set up to dynamically assign IP information.

Click *Yes* to continue, and then click *OK* if prompted to restart your computer. Next, configure the PCs to accept IP information assigned by the device.

Open the Control Panel window, and then double-click the Network icon.

In the *Network* dialog box, click the *Protocols* tab.

In the *Protocols* tab, select *TCP/IP*, and then click *Properties*.

In the Microsoft TCP/IP Properties dialog box, click the radio button labelled Obtain an IP address from a DHCP server.

Click *OK* twice to confirm and save your changes, and then close the Control Panel.

**Assigning static Internet information to your PCs**

If you are a typical user, you will not need to assign static Internet information to your LAN PCs because your ISP automatically assigns this information for you.

In some cases however, you may want to assign Internet information to some or all of your PCs directly (often called "statically"), rather than allowing the device to assign it. This option may be desirable (but not required) if:

- You have obtained one or more public IP addresses that you want to always associate with specific computers (for example, if you are using a computer as a public web server).
- You maintain different subnets on your LAN (subnets are described in Appendix B).

Before you begin, you must have the following information available:

- The IP address and subnet mask of each PC
- The IP address of the default gateway for your LAN. In most cases, this is the address assigned to the LAN port on the device. By default, the LAN port is assigned the IP address 192.168.1.1. (You can change this number or another number can be assigned by your ISP.)
- The IP address of your ISP's Domain Name System (DNS) server.

On each PC to which you want to assign static information, follow the instructions relating only to checking for and/or installing the IP protocol. Once it is installed, continue to follow the instructions for displaying each of the Internet Protocol (TCP/IP) properties. Instead of enabling dynamic assignment of the IP addresses for the computer, DNS server and default gateway, click the radio buttons that enable you to enter the information manually.


Note

*Your PCs must have IP addresses that place them in the same subnet as the* device*'s LAN port.*

## Configuring USB PC

### Connecting a computer to the USB port

If you use the device's USB port to connect to a PC, you must install the provided USB driver software on the PC. The driver enables Ethernet-over-USB communication with the device.

Configuring the USB computer is a two-part process:

- In Part 1, you install the USB driver on the PC.
  - If your computer is running Windows 2000, 98, 98 SE, XP or ME, follow the instructions given below.
- In Part 2, you configure the IP properties on the USB PC.

### Part 1. Installing the USB Driver

Ensure that the USB cable **is not connected** to the USB port on the PC. The installation program will prompt you when to connect the cable.

This USB driver supports Windows 2000, 98, 98 SE, XP or ME

***1. Find the USB driver in the CD, double-click on setup.exe to start the DSL Modem Setup Wizard.***

The Installing window displays as the Wizard prepares your system for the installation:


***Figure 83: USB Setup Wizard: Installing Window***

If a Microsoft digital signature dialog box is displayed, click Yes to continue.

The installation program will begin copying the necessary installation files to the required locations. When complete, a window displays to prompt you to connect the USB cable to your computer.


***Figure 84: Prompt for USB Cable Plug-in***

***2. Plug the USB cable from the device into the USB port of the PC.***

The USB cable provided has a flat connector on one end (called Type A) and a square connector on the other (Type B). Connect the flat connector to your PC and the square connector to the device.


***Figure 85: USB Cable Connectors***

If a Microsoft digital signature dialog box is displayed, click Yes to continue.

A window displays briefly, indicating that the system has found new hardware, and the Installing window displays as the installation finishes.

You have now finished installing the driver. You do not need to restart your computer. Proceed to *Part 2. Configuring IP properties on the USB PC*.

### Part 2. Configuring IP properties on the USB PC

Now that the USB driver installation is complete, you must configure the USB PC so that its IP properties place it in the same subnet as the device's USB port. There are two ways to do this:

The device is configured to assign an appropriate IP address to the USB PC. If you want to use this automatic assignment feature, called "DHCP server," you must configure the USB PC to accept dynamically assigned IP information. Follow the instruction on *Configuring Ethernet PC* section that corresponds to the operating system installed on your PC.

If you want to assign a static IP address to the PC, follow the instructions on *Configuring Ethernet PC* section and use the following information:

In the Network and Dial-up Connections window, be sure to select the icon that corresponds to your new USB connection (not the one that corresponds to your Ethernet NIC). When you display properties for the icon, the following text should display in the Connect Using text box:

- USB IAD LAN Modem #n
- The USB port on the device is preconfigured with these properties:
- USB port IP address:192.168.1.100 (for example)
  USB port subnet mask: 255.255.255.0

Therefore, your PC must be configured as follows:

*IP address:* 192.168.1.*n* where *n* is a number from *2* to *254* that does not conflict with the DHCP address range.

*Subnet mask:* 255.255.255.0

# B Appendix B - IP Addresses, Network Masks, and Subnets

## IP Addresses


Note

*This section refers only to IP addresses for IPv4 (version 4 of the Internet Protocol). IPv6 addresses are not covered.*

*This section assumes basic knowledge of binary numbers, bits, and bytes.*

IP addresses, the Internet's version of telephone numbers, are used to identify individual nodes (computers or devices) on the Internet. Every IP address contains four numbers, each from 0 to 255 and separated by dots (periods), e.g. 20.56.0.211. These numbers are called, from left to right, field1, field2, field3, and field4.

This style of writing IP addresses as decimal numbers separated by dots is called *dotted decimal notation*. The IP address 20.56.0.211 is read "twenty dot fifty-six dot zero dot two-eleven."

### Structure of an IP address

IP addresses have a hierarchical design similar to that of telephone numbers. For example, a 7-digit telephone number starts with a 3-digit prefix that identifies a group of thousands of telephone lines, and ends with four digits that identify one specific line in that group.

Similarly, IP addresses contain two kinds of information:

- Network ID
  Identifies a particular network within the Internet or intranet
- Host ID
  Identifies a particular computer or device on the network

The first part of every IP address contains the network ID, and the rest of the address contains the host ID. The length of the network ID depends on the network's *class* (see following section). The table below shows the structure of an IP address.

| | **Field1** | **Field2** | **Field3** | **Field4** |
|---|---|---|---|---|
| Class A | Network ID | Host ID | | |
| Class B | Network ID | | Host ID | |
| Class C | Network ID | | | Host ID |

Here are some examples of valid IP addresses:

Class A: 10.30.6.125 (network = 10, host = 30.6.125)
Class B: 129.88.16.49 (network = 129.88, host = 16.49)
Class C: 192.60.201.11 (network = 192.60.201, host = 11)

### Network classes

The three commonly used network classes are A, B, and C. (There is also a class D but it has a special use beyond the scope of this discussion.) These classes have different uses and characteristics.

Class A networks are the Internet's largest networks, each with room for over 16 million hosts. Up to 126 of these huge networks can exist, for a total of over 2 billion hosts. Because of their huge size, these networks are used for WANs and by organizations at the infrastructure level of the Internet, such as your ISP.

Class B networks are smaller but still quite large, each able to hold over 65,000 hosts. There can be up to 16,384 class B networks in existence. A class B network might be appropriate for a large organization such as a business or government agency.

Class C networks are the smallest, only able to hold 254 hosts at most, but the total possible number of class C networks exceeds 2 million (2,097,152 to be exact). LANs connected to the Internet are usually class C networks.

Some important notes regarding IP addresses:

- The class can be determined easily from field1:
  field1 = 1-126: Class A
  field1 = 128-191: Class B
  field1 = 192-223: Class C
  (field1 values not shown are reserved for special uses)
- A host ID can have any value except all fields set to 0 or all fields set to 255, as those values are reserved for special uses.

## Subnet masks

Definition mask

*A mask looks like a regular IP address, but contains a pattern of bits that tells what parts of an IP address are the network ID and what parts are the host ID: bits set to 1 mean "this bit is part of the network ID" and bits set to 0 mean "this bit is part of the host ID."*

*Subnet masks* are used to define *subnets* (what you get after dividing a network into smaller pieces). A subnet's network ID is created by "borrowing" one or more bits from the host ID portion of the address. The subnet mask identifies these host ID bits.

For example, consider a class C network 192.168.1. To split this into two subnets, you would use the subnet mask:

255.255.255.128

It's easier to see what's happening if we write this in binary:

11111111. 11111111. 11111111.10000000

As with any class C address, all of the bits in field1 through field3 are part of the network ID, but note how the mask specifies that the first bit in field4 is also included. Since this extra bit has only two values (0 and 1), this means there are two subnets. Each subnet uses the remaining 7 bits in field4 for its host IDs, which range from 1 to 126 hosts (instead of the usual 0 to 255 for a class C address).

Similarly, to split a class C network into four subnets, the mask is:

255.255.255.192 or 11111111. 11111111. 11111111.11000000

The two extra bits in field4 can have four values (00, 01, 10, 11), so there are four subnets. Each subnet uses the remaining six bits in field4 for its host IDs, ranging from 1 to 62.

Note

*Sometimes a subnet mask does not specify any additional network ID bits, and thus no subnets. Such a mask is called a default subnet mask. These masks are:*

*Class A:255.0.0.0*
*Class B:255.255.0.0*
*Class C:255.255.255.0*

*These are called default because they are used when a network is initially configured, at which time it has no subnets.*

# C Appendix C - Troubleshooting

This appendix suggests solutions for problems you may encounter in installing or using the device, and provides instructions for using several IP utilities to diagnose problems.

Contact Customer Support if these suggestions do not resolve the problem.

## Troubleshooting Suggestions

| Problem | Troubleshooting Suggestion |
|---|---|
| **LEDs** | |
| *Power LED does not illuminate after product is turned on.* | Verify that you are using the power cable provided with the device and that it is securely connected to the device and a wall socket/power strip. |
| *Internet LED does not illuminate after phone cable is attached.* | Verify that a standard telephone cable (called an RJ-11 cable) like the one provided is securely connected to the DSL port and your wall phone port. Allow about 30 seconds for the device to negotiate a connection with your ISP. |
| *LINK LAN LED does not illuminate after Ethernet cable is attached.* | Verify that the Ethernet cable is securely connected to your LAN hub or PC and to the device. Make sure the PC and/or hub is turned on.<br>Verify that your cable is sufficient for your network requirements. A 100 Mbit/sec network (10BaseTx) should use cables labeled CAT 5. A 10Mbit/sec network may tolerate lower quality cables. |
| **Internet Access** | |
| My PC cannot access the Internet | Run a health check on your device. Use the ping utility (discussed in the following section) to check whether your PC can communicate with the device's LAN IP address (by default 192.168.1.1). If it cannot, check the Ethernet cabling.<br>If you statically assigned a private IP address to the computer, (not a registered public address), verify the following:<br>• Check that the gateway IP address on the computer is your public IP address (see Current Status on page 1 for instructions on viewing the IP information.) If it is not, correct the address or configure the PC to receive IP information automatically.<br>• Verify with your ISP that the DNS server specified for the PC is valid. Correct the address or configure the PC to receive this information automatically. |
| *My LAN PCs cannot display web pages on the Internet.* | Verify that the DNS server IP address specified on the PCs is correct for your ISP, as discussed in the item above. If you specified that the DNS server be assigned dynamically from a server, then verify with your ISP that the address configured on the device is correct, and then you can use the ping utility, discussed on page 63, to test connectivity with your ISP's DNS server. |
| **Web pages** | |

| Problem | Troubleshooting Suggestion |
|---|---|
| *I forgot/lost my user ID or password.* | If you have not changed the password from the default, try using "admin" as both the user ID and password. Otherwise, you can reset the device to the default configuration by pressing three times the Reset Default button on the front panel of the device. Then, type the default User ID and password shown above. **WARNING:** Resetting the device removes any custom settings and returns all settings to their default values. |
| *I cannot access the web pages from my browser.* | Use the ping utility, discussed in the following section, to check whether the PC can communicate with the device's LAN IP address (by default 192.168.1.1). If it cannot, check the Ethernet cabling.<br>Verify that you are using Internet Explorer or Netscape Navigator v4.0 or later.<br>Verify that the PC's IP address is defined as being on the same subnet as the IP address assigned to the LAN port on the device. |
| *My changes to the web pages are not being retained.* | Be sure to use the *Confirm Changes* function after any changes. |

## Diagnosing Problem using IP Utilities

### Ping

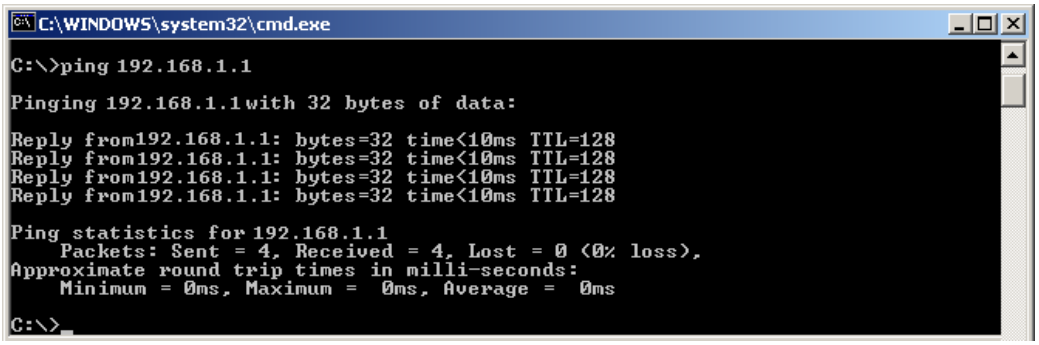
*Ping* is a command you can use to check whether your PC can recognize other computers on your network and the Internet. A ping command sends a message to the computer you specify. If the computer receives the message, it sends messages in reply. To use it, you must know the IP address of the computer with which you are trying to communicate.

On Windows-based computers, you can execute a ping command from the Start menu. Click the *Start* button, and then click *Run*. In the *Open* text box, type a statement such as the following:

ping 192.168.1.1

Click *OK*. You can substitute any private IP address on your LAN or a public IP address for an Internet site, if known.

If the target computer receives the message, a *Command Prompt* window is displayed:




If the target computer cannot be located, you will receive the message *Request timed out*.

Using the ping command, you can test whether the path to the device is working (using the preconfigured default LAN IP address 192.168.1.1) or another address you assigned.

You can also test whether access to the Internet is working by typing an external address, such as that for *www.yahoo.com* (216.115.108.243). If you do not know the IP address of a particular Internet location, you can use the *nslookup* command, as explained in the following section.

From most other IP-enabled operating systems, you can execute the same command at a command prompt or through a system administration utility.

### nslookup

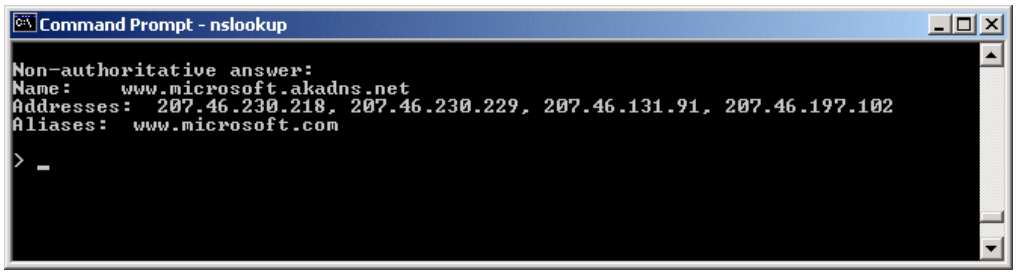
You can use the nslookup command to determine the IP address associated with an Internet site name. You specify the common name, and the nslookup command looks up the name in on your DNS server (usually located with your ISP). If that name is not an entry in your ISP's DNS table, the request is then referred to another higher-level server, and so on, until the entry is found. The server then returns the associated IP address.

On Windows-based computers, you can execute the nslookup command from the *Start* menu. Click the *Start* button, and then click *Run*. In the *Open* text box, type the following:

Nslookup

Click *OK*. A Command Prompt window displays with a bracket prompt (>). At the prompt, type the name of the Internet address that you are interested in, such as *www.microsoft.com*.

The window will display the associate IP address, if known, as shown below:




There may be several addresses associated with an Internet name. This is common for web sites that receive heavy traffic; they use multiple, redundant servers to carry the same information.

To exit from the nslookup utility, type **exit** and press **[Enter]** at the command prompt.

# D Appendix D - Advanced DSL port attributes

The following table displays detailed information about the advanced DSL port attributes.


Note

*You should only need to refer to these attributes if your ISP has asked you to check something or if you are experienced in DSL port configuration.*

| Attribute | Value |
|---|---|
| Line Rate | DSL down stream trained rate (cells/sec) |
| TxCellTransmitted | Number of transmitted ATM cells |
| RxCellReceived | Number of received ATM cells |
| Cbr_CPS | Bit rate for CBR QoS Class |
| Rvbr SCR_CPS | Sustained cell rate for rt-vbr |
| Vbr SCR_CPS | Sustained cell rate for nrt-vbr |
| Rvbr PCR_CPS | Peak cell rate for rt-vbr |
| Vbr PCR_CPS | Peak cell rate for nrt-vbr |
| Ubr_CPS | Cell rate for UBR+ |
| Ubr MCR_CPS | Minimum Cell rate for UBR+ |
| CACMode | Gives CAC Mode |
| CACFunction | Call Admission control function |
| Port Speed Hook | Function to accommodate the port speed changes |
| Vpi Range | Range of valid VPI |
| Vci Range | Range of valid VCI |
| Default Pcr | Default Peak Cell Rate |
| Traffic Shaping | Gives weather traffic shaping is enabled/disabled |
| Ni Type | Network Interface Type |
| Is Dsl Dma Up | Operational Status of DSL DMA block |
| Enabled Channels | Number of enabled channels |
| DSP Firmware Version | DSP code version number |
| DSP Version | DSL driver version number |
| Connected | Current connected state:<br>True – modem is connected to a remote modem<br>False – modem is not connected to a remote modem |
| Operational Mode | Current operating (connected) mode (modulation) |

| Attribute | Value |
|---|---|
| State | Current state of the device:<br>Idle – not connected or attempting to connect<br>HandShake – connecting/hunting for remote modem<br>Training – connecting/found a remote modem<br>Showtime – connected to remote modem |
| Watchdog | Watchdog timer which confirms that the DSP is executing a program correctly |
| Operation Progress | Detailed startup information to be used for debugging |
| Last Failed | This value is reset to 0 each time a startup is attempted. If there is a failure, it indicates the reason for the failure. |
| Tx Bit Rate | Transmit rate (bits per second) of the device |
| Rx Bit Rate | Receive rate (bits per second) of the device |
| Tx Cell Rate | Transmit rate (cells per second) of the device |
| Rx Cell Rate | Receive rate (cells per second) of the device |
| Phy TXCell Count | Transmit ATM cell counter |
| Phy RXCell Count | Receive ATM cell counter |
| Phy Cell Drop Count | UTOPIA cell drop counter |
| Overall Failure | Indicates the cause of failure |
| Local ITUCountry Code | Country code used by the device (modulation specific) |
| Local SEF | Number of severely errored frame defects received by the device |
| Local End LOS | Number of loss of signal defects received by the device |
| Local SNRMargin | The local Signal to Noise Ration margin |
| Local Line Attn | The local attenuation values |
| Local Tx Power | Current transmit power attenuation of the device |
| Local Fast Channel Rx Rate | Receive rate (bits per second) of the device on the fast path |
| Local Fast Channel Tx Rate | Transmit rate (bits per second) of the device on the fast path |
| Local Fast Channel FEC | Instances of Forward Error Correction required by the device on the fast channel |
| Local Fast Channel CRC | Number of CRC errors received by the device on the fast channel |
| Local Fast Channel HEC | Number of ATM Cell Header errors corrected by the device on the fast channel |
| Local Fast Channel NCD | Number of no cell delineation received by the device on the fast channel |
| Local Fast Channel OCD | Number of out of cell delineation received by the device on the fast channel |
| Local Interleaved Channel Rx Rate | Receive rate (bits per second) of the device on the interleaved path |
| Local Interleaved Channel Tx Rate | Transmit rate (bits per second) of the device on the interleaved path |

| Attribute | Value |
|---|---|
| Local Interleaved Channel FEC | Instances of Forward Error Correction required by the device on the interleaved channel |
| Local Interleaved Channel CRC | Number of CRC errors received by the device on the interleaved channel |
| Local Interleaved Channel HEC | Number of ATM Cell Header errors corrected by the device on the interleaved channel |
| Local Interleaved Channel NCD | Number of no cell delineation received by the device on the interleaved channel |
| Local Interleaved Channel OCD | Number of out of cell delineation received by the device on the interleaved channel |
| Remote SEF | Number of severely errored frame defects received by the device |
| Remote LOS | Number of loss of signal defects received by the device |
| Remote Line Attn | The remote attenuation values |
| Remote SNRMargin | The remote Signal to Noise Ration margin |
| Remote Fast Channel FEC | Instances of Forward Error Correction required by the device on the fast channel |
| Remote Fast Channel CRC | Number of CRC errors received by the device on the fast channel |
| Remote Fast Channel HEC | Number of ATM Cell Header errors corrected by the device on the fast channel |
| Remote Fast Channel NCD | Number of no cell delineation received by the device on the fast channel |
| Remote Interleaved Channel FEC | Instances of Forward Error Correction required by the device on the interleaved channel |
| Remote Interleaved Channel CRC | Number of CRC errors received by the device on the interleaved channel |
| Remote Interleaved Channel HEC | Number of ATM Cell Header errors corrected by the device on the interleaved channel |
| Remote Interleaved Channel NCD | Number of no cell delineation received by the device on the interleaved channel |
| Activate Line | Abort – deactivates the DSL link<br>None – signifies that this parameter has been read<br>Start – activates the DSL link |
| Host Control | Disable – terminates any host/API interaction with the DSP (for testing purposes)<br>Enable – enables host/API interaction with the DSP |
| Auto Start | "True" - A Connection will be established at power up.<br>"False" - The modem will remain in Idle mode at power up. |
| Failsafe | True – a failsafe timer is activated when a startup request is made. Once a connection has been established, the failsafe timer is disabled<br>False – a failsafe timer is not activated when a startup request is made |

| Attribute | Value |
|---|---|
| Whip | Possible Values if compiled for Whip Serial:<br>Serial or Inactive<br>Possible Values if compiled for Whip TCP:<br>TCP or Inactive<br>Possible Values if compiled for Whip Serial/TCP:<br>Serial, TCP or Inactive |
| Whip Active | Indicated state of whip. Possible values are Inactive, SerialActive and TCPActive |
| Action | An action given when ActivateLine is set to Start. Possible values are Startup, SpectrumReverb, SpectrumMedely or SpectrumPilot |
| Standard | Indicates the preferred standard compliance. *Multimode* indicates that the device automatically detects the other end as one of the supported standards. |
| Utopia Interface | Level1 – Utopia Level 1 internal framing is used with the DSP<br>Level2 – Utopia Level 2 internal framing is used with the DSP |
| EC FDM Mode | EC – enables Echo Cancellation. This setting is necessary if your device is connected to a high speed CO.<br>FDM – enables Frequency Division Multiplexing |
| Max Bits Per Bin | The maximum number of bits per bin. This can be any value between 1 and 15 |
| Tx Start Bin | A value that indicates the lowest bin number allowed for transmit signal |
| Tx End Bin | A value that indicates the highest bin number allowed for transmit signal |
| Rx Start Bin | A value that indicates the lowest bin number allowed for receive signal |
| Rx End Bin | A value that indicates the highest bin number allowed for receive signal |
| Rx Auto Bin Adjust | Disable – the bin settings configured as the RxStartBin/RxEndBin parameters are used<br>Enable – DSP automatically adjusts the bin selection for receive signal |
| Tx Attenuation | A value between 0dB and 12dB that indicates the transmit power attenuation |
| Bit Swap | Disable – disables the adjustment of the number of bits assigned to a subcarrier without interrupting data flow<br>Enable – enables the adjustment off the number of bits assigned to a subcarrier without interrupting data flow |
| Max Down Rate | A value that sets the maximum downstream rate for those applications where it is necessary to limit the downstream data rate |
| Physical Port | A value between 0 and 14 that sets the Utopia Level 2 Utopia address |

| Attribute | Value |
|---|---|
| Retrain | Disable – disables full retrain capability<br>Enable – enables full retrain capability |
| Detect Noise | Enables/disables noise detection (only valid for Annex AHS) |
| Capability | This parameter controls whether the CPE will attempt to startup using alternate standards if the CO does not support G.Span (High Speed (HS)).<br>The CPE has the ability to connect in either ADSL Annex A or G.Span. This is provided by the ADSL/Annex A /G.Span Auto Detect feature. The standard used depends on the capability of the CO.<br>Using Auto Detect, startup at the CPE is first attempted in Annex A. The CO is the master and the CPE is the slave. If the result of handshake with the CO is G.Span (HS), then the CPE will switch to G.Span. If the CO does not support G.Span, then the resultant connection will be ADSL Annex A.<br>This parameter must be set to AHS to configure the modem for A & HS 'two-speed' Auto Detect. For Auto Detect, all other parameters should be set to the Annex A profile. If UTOPIA Level 2 framing is set (using the UtopiaInterface parameter), ensure that the UTOPIA address is set (using the PhysicalPort parameter) as there is no default value. If the result of handshake with the CO is G.Span (HS), then the CPE will switch to G.Span and the appropriate CPE parameters will be automatically re-configured by the DSP for G.Span operation.<br>A: Annex A capable<br>AHS: Annex A or High Speed capable<br>Disable: the device does not send any standards capability information to the CO. |
| Coding Gain | The gain due to trellis/RS coding. Its value ranges from 0-7 dB. *Auto* automatically selects the coding gain. |
| Framer Type | Value can be set to Type 0 – 3 or Type3ET. To enable DataBoost set FramerType to Type3ET |
| Dying Gasp | Enables/disables dying gasp. |
| Defaults | Sets the recommended default parameters for a given Standard. |
| Reset Defaults | Reset device to use default port configuration |

# E Appendix E - Glossary

| Term | Description |
|---|---|
| 10BASE-T | A designation for the type of wiring used by Ethernet networks with a data rate of 10 Mbps. Also known as Category 3 (CAT 3) wiring. See *data rate, Ethernet*. |
| 100BASE-T | A designation for the type of wiring used by Ethernet networks with a data rate of 100 Mbps. Also known as Category 5 (CAT 5) wiring. See *data rate, Ethernet*. |
| ADSL | Asymmetric Digital Subscriber Line<br>The most commonly deployed "flavor" of DSL for home users is asymmetrical DSL. The term asymmetrical refers to its unequal data rates for downloading and uploading (the download rate is higher than the upload rate). The asymmetrical rates benefit home users because they typically download much more data from the Internet than they upload. |
| Analog | An analog signal is a signal that has had its frequency modified in some way, such as by amplifying its strength or varying its frequency, in order to add information to the signal. The voice component in DSL is an analog signal. See *digital*. |
| ATM | Asynchronous Transfer Mode<br>A standard for high-speed transmission of data, text, voice, and video, widely used within the Internet. ATM data rates range from 45 Mbps to 2.5 Gbps. See *data rate*. |
| Authenticate | To verify a user's identity, such as by prompting for a password. |
| Binary | The "base two" system of numbers that uses only two digits, 0 and 1, to represent all numbers. In binary, the number 1 is written as 1, 2 as 10, 3 as 11, 4 as 100, etc. Although expressed as decimal numbers for convenience, IP addresses in actual use are binary numbers; e.g., the IP address 209.191.4.240 is 11010001.10111111.00000100.11110000 in binary. See bit, IP address, network mask. |
| Bit | Short for "binary digit," a bit is a number that can have two values, 0 or 1. See binary. |
| Bps | bits per second |

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| Bridging | Passing data from your network to your ISP and vice versa using the hardware addresses of the devices at each location. Bridging contrasts with routing which can add more intelligence to data transfers by using network addresses instead. The device can perform both routing and bridging. Typically, when both functions are enabled, the device routes IP data and bridges all other types of data. See routing. |
| Broadband | A telecommunications technology that can send different types of data over the same medium. DSL is a broadband technology. |
| Broadcast | To send data to all computers on a network. |
| DHCP | Dynamic Host Configuration Protocol<br>DHCP automates address assignment and management. When a computer connects to the LAN, DHCP assigns it an IP address from a shared pool of IP addresses; after a specified time limit, DHCP returns the address to the pool. |
| DHCP relay | Dynamic Host Configuration Protocol relay<br>A DHCP relay is a computer that forwards DHCP data between computers that request IP addresses and the DHCP server that assigns the addresses. Each of the device's interfaces can be configured as a DHCP relay. See DHCP. |
| DHCP server | Dynamic Host Configuration Protocol server<br>A DHCP server is a computer that is responsible for assigning IP addresses to the computers on a LAN. See DHCP. |
| Digital | Of data, having a form based on discrete values expressed as binary numbers (0's and 1's). The data component in DSL is a digital signal. See analog. |
| DNS | Domain Name System<br>The DNS maps domain names into IP addresses. DNS information is distributed hierarchically throughout the Internet among computers called DNS servers. For example, www.yahoo.com is the domain name associated with IP address 216.115.108.243. When you start to access a web site, a DNS server looks up the requested domain name to find its corresponding IP address. If the DNS server cannot find the IP address, it communicates with higher-level DNS servers to determine the IP address. See domain name. |
| Domain name | A domain name is a user-friendly name used in place of its associated IP address. Domain names must be unique; their assignment is controlled by the Internet Corporation for Assigned Names and Numbers (ICANN). Domain names are a key element of URLs, which identify a specific file at a web site. See DNS. |

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| Download | To transfer data in the downstream direction, i.e., from the Internet to the user. |
| DSL | Digital Subscriber Line<br>A technology that allows both digital data and analog voice signals to travel over existing copper telephone lines. |
| Encryption keys | See network keys |
| Ethernet | The most commonly installed computer network technology, usually using twisted pair wiring. Ethernet data rates are 10 Mbps and 100 Mbps. See also 10BASE-T, 100BASE-T, twisted pair. |
| FTP | File Transfer Protocol<br>A program used to transfer files between computers connected to the Internet. Common uses include uploading new or updated files to a web server, and downloading files from a web server. |
| Gbps | Abbreviation of Gigabits per second, or one billion bits per second. Internet data rates are often expressed in Gbps. |
| Host | A device (usually a computer) connected to a network. |
| HTTP | Hyper-Text Transfer Protocol<br>HTTP is the main protocol used to transfer data from web sites so that it can be displayed by web browsers. See web browser, web site. |
| Hub | A hub is a place of convergence where data arrives from one or more directions and is forwarded out in one or more directions. It connects an Ethernet bridge/router to a group of PCs on a LAN and allows communication to pass between the networked devices. |
| ICMP | Internet Control Message Protocol<br>An Internet protocol used to report errors and other network-related information. The ping command makes use of ICMP. |
| IEEE | The Institute of Electrical and Electronics Engineers is a technical professional society that fosters the development of standards that often become national and international standards. |
| Internet | The global collection of interconnected networks used for both private and business communications. |
| Intranet | A private, company-internal network that looks like part of the Internet (users access information using web browsers), but is accessible only by employees. |

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| IP | See TCP/IP. |
| IP address | Internet Protocol address<br>The address of a host (computer) on the Internet, consisting of four numbers, each from 0 to 255, separated by periods, e.g., 209.191.4.240. An IP address consists of a network ID that identifies the particular network the host belongs to, and a host ID uniquely identifying the host itself on that network. A network mask is used to define the network ID and the host ID. Because IP addresses are difficult to remember, they usually have an associated domain name that can be specified instead. See domain name, network mask. |
| ISP | Internet Service Provider<br>A company that provides Internet access to its customers, usually for a fee. |
| LAN | Local Area Network.<br>A network limited to a small geographic area, such as a home or small office. |
| LED | Light Emitting Diode<br>An electronic light-emitting device. The indicator lights on the front of the device are LEDs. |
| MAC address | Media Access Control address<br>The permanent hardware address of a device, assigned by its manufacturer. MAC addresses are expressed as six pairs of hex characters, with each pair separated by colons. For example; NN:NN:NN:NN:NN:NN. |
| Mask | See network mask. |
| Mbps | Abbreviation for Megabits per second, or one million bits per second. Network data rates are often expressed in Mbps. |
| NAT | Network Address Translation<br>A service performed by many routers that translates your network's publicly known IP address into a private IP address for each computer on your LAN. Only your router and your LAN know these addresses; the outside world sees only the public IP address when talking to a computer on your LAN. |
| Network | A group of computers that are connected together, allowing them to communicate with each other and share resources, such as software, files, etc. A network can be small, such as a LAN, or very large, such as the Internet. |
| Network keys | (Also known as encryption keys.) 64-bit and 128-bit encryption keys used in WEP wireless security schemes. The keys encrypt data over the WLAN, and only wireless PCs configured with WEP keys |

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| | that correspond to the keys configured on the device can send/receive encrypted data. |
| Network mask | A network mask is a sequence of bits applied to an IP address to select the network ID while ignoring the host ID. Bits set to 1 mean "select this bit" while bits set to 0 mean "ignore this bit." For example, if the network mask 255.255.255.0 is applied to the IP address 100.10.50.1, the network ID is 100.10.50, and the host ID is 1. See binary, IP address, subnet. |
| NIC | Network Interface Card<br>An adapter card that plugs into your computer and provides the physical interface to your network cabling. For Ethernet NICs this is typically an RJ-45 connector. See Ethernet, RJ-45. |
| Packet | Data transmitted on a network consists of units called packets. Each packet contains a payload (the data), plus overhead information such as where it came from (source address) and where it should go (destination address). |
| Ping | Packet Internet (or Inter-Network) Groper<br>A program used to verify whether the host associated with an IP address is online. It can also be used to reveal the IP address for a given domain name. |
| Port | A physical access point to a device such as a computer or router, through which data flows into and out of the device. |
| PPP | Point-to-Point Protocol<br>A protocol for serial data transmission that is used to carry IP (and other protocol) data between your ISP and your computer. The WAN interface on the device uses two forms of PPP called PPPoA and PPPoE. See PPPoA, PPPoE. |
| PPPoA | Point-to-Point Protocol over ATM<br>One of the two types of PPP interfaces you can define for a Virtual Circuit (VC), the other type being PPPoE. You can define only one PPPoA interface per VC. |
| PPPoE | Point-to-Point Protocol over Ethernet<br>One of the two types of PPP interfaces you can define for a Virtual Circuit (VC), the other type being PPPoA. You can define one or more PPPoE interfaces per VC. |
| Protocol | A set of rules governing the transmission of data. In order for a data transmission to work, both ends of the connection have to follow the rules of the protocol. |
| Remote | In a physically separate location. For example, an employee away on travel who logs in to the company's intranet is a remote user. |

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| RIP | Routing Information Protocol<br>The original TCP/IP routing protocol. There are two versions of RIP: version I and version II. |
| RJ-11 | Registered Jack Standard-11<br>The standard plug used to connect telephones, fax machines, modems, etc. to a telephone port. It is a 6-pin connector usually containing four wires. |
| RJ-45 | Registered Jack Standard-45<br>The 8-pin plug used in transmitting data over phone lines. Ethernet cabling usually uses this type of connector. |
| Routing | Forwarding data between your network and the Internet on the most efficient route, based on the data's destination IP address and current network conditions. A device that performs routing is called a router. |
| SDNS | Secondary Domain Name System (server)<br>A DNS server that can be used if the primary DSN server is not available. See DNS. |
| Subnet | A subnet is a portion of a network. The subnet is distinguished from the larger network by a subnet mask that selects some of the computers of the network and excludes all others. The subnet's computers remain physically connected to the rest of the parent network, but they are treated as though they were on a separate network. See network mask. |
| Subnet mask | A mask that defines a subnet. See network mask. |
| TCP | See TCP/IP. |
| TCP/IP | Transmission Control Protocol/Internet Protocol<br>The basic protocols used on the Internet. TCP is responsible for dividing data up into packets for delivery and reassembling them at the destination, while IP is responsible for delivering the packets from source to destination. When TCP and IP are bundled with higher-level applications such as HTTP, FTP, Telnet, etc., TCP/IP refers to this whole suite of protocols. |
| Telnet | An interactive, character-based program used to access a remote computer. While HTTP (the web protocol) and FTP only allow you to download files from a remote computer, Telnet allows you to log into and use a computer from a remote location. |
| TFTP | Trivial File Transfer Protocol<br>A protocol for file transfers, TFTP is easier to use than File Transfer Protocol (FTP) but not as capable or secure. |
| TKIP | Temporal Key Integrity Protocol (TKIP) provides WPA with a data encryption function. It ensures that a unique master key is generated for each packet, supports message integrity and |

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| | sequencing rules and supports re-keying mechanisms. |
| Triggers | Triggers are used to deal with application protocols that create separate sessions. Some applications, such as NetMeeting, open secondary connections during normal operations, for example, a connection to a server is established using one port, but data transfers are performed on a separate connection. A trigger tells the device to expect these secondary sessions and how to handle them.<br><br>Once you set a trigger, the embedded IP address of each incoming packet is replaced by the correct host address so that NAT can translate packets to the correct destination. You can specify whether you want to carry out address replacement, and if so, whether to replace addresses on TCP packets only, UDP packets only, or both. |
| Twisted pair | The ordinary copper telephone wiring used by telephone companies. It contains one or more wire pairs twisted together to reduce inductance and noise. Each telephone line uses one pair. In homes, it is most often installed with two pairs. For Ethernet LANs, a higher grade called Category 3 (CAT 3) is used for 10BASE-T networks, and an even higher grade called Category 5 (CAT 5) is used for 100BASE-T networks. See 10BASE-T, 100BASE-T, Ethernet. |
| Unnumbered interfaces | An unnumbered interface is an IP interface that does not have a local subnet associated with it. Instead, it uses a router-id that serves as the source and destination address of packets sent to and from the router. Unlike the IP address of a normal interface, the router-id of an unnumbered interface is allowed to be the same as the IP address of another interface. For example, the WAN unnumbered interface of your device uses the same IP address of the LAN interface (192.168.1.1).<br><br>The unnumbered interface is temporary – PPP or DHCP will assign a 'real' IP address automatically. |
| Upstream | The direction of data transmission from the user to the Internet. |
| VC | Virtual Circuit<br>A connection from your DSL router to your ISP. |
| VCI | Virtual Circuit Identifier<br>Together with the Virtual Path Identifier (VPI), the VCI uniquely identifies a VC. Your ISP will tell you the VCI for each VC they provide. See VC. |

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| VPI | Virtual Path Identifier<br>Together with the Virtual Circuit Identifier (VCI), the VPI uniquely identifies a VC. Your ISP will tell you the VPI for each VC they provide. See VC. |
| WAN | Wide Area Network<br>Any network spread over a large geographical area, such as a country or continent. With respect to the device, WAN refers to the Internet. |
| Web browser | A software program that uses Hyper-Text Transfer Protocol (HTTP) to download information from (and upload to) web sites, and displays the information, which may consist of text, graphic images, audio, or video, to the user. Web browsers use Hyper-Text Transfer Protocol (HTTP). Popular web browsers include Netscape Navigator and Microsoft Internet Explorer. See HTTP, web site, WWW. |
| Web page | A web site file typically containing text, graphics and hyperlinks (cross-references) to the other pages on that web site, as well as to pages on other web sites. When a user accesses a web site, the first page that is displayed is called the home page. See hyperlink, web site. |
| Web site | A computer on the Internet that distributes information to (and gets information from) remote users through web browsers. A web site typically consists of web pages that contain text, graphics, and hyperlinks. See hyperlink, web page. |
| WEP | Wired Equivalent Privacy (WEP) encrypts data over WLANs. Data is encrypted into blocks of either 64 bits length or 128 bits length. The encrypted data can only be sent and received by users with access to a private network key. Each PC on your wireless network must be manually configured with the same key as your device in order to allow wireless encrypted data transmissions. Eavesdroppers cannot access your network if they do not know your private key. WEP is considered to be a low security option. |
| Wireless | Wireless is a term used to describe telecommunications in which electromagnetic waves (rather than some form of wire) carry the signal over part or the entire communication path. See wireless LAN. |
| Wireless LAN | A wireless LAN (WLAN) is one in which a mobile user can connect to a local area network (LAN) through a wireless (radio) connection. A standard, IEEE 802.11, specifies the technologies for wireless LANs. |
| WPA | Wi-Fi Protected Access<br>WPA is an initiative by the IEEE and Wi-Fi Alliance to address the security limitations of WEP. WPA provides a stronger data encryption method (called Temporal Key Integrity Protocol (TKIP)). It runs in a special, easy-to-set-up home mode called Pre-Shared Key (PSK) that allows you to manually enter a pass phrase on all the |

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| | devices in your wireless network. WPA data encryption is based on a WPA master key. The master key is derived from the pass phrase and the network name (SSID) of the device.<br><br>It provides improved data encryption and stronger user authentication. The mode of WPA supported on your device is called Pre-Shared Key (PSK), which allows you to manually enter a type of key called a pass phrase. |
| WWW | World Wide Web<br><br>Also called (the) Web. Collective term for all web sites anywhere in the world that can be accessed via the Internet. |

# F Appendix F - Specification

### *A1. Hardware Specifications*

■ LAN Interface
- One 10/100BaseT Ethernet port
- Connector – RJ-45
- One USB 1.1 device port, type B connector

■ WAN ADSL Line Interface
- Compliant with ITU-T G.992.1, G.992.2, G.992.3, G.992.5 and ANSI and ANSI T1.413 Issue 2
- Line Impedance: 100 Ω
- Connection Loops: One (pair wire)
- Connector: RJ-11

■ Indicators
- PWR – Green LED indicates power and operation
- WAN – Green LED indicates ADSL connection
- PPP – Green LED indicates PPP connection
- LAN – Green LED indicates LAN data Transmitting / Receiving
- USB – Green LED indicates data Transmitting / Receiving through USB port (***X8824e/X8824m only***)
- ALM – Red LED indicates device error (***X8821e/X8821m only***)

■ OAM&P
- Local: Telnet or Web management via Ethernet
- Remote: Telnet or Web Management

■ Environment
- Operation Temperature: 0°C ~ 45°C
- Operation Humidity: 5% ~ 95%
- Storage Temperature: -20 ~ +85°C
- Storage Humidity: 5%~95%

■ Power
- AC Adapter: Input 110/220VAC, 50/60Hz; Output 15VAC 1A

■ Certificates
- CE, CB

### *A2. Software Specifications*

- ATM
- ATM Cells over ADSL, AAL5
- Bridge mode: Supports 8 PVCs
- Router mode: Supports 5 PVCs
- Supports UBR, CBR, VBR-nrt, and VBR-rt traffic classes
- ATM Forum UNI 3.0, UNI 3.1, UNI 4.0
- ILMI 4.0

- Bridging
- Transparent Bridging and spanning tree protocol (IEEE 802.1D)
- RFC2684 (RFC 1483) Bridged
- IP packet filtering
- ZIPB (Zero installation PPP Bridge)

- Routing
- IP routing: RIP1 and RIP2, and static routing
- PPPoE and IP over ATM, PPP over ATM
- PAP and CHAP for user authentication in PPP connection
- RFC2684 (RFC1483) Routed
- NAT/PAT with extensive ALG support
- Supports SNTP and DNS relay
- Virtual interface and secondary IP addresses
- Supports IP QoS per RFC2472/2475 Routing

- Configuration and Network Management Features
- TR-037 compliant auto-configuration using ILMI
- DHCP client, server and reply for IP management
- System Log capability
- WEB and Telnet for local or remote management
- TFTP, HTTP for firmware upgrade and configuration
- TR-069 for local and remote configuration and management

# G Appendix G - Warranties

### *B1. Product Warranty*

XAVi Technologies warrants that the ADSL unit will be free from defects in material and workmanship for a period of twelve (12) months from the date of shipment.

XAVi Technologies shall incur no liability under this warranty if

— The allegedly defective goods are not returned prepaid to XAVi Technologies within thirty (30) days of the discovery of the alleged defect and in accordance with XAVi Technologies' repair procedures; or

— XAVi Technologies' tests disclose that the alleged defect is not due to defects in material or workmanship.

XAVi Technologies' liability shall be limited to either repair or replacement of the defective goods, at XAVi Technologies' option.

XAVi Technologies MARKS NO EXPRESS OR IMPLIED WARRANTIES REGARDING THE QUALITY, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE BEYOND THOSE THAT APPEAR IN THE APPLICABLE USER'S DOCUMETATION. XAVi SHALL NOT BE RESPONSIBLE FOR CONSEQUENTIAL, INCIDENTAL, OR PUNITIVE DAMAGE, INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR DAMAGES TO BUSINESS OR BUSINESS RELATIONS. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES.

### *B2. Warranty Repair*

1. During the first three (3) months of ownership, XAVi Technologies will repair or replace a defective product covered under warranty within twenty-four (24) hours of receipt of the product. During the fourth (4th) through twelfth (12th) months of ownership, XAVi Technologies will repair or replace a defective product covered under warranty within ten (10) days of receipt of the product. The warranty period for the replaced products shall be ninety (90) days or the remainder of the warranty period of the original unit, whichever is greater. XAVi Technologies will ship surface freight. Expedited freight is at customer's expense.
2. The customer must return the defective product to XAVi Technologies within fourteen (14) days after the request for replacement. If the defective product is not returned within this time period, XAVi Technologies will bill the customer for the product at list price.

### *B3. Out-of-Warranty Repair*

XAVi Technologies will either repair or, at its option, replace a defective product not covered under warranty within ten (10) working days of its receipt. Repair charges are available from the Repair Facility upon request. The warranty on a serviced product is thirty (30) days measured from date of service. Out-of-warranty repair charges are based upon the prices in effect at the time of return.

# H Appendix H - Regulation

***FCC Part 15 Notice***

**Warning:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 to the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, used, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is unlikely to cause harmful interference. But if it does, the user will be required to correct the interference at his or her own expense. The authority to operate this equipment is conditioned by the requirement that no modifications will be made to the equipment unless XAVi expressly approves the changes or modifications.

**Warning:** Operation is subject to the following two conditions:
1) This device may not cause harmful interference.
2) This device must accept any interference received including interference that may cause undesired operation.

### *FCC Part 68 Notice*

This equipment complies with Part 68 of FCC Rules. On the base unit of this equipment is a label that contains, among other information, the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. IF REQUESTED, THIS INFORMATION MUST BE GIVEN TO THE TELEPHONE COMPANY.

The REN is useful to determine the quantity of devices you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of the REN of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to you line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area.

If your equipment causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC. Your telephone company may make changes in it is facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this telephone equipment, Please contact the following address and phone number for information on obtaining service or repairs.

The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

NOTICE: The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or an electronic device to send any message via a telephone fax machine, unless such a message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission the following information:

- ✓ The date and time of transmission
- ✓ Identification of either business, business entity or individual sending message
- ✓ Telephone number of either the sending machine, business entity or individual

**Warning:** Users should not attempt to make such connections themselves, but should contact appropriate electric inspection authority, or electrician, as appropriate.
Do not use any other power adapter except the one that accompanies the unit. Use of other adapter could result in damage to the unit. To prevent electronic shock, please do not open the cover.

### *UL Safety Regulations*

- ✓ Disconnect TNV circuit connector or before removing cover or equivalent.
- ✓ Disconnect TNV circuit connector(s) before disconnecting power.
- ✓ Do not use this product near water for example, near a bathtub, washbowl, and kitchen sink or laundry tub, in a wet basement, or near a swimming pool.
- ✓ Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightening.
- ✓ Do not use the telephone to report a gas leak in the vicinity of the leak.
- ✓ Use only the power cord batteries indicated in this manual. Do not dispose of batteries in a fire, as they may explode. Check with local codes for possible special disposal instructions.

No. 26 AWG Telephone Line Cord shall either be provided with the equipment or shall be described in the safety instruction. If fuse (F1) is not present, see the caution statement listed below:

**CAUTION:** To reduce the risk of fire, use only No. 26 AWG or larger UL Listed or CSA Certified Telecommunication Line Cord.

# Appendix I - Contact information

You can help us serve you better by sending us your comments and feedback. Listed below are the addresses, telephone and fax numbers of our offices. You can also visit us on the World Wide Web at www.xavi.com.tw for more information. We look forward to hearing from you!

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