PLANET
Networking & Communication

802.11n Wireless ADSL 2/2+ Router

ADN-4000

User's Manual

Copyright

PLANET makes no representations or warranties, either expressed or implied, with respect to the contents hereof and specifically disclaims any warranties, merchantability or fitness for any particular purpose. Any software described in this manual is sold or licensed "as is". Should the programs prove defective following their purchase, the buyer (and not this company, its distributor, or its dealer) assumes the entire cost of all necessary servicing, repair, and any incidental or consequential damages resulting from any defect in the software. Further, this company reserves the right to revise this publication and to make changes from time to time in the contents hereof without obligation to notify any person of such revision or changes.

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

FCC Caution

To assure continued compliance (example-use only shielded interface cables when connecting to computer or peripheral devices). Any changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the Following two conditions: (1) This device may not cause harmful interference, and (2) this Device must accept any interference received, including interference that may cause undesired operation.

Federal Communication Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm (8 inches) during normal operation.

R&TTE Compliance Statement

This equipment complies with all the requirements of DIRECTIVE 1999/5/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL OF 9 March 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE)
The R&TTE Directive repeals and replaces in the directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) As of April 8, 2000.

WEEE Regulation

To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

Safety

This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines of this and of the computer manufacture must therefore be allowed at all times to ensure the safe use of the equipment.

Revision

User’s Manual for 802.11n Wireless ADSL 2/2+ Router
Model: ADN-4000
Rev: 1.0 (July. 2008)
Part No. EM-ADN4000v1.doc

Table of Contents

1 Introduction

The PLANET 802.11n Wireless ADSL 2/2+ Router with 2T3R MIMO antenna technology, ADN-4000, provides office and residential users the ideal solution for sharing a high-speed ADSL 2/2+ broadband Internet connection and four-10/100Mbps Fast Ethernet backbone. It can support downstream transmission rates of up to 24Mbps and upstream transmission rates of up to 3.5Mbps. The product supports PPPoA (RFC 2364 - PPP over ATM Adaptation Layer 5), RFC 2684 encapsulation over ATM (bridged or routed), PPP over Ethernet (RFC 2516), and IPoA (RFC1483) to establish a connection with ISP.

With built-in IEEE 802.11b/g/n Draft 2.0 wireless network capability, all computers and wireless-enabled network devices can connect to the ADN-4000 without additional cabling. New 802.11n Draft 2.0 wireless capability also gives you the highest speed of wireless experience ever. With a compatible wireless card installed in your PC, you can transfer file up to 300Mbps (transfer data rate). The radio coverage is also doubled, so you don’t need to worry if the size of your office or house is big.

To secure the wireless communication, the ADN-4000 supports most up-to-date encryption, WEP, and WPA-PSK/ WPA2-PSK. In order to simplify the security settings, ADN-4000 supports WPS configuration with PBC/PIN type. Your whole wireless network can be secured.

Via the user-friendly management interface, ADN-4000 can be managed by workstations running standard web browsers. Furthermore, ADN-4000 provides DHCP server, NAT, Virtual Server, DMZ, Access Control, IP Filter, PPTP/IPSec/L2TP pass-through, DDNS, and UPnP capability.

The ADN-4000 also serves as an Internet firewall, protecting your network from being accessed by outside users. It provides the natural firewall function (Network Address Translation, NAT). All incoming and outgoing IPs are monitored and filtered. Moreover, it can be configured to block internal users from accessing to the Internet.

1.1 Feature

Internet Access Features

- ***Shared Internet Access*** All users on the LAN can access the Internet through the ADN-4000 using only a single external IP Address. The local (invalid) IP Addresses are hidden from external sources. This process is called NAT (Network Address Translation).
- ***Built-in ADSL 2/2+ Modem*** The ADN-4000 provides ADSL 2/2+ modem, and supports all common ADSL connections.
- ***Auto-detection of Internet Connection Method*** In most situations, the ADN-4000 can test your

ADSL and Internet connection to determine the connection method used by your ISP.

- ***PPPoE, PPPoA, Direct Connection Support*** Various WAN connections are supported by ADN-4000.
- ***Fixed or Dynamic IP Address*** On the Internet (WAN port) connection, the ADN-4000 supports both Dynamic IP Address (IP Address is allocated on connection) and Fixed IP Address.

Advanced Internet Functions

- ***Virtual Servers*** This feature allows Internet users to access Internet servers on your LAN. The required setup is quick and easy.
- ***DMZ Support*** The ADN-4000 can translate public IP addresses to private IP address to allow unrestricted 2-way communication with Servers or individual users on the Internet. This provides the most flexibility to run programs, which could be incompatible in NAT environment.
- ***Firewall*** Supports simple firewall with NAT technology and provides option for access control from Internet, like Telnet, FTP, TFTP, HTTP, SNMP, and ICMP services. It also supports IP/MAC /Application/URL filtering.
- ***Universal Plug and Play (UPnP)*** UPnP allows automatic discovery and configuration of the Broadband Router. UPnP is supported by Windows ME, XP, or later.
- ***Dynamic DNS Support*** When used with the Virtual Servers feature, allows users to connect to Servers on your LAN using a Domain Name, even if you have a dynamic IP address which changes every time you connect.
- ***VPN Pass through Support*** PCs with VPN (Virtual Private Networking) software using PPTP, L2TP, and IPSec are transparently supported - no configuration is required.
- ***RIP Routing*** It supports RIPv1/2 routing protocol for routing capability.
- ***Simple Network Management Protocol (SNMP)*** It is an easy way to remotely manage the router via SNMP.

Wireless Features

- ***Standards Compliant*** The ADN-4000 complies with IEEE 802.11n (Draft 2.0) wireless technology capable of up to 300Mbps data rate.
- ***Three detachable antennas with MIMO technology*** The ADN-4000 provides farther coverage, less dead spaces and higher throughput with 2T3R MIMO technology.
- ***Support IEEE 802.11b, g and 802.11n Draft 2.0 Wireless Station*** The 802.11n standard provides for backward compatibility with the 802.11b and 802.11g standard, so 802.11b, 802.11g, and 802.11n Draft 2.0 can be used simultaneously.
- ***WEP support*** Support for WEP (Wired Equivalent Privacy) is included. Key sizes of 64 Bit and 128 Bit are supported.
- ***WPS Push Button Control*** The ADN-4400 supports WPS (Wi-Fi Protected Setup) to easy connect wireless network without configuring the security.
- ***WPA-PSK support*** WPA-PSK_TKIP and WAP-PSK_AES encryption are supported.
- ***Wireless MAC Access Control*** The Wireless Access Control feature can check the MAC address (hardware address) of Wireless stations to ensure that only trusted Wireless Stations can access your LAN.

LAN Features

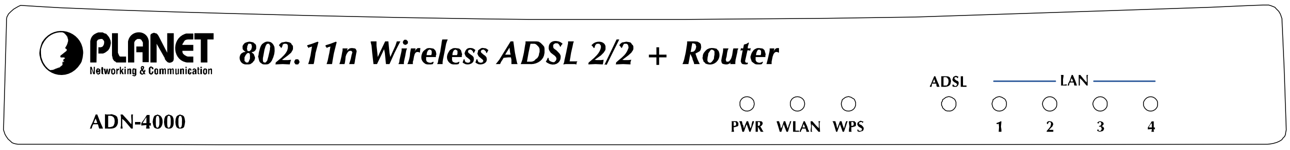
- ***4-Port Switch*** The ADN-4000 incorporates a 4-port 10/100BaseT switching hub, making it easy to create or extend your LAN.
- ***DHCP Server Support*** **D**ynamic **H**ost **C**onfiguration **P**rotocol provides a dynamic IP address to PCs and other devices upon request. The ADN-4000 can act as a DHCP Server for devices on your local LAN and WLAN.

1.2 Package Contents

- ADN-4000 Unit
- Quick Installation Guide x 1
- User's Manual CD x 1
- Power Adapter x 1
- RJ-45 Cable x 1
- RJ-11 Cable x 2
- Antenna x 3
- ADSL Splitter x 1

1.3 Physical Details

Front Panel LEDs of ADN-4000

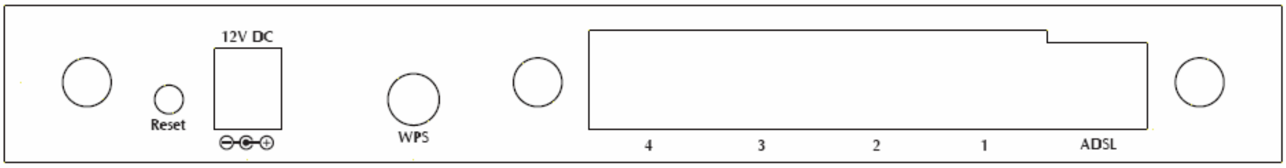

PLANET
Networking & Communication
802.11n Wireless ADSL 2/2 + Router
ADN-4000
PWR
WLAN
WPS
ADSL
LAN
1
2
3
4

LED Indicator

LED	**Status**	**Description**
PWR	**ON**	The Router is ready.
WLAN	**OFF**	Wireless LAN is disabled
	BLINKING	Wireless traffic is transmitting or receiving
WPS	**OFF**	WPS function is disabled

	BLINKING	WPS function is enabled
ADSL	**ON**	Connected to an ADSL DSLAN successfully
	BLINKING	No Connection
LAN1-4	**ON**	The LAN cable is connected to the router
	OFF	No network connection
	Blinking	Network traffic transferring or receiving through the LAN port

Rear Panel of ADN-4000



Rear panel Port and Button Definition

Port	Description
Reset	▪ Reboot router: press the reset button for less than 5 seconds, and it will keep your original configurations. ▪ Load factory default setting: press the reset button for longer than 5 seconds and the router will reset itself to the factory default settings (**warning**: your original configurations will be replaced with the factory default settings)
Power	Power connector with 12V DC 1A.
WPS Button	Wi-Fi Protected Setup (WPS) is the simplest way to build connection between wireless network clients and this ADSL router. Press this button on the router and enable WPS function of the wireless clients, the router and clients will automatically configure the security key and connect directly. Please note that the router will wait for WPS requests from wireless clients in 2 minutes after the WPS button is pressed.
LAN1-4	Router is successfully connected to a device through the corresponding port (1, 2, 3, or 4). If the LED is flashing, the Router is actively sending or receiving data over that port.
ADSL Connector	The RJ-11 connector allows data communication between the modem and the ADSL network through a twisted-pair phone wire.

2 Installation

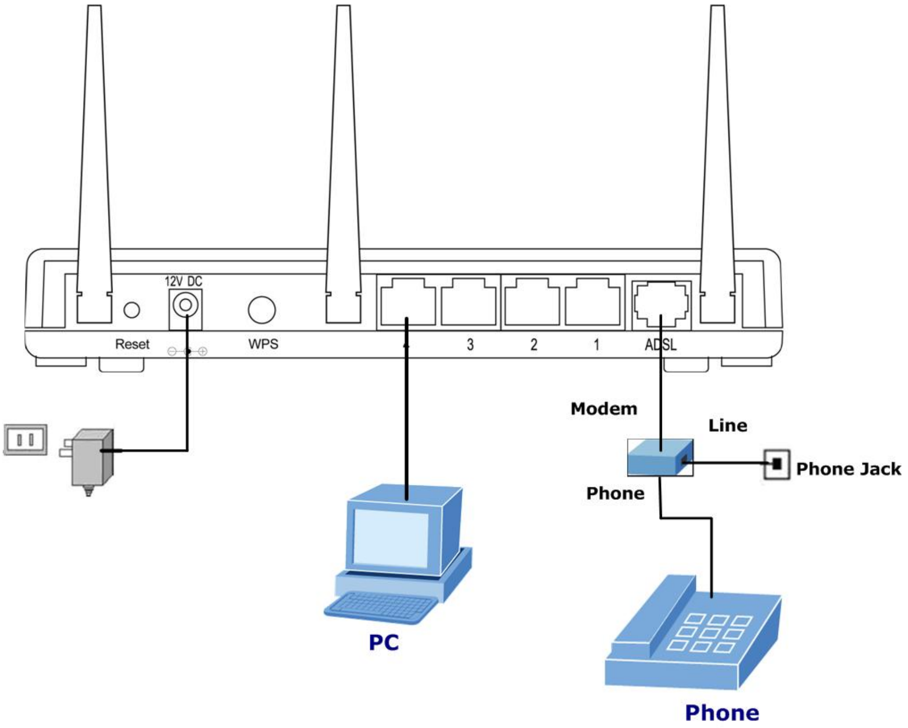
This chapter offers information about installing your router. If you are not familiar with the hardware or software parameters presented here, please consult your service provider for the values needed.

2.1 System Requirement

1. Personal computer (PC)
2. Pentium III 266 MHz processor or higher
3. 128 MB RAM minimum
4. 20 MB of free disk space minimum
5. RJ45 Ethernet Port

2.2 Hardware Installation

This section describes how to connect and configure the ADN-4000.



1. Choose an Installation Site

Select a suitable place on the network to install the ADN-4000.

NOTE	For best Wireless reception and performance, the ADN-4000 should be positioned in a central location with minimum obstructions between the ADN-4000 and the PCs. Also, if using multiple Access Points, adjacent Access Points should use different Channels.

2. Connect LAN Cables

Use standard LAN cables to connect PCs to the Switching Hub ports on the ADN-4000. Both 10Base-T and 100Base-TX connections can be used simultaneously.

If required, connect any port to a normal port on another Hub, using a standard LAN cable. Any LAN port on the ADN-4000 will automatically function as an "**Uplink**" port when required.

3. Connect ADSL Cable

Connect the supplied ADSL cable from to the WAN port on the ADN-4000 (the RJ-11 connector) to the ADSL terminator provided by your phone company.

4. Power Up

Connect the supplied power adapter to the ADN-4000. Use only the power adapter provided. Using a different one may cause hardware damage.

5. Check the LEDs

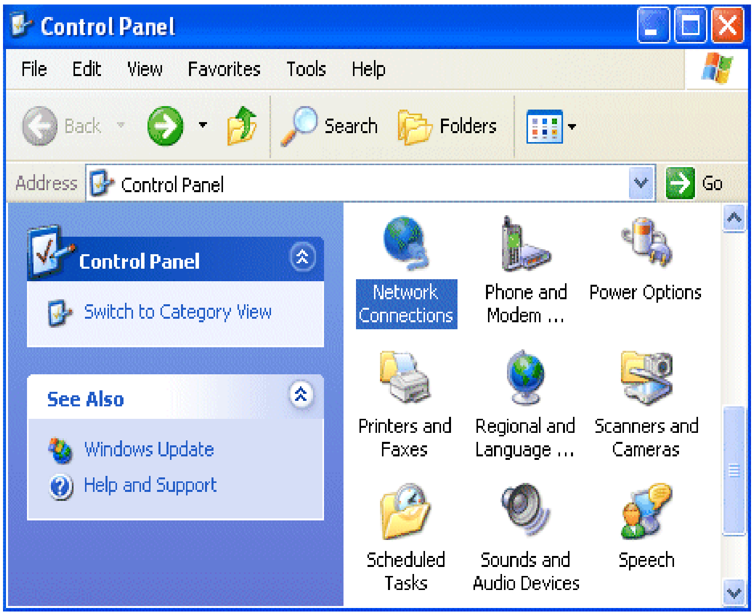
- The *PWR* LED should be ON.
- The *WLAN* LED should be flash, when wireless AP is ready.
- The ADSL LED should be ON if ADSL line is connected.
- For each LAN (PC) connection, one of the LAN LEDs should be ON (provided the PC is also ON.)

Note: You must use the power adapter shipped along with the router, do NOT use any other power adapter from other sources.

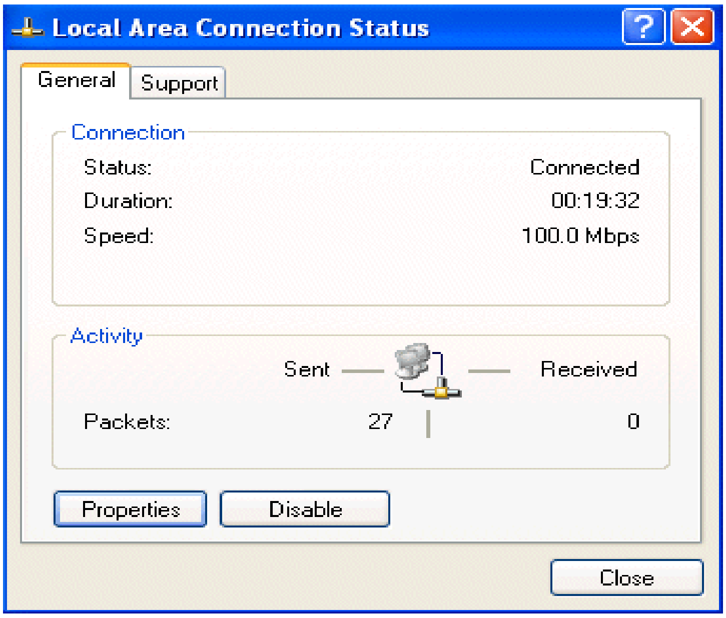
2.3 Configuring the Network Properties

Configuring PC in Windows XP

1. Go to **Start / Control Panel (in Classic View)**. In the Control Panel, double-click on **Network Connections**
2. Double-click **Local Area Connection**.



3. In the **Local Area Connection Status** window, click **Properties**.



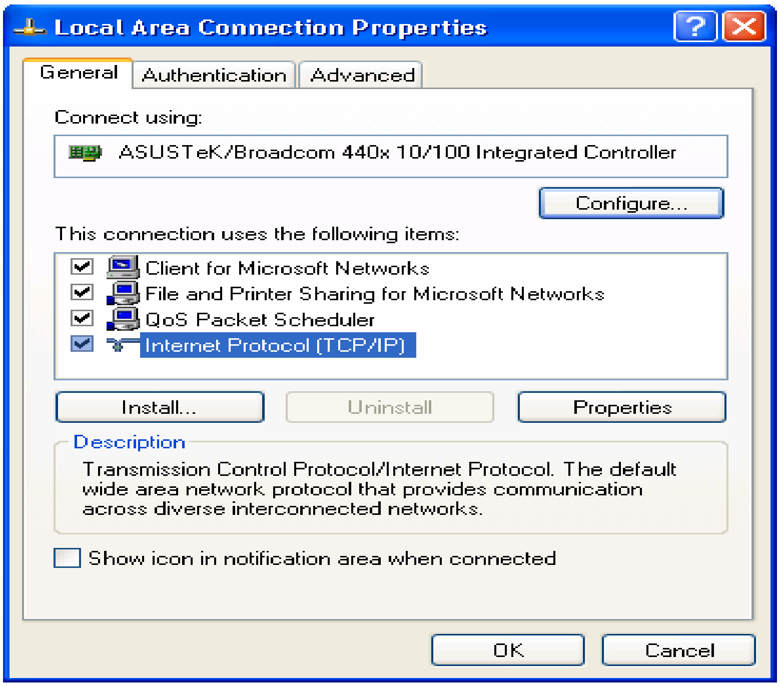
Connection

Status:	Connected
Duration:	00:19:32
Speed:	100.0 Mbps

Activity

	Sent	Received
Packets:	27	0

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



Local Area Connection Properties

Connect using:

ASUSTeK/Broadcom 440x 10/100 Integrated Controller

This connection uses the following items:

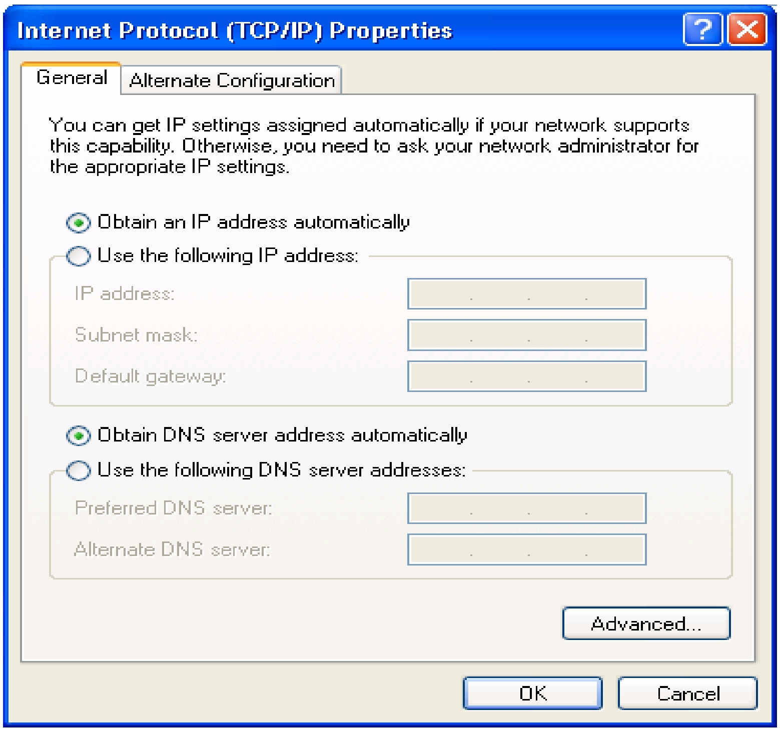
☑ Client for Microsoft Networks
☑ File and Printer Sharing for Microsoft Networks
☑ QoS Packet Scheduler
☑ Internet Protocol (TCP/IP)

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

□ Show icon in notification area when connected

5. Select the **Obtain an IP address automatically** and the **Obtain DNS server address automatically** radio buttons.
6. Click **OK** to finish the configuration.



Internet Protocol (TCP/IP) Properties

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

● Obtain an IP address automatically
○ Use the following IP address:

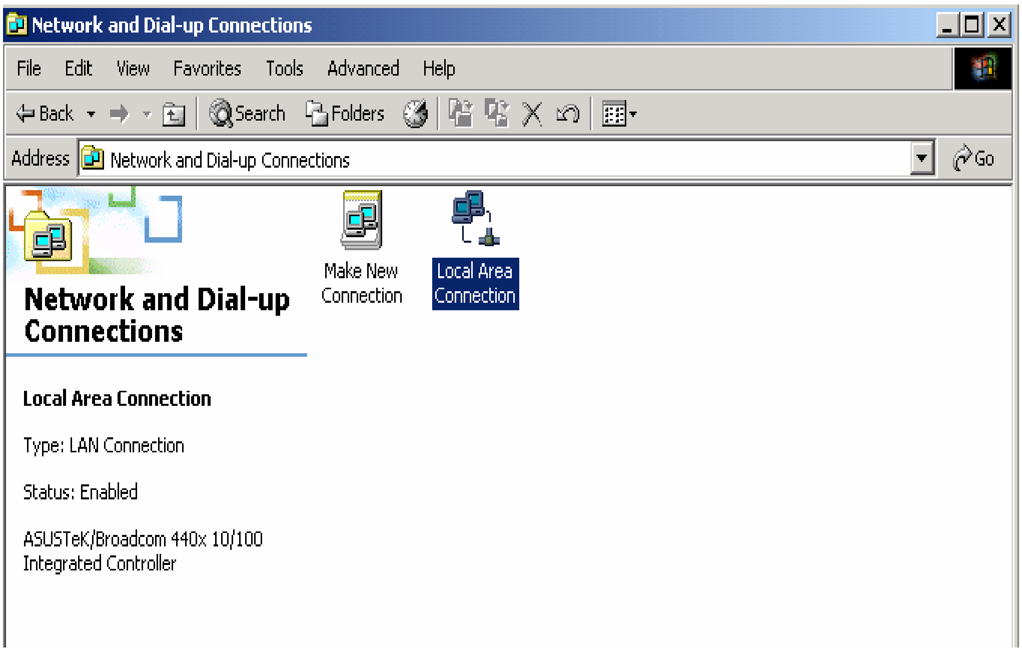
IP address: . . .
Subnet mask: . . .
Default gateway: . . .

● Obtain DNS server address automatically
○ Use the following DNS server addresses:

Preferred DNS server: . . .
Alternate DNS server: . . .

Configuring PC in Windows 2000

1. Go to **Start / Settings / Control Panel**. In the Control Panel, double-click on **Network and Dial-up Connections**.
2. Double-click **Local Area Connection**.



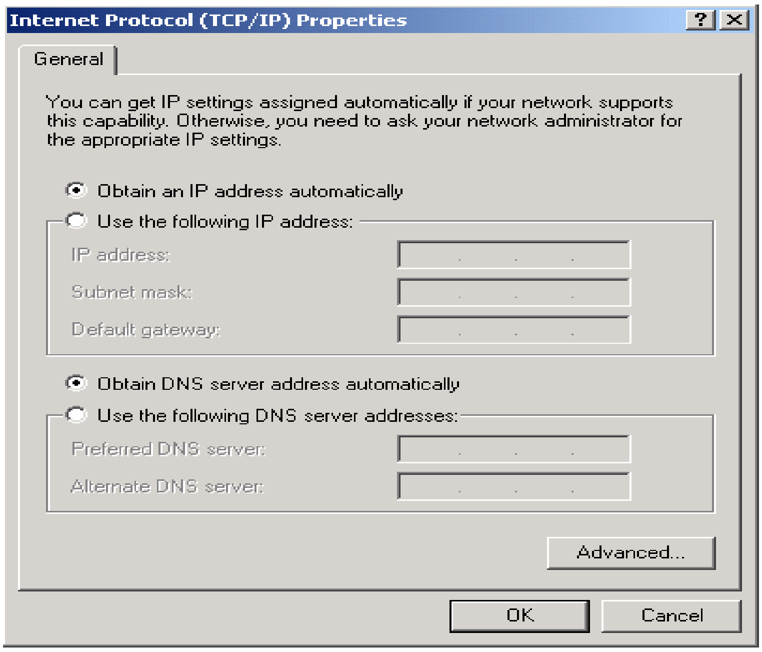
Local Area Connection

Type: LAN Connection

Status: Enabled

ASUSTeK/Broadcom 440x 10/100 Integrated Controller

3. In the **Local Area Connection Status** window click **Properties**.
4. Select **Internet Protocol (TCP/IP)** and click **Properties**.
5. Select the **Obtain an IP address automatically** and the **Obtain DNS server address automatically** radio buttons.
6. Click **OK** to finish the configuration.



Internet Protocol (TCP/IP) Properties

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

● Obtain an IP address automatically

○ Use the following IP address:

IP address: . . .

Subnet mask: . . .

Default gateway: . . .

● Obtain DNS server address automatically

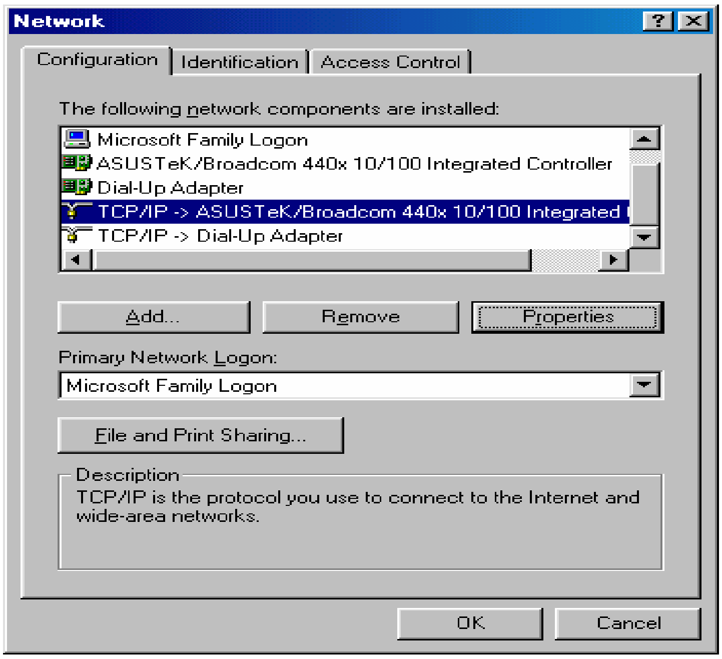
○ Use the following DNS server addresses:

Preferred DNS server: . . .

Alternate DNS server: . . .

Configuring PC in Windows 98/Me

1. Go to **Start / Settings / Control Panel**. In the Control Panel, double-click on **Network** and choose the **Configuration** tab.
2. Select **TCP/IP → ASUS Tek/Broadcom 440x 10/100 Integrated Controller,** or the name of your Network Interface Card (NIC) in your PC.



The following network components are installed:

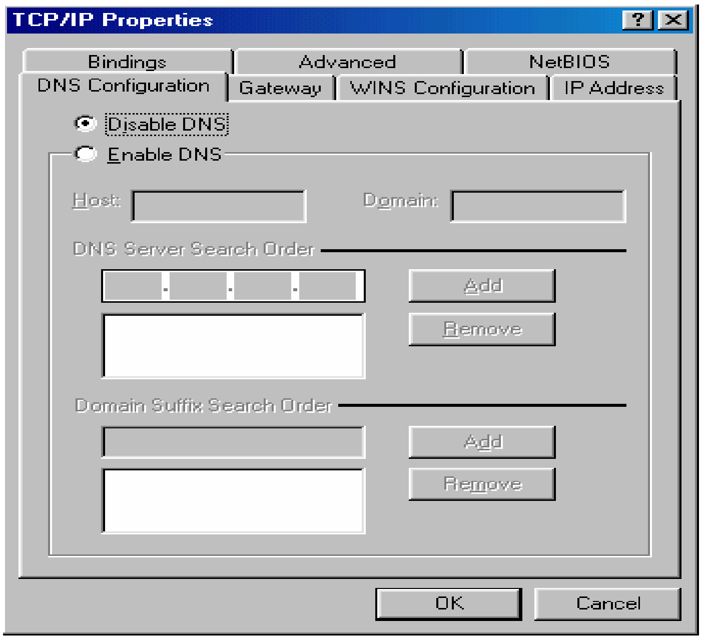
- Microsoft Family Logon
- ASUSTeK/Broadcom 440x 10/100 Integrated Controller
- Dial-Up Adapter
- TCP/IP -> ASUSTeK/Broadcom 440x 10/100 Integrated
- TCP/IP -> Dial-Up Adapter

Primary Network Logon: Microsoft Family Logon

Description

TCP/IP is the protocol you use to connect to the Internet and wide-area networks.

3. Select the **Obtain an IP address automatically** radio button.
4. Then select the **DNS Configuration** tab.
5. Select the **Disable DNS** radio button and click **OK** to finish the configuration.



● Disable DNS

○ Enable DNS

Host:

Domain:

DNS Server Search Order

Domain Suffix Search Order

3 Configurations

3.1 Determine your connection settings

Before you configure the router, you need to know the connection information supplied by your ADSL service provider.

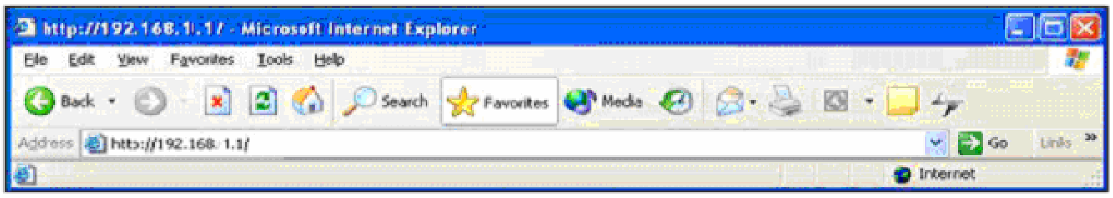
3.2 Connecting the ADSL Router to your network

Unlike a simple hub or switch, the setup of the ADSL Router consists of more than simply plugging everything together. Because the Router acts as a DHCP server, you will have to set some values within the Router, and also configure your networked PCs to accept the IP Addresses the Router chooses to assign them.
Generally there are several different operating modes for your applications. And you can know which mode is necessary for your system from ISP. These modes are router, bridge, PPPoE+NAT, and PPPoA+NAT.

3.3 Configuring with Web Browser

It is advisable to change the administrator password to safeguard the security of your network.

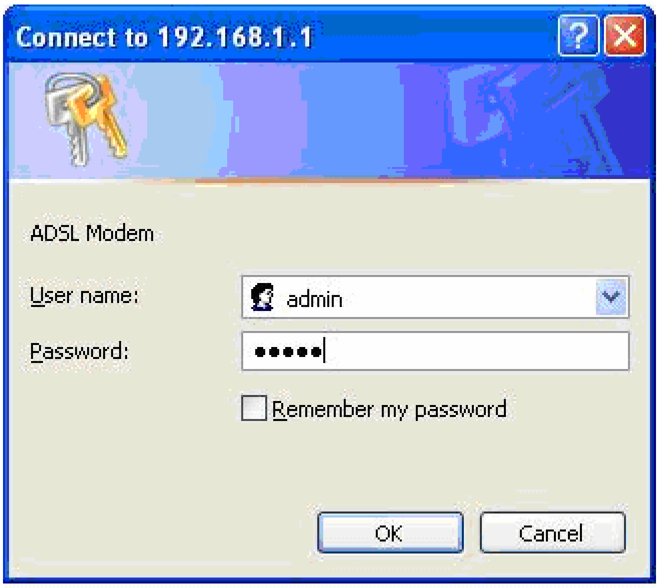
1. Open web browser and type ***http://192.168.1.1*** in the browser's address box. This number is the default IP address for this device. Press Enter.



http://192.168.1.1/ - Microsoft Internet Explorer

Address http://192.168.1.1/

2. A user name and password prompt will appear. The username and password are both "**admin**".



Connect to 192.168.1.1

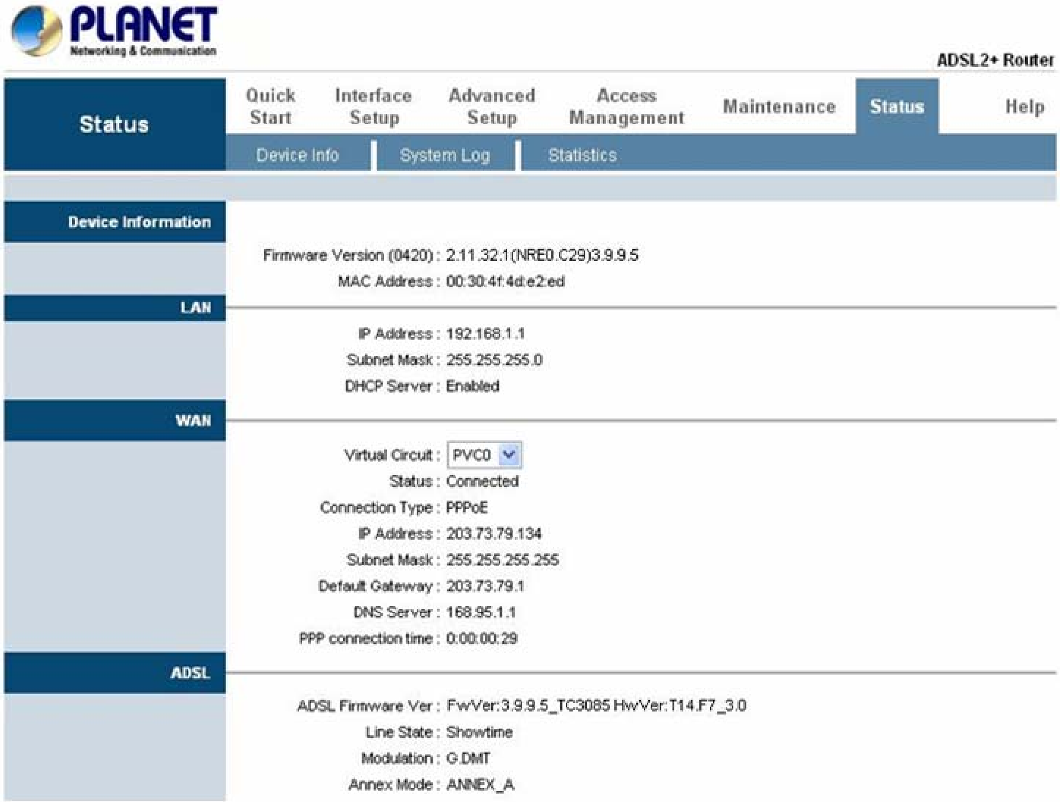
ADSL Modem

User name: admin

Password: •••••

☐ Remember my password

Home Screen



Device Information

Firmware Version (0420) : 2.11.32.1(NRE0.C29)3.9.9.5
MAC Address : 00:30:4f:4d:e2:ed

LAN

IP Address : 192.168.1.1
Subnet Mask : 255.255.255.0
DHCP Server : Enabled

WAN

Virtual Circuit : PVC0
Status : Connected
Connection Type : PPPoE
IP Address : 203.73.79.134
Subnet Mask : 255.255.255.255
Default Gateway : 203.73.79.1
DNS Server : 168.95.1.1
PPP connection time : 0:00:00:29

ADSL

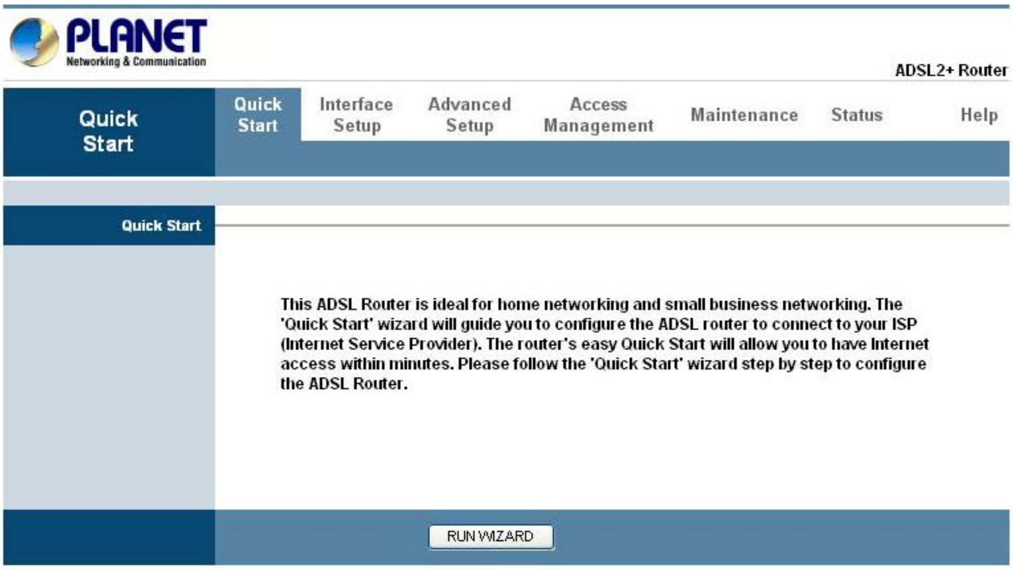
ADSL Firmware Ver : FwVer:3.9.9.5_TC3085 HwVer:T14.F7_3.0
Line State : Showtime
Modulation : G.DMT
Annex Mode : ANNEX_A

3.3.1 Quick Start

You can use "**Setup Wizard**" to setup the router as follows, and the router will connect to the Internet via ADSL line.

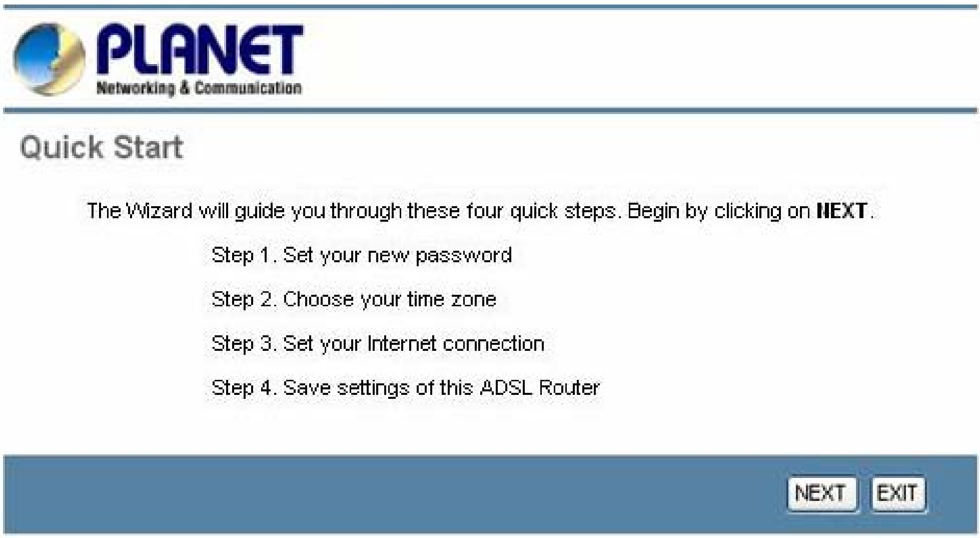
Click "**Quick Start**" to get into the quick setup procedures.

Click "**RUN WIZARD**" to start up this procedure.



This ADSL Router is ideal for home networking and small business networking. The 'Quick Start' wizard will guide you to configure the ADSL router to connect to your ISP (Internet Service Provider). The router's easy Quick Start will allow you to have Internet access within minutes. Please follow the 'Quick Start' wizard step by step to configure the ADSL Router.

Step 1 - Click "**Next**" to begin these four quick steps.



Quick Start

The Wizard will guide you through these four quick steps. Begin by clicking on **NEXT**.

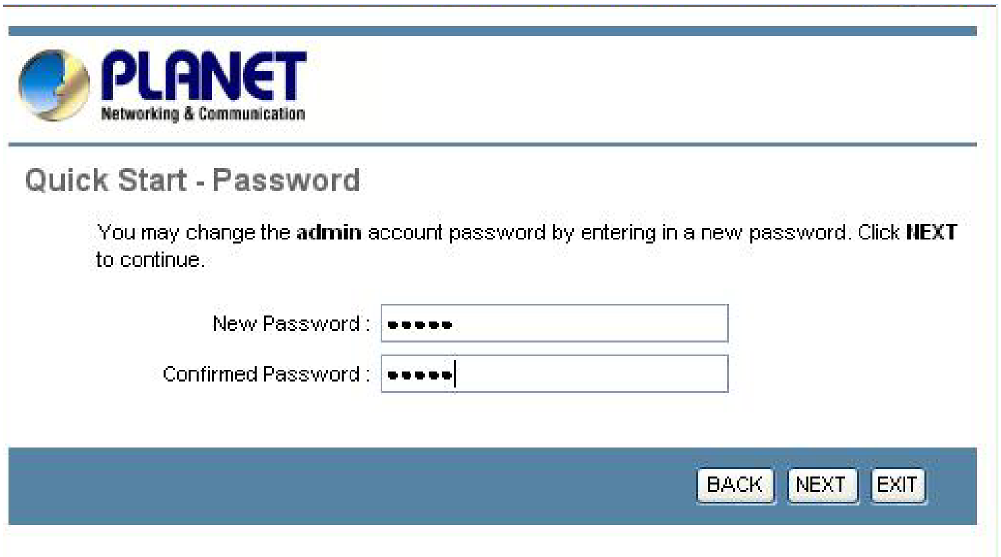
Step 1. Set your new password

Step 2. Choose your time zone

Step 3. Set your Internet connection

Step 4. Save settings of this ADSL Router

Step 2 - Click "**Next**" to setup your new administrator's password.



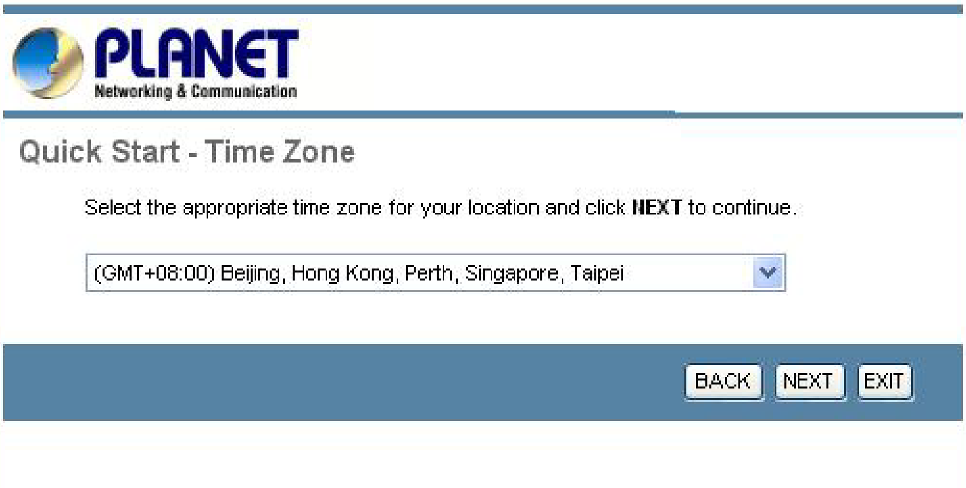
Quick Start - Password

You may change the **admin** account password by entering in a new password. Click **NEXT** to continue.

New Password : •••••

Confirmed Password : •••••

Step 3 - Click "**Next**" to setup your time zone.

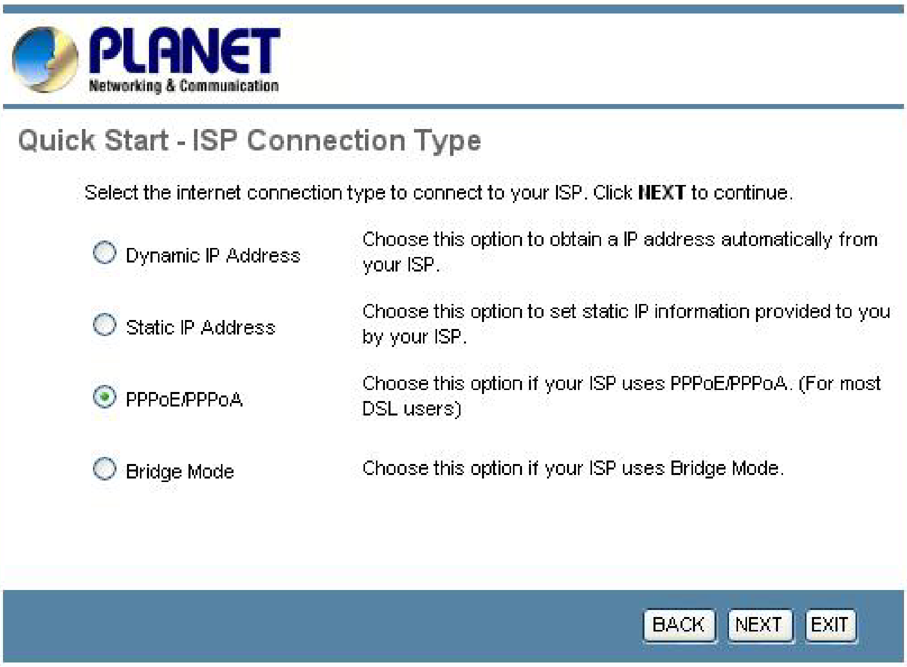


Quick Start - Time Zone

Select the appropriate time zone for your location and click **NEXT** to continue.

(GMT+08:00) Beijing, Hong Kong, Perth, Singapore, Taipei

Step 4 - Click "**Next**" to setup your Internet connection type. You can have this information from your Internet Service Provider.

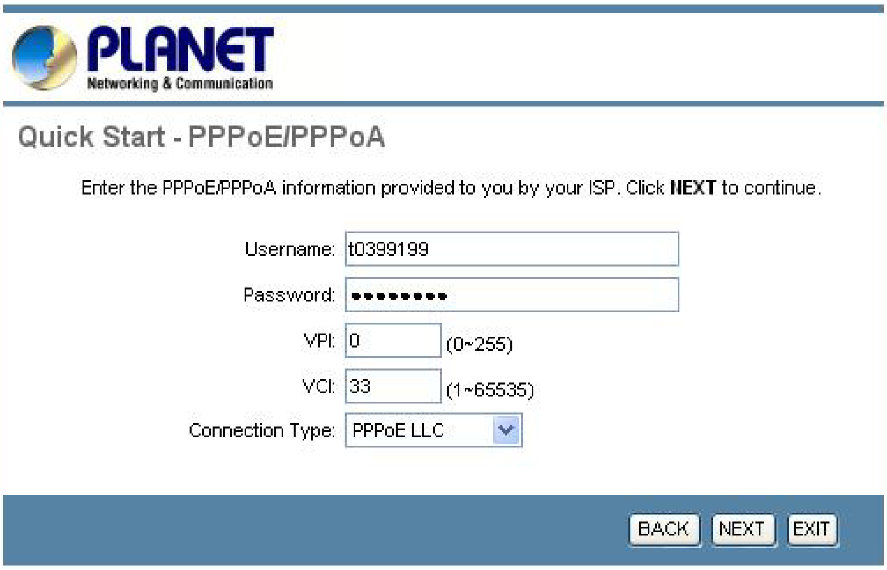


Quick Start - ISP Connection Type

Select the internet connection type to connect to your ISP. Click **NEXT** to continue.

○ Dynamic IP Address	Choose this option to obtain a IP address automatically from your ISP.
○ Static IP Address	Choose this option to set static IP information provided to you by your ISP.
● PPPoE/PPPoA	Choose this option if your ISP uses PPPoE/PPPoA. (For most DSL users)
○ Bridge Mode	Choose this option if your ISP uses Bridge Mode.

Step 5 - Enter the connection information provided by your ISP.



Quick Start - PPPoE/PPPoA

Enter the PPPoE/PPPoA information provided to you by your ISP. Click **NEXT** to continue.

Username: t0399199

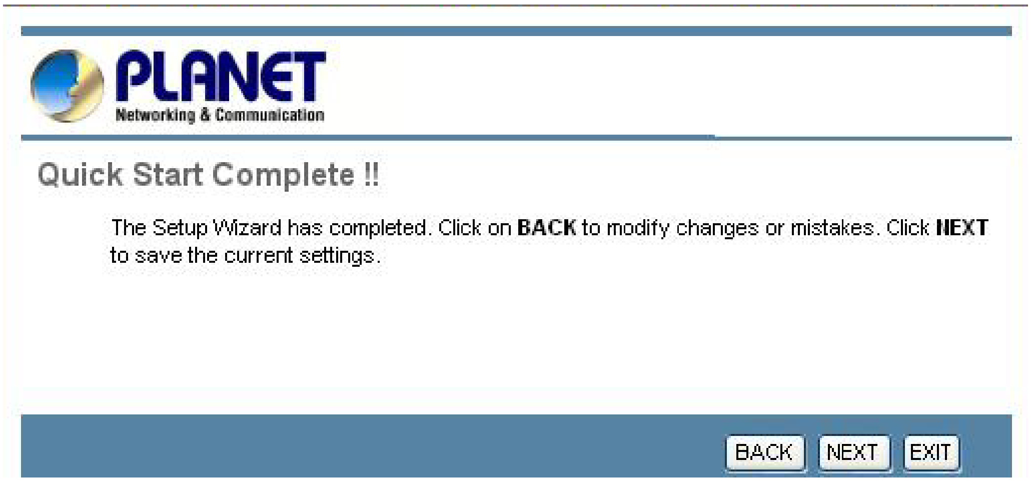
Password: ●●●●●●●●●

VPI: 0 (0~255)

VCI: 33 (1~65535)

Connection Type: PPPoE LLC

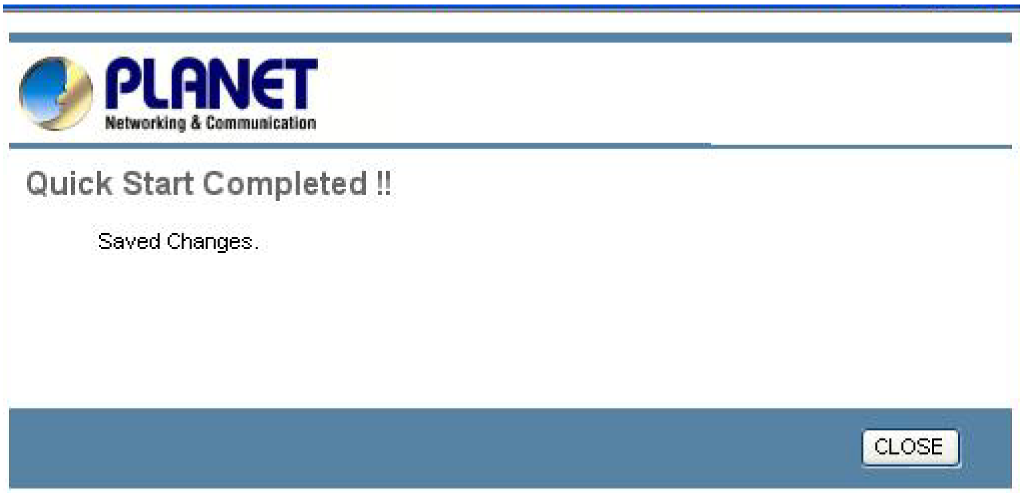
Step 6 - The Setup Wizard has completed. If you have any change or mistake, click “**Back**” to modify it, or click “**Next**” to save the current settings.



Quick Start Complete !!

The Setup Wizard has completed. Click on **BACK** to modify changes or mistakes. Click **NEXT** to save the current settings.

Step 7 - Saved Changes.



Quick Start Completed !!

Saved Changes.

3.4 Interface Setup

3.4.1 WAN Configuration

Go to **Interface Setup -> Internet**. The router can be connected to your service provider in any of the following ways.

3.4.1.1 ATM VC

ATM settings are used to connect to your ISP. Your ISP provides VPI, VCI, settings to you. In this Device, you can totally setup 8 PVCs on different encapsulations if you apply 8 different virtual circuits from your ISP. You need to activate the VC to take effect. For PVCs management, you can use ATM QOS to setup each PVC traffic line's priority.

Virtual Circuit: Select the VC number you want to setup.

VPI: Virtual Path Identifier. The valid range for the VPI is 0 to 255.

VCI: Virtual Channel Identifier. The valid range for the VCI is 32 to 65635 (0 to 31 is reserved for local management of ATM traffic).

3.4.1.2 ATM QoS

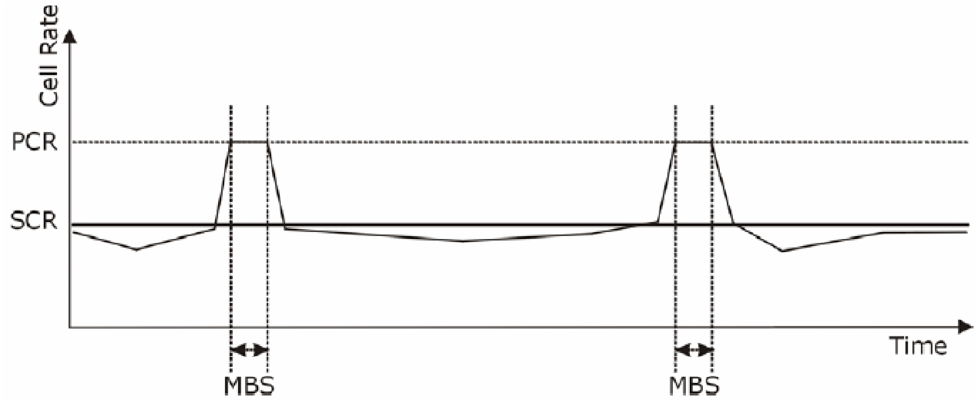
ATM QoS: Select the Quality of Service types for this Virtual Circuit. The ATM QoS types include CBR (Constant Bit Rate), UBR (Unspecified Bit Rate). These QoS types are all controlled by the parameters specified below, including PCR, SCR, and MBS.

PCR: Peak Cell Rate (PCR) is the maximum rate at which the sender can send cells. This parameter may be lower (but not higher) than the maximum line speed. 1 ATM cell is 53 bytes (424 bits), so a maximum speed of 832 Kbps gives a maximum PCR of 1962 cells/sec. This rate is not guaranteed because it is dependent on the line speed.

SCR: Sustained Cell Rate (SCR) is the mean cell rate of a bursty, on-off traffic source that can be sent at the peak rate, and a parameter for burst-type traffic. SCR may not be greater than the PCR; the system default is 0 cells/sec.

MBS: Maximum Burst Size (MBS) is the maximum number of cells that can be sent at the PCR. After MBS is reached, cell rates fall below SCR until cell rate averages to the SCR again. At this time, more cells (up to the MBS) can be sent at the PCR again.

The following figure illustrates the relationship between PCR, SCR and MBS.

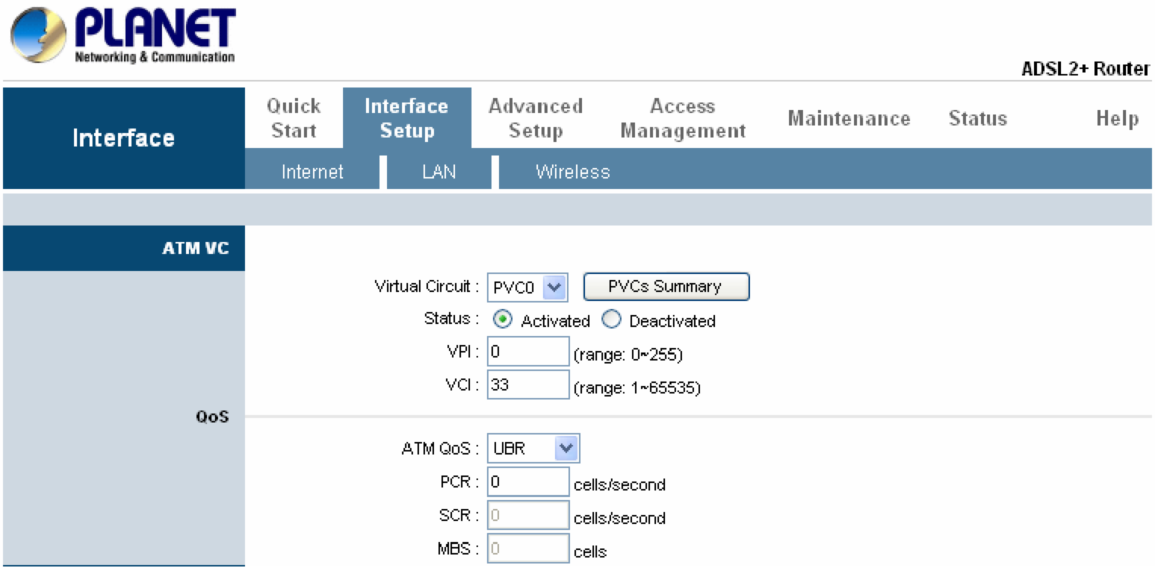


CBR is for connections that support constant rates of data transfer. The only parameter you need to worry about in CBR is PCR.

UBR is for connections that have variable traffic. The only parameter you need to worry about in UBR is PCR.

rtVBR is for connections that, while having variable traffic, require precise timing between traffic source and destination. PCR, SCR and MBS must all be set for rtVBR.

nrtVBR is for connections that have variable traffic, do not require precise timing, but still require a set bandwidth availability. PCR, SCR and MBS must all be set for nrtVBR.



Virtual Circuit : PVC0
Status : ● Activated ○ Deactivated
VPI : 0 (range: 0~255)
VCI : 33 (range: 1~65535)

ATM QoS : UBR
PCR : 0 cells/second
SCR : 0 cells/second
MBS : 0 cells

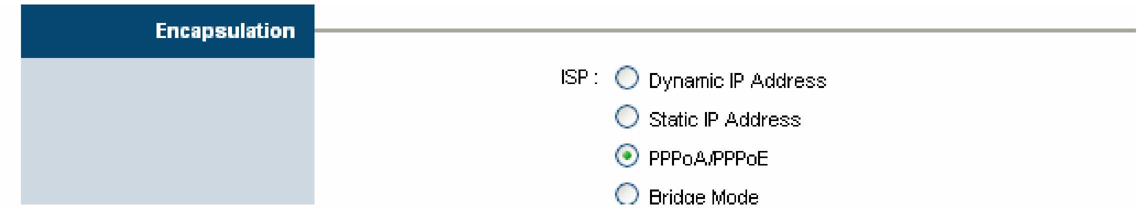
The following table describes the labels in this screen.

Parameter	**Description**
Virtual Circuit	Select the PVC you wish to modify.
Status	Each PCV can be toggled Activated or Deactivate.

VPI	Enter your VPI number here.
VCI	Enter your VCI number here.
ATM QoS	Select the QoS type for the PVC in question from the dropdown list.
PCR	Enter the PCR here. For all QoS types.
SCR	Enter the SCR here. Only for rtVBR and nrtVBR.
MBS	Enter the MBS here. Only for rtVBR and nrtVBR.

3.4.1.3 Encapsulation

Select the encapsulation protocol your ISP uses. The following section will vary depending on which encapsulation protocol you select.



Encapsulation

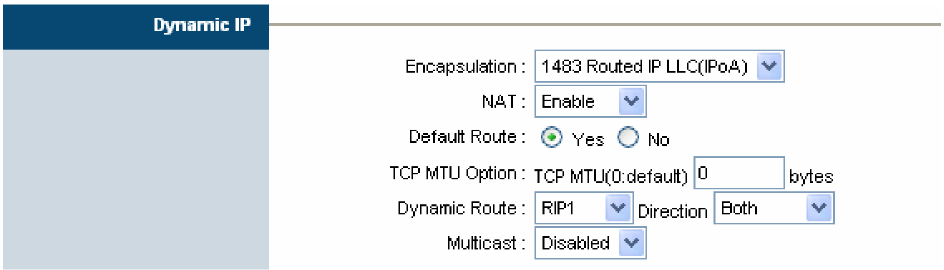
ISP : ○ Dynamic IP Address
○ Static IP Address
● PPPoA/PPPoE
○ Bridge Mode

The following table describes the labels in this screen.

Parameter	**Description**
Dynamic IP Address	Obtain an IP address automatically from your service provider.
Static IP Address	Uses a static IP address. Your service provider gives a static IP address to access Internet services.
PPPoE/PPPoA	PPPoE (PPP over Ethernet) and PPPoA (PPP over ATM) are common connection methods used for xDSL.
Bridge Mode	Bridge Mode is a common connection method used for xDSL modem.

(1) Dynamic IP Address

Select this option if your ISP provides you an IP address automatically. Please enter the Dynamic IP information accordingly.



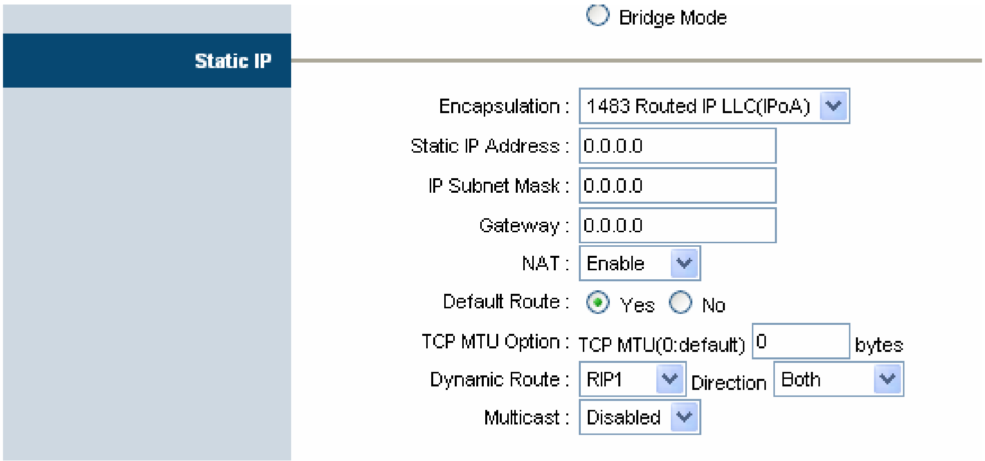
Encapsulation : 1483 Routed IP LLC(IPoA)
NAT : Enable
Default Route : ● Yes ○ No
TCP MTU Option : TCP MTU(0:default) 0 bytes
Dynamic Route : RIP1 Direction Both
Multicast : Disabled

The following table describes the labels in this screen.

Parameter	**Description**
Encapsulation	Select your encapsulation type from the dropdown list.
NAT	Select whether NAT is Enabled or Disabled.
Default Route	Select whether this PVC will be the default route for Internet data.
TCP MTU Option	Enter TCP MTU Value here
Dynamic Route	Select the RIP type and direction from the dropdown lists.
Multicast	Select the multicast protocol you wish to use from the dropdown list.

(2) Static IP Address

Select this option to set static IP information. You will need to enter in the encapsulation type (1483 Bridged IP LLC, 1483 Bridged IP VC-Mux, 1483 Routed IP LLC (IPoA), 1483 Routed IP VC-Mux), IP address, subnet mask, and gateway address provided to you by your ISP. Each IP address entered in the fields must be in the appropriate IP form, which is 4 IP octets separated by a dot (x.x.x.x). The Router will not accept the IP address if it is not in this format.



○ Bridge Mode

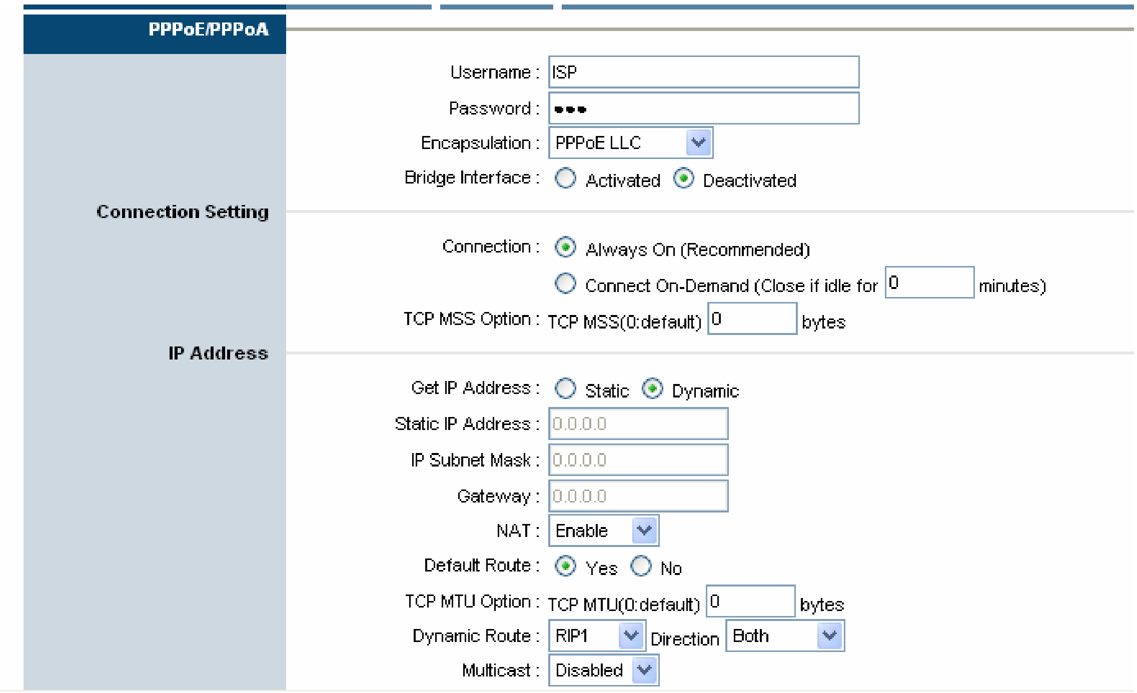
Encapsulation : 1483 Routed IP LLC(IPoA)
Static IP Address : 0.0.0.0
IP Subnet Mask : 0.0.0.0
Gateway : 0.0.0.0
NAT : Enable
Default Route : ● Yes ○ No
TCP MTU Option : TCP MTU(0:default) 0 bytes
Dynamic Route : RIP1 Direction Both
Multicast : Disabled

The following table describes the labels in this screen.

Parameter	Description
Encapsulation	Select your encapsulation type from the dropdown list.
Static IP Address	Enter the static IP Address here.
IP Subnet Mask	Enter the IP Subnet Mask here.
Gateway	Enter the Gateway address here.
NAT	Select whether NAT is Enabled or Disabled.
Default Route	Select whether this PVC will be the default route for Internet data.
Dynamic Route	Select the RIP type and direction from the dropdown lists.
Multicast	Select the multicast protocol you wish to use from the dropdown list.

(3) PPPoA / PPPoE

Select this option if your ISP requires you to use a PPPoE connection. This option is typically used for DSL service. Select Dynamic PPPoE to obtain an IP address automatically for your PPPoE connection. Selection Static PPPoE to use static IP address for your PPPoE connection. Please enter the information accordingly.



PPPoE/PPPoA

Connection Setting

Username : ISP
Password : •••
Encapsulation : PPPoE LLC
Bridge Interface : ○ Activated ● Deactivated

Connection : ● Always On (Recommended)
○ Connect On-Demand (Close if idle for 0 minutes)
TCP MSS Option : TCP MSS(0:default) 0 bytes

IP Address

Get IP Address : ○ Static ● Dynamic
Static IP Address : 0.0.0.0
IP Subnet Mask : 0.0.0.0
Gateway : 0.0.0.0
NAT : Enable
Default Route : ● Yes ○ No
TCP MTU Option : TCP MTU(0:default) 0 bytes
Dynamic Route : RIP1 Direction Both
Multicast : Disabled

The following table describes the labels in this screen.

Parameter	**Description**
Username	Enter your username for your PPPoE/PPPoA connection.
Password	Enter your password for your PPPoE/PPPoA connection.
Encapsulation	Select your encapsulation type from the dropdown list.
Bridge Interface	Select whether the Interface will be Activated or Deactivated.
Connection	Select whether your connection is always on or if it connects on demand. If on demand, specify how many minutes the connection may be idle before it disconnects.
TCP MSS Option	Enter the TCP MSS you wish to use here.
Get IP Address	Choose whether the ROUTER obtains the IP address statically or dynamically.
Static IP Address	Enter the static IP address here. Only if you chose Static above.
IP Subnet Mask	Enter the IP subnet mask here. Only if you chose Static above.
Gateway	Enter the gateway here. Only if you chose Static above.
NAT	Select whether NAT is Enabled or Disabled.
Default Route	Select whether this PVC will be the default route for Internet data.
TCP MTU Option	Enter TCP MTU Value here.
Dynamic Route	Select the RIP type and direction from the dropdown lists.
Multicast	Select the multicast protocol you wish to use from the dropdown list.

- ***Connection Setting*****:** For PPPoE/PPPoA connection, you can select **Always on** or **Connect on-demand**. Connect on demand is dependent on the traffic. If there is no traffic (or Idle) for a pre-specified period of time, the connection will tear down automatically. And once there is traffic send or receive, the connection will be automatically on.

- ***IP Address*****:** For PPPoE/PPPoA connection, you need to specify the public IP address for this ADSL Router. The IP address can be either dynamically (via DHCP) or given IP address provide by your ISP. For Static IP, you need to specify the IP address, Subnet Mask and Gateway IP address.

- ***NAT:*** Select this option to Activate/Deactivated the NAT (Network Address Translation) function for this VC. The NAT function can be activated or deactivated per PVC basis.

[Dynamic Route]

RIP (Routing Information Protocol): Select this option to specify the RIP version, including ***RIP1***, ***RIP2-B*** and ***RIP2-M***. RIP2-B & RIP2-M are both sent in RIP-2 format, the difference is that RIP2-M using Multicast and RIP2-B using Broadcast format.

RIP Direction: Select this option to specify the RIP direction.

- ***None*** is for disabling the RIP function.
- ***Both*** means the ADSL Router will periodically send routing information and accept routing information then incorporate into routing table.
- ***IN only*** means the ADSL router will only accept but will not send RIP packet.
- ***OUT only*** means the ADSL router will only sent but will not accept RIP packet.

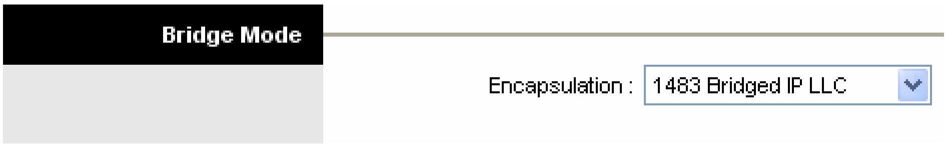
[Multicast]

IGMP (Internet Group Multicast Protocol): It is a session-layer protocol used to establish membership in a multicast group. The ADSL supports both IGMP version ***IGMP-v1*** & ***IGMP-v2***. Select ***None*** to disable it.

Your ISP should provide the above information. Note that you must enter the user name exactly as your ISP assigned it. If the assigned name is in the form of user@domain where domain identifies a service name, enter it exactly as given.

(4) Bridge Mode

The modem can be configured to act as a bridging device between your LAN and your ISP. Bridges are devices that enable 2 or more networks to communicate as if they are 2 segments of the same physical LAN. Please set the Connection type.



Bridge Mode

Encapsulation : 1483 Bridged IP LLC

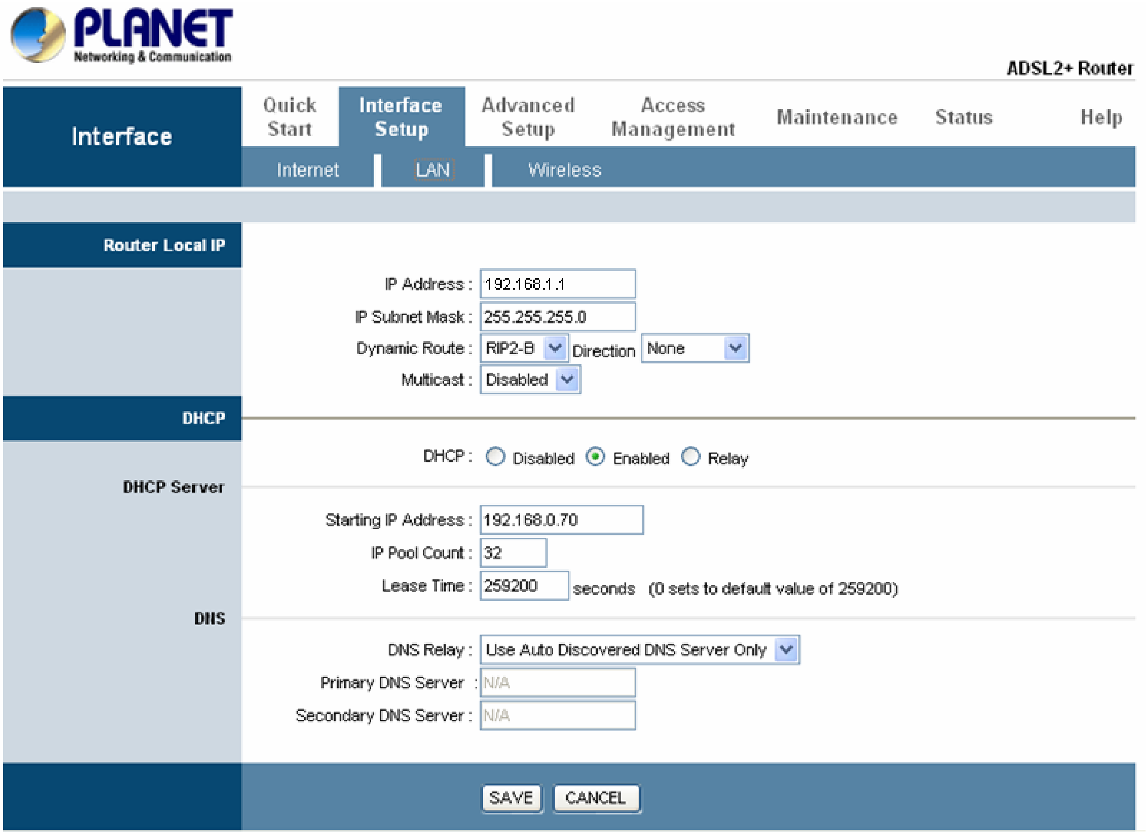
The following table describes the labels in this screen.

Parameter	Description
Encapsulation	Select your encapsulation type from the dropdown list.

3.4.2 LAN Configuration

Go to **Interface Setup** -> **LAN**. The **LAN** option enables you to configure the LAN port.

There are the IP settings of the LAN Interface for the device. These settings may be referred to as Private settings. You may change the LAN IP address if needed. The LAN IP address is provided to your internal network and cannot be seen on the Internet.



IP Address : 192.168.1.1

IP Subnet Mask : 255.255.255.0

Dynamic Route : RIP2-B Direction None

Multicast : Disabled

DHCP : ○ Disabled ● Enabled ○ Relay

Starting IP Address : 192.168.0.70

IP Pool Count : 32

Lease Time : 259200 seconds (0 sets to default value of 259200)

DNS Relay : Use Auto Discovered DNS Server Only

Primary DNS Server : N/A

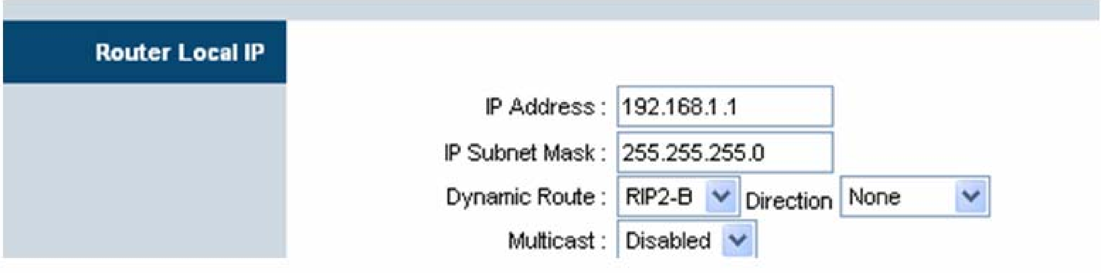
Secondary DNS Server : N/A

3.4.2.1 Router Local IP

IP Address: Enter the IP address of your ADSL router in dotted decimal notation, for example, 192.168.1.1 (default setting).

IP Subnet Mask: Your ADSL router will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing sub netting, use the subnet mask computed by the ADSL router.

Dynamic Route: Select the Dynamic Route from **RIP1**, **RIP2-B**, and **RIP2-M**. Please refer to **Dynamic Routing.** The only difference is the interface.



IP Address : 192.168.1.1

IP Subnet Mask : 255.255.255.0

Dynamic Route : RIP2-B Direction None

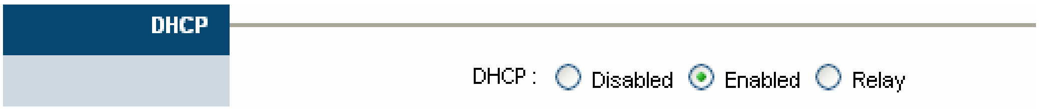
Multicast : Disabled

The following table describes the labels in this screen.

Parameter	**Description**
IP Address	Enter the IP address you wish to use with your LAN here.
IP Subnet Mask	Enter the IP subnet mask you wish to use with your LAN here.
Dynamic Route	Select the Routing Information Protocol (RIP) you wish to use from the dropdown list and the direction you want from the dropdown list. The RIP and direction options are described below.
Multicast	Select the multicast protocol you wish to use from the dropdown list.

3.4.2.2 DHCP Server

Dynamic **H**ost **C**ontrol **P**rotocol (DHCP), when enabled, gives out IP addresses to a device that requests an IP address to be logged on to the network as it boots up. A device must be configured as a DHCP client to obtain the IP address automatically. The DHCP address pool contains the range of the IP address that will automatically be assigned to the clients on the network.



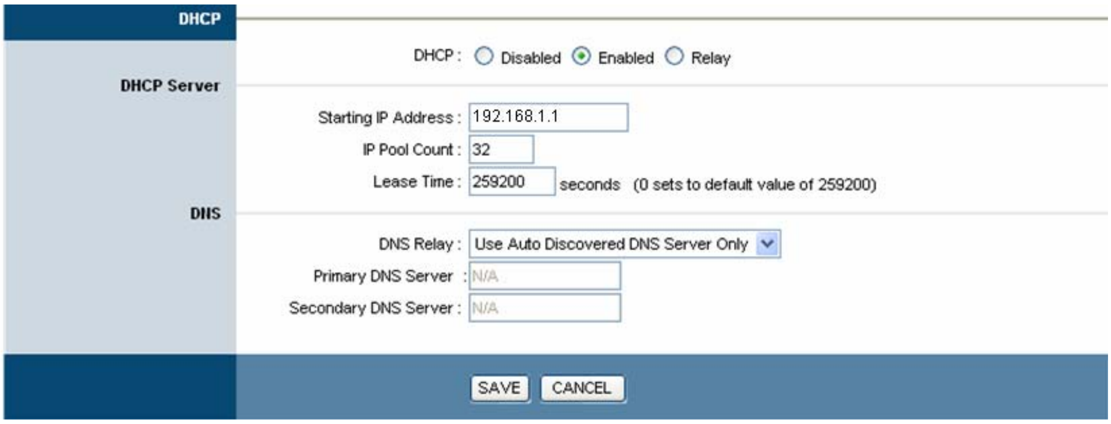
DHCP : ○ Disabled ● Enabled ○ Relay

The following table describes the labels in this screen.

Parameter	**Description**
DHCP	Select whether DHCP is Disabled, Enabled or Relay.

3.4.2.2.1 DHCP Enable

The next screen will vary depending on the DHCP option you selected.



DHCP

DHCP Server

DHCP : ○ Disabled ● Enabled ○ Relay

Starting IP Address : 192.168.1.1

IP Pool Count : 32

Lease Time : 259200 seconds (0 sets to default value of 259200)

DNS

DNS Relay : Use Auto Discovered DNS Server Only

Primary DNS Server : N/A

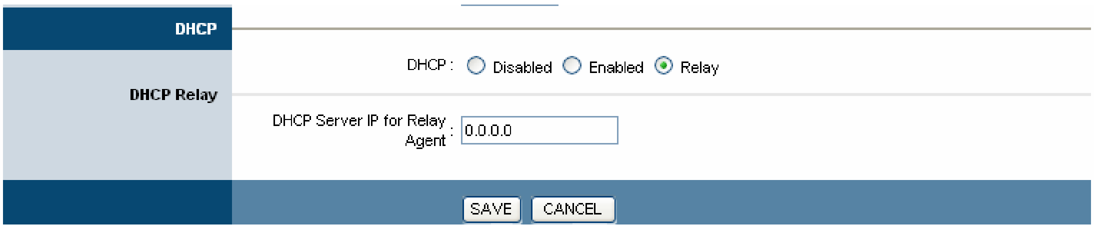
Secondary DNS Server : N/A

The following table describes the labels in this screen.

Parameter	**Description**
Starting IP Address	Enter the starting IP address you wish to use as the DHCP server's IP assignment.
IP Pool Count	Enter the maximum user pool size you wish to allow.
Lease Time	Enter the amount of time you wish to lease out a given IP address.
DNS Relay	Select the DNS relay option you wish to use from the dropdown list.
Primary DNS Server	Enter the primary DNS server IP address you wish to use. For user discovered DNS only.
Secondary DNS Server	Enter the secondary DNS server IP address you wish to use. For user discovered DNS only.

3.4.2.2.2 DHCP Relay

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. If it is enable, the DHCP requests from local PCs will forward to the DHCP server runs on WAN side. To have this function working properly, please run on router mode only, disable the DHCP server on the LAN port, and make sure the routing table has the correct routing entry.



DHCP

DHCP Relay

DHCP : ○ Disabled ○ Enabled ● Relay

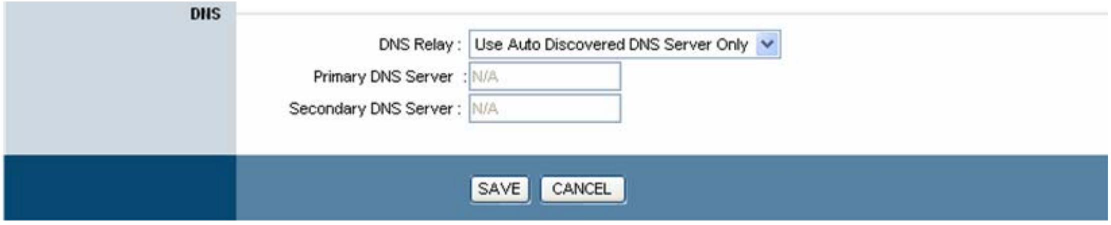
DHCP Server IP for Relay Agent : 0.0.0.0

The following table describes the labels in this screen.

Parameter	**Description**
DCHP Server IP for Relay Agent	Enter the IP address for the DHCP relay agent.

3.4.2.2.3 DNS Relay

The DNS Configuration allows the user to set the configuration of DNS.



DNS

DNS Relay : Use Auto Discovered DNS Server Only

Primary DNS Server : N/A

Secondary DNS Server : N/A

DNS Rely Selection: If user wants to disable this feature, he just needs to set both Primary & Secondary DNS to 0.0.0.0. Using DNS relay, users can setup DNS server IP to 192.168.1.1 on their computer. If not, device will perform as NO DNS relay.

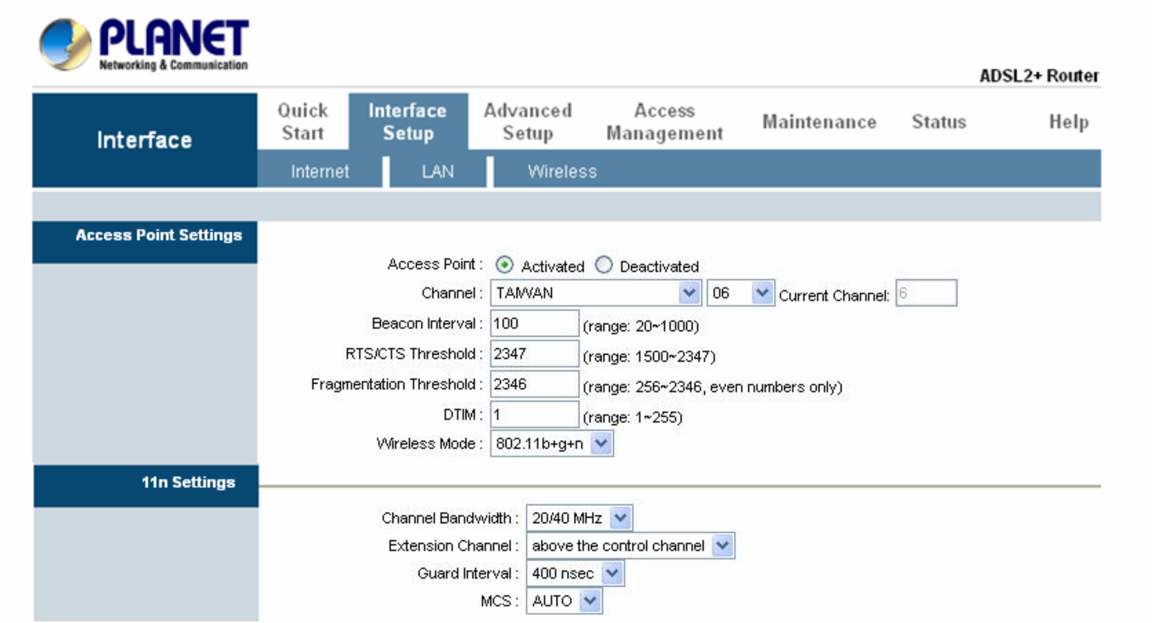
If you don’t want to use the DNS Relay option, set the DNS relay to “**Use User Discovered DNS Server Only**” and set both Primary and Secondary DNS Servers to “**0.0.0.0**”.

3.4.3 Wireless Configuration

Go to **Interface -> Wireless** to setup the wireless parameters.

This section introduces the wireless LAN and some basic configurations. Wireless LANs can be as simple as two computers with wireless LAN cards communicating in a peer-to-peer network or as complex as a number of computers with wireless LAN cards communicating through access points which bridge network traffic to the wired LAN.

3.4.3.1 Access Point Settings



Access Point : ● Activated ○ Deactivated

Channel : TAIWAN 06 Current Channel: 6

Beacon Interval : 100 (range: 20~1000)

RTS/CTS Threshold : 2347 (range: 1500~2347)

Fragmentation Threshold : 2346 (range: 256~2346, even numbers only)

DTIM : 1 (range: 1~255)

Wireless Mode : 802.11b+g+n

Channel Bandwidth : 20/40 MHz

Extension Channel : above the control channel

Guard Interval : 400 nsec

MCS : AUTO

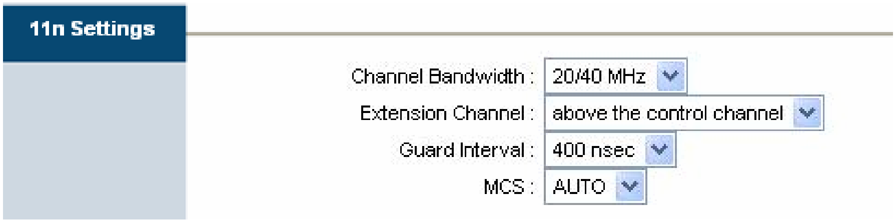
The following table describes the labels in this screen.

Parameter	Description
Access Point	Default setting is set to "**Activated**". If you do not have any wireless, both 802.11g and 802.11b, device in your network, select "**Deactivate**".
Channel	The range of radio frequencies used by IEEE 802.11b/g wireless devices is called a channel. Select a channel from the drop-down list box.
Beacon interval	The Beacon Interval value indicates the frequency

	interval of the beacon. Enter a value between 20 and 1000. A beacon is a packet broadcast by the Router to synchronize the wireless network.
RTS/CTS Threshold	The RTS (Request To Send) threshold (number of bytes) for enabling RTS/CTS handshake. Data with its frame size larger than this value will perform the RTS/CTS handshake. Setting this attribute to be larger than the maximum MSDU (MAC service data unit) size turns off the RTS/CTS handshake. Setting this attribute to zero turns on the RTS/CTS handshake Enter a value between 1500 and 2347.
Fragmentation Threshold	The threshold (number of bytes) for the fragmentation boundary for directed messages. It is the maximum data fragment size that can be sent. Enter a value between 256 and 2346.
DMIT	This value, between 1 and 255, indicates the interval of the Delivery Traffic Indication Message (DTIM).
Wireless Mode	**802.11b** – It only allows 802.11b wireless network client to connect this router (maximum transfer rate 11Mbps). **802.11g** – It only allows 802.11g wireless network client to connect this router (maximum transfer rate 54Mbps). **802.11b+g** – It only allows 802.11b and 802.11g wireless network client to connect this router (maximum transfer rate 11Mbps for 802.11b clients, and maximum 54Mbps for 802.11g clients). **802.11n** – It only allows 802.11n wireless network client to connect this router (maximum transfer rate 300Mbps). **802.11g+n** – It allows 802.11g, and 802.11n wireless network client to connect this router (maximum transfer rate 54Mbps for 802.11g clients, and maximum 300Mbps for 802.11n clients).

	802.11b+g+n – It allows 802.11b, 802.11g, and 802.11n wireless network client to connect this router (maximum transfer rate 11Mbps for 802.11b clients, maximum 54Mbps for 802.11g clients, and maximum 300Mbps for 802.11n clients). **NOTE**: For 802.11b and 802.11g mode, the signals can be transmitted only by antenna 1 (The antenna in the right side of the rear panel). For 802.11n mode: The router is operating in a 2T3R Spatial Multiplexing MIMO configuration. 2 antennas are for signal transmitting and 3 antennas are for signal receiving.

3.4.3.2 802.11n Settings



11n Settings

Channel Bandwidth : 20/40 MHz

Extension Channel : above the control channel

Guard Interval : 400 nsec

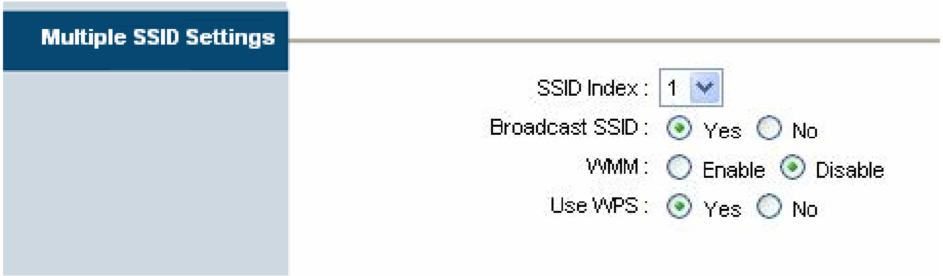
MCS : AUTO

The following table describes the labels in this screen.

Parameter	Description
Channel Bandwidth	Set channel width of wireless radio. **Do not modify default value if you don’t know what it is, default setting is ‘20/40 MHz’.**
Extension Channel	Select the extension channel to above or below the control channel while 40MHz channel bandwidth is selected. **Do not modify the default value if you don’t know what it is.**

Guard Interval	It is one of several draft-n features designed to improve efficiency. Select 400nsec to provide a shorter delay between transmission frames in 11n network. The throughput in 400nec guard interval is better than 800nsec guard interval.
MCS	Select MCS 0-15 to configure the data rate of 11n network. When MCS 15 is selected, the data rate is up to 300Mbps. It is recommended to set "**Auto**" and the router will negotiate with wireless clients to operate in a proper data rate.

3.4.3.3 Multiple SSID Settings



Multiple SSID Settings

SSID Index : 1

Broadcast SSID : ● Yes ○ No

WMM : ○ Enable ● Disable

Use WPS : ● Yes ○ No

The following table describes the labels in this screen.

Parameter	Description
SSID Index	This router can support multiple SSIDs. By default, this function is disabled. You can only set a set of SSID.
Broadcast SSID	Select "**Yes**" to make the SSID to be visible so wireless clients can scan the router within the network. Select "**No**" if you want to hide the SSID of the router. Wireless clients have to set the same SSID of the router in order to access the network.
WMM	The short of Wi-Fi Multi Media, it will enhance the data transfer performance of multimedia contents when they’re being transferred over wireless

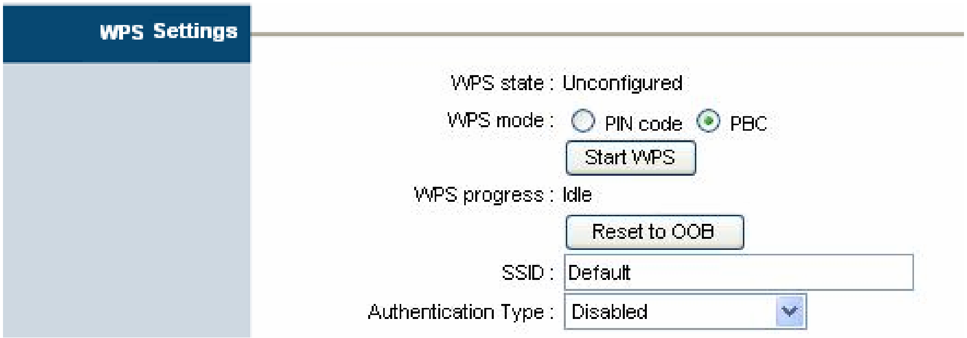
	network.
Use WPS	Select "**Yes**" to enable WPS function, Select "**No**" to disable WPS.

3.4.3.4 WPS Settings

Wi-Fi Protected Setup (WPS) is the simplest way to build connection between wireless network clients and this router. You don’t have to select encryption mode and input a long encryption pass phrase every time when you need to setup a wireless client, you only have to press a button on wireless client and this wireless router, and the WPS will do the setup for you.

This router supports two types of WPS: Push-Button Configuration (PBC), and PIN code.

- If you want to use PBC, you have to switch this wireless router to WPS mode and push a specific button on the wireless client to start WPS mode. You can push Reset/WPS button of this router, or select “PBC” and click “Start WPS” button in the WPS setup page to do this.
- If you want to use PIN code, you have to know the PIN code of wireless client and switch it to WPS mode, then set the PIN code of the wireless client you wish to connect to this router in the WPS setup page and click “Start WPS” button to start WPS mode.



WPS state : Unconfigured
WPS mode : ○ PIN code ● PBC
WPS progress : Idle
SSID : Default
Authentication Type : Disabled

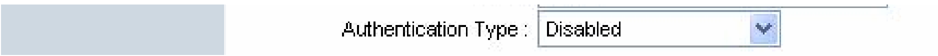
The following table describes the labels in this screen.

Parameter	**Description**
WPS state	If the wireless security (encryption) function of

	this wireless router is enabled, you’ll see "**Configured**" message here. If wireless security function has not been set, you’ll see "**Unconfigured**".
WPS mode	When PIN code is selected, you have to enter the 8-digit PIN code of the wireless client you wish to connect to this router. If PBC mode is selected, just click "**Start WPS**" button to start WPS mode.
AP self PIN Code	The PIN code of the router. You can enter the PIN code of the router to the wireless client so the wireless client can start WPS mode to connect to the router. The security settings of the router will be set to the same as the wireless client.
Enrollee PIN Code	Enter the PIN code of the wireless client here. If you have entered the PIN code of the wireless client and switch to the WPS mode, the security settings of the wireless client will be set to the same as the router.
WPS progress	Display the progress during WPS communication.
Reset to OOB	Click this button and all the wireless settings of the router will be reset to factory defaults.
SSID	The SSID (up to 32 printable ASCII characters) is the unique name identified in a WLAN. The ID prevents the unintentional merging of two co-located WLANs. The default SSID of the router is "**default**".
Authentication Type	It’s very important to set wireless security settings properly. If you don’t, hackers and malicious users can reach your network and valuable data without your consent and this will cause serious security problem. This router supports WEP, WPA-PSK and WPA2-PSK authentication type. If the router has enabled the authentication, all the wireless clients’ settings have to be consistent with the router for

	building the connection.

3.4.3.5 Wireless Authentication



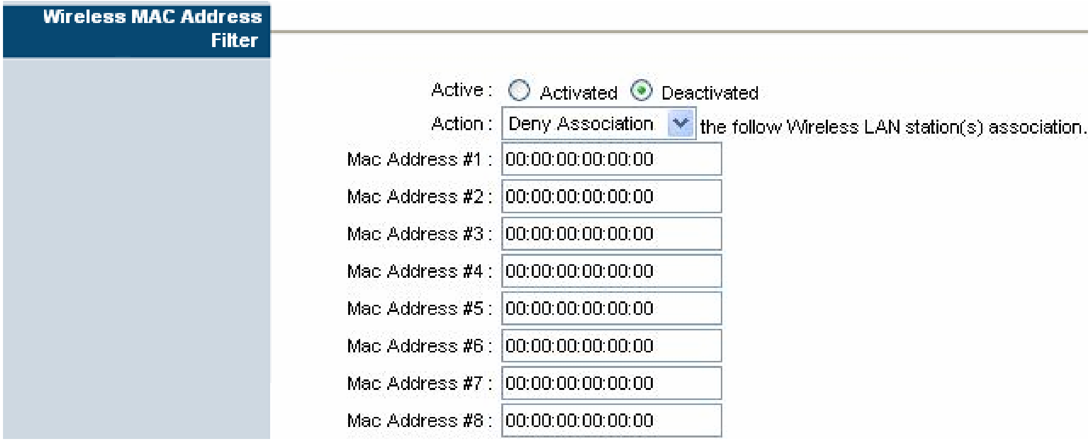
Authentication Type : Disabled

The following table describes the labels in this screen.

Parameter	Description
WEP-64Bits	WEP is less level of security than WPA. WEP supports **64-bit** and **128-bit** key lengths to encrypt the wireless data. The longer key length will provide higher security. When "**WEP-64Bits**" is selected, you have to enter exactly 5 ASCII characters (“a-z” and “0-9”) or 10 hexadecimal digits ("0-9", "a-f") for each Key (1-4).
WEP-128Bits	When "**WEP-128Bits**" is selected, you have to enter exactly 13 ASCII characters (“a-z” and “0-9”) or 26 hexadecimal digits ("0-9", "a-f") for each Key (1-4).
WPA-PSK	WPA-PSK is suitable for home and small business. It uses TKIP or AES for data encryption. When "**WPA-PSK**" is selected, please select the encryption method and enter 8-63 ASCII characters or 64 hexadecimal characters as the "**Pre-Shared Key**".
WPA2-PSK	WPA2-PSK is also for home and small business. It uses TKIP or AES for data encryption. WPA2-PSK offers the highest level of security available. When "**WPA2-PSK**" is selected, please select the encryption method and enter 8-63 ASCII characters or 64 hexadecimal characters as the "**Pre-Shared Key**".
WPA-PSK/ WPA2-PSK	When "**WPA-PSK/WPA2-PSK**" is selected,

	please select the encryption method (TKIP or AES) and enter 8-63 ASCII characters or 64 hexadecimal characters as the "**Pre-Shared Key**".

3.4.3.6 Wireless MAC Address Filter



Active : ○ Activated ● Deactivated

Action : Deny Association the follow Wireless LAN station(s) association.

Mac Address #1 : 00:00:00:00:00:00

Mac Address #2 : 00:00:00:00:00:00

Mac Address #3 : 00:00:00:00:00:00

Mac Address #4 : 00:00:00:00:00:00

Mac Address #5 : 00:00:00:00:00:00

Mac Address #6 : 00:00:00:00:00:00

Mac Address #7 : 00:00:00:00:00:00

Mac Address #8 : 00:00:00:00:00:00

The following table describes the labels in this screen.

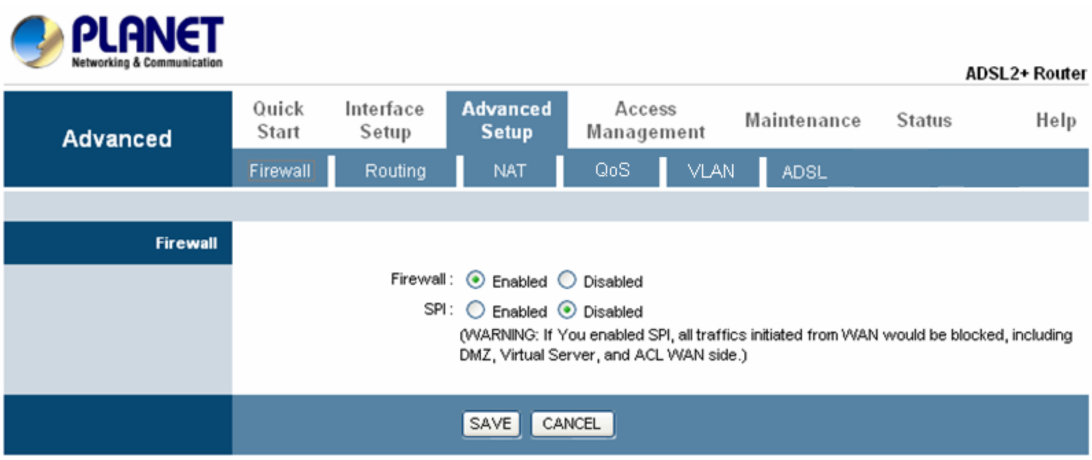
Parameter	**Description**
Active	This router can prevent the wireless clients from accessing the wireless network by checking the MAC Address of the clients. If you enable this function, please set the MAC Address of the wireless clients that you want to filter.
Action	▪ Allow Association – Only allow the wireless clients with the MAC Address you have specified can access to the router. ▪ Deny Association – The wireless clients with the MAC Address you have specified will be denied accessing to the router.
Mac Address #1-8	Please enter the MAC Address of the wireless clients for the filtering control.

3.5 Advanced Setup

3.5.1 Firewall

Go to **Advance Setup**-> **Firewall** to set firewall rule.

User can enable or disable firewall feature of the ADSL router in the page.



Firewall : ● Enabled ○ Disabled

SPI : ○ Enabled ● Disabled

(WARNING: If You enabled SPI, all traffics initiated from WAN would be blocked, including DMZ, Virtual Server, and ACL WAN side.)

The following table describes the labels in this screen.

Parameter	**Description**
Firewall	Select this option can automatically detect and block Denial of Service (DoS) attacks, such as Ping of Death, SYN Flood, Port Scan and Land Attack.
SPI	Select this option to "**Enabled**" or "**Disabled**" the SPI feature. (**NOTE**: If you enable SPI, all traffics initiate from WAN would be blocked, including DMZ, Virtual Server, and ACL WAN side)

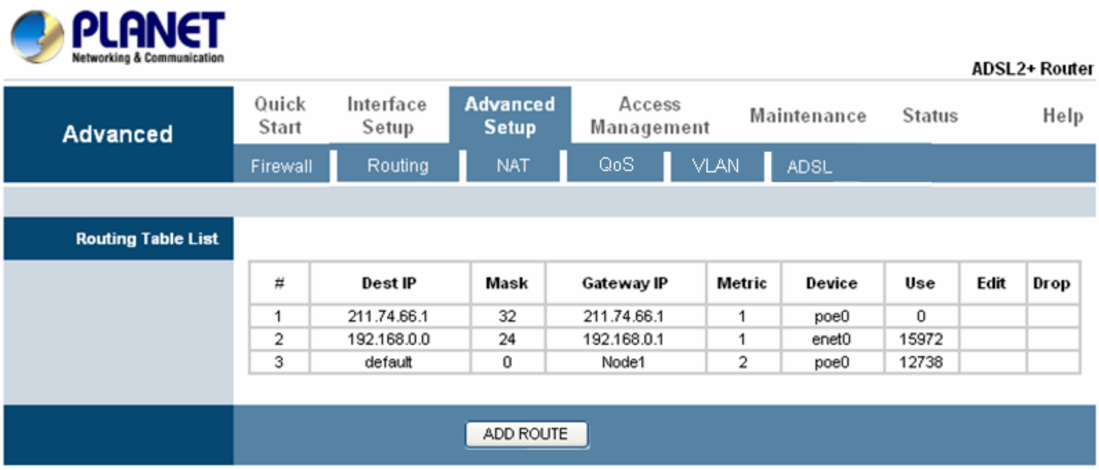
3.5.2 Routing

3.5.2.1 Static Routing

Go to **Advance Setup-> Routing** to see the Routing Table

Routing Table List

This table lists IP address of Internet destinations commonly accessed by your network. When a computer requests to send data to a listed destination, the device uses the Gateway IP to identify the first Internet router it should contact to route the data most efficiently. Select this option will list the routing table information. You can press **ADD ROUTE** to edit the static route. (As below screen)



#	Dest IP	Mask	Gateway IP	Metric	Device	Use	Edit	Drop
1	211.74.66.1	32	211.74.66.1	1	poe0	0		
2	192.168.0.0	24	192.168.0.1	1	enet0	15972		
3	default	0	Node1	2	poe0	12738		

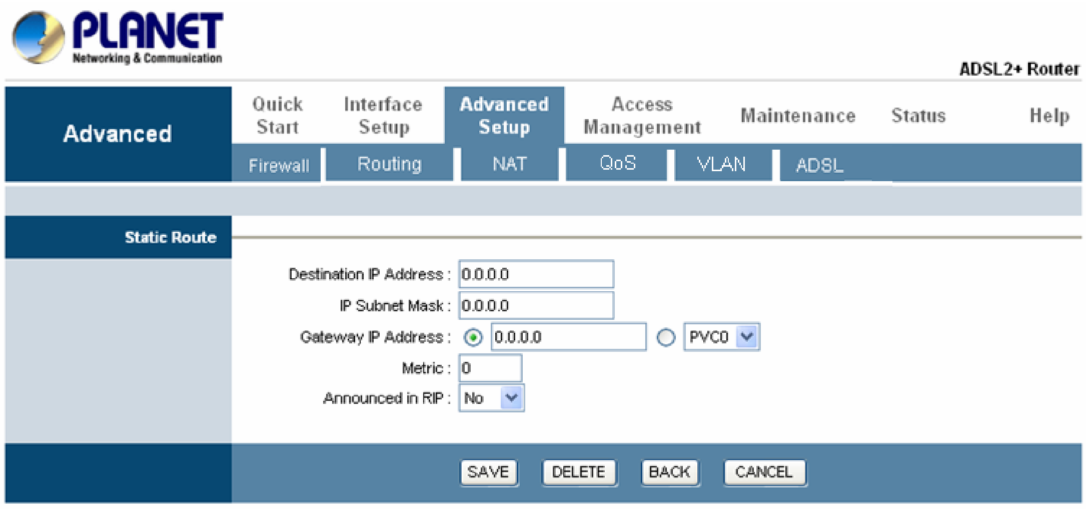
The following table describes the labels in this screen.

Parameter	**Description**
Dest IP	Show the IP Address of the destination LAN.
Mask	Show the Subnet Mask of the destination LAN. If it shows "8" that means the Subnet Mask is "255.0.0.0"; "16" means the Subnet Mask is "255.255.0.0"; "24" means the Subnet Mask is "255.255.255.0".
Metric	The number of hops (routers) to pass through to reach the destination LAN. It must be between 1 and 15.

Device	Show the interface that go to the next hop (router), such as LAN port.
Use	The counter for access time.
Edit	Edit the route, this icon is not shown for system default route.
Drop	Drop the route, this icon is not shown for system default route.

[Add Route]

Select this option to set Static Routing information.



Destination IP Address : 0.0.0.0

IP Subnet Mask : 0.0.0.0

Gateway IP Address : ● 0.0.0.0 ○ PVC0

Metric : 0

Announced in RIP : No

The following table describes the labels in this screen.

Parameter	**Description**
Destination IP Address:	This parameter specifies the IP network address of the final destination of packets routed by this rule.
IP Subnet Mask	Enter the subnet mask for this destination.
Gateway IP Address	Enter the IP address of the gateway. A gateway does the actual forwarding of the packets. Enter the gateway’s IP address in the field or select which PVC you wish to act as a gateway.
Metric	Metric represents the "**cost**" of transmission for routing purposes. IP Routing uses hop count as the measurement of cost, with a minimum of 1 for

	directly connected networks. Enter a number that approximates the cost for this link. The number need not to be precise, but it must between 1 and 15. In practice, 2 or 3 is usually a good number.
Announced in RIP	This parameter determines if the ADSL router includes the router to this remote node in its RIP broadcasts. If you choose "**Yes**", the router in this remote node will be propagated to other hosts through RIP broadcasts. If you choose "**No**", this route is kept private and is not included in the RIP broadcasts.

When you are done making changes, click on **SAVE** to save your changes, **DELETE** to delete the rule with the parameters you set, **BACK** to return to the previous screen or **CANCEL** to exit without saving.

3.5.2.2 Dynamic Routing

Go to **Interface Setup** -> **LAN** to select the Dynamic Route from **RIP1**, **RIP2-B**, and **RIP2-M.**

Explaining RIP Setup

Routing **I**nformation **P**rotocol (RIP) allows a router to exchange routing information with other routers. The RIP Direction field controls how RIP packets are allowed to enter and leave the router. Selecting **Both** means the router will broadcast its routing table and incorporate the RIP information that it receives.

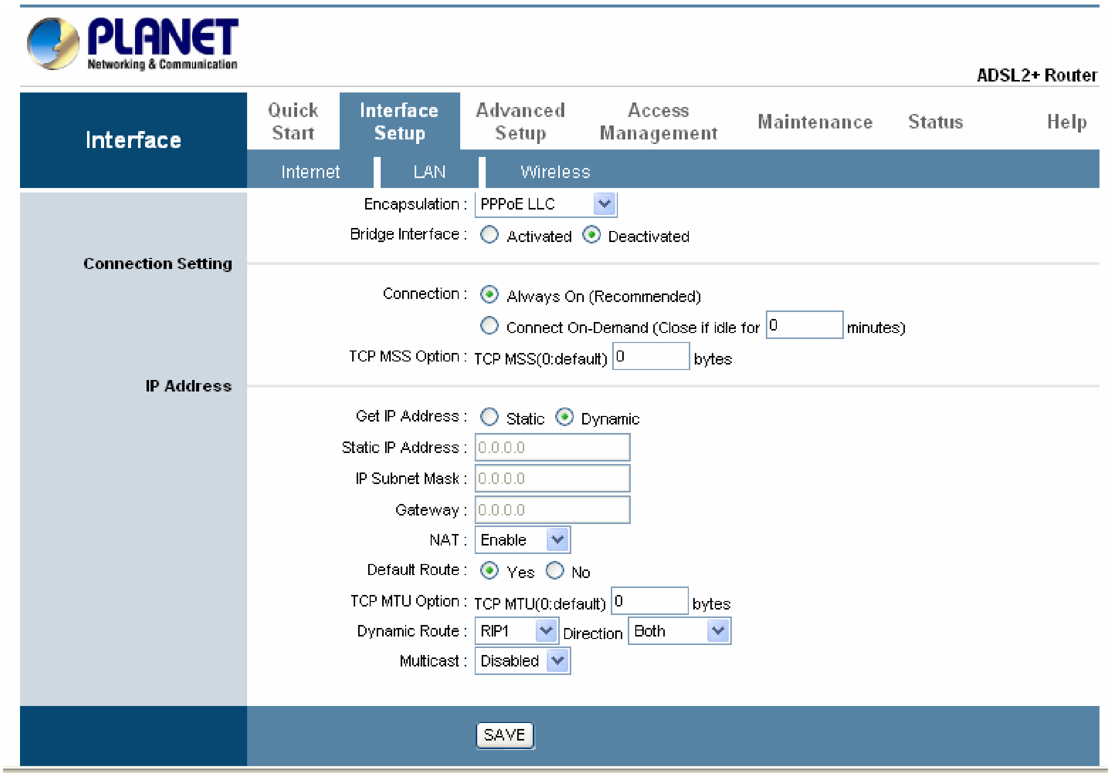
Selecting **In Only** means the router will only accept RIP packets received, not send RIP packets. Selecting **Out Only** means the router will only send RIP packets, not accept any RIP packets received. Selecting **None** means the router will not send any RIP packets nor will it accept any RIP packets received.

The Dynamic Route field controls the format and the broadcasting method of RIP packets that the router sends. It recognizes both formats when receiving packets.

RIP-1 is universally supported, but RIP-2 carries more information. RIP-1 is adequate for most networks. Only consider RIP-2 if your network has unusual topology.

Both RIP-2B and RIP-2M sends the routing data in RIP-2 format. RIP-2B uses subnet broadcasting while RIP-2M uses multicasting.

- Direction: Select the RIP direction from None, Both, In Only and Out Only.
- Multicast: IGMP (Internet Group Multicast Protocol) is a session-layer protocol used to establish membership in a multicast group. The ADSL router supports both IGMP-v1 and IGMP-v2. Select **None** to disable it.



Encapsulation : PPPoE LLC

Bridge Interface : ○ Activated ● Deactivated

Connection : ● Always On (Recommended)

○ Connect On-Demand (Close if idle for 0 minutes)

TCP MSS Option : TCP MSS(0:default) 0 bytes

Get IP Address : ○ Static ● Dynamic

Static IP Address : 0.0.0.0

IP Subnet Mask : 0.0.0.0

Gateway : 0.0.0.0

NAT : Enable

Default Route : ● Yes ○ No

TCP MTU Option : TCP MTU(0:default) 0 bytes

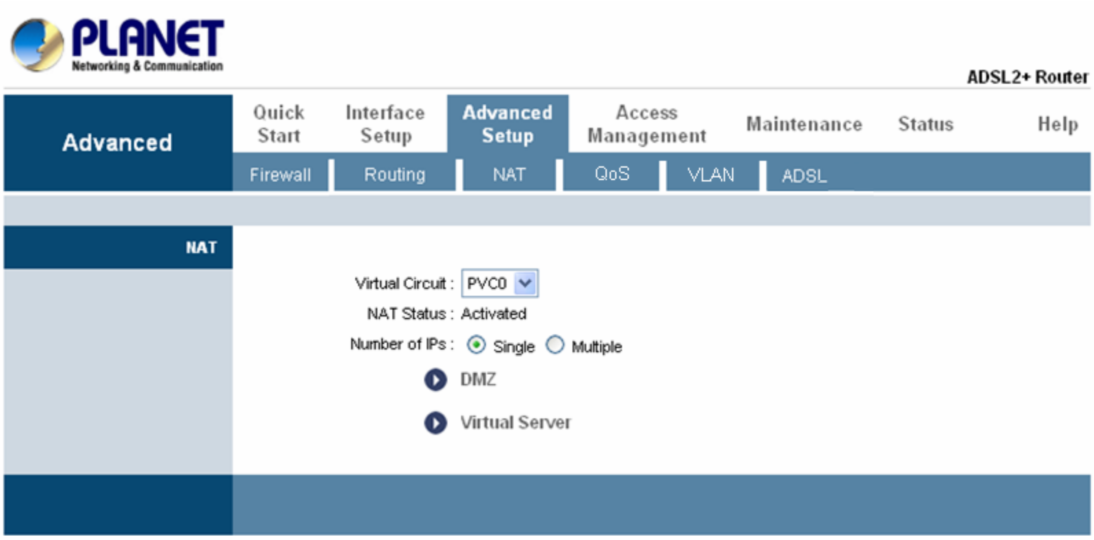
Dynamic Route : RIP1 Direction Both

Multicast : Disabled

3.5.3 NAT Setting

Go to **Advanced Setup->NAT** to setup the NAT features.

Network Address Translation (NAT) is a method for disguising the private IP addresses you use on your LAN as the public IP address you use on the Internet. You define NAT rules that specify exactly how and when to translate between public and private IP addresses. Simply select this option to setup the NAT function for your ADSL router.



Virtual Circuit : PVC0

NAT Status : Activated

Number of IPs : ● Single ○ Multiple

The following table describes the labels in this screen.

Parameter	**Description**
Virtual Circuit (VC)	The Virtual Circuit (VC) properties of the ATM VC interface identify a unique path that your ADSL/Ethernet router uses to communicate via the ATM-based network with the telephone company central office equipment. Please select the channel (PVC) you want to configure.
NAT Status	This filed shows the current status of the NAT function for the current VC.
Number of IPs	Select "**Single**" if you only have a public IP Address. Select "**Multiple**" if you have multiple IP Addresses.

Note: For VCs with single IP, they share the same DMZ & Virtual servers; for VCs with multiple IPs, each VC cab set DMZ and Virtual servers. Furthermore, for VCs with multiple IPs, they can define the Address Mapping rules; for VCs with single IP, since they have only one IP, there is no need to individually define the Address Mapping rule.

What NAT Does

NAT changes the source IP address in a packet received from a subscriber (the inside local address) to another (the inside global address) before forwarding the packet to the

WAN side. When the response comes back, NAT translates the destination address (the inside global address) back to the inside local address before forwarding it to the original inside host. Note that the IP address (either local or global) of an outside host is never changed.

The global IP addresses for the inside hosts can be either static or dynamically assigned by the ISP. You may also designate servers, such as a Web server and a telnet server, on your local network and make them accessible to the outside world. With no servers defined, your ROUTER filters out all incoming inquiries, thus preventing intruders from probing your network. For more information on IP address translation, refer to RFC 1631, The IP Network Address Translator (NAT).

Inside/outside indicates where a host is located relative to the ROUTER. The computers hosts of your LAN are inside, while the Web servers on the Internet are outside.

Global/local indicates the IP address of a host in a packet as the packet traverses a router. The local address refers to the IP address of a host when the packet is in the local network, while the global address refers to the IP address of the host when the same packet is traveling in the WAN side.

Note that inside/outside refers to the location of a host, while global/local refers to the IP address of a host used in a packet. Thus, an inside local address (ILA) is the IP address of an inside host of a packet when the packet is still in the local network, while an inside global address (IGA) is the IP address of the same inside host when the packet is on the WAN side.

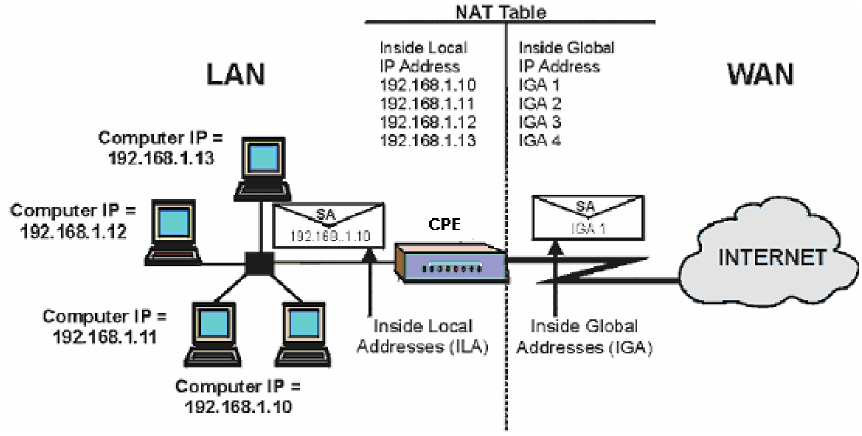
The following table summarizes this information.

ITEM	DESCRIPTION
Inside	This refers to the host on the LAN.
Outside	This refers to the host on the WAN.
Local	This refers to the packet address (source or destination) as the packet travels on the LAN.
Global	This refers to the packet address (source or destination) as the packet travels on the WAN.

How NAT Works

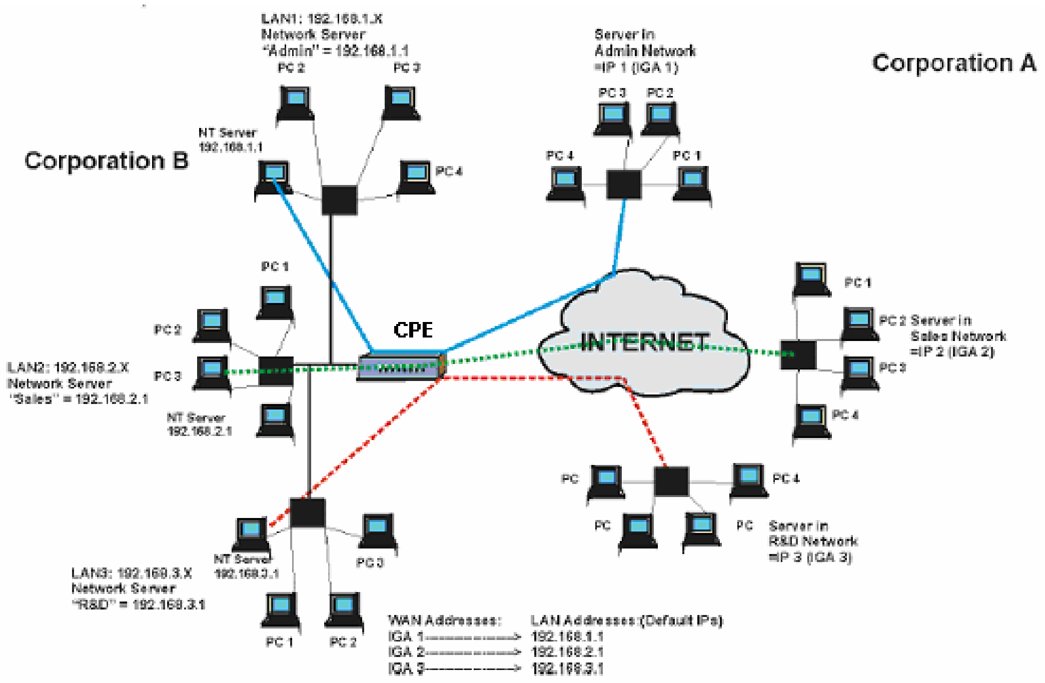
Each packet has two addresses – a source address and a destination address. For outgoing packets, the ILA is the source address on the LAN, and the IGA is the source address on the WAN. For incoming packets, the ILA is the destination address on the LAN, and the IGA is the destination address on the WAN. NAT maps private (local) IP addresses to globally unique ones required for communication with hosts on other networks. It replaces the original IP source address (and TCP or UDP source port numbers for Many-to-One and Many-to-Many Overload NAT mapping) in each packet and then forwards it to the Internet. The ROUTER keeps track of the original addresses and port numbers so incoming reply packets can have their original values restored.

The following figure illustrates this.



NAT Application

The following figure illustrates a possible NAT application, where three inside LANs (logical LANs using IP Alias) behind the router can communicate with three distinct WAN networks. More examples follow at the end of this chapter.



NAT Mapping Types

NAT supports five types of IP/port mapping. They are:

a. **One-to-One**: In One-to-One mode, the TC3162 EVM maps one local IP address to one global IP address.

b. **Many-to-One**: In Many-to-One mode, the TC3162 EVM maps multiple local IP addresses to one global IP address.

c. **Many-to-Many Overload**: In Many-to-Many Overload mode, the TC3162 EVM maps multiple local IP addresses to shared global IP addresses.

d. **Many-to-Many No Overload**: In Many-to-Many No Overload mode, the TC3162 EVM maps each local IP address to a unique global IP address.

e. **Server**: This type allows you to specify inside servers of different services behind the NAT to be accessible to the outside world.

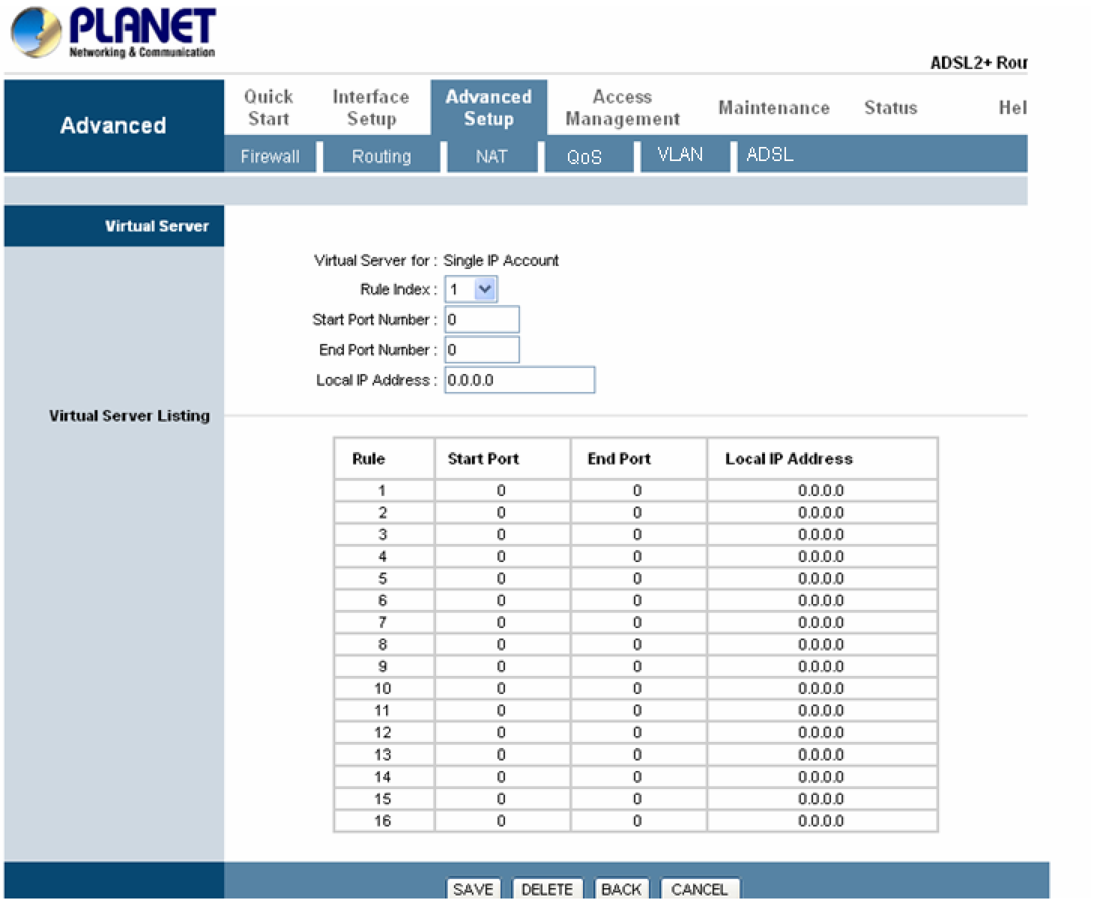
The following table summarizes these types.

TYPE	IP MAPPING
One-to-One	ILA1 IGA1
Many-to-One (SUA/PAT)	ILA1 IGA1 ILA2 IGA1 …
Many-to-Many Overload	ILA1 IGA1 ILA2 IGA2 ILA3 IGA1 ILA4 IGA2 …
Many-to-Many No Overload	ILA1 IGA1 ILA2 IGA2 ILA3 IGA3 …
Server	Server 1 IP IGA1 Server 2 IP IGA1 Server 3 IP IGA1

3.5.3.1 Virtual Server

Go to **Advanced Setup ->NAT -> Virtual Server** to set virtual server as you need. (known as Port Mapping).

Use the Virtual Server function when you want different servers/clients in your LAN to handle different service/Internet application type (e.g. Email, FTP, Web server etc.) from the Internet. Computers use numbers called port numbers to recognize a particular service/Internet application type. The Virtual Server allows you to re-direct a particular service port number (from the Internet/WAN) to a particular LAN private IP Address and its service port number.



Virtual Server for : Single IP Account
Rule Index : 1
Start Port Number : 0
End Port Number : 0
Local IP Address : 0.0.0.0

Rule	Start Port	End Port	Local IP Address
1	0	0	0.0.0.0
2	0	0	0.0.0.0
3	0	0	0.0.0.0
4	0	0	0.0.0.0
5	0	0	0.0.0.0
6	0	0	0.0.0.0
7	0	0	0.0.0.0
8	0	0	0.0.0.0
9	0	0	0.0.0.0
10	0	0	0.0.0.0
11	0	0	0.0.0.0
12	0	0	0.0.0.0
13	0	0	0.0.0.0
14	0	0	0.0.0.0
15	0	0	0.0.0.0
16	0	0	0.0.0.0

The Virtual Server is the server or server(s) behind NAT (on the LAN), for example, Web server or FTP server, that you can make visible to the outside world even though NAT makes your whole inside network appear as a single machine to the outside world.

The following table describes the labels in this screen.

Parameter	Description
Virtual Server for	Show the Virtual Server setting is for single or multiple IP Addresses.
Rule Index	Choose the rule number.
Application	Select the application of the virtual server, for example: FTP or HTTP Server. When the application is selected, the port number for the application will be assigned automatically.
Start & End port number	Enter the specific Start and End Port number you want to forward. If it is one port only, you can enter the End port number the same as Start port number. For example, set the FTP Virtual server, you can set the start and end port number to 21.
Local IP Address	Enter the IP Address for the Virtual Server in LAN side.
Virtual Server Listing	This is a listing of all virtual servers your have set.

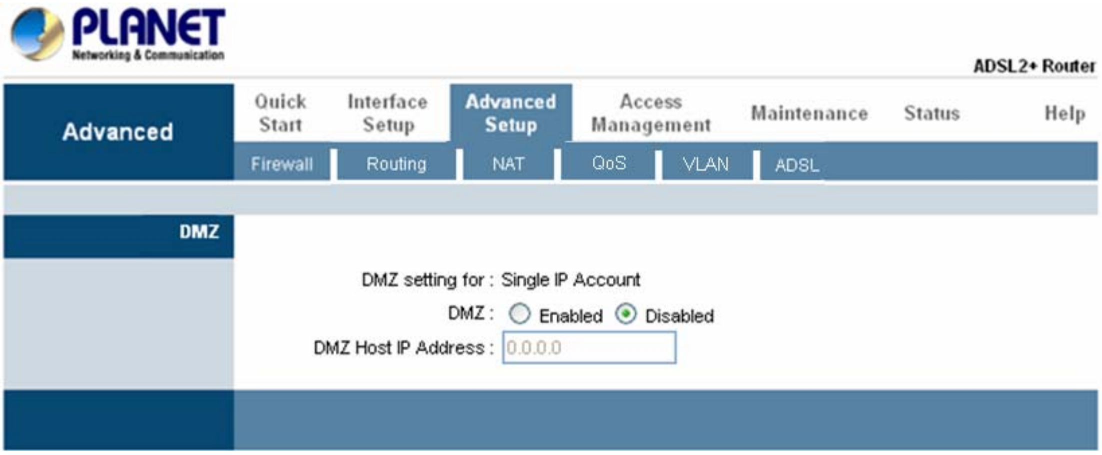
When you are done making changes, click on **SAVE** to save your changes, **DELETE** to delete the rule with the parameters you set, **BACK** to return to the previous screen or **CANCEL** to exit without saving.

3.5.3.2 DMZ Setting

Go to **Advanced Setup ->NAT -> DMZ** to set DMZ parameters.

A ***DMZ*** (de-militarized zone) is a host between a private local network and the outside public network. It prevents outside users from getting direct access to s server that has company data. Users of the public network outside the company can access only the DMZ host.

For example, if you have a local client PC that cannot run an Internet application (e.g. Games) properly from behind the NAT firewall, then you can open the client up to unrestricted two-way Internet access by defining a DMZ Host.



DMZ setting for : Single IP Account

DMZ : ○ Enabled ● Disabled

DMZ Host IP Address : 0.0.0.0

The following table describes the labels in this screen.

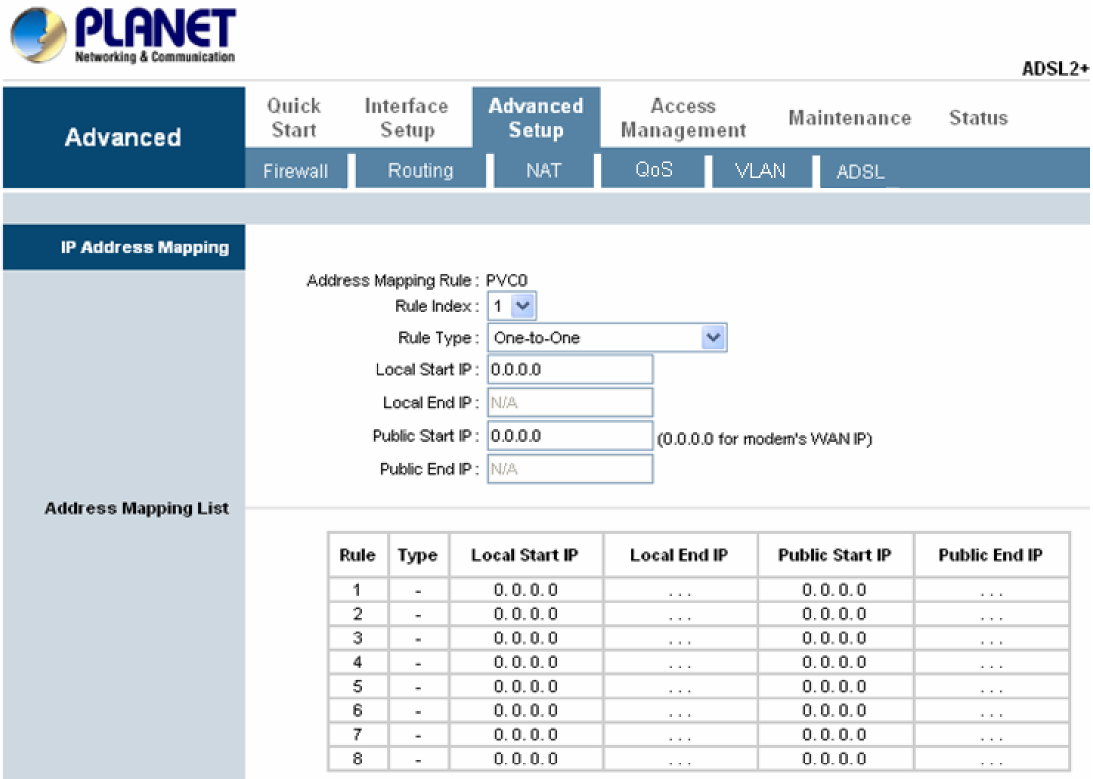
Parameter	**Description**
DMZ setting for	Show the DMZ setting is for single or multiple IP Addresses.
DMZ	Enable or disable the DMZ function.
DMZ Host IP Address	Enter a static IP Address to the DMZ Host. This IP Address will be exposed to the Internet.

When you are done making changes, click on **SAVE** to save your changes or on **BACK** to return to the previous screen.

3.5.3.3 IP Address Mapping

Go to **Advanced Setup ->NAT -> Multiple ->IP Address mapping** to set IP Address mapping parameters.

The IP Address Mapping is for those VCs that with multiple IPs. The IP Address Mapping rule is per-VC based. (Only for Multiple IPs' VCs).



Address Mapping Rule : PVC0
Rule Index : 1
Rule Type : One-to-One
Local Start IP : 0.0.0.0
Local End IP : N/A
Public Start IP : 0.0.0.0 (0.0.0.0 for modem's WAN IP)
Public End IP : N/A

Rule	Type	Local Start IP	Local End IP	Public Start IP	Public End IP
1	-	0.0.0.0	...	0.0.0.0	...
2	-	0.0.0.0	...	0.0.0.0	...
3	-	0.0.0.0	...	0.0.0.0	...
4	-	0.0.0.0	...	0.0.0.0	...
5	-	0.0.0.0	...	0.0.0.0	...
6	-	0.0.0.0	...	0.0.0.0	...
7	-	0.0.0.0	...	0.0.0.0	...
8	-	0.0.0.0	...	0.0.0.0	...

The following table describes the labels in this screen.

Parameter	**Description**
Address Mapping Rule	Show the Address Mapping for single or multiple IP Addresses.
Rule Index	Choose the rule number.
Rule Type	There are 4 types of **One-to-One, Many-to-One, Many-to-Many Overload**, and **Many-to Many No-Overload.**
Local Start & End IP	Enter the local IP address you plan to map to. Local Start IP is the starting local IP address & Local End IP is the ending local IP address. If the rule is for all local IPs, then the Start IP is 0.0.0.0 and the End IP is 255.255.255.255.
Public Start & End IP	Enter the Public IP Address you want to do NAT. Public Start IP is the starting Public IP Address and Public End IP is the ending Public IP Address. If you have a Dynamic IP, enter 0.0.0.0 as the Public Start IP.

Address Mapping Server Listing	This is a listing of all virtual servers your have set.

When you are done making changes, click on **SAVE** to save your changes, **DELETE** to delete the rule with the parameters you set, **BACK** to return to the previous screen or **CANCEL** to exit without saving.

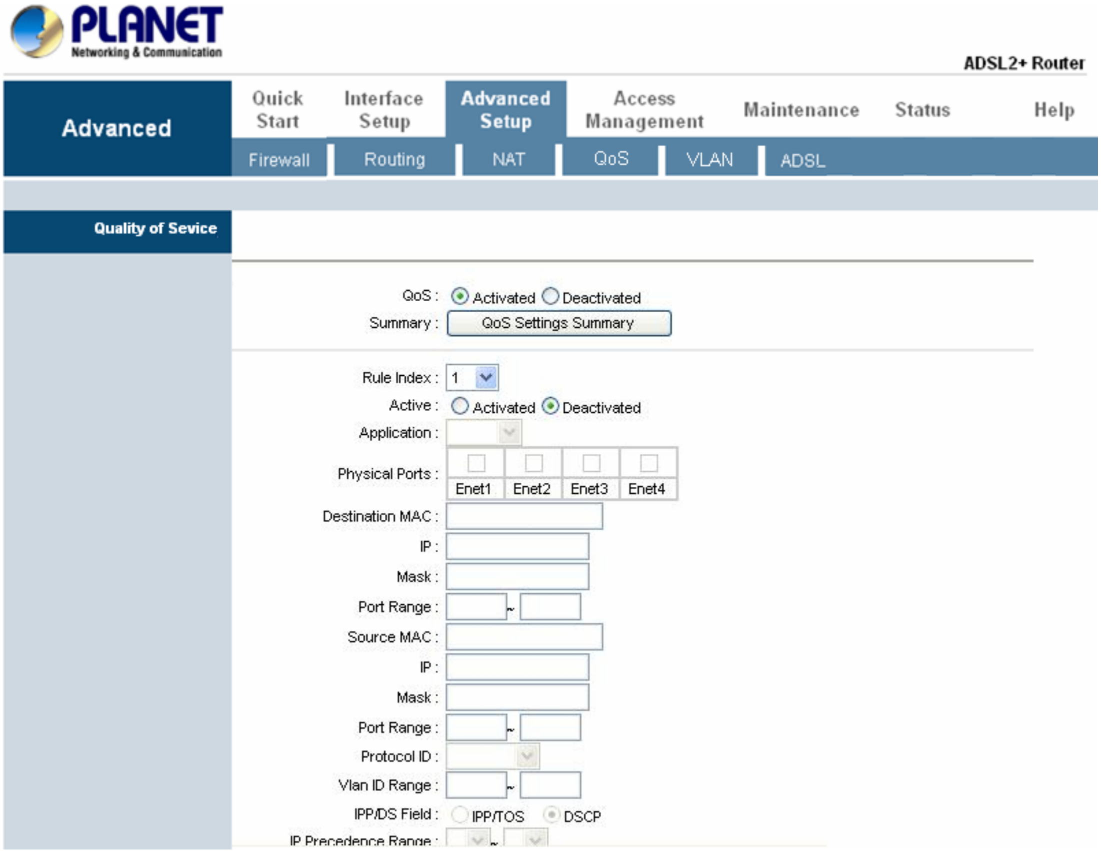
3.5.4 QoS

Go to **Advanced Setup ->QoS** to set up Qos settings.

Quality of Service (QoS) helps to prioritize data as it enters your router. By attaching special identification marks or headers to incoming packets, QoS determines which queue the packets enter, based on priority. This is useful when there are certain types of data you want to give higher priority to, such as voice data packets given higher priority than Web data packets.

The main goal of QoS is prioritizing incoming data, preventing data loss due to factors such as jitter, delay and dropping. Another important aspect of QoS is ensuring that prioritizing one data flow doesn’t interfere with other data flows.

QoS can be toggled Activated and Deactivated. QoS must be activated before you can edit the following options. When you are done making changes, click on SAVE to save your changes.



QoS : ● Activated ○ Deactivated

Summary : QoS Settings Summary

Rule Index : 1

Active : ○ Activated ● Deactivated

Application :

Physical Ports : □ Enet1 □ Enet2 □ Enet3 □ Enet4

Destination MAC :

IP :

Mask :

Port Range : ~

Source MAC :

IP :

Mask :

Port Range : ~

Protocol ID :

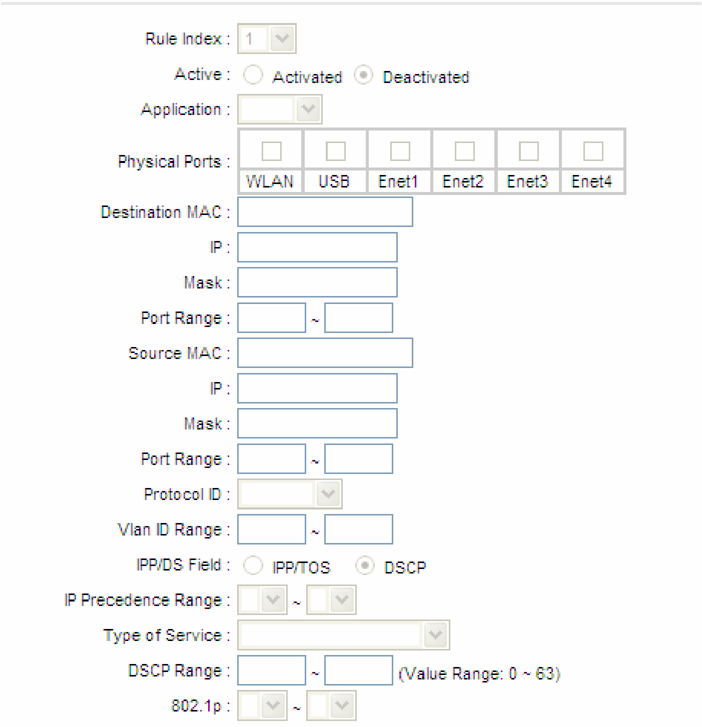
Vlan ID Range : ~

IPP/DS Field : ○ IPP/TOS ● DSCP

IP Precedence Range : ~

3.5.4.1 Rule

You can set 16 different QoS rules. Each QoS rule has its detail setting conditions like: 802.1p, application, DSCP, IP, MAC, Protocol, TOS, VLAN…etc, you can modify the default value to any new one you wish. Please notice that only when the packet fulfill every detail setting conditions here, then this packet will be remarked as the priority queue of each rule. The non-selected setting part will be treated as “don’t care” and the system will not handle this setting part. If the original packet does not have 802.1q tagged header, system will not add header for this packet even the detail setting condition has adding 802.1p priority ability.



Rule Index : 1

Active : ○ Activated ● Deactivated

Application :

Physical Ports : □ WLAN □ USB □ Enet1 □ Enet2 □ Enet3 □ Enet4

Destination MAC :

IP :

Mask :

Port Range : ~

Source MAC :

IP :

Mask :

Port Range : ~

Protocol ID :

Vlan ID Range : ~

IPP/DS Field : ○ IPP/TOS ● DSCP

IP Precedence Range : ~

Type of Service :

DSCP Range : ~ (Value Range: 0 ~ 63)

802.1p : ~

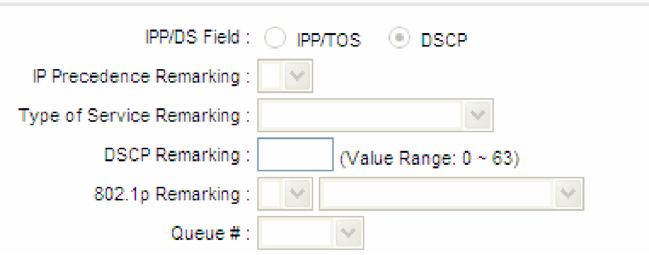
The following table describes the labels in this screen.

Parameters	**Description**
Rule Index	Select 16 different rules, each rule's detail can be set and saved
Active	Select QoS is activated or deactivated
Application	Select 11 different applications: IGMP, SIP, H.323, MGCP, SNMP, DNS, DHCP, RIP, RSTP, RTCP, RTP
Physical Ports	Once you select the application, the associated ports will be displayed
Destination MAC	Set the Ethernet MAC value that you want to filter in destination side
Destination IP	Set the IP address value that you want to filter in destination side
Destination Mask	Set the subnet mask value that you want to filter in destination side
Destination Port Range	Set the port range value that you want to filter in destination side
Source MAC	Set the Ethernet MAC value that you want to filter in source side
Source IP	Set the IP address value that you want to filter in source side

Source Mask	Set the subnet mask value that you want to filter in source side
Source Port Range	Set the port range value that you want to filter in source side
Protocol ID	Set the protocol ID type that you want to filter
Vlan ID Range	Set the VLAN value that you want to filter
IPP/DS Field	Select IP QoS format
IP Precedence Range	Select the IP precedence range
Type of Service	Select 5 different type of service
DSCP Range	Set the DSCP value that you want to filter
802.1p	Set the remarked new 802.1p priority value on the packet that fulfill every detail setting condition of each rule

3.5.4.2 Action

After finishing all rules detail condition setting, select the rule you want to execute and action here.



IPP/DS Field : ○ IPP/TOS ● DSCP

IP Precedence Remarking :

Type of Service Remarking :

DSCP Remarking : (Value Range: 0 ~ 63)

802.1p Remarking :

Queue # :

The following table describes the labels in this screen.

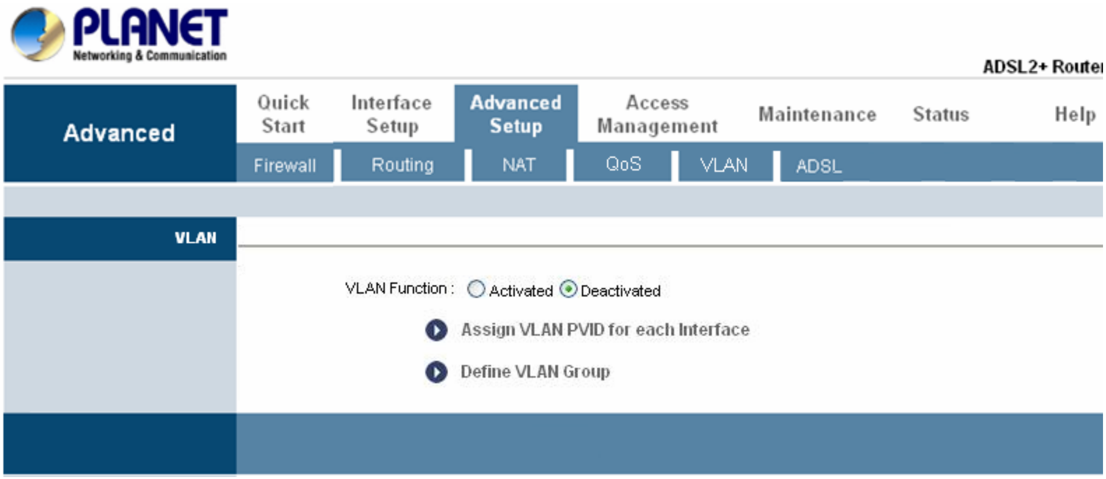
Parameter	Description
IPP/DS Field	Select IP QoS format
IP Precedence Remarking	Select the remarking value of IP precedence
Type of service Remarking	Select the remarking value of type of service
DSCP Remarking	Select the remarking value of DSCP
802.1p Remarking	Select the remarking value of 802.1p
Queue #	Select four types of Queue: Low, Medium, High, Highest

3.5.5 VLAN

Go to **Advanced Setup ->VLAN** to set VLAN settings.

A Virtual LAN (VLAN) is a switched network logically segmented by functions, project teams, or applications; the physical location of VLAN members is unimportant. VLANs allow ports on the same or different switches to be grouped so that traffic is confined to members of only that group. In high-traffic networks, VLANs can reduce the amount of data sent to unnecessary destinations.

VLAN can be toggled Activated or Deactivated. Note that VLAN must be activated before you can access the next two screens.



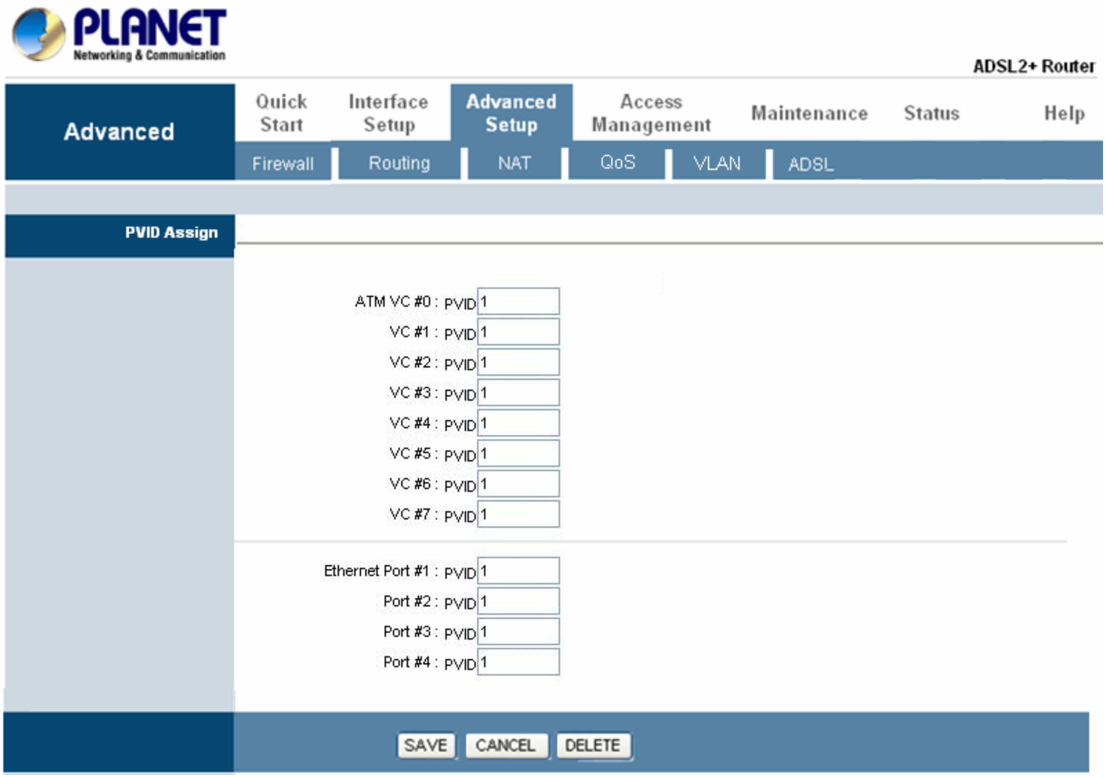
VLAN Function : ○ Activated ● Deactivated

Assign VLAN PVID for each Interface

Define VLAN Group

Click on Assign VLAN PVID for each Interface or Define VLAN group to open the respective screens.

3.5.5.1 Assign VLAN PVID For Each Interface



ATM VC #0 : PVID 1
VC #1 : PVID 1
VC #2 : PVID 1
VC #3 : PVID 1
VC #4 : PVID 1
VC #5 : PVID 1
VC #6 : PVID 1
VC #7 : PVID 1

Ethernet Port #1 : PVID 1
Port #2 : PVID 1
Port #3 : PVID 1
Port #4 : PVID 1

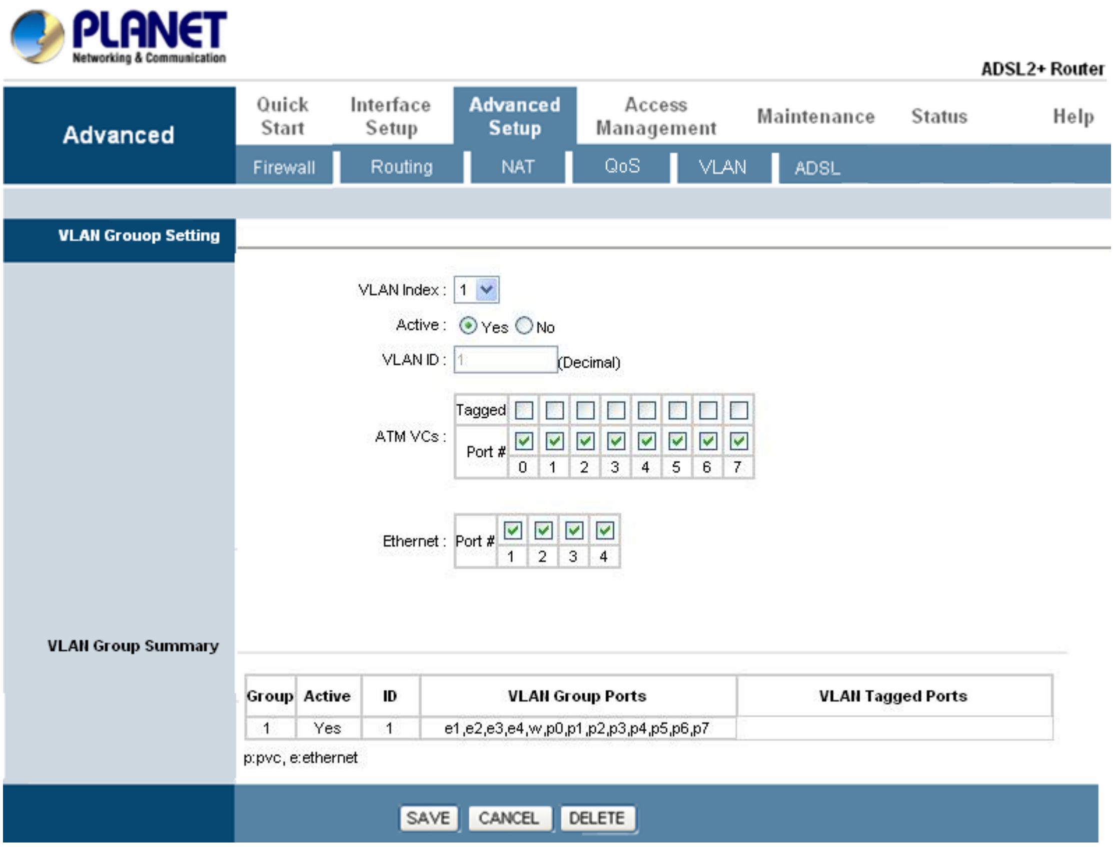
The following table describes the labels in this screen.

Parameter	Description
ATM VC #0: PVID	Enter the PVID number you wish to assign to ATM VC#0
VC #1: PVID	Enter the PVID number you wish to assign to ATM VC#1
VC #2: PVID	Enter the PVID number you wish to assign to ATM VC#2
VC #3: PVID	Enter the PVID number you wish to assign to ATM VC#3
VC #4: PVID	Enter the PVID number you wish to assign to ATM VC#4
VC #5: PVID	Enter the PVID number you wish to assign to ATM VC#5
VC #6: PVID	Enter the PVID number you wish to assign to ATM VC#6
VC #7: PVID	Enter the PVID number you wish to assign to

	ATM VC#7
Ethernet Port #1: PVID	Enter the PVID number you wish to assign to Ethernet Port #1
Ethernet Port #2: PVID	Enter the PVID number you wish to assign to Ethernet Port #2
Ethernet Port #3: PVID	Enter the PVID number you wish to assign to Ethernet Port #3
Ethernet Port #4: PVID	Enter the PVID number you wish to assign to Ethernet Port #4
USB: PVID	Enter the PVID number you wish to assign to USB
WLAN: PVID	Enter the PVID number you wish to assign to WLAN

When you are done making changes, click on **SAVE** to save your changes, **CANCEL** to exit without saving or **NEXT** to continue to the next screen.

3.5.5.2 Define VLAN Group



VLAN Index : 1

Active : ● Yes ○ No

VLAN ID : 1 (Decimal)

ATM VCs :

Tagged	□	□	□	□	□	□	□	□
Port #	☑	☑	☑	☑	☑	☑	☑	☑
	0	1	2	3	4	5	6	7

Ethernet :

Port #	☑	☑	☑	☑
	1	2	3	4

Group	Active	ID	VLAN Group Ports	VLAN Tagged Ports
1	Yes	1	e1,e2,e3,e4,w,p0,p1,p2,p3,p4,p5,p6,p7	

p:pvc, e:ethernet

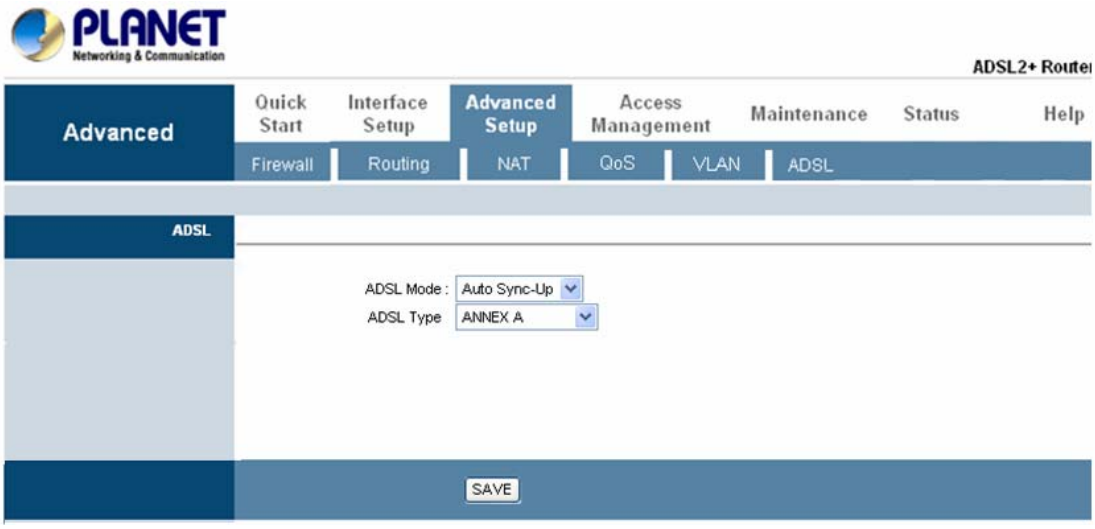
The following table describes the labels in this screen.

Parameter	Description
VLAN Index	The number of the index is determined by the model or IC.
Active	Toggle this index on or off with Yes and No, respectively.
VLAN ID	Enter the VLAN ID number.
ATM VCs	Checking the Tagged and Port # boxes for each port number will add a tag to let other devices know if they need to check the packet and allow the packet through to the port in question, respectively.
Ethernet	Checking the Tagged and Port # boxes for each port number will add a tag to let other devices know if they need to check the packet and allow the packet through to the port in question, respectively.
USB	Checking the Tagged and Port # box will add a tag to let other devices know if they need to check the packet and allow the packet through to the port in question, respectively.
Wireless LAN	Checking the Tagged and Port # box will add a tag to let other devices know if they need to check the packet and allow the packet through to the port in question, respectively.

When you are done making changes, click on **SAVE** to save your changes, **DELETE** to delete the rule with the parameters you set or **CANCEL** to exit without saving.

3.5.6 ADSL

Go to **Advanced Setup ->ADSL** to set different ADSL connection



ADSL Mode : Auto Sync-Up

ADSL Type ANNEX A

The following table describes the labels in this screen.

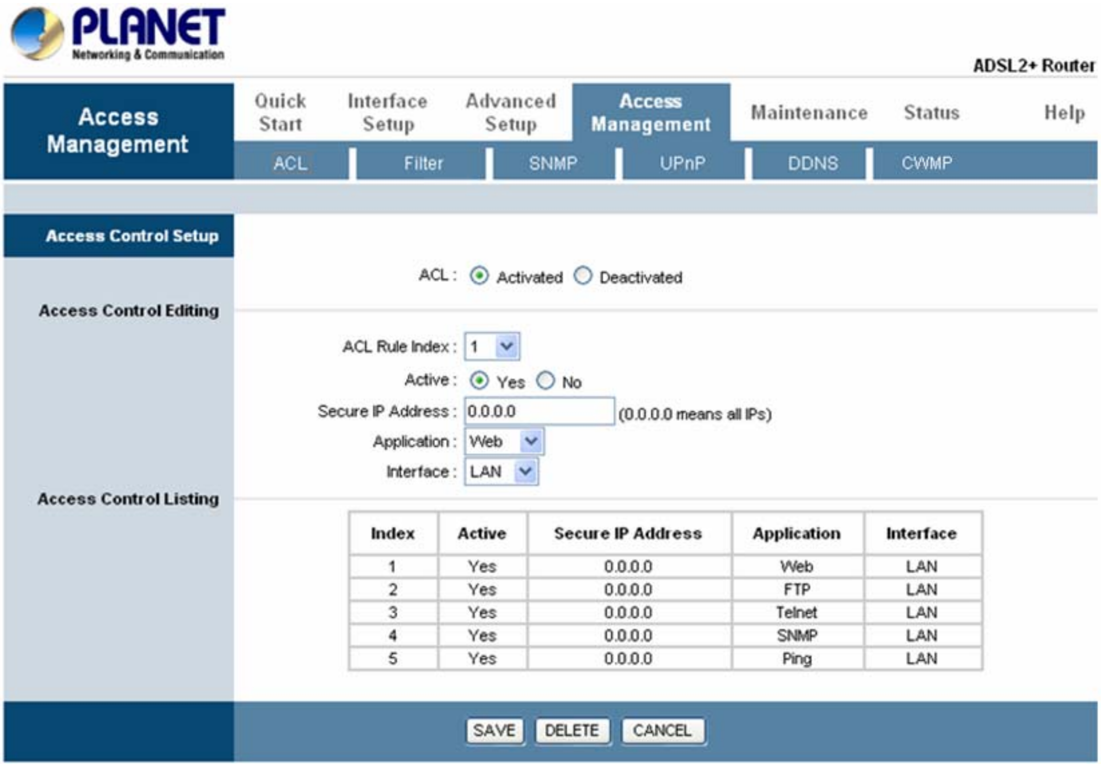
Parameter	Description
ADSL Mode	The default setting is “**Auto Sync-Up**”. This mode will automatically detect the ADSL mode including **ADSL2+**, **ADSL2**, **G.DMT**, **T1.413** and **G.lite**. If you are not sure how to select the ADSL mode, please contact with your ISP.
ADSL Type	Select the ADSL type you use from the dropdown list. ANNEX A, ANNEX I, ANNEX A/L, ANNEX M, ANNEX A/I/J/L/M

3.6 Access Management

3.6.1 ACL

Go to **Access Management -> ACL** to enable remote management.

Access Control Listing (ACL) is a management tool that acts as a filter for incoming or outgoing packets, based on application. You may use telnet or Web to remotely manage the ADSL Router. User just needs to enable Telnet or Web and give it an IP address that wants to access the ADSL Router. The default IP 0.0.0.0 allows any client to use this service to remotely manage the ADSL Router.



Access Control Setup

ACL : ● Activated ○ Deactivated

Access Control Editing

ACL Rule Index : 1

Active : ● Yes ○ No

Secure IP Address : 0.0.0.0 (0.0.0.0 means all IPs)

Application : Web

Interface : LAN

Access Control Listing

Index	Active	Secure IP Address	Application	Interface
1	Yes	0.0.0.0	Web	LAN
2	Yes	0.0.0.0	FTP	LAN
3	Yes	0.0.0.0	Telnet	LAN
4	Yes	0.0.0.0	SNMP	LAN
5	Yes	0.0.0.0	Ping	LAN

The following table describes the labels in this screen.

Parameter	Description
ACL	There has **Activated** & **Deactivated** option. The default setting is Deactivated which means all IP can access via router. If you choose Activated, you only can access via router by listed IP addresses.

ACL Rule Index:	This is the item number to record the setting rule.
Active	Once you choose "**Yes**" then you can access the IP via router.
Secure IP Address	The default 0.0.0.0~0.0.0.0 allows any user to use this service to remotely manage the router. Type a range of IP Addresses to authorize access to a number of users with matching IP Addresses.
Application	Each of these labels denotes a service that you may use to remotely manage the Router. Choices are **Web**, **FTP**, **Telnet**, **SNMP**, **Ping**, and **ALL**.
Interface	Select the access interface. Choices are WAN, LAN and Both.

3.6.2 Filter

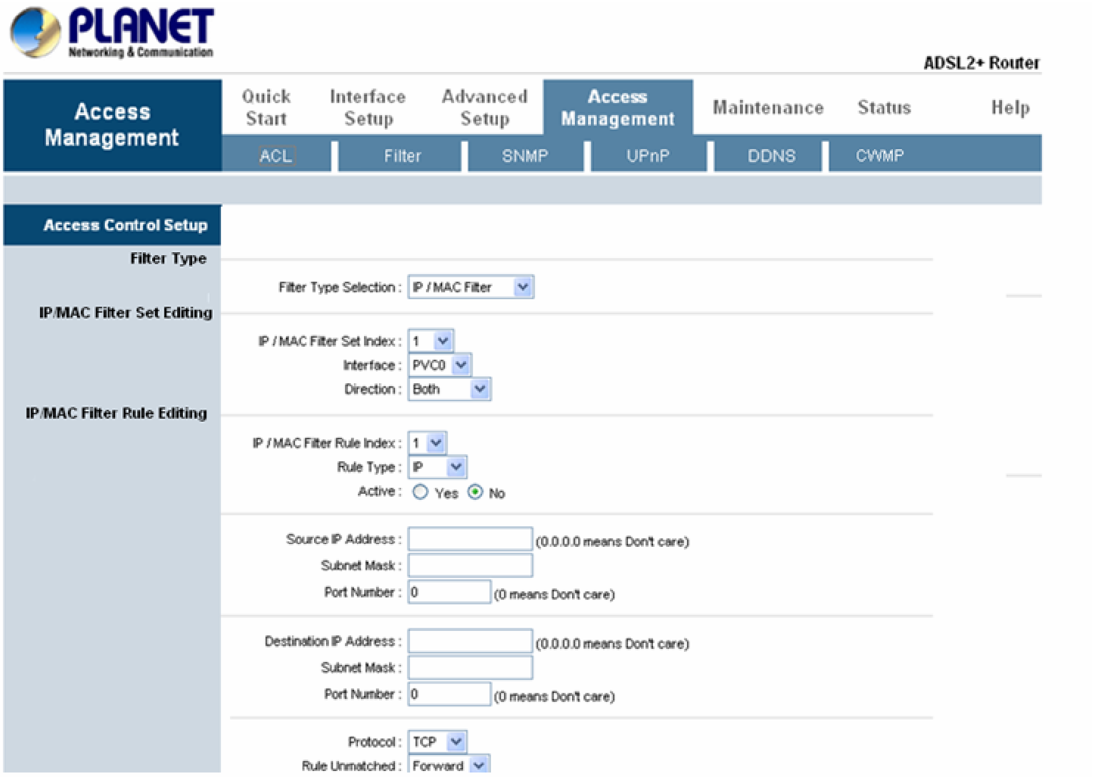
You can forbid some users accessing to the router by filtering the users through IP Address or MAC Address. You can also restrict some applications or URLs be accessing by users through the router here. Please select the filter type to start configuring.

Go to **Access Management -> Filter** to block some packets form WAN.

3.6.2.1 IP/MAC Filter

The Router provides extensive firewall protection by restricting connection parameters to limit the risk of intrusion and defending against a wide array of common hacker attackers. Go to **Access Management** ->**IP/MAC Filter** to set different IP filter rules of a given protocol (TCP, UDP, or ICMP) and a specific direction (incoming, outgoing, or both) to filter the packets.

IP/MAC Filter is a more complex filtering tool, based more on IP and custom rules. Each of the indices can hold six rules, and each interface can have four associated indices, allowing 24 rules per interface. If all six rules in an index are Next rules, the data will be sent to the next index for filtering.



Access Control Setup

Filter Type

Filter Type Selection : IP / MAC Filter

IP/MAC Filter Set Editing

IP / MAC Filter Set Index : 1

Interface : PVC0

Direction : Both

IP/MAC Filter Rule Editing

IP / MAC Filter Rule Index : 1

Rule Type : IP

Active : ○ Yes ● No

Source IP Address : (0.0.0.0 means Don't care)

Subnet Mask :

Port Number : 0 (0 means Don't care)

Destination IP Address : (0.0.0.0 means Don't care)

Subnet Mask :

Port Number : 0 (0 means Don't care)

Protocol : TCP

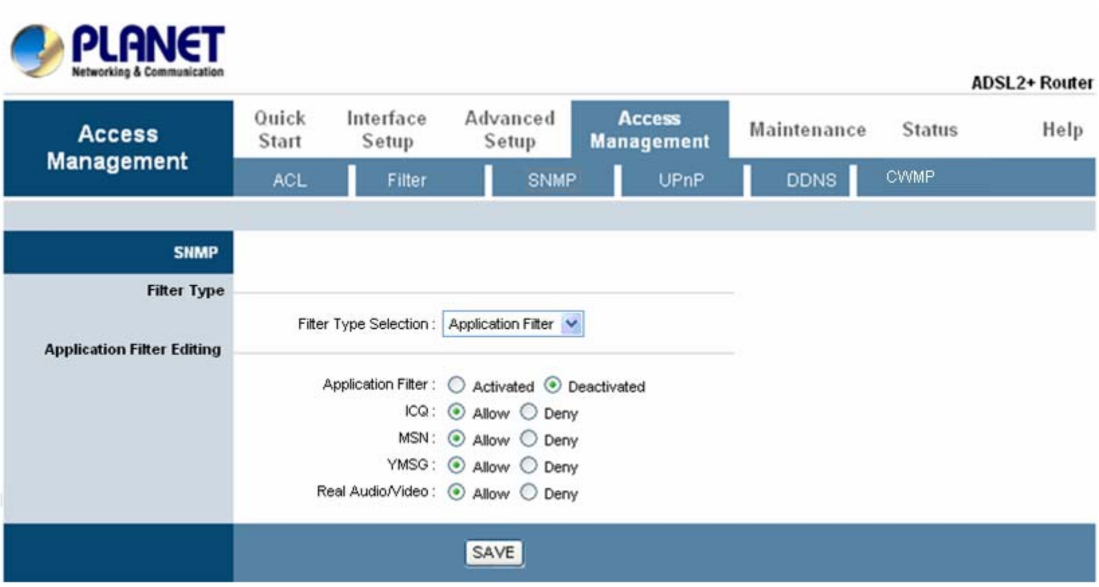
Rule Unmatched : Forward

The following table describes the labels in this screen.

Parameter	**Description**
IP/MAC Filter Set Index	This is the item number to record the setting.
Interface	Choices from PVC0 to PVC7 and LAN.
Direction	Select the access to the Internet (Outgoing) or from the Internet (Incoming), or Both.
IP/MAC Filter Rule Index	This is the item number to record the setting rule.
Rule Type	Select to filter through the IP Address or MAC Address.
Active	Select "**Yes**" to enable the current rule, select "**No**" to cancel the current rule.
Source IP Address	Enter the start IP Address which will be monitored. If "**0.0.0.0**" is set, it means for any IP Address.
Subnet Mask	Enter the Subnet Mask based on the Source IP Address.
Port Number	LAN users use port number to distinguish one

	network application over another such as 21 is for FTP service. The port number range is from 0 to 65535. It is recommended that this option be configured by an advanced user.
Destination IP Address	Enter the start IP Address which will be monitored. If "0.0.0.0" is set, it means for any IP Address.
Subnet Mask	Enter the Subnet Mask based on the Destination IP Address.
Port Number	This is the port or port ranges that define the application.
Protocol	It is the packet protocol type used by the application. Please select "**TCP**", "**UDP**" or "**ICMP**". For example, FTP service, you have to select "**TCP**".
Rule Unmatched	Select action for the traffic unmatching current rule. “Forward” is to leave it pass through; "**Next**" is to check it by the next rule.
IP/MAC Filter Listing	The IP/MAC Filter Listing will list the IP/MAC Filter rules you have configured. You can review the settings here.

3.6.2.2 Application Filter



Filter Type Selection : Application Filter

Application Filter : ○ Activated ● Deactivated

ICQ : ● Allow ○ Deny

MSN : ● Allow ○ Deny

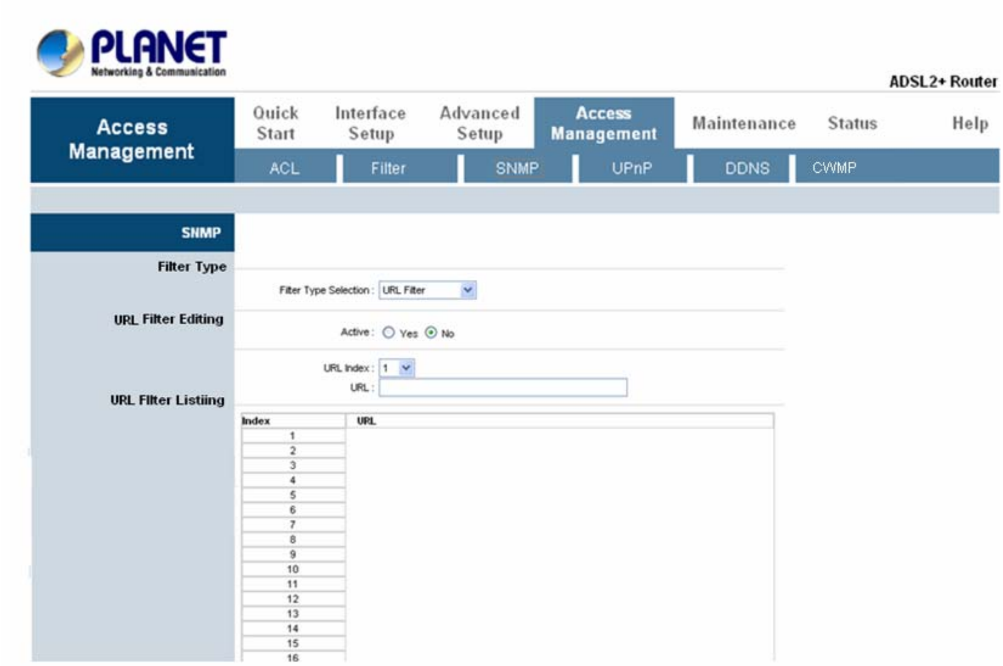
YMSG : ● Allow ○ Deny

Real Audio/Video : ● Allow ○ Deny

The following table describes the labels in this screen.

Parameter	Description
Application Filter	Activate or deactivate the application filter.
ICQ/MSN/YMSG/Real Audio/Video	If "**Allow**" is selected, the packets for these applications will be able to pass through the router. If you want to restrict these applications, please select "**Deny**".

3.6.2.3 URL Filter



Filter Type

Filter Type Selection : URL Filter

URL Filter Editing

Active : ○ Yes ● No

URL Index : 1

URL :

URL Filter Listiing

Index	URL
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

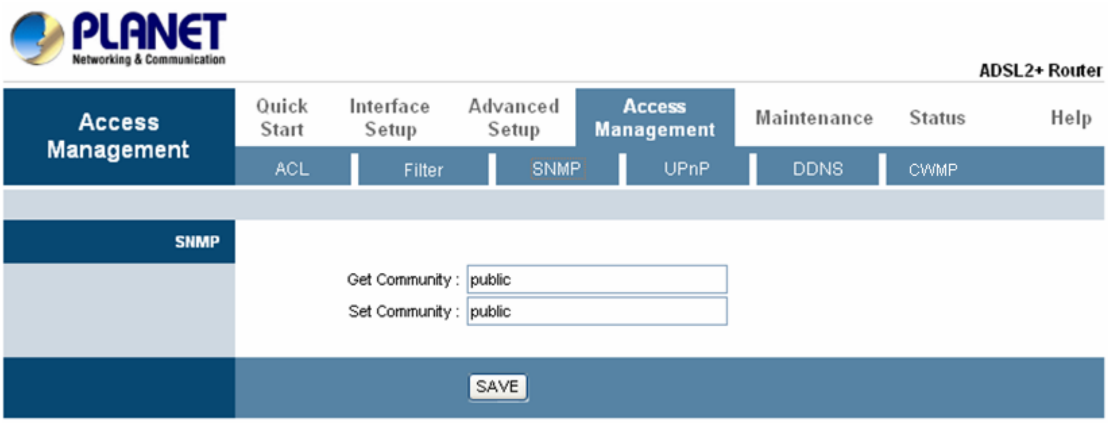
The following table describes the labels in this screen.

Parameter	**Description**
Active	Activate or deactivate the URL filter.
URL Index	This is the item number to record the setting.
URL	A URL can be thought of as the "**address**" of a web page and is sometimes referred to informally as a "**web address**" Please enter the web address here that you want to restrict to be connected.
URL Filter Listing	The URL Filter Listing will list the URL you have configured. You can review the settings here.

3.6.3 SNMP

Go to **Access Management** -> **SNMP** to set SNMP.

The **Simple Network Management Protocol (SNMP)** is used for exchanging information between network devices. It enables a host computer to access configuration, performance, and other system data that resides in a database on the modem. The host computer is called a *management station* and the modem is called an *SNMP agent*. The data that can be accessed via SNMP is stored in a *Management Information Database* (MIB) on the modem.



Get Community : public

Set Community : public

The following table describes the labels in this screen.

Parameter	Description
Get Community	Select to set the password for incoming Get- and Get Next request from management station.
Set Community	Select to set the password for incoming Set request from management station.

The default password is "**public**". When you are done making changes, click on **SAVE** to save your changes.

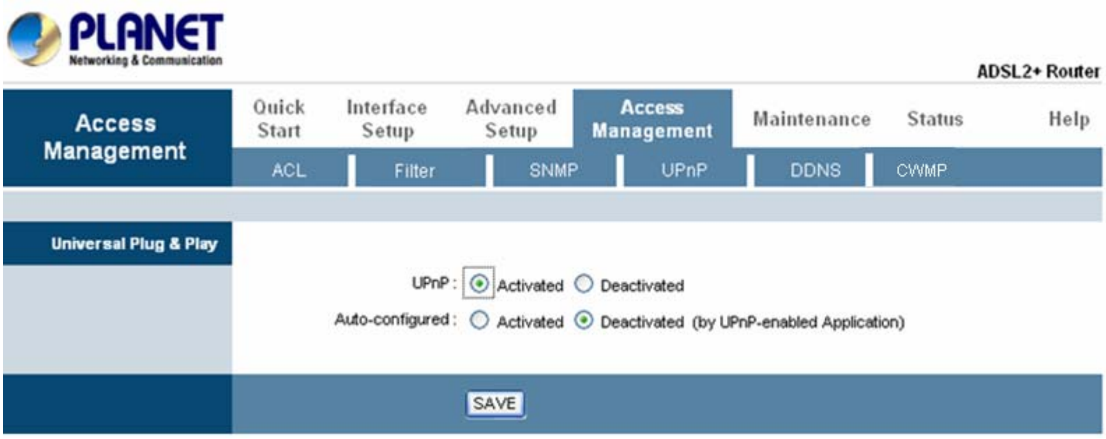
3.6.4 UPNP

Go to **Access Management** -> **UPNP** to set UPNP.

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

How do I know if I'm using UPnP?

UPnP hardware is identified as an icon in the Network Connections folder (in Windows XP & Windows ME). Each UPnP-compatible device that is installed on your network will appear as a separate icon.



UPnP : ● Activated ○ Deactivated

Auto-configured : ○ Activated ● Deactivated (by UPnP-enabled Application)

The following table describes the labels in this screen.

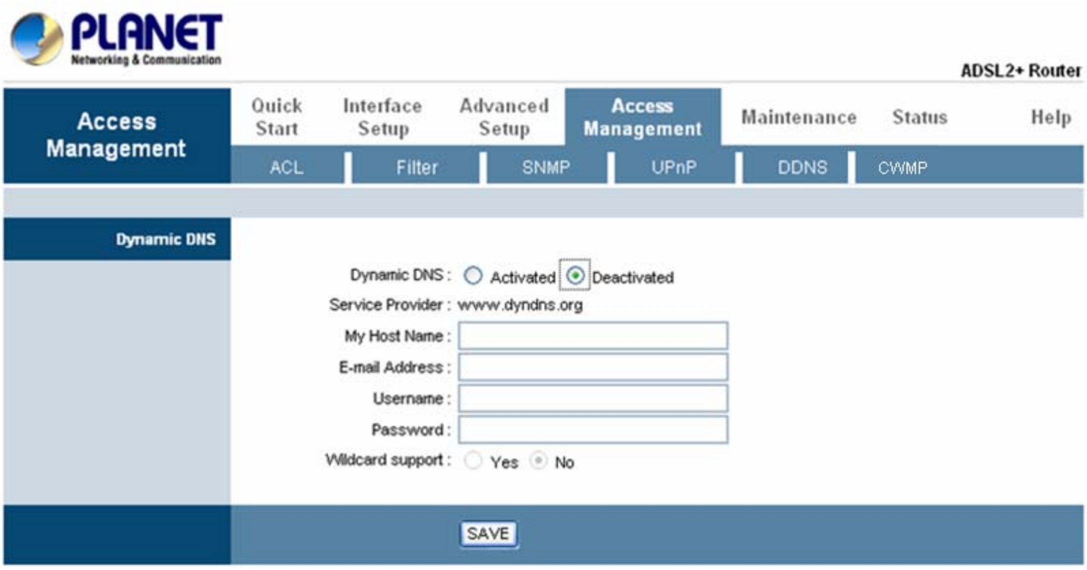
Parameter	**Description**
UPnP (Universal Plug and Play)	You can choose "**Activated**" or "**Deactivated**" option from this session.
Auto-Configured (by UPnP Application)	UPnP network devices can automatically configure network addressing, announce their presence in the network to other UPnP devices and enable exchange of simple product and service descriptions. Choose "**Activated**" option to allow UPnP-enabled applications to automatically configure the ADSL Router so that they can communicate through the ADSL Router, for example by using NAT traversal, UPnP applications automatically reserve a NAT forwarding port in order to communicate with another UPnP enabled device; this eliminates the need to manually configure port forwarding for the UPP enabled application. If you don’t want to make configuration changes through UPnP, just choose "**Deactivated**".

SAVE: Click **SAVE** to save the setting to the ADSL Router.

3.6.5 DDNS

Go to **Access Management-> DDNS** to set DDNS account.

The **Dynamic Domain Name System** allows you to update your current dynamic IP address with one or many dynamic DNS services so that anyone can contact you (in NetMeeting, CU-SeeMe, etc.). You can also access your FTP server or Web site on your own computer using a DNS-like address (for instance myhost.dhs.org, where my host is a name of your choice) that will never change instead of using an IP address that changes each time you reconnect. Your friends or relatives will always be able to call you even if they don't know your IP address. First of all, you need to have registered a dynamic DNS account with www.dyndns.org. This is for people with a dynamic IP from their ISP or DHCP server that would still like to have a DNS name. The Dynamic DNS service provider will give you a password or key.



Dynamic DNS : ○ Activated ● Deactivated
Service Provider : www.dyndns.org
My Host Name :
E-mail Address :
Username :
Password :
Wildcard support : ○ Yes ● No

The following table describes the labels in this screen.

Parameter	Description
Dynamic DNS	Choose the option for **Activated** or **Deactivated** DDNS.
Service Provider	The default Dynamic DNS service provider is **www.dyndns.org**.

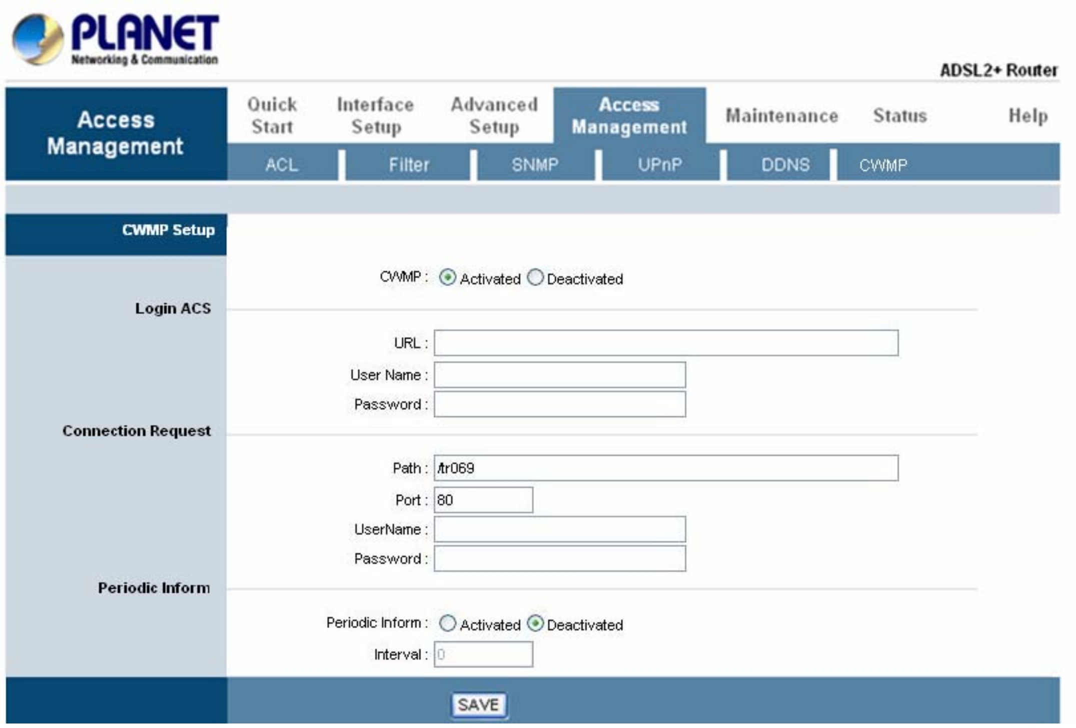
My Host Name	Type the domain name assigned to your ADSL by your Dynamic DNS provider.
E-mail Address	Type your e-mail address.
Username	Type your user name.
Password	Type the password assigned to you.
Wildcard support	Select **Yes** or **No** to turn on DYNDNS Wildcard. ***DYNDNS Wildcard*** --> Enabling the wildcard feature for your host causes *.yourhost.dyndns.org to be aliased to the same IP address as yourhost.dyndns.org. This feature is useful if you want to be able to use, for example, www.yourhost.dyndns.org and still reach your hostname.

SAVE: Click **SAVE** to save your changes.

Note that you must enter the user name exactly as your ISP assigned it. If the assigned name is in the form of user@domain where domain identifies a service name, enter it exactly as given. When you are done making changes, click on SAVE to save your changes.

3.6.6 CWMP

Go to **Access Management-> CWMP** to set CWMP parameters.



CWMP Setup

CWMP : ● Activated ○ Deactivated

Login ACS

URL :

User Name :

Password :

Connection Request

Path : /tr069

Port : 80

UserName :

Password :

Periodic Inform

Periodic Inform : ○ Activated ● Deactivated

Interval : 0

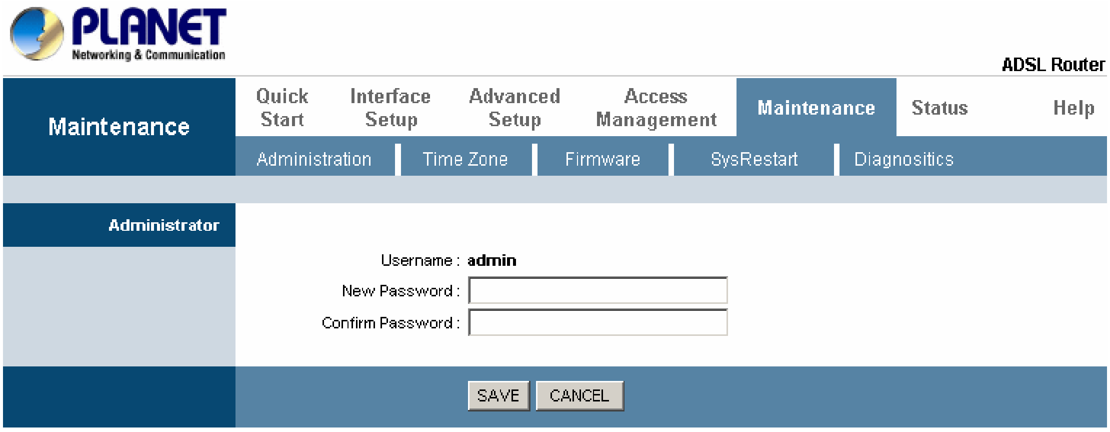
The following table describes the labels in this screen.

Parameter	**Description**
CWMP	Choose the option for **Activated** or **Deactivated** CWMP.
URL	Type the ACS service address.
User Name	Type the user name for the ACS service.
Password	Type the password for the ACS service.
Paths	Type the path of the ACS service.
Port	The port for ACS service and default is 80.
Periodic Inform	Choose the option for **Activated** or **Deactivated** Periodic Inform.
Interval	Type the interval of Periodic Inform.

3.7 Maintenance

3.7.1 Administration

Go to **Maintenance-> Administration** to set a new user's name and password to restrict management access to the router.
The default is **admin (User's name)** and **admin (Password)**



Username : admin
New Password :
Confirm Password :

The following table describes the labels in this screen.

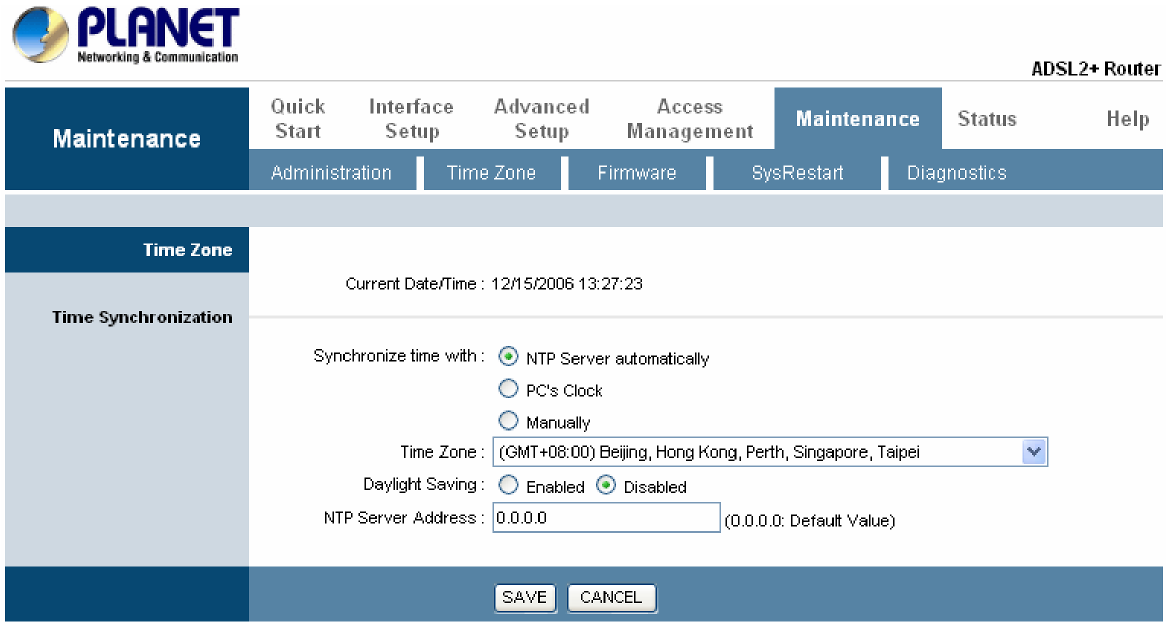
Parameter	**Description**
New Password	Type the new password in this field.
Confirm Password	Type the new password again in this field.

Note: If you ever forget the password to log in, you may press the **RESET** button up to 6 second to restore the factory default settings. The Factory Default Settings for User Name & Password are **admin** & **admin**.

3.7.2 Time Zone

Go to **Maintenance->Time Zone** and select system time as you wish.

The system time is the time used by the device for scheduling services. You can manually set the time or connect to a NTP (Network Time Protocol) server. If an NTP server is set, you will only need to set the time zone. If you manually set the time, you may also set Daylight Saving dates and the system time will automatically adjust on those dates.



Time Zone

Time Synchronization

Current Date/Time : 12/15/2006 13:27:23

Synchronize time with : ● NTP Server automatically ○ PC's Clock ○ Manually

Time Zone : (GMT+08:00) Beijing, Hong Kong, Perth, Singapore, Taipei

Daylight Saving : ○ Enabled ● Disabled

NTP Server Address : 0.0.0.0 (0.0.0.0: Default Value)

The following table describes the labels in this screen.

Parameter	**Description**
Current Date/Time	This field displays an updated Date and Time when you reenter this menu.
[Time Synchronization]	
Synchronize time with	You can choose "**NTP Server automatically**", "**PC's Clock**", or "**Manually**" to coordinate the time.
Time Zone	Choose the Time Zone of your location. This will set the time difference between your time zone and Greenwich Mean Time (GMT).
Daylight Saving	Choose "**Enabled**" or "**Disabled**" to use daylight savings time.
NTP Server Address	Type the IP address or domain name of your timeserver. Check with your ISP/network administrator if you are unsure of this

	information. A **N**etwork **T**ime **P**rotocol (NTP) server can automatically set the router time for you. If you use an NTP server, you will only need to select your time zone. If you manually set the time, you can enable Daylight Saving. The router will automatically adjust when Daylight Saving goes into effect.

When you are done making changes, click on **SAVE** to save your changes or on **CANCEL** to exit without saving.

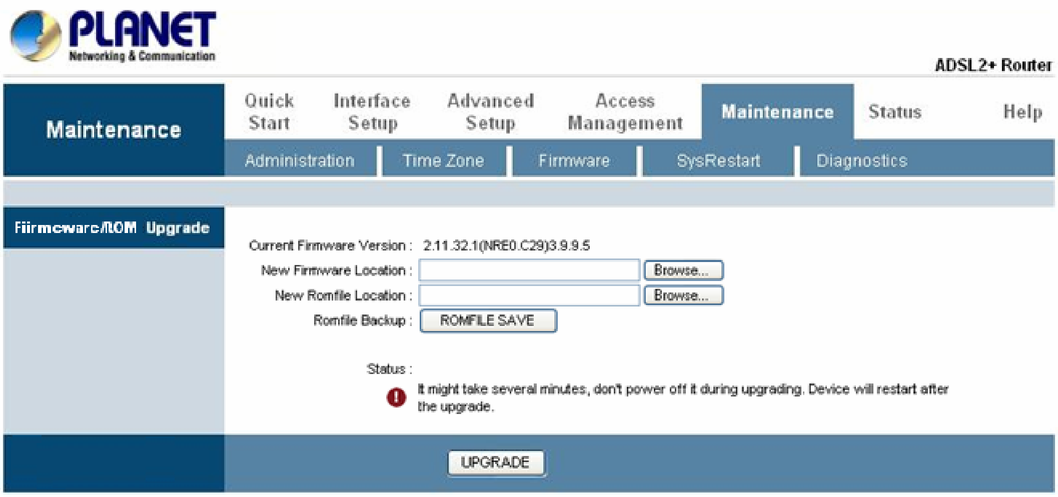
3.7.3 Firmware

Go to **Maintenance** -> **Firmware** to upgrade the firmware.

You can upgrade the **firmware** of the router in this page. Make sure the firmware you want to use is on the local hard drive of the computer. Click on **Browse** to browse the local had drive and locate the firmware to be used for the update. Then press **UPGRADE** to upload new Firmware.

It might take several minutes, don't power off it during upgrading. Device will restart after the upgrade!!

After a success upload, the system automatically restarts. Please wait for the device to finish restarting. This should take about 2 minutes or more. You need to log in again if you want to access the device.



Current Firmware Version : 2.11.32.1(NRE0.C29)3.9.9.5

New Firmware Location : [ ] Browse...

New Romfile Location : [ ] Browse...

Romfile Backup : ROMFILE SAVE

Status :

It might take several minutes, don't power off it during upgrading. Device will restart after the upgrade.

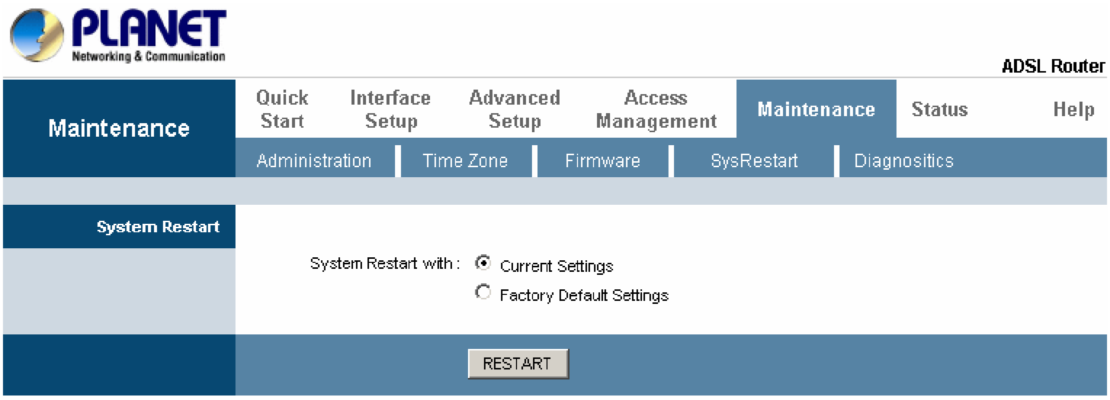
The following table describes the labels in this screen.

Parameter	**Description**
Current Firmware Version	The current firmware version will be shown here.
New Firmware Location	Type in the location of the new firmware or click "**Browse**" to find it.
New Romfile Location	To restore the backup settings, please type in the location of the backup file or click "**Browse**" to find it.
Romfile Backup	To save the current settings as a backup file, please click "**ROMFILE SAVE**". Then please change the file name and select the location you want to save the file.
Upgrade	Click "**Upgrade**" to begin the upgrade processes or backup file restoring processes. After the router is restarted, the processes are completed. It might take several minutes, don't power off the router during upgrading or restoring.

3.7.4 SysRestart

Go to **Maintenance->SysRestart** to do system restart.

The **SysRestart** screen allows you to restart your router with either its current settings still in place or the factory default settings.



System Restart with : ● Current Settings ○ Factory Default Settings

The following table describes the labels in this screen.

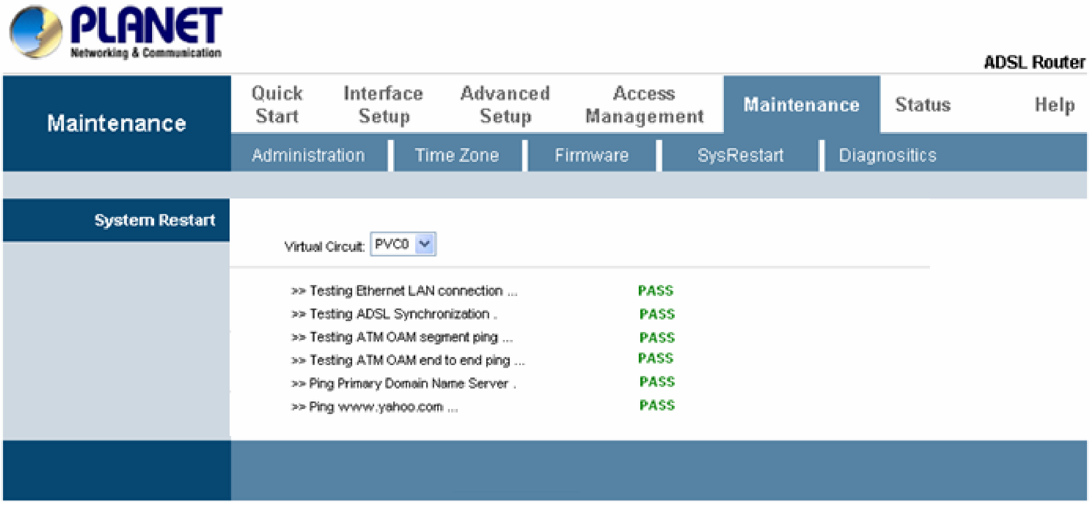
Parameter	**Description**

Current Settings	If you wish to restart the router using the factory default settings (for example, after a firmware upgrade or if you have saved an incorrect configuration), select **Factory Default Settings** to reset to factory default settings. Otherwise, you can select **Current Settings**. You may also reset your router to factory settings by holding the DEFAULT button on the back panel of your router in for 10-12 second while the router is turned on.
Factory Default Settings	

3.7.5 Diagnostics

Go to **Maintenance**->**Diagnostics** to do system restart.

This page allows you to diagnose the connectivity of the LAN and WAN network.



Virtual Circuit: PVC0

```
>> Testing Ethernet LAN connection ...        PASS
>> Testing ADSL Synchronization .             PASS
>> Testing ATM OAM segment ping ...           PASS
>> Testing ATM OAM end to end ping ...        PASS
>> Ping Primary Domain Name Server .          PASS
>> Ping www.yahoo.com ...                     PASS
```

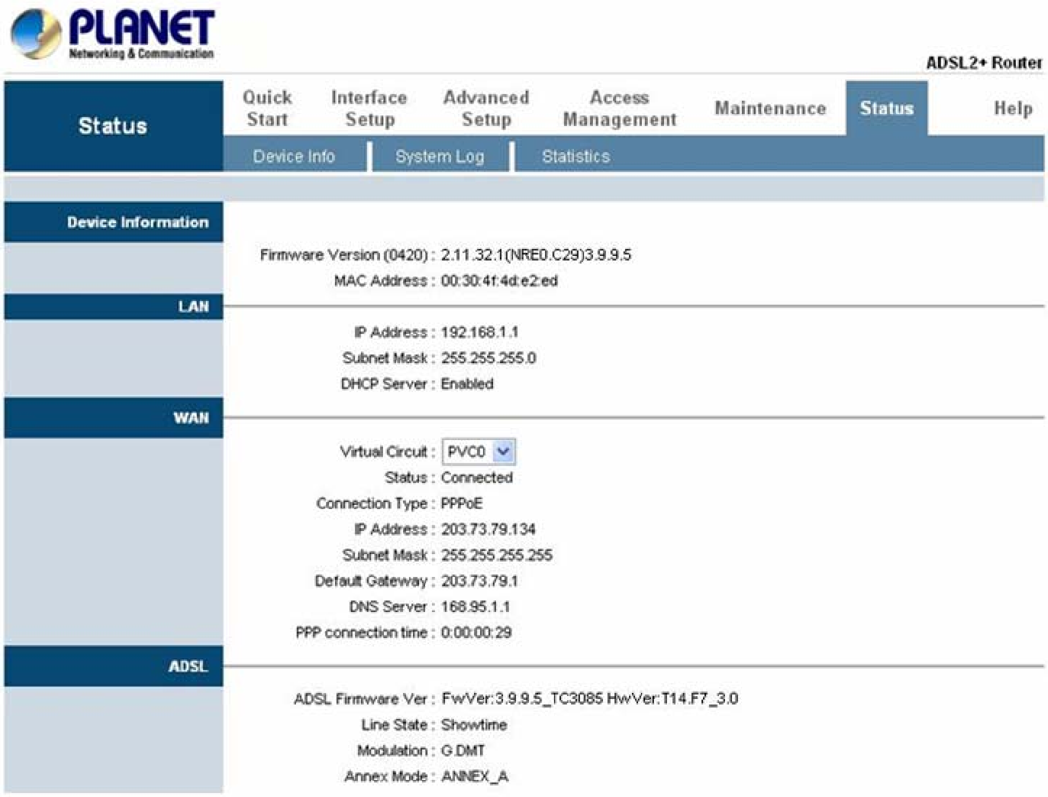
3.8 Status

3.8.1 Device Info

Go to **Status**->**Device Info** to check system information.

The **Device Info** screen is a tool that you use to monitor your ADSL Router. It shows the Firmware Version, WAN, LAN, and MAC address information. Note that these fields are read-only and are not meant for diagnostic purposes. Except the Virtual

Circuit, click the drop-down list and select the name of the Virtual Circuit on which the system status is to be shown.



Device Information

Firmware Version (0420) : 2.11.32.1(NRE0.C29)3.9.9.5
MAC Address : 00:30:4f:4d:e2:ed

LAN

IP Address : 192.168.1.1
Subnet Mask : 255.255.255.0
DHCP Server : Enabled

WAN

Virtual Circuit : PVC0
Status : Connected
Connection Type : PPPoE
IP Address : 203.73.79.134
Subnet Mask : 255.255.255.255
Default Gateway : 203.73.79.1
DNS Server : 168.95.1.1
PPP connection time : 0:00:00:29

ADSL

ADSL Firmware Ver : FwVer:3.9.9.5_TC3085 HwVer:T14.F7_3.0
Line State : Showtime
Modulation : G.DMT
Annex Mode : ANNEX_A

[Device Information]

Firmware Version: This filed displays current firmware version.

MAC Address: The MAC (Media Access Control) or Ethernet address unique to your modem.

[LAN]

IP Address: The LAN port IP address

Subnet Mask: The LAN port IP subnet mask.

DHCP Server: The status of **DHCP** Server (Enabled or Disabled)

[WAN]

Virtual Circuit: Click the drop-down list and select the name of the Virtual Circuit on which the system status is to be shown.

Status:	Connected or Not Connected
Connection Type:	The WAN Connection Type.
IP Address:	The WAN port IP address
Subnet Address:	The WAN port IP subnet mask.
Default Gateway:	The IP address of the default gateway, if applicable.
DNS Server:	The IP address of the DNS Server

[ADSL]

ADSL Firmware Version: This field displays current ADSL firmware version.

Line States: This field displays the ADSL connection process and status.

Modulation: This field displays the ADSL modulation status for G.dmt or T1.413.

Annex Mode: This field displays the ADSL annex modes for Annex A or Annex B.

Downstream and Upstream: Status of SNR Margin, Line Attenuation and Data Rate

SNR Margin: The amount of increased noise that can be tolerated while maintaining the designed BER (bit error rate). The SNR Margin is set by Central Office DSLAM. If the SNR Margin is increased, bit error rate performance will improve, but the data rate will decrease. Conversely, if the SNR Margin is decreased, bit error rate performance will decrease, but the data rate will increase.

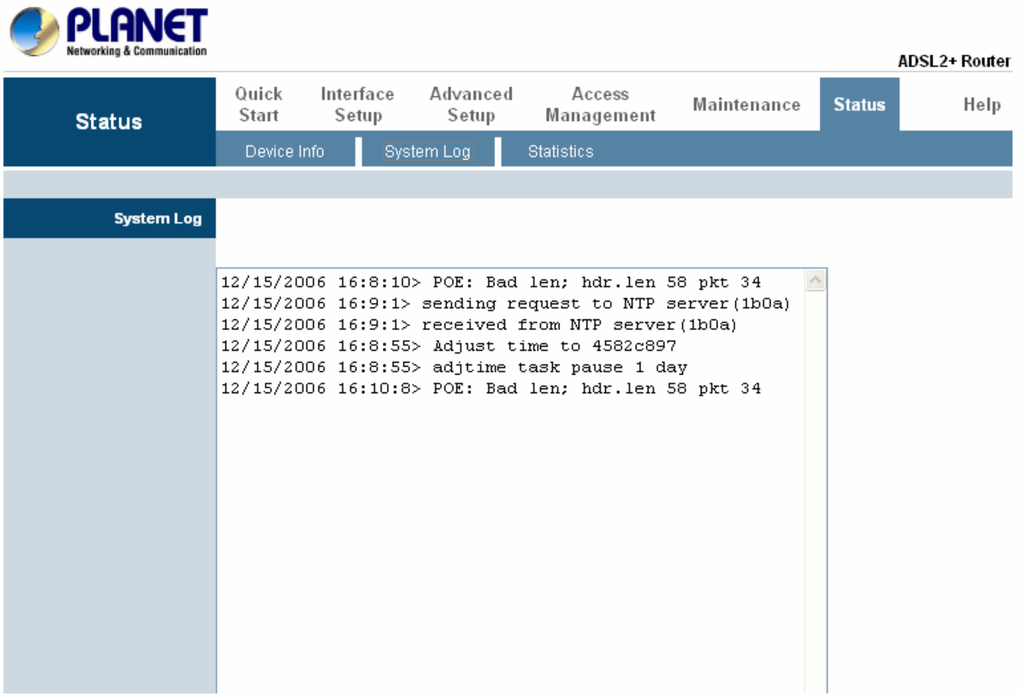
Line Attenuation: Attenuation is the decrease in magnitude of the ADSL line signal between the transmitter (Central Office DSLAM) and the receiver (Client ADSL Modem), measured in dB. It is measured by calculating the difference in dB between the signal power level received at the Client ADSL Router and the reference signal power level transmitted from the Central Office DSLAM.

Data Rate: This field displays the ADSL data rate.

3.8.2 System Log

Go to **Status -> System Log** and you can see the system log file. Click "**Save Log**" to save system log file.

The **System Log** displays data generated or acquired by routine system communication with other devices, such as the results of negotiations with the ISP's computers for DNS and gateway IP addresses. The device keeps a running log of events and activities occurring on the Router. You can click **Save Log** to display a Windows File Download dialog box that enables opening or saving the contents of the log to your PC. To remove all entries from the list, click **Clear Log**. New entries will begin accumulating. If the device is rebooted, the logs are automatically cleared.



```
12/15/2006 16:8:10> POE: Bad len; hdr.len 58 pkt 34
12/15/2006 16:9:1> sending request to NTP server(1b0a)
12/15/2006 16:9:1> received from NTP server(1b0a)
12/15/2006 16:8:55> Adjust time to 4582c897
12/15/2006 16:8:55> adjtime task pause 1 day
12/15/2006 16:10:8> POE: Bad len; hdr.len 58 pkt 34
```

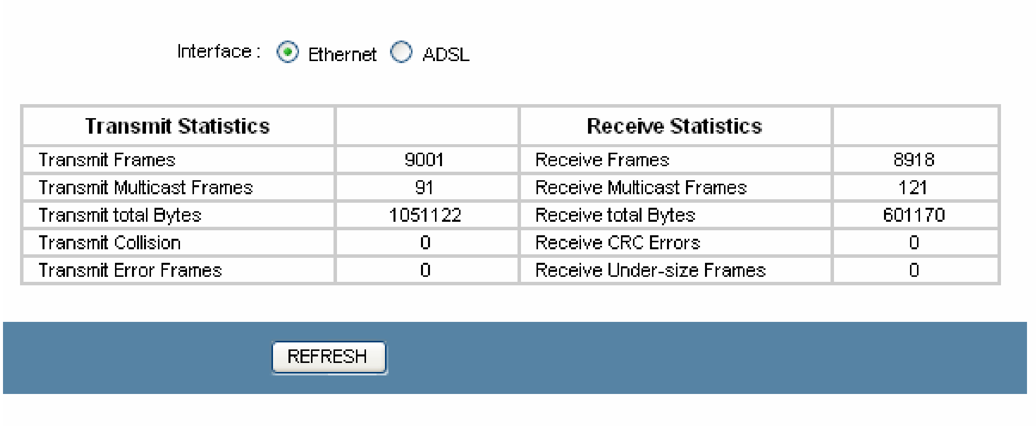
3.8.3 Statistics

Go to **Status-> Statistics** and select **ADSL** or **Ethernet** interface.

The ADSL Router keeps **statistic** of traffic that passes through it. You are able to view the amount of packets that passes through the Router on both the WAN port & the LAN port. The traffic counter will reset if the device is rebooted. You can select **Ethernet**/**ADSL** to view the statistics report of LAN/WAN.

[Ethernet]

The Ethernet screen gives you information on how much data your router has transmitted and received across the Ethernet connection. Click on REFRESH to update the screen.

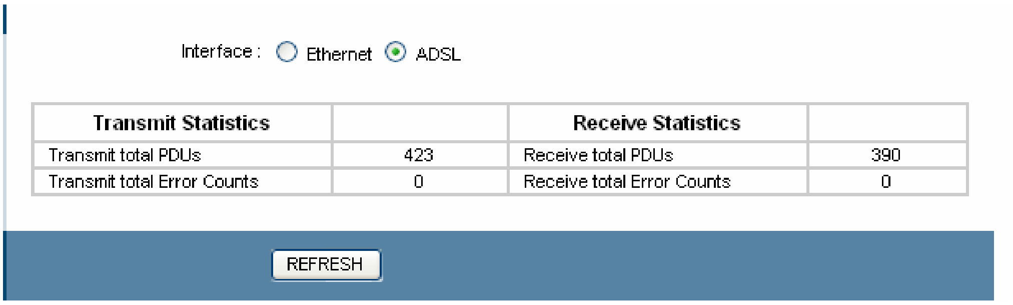


Interface : ● Ethernet ○ ADSL

Transmit Statistics		Receive Statistics	
Transmit Frames	9001	Receive Frames	8918
Transmit Multicast Frames	91	Receive Multicast Frames	121
Transmit total Bytes	1051122	Receive total Bytes	601170
Transmit Collision	0	Receive CRC Errors	0
Transmit Error Frames	0	Receive Under-size Frames	0

[ADSL]

The ADSL screen gives you information about how much data your router has transmitted or received across the ADSL connection. Click on REFRESH to update the screen.



Interface : ○ Ethernet ● ADSL

Transmit Statistics		Receive Statistics	
Transmit total PDUs	423	Receive total PDUs	390
Transmit total Error Counts	0	Receive total Error Counts	0

Appendix A: Glossary

Address mask

A bit mask select bits from an Internet address for subnet addressing. The mask is 32 bits long and selects the network portion of the Internet address and one or more bits of the local portion. Sometimes it called subnet mask.

AAL5

ATM Adaptation Layer - This layer maps higher layer user data into ATM cells, making the data suitable for transport through the ATM network.

ADSL

Asymmetric digital subscriber line

ATM

Asynchronous Transfer Mode - A cell-based data transfer technique in which channel demand determines packet allocation. ATM offers fast packet technology, real time, and demand led switching for efficient use of network resources.

AWG

American Wire Gauge - The measurement of thickness of a wire

Bridge

A device connects two or more physical networks and forward packets between them. Bridges can usually be made to filter packets, that is, to forward only certain traffic. Related devices are repeaters which simply forward electrical signals from one cable to the other and full-fledged routers which make routing decisions based on several criteria.

Broadband

Characteristic of any network multiplexes independent network carriers onto a single cable. Broadband technology allows several networks to coexist on one single cable; traffic from one network does not interfere with traffic from another. Broadcast a packet delivery system where a copy of a given packet is given to all hosts attached to the network. Example: Ethernet.

CO
Central Office. Refers to equipment located at a Telco or service provider's office.

CPE
Customer Premises Equipment located in a user's premises

DHCP (Dynamic Host Configuration Protocol)
DHCP is software that automatically assigns IP addresses to client stations logging onto a TCP/IP network. DHCP eliminates having to manually assign permanent IP addresses to every device on your network. DHCP software typically runs in servers and is also found in network devices such as Routers.

DMT
Discrete Multi-Tone frequency signal modulation

Downstream rate
The line rate for return messages or data transfers from the network machine to the user's premises machine.

DSLAM
Digital Subscriber Line Access Multiplex

Dynamic IP Addresses
A dynamic IP address is an IP address that is automatically assigned to a client station (computer, printer, etc.) in a TCP/IP network. Dynamic IP addresses are typically assigned by a DHCP server, which can be a computer on the network or another piece of hardware, such as the Router. A dynamic IP address may change every time your computer connects to the network.

Encapsulation
The technique layer protocols in which a layer adds header information to the protocol data unit (PDU) from the layer above. As an example, in Internet terminology, a packet would contain a header from the physical layer, followed by a header from the network layer (IP), followed by a header from the transport layer (TCP), and followed by the application protocol data.

Ethernet

One of the most common local area network (LAN) wiring schemes, Ethernet has a transmission rate of 10 Mbps.

FTP

File Transfer Protocol. The Internet protocol (and program) transfer files between hosts.

Hop count

A measure of distance between two points on the Internet. It is equivalent to the number of gateways that separate the source and destination.

HTML

Hypertext Markup Language - The page-coding language for the World Wide Web.

HTML browser

A browser used to traverse the Internet, such as Netscape or Microsoft Internet Explorer.

http

Hypertext Transfer Protocol - The protocol carry world-wide-web (www) traffic between a www browser computer and the www server being accessed.

ICMP

Internet Control Message Protocol - The protocol handle errors and control messages at the IP layer. ICMP is actually part of the IP protocol.

Internet address

An IP address is assigned in blocks of numbers to user organizations accessing the Internet. These addresses are established by the United States Department of Defense's Network Information Center. Duplicate addresses can cause major problems on the network, but the NIC trusts organizations to use individual addresses responsibly. Each address is a 32-bit address in the form of x.x.x.x where x is an eight- bit number from 0 to 255. There are three classes: A, B and C, depending on how many computers on the site are likely to be connected.

I**nternet Protocol (IP)**

The network layer protocol for the Internet protocol suite

IP address

The 32-bit address assigned to hosts that want to participate in a TCP/IP Internet.

ISP

Internet service provider - A company allows home and corporate users to connect to the Internet.

MAC

Media Access Control Layer - A sub-layer of the Data Link Layer (Layer 2) of the ISO OSI Model responsible for media control.

MIB

Management Information Base - A collection of objects can be accessed via a network management protocol, such as SNMP and CMIP (Common Management Information Protocol).

NAT

Network Address Translation - A proposal for IP address reuse, where the local IP address is mapped to a globally unique address.

NVT

Network Virtual Terminal

PAP

Password Authentication Protocol

PORT

The abstraction used in Internet transport protocols to distinguish among multiple simultaneous connections to a single destination host.

POTS

Plain Old Telephone Service - This is the term describe basic telephone service.

PPP

Point-to-Point-Protocol - The successor to SLIP, PPP provides router-to-router and host-to-network connections over both synchronous and asynchronous circuits.

PPPoE

PPP over Ethernet is a protocol for connecting remote hosts to the Internet over an always-on connection by simulating a dial-up connection.

Remote server

A network computer allows a user to log on to the network from a distant location.

RFC

Request for Comments - Refers to documents published by the Internet Engineering Task Force (IETF) proposing standard protocols and procedures for the Internet. RFC can be found at www.ietf.org.

Route

The path that network traffic takes from its source to its destination. The route a datagram may follow can include many gateways and many physical networks.
In the Internet, each datagram is routed separately.

Router

A system is responsible for making decisions about which of several paths network (or Internet) traffic will follow. To do this, it uses a routing protocol to gain information about the network and algorithms to choose the best route based on several criteria known as "routing metrics".

Routing Table

Information stored within a router that contains network path and status information. It is used to select the most appropriate route to forward information along.

Routing Information Protocol

Routers periodically exchange information with one another so that they can determine minimum distance paths between sources and destinations.

SNMP

Simple Network Management Protocol - The network management protocol of choice for TCP/IP-based Internet.

SOCKET

(1) The Berkeley UNIX mechanism for creating a virtual connection between processes.
(2) IBM term for software interfaces that allow two UNIX application programs to talk

via TCP/IP protocols.

Spanning-Tree Bridge Protocol (STP)

Spanning-Tree Bridge Protocol (STP) - Part of an IEEE standard. A mechanism for detecting and preventing loops from occurring in a multi-bridged environment. When three or more LAN's segments are connected via bridges, a loop can occur. Because of a bridge forwards all packets that are not recognized as being local, some packets can circulate for long periods of time, eventually degrading system performance. This algorithm ensures only one path connects any pair of stations, selecting one bridge as the 'root' bridge, with the highest priority one as identifier, from which all paths should radiate.

Spoofing

A method of fooling network end stations into believing that keep alive signals have come from and returned to the host. Polls are received and returned locally at either end

Static IP Address

A static IP address is an IP address permanently assigned to computer in a TCP/IP network. Static IP addresses are usually assigned to networked devices that are consistently accessed by multiple users, such as Server PCs, or printers. If you are using your Router to share your cable or DSL Internet connection, contact your ISP to see if they have assigned your home a static IP address. You will need that address during your Router's configuration.

Subnet

For routing purposes, IP networks can be divided into logical subnets by using a subnet mask. Values below those of the mask are valid addresses on the subnet.

TCP

Transmission Control Protocol - The major transport protocol in the Internet suite of protocols provides reliable, connection-oriented full-duplex streams.

TFTP

Trivial File Transfer Protocol. A simple file transfer protocol (a simplified version of FTP) that is often boot diskless workstations and other network devices such as routers over a network (typically a LAN).

Telnet

The virtual terminal protocol in the Internet suite of protocols - Allows users of one host to log into a remote host and act as normal terminal users of that host.

Transparent bridging

The intelligence necessary to make relaying decisions exists in the bridge itself and is thus transparent to the communicating workstations. It involves frame forwarding, learning workstation addresses, and ensuring no topology loops exist (in conjunction with the Spanning-Tree algorithm).

UDP

User Datagram Protocol - A connectionless transport protocol that runs on top of TCP/IP's IP. UDP, like TCP, uses IP for delivery; however, unlike TCP, UDP provides for exchange of datagram without acknowledgments or guaranteed delivery. Best suited for small, independent requests, such as requesting a MIB value from an SNMP agent, in which first setting up a connection would take more time than sending the data.

UNI signaling

User Network Interface signaling for ATM communications.

Virtual Connection (VC)

A link that seems and behaves like a dedicated point-to-point line or a system that delivers packets in sequence, as happens on an actual point-to-point network. In reality, the data is delivered across a network via the most appropriate route. The sending and receiving devices do not have to be aware of the options and the route is chosen only when a message is sent. There is no pre-arrangement, so each virtual connection exists only for the duration of that one transmission.

WAN

Wide area network - A data communications network that spans any distance and is usually provided by a public carrier (such as a telephone company or service provider).