BILLION™

BiPAC 7401V(G)P *R4*

VoIP/(802.11g) ADSL2+ Firewall Router

User Manual

Table of Contents

Chapter 1: Introduction

Introduction to your Router

Welcome to the VoIP/ 802.11g ADSL2+ Firewall Router. The router is an “all-in-one” ADSL router, combining an ADSL modem, ADSL router and Ethernet network switch functionalities, 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.

Features

☞ **Express Internet Access**

The router complies with ADSL worldwide standards. It supports downstream rate up to 12/24 Mbps with ADSL2/2+, 8Mbps with ADSL. Users enjoy not only high-speed ADSL services but also broadband multimedia applications such as interactive gaming, video streaming and real-time audio much easier and faster than ever. It is compliant with Multi-Mode standard (ANSI T1.413, Issue 2; G.dmt (ITU G.992.1); G.lite (ITU G.992.2); G.hs (ITU G994.1); G.dmt.bis (ITU G.992.3); G.dmt.bis.plus (ITU G.992.5)).

☞ **802.11g Wireless AP with WPA Support**

With integrated 802.11g Wireless Access Point in the router, the device offers a quick and easy access among wired network, wireless network and broadband connection (ADSL) with single device simplicity, and as a result, mobility to the users. In addition to 54 Mbps 802.11g data rate, it also interoperates backward with existing 802.11b equipment. The Wireless Protected Access (WPA-PSK and WPA2-PSK) and Wireless Encryption Protocol (WEP) supported features enhance the security level of data protection and access control via Wireless LAN.

☞ **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 crossover cable can be used directly for auto detection.

☞ **Multi-Protocol to Establish a Connection**

It supports PPPoA (RFC 2364 - PPP over ATM Adaptation Layer 5), RFC 1483 encapsulation overATM (bridged or routed), PPP over Ethernet (RFC 2516), and IPoA (RFC1577) to establish a connection with the ISP. The product also supports VC-based and LLC-based multiplexing.

☞ **Quick Installation Wizard**

It 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 Net meeting 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.

☞ SOHO Firewall Security with DoS and SPI

Along with the built-in NAT natural firewall feature, the router also provides advanced hacker pattern-filtering protection. It can automatically detect and block Denial of Service (DoS) attacks. The router is built with Stateful Packet Inspection (SPI) to determine if a data packet is allowed through the firewall to the private LAN.

☞ Domain Name System (DNS) Relay

It 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.

☞ Quality of Service (QoS)

QoS gives you full control over which types of outgoing data traffic should be given priority by the router, ensuring important data like gaming packets, customer information, or management information move through the router ay lightning speed, even under heavy load. The QoS features are configurable by source IP address, destination IP address, protocol, and port. You can throttle the speed at which different types of outgoing data pass through the router, to ensure P2P users don't saturate upload bandwidth, or office browsing doesn't bring client web serving to a halt. In addition, or alternatively, you can simply change the priority of different types of upload data and let the router sort out the actual speeds.

☞ 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

It has routing capability and supports easy static routing table or RIP1/2 routing protocol.

☞ Simple Network Management Protocol (SNMP)

It is an easy way to remotely manage the router via SNMP.

☞ Web based GUI

It 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

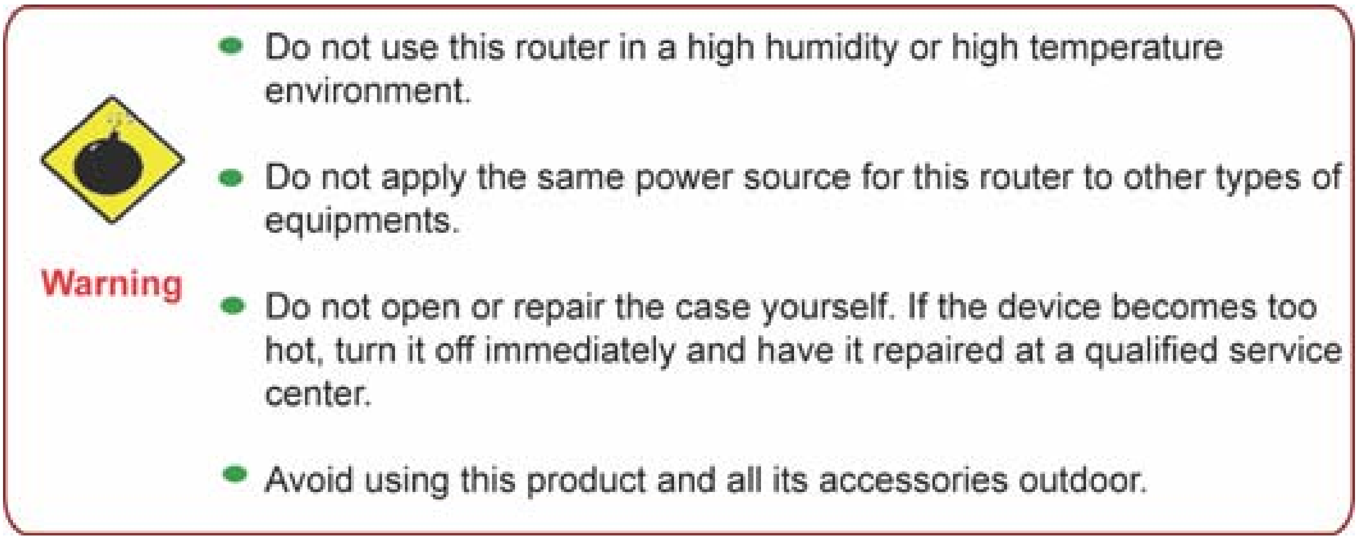
Device can be upgraded to the latest firmware through the WEB based GUI.

☞ Rich Management Interfaces

It 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.

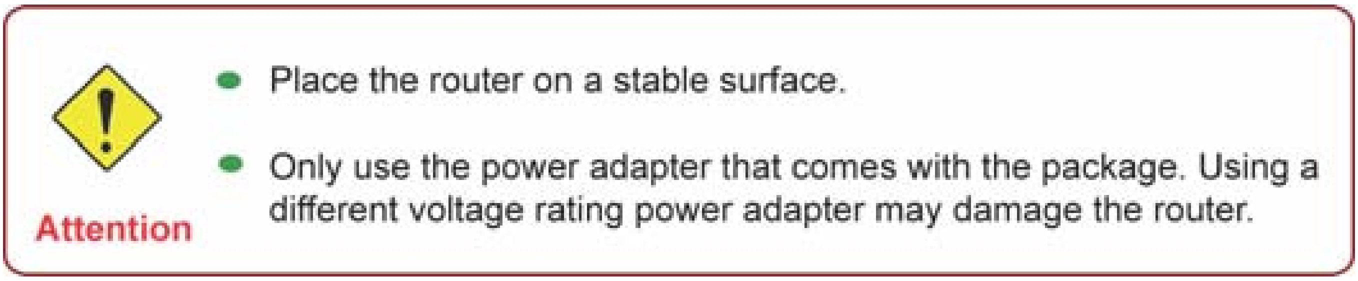
Chapter 2: Installing the Router

Important note for using this router



Warning

- Do not use this router in a high humidity or high temperature environment.
- Do not apply the same power source for this router to other types of equipments.
- Do not open or repair the case yourself. If the device becomes too hot, turn it off immediately and have it repaired at a qualified service center.
- Avoid using this product and all its accessories outdoor.



Attention

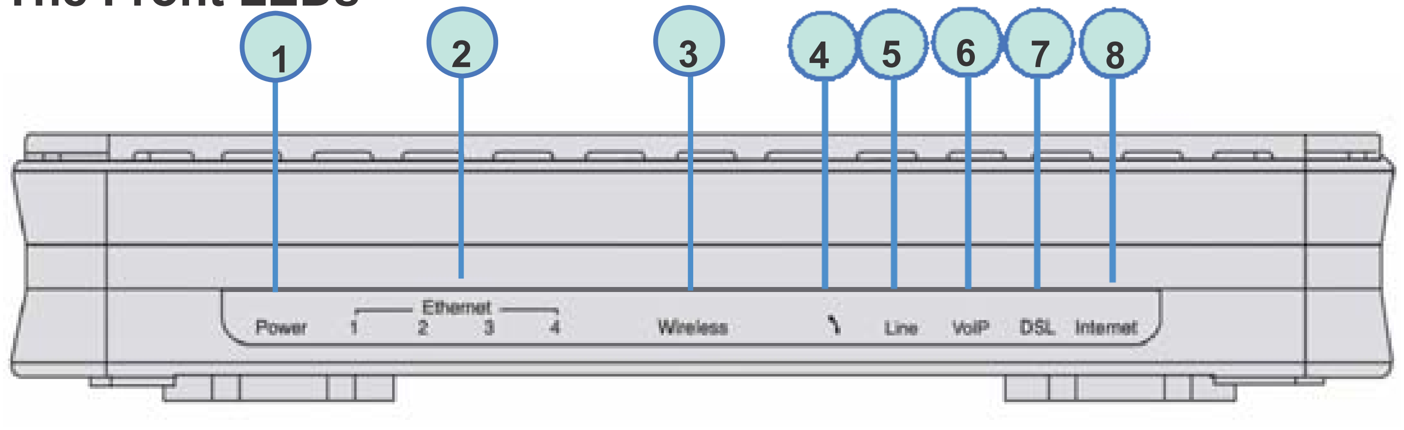
- Place the router on a stable surface.
- Only use the power adapter that comes with the package. Using a different voltage rating power adapter may damage the router.

Package Contents

- **VoIP/802.11g ADSL2+ Firewall Router**
- **CD-ROM containing the online manual**
- **RJ-11 ADSL/telephone Cable**
- **Ethernet (RJ-45) Cable**
- **RJ-45 to RD-232 Console kit**
- **Switching Power Adapter (12VDC, 1.0A)**
- **One 2dBi detachable antenna**
- **Quick Start Guide**
- **Splitter / Micro-filter (option)**

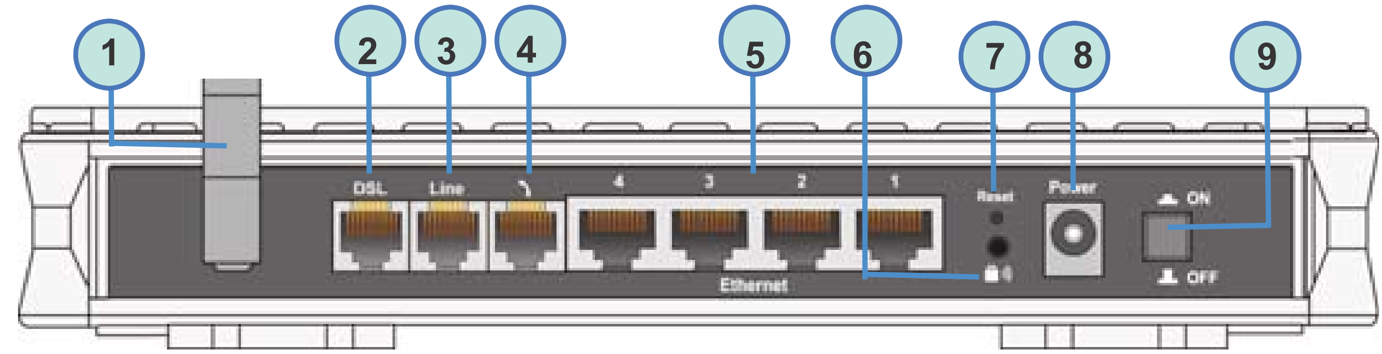
Device Description

The Front LEDs



LED		Meaning
1	**Power**	Lit when power is ON. Lit red means system failure. Restart the device or contact Billion for support.
2	**Ethernet port 1X — 4X** (RJ-45 connector)	Lit when one of LAN ports is connected to an Ethernet device. Lit green when the speed of transmission hits 100Mbps; Lit orange when the speed of transmission hits 10Mbps. Blink when data is being Transmitted / Received.
3	**Wireless**	Lit green when a wireless connection is established. Flash when the device is sending/receiving data.
4	**Phone**	Lit green when the phone is off hook.
5	**Line** (Router with LINE port only)	Lit when the inbound and outbound calls are transmitted through PSTN.
6	**VoIP**	Lit when the SIP Registration is OK. Green for Phone.
7	**DSL**	Lit Green when the device is successfully connected to an ADSL DSLAM. ("line synch").
8	**Internet**	Lit red when WAN port fails to get IP address. Lit green when WAN port gets IP address successfully.

The Rear Ports



NOTE: Ethernet # 4 can be used as a console port. You need a special console tool which is included in the package to connect with the LAN.

Port		Meaning
1	**Antenna** (Wireless Router only)	Connect the detachable antenna to this port.
2	**DSL**	Connect this port to the ADSL/telephone network with the RJ-11 cable (telephone) provided.
3	**Line** (Router with LINE port only)	Connect this port to the telephone jack on the wall with RJ-11 cable.
4	**Phone** **1X** (RJ-11 connector)	Connect this port to an analog phone set with RJ-11 cable.
5	**Ethernet** **1X — 4X** (RJ-45 connector)	Connect a UTP Ethernet cable (Cat-5 or Cat-5e) to one of the LAN ports when connecting to a PC or an office/home network of 10Mbps or 100Mbps. ***Caution: Port 4 can be either a LAN or Console port at a time but not both.***
6	**WPS**	Push WPS button to trigger Wi-Fi Protected Setup function.
7	**RESET**	To be sure the device is being turned on press RESET button for: 1-3 seconds: quick reset the device. 6 seconds and above, power off, power on the device: restore to factory default settings. (Cannot login to the router or forgot your Username/Password. Press the button for more than 6 seconds). ***Caution: After pressing the RESET button for more than 6 seconds, to be sure you power cycle the device again.***
8	**Power**	Connect it with the supplied power adapter.
9	**Power Switch**	Power ON/OFF switch

Cabling

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

Make sure that all devices (e.g. telephones, fax machines, analogue modems) connected to the same telephone line as your router have a line filter connected between them and the wall outlet (unless you are using a Central Splitter or Central Filter installed by a qualified and licensed electrician), and that all line filters are correctly installed in a right way. If line filter is not installed and connected properly, it may cause problem to your ADSL connection or may result in frequent disconnections.

Chapter 3: Basic Installation

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

Please check your PC 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.

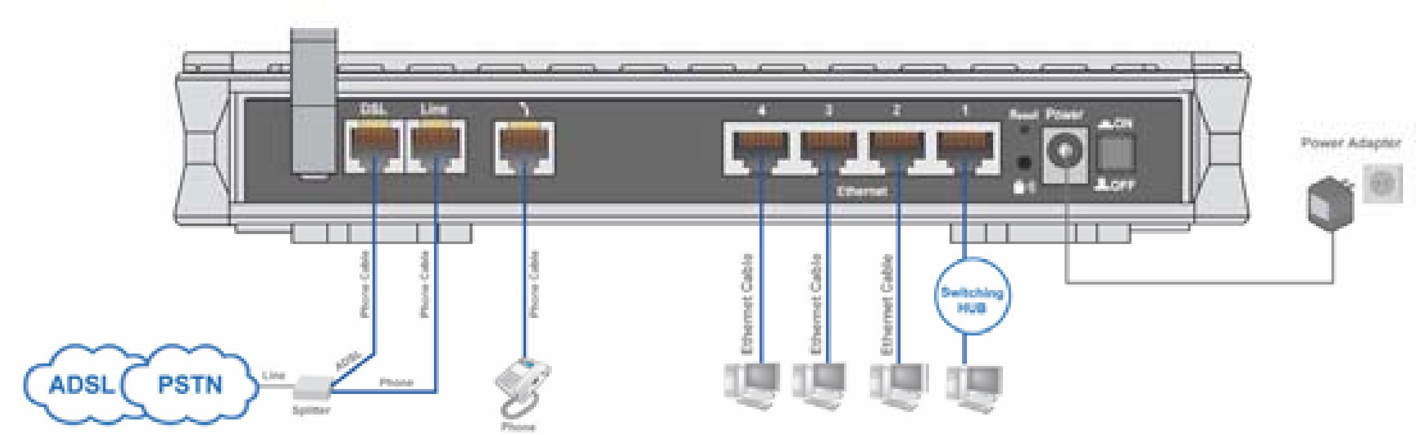
There are ways to connect the router, either through an external repeater hub or connect directly to your PCs. However, make sure that your PCs have an Ethernet interface installed properly prior to connecting the router device. You ought to configure your PCs to obtain an IP address through a DHCP server 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 problem accessing the router web interface it is advisable to uninstall your firewall program on your PCs, as they can cause problems accessing the IP address of the router. Users should make their own decisions on what is best to protect their network.

Please follow the following steps to configure your PC network environment.

NOTE: Any TCP/IP capable workstation can be used to communicate with or through this router. To configure other types of workstations, please consult your manufacturer documentation.

Connecting Your Router

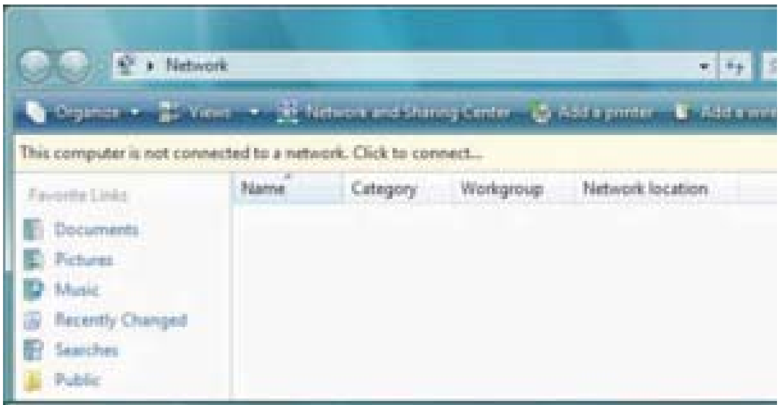
1. Connect this router to a **LAN** (Local Area Network) and the ADSL/telephone (**ADSL**) net work.
2. Power on the device.
3. Make sure the **Power LED** lit steadily and that the **LAN** LED is lit.
4. Connect your router to the telephone jack on the wall with RJ-11 cable.



Network Configuration

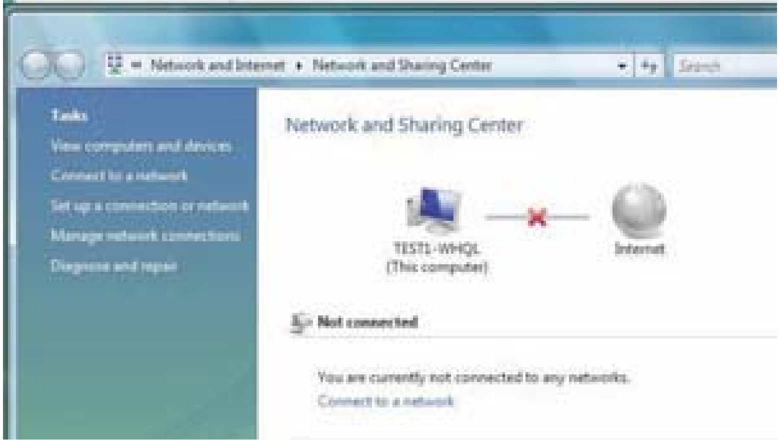
Configuring PC in Windows Vista

1. Go to Start. Click on Network.
2. Then click on Network and Sharing Center at the top bar.



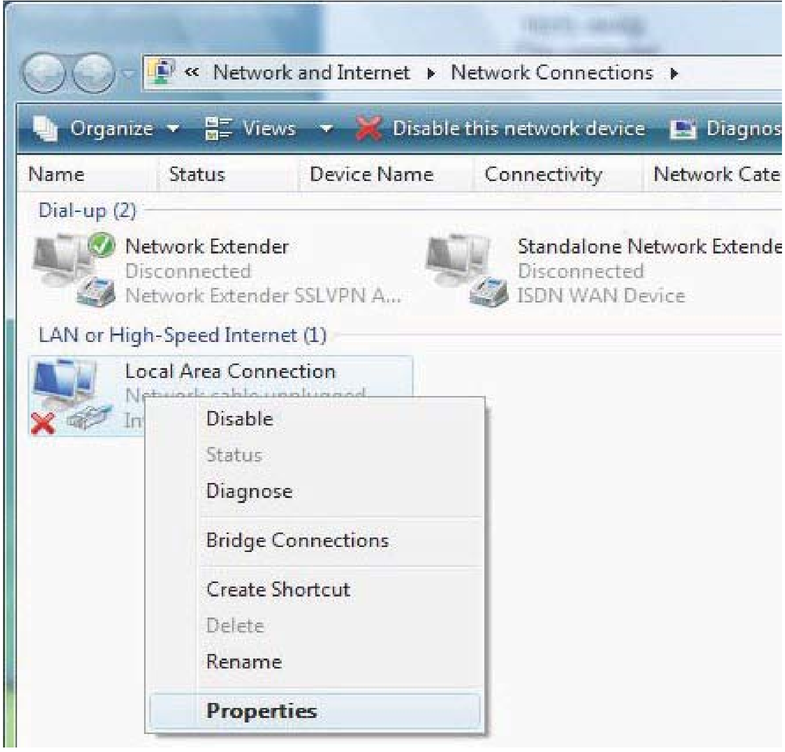
This computer is not connected to a network. Click to connect...

3. When the Network and Sharing Center window pops up, select and click on Manage network connections on the left window column.

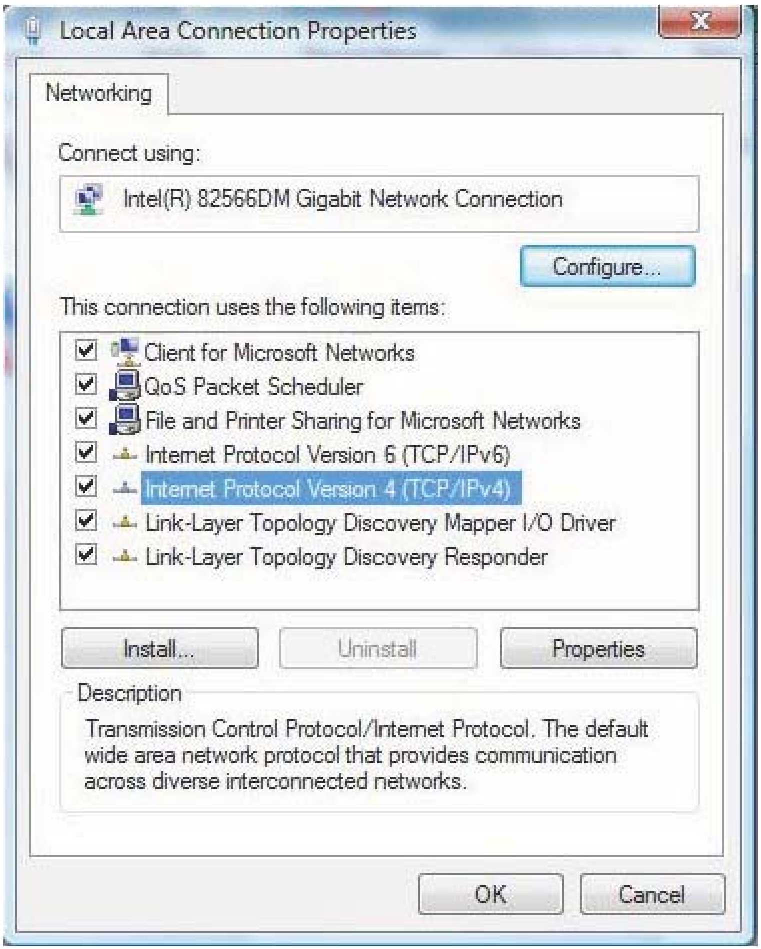


You are currently not connected to any networks.

4. Select the Local Area Connection, and right click the icon to select Properties.



5. Select Internet Protocol Version 4 (TCP/IPv4) then click Properties.



Local Area Connection Properties

Connect using:

Intel(R) 82566DM Gigabit Network Connection

This connection uses the following items:

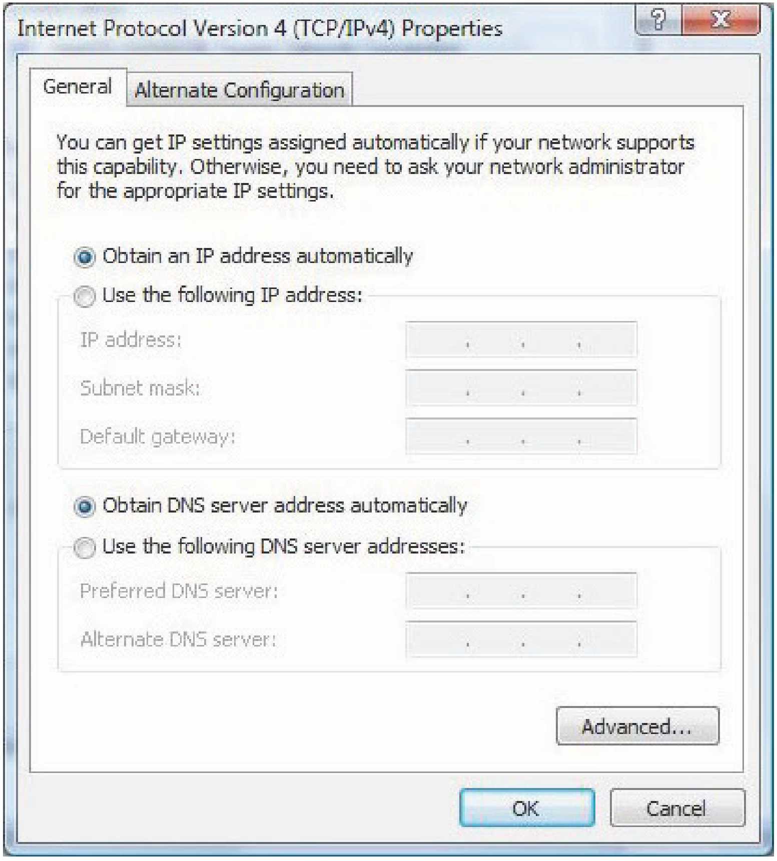
- ☑ Client for Microsoft Networks
- ☑ QoS Packet Scheduler
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- ☑ Link-Layer Topology Discovery Mapper I/O Driver
- ☑ Link-Layer Topology Discovery Responder

Description

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

6. In the TCP/IPv4 properties window, select the Obtain an IP address automatically and Obtain DNS Server address automatically radio buttons. Then click OK to exit the setting.

7. Click OK again in the Local Area Connection Properties window to apply the new configuration.



Internet Protocol Version 4 (TCP/IPv4) Properties

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

● Obtain an IP address automatically

○ Use the following IP address:

IP address: . . .

Subnet mask: . . .

Default gateway: . . .

● Obtain DNS server address automatically

○ Use the following DNS server addresses:

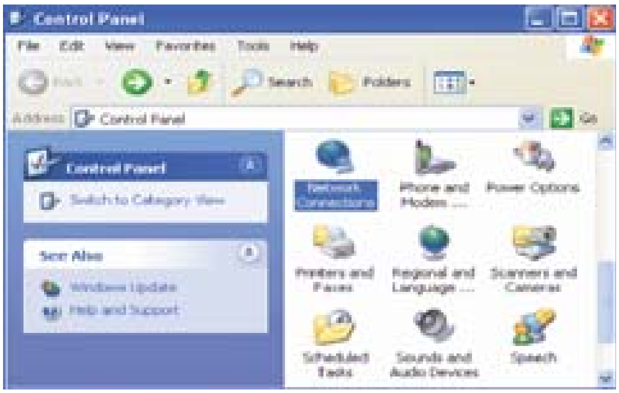
Preferred DNS server: . . .

Alternate DNS server: . . .

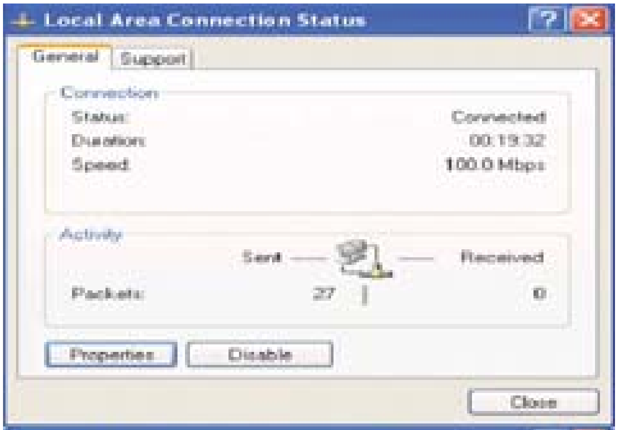
Configuring PC in Windows XP

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

2. Double-click Local Area Connection.



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


Local Area Connection Status

General | Support

Connection

Status: Connected

Duration: 00:19:32

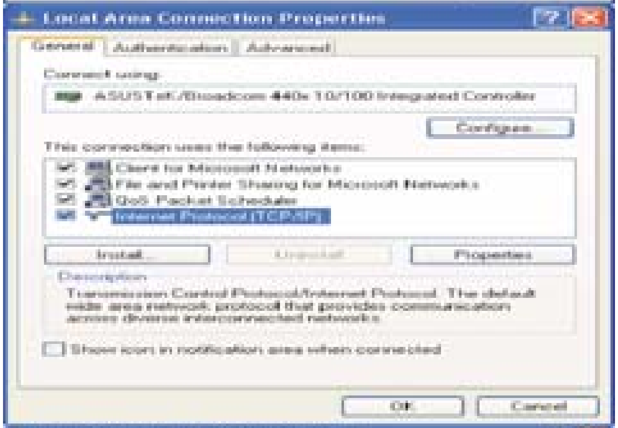
Speed: 100.0 Mbps

Activity

Sent — — Received

Packets: 27 | 0

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


Local Area Connection Properties

General | Authentication | Advanced

Connect using:

ASUSTeK/Broadcom 440x 10/100 Integrated Controller

This connection uses the following items:

☑ Client for Microsoft Networks

☑ File and Printer Sharing for Microsoft Networks

☑ QoS Packet Scheduler

☑ Internet Protocol (TCP/IP)

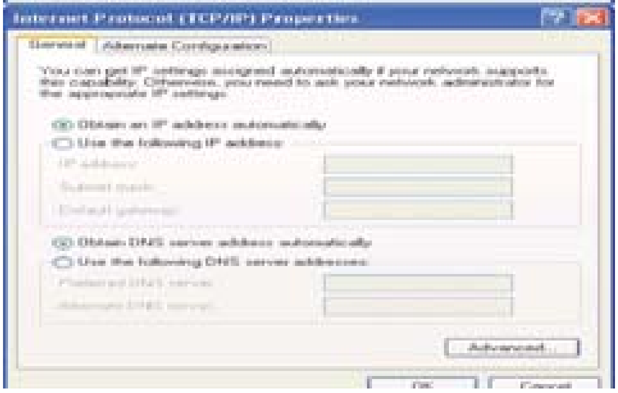
Description

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

□ Show icon in notification area when connected

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

6. Click OK to finish the configuration.


Internet Protocol (TCP/IP) Properties

General | Alternate Configuration

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

● Obtain an IP address automatically

○ Use the following IP address:

IP address:

Subnet mask:

Default gateway:

● Obtain DNS server address automatically

○ Use the following DNS server addresses:

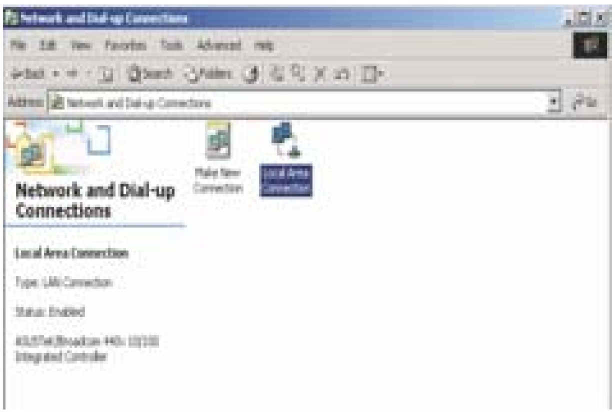
Preferred DNS server:

Alternate DNS server:

Configuring PC in Windows 2000

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

2. Double-click Local Area Connection.


Network and Dial-up Connections
File Edit View Favorites Tools Advanced Help
Back Search Folders
Address Network and Dial-up Connections
Make New Connection
Local Area Connection

Network and Dial-up Connections

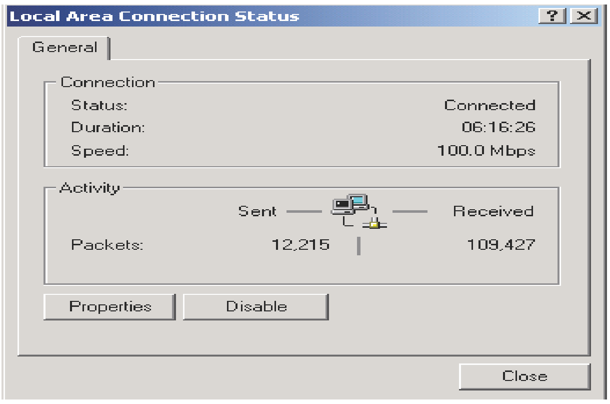
Local Area Connection

Type: LAN Connection

Status: Enabled

ASUSTeK/Broadcom 440x 10/100 Integrated Controller

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


Local Area Connection Status

General

Connection

Status: Connected

Duration: 06:16:26

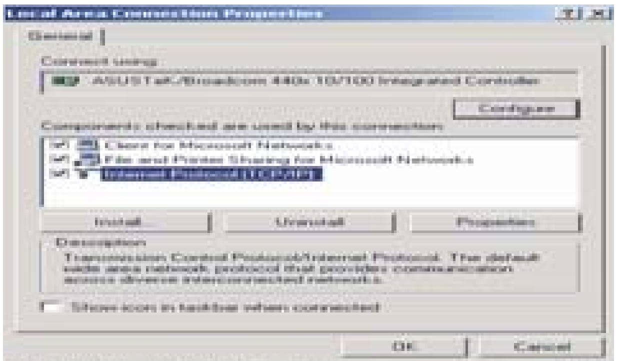
Speed: 100.0 Mbps

Activity

Sent — Received

Packets: 12,215 | 109,427

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


Local Area Connection Properties

General

Connect using:

ASUSTeK/Broadcom 440x 10/100 Integrated Controller

Components checked are used by this connection:

☑ Client for Microsoft Networks

☑ File and Printer Sharing for Microsoft Networks

☑ Internet Protocol (TCP/IP)

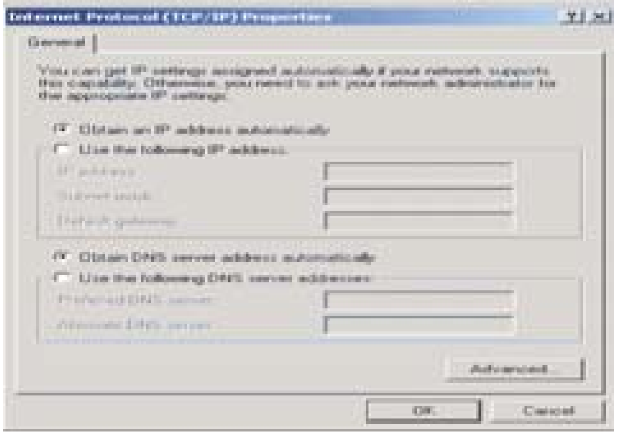
Description

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

□ Show icon in taskbar when connected

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

6. Click OK to finish the configuration.


Internet Protocol (TCP/IP) Properties

General

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

● Obtain an IP address automatically

○ Use the following IP address:

IP address:

Subnet mask:

Default gateway:

● Obtain DNS server address automatically

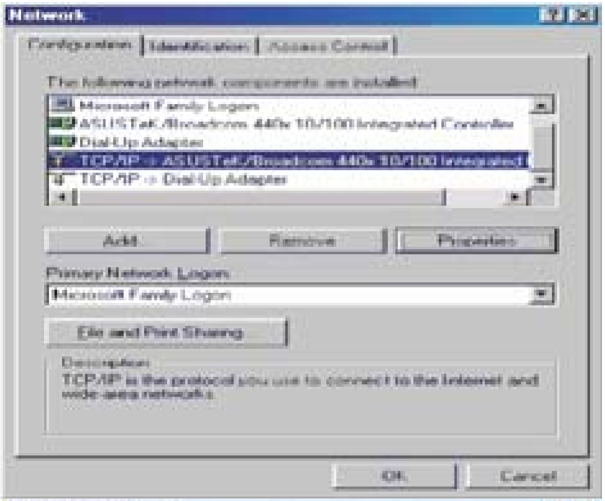
○ Use the following DNS server addresses:

Preferred DNS server:

Alternate DNS server:

Configuring PC in Windows 95/98/Me

1. Go to Start > Settings > Control Panel. In the Control Panel, double-click on Network and choose the Configuration tab.
2. Select TCP/IP > NE2000 Compatible, or the name of your Network Interface Card (NIC) in your PC.



Network

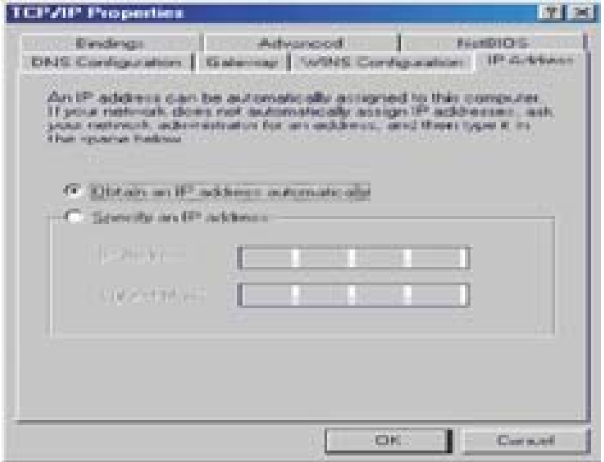
The following network components are installed:

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

Primary Network Logon: Microsoft Family Logon

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

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

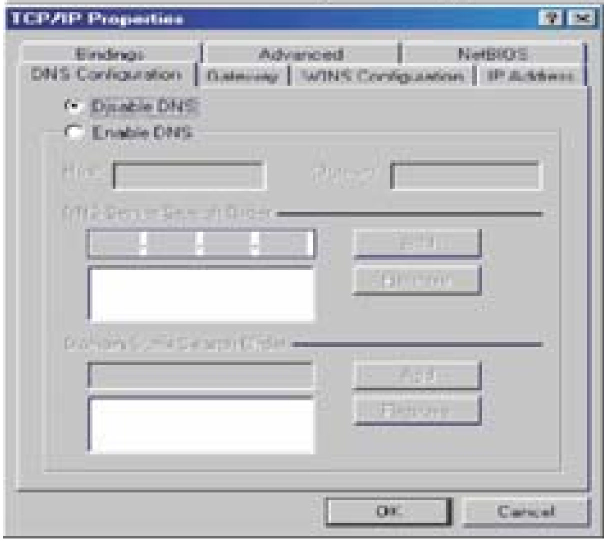


TCP/IP Properties

An IP address can be automatically assigned to this computer. If your network does not automatically assign IP addresses, ask your network administrator for an address, and then type it in the space below.

● Obtain an IP address automatically
○ Specify an IP address:

4. Then select the DNS Configuration tab.
5. Select the Disable DNS radio button and click OK to finish the configuration.

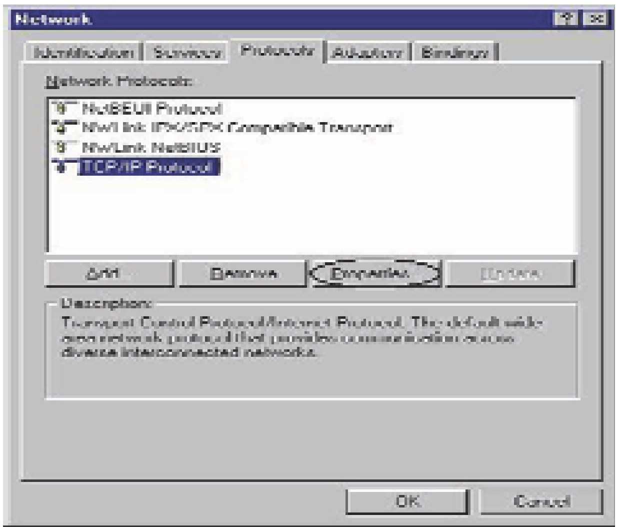


TCP/IP Properties

● Disable DNS
○ Enable DNS

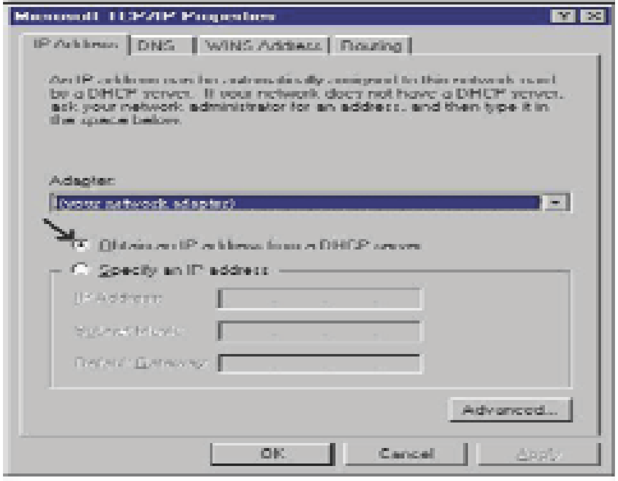
Configuring PC in Windows NT4.0

1. Go to Start > Settings > Control Panel. In the Control Panel, double-click on Network and choose the Protocols tab.
2. Select TCP/IP Protocol and click Properties.



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

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



An IP address can be automatically assigned to this network card by a DHCP server. If your network does not have a DHCP server, ask your network administrator for an address, and then type it in the space below.

Adapter: [your network adapter]

● Obtain an IP address from a DHCP server

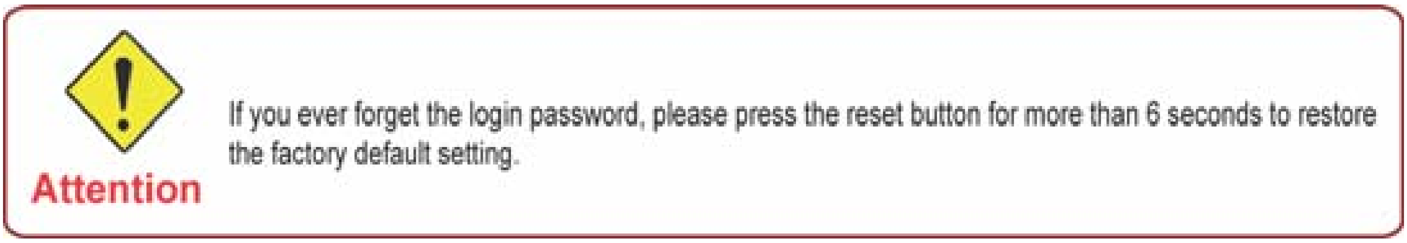
○ Specify an IP address

Factory Default Settings

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

Web Interface (Username and Password)

- Username: admin
- Password: admin



Attention

If you ever forget the login password, please press the reset button for more than 6 seconds to restore the factory default setting.

The default username and password are “**admin**” and “**admin**” respectively.

Device LAN 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

LAN and WAN Port Addresses

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

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.
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

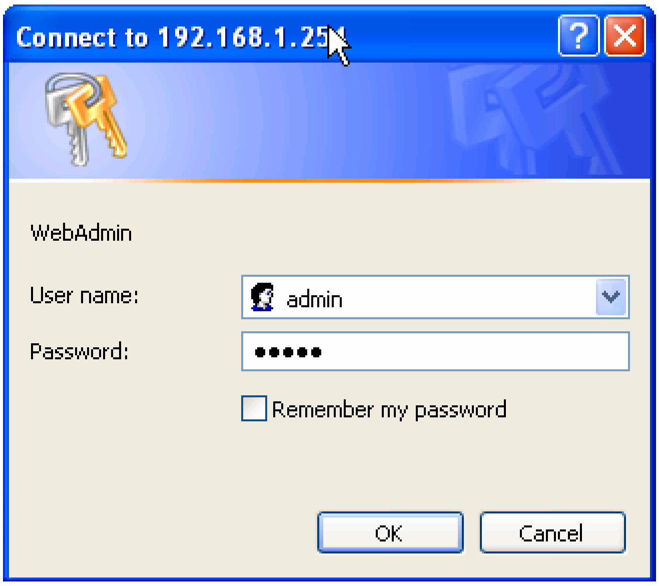
Before configuring this device, you have to check with your ISP (Internet Service Provider) to find out what kind of service is provided such as DHCP (Obtain an IP Address Automatically, Static IP (Fixed IP Address) or PPPoE.

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

PPPoE(RFC2516)	VPI/VCI, VC / 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(RFC2364)	VPI/VCI, VC / 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).
MPoA(RFC1483/ RFC2684)	VPI/VCI, VC / LLC-based multiplexing, IP address, Subnet mask, Gateway address, and Domain Name System (DNS) IP address (it is a fixed IP address).
IPoA(RFC1577)	VPI/VCI, VC / LLC-based multiplexing, IP address, Subnet mask, Gateway address, and Domain Name System (DNS) IP address (it is a fixed IP address).
Pure Bridge	VPI/VCI, VC / LLC-based multiplexing to use Bridged Mode.

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” respectively. (See Figure 3.14)



Connect to 192.168.1.254

WebAdmin

User name: admin

Password: ●●●●●

□ Remember my password

Figure 3.14: User name & Password Prompt Window

Congratulations! You are now successfully logon to the VoIP/ 802.11g ADSL2+ Firewall Router!

Chapter 4: Configuration

At the configuration homepage, the left navigation column provides you the link to each configuration page. The category of each configuration page is listed as below.

☞ **Status**

ADSL Status
ARP Table
DHCP Table
Routing Tabe
NAT Sessions
UPnP Portmap
VoIP Status
VoIP Call Log
Event Log
Error Log
Diagnostic

☞ **Quick Start**

☞ **Configuration**

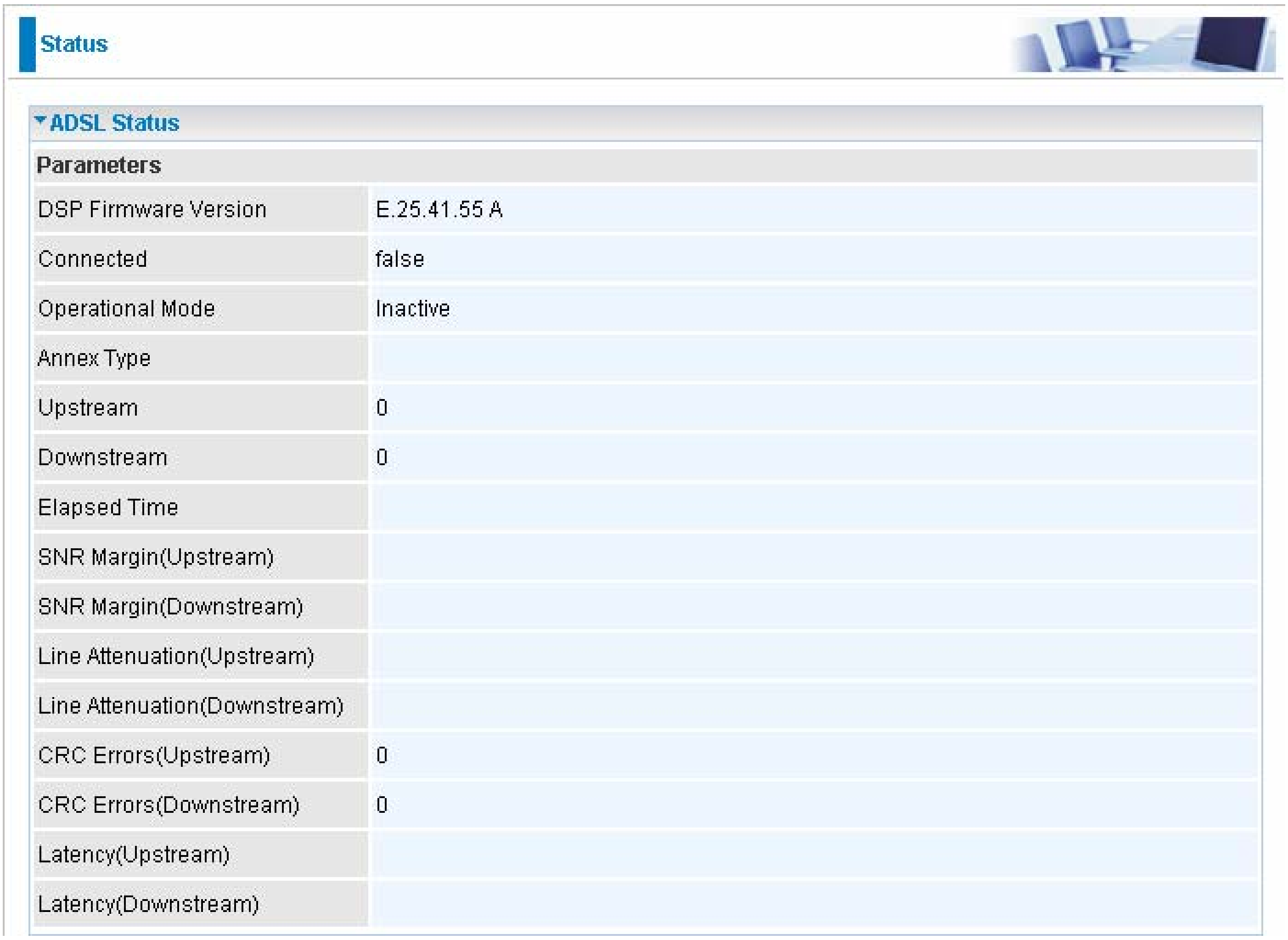
LAN
WAN
System
Firewall
VoIP
QoS
Virtual Server
Wake on LAN
Time Schedule
Advanced

☞ **Language (provides user interface in English and French languages)**

Status

ADSL Status

This section displays the ADSL overall status, which shows a number of helpful information such as DSP firmware version.



Status

▾ADSL Status

Parameters	
DSP Firmware Version	E.25.41.55 A
Connected	false
Operational Mode	Inactive
Annex Type	
Upstream	0
Downstream	0
Elapsed Time	
SNR Margin(Upstream)	
SNR Margin(Downstream)	
Line Attenuation(Upstream)	
Line Attenuation(Downstream)	
CRC Errors(Upstream)	0
CRC Errors(Downstream)	0
Latency(Upstream)	
Latency(Downstream)	

DSP Firmware Version: DSP code version

Connected：To show if the ADSL line has already been connected.

Operational Mode: To show the state when user select "AUTO" on connect mode.

Annex Type: It is related to transmission rate, including Annex A and B.

Upstream: Upstream rate.

Downstream: Downstream rate.

Elapsed Time: It means the running time of ADSL.

SNR Margin (Upstream): This is noise margin in upstream.

SNR Margin (Downstream): This is noise margin in downstream.

Line Attenuation (Upstream): This is attenuation of signal in upstream.

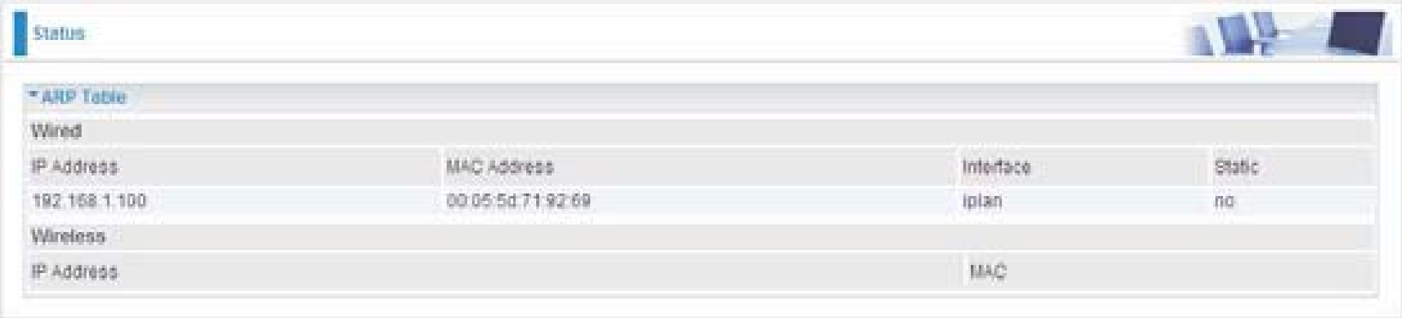
Line Attenuation (Downstream): This is attenuation of signal in downstream.

CRC Errors (Upstream): This is CRC error in upstream.

CRC Errors (Downstream): This is CRC error in downstream.

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.



▾ARP Table

Wired

IP Address	MAC Address	Interface	Static
192.168.1.100	00:05:5d:71:92:69	iplan	no

Wireless

IP Address	MAC

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

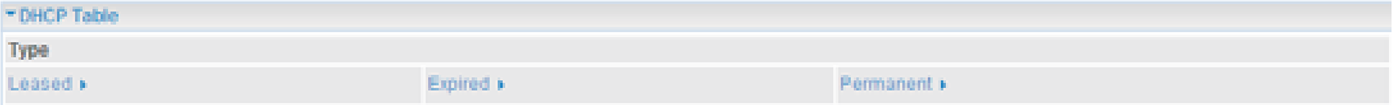
MAC Address: The MAC (Media Access Control) addresses for each device on your LAN.

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.

DHCP Table



▾ DHCP Table

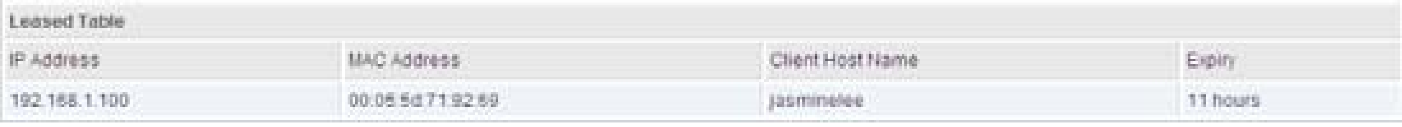
Type		
Leased ▸	Expired ▸	Permanent ▸

Leased: The DHCP assigned IP addresses information.

Expired: The expired IP addresses information.

Permanent: The fixed host mapping information.

Leased Table



Leased Table

IP Address	MAC Address	Client Host Name	Expiry
192.168.1.100	00:05:5d:71:92:69	jasminelee	11 hours

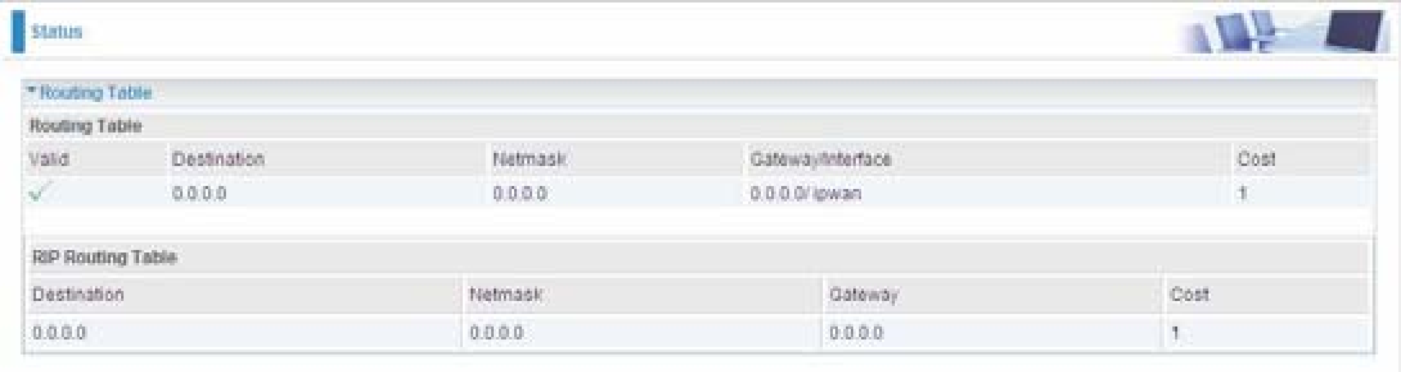
IP Address: The IP address that assigned to client.

MAC Address: The MAC address of client.

Client Host Name: The Host Name (Computer Name) of client.

Expiry: The current lease time of client.

Routing Table



▾ Routing Table

Routing Table

Valid	Destination	Netmask	Gateway/Interface	Cost
✓	0.0.0.0	0.0.0.0	0.0.0.0/ ipwan	1

RIP Routing Table

Destination	Netmask	Gateway	Cost
0.0.0.0	0.0.0.0	0.0.0.0	1

Routing Table

Valid: It indicates a successful routing status.

Destination: The IP address of the destination network.

Netmask: The destination Netmask address.

Gateway/Interface: The IP address of the gateway or existing interface that this route will use.

Cost: The number of hops counted as the cost of the route.

RIP Routing Table

Destination: The IP address of the destination network.

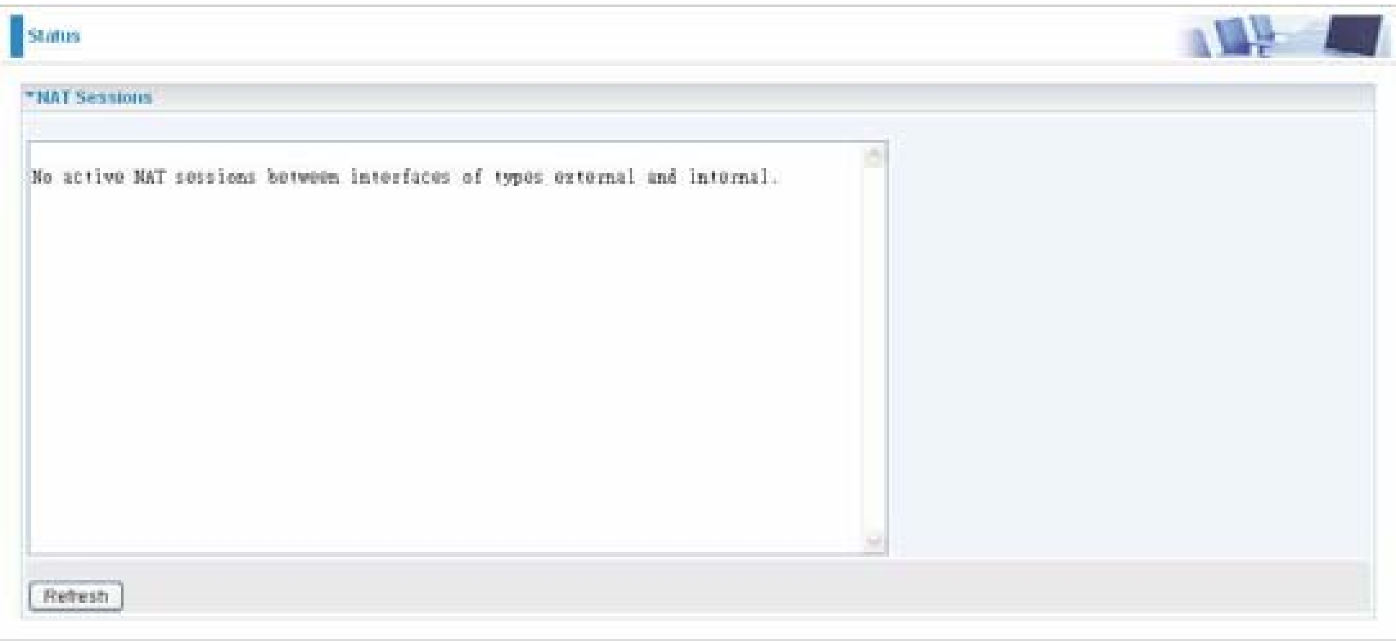
Netmask: The destination Netmask address.

Gateway: The IP address of the gateway that this route will use.

Cost: The number of hops counted as the cost of the route.

NAT Sessions

This section lists all current NAT sessions between interface of types external (WAN) and internal (LAN).



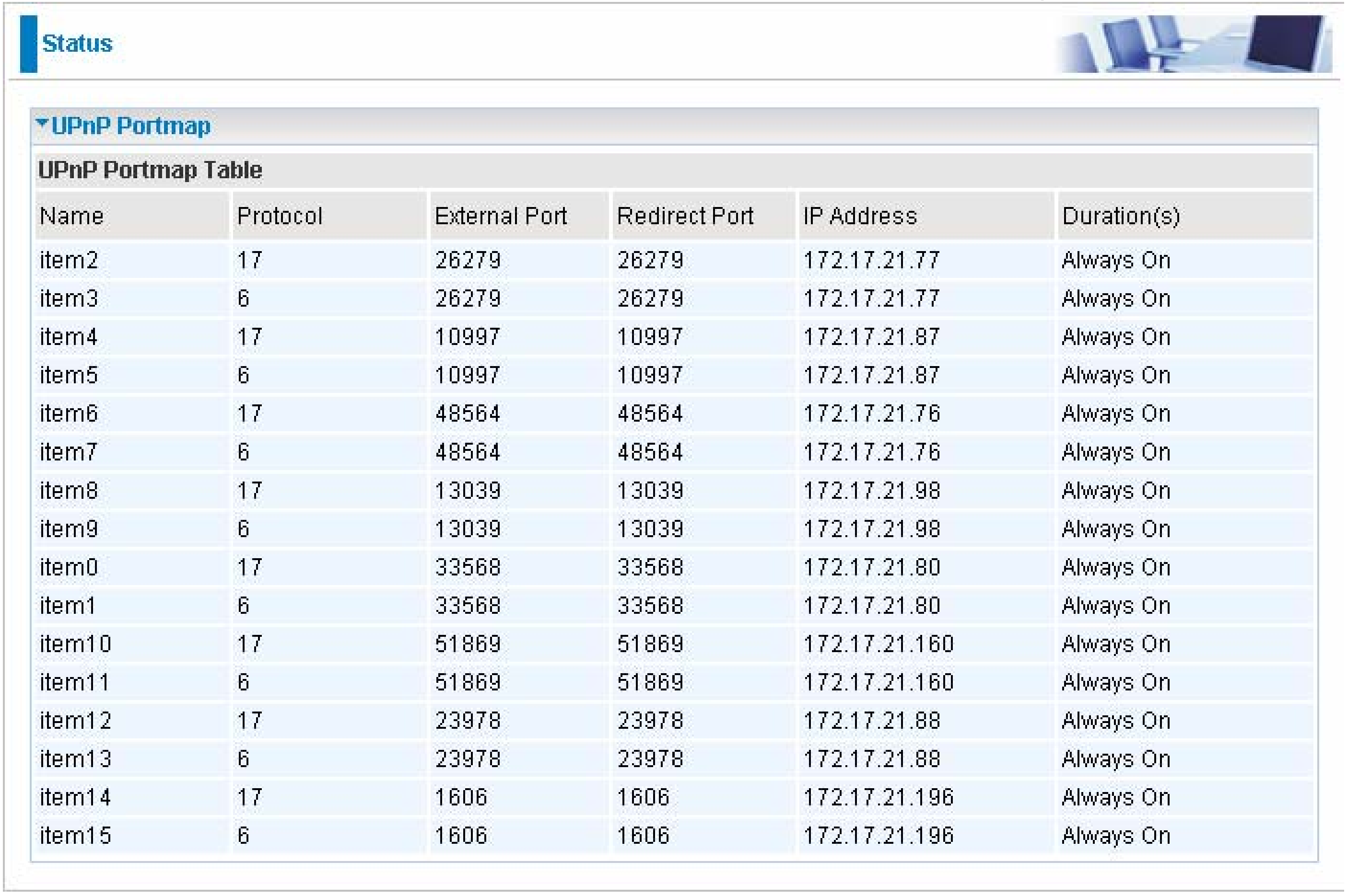
Status

▾NAT Sessions

No active NAT sessions between interfaces of types external and internal.

UPnP Portmap

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



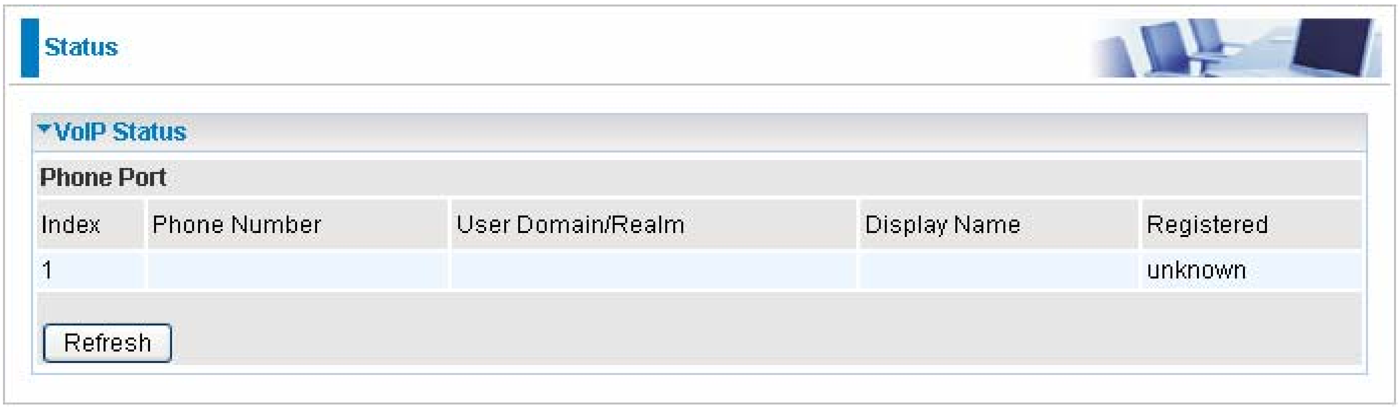
Status

▾UPnP Portmap

UPnP Portmap Table

Name	Protocol	External Port	Redirect Port	IP Address	Duration(s)
item2	17	26279	26279	172.17.21.77	Always On
item3	6	26279	26279	172.17.21.77	Always On
item4	17	10997	10997	172.17.21.87	Always On
item5	6	10997	10997	172.17.21.87	Always On
item6	17	48564	48564	172.17.21.76	Always On
item7	6	48564	48564	172.17.21.76	Always On
item8	17	13039	13039	172.17.21.98	Always On
item9	6	13039	13039	172.17.21.98	Always On
item0	17	33568	33568	172.17.21.80	Always On
item1	6	33568	33568	172.17.21.80	Always On
item10	17	51869	51869	172.17.21.160	Always On
item11	6	51869	51869	172.17.21.160	Always On
item12	17	23978	23978	172.17.21.88	Always On
item13	6	23978	23978	172.17.21.88	Always On
item14	17	1606	1606	172.17.21.196	Always On
item15	6	1606	1606	172.17.21.196	Always On

VoIP Status



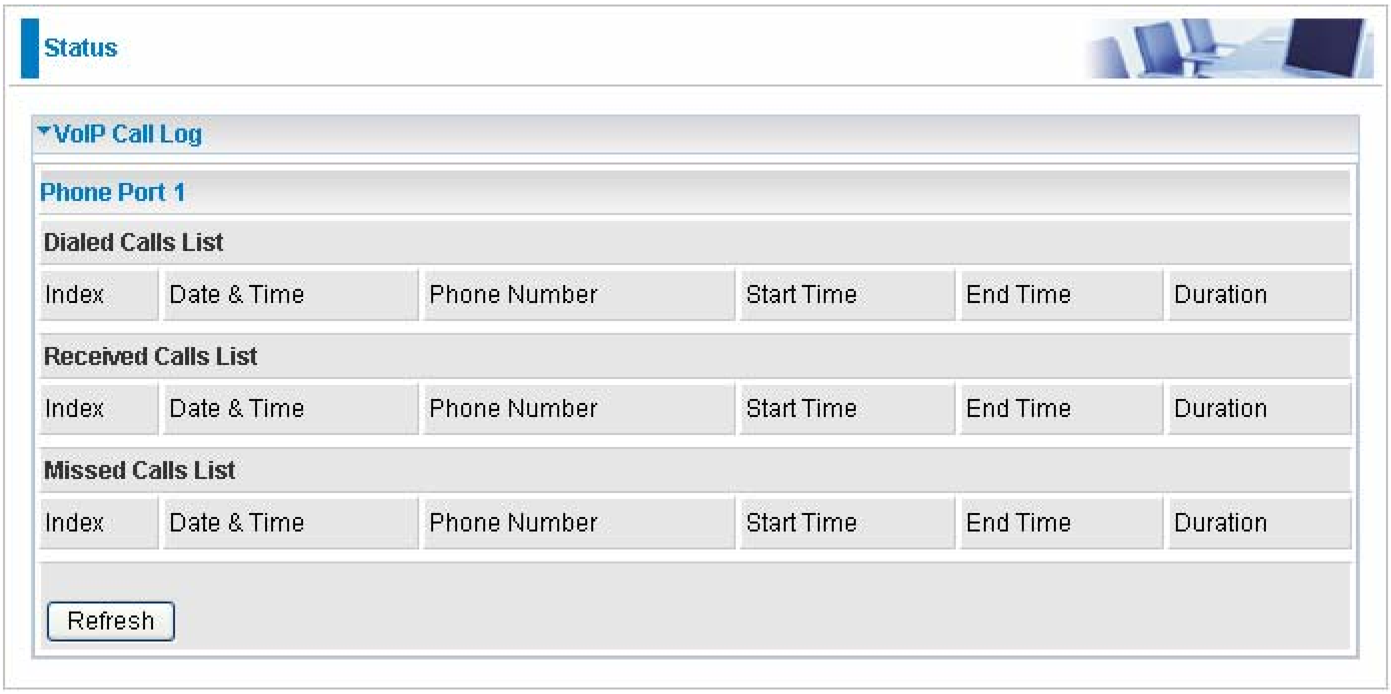
Status

VoIP Status

Phone Port

Index	Phone Number	User Domain/Realm	Display Name	Registered
1				unknown

VoIP Call Log



Status

VoIP Call Log

Phone Port 1

Dialed Calls List

Index	Date & Time	Phone Number	Start Time	End Time	Duration

Received Calls List

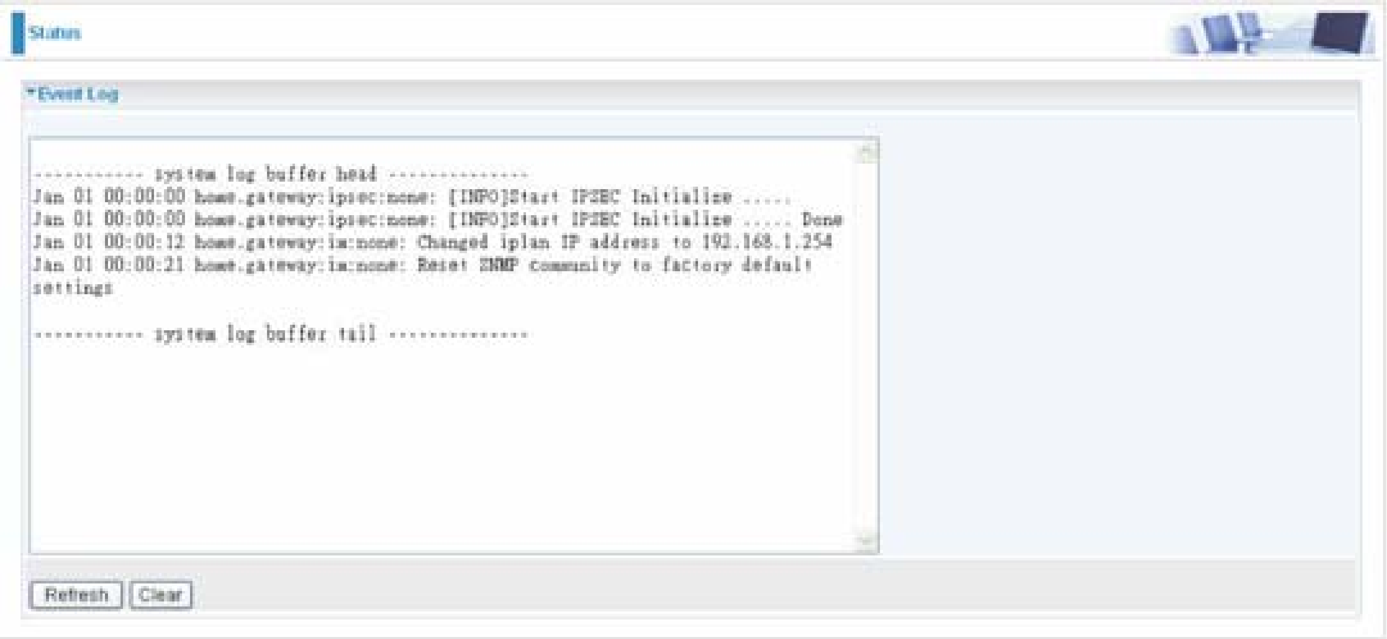
Index	Date & Time	Phone Number	Start Time	End Time	Duration

Missed Calls List

Index	Date & Time	Phone Number	Start Time	End Time	Duration

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.

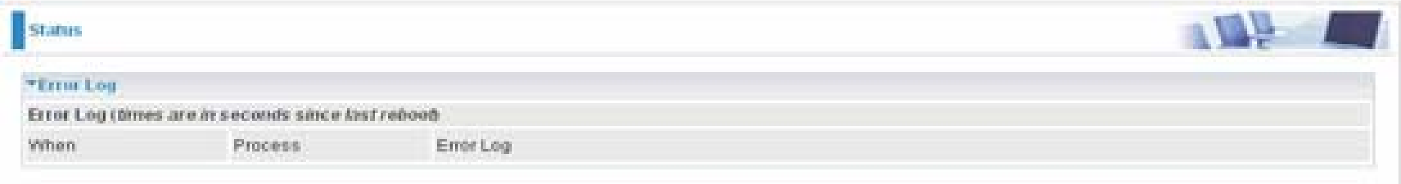


```
----------- system log buffer head -------------
Jan 01 00:00:00 home.gateway:ipsec:none: [INFO]Start IPSEC Initialize .....
Jan 01 00:00:00 home.gateway:ipsec:none: [INFO]Start IPSEC Initialize ..... Done
Jan 01 00:00:12 home.gateway:im:none: Changed iplan IP address to 192.168.1.254
Jan 01 00:00:21 home.gateway:im:none: Reset SNMP community to factory default
settings

----------- system log buffer tail -------------
```

Error Log

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

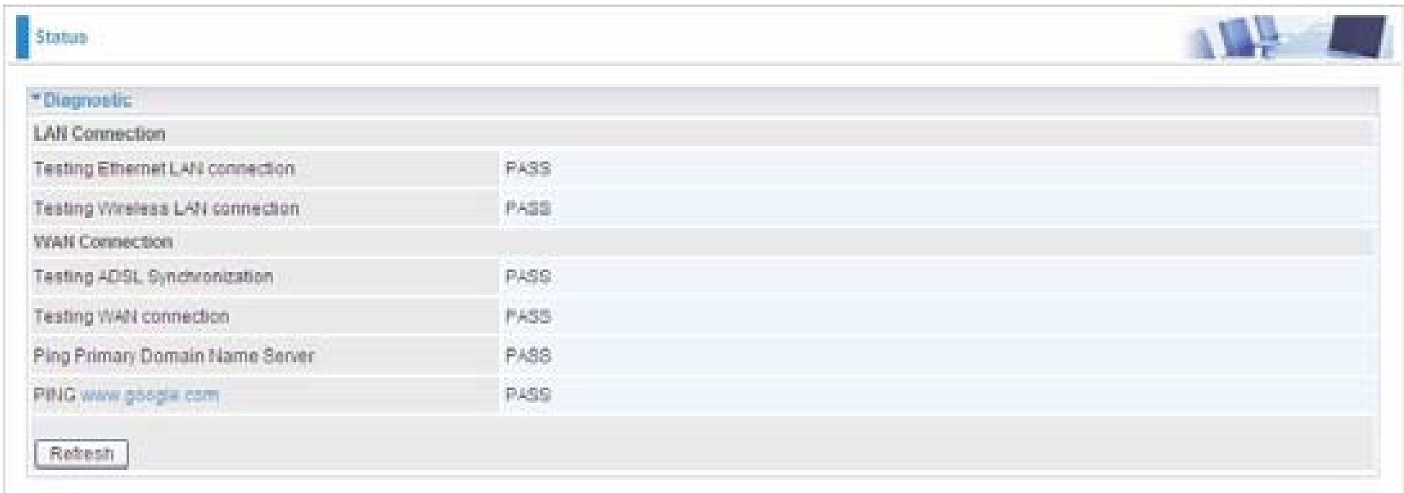


Error Log (times are in seconds since last reboot)

When	Process	Error Log

Diagnostic

It tests the connection to computer(s) which is connected to the LAN ports and also the WAN Internet connection. If PING **www.google.com** is shown FAIL and the rest is PASS, you ought to check your PC's DNS setting is correct.



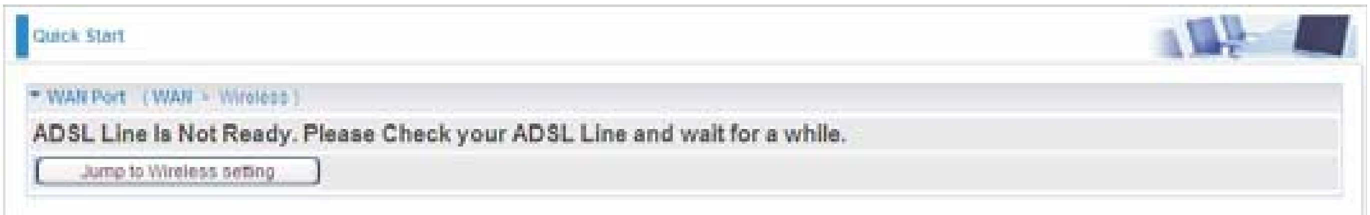
Status

Diagnostic

LAN Connection	
Testing Ethernet LAN connection	PASS
Testing Wireless LAN connection	PASS
WAN Connection	
Testing ADSL Synchronization	PASS
Testing WAN connection	PASS
Ping Primary Domain Name Server	PASS
PING www.google.com	PASS

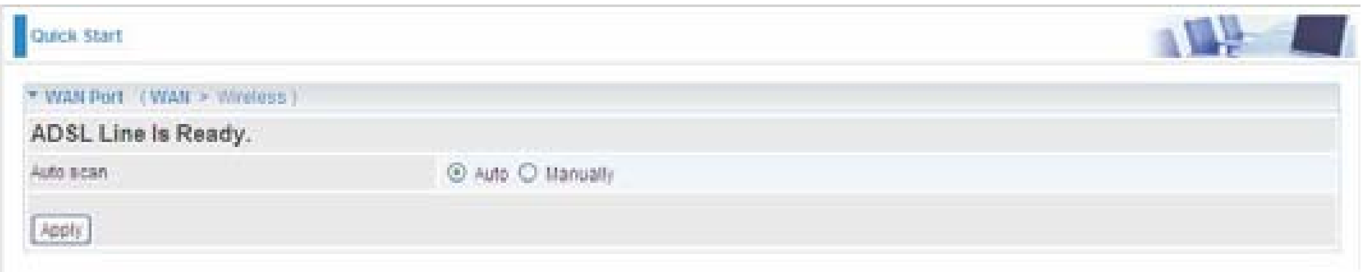
Quick Start

1. Click Quick Start. If your ADSL line is not ready, you need to check your ADSL line has been set or not.



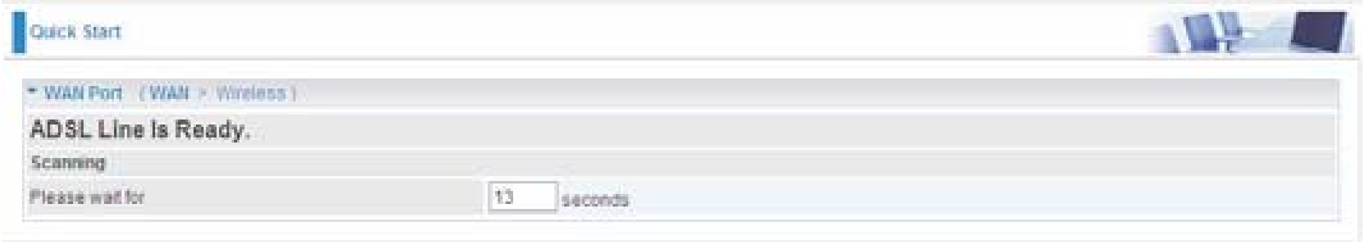
ADSL Line Is Not Ready. Please Check your ADSL Line and wait for a while.

2. If your ADSL line is ready, the screen appears ADSL Line is Ready. Choose Auto radio button and click Apply. It will automatically scan the recommended mode for you. Manually mode makes you to set the ADSL line by manual. (If you choose Manually, you will directly go to step 5.)



ADSL Line Is Ready.

Auto scan ● Auto ○ Manually

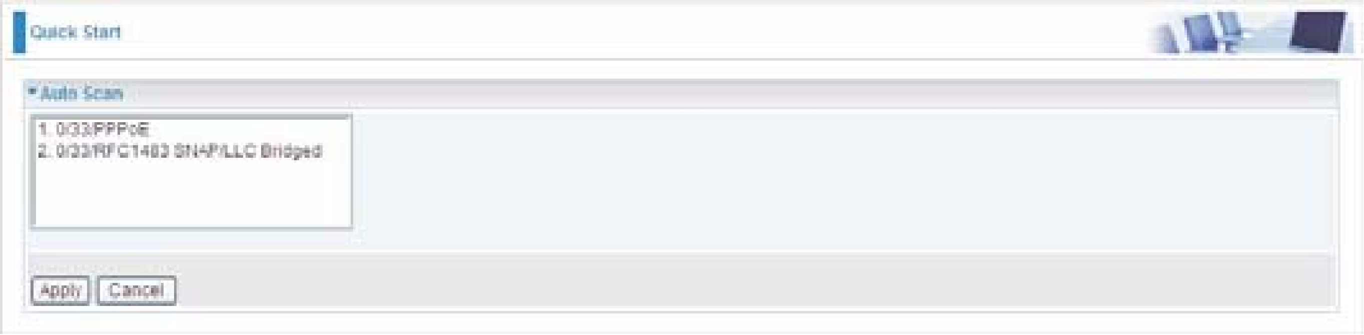


ADSL Line Is Ready.

Scanning

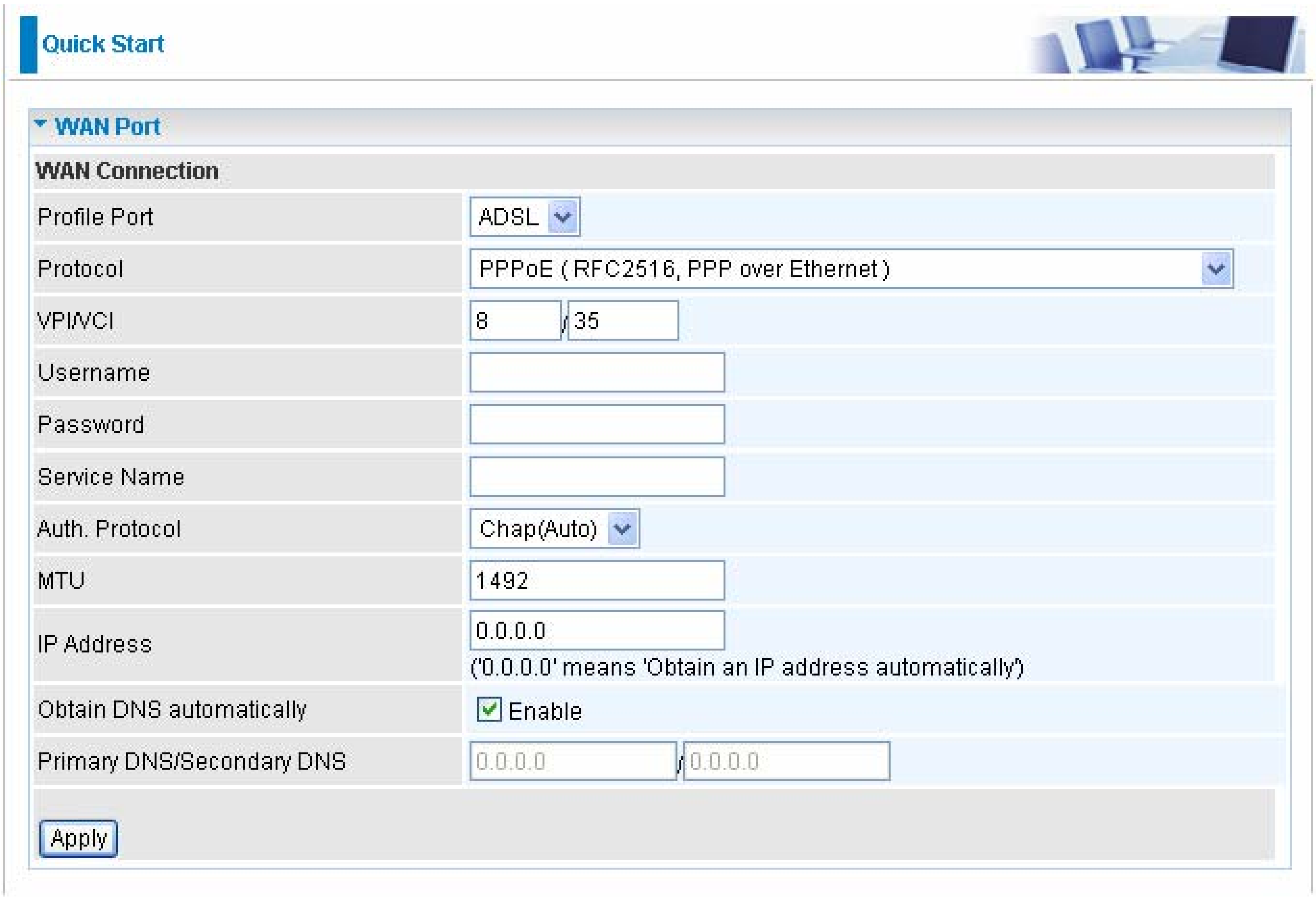
Please wait for 13 seconds

3. The list below has different mode applied for your choice. Choose 0/33/PPPoE(Recommended) and click Apply.



1. 0/33/PPPoE
2. 0/33/RFC1483 SNAP/LLC Bridged

4. Please enter "Username" and "Password" as supplied by your ISP (Internet Service Provider) and click Apply to continue.



▾ WAN Port

WAN Connection	
Profile Port	ADSL
Protocol	PPPoE (RFC2516, PPP over Ethernet)
VPI/VCI	8 / 35
Username	
Password	
Service Name	
Auth. Protocol	Chap(Auto)
MTU	1492
IP Address	0.0.0.0 ('0.0.0.0' means 'Obtain an IP address automatically')
Obtain DNS automatically	☑ Enable
Primary DNS/Secondary DNS	0.0.0.0 / 0.0.0.0

Profile Port: Select the connection mode. There is ADSL**.**

Protocol: Select the protocol mode. The default mode is PPPoE.

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

Username: Enter the username provided by your ISP.

Password: Enter the password provided by your ISP.

Service Name: This item is for identification purposes. If it is required, your ISP provides you the information.

Authentication Protocol: Default is **Auto.** Your ISP advises on using **Chap** or **Pap.**

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

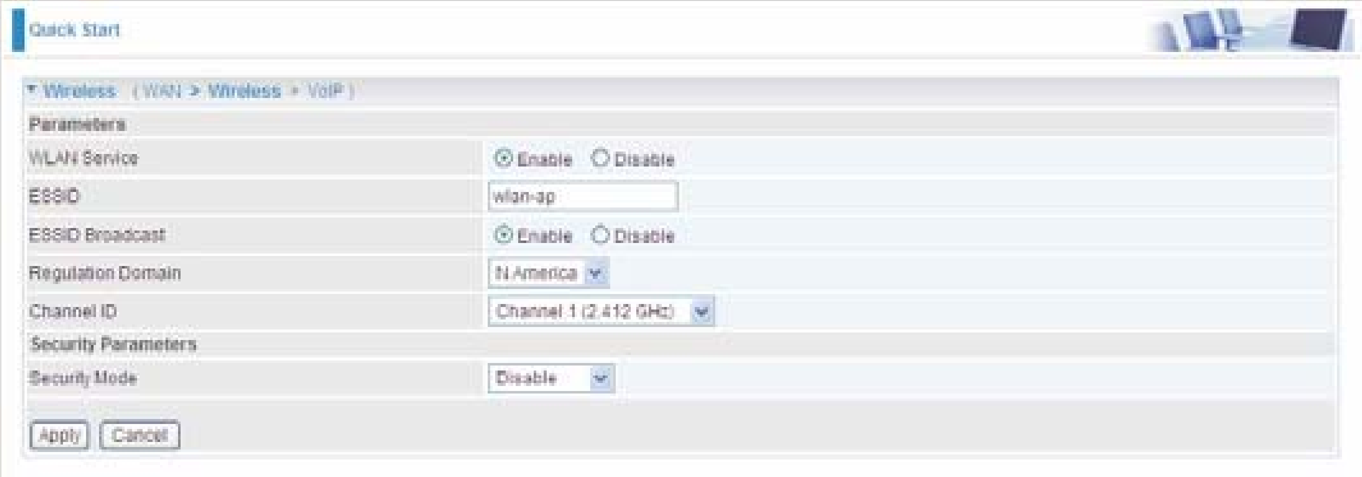
IP Address: Your WAN IP address. Leave this at 0.0.0.0 to obtain automatically an IP address from your ISP.

Obtain DNS: A Domain Name System (DNS) contains a mapping table for domain name and IP addresses. DNS helps to find the IP address for the specific domain name. Check the checkbox to obtain DNS automatically.

Primary DNS: Enter the primary DNS.

Secondary DNS: Enter the secondary DNS

5. Configure the Wireless LAN setting.



Quick Start

▾ Wireless (WAN > Wireless > VoIP)

Parameters	
WLAN Service	● Enable ○ Disable
ESSID	wlan-ap
ESSID Broadcast	● Enable ○ Disable
Regulation Domain	N.America
Channel ID	Channel 1 (2.412 GHz)
Security Parameters	
Security Mode	Disable

WLAN Service: Default setting is set to Enable. If you want to use wireless, both 802.11g and 802.11b device in your network, you can select Enable.

ESSID: The ESSID is the unique name of a wireless access point (AP) to be distinguished from another. For security propose, change to a unique ID name to the AP which is already built-in to the router's wireless interface. It is case sensitive and must not excess 32 characters. Make sure your wireless clients have exactly the ESSID as the device, in order to get connected to your network.

ESSID Broadcast: It is function in which transmits its ESSID to the air so that when wireless client searches for a network, router can then be discovered and recognized. Default setting is **Enable.**

ⓘ **Enable:** When Enable is selected, you can allow anybody with a wireless client to be able to locate the Access Point (AP) of your router.

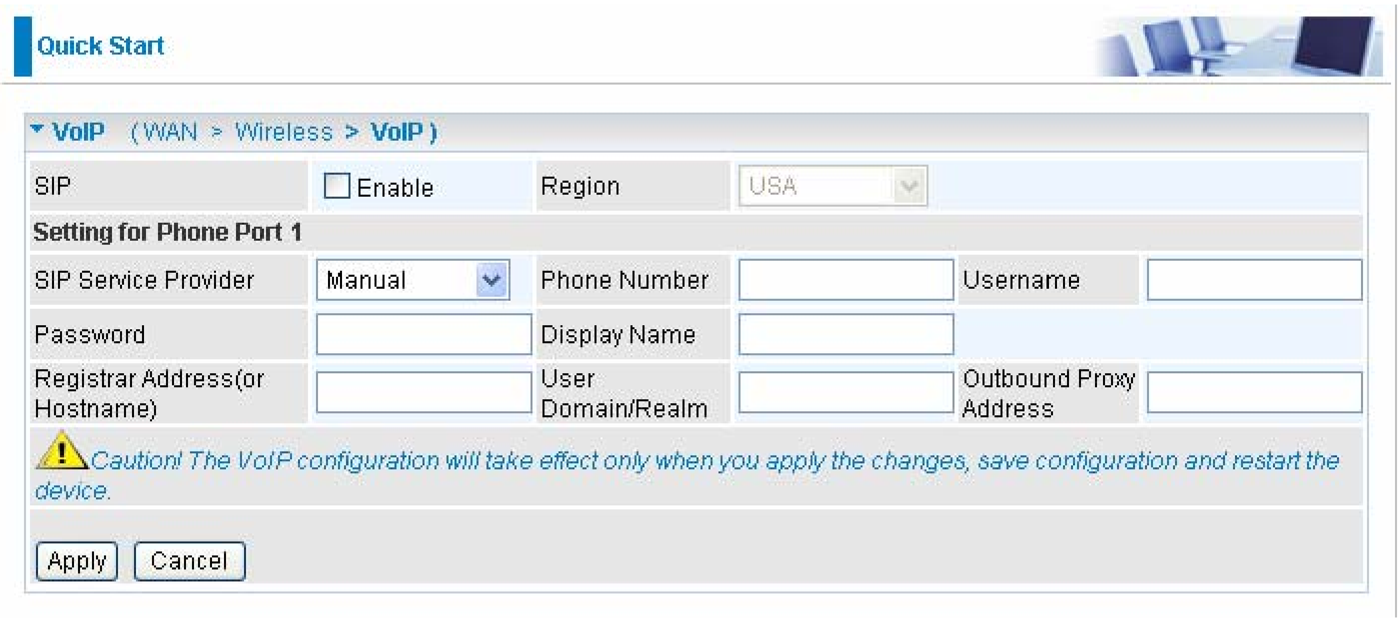
ⓘ **Disable:** Select Disable if you do not want broadcast your ESSID. When select Disable, no one will be able to locate the Access Point (AP) of your router.

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

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

Security Mode: You can disable or enable with WPA or WEP for protecting wireless network. The default mode of wireless security is **Disable**.

6. Set up VoIP.



Quick Start

▾ VoIP (WAN > Wireless > VoIP)

SIP	□ Enable	Region	USA		
Setting for Phone Port 1					
SIP Service Provider	Manual	Phone Number		Username	
Password		Display Name			
Registrar Address(or Hostname)		User Domain/Realm		Outbound Proxy Address	

⚠ *Caution! The VoIP configuration will take effect only when you apply the changes, save configuration and restart the device.*

SIP: To use VoIP SIP as VoIP call signaling protocol. Default is set to ***Disable.***

Region: This selection is a drop-down box, which allows user to select the country for which the VoIP device must work. When a country is selected, the country parameters are automatically loaded.

SIP Service Provider: This section allows you to select the service provider. When the selection is done, respective parameters below are automatically displayed.

Phone Number: This parameter holds the registration ID of the user within the VoIP SIP registrar.

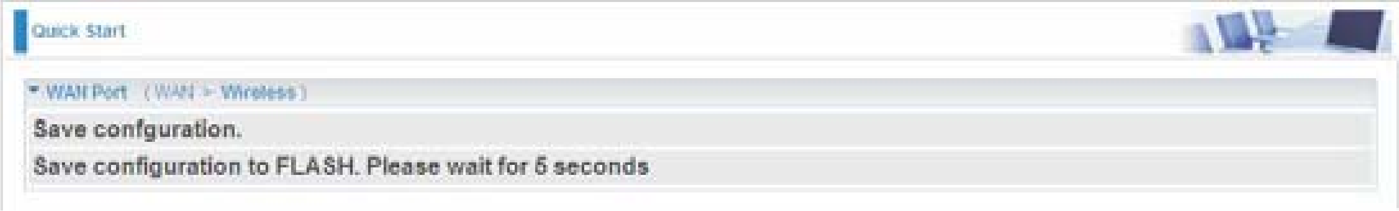
Username: If the username is same as the Phone Number, leave it blank. Otherwise, fill in the space with your username given by your VoIP provider.

Password: This parameter holds the password used for authentication within VoIP SIP registrar.

Display Name: This parameter will be appeared on the Caller ID.

Remark:
For products available in the USA/Canada market, only channel 1~11 can be operated.
Selection of other channels is not possible.

7. Wait for the configuration.

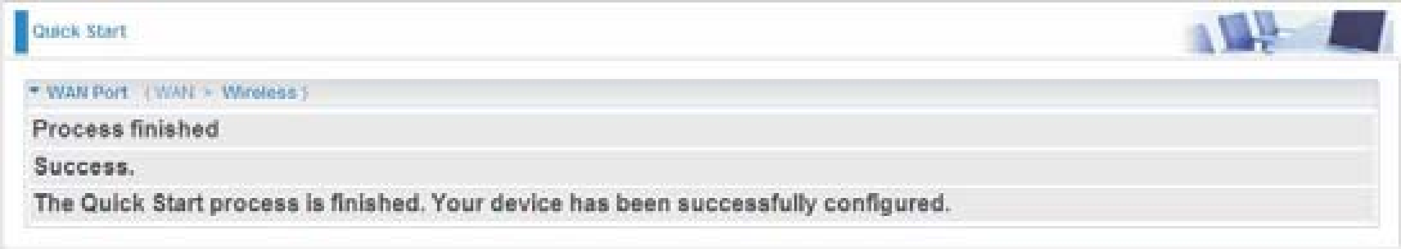


Quick Start

▾ WAN Port (WAN > Wireless)

Save confguration.

Save configuration to FLASH. Please wait for 5 seconds



Quick Start

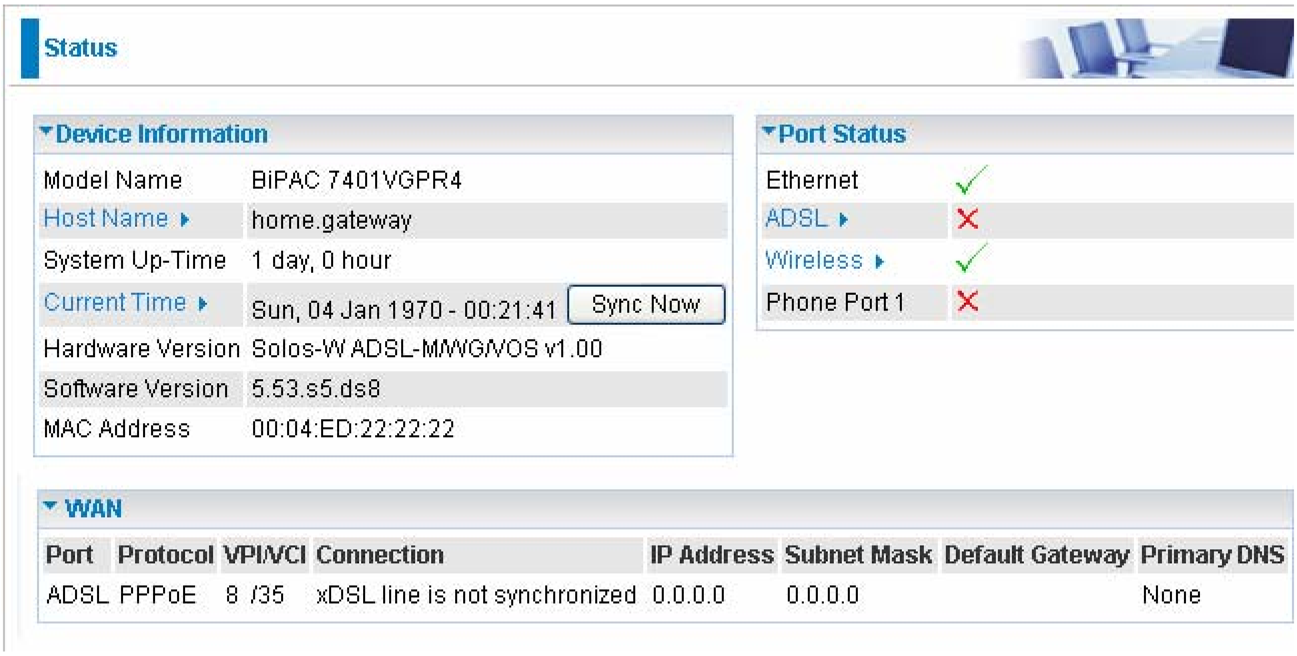
▾ WAN Port (WAN > Wireless)

Process finished

Success.

The Quick Start process is finished. Your device has been successfully configured.

8. When ADSL is synchronic, it will appear "check".



Status

▾Device Information

Model Name	BiPAC 7401VGPR4
Host Name ▸	home.gateway
System Up-Time	1 day, 0 hour
Current Time ▸	Sun, 04 Jan 1970 - 00:21:41 Sync Now
Hardware Version	Solos-W ADSL-M/WG/VOS v1.00
Software Version	5.53.s5.ds8
MAC Address	00:04:ED:22:22:22

▾Port Status

Ethernet	✓
ADSL ▸	✗
Wireless ▸	✓
Phone Port 1	✗

▾ WAN

Port	Protocol	VPI/VCI	Connection	IP Address	Subnet Mask	Default Gateway	Primary DNS
ADSL	PPPoE	8 /35	xDSL line is not synchronized	0.0.0.0	0.0.0.0		None

Configuration

When you click this item, the column will expand to display the sub-items that will allow you to further configure your ADSL router.

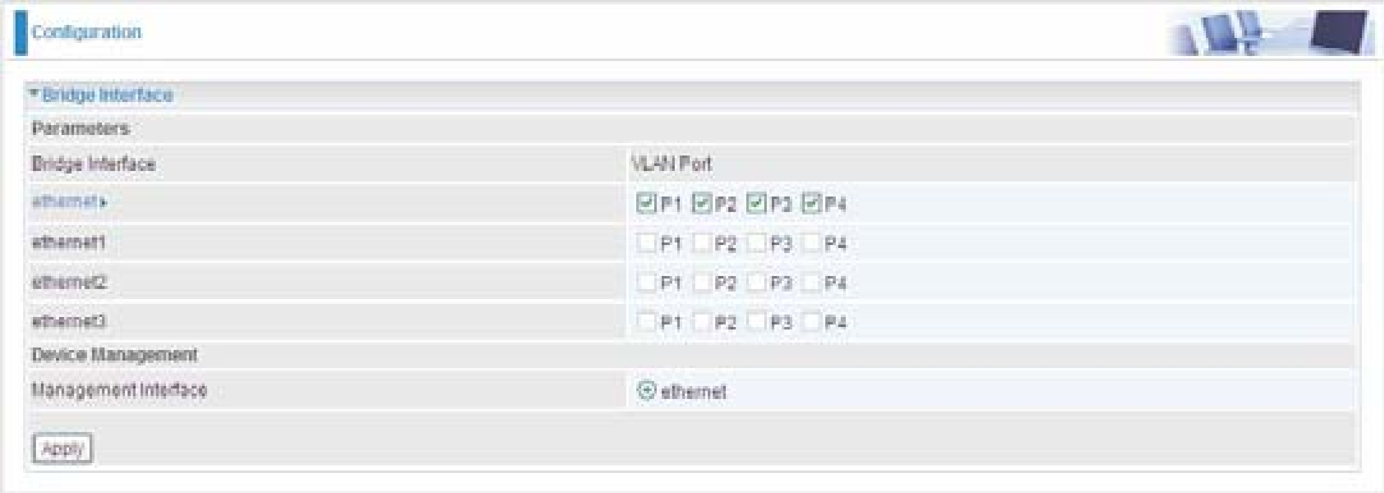
LAN, WAN, System, Firewall, VoIP, QoS, Virtual Server, Wake on LAN, Time Schedule and Advanced

The function of each configuration sub-item is described in the following sections.

LAN - Local Area Network

Here are the items within the LAN section: **Bridge Interface, Ethernet, IP Alias, Ethernet Client Filter, Wireless, Wireless Security, Wireless Client / MAC Address Filter, WPS, Port Setting** and **DHCP Server.**

Bridge Interface



Configuration

▾Bridge Interface

Parameters

Bridge Interface	VLAN Port
ethernet	☑ P1 ☑ P2 ☑ P3 ☑ P4
ethernet1	□ P1 □ P2 □ P3 □ P4
ethernet2	□ P1 □ P2 □ P3 □ P4
ethernet3	□ P1 □ P2 □ P3 □ P4

Device Management

Management Interface	● ethernet

You can setup member ports for each VLAN group under Bridge Interface section. From the example, two VLAN groups need to be created.

Ethernet: P1 (Port 1)

Ethernet1: P2, P3 and P4 (Port 2, 3, 4). Uncheck P2, P3, P4 from Ethernet VLAN port first.

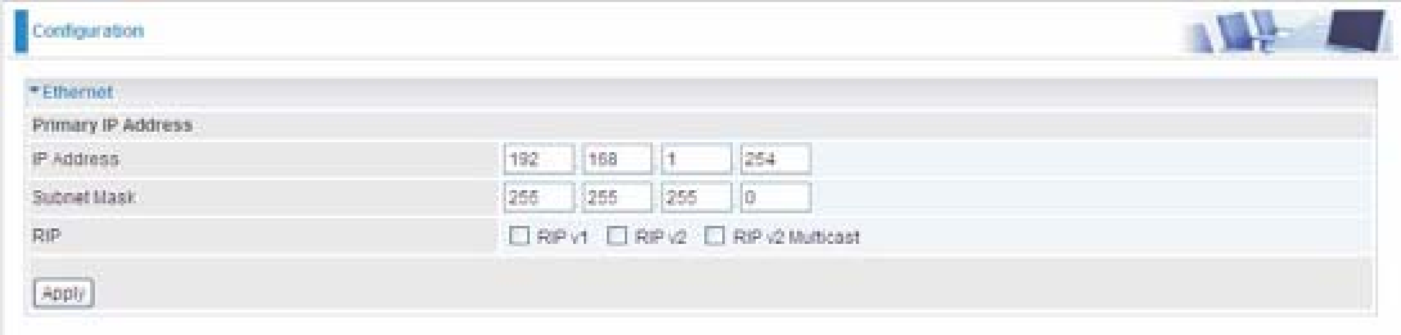
Note: You should setup each VLAN group with caution. Each Bridge Interface is arranged in this order.

Bridge Interface	VLAN Port (Always starts with)
ethernet	P1 / P2 / P3 / P4
ethernet1	P2 / P3 / P4
ethernet2	P3 / P4
ethernet3	P4

Management Interface: To specify which VLAN group has possibility to do device management, like doing web management.

Note: NAT/NAPT can be applied to management interface only.

Ethernet



Configuration

▾Ethernet

Primary IP Address

IP Address	192	168	1	254
Subnet Mask	255	255	255	0
RIP	□ RIP v1	□ RIP v2	□ RIP v2 Multicast	

Primary IP Address

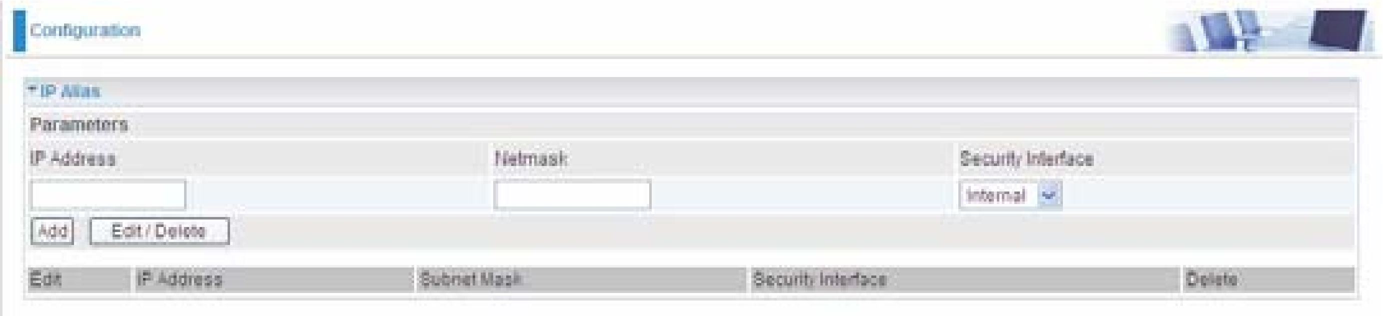
IP Address: The default IP on this router.

Subnet Mask: The default subnet mask on this router.

RIP: RIP v1, RIP v2, and RIP v2 Multicast. Check to enable RIP function.

IP Alias

This function creates multiple virtual IP interfaces on this router. It helps to connect two or more local networks to the ISP or remote node. In this case, an internal router is not required.



Configuration

▾IP Alias

Parameters

IP Address	Netmask	Security Interface
		Internal

Edit	IP Address	Subnet Mask	Security Interface	Delete

IP Address: Specify an IP address on this virtual interface.

SubNetmask: Specify a subnet mask on this virtual interface.

Security Interface: Specify the firewall setting on this virtual interface.

Internal: The network is behind NAT. All traffic will do network address translation when sending out to Internet if NAT is enabled.

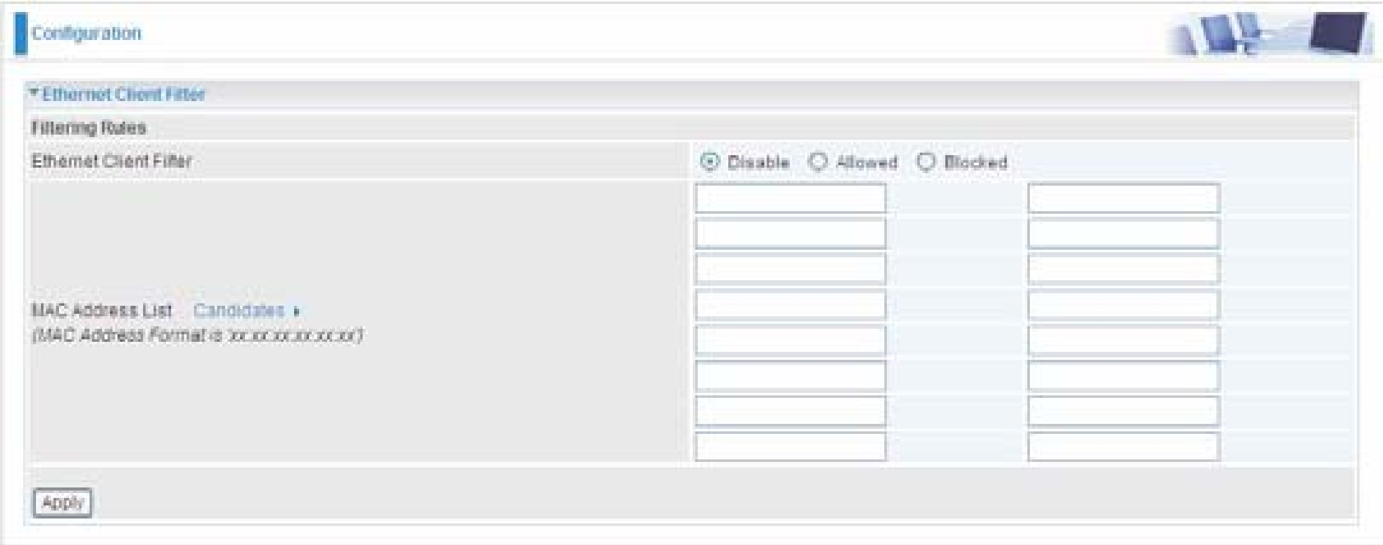
External: There is no NAT on this IP interface and connected to the Internet directly. Mostly it will be used when providing multiple public IP addresses by ISP. In this case, you can use public IP address in local network which gateway IP address point to the IP address on this interface.

DMZ: Specify this network to DMZ area. There is no NAT on this interface.

Ethernet Client Filter

The Ethernet Client Filter supports up to 16 Ethernet network machines that helps you to manage your network control to accept traffic from specific authorized machines or can restrict unwanted machine(s) to access your LAN.

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



Configuration

▾Ethernet Client Filter

Filtering Rules

Ethernet Client Filter ● Disable ○ Allowed ○ Blocked

MAC Address List Candidates ▸
(MAC Address Format is xx:xx:xx:xx:xx:xx)

Apply

Ethernet Client Filter: Default setting is set **Disable**.

ⓘ **Allowed:** check to authorize specific device accessing your LAN by insert the MAC Address in the space provided or click the Candidate button. Make sure your PC's MAC is listed.

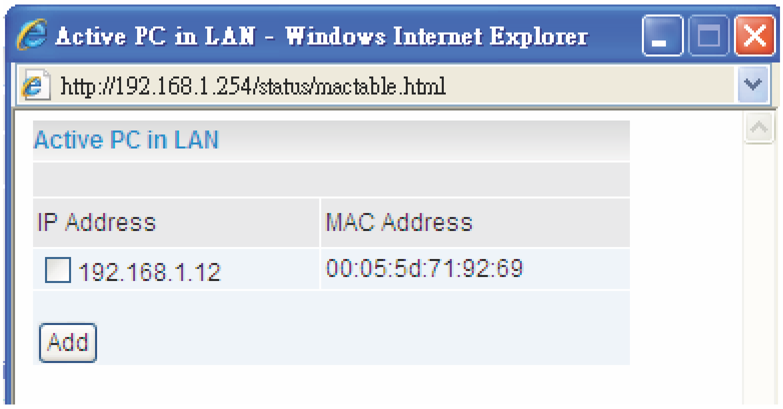
ⓘ **Blocked:** check to prevent unwanted device accessing your LAN by insert the MAC Address in the space provided or click the Candidate button. Make sure your PC's MAC is not listed.

The maximum client is 16. The MAC addresses are 6 bytes long; they are presented only in hexadecimal characters. The number 0 - 9 and letters a - f are acceptable.

Note: Follow the MAC Address Format xx:xx:xx:xx:xx:xx. Semicolon (:) must be included.

Candidates: automatically detects devices connected to the router through the Ethernet. .

Click the Candidate button to access the **Active PC in LAN** window.



Active PC in LAN - Windows Internet Explorer

http://192.168.1.254/status/mactable.html

Active PC in LAN

IP Address	MAC Address
□ 192.168.1.12	00:05:5d:71:92:69

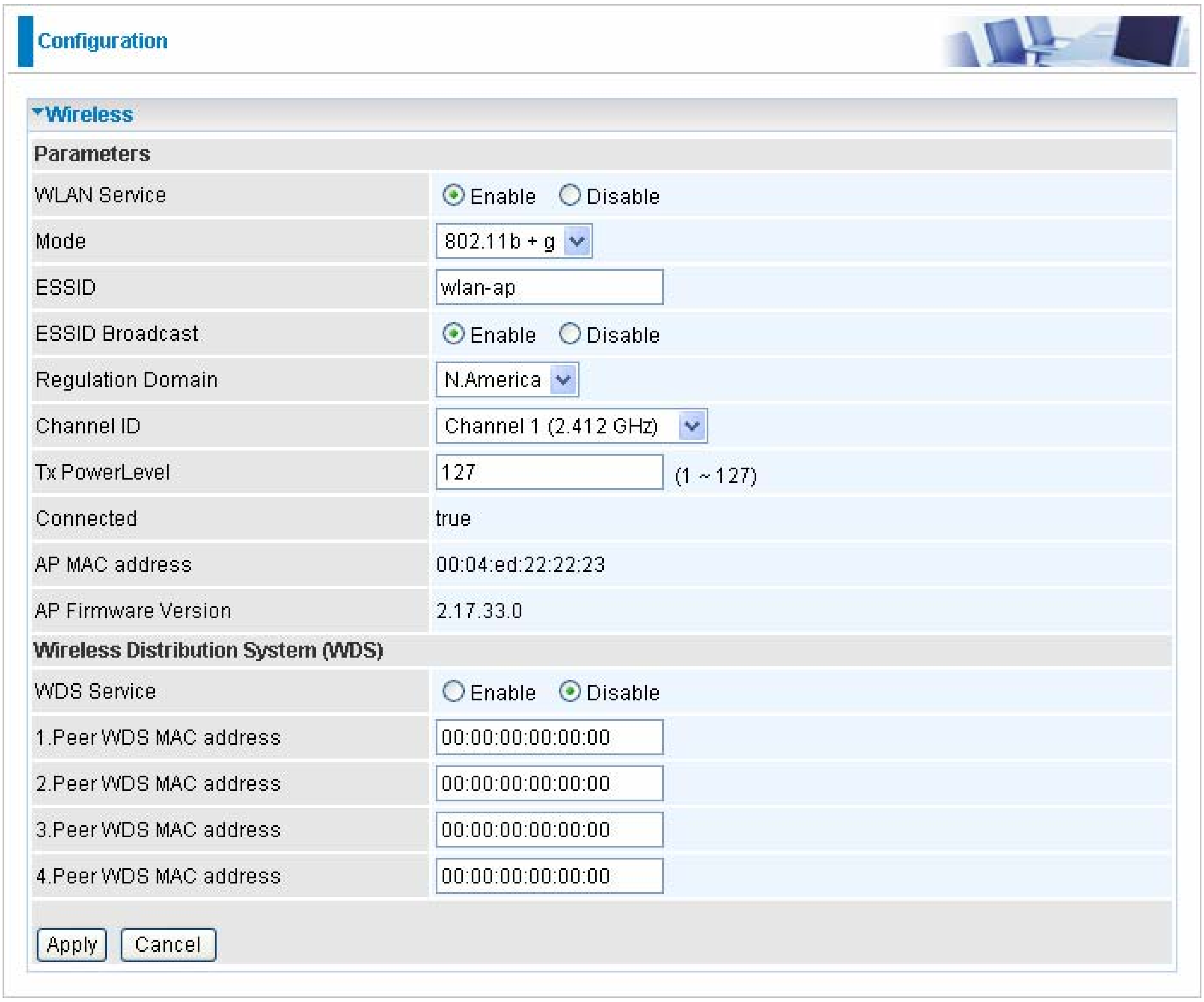
Add

Active PC in LAN: Active PC in LAN displays a list of individual Ethernet device's IP Address &

MAC Address which connecting to the router.

You can easily by checking the box next to the IP address to be blocked or allowed. Then, Add to insert to the Ethernet Client Filter table. The maximum Ethernet client is 16.

Wireless



Parameters	
WLAN Service	● Enable ○ Disable
Mode	802.11b + g
ESSID	wlan-ap
ESSID Broadcast	● Enable ○ Disable
Regulation Domain	N.America
Channel ID	Channel 1 (2.412 GHz)
Tx PowerLevel	127 (1 ~ 127)
Connected	true
AP MAC address	00:04:ed:22:22:23
AP Firmware Version	2.17.33.0
Wireless Distribution System (WDS)	
WDS Service	○ Enable ● Disable
1.Peer WDS MAC address	00:00:00:00:00:00
2.Peer WDS MAC address	00:00:00:00:00:00
3.Peer WDS MAC address	00:00:00:00:00:00
4.Peer WDS MAC address	00:00:00:00:00:00

Parameters

WLAN Service: Default setting is set to Enable. If you do not have any wireless, both 802.11g and 802.11b, device in your network, select Disable.

Mode: The default setting is 802.11b+g (Mixed mode). If you do not know or have both 11g and 11b devices in your network, then keep the default in mixed mode. From the drop-down manual, you can select 802.11g if you have only 11g card. If you have only 11b card, then select 802.11b.

ESSID: The ESSID is the unique name of a wireless access point (AP) to be distinguished from another. For security purpose, change the default wlan-ap to a unique ID name to the AP already built-in to the router's wireless interface. It is case sensitive and must not excess 32 characters. Make sure your wireless clients have exactly the ESSID as the device, in order to get connected to your network.

Note: It is case sensitive and must not excess 32 characters.

ESSID Broadcast: It is function in which transmits its ESSID to the air so that when wireless client searches for a network, router can then be discovered and recognized. Default setting is **Enabled.**

ⓘ **Disable:** If you do not want broadcast your ESSID. Any client uses "any" wireless setting cannot discover the Access Point (AP) of your router.

ⓘ **Enable:** Any client that using the “any” setting can discover the Access Point (AP).

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

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

Note: Wireless performance may degrade if select ID channel is already being occupied by other AP(s).

TX PowerLevel: It is a function that enhances the wireless transmitting signal strength. User may adjust this power level from minimum 1 up to maximum 127.

Note: The Power Level maybe different in each access network user premises environment and choose the most suitable level for your network.

Connected: Representing in **true** or **false**. That it is the connection status between the system and the build-in wireless card.

AP MAC Address: It is a unique hardware address of the Access Point.

AP Firmware Version: The Access Point firmware version.

Wireless Distribution System (WDS)

It is a wireless access point mode that enables wireless link and communication with other access point. It is easy to be installed simply to define peer’s MAC address of the connected AP. WDS takes advantages of cost saving and flexibility which no extra wireless client device is required to bridge between two access points and extending an existing wired or wireless infrastructure network to create a larger network. It can connect up to 4 wireless APs for extending cover range at the same time.

In addition, WDS enhances its link connection security in WEP mode, WEP key encryption must be the same for both access points.

WDS Service: The default setting is **Disable.** Check **Enable** radio button to activate this function.

1. **Peer WDS MAC Address:** It is the associated AP’s MAC Address. It is important that your peer’s AP must include your MAC address in order to acknowledge and communicate with each other.

2. **Peer WDS MAC Address:** It is the second associated AP’s MAC Address.

3. **Peer WDS MAC Address:** It is the third associated AP’s MAC Address.

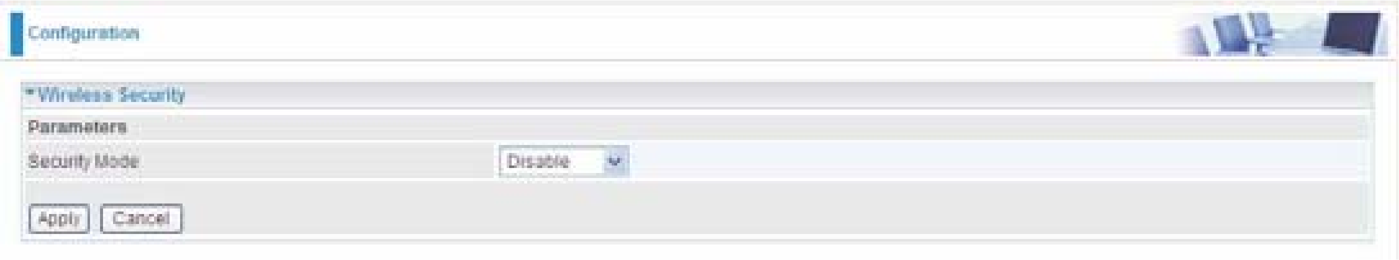
4. **Peer WDS MAC Address:** It is the fourth associated AP’s MAC Address.

Note: For MAC Address, Semicolon (:) must be included.

Wireless Security

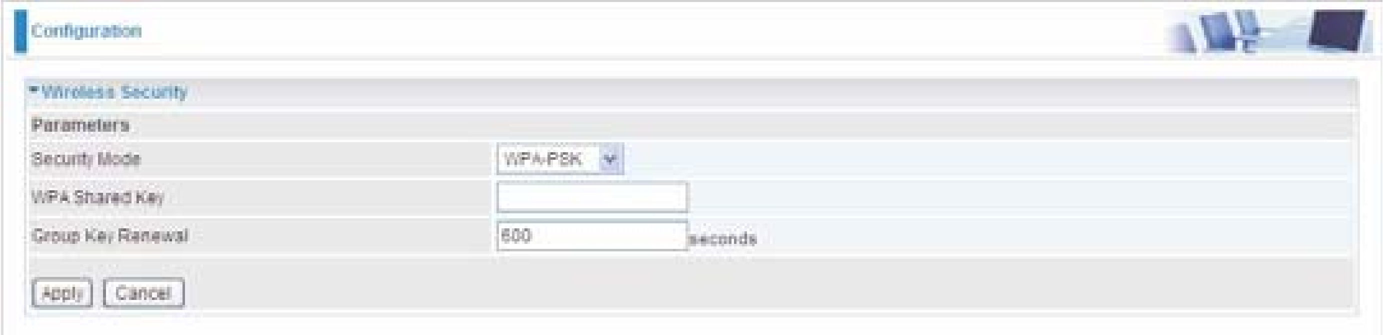
You can disable or enable with WPA or WEP for protecting wireless network.

The default mode of wireless security is disabled.



Security Mode: Disable

WPA-PSK / WPA2-PSK / WEP



Configuration

▾Wireless Security

Parameters	
Security Mode	WPA-PSK
WPA Shared Key	
Group Key Renewal	600 seconds

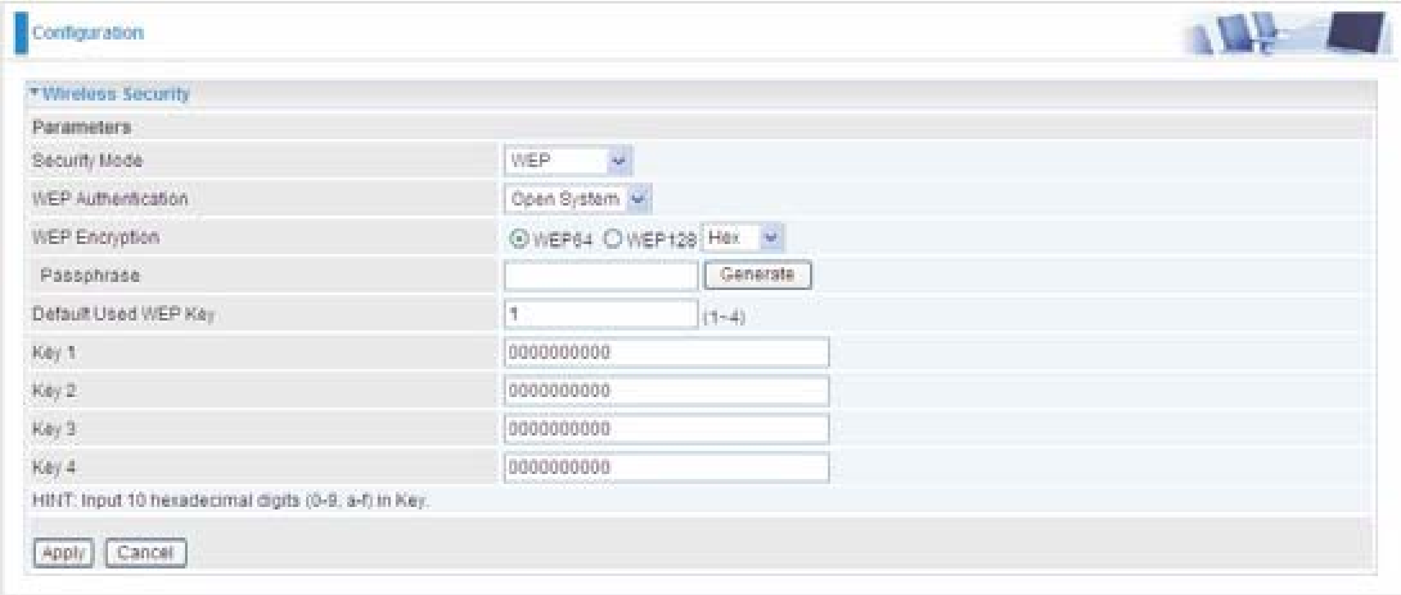
Security Mode: You can disable or enable with WPA or WEP for protecting wireless network. The default mode of wireless security is **Disable**.

WPA Algorithms: There are two types of the WPA-PSK, WPA-PSK and WPA2-PSK. The WPA-PSK adapts the TKIP (Temporal Key Integrity Protocol) encrypted algorithms, which incorporates Message Integrity Code (MIC) to provide protection against hackers. The WPA2-PSK adapts CCMP (Cipher Block Chaining Message Authentication Code Protocol) of the AES (Advanced Encryption Security) algorithms.

WPA Shared Key: The key for network authentication. The input format is in character style and key size should be in the range between 8 and 63 characters.

Group Key Renewal: The period of renewal time for changing the security key automatically between wireless client and Access Point (AP). Default value is **600** seconds.

WEP



Configuration

▾Wireless Security

Parameters	
Security Mode	WEP
WEP Authentication	Open System
WEP Encryption	● WEP64 ○ WEP128 Hex
Passphrase	Generate
Default Used WEP Key	1 (1~4)
Key 1	0000000000
Key 2	0000000000
Key 3	0000000000
Key 4	0000000000

HINT: Input 10 hexadecimal digits (0-9, a-f) in Key.

WEP Authentication: To prevent unauthorized wireless stations from accessing data transmitted over the network, the router offers secure data encryption, known as WEP. If you require high security for transmissions, there are two options to select from: **Open System, Share key**.

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 will offer 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.

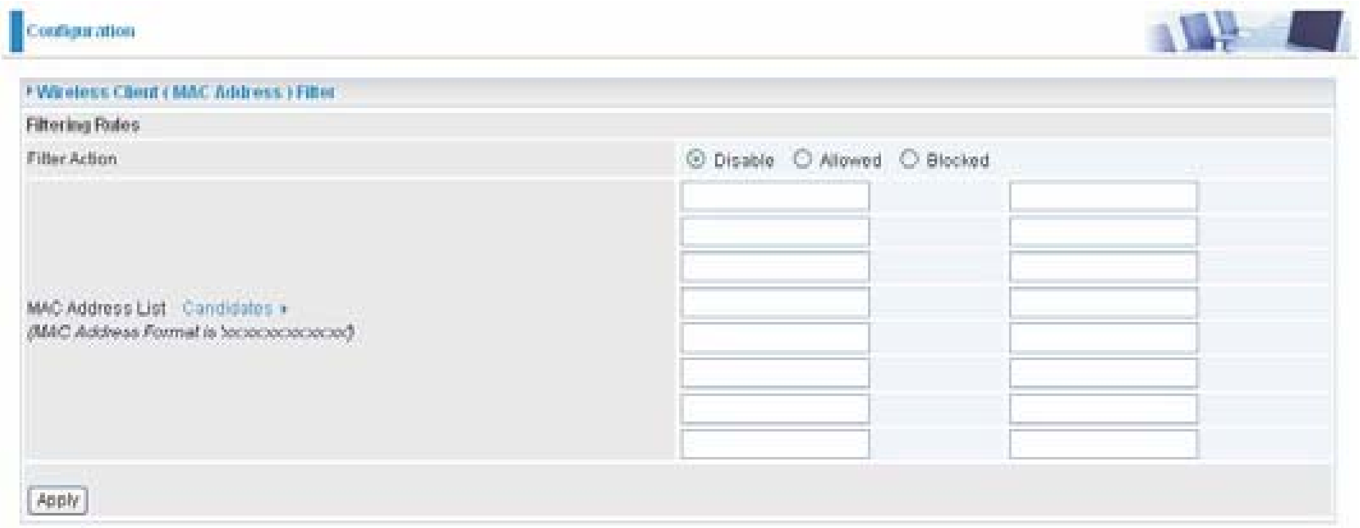
Default Used WEP Key: Select the encryption key ID; please refer to **Key (1~4)** below.

Key (1-4): 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 in HEX style, 10 and 26 HEX codes are required for WEP64 and WEP128 respectively.

Wireless Client / MAC Address Filter

The MAC Address supports up to 16 wireless network machines and helps you manage your network control to accept traffic from specific authorized machines or to restrict unwanted machine(s) to access your LAN.

There are no pre-define MAC Address filter rules; you can add the filter rules to meet your requirements.



Wireless Client (MAC Address) Filter

Filtering Rules

Filter Action ◉ Disable ○ Allowed ○ Blocked

MAC Address List Candidates
(MAC Address Format is 'xx:xx:xx:xx:xx:xx')

Wireless Client Filter: Default setting is set to **Disable**.

ⓘ **Allowed:** To authorize specific device accessing your LAN by insert the MAC Address in the space provided or click the Candidate button. Make sure your PC's MAC is listed.

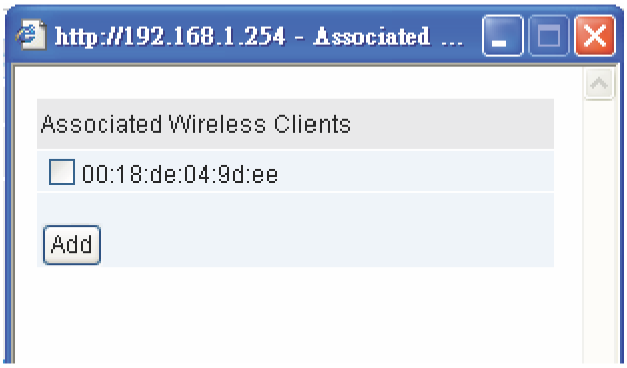
ⓘ **Blocked:** To prevent unwanted device accessing the LAN by insert the MAC Address in the space provided or click the Candidate button. Make sure your PC's MAC is not listed.

The maximum client is 16. The MAC addresses are 6 bytes long; they are presented only in hexadecimal characters. The number **0 - 9** and letters **a - f** are acceptable.

Note: Follow the MAC Address Format xx:xx:xx:xx:xx:xx. Semicolon (:) must be included.

Candidates: It automatically detects devices connected to the router through the Wireless feature.

Click the Candidate button to access the **Associated Wireless Client** window.



Associated Wireless Clients

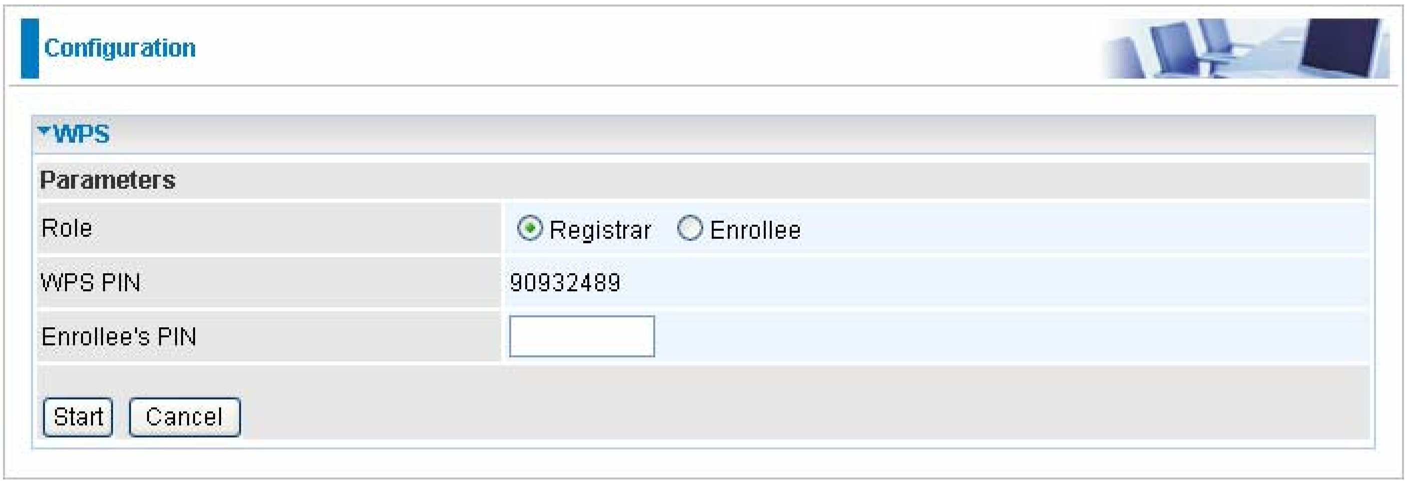
□ 00:18:de:04:9d:ee

Associate Wireless Client: Displays a list of individual wireless device's MAC Address that currently connects to the router.

You can easily by checking the box next to the MAC address to be blocked or allowed. Then, Add to insert to the Wireless Client (MAC Address) Filter table. The maximum Wireless client is 16.

WPS

WPS feature is follow Wi-Fi Alliance WPS standard and it easily set up security-enabled Wi- Fi networks in the home and small office environment. It is reduced by half the user steps to configure a network and supports two methods that are familiar to most consumers to configure a network and enable security.



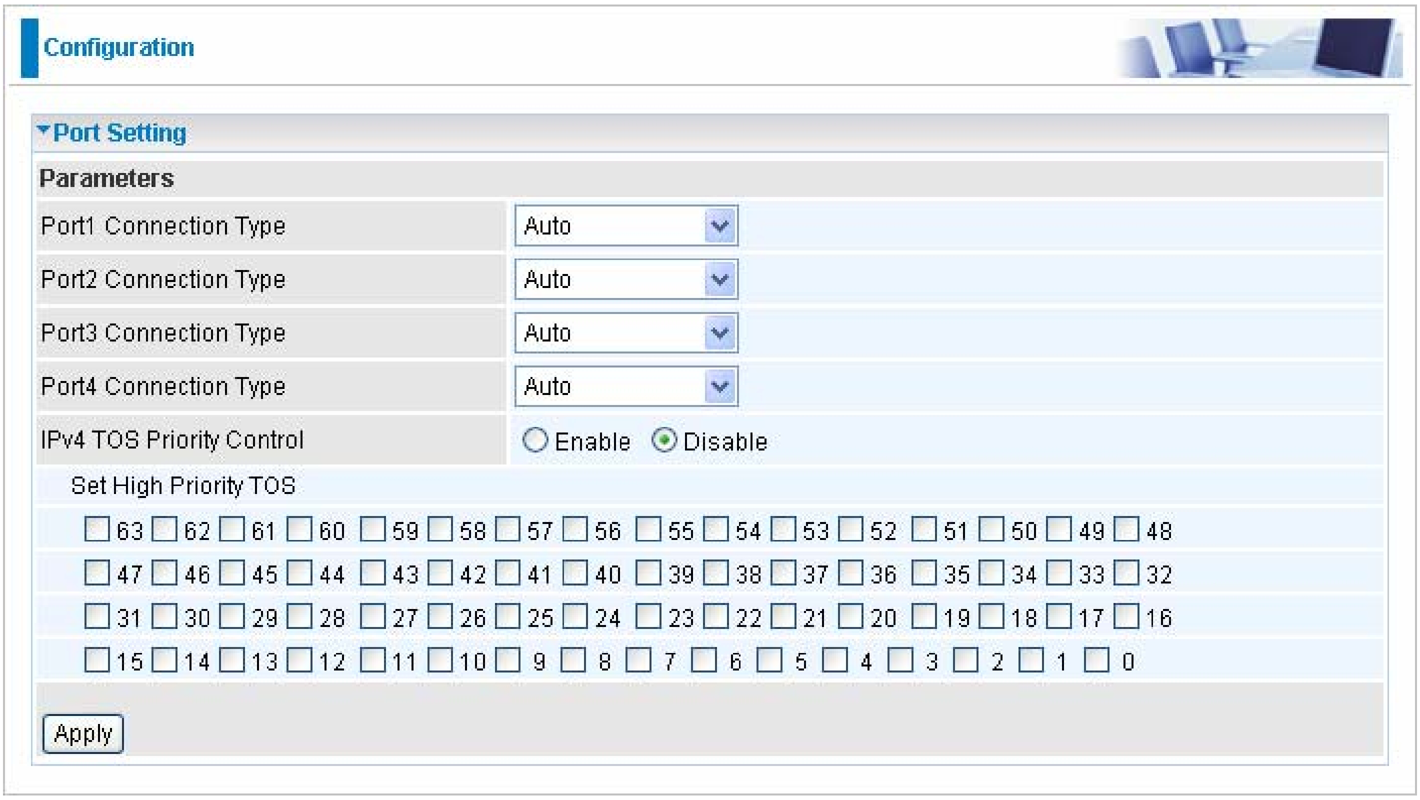
Configuration

▾WPS

Parameters	
Role	● Registrar ○ Enrollee
WPS PIN	90932489
Enrollee's PIN	

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.



Parameters	
Port1 Connection Type	Auto
Port2 Connection Type	Auto
Port3 Connection Type	Auto
Port4 Connection Type	Auto
IPv4 TOS Priority Control	○ Enable ● Disable

Set High Priority TOS

□ 63 □ 62 □ 61 □ 60 □ 59 □ 58 □ 57 □ 56 □ 55 □ 54 □ 53 □ 52 □ 51 □ 50 □ 49 □ 48
□ 47 □ 46 □ 45 □ 44 □ 43 □ 42 □ 41 □ 40 □ 39 □ 38 □ 37 □ 36 □ 35 □ 34 □ 33 □ 32
□ 31 □ 30 □ 29 □ 28 □ 27 □ 26 □ 25 □ 24 □ 23 □ 22 □ 21 □ 20 □ 19 □ 18 □ 17 □ 16
□ 15 □ 14 □ 13 □ 12 □ 11 □ 10 □ 9 □ 8 □ 7 □ 6 □ 5 □ 4 □ 3 □ 2 □ 1 □ 0

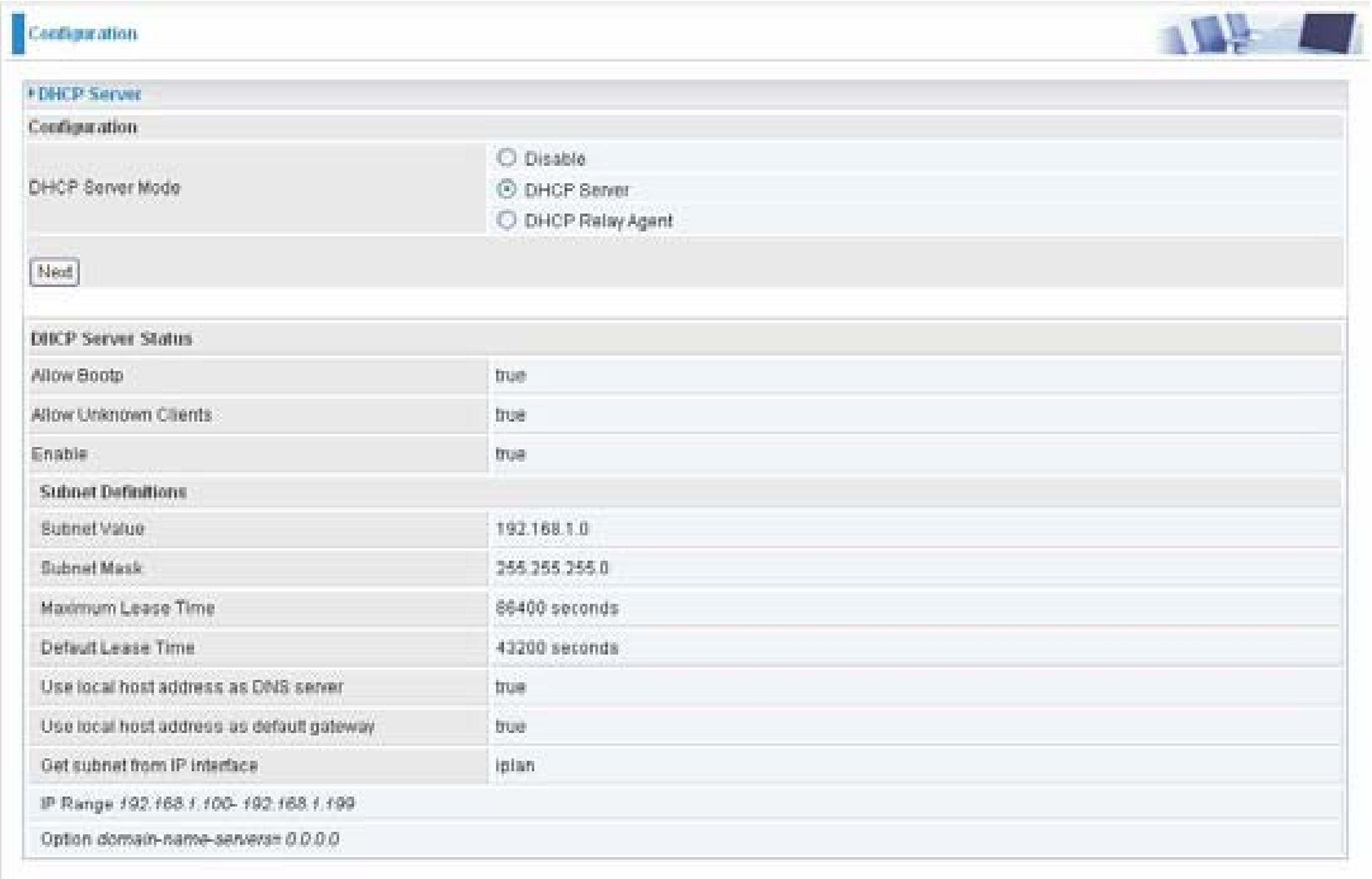
Port # Connection Type: There are Six options to choose from: Auto, disable, 10M half-duplex, 10M full-duplex, 100M half-duplex, 100M full-duplex and Disable. Sometimes, there are Ethernet compatibility problems with legacy Ethernet devices, and you can configure different types to solve compatibility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

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.



Configuration

DHCP Server

Configuration

DHCP Server Mode: ○ Disable ● DHCP Server ○ DHCP Relay Agent

DHCP Server Status	
Allow Bootp	true
Allow Unknown Clients	true
Enable	true
Subnet Definitions	
Subnet Value	192.168.1.0
Subnet Mask	255.255.255.0
Maximum Lease Time	86400 seconds
Default Lease Time	43200 seconds
Use local host address as DNS server	true
Use local host address as default gateway	true
Get subnet from IP interface	iplan

IP Range *192.168.1.100- 192.168.1.199*

Option *domain-name-servers= 0.0.0.0*

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 PCs on your network, and set the default gateway for each PCs 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.

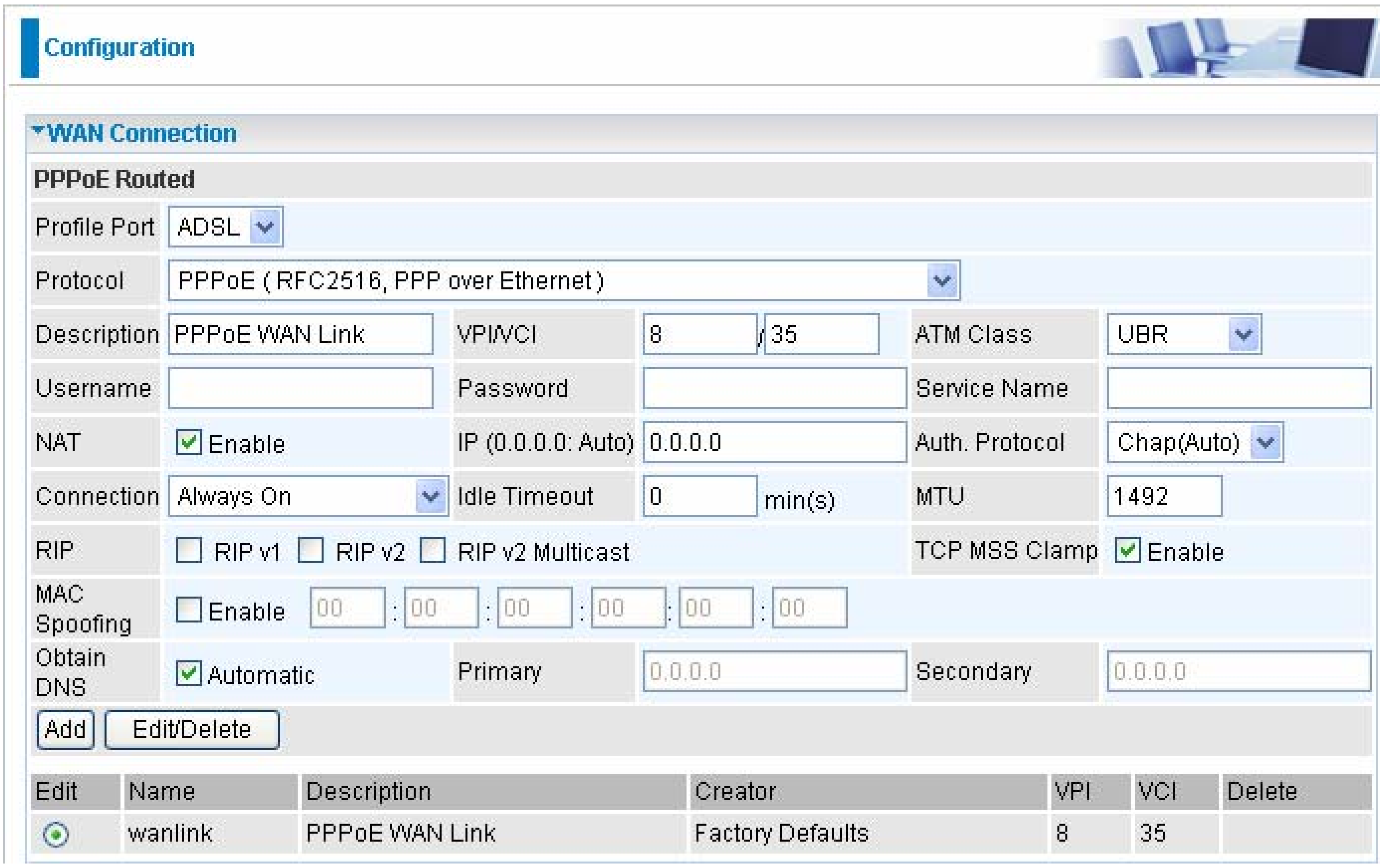
WAN - Wide Area Network

WAN refers to your Wide Area Network connection, i.e. your router's connection to your ISP and the Internet. Here are the items within the WAN section: **WAN Profile** and **ADSL Mode.**

WAN Profile

PPPoE Connection

PPPoE (PPP over Ethernet) provides access control in a manner which is similar to dial-up services using PPP.



PPPoE Routed

Profile Port	ADSL				
Protocol	PPPoE (RFC2516, PPP over Ethernet)				
Description	PPPoE WAN Link	VPI/VCI	8 / 35	ATM Class	UBR
Username		Password		Service Name	
NAT	☑ Enable	IP (0.0.0.0: Auto)	0.0.0.0	Auth. Protocol	Chap(Auto)
Connection	Always On	Idle Timeout	0 min(s)	MTU	1492
RIP	□ RIP v1 □ RIP v2 □ RIP v2 Multicast			TCP MSS Clamp	☑ Enable
MAC Spoofing	□ Enable	00 : 00 : 00 : 00 : 00 : 00			
Obtain DNS	☑ Automatic	Primary	0.0.0.0	Secondary	0.0.0.0

Edit	Name	Description	Creator	VPI	VCI	Delete
●	wanlink	PPPoE WAN Link	Factory Defaults	8	35	

Profile Port: Select the profile port as ADSL.

Protocol: The ATM protocol will be used in the device.

Description: A given name for the connection.

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

ATM Class: The Quality of Service for ATM layer.

Username: Enter the username provided by your ISP. You can input up to 128 alphanumeric characters (case sensitive). This is 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 provides you the information. Maximum input is 15 alphanumeric characters.

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.

IP (0.0.0.0:Auto): Your WAN IP address. Leave this at 0.0.0.0 to obtain automatically an IP address from your ISP.

Auth. Protocol: Default is Auto. Your ISP should advise you on whether to use Chap or Pap.

Connection:

ⓘ 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 on 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).

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

ⓘ **Detail:** You can define the destination port and packet type (TCP/UDP) without checking by timer. It allows you to set which outgoing traffic will not trigger and reset the idle timer.

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

RIP: RIP v1, RIP v2, and RIP v2 Multicast. Check to enable RIP function.

TCP MSS Clamp: This option helps to discover the optimal MTU size automatically. Default is enabled.

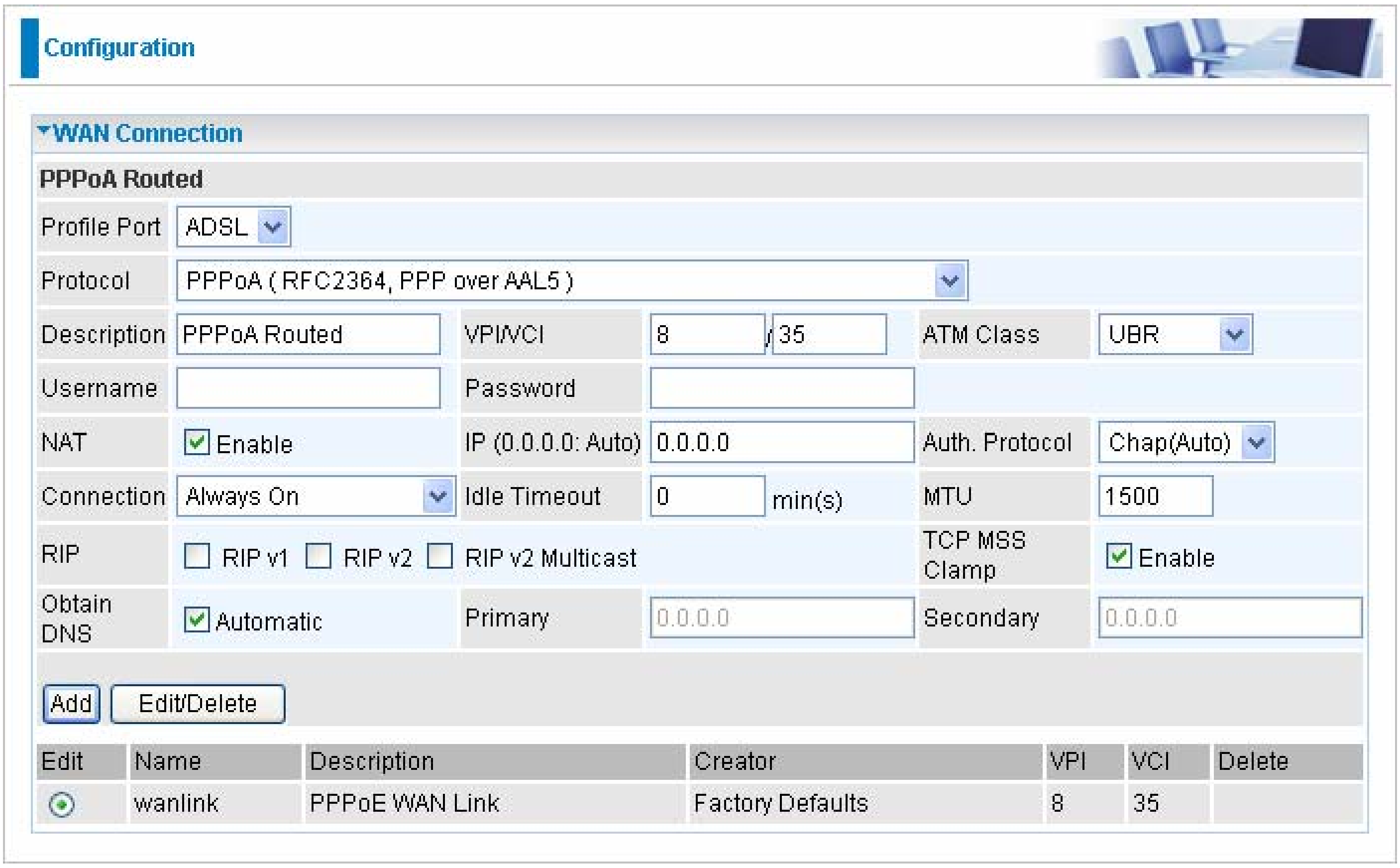
MAC Spoofing: Some service providers require the configuring of this option. You must fill in the MAC address that specify by service provider when it is required. Default is disabled.

Obtain DNS: A Domain Name System (DNS) contains a mapping table for domain name and IP addresses. DNS helps to find the IP address for the specific domain name. Check the checkbox to obtain DNS automatically.

Primary DNS: Enter the primary DNS.

Secondary DNS: Enter the secondary DNS

PPPoA Connection



Configuration

WAN Connection

PPPoA Routed

Profile Port	ADSL				
Protocol	PPPoA (RFC2364, PPP over AAL5)				
Description	PPPoA Routed	VPI/VCI	8 / 35	ATM Class	UBR
Username		Password			
NAT	☑ Enable	IP (0.0.0.0: Auto)	0.0.0.0	Auth. Protocol	Chap(Auto)
Connection	Always On	Idle Timeout	0 min(s)	MTU	1500
RIP	□ RIP v1 □ RIP v2 □ RIP v2 Multicast			TCP MSS Clamp	☑ Enable
Obtain DNS	☑ Automatic	Primary	0.0.0.0	Secondary	0.0.0.0

Add | Edit/Delete

Edit	Name	Description	Creator	VPI	VCI	Delete
●	wanlink	PPPoE WAN Link	Factory Defaults	8	35	

Profile Port: Select the profile port as ADSL.

Protocol: The ATM protocol will be used in the device.

Description: A given name for the connection.

VPI/VCI: Enter the information provided by your

ISP.

ATM Class: The Quality of Service for ATM layer.

Username: Enter the username provided by your ISP. You can input up to 128 alphanumeric characters (case sensitive). This is 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).

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.

IP (0.0.0.0:Auto): Your WAN IP address. Leave this at 0.0.0.0 to obtain automatically an IP address from your ISP.

Auth. Protocol: Default is Auto. Your ISP should advise you on whether to use Chap or Pap.

Connection:

- **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 on 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).

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

Detail: You can define the destination port and packet type (TCP/UDP) without checking by timer. It allows you to set which outgoing traffic will not trigger and reset the idle timer.

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

RIP: RIP v1, RIP v2, and RIP v2 Multicast. Check to enable RIP function.

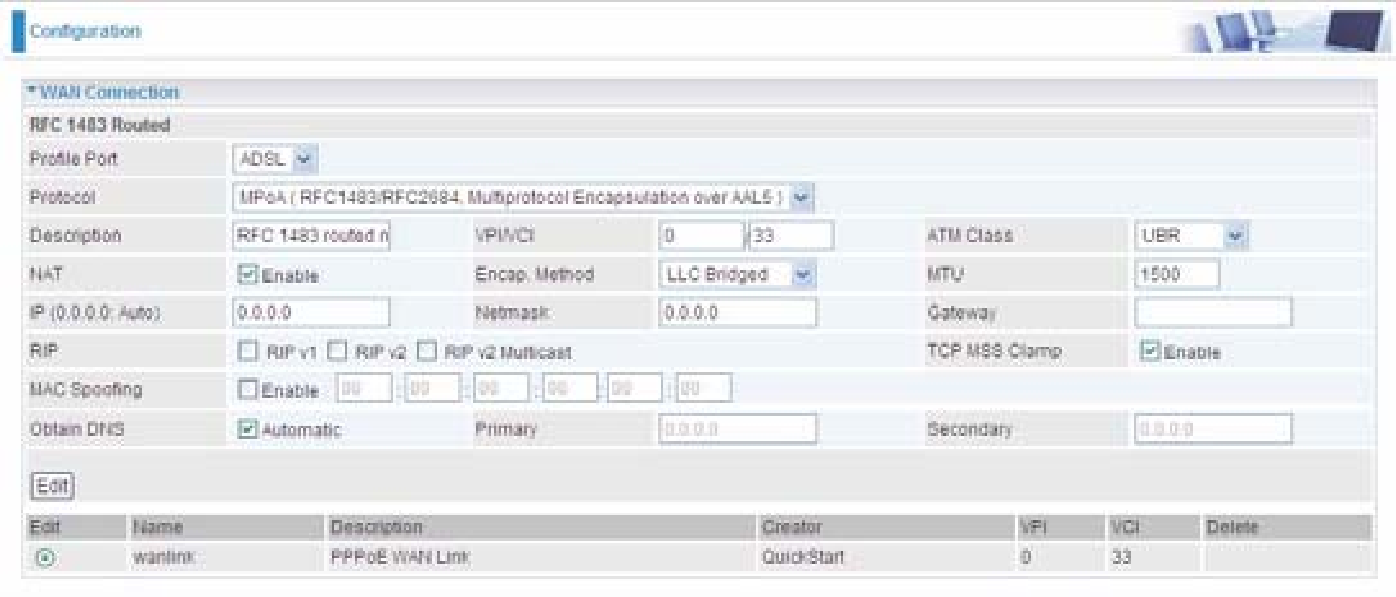
TCP MSS Clamp: This option helps to discover the optimal MTU size automatically. Default is enabled.

Obtain DNS: A Domain Name System (DNS) contains a mapping table for domain name and IP addresses. DNS helps to find the IP address for the specific domain name. Check the checkbox to obtain DNS automatically.

Primary DNS: Enter the primary DNS.

Secondary DNS: Enter the secondary DNS.

MPoA Connection



Configuration

▾WAN Connection

RFC 1483 Routed

Profile Port	ADSL				
Protocol	MPoA (RFC1483/RFC2684, Multiprotocol Encapsulation over AAL5)				
Description	RFC 1483 routed n	VPI/VCI	0 / 33	ATM Class	UBR
NAT	☑ Enable	Encap. Method	LLC Bridged	MTU	1500
IP (0.0.0.0: Auto)	0.0.0.0	Netmask	0.0.0.0	Gateway	
RIP	□ RIP v1 □ RIP v2 □ RIP v2 Multicast			TCP MSS Clamp	☑ Enable
MAC Spoofing	□ Enable 00 : 00 : 00 : 00 : 00 : 00				
Obtain DNS	☑ Automatic	Primary	0.0.0.0	Secondary	0.0.0.0

Edit

Edit	Name	Description	Creator	VPI	VCI	Delete
⦿	wanlink	PPPoE WAN Link	QuickStart	0	33	

Profile Port: Select the profile port as ADSL.

Protocol: The ATM protocol will be used in the device.

Description: A given name for the connection.

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

ATM Class: The Quality of Service for ATM layer.

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.

Encap. mode: Choose whether you want the packets in WAN interface as bridged packet or routed packet.

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

IP (0.0.0.0:Auto): Specify an IP address allowed to logon and access the router's web server.

Note: IP 0.0.0.0 indicates all users who are connected to this router are allowed to logon the device and modify data.

Netmask: The default is 255.255.255.0. User can change it to other such as 255.255.255.128. Type the subnet mask assigned to you by your ISP (if given).

Gateway: Enter the IP address of the default gateway (if given).

RIP: RIP v1, RIP v2, and RIP v2 Multicast. Check to enable RIP function.

TCP MSS Clamp: This option helps to discover the optimal MTU size automatically. Default is enabled.

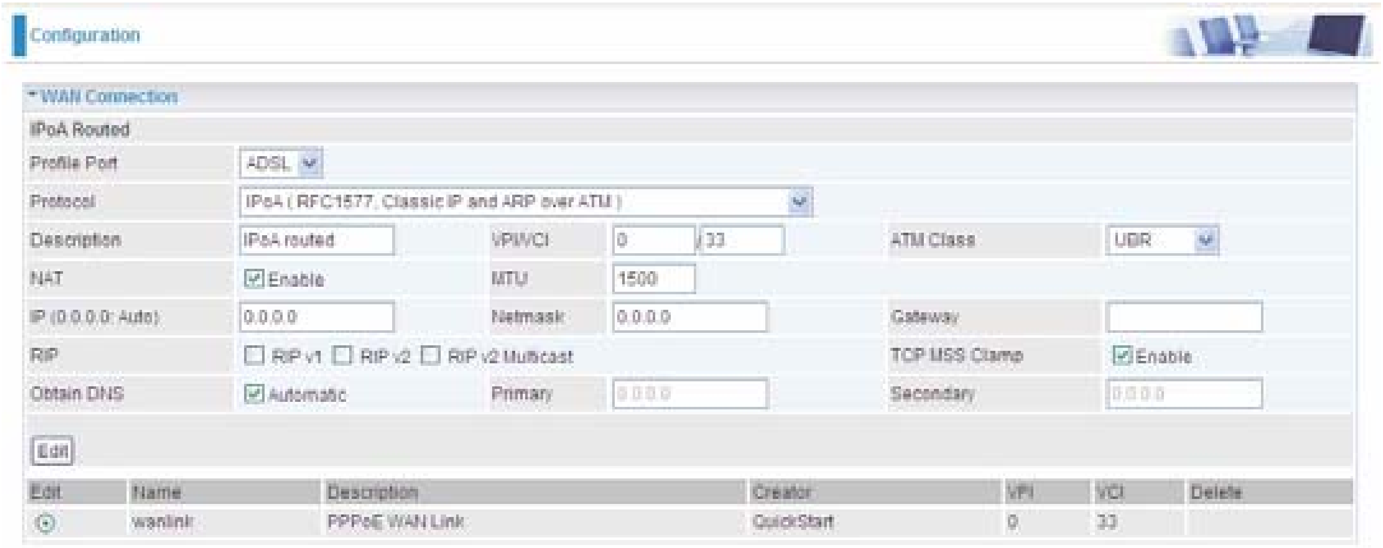
MAC Spoofing: Some service providers require the configuring of this option. You must fill in the MAC address that specify by service provider when it is required. Default is disabled.

Obtain DNS: A Domain Name System (DNS) contains a mapping table for domain name and IP addresses. DNS helps to find the IP address for the specific domain name. Check the checkbox to obtain DNS automatically.

Primary DNS: Enter the primary DNS.

Secondary DNS: Enter the secondary DNS.

IPoA Routed Connection



Profile Port	ADSL				
Protocol	IPoA (RFC1577, Classic IP and ARP over ATM)				
Description	IPoA routed	VPI/VCI	0 / 33	ATM Class	UBR
NAT	☑ Enable	MTU	1500		
IP (0.0.0.0: Auto)	0.0.0.0	Netmask	0.0.0.0	Gateway	
RIP	□ RIP v1 □ RIP v2 □ RIP v2 Multicast			TCP MSS Clamp	☑ Enable
Obtain DNS	☑ Automatic	Primary	0.0.0.0	Secondary	0.0.0.0

Edit	Name	Description	Creator	VPI	VCI	Delete
⊙	wanlink	PPPoE WAN Link	QuickStart	0	33	

Profile Port: Select the profile port as ADSL.

Protocol: The ATM protocol will be used in the device.

Description: A given name for the connection.

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

ATM Class: The Quality of Service for ATM layer.

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.

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

IP (0.0.0.0:Auto): Specify an IP address allowed to logon and access the router's web server.
Note: IP 0.0.0.0 indicates all users who are connected to this router are allowed to logon the device and modify data.

Netmask: The default is 255.255.255.0. User can change it to other such as 255.255.255.128. Type the subnet mask assigned to you by your ISP (if given).

Gateway: Enter the IP address of the default gateway (if given).

RIP: RIP v1, RIP v2, and RIP v2 Multicast. Check to enable RIP function.

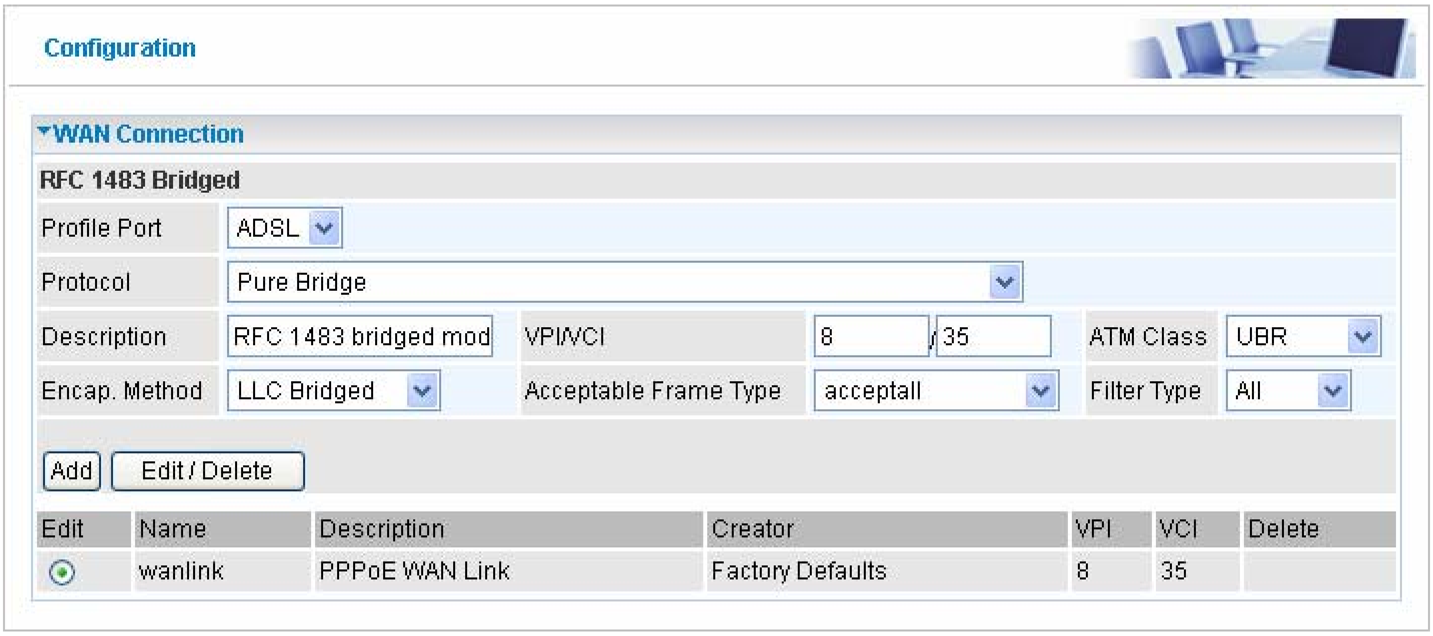
TCP MSS Clamp: This option helps to discover the optimal MTU size automatically. Default is enabled.

Obtain DNS: A Domain Name System (DNS) contains a mapping table for domain name and IP addresses. DNS helps to find the IP address for the specific domain name. Check the checkbox to obtain DNS automatically.

Primary DNS: Enter the primary DNS.

Secondary DNS: Enter the secondary DNS.

Pure Bridge



Configuration

▾WAN Connection

RFC 1483 Bridged

Profile Port	ADSL				
Protocol	Pure Bridge				
Description	RFC 1483 bridged mod	VPI/VCI	8 / 35	ATM Class	UBR
Encap. Method	LLC Bridged	Acceptable Frame Type	acceptall	Filter Type	All

Edit	Name	Description	Creator	VPI	VCI	Delete
◉	wanlink	PPPoE WAN Link	Factory Defaults	8	35	

Profile Port: Select the profile port as ADSL.

Protocol: The ATM protocol will be used in the device.

Description: A given name for this connection.

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

ATM Class: The Quality of Service for ATM layer.

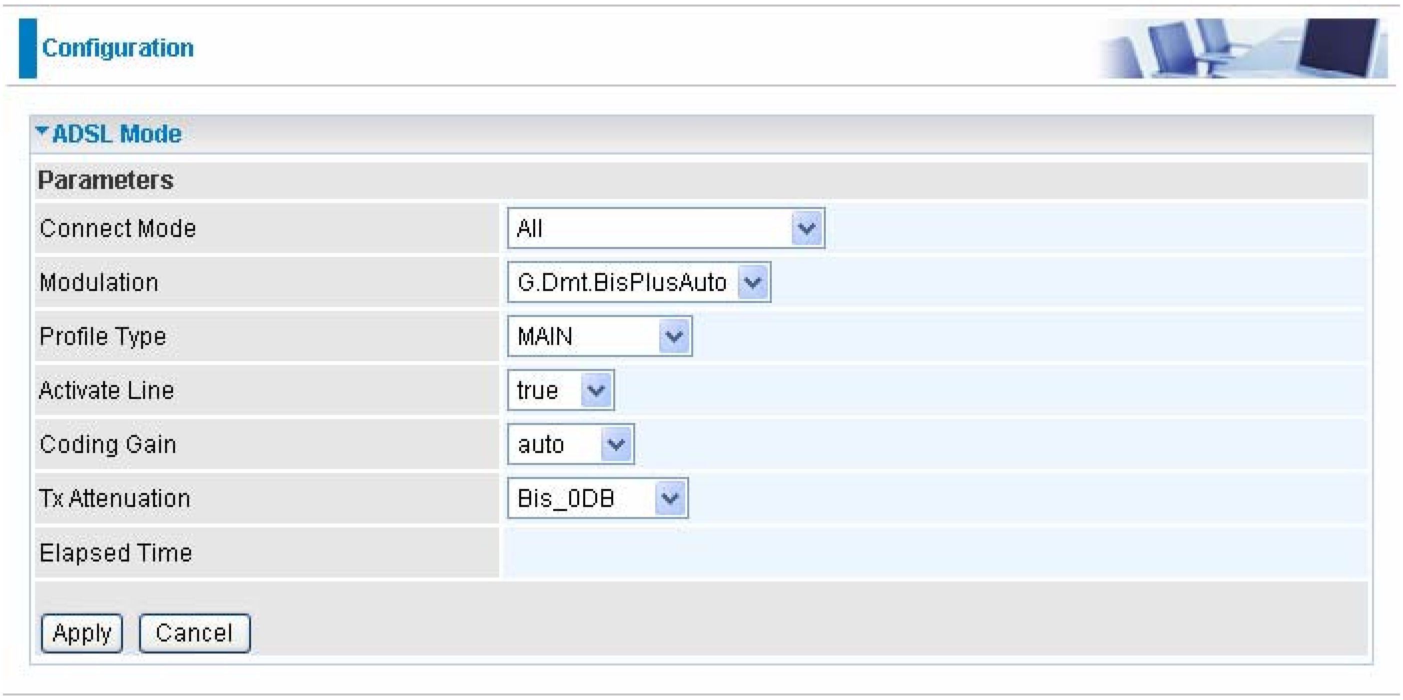
Encap. method: Select the encapsulation format, this is provided by your ISP.

Acceptable Frame Type: Specify which kind of traffic goes through this connection, all traffic or only VLAN tagged.

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.

ADSL Mode



Configuration

ADSL Mode

Parameters	
Connect Mode	All
Modulation	G.Dmt.BisPlusAuto
Profile Type	MAIN
Activate Line	true
Coding Gain	auto
Tx Attenuation	Bis_0DB
Elapsed Time	

Connect Mode: This mode will automatically detect your ADSL line code, ADSL2+, ADSL2, AnnexM2 and AnnexM2+, ADSL, All. Please keep the factory setting unless ADSL is detected as the symptom of synchronization problem.

Modulation: It will automatically detect capability of your ADSL line mode. Please keep the factory setting unless ADSL is detected as the symptom of synchronization problem.

Profile Type: Please keep the factory settings unless ADSL is detected as the symptom of low link rate or unstable problems. You may need to change the profile setting to reach the best ADSL line rate, it depends on the different DSLAM and location.

Activate Line: Aborting (false) your ADSL line and making it active (true) again for taking effect with setting of Connect Mode.

Coding Gain: It reduces router's transmit power which will effect to router's downstream performance. Higher the gain will increase the downstream rate but it sometimes causes unstable ADSL line. The configurable ADSL coding gain is from 0 dB to 7dB, or automatic.

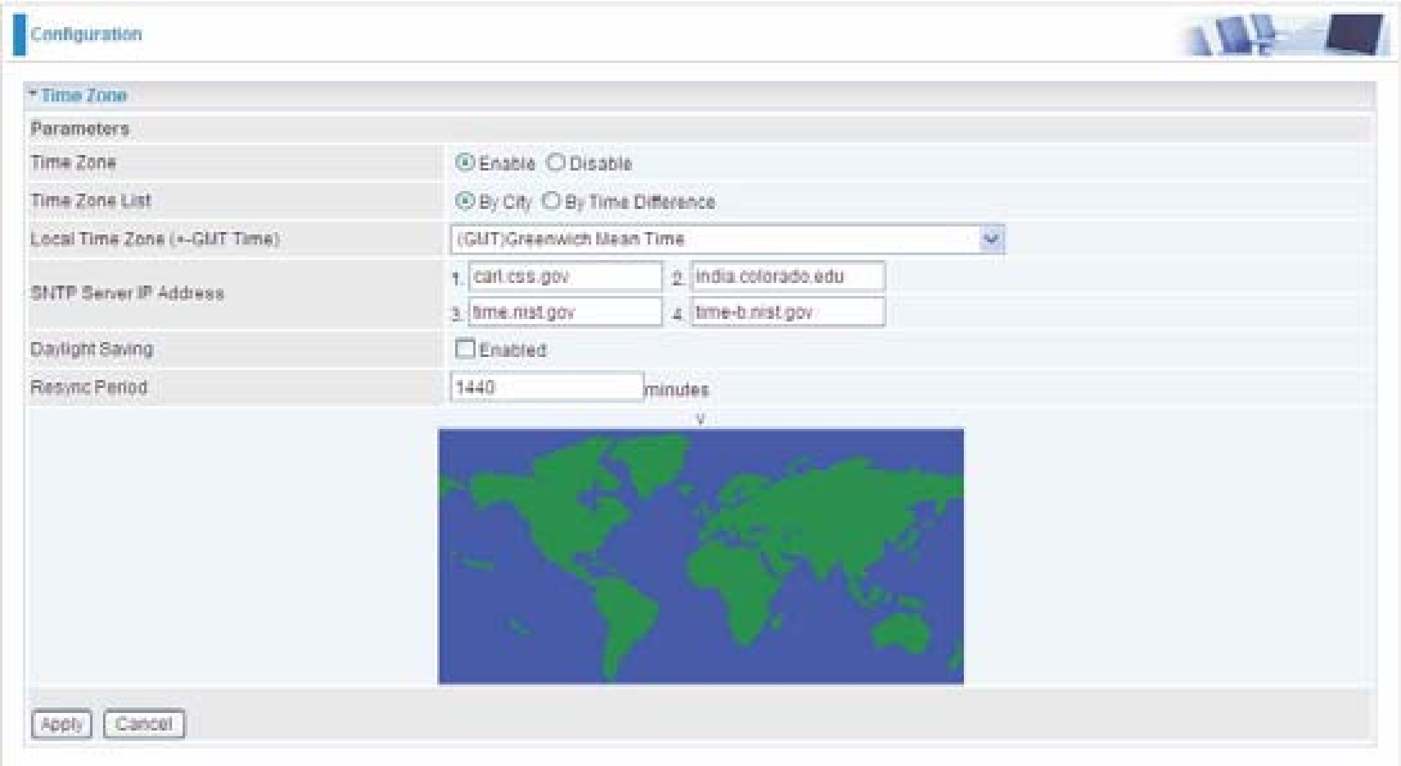
Tx Attenuation: It is the ADSL transmission power that the modem is using. The lower the power the better performance in router's upstream. Configurable value is between 0~12.

Elapsed Time: It means the running time of ADSL.

System

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

Time Zone



Configuration

▾ Time Zone

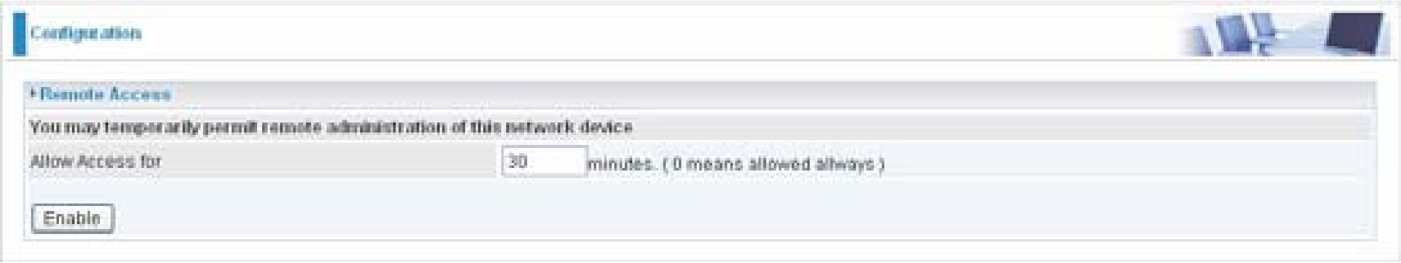
Parameters	
Time Zone	● Enable ○ Disable
Time Zone List	● By City ○ By Time Difference
Local Time Zone (+-GMT Time)	(GMT)Greenwich Mean Time
SNTP Server IP Address	1. carl.css.gov 2. india.colorado.edu 3. time.nist.gov 4. time-b.nist.gov
Daylight Saving	□ Enabled
Resync Period	1440 minutes

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 list, simply enter its IP address as shown above. Your ISP may provide an SNTP server for you to use.

Daylight Saving is also known as Summer Time Period. Many places in the world adapt it during summer time to move one hour of daylight from morning to the evening in local standard time. Check Enable box to set your local time.

Resync Period (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


Configuration

▸Remote Access

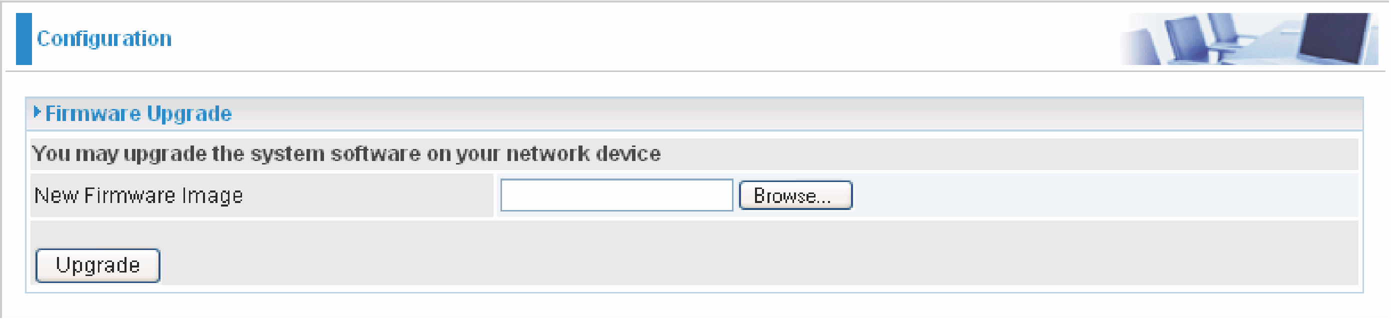
You may temporarily permit remote administration of this network device

Allow Access for 30 minutes. (0 means allowed always)

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 minute.

Firmware Upgrade


Configuration

▸Firmware Upgrade

You may upgrade the system software on your network device

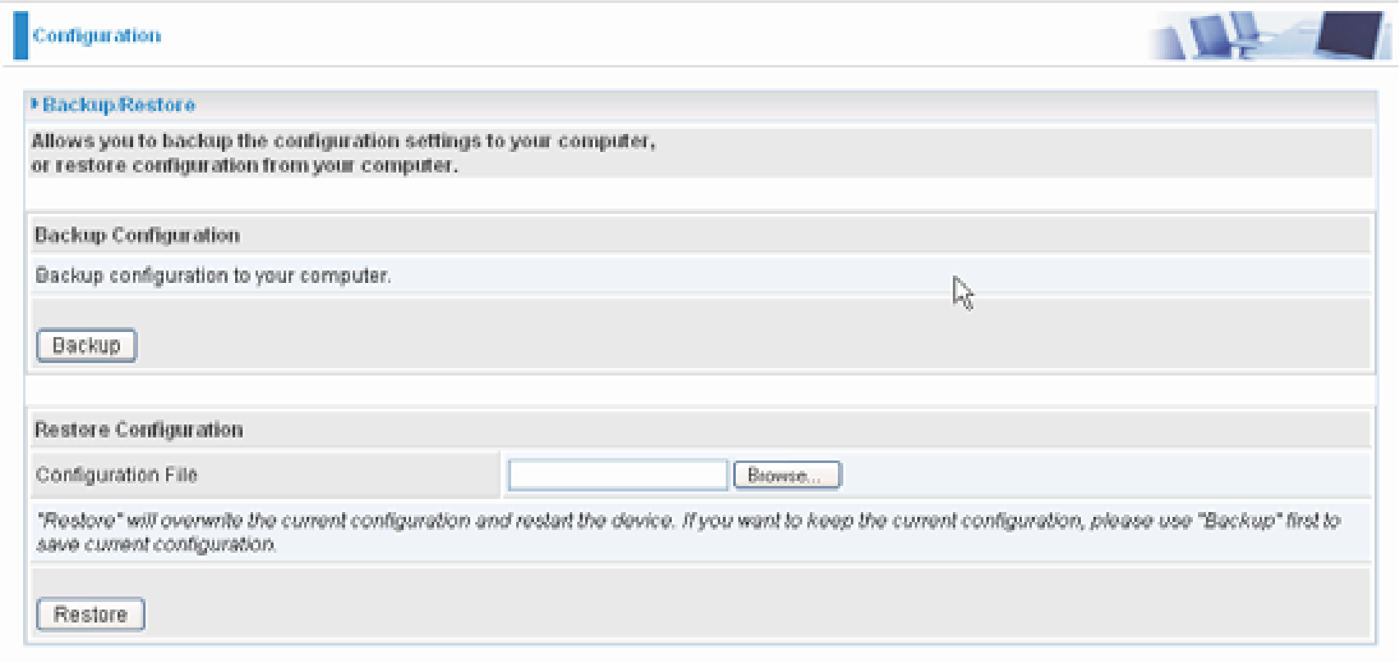
New Firmware Image

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 revised, and your 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.

DO NOT power down the router or interrupt the firmware upgrading while it is still in process. Improper operation could damage the router.

Backup / Restore



Allows you to backup the configuration settings to your computer,
or restore configuration from your computer.

Backup Configuration

Backup configuration to your computer.

Restore Configuration

Configuration File

"Restore" will overwrite the current configuration and restart the device. If you want to keep the current configuration, please use "Backup" first to save current configuration.

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.

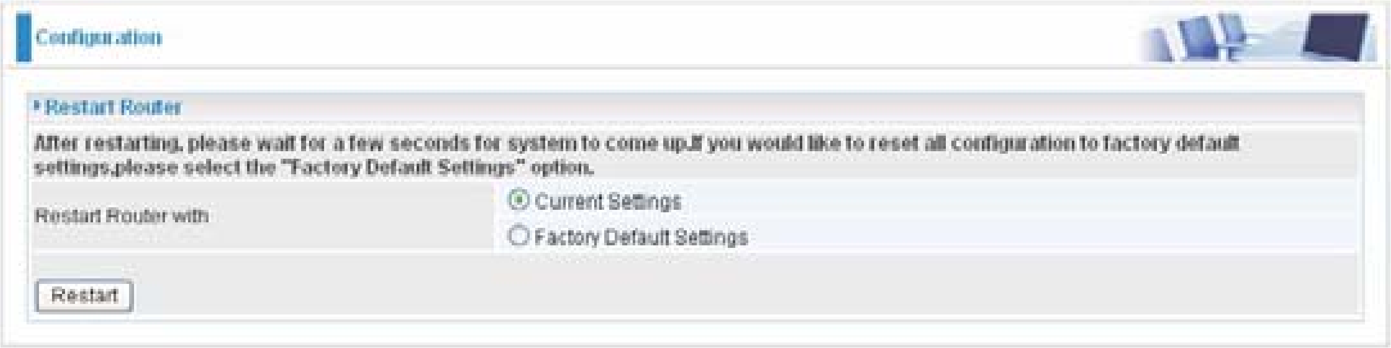
Press Backup to select where on your local PC to save the settings file. You may also change the name of the file when saving if you wish to keep multiple backups.

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 with option Current Settings to reboot your router (and restore your last saved configuration).



Restart Router

After restarting, please wait for a few seconds for system to come up.If you would like to reset all configuration to factory default settings,please select the "Factory Default Settings" option.

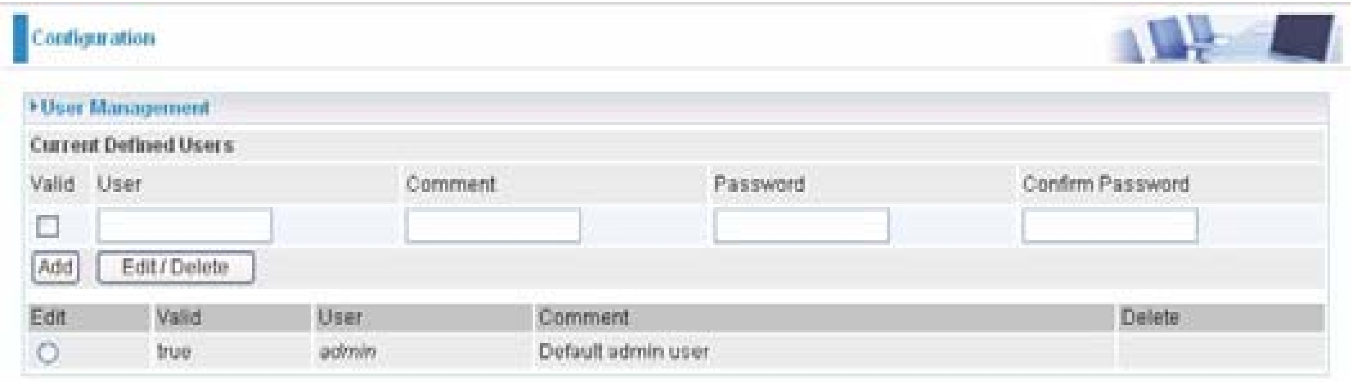
Restart Router with ● Current Settings ○ Factory Default Settings

If you wish to restart the router using the factory default settings (for example, after a firmware upgrade or if you have saved an incorrect configuration), select Factory Default Settings to reset to factory default settings.

You may also reset your router to factory settings by holding the small Reset pinhole button more than 6 seconds on the back of your router.

Caution: After pressing the RESET button for more than 6 seconds, to be sure you power cycle the device again.

User Management


Configuration

▸User Management

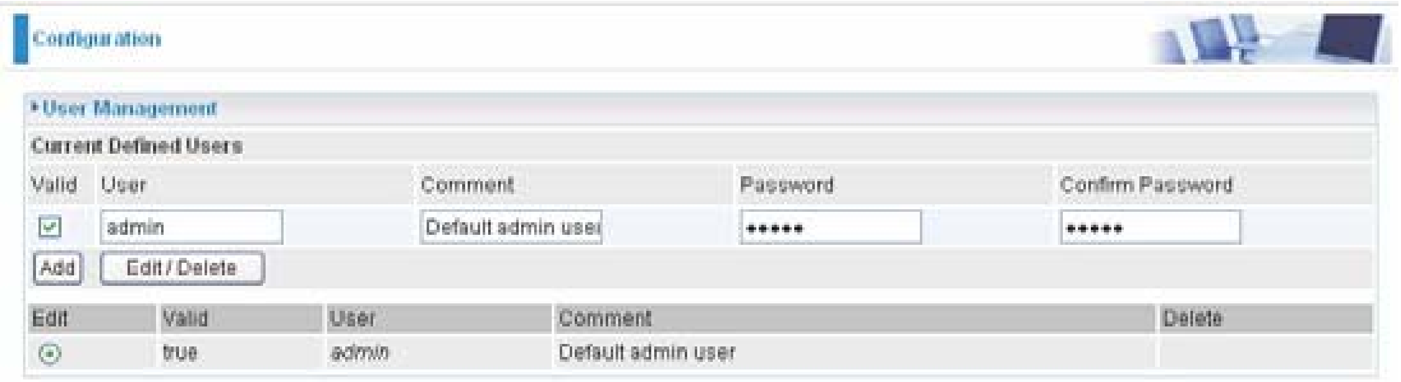
Current Defined Users

Valid	User	Comment	Password	Confirm Password
□				

Edit	Valid	User	Comment	Delete
○	true	*admin*	Default admin user	

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 Add new users who are able to access the device’s configuration interface. Once you have clicked on Edit, you are shown the following options:


Configuration

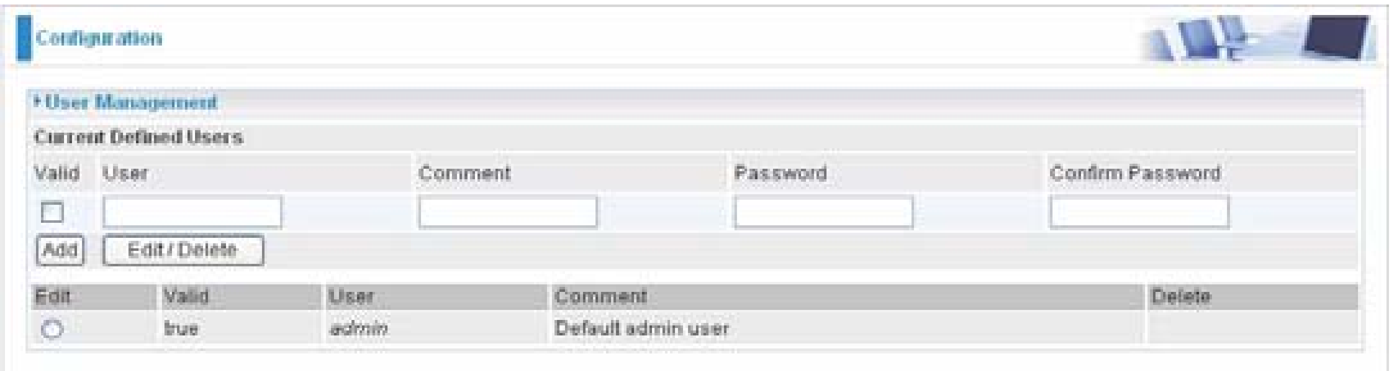
▸User Management

Current Defined Users

Valid	User	Comment	Password	Confirm Password
☑	admin	Default admin use	•••••	•••••

Edit	Valid	User	Comment	Delete
●	true	*admin*	Default admin user	

You can change the user’s password, whether their account is active and valid, as well as add a comment to each user account. Click Edit/Delete button to save your revise. You cannot delete the default admin account, if you do you will be log out. 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.


Configuration

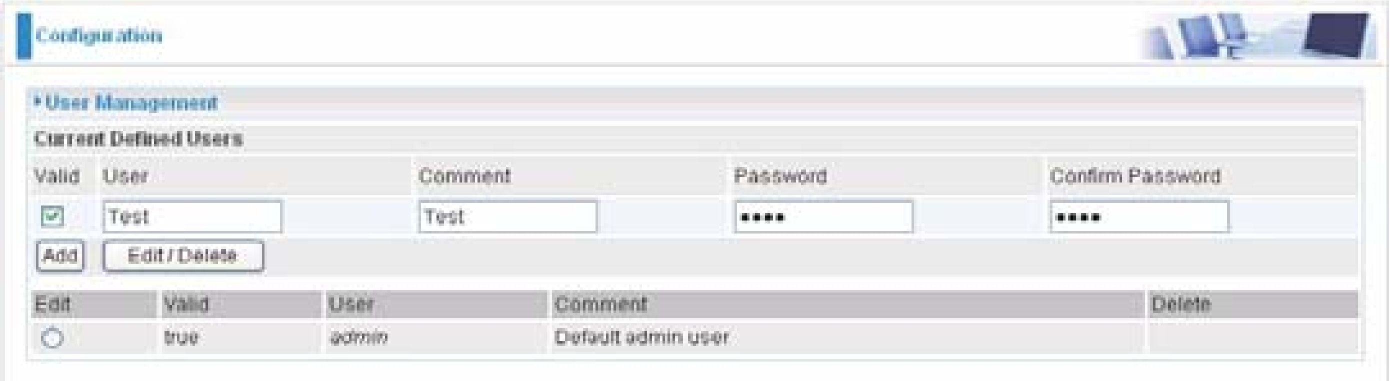
▸User Management

Current Defined Users

Valid	User	Comment	Password	Confirm Password
□				

Edit	Valid	User	Comment	Delete
○	true	*admin*	Default admin user	

When you create a user account, check Valid box and fill in the respective information for User, Comment, Password and Confirm Password in the blanks provided. Then click the Add button to add your new user account.



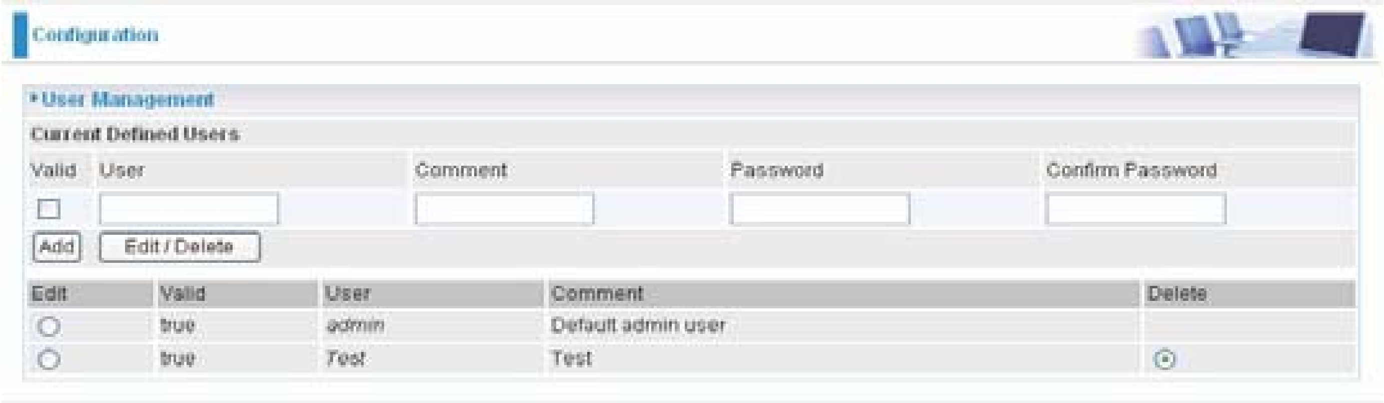
User Management

Current Defined Users

Valid	User	Comment	Password	Confirm Password
☑	Test	Test	••••	••••

Edit	Valid	User	Comment	Delete
○	true	*admin*	Default admin user	

To delete a user account, click on the Delete radio button on the right column of the account you wish to delete and then click the Edit/Delete button on the top to confirm your deletion.



User Management

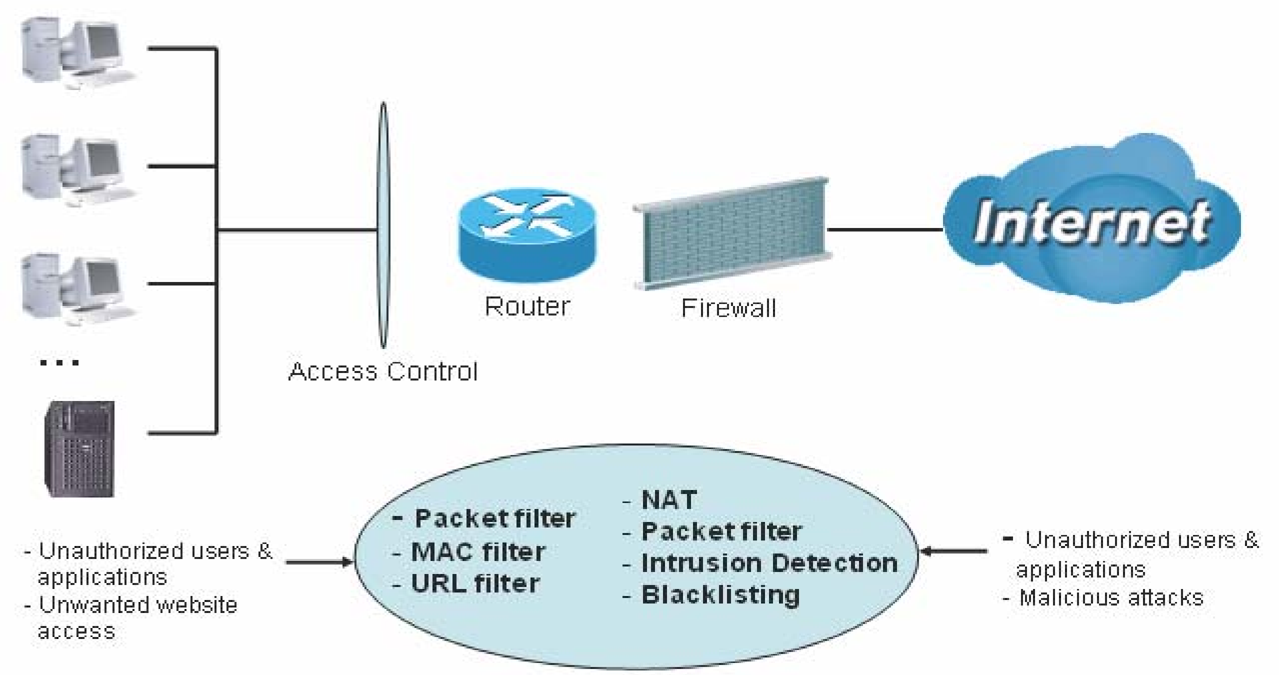
Current Defined Users

Valid	User	Comment	Password	Confirm Password
□				

Edit	Valid	User	Comment	Delete
○	true	*admin*	Default admin user	
○	true	*Test*	Test	●

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. Besides, when using 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: Prevent outsiders from accessing your local network. The router provides three levels of security support:

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.

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

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

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

Access Control: Prevent access from PCs on your local network.

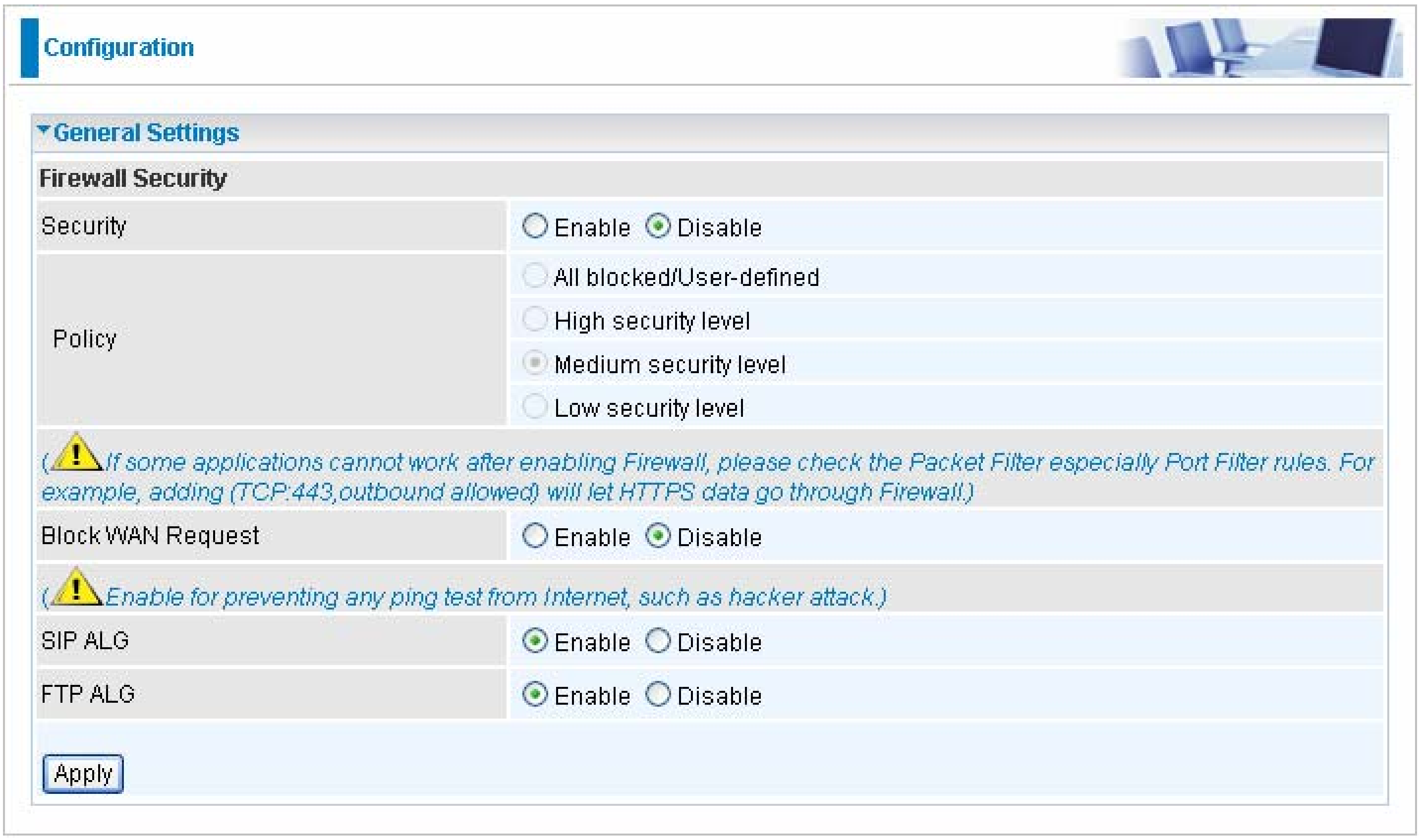
Firewall Security and Policy (General Settings): Outbound direction of Packet Filter rules to prevent unauthorized computers or applications from accessing the Internet.

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

Listed are the items under the Firewall section: **General Settings, Packet Filter, Intrusion Detection, URL Filter, IM/P2P Blocking and Firewall Log.**

General Settings

You can choose not to enable Firewall and still able to access to URL Filter and IM/P2P Blocking or enable the Firewall using preset filter rules and modify the port filter rules as required. The Packet Filter is used to filter packets based-on Applications (Port) or IP addresses.



Firewall Security	
Security	○ Enable ● Disable
Policy	○ All blocked/User-defined ○ High security level ● Medium security level ○ Low security level

(⚠If some applications cannot work after enabling Firewall, please check the Packet Filter especially Port Filter rules. For example, adding (TCP:443,outbound allowed) will let HTTPS data go through Firewall.)

Block WAN Request	○ Enable ● Disable

(⚠Enable for preventing any ping test from Internet, such as hacker attack.)

SIP ALG	● Enable ○ Disable
FTP ALG	● Enable ○ Disable

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 predefined port filter rules for High, Medium and Low security are displayed in Port Filters of Packet Filter.

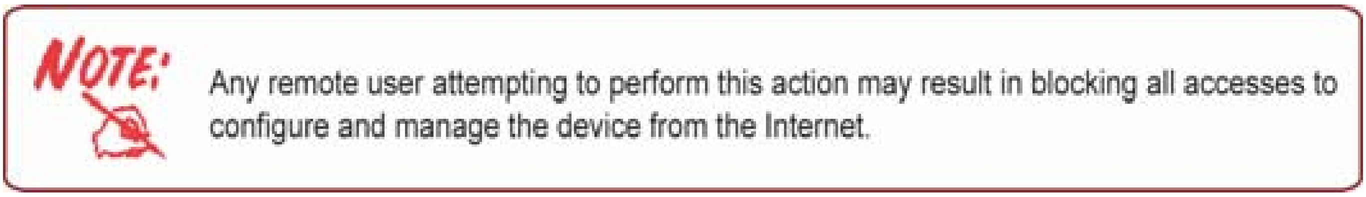
Select either High, Medium or Low security level to enable the Firewall. The only difference between these three security levels is the preset port filter rules in the Packet Filter. Firewall functionality is the same for all levels; it is only the list of preset port filters that changes between each setting. For more detailed on level of preset port filter information, refer to Table 1: Predefined Port Filter.

If you choose of the preset security levels and add custom filters, this level of filter rules will be saved even and do not need to re-configure the rules again if you disable or switch to other firewall level.

The "Block WAN Request" is a stand-alone function and not relate to whether security enable or disable. Mostly it is for preventing any scan tools from WAN site by hacker.

SIP ALG: You can choose to enable or disable SIP ALG by clicking on the radio buttons.

FTP ALG: You can choose to enable or disable FTP ALG by clicking on the radio buttons.

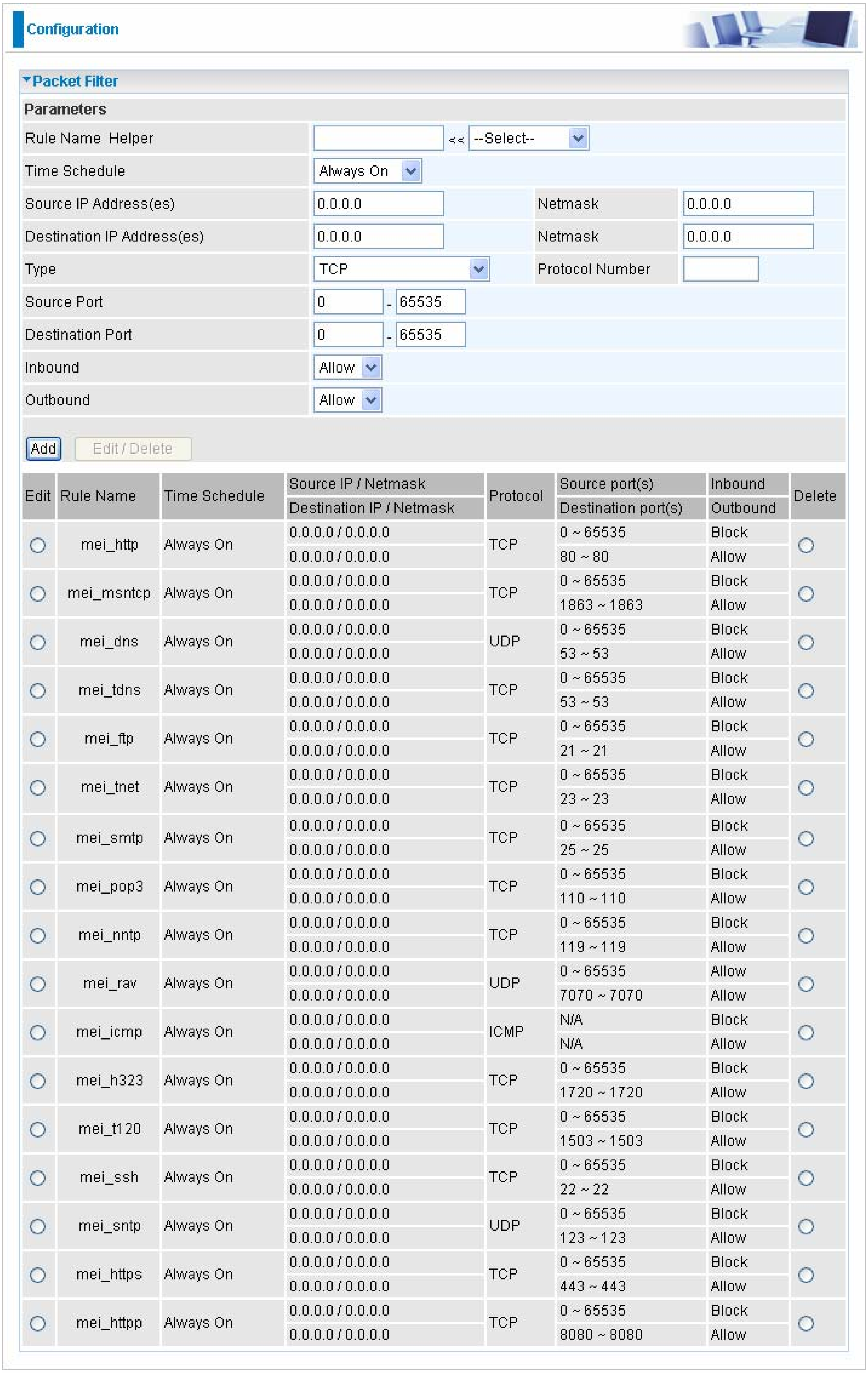


NOTE:

Any remote user attempting to perform this action may result in blocking all accesses to configure and manage the device from the Internet.

Packet Filter

This function is only available when the Firewall is enabled and one of these four security levels is chosen (All blocked, High, Medium and Low). The preset port filter rules in the Packet Filter must modify accordingly to the level of Firewall, which is selected. See Table1: Predefined Port Filter for more detail information.



Configuration

▾Packet Filter

Parameters			
Rule Name Helper	<< --Select--		
Time Schedule	Always On		
Source IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Destination IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Type	TCP	Protocol Number	
Source Port	0 - 65535		
Destination Port	0 - 65535		
Inbound	Allow		
Outbound	Allow		

Add   Edit / Delete

Edit	Rule Name	Time Schedule	Source IP / Netmask Destination IP / Netmask	Protocol	Source port(s) Destination port(s)	Inbound Outbound	Delete
○	mei_http	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 80 ~ 80	Block Allow	○
○	mei_msntcp	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 1863 ~ 1863	Block Allow	○
○	mei_dns	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	UDP	0 ~ 65535 53 ~ 53	Block Allow	○
○	mei_tdns	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 53 ~ 53	Block Allow	○
○	mei_ftp	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 21 ~ 21	Block Allow	○
○	mei_tnet	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 23 ~ 23	Block Allow	○
○	mei_smtp	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 25 ~ 25	Block Allow	○
○	mei_pop3	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 110 ~ 110	Block Allow	○
○	mei_nntp	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 119 ~ 119	Block Allow	○
○	mei_rav	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	UDP	0 ~ 65535 7070 ~ 7070	Allow Allow	○
○	mei_icmp	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	ICMP	N/A N/A	Block Allow	○
○	mei_h323	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 1720 ~ 1720	Block Allow	○
○	mei_t120	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 1503 ~ 1503	Block Allow	○
○	mei_ssh	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 22 ~ 22	Block Allow	○
○	mei_sntp	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	UDP	0 ~ 65535 123 ~ 123	Block Allow	○
○	mei_https	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 443 ~ 443	Block Allow	○
○	mei_httpp	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 8080 ~ 8080	Block Allow	○

Example: Predefined Port Filters Rules

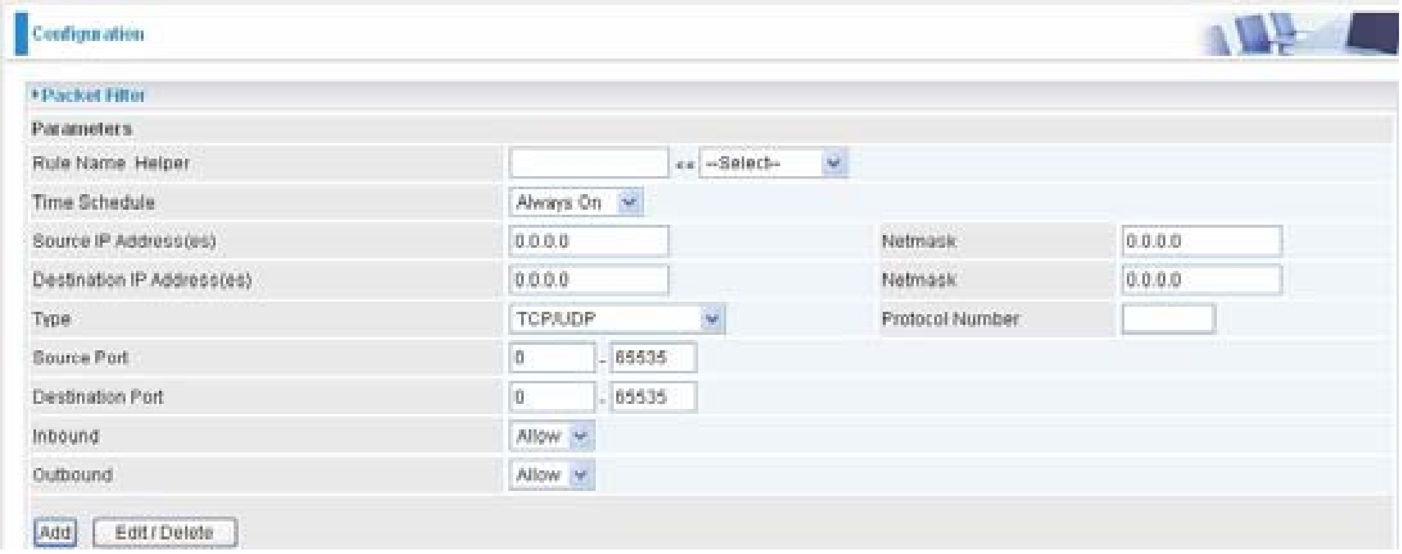
The predefined port filter rules for High, Medium and Low security levels are listed. See Table 1.

***Note:** Firewall – All Blocked/User-defined, you must define and create the port filter rules yourself. No predefined rule is being preconfigured.*

Table 1: Predefined Port Filter Application	Protocol	Port Number		Firewall - Low		Firewall - Medium		Firewall – High	
		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	NO	YES
DNS (53)	TCP(6)	53	53	NO	YES	NO	YES	NO	YES
FTP(21)	TCP(6)	21	21	NO	YES	NO	YES	NO	NO
Telnet(23)	TCP(6)	23	23	NO	YES	NO	YES	NO	NO
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(NNTP) (Network News Transfer Protocol)	TCP(6)	119	119	NO	YES	NO	YES	NO	NO
RealAudio/ RealVideo (7070)	UDP(17)	7070	7070	YES	YES	YES	YES	NO	NO
PING	ICMP(1)	N/A	N/A	NO	YES	NO	YES	NO	YES
H.323(1720)	TCP(6)	1720	1720	YES	YES	NO	YES	NO	NO
T.120(1503)	TCP(6)	1503	1503	YES	YES	NO	YES	NO	NO
SSH(22)	TCP(6)	22	22	NO	YES	NO	YES	NO	NO
NTP /SNTP	UDP(17)	123	123	NO	YES	NO	YES	NO	YES
HTTP/HTTP Proxy (8080)	TCP(6)	8080	8080	NO	YES	NO	NO	NO	NO
HTTPS(443)	TCP(6)	443	443	NO	YES	NO	YES	N/A	N/A
ICQ (5190)	TCP(6)	5190	5190	YES	YES	N/A	N/A	N/A	N/A
MSN (1863)	TCP(6)	1863	1863	YES	YES	N/A	N/A	N/A	N/A
MSN (7001)	UDP(17)	7001	7001	YES	YES	N/A	N/A	N/A	N/A
MSN VEDIO (9000)	TCP(6)	9000	9000	NO	YES	N/A	N/A	N/A	N/A

Inbound: Internet to LAN
Outbound: LAN to Internet
YES: Allowed
NO: Blocked
N/A: Not Applicable

Packet Filter – Add TCP/UDP Filter



Configuration

Packet Filter

Parameters

Rule Name Helper	<< --Select--		
Time Schedule	Always On		
Source IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Destination IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Type	TCP/UDP	Protocol Number	
Source Port	0 - 65535		
Destination Port	0 - 65535		
Inbound	Allow		
Outbound	Allow		

Rule Name Helper: Users-define description to identify this entry or click “Select” drop-down menu to select existing predefined rules. The maximum name length is 32 characters.

Time Schedule: It is self-defined time period. You may specify a time schedule for your prioritization policy. For setup and detail, refer to Time Schedule section

Source IP Address(es) / Destination IP Address(es): This is the Address-Filter used to allow or block traffic to/from particular IP address(es). Selecting the Subnet Mask of the IP address range you wish to allow/block the traffic to or form; set IP address and Subnet Mask to 0.0.0.0 to inactive the Address-Filter rule.

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”.

Type: It is the packet protocol type used by the application, select TCP, UDP or both TCP/UDP.

Protocol Number: Insert the port number.

Source Port: This Port or Port Ranges defines the port allowed to be used by the Remote/WAN to connect to the application. Default is set from range 0 ~ 65535. It is recommended that this option be configured by an advanced user.

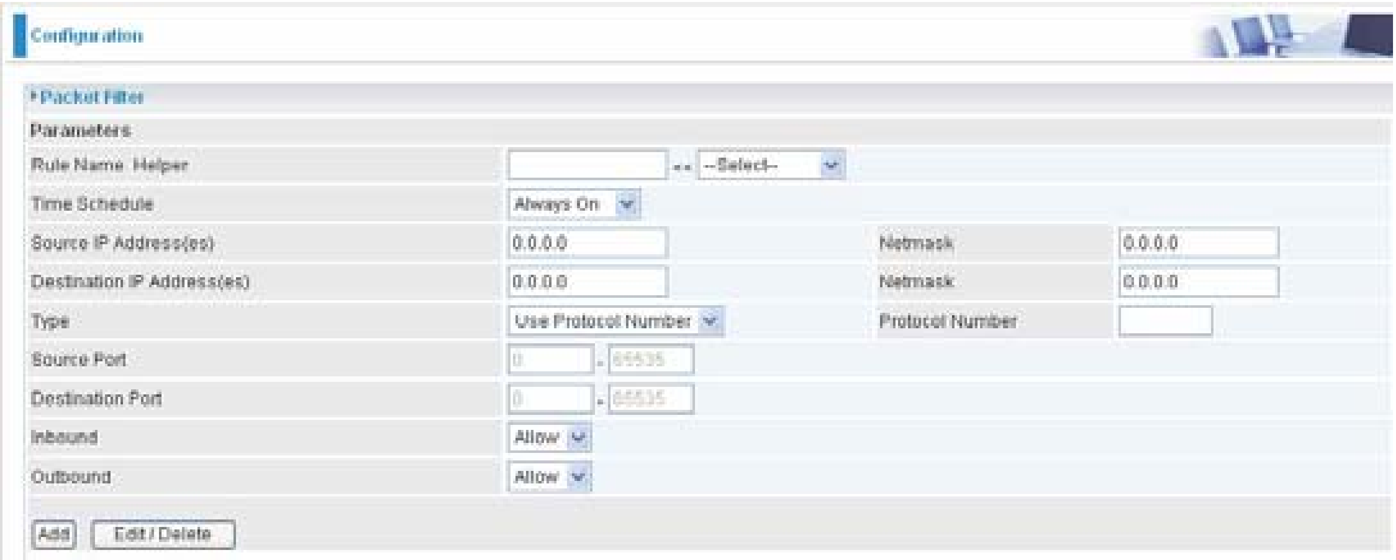
Destination Port: This is the Port or Port Ranges that defines the application.

Inbound / Outbound: Select Allow or Block the access to the Internet (“Outbound”) or from the Internet (“Inbound”).

Click Add button to apply your changes.

Packet Filter – Add Raw IP Filter

Go to “Type” drop-down menu, select “Use Protocol Number”.



Configuration

Packet Filter

Parameters			
Rule Name Helper	-- --Select--		
Time Schedule	Always On		
Source IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Destination IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Type	Use Protocol Number	Protocol Number	
Source Port	0 - 65535		
Destination Port	0 - 65535		
Inbound	Allow		
Outbound	Allow		

Rule Name Helper: Users-define description to identify this entry or choosing “Select” drop-down menu to select existing predefined rules.

Time Schedule: It is self-defined time period. You may specify a time schedule for your prioritization policy. For setup and detail, refer to Time Schedule section

Source IP Address(es) / Destination IP Address(es): This is the Address-Filter used to allow or block traffic to/from particular IP address(es). Selecting the Subnet Mask of the IP address range you wish to allow/block the traffic to or form; set IP address and Subnet Mask to 0.0.0.0 to inactive the Address-Filter rule.

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”.

Type: It is the packet protocol type used by the application, select TCP, UDP or both TCP/UDP.

Protocol Number: Insert the port number, i.e. GRE 47.

Source Port: This Port or Port Ranges defines the port allowed to be used by the Remote/WAN to connect to the application. Default is set from range 0 ~ 65535. It is recommended that this option be configured by an advanced user.

Destination Port: This is the Port or Port Ranges that defines the application.

Inbound / Outbound: Select Allow or Block the access to the Internet (“Outbound”) or from the Internet (“Inbound”).

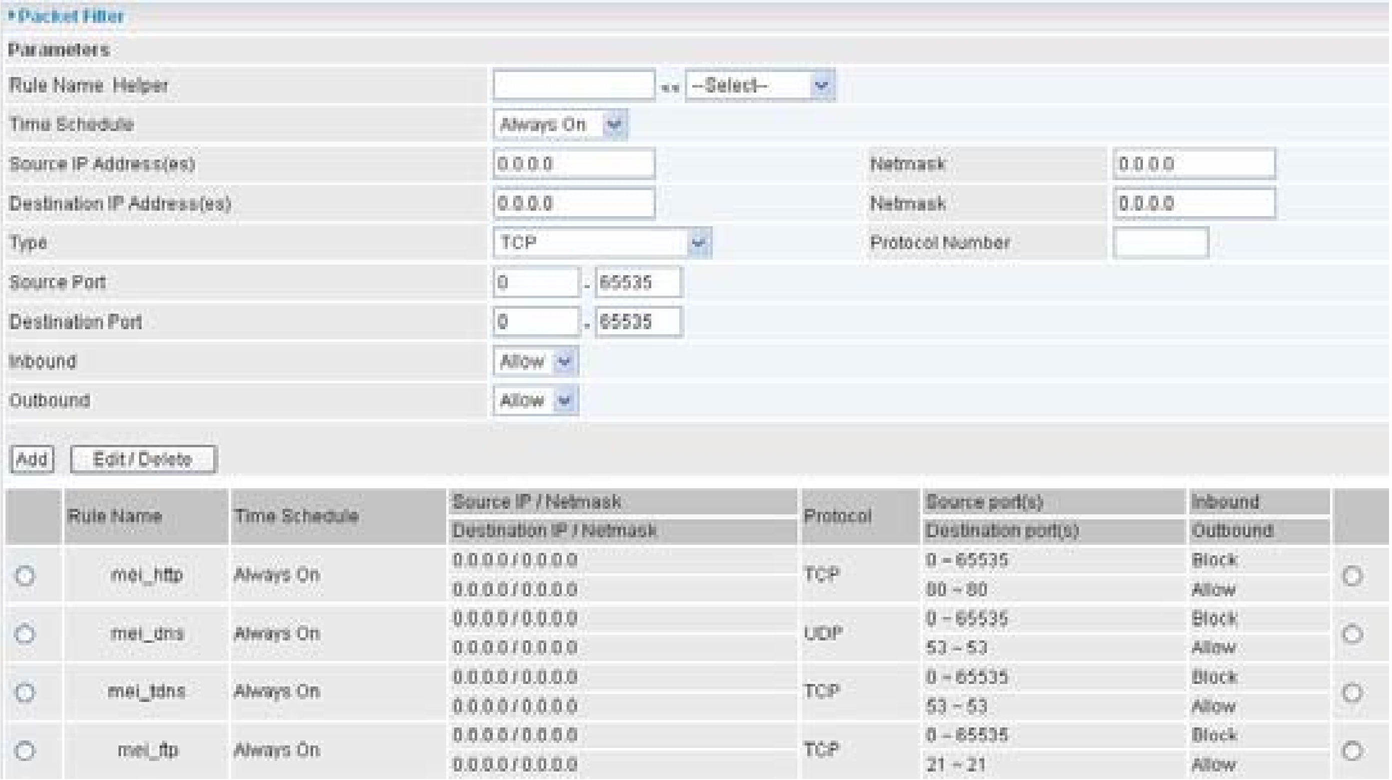
Click the Add button to apply your changes.

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

The predefined 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. 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 which means remote access through HTTP to your router is not allowed.

Note: Inbound indicates accessing from Internet to LAN and Outbound is from LAN to the Internet.



▸Packet Filter

Parameters

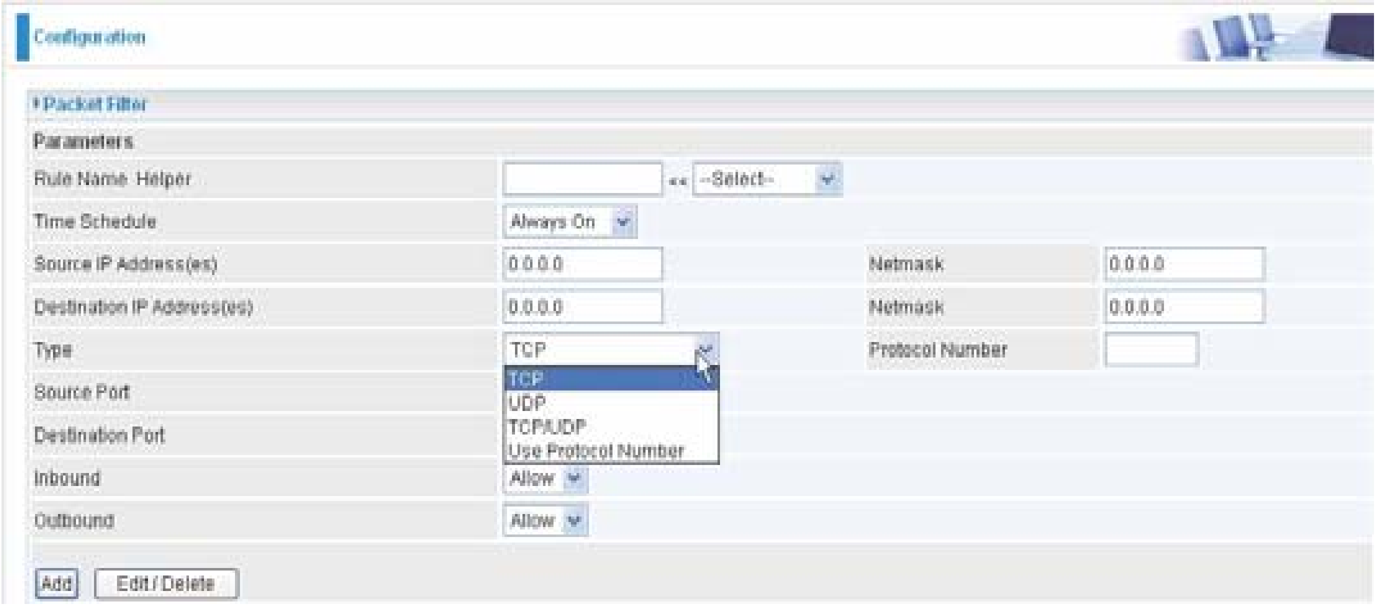
Rule Name Helper	<< --Select--		
Time Schedule	Always On		
Source IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Destination IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Type	TCP	Protocol Number	
Source Port	0 - 65535		
Destination Port	0 - 65535		
Inbound	Allow		
Outbound	Allow		

	Rule Name	Time Schedule	Source IP / Netmask Destination IP / Netmask	Protocol	Source port(s) Destination port(s)	Inbound Outbound	
○	mei_http	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 80 ~ 80	Block Allow	○
○	mei_dns	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	UDP	0 ~ 65535 53 ~ 53	Block Allow	○
○	mei_tdns	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 53 ~ 53	Block Allow	○
○	mei_ftp	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 21 ~ 21	Block Allow	○

Configuring Packet Filter:

1. Click Packet Filters. You will then be presented with the predefined port filter rules screen (in this case for the low security level), shown below:

Note: You may click Edit the predefined rule instead of Delete it. This is an example to show to how you add a filter on your own.

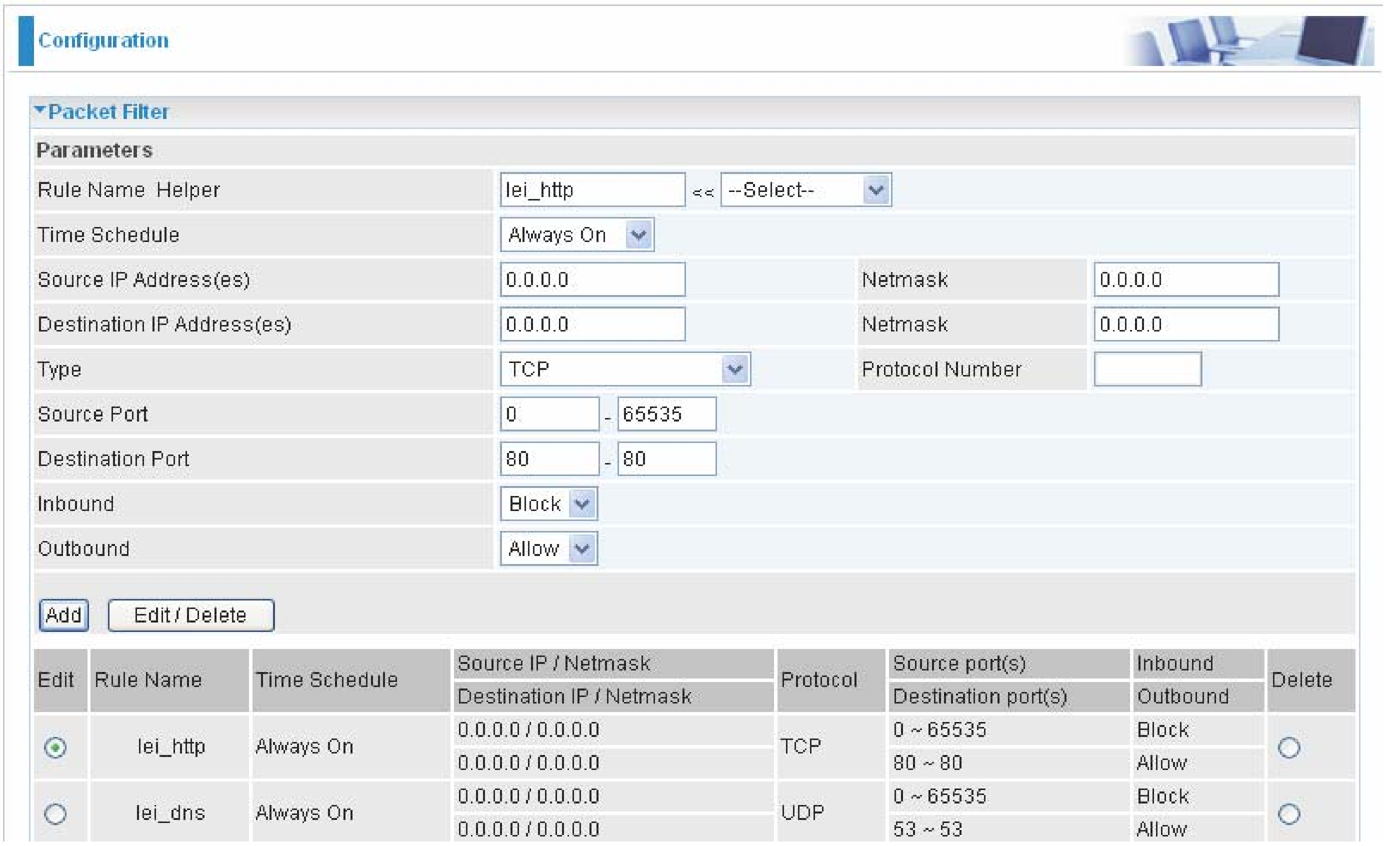


Configuration

Packet Filter

Parameters			
Rule Name Helper	<< --Select--		
Time Schedule	Always On		
Source IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Destination IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Type	TCP TCP UDP TCP/UDP Use Protocol Number	Protocol Number	
Source Port			
Destination Port			
Inbound	Allow		
Outbound	Allow		

2. Choose the radio button you want to delete the existing HTTP rule. Click Edit/Delete button to delete the existing HTTP rule.



Configuration

Packet Filter

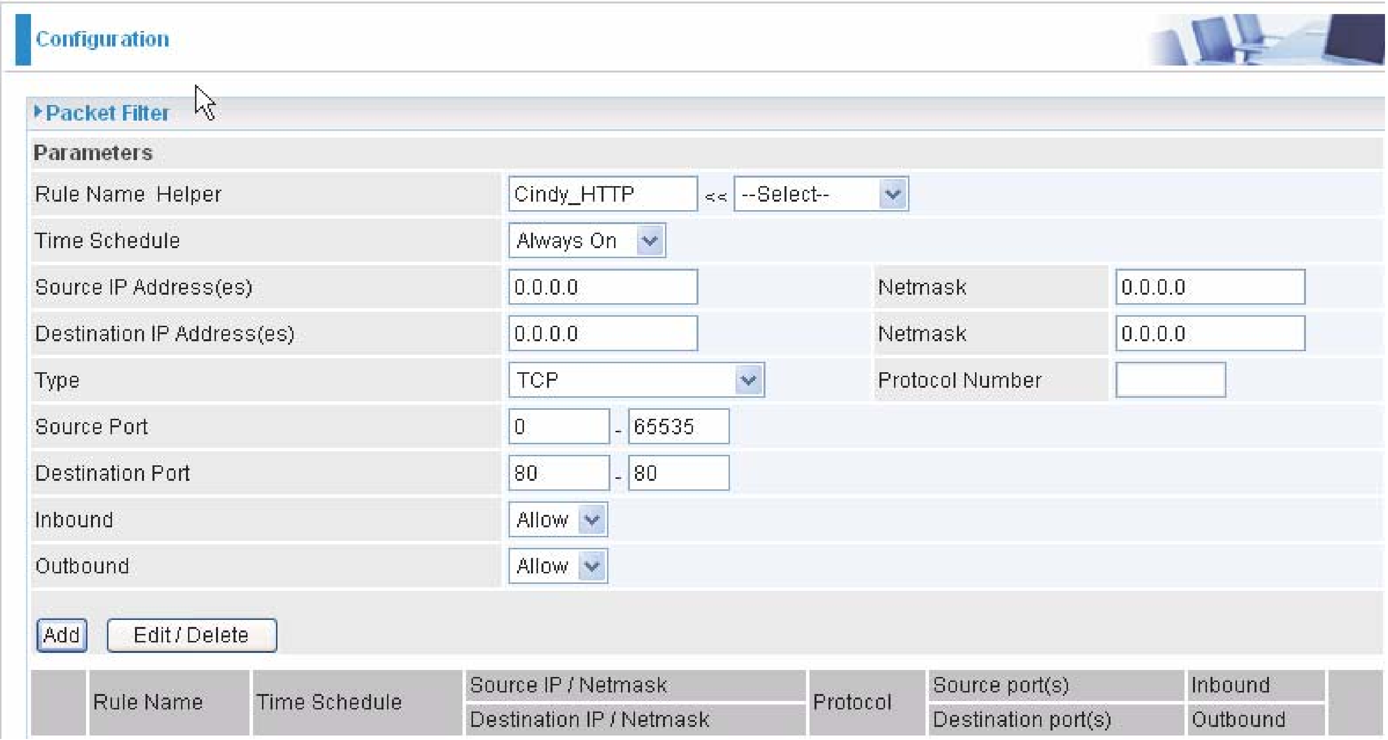
Parameters			
Rule Name Helper	lei_http << --Select--		
Time Schedule	Always On		
Source IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Destination IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Type	TCP	Protocol Number	
Source Port	0 - 65535		
Destination Port	80 - 80		
Inbound	Block		
Outbound	Allow		

Edit	Rule Name	Time Schedule	Source IP / Netmask Destination IP / Netmask	Protocol	Source port(s) Destination port(s)	Inbound Outbound	Delete
●	lei_http	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 80 ~ 80	Block Allow	○
○	lei_dns	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	UDP	0 ~ 65535 53 ~ 53	Block Allow	○

3. Input the Rule Name, Time Schedule, Source/Destination IP, Type, Source/Destination Port, Inbound and Outbound.

Example:

Application: Cindy_HTTP
Time Schedule: Always On
Source / Destination IP Address(es): 0.0.0.0 (I do not wish to active the address-filter, instead I use the port-filter)
Type: TCP (Please refer to Table1: Predefined Port Filter)
Source Port: 0-65535 (I allow all ports to connect with the application))
Redirect Port: 80-80 (This is Port defined for HTTP)
Inbound / Outbound: Allow



Configuration

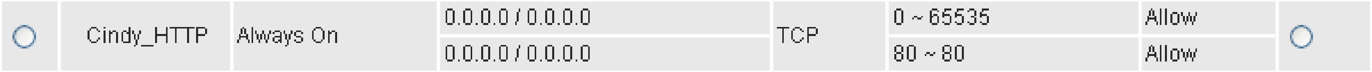
▸Packet Filter

Parameters

Rule Name Helper	Cindy_HTTP << --Select--		
Time Schedule	Always On		
Source IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Destination IP Address(es)	0.0.0.0	Netmask	0.0.0.0
Type	TCP	Protocol Number	
Source Port	0 - 65535		
Destination Port	80 - 80		
Inbound	Allow		
Outbound	Allow		

	Rule Name	Time Schedule	Source IP / Netmask Destination IP / Netmask	Protocol	Source port(s) Destination port(s)	Inbound Outbound	

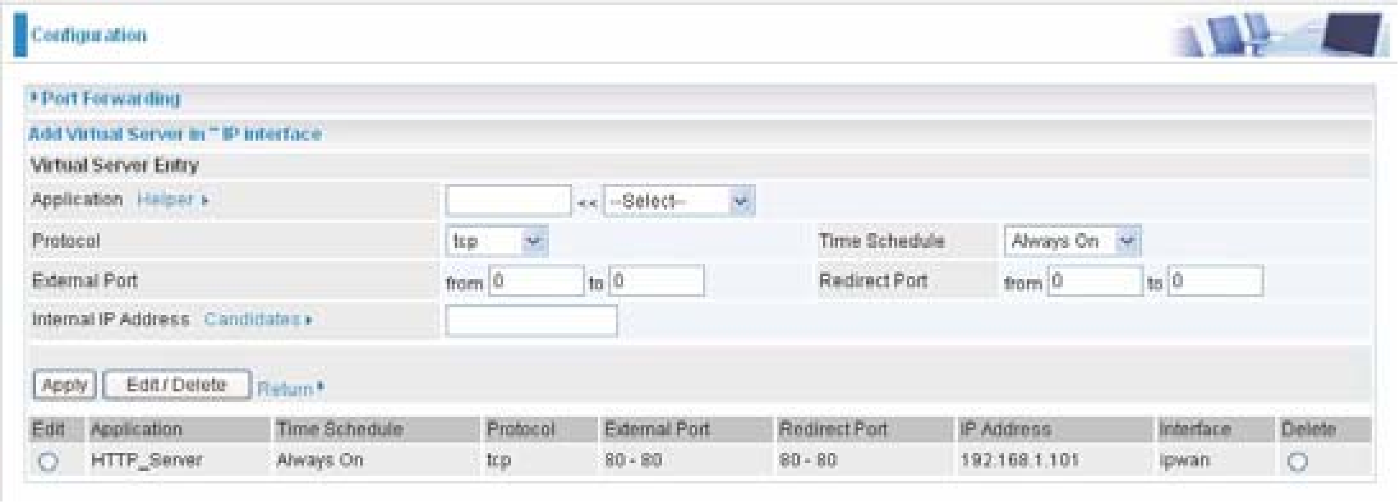
1. The new port filter rule for HTTP is shown below:



○	Cindy_HTTP	Always On	0.0.0.0 / 0.0.0.0 0.0.0.0 / 0.0.0.0	TCP	0 ~ 65535 80 ~ 80	Allow Allow	○

2. 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:

Note: For how to configure the HTTP in Virtual Server, go to Add Virtual Server in Virtual Server section for more details.



Configuration

- Port Forwarding

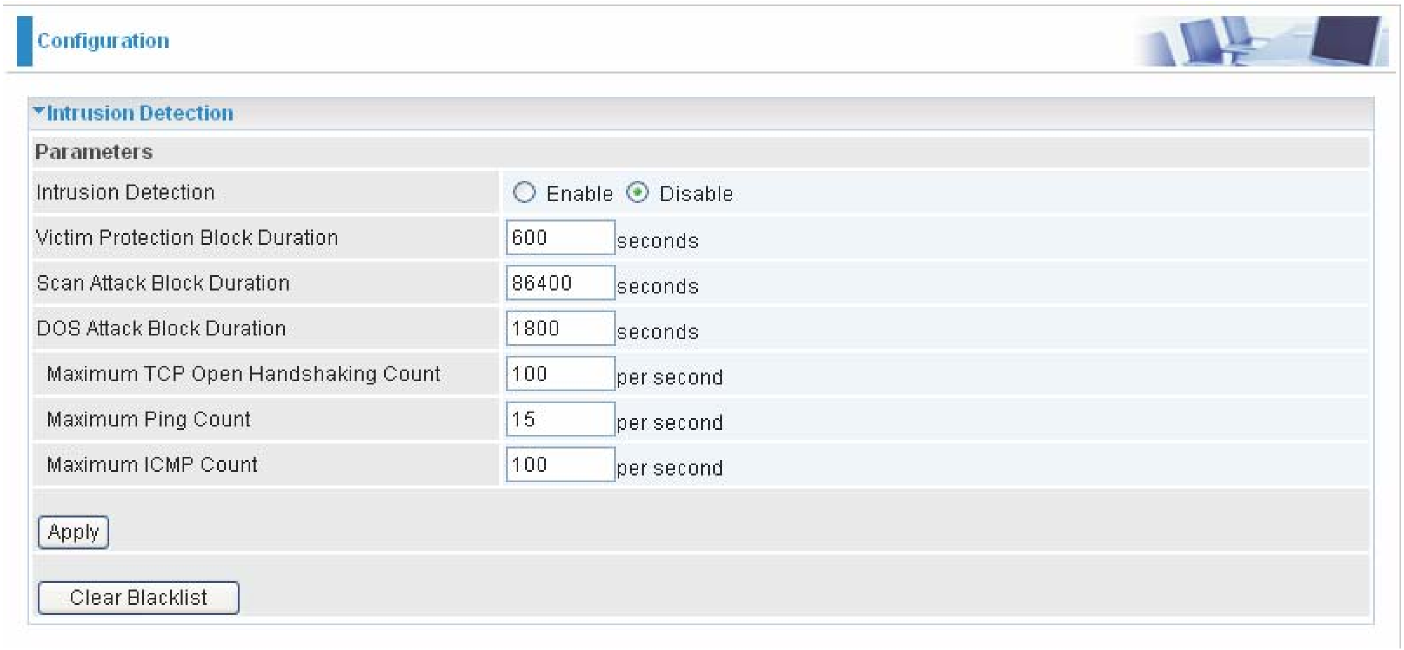
Add Virtual Server in " IP interface

Virtual Server Entry

Application Helper ▸	<< --Select--		
Protocol	tcp	Time Schedule	Always On
External Port	from 0 to 0	Redirect Port	from 0 to 0
Internal IP Address Candidates ▸			

Edit	Application	Time Schedule	Protocol	External Port	Redirect Port	IP Address	Interface	Delete
○	HTTP_Server	Always On	tcp	80 - 80	80 - 80	192.168.1.101	ipwan	○

Intrusion Detection



Configuration

▾Intrusion Detection

Parameters	
Intrusion Detection	○ Enable ● Disable
Victim Protection Block Duration	600 seconds
Scan Attack Block Duration	86400 seconds
DOS Attack Block Duration	1800 seconds
Maximum TCP Open Handshaking Count	100 per second
Maximum Ping Count	15 per second
Maximum ICMP Count	100 per second

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.

Intrusion Detection: If enabled, IDS will block Smurf attack attempts. Default is false.

Block Duration:

ⓘ **Victim Protection Block Duration**: This is the duration for blocking *Smurf* attacks. Default value is 600 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.

ⓘ **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.

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 cannot protect against such attacks.

Table 2: Hacker attack types recognized by the IDS

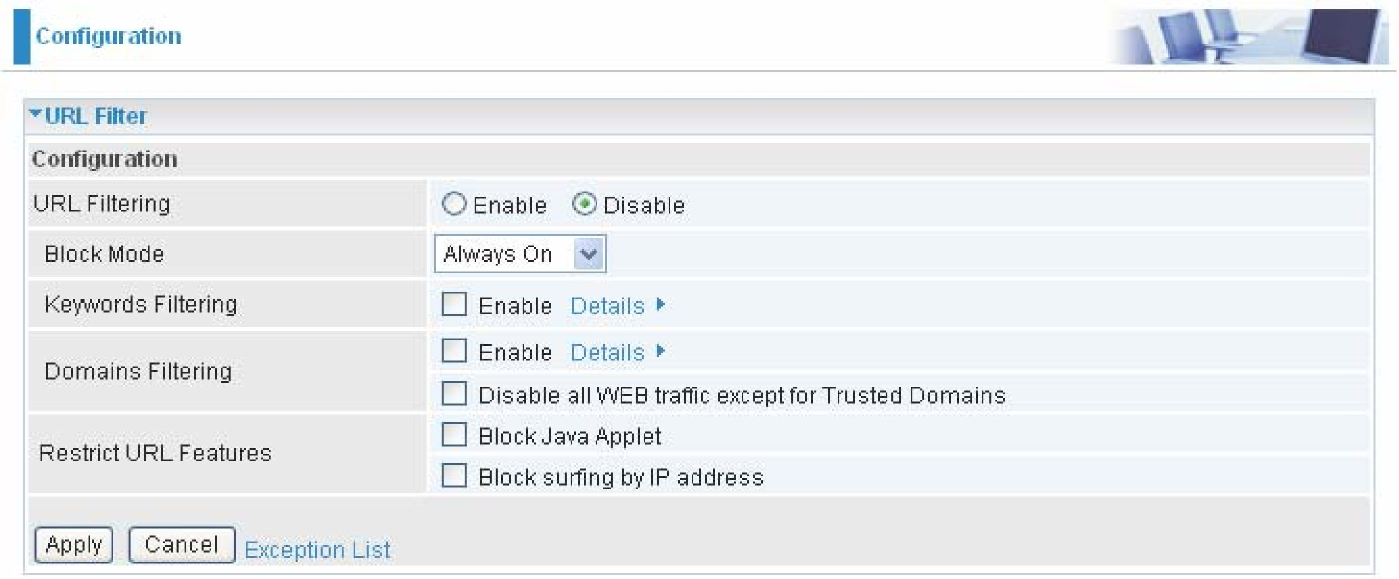
Intrusion Name	Detect Parameter	Blacklist	Type of Block Duration	Drop Packet	Show Log
Ascend Kill	Ascend Kill data	Src IP	DoS	Yes	Yes
WinNuke	TCP Port 135, 137~139, Flag: URG	Src IP	DoS	Yes	Yes
Smurf	ICMP type 8 Des IP is broadcast	Dst IP	Victim Protection	Yes	Yes
Land attack	SrcIP = DstIP			Yes	Yes
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

URL Filter

URL (Uniform Resource Locator – e.g. an address in the form of http://www.abcde.com 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.



Configuration

▾URL Filter

Configuration	
URL Filtering	○ Enable ● Disable
Block Mode	Always On
Keywords Filtering	□ Enable Details ▸
Domains Filtering	□ Enable Details ▸ □ Disable all WEB traffic except for Trusted Domains
Restrict URL Features	□ Block Java Applet □ Block surfing by IP address

Apply Cancel Exception List

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

Block Mode: A list of the modes that you can choose to check the URL filter rules. The default is set to **Always On.**

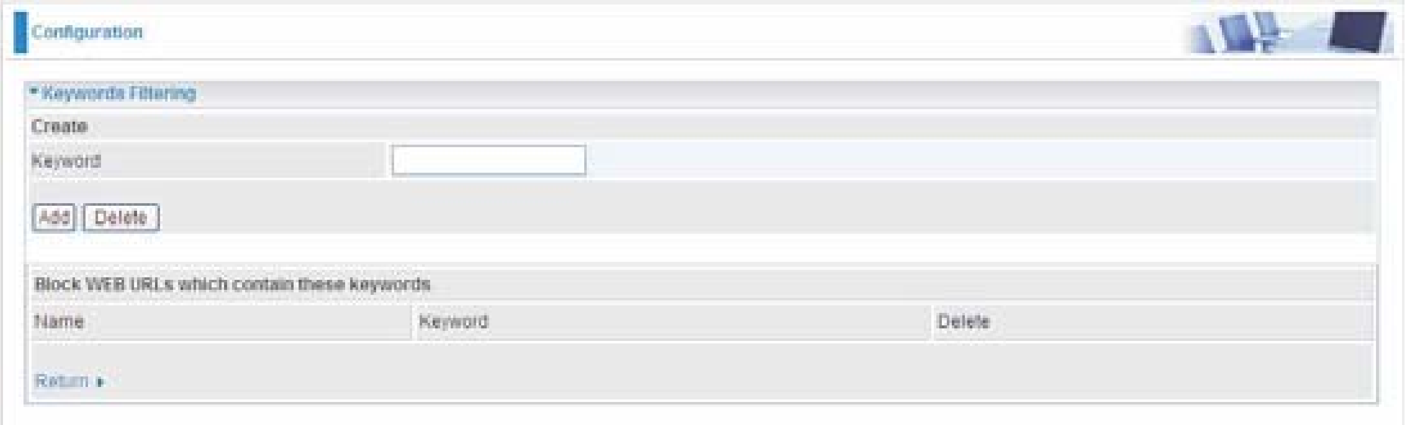
ⓘ **Disabled:** No action will be performed by the Block Mode.

ⓘ **Always On:** Action is enabled. URL filter rules will be monitoring and checking at all hours of the day.

ⓘ **TimeSlot1 ~ TimeSlot16:** It is self-defined time period. You may specify the time period to check the URL filter rules, i.e. during working hours. For setup and detail, refer to **Time Schedule** section.

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.abc.com/abcde.html**, it will be dropped as the keyword “abcde” occurs in the URL.


Configuration

▾ Keywords Filtering

Create	
Keyword	

Add Delete

Block WEB URLs which contain these keywords

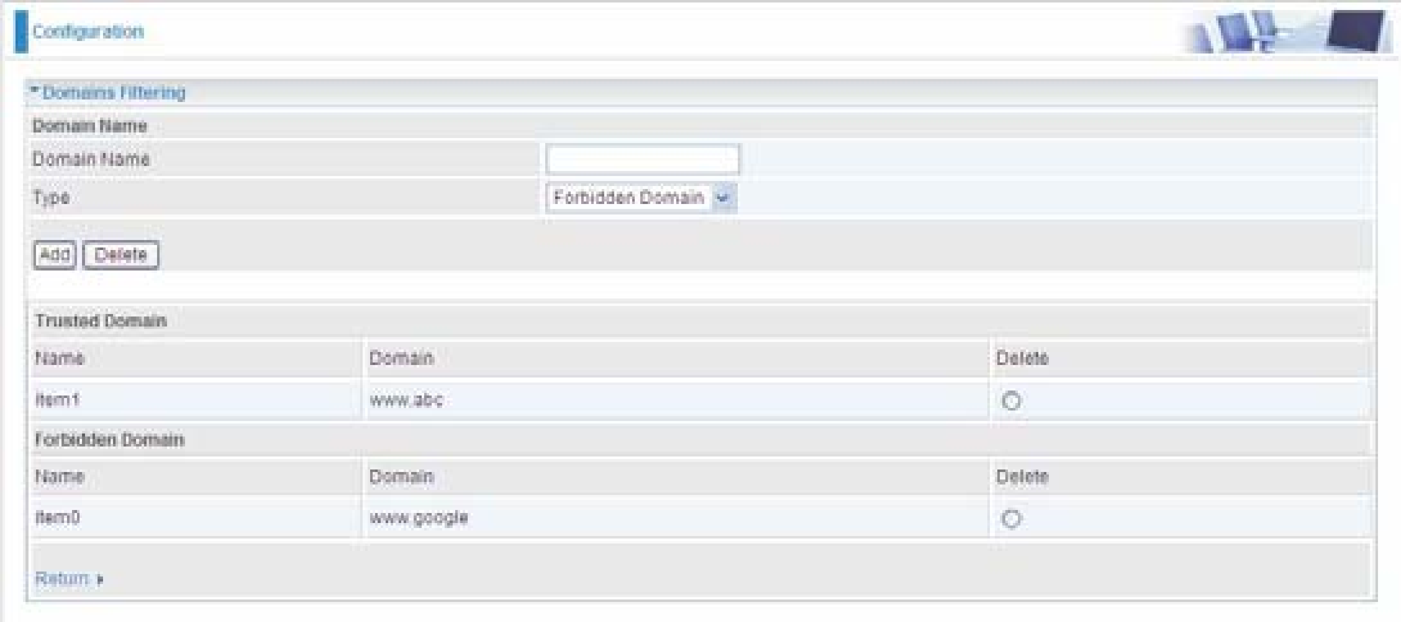
Name	Keyword	Delete

Return ▸

Domains Filtering: This function checks the whole URL not the IP address, 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). For this function to be activated, both check-boxes must be checked. Here is the checking procedure:

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. If yes, then the connection attempt will be 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 completed URL, "www" + domain name shall be specified. For example to block traffic to **www.google.com.au**, enter "**www.google**" or "**www.google.com**"

In the example below, the URL request for **www.abc.com** will be sent to the remote web server because it is listed in the trusted list, whilst the URL request for **www.google** or **www.google.com** will be dropped, because **www.google** is in the forbidden list.


Configuration

▾ Domains Filtering

Domain Name	
Domain Name	
Type	Forbidden Domain

Add Delete

Trusted Domain

Name	Domain	Delete
item1	www.abc	○

Forbidden Domain

Name	Domain	Delete
item0	www.google	○

Return ▸

Example:

Andy wishes to disable all WEB traffic except for ones listed in the trusted domain, which would prevent Bobby from accessing other web sites. Andy selects both functions in the Domain Filtering and thinks that it will stop Bobby. But Bobby knows this function, Domain Filtering, ONLY disables all WEB traffic except for Trusted Domain, BUT not its IP address. If this is the situation, Block surfing by IP address function can be handy and helpful to Andy. Now, Andy can prevent Bobby from accessing other sites.

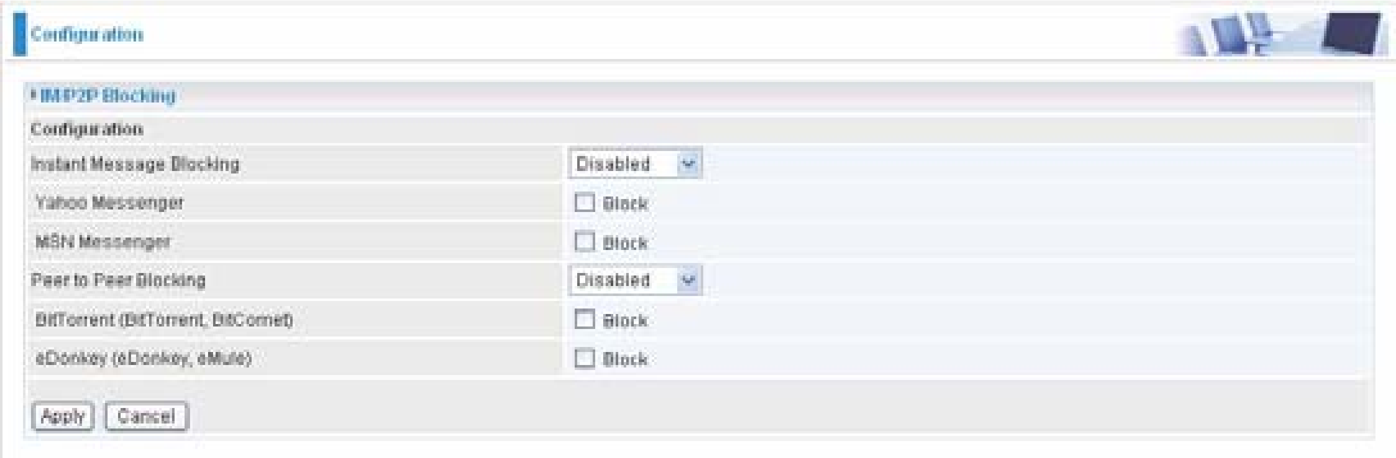
Restrict URL Features: This function enhances the restriction to your URL rules.

- ⓘ **Block Java Applet:** This function can block Web content that includes the Java Applet. It is to prevent someone who wants to damage your system via standard HTTP protocol.

- ⓘ **Block surfing by IP address:** Preventing someone who uses the IP address as URL for skipping Domains Filtering function. Activates only and if Domain Filtering enabled.

IM / P2P Blocking

IM, short for Instant Message, is required to use client program software that allows users to communicate, in exchanging text message, with other IM users in real time over the Internet. A P2P application, known as Peer-to-peer, is group of computer users who share file to specific groups of people across the Internet. Both Instant Message and Peer-to-peer applications make communication faster and easier but your network can become increasingly insecure at the same time. Billion's IM and P2P blocking helps users to restrict LAN PCs to access to the commonly used IM, Yahoo and MSN, and P2P, BitTorrent and eDonkey, applications over the Internet.



IM/P2P Blocking

Configuration	
Instant Message Blocking	Disabled
Yahoo Messenger	□ Block
MSN Messenger	□ Block
Peer to Peer Blocking	Disabled
BitTorrent (BitTorrent, BitComet)	□ Block
eDonkey (eDonkey, eMule)	□ Block

Instant Message Blocking: The default is set to Disabled.

- **Disabled:** Instant Message blocking is not triggered. No action will be performed.
- **Always On:** Action is enabled.
- **TimeSlot1 ~ TimeSlot16:** This is the self-defined time period. You may specify the time period to trigger the blocking, i.e. during working hours. For setup and detail, refer to **Time Schedule** section.

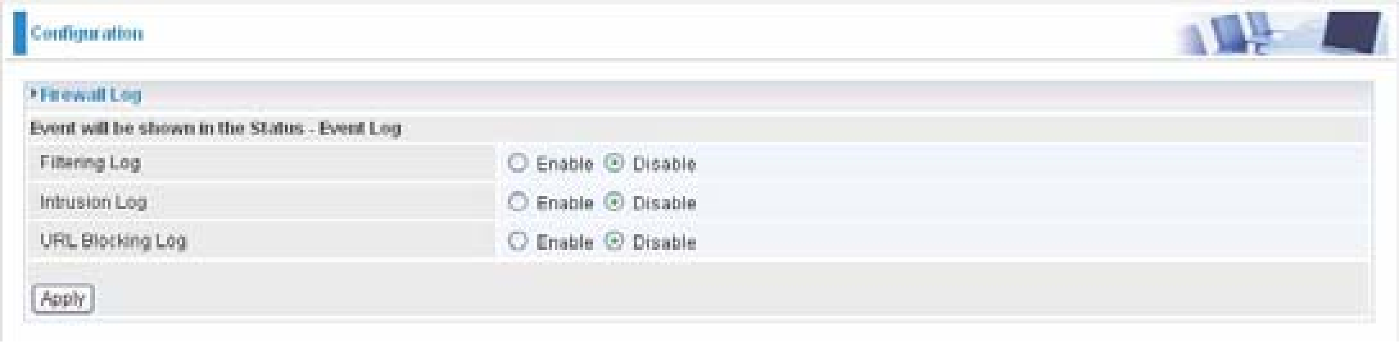
Yahoo/MSN Messenger: Check the box to block either or both Yahoo or/and MSN Messenger.
To be sure you enabled the *Instant Message Blocking* first.

- **Peer to Peer Blocking:** The default is set to Disabled.
- **Disabled:** Instant Message blocking is not triggered. No action will be performed.
- **Always On:** Action is enabled.

TimeSlot1 ~ TimeSlot16: This is the self-defined time period. You may specify the time period to trigger the blocking, i.e. during working hours. For setup and detail, refer to Time Schedule section.

BitTorrent / eDonkey: Check the box to block either or both Bit Torrent or/and eDonkey. To be sure you enabled the Peer to Peer Blocking first.

Firewall Log



Configuration

▸Firewall Log

Event will be shown in the Status - Event Log

Filtering Log	○ Enable ● Disable
Intrusion Log	○ Enable ● Disable
URL Blocking Log	○ Enable ● Disable

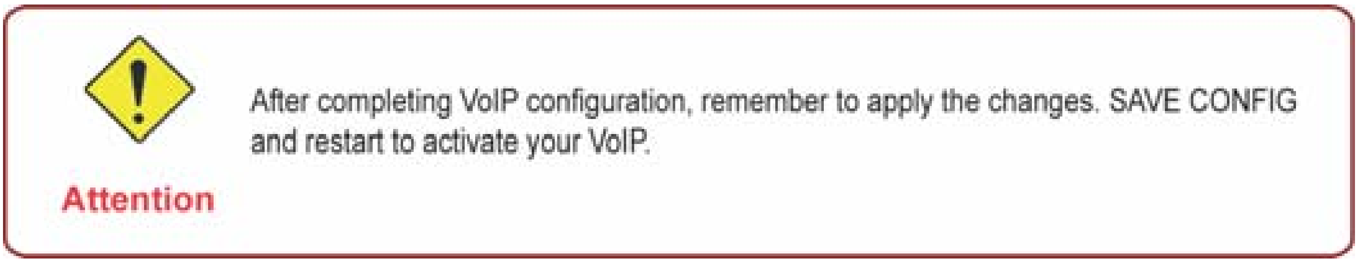
Firewall Log display log information of any unexpected action with your firewall settings.

Check the Enable box to activate the logs.

Log information can be seen in the Status – Event Log after enabling.

VoIP - Voice over Internet Protocol

VoIP enables telephone calls through existing Internet connection instead of going through the PSTN (Public Switched Telephone Network). It is not only cost-effective, especially for a long distance telephone charges, but also toll-quality voice calls over the Internet.



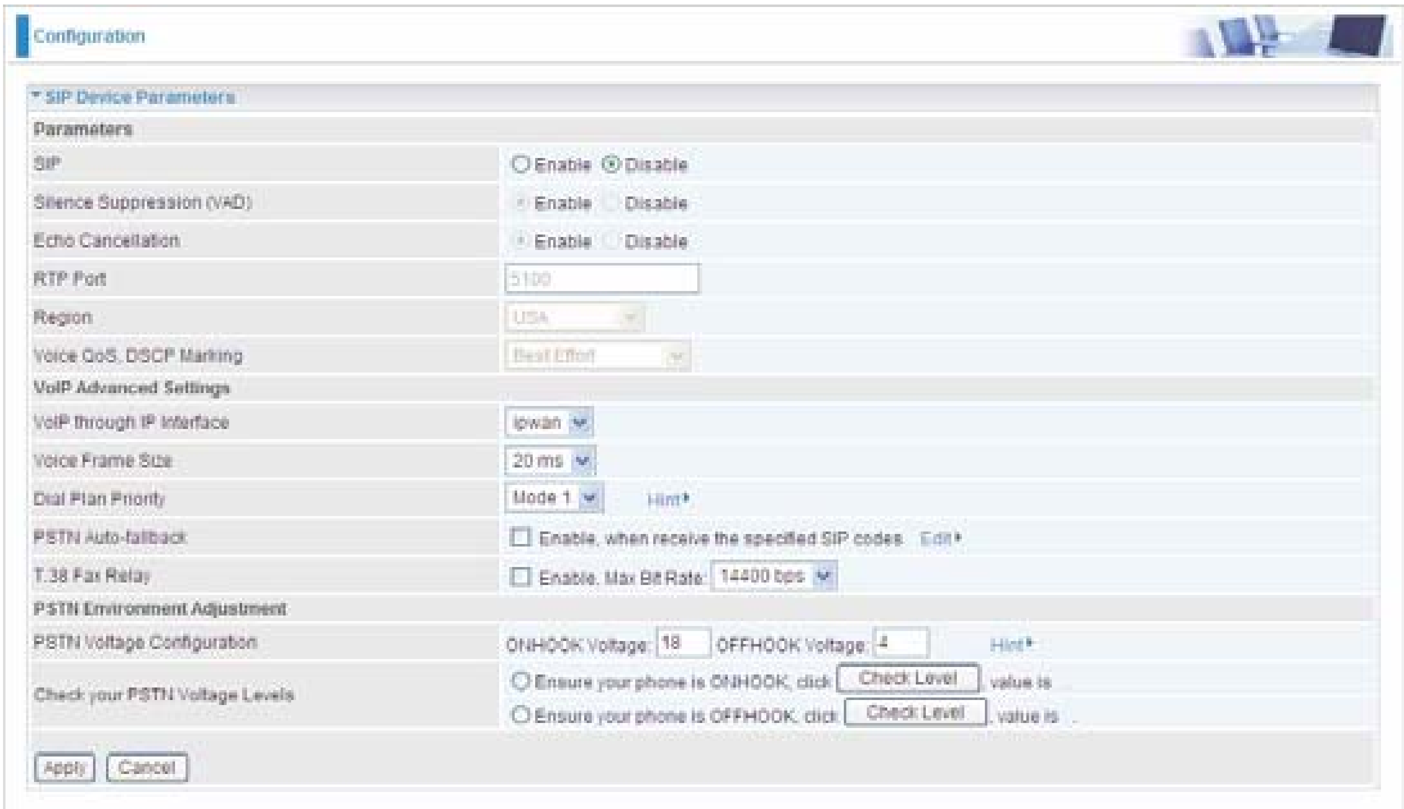
Attention

After completing VoIP configuration, remember to apply the changes. SAVE CONFIG and restart to activate your VoIP.

Here are the items within the VoIP section: **SIP Device Parameters, SIP Accounts, Phone Port, PSTN Dial Plan, VoIP Dial Plan, Call Features, Speed Dial and Ring &Tone.**

SIP Device Parameters

This section provides easy setup for your VoIP service. Phone port 1 and 2 can be registered to different SIP Service Provider.



Configuration

▾ SIP Device Parameters

Parameters	
SIP	○ Enable ● Disable
Silence Suppression (VAD)	● Enable ○ Disable
Echo Cancellation	● Enable ○ Disable
RTP Port	5100
Region	USA
Voice QoS, DSCP Marking	Best Effort
VoIP Advanced Settings	
VoIP through IP Interface	ipwan
Voice Frame Size	20 ms
Dial Plan Priority	Mode 1 Hint
PSTN Auto-fallback	□ Enable, when receive the specified SIP codes Edit
T.38 Fax Relay	□ Enable, Max Bit Rate: 14400 bps
PSTN Environment Adjustment	
PSTN Voltage Configuration	ONHOOK Voltage: 18 OFFHOOK Voltage: 4 Hint
Check your PSTN Voltage Levels	○ Ensure your phone is ONHOOK, click Check Level , value is ○ Ensure your phone is OFFHOOK, click Check Level , value is .

SIP Device Parameters

SIP: To use VoIP SIP as VoIP call signaling protocol. Default is set to Disable.

Silence Suppression (VAD): Voice Activation Detection (VAD) prevents transmitting the nature silence to consume the bandwidth. It is also known as Silence Suppression which is a software application that ensures the bandwidth is reserved only when voice activity is activated. Default is set to Enable.

Echo Cancellation: G.168 echo canceller is an ITU-T standard. It is used for isolating the echo while you are on the phone. This helps you not to hear much of your own voice reflecting on the phone while you talk. Default is set to Enable.

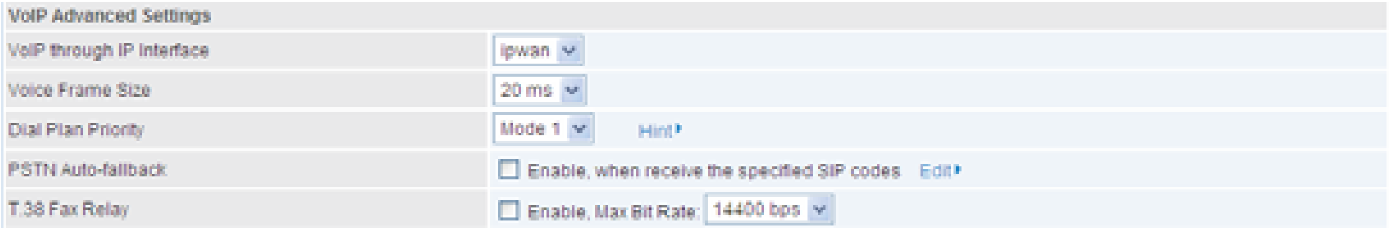
RTP Port: Provide the based value from the media (RTP) ports that are assigned for various endpoints and the different call sessions that may exist within an end-point. (Range from 5100 to 65535, default value is 5100)

Region: This selection is a drop-down box, which allows user to select the country for which the VoIP device must work. When a country is selected, the country parameters are automatically loaded.

Voice QoS, DSCP Marking: Differentiated Services Code Point (DSCP), it is the first 6 bits in the ToS byte. DSCP Marking allows users to assign specific application traffic to be executed in priority by the next Router based on the DSCP value. See Table 4. The DSCP Mapping Table:

Note: To be sure the router(s) in the backbones network have the capability in executing and checking the DSCP through-out the QoS network.

Advanced – Parameters



VoIP Advanced Settings	
VoIP through IP Interface	ipwan ▾
Voice Frame Size	20 ms ▾
Dial Plan Priority	Mode 1 ▾ Hint ▸
PSTN Auto-fallback	□ Enable, when receive the specified SIP codes Edit ▸
T.38 Fax Relay	□ Enable, Max Bit Rate: 14400 bps ▾

VoIP through IP Interface: IP Interface decides where to send/receive the voip traffic; it includes: ipwan and iplan. Easy way to select the interface is to check the location of the SIP server. If it locates some where in the Internet then select **ipwan.** If the VoIP SIP server is on the local Network then select **iplan.**

Voice Frame Size: Frame size is available from 10ms to 60ms. Frame size meaning how many milliseconds the Voice packets will be queued and sent out. It is ideal to have the same frame size in both of Caller and Receiver.

Dial Plan Priority: Define the priority between VoIP and PSTN dial plan.

PSTN Auto-fallback: Whenever VoIP SIP responses error and error code matching with the codes in the **Edit** section, the VoiP calls will automatically fallback to PSTN. In the other word, the call will be called via the PSTN when VoIP SIP returns an error code.

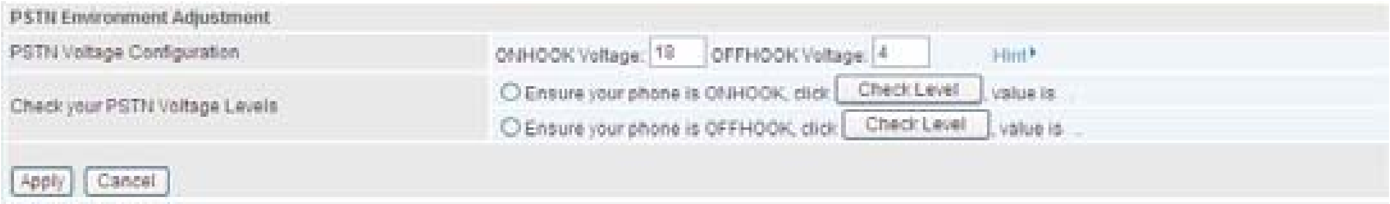
Click the **Edit** to add or remove the responses code. To be sure the code is separated by a comma **(,).**

For more information about SIP responses codes, please check Here ▸ to link to **http://voip-info.org/wiki/view/sip+response+codes** where you can get to know the meaning of each error code.

T.38 Fax Relay: It allows the transfer of facsimile documents in real-time between two standard Group 3 facsimile terminals over the Internet or other networks using IP protocols. It will only function when both sites are support this feature and enabled.

Advanced – PSTN Environment Adjustment

PSTN Environment Adjustment options will help you to adjust the onhook and offhook voltage detection values for your environment. You should use these if the default values are incorrect and result in PSTN calls not being detected properly, e.g. calls being terminated within 5 seconds of being answered. The actual levels are determined by your environment including the number and type of telephones used.



PSTN Environment Adjustment	
PSTN Voltage Configuration	ONHOOK Voltage: 18 OFFHOOK Voltage: 4 Hint ▸
Check your PSTN Voltage Levels	○ Ensure your phone is ONHOOK, click [Check Level] , value is . ○ Ensure your phone is OFFHOOK, click [Check Level] , value is .
[Apply] [Cancel]	

Note: ONHOOK means hung up.

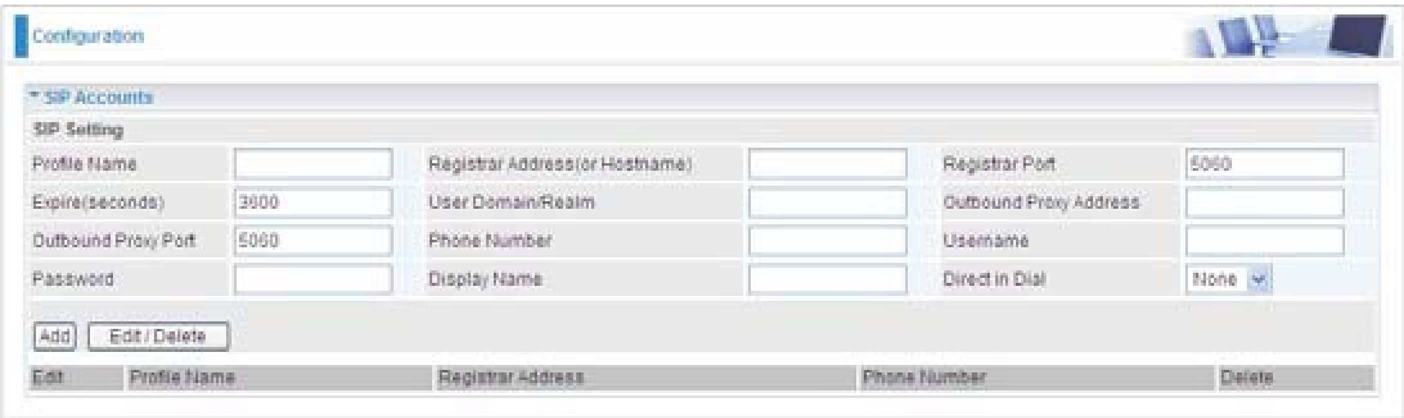
To take your phone OFFHOOK, lift the receiver then press Hook/Flash until you hear your normal PSTN dialtone, not your VoIP dialtone. Wait several seconds and then press Check Level.

You should check the OFFHOOK value for each telephone you have connected to this device. Set the OFFHOOK voltage to the lowest setting registered for all your telephones, e.g. if your telephones return values of 4, 5 and 7 then you should set your OFFHOOK voltage to 4.

Note: The detected values will not automatically be set by the Check Level function; you must enter the lowest level detected after testing all your telephones.

SIP Accounts

This section reflects and contains basic settings for the VoIP module from selected provider in the Wizard section. Fail to provide correct information will halt making calls out to the Internet.



Configuration

SIP Accounts

SIP Setting

Profile Name		Registrar Address(or Hostname)		Registrar Port	5060
Expire(seconds)	3600	User Domain/Realm		Outbound Proxy Address	
Outbound Proxy Port	5060	Phone Number		Username	
Password		Display Name		Direct in Dial	None

Edit	Profile Name	Registrar Address	Phone Number	Delete

Profile Name: User-defined name is for identifying the Profile.

Registrar Address (or Hostname): Indicate the VoIP SIP registrar IP address.

Registrar Port: Specify the port of the VoIP SIP registrar on which it will listen for register requests from VoIP device.

Expire: Expire time for the registration message sending.

User Domain/Realm: Set different domain name for the VoIP SIP proxy server.

Outbound Proxy Address: Indicate the VoIP SIP outbound proxy server IP address. This parameter is very useful when VoIP device is behind a NAT.

Outbound Proxy Port: Specify the port of the VoIP SIP outbound proxy on which it will listen for messages.

Phone Number: This parameter holds the registration ID of the user within the VoIP SIP registrar.

Username: Same as Phone Number.

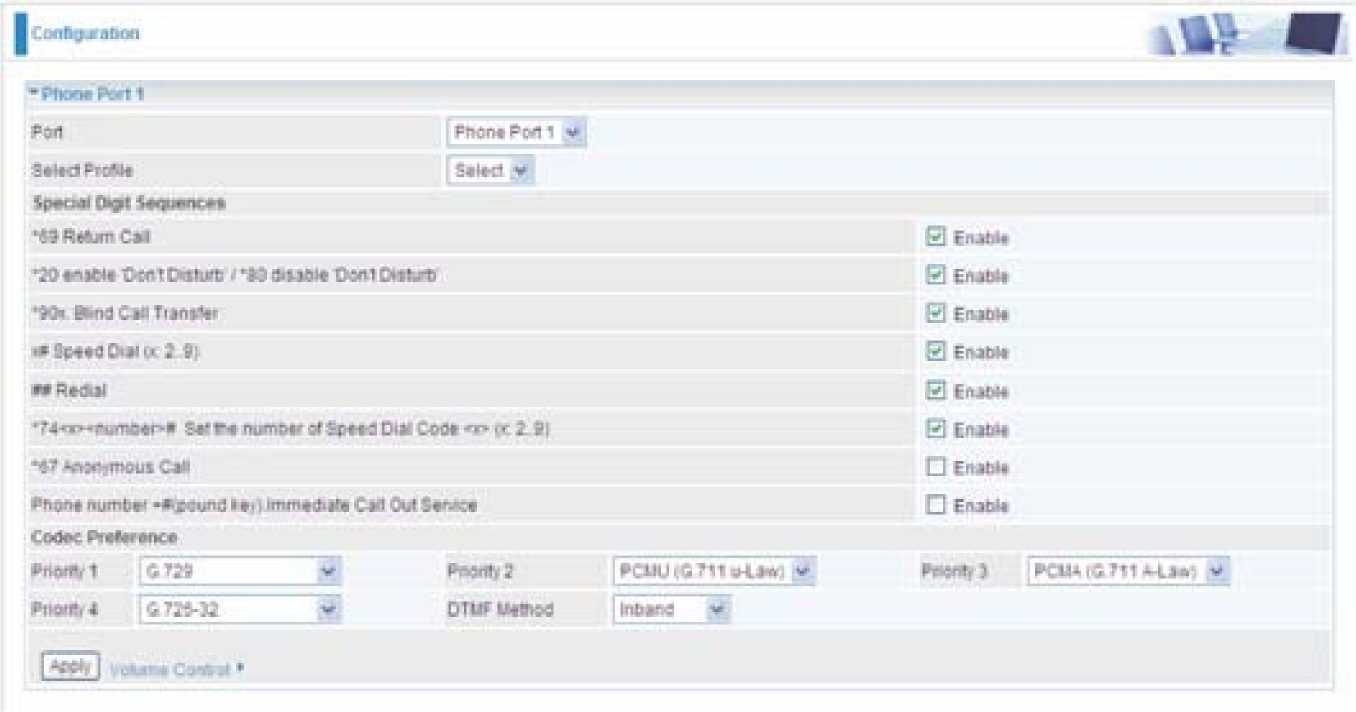
Password: This parameter holds the password used for authentication within VoIP SIP registrar.

Display Name: This parameter will be appeared on the Caller ID.

Direct in Dial: Select the ringing port when getting an incoming VoIP call.

Phone Port

This section displays status and allows you to edit the account information of your Phones. Click Edit to update your phone information.



Configuration

▾ Phone Port 1

Port	Phone Port 1
Select Profile	Select

Special Digit Sequences

*69 Return Call	☑ Enable
*20 enable 'Don't Disturb' / *80 disable 'Don't Disturb'	☑ Enable
*90x Blind Call Transfer	☑ Enable
x# Speed Dial (x: 2..9)	☑ Enable
## Redial	☑ Enable
*74<x><number># Set the number of Speed Dial Code <x> (x: 2..9)	☑ Enable
*67 Anonymous Call	□ Enable
Phone number +#(pound key) Immediate Call Out Service	□ Enable

Codec Preference

Priority 1	G.729	Priority 2	PCMU (G.711 u-Law)	Priority 3	PCMA (G.711 A-Law)
Priority 4	G.726-32	DTMF Method	Inband		

Select Profile: It allows you to select a desired VoIP provider whom is not defined already in the *SIP Service Provider.* You may manually setup the SIP accounts by entering VoIP SIP information to *User-defined Profile***.** See below for details.

***69 (Return Call):** Dial *69 to return the last missed call. It is only available for VoIP call(s).

***20 (Do not Disturb ON):** Dial *20 to set the No Disturb on. Your phone will not ring if someone calls.

***80 (Do not Disturb OFF):** Dial *80 to set the No Disturb off. Your will be able to hear ring tone when someone calls.

***90x (Blind Call Transfer):** Dial *90 + phone-number to translate a call to a third party. This feature is enabled by default.

x# Speed Dial (x:2..9): Refer to Phone Port section in the Web GUI. Set up your Speed Dial phone book first before accessing the Speed Dial feature. It is enabled by default.

## Redial: Press ## to redial the latest number you dialed. This feature is enabled by default.

***74<x><number>#:** Use your phone key pad to insert a phone number to the Speed Dial phone book. Or you can update your Speed Dial phone number manually. Refer to the Phone Port section in the Web GUI for details.

***67 Anonymous Call:** Hide the own phone number for each call and it will not be displayed on the remote site. It is only applied to the next call when you enter this control character. The detailed operation procedure is “Off Hook -> *67 -> On Hook -> Off Hook -> Dial”. This feature is disabled by default.

Phone Number + #: This is the fast dial which you can dial out a phone number immediately without waiting.

Note: Refer to Special Dial Code section in this Manual for more details.

Codec Preference

Codec is known as Coder-Decoder used for data signal conversion. Set the priority of voice compression; Priority 1 owns the top priority.

G.729: It is used to encoder and decoder voice information into a single packet which reduces the bandwidth consumption.

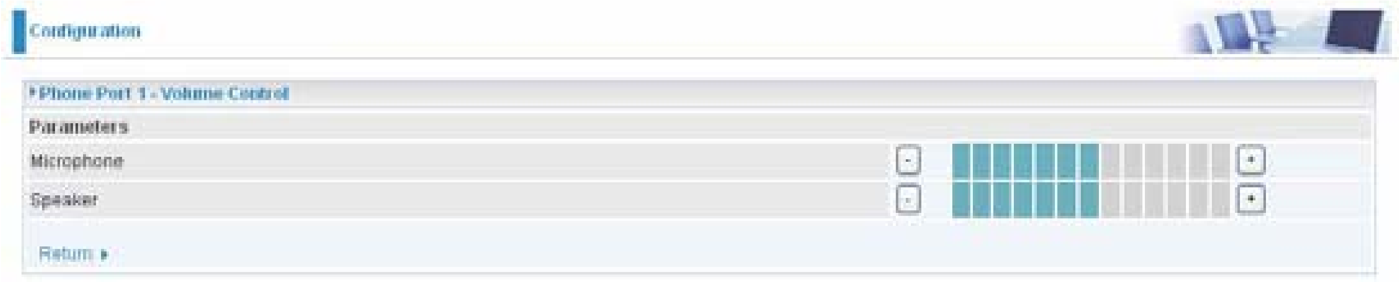
G.711μ-LAW: It is a basic non-compressed encoder and decoder technique. μ-LAW uses pulse code modulation (PCM) encoder and decoder to convert 14-bit linear sample.

G.711A-LAW: It is a basic non-compressed encoder and decoder technique. A-LAW uses pulse code modulation (PCM) encoder and decoder to convert 13-bit linear sample.

G.726-32: It is used to encoder and decoder voice information into a single packet which reduces the bandwidth consumption. Currently only supports bit rate with 32Kbps.

DTMF Method: The Inband, RFC 2833 and SIP INFO (RFC 2976) are supported.

Volume Control



Volume control helps you to adjust the voice quality of telephone to the best comfortable listening level.

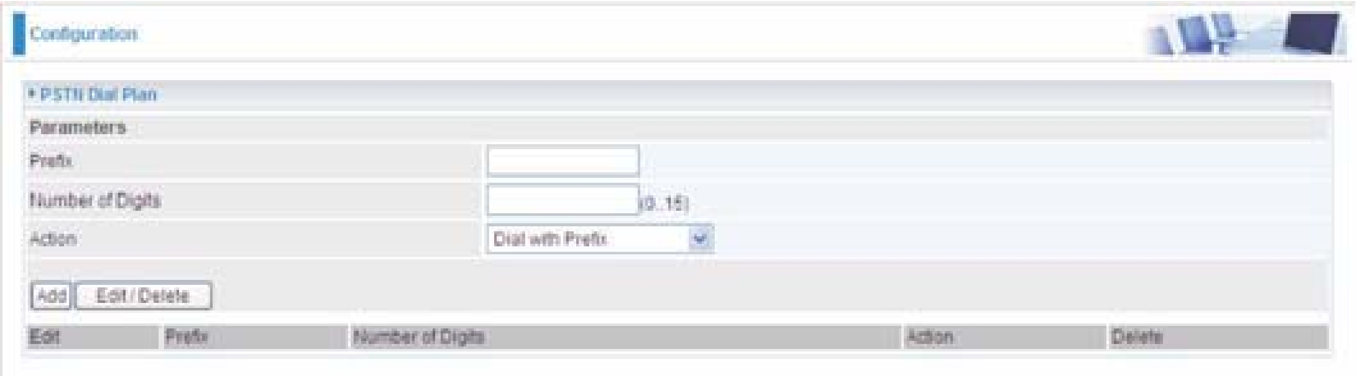
Press “-“, the minus sign, to reduce either microphone or/both speaker’s level of your telephone.

Press “+“, the plus sign, to increase either microphone or/both speaker’s level of your telephone.

PSTN Dial Plan (Router with LINE port only)

This section enables you to configure “VoIP with PSTN switching” on your system. You can define a range of dial plans to make regular call from VoIP switching to PSTN line. Prefix numbers is essential key to make a distinguishing between VoIP and Regular phone call. If actual numbers dialed matches with prefix number defined in this dial plan, the dialed number will be routed to the PSTN to make a regular call. Otherwise, the number will be routed to the VoIP networks.

Reminder! In order to utilize this feature, you must have registered and connected to your SIP Server first.



Prefix:

Number of Digits: (0..15)

Action: Dial with Prefix

Edit	Prefix	Number of Digits	Action	Delete

Prefix: Specify number(s) for switching to a PSTN call.

Number of Digits: Specify the total number of digits wish to dial out. Maximum digit number is 15.

Action: Specify a dialing method you wish to make PSTN call(s).

ⓘ **Dial with Prefix:** The dialed number ***with*** prefix will be sent call through the PSTN.

Note: The actual dialed number of valid digits length requires matching in the Number of Digits filed.

ⓘ **Dial without Prefix:** The dialed number will be sent call through the PSTN ***without*** prefix.

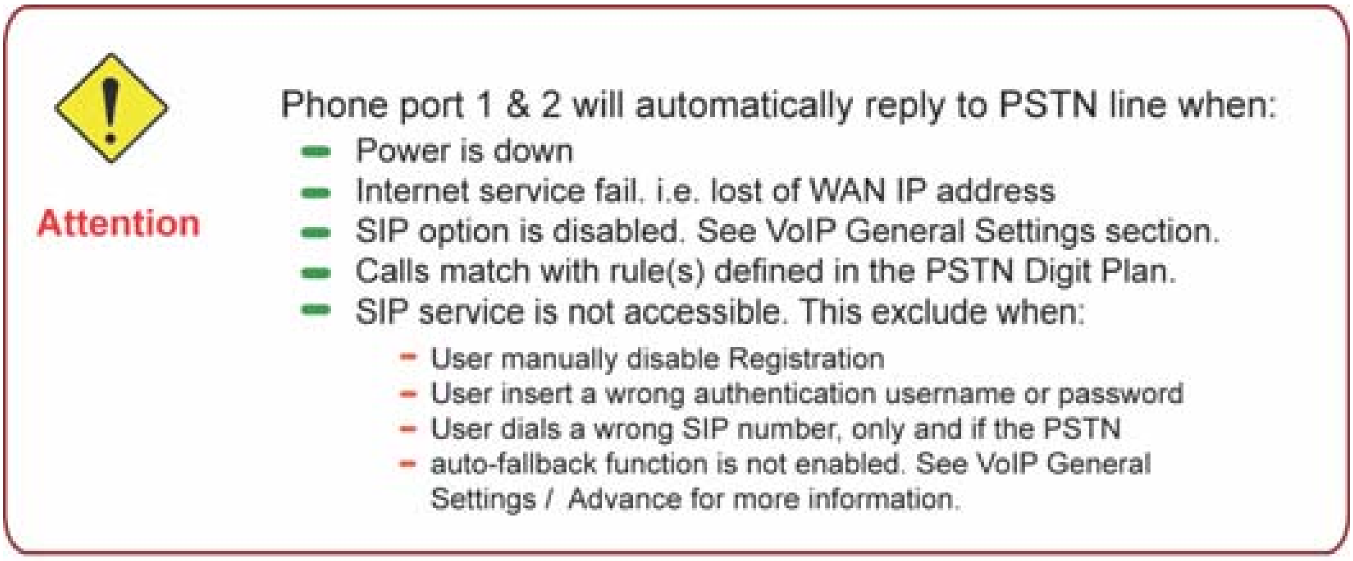
Note: The actual dialed number of valid digits length requires matching in the Number of Digits filed.

ⓘ **Dial at Timeout:** The dialed number will be sent call through the PSTN ***with*** the prefix when timeout starts. This timeout activates when no more digits are dialed in a specific duration.

Note: The actual dialed number of valid digits length MUST NOT exceed in the Number of Digits filed.

ⓘ **Dial at Timeout no Prefix:** The dialed number will be sent call through the PSTN ***without*** prefix when timeout starts. This timeout activates when no more digits are dialed in a specific duration.

Note: The actual dialed number of valid digits length MUST NOT exceed in the Number of Digits filed.



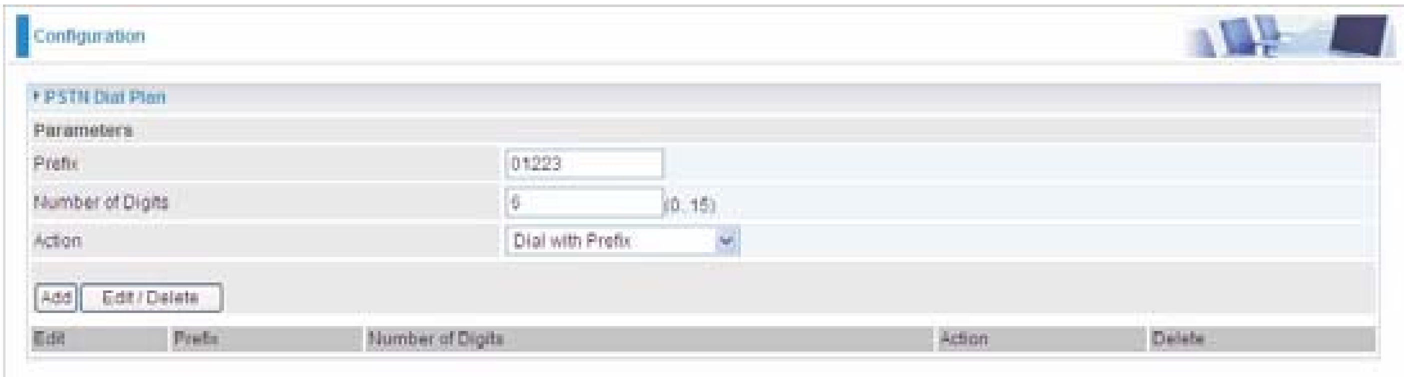
Attention

Phone port 1 & 2 will automatically reply to PSTN line when:

- Power is down
- Internet service fail. i.e. lost of WAN IP address
- SIP option is disabled. See VoIP General Settings section.
- Calls match with rule(s) defined in the PSTN Digit Plan.
- SIP service is not accessible. This exclude when:
  - User manually disable Registration
  - User insert a wrong authentication username or password
  - User dials a wrong SIP number, only and if the PSTN
  - auto-fallback function is not enabled. See VoIP General Settings / Advance for more information.

PSTN Dial Plan Examples:

1. Dial with Prefix



Configuration

PSTN Dial Plan

Parameters

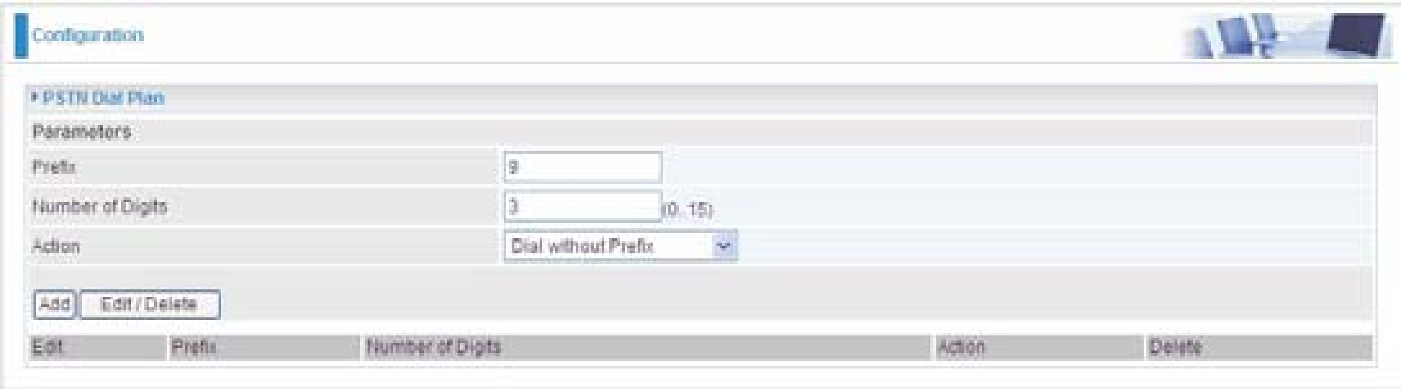
Prefix	01223
Number of Digits	6 (0..15)
Action	Dial with Prefix

Add | Edit / Delete

Edit	Prefix	Number of Digits	Action	Delete

If you dial 01223 707070, number 01223707070 will be dialed out via FXO to make a regular phone call.

2. Dial without Prefix



Configuration

PSTN Dial Plan

Parameters

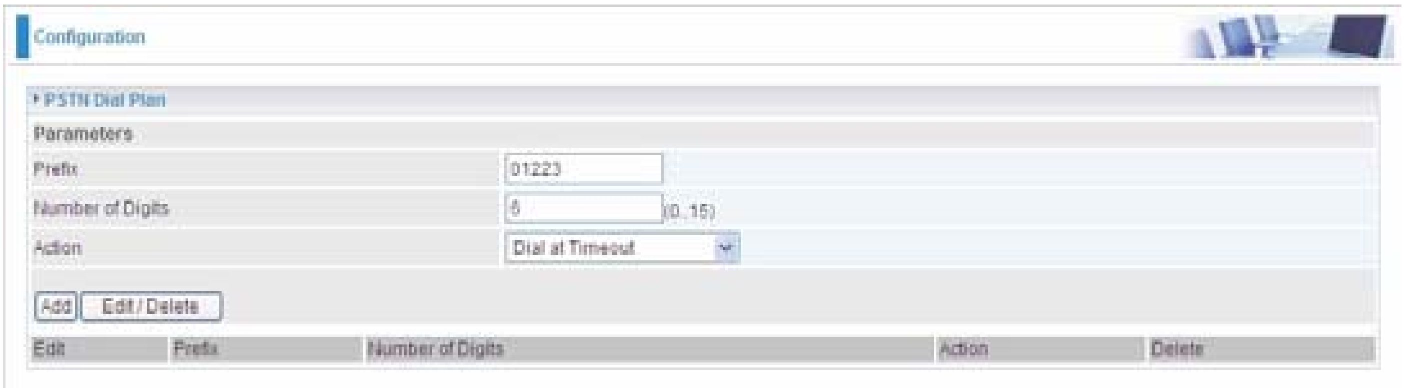
Prefix	9
Number of Digits	3 (0..15)
Action	Dial without Prefix

Add | Edit / Delete

Edit	Prefix	Number of Digits	Action	Delete

If you dial 9102, the number 102 will only be dialed out via FXO port to make a regular phone call.

3. Dial at Timeout



Configuration

PSTN Dial Plan

Parameters

Prefix	01223
Number of Digits	6 (0..15)
Action	Dial at Timeout

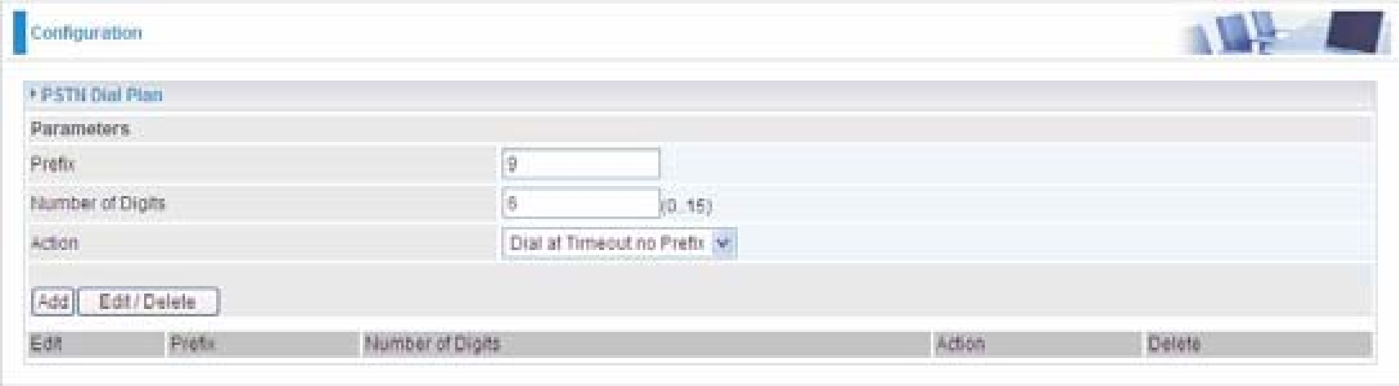
Add | Edit / Delete

Edit	Prefix	Number of Digits	Action	Delete

If you only dial 01223 7070 and no more numbers, after the timeout activates, 012237070 will be dialed to make a regular call via FXO port.

Even though 7070 (only 4 digits) does not match with number of digits 6 defined in the filed, 7070 is still a valid phone number since it has not exceeded 6 digits.

4. Dial at Timeout no Prefix



PSTN Dial Plan

Parameters

Prefix	9
Number of Digits	6 (0..15)
Action	Dial at Timeout no Prefix

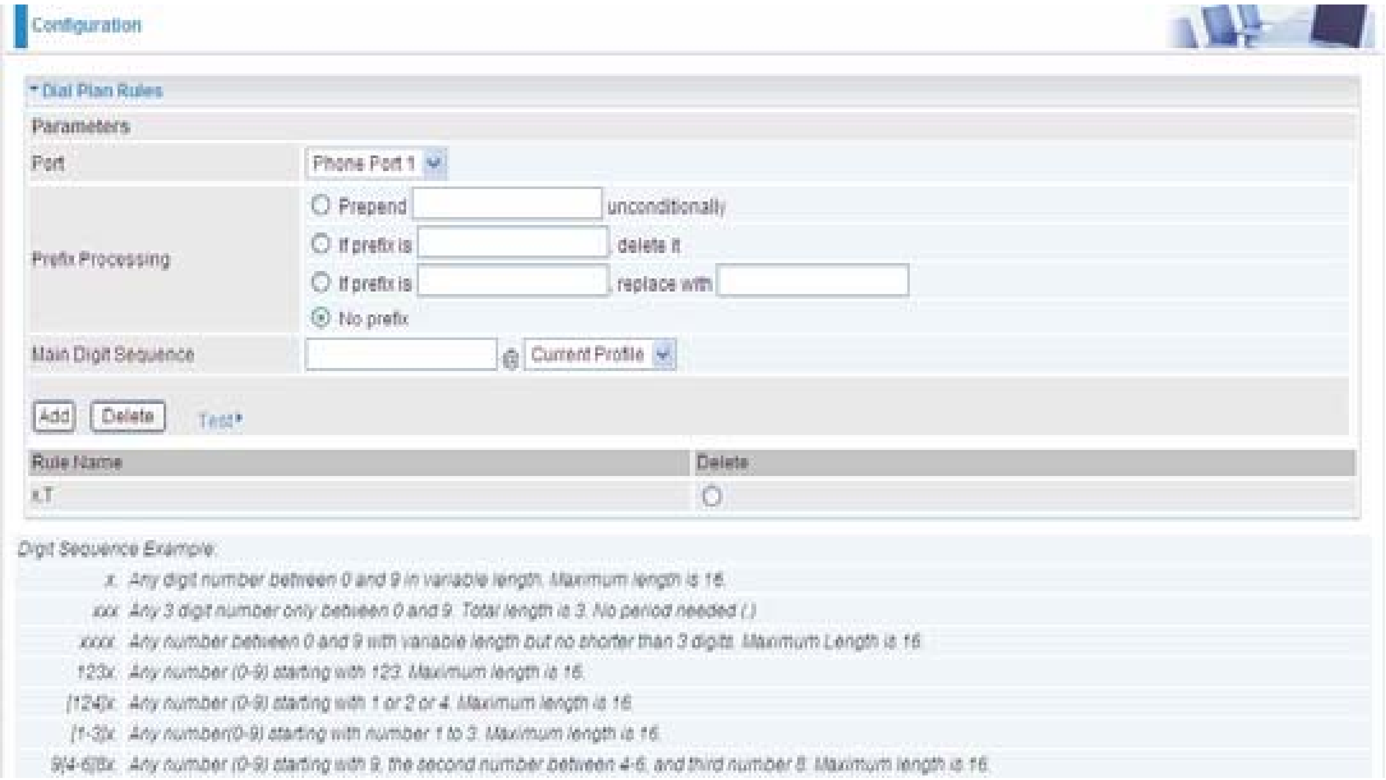
Edit	Prefix	Number of Digits	Action	Delete

If you only dial 97070 and no more numbers, after the timeout activates, 7070 will be dialed without prefix to make a regular call via FXO port.

Even though 7070 (only 4 digits) does not match with number of digits 6 defined in the filed, 7070 is still a valid phone number since it has not exceed 6 digits.

VoIP Dial Plan

This section helps you to make a telephony number dialed as making a regular call via VoIP. You no longer need to memorize a long dial string of number for making a VoIP call. Go to Configuration > VoIP > VoIP Dial Plan > Edit.



Configuration

▾ Dial Plan Rules

Parameters

Port	Phone Port 1
Prefix Processing	○ Prepend ______ unconditionally ○ If prefix is ______ delete it ○ If prefix is ______ replace with ______ ● No prefix
Main Digit Sequence	______ Current Profile

Rule Name	Delete
x.T	○

Digit Sequence Example:

x.	Any digit number between 0 and 9 in variable length. Maximum length is 16.
xxx	Any 3 digit number only between 0 and 9. Total length is 3. No period needed (.)
xxxx.	Any number between 0 and 9 with variable length but no shorter than 3 digits. Maximum Length is 16
123x.	Any number (0-9) starting with 123. Maximum length is 16.
[124]x.	Any number (0-9) starting with 1 or 2 or 4. Maximum length is 16.
[1-3]x.	Any number(0-9) starting with number 1 to 3. Maximum length is 16.
9[4-6]8x.	Any number (0-9) starting with 9, the second number between 4-6, and third number 8. Maximum length is 16.

Parameters

A listed of special dial feature comes handy when you have a miss call or need to transfer a call to a third party. Details please refer to the section **Special dial codes** below.

***69 (Return Call):** Dial *69 to return the last missed call. It is only available for VoIP call(s).

***20 (Do not Disturb ON):** Dial *20 to set the No Disturb on. Your phone will not ring if someone calls.

***80 (Do not Disturb OFF):** Dial *80 to set the No Disturb off. Your will be able to hear ring tone when someone calls.

***90x (Blind Call Transfer):** Dial *90 + phone-number to translate a call to a third party. This feature is enabled by default.

x# Speed Dial (x:2..9): Refer to **Phone Port** section in the Web GUI. Set up your Speed Dial phone book first before accessing the Speed Dial feature. It is enabled by default.

## Redial: Press ## to redial the latest number you dialed. This feature is enabled by default.

***74<x><number>#:** Use your phone key pad to insert a phone number to the Speed Dial phone book. Or you can update your Speed Dial phone number manually. Refer to the **Phone Port** section in the Web GUI for details.

***67 Anonymous Call:** Hide the own phone number for each call and it will not be displayed on the remote site. It is only applied to the next call when you enter this control character. The detailed operation procedure is “Off Hook -> *67 -> On Hook -> Off Hook -> Dial”. This feature is disabled by default.

Phone Number + #: This is the fast dial which you can dial out a phone number immediately without waiting.

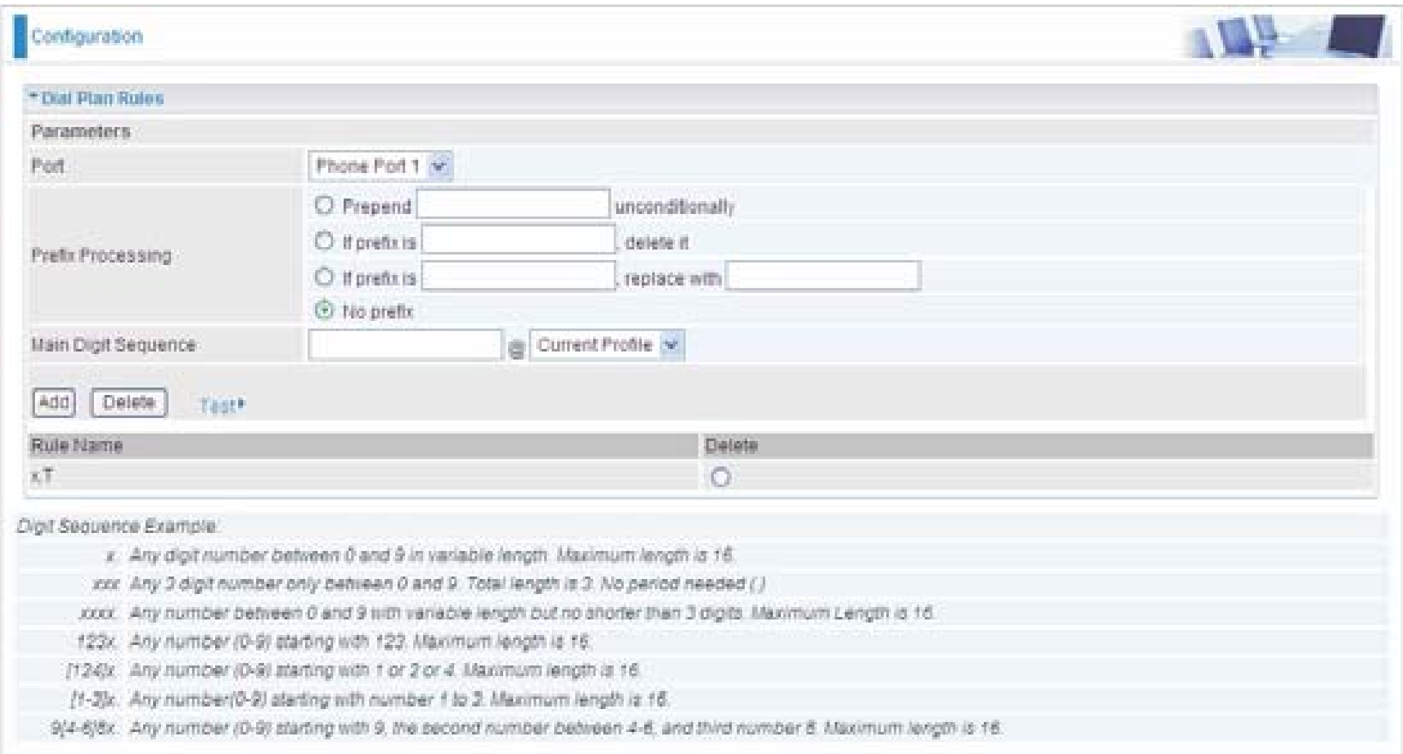
Note: Refer to Special Dial Code section in this Manual for more details.

Test: It is a tool to help to identify the call number is being properly being processed prior to making an actual call.

Click **Apply** to apply the settings.

Dial Plan Rules List

Click the Add button to create and define a VoIP dial-plan rule(s).



Configuration

▾ Dial Plan Rules

Parameters

Port	Phone Port 1
Prefix Processing	○ Prepend ______ unconditionally ○ If prefix is ______ , delete it ○ If prefix is ______ , replace with ______ ● No prefix
Main Digit Sequence	______ Current Profile

Rule Name	Delete
x.T	○

Digit Sequence Example:

x.	*Any digit number between 0 and 9 in variable length. Maximum length is 16.*
xxx	*Any 3 digit number only between 0 and 9. Total length is 3. No period needed (.)*
xxxx.	*Any number between 0 and 9 with variable length but no shorter than 3 digits. Maximum Length is 16.*
123x.	*Any number (0-9) starting with 123. Maximum length is 16.*
[124]x.	*Any number (0-9) starting with 1 or 2 or 4. Maximum length is 16.*
[1-3]x.	*Any number(0-9) starting with number 1 to 3. Maximum length is 16.*
9[4-6]8x.	*Any number (0-9) starting with 9, the second number between 4-6, and third number 8. Maximum length is 16.*

Prefix Processing:

Prepend xxx unconditionally: xxx number is appended unconditionally to the front of the dialing number when making a call. Prefix can also be included with any number and/or character such as **+**, *****, **#**.

Note: For special service with +, *, #, you may need to check with your VoIP or Local Telephone Service Provider for information.

If Prefix is xxx, delete it: Prefix xxx is removed from the dialing numbers before making a call.

If Prefix is xxx, replace with: Prefix xxx is appended to the front of the dialing numbers when making a call.

No prefix: No prefix is appended to the front of the dialing numbers. It is set as in default settings.

Main Digit Sequence: The call(s) can be called out via SIP or PSTN or ENUM.

x: Any numeric number between 0 and 9.

. (period): Repeat numeric number(s) between 0 and 9.

*** (asterisk sign):** It is normal character '*' on phone key pad. Please check if special service(s) is provided by your VoIP Service Provider or your Local Telephone Service Provider.

# (pound sign): It is normal character '#' on phone key pad. Please check if it is provided by your VoIP Service Provider or Local Telephone Service Provider for special service(s).

<@ Current Profile>: Referring to the VoIP account registered on the *VoIP Wizard* for Port 1 / 2.

<@ PSTN>: Meaning making call(s) via the PSTN line.

<@ENUM>: Meaning making a VoIP SIP direct call via E.164 number ("ENUM") to an ENUM callee.

Electronic Number (ENUM) uses the DNS (Domain Network System) based technology to map between a traditional phone number (PSTN) to an Internet addresses/ SIP URL. The ENUM number must be registered via a public ENUM site or your VoIP Service Provider.

<@ SIPgateway>: It is used for the Intelligent Call Routing feature where you need to set up your SIP account on the VoIP User-defined Profiles link on the VoIP Wizard page. Go to the VoIP Wizard in this manual for more information.

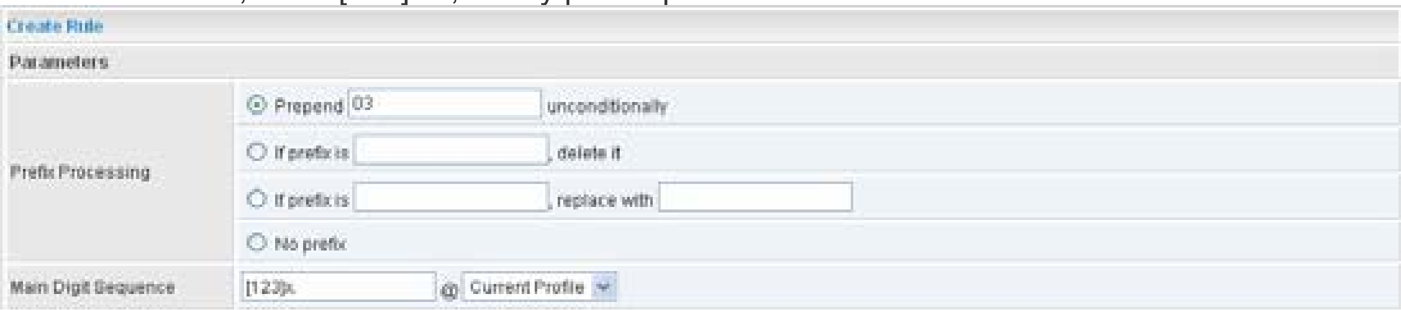
Dial-Plan Examples:	Description
x.	Any digit number between 0 and 9 in variable length. Maximum length is 16.
xxx	Any 3 digit number only between 0 and 9. Total length is 3. ***Note: No period is needed (.)***
xxxx.	Any number between 0 and 9 with variable length but no shorter than 3 digits. Maximum length is 16.
123x.	Any number (0-9) starting with 123. Maximum length is 16.
[x…x]x. For example: [124]x.	Any number (0-9) starting with 1 or 2 or 4. Maximum length is 16.
[x-x]x. For example: [1-3]x.	Any number (0-9) starting with number 1 to 3. Maximum length is 16.
x[x-x]x. For example: 9[4-6]8x.	Any number (0-9) starting with 9, the second number between 4-6, and third number 8. Maximum length is 16.
Special Dial Plan Examples:	**Description**
*xx*x.	Starting with '* sign' + any two digit numbers + any number (0-9) in variable length. Maximum length is 16.
*xx	Starting with '* sign' + any 2 digit numbers between 0 and 9. Total length including the * is 3. ***Note: No period is needed (.)***
**xx*x.	Starting with '** sign' + any two digit numbers between 0 + any number (0-9) in variable length. Maximum length is 16.
#xx.	Starting with '# sign' + any digit number (0-9) in variable length but no shorter than 1 digits. Maximum length is 16.
##xx*x.	Starting with '## sign' + any two digit numbers + '* sign' + any number (0-9) in variable length. Maximum length is 16.

Intelligent Call Routing Example:

VoIP Gateway let you use 3 VoIP/SIP providers at the same time. VoIP/SIP providers are

localcheap.com, **longdischeap.com** and **mobilecheap.com**. Each provider has its price for different type of calls and I can set the following rule for each providers.

1. Phone 1: For Local calls: I use localcheap.com that charges $0.01 per minute to all local calls. I set a dial rule, <:03>[123]x.T, on my phone port 1.



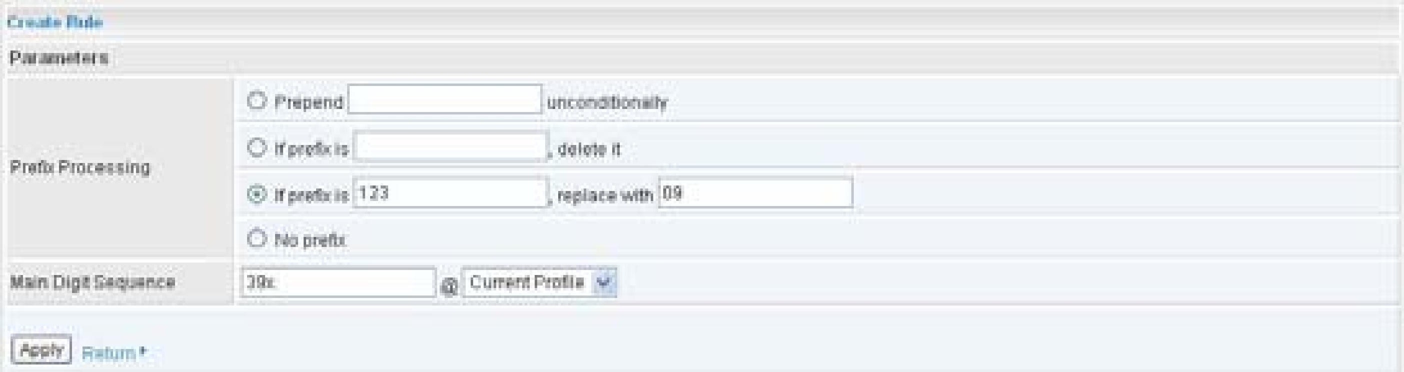
Create Rule

Parameters

Prefix Processing	● Prepend 03 unconditionally
	○ If prefix is , delete it
	○ If prefix is , replace with
	○ No prefix
Main Digit Sequence	[123]x @ Current Profile

Localcheap.com is the default VoIP provider I set on phone port 1. When I call out any number start with 1 or 2 or 3 and plus rest of the phone number for local call, 03 is always prepended in front of these number. If 23295 are dialed, 03-2-32935 is the actual phone number called out via localcheap.com provider.

2. Phone 2: For Mobile calls: I use mobilecheap.com that charges $0.25 per minute to all local calls. I set a dial rule, <123:09>39x.T, on my phone port 2.



Create Rule

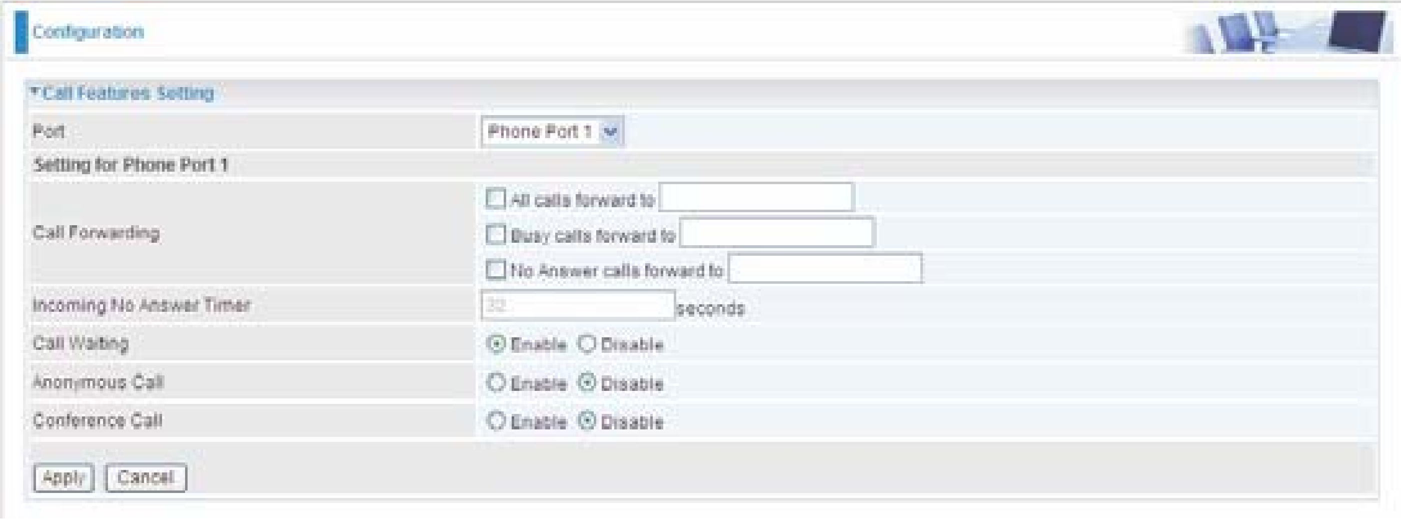
Parameters

Prefix Processing	○ Prepend unconditionally
	○ If prefix is , delete it
	● If prefix is 123 , replace with 09
	○ No prefix
Main Digit Sequence	39x @ Current Profile

Mobilecheap.com is the default VoIP provider I set on phone port 2. When I call out 123-39-45678 for a mobile call, 123 is replaced with 09. Therefore, 09-39-45678 is the actual phone number called out via Mobilecheap.com provider.

The Intelligent Call Gateway not only saves time from changing VoIP settings to different provider to make call get routed to specific gateway(s) automatically but also taking advantage of different call rate.

Call Feature

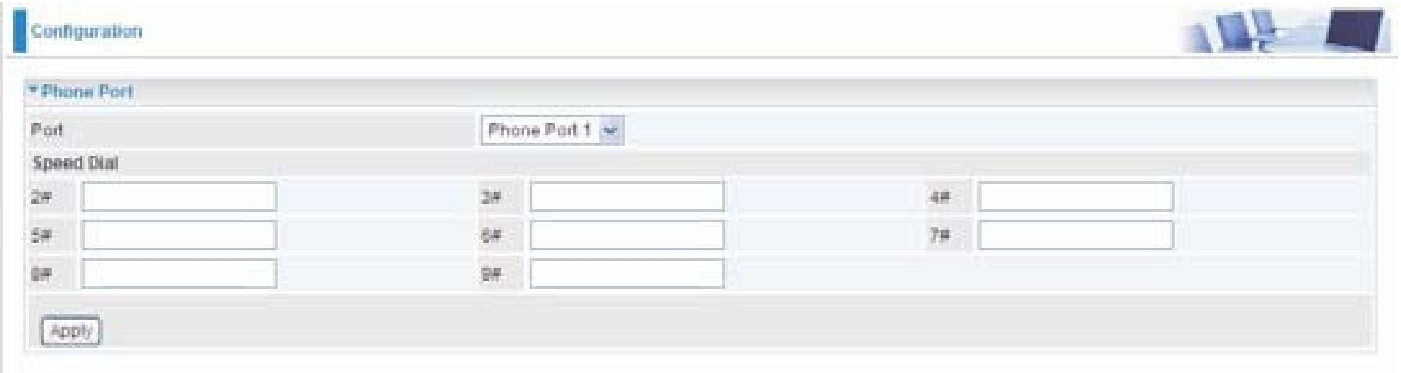


Configuration

Call Features Setting

Port	Phone Port 1
Setting for Phone Port 1	
Call Forwarding	□ All calls forward to □ Busy calls forward to □ No Answer calls forward to
Incoming No Answer Timer	32 seconds
Call Waiting	● Enable ○ Disable
Anonymous Call	○ Enable ● Disable
Conference Call	○ Enable ● Disable

Speed Dial



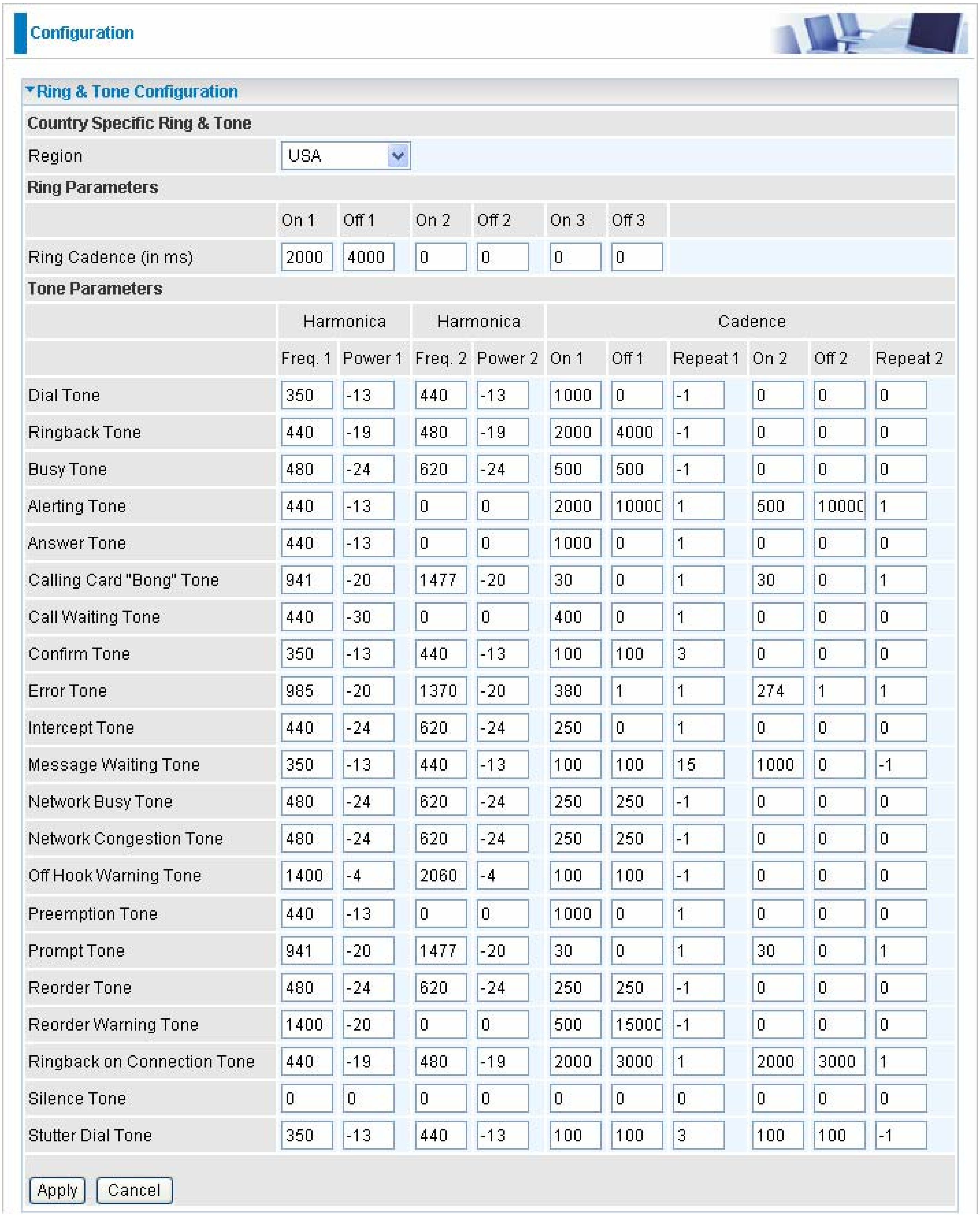
Configuration

Phone Port

Port	Phone Port 1				
Speed Dial					
2#		3#		4#	
5#		6#		7#	
8#		9#			

Ring & Tone

This section allows advanced user to change the existing or newly defined parameters for the various ring tones (dial tone, busy tone, answer tone and etc.)



Configuration

▾Ring & Tone Configuration

Country Specific Ring & Tone

Region: USA

Ring Parameters

	On 1	Off 1	On 2	Off 2	On 3	Off 3
Ring Cadence (in ms)	2000	4000	0	0	0	0

Tone Parameters

	Harmonica		Harmonica		Cadence					
	Freq. 1	Power 1	Freq. 2	Power 2	On 1	Off 1	Repeat 1	On 2	Off 2	Repeat 2
Dial Tone	350	-13	440	-13	1000	0	-1	0	0	0
Ringback Tone	440	-19	480	-19	2000	4000	-1	0	0	0
Busy Tone	480	-24	620	-24	500	500	-1	0	0	0
Alerting Tone	440	-13	0	0	2000	1000C	1	500	1000C	1
Answer Tone	440	-13	0	0	1000	0	1	0	0	0
Calling Card "Bong" Tone	941	-20	1477	-20	30	0	1	30	0	1
Call Waiting Tone	440	-30	0	0	400	0	1	0	0	0
Confirm Tone	350	-13	440	-13	100	100	3	0	0	0
Error Tone	985	-20	1370	-20	380	1	1	274	1	1
Intercept Tone	440	-24	620	-24	250	0	1	0	0	0
Message Waiting Tone	350	-13	440	-13	100	100	15	1000	0	-1
Network Busy Tone	480	-24	620	-24	250	250	-1	0	0	0
Network Congestion Tone	480	-24	620	-24	250	250	-1	0	0	0
Off Hook Warning Tone	1400	-4	2060	-4	100	100	-1	0	0	0
Preemption Tone	440	-13	0	0	1000	0	1	0	0	0
Prompt Tone	941	-20	1477	-20	30	0	1	30	0	1
Reorder Tone	480	-24	620	-24	250	250	-1	0	0	0
Reorder Warning Tone	1400	-20	0	0	500	1500C	-1	0	0	0
Ringback on Connection Tone	440	-19	480	-19	2000	3000	1	2000	3000	1
Silence Tone	0	0	0	0	0	0	0	0	0	0
Stutter Dial Tone	350	-13	440	-13	100	100	3	100	100	-1

Country Specific Ring & Tone

Region: Select a country ring-tone, from the drop-down list, where you are located. This VoIP router provides default parameter of ring tones according to different countries. The ring-tone parameters are automatically displayed after entering a specific country. If your country is not in the list, you may manually create ring-tone parameters.

Ring Parameters

Ring Cadence (in ms): Ring cadence is defined by three fields, Frequency: On Time1, Off Time1, On Time2, Off Time2 and On Time3, Off Time3. Frequency is specified in Hertz. Time is given in milliseconds.

Tone Parameters

You may need to check with your local telephone service provider for such information. Also, it is recommended that this option be configured by advanced user unless you are instructed to do so.

Click **Apply** to apply the settings.

QoS - Quality of Service

QoS function helps you to control your network traffic for each application from LAN (Ethernet and/or Wireless) to WAN (Internet). It facilitates you to control the different quality and speed of through put for each application when the system is running with full loading of upstream.

Here are the items within the QoS section: **Prioritization, Outbound IP Throttling & Inbound IP Throttling (bandwidth management).**

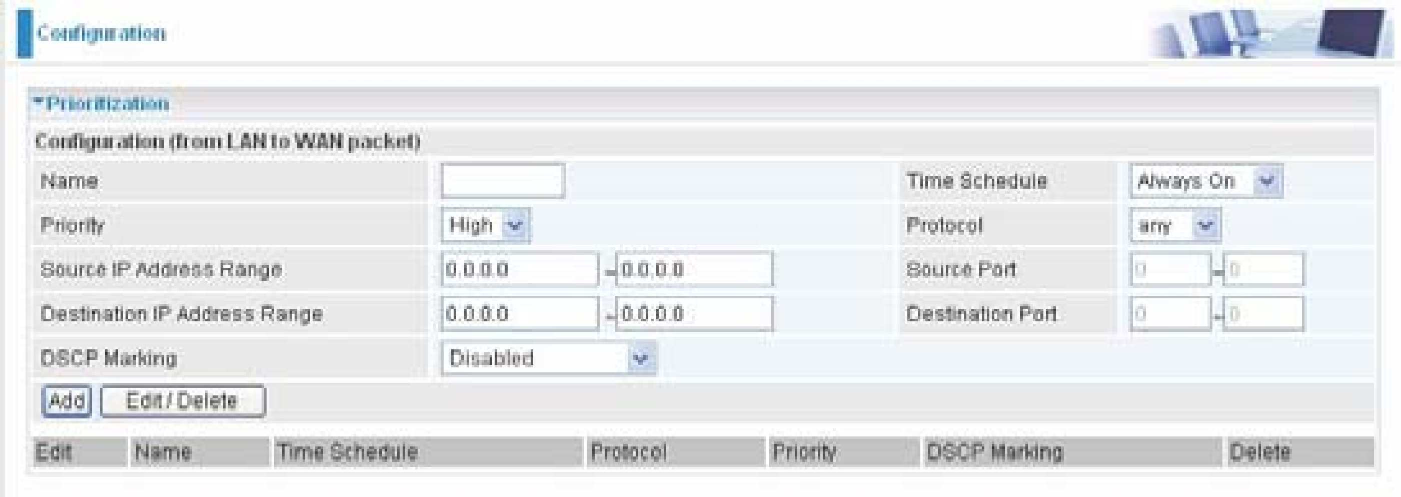
Prioritization

There are three priority settings to be provided in the Router:

- **High**
- **Normal** (The default is normal priority for all of traffic without setting)
- **Low**

And the balances of utilization for each priority are High (60%), Normal (30%) and Low (10%).

To delete the application, you can choose Delete option and then click Edit/Delete.



Configuration

▾Prioritization

Configuration (from LAN to WAN packet)

Name		Time Schedule	Always On
Priority	High	Protocol	any
Source IP Address Range	0.0.0.0 - 0.0.0.0	Source Port	0 - 0
Destination IP Address Range	0.0.0.0 - 0.0.0.0	Destination Port	0 - 0
DSCP Marking	Disabled		

Add | Edit / Delete

Edit	Name	Time Schedule	Protocol	Priority	DSCP Marking	Delete

Name: User-define description to identify this new policy/application.

Time Schedule: Scheduling your prioritization policy.

Priority: The priority given to each policy/application. Its default setting is set to High; you may adjust this setting to fit your policy/application.

Protocol: The name of supported protocol.

Source IP Address Range: The source IP address or range of packets to be monitored.

Source Port: The source port of packets to be monitored.

Destination IP Address Range: The destination IP address or range of packets to be monitored.

Destination Port: The destination port of packets to be monitored.

DSCP Marking: Differentiated Services Code Point (DSCP), it is the first 6 bits in the ToS byte. DSCP Marking allows users to assign specific application traffic to be executed in priority by the next Router based on the DSCP value. See Table 4 for **DSCP Mapping Table**.

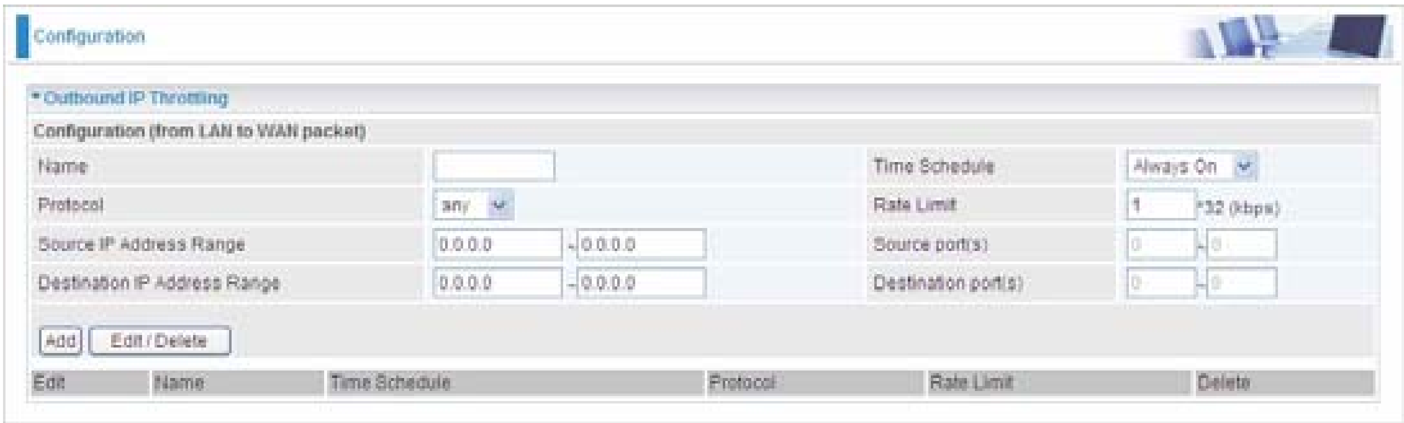
Note: To be sure the router(s) in the backbones network have the capability in executing and checking the DSCP through-out the QoS network.

Table 4: DSCP Mapping Table

DSCP Mapping Table	
(Wireless) ADSL Router	Standard DSCP
Disabled	None
Best Effort	Best Effort (000000)
Premium	Express Forwarding (101110)
Gold service (L)	Class 1, Gold (001010)
Gold service (M)	Class 1, Silver (001100)
Gold service (H)	Class 1, Bronze (001110)
Silver service (L)	Class 2, Gold (010010)
Silver service (M)	Class 2, Silver (010100)
Silver service (H)	Class 2, Bronze (010110)
Bronze service (L)	Class 3, Gold (011010)
Bronze service (M)	Class 3, Silver (011100)
Bronze service (H)	Class 3, Bronze (011110)

Outbound IP Throttling (LAN to WAN)

IP Throttling allows you to limit the speed of IP traffic. The value entered will limit the speed of the application that you set to the specified value's multiple of 32kbps.



Configuration

▪ Outbound IP Throttling

Configuration (from LAN to WAN packet)

Name		Time Schedule	Always On
Protocol	any	Rate Limit	1 *32 (kbps)
Source IP Address Range	0.0.0.0 ~ 0.0.0.0	Source port(s)	0 ~ 0
Destination IP Address Range	0.0.0.0 ~ 0.0.0.0	Destination port(s)	0 ~ 0

Edit	Name	Time Schedule	Protocol	Rate Limit	Delete

Name: User-define description to identify this new policy/name.

Time Schedule: Scheduling your prioritization policy. Refer to **Time Schedule** for more information.

Protocol: The name of supported protocol.

Rate Limit: To limit the speed of outbound traffic

Source IP Address Range: The source IP address or range of packets to be monitored.

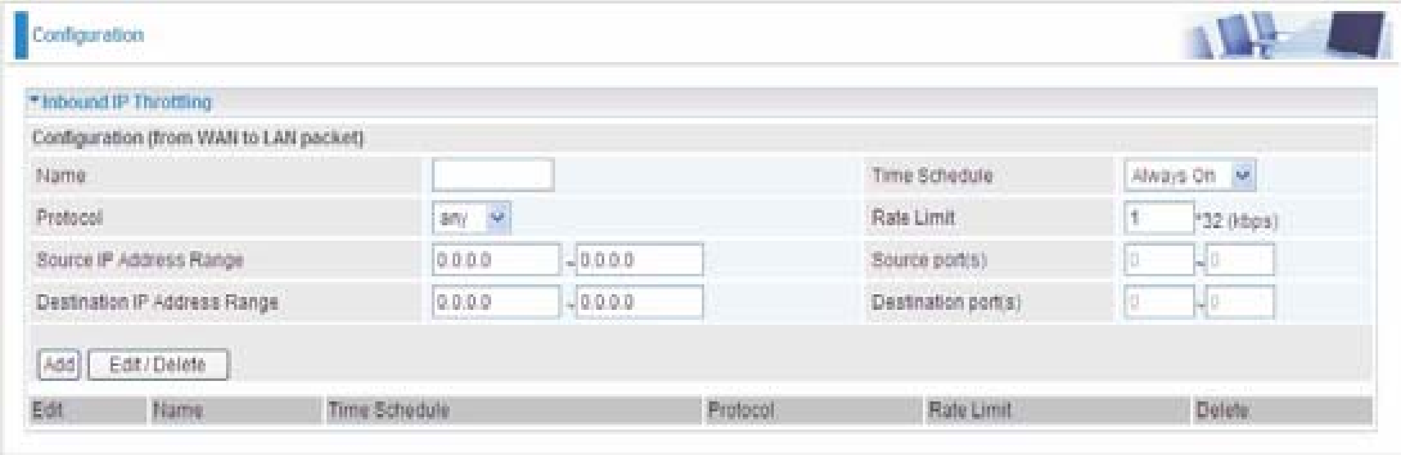
Source Port(s): The source port of packets to be monitored.

Destination IP Address Range: The destination IP address or range of packets to be monitored.

Destination Port(s): The destination port of packets to be monitored.

Inbound IP Throttling (WAN to LAN)

IP Throttling allows you to limit the speed of IP traffic. The value entered will limit the speed of the application that you set to the specified value's multiple of 32kbps.



Configuration (from WAN to LAN packet)

Name		Time Schedule	Always On
Protocol	any	Rate Limit	1 *32 (kbps)
Source IP Address Range	0.0.0.0 ~ 0.0.0.0	Source port(s)	0 ~ 0
Destination IP Address Range	0.0.0.0 ~ 0.0.0.0	Destination port(s)	0 ~ 0

Edit	Name	Time Schedule	Protocol	Rate Limit	Delete

Name: User-define description to identify this new policy/application.

Time Schedule: Scheduling your prioritization policy. Refer to **Time Schedule** for more information.

Protocol: The name of supported protocol.

Rate Limit: To limit the speed of for inbound traffic.

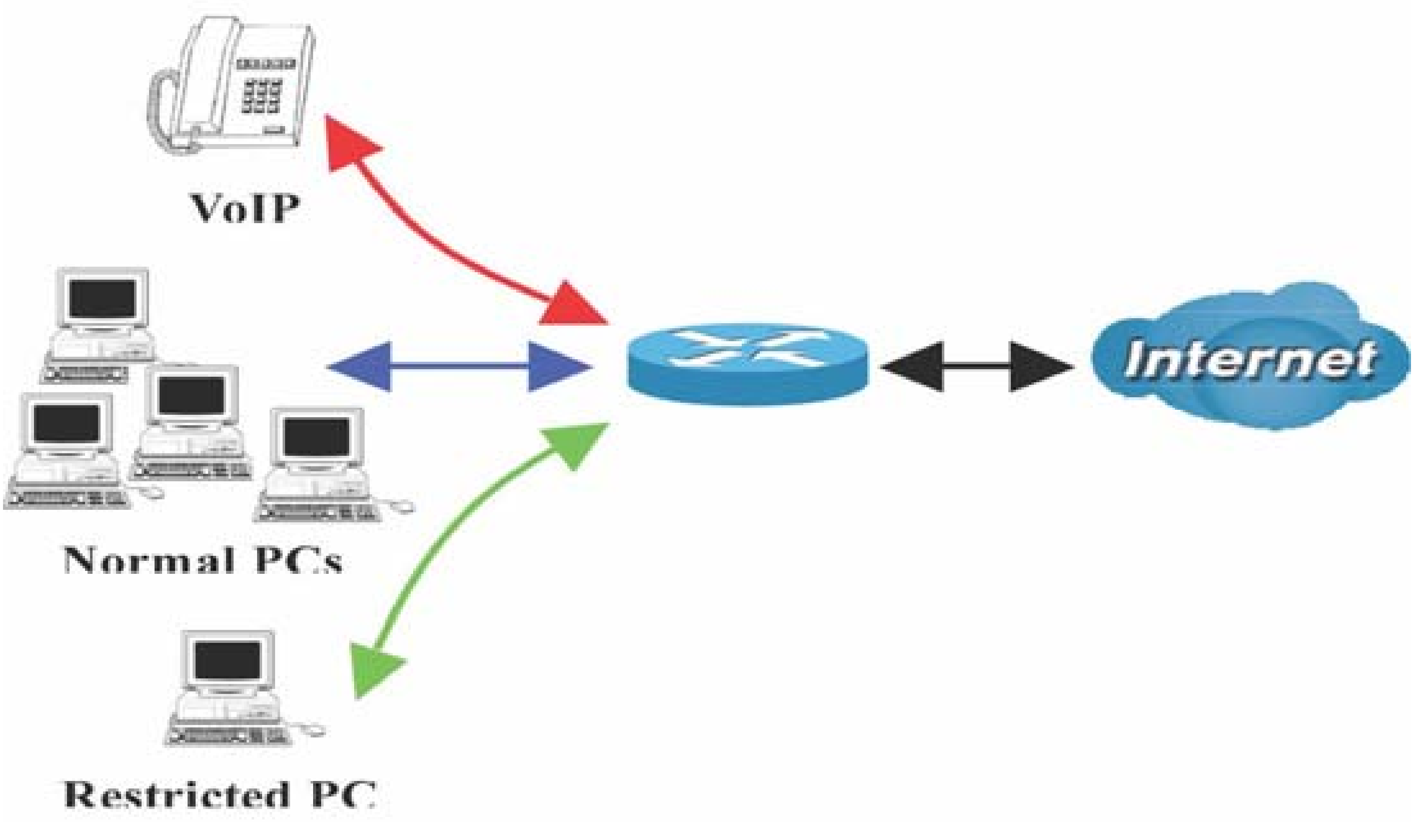
Source IP Address Range: The source IP address or range of packets to be monitored.

Source Port(s): The source port of packets to be monitored.

Destination IP Address Range: The destination IP address or range of packets to be monitored.

Destination Port(s): The destination port of packets to be monitored.

Example: QoS for your Network



Information and Settings

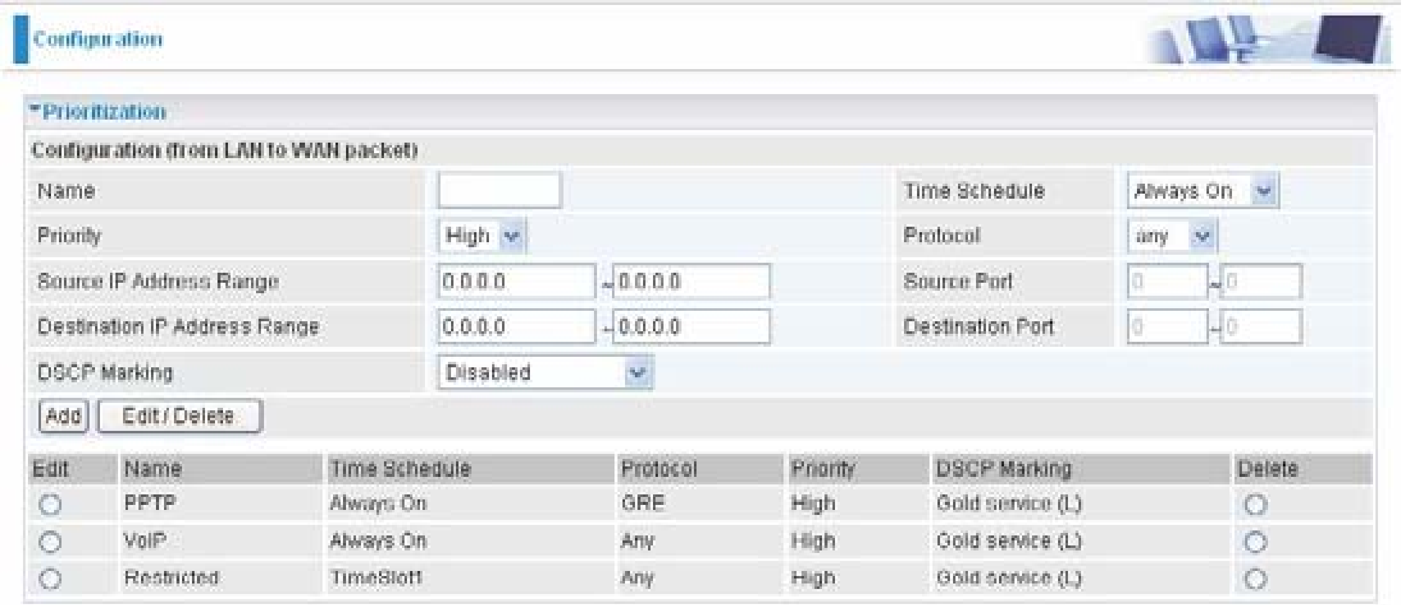
Upstream: 928 kbps

Downstream: 8 Mbps

VoIP User : 192.168.1.1

Normal Users : 192.168.1.2~192.168.1.5

Restricted User: 192.168.1.100



Configuration

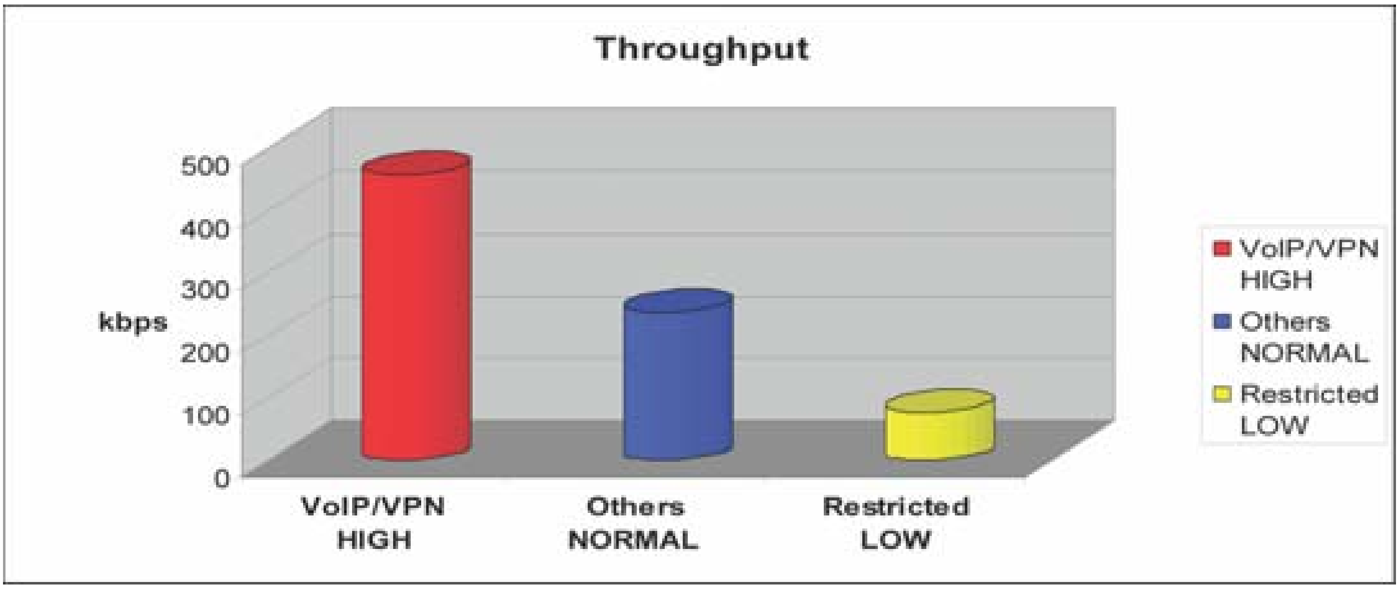
Prioritization

Configuration (from LAN to WAN packet)

Name		Time Schedule	Always On
Priority	High	Protocol	any
Source IP Address Range	0.0.0.0 ~ 0.0.0.0	Source Port	0 ~ 0
Destination IP Address Range	0.0.0.0 ~ 0.0.0.0	Destination Port	0 ~ 0
DSCP Marking	Disabled		

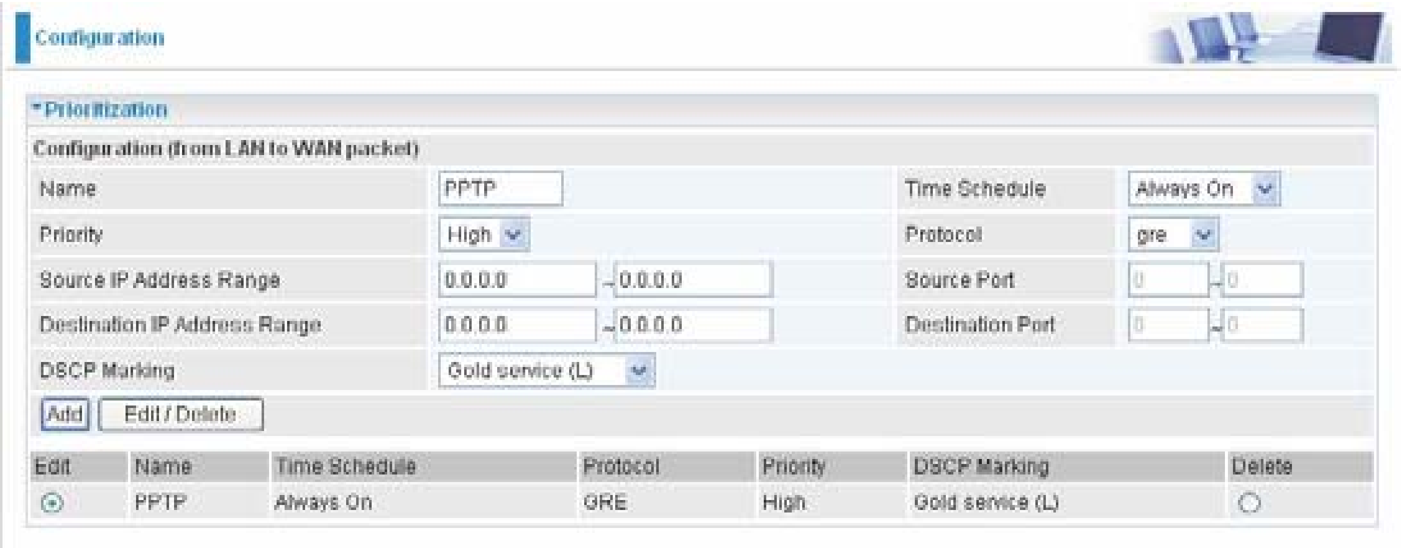
Add | Edit / Delete

Edit	Name	Time Schedule	Protocol	Priority	DSCP Marking	Delete
○	PPTP	Always On	GRE	High	Gold service (L)	○
○	VoIP	Always On	Any	High	Gold service (L)	○
○	Restricted	TimeSlot1	Any	High	Gold service (L)	○



Mission-critical application

Mostly the VPN connection is mission-critical application for doing data exchange between head and branch office.



Configuration

▾Prioritization

Configuration (from LAN to WAN packet)

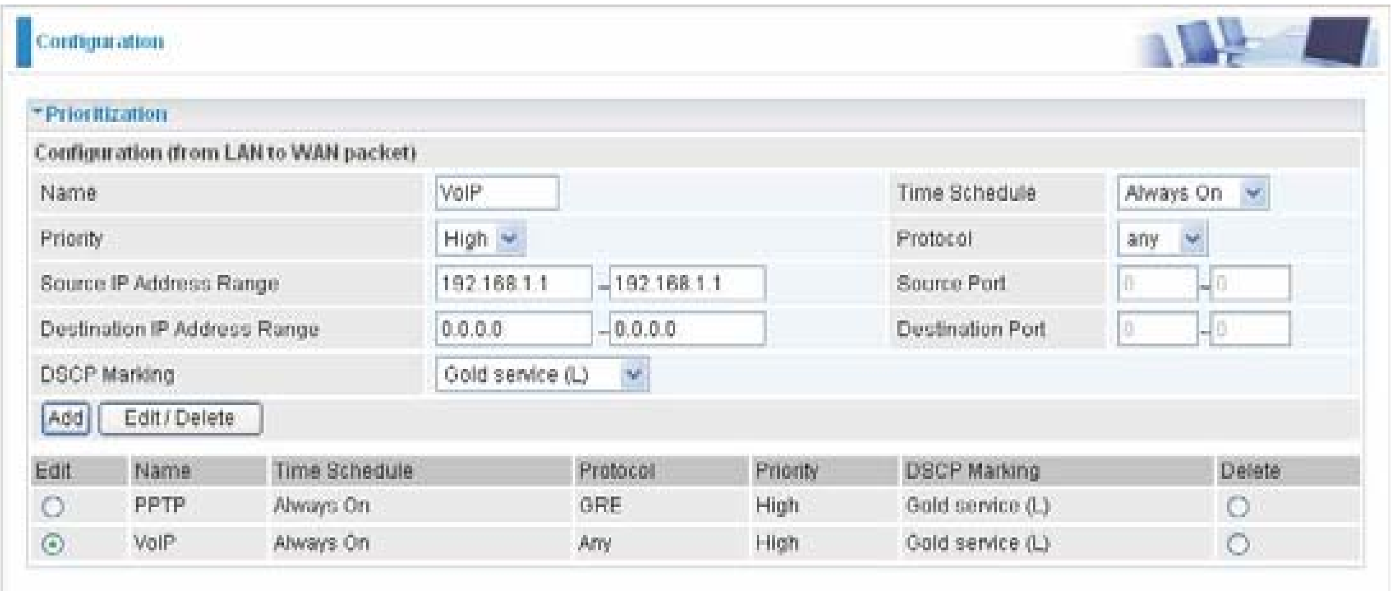
Name	PPTP	Time Schedule	Always On
Priority	High	Protocol	gre
Source IP Address Range	0.0.0.0 - 0.0.0.0	Source Port	0 - 0
Destination IP Address Range	0.0.0.0 - 0.0.0.0	Destination Port	0 - 0
DSCP Marking	Gold service (L)		

Edit	Name	Time Schedule	Protocol	Priority	DSCP Marking	Delete
●	PPTP	Always On	GRE	High	Gold service (L)	○

The mission-critical application must be sent out smoothly without any dropping. Set priority as high level for preventing any other applications to saturate the bandwidth.

Voice application

Voice is latency-sensitive application. Most VoIP devices are use SIP protocol and the port number will be assigned by SIP module automatically. Better to use fixed IP address for catching VoIP packets as high priority.



Configuration

▾Prioritization

Configuration (from LAN to WAN packet)

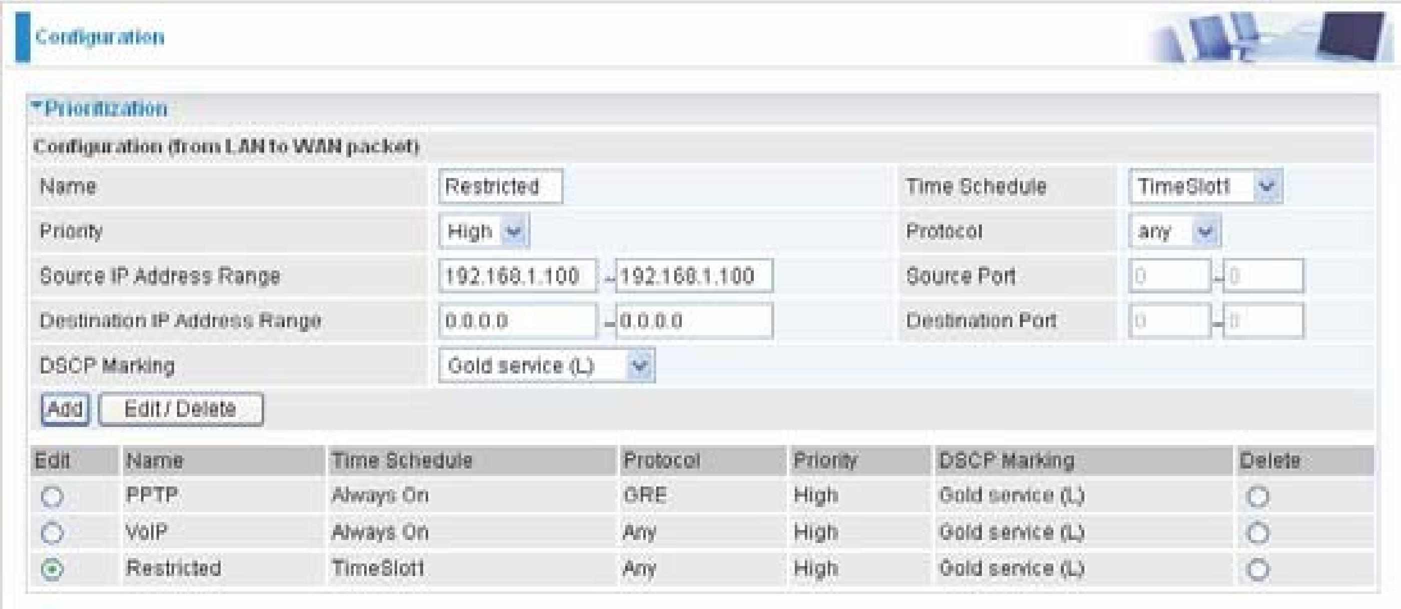
Name	VoIP	Time Schedule	Always On
Priority	High	Protocol	any
Source IP Address Range	192.168.1.1 - 192.168.1.1	Source Port	0 - 0
Destination IP Address Range	0.0.0.0 - 0.0.0.0	Destination Port	0 - 0
DSCP Marking	Gold service (L)		

Edit	Name	Time Schedule	Protocol	Priority	DSCP Marking	Delete
○	PPTP	Always On	GRE	High	Gold service (L)	○
●	VoIP	Always On	Any	High	Gold service (L)	○

Above settings will help to improve quality of your VoIP service when traffic is full loading.

Restricted Application

Some of companies will setup FTP server for customer downloading or home user sharing their files by using FTP.



Configuration

▼Prioritization

Configuration (from LAN to WAN packet)

Name	Restricted	Time Schedule	TimeSlot1
Priority	High	Protocol	any
Source IP Address Range	192.168.1.100 - 192.168.1.100	Source Port	0 - 0
Destination IP Address Range	0.0.0.0 - 0.0.0.0	Destination Port	0 - 0
DSCP Marking	Gold service (L)		

Edit	Name	Time Schedule	Protocol	Priority	DSCP Marking	Delete
○	PPTP	Always On	GRE	High	Gold service (L)	○
○	VoIP	Always On	Any	High	Gold service (L)	○
●	Restricted	TimeSlot1	Any	High	Gold service (L)	○

With above settings that help to limit utilization of upstream of FTP. Time schedule also help you to only limit utilization at daytime.

Advanced setting by using IP throttling

With IP throttling you can specify more detail for allocating bandwidth; even the applications are located in the same level.

Upstream: 928kbps (29*32kbps)

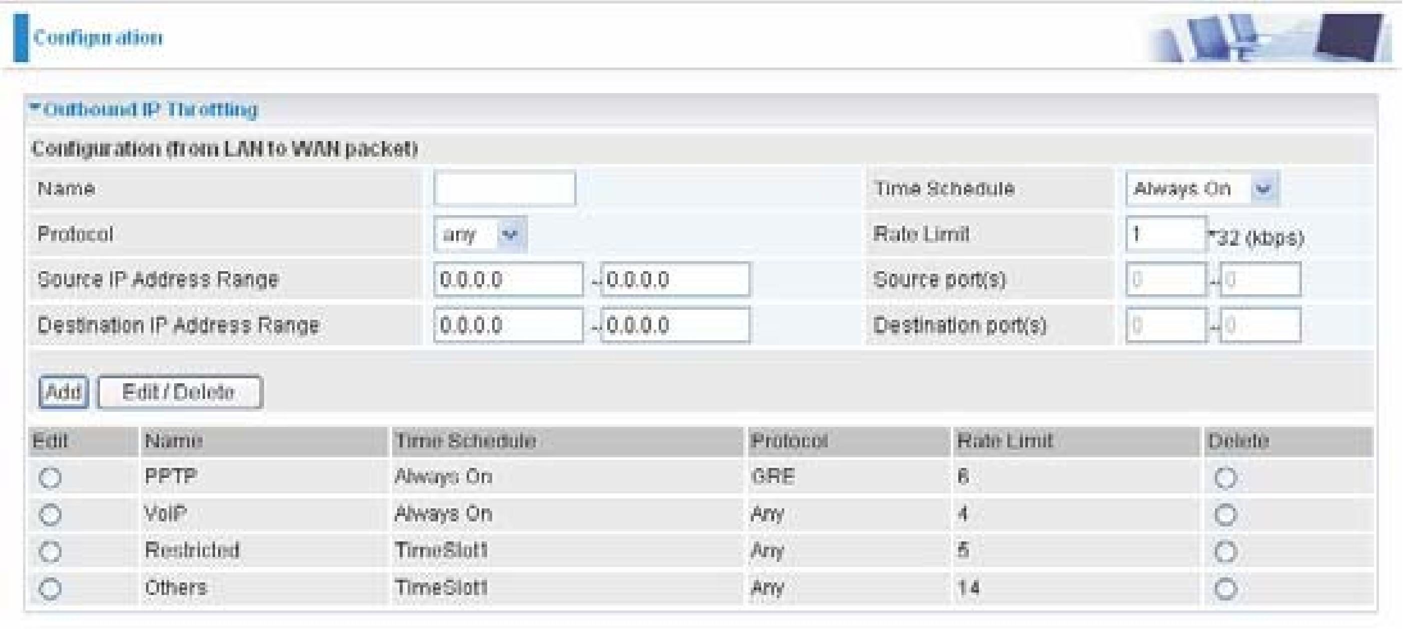
Mission-critical Application: 192kbps (6*32kbps)

Voice Application: 128kbps (4*32kbps)

Restricted Application: 160kbps (5*32kbps)

Other Applications: 448kbps (14*32kbps)

6+4+14+5=29, 29*32kbps=928kbps



Configuration

▾Outbound IP Throttling

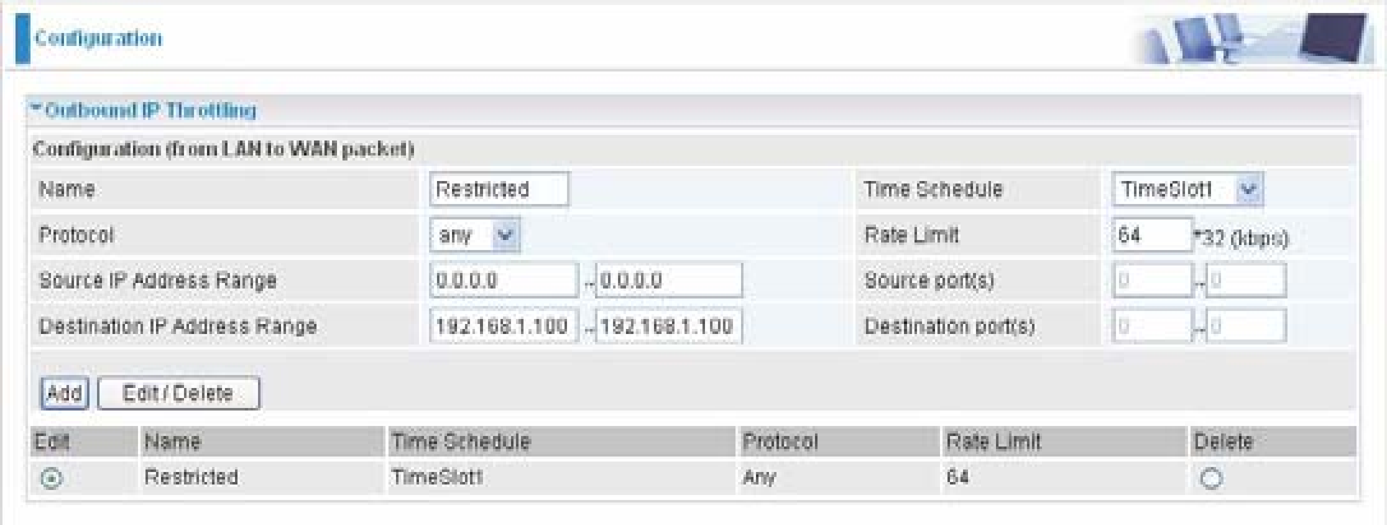
Configuration (from LAN to WAN packet)

Name		Time Schedule	Always On
Protocol	any	Rate Limit	1 *32 (kbps)
Source IP Address Range	0.0.0.0 ~ 0.0.0.0	Source port(s)	0 ~ 0
Destination IP Address Range	0.0.0.0 ~ 0.0.0.0	Destination port(s)	0 ~ 0

Add | Edit / Delete

Edit	Name	Time Schedule	Protocol	Rate Limit	Delete
○	PPTP	Always On	GRE	6	○
○	VoIP	Always On	Any	4	○
○	Restricted	TimeSlot1	Any	5	○
○	Others	TimeSlot1	Any	14	○

Sometime your customers or friends may upload their files to your FTP server and that will saturate your downstream bandwidth. The settings below help you to limit bandwidth for the restricted application.



Configuration

▾Outbound IP Throttling

Configuration (from LAN to WAN packet)

Name	Restricted	Time Schedule	TimeSlot1
Protocol	any	Rate Limit	64 *32 (kbps)
Source IP Address Range	0.0.0.0 ~ 0.0.0.0	Source port(s)	0 ~ 0
Destination IP Address Range	192.168.1.100 ~ 192.168.1.100	Destination port(s)	0 ~ 0

Add | Edit / Delete

Edit	Name	Time Schedule	Protocol	Rate Limit	Delete
●	Restricted	TimeSlot1	Any	64	○

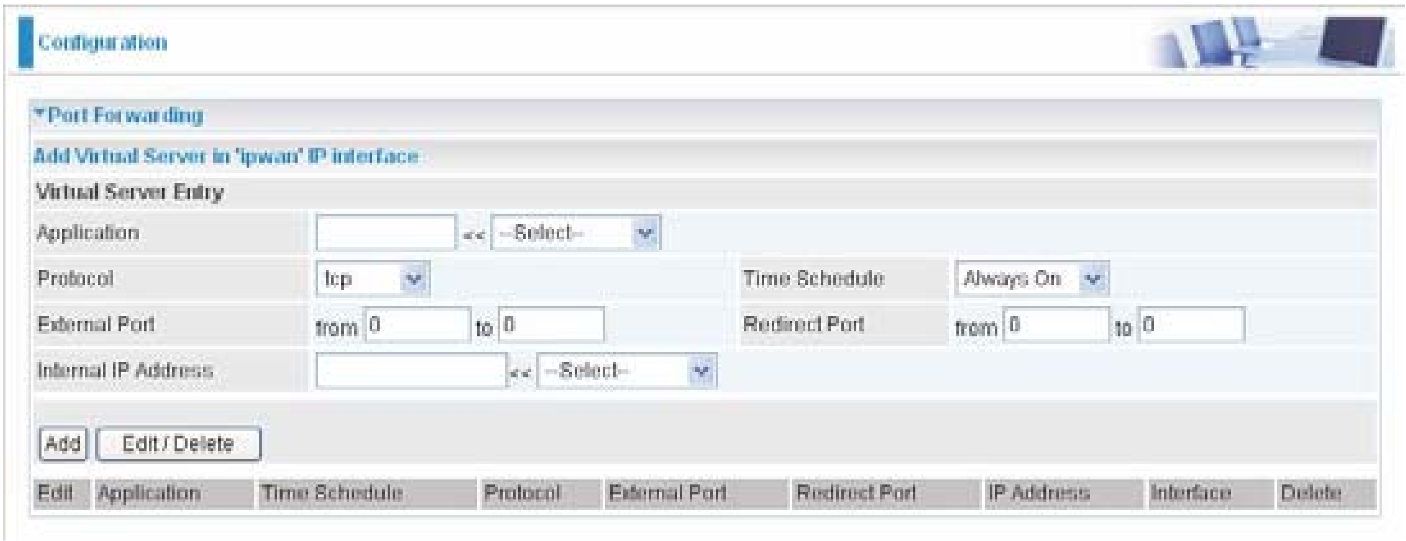
Virtual Server (known as Port Forwarding)

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 device can be configured as a virtual server so that remote users accessing services such as Web or FTP services via the public (WAN) IP address can be automatically redirected to local servers in the LAN network. Depending on the requested service (TCP/UDP port number), the device redirects the external service request to the appropriate server within the LAN network



Configuration

▾Port Forwarding

Add Virtual Server in 'ipwan' IP interface

Virtual Server Entry

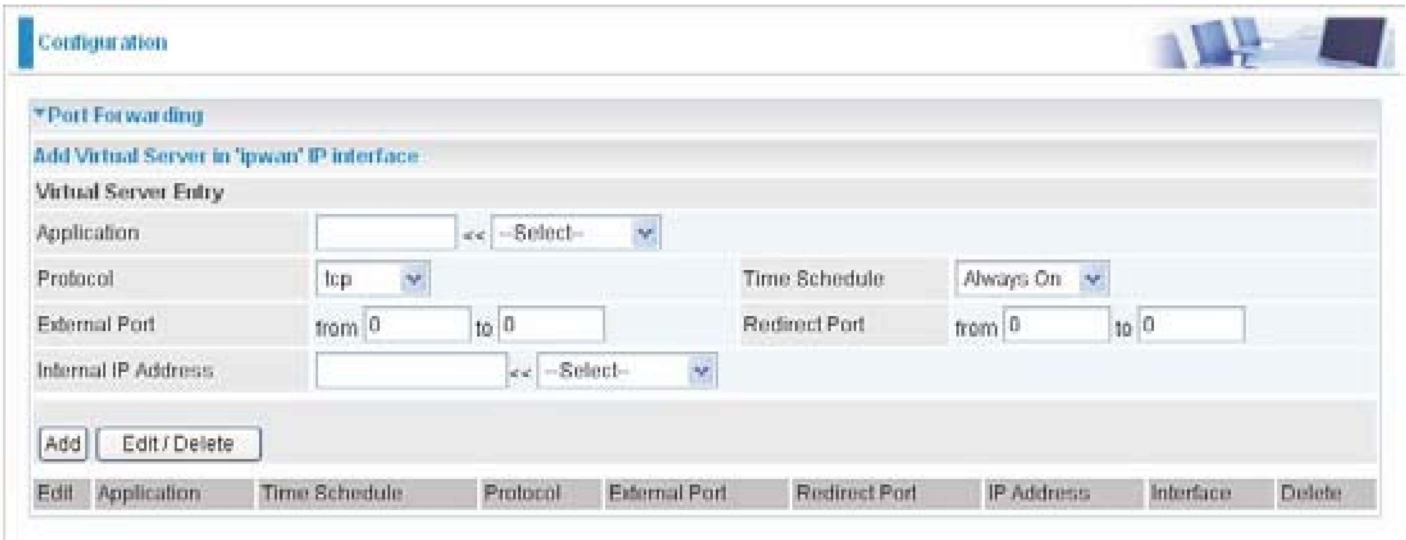
Application	<< --Select--		
Protocol	tcp	Time Schedule	Always On
External Port	from 0 to 0	Redirect Port	from 0 to 0
Internal IP Address	<< --Select--		

Edit	Application	Time Schedule	Protocol	External Port	Redirect Port	IP Address	Interface	Delete

Add Virtual Server

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.



Configuration

▾Port Forwarding

Add Virtual Server in 'ipwan' IP interface

Virtual Server Entry

Application	<< --Select--		
Protocol	tcp	Time Schedule	Always On
External Port	from 0 to 0	Redirect Port	from 0 to 0
Internal IP Address	<< --Select--		

Add   Edit / Delete

Edit	Application	Time Schedule	Protocol	External Port	Redirect Port	IP Address	Interface	Delete

Application: Users-define description to identify this entry or click the Application drop-down menu to select an existing predefined rules.

Select: 20 predefined rules are available. Application, Protocol and External/Redirect Ports will be filled after the selection.

Protocol: It is the supported protocol for the virtual server. 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.

Time Schedule: User-defined time period to enable your virtual server. You may specify a time schedule or Always on for the usage of this Virtual Server Entry. For setup and detail, refer to **Time Schedule** section

External Port: The Port number on the Remote/WAN side used when accessing the virtual server.

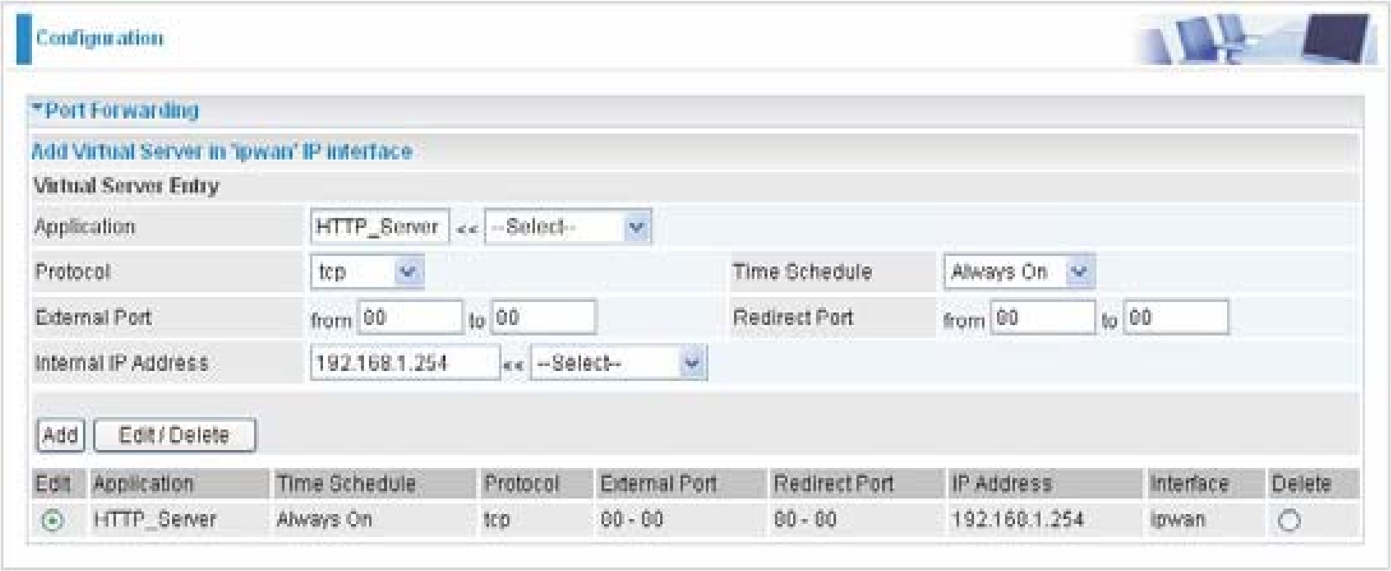
Redirect Port: The Port number used by the Local server in the LAN network.

Internal IP Address: The private IP in the LAN network, which will be providing the virtual server application. The Select List lists all existing PCs connecting to the network. You may assign a PC with IP address and MAC from this list.

Example:

If you like to remote accessing your Router through the Web/HTTP at all time, you would need to enable port number 80 (Web/HTTP) and map to Router's IP Address. Then all incoming HTTP requests from you (Remote side) will be forwarded to the Router with IP address of 192.168.1.254. Since port number 80 has already been predefined, next to the Application click Helper. A list of predefined rules window will pop and select HTTP_Sever.

Application: *HTTP_Sever*
Time Schedule: *Always On*
Protocol: *tcp*
External Port: *80-80*
Redirect Port: *80-80*
IP Address: *192.168.1.254*



Configuration

Port Forwarding

Add Virtual Server in 'ipwan' IP interface

Virtual Server Entry

Application	HTTP_Server << --Select--		
Protocol	tcp	Time Schedule	Always On
External Port	from 80 to 80	Redirect Port	from 80 to 80
Internal IP Address	192.168.1.254 << --Select--		

Add | Edit / Delete

Edit	Application	Time Schedule	Protocol	External Port	Redirect Port	IP Address	Interface	Delete
◉	HTTP_Server	Always On	tcp	80 - 80	80 - 80	192.168.1.254	ipwan	○

Add: Click it to apply your settings.

Edit/Delete: Click it to edit or delete this virtual server application.

NOTE:

Using Port Forwarding does have implications, as outside users will be able to connect to the PCs on your network. For this reason, you are adviced to use specific Virtual Server entries just for the port your application requires instead of using DMZ. Doing so will result in all connections from WAN to attempt to access the public IP your DMZ specifies.

Attention

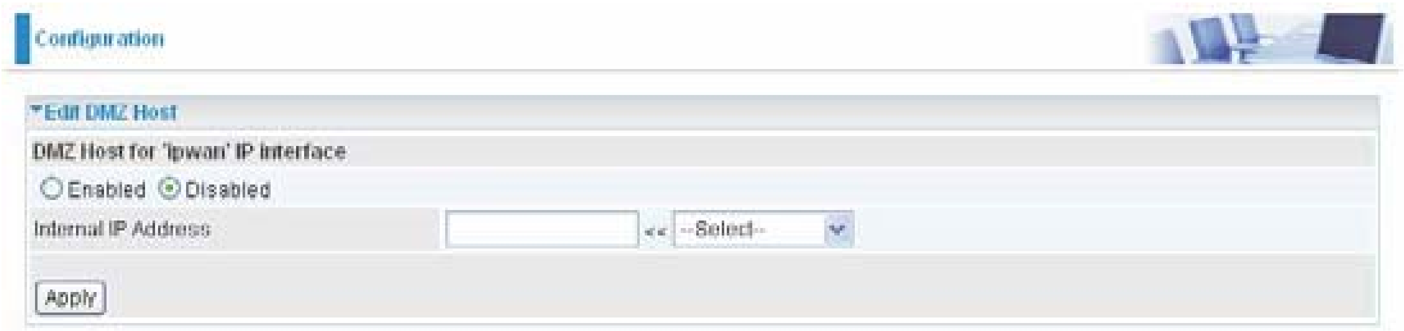
If you have enabled the NAT option in the WAN-ISP section, the virtual server function will hence become invalid. If the DHCP server option is enabled, you have to be very careful in assigning IP addresses of the virtual server in order to avoid conflict. The easiest way to configure the virtual server is manually assign a static IP address that does not fall into the range of IP addresses which is to be assigned by the DHCP server to each virtual server PC. You can configure the virtual server IP address but it must be in the same subnet as the router.

Edit DMZ Host

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.

Cautious: This Local computer exposing to the Internet may face varies of security risks.

Go to Configuration > Virtual Server > Edit DMZ Host



Configuration

▾Edit DMZ Host

DMZ Host for 'ipwan' IP interface

○ Enabled ● Disabled

Internal IP Address [ ] << --Select--

Apply

- **Enabled:** It activates your DMZ function.

- **Disabled:** As set in default setting, it disables the DMZ function.

Internal IP Address: Give a static IP address to the DMZ Host when **Enabled** radio button is checked. Be aware that this IP will be exposed to the WAN/Internet.

The Select List lists all existing PCs connecting to the network. You may assign a PC with IP address and MAC from this list.

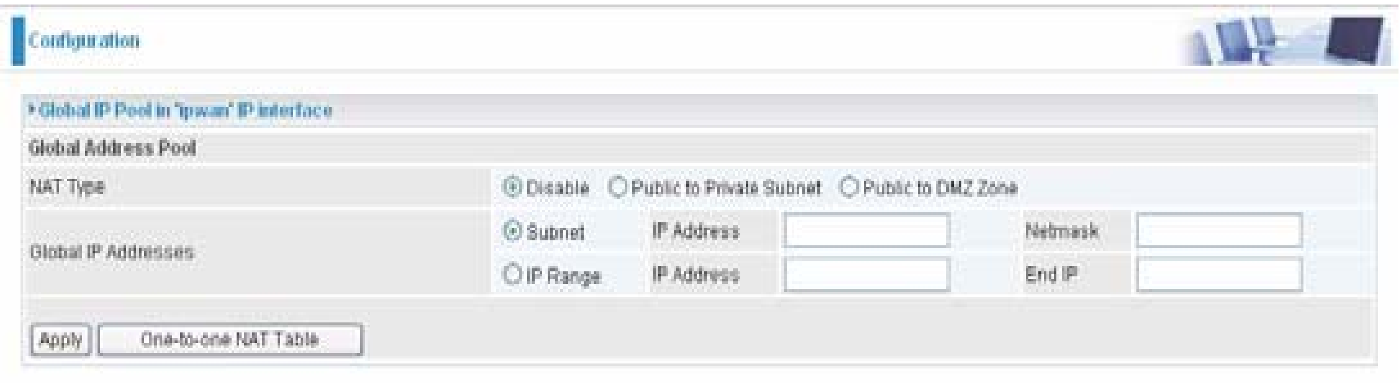
Select the Apply button to apply your changes.

Edit One-to-One NAT (Network Address Translation)

One-to-One NAT maps a specific private/local IP address to a global/public IP address.

If you have multiple public/WAN IP addresses from you ISP, you are eligible for One-to-One NAT to utilize these IP addresses.

Go to Configuration > Virtual Server > Edit One-to-one NAT



Configuration

▸ Global IP Pool in 'ipwan' IP interface

Global Address Pool					
NAT Type	● Disable ○ Public to Private Subnet ○ Public to DMZ Zone				
Global IP Addresses	● Subnet	IP Address		Netmask	
	○ IP Range	IP Address		End IP	

Apply | One-to-one NAT Table

NAT Type: Select desired NAT type. As set in default setting, it disables the One-to-One NAT function.

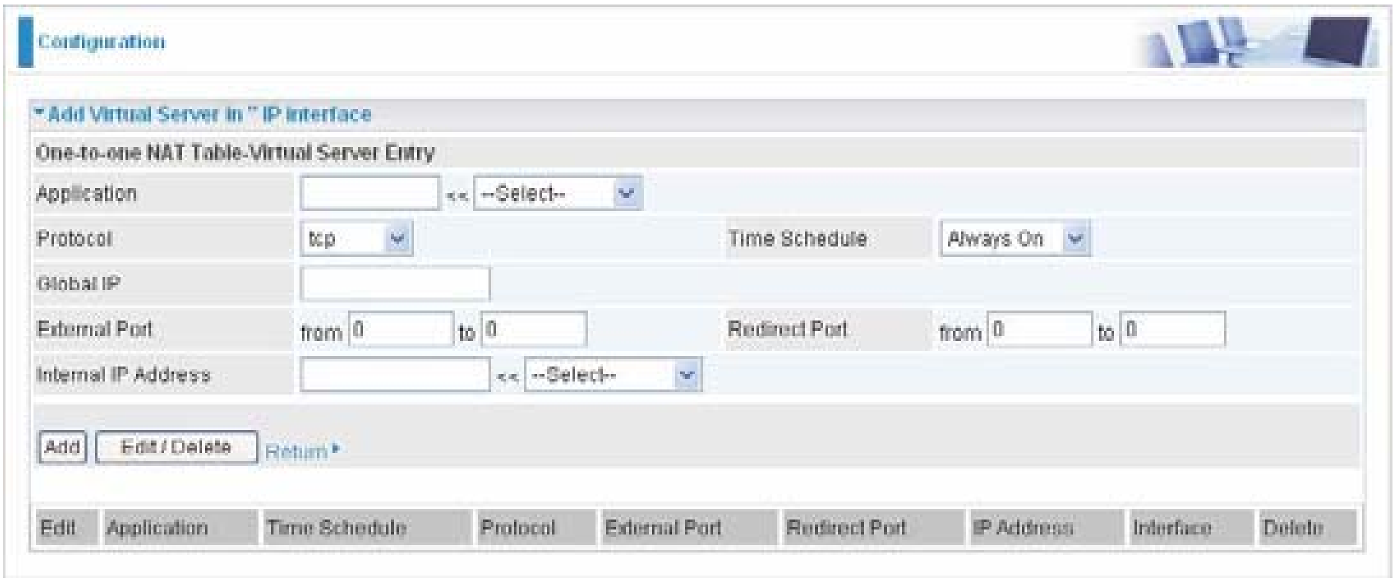
Global IP Address:

- **Subnet:** The subnet of the public/WAN IP address given by your ISP. If your ISP has provided this information, you may insert it here. Otherwise, use IP Range method.

- **IP Range:** The IP address range of your public/WAN IP addresses. For example, IP: 192.168.1.1, end IP: 192.168.1.10

Select the **Apply** button to apply your changes.

Check One-to-one NAT Table to create a new One-to-One NAT rule:



Configuration

▾ Add Virtual Server in " IP interface

One-to-one NAT Table-Virtual Server Entry			
Application	<< --Select--		
Protocol	tcp	Time Schedule	Always On
Global IP			
External Port	from 0 to 0	Redirect Port	from 0 to 0
Internal IP Address	<< --Select--		

Add | Edit / Delete | Return ▸

Edit	Application	Time Schedule	Protocol	External Port	Redirect Port	IP Address	Interface	Delete

Application: Users-defined description to identify this entry or click select drop-down menu to select existing predefined rules.

Select: 20 predefined rules are available. Application, Protocol and External/Redirect Ports will be filled after the selection.

Protocol: It is the supported protocol for the virtual server. 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;

Time Schedule: User-defined time period to enable your virtual server. You may specify a time schedule or Always on for the usage of this Virtual Server Entry. For setup and detail, refer to **Time Schedule** section

Global IP: Define a public/ WAN IP address for this Application to use. This Global IP address must be defined in the Global IP Address.

External Port: The Port number on the Remote/WAN side used when accessing the virtual server.

Redirect Port: The Port number used by the Local server in the LAN network.

Internal IP Address: The private IP in the LAN network, which will be providing the virtual server application. The Select List lists all existing PCs connecting to the network. You may assign a PC with IP address and MAC from this list.

Select the **Add** button to apply your changes.

Example: List of some well-known and registered port numbers.

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" (Please refer to Table 5). The registered ports are numbered from 1024 through 49151. The remaining ports, referred to as dynamic or private ports, are numbered from 49152 through 65535.

For further information, please see IANA's website at **http://www.iana.org/assignments/port-numbers**

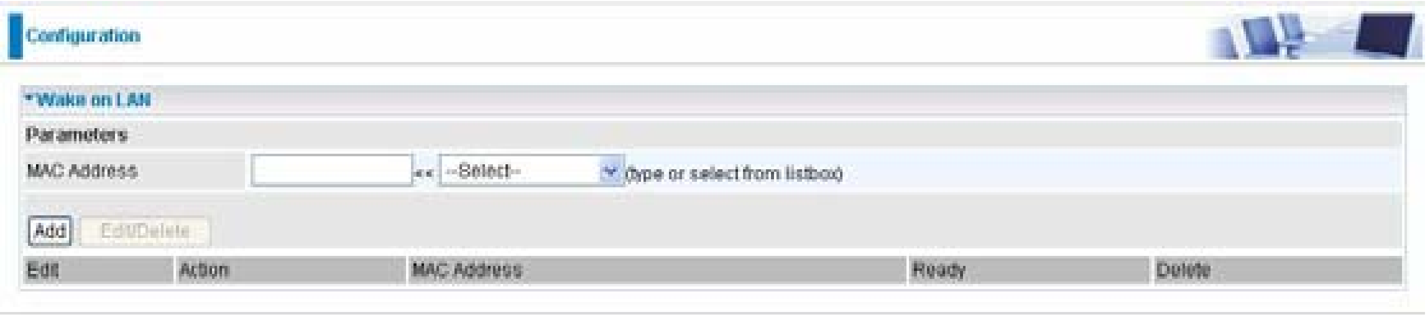
For help on determining which private port numbers are used by common applications on this list, please see the FAQs (Frequently Asked Questions) at **http://www.billion.com**

Table 5: Well-known and registered 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) / SNTP (Simple Network Time Protocol)
161	TCP	SNMP
443	TCP & UDP	HTTPS
1503	TCP	T.120
1720	TCP	H.323
4000	TCP	ICQ
7070	UDP	RealAudio

Wake on LAN

Wake on LAN (WOL, sometimes WoL) is an Ethernet computer networking standard that allows a computer to be turned on or woken up remotely by a network message.



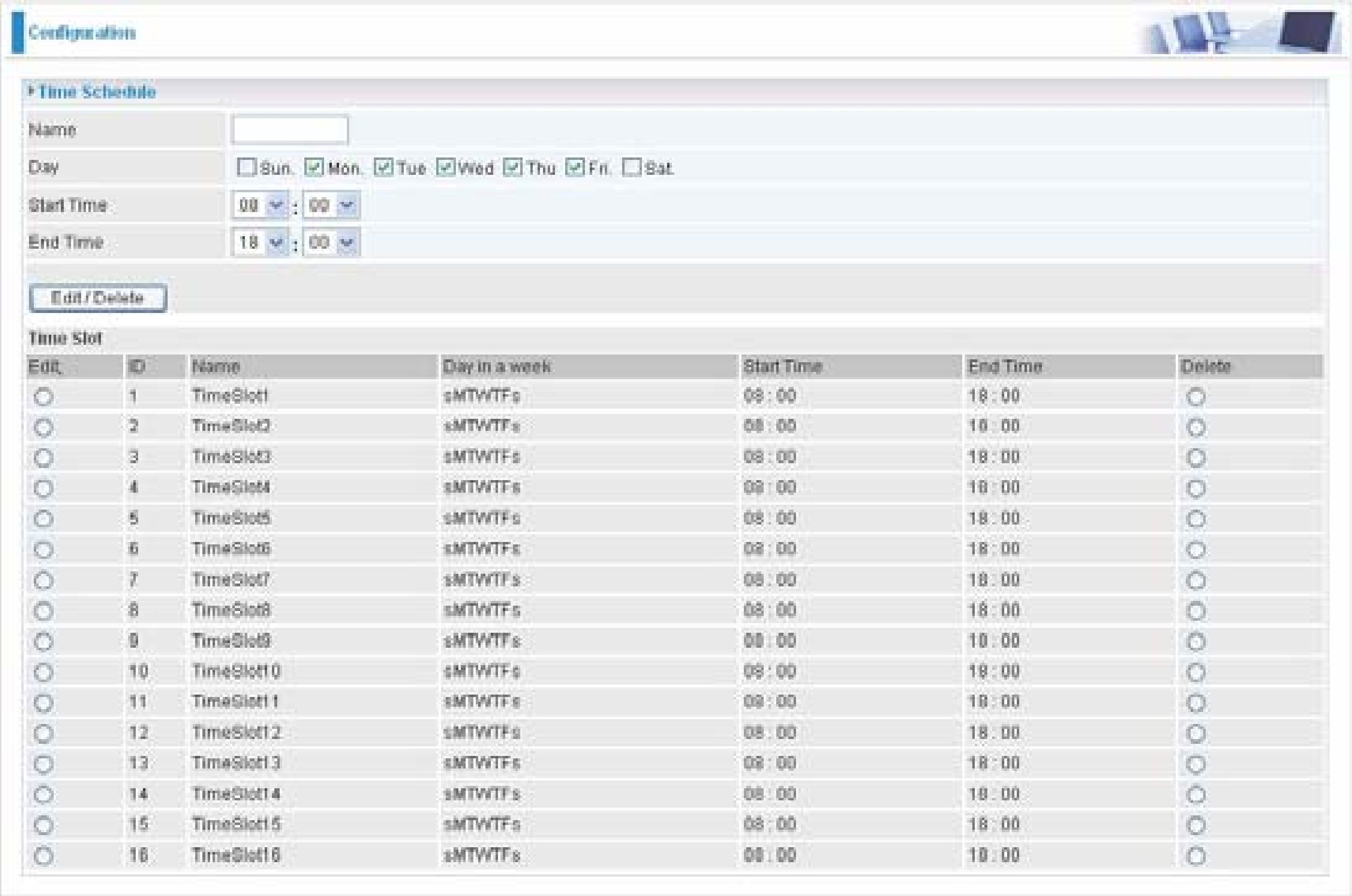
Select : Select MAC address of the computer that you want to wake up or turn on remotely.

Add: After selecting, click **Add** then you can perform the Wake-up action.
Edit/Delete: Click to edit or delete the selected MAC address.
Ready: “**Yes**“ indicating the remote computer is ready for your waking up.
“**No**“ indicating the machine is not ready for your waking up.
Delete: Delete the selected MAC address.

Time Schedule

The Time Schedule supports up to 16 time slots which helps you to manage your Internet connection. In each time profile, you may schedule specific day(s) i.e. Monday through Sunday to restrict or allowing the usage of the Internet by users or applications.

This Time Schedule correlates closely with router’s time, since router does not have a real time clock on board; it uses the Simple Network Time Protocol (SNTP) to get the current time from an SNTP server from the Internet. Refer to Time Zone for details. You router time should correspond with your local time. If the time is not set correctly, your Time Schedule will not function properly.



Configuration

▸Time Schedule

Name	
Day	□Sun. ☑Mon. ☑Tue ☑Wed ☑Thu ☑Fri. □Sat.
Start Time	08 : 00
End Time	18 : 00

Time Slot

Edit	ID	Name	Day in a week	Start Time	End Time	Delete
○	1	TimeSlot1	sMTWTFs	08 : 00	18 : 00	○
○	2	TimeSlot2	sMTWTFs	08 : 00	18 : 00	○
○	3	TimeSlot3	sMTWTFs	08 : 00	18 : 00	○
○	4	TimeSlot4	sMTWTFs	08 : 00	18 : 00	○
○	5	TimeSlot5	sMTWTFs	08 : 00	18 : 00	○
○	6	TimeSlot6	sMTWTFs	08 : 00	18 : 00	○
○	7	TimeSlot7	sMTWTFs	08 : 00	18 : 00	○
○	8	TimeSlot8	sMTWTFs	08 : 00	18 : 00	○
○	9	TimeSlot9	sMTWTFs	08 : 00	18 : 00	○
○	10	TimeSlot10	sMTWTFs	08 : 00	18 : 00	○
○	11	TimeSlot11	sMTWTFs	08 : 00	18 : 00	○
○	12	TimeSlot12	sMTWTFs	08 : 00	18 : 00	○
○	13	TimeSlot13	sMTWTFs	08 : 00	18 : 00	○
○	14	TimeSlot14	sMTWTFs	08 : 00	18 : 00	○
○	15	TimeSlot15	sMTWTFs	08 : 00	18 : 00	○
○	16	TimeSlot16	sMTWTFs	08 : 00	18 : 00	○

Name: A user-define description to identify this time portfolio.

Day in a week: The default is set from Sunday through Saturday. You may specify the days for the schedule to be applied.

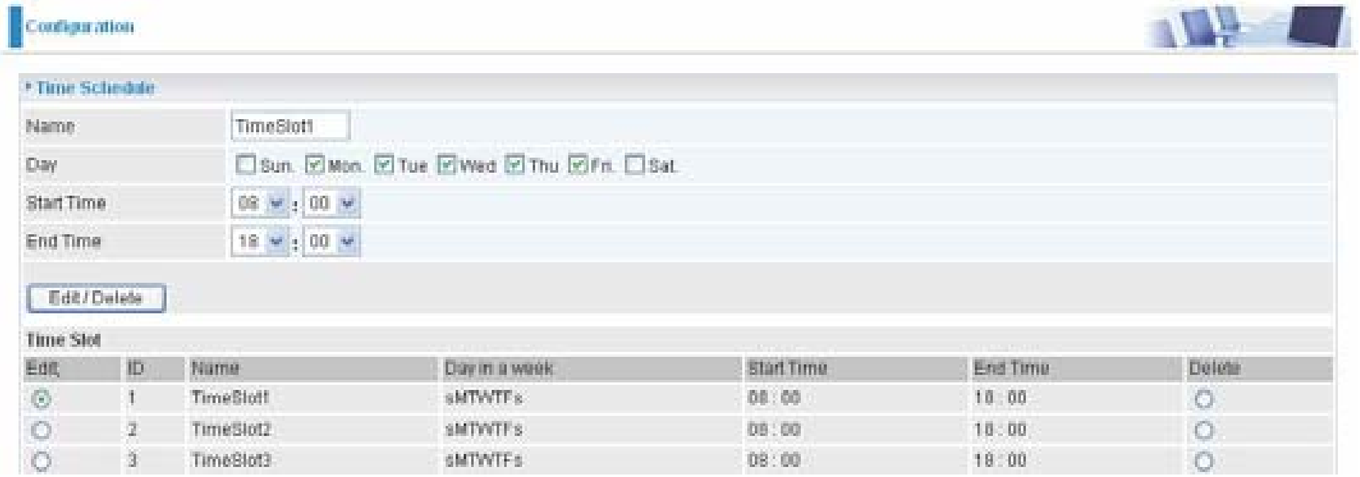
Start Time: The default is set at 8:00 AM. You may specify the start time of the schedule.

End Time: The default is set at 18:00 (6:00PM). You may specify the end time of the schedule. Select the **Apply** button to apply your changes.

Configuration of Time Schedule

Edit a Time Slot

1. Choose any Time Slot (ID 1 to ID 16) to edit, click Edit radio button.



Configuration

▸ Time Schedule

Name	TimeSlot1
Day	☐ Sun. ☑ Mon. ☑ Tue ☑ Wed ☑ Thu ☑ Fri. ☐ Sat.
Start Time	08 : 00
End Time	18 : 00

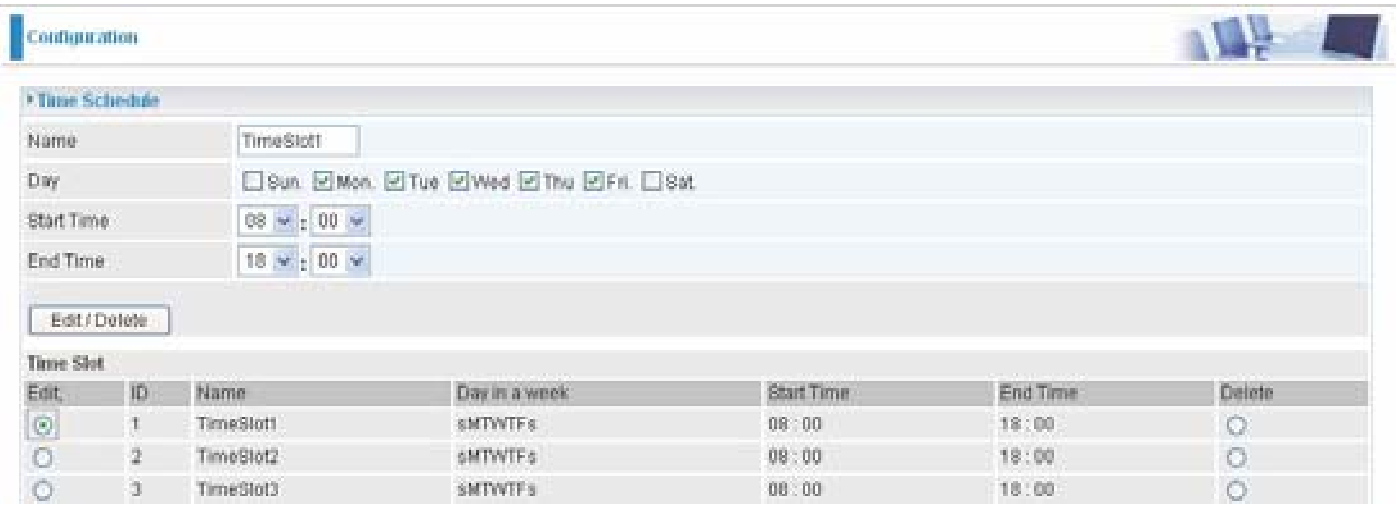
Edit / Delete

Time Slot

Edit	ID	Name	Day in a week	Start Time	End Time	Delete
●	1	TimeSlot1	sMTWTFs	08 : 00	18 : 00	○
○	2	TimeSlot2	sMTWTFs	08 : 00	18 : 00	○
○	3	TimeSlot3	sMTWTFs	08 : 00	18 : 00	○

Note: Watch it carefully, the days you have selected will present in capital letter. Lower case letter shows the day(s) is not selected, and no rule will apply on this day(s).

2. A detailed setting of this Time Slot will be shown.



Configuration

▸ Time Schedule

Name	TimeSlot1
Day	☐ Sun. ☑ Mon. ☑ Tue ☑ Wed ☑ Thu ☑ Fri. ☐ Sat.
Start Time	08 : 00
End Time	18 : 00

Edit / Delete

Time Slot

Edit	ID	Name	Day in a week	Start Time	End Time	Delete
●	1	TimeSlot1	sMTWTFs	08 : 00	18 : 00	○
○	2	TimeSlot2	sMTWTFs	08 : 00	18 : 00	○
○	3	TimeSlot3	sMTWTFs	08 : 00	18 : 00	○

ID: This is the index of the time slot.

Name: A user-define description to identify this time portfolio.

Day in a week: The default is set from Monday through Friday. You may specify the days for the schedule to be applied.

Start Time: The default is set at 8:00 AM. You may specify the start time of the schedule.

End Time: The default is set at 18:00 (6:00PM). You may specify the end time of the schedule.

Choose Edit radio button and click Edit/Delete button to apply your changes.

Delete a Time Slot

Select the Delete radio button of the selected Time Slot under the Time Slot section, and click the Edit/Delete button to confirm the deletion of the selected Time profile, i.e. erase the Day and back to default setting of Start Time / End Time.

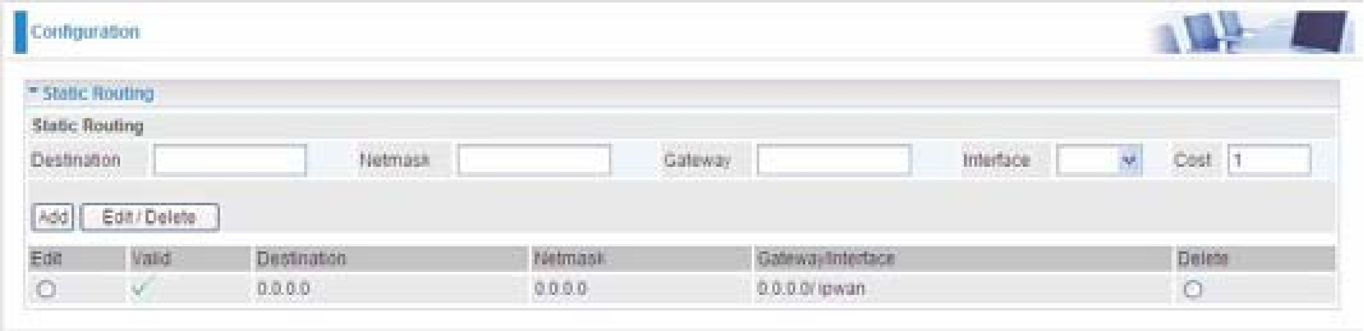
Advanced

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.

Here are the items within the Advanced section: **Static Route, Static ARP, Dynamic DNS, Device Management, IGMP and VLAN Bridge.**

Static Route

Go to Configuration > Advanced > Static Route



Configuration

▾ Static Routing

Static Routing

Destination [ ] Netmask [ ] Gateway [ ] Interface [▾] Cost [1]

Edit	Valid	Destination	Netmask	Gateway/Interface	Delete
○	✓	0.0.0.0	0.0.0.0	0.0.0.0/ ipwan	○

Destination: This is the destination subnet IP address.

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

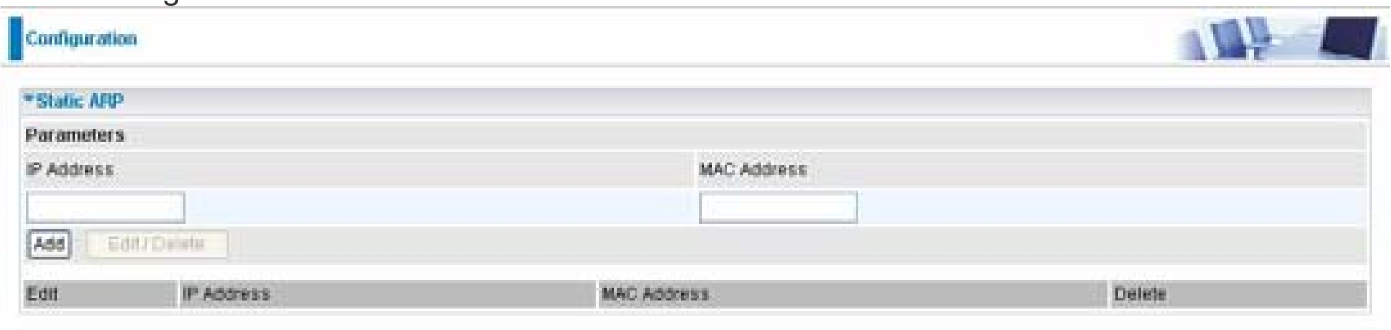
Gateway: This is the gateway IP address to which packets are to be forwarded.

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.

Static ARP

Go to Configuration > Advanced > Static ARP



Configuration

Static ARP

Parameters	
IP Address	MAC Address

Add | Edit / Delete

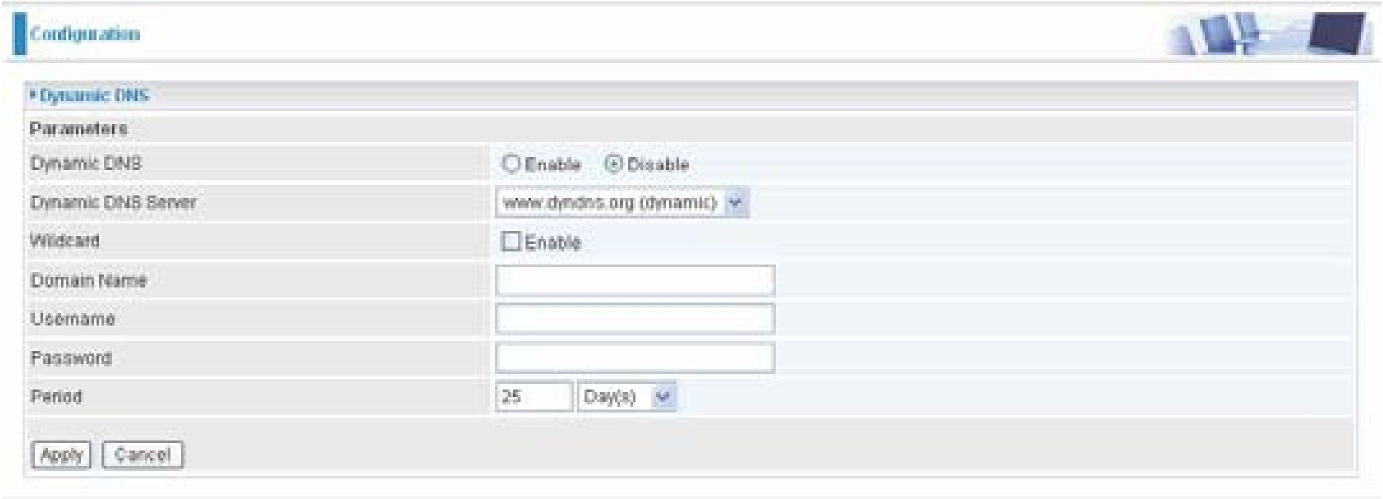
Edit	IP Address	MAC Address	Delete

IP Address: Fill in the IP address of the host computer that is sending the data packet.

MAC Address: Fill in the MAC address of the computer that the incoming data packets are to be forwarded.

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.



Configuration

Dynamic DNS

Parameters	
Dynamic DNS	○ Enable ● Disable
Dynamic DNS Server	www.dyndns.org (dynamic)
Wildcard	□ Enable
Domain Name	
Username	
Password	
Period	25 Day(s)

Apply | Cancel

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:

- **Disable:** Check to disable the Dynamic DNS function.

- ⓘ **Enable:** Check to enable the Dynamic DNS function. The following fields will be activated and required.

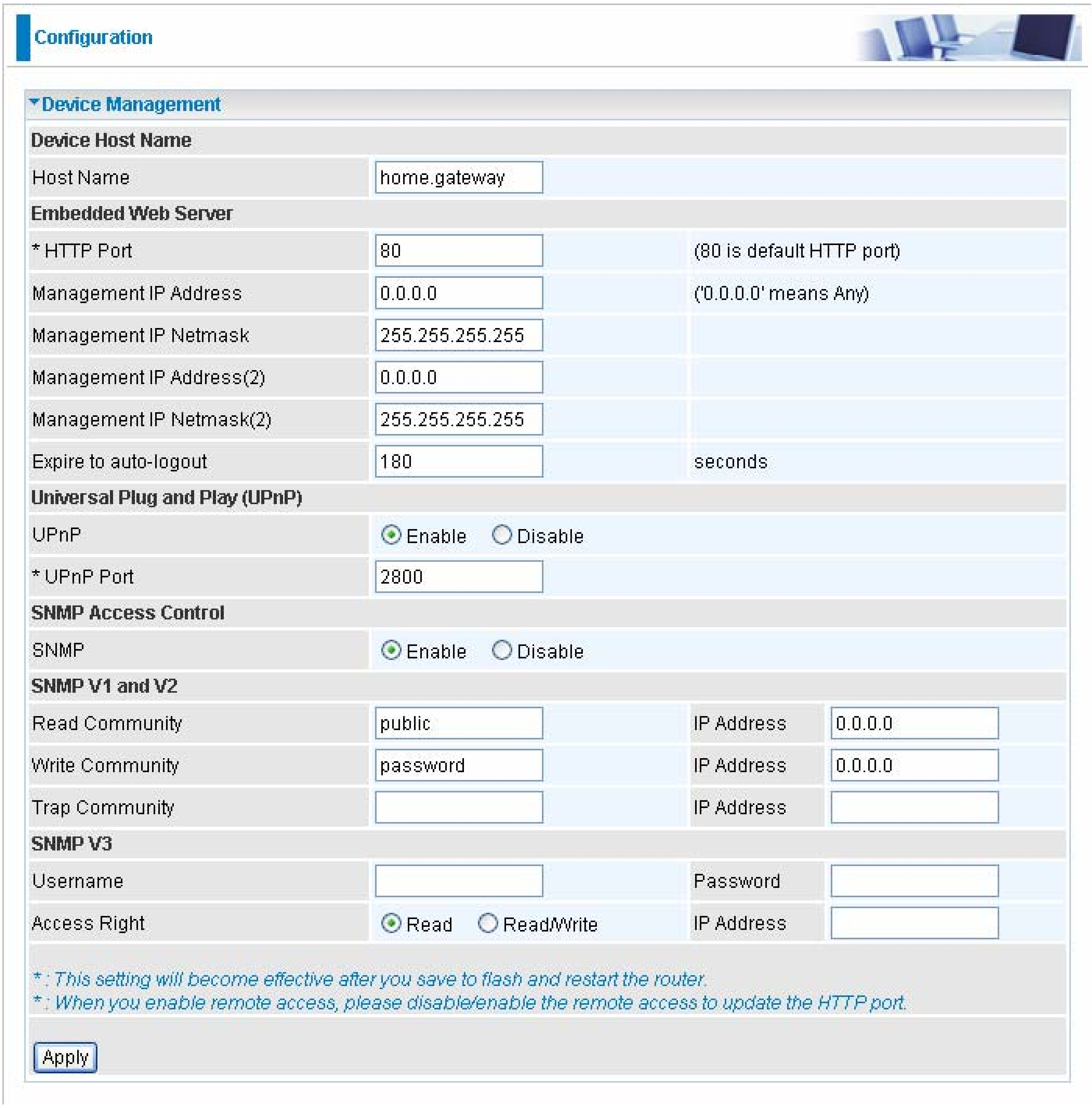
Dynamic DNS Server: Select the DDNS service you have established an account with.

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.

Device Management

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



Configuration

▾Device Management

Device Host Name			
Host Name	home.gateway		
Embedded Web Server			
* HTTP Port	80	(80 is default HTTP port)	
Management IP Address	0.0.0.0	('0.0.0.0' means Any)	
Management IP Netmask	255.255.255.255		
Management IP Address(2)	0.0.0.0		
Management IP Netmask(2)	255.255.255.255		
Expire to auto-logout	180	seconds	
Universal Plug and Play (UPnP)			
UPnP	● Enable ○ Disable		
* UPnP Port	2800		
SNMP Access Control			
SNMP	● Enable ○ Disable		
SNMP V1 and V2			
Read Community	public	IP Address	0.0.0.0
Write Community	password	IP Address	0.0.0.0
Trap Community		IP Address	
SNMP V3			
Username		Password	
Access Right	● Read ○ Read/Write	IP Address	

*: This setting will become effective after you save to flash and restart the router.
*: When you enable remote access, please disable/enable the remote access to update the HTTP port.

Device Host Name

Host Name: Assign it a name**.**

(The Host Name cannot be used with one word only. There are two words should be connected with a '.' at least.
Example:
Host Name: homegateway ==> Incorrect
Host Name: home.gateway or my.home.gateway ==> Correct)

Embedded Web Server (2 Management IP Accounts)

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.

Enable: Select Enable to allow management access from remote side (mostly from internet).

SNMP V1 and V2:
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 V3:

Specify a name and password for authentication. And define the access right from identified IP address. Once the authentication has succeeded, users from this IP address will be able to view and modify the data.

SNMP Version: SNMPv2c and SNMPv3

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.
SNMPv3 is a strong authentication mechanism, authorization with fine granularity for remote monitoring.

Traps supported: Cold Start, Authentication Failure.

The following MIBs are supported:

From RFC 1213 (MIB-II)

System group

System group

Interface group

Address Translation group

IP group

ICMP Group

TCP group

UDP group

EGP (not applicable)

Transmission

SNMP group

From RFC 1650 (EtherLike-MIB)

dot3stats

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 RFC 1573 (IfMIB)

ifMIBObjects group

From RFC 1695 (atmMIB)

atmMIBObjects

From RFC 1493 (Bridge MIB)

From RFC 1907 (SNMPv2) only snmpSetSerialNo OID

dot1 dBase group

dot1 dTp group

dot1 dStp group (if configured as spanning tree)

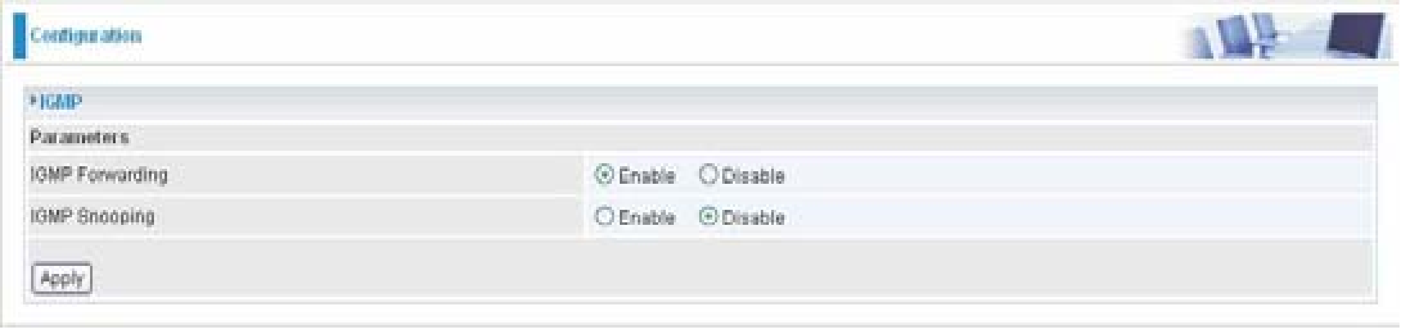
From RFC 1471 (PPP/LCP MIB)

pppLink group

pppLgr group (not applicable)

IGMP

IGMP, known as Internet Group Management Protocol, is used to management hosts from multicast group.



Configuration

IGMP

Parameters

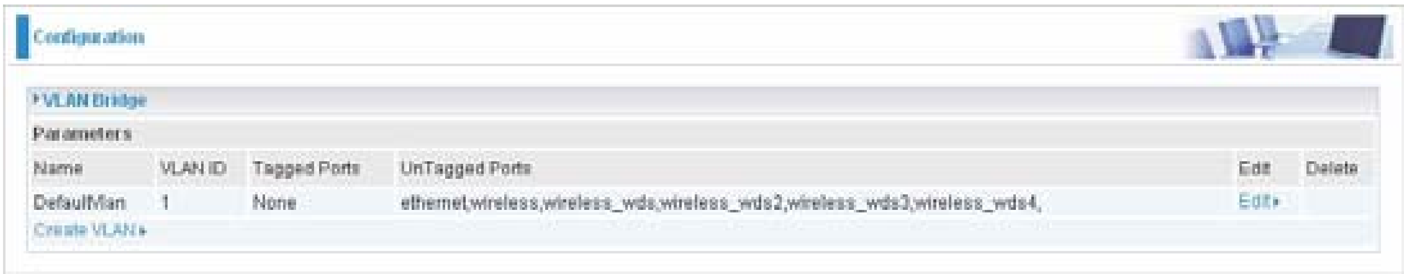
IGMP Forwarding	● Enable ○ Disable
IGMP Snooping	○ Enable ● Disable

IGMP Forwarding: Accepting multicast packet. Default is set to Enable.

IGMP Snooping: Allowing switched Ethernet to check and make correct forwarding decisions. Default is set to Disable.

VLAN Bridge

This section allows you to create VLAN group and specify the member.



Configuration

VLAN Bridge

Parameters

Name	VLAN ID	Tagged Ports	UnTagged Ports	Edit	Delete
DefaultVlan	1	None	ethernet,wireless,wireless_wds,wireless_wds2,wireless_wds3,wireless_wds4,	Edit	

Edit: Edit your member ports in selected VLAN group.

Create VLAN: To create another VLAN group.

Logout

To exit the router web interface, choose Logout. Please save your configuration setting before logging out of the system.

Be aware that the router configuration interface can only be accessed by one PC at a time. Therefore when a PC has logged into the system interface, the other users cannot access the system interface until the current user has logged out of the system. If the previous user forgets to logout, the second PC can only access the router web interface after a user-defined auto logout period which is by default 3 minutes. You can however modify the value of the auto logout period using the Advanced > Device Management section of the router web interface. Please see the Advanced section of this manual for more information.

Chapter 5: Troubleshooting

If your router is not functioning properly, please refer to the suggested solutions provided in this chapter. If your problems persist or the suggested solutions do not meet your needs, please kindly contact your service provider or Billion for support.

Problems with the router

Problem	Suggested Action
None of the LEDs lit when the router is turned on.	Check the connection between the router and the adapter. If the problem persists, most likely it is due to the malfunction of your hardware. Please contact your service provider or Billion for technical support.
You have forgotten your login username or password	Try the default username & password (Please refer to Chapter 3). If this fails, restore your router to its default setting by pressing the reset button for more than 6 seconds.

Problems with WAN interface

Problem	Suggested Action
Initialization of PVC connection (line-sync)fail	Make sure that the telephone cable is properly connected between the ADSL port and the wall jack. The ADSL LED on the front panel should lit. 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 problem, you may need to verify these settings with your ISP.
Frequent loss of ADSL linesync (disconnection)	Make sure that all devices (e.g telephone, fax machine, analogue modems) that are connected to the telephone line as your router have a line filter connected between them and the wall outlet (unless your are using a Central Splitter or Central Filter installed by a qualified and licensed electrician). Make sure that alll line filters are correctly installed as missing line filters or incorrect installation of line filters can cause ADSL connection problem, including frequent disconnections.

Problem with LAN interface

Problem	Suggested Action
Cannot PING any PC on LAN	Check the Ethernet LEDs on the front panel. The LED should be on for the port that has a PC connected. If it does not lit, check to see if the cable between your router and the PC is properly connected. Make sure you have first uninstalled your firewall program before troubleshooting.
	Verify that the IP address and the subnet mask are consistent for both the router and the workstations.

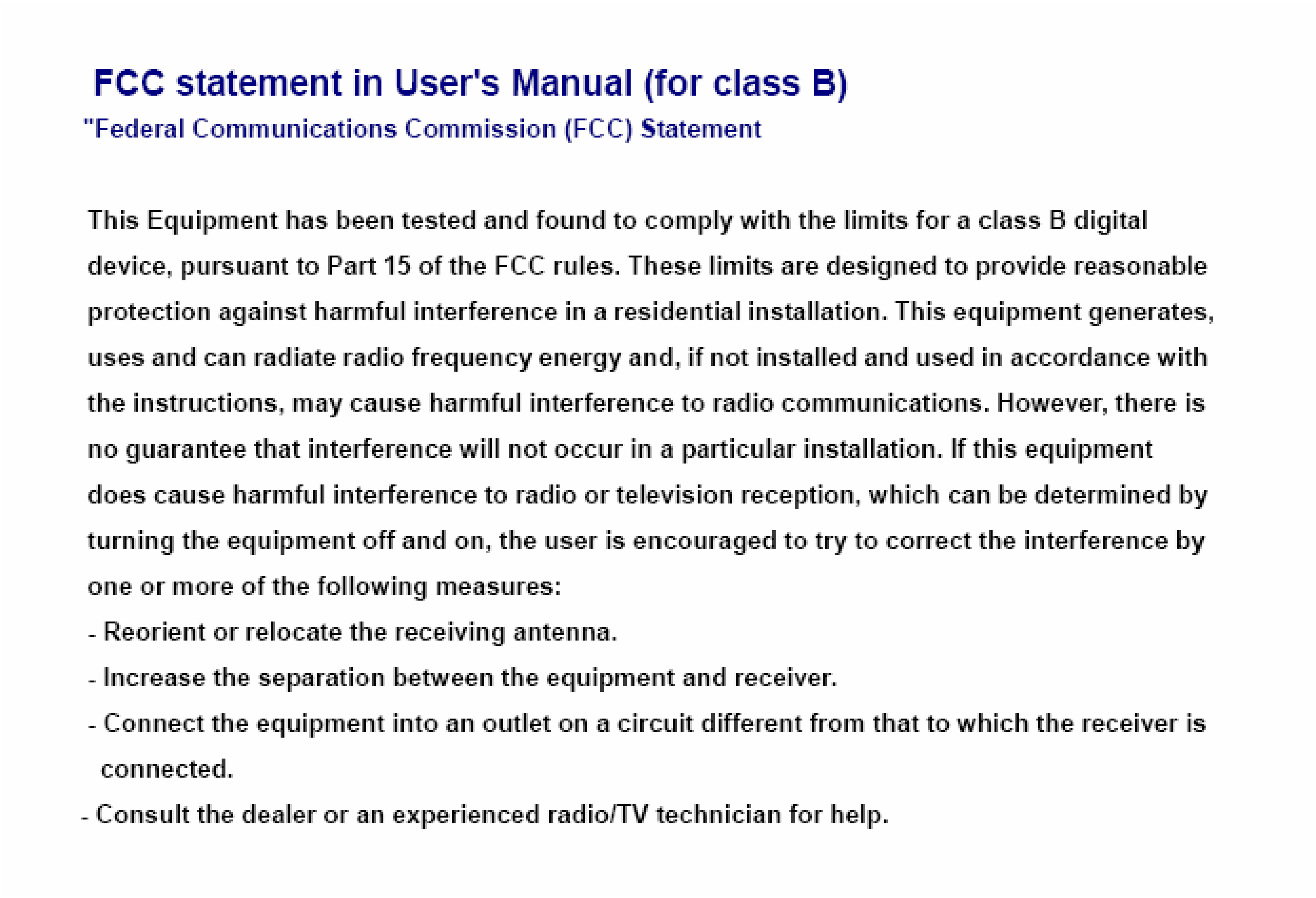
Appendix: Product Support & Contact

Following the suggestions listed in the Troubleshooting section of the user manual can help you solve most of your problems. However if your problems persist or you come across other technical issues that are not listed in the Troubleshooting section, please contact the dealer from where you purchased your product.

Contact Billion

Worldwide:

http://www.billion.com

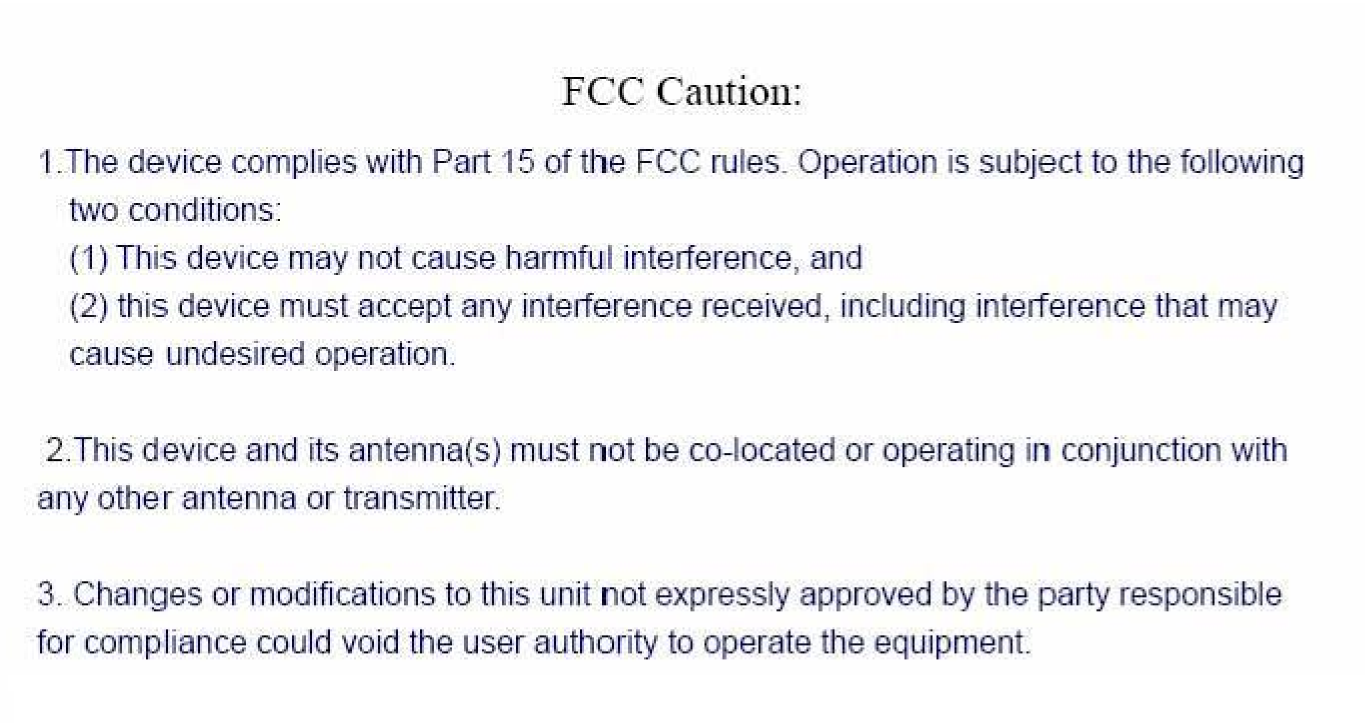


FCC statement in User's Manual (for class B)

"Federal Communications Commission (FCC) Statement

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

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



FCC Caution:

1.The device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

2.This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

3. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

IMPORTANT NOTE:
FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.