VDSL2 Router

VC-200M / VC-200S

User's Manual

Copyright

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.

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

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 VDSL2 Router
Model: VC-200M / VC-200S
Rev: 1.0 (March 2007)
Part No. EM-VC200v1

Table of Contents

Chapter 1: Introduction

The PLANET VDSL2 Router, VC-200M / VC-200S is based on two core networking technologies: Ethernet and VDSL2 (Very High Speed Digital Subscriber Line 2). This technology offers the absolute fastest possible data transmission speeds over existing copper telephone lines without the need for rewiring.

The ideal situation, the date rate of VDSL2 can up to 40Mbps upstream and 100Mbps downstream.

The VC-200M / VC-200S supports ITU-T G993.2, and provide selectable operating mode of bridging and routing.

Via the user-friendly management interface, VC-200M / VC-200S can be managed by computer running standard web browsers. Furthermore, VC-200M / VC-200S provides DHCP server, NAT, virtual server, DMZ, DNS proxy, and UPnP capability. It provides the natural firewall function (Network Address Translation, NAT). All incoming and outgoing IPs are monitored and filtered

VC-200M / VC-200S provide 4-port 10/100 Ethernet switch, it provide data deliver and receive in local network, so that it is the best selection for small enterprise and residence.

In the following section, unless specified, terms VDSL2 ROUTER will means the VC-200M / VC-200S.

1.1 Feature

- Internet Access Features
  - ***Shared Internet Access.*** All users on the LAN can access the Internet through the VDSL2 ROUTER 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 VDSL2 modem.*** The VDSL2 ROUTER provides VDSL2 modem, and supports all common VDSL2 connections.
  - ***Fixed or Dynamic IP Address or PPPoE.*** On the Internet (WAN port) connection, the VDSL2 ROUTER 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.
  - ***Firewall.*** Supports simple firewall with NAT technology.

- ***Universal Plug and Play (UPnP)*** UPnP allows automatic discovery and configuration of the Broadband Router. UPnP is supported by Windows ME, XP, or later.
- **Selectable VDSL2 transmission modes.** User can choose transmission modes (8a,8b,12a,12b,and 17a) through management interface on VDSL2 ROUTER
- **User Friendly Interface.** VDSL2 ROUTER can be managed and controlled through Web UI.

■ LAN Features
- ***4-Port Switch.*** The VDSL2 ROUTER 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 VDSL2 ROUTER can act as a DHCP Server for devices on your local LAN.

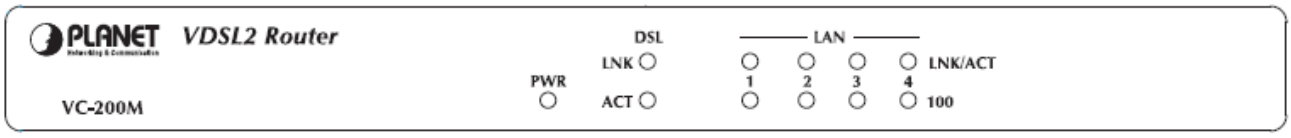
1.2 Package Contents

- VDSL2 ROUTER Unit
- Power Adapter
- Quick Installation Guide
- User's Manual CD
- RJ-11cable
- RJ-45 cable

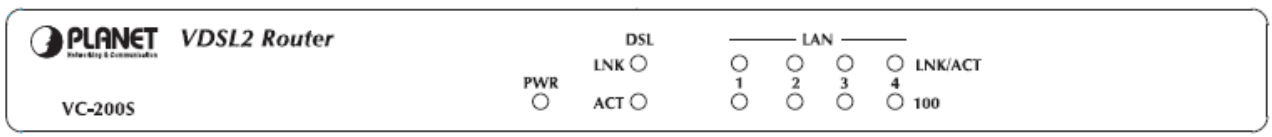
1.3 Physical Details

Front Panel

VC-200M front panel



VC-200S front panel



Front Panel LED definition

LED		State	Description
PWR		ON	When the router is powered on, and in ready state.
		OFF	When the router is powered off.
DSL	LNK	Flashing	Router is trying to establish a connection between VC-200M and VC-200S, or telecom's network.
		ON	Successfully connected between VC-200M and VC-200S, or router and telecom's network, and in ready state.
	ACT	Flashing	Data is being transmitted or received.
LAN **1-4**	LNK/ACT	Flashing/ON	Data is being transmitted or received via the corresponding LAN port, and in ready state.
	100	ON	Orange color, it corresponding LAN port is using 100BaseT.

Rear Panel

Rear panel Port and Button Definition

Connector	Description
POWER	Power connector with 12V DC 1 A
RESET Button	Press 1-3 seconds for reboot system. Press more than 5 seconds for reset to factory default setting.
LAN (1-4)	Router is successfully connected to a device through the corresponding port (1, 2, 3, or 4). If the LED light of LNK/ACT is flashing, the Router is actively sending or receiving data over that port.
PHONE	The RJ-11 connector allows voice communication between the router

	and phone through a twisted-pair phone wire.
VDSL2	The RJ-11 connector allows data communication between the router and the VDSL2 network through a twisted-pair phone wire

Chapter 2: Hardware Installation

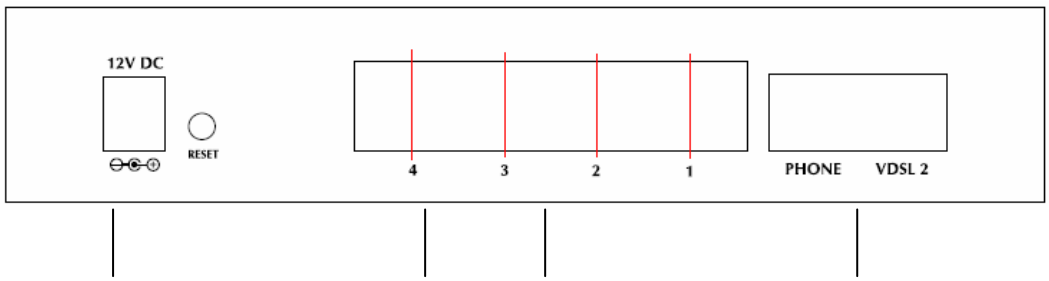
This chapter offers information about installing your router. If you are not familiar with the hardware or software parameters presented here, please consult your service provider for the values needed.

2.1 System Requirement

1. Personal computer (PC)
2. Pentium II 233 MHz processor minimum
3. 32 MB RAM minimum
4. 20 MB of free disk space minimum

2.2 Hardware Installation

This section describes how to connect and configure VDSL2 ROUTER.



Power Adapter To PC/Hub To VDSL2/Phone Line

Step 1. Connect the VDSL2 Line

There are two ways to connect VC-200M or VC-2000S.

I. Connect the supplied RJ11 cable to VDSL2 ports between VC-200M and VC-200S.

II. Uses the supplied RJ-11cable connects to VC-200M or VC-200S with your phone company.

Step 2. Connect a Workstation to the Router's LAN port

Uses the supplied RJ-45 cable connects to PC with the Switching Hub port of VDSL2 ROUTER. Both 10Base-T and 100Base-TX connections can be used simultaneously.

If required, using a standard RJ-45 cable connect to any LAN port of VDSL2 ROUTER with a normal Hub.

Any LAN port of VDSL2 ROUTER will automatically function as an "Uplink" port when required.

Step 3. Connect the Power Adapter to the Router

Connect the power adapter to the port labeled 12V DC on the rear panel of router.

Step 4. Connect All Cables to the Network

The procedure for connecting cables differs depending on whether or not your telephone equipment is connected to a POTS splitter.

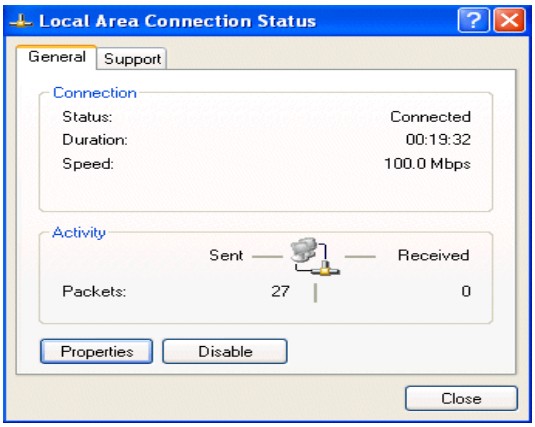
2.3 Configuring the Network Properties

2.3.1 Configuring PC in Windows XP

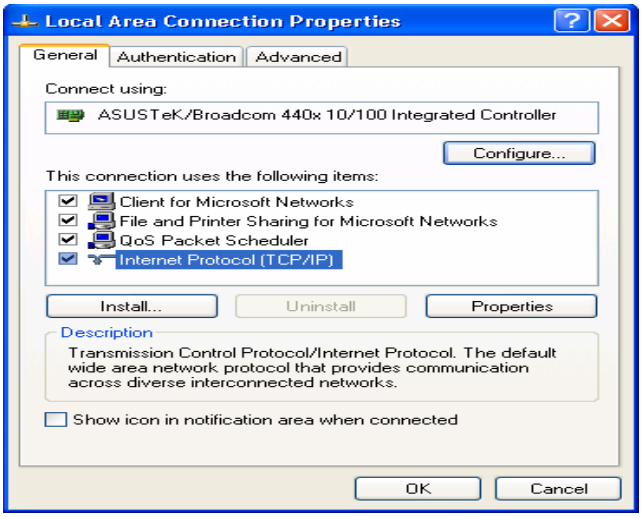
1. Go to **Start / Control Panel (in Classic View)**. In the Control Panel, double-click on **Network Connections**

2. Double-click **Local Area Connection**.

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



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



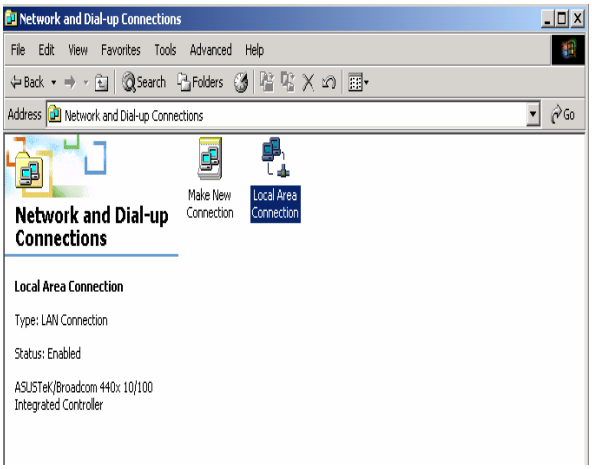
5. Select the **Obtain an IP address automatically** and the **Obtain DNS server address automatically** radio buttons.

6. Click **OK** to finish the configuration.

2.3.2 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**.

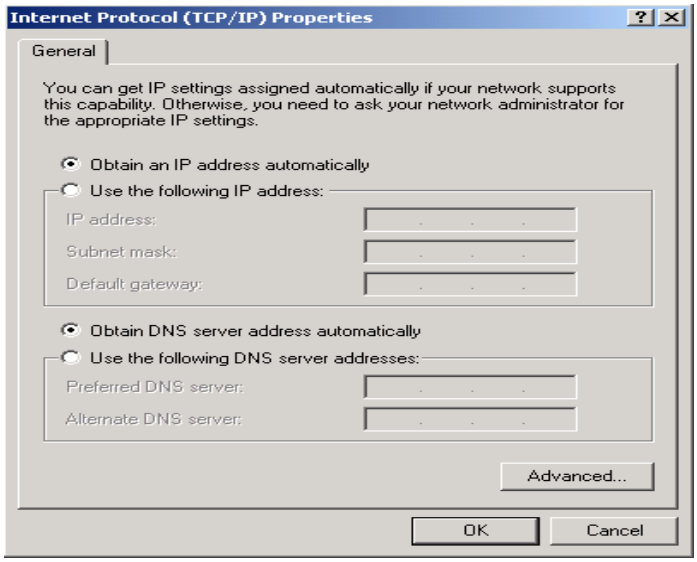


3. In the **Local Area Connection Status** window click **Properties**.

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.

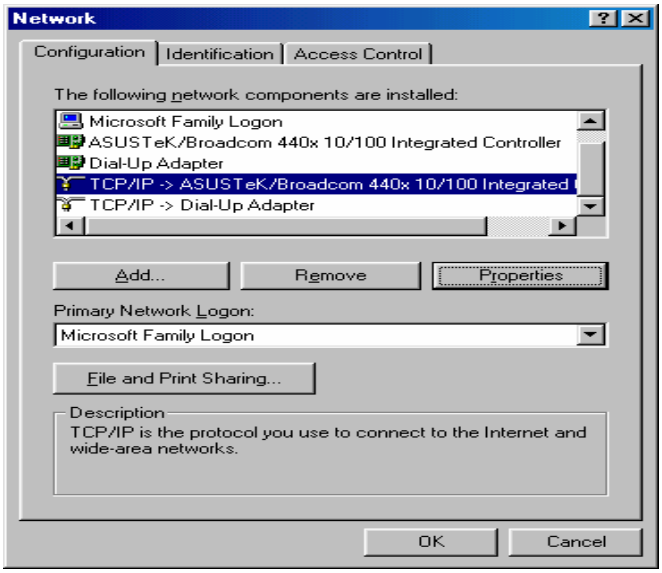
6. Click **OK** to finish the configuration.



2.3.3 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.

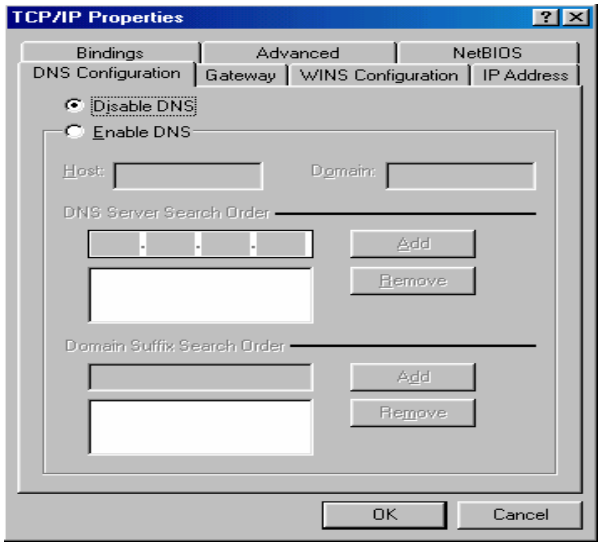
2. Select **TCP/IP ->**
   NE2000 Compatible, or the name of your Network Interface Card (NIC) in your PC.



3. Select the **Obtain an IP address automatically** radio button.

4. Then select the **DNS Configuration** tab.

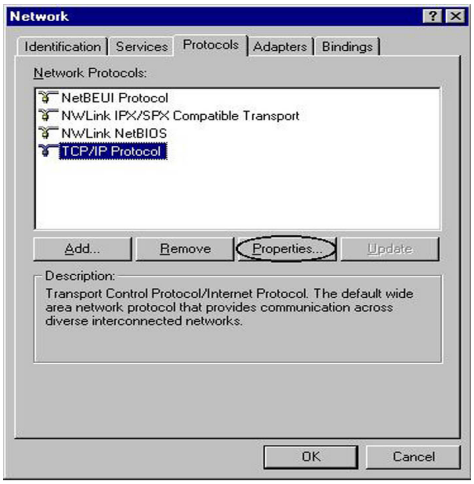
5. Select the **Disable DNS** radio button and click **OK** to finish the configuration.



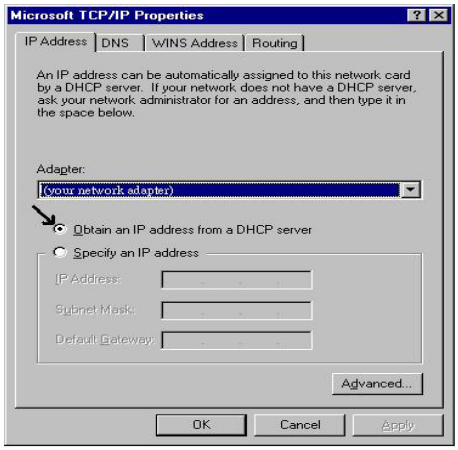
2.3.4 Configuring PC in Windows NT4.0

1. Go to **Start / Settings / Control Panel**. In the Control Panel, double-click on **Network** and choose the **Protocols** tab.

2. Select **TCP/IP Protocol** and click **Properties**.

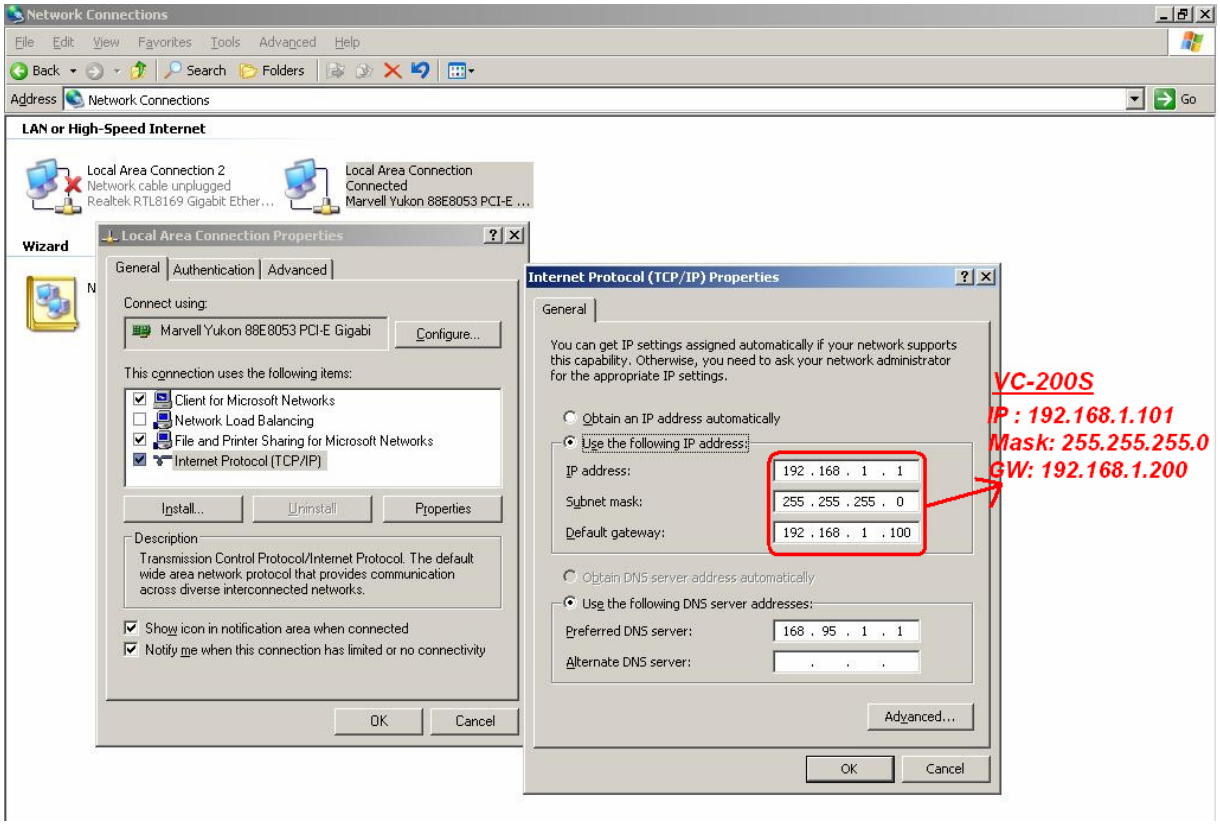


3. Select the **Obtain an IP address from a DHCP server** radio button and click **OK**.



Note: By factory default: DHCP is disabled, Device Mode is Bridge Mode, VC-200M's default LAN IP address is **192.168.1.100**, and VC-200S is **192.168.1.200**.

So please set fix IP address in TCP/IP properties of your network card (show as below), then you can start your Web Browser to login VC-200M or VC-200S (please see **Chapter 3.3**).



Chapter 3: Configuration

3.1 Determine your connection settings

Before you configure the router, you need to know the connection information supplied by your VDSL2 service provider.

3.2 Connecting the VDSL2 Router to your network

Unlike a simple hub or switch, the setup of the VDSL2 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. These modes are router, bridge.

3.3 Configuring with Web Browser

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

1. To configure the router, open your browser, type ***http://192.168.1.100*** for VC-200M and ***http://192.168.1.200*** for VC-200S in the browsers address box.

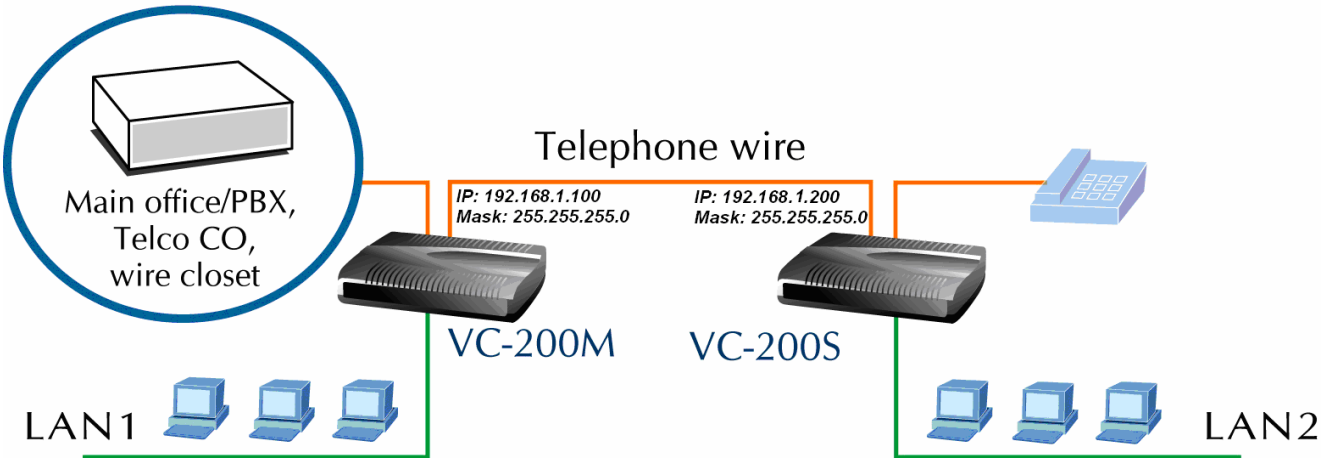
Save this address in your Favorites for future reference.

At login prompt will appear, and default password is "**admin"**, then click **'LOGIN**'.

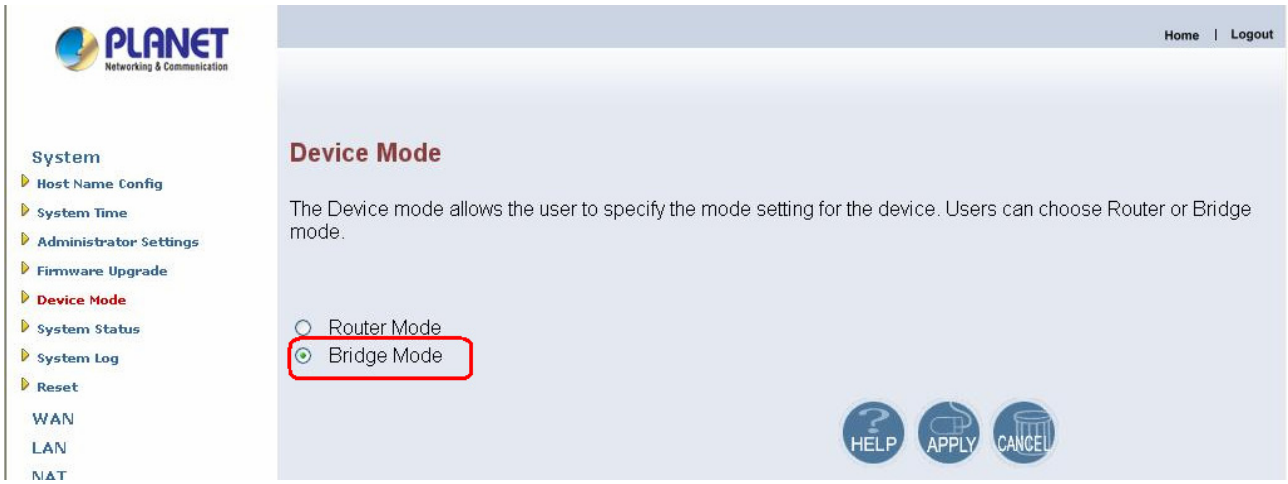
3.4 Quick Installation

There are two device modes: Bridge Mode and Router Mode can configure the VC-200M and VC-200S when in different mode, displayed show as below.

Bridge Mode



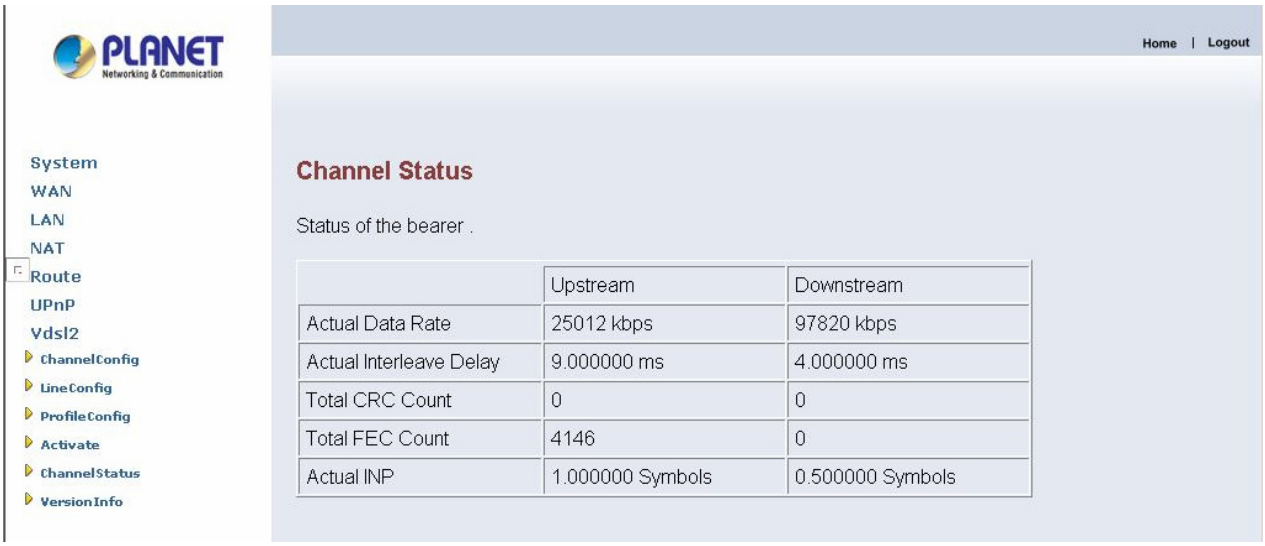
Step1- Click "**Bridge Mode**" in VC-200M and VC-200S, and then press "**APPLY**" to submit setting.



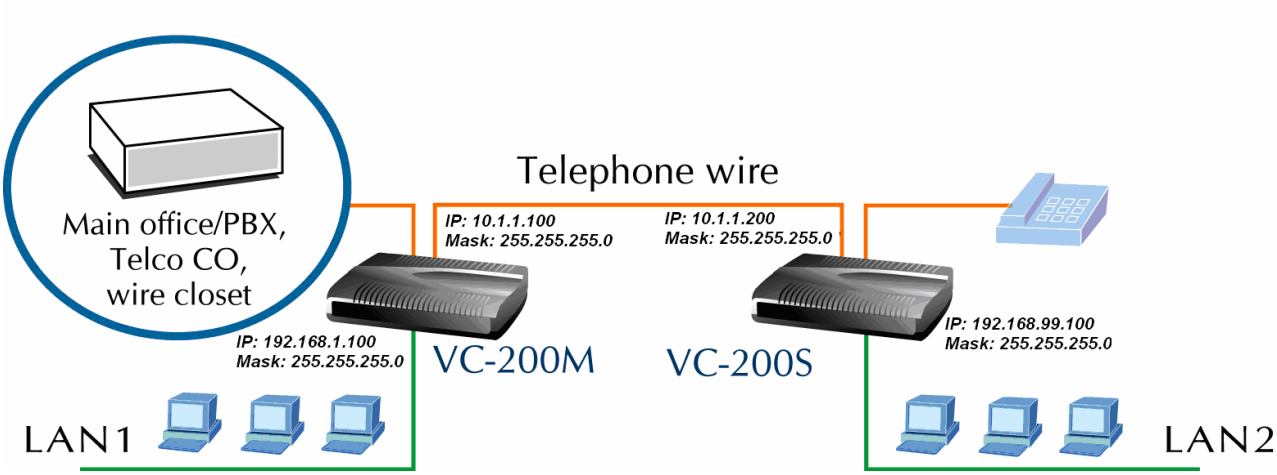
Step2- Select profile in VC-200M and VC-200S, we suggest select same profile in VC-200M and VC-200S, otherwise the connection won't synchronously.

Step3- Click "**Active**" to make the connection is ready.

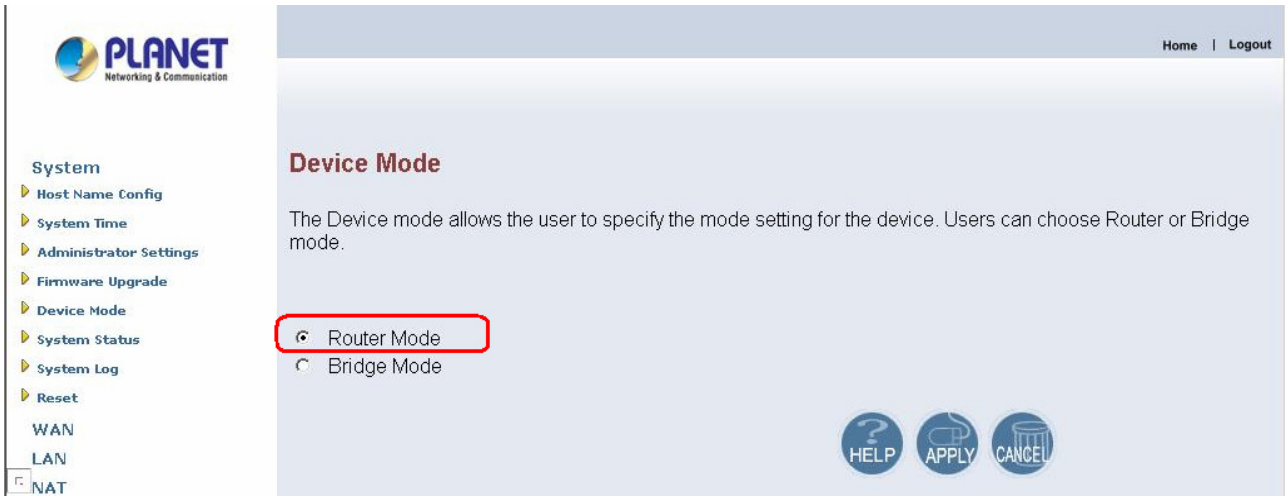
Step4- After successful connect between VC-200M and VC-200S, the information will show on channel status.



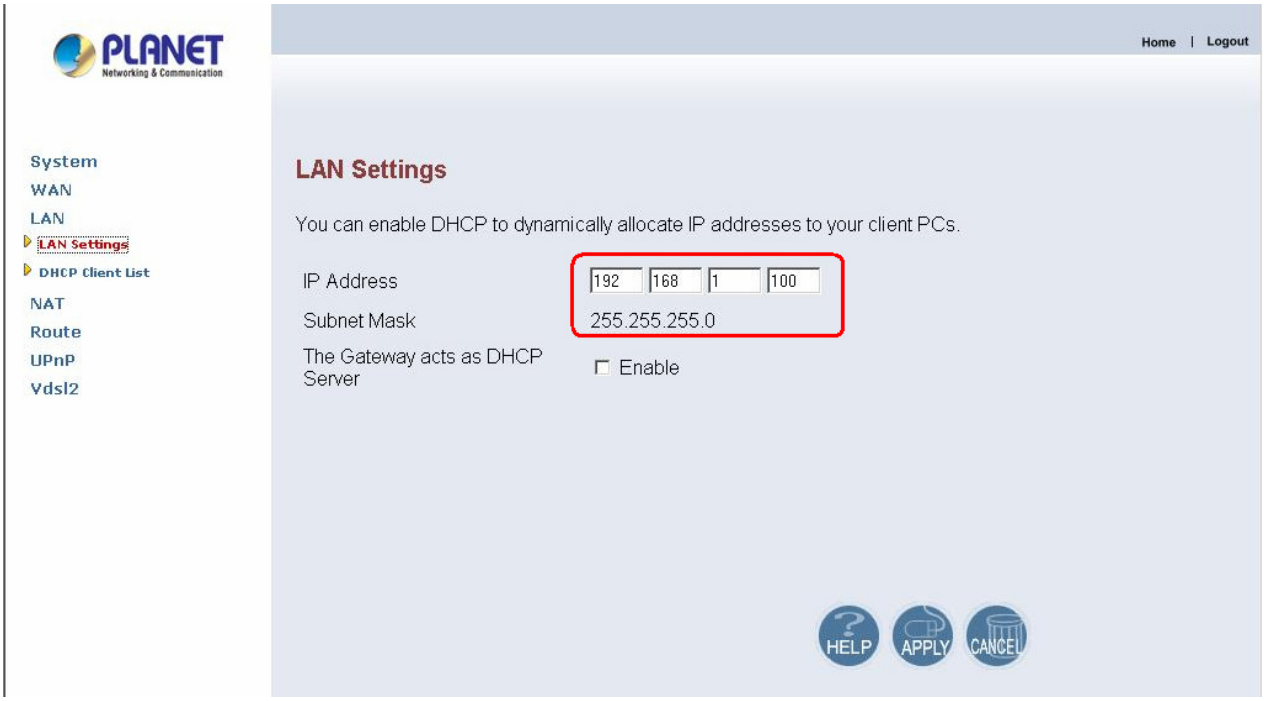
Router Mode



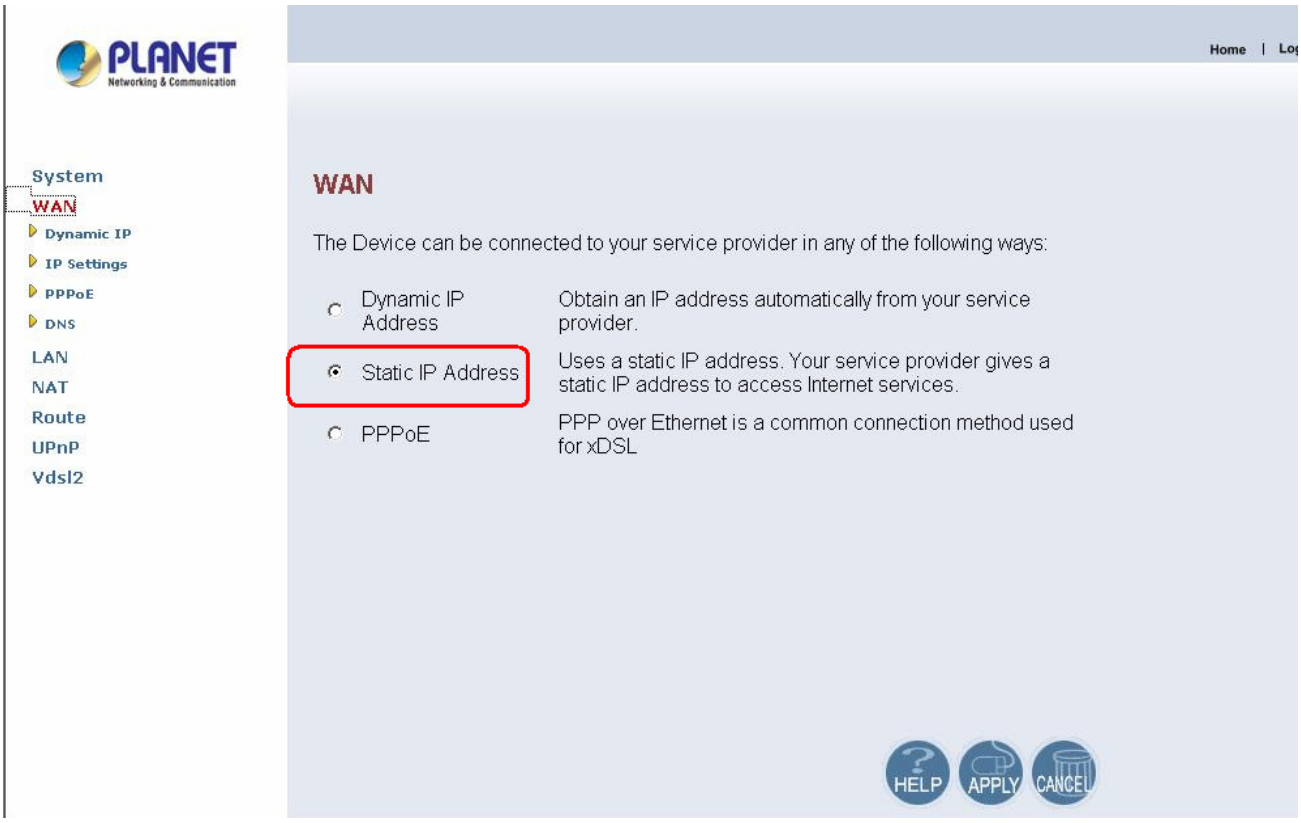
Step1- Click "**Router Mode**" in VC-200M and VC-200S, and then press "**APPLY**" to submit setting.



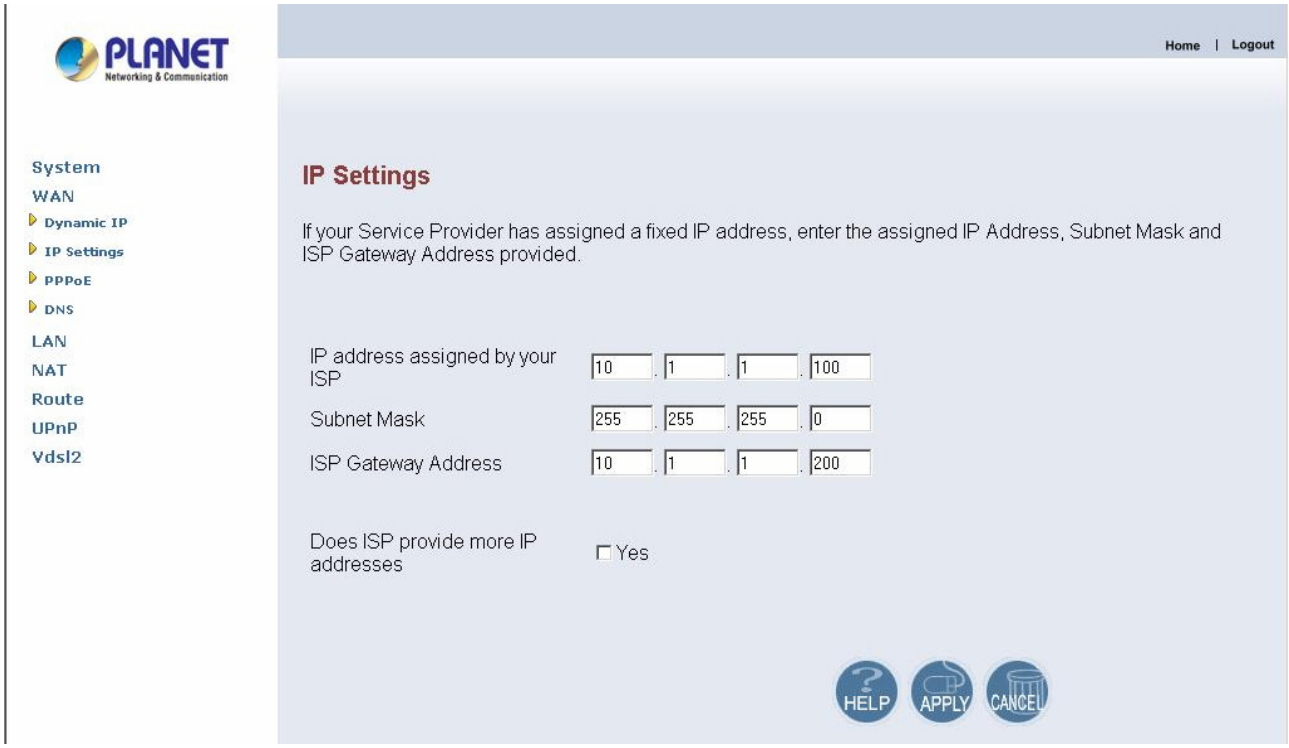
Step2- Change LAN IP address, e.g. VC-200M is **192.168.1.100**, VC-200S is **192.168.99.100**.



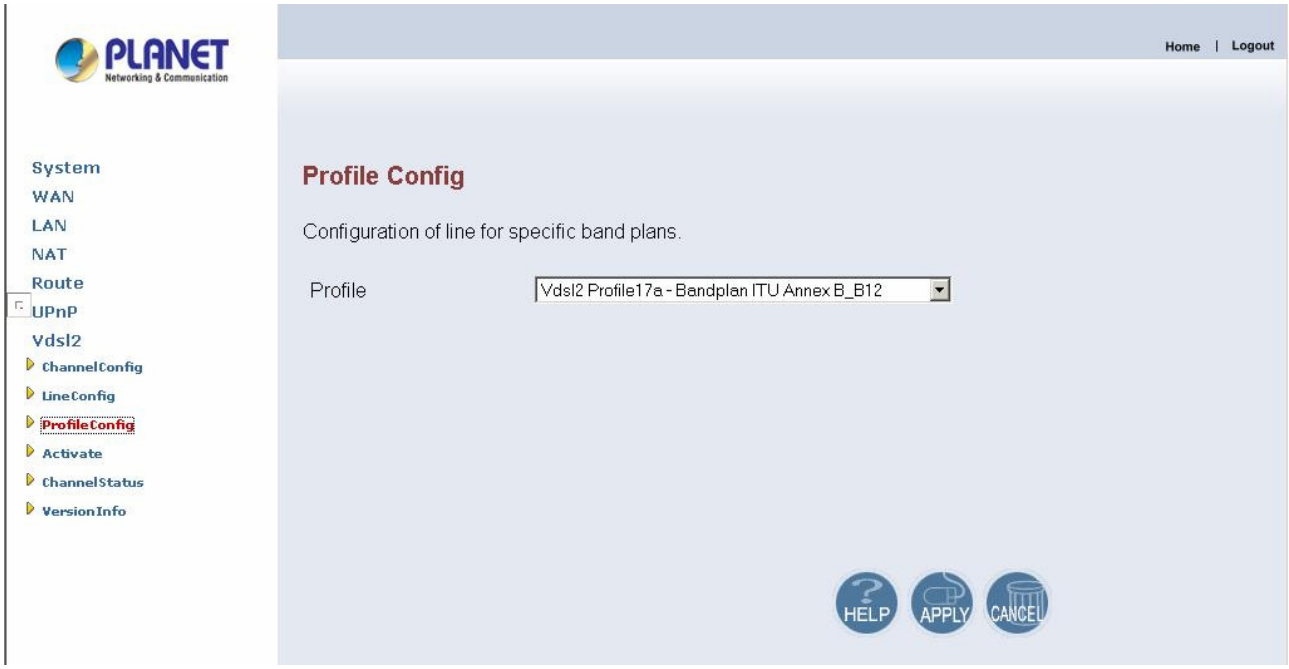
Step3- Select WAN IP address, e.g. we set WAN to the Static IP address.



Step4- Fill in WAN IP address, e.g.VC-200M is set 10.1.1.100, VC-200S is 10.1.1.200, and gateway address should point each other.

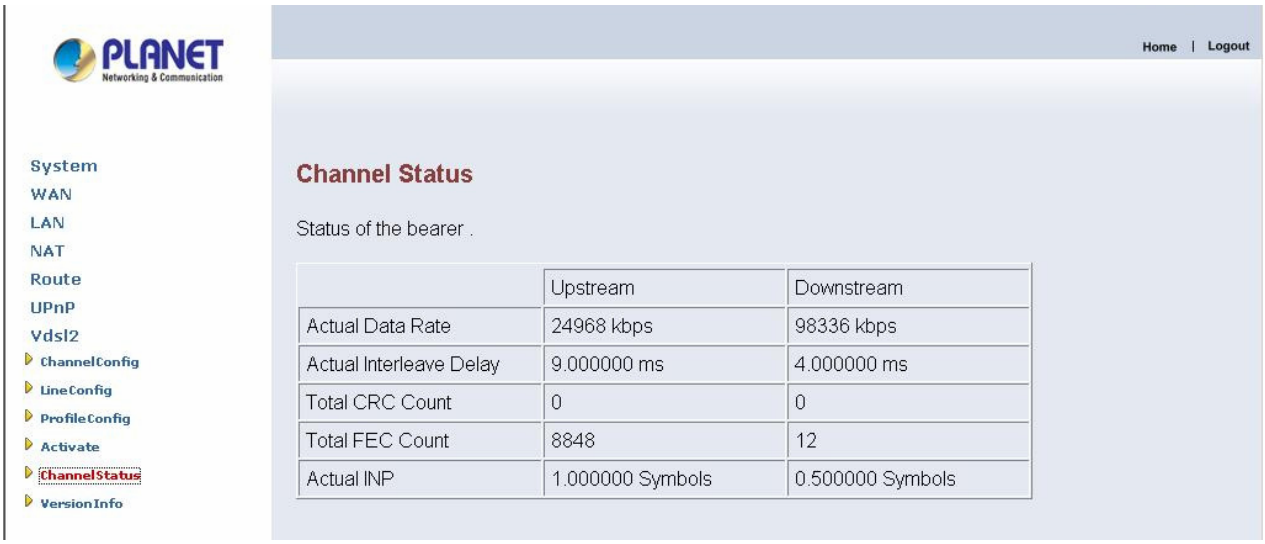


Step5- Select profile in VC-200M and VC-200S, we suggest select same profile in VC-200M and VC-200S, otherwise the connection won't synchronously.



Step6- Click "**Active**" to make the connection is ready.

Step7- After successful connect between VC-200M and VC-200S, the information will show on channel status.



Note: Please reference the throughput test for Bridge Mode and Router Mode in **Appendix A: Throughput of VDSL2 profiles**.

3.5 Configuration Menu for Administrator

The chapter is only for Administrator.

The Homepage is the first screen displayed when a user logs on the VDSL2 ROUTER Web UI. The VDSL2 ROUTER Web UI is categorized into two modules.

1. Setup Wizard- An easy-to use setup wizard provides the most common configurations.
2. Advanced Setup- Advanced setup features allow the user to configure all the functions that are supported by VDSL2 ROUTER like routing, and UPnP.

3.5.1 Setup Wizard

The Setup Wizard is designed for ease-of-use in order to quickly configure the most common settings. The Admin can view the **Setup Wizard** link in the Web UI. The wizard's first step that allows the admin to configure the system host settings displayed show as below.

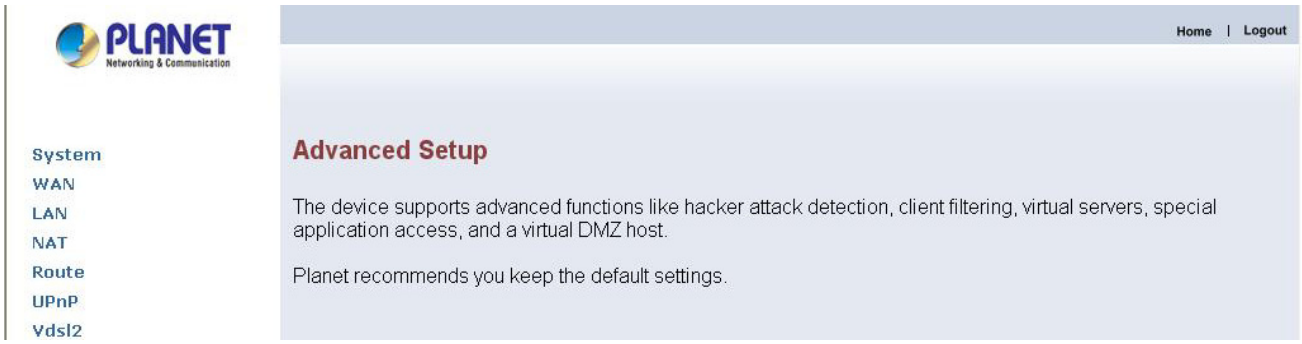
There are five steps to complete the wizard. Follow the instructions given in each step and enter the desired settings.

3.5.2 Advanced Setup

Click on the **Advanced Setup** link in the Web UI in case you want to configure a wider range of settings. The following configuration options are displayed in the left navigation bar, show as below.

- System

- WAN
- LAN
- NAT
- Route
- UPnP



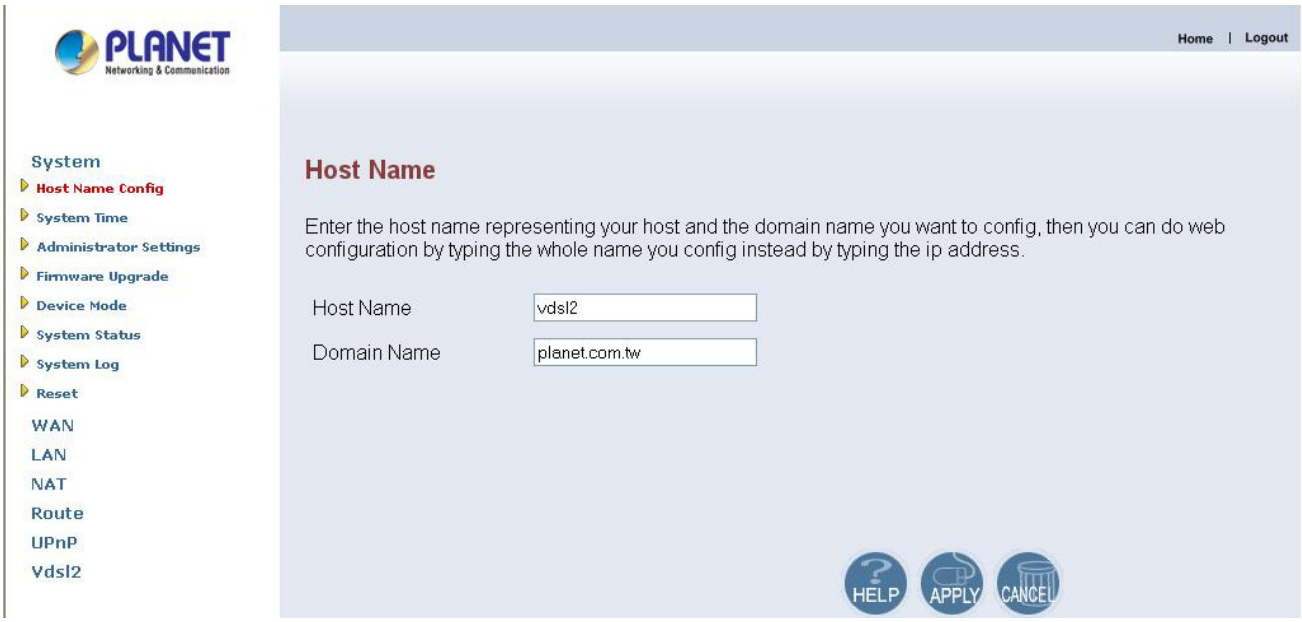
3.5.3 System

The **System** link can be viewed in the left navigation bar. The following are the options available under system, show as below.

- Host Name Config
- System Time
- Administrator Settings
- Firmware Upgrade
- System Status
- System Log
- Reset

3.5.3.1 Host Name Config

To configure System settings, the user has to enter host and domain name. Click on the **Host Name Config** link in the left navigation bar, show as below.

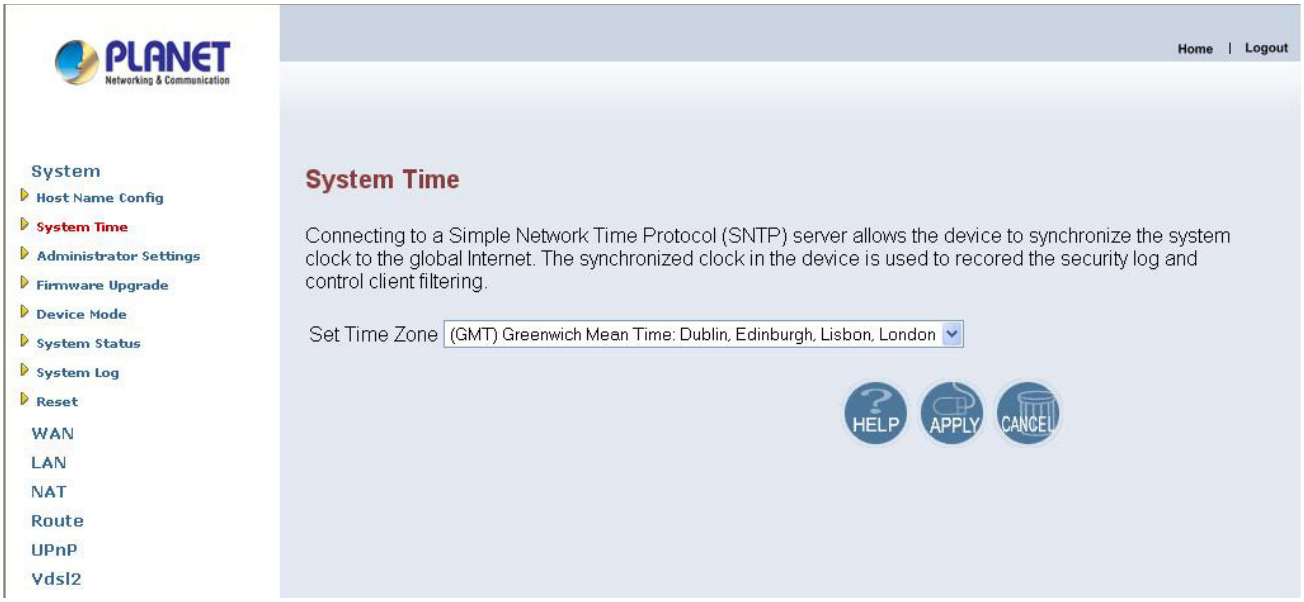


The screen contains the following details:

Filed	Description
Host Name	Enter the host name of the VDSL2 ROUTER.
Domain Name	Enter the domain name of the VDSL2 ROUTER.

3.5.3.2 System Time

To configure the system time zone, click on the **System Time** link in the left navigation bar, show as below.



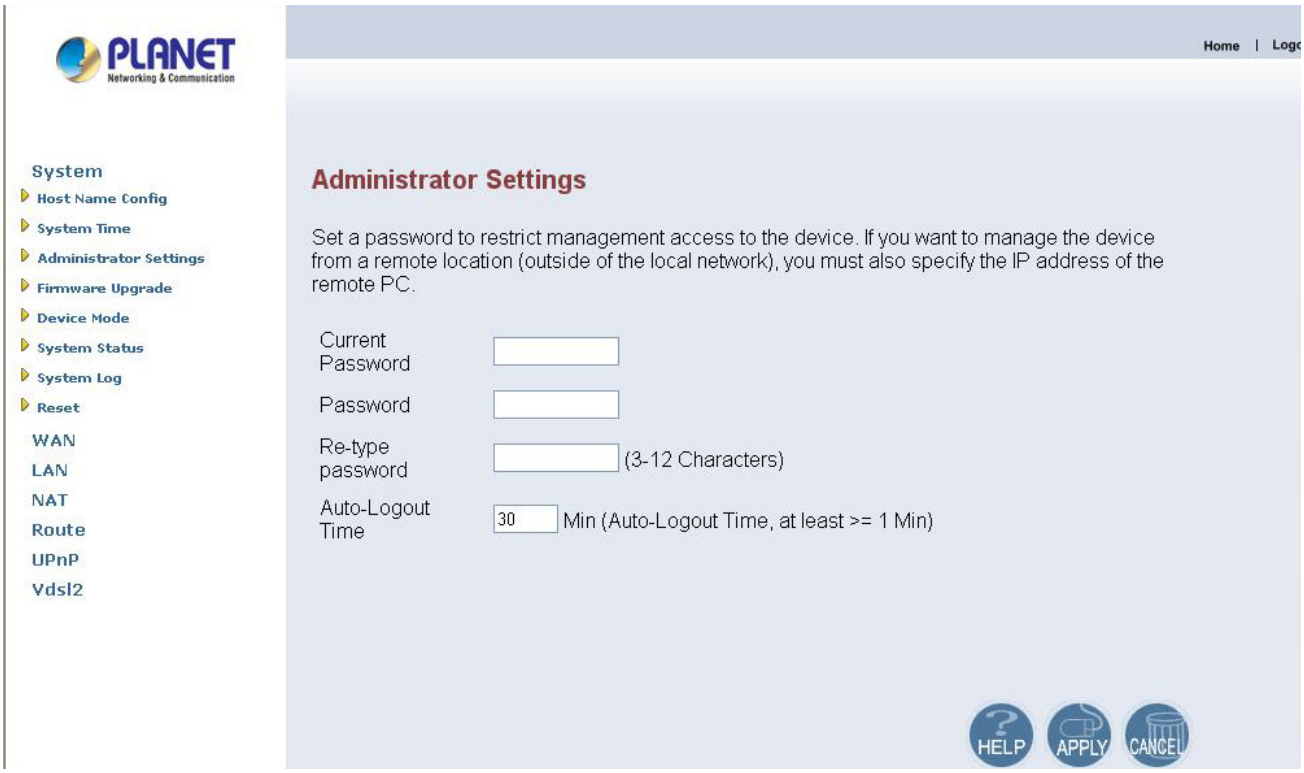
The screen contains the following details:

Filed	Description
Set Time Zone	Synchronize the system clock with the SNTP server.

- Click "**CANCEL**" to exit from this page without saving the changes.
- Click "**APPLY"** to save the information that has been entered.

3.5.3.3 Administrator Settings

To add a user or change user's password, click on the **Administrator Settings** link in the left navigation bar, show as below.



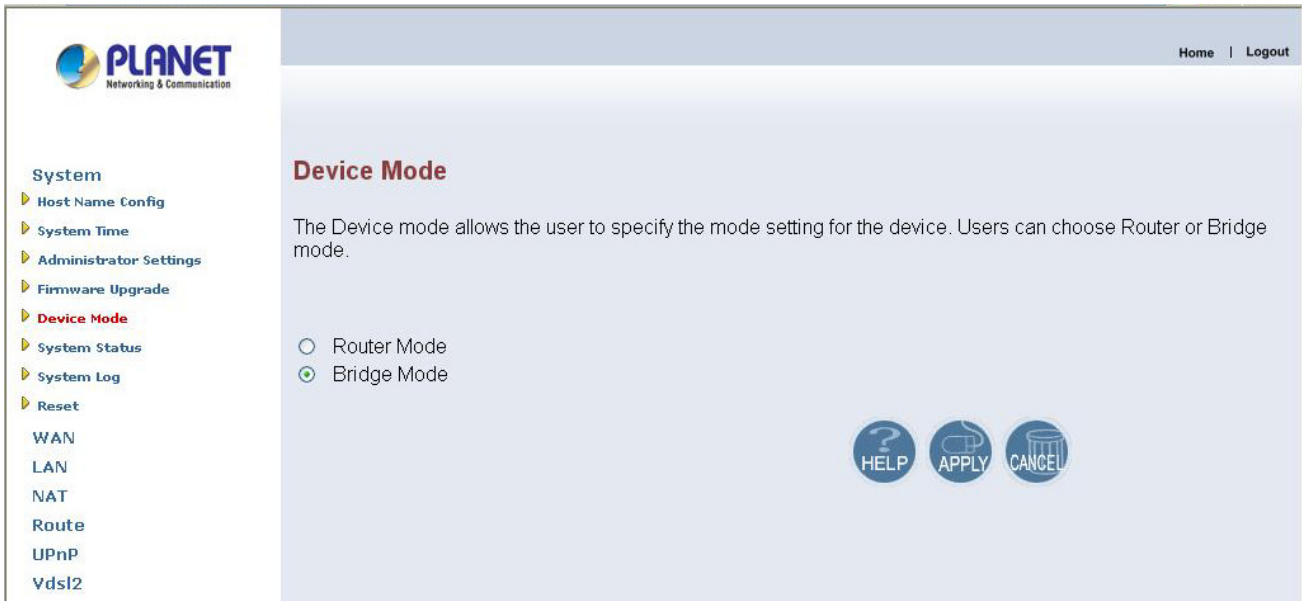
While adding a user, each user must be assigned a separate port. Hence the number of user that can bee added to the system depends on the number of ports available on the VDSL2 ROUTER.

Filed	Description
Current Password	This is the password associate with the administrator. This is enabled only for the user **Administrator** login.
Password	This is the password of the login administrator.
Re-Type Password	This is password verification.
Auto-Logout Time	The auto-logout time, at least one minute.

3.5.3.4 Device Mode

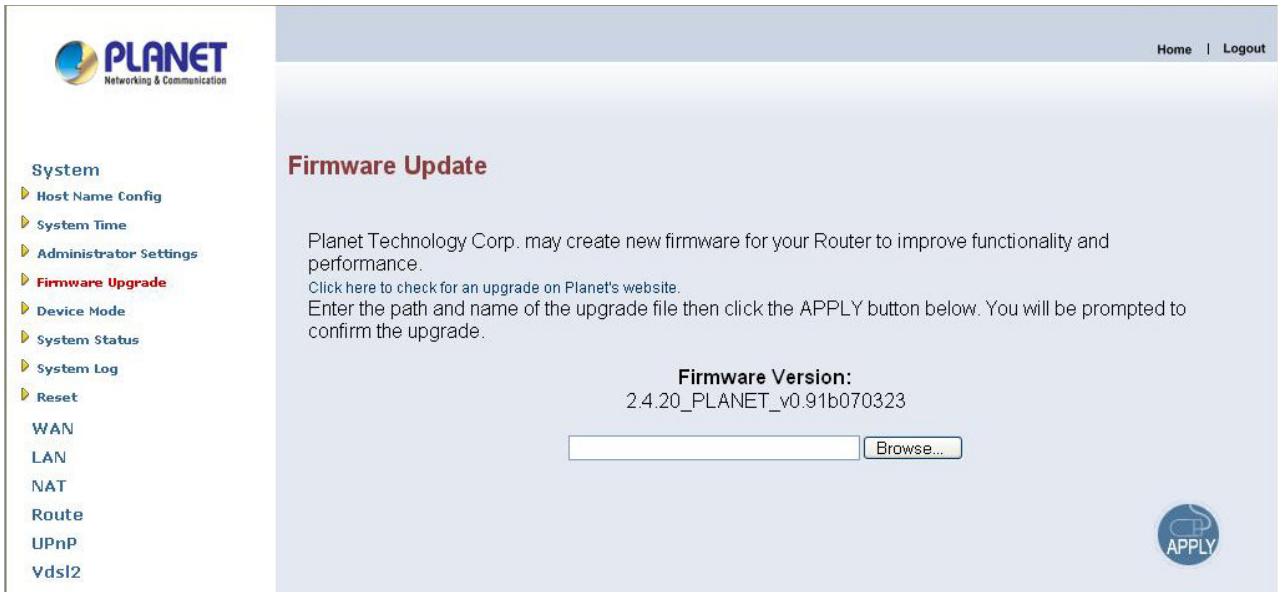
The VDSL2 ROUTER used in the reference system is able to act as either a bridge or a router. Clicking on **Device Mode** link on the left navigation bar allows the user to change the mode of operation, show as below.

Note: By factory default: Device Mode is Bridge Mode.



3.5.3.5 Firmware Upgrade

To update the system firmware, click on the **Firmware Upgrade** link in the left navigation bar, show as below.

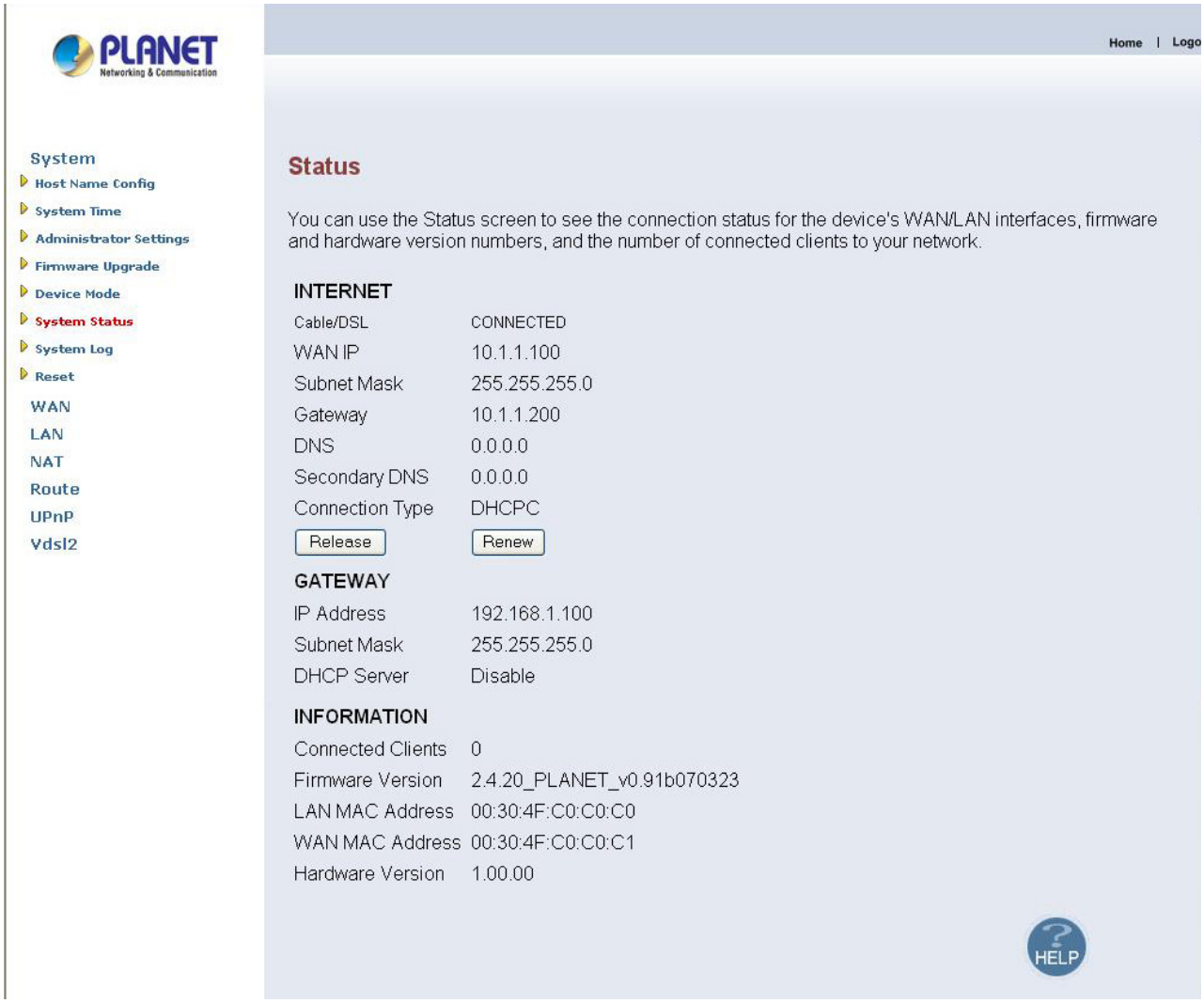


- Click "**Browse**" to select a specified file name to change the file Name.
- Click "**APPLY**" to start the firmware update.

3.5.3.6 System Status

To view system status, click on the **System Status** link in the left navigation bar, show as below.

This screen displays the status of certain important system parameters. It also offers control over the current DHCP lease for the IP Address.



- Click "**Release"** to release IP Address for the WAN interface.
- Click "**Renew"** to renew the IP Address for the WAN interface.

3.5.3.7 System Logs

To view the system logs, click on the **System Logs** link in the left navigation bar, show as below.

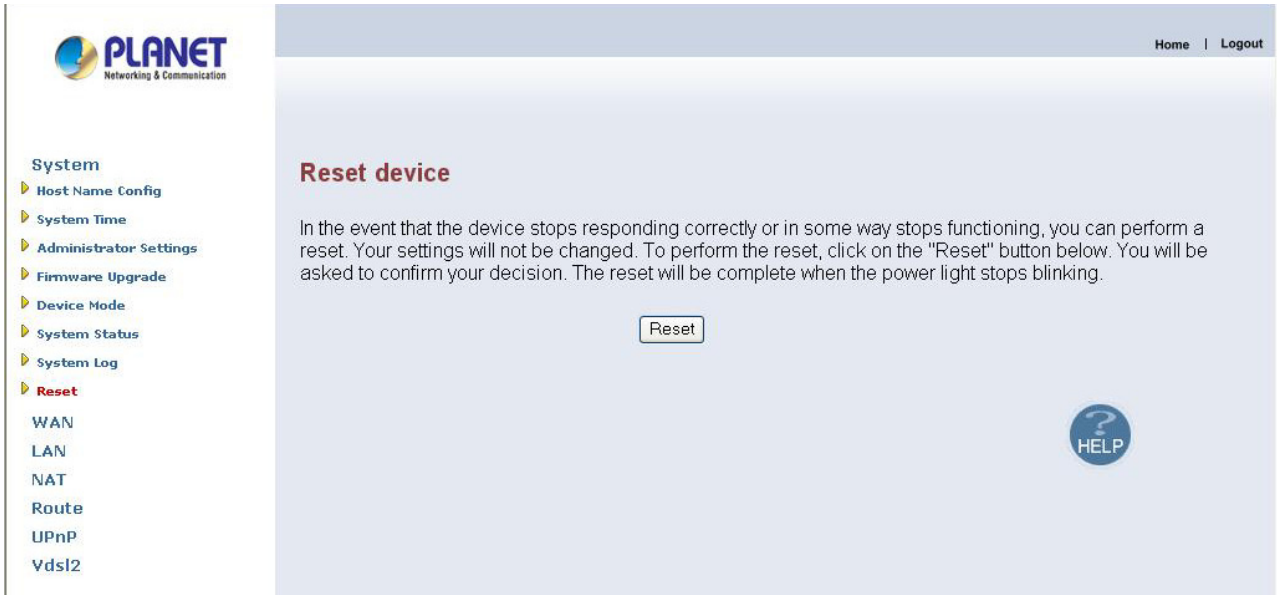
The screen contains the following details:

Filed	Description
Log File	This lists all the system events.

- Click "**Download**" to download the log file to the computer.
- Click "**Clear**" to clear this page.
- Click "**Refresh**" to retrieve system event and update the log file.

3.5.3.8 Reset

To restart the system, click on the **Reset** link in the left navigation bar, show as below.

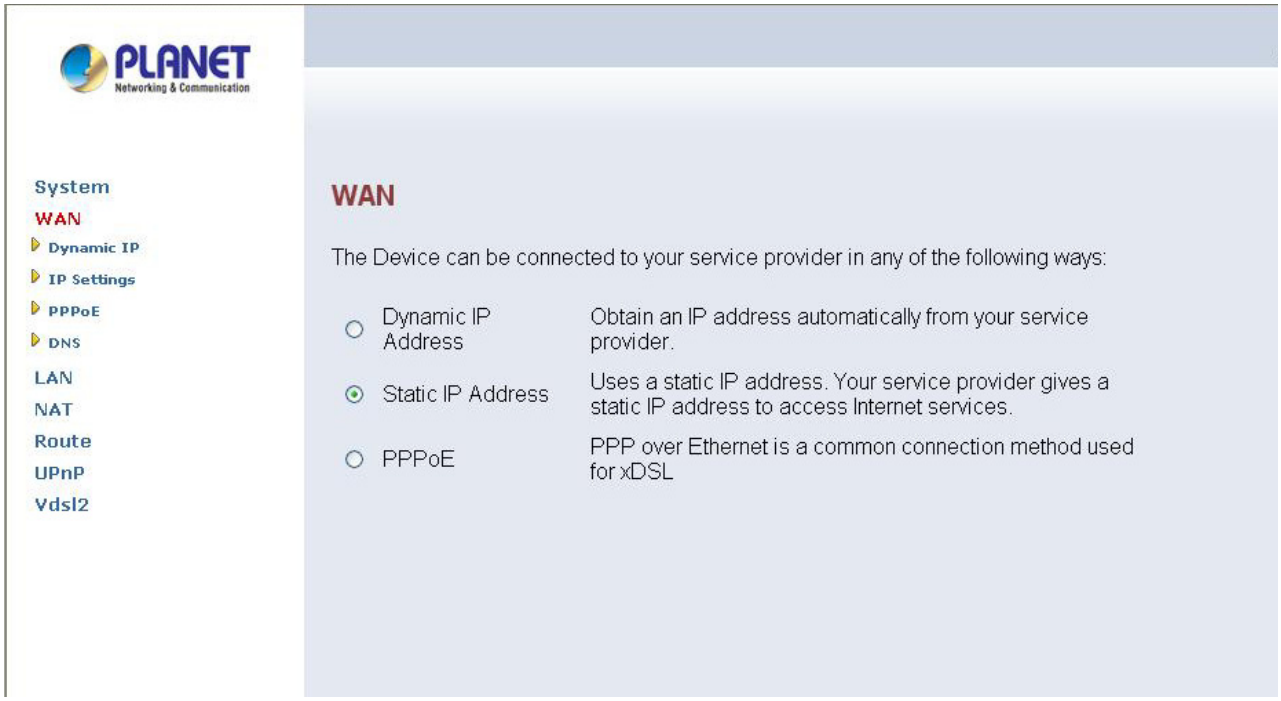


- Click "**Reset"** to restart the system.

3.5.4 WAN

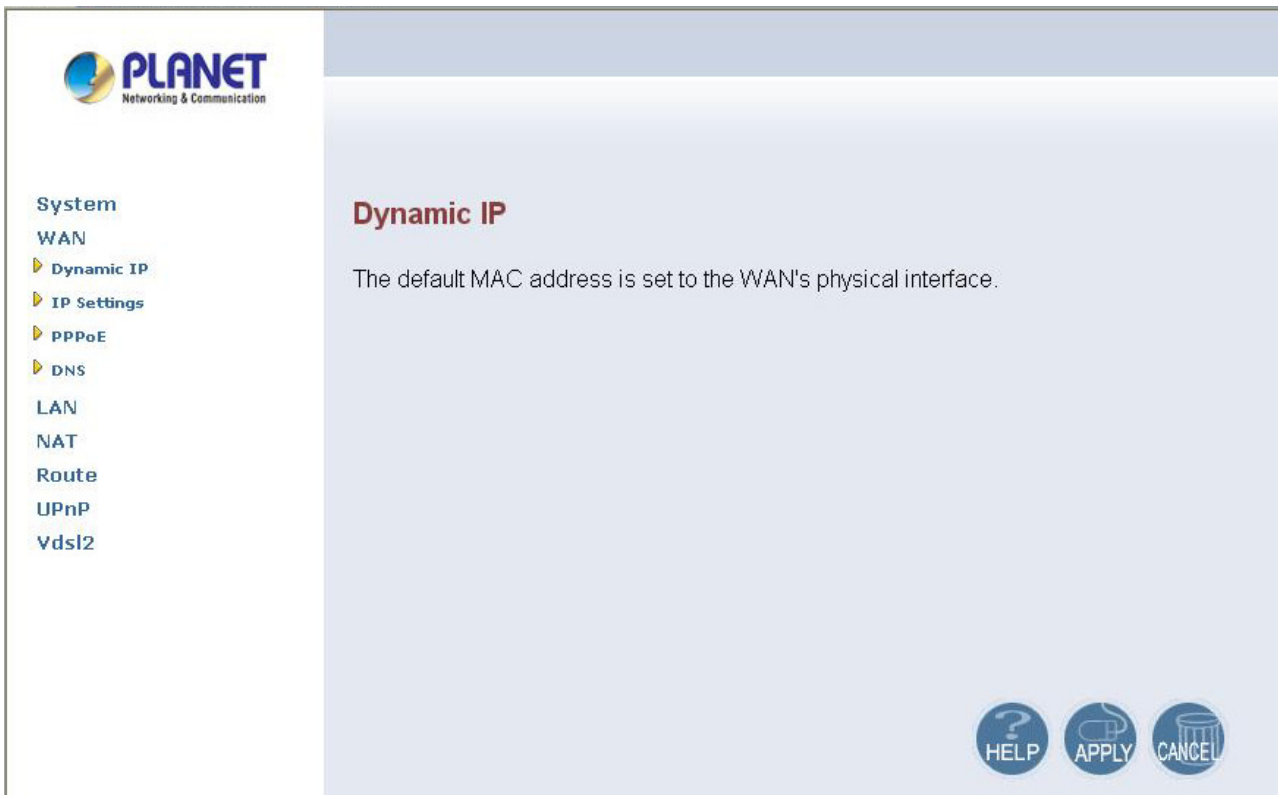
The WAN settings can be viewed in the left navigation bar. The following are the options available under WAN, show as below.

- Dynamic IP
- Static IP
- PPPoE
- DNS



3.5.4.1 Dynamic IP

To configure the WAN interface to dynamically obtain an IP Address, click on the **Dynamic IP** link in the left navigation bar, show as below.

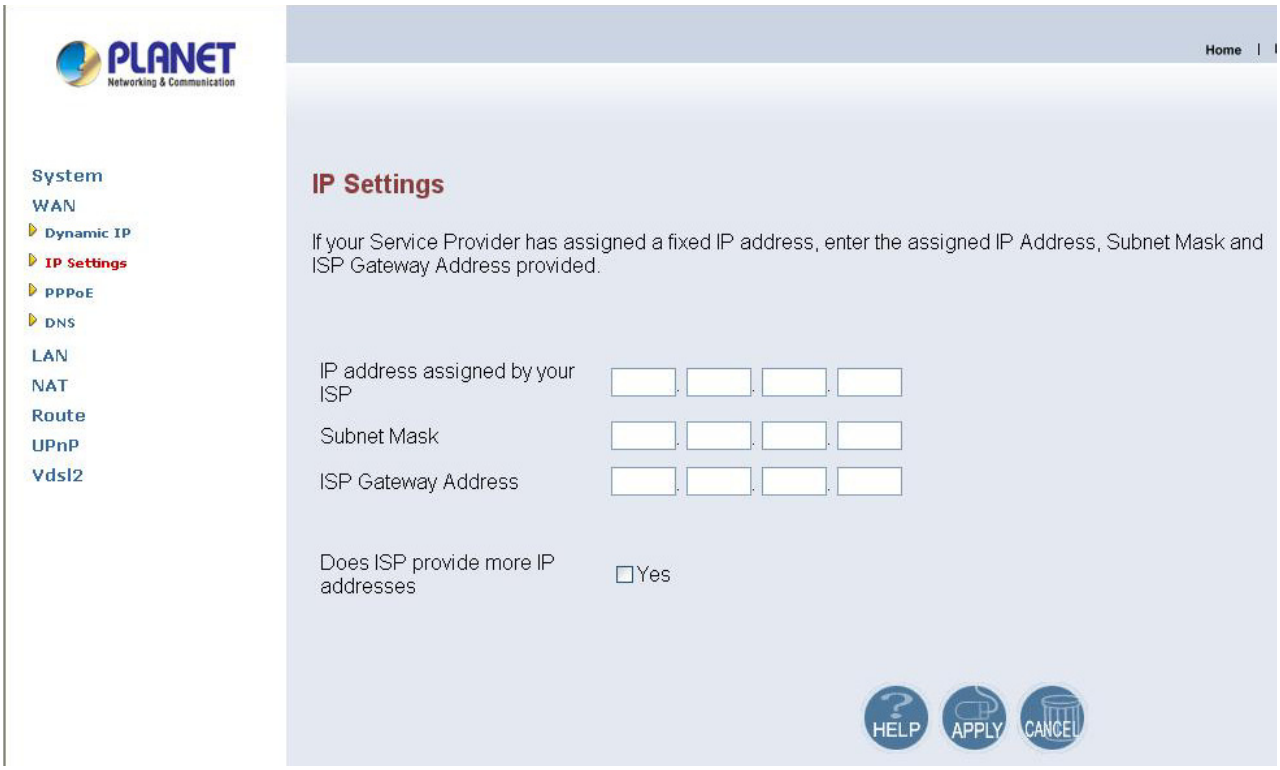


The screen contains the following details:

- Click "**APPLY**" to save the information that has been entered.
- Click "**CANCEL**" to exit from this page.

3.5.4.2 Static IP

To configure the WAN interface to use a Static IP Address, click on the **Static IP** link in the left navigation bar, show as below.

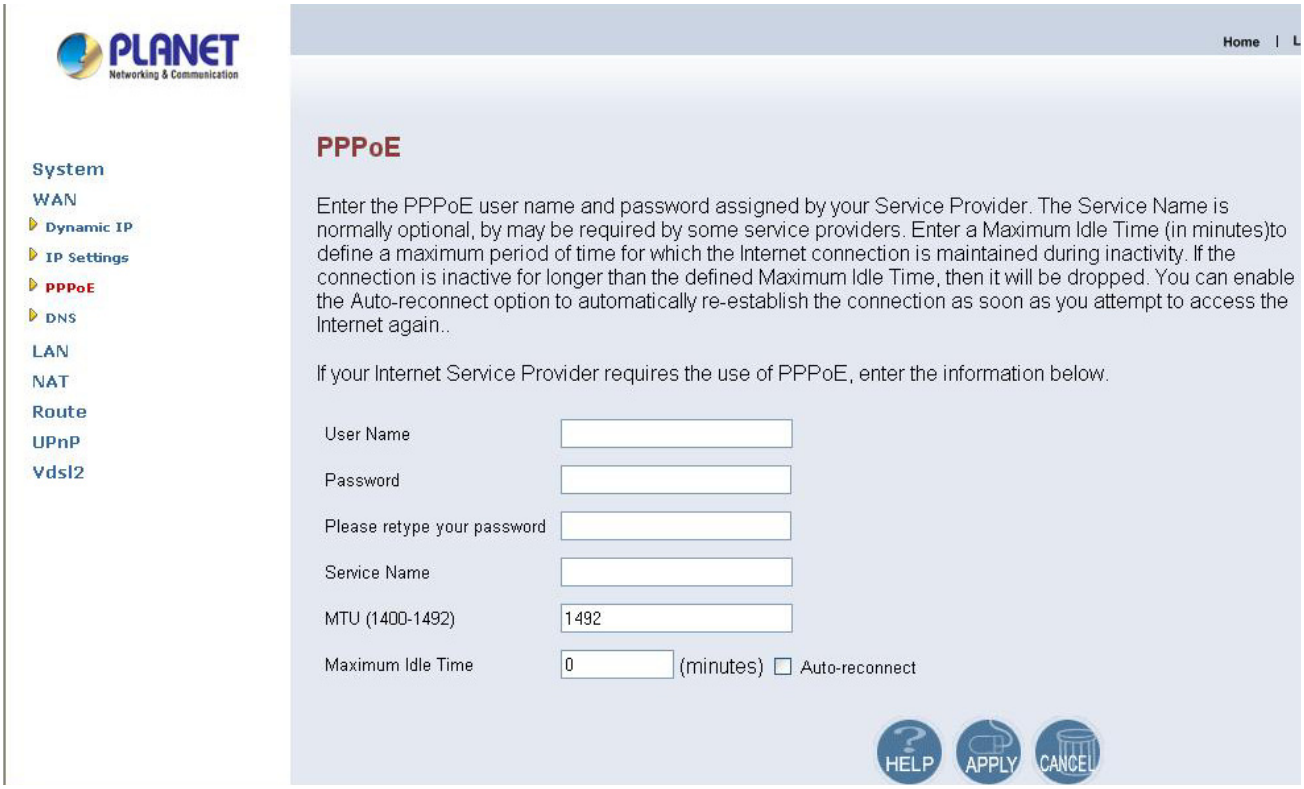


The Screen contains the following details:

Filed	Description
IP Address assigned by your ISP	Enter the IP Address of VDSL2 ROUTER.
Subnet Mask	Enter the Subnet Mask of VDSL2 ROUTER.
ISP Gateway Address	Enter the Gateway address of VDSL2 ROUTER.
Does ISP provide more IP Address	Provides more IP Addresses of the WAN interface. Select the check box to enable this option.

3.5.4.3 PPPoE

To configure the WAN interface to use PPPoE, click on the **PPPoE** link in the left navigation bar, show as below.



The screen contains the following details:

Filed	Description
User Name	Enter a name to use the PPPoE session.
Password	Enter the password of login user.
Re-Type Password	Enter the password to reconfirm.
Service Name	Enter a service name.
MTU	Enter the maximum connection units of the PPPoE. The MTU range is 1400 to 1492 bytes, by factory default is **1492**.
Maximum Idle Time	This is the period of time required to keep the connection alive if no packets are transmitted. If no packets are transmitted between LAN port and WAN port or between VDSL2 ROUTER and WAN, the connection is disconnected after the "**Maximum Idle Time**" If the **Auto-reconnect** check box is selected, the PPP connection is re-established if there is some data that is received from the upper layers to be transmitted on this link.

- Click "**CANCEL**" to exit from this page without saving the changes.
- Click "**APPLY**" to save the information that has been entered.

3.5.4.4 DNS

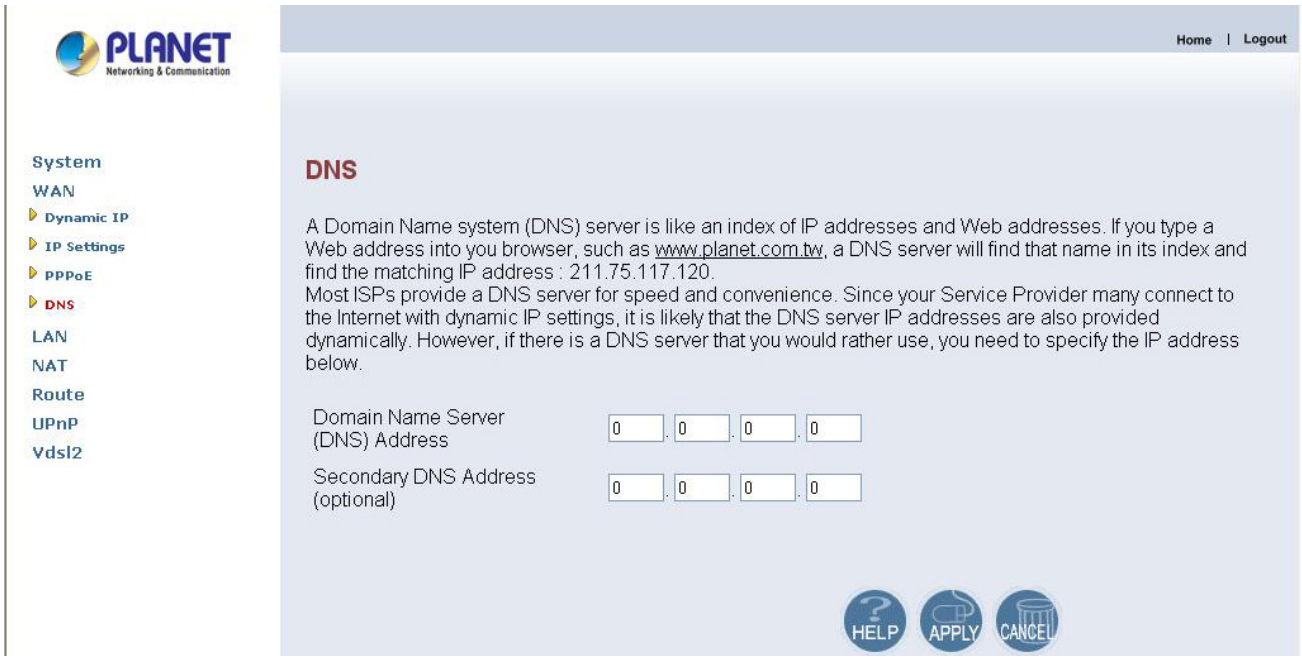
Domain **N**ame **S**ervice (DNS) stores and associates many types of information with domain names.

Most importantly, it translates domain names (computer hostnames) to IP addresses. It also lists mail exchanges servers accepting e-mail for each domain.

In providing a worldwide keyword-based redirection service, DNS is an essential component of contemporary Internet use.

DNS service must translate the name into the corresponding IP address. For example, the domain name www.example.com might translate to 198.105.232.4.

To configure the DNS address, click on the **DNS** link in the left navigation bar, show as below.



The screen contains the following details:

Filed	Description
Domain Name Server(DNS) Address	Enter the DNS address of the primary DNS server.
Secondary DNS Address(optional)	Enter the address of the secondary DNS server, if available.

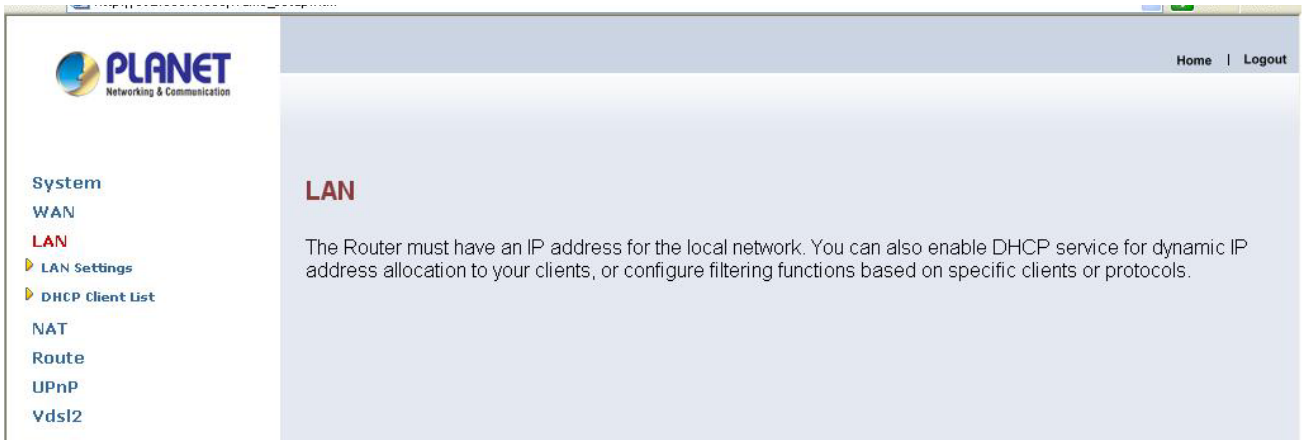
- Click "**CANCEL**" to exit from this page without saving the changes.

- Click "**APPLY**" to save the information that has been entered.

3.5.5 LAN

The LAN setting can be viewed in the left navigation bar. The following are the options available under LAN, show as below.

- LAN settings
- DHCP Client List

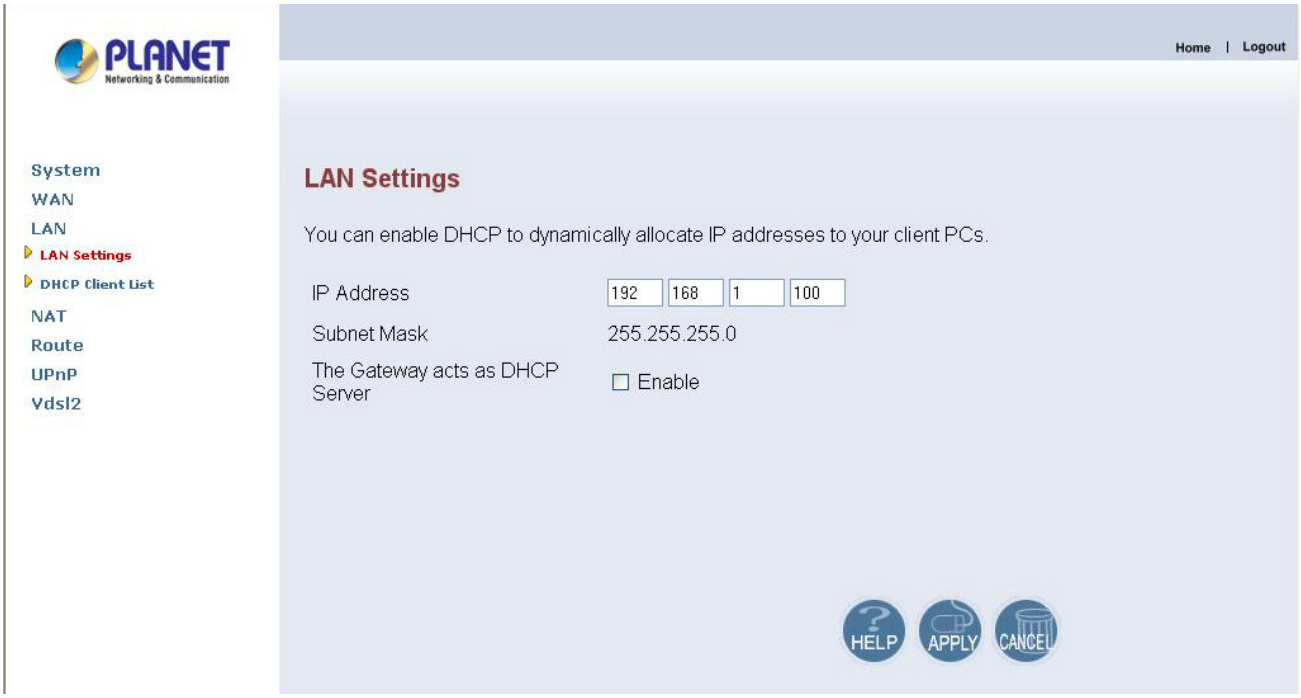


3.5.5.1 LAN Setting

To configure the LAN interface, click on the **LAN Setting** link in the left navigation bar, show as below.

The **D**ynamic **H**ost **C**onfiguration **P**rotocol (DHCP) Server gives out IP addresses when a device is booting up and request an IP to be logged on to the network. It must be set as a DHCP client to obtain the IP address automatically.

Note: By factory default, the DHCP is disabled, VC-200M's default LAN IP address is 192.168.1.100, and VC-200S is 192.168.1.200.



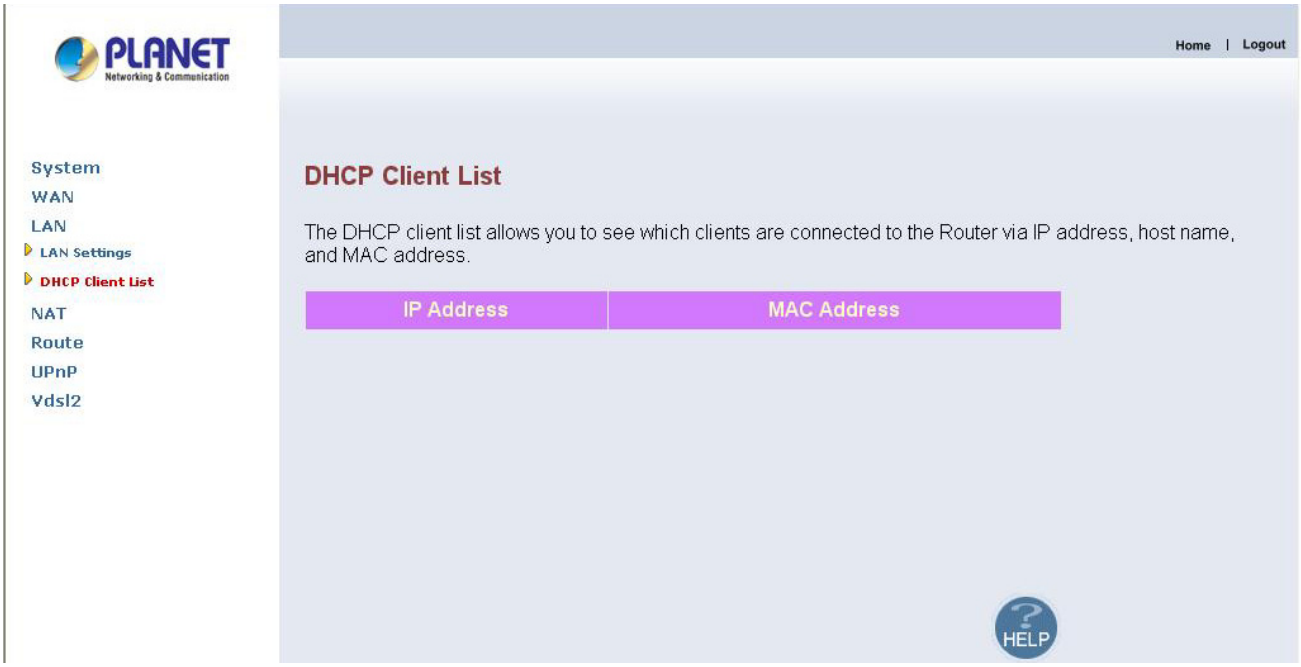
The screen contains the following details:

Filed	Description
IP Address	Enter the LAN interface IP Address of VDSL2 ROUTER
Subnet Mask	Enter the LAN Subnet Mask of VDSL2 ROUTER
The Gateway acts as DHCP Server	Enable or disables the DHCP Server of the of VDSL2 ROUTER. Select the check-box to enable this option.
IP Pool Starting Address	Enter the starting IP Address of the DHCP server.(When Enable DHCP Server)
IP Pool Ending Address	Enter the ending IP Address of the DHCP server. (When Enable DHCP Server)
Lease Time	Select the lease time of the DHCP server. (When Enable DHCP Server)
Local Domain Name	Enter the Domain Name of the DHCP server. (When Enable DHCP Server)

- Click "**CANCEL**" to exit from this page without saving the changes.
- Click "**APPLY**" to save the information that has been entered.

3.5.5.2 DHCP Client List

To view the DHCP client list, click on the **DHCP Client List** link in the left navigation bar, the screen is displayed to list all DHCP client connection with IP Address and MAC Address, show as below.



3.5.6 NAT

Network **A**ddress **T**ranslation (NAT) allows multiple users at your local site to access the Internet through a single public IP address or multiple public IP addresses. NAT can also prevent hacker attacks by mapping local addresses to public addresses for key services such as the Web or FTP.

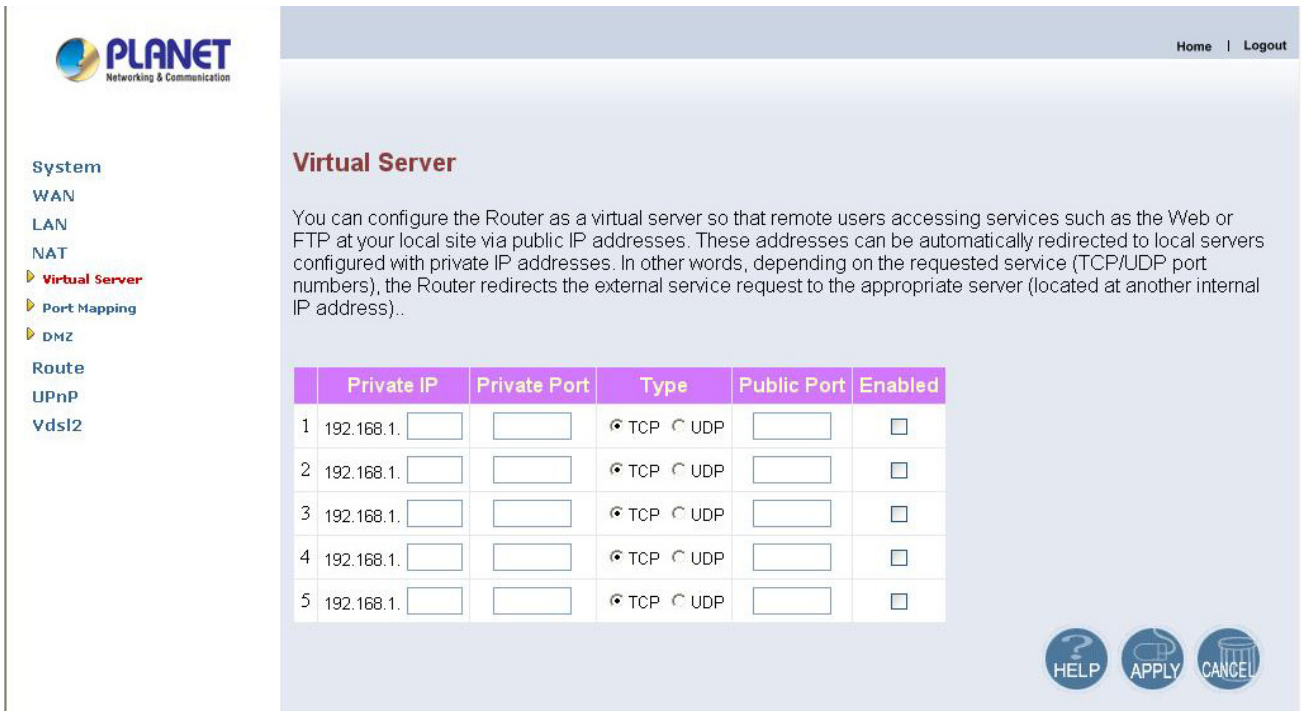
The NAT Settings can be viewed in the left navigation bar. The following are the options available under NAT, show as below.

- Virtual Server
- Port Mapping
- DMZ

3.5.6.1 Virtual Server

You can configure the Router as a virtual sever so that remote users can access services such as the Web or FTP server at your local site via public IP address. These addresses can be automatically redirected to local servers configured with private IP addresses. In other words, depend on the requested service (TCP/UDP port numbers). The Router redirects the external service request to the appropriate server (located at another internal IP address)

To configure virtual server, click on the **Virtual Sever** link in the left navigation bar, show as below.



The screen contains the following details:

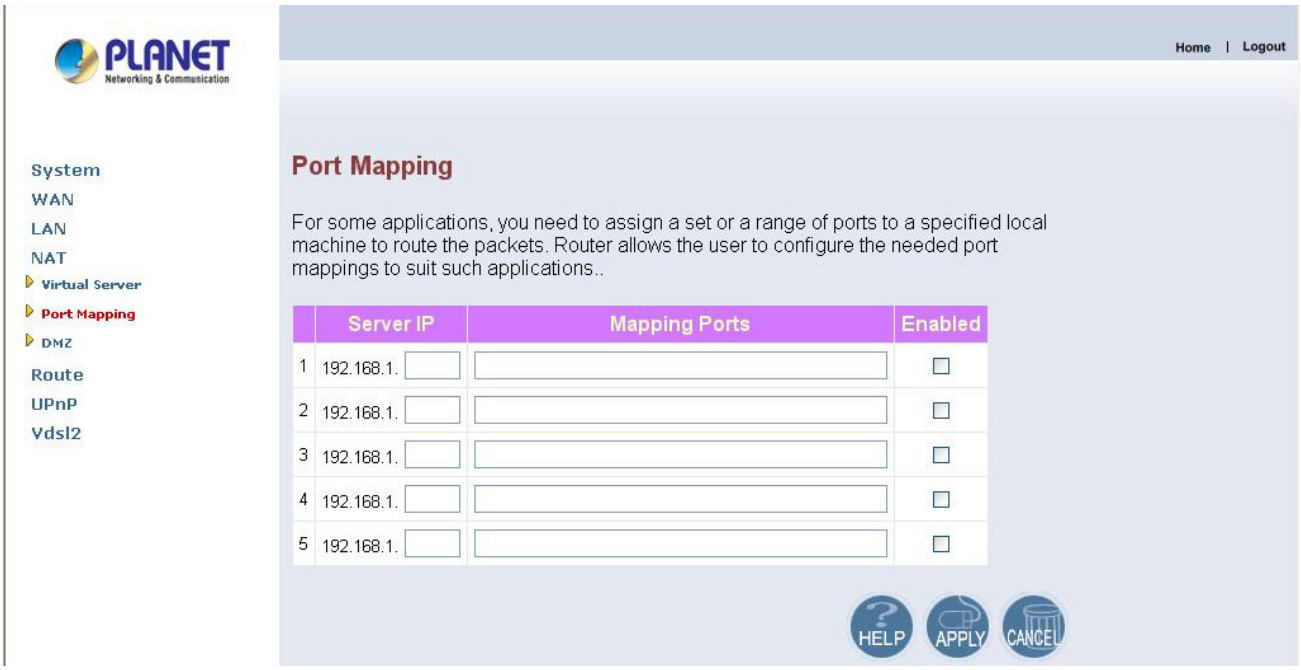
Filed	Description
Private IP	Enter a private IP Address of specified entry.
Private Port	Enter a private Port number of the specified entry.
Type	Select virtual server protocol type of the specified entry.
Public Port	Enter a public Port number of the internet user to access the virtual server.
Enabled	Enable the specified entry of the virtual server.

- Click "**CANCEL**" to exit from this page without saving the changes.
- Click "**APPLY**" to save the information that has been entered.

3.5.6.2 Port Mapping

For some applications, you need to assign a set or a range of port to a specified local machine to route the packets. Router allows the user to configure the needed port mappings to suit such application.

To configure Port Mapping, click on the **Port Mapping** link in the left navigation bar, show as below.



The screen contains the following details:

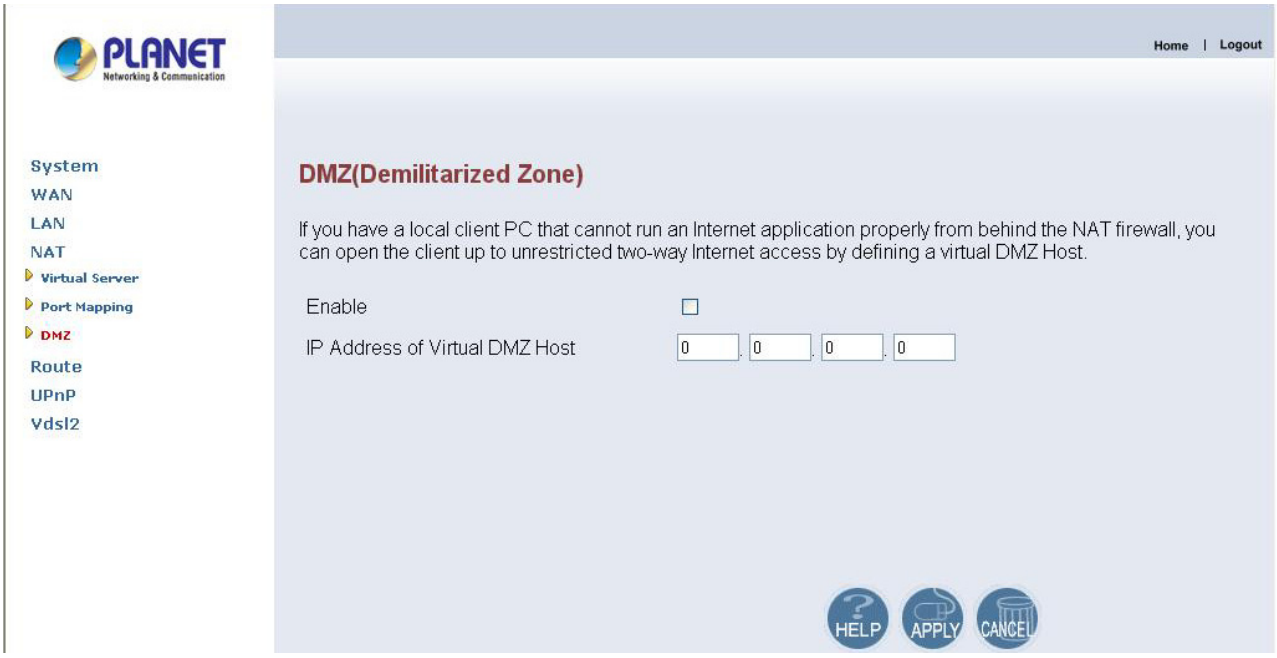
Filed	Description
Server IP	Enter the IP Address of a specified local machine.
Mapping Port	Assign a range of port or specific port number to route the packets. e.g. 8080-8081,21
Enabled	Enable a specified entry of the Port Mapping.

- Click "**CANCEL**" to exit from this page without saving the changes.
- Click "**APPLY**" to save the information that has been entered.

3.5.6.3 DMZ

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.

To configure the DMZ, click on the **DMZ** link in the left navigation bar, show as below.



The screen contains the following details:

Filed	Description

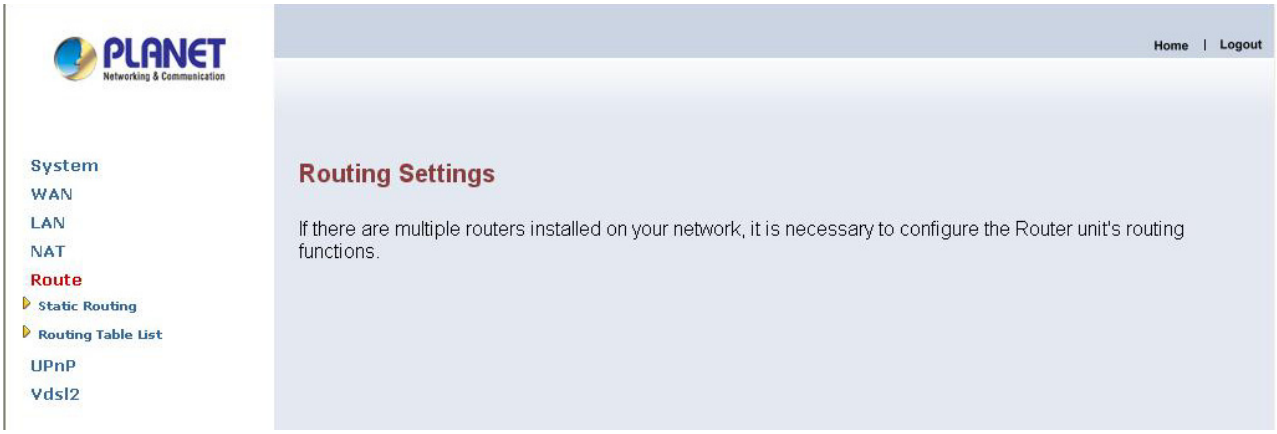
Enable	Enable or disable the DMZ setting of VDSL2 ROUTER.Select the check box to enable this option.
IP Address	Enter IP Address of the DMZ host.

- Click "**CANCEL**" to exit from this page without saving the changes.
- Click "**APPLY**" to save the information that has been entered.

3.5.7 Route

The Route Settings can be viewed in the left navigation bar. The following are the options available under Route, show as below.

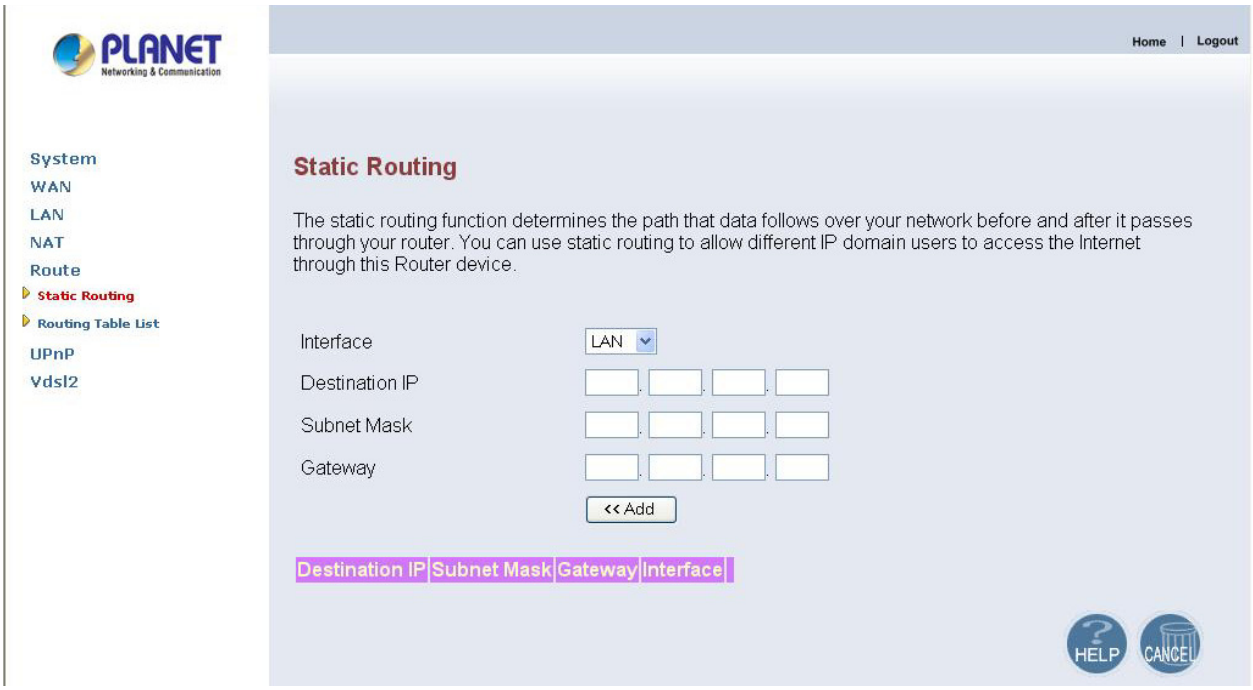
- Static Routing
- Routing Table List



3.5.7.1 Static Route

The static routing function determines the path that data follows over your network before and after it passes through your router. You can use static routing to allow different domain users to access the Internet through this Router.

To setup Static Routing, click on the **Static Routing** link in the left navigation bar, show as below.

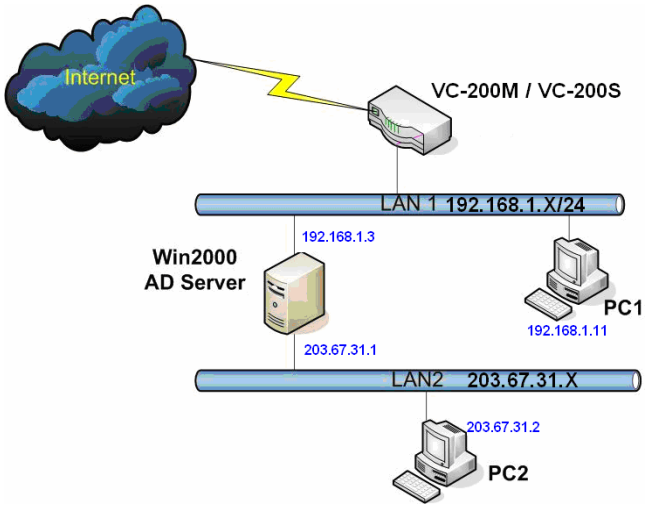


The screen contains the following details:

Filed	Description
Interface	Select the direction of WAN or LAN.
Destination IP	Enter the IP Address of routing entry.
Subnet Mask	Enter the Subnet Mask of routing entry.
Gateway	Enter the Gateway address of routing entry.

- Click "**Add**" to add the information that has been entered.
- Click "**CANCEL**" to exit from this page without saving the changes.

Example:



PC2 can go to Internet through VDSL2 ROUTER, so please reference as below to fill in static routing table.

Interface: LAN

Destination IP: 203.67.31.0

Subnet mask: 255.255.255.0

Gateway: 192.168.1.3

3.5.7.2 Routing Table List

To view the Routing entry table list of VDSL2 ROUTER, click on the **Routing Table** by link in the left navigation bar, show as below.

- Click "**Refresh**" to update currently routing list of VDSL2 ROUTER.

3.5.8 UPnP

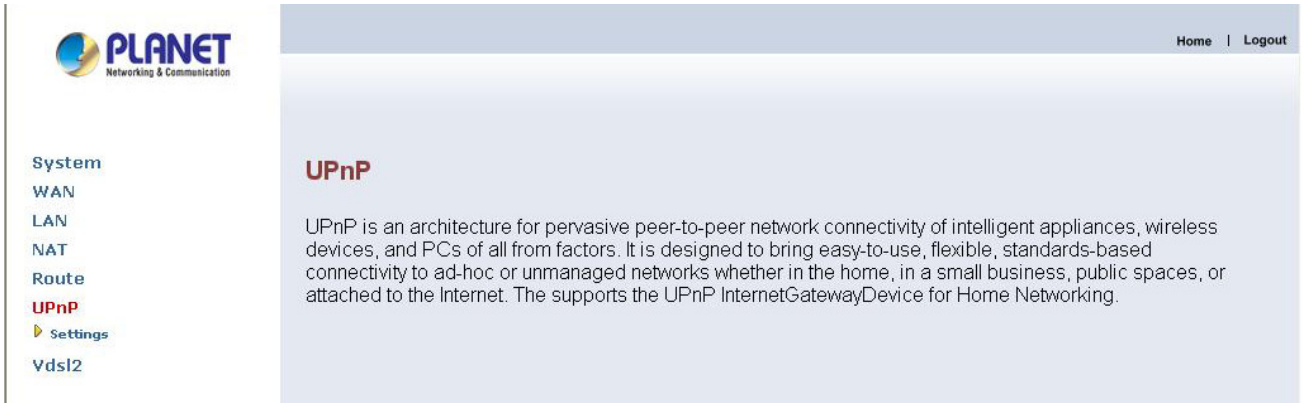
UPnP (Universal Plug and Play) is a distributed, open networking standard that uses TCP/IP for simple peer-to-peer network connectivity between devices. An UPnP device can dynamically join a network, obtain an IP address, convey its capabilities and learn about other devices on the network. In turn, 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.

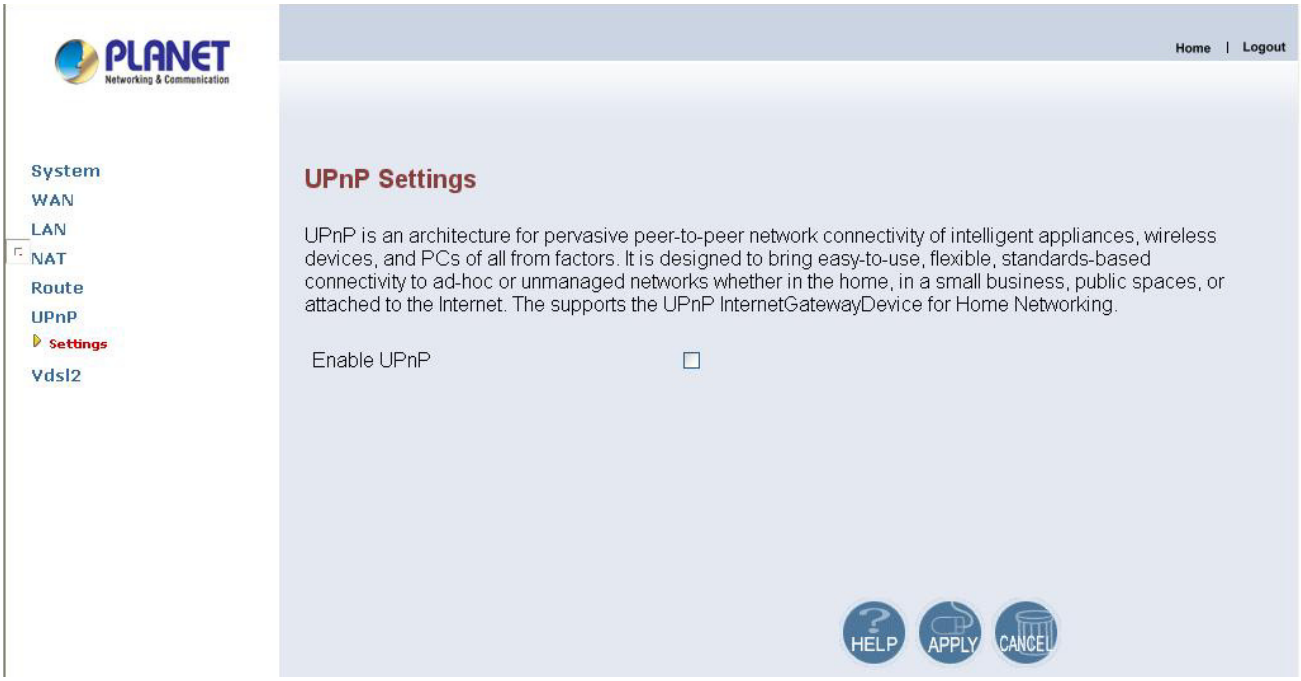
The UPnP settings can be viewed in the left navigation bar. The following are the options available under UPnP, show as below.

- Settings



3.5.8.1 Settings

To enable or disable the UPnP settings, click on the Settings link in the left navigation bar, show as below.



The screen contains the following details:

Filed	Description
Enable UPnP	To enable or disable UPnP Setting. Select the check box to Enable or Disable the UPnP function of VDSL2 ROUTER.

- Click "**CANCEL**" to exit from this page without saving the changes.
- Click "**APPLY**" at any time during configure to save the information that you have been entered.

Chapter 4: Operating the VDSL2 System

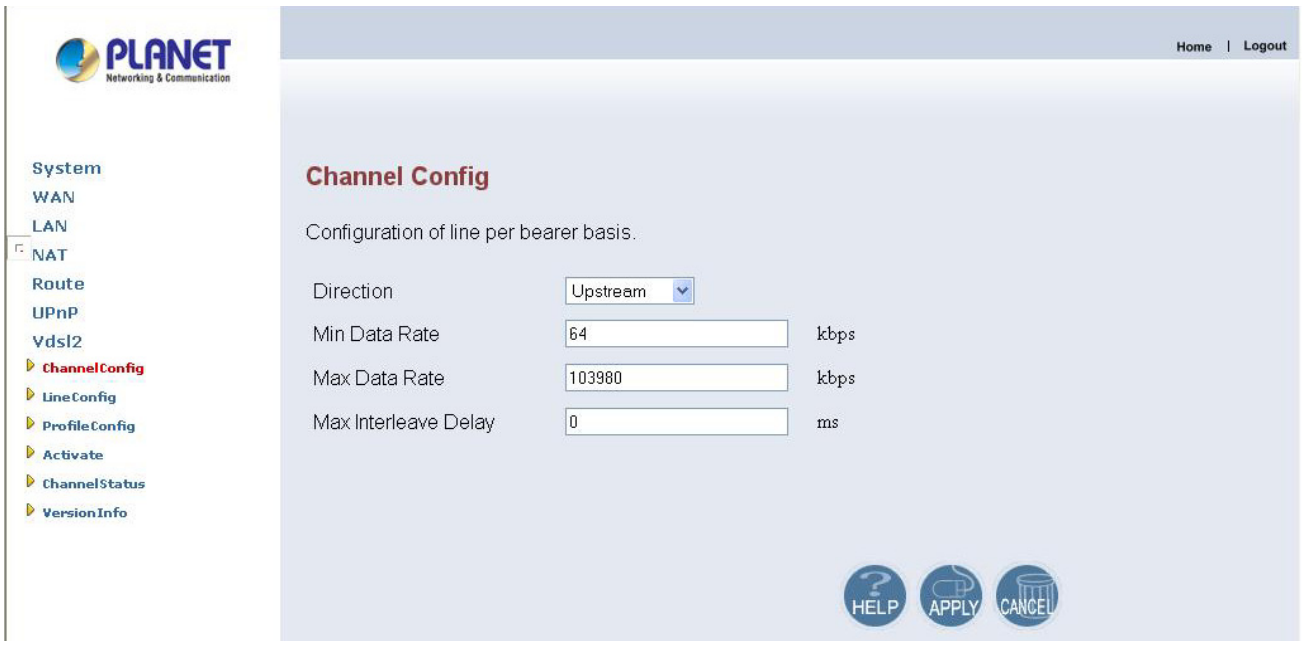
4.1 Configuration Settings

Configure and start the VC-200M and the CPE.

- Configuration: As a minimum configuration, usually selecting the profile is required. See **Chapter 4.1.3**, Profile Configuration
- Next, both sides should be activated from the Web UI.
  See **Chapter 4.1.4**, Line Activation
- The connection status of the link can be monitored.
  See **Chapter 4.1.5**, Channel Status

4.1.1 Channel Configuration

To set direction, Min Data Rate, Max Date Rate, and Max Interleve Delay of channl1, click on the **ChannelConfig** in the left navigation bar, show as below.



The screen contains the following details:

Setting	Description
Direction	To which direction shall the settings apply? • Upstream • Downstream
Min Date Rate	Minimum Payload Date Rate, by factory default is **64 kbps**.
Max Date Rate	Maximum Payload Date Rate, by factory default is **15000 kbps**.
Max Interleave Delay	Maximum Interleave Delay, by factory default is **10ms**.

- Click "**CANCEL**" to exit from this page without saving the changes.
- Click "**APPLY**" at any time during configure to save the information that you have been entered.

4.1.2 Line Configuration

Signal-to-**N**oise **R**atio, often written S/N or SNR, is a measure of signal strength relative to background noise. The ratio is usually measured in decibels (**dB**).

If the incoming signal strength in microvolts is V_s, and the noise level, also in microvolts, is V_n, then the signal-to-noise ratio, S/N, in decibels is given by the formula

$$S/N = 20 \log_{10} (V_s/V_n)$$

If $V_s = V_n$, then S/N = 0. In this situation, the signal borders on unreadable, because the noise level severely competes with it. In digital communications, this will probably cause a reduction in data speed because of frequent errors that require the source (transmitting) computer or terminal to resend some packets of data.

Ideally, V_s is greater than V_n, so S/N is positive. As an example, suppose that V_s = 10.0 microvolts and V_n = 1.00 microvolt. Then

$$S/N = 20 \log_{10} (10.0) = 20.0 \text{ dB}$$

This results in the signal being clearly readable. If the signal is much weaker but still above the noise -- say 1.30 microvolts -- then

$$S/N = 20 \log_{10} (1.30) = 2.28 \text{ dB}$$

This is a marginal situation. There might be some reduction in data speed under these conditions.

If V_s is less than V_n, then S/N is negative. In this type of situation, reliable communication is generally not possible unless steps are taken to increase the signal level and/or decrease the noise level at the destination (receiving) computer or terminal.

To select the direction and target SNRM of line, click on the **Line Confing** link in the left navigation bar, show as below.

The screen contains the following details:

Setting	Description
Direction	Select the target direction of downstream or upstream.
Target SNRM	Set the required SNR Margin×10(50=5dB), by default is **6dB**.

- Click "**CANCEL**" to exit from this page without saving the changes.
- Click "**APPLY**" at any time during configure to save the information that you have been entered.

4.1.3 Profile Configuration

VDSL2 was developed and standardized in record time to address the shortcomings of existing access technologies. It servers as the ideal xDSL technology for eliminating last-mile bottlenecks and enable global mass deployment of advance Triple Play

services.
Unlike its predecessor, which allowed choosing either DMT (Discrete Multitone) or QAM (Quadrature Amplitude Modulation) technology, VDSL2 only uses the DMT line code.
DMT is a method of separating a DSL signal so that the usable frequency range is separated into multiple small frequency bands, or tone. It uses up to 4096 tones which are spaced 4 kHz or 8 kHz apart. Each tone can be used for either downstream or upstream.
However VDSL2 ROUTER provide 10 VDSL2 profiles: 8a, 8b, 12a, 12b, and 17a frequency bands.
Table 1 list 8a, 8b, 21a, 12b, and 17a standard VDSL2 profile about the bandwidth, tones, tone spacing, and line power.

Profile	8a	8b	12a	12b	17a
Bandwidth (MHz)	8.832	8.832	12.	12.	17.664
Tones	2048	2048	2783	2783	4096
Tone Spacing (kHz)	4.3125	4.3125	4.3125	4.3125	4.3125
Line Power (dBm)	+17.5	+ 20.5	+14.5	+14.5	+14.5

<Table 1>

To select VDSL2 profile, click on the **ProfileConfig** link in the left navigation bar, show as below.

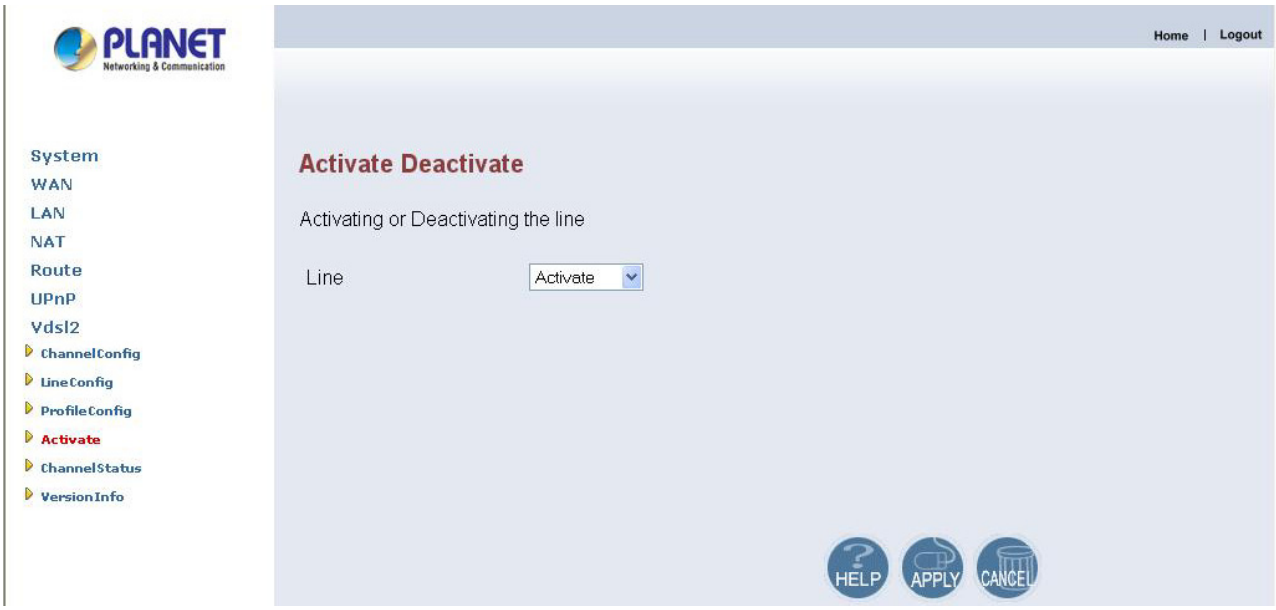
Setting	Description
Profile	Select the ten standard VDSL2 profiles.

- Click "**CANCEL**" to exit from this page without saving the changes.
- Click "**APPLY**" at any time during configure to save the information that you have been entered.

Note: By factory default is VDSL2 Profile 17a-Bandplan ITU AnnexB_B12.

4.1.4 Active

To enable or disable VDSl2, click on the **Active** link in the left navigation bar, show as below.



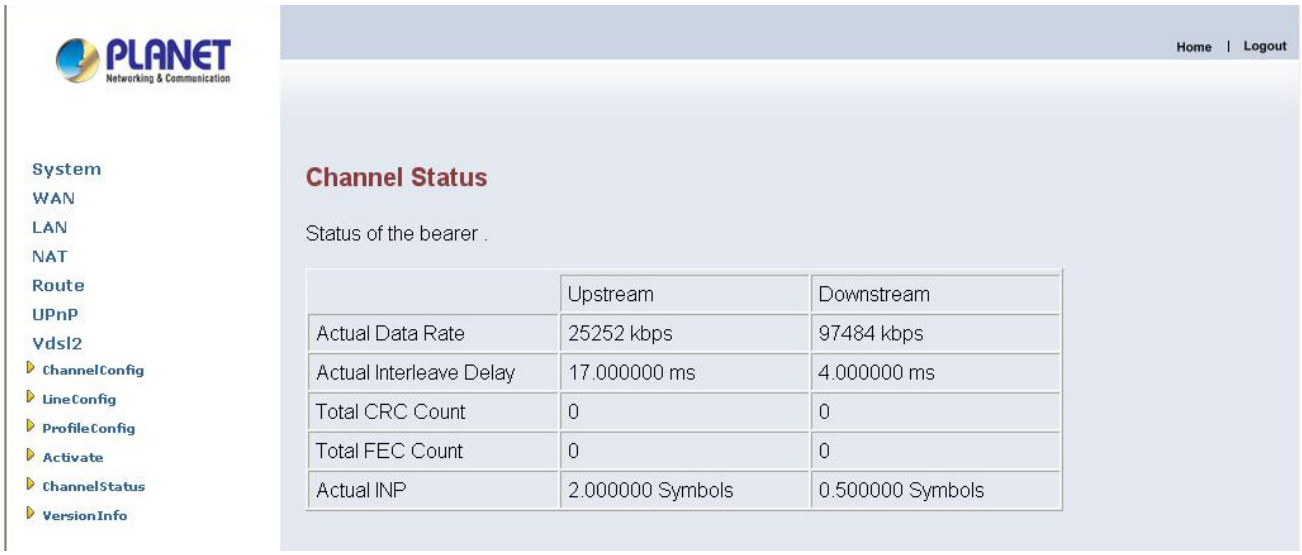
The screen contains the following details:

Setting	Description
Line	Activate or deactivate the line.

- Click "**CANCEL**" to exit from this page without saving the changes.
- Click "**APPLY**" at any time during configure to save the information that you have been entered.

4.1.5 Channel Status

To view the channel status is about Date Rate, Delay, Error Counters and Impulse Noise Protection.



4.1.6 Version Information

To view the version information is about Web UI, API Library, Chipset FW, Chipset HW, and DSL Driver.

Appendix A: Throughput Test for VDSL2 profiles

Short distance		Router Mode		Bridge Mode	
		UP	Down	UP	Down
1	8a-Bandeplan ITU AnnexA_M1_EU32	5M	20M	10M	50M
2	8a-Bandeplan ITU AnnexB_B12	5M	20M	10M	50M
3	8b-Bandeplan ITU AnnexA_M1_EU32	5M	20M	10M	50M
4	8b-Bandeplan ITU AnnexB_B12	5M	20M	10M	50M
5	12a-Bandeplan ITU AnnexA_M1_EU32	15M	15M	30M	50M
6	12a-Bandeplan ITU AnnexB_B12	15M	15M	30M	50M
7	12b-Bandeplan ITU AnnexA_M1_EU32	15M	15M	30M	50M
8	12b-Bandeplan ITU AnnexB_B13	15M	15M	30M	50M
9	17a-Bandeplan ITU AnnexB_B08	15M	15M	30M	100M
10	17a-Bandeplan ITU AnnexB_B12	15M	15M	30M	100M
400M		UP	Down	UP	Down
1	8a-Bandeplan ITU AnnexA_M1_EU32	5M	20M	10M	50M
2	8a-Bandeplan ITU AnnexB_B12	5M	20M	10M	50M
3	8b-Bandeplan ITU AnnexA_M1_EU32	5M	20M	10M	50M
4	8b-Bandeplan ITU AnnexB_B12	5M	20M	10M	50M
5	12a-Bandeplan ITU AnnexA_M1_EU32	15M	15M	30M	50M
6	12a-Bandeplan ITU AnnexB_B12	15M	15M	30M	50M
7	12b-Bandeplan ITU AnnexA_M1_EU32	15M	15M	30M	50M
8	12b-Bandeplan ITU AnnexB_B13	15M	15M	30M	50M
9	17a-Bandeplan ITU AnnexB_B08	15M	15M	30M	100M
10	17a-Bandeplan ITU AnnexB_B12	15M	15M	30M	100M
1KM		UP	Down	UP	Down
1	8a-Bandeplan ITU AnnexA_M1_EU32	5M	20M	10M	30M
2	8a-Bandeplan ITU AnnexB_B12	5M	20M	10M	30M
3	8b-Bandeplan ITU AnnexA_M1_EU32	5M	20M	10M	30M
4	8b-Bandeplan ITU AnnexB_B12	5M	20M	10M	30M
5	12a-Bandeplan ITU AnnexA_M1_EU32	5M	20M	10M	30M
6	12a-Bandeplan ITU AnnexB_B12	5M	20M	10M	30M
7	12b-Bandeplan ITU AnnexA_M1_EU32	5M	20M	10M	30M
8	12b-Bandeplan ITU AnnexB_B13	5M	20M	10M	30M
9	17a-Bandeplan ITU AnnexB_B08	5M	20M	10M	30M
10	17a-Bandeplan ITU AnnexB_B12	5M	20M	10M	30M

Appendix B: Glossary

DHCP

DHCP stands for Dynamic Host Configuration Protocol. This protocol automatically configures the TCP/IP settings of every computer on your home network.

DNS Server Address

DNS stands for Domain Name System, which allows Internet host computers to have a domain name (such as www.planet.com.tw) and one or more IP addresses (such as 192.34.45.8). A DNS server keeps a database of host computers and their respective domain names and IP addresses, so that when a domain name is requested (as in typing " www.planet.com.tw" into your Internet browser), the user is sent to the proper IP address. The DNS server address used by the computers on your home network is the location of the DNS server your ISP has assigned.

DSL Modem

DSL stands for Digital Subscriber Line. A DSL modem uses your existing phone lines to transmit data at high speeds.

Ethernet

A standard for computer networks. Ethernet networks are connected by special cables and hubs, and move data around at up to 100 million bits per second (Mbps).

IP Address

IP stands for Internet Protocol. An IP address consists of a series of four numbers separated by periods that identifies a single, unique Internet computer host. Example: 192.34.45.8.

ISP Gateway Address

(See ISP for definition). The ISP Gateway Address is an IP address for the Internet router located at the ISP's office. This address is required only when using a cable or DSL modem.

ISP

Internet Service Provider. An ISP is a business that provides connectivity to the Internet for individuals and other businesses or organizations.

LAN

Local Area Network. A LAN is a group of computers and devices connected together in a relatively small area (such as a house or an office). Your home network is considered a LAN.

MAC Address

MAC stands for Media Access Control. A MAC address is the hardware address of a device connected to a network.

NAT

Network Address Translation. This process allows all of the computers on your home network to use one IP address. The NAT capability of the Device, allows you to access the Internet from any computer on your home network without having to purchase more IP addresses from your ISP.
Network Address Translation can be used to give multiple users access to the Internet with a single user account, or to map the local address for an IP server(such as Web or FTP) to a public address. This secures your network from direct attack by hackers, and provides more flexible management by allowing you to change internal IP addresses without affecting outside access to your network. NAT must be enabled to provide multi-user access to the Internet or to use the Virtual Server function.

PPPoE

Point-to-Point Protocol over Ethernet. Point-to-Point Protocol is a method of secure data transmission originally created for dial-up connections. PPPoE is for Ethernet connections.

Subnet Mask

A subnet mask, which may be a part of the TCP/IP information provided by your ISP, is a set of four numbers configured like an IP address. It is used to create IP address numbers used only within a particular network (as opposed to valid IP address numbers recognized by the Internet.

TCP/IP

Transmission Control Protocol/Internet Protocol. This is the standard protocol for data transmission over the Internet.

WAN

Specify the WAN connection type required by your Internet Service Provider, then click "Apply" to provide detailed configuration parameters for the selected connection type. Specify one of the first five options to configure a WAN connection through the RJ-45 port.