BIPAC-74*x* GE Series Router

741 GE, 741 GE V2 and 743 GE

User's Manual

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Chapter 1: Introduction

Introduction to your BIPAC-74x GE Series Router

Welcome to the Billion BIPAC-74x GE Series. Your Billion router is an “all-in-one” unit, combining an ADSL modem, ADSL router and Ethernet network switch, providing everything you need to get the machines on your network connected to the Internet over your ADSL broadband connection. With features such as an ADSL Quick-Start wizard and DHCP Server, you can be online in no time at all and with a minimum of fuss and configuration, catering for first-time users to the guru requiring advanced features and control over their Internet connection and network.

Support

This manual will guide you through configuring your router using its web browser interface – all you need to setup and manage your new router is a web browser! If you have any questions or problems that you can’t find the answer for in this manual, please visit the Billion Australia website at http://www.billion.com.au/ and check the FAQ (Frequently Asked Questions), support and forum sections. Billion Australia provides a group of online discussion forums where you can post your question or query to other Billion users like yourself. In addition, Billion Australia offers a telephone support line opens 7 days a week. You can contact the support line on 1300 139 159 or via email at support@billion.com.au

Users looking to directly configure advanced options may wish to read the 74x GE Series CLI (Command Line Interface) manual, available from the Billion Australia website at http://www.billion.com.au/

Features

- **ADSL Multi-Mode Standard**
  Supports downstream transmission rates of up to 8Mbps and upstream transmission rates of up to 1024Kbps. It also supports rate management that allows ADSL subscribers to select an Internet access speed suiting their needs and budgets. It is compliant with Multi-Mode standard (ANSI T1.413, Issue 2; G.dmt(G.992.1); G.lite(G992.2)). The Annex A and B are supported in different H/W platforms.

- **Wireless Ethernet 802.11b**

  Provides a wireless Ethernet 802.11b access point for extending the communication media to WLAN.

- **Fast Ethernet Switch**

A 4-port 10/100Mbps fast Ethernet switch is built in with automatic switching between MDI and MDI-X for 10Base-T and 100Base-TX ports. An Ethernet straight or cross-over cable can be used directly for auto detection.

- **Multi-Protocol to Establish A Connection**
  Supports PPPoA (RFC 2364 - PPP over ATM Adaptation Layer 5), RFC 1483 encapsulation over ATM (bridged or routed), PPP over Ethernet (RFC 2516), IPoA (RFC1577) and PPTP-to-PPPoA relaying to establish a connection with the ISP. The product also supports VC-based and LLC-based multiplexing.

- **Quick Installation Wizard**
  Supports a WEB GUI page to install this device quickly. With this wizard, end users can enter the information easily which they get from their ISP, then surf the Internet immediately.

- **Universal Plug and Play (UPnP) and UPnP NAT Traversal**
  This protocol is used to enable simple and robust connectivity among stand-alone devices and PCs from many different vendors. It makes network simple and affordable for users. UPnP architecture leverages TCP/IP and the Web to enable seamless proximity networking in addition to control and data transfer among networked devices. With this feature enabled, users can now connect to Netmeeting or MSN Messenger seamlessly.

- **Network Address Translation (NAT)**
  Allows multi-users to access outside resources such as the Internet simultaneously with one IP address/one Internet access account. Many application layer gateway (ALG) are supported such as web browser, ICQ, FTP, Telnet, E-mail, News, Net2phone, Ping, NetMeeting, IP phone and others.

- **Firewall**
  Supports SOHO firewall with NAT technology, automatically detects and blocks Denial of Service (DoS) attacks. URL blocking, packet filtering and SPI (Stateful Packet Inspection) are also supported. The hacker's attack will be recorded associated with timestamp in the security logging area. More firewall functions will always be implemented through updated firmware releases.

- **Domain Name System (DNS) relay**
  Provides an easy way to map the domain name (a friendly name for users such as www.yahoo.com) and IP address. When a local machine sets its DNS server with this router's IP address, every DNS conversion request packet from the PC to this router will be forwarded to the real DNS in the outside network.

- **Dynamic Domain Name System (DDNS)**
  The Dynamic DNS service allows you to alias a dynamic IP address to a static hostname. This dynamic IP address is the WAN IP address. For example, to use the service, you must first apply for an account from a DDNS service like http://www.dyndns.org/. More than 5 DDNS servers are supported.

- **Virtual Private Network (VPN)**
  Allows user to make a tunnel with a remote site directly to secure the data transmission among the connection. User can use embedded PPTP client/server, IKE and IPSec which are supported by this router to make a VPN connection or users can run the PPTP client in PC and the router already provides IPSec and PPTP pass through function to establish a VPN connection if the user likes to run the PPTP client in his local computer.

- **Virtual Server ("port forwarding")**
  Users can specify some services to be visible from outside users. The router can detect incoming service requests and forward either a single port or a range of ports to the specific local computer to handle it. For example, a user can assign a PC in the LAN acting as a WEB server inside and expose it to the outside network. Outside users can browse inside web servers directly while it is protected by NAT. A DMZ host setting is also provided to a local computer exposed to the outside network, Internet.

- **Rich Packet Filtering**
  Not only filters the packet based on IP address, but also based on Port numbers. It will filter packets from and to the Internet, and also provides a higher level of security control.

- **Dynamic Host Configuration Protocol (DHCP) client and server**
  In the WAN site, the DHCP client can get an IP address from the Internet Service Provider (ISP) automatically. In the LAN site, the DHCP server can allocate a range of client IP addresses and distribute them including IP address, subnet mask as well as DNS IP address to local computers. It provides an easy way to manage the local IP network.

- **Static and RIP1/2 Routing**
  Supports an easy static routing table or RIP1/2 routing protocol to support routing capability.

- **Simple Network Management Protocol (SNMP)**
  It is an easy way to remotely manage the router via SNMP.

- **Web based GUI**
  Supports web based GUI for configuration and management. It is user-friendly and comes with on-line help. It also supports remote management capability for remote users to configure and manage this product.

- **Firmware Upgradeable**
  Device can be upgraded to the latest firmware through the WEB based GUI.

- **Rich management interfaces**
  Supports flexible management interfaces with local console port, LAN port, and WAN port. Users can use terminal applications through the console port to configure and manage the device, or Telnet, WEB GUI, and SNMP through LAN or WAN ports to configure and manage the device.

BIPAC-74x GE Series Router Application

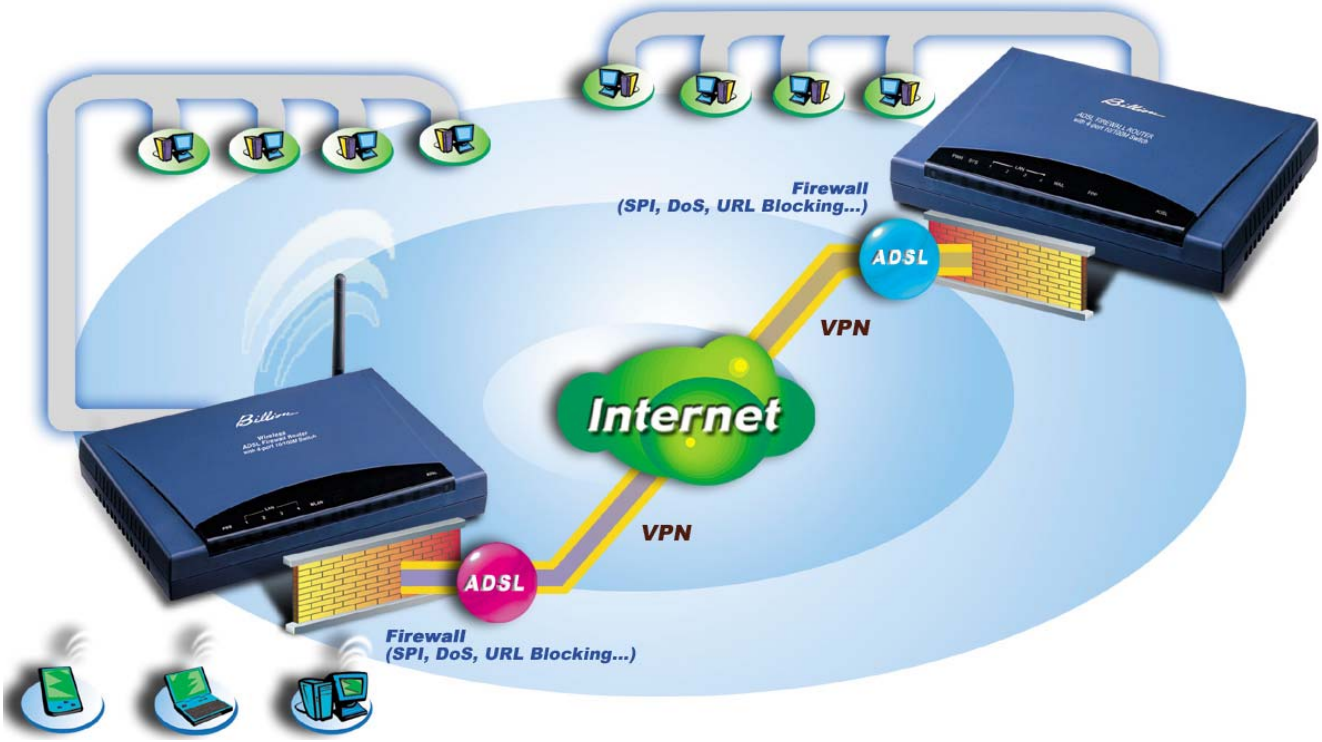


Figure 1.1 Application Diagram

Thank you for your purchase, and welcome to the world of broadband Internet!

Chapter 2: Installing the Router

Important note for using the BIPAC-74x GE Series Router

Warning

- ✓ Do not use the BIPAC-74x GE in high humidity or high temperatures.
- ✓ Do not use the same power source for the BIPAC-74x GE as other equipment.
- ✓ Do not open or repair the case yourself. If the BIPAC-74x GE is too hot, turn off the power immediately and have it repaired at a qualified service center.

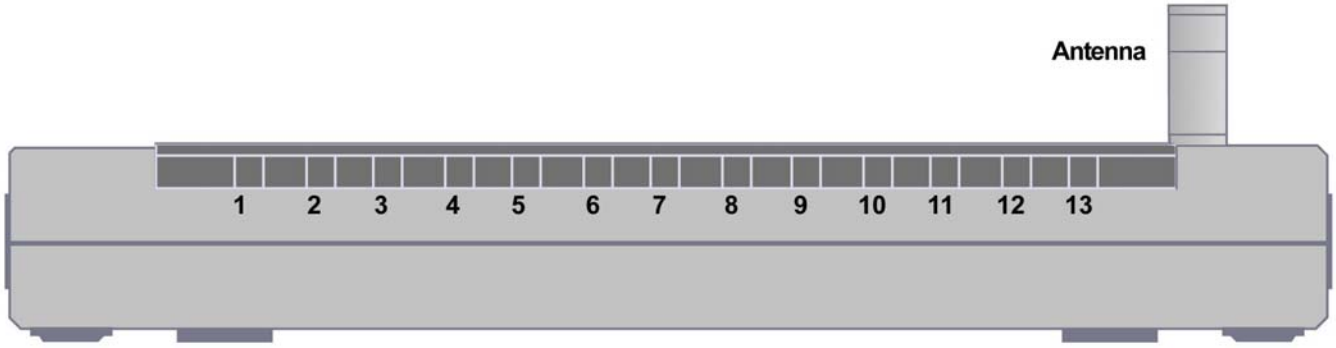
Attention

- ✓ Place the BIPAC-74x GE on a stable surface.
- ✓ Only use the power adapter that comes with the package. Using a different voltage rating power adaptor may damage the router.

Package Contents

- BIPAC-740x GE Series Router ***x1***
- CD-ROM containing the online manual ***x 1***
- Quick Start Guide ***x 1***
- RJ-11 ADSL/telephone Cable ***x 1***
- Ethernet (CAT-5 LAN) Cable ***x 1***
- AC-DC power adapter (12VDC, 1A) ***x 1***

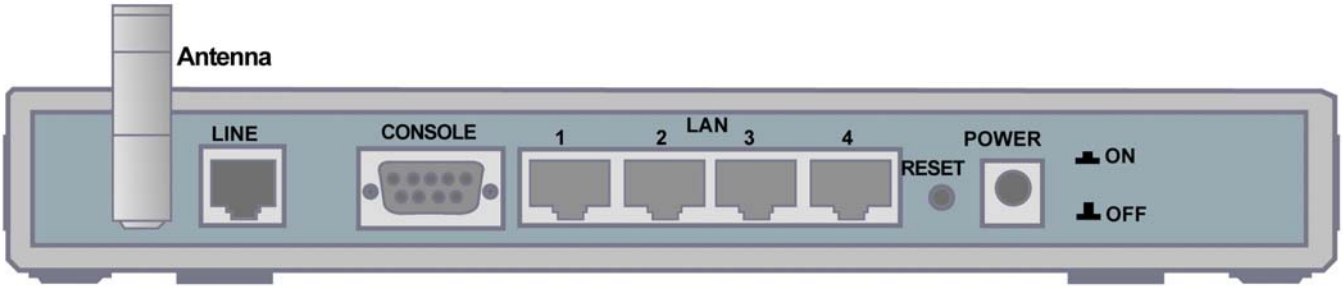
The Front LEDs



NOTE: *Only the 743-GE unit has a wireless interface and antenna. 741-GE and 741-GE V2 routers do not have an antenna or wireless interface.*

LED		Meaning
1	**PWR**	Lit when power is ON.
2	**SYS**	Lit when the system is ready.
3	**LAN port 1**	Lit when connected to an Ethernet device. Green for 100Mbps; Orange for 10Mbps Blinking when data is transmitted/received.
4	**LAN port 2**	Lit when connected to an Ethernet device. Green for 100Mbps; Orange for 10Mbps Blinking when data is transmitted/received.
5	**LAN port 3**	Lit when connected to an Ethernet device. Green for 100Mbps; Orange for 10Mbps Blinking when data is transmitted/received.
6	**LAN port 4**	Lit when connected to an Ethernet device. Green for 100Mbps; Orange for 10Mbps Blinking when data is transmitted/received.
7	**WLAN**	Lit green when the wireless connection is established. Flashes when sending/receiving data.
10	**MAIL**	Lit when there is Email in your configured Email account.
11	**PPP**	Lit when there is a PPPoA/PPPoE connection.
13	**ADSL**	Lit when successfully connected to an ADSL DSLAM (“linesync”).

The Rear Ports



NOTE: *Only the 743-GE unit has a wireless interface and antenna. 741-GE and 741-GE V2 routers do not have an antenna or wireless interface.*

Port		Meaning
1	**LINE**	Connect the supplied RJ-11 ("telephone") cable to this port when connecting to the ADSL/telephone network.
2	**CONSOLE**	Connect a PS2/RS-232 cable to this port when connecting to a PC's RS-232 port (9-pin serial port).
3	**LAN** **1X — 4X** **(RJ-45 connector)**	Connect a UTP Ethernet cable (Cat-5 or Cat-5e) to one of the four LAN ports when connecting to a PC or an office/home network of 10Mbps or 100Mbps.
4	**RESET**	After the device is powered on, press it to reset the device or restore to factory default settings. **0-3 seconds**: reset the device **3-6 seconds**: no action **10-12 seconds**: restore to factory default settings (this is used when you can not login to the router, e.g. forgot the password)
5	**PWR**	Connect the supplied power adapter to this jack.
6	**Power Switch**	Power ON/OFF switch

Cabling

One of the most common causes of problems is bad cabling or ADSL line(s). Make sure that all connected devices are turned on. On the front of the product is a bank of LEDs. Verify that the LAN Link and ADSL line LEDs are lit. If they are not, verify that you are using the proper cables.

Ensure that all other devices connected to the same telephone line as your Billion router (e.g. telephones, fax machines, analogue modems) have a line filter connected between them and the wall socket (unless you are using a Central Splitter or Central Filter installed by a qualified and licensed electrician), and ensure that all line filters are correctly installed and the right way around. Missing line filters or line filters installed the wrong way around can cause problems with your ADSL connection, including causing frequent disconnections.

Chapter 3: Basic Installation and Configuration

The router can be configured with your web browser. A web browser is included as a standard application in the following operating systems: Linux, Mac OS, Windows 95/98/NT/2000/XP/Me, etc. The product provides a very easy and user-friendly interface for configuration.

PCs must have an Ethernet interface installed properly and be connected to the router either directly or through an external repeater hub, and have TCP/IP installed and configured to obtain an IP address through a DHCP server or a fixed IP address that must be in the same subnet as the router. The default IP address of the router is **192.168.1.254** and the subnet mask is **255.255.255.0** (i.e. any attached PC must be in the same subnet, and have an IP address in the range of 192.168.1.1 to 192.168.1.253). The best and easiest way is to configure the PC to get an IP address automatically from the router using DHCP. If you encounter any problems accessing the router's web interface it may also be advisable to **uninstall** any kind of software firewall on your PCs, as they can cause problems accessing the 192.168.1.254 IP address of the router. Users should make their own decisions on how to best protect their network.

Please follow the steps below for your PC's network environment installation. First of all, please check your PC's network components. The TCP/IP protocol stack and Ethernet network adapter must be installed. If not, please refer to your Windows-related or other operating system manuals.

Any TCP/IP capable workstation can be used to communicate with or through the BIPAC-74x GE. To configure other types of workstations, please consult the manufacturer's documentation.

Connecting your router

1. Connect the Router to a LAN (Local Area Network) and the ADSL/telephone network.
2. Power on the device.
3. Make sure the PWR and SYS LEDs are lit steadily and that the relevant LAN LED is lit.

Configuring PCs in Windows

For Windows 98 / ME

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

2. Select **TCP / IP -> NE2000 Compatible**, or the name of any Network Interface Card (NIC) in your PC. (**See Figure 3.1)**

3. Click **Properties**.

4. Select the IP Address tab. In this page, click the Obtain an IP address automatically radio button. (**See Figure 3.2)**

5. Then select the **DNS Configuration** tab. **(See Figure 3.3)**

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

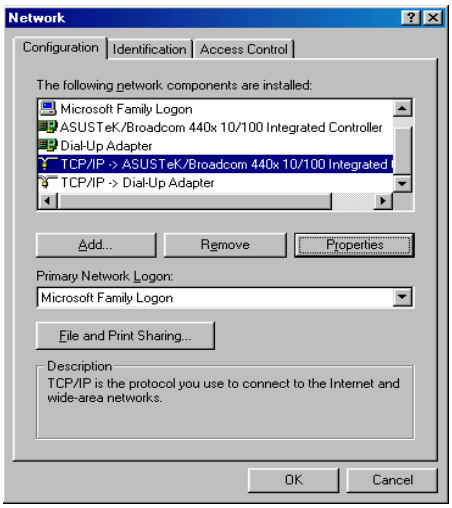


Figure 3.1: TCP / IP

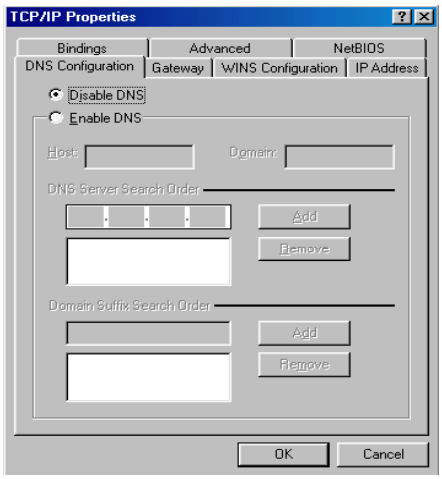


Figure 3.3: DNS Configuration

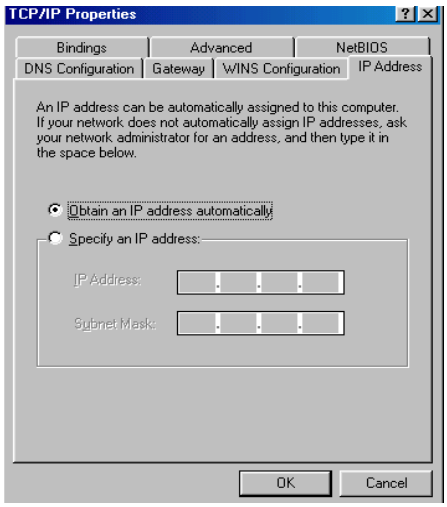


Figure 3.2: IP Address

For Windows NT4.0

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

2. Select **TCP/IP Protocol** and click **Properties**. (**See Figure 3.4)**

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

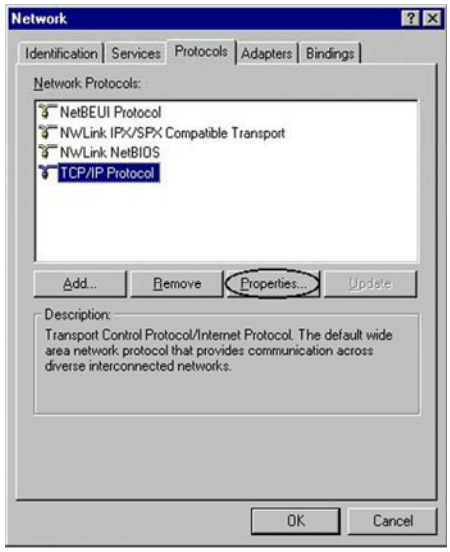


Figure 3.4: TCP / IP

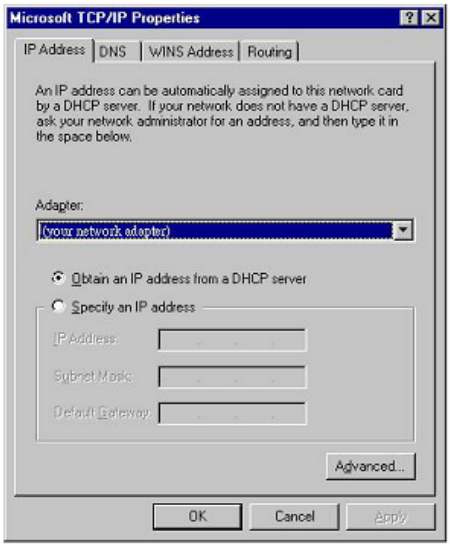


Figure 3.5: IP Address

For Windows 2000

1. Go to **Start / Settings / Control Panel**. In the Control Panel, double-click **Network and Dial-up Connections**.

2. Double-click **Local Area ("LAN") Connection**. **(See Figure 3.6)**

3. In the **LAN Area Connection Status** window, click **Properties**. **(See Figure 3.7)**

4. Select **Internet Protocol (TCP/IP)** and click **Properties**. **(See Figure 3.8)**

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

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

Figure 3.6: LAN Area Connection

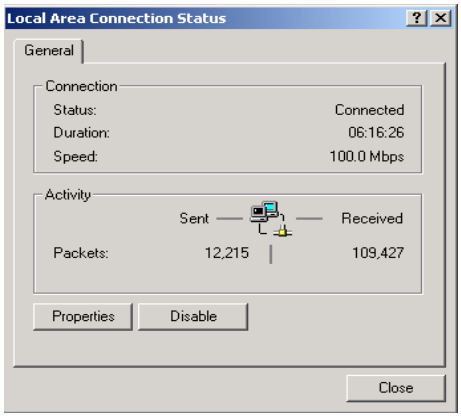


Figure 3.7: LAN Connection Status

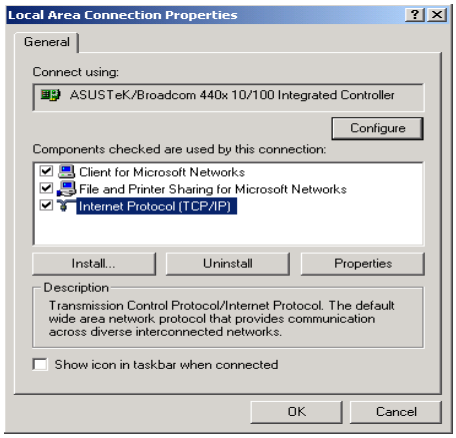


Figure 3.8: TCP / IP

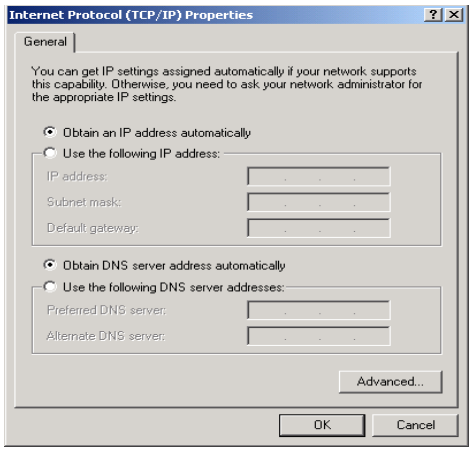


Figure 3.9: IP Address & DNS Configuration

For Windows XP

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

2. Double-click **Local Area Connection**. **(See Figure 3.10)**

3. In the **LAN Area Connection Status** window, click **Properties**. (**See Figure 3.11)**

4. Select **Internet Protocol (TCP/IP)** and click **Properties**. (**See Figure 3.12)**

5. Select the **Obtain an IP address automatically** and **Obtain DNS server address automatically** radio buttons. (**See Figure 3.13**)

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

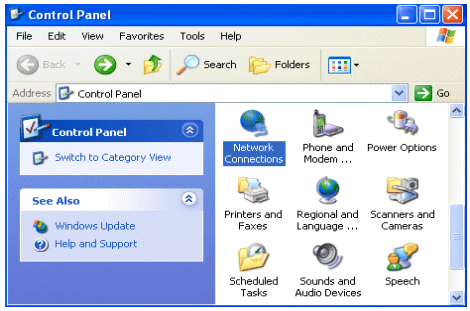


Figure 3.10: LAN Area Connection

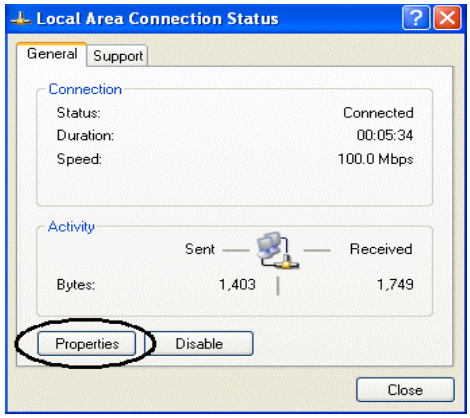


Figure 3.11: LAN Connection Status

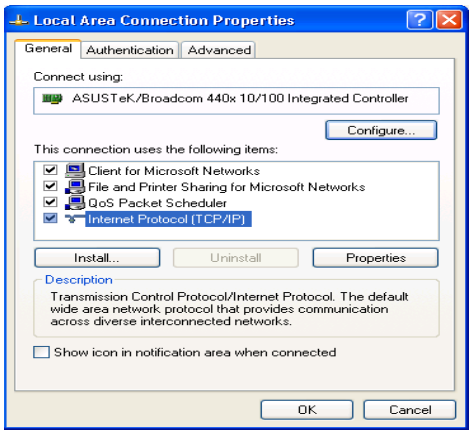


Figure 3.12: TCP / IP

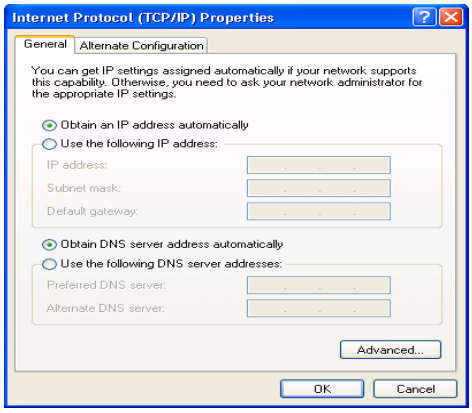


Figure 3.13: IP Address & DNS Configuration

Factory Default Settings

Before configuring your, you need to know the following default settings.

- **Web Interface:**
  - Username: admin
  - Password : admin

- **LAN Device IP Settings:**
  - IP Address: 192.168.1.254
  - Subnet Mask: 255.255.255.0

- **ISP setting in WAN site :**
  - PPPoE

- **DHCP server :**
  - DHCP server is enabled.
  - Start IP Address : 192.168.1.100
  - IP pool counts : 100

Username and Password

The default username and password are "**admin**" and "**admin**" respectively.

Attention

If you ever forget the password to log in, you may press the RESET button to restore the factory default settings

LAN and WAN Port Addresses

The parameters of LAN and WAN ports are pre-set in the factory. The default values are shown below.

	LAN Port	WAN Port
IP address	192.168.1.254	The PPPoE function is *enabled* to automatically get the WAN port configuration from the ISP, but you have to set the username and password first.
Subnet Mask	255.255.255.0	
DHCP server function	Enabled	
IP addresses for distribution to PCs	100 IP addresses continuing from 192.168.1.100 through 192.168.1.199	

Information from your ISP

Before configuring this device, you have to check with your ISP (Internet Service Provider) what kind of service is provided such as PPPoE, PPPoA, RFC1483, IPoA, or PPTP-to-PPPoA Relaying.

Gather the information as illustrated in the following table and keep it for reference.

PPPoE	VPI/VCI, VC-based/LLC-based multiplexing, Username, Password, Service Name, and Domain Name System (DNS) IP address (it can be automatically assigned by your ISP when you connect or be set manually).
PPPoA	VPI/VCI, VC-based/LLC-based multiplexing, Username, Password, and Domain Name System (DNS) IP address (it can be automatically assigned by your ISP when you connect or be set manually).
RFC1483 Bridged	VPI/VCI, VC-based/LLC-based multiplexing to use Bridged Mode.
RFC1483 Routed	VPI/VCI, VC-based/LLC-based multiplexing, IP address, Subnet mask, Gateway address, and Domain Name System (DNS) IP address (it is fixed IP address).
IPoA	VPI/VCI, VC-based/LLC-based multiplexing, IP address, Subnet mask, Gateway address, and Domain Name System (DNS) IP address (it is fixed IP address).

Configuring with your Web Browser

Open your web browser, enter the IP address of your router, which by default is **192.168.1.254**, and click "**Go**", a user name and password window prompt will appear. **The default username and password are "admin" and "admin". (See Figure 3.14)**

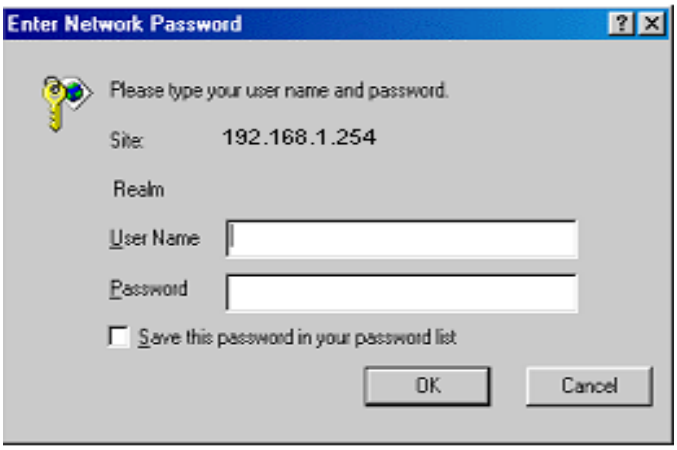


Figure 3.14: User namd & Password Prompt Widonw

You will get a status report web page when logged in successfully: **(See Figure 3.15)**

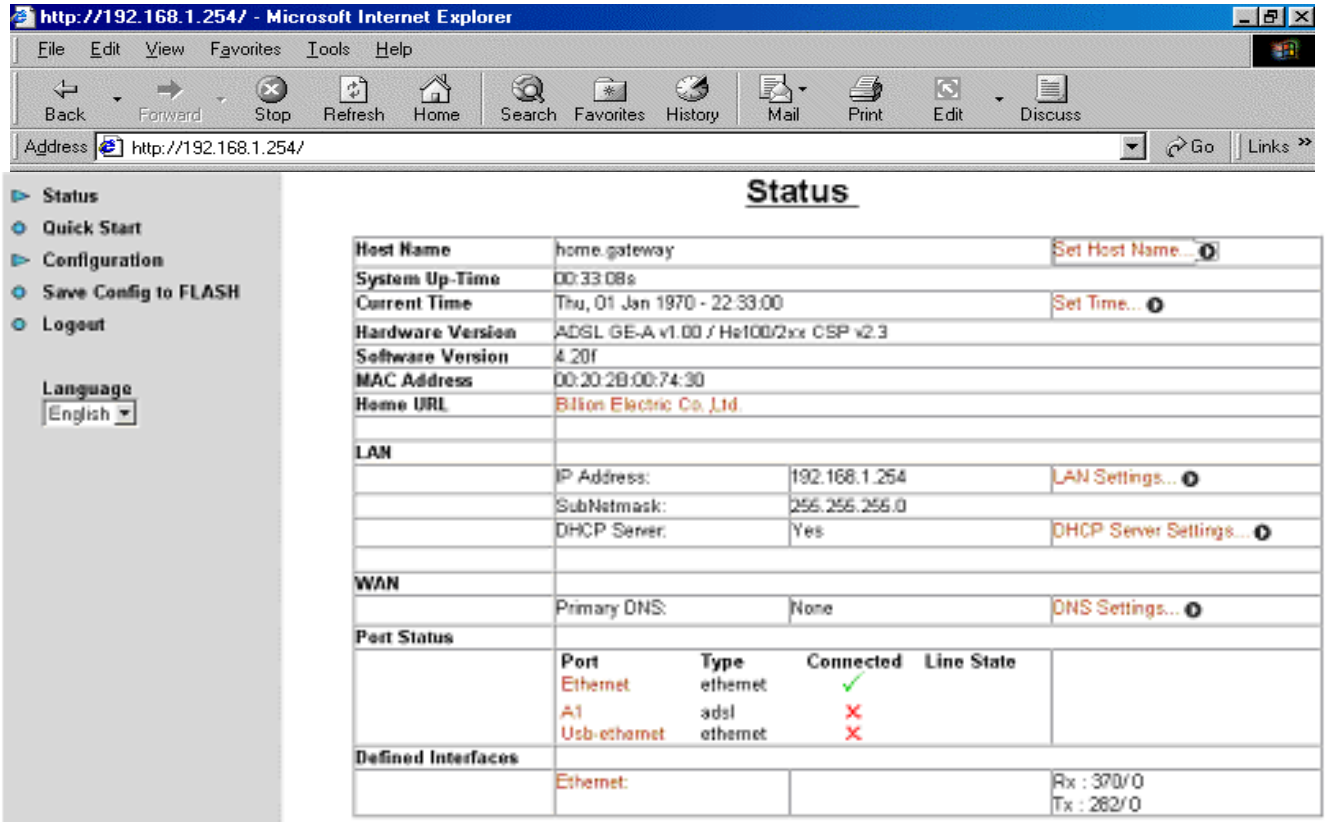


Figure 3.15: Staus Report Page

At the configuration homepage, the left navigation pane where bookmarks are provided links you directly to the desired setup page, including:

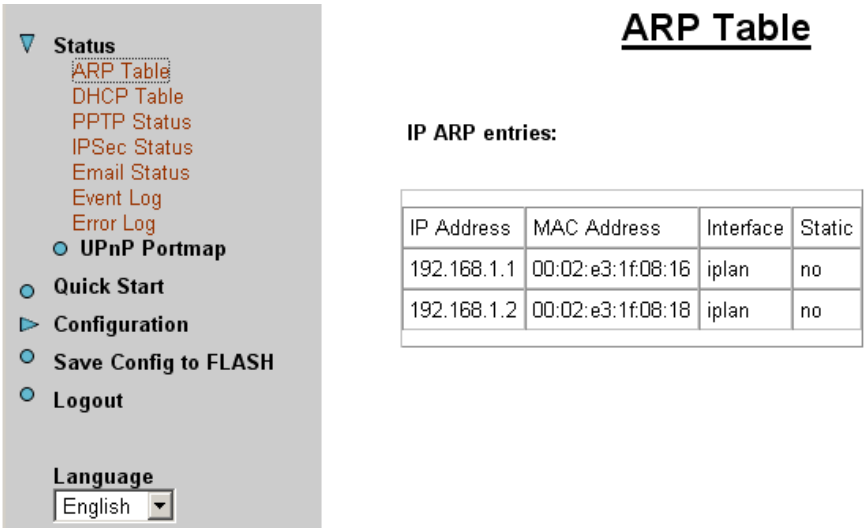
- **Status** (ARP Table, DHCP Table, PPTP Status, IPSec Status, Email Status, Event Log & Error Log)
- **Quick Start**
- **Configuration** (LAN, WAN, System, Firewall, VPN, Virtual Server & Advanced)
- **Save Config to FLASH**
- **Logout**
- **Language** (provides user interface in English language).

Please see the relevant sections of this manual for detailed instructions on how to configure your Billion router.

Status

ARP Table

This section displays the router's ARP (Address Resolution Protocol) Table, which shows the mapping of Internet (IP) addresses to Ethernet (MAC) addresses. This is useful as a quick way of determining the MAC address of the network interface of your PCs to use with the router's **Firewall – MAC Address Filter** function. See the Firewall section of this manual for more information on this feature.



IP Address: A list of IP addresses of devices on your LAN (Local Area Network).

MAC Address: The MAC (Media Access Control) addresses for each device on your LAN.

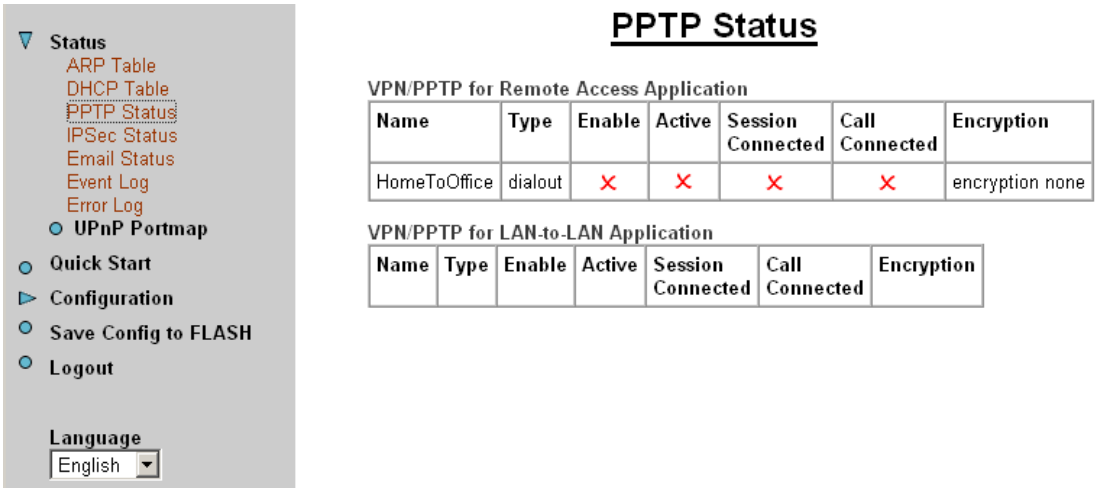
Interface: The interface name (on the router) that this IP Address connects to.

Static: Static status of the ARP table entry:

- "**no**" for dynamically-generated ARP table entries
- "**yes**" for static ARP table entries added by the user

PPTP Status

This shows details of your configured PPTP VPN Connections.



Name: The name you assigned to the particular PPTP connection in your VPN configuration.

Type: The type of connection (dial-in/dial-out).

Enabled: Whether this connection is currently enabled.

Active: Whether the connection is currently active.

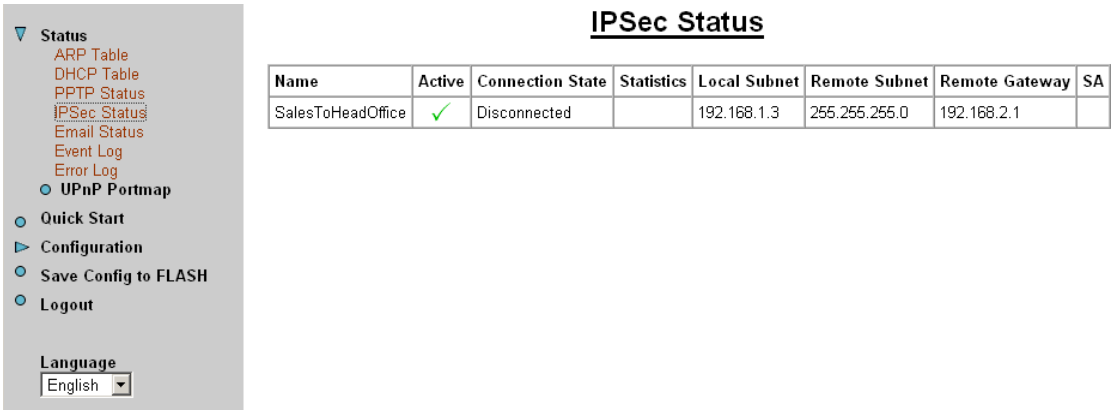
Session Connected: Whether the VPN Session is currently connected.

Call Connected: If the Call for this VPN entry is currently connected.

Encryption: The encryption type used for this VPN connection.

IPSec Status

This shows details of your configured IPSec VPN Connections.



Name: The name you assigned to the particular VPN entry.

Active: Whether the VPN Connection is currently Active.

Connection State: Whether the VPN is Connected or Disconnected.

Statistics: Statistics for this VPN Connection.

Local Subnet: The local IP Address or Subnet used.

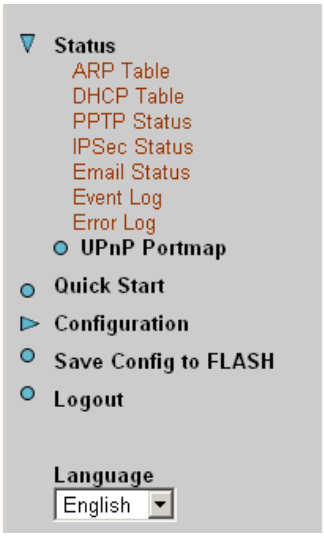
Remote Subnet: The Subnet of the remote site.

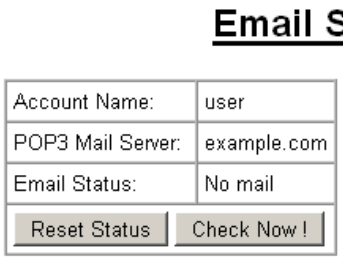
Remote Gateway: The Remote Gateway IP address.

SA: The Security Association for this VPN entry.

Email Status

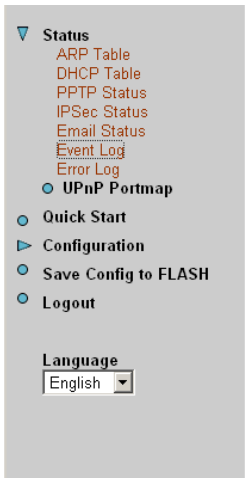
Details and status for the Email Account you have configured the router to check. Please see the **Advanced** section of this manual for details on this function.

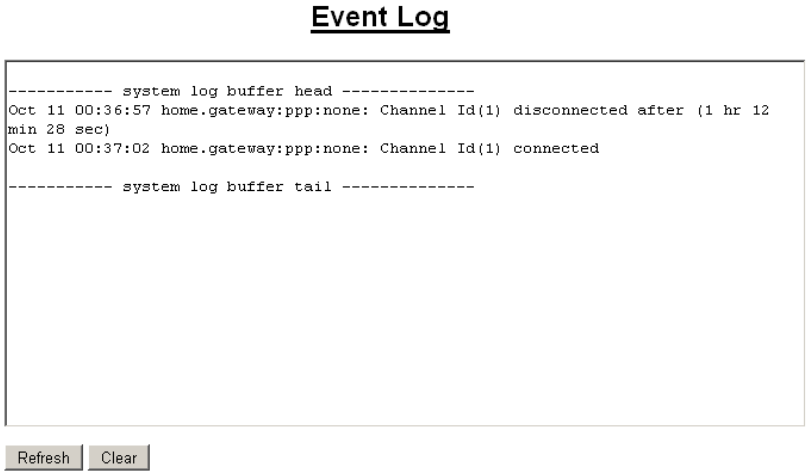




Event Log

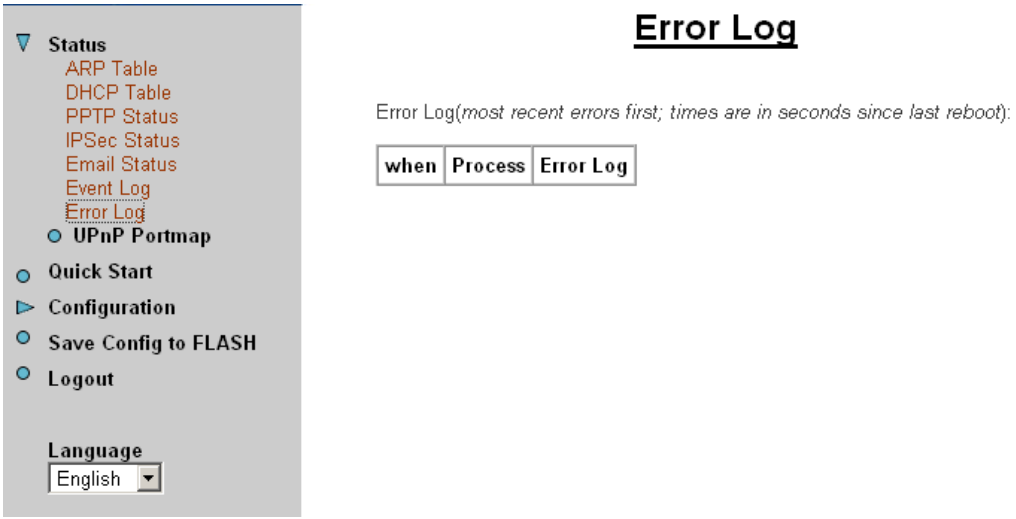
This page displays the router's Event Log entries. Major events are logged to this window, such as when the router's ADSL connection is disconnected, as well as Firewall events when you have enabled Intrusion or Blocking Logging in the **Configuration – Firewall** section of the interface. Please see the **Firewall** section of this manual for more details on how to enable Firewall logging.





Error Logging

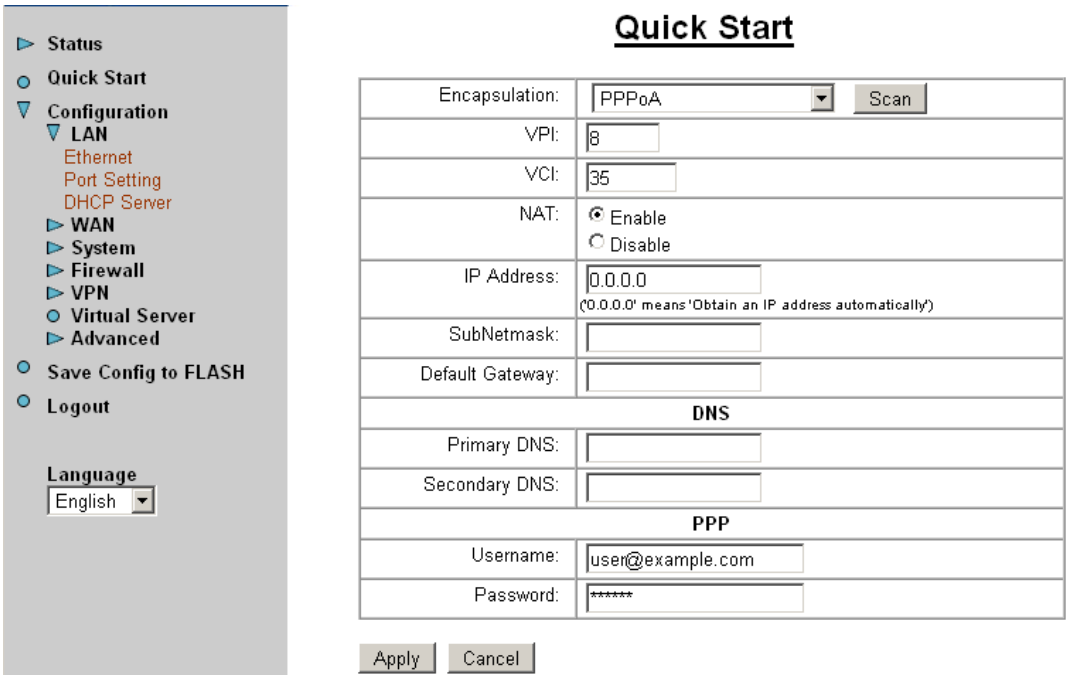
Any errors encountered by the router (e.g. invalid names given to entries) are logged to this window.



UPnP Portmap

The section lists all port-mapping established using UPnP (Universal Plug and Play). Please see the **Advanced** section of this manual for more details on UPnP and the router's UPnP configuration options.

Quick Start

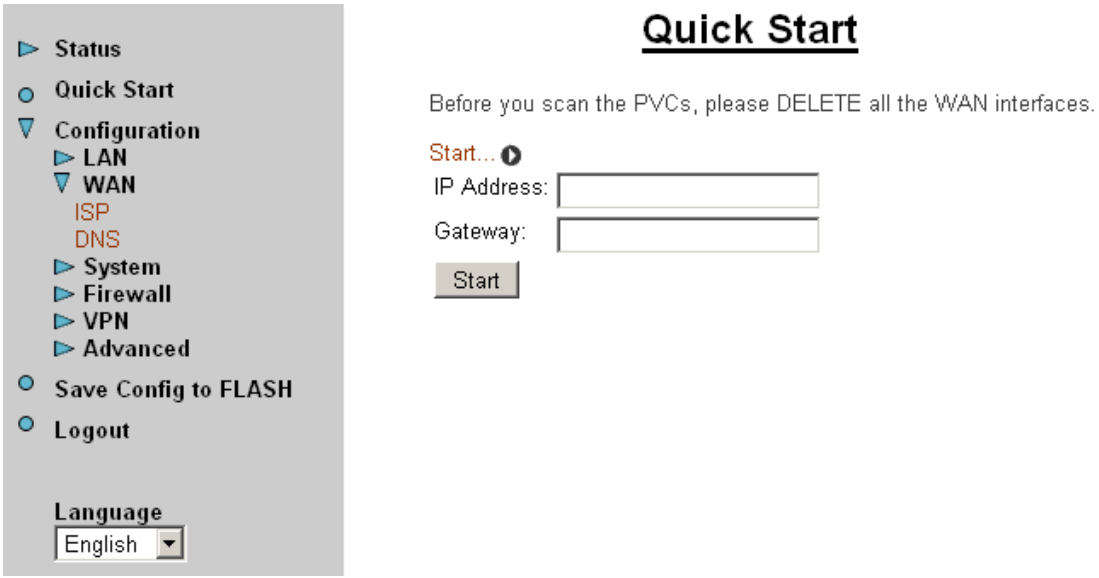


Quick Start offers a fast and easy way to configure the connection to your ISP.

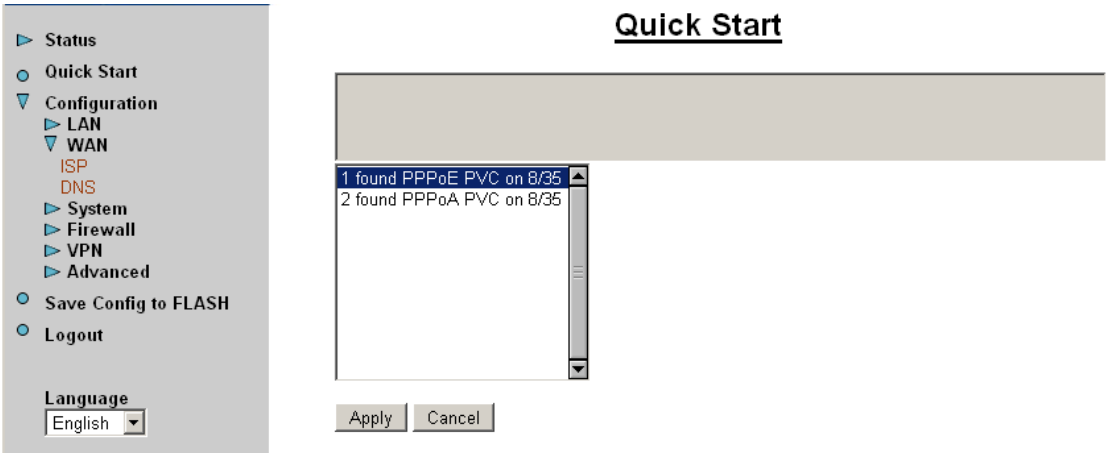
For detailed instructions on configuring your WAN settings, please see the **WAN** section of this manual.

Usually, the only details you will need for the Quick Start wizard to get you online are your login (often in the form of *username@ispname*), your password the Encapsulation type. Residential ISPs in Australia usually use PPPoA and PPPoE.

Your ISP will be able to supply all the details you need, alternatively, if you have deleted the current WAN Connection in the **WAN – ISP** section of the interface, you can use the router's PVC Scan feature to attempt to determine the Encapsulation types offered by your ISP.



Click **Start** to begin scanning for encapsulation types offered by your ISP. If the scan is successful you will then be presented with a list of supported options:



Select the desired option from the list and click **Apply** to return to the Quick Start interface to continue configuring your ISP connection. Please note that the contents of this list will vary, depending on what is supported by your ISP.

Configuration

When you click this item, you get following sub-items to configure the ADSL router.

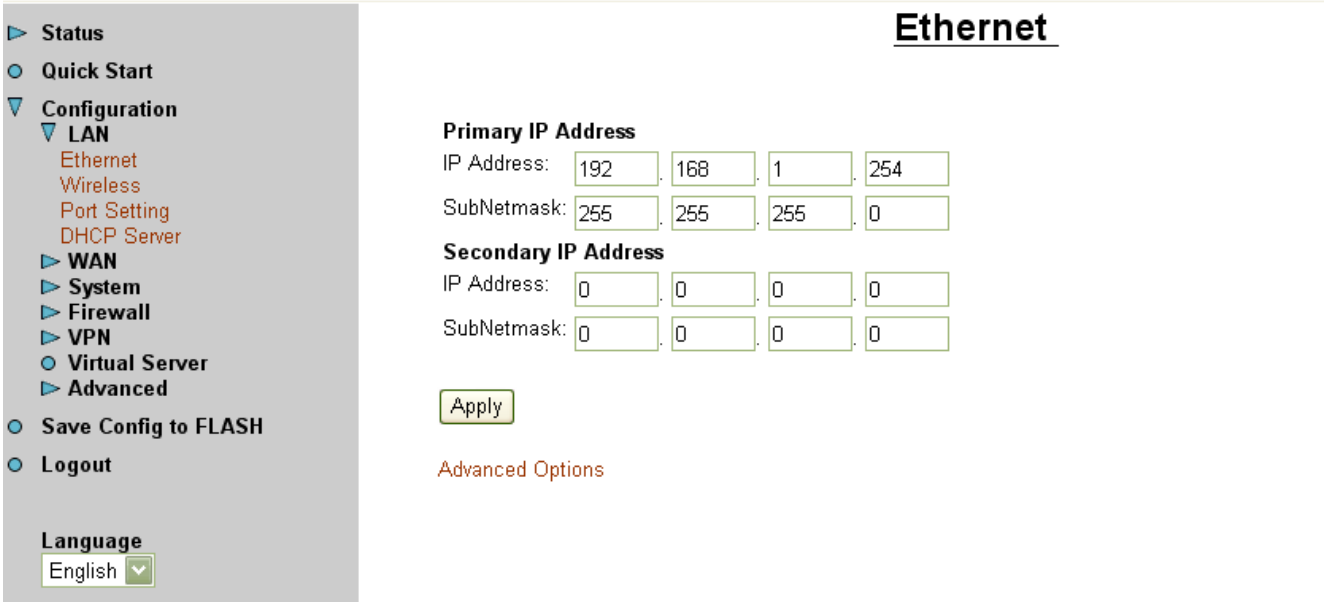
LAN, WAN, System, Firewall, VPN, Virtual Server and **Advanced**

These functions are described below in the following sections.

LAN (Local Area Network)

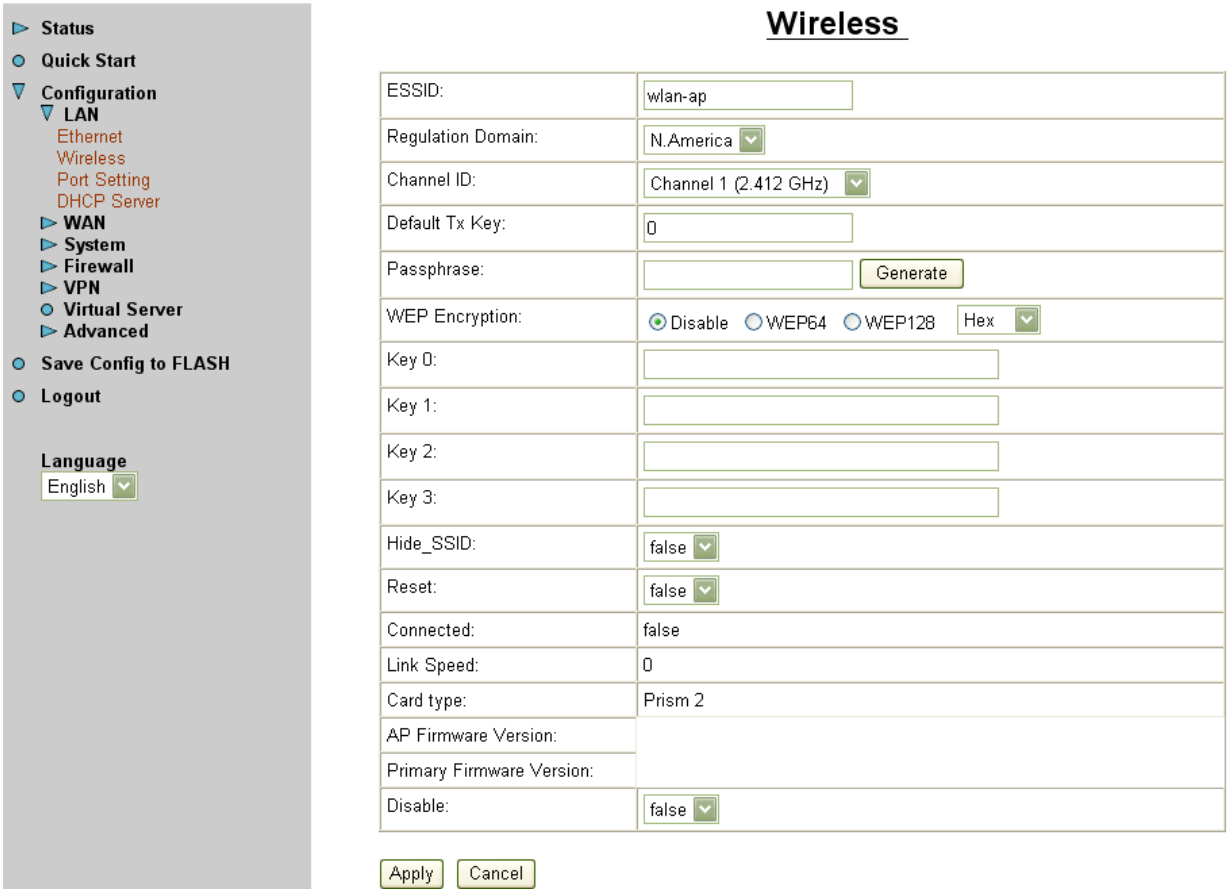
There are four items within the LAN section: **Ethernet, Wireless, Port Setting** and **DHCP Server**.

Ethernet



The router supports two Ethernet IP addresses in the LAN, and two different LAN subnets through which you can access the Internet at the same time. Users will usually only have one subnet in their LAN, so there is no need to configure a Secondary IP address. The default IP address for the router is 192.168.1.254. The **Advanced Options** section will allow you to manually configure the routing table.

Wireless (743 GE only)



ESSID: This is the unique ID given to the Access Point (AP). By default, the router comes preconfigured with the ESSID "wlan-ap". To connect the device, your wireless clients must have the same ESSID as the device.

Regulation Domain: There are seven Regulation Domains for you to choose from, including **North America (N.America)**, **Europe**, **France**, **Spain, Japan, Israel, and Australia**. The Channel ID will be different based on this setting.

Channel ID: Select the ID channel that you would like to use.

WEP Encryption: To prevent unauthorized wireless stations from accessing data transmitted over the network, the router offers highly secure data encryption, known as WEP. If you require high security for transmissions, there are two alternatives to select from: WEP 64 and WEP 128. WEP 128 offers increased security over WEP 64.

Passphrase: This is used to generate WEP keys automatically based upon the input string and a pre-defined algorithm in WEP64 or WEP128. You can input the same string in both the AP and Client card settings to generate the same WEP keys. Please note that you do not have to enter **Key (0-3)** as below when the **Passphrase** is enabled.

Default Used WEP Key: Select the encryption key ID, please refer to **Key (0-3)** below. Note that on Windows and some wireless card software, the encryption key IDs are instead numbered 1-4.

Key (0-3): Enter the key to encrypt wireless data. To allow encrypted data transmission, the WEP Encryption Key values on all wireless stations must be the same as the router.

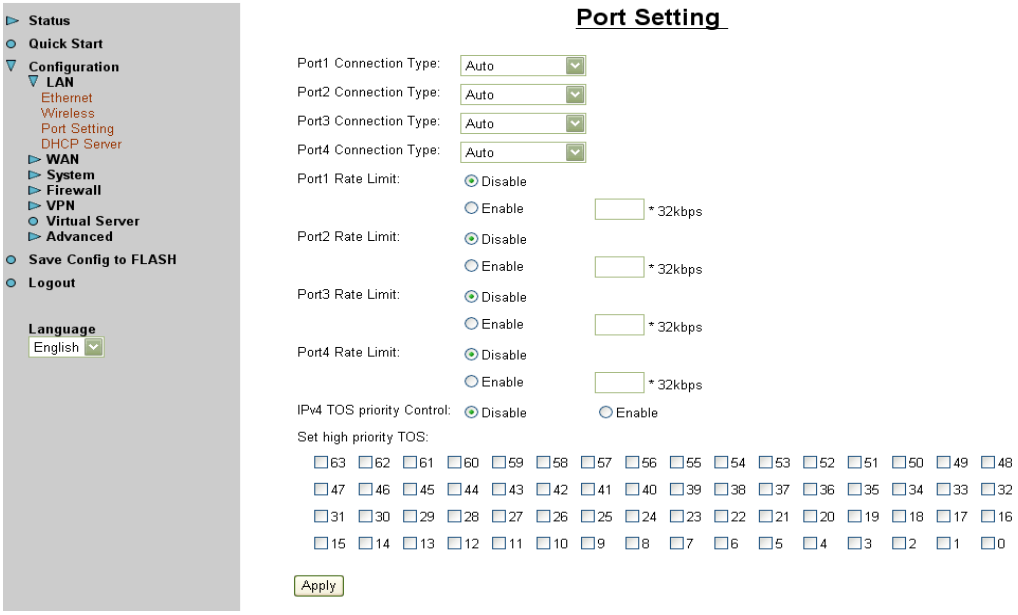
There are four keys for your selection. The input format is either ASCII or HEX style. WEP64 with ASCII keys requires 5 ASCII characters, and WEP128 with ASCII keys requires 13 ASCII characters. WEP64 with HEX keys requires 10 HEX characters, and WEP128 with HEX keys requires 26 HEX characters. The separator is a hyphen/dash ("-") between each pair of characters. For example, using WEP64 and HEX keys, the key 1122334455 would be typed in as 11-22-33-44-55. Note that Windows, and some wireless card software, do not use the hyphen/dash separator.

Reset: Reset the Wireless AP function.

Hide_SSID: When enabled, the Wireless AP is invisible from site-surveying by wireless clients. Wireless clients still can associate with this Wireless AP if configured with the same ESSID value.

Port Setting

This section allows you to configure the settings for the router's Ethernet ports to solve some of the compatibility problems that may be encountered while connecting to the Internet, as well allowing users to tweak the performance of their network.



Port # Connection Type: Five options to choose from: Auto, 10M half-duplex, 10M full-duplex, 100M half-duplex or 100M full-duplex. Sometimes, there are Ethernet compatibility problems with legacy Ethernet devices, and you can configure different types to solve compatibility issues. The default is **Auto**, which users should keep unless there are specific problems with PCs not being able to access your LAN.

Port # Rate Limit: This function allows you to limit the speed of Ethernet traffic for the relevant port. The value entered will limit the speed of the port to the specified value's multiple of 32kbps. For example, to limit the speed of Port 1 to 128kbps, set a value of 4 for that port and **Enable** port rate limiting for that port. This can be useful if you want to prevent one particular PC on your network from using all available Internet bandwidth.

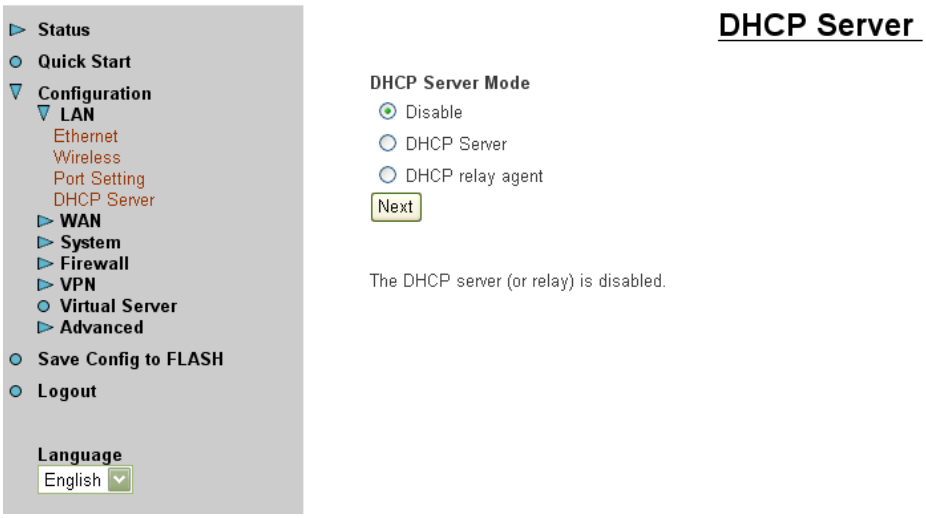
This function will limit the speed of that port for all Ethernet traffic, including LAN traffic.

IPv4 TOS priority Control (Advanced users): TOS, Type of Services, is the 2nd octet of an IP packet. Bits 6-7 of this octet are reserved and bit 0-5 are used to specify the priority of the packet.

This feature uses bits 0-5 to classify the packet's priority. If the packet is high priority, it will flow first and will not be constrained by the Rate Limit. Therefore, when this feature is enabled, the router's Ethernet switch will check the 2nd octet of each IP packet. If the value in the TOS field matches the checked values in the table (0 to 63), this packet will be treated as high priority.

DHCP Server

You can disable or enable the DHCP (Dynamic Host Configuration Protocol) server or enable the router's DHCP relay functions. The DHCP protocol allows your router to dynamically assign IP addresses to PCs on your network if they are configured to obtain IP addresses automatically.



To disable the router's DHCP Server, check **Disabled** and click **Next,** then click **Apply.** When the DHCP Server is disabled you will need to manually assign a fixed IP address to each PC on your network, and set the default gateway for each PC to the IP address of the router (by default this is 192.168.1.254).

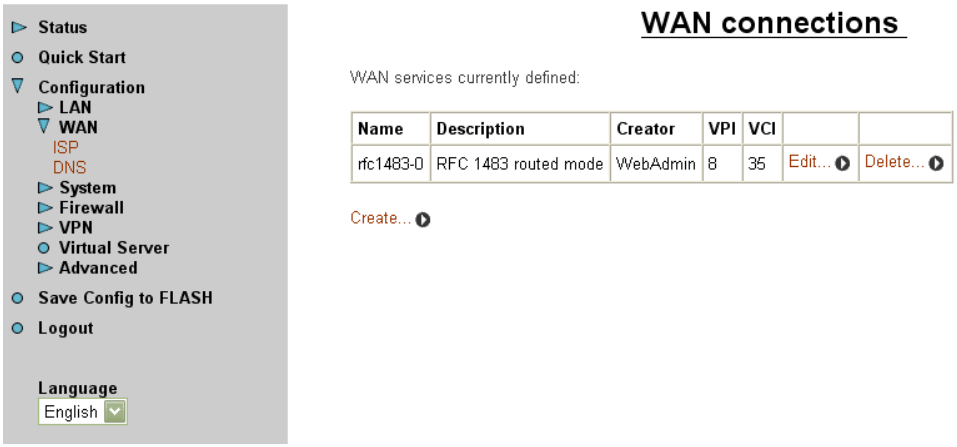
To configure the router's DHCP Server, check **DHCP Server** and click **Next**. You can then configure parameters of the DHCP Server including the IP pool (starting IP address and ending IP address to be allocated to PCs on your network), lease time for each assigned IP address (the period of time the IP address assigned will be valid), DNS IP address and the gateway IP address. These details are sent to the DHCP client (i.e. your PC) when it requests an IP address from the DHCP server. Click **Apply** to enable this function. If you check "**Use Router as a DNS Server**", the ADSL Router will perform the domain name lookup, find the IP address from the outside network automatically and forward it back to the requesting PC in the LAN (your Local Area Network).

If you check **DHCP Relay Agent** and click **Next**, then you will have to enter the IP address of the DHCP server which will assign an IP address back to the DHCP client in the LAN. Use this function only if advised to do so by your network administrator or ISP. Click **Apply** to enable this function.

WAN (Wide Area Network)

WAN refers to your Wide Area Network connection, i.e. your router's connection to your ISP and the Internet. There are two items within the **WAN** section: **ISP** and **DNS.**

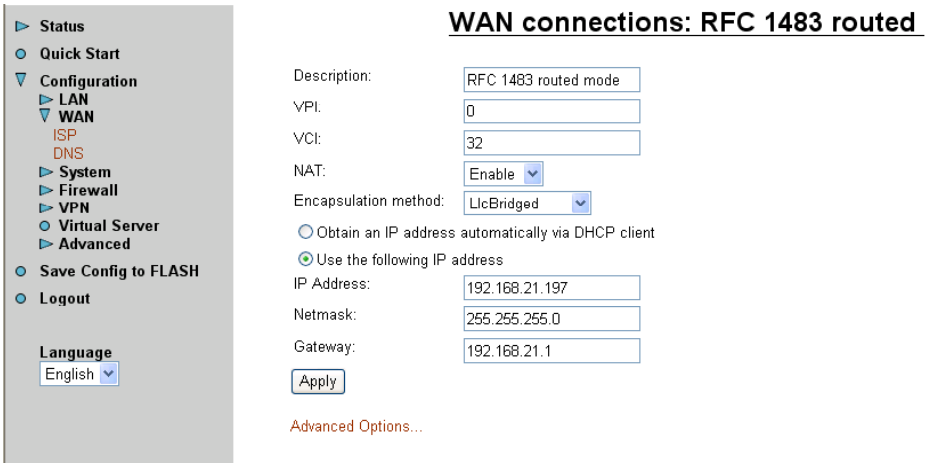
ISP



The factory default is PPPoE. If your ISP uses this access protocol, click **Edit** to input other parameters as below. If your ISP does not use PPPoE, you can delete the default WAN connection entry by clicking **Delete**. You may then click **Create** to create a connection to your ISP to surf the Internet.

A simpler alternative is to delete the current WAN connection entry then select **Quick Start** from the main menu on the left. Please see the Quick Start section of the manual for more information.

RFC 1483 Routed Connections



Description: Your description of this connection.

VPI and VCI: Enter the information provided by your ISP. The default for Australian ISPs is VPI=8, VCI=35.

NAT: The NAT (Network Address Translation) feature allows multiple users to access the Internet through a single IP account, sharing the single IP address. If users on your LAN have public IP addresses and can access the Internet directly, the NAT function can be disabled.

Encapsulation method: Select the protocol format, the default is LlcBridged. Select the one provided by your ISP.

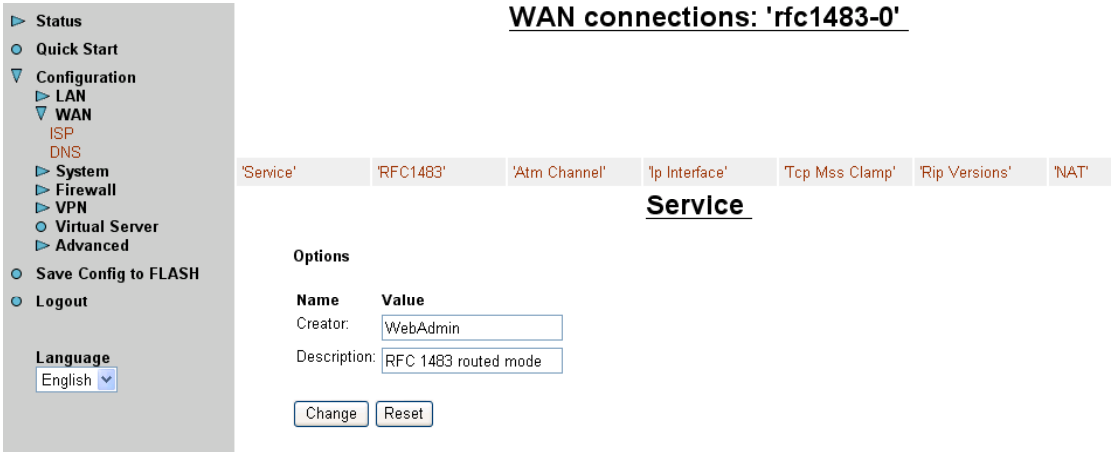
DHCP client: Enable or disable the DHCP client, specify if the Router can get an IP address from the Internet Service Provider (ISP) automatically or not. Please click **Obtain an IP address automatically via DHCP client** to enable the DHCP client function or click Specify an IP address to disable the DHCP client function, and specify the IP address manually. The setting of this item is specified by your ISP.

Advanced (RFC 1483 Routed)

*The **Advanced** configuration section is for troubleshooting purposes only. Please DO NOT change these settings unless advised to by your ISP's technical support staff or your network administrator.*

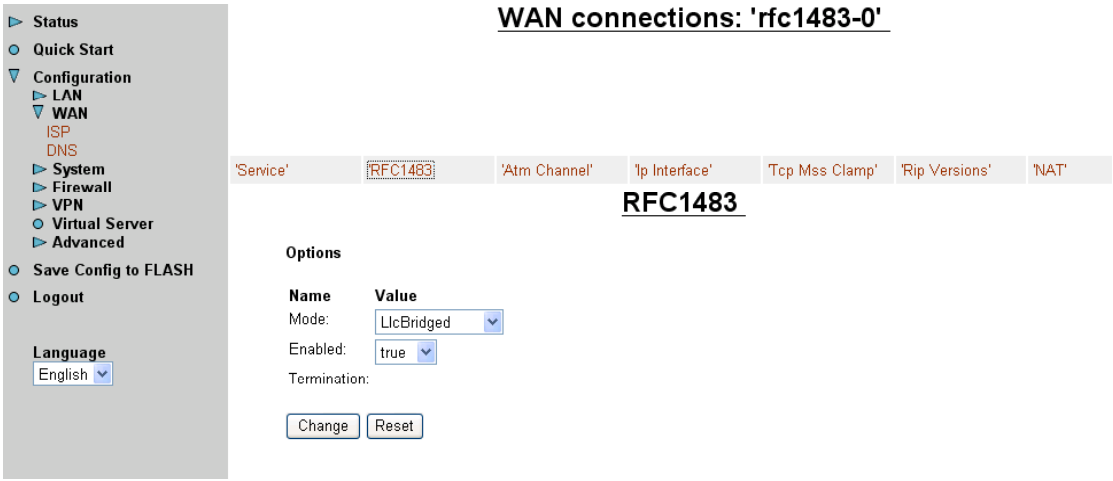
There are nine items included in this **Advanced Options** section: **Service, RFC 1483, Atm Channel, Ip Interface, Tcp Mss Clamp, Rip Version** and **NAT.**

Service



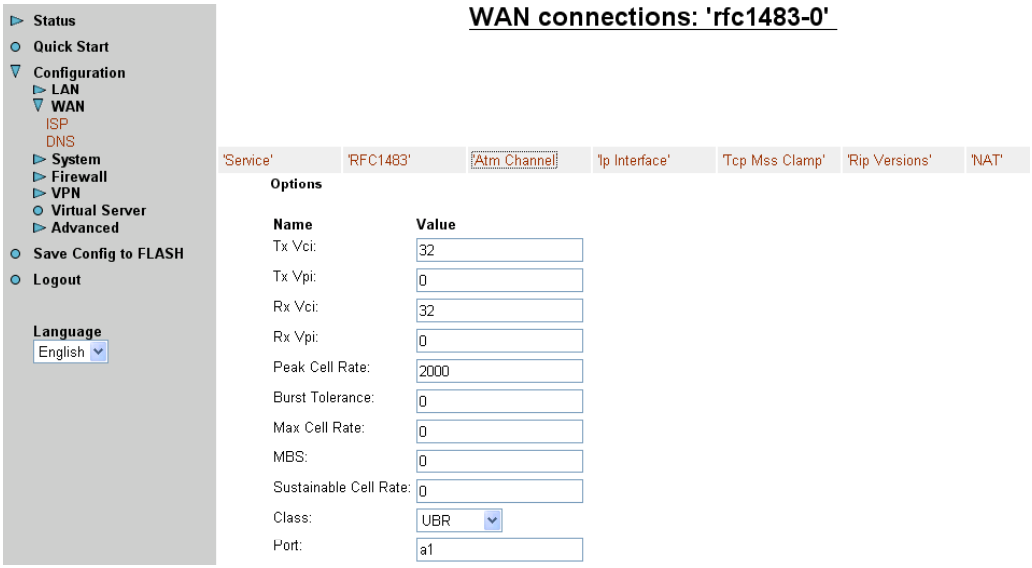
Service: The name of the creator and service, you can edit and change the name.

RFC 1483



RFC1483: Set the encapsulation method/mode. Your ISP will advise the mode to use.

Atm Channel



ATM Channel: ATM channel related settings.

VPI: A field in the ATM header. The VPI is used to identify the virtual path that a circuit belongs to. The VPI can be any value between 0 and 4095. For Australian users this should be 8.

VCI: Part of the ATM header. The VCI is a tag that identifies which channel a cell will travel over.The VCI can be any value between 1 and 65535. For Australian users this should be 35.

The VPI / VCI number is determined by your ISP, please contact your ISP to get this information.

Peak Cell Rate: the maximum rate at which ATM cells are allowed to be transported into the ATM network.

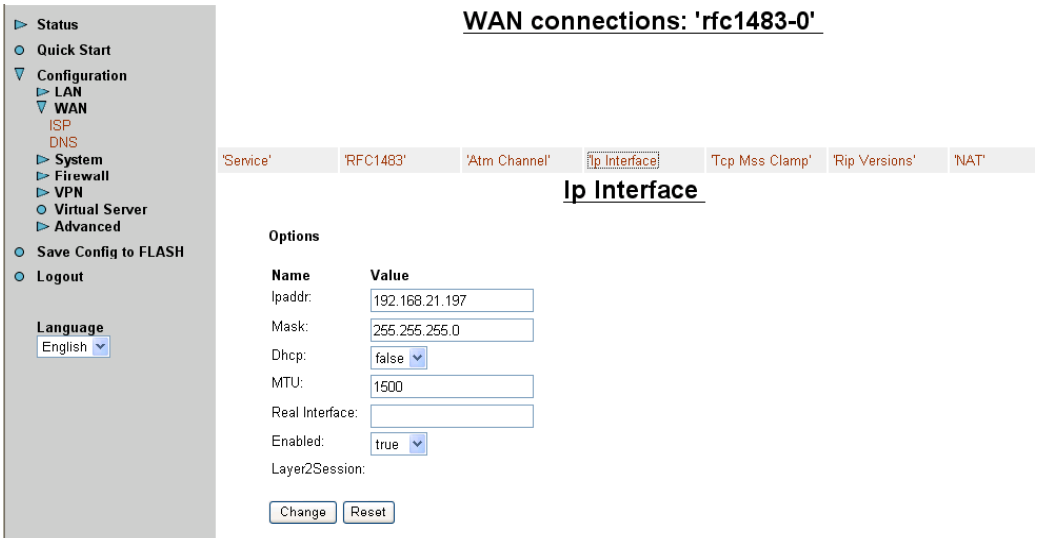
Burst Tolerance: Controls the maximum burst size for VBR (Variable Bit Rate) and VBR RT (VBR Real Time) channels. This value overrides an existing BT value (if set). The MBS can be any value between 0 and 100.

Cell Rate: Determines the minimum rate at which ATM cells are allowed to be transported into the ATM network.

MBS: Maximum Burst Size; this command sets the maximum burst size (MBS) for the RFC1483 transport.

Sustainable Cell Rate: the average cell rate for a VBR or VBR RT connection. The SCR can be any positive value that is less than both the PortSpeed set (when the port was created) and the PCR set for the channel.

Ip Interface



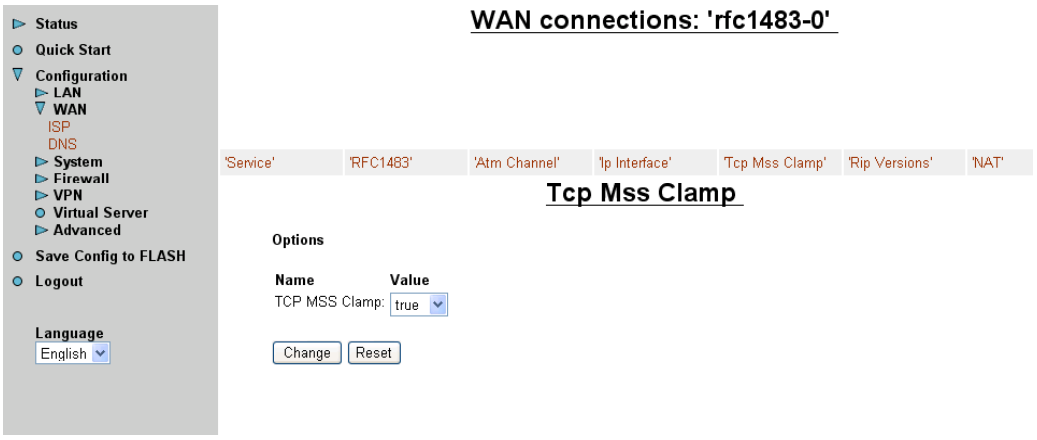
Ip Interface: IP protocol related setting.

DHCP: Enables or disables DHCP for this interface.

MTU: Maximum Transmission Unit. The size of the largest datagram (excluding media-specific headers) that IP will attempt to send through the interface.

Real Interface, Enabled, Layer2Session: for technical staff inspection purposes.

Tcp Mss Clamp

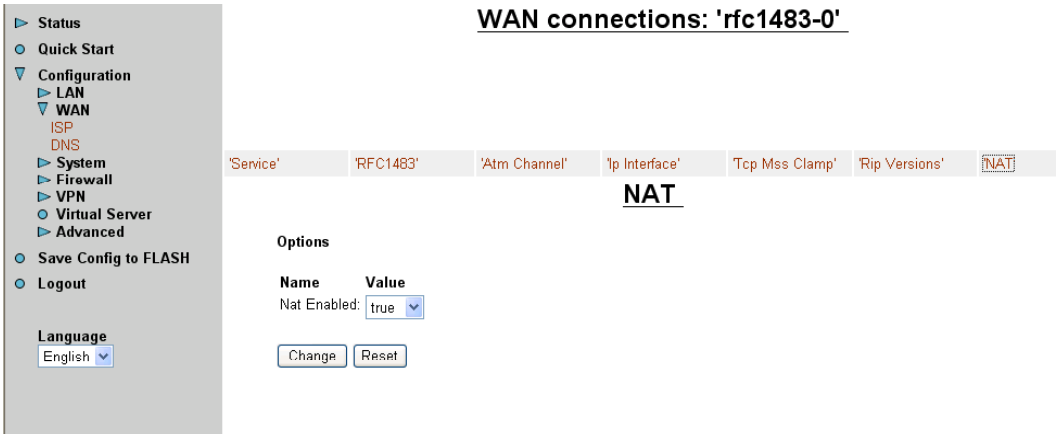


Tcp Mss Clamp: enables/disables TCP MSS (Maximum Segment Size) Clamp functionality on an existing IP interface. When TCP MSS Clamp is enabled on an interface, all TCP traffic routed through that interface will be examined. If a TCP SYN (synchronize/start) segment is sent with a maximum segment size larger than the interface MTU (Maximum Transmission Unit), the MSS option will be rewritten in order to allow TCP traffic to pass through the interface without requiring fragmentation.

Rip Versions

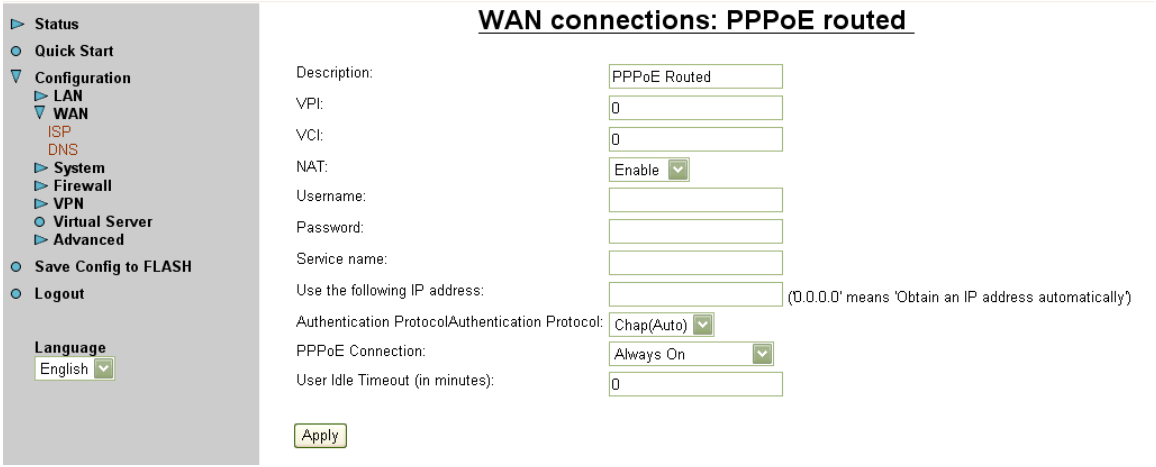
RIP Versions: this specifies whether or not an existing interface can send RIP messages or accept RIP messages. You can specify which version of RIP messages will broadcast routing information on the interface. Routing information is broadcast every 30 seconds or when the RIP routing table is changed.

NAT



NAT: Enable or disable Network Address Translation protocol.

PPPoE Connections



Description: A user-definable name for this connection.

VPI/VCI: Enter the information provided by your ISP. The default for Australian ISPs will be VPI=8, VCI=35.

NAT: The NAT (Network Address Translation) feature allows multiple users to access the Internet through a single ISP account, sharing a single IP address. If users on your LAN have public IP addresses and can access the Internet directly, the NAT function can be disabled.

Username: Enter the username provided by your ISP. You can input up to **128** alphanumeric characters (case sensitive). This will usually be in the format of "username@ispname" instead of simply "username".

Password: Enter the password provided by your ISP. You can input up to **128** alphanumeric characters (case sensitive).

Service Name: This item is for identification purposes. If it is required, your ISP will provide you the information. Maximum input is **20** alphanumeric characters.

Authentication Protocol: Default is **Chap(Auto**). Your ISP will advise you whether to use **Chap** or **Pap.**

⊙ **Always on:** If you want the router to establish a PPPoE session when starting up and to automatically re-establish the PPPoE session when disconnected by the ISP.

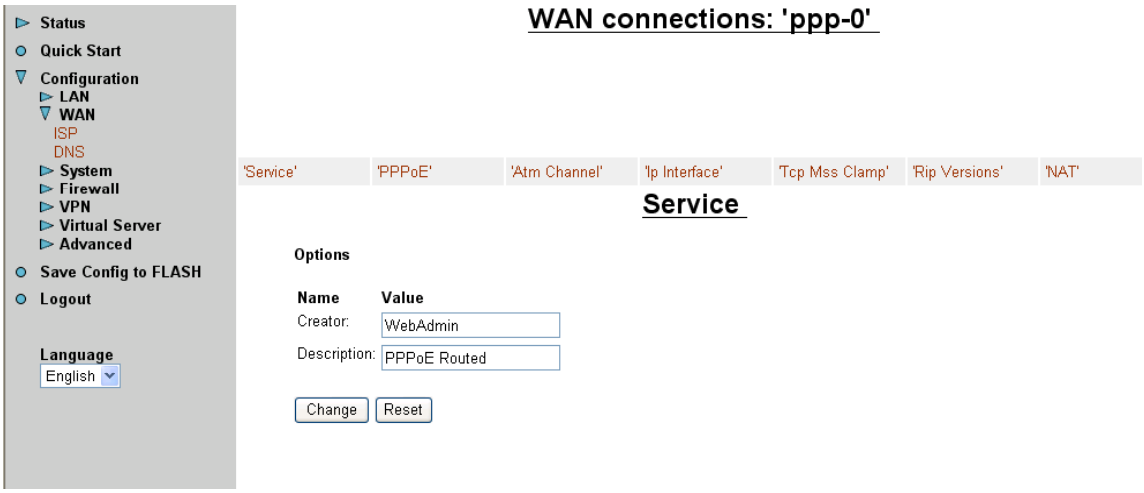
⊙ **Connect to Demand:** If you want to establish a PPPoE session only when there is a packet requesting access to the Internet (i.e. when a program on your computer attempts to access the Internet).

Advanced (PPPoE)

*The **Advanced** configuration section is for troubleshooting purposes only. Please DO NOT change these settings unless advised to by your ISP's technical support staff or your network administrator.*

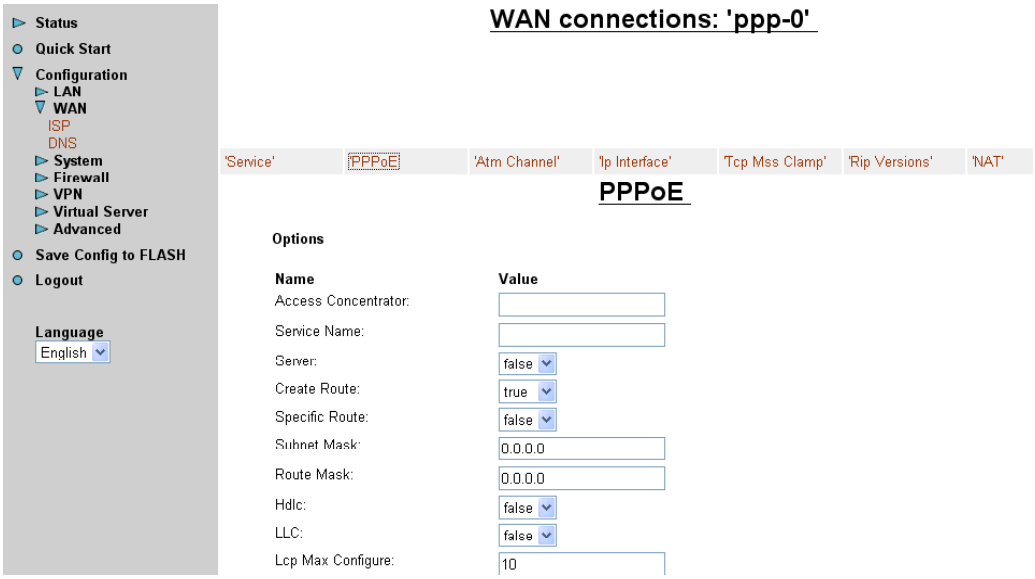
There are nine items included in this **Advanced Options** section: **Service, PPPoE, Atm Channel, Ip Interface, Tcp Mss Clamp, Rip Version** and **NAT.**

Service



Service: The name of the creator and service, you can edit and change the name.

PPPoE



Access Concentrator: A PPPoE tag that identifies a remote access concentrator (or PPPoE server). PPPoE will only connect to the named access concentrator. If no concentrator tag is set, PPPoE connects to the first access concentrator that responds. The tag name/number is determined by your ISP.

Service Name: A PPPoE tag that identifies a specific service that is acceptable to the PPPoE client. If set, the PPPoE transport will connect to the first access concentrator it finds that uses this service. If an access concentrator is also set, the PPPoE transport will connect to the specified service on the named concentrator. The service name is determined by your ISP.

Server: Dial-in status.

Create Route: This setting specifies whether a route is added to the system after IPCP (Internet Protocol Control Protocol) negotiation is completed. If set to *enabled*, a route will be created which directs packets to the remote end of the PPP link.

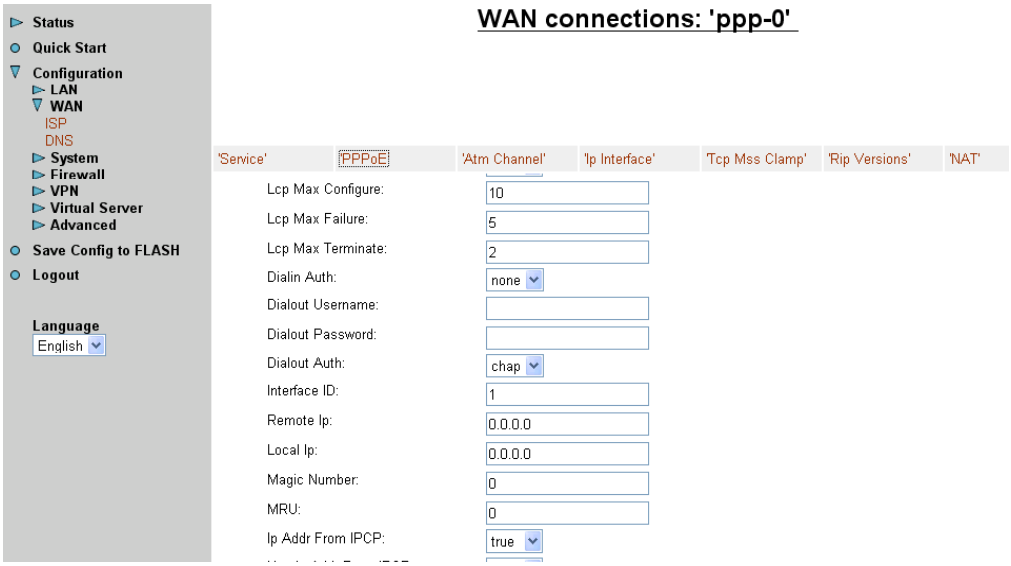
Specific Route: Specifies whether the route created when a PPP link comes up is a specific or default route. If set to *enabled*, the route created will only apply to packets for the subnet at the remote end of the PPP link. The address of this subnet is obtained during IPCP negotiation.

Subnetmask: sets the subnet mask used for the local IP interface connected to the PPP transport. If the value *0.0.0.0* is supplied, the netmask will be calculated from the class of the IP address obtained during IPCP negotiation.

Routemask: Sets the subnet mask used by the route that is created when a PPP link comes up. If it is set to *0.0.0.0*, the subnet mask is determined by the IP address of the remote end of the link. The class of the IP address is obtained during IPCP (Internet Protocol Control Protocol) negotiation.

Hdlc: This setting allows you to enable/disable whether your system can transmit and receive packets containing HDLC headers. If you want LLC packets to be transmitted and received instead of/as well as HDLC packets.

LLC: This setting allows you to enable/disable whether your system can transmit and receive packets containing LLC headers.



Lcp Max Configure: Link Control Protocol; the maximum number of configuration attempts that can be transmitted without reply before assuming that the destination address is unable to respond.

Lcp Max Failure: Link Control Protocol; the maximum number of consecutive negative acknowledgements (indicating that the information received contains errors) that can be transmitted before assuming that parameter negotiation is not converging. It can be any positive value.

Lcp Max Terminate: Link Control Protocol; the maximum number of consecutive Terminate Requests that will be sent without reply before assuming that the destination address is unable to respond. It can be any positive value.

Dial Auth: Sets the authentication method that remote PPP clients must use to dial in to the server.

Dialout Username: A name that identifies a user and, together with the dialout password, enables a user to login to the remote end. The username will be required by the PPP server when the user wants to login remotely. It can be made up of one or more characters and/or digits.

Dialout Password: An arbitrary word that acts as a dialout password enabling you to login to the remote end. The password will be required by the PPP server when you want to login remotely. It can be made up of one or more characters and/or digits.

Dialout Auth: Sets the authentication protocol used to connect to external PPP servers (dialout).

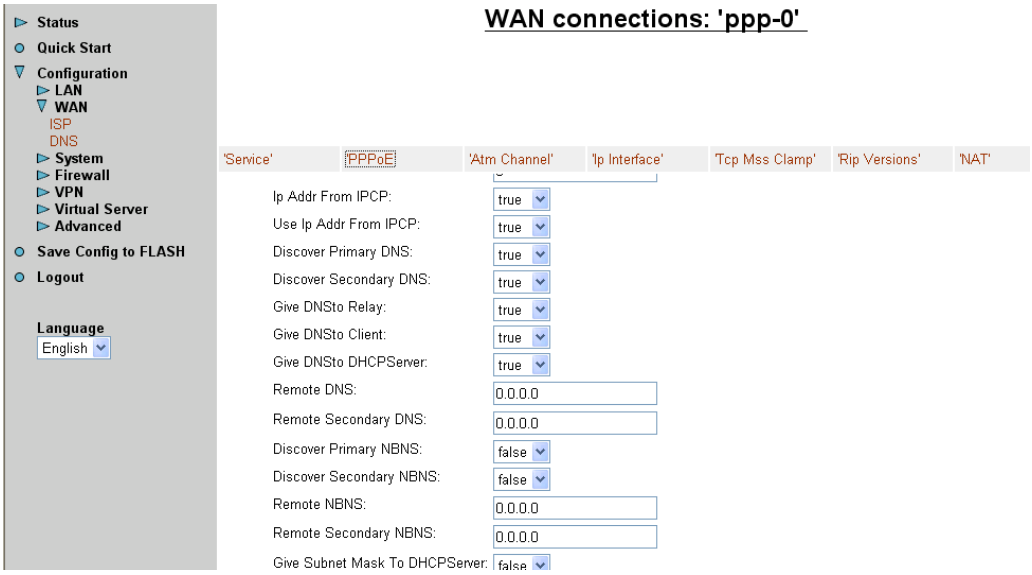
Local IP: Tells the PPP process the local IP address to be associated with the client-end of an interface.

Remote IP: Sets the IP address supplied to the remote end of the PPP connection during negotiation. This is particularly important for PPP dial in transports.

Magic Number: This value is for establishing and identifying the PPP link. This is used in

the LCP protocol.

MRU : Maximum Receive Unit. This is negotiated during the LCP protocol stage.



Use Ip Addr From IPCP: Specifies if the IP address given by IPCP negotiation process is to be used.

Discover Primary/Secondary DNS: This setting enables/disables whether the primary/secondary DNS server address is requested from a remote PPP peer using IPCP. The default setting for this command is *enabled*.

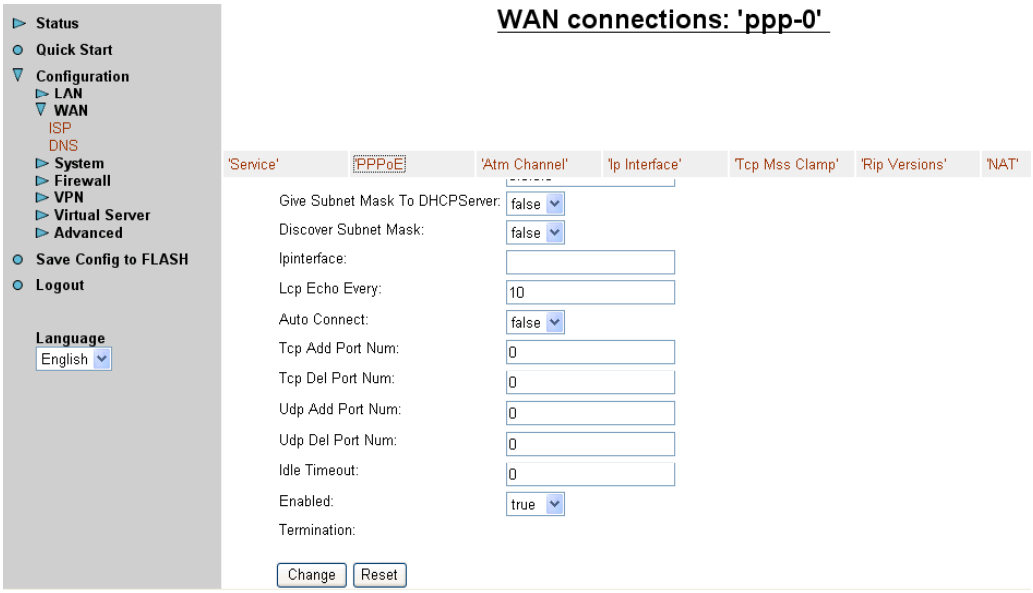
Give DNSto Relay: Controls whether the PPP Internet Protocol Control Protocol (IPCP) can request the DNS server IP address for a remote PPP peer. Once IPCP has discovered the DNS server IP address, it automatically gives the address to the local DNS relay so that a connection can be established.

Give DNSto Client: Controls whether the PPP Internet Protocol Control Protocol (IPCP) can request a DNS server IP address for a remote PPP peer. Once IPCP has discovered the DNS server IP address, it automatically gives the address to the local DNS client so that a connection can be established.

Give DNSto DHCP Server: Similar to the above, but gives the DNS server address to the DHCP server.

Primary/Secondary Remote DNS: Sets the primary and secondary local DNS server addresses that will be given to a remote PPP peer when the peer requests a primary or secondary DNS server IP address using IPCP. Setting the secondary IP address is optional.

Discover Primary NBNS / Discover Secondary NBNS / Remote NBNS / Remote Secondary NBNS: For technical staff inspection purposes.



Lcp Echo Every: This is the time frame frame (in seconds at which a specified PPP transport is to send an LCP (Link Control Protocol) echo request . If no reply to the request is received, the PPP connection is torn down. This functionality is also known as 'keep-alive'.

Auto Connect: This command allows you to enable/disable the PPPoE autoconnect function. If enabled, PPPoE automatically connects to TCP/IP whenever a user requests TCP/IP packets from a public destination.

Tcp Add Port Num, Tcp Del Port Num, Udp Add Port Num and

Udp Del Port Num: For technical staff inspection purposes.

Idle Timeout: The length of time (in minutes) that a PPPoE session connected to an ISP can remain idle before the session is disabled. The time can be any value between 0 and 60. A value of 0 means that no idle timeout is set.

Atm Channel

Refer to ***Advanced (RFC 1483 Routed)*** section.

Ip Interface

Refer to ***Advanced (RFC 1483 Routed)*** section.

Tcp Mss Clamp

Refer to ***Advanced (RFC 1483 Routed)*** section.

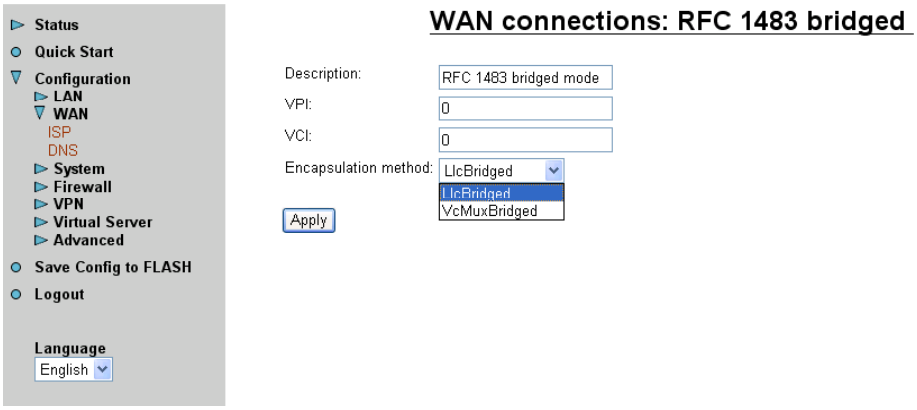
Rip Versions

Refer to ***Advanced (RFC 1483 Routed)*** section.

NAT

Refer to ***Advanced (RFC 1483 Routed)*** section.

RFC 1483 Bridged Connections



VPI and VCI: Enter the information provided by your ISP.

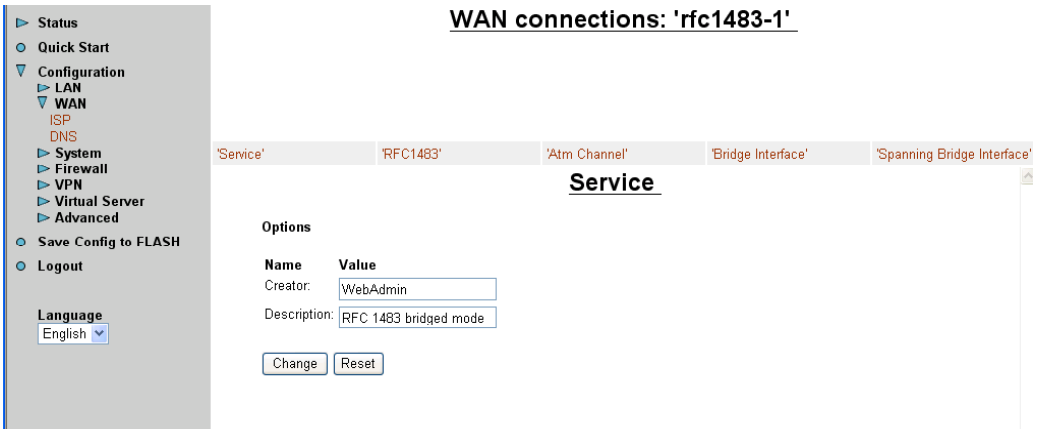
Encapsulation method: Select the protocol format, this is provided by your ISP.

Advanced (RFC1483 Bridged)

*The **Advanced** configuration section is for troubleshooting purposes only. Please DO NOT change these settings unless advised to by your ISP's technical support staff or your network administrator.*

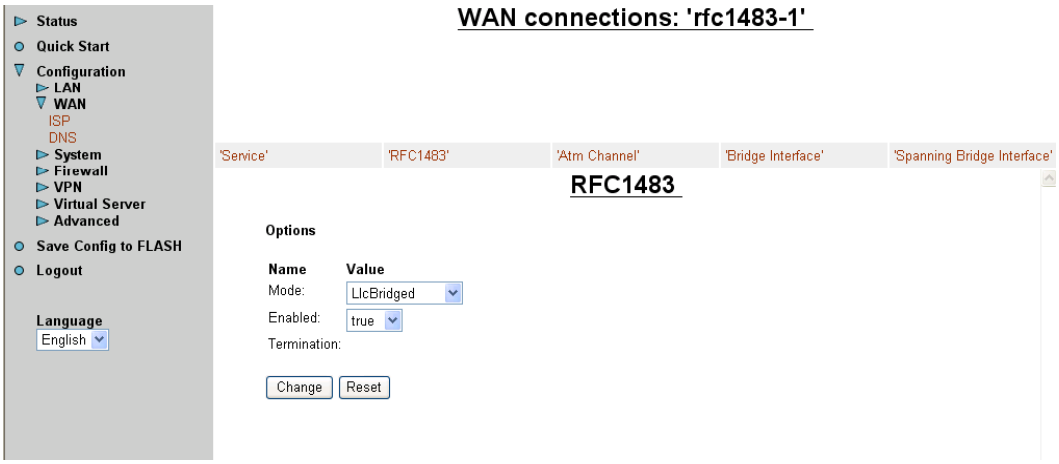
There are five items included in this **Advanced Options** section: **Service, RFC 1483, Atm Channel, Bridge Interface** and **Spanning Bridge Interface.**

Service



Service: The name of the creator and service, you can edit and change the name.

RFC 1483

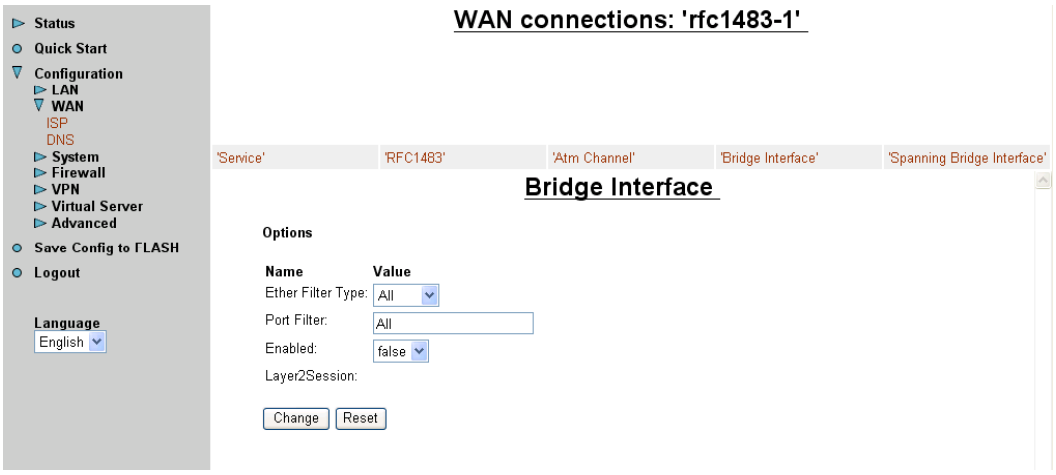


Mode (Encapsulation method): Select the protocol format. This is provided by your ISP.

Atm Channel

Refer to ***Advanced (RFC 1483 Routed)*** section.

Bridge Interface

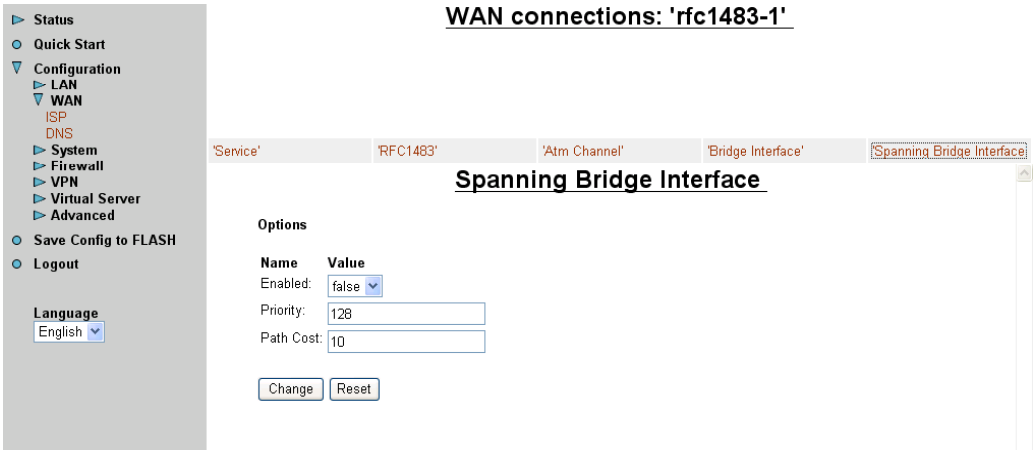


Ether Filter Type: Specify the type of ethernet filtering performed by the named bridge interface.

All	Allows all types of ethernet packets through the port.
Ip	Allows only IP/ARP types of ethernet packets through the port.
Pppoe	Allows only PPPoE types of ethernet packets through the port.

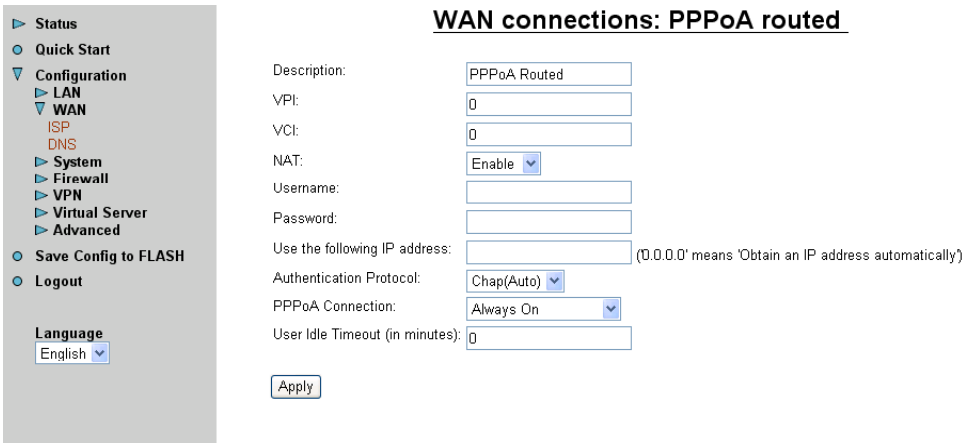
Port Filter: Control the bridge's forwarding and broadcasting behavior. It allows you to set a portfilter on a bridge interface to determine which port or ports multicast and unknown packets should be forwarded to.

Spanning Bridge Interface



Priority: Set the spanning tree protocol priority. Where two bridges have the same priority, their MAC address is compared and the smaller MAC address is treated as the most significant. A value that assigns priority to the bridge: the lower the priority number, the more significant the bridge becomes in protocol terms. The priority can be any value (in seconds) between 0 and 65535.

PPPoA Routed Connections



Description: User-definable name for the connection.

VPI/VCI: Enter the information provided by your ISP. The default for Australian ISPs is VPI=8, VCI=35.

NAT: The NAT (Network Address Translation) feature allows multiple users to access the Internet through a single IP account, sharing a single IP address. If users on your LAN have public IP addresses and can access the Internet directly, the NAT function can be disabled.

Username: Enter the username provided by your ISP. You can input up to **128** alphanumeric characters (case sensitive). This will usually be in the format of "username@ispname" instead of simply "username".

Password: Enter the password provided by your ISP. You can input up to **128** alphanumeric characters (case sensitive).

Service Name: This item is for identification purposes. If it is required, your ISP will provide you the information. Maximum input is **20** alphanumeric characters.

PPP Authentication Protocol Type: Default is **Auto**.

⊙ **Always on:** If you want the router to establish a PPPoA session when starting up and to automatically re-establish the PPPoA session when disconnected by the ISP.

⊙ **Connect to Demand:** If you want to establish a PPPoA session only when there is a packet requesting access to the Internet (i.e. when a program on your computer attempts to access the Internet).

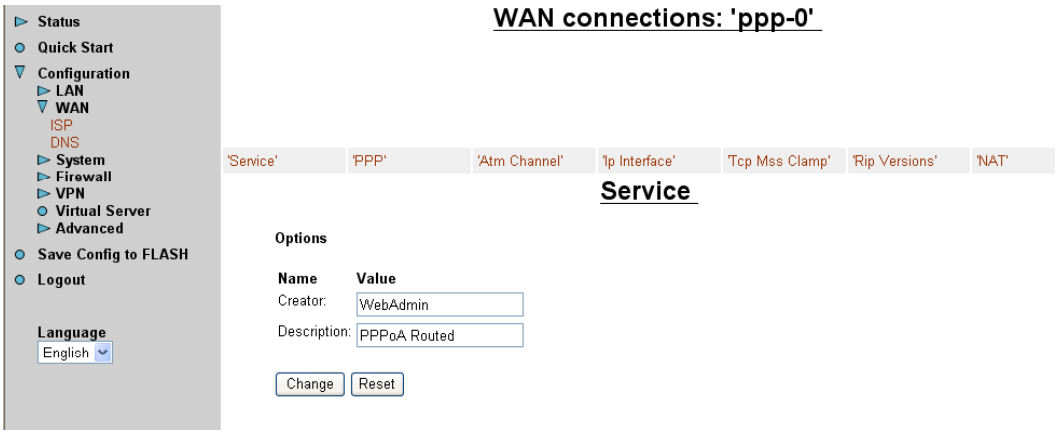
User Idle Timeout (in minutes): Auto-disconnect the broadband firewall gateway when there is no activity on the line for a predetermined period of time.

Advanced (PPPoA)

*The **Advanced** configuration section is for troubleshooting purposes only. Please DO NOT change these settings unless advised to by your ISP's technical support staff or your network administrator.*

There are nine items included in this **Advanced Options** section: **Service, PPP, Atm Channel, Ip Interface, Tcp Mss Clamp, Rip Versions** and **NAT**.

Service



Service: The name of the creator and service, you can edit and change the name.

PPP

Refer to ***Advanced (PPPoE)*** section.

Atm Channel

Refer to ***Advanced (RFC 1483 Routed)*** section.

Ip Interface

Refer to ***Advanced (RFC 1483 Routed)*** section.

Tcp Mss Clamp

Refer to ***Advanced (RFC 1483 Routed)*** section.

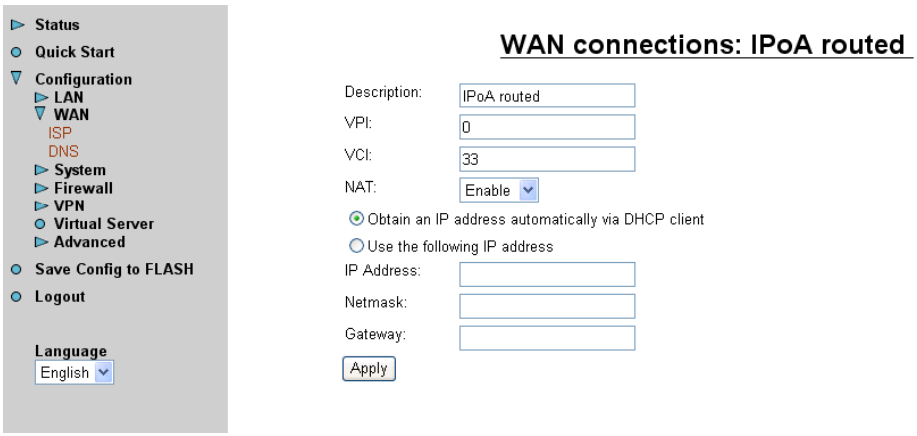
Rip Versions

Refer to ***Advanced (RFC 1483 Routed)*** section.

NAT

Refer to ***Advanced (RFC 1483 Routed)*** section.

IPoA Routed Connections



Description: User-definable name for the connection.

VPI/VCI: Enter the information provided by your ISP. The default for Australian ISPs is VPI=8, VCI=35.

NAT: The NAT (Network Address Translation) feature allows multiple users to access the Internet through a single IP account, sharing a single IP address. If users on your LAN have public IP addresses and can access the Internet directly, the NAT function can be disabled.

DHCP client: Enable or disable the DHCP client, specifying if the router can obtain an IP address from the Internet Service Provider (ISP) automatically or not. Please click **Obtain an IP address automatically via DHCP client** to enable the DHCP client function or click **Specify an IP address** to disable the DHCP client function, and specify the IP address manually. The setting of this item is specified by your ISP.

Advanced (IPoA Routed)

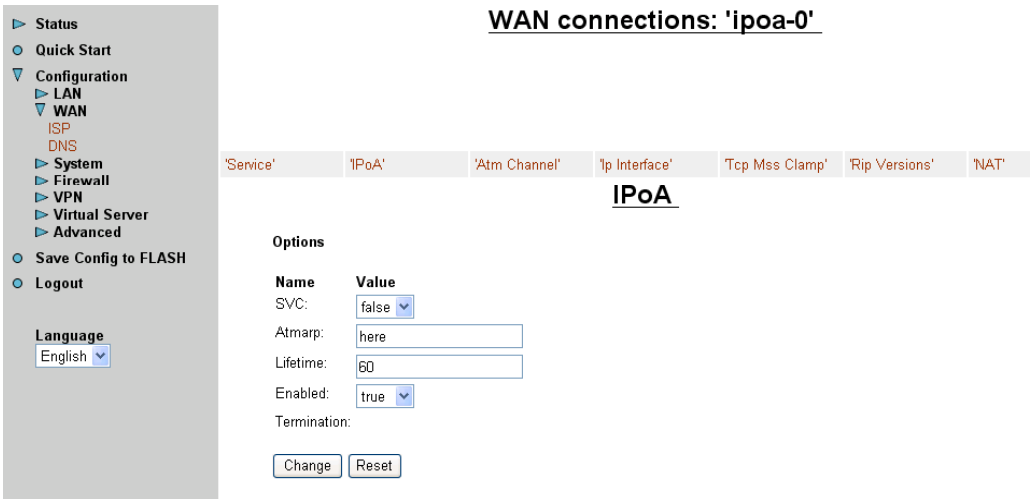
*The **Advanced** configuration section is for troubleshooting purposes only. Please DO NOT change these settings unless advised to by your ISP's technical support staff or your network administrator.*

There are nine items included in this **Advanced Options** section: **Service, PPP, Atm Channel, Ip Interface, Tcp Mss Clamp, Rip Versions** and **NAT**.

Service

Service: The name of the creator and service, you can edit and change the name.

IPoA



SVC: Switched Virtual Channel (SVC) status (true or false).

Atmarp: ARP Server ATM details (Server IP address or '*here*'). The ATM ARP server you want to use. If you want your local machine to be the ATM ARP server, type *'here'*. If you

want another machine to be the ATM ARP server, type the ATM-address of that machine.

Lifetime: Set idle time-out for IP over ATM SVCs. If there is no traffic on an SVC for this period, then it will be disconnected.

Atm Channel

Refer to ***Advanced (RFC 1483 Routed)*** section.

Ip Interface

Refer to ***Advanced (RFC 1483 Routed)*** section.

Tcp Mss Clamp

Refer to ***Advanced (RFC 1483 Routed)*** section.

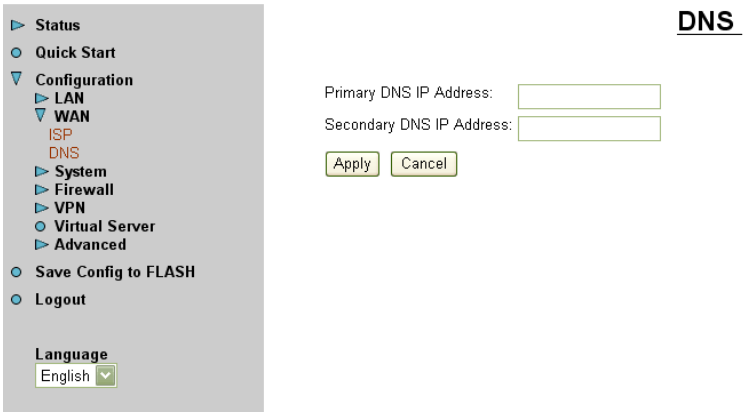
Rip Versions

Refer to ***Advanced (RFC 1483 Routed)*** section.

NAT

Refer to ***Advanced (RFC 1483 Routed)*** section.

DNS



A Domain Name System (DNS) contains a mapping table for domain name and IP addresses. On the Internet, every host has a unique and user-friendly name (domain name) such as www.billion.com.au and an IP address. An IP address is a 32-bit number in the form of *xxx.xxx.xxx.xxx*, for example 192.168.1.254. You can think of an IP address as a telephone number for devices on the Internet, and the DNS will allow you to find the telephone number for any particular domain name. As an IP Address is hard to remember, the DNS converts the friendly name into its equivalent IP Address.

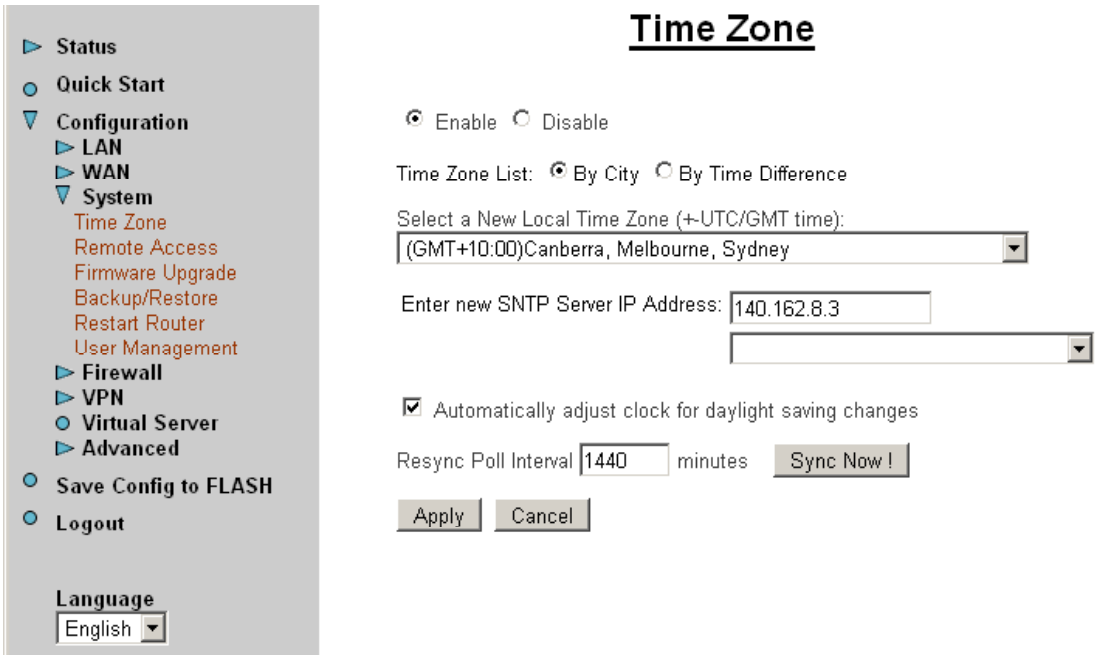
You can obtain a Domain Name System (DNS) IP address automatically if your ISP has provided it when you logon. Usually when you choose PPPoE or PPPoA as your WAN - ISP protocol, the ISP will provide the DNS IP address automatically. You may leave the configuration field blank. Alternatively, your ISP may provide you with an IP address of their DNS. If this is the case, you must enter the DNS IP address.

If you choose one of the other three protocols ─ RFC1483 Routed/Bridged and IPoA check with your ISP, it may provide you with an IP address for their DNS server. You must enter the DNS IP address if you set the DNS of your PC to the LAN IP address of this router.

System

There are six items within the **System** section: **Time Zone, Remote Access, Firmware Upgrade, Backup/Restore, Restart Router** and **User Management.**

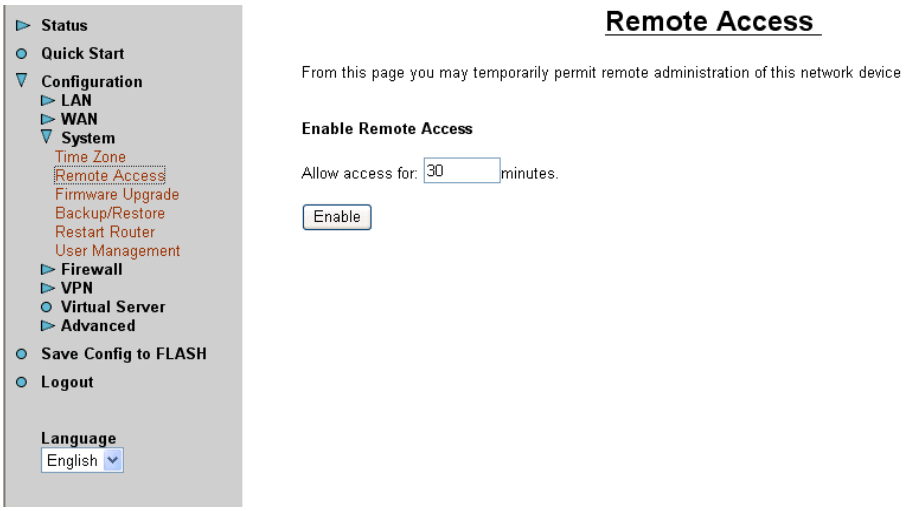
Time Zone



The router does not have a real time clock on board; instead, it uses the Simple Network Time Protocol (SNTP) to get the current time from an SNTP server outside your network. Choose your local time zone, click **Enable** and click the **Apply** button. After a successful connection to the Internet, the router will retrieve the correct local time from the SNTP server you have specified. If you prefer to specify an SNTP server other than those in the drop-down list, simply enter its IP address as shown above. Your ISP may provide an SNTP server for you to use.

Resync Poll Interval (in minutes) is the periodic interval the router will wait before it re-synchronizes the router's time with that of the specified SNTP server. In order to avoid unnecessarily increasing the load on your specified SNTP server you should keep the poll interval as high as possible – at the absolute minimum every few hours or even days.

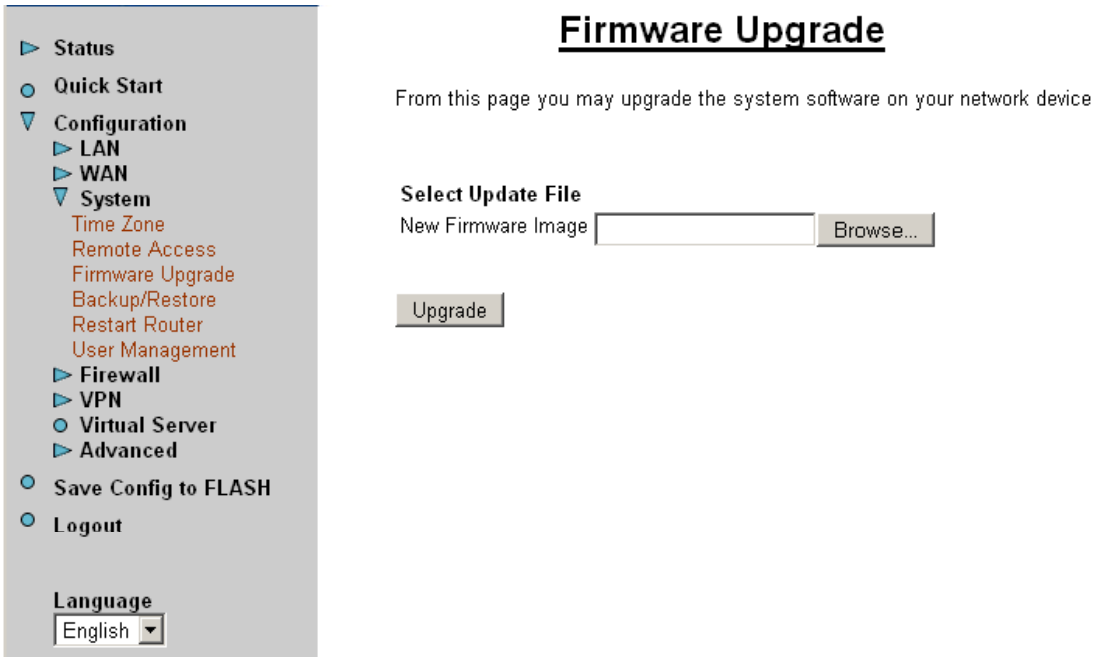
Remote Access



To temporarily permit remote administration of the router (i.e. from outside your LAN), select a time period the router will permit remote access for and click **Enable.** You may change other configuration options for the web administration interface using **Device Management** options in the **Advanced** section of the GUI.

If you wish to permanently enable remote access, choose a time period of 0 minutes.

Firmware Upgrade

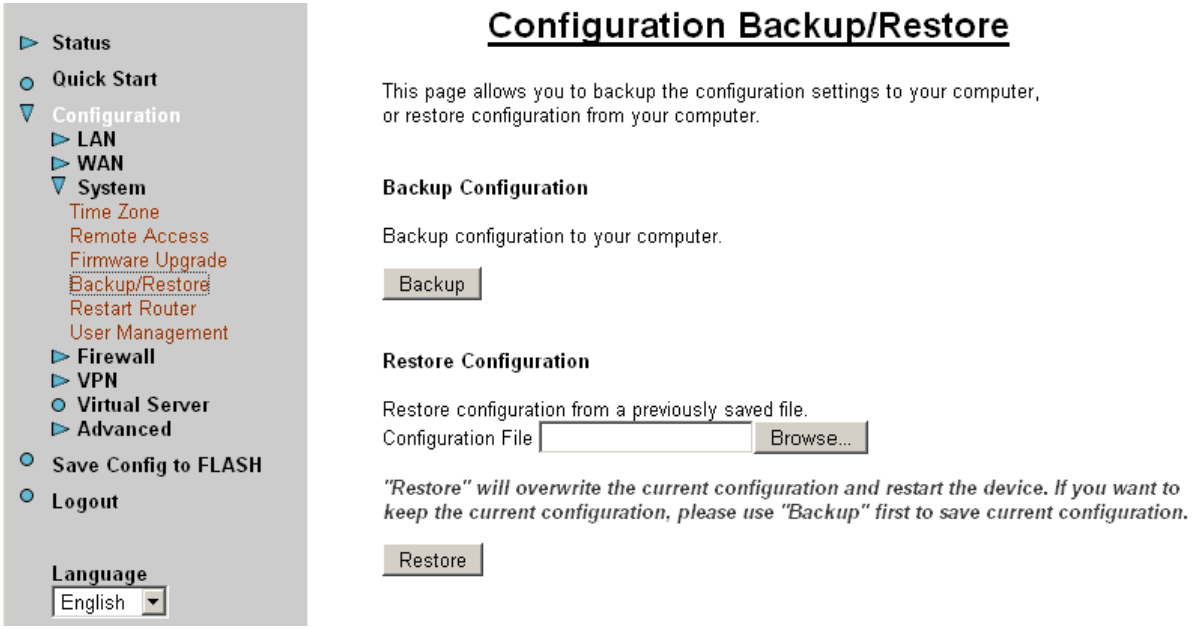


Your router's "firmware" is the software that allows it to operate and provides all its functionality. Think of your router as a dedicated computer, and the firmware as the software it runs. Over time this software may be improved and modified, and your Billion router allows you to upgrade the software it runs to take advantage of these changes.

Clicking on **Browse** will allow you to select the new firmware image file you have downloaded to your PC. Once the correct file is selected, click Upgrade to update the firmware in your router.

Please note: Australian users should only download new firmware updates from the Australian Billion website at www.billion.com.au – be sure you download and attempt to install firmware updates for your specific model of router.

Backup / Restore



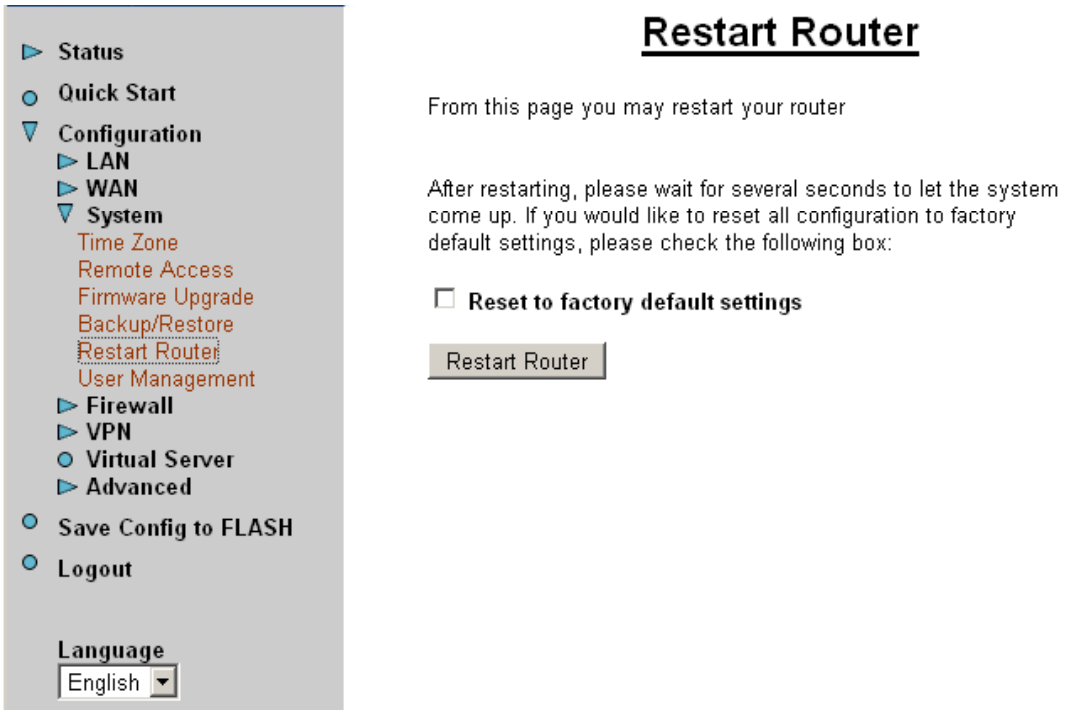
These functions allow you to save and backup your router's current settings to a file on your PC, or to restore a previously saved backup. This is useful if you wish to experiment with different settings, knowing that you have a backup handy in the case of any mistakes. It is advisable to backup your router's settings before making any significant changes to your router's configuration.

Press **Backup** to select where on your local PC to save the settings file. You may also change the name of the file when saving if you wish to keep multiple backups.

Press **Browse** to select a file from your PC to restore. You should only restore settings files that have been generated by the Backup function, and that were created when using the **current version** of the router's firmware. **Settings files saved to your PC should not be manually edited in any way.**

After selecting the settings file you wish to use, pressing **Restore** will load those settings into the router.

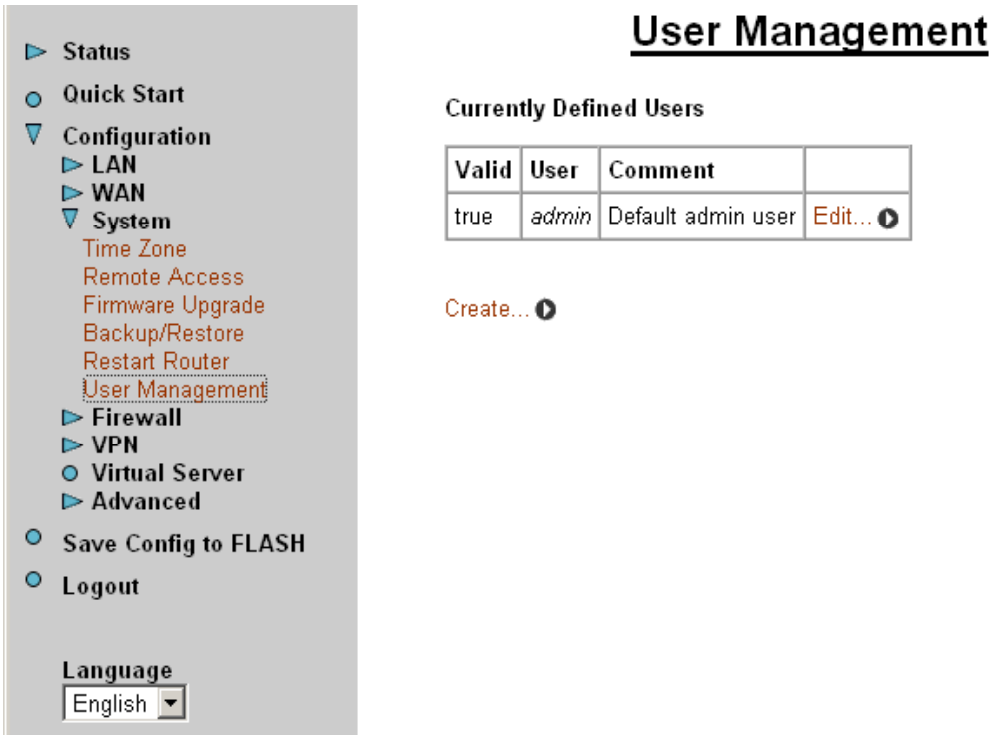
Restart Router



Click **Restart Router** to reboot your router (and restore your last saved configuration). 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), check the **Reset to factory default settings** box first.

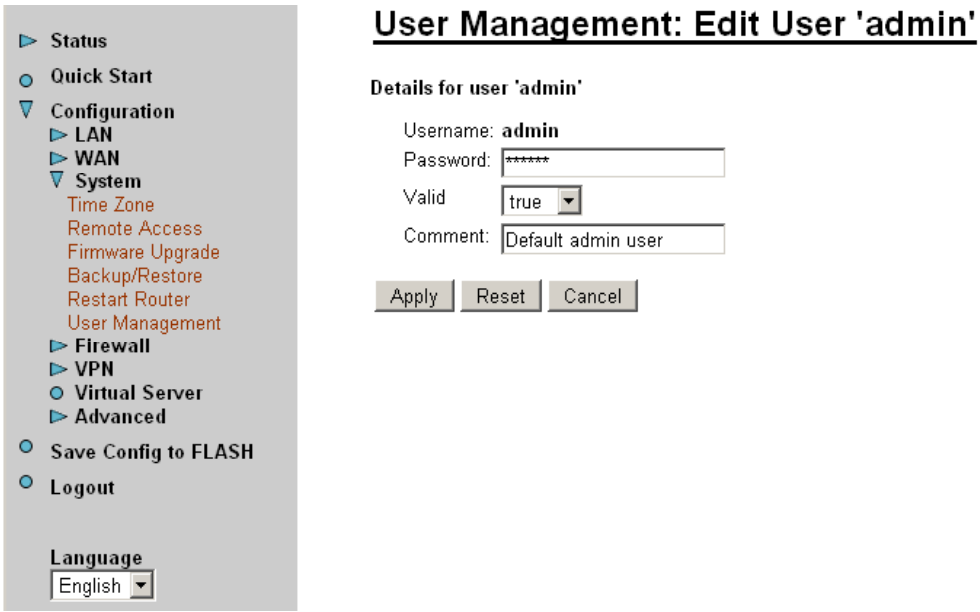
You may also reset your router to factory settings by holding the small Reset pinhole button on the back of your router in for 10-12 seconds whilst the router is turned on.

User Management



In order to prevent unauthorized access to your router's configuration interface, it requires all users to login with a password. You can set up multiple user accounts, each with their own password.

You are able to **Edit** existing users and **Create** new users who are able to access the device's configuration interface. Once you have clicked on **Edit,** you are shown the following options:



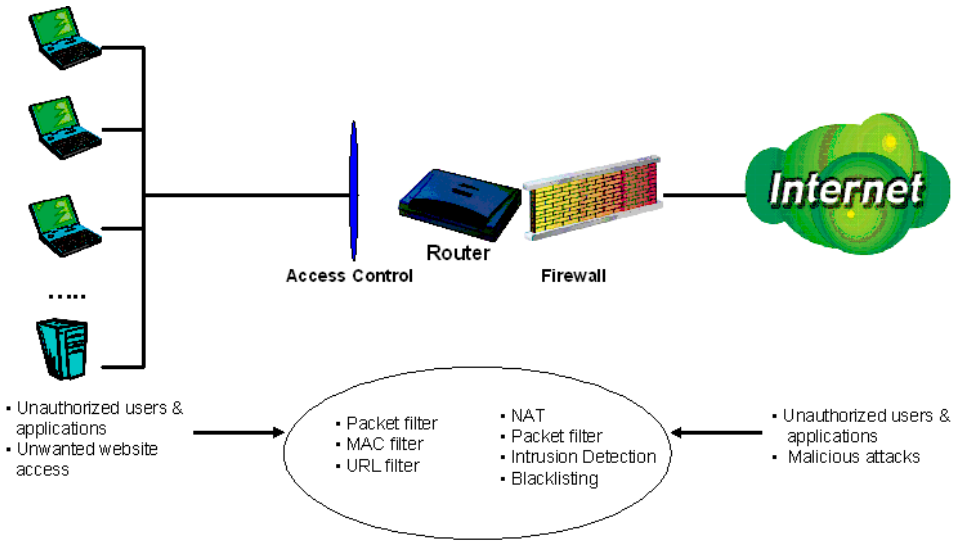
You can change the user's **password**, whether their account is active and **Valid**, as well as add a comment to each user account. These options are the same when creating a user account, with the exception that once created you cannot change the username. You cannot delete the default admin account, however you can delete any other created

accounts by clicking **Delete** when editing the user.

You are strongly advised to change the password on the default “admin” account when you receive your router, and any time you reset your configuration to Factory Defaults. By default this password is “admin”.

Firewall and Access Control

Your router includes a full SPI (Stateful Packet Inspection) firewall for controlling Internet access from your LAN, as well as helping to prevent attacks from hackers. In addition to this, when using NAT (Network Address Translation. Please see the **WAN** configuration section for more details on NAT) the router acts as a "natural" Internet firewall, as all PCs on your LAN will use private IP addresses that cannot be directly accessed from the Internet.



Firewall & Filter

Firewall: Prevents access from outside your network. The router provides three levels of security support:

NAT natural firewall: This masks LAN users' IP addresses which are invisible to outside users on the Internet, making it much more difficult for a hacker to target a machine on your network. This natural firewall is on when NAT function is enabled.

NOTE:

When using Virtual Servers your PCs will be exposed to the degree specified in your Virtual Server settings provided the ports specified are opened in your firewall packet filter settings.

Firewall Security and Policy (General Settings): Inbound direction of Packet Filter rules to prevent unauthorized computers or applications accessing your local network from the Internet.

Intrusion Detection: Enable Intrusion Detection to detect, prevent and log malicious attacks.

Access Control: Prevents access from PCs on your local network:

Firewall Security and Policy (General Settings): Outbound direction of Packet Filter rules to prevent unauthorized computers or applications accessing the Internet.

MAC Filter rules: To prevent unauthorized computers accessing the Internet.

URL Filter: To block PCs on your local network from unwanted websites.

You can find six items under the **Firewall** section: **General Settings, Packet Filter, Intrusion Detection, MAC Address Filter, URL Filter** and **Firewall Log.**

General Settings

You can choose not to enable Firewall, to add all filter rules by yourself, or enable the Firewall using preset filter rules and modify the port filter rules as required. The Packet Filter is divided into two sections: Port Filters and Address Filters, used to filter packets based-on Applications (Port) or IP addresses.

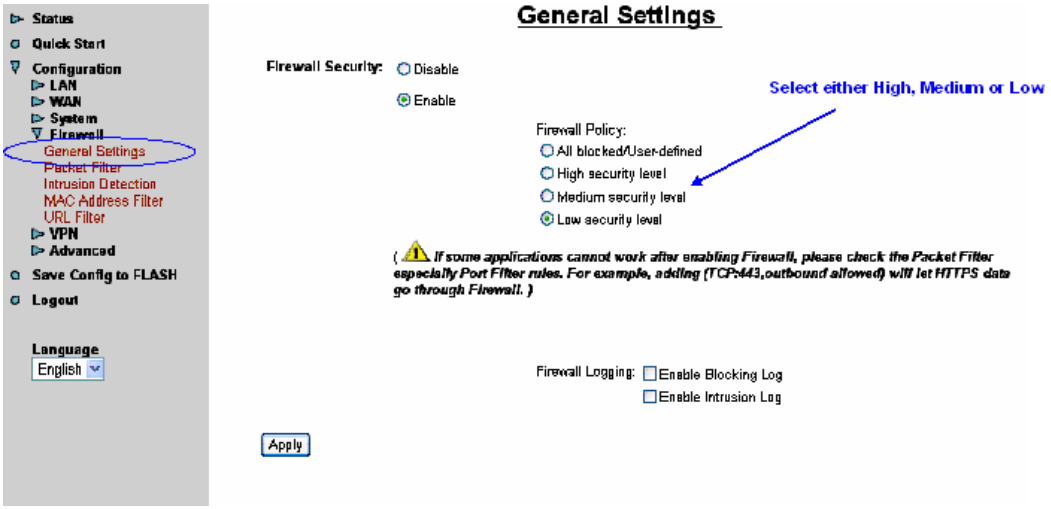
There are four options when you enable the Firewall, they are:

- All blocked/User-defined: no pre-defined port or address filter rules by default, meaning that all inbound (Internet to LAN) and outbound (LAN to Internet) packets will be blocked. Users have to add their own filter rules for further access to the Internet.

- High/Medium/Low security level: the pre-defined port filter rules for High, Medium and Low security are displayed in Port Filters of Packet Filter.

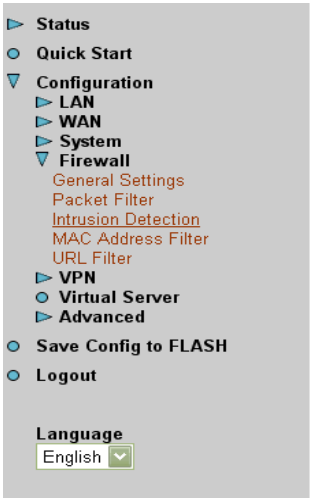
Select either **High, Medium** or **Low security level** to enable the Firewall. The only difference between these three security levels is the preset port filter rules in the Packet Filter. Firewall functionality is the same for all levels; it is only the list of preset port filters that changes between each setting.

If you choose of the preset security levels and then add custom filters, you may temporarily disable the firewall and recover your custom filter settings by re-selecting the same security level.



When the Firewall is enabled, you can also enable the Firewall Logging function. The Firewall Logs can be viewed via the Status – Event Log section of the web interface. Please see the Status section of this manual for more information. If you encounter any access problems with the Firewall enabled, you can check this log to identify whether the problem is caused by the Packet Filter rules or not. Any time a connection attempt is blocked by the firewall a corresponding entry will appear in the Event Log to assist in troubleshooting and firewall port filter configuration.

Packet Filter



Packet Filter

Type	Configuration		Note
external < > internal	Port Filters...	Address Filters...	1. By default, all protocol types and TCP/UDP ports are blocked. 2. Only the listed IP addresses are blocked

Port Filters

The pre-defined port filter rules for High, Medium and Low security levels are listed below.

Application	Protocol	Port Number		Firewall - High		Firewall - Medium		Firewall - Low	
		Start	End	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
HTTP(80)	TCP(6)	80	80	NO	**YES**	NO	**YES**	NO	**YES**
DNS (53)	UDP(17)	53	53	NO	**YES**	NO	**YES**	**YES**	**YES**
DNS (53)	TCP(6)	53	53	NO	**YES**	NO	**YES**	**YES**	**YES**
FTP(21)	TCP(6)	21	21	NO	NO	NO	**YES**	NO	**YES**
Telnet(23)	TCP(6)	23	23	NO	NO	NO	**YES**	NO	**YES**
SMTP(25)	TCP(6)	25	25	NO	**YES**	NO	**YES**	NO	**YES**
POP3(110)	TCP(6)	110	110	NO	**YES**	NO	**YES**	NO	**YES**
NEWS(119)	TCP(6)	119	119	NO	NO	NO	**YES**	NO	**YES**
RealAudio (7070)	UDP(17)	7070	7070	NO	NO	**YES**	**YES**	**YES**	**YES**
PING	ICMP(1)	N/A	N/A	NO	**YES**	NO	**YES**	NO	**YES**
H.323(1720)	TCP(6)	1720	1720	NO	NO	NO	**YES**	**YES**	**YES**
T.120(1503)	TCP(6)	1503	1503	NO	NO	NO	**YES**	**YES**	**YES**
SSH(22)	TCP(6)	22	22	NO	NO	NO	**YES**	**YES**	**YES**
NTP(123)	UDP(17)	123	123	NO	**YES**	NO	**YES**	NO	**YES**
HTTPS(443)	TCP(6)	443	443	NO	NO	NO	**YES**	NO	**YES**
ICQ (5190)	TCP(6)	5190	5190	NO	NO	NO	**NO**	**YES**	**YES**

Inbound: Internet to LAN, Outbound: LAN to Internet.

Address Filters

Address Filters are used to block traffic to/from particular IP addresses. They can be used to block IP addresses either on the Internet or on your local network. There are no pre-defined address filter rules; you can add the filter rules to meet your requirements. There are two kinds of address filters, one is inbound, the other is outbound. The rules can be set to prevent unauthorized users (hosts or network) to access the Internet from LAN (outbound) and/or access LAN from the Internet (inbound).

Host IP Address: This is the IP address you wish to block access to or from.

Host Subnet Mask: This is the subnet mask for the IP address range you wish to block.

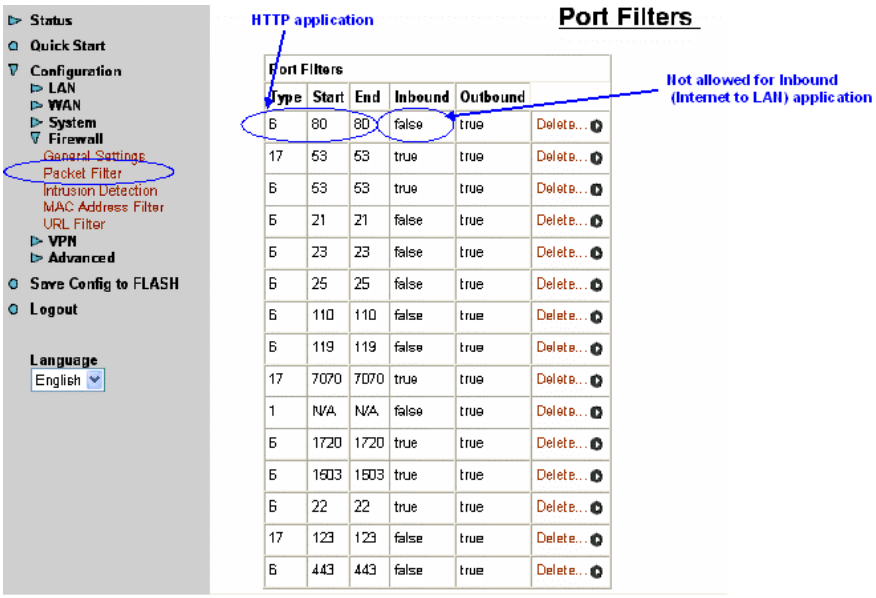
Direction: Whether you want to block access to the Internet (**"outbound"**), from the Internet (**"inbound"**) or both to and from the Internet (**"both"**).

Tip: To block access to/from a single IP address, enter that IP address as the **Host IP Address** and use a **Host Subnet Mask** of "255.255.255.255".

Example: Configuring your firewall to allow for a publicly accessible web server on your LAN

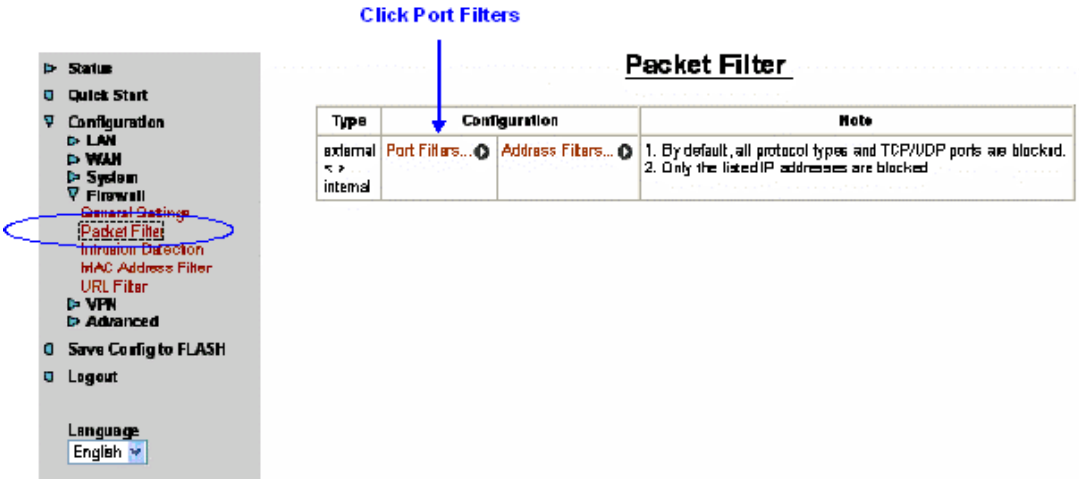
The pre-defined port filter rule for HTTP (TCP port 80) is the same no matter whether the firewall is set to a high, medium or low security level. The default setting for HTTP allows outbound access, but not inbound access. To setup a web server located on the local network when the firewall is enabled, you have to configure the Port Filters setting for HTTP.

As you can see from the diagram below, when the firewall is enabled with one of the three presets (Low/Medium/High), inbound HTTP access is not allowed.

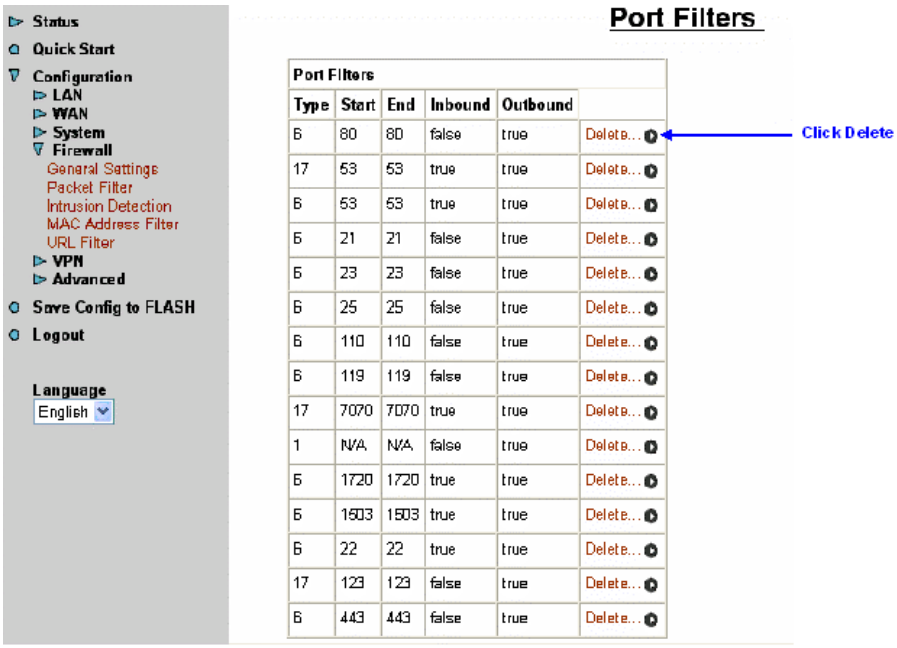


Configuring Packet Filter

1. Click Packet Filter - you will get the following page:

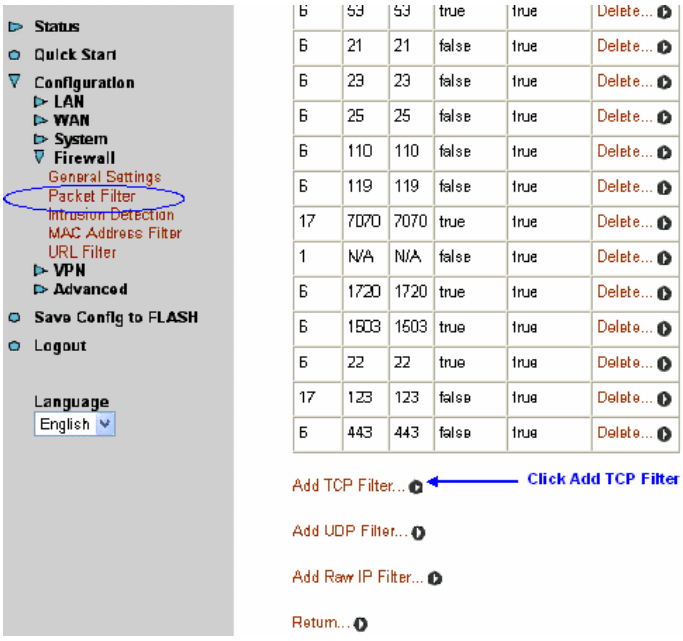


2. Click **Port Filters**. You will then be presented with the pre-defined port filter rules screen (in this case for the low security level), shown below:

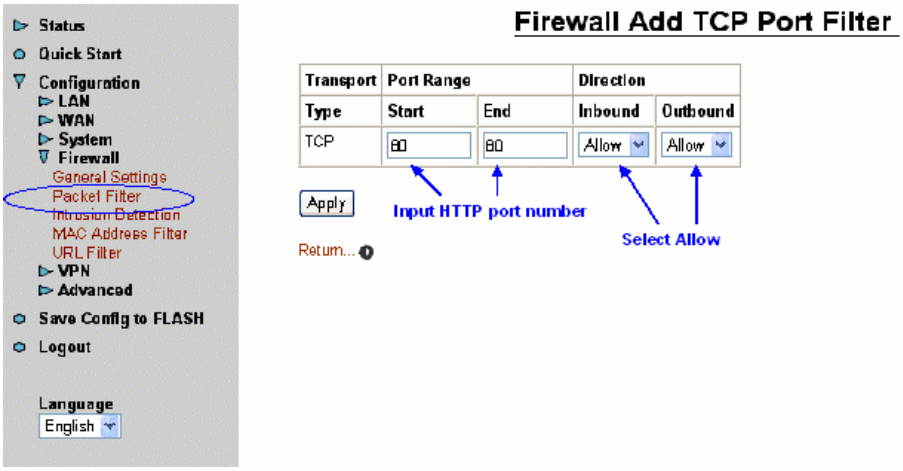


3. Click **Delete** to delete the existing HTTP rule.

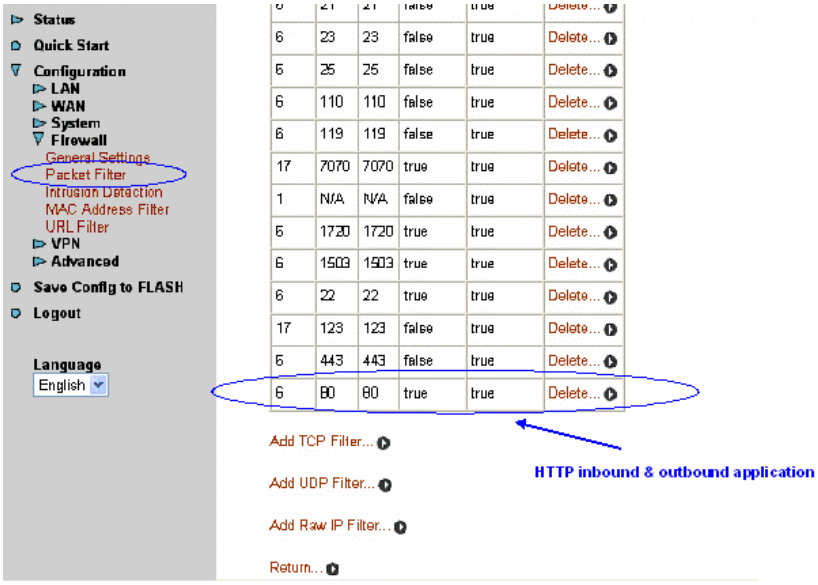
4. Click **Add TCP Filter**.



5. Input the port number (80) and set both **Inbound** & **Outbound** to **Allow**.



6. The new port filter rule for HTTP is shown below:



7. Configure your Virtual Server ("port forwarding") settings so that incoming HTTP requests on port 80 will be forwarded to the PC running your web server:

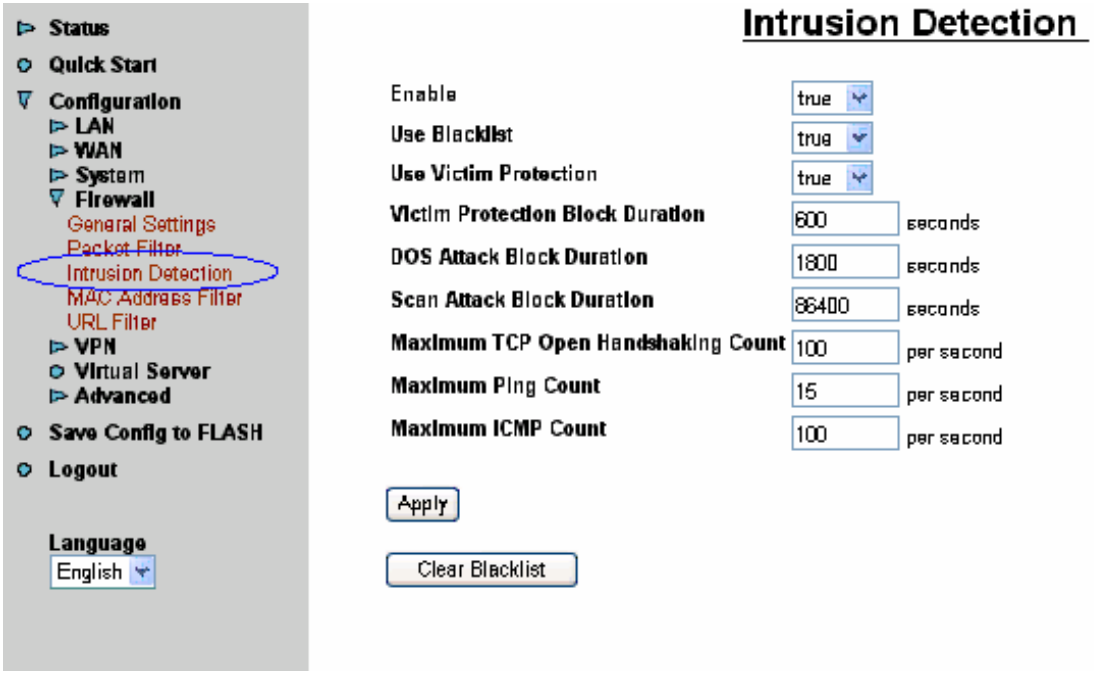
Virtual Server

Enable	Application	Protocol	Port	IP Address
☐	FTP	TCP	21	192.168.2.
☐	Telnet	TCP	23	192.168.2.
☐	SMTP	TCP	25	192.168.2.
☐	HTTP	TCP	80	192.168.2.
☐	POP3	TCP	110	192.168.2.
☐	NNTP	TCP	119	192.168.2.
☐	NTP	UDP	123	192.168.2.
☐	HTTPS	TCP	443	192.168.2.
☐	IKE	UDP	500	192.168.2.
☐	T.120	TCP	1503	192.168.2.
☐	H.323	TCP	1720	192.168.2.

To enable the HTTP service in Virtual Server settings, input the web server PC's IP address.

Tip: If you wish to setup permanent remote management of your router, you may enter the router's IP instead.

Intrusion Detection



The router's *Intrusion Detection System* (IDS) is used to detect hacker attacks and intrusion attempts from the Internet. If the IDS function of the firewall is enabled, inbound packets are filtered and blocked depending on whether they are detected as possible hacker attacks, intrusion attempts or other connections that the router determines to be suspicious.

Blacklist: If the router detects a possible attack, the source IP or destination IP address will be added to the Blacklist. Any further attempts using this IP address will be blocked for the time period specified as the **Block Duration**. The default setting for this function is false (disabled). Some attack types are denied immediately without using the Blacklist function, such as *Land attack* and *Echo/CharGen scan*.

Block Duration:

- **DoS Attack Block Duration**: This is the duration for blocking hosts that attempt a possible Denial of Service (DoS) attack. Possible DoS attacks this attempts to block include *Ascend Kill* and *WinNuke*. Default value is 1800 seconds.
- **Scan Attack Block Duration**: This is the duration for blocking hosts that attempt a possible Scan attack. Scan attack types include *X'mas scan, IMAP SYN/FIN scan* and similar attempts. Default value is 86400 seconds.
- **Victim Protection Block Duration**: This is the duration for blocking *Smurf* attacks. Default value is 600 seconds.

Victim Protection: If enabled, IDS will block Smurf attack attempts. Default is false.

Max TCP Open Handshaking Count: This is a threshold value to decide whether a *SYN Flood* attempt is occurring or not. Default value is 100 TCP SYN per seconds.

Max PING Count: This is a threshold value to decide whether an *ICMP Echo Storm* is occurring or not. Default value is 15 ICMP Echo Requests (PING) per second.

Max ICMP Count: This is a threshold to decide whether an *ICMP flood* is occurring or not. Default value is 100 ICMP packets per seconds except ICMP Echo Requests (PING).

For *SYN Flood*, *ICMP Echo Storm* and *ICMP flood*, IDS will just warn the user in the Event Log. It can not protect against such attacks.

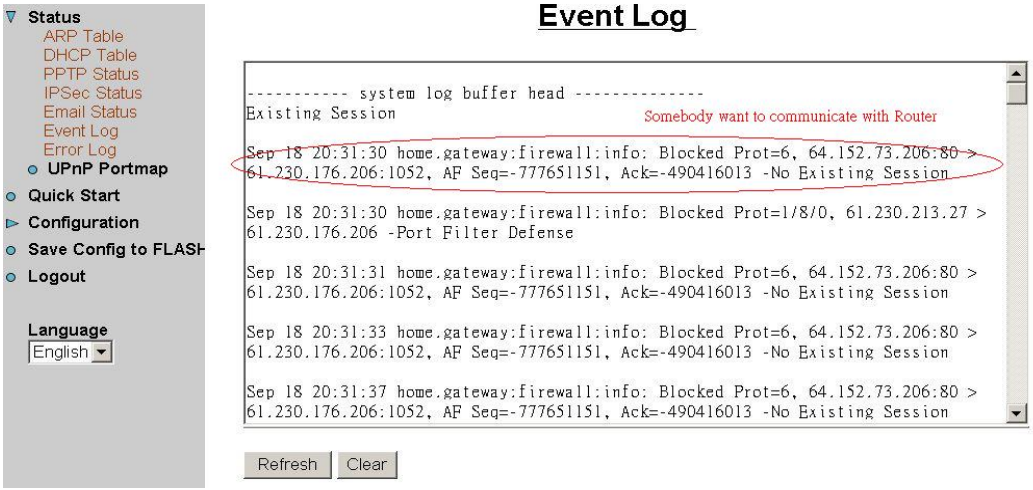
Table 1: Hacker attack types recognized by the IDS

Intrusion Name	Detect Parameter	Blacklist	Type of Block Duration	Drop Packet	Show Log
Ascend Kill	Ascend Kill data	Src IP	DoS	Yes	Yes
WinNuke	TCP Port 135, 137~139, Flag: URG	Src IP	DoS	Yes	Yes
Smurf	ICMP type 8 Des IP is broadcast	Dst IP	Victim Protection	Yes	Yes
Land attack	SrcIP = DstIP			Yes	Yes
Echo/CharGen Scan	UDP Echo Port and CharGen Port			Yes	Yes
Echo Scan	UDP Dst Port = Echo(7)	Src IP	Scan	Yes	Yes
CharGen Scan	UDP Dst Port = CharGen(19)	Src IP	Scan	Yes	Yes
X'mas Tree Scan	TCP Flag: X'mas	Src IP	Scan	Yes	Yes
IMAP SYN/FIN Scan	TCP Flag: SYN/FIN DstPort: IMAP(143) SrcPort: 0 or 65535	Src IP	Scan	Yes	Yes
SYN/FIN/RST/ACK Scan	TCP, No Existing session And Scan Hosts more than five.	Src IP	Scan	Yes	Yes
Net Bus Scan	TCP No Existing session DstPort = Net Bus 12345,12346, 3456	SrcIP	Scan	Yes	Yes
Back Orifice Scan	UDP, DstPort = Orifice Port (31337)	SrcIP	Scan	Yes	Yes
SYN Flood	Max TCP Open Handshaking Count (Default 100 c/sec)				Yes
ICMP Flood	Max ICMP Count (Default 100 c/sec)				Yes
ICMP Echo	Max PING Count (Default 15 c/sec)				Yes

Src IP: Source IP
Src Port: Source Port
Dst Port: Destination Port
Dst IP: Destination IP

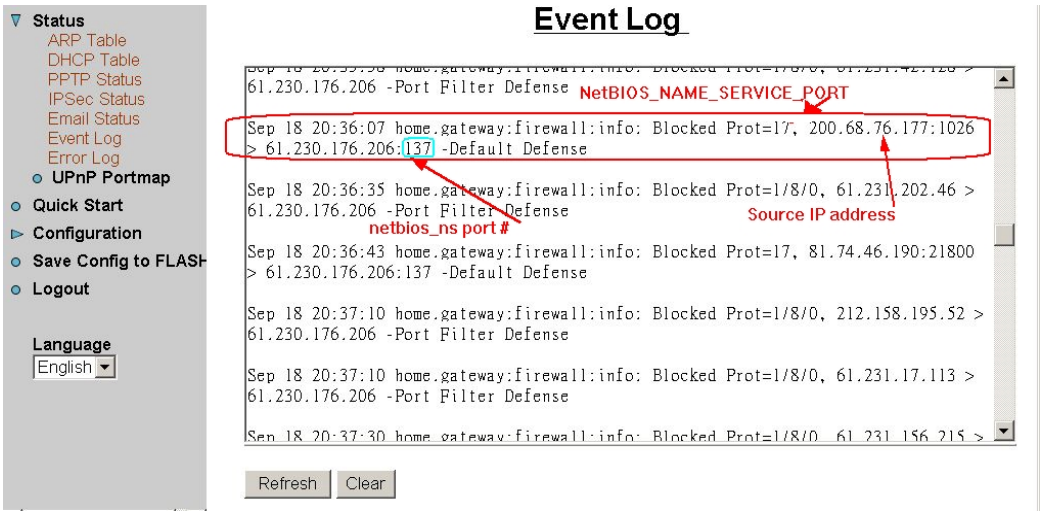
Example: Logfile entries for attacks detected by the firewall's IDS

Attacked with a TCP packet/Port 1052 from source IP: 64.152.73.206:



Attacked by ICMP PING requests:

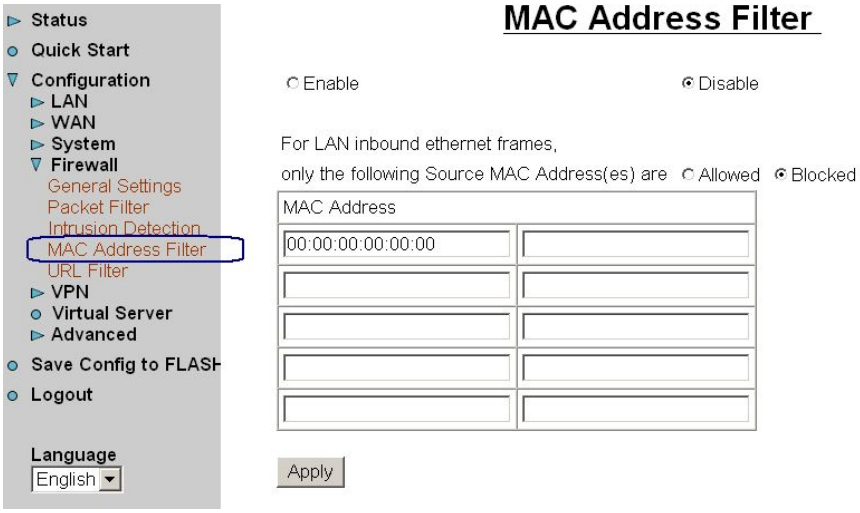
Attacked by NetBIOS_NAME_SERVICE_PORT packet from the source IP address 200.68.76.177 to port 137 (a netbios_ns port):



MAC Address Filter

A MAC (Media Access Control) address is the unique network hardware identifier for each PC on your network's interface (i.e. its Network Interface Card or Ethernet card). Using your router's MAC Address Filter function, you can configure the switch to only accept traffic from specified machines, or else to block specific machines from accessing your LAN.

There are no pre-defined MAC address filter rules; you can add the filter rules to meet your requirements



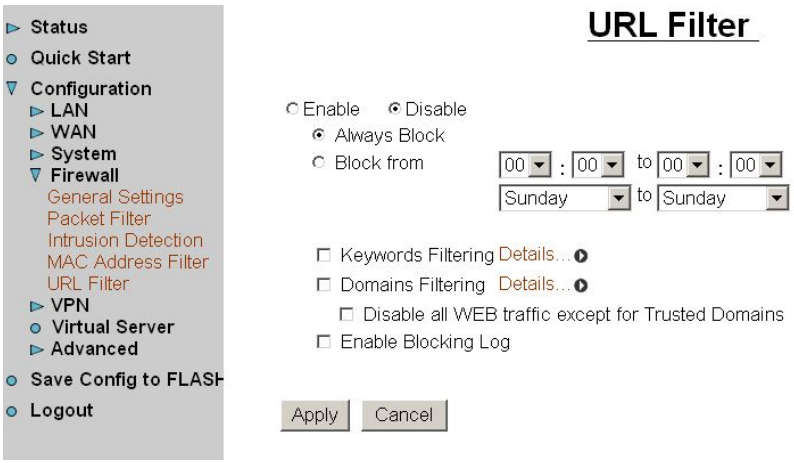
Enable/Disable: To enable or disable the MAC Address Filter function.

Allowed/Blocked: To allow or block the following MAC addresses to surf outside network only. If you check **Allowed**, please be sure your PC's MAC address is listed. If you check **Blocked**, please be sure your PC's MAC address is not listed.

MAC Address: There are 10 entries to enter the MAC addresses you want manage.

URL Filter

URL (Uniform Resource Locator – e.g. an address in the form of http://www.billion.com.au/ or http://www.example.com/) filter rules allow you to prevent users on your network from accessing particular websites by their URL. There are no pre-defined URL filter rules; you can add filter rules to meet your requirements.



Enable/Disable: to enable or disable URL Filter feature.

Always Block: Select to always check the URL filter rules (i.e. at all hours of the day).

Block from: Specify the time period to check the URL filter rules (e.g. during work hours).

Keywords Filtering: Allows blocking by specific keywords within a particular URL rather than having to specify a complete URL (e.g. to block any image called “advertisement.gif”). When enabled, your specified keywords list will be checked to see if any keywords are present in URLs accessed to determine if the connection attempt should be blocked. Please note that the URL filter blocks web browser (HTTP) connection attempts using port 80 only.

For example, if the URL is http://www.billion.com.tw/abcde.html, it will be dropped as the keyword “abcde” occurs in the URL.

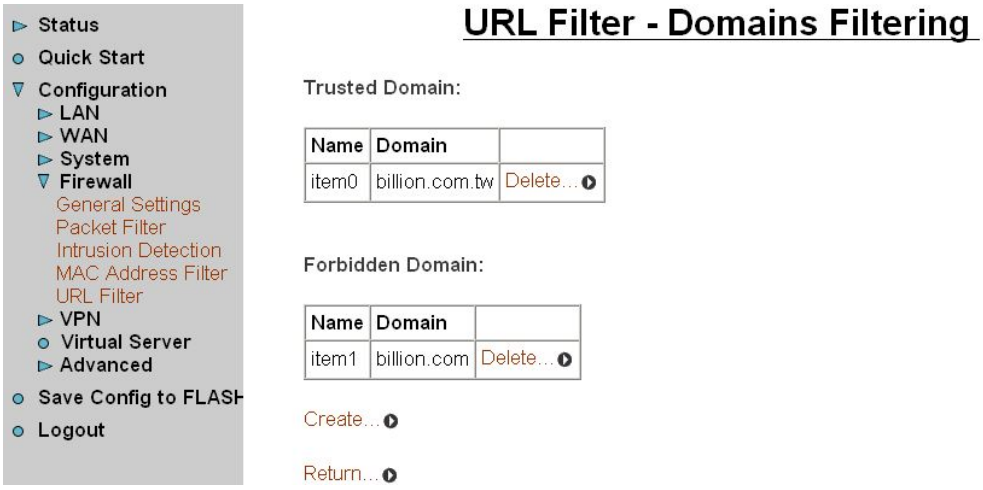
Domains Filtering: This function checks the domain name in URLs accessed against your list of domains to block or allow. If it is matched, the URL request will be sent (Trusted) or dropped (Forbidden). The checking procedure is :

1. Check the domain in the URL to determine if it is in the trusted list. If yes, the connection attempt is sent to the remote web server.

2. If not, check if it is listed in the forbidden list, and if present then the connection attempt is dropped..

3. If the packet does not match either of the above two items, it is sent to the remote web server.

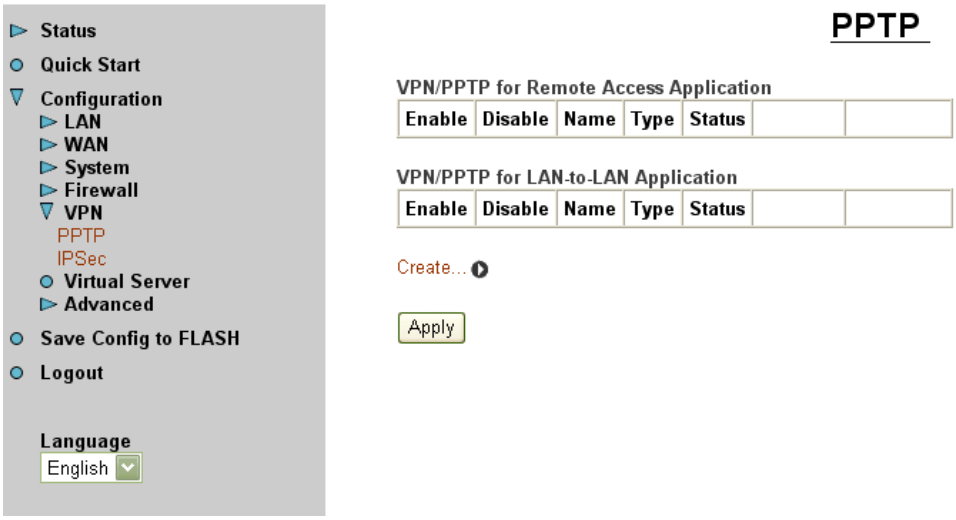
4. Please be note that the domain only should be specified, not the full URL. For example to block traffic to www.billion.com.au, enter “billion” or “billion.com.au” instead of “www.billion.com.au”. In the example below, the URL request for www.billion.com.tw will be sent to the remote web server because it is listed in the trusted list, whilst the URL request for www.billion.com or www.billion.com.au will be dropped, because billion.com is in the forbidden list.



VPN (Virtual Private Networks)

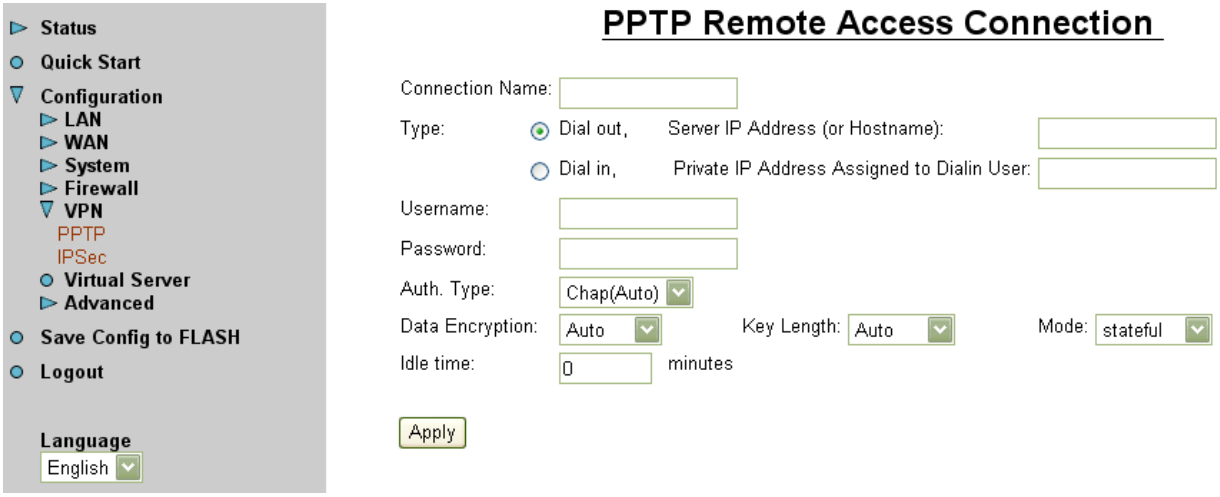
Your router support two main types of VPN (Virtual Private Network), **PPTP** and **IPSec**, and these are the two major section choices from the menu on the left.

PPTP



There are two types of PPTP VPN supported, **Remote Access** and **LAN-to-LAN** (please refer below for more information.). Click **Create** to configure a new VPN connection.

Remote Access PPTP Connection



Connection Name: This allows you to identify this particular connection, e.g. “Connection to office”.

Type: Check **Dial Out** if you want your router to operate as a client (connecting to a remote VPN server, e.g. your office server), check **Dial In** operate as a VPN server.

- When configuring your router as a Client, enter the remote **Server IP Address (or Hostname)** you wish to connection to.
- When configuring your router as a server, enter the **Private IP Address Assigned to Dial in User** address.

Username: If you are a Dial-Out user (client), enter the username provided by your Host. If you are a Dial-In user (server), enter your own username.

Password: If you are a Dial-Out user (client), enter the password provided by your Host. If you are a Dial-In user (server), enter your own password.

PPP Authentication Type: Default is **Auto** if you want the router to determine the authentication type to use, or else manually specify CHAP (Challenge Handshake Authentication Protocol) or PAP (Password Authentication Protocol) if you know which type the server is using (when acting as a client), or else the authentication type you want clients connecting to you to use (when acting as a server). When using PAP, the password is sent unencrypted, whilst CHAP encrypts the password before sending, and also allows for challenges at different periods to ensure that the client has not been replaced by an intruder.

Data Encryption: Data sent over the VPN connection can be encrypted by an MPPE algorithm. Default is **Auto,** so that this setting is negotiated when establishing a connection, or else you can manually **Enable** or **Disable** encryption.

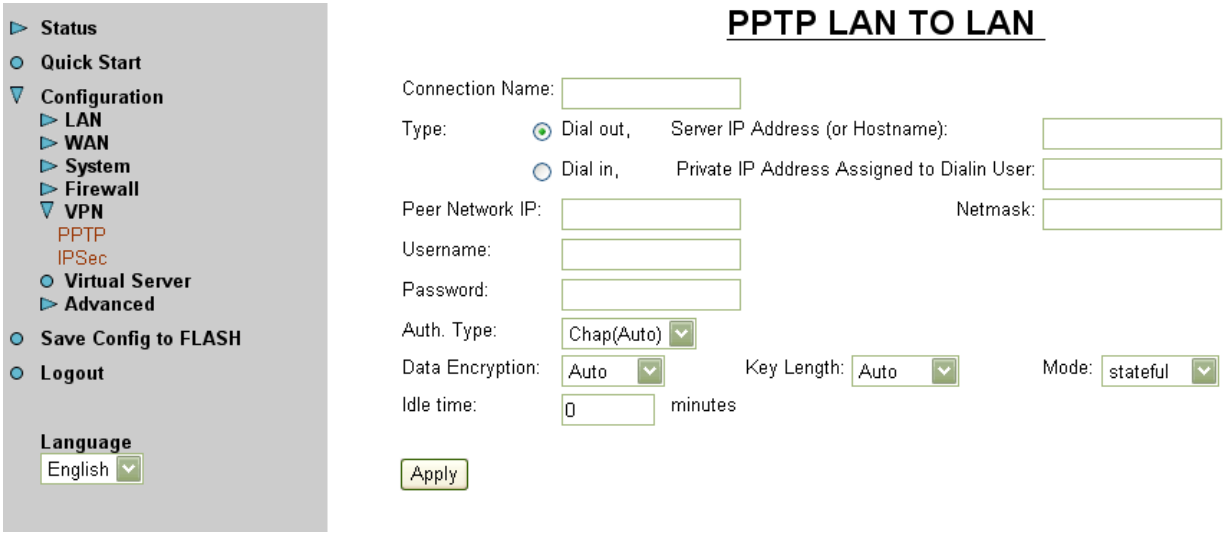
Key Length: The data can be encrypted by MPPE algorithm with 40 bits or 128 bits. Default is **Auto**, it is negotiated when establishing a connection. 128 bit keys provide stronger encryption than 40 bit keys.

Mode: You may select **Stateful** or **Stateless** mode. The key will be changed every 256 packets when you select Stateful mode. If you select Stateless mode, the key will be changed in each packet.

Idle Time: Auto-disconnect the VPN connection when there is no activity on the connection for a predetermined period of time. 0 means this connection is always on.

Click **Apply** after changing settings.

LAN to LAN PPTP Connection



Connection Name: A user-define description of the connection.

- When configuring your router establish the connection to a remote LAN, enter the remote **Server IP Address (or Hostname)** you wish to connection to.
- When configuring your router as a server to accept incoming connections, enter the **Private IP Address Assigned to Dial in User** address.

Peer Network IP: Enter Peer network IP address.

Netmask: Enter the subnet mask of peer network based on the Peer Network IP setting.

Username: If you are a Dial-Out user (client), enter the username provided by your Host. If you are a Dial-In user (server), enter your own username.

Password: If you are a Dial-Out user (client), enter the password provided by the your Host. If you are a Dial-In user (server), enter your own password.

PPP Authentication Type: Default is **Auto** if you want the router to determine the authentication type to use, or else manually specify CHAP (Challenge Handshake Authentication Protocol) or PAP (Password Authentication Protocol) if you know which type the server is using (when acting as a client), or else the authentication type you want clients connecting to you to use (when acting as a server). When using PAP, the password is sent unencrypted, whilst CHAP encrypts the password before sending, and also allows for challenges at different periods to ensure that the client has not been replaced by an intruder.

Data Encryption: Data sent over the VPN connection can be encrypted by an MPPE algorithm. Default is **Auto,** so that this setting is negotiated when establishing a connection, or else you can manually **Enable** or **Disable** encryption.

Key Length: The data can be encrypted by MPPE algorithm with 40 bits or 128 bits. Default is **Auto**, it is negotiated when establishing a connection. 128 bit keys provide stronger encryption than 40 bit keys.

Mode: You may select **Stateful** or **Stateless** mode. The key will be changed every 256

packets when you select Stateful mode. If you select Stateless mode, the key will be changed in each packet.

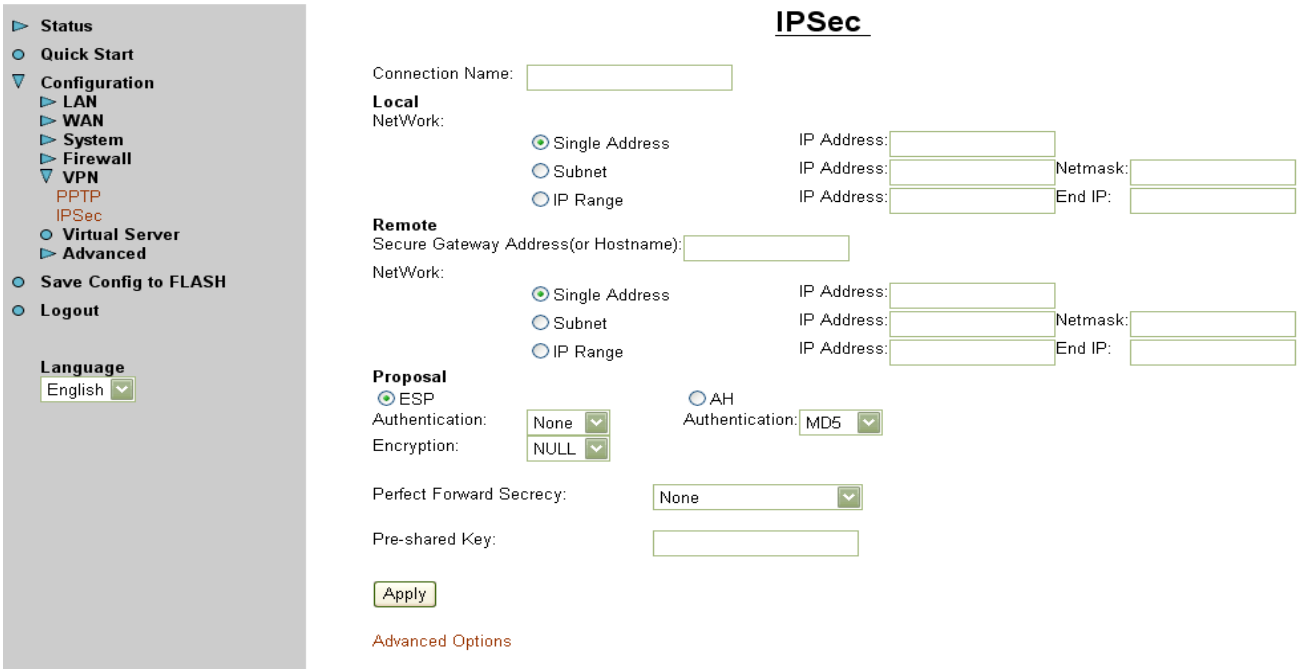
Idle Time: Auto-disconnect the VPN connection when there is no activity on the connection for a predetermined period of time. 0 means this connection is always on.

Click **Apply** after changing settings.

IPSec

Click **Create** to configure a new IPSec VPN connection.

Configure a new VPN connection



Connection Name: A user-defined name for the connection (e.g. “connection to office”).

Local:

Local Network: Set the IP address, subnet or address range of the local network.

⊙ **Single Address:** The IP address of the local host.

⊙ **Subnet:** The subnet of the local network. For example, IP: 192.168.1.0 with netmask 255.255.255.0 specifies one class C subnet starting from 192.168.1.1 (i.e. 192.168.1.1 through to 192.168.1.254).

⊙ **IP Range:** The IP address range of the local network. For example, IP: 192.168.1.1, end IP: 192.168.1.10

Remote:

Secure Gateway Address (or hostname): The IP address or hostname of the remote VPN device that is connected and establishes a VPN tunnel.

Network: Set the IP address, subnet or address range of the remote network.

Proposal:

Proposal: Select the IPSec security method. There are two methods of checking the authentication information, AH (authentication header) and ESP (Encapsulating Security Payload). Use ESP for greater security so that data will be encrypted and authenticated. Using AH data will be authenticated but not encrypted.

Authentication: Authentication establishes the integrity of the datagram and ensures it is not tampered with in transmit. There are three options, Message Digest 5 (**MD5**), Secure Hash Algorithm (**SHA-1**) or **NONE**. SHA-1 is more resistant to brute-force attacks than

MD5, however it is slower.

- **MD5:** A one-way hashing algorithm that produces a 128−bit hash.
- **SHA-1:** A one-way hashing algorithm that produces a 160−bit hash.

Encryption: Select the encryption method from the pull-down menu. There are four options, **DES**, **3DES**, **AES** and **NONE**. NONE means it is a tunnel only with no encryption. 3DES and AES are more powerful but increase latency.

- **DES:** Stands for Data Encryption Standard, it uses 56 bits as an encryption method.
- **3DES:** Stands for Triple Data Encryption Standard, it uses 168 (56*3) bits as an encryption method.
- **AES:** Stands for Advanced Encryption Standards, it uses 128 bits as an encryption method.

Perfect Forward Secrecy: Choose whether to enable PFS using Diffie-Hellman public-key cryptography to change encryption keys during the second phase of VPN negotiation. This function will provide better security, but extends the VPN negotiation time. Diffie-Hellman is a public-key cryptography protocol that allows two parties to establish a shared secret over an unsecured communication channel (i.e. over the Internet). There are three modes, MODP 768-bit, MODP 1024-bit and MODP 1536-bit. MODP stands for Modular Exponentiation Groups.

Pre-shared Key: This is for the Internet Key Exchange (IKE) protocol, a string from 4 to 128 characters. Both sides should use the same key. IKE is used to establish a shared security policy and authenticated keys for services (such as IPSec) that require a key. Before any IPSec traffic can be passed, each router must be able to verify the identity of its peer. This can be done by manually entering the pre-shared key into both sides (router or hosts).

Select the **Save** button to save the setting.

Advanced Option

Click **Advanced Option** to change the following settings:

SA Lifetime: Specify the number of minutes that a Security Association (SA) will stay active before new encryption and authentication key will be exchanged. There are two kinds of SAs, IKE and IPSec. IKE negotiates and establishes SA on behalf of IPSec, an IKE SA is used by IKE.

Phase 1 (IKE): To issue an initial connection request for a new VPN tunnelThe range can be from 5 to 15,000 minutes, and the default is 240 minutes.

Phase 2 (IPSec): To negotiate and establish secure authentication. The range can be from 5 to 15,000 minutes, and the default is 60 minutes.

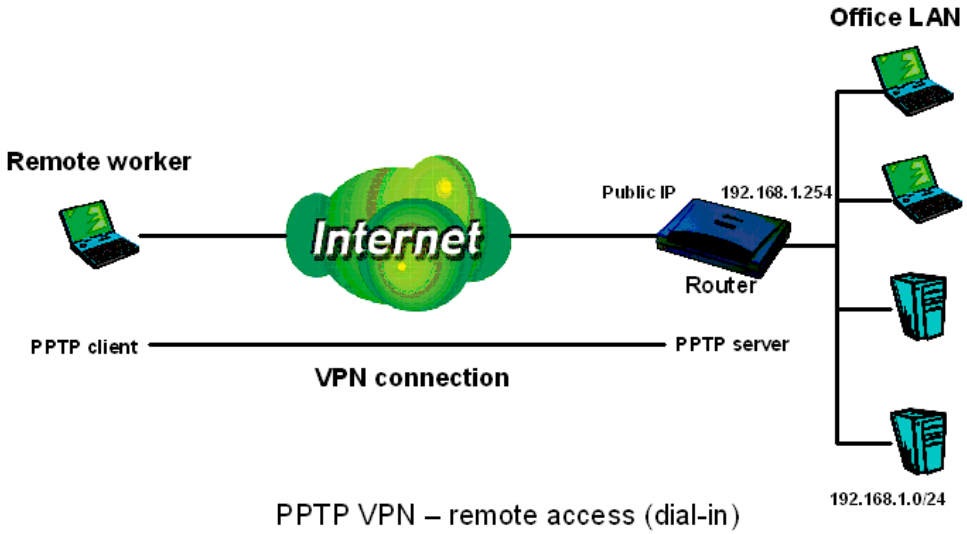
A short SA time increases security by forcing the two parties to update the keys. However, every time the VPN tunnel re-negotiates, access through the tunnel will be temporarily disconnected.

Select the **Change** button to update the settings.

Tip: The Billion Australia website at http://www.billion.com.au/ FAQ section and forums have many examples of configuring third-party VPN applications for establishing connections with your Billion router, as well as many helpful tips from Billion and other users on troubleshooting any issues you may encounter when establishing a VPN.

Example: Configuring a Remote Access PPTP VPN Dial-in Connection

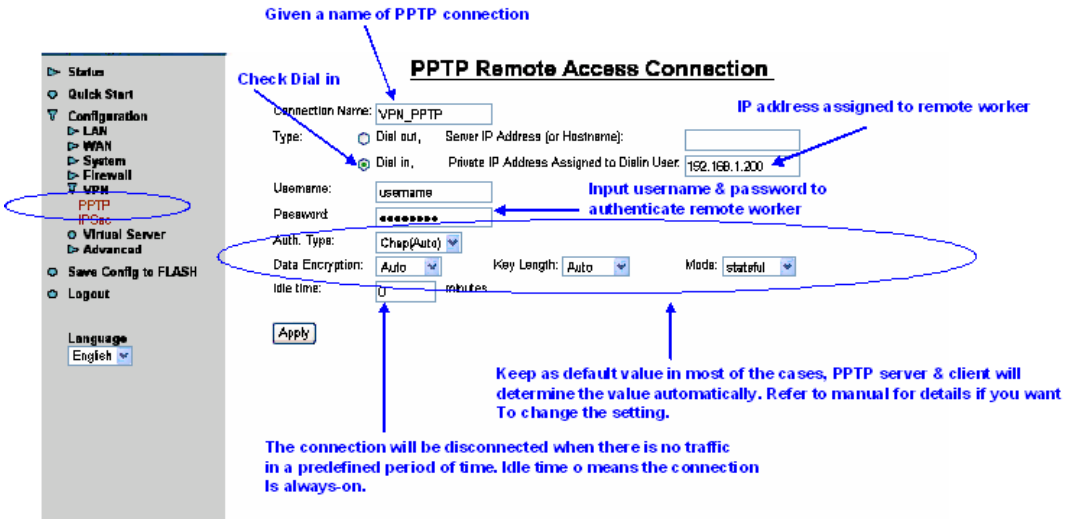
A remote worker establishes a PPTP VPN connection with the head office using Microsoft's VPN Adapter (included with Windows 2000/ME, etc.). The router is installed in the head office, connected to a couple of PCs and Servers.



PPTP VPN – remote access (dial-in)

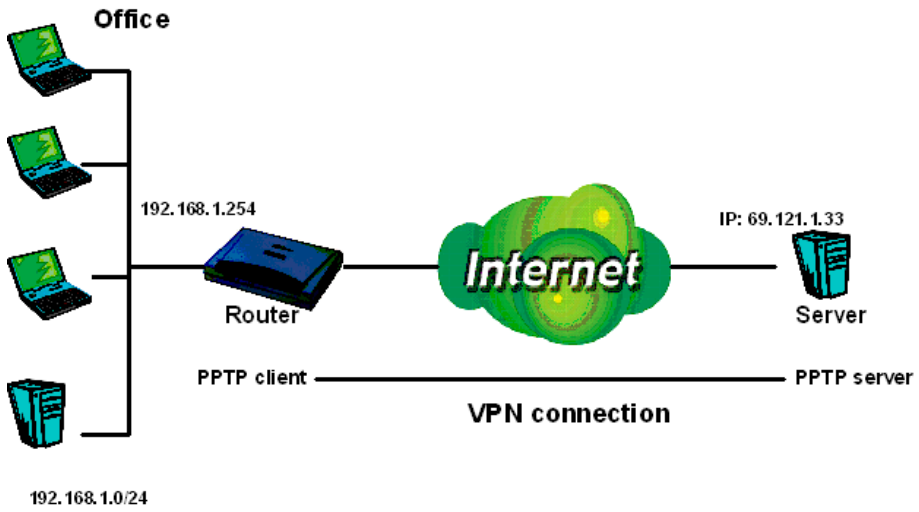
Configuring PPTP VPN in the Office

The input IP address 192.168.1.200 will be assigned to the remote worker. Please make sure this IP is not used in the Office LAN.



Example: Configuring a Remote Access PPTP VPN Dial-out Connection

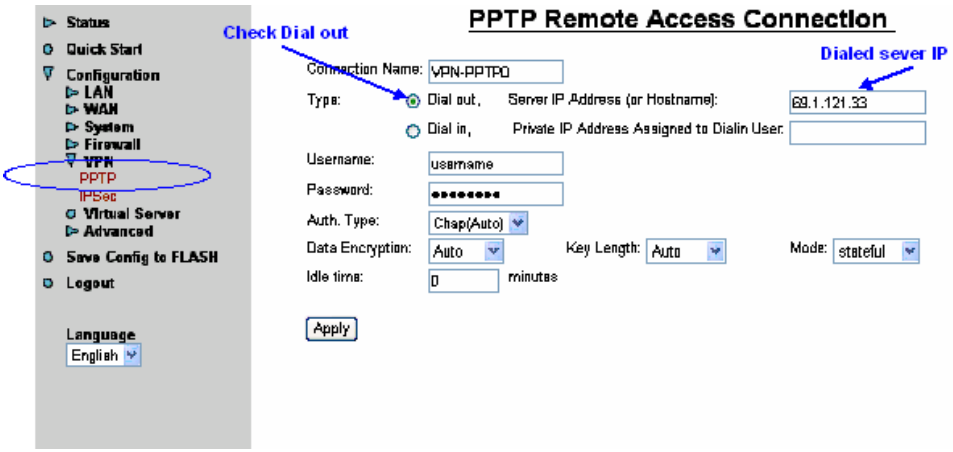
A company's office establishes a PPTP VPN connection with a file server located at a separate location. The router is installed in the office, connected to a couple of PCs and Servers.



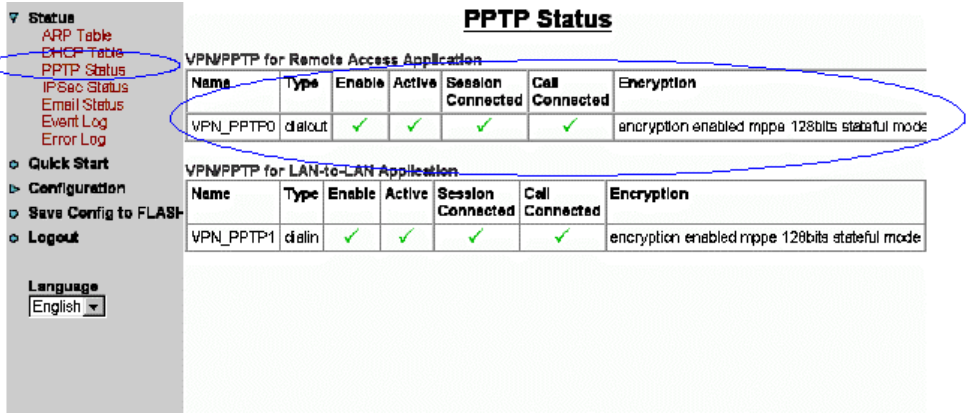
PPTP VPN – remote access (dial-out)

Configuring the PPTP VPN in the Office

You can either input the IP address (69.1.121.33 in this case) or hostname to reach the server.

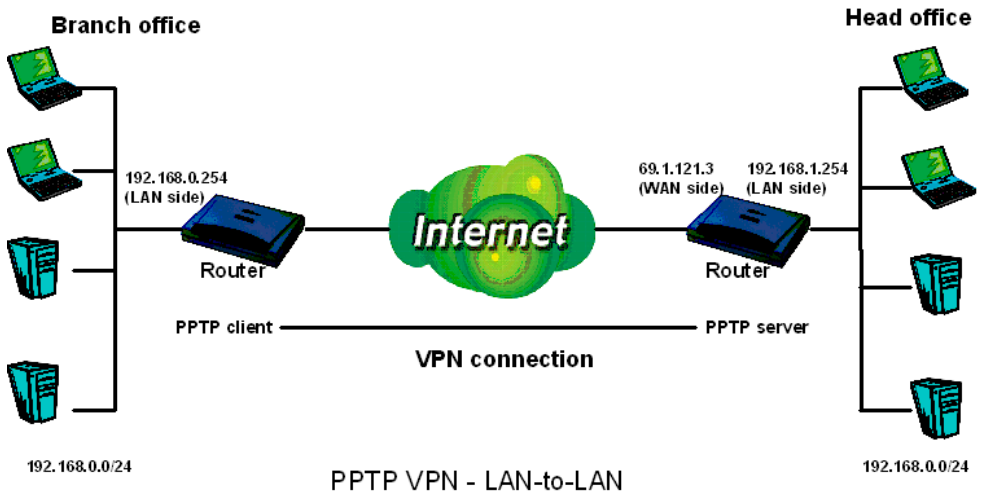


PPTP Status



Example: Configuring a LAN-to-LAN PPTP VPN Connection

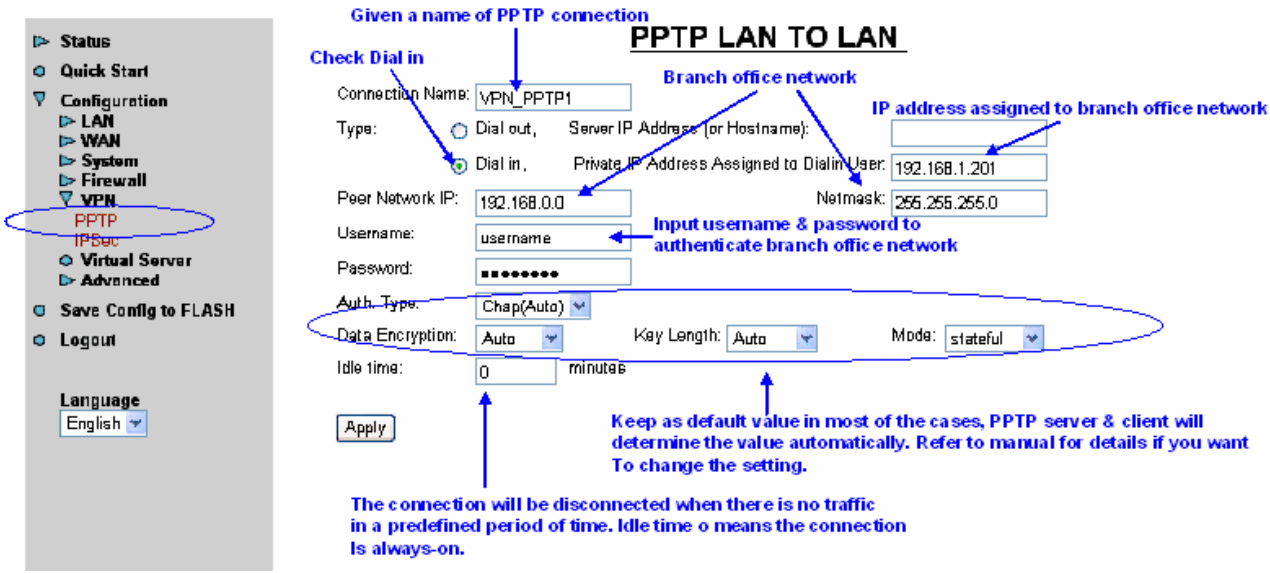
The branch office establishes a PPTP VPN tunnel with head office to connect two private networks over the Internet.. The routers are installed in the head office and branch office accordingly.



PPTP VPN - LAN-to-LAN

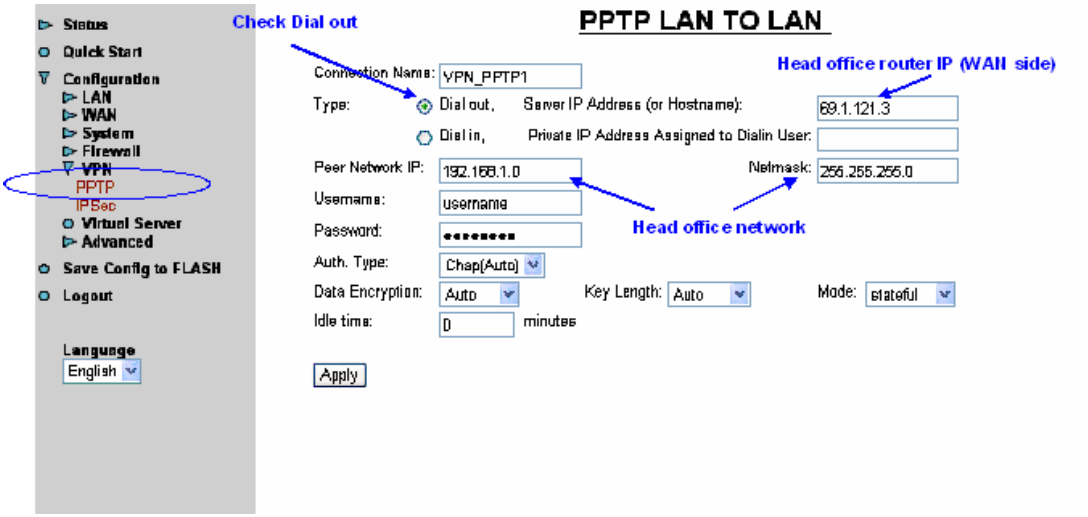
Configuring PPTP VPN in the Head Office

The IP address 192.168.1.201 will be assigned to the router located in the branch office. Please make sure this IP is not used in the head office LAN.

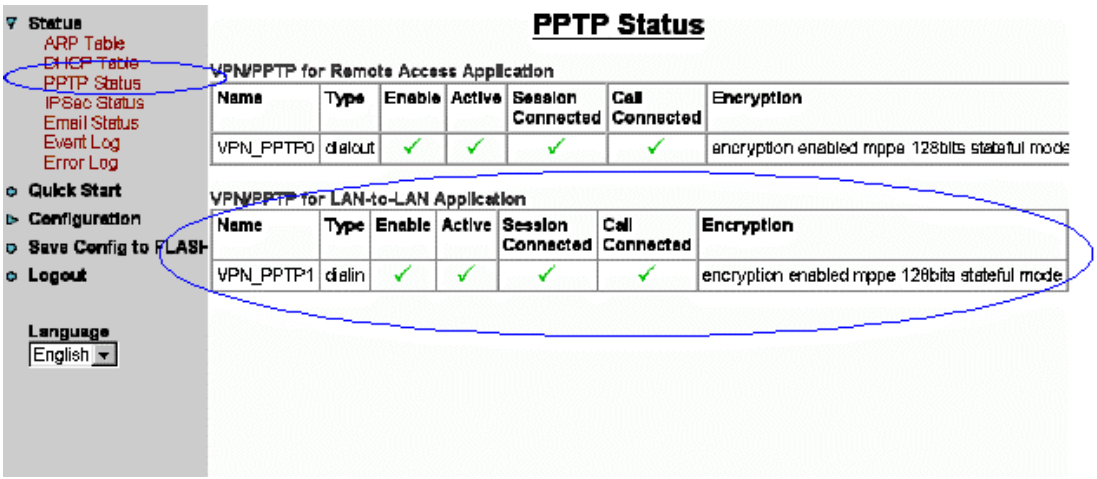


Configuring PPTP VPN in the Branch Office

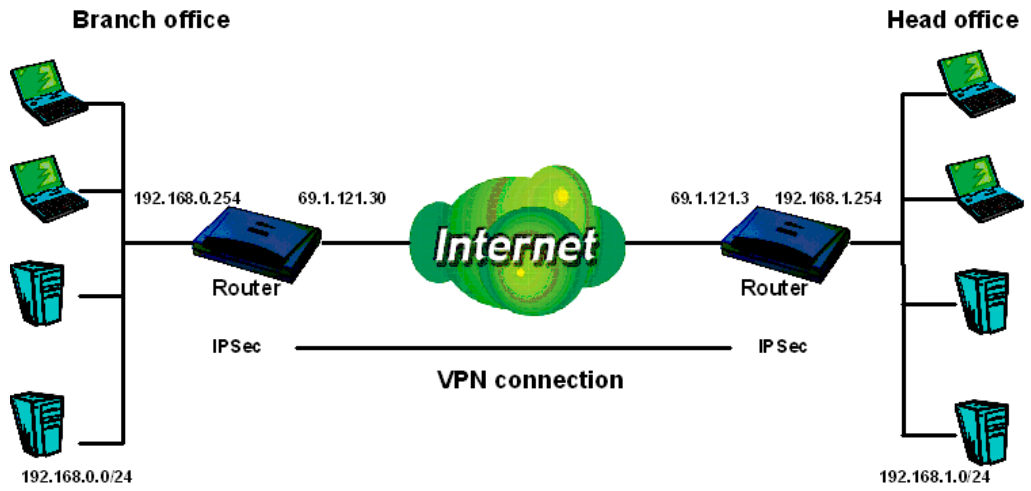
The IP address 69.1.121.30 is the **Public IP** address of the router located in head office. If you registered the DDNS (please refer to the **DDNS** section of this manual), you can also use the domain name instead of the IP address to reach the router.



PPTP Status in the Head Office



Example: Configuring a IPSec LAN-to-LAN PPTP VPN Connection

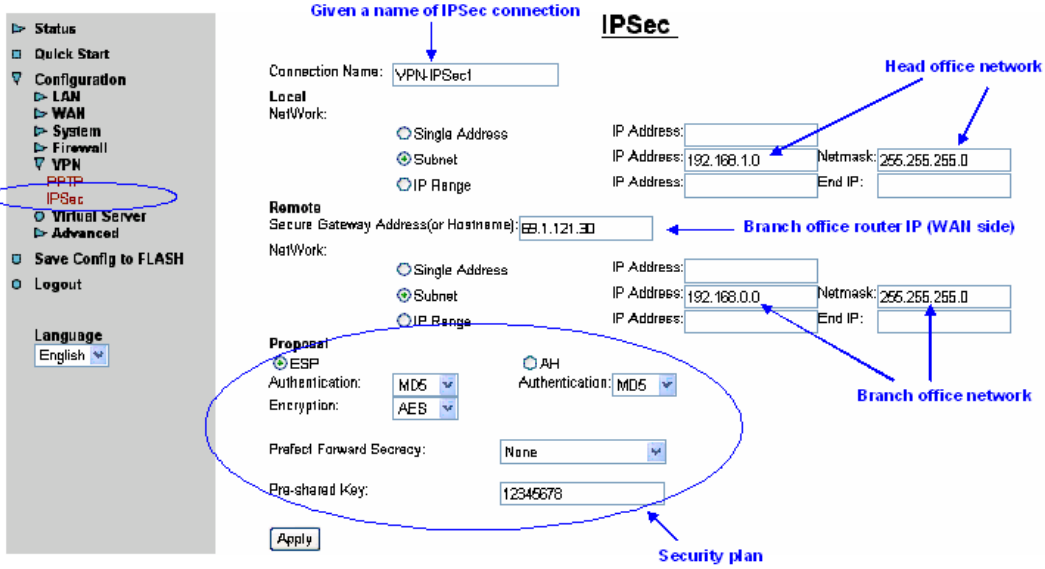


IPSec VPN - LAN-to-LAN

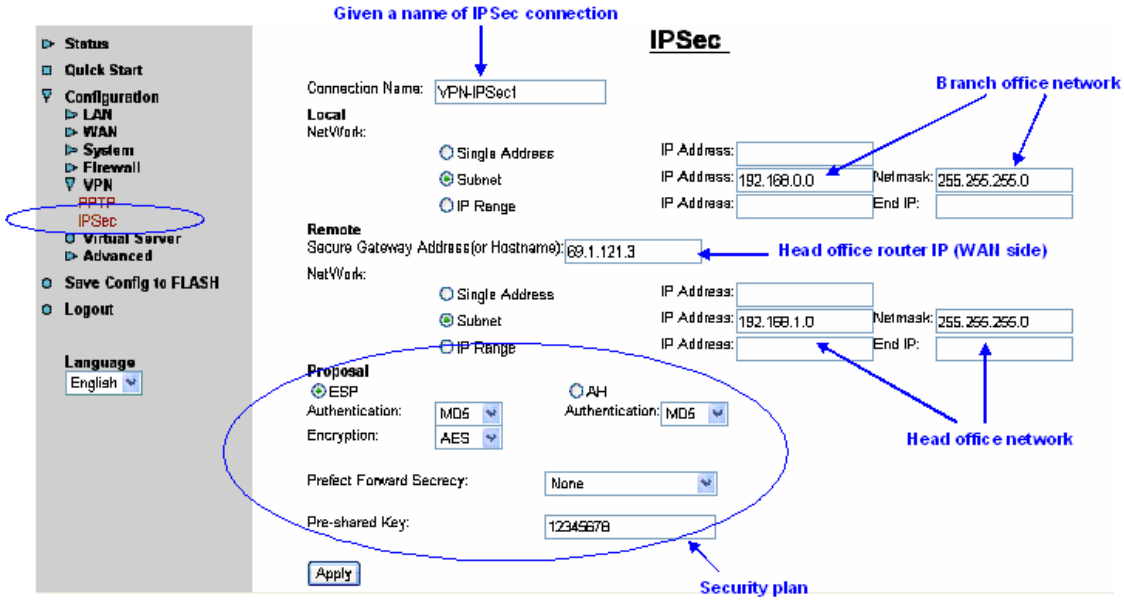
Network Configuration and Security Plan

	Branch Office	Head Office
Local Network ID	192.168.0.0/24	192.168.1.0/24
Local Router IP	69.1.121.30	69.1.121.3
Remote Network ID	192.168.1.0/24	192.168.0.0/24
Remote Router IP	69.1.121.3	69.1.121.30
IKE Pre-shared Key	12345678	12345678
VPN Connection Type	Tunnel mode	Tunnel mode
Security Algorithm	ESP:MD5 with AES	ESP:MD5 with AES

Configuring IPSec VPN in the Head Office



Configuring IPSec VPN in the Branch Office



Virtual Server ("Port Forwarding")

In TCP/IP and UDP networks a port is a 16-bit number used to identify which application program (usually a server) incoming connections should be delivered to. Some ports have numbers that are pre-assigned to them by the IANA (the Internet Assigned Numbers Authority), and these are referred to as "well-known ports". Servers follow the well-known port assignments so clients can locate them.

If you wish to run a server on your network that can be accessed from the WAN (i.e. from other machines on the Internet that are outside your local network), or any application that can accept incoming connections (e.g. Peer-to-peer/P2P software such as instant messaging applications and P2P file-sharing applications) and are using NAT (Network Address Translation), then you will usually need to configure your router to forward these incoming connection attempts using specific ports to the PC on your network running the application. You will also need to use port forwarding if you want to host an online game server.

The reason for this is that when using NAT, your publicly accessible IP address will be used by and point to your router, which then needs to deliver all traffic to the private IP addresses used by your PCs. Please see the **WAN** configuration section of this manual for more information on NAT.

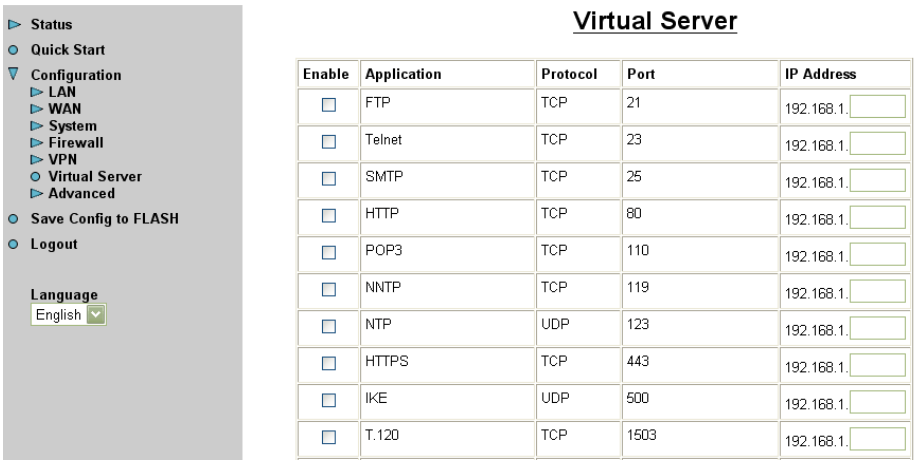
The Internet Assigned Numbers Authority (IANA) is the central coordinator for the assignment of unique parameter values for Internet protocols. Port numbers range from 0 to 65535, but only ports numbers 0 to 1023 are reserved for privileged services and are designated as "well-known ports". The registered ports are numbered from 1024 through 49151. The remaining ports, referred to as dynamic ports or private ports, are numbered from 49152 through 65535.

Examples of well-known and registered port numbers are as below, for further information, please see IANA's website at: http://www.iana.org/assignments/port-numbers

For help on determining which private port numbers are used by common applications on this list, please see the FAQs (Frequently Asked Questions) at: http://www.billion.com.au/

Well-known ports		
Port Number	**Protocol**	**Description**
20	TCP	FTP Data
21	TCP	FTP Control
22	TCP & UDP	SSH Remote Login Protocol
23	TCP	Telnet
25	TCP	SMTP (Simple Mail Transfer Protocol)
53	TCP & UDP	DNS (Domain Name Server)
69	UDP	TFTP (Trivial File Transfer Protocol)
80	TCP	World Wide Web HTTP

110	TCP	POP3 (Post Office Protocol Version 3)
119	TCP	NEWS (Network News Transfer Protocol)
123	UDP	NTP (Network Time Protocol)
161	TCP	SNMP
443	TCP & UDP	HTTPS
1503	TCP	T.120
1720	TCP	H.323
4000	TCP	ICQ
7070	UDP	RealAudio



Because NAT can act as a "natural" Internet firewall, your router protects your network from being accessed by outside users when using NAT, as all incoming connection attempts will point to your router unless you specifically create Virtual Server entries to forward those ports to a PC on your network. When your router needs to allow outside users to access internal servers, e.g. a web server, FTP server, Email server or game server, the router can act as a "virtual server". You can set up a local server with a specific port number for the service to use, e.g. web/HTTP (port 80), FTP (port 21), Telnet (port 23), SMTP (port 25), or POP3 (port 110), When an incoming access request to the router for a specified port is received, it will be forwarded to the corresponding internal server.

For example, if you set the port number 80 (Web/HTTP) to be mapped to the IP Address 192.168.1.2, then all incoming HTTP requests from outside users will be forwarded to the local server (PC) with the IP address of 192.168.1.2. If the port is not listed as a predefined application, you need to add it manually.

In addition to specifying the port number to be used, you will also need to specify the protocol used. The protocol used is determined by the particular application. Most applications will use TCP or UDP, however you can specify other protocols using the drop-down **Protocol** menu. Setting the protocol to "all" will cause all incoming connection attempts using all protocols on all port numbers to be forwarded to the specified IP address.

DMZ: The DMZ Host is a local computer exposed to the Internet. When setting a particular internal IP address as the DMZ Host, all incoming packets will be checked by the Firewall and NAT algorithms, then passed to the DMZ host when a packet received does not use a port number used by any other Virtual Server entries.

Using port forwarding does have security implications, as outside users will be able to connect to PCs on your network. For this reason you are advised to use specific Virtual Server entries just for the ports your application requires instead of simply using DMZ or create a Virtual Server entry for "All" protocols, as doing so will result in all connection attempts to your public IP address will access the PC specified.

Attention

If you have disabled the NAT option in the WAN-ISP section, the Virtual Server function will hence be invalid.

Attention

If the DHCP server option is enabled, you have to be very careful in assigning the IP addresses of the virtual servers in order to avoid conflicts. The easiest way of configuring Virtual Servers is to manually assign static IP address to each virtual server PC, with an address that does not fall into the range of IP addresses that are to be issued by the DHCP server. You can configure the virtual server IP address manually, but it must still be in the same subnet as the router.

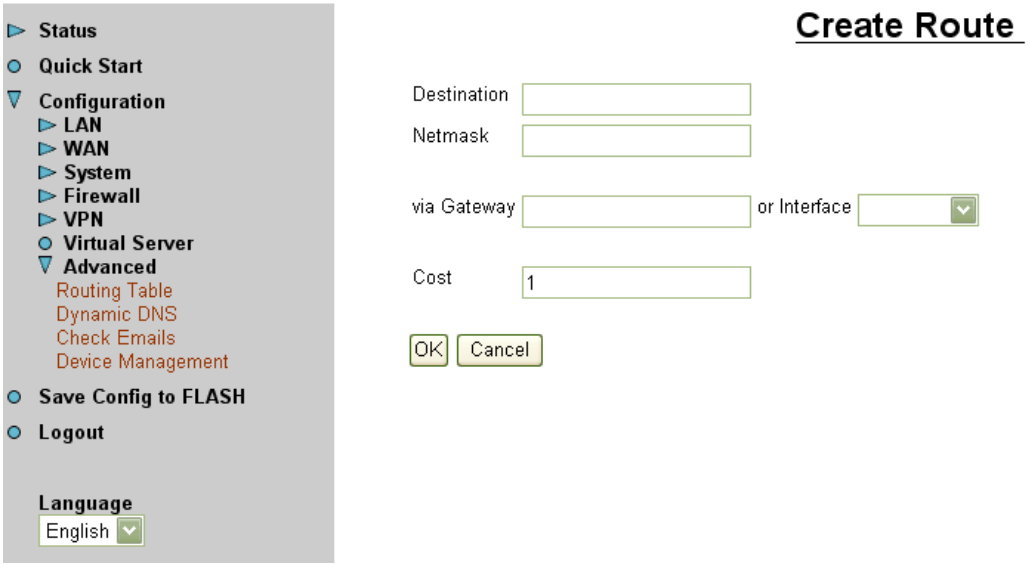
Advanced

Configuration options within the **Advanced** section are for users who wish to take advantage of the more advanced features of the router. Users who do not understand the features should not attempt to reconfigure their router, unless advised to do so by support staff.

There are four items within the **Advanced** section: **Routing Table, Dynamic DNS**, **Checking Email** and **Device Management.**

Routing Table

Click on **Routing Table** and then choose **Create Route** add a routing table.



Destination: This is the destination subnet IP address.

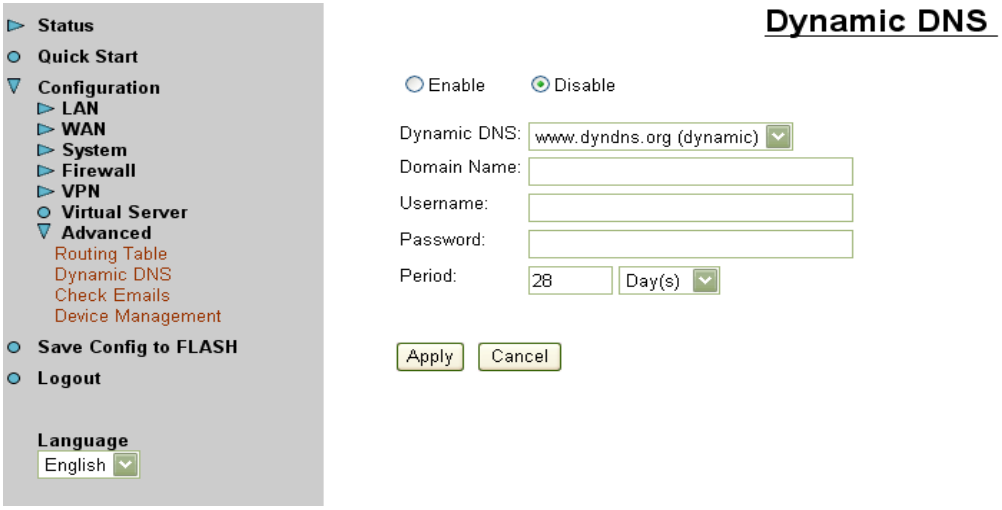
Netmask: Subnet mask of the destination IP addresses based on above destination subnet IP.

Gateway: This is the gateway IP address to which packets are to be forwarded.

Interface: Select the interface through which packets are to be forwarded.

Cost: This is the same meaning as Hop. This should usually be left at 1.

Dynamic DNS



The Dynamic DNS function allows you to alias a dynamic IP address to a static hostname, allowing users whose ISP does not assign them a static IP address to use a domain name. This is especially useful for hosting servers via your ADSL connection, so that anyone wishing to connect to you may use your domain name, rather than having to use your dynamic IP address, which changes from time to time. This dynamic IP address is the WAN IP address of the router, which is assigned to you by your ISP.

You will first need to register and establish an account with the Dynamic DNS provider using their website, for example http://www.dyndns.org/

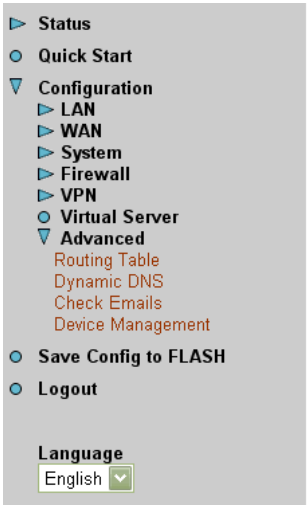
There are more than 5 DDNS services supported.

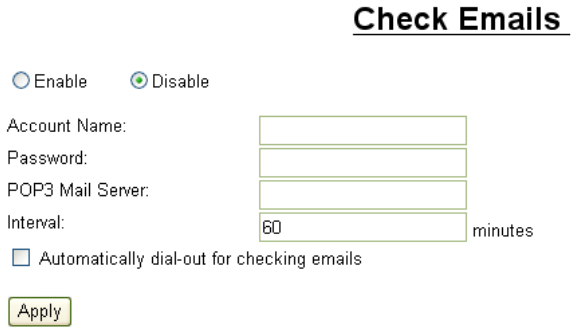
Dynamic DNS: Select the DDNS service you have established an account with.

Domain Name, Username and Password: Enter your registered domain name and your username and password for this service.

Period: Set the time period between updates, for the Router to exchange information with the DDNS server. In addition to updating periodically as per your settings, the router will perform an update when your dynamic IP address changes.

Check Emails





This function allows you to have the router check your POP3 mailbox for new Email messages. The **Mail** LED on your router will light when it detects new messages waiting for download. You may also view the status of this function using the **Status – Email Checking** section of the web interface, which also provides details on the number of new messages waiting. See the **Status** section of this manual for more information.

⊙ **Disable:** Check to disable the router's Email checking function.

⊙ **Enable:** Check to enable the routers Emailing checking function. The following fields will be activated and required:

Account Name: Enter the name (login) of the POP3 account you wish to check.. Normally, it is the text in your email address before the "@" symbol. If you have trouble with it, please contact your ISP.

Password: Enter the account's password.

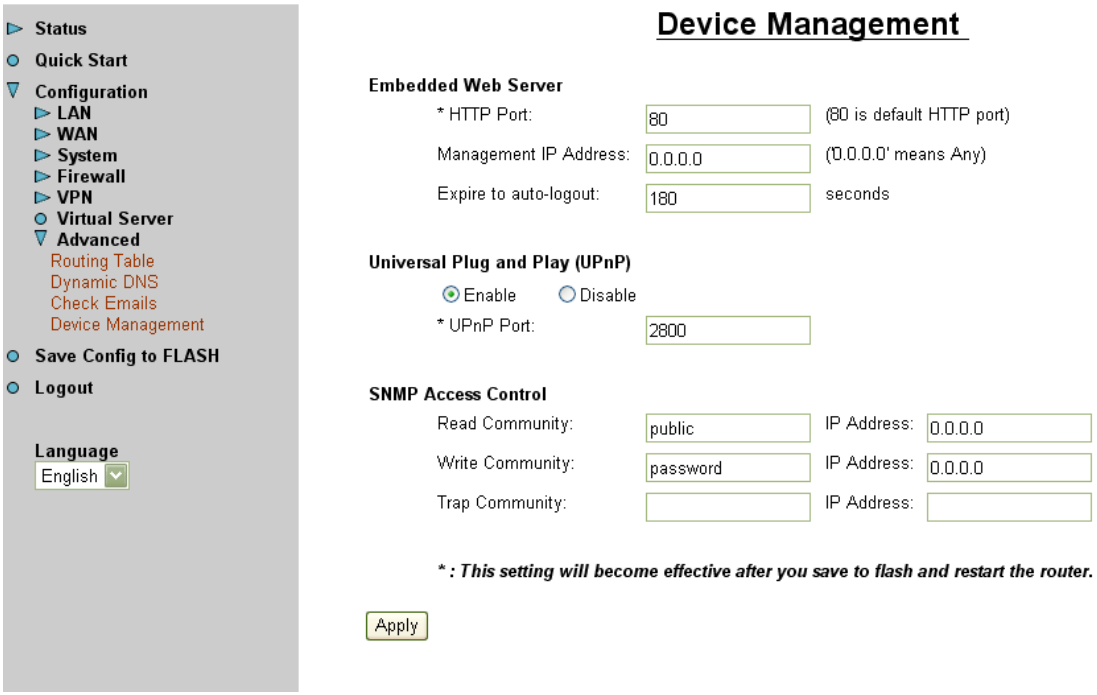
POP3 Mail Server: Enter your (POP) mail server name. You Internet Service Provider (ISP) or network administrator will be able to supply you with this.

Interval: Enter the value in minutes between periodic mail checks.

Automatically dial-out for checking emails: When the function is enabled, your ADSL router will connect to your ISP automatically to check emails if your Internet connection dropped. Please be careful when using this feature if your ADSL service is charged by time online.

Device Management

The Device Management advanced configuration settings allow you to control your router's security options and device monitoring features.



Embedded Web Server:

HTTP Port: This is the port number the router's embedded web server (for web-based configuration) will use. The default value is the standard HTTP port, 80. Users may specify an alternative if, for example, they are running a web server on a PC within their LAN.

Management IP Address: You may specify an IP address allowed to logon and access the router's web server. Setting the IP address to 0.0.0.0 will disable IP address restrictions, allowing users to login from any IP address.

Expire to auto-logout: Specify a time frame for the system to auto-logout the user's configuration session.

For Example: User A changes HTTP port number to **100**, specifies their own IP address of **192.168.1.55**, and sets the logout time to be **100** seconds. The router will only allow User A access from the IP address **192.168.1.55** to logon to the Web GUI by typing: http://**192.168.1.254:100** in their web browser. After 100 seconds, the device will automatically logout User A.

Universal Plug and Play (UPnP):

UPnP offers peer-to-peer network connectivity for PCs and other network devices, along with control and data transfer between devices. UPnP offers many advantages for users running NAT routers through UPnP NAT Traversal, and on supported systems makes tasks such as port forwarding much easier by letting the application control the required settings, removing the need for the user to control advanced configuration of their device.

Both the user's Operating System and the relevant application must support UPnP in addition to the router. Windows XP and Windows Me natively support UPnP (when the component is installed), and Windows 98 users may install the Internet Connection Sharing client from Windows XP in order to support UPnP. Windows 2000 does not support UPnP.

⊙ **Disable:** Check to disable the router's UPnP functionality.

⊙ **Enable:** Check to enable the router's UPnP functionality.

UPnP Port: Its default setting is 2800. It is highly recommended for users to use this port value. If this value conflicts with other ports already being used you may wish to change the port.

SNMP Access Control (Software on a PC within the LAN is required in order to utilize this function) – Simple Network Management Protocol.

Read Community: Specify a name to be identified as the Read Community, and an IP address. This community string will be checked against the string entered in the configuration file. Once the string name is matched, user obtains this IP address will be able to view the data.

Write Community: Specify a name to be identified as the Write Community, and an IP address. This community string will be checked against the string entered in the configuration file. Once the string name is matched, users from this IP address will be able to view and modify the data.

Trap Community: Specify a name to be identified as the Trap Community, and an IP address. This community string will be checked against the string entered in the configuration file. Once the string name is matched, users from this IP address will be sent SNMP Traps.

SNMP Version : SNMPv2c

Billion provides an SNMP utility for download via the website at www.billion.com.au which allows users to obtain information from the router without the need to have advanced knowledge of the workings of SNMP. Advanced users may refer to the information below in order to access the router using custom utilities and scripts:

SNMP version: SNMPv2c

(SNMPv2c is the combination of the enhanced protocol features of SNMPv2 without the SNMPv2 security. The "c" comes from the fact that SNMPv2c uses the SNMPv1 community string paradigm for "security", but is widely accepted as the SNMPv2 standard.)

Traps supported: Cold Start, Authentication Failure.

The following MIBs are supported:

➢ **From RFC 1213 (MIB-II):**

☑ System group

- ☑ Interfaces group
- ☑ Address Translation group
- ☑ IP group
- ☑ ICMP group
- ☑ TCP group
- ☑ UDP group
- ☒ EGP (not applicable)
- ☑ Transmission
- ☑ SNMP group

- **From RFC1650 (EtherLike-MIB):**
  - ☑ dot3Stats

- **From RFC 1493 (Bridge MIB):**
  - ☑ dot1dBase group
  - ☑ dot1dTp group
  - ☑ dot1dStp group (if configured as spanning tree)

- **From RFC 1471 (PPP/LCP MIB):**
  - ☑ pppLink group
  - ☒ pppLqr group

- **From RFC 1472 (PPP/Security MIB):**
  - ☑ PPP Security Group)

- **From RFC 1473 (PPP/IP MIB):**
  - ☑ PPP IP Group

- **From RFC 1474 (PPP/Bridge MIB):**
  - ☑ PPP Bridge Group

- **From RFC1573 (IfMIB):**
  - ☑ ifMIBObjects Group

- **From RFC1695 (atmMIB):**
  - ☑ atmMIBObjects

- **From RFC 1907 (SNMPv2):**
  - ☑ only snmpSetSerialNo OID

Save Configuration to Flash

After changing the router's configuration settings, you must save all of the configuration parameters to FLASH to avoid them being lost after turning off or resetting your router. Click **Save** to write your new configuration to FLASH.

Logout

To exit the router's web interface, choose **Logout**. Please ensure that you have saved the configuration settings before you logout.

Be aware that the router is restricted to only one PC accessing the configuration web pages at a time. Once a PC has logged into the web interface, other PCs cannot get access until the current PC has logged out of the web interface. If the previous PC forgets to logout, the second PC can access the page after a user-defined period, by default 3 minutes. You can modify this value using the **Advanced – Device Management** section of the web interface. Please see the **Advanced** section of this manual for more information.

Chapter 4: Troubleshooting

If the router is not functioning properly, first check this chapter for simple troubleshooting before contacting your service provider or Billion support.

Problems starting up the router

Problem	Corrective Action
None of the LEDs are on when you turn on the router.	Check the connection between the adapter and the router. If the error persists, you may have a hardware problem. In this case you should contact technical support.
You have forgotten your router login and/or password.	Try the default login and password admin/admin. If this fails, you can restore your router to its factory settings by holding the Reset button on the back of your router in for 10-12 seconds.

Problems with the WAN Interface

Problem	Corrective Action
Initialization of the PVC connection (“linesync”) failed.	Ensure that the telephone cable is connected properly from the ADSL port to the wall jack. The ADSL LED on the front panel of the router should be on. Check that your VPI, VCI, encapsulation type and type of multiplexing settings are the same as those provided by your ISP. Reboot the router GE. If you still have problems, you may need to verify these settings with your ISP.

Frequent loss of ADSL linesync (disconnections).	Ensure that all other devices connected to the same telephone line as your Billion router (e.g. telephones, fax machines, analogue modems) have a line filter connected between them and the wall socket (unless you are using a Central Splitter or Central Filter installed by a qualified and licensed electrician), and ensure that all line filters are correctly installed and the right way around. Missing line filters or line filters installed the wrong way around can cause problems with your ADSL connection, including causing frequent disconnections.

Problems with the LAN Interface

Problem	Corrective Action
Can't ping any PCs on the LAN.	Check the Ethernet LEDs on the front panel. The LED should be on for a port that has a PC connected. If it is off, check the cables between your router and the PC. Make sure you have uninstalled any software firewall for troubleshooting.
	Verify that the IP address and the subnet mask are consistent between the router and the workstations.

APPENDIX A: Specification

Protocols	IP, NAT, PPTP, ARP, ICMP, DHCP, PPPoE, PPPoA, IPoA, PPTP client, RIP1/2
LAN Port	RJ-45, 4 ports 10/100Base-T LAN Switch
WAN Port	RJ-11, 1 ADSL port
LED Indicators	Power, System, LAN 1 to 4, WLAN, MAIL, PPP and ADSL
Input Power	12V DC @ 1A
Power Consumption	< 10 watts
Agency and Regulatory	CE, A-Tick
Operating Temperature	0℃ to 45℃
Storage Temperature	-10℃ to 70℃
Operating Humidity	5-95% non-condensing

APPENDIX B: Product Support

Most problems can be solved by referring to the **Troubleshooting** section of this manual. If you cannot resolve the problem with the **Troubleshooting** chapter, please contact the dealer where you purchased this product. You can also call the Billion Support line at 1300 139 159 or email support via **support@billion.com.au** or post your question and check the FAQ (Frequently Asked Questions) section of the Billion Australia website at **http://www.billion.com.au**

You can also download the latest firmware and utilities from the Billion Australia website at **http://www.billion.com.au**

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