# HT-178 User Manual

**VER: 1.0**

# Contents

# 1 Safety Precautions

Read the following information carefully before operating the device. Please follow the following precaution items to protect the device from risks and damage caused by fire and electric power:

- Use volume labels to mark the type of power.
- Use the power adapter that is packed within the device package.
- Pay attention to the power load of the outlet or prolonged lines. An overburden power outlet or damaged lines and plugs may cause electric shock or fire accident. Check the power cords regularly. If you find any damage, replace it at once.
- Proper space left for heat dissipation is necessary to avoid any damage caused by overheating to the device. The holes on the device are designed for heat dissipation to ensure that the device works normally. Do not cover these heat dissipation holes.
- Do not put this device close to a place where a heat source exits or high temperature occurs. Avoid the device from direct sunshine.
- Do not put this device close to a place where is over damp or watery. Do not spill any fluid on this device.
- Do not connect this device to any PC or electronic product, unless our customer engineer or your broadband provider instructs you to do this, because any wrong connection may cause any power or fire risk.
- Do not place this device on an unstable surface or support.

# 2 Overview

The Router is designed to provide a simple and cost-effective Internet connection for a private Ethernet. The Router combines high-speed Internet connection, IP routing for the LAN connectivity in one package. It is usually preferred to provide high access performance applications for the individual users, the SOHOs, and the small enterprises.

The Router is easy to install and use. The Router connects to an Ethernet LAN or computers via standard Ethernet ports. The connection is made using ordinary telephone line with standard connectors. The advanced security enhancements, packet filtering and port redirection, can help protect your network from potentially devastating intrusions by malicious agents from outside your network.

Network and Router management is done through the web-based management interface that can be accessed through the local Ethernet using any web browser. You may also enable remote management to enable configuration of the Router via the WAN interface.

## 2.1 Application

- Home gateway
- SOHOs
- Small enterprises
- Higher data rate broadband sharing
- Audio and video streaming and transfer
- PC file and application sharing
- Network and online gaming

## 2.2 Features

- User-friendly GUI for web configuration
- Several pre-configured popular games. Just enable the game and the port settings are automatically configured.
- Compatible with all standard Internet applications
- Simple web-based status page displays a snapshot of system configuration, and links to the configuration pages

- Downloadable flash software updates
- Support for up to 8 PPPoE sessions
- Support RIP v1 & RIP v2
- IP routing and bridging
- Point-to-point protocol (PPP)
- Network/port address translation (NAT/PAT)
- Quality of service (QoS)
- Universal plug-and-play(UPnP)
- Web filtering
- Management and control

Web-based management (WBM)

## 2.3 Standards Compatibility and Compliance

- Support application level gateway (ALG)
- ANSI T1.413 Issue 2
- IEEE 802.3
- IEEE 802.3u

# 3 Hardware Description and Installation

**Note:**

The figures in this document are for reference only.

## 3.1 Hardware Description

### 3.1.1 Front Panel


Figure 1 Front panel

The following table describes the indicators on the front panel.

| **USB** | Functions |
|---|---|
| Green | Device connected |
| Green blinking | DATA |

| **Lan ports** | Functions |
|---|---|
| Green | link/act |
| Green blinking | Blinking speed will adapt According to transferring DATA |

| **SFP** | Functions |
|---|---|
| Green | link/act |

| **Wan ethernet** | Functions |
|---|---|
| Green | link/act |
| Green blinking | Blinking speed will adapt According to transferring DATA |

| **Internet** | Functions |
|---|---|
| Green | Connected |
| Red | authentication failed/no asnwer from DHCP(connection without dialer) |

| **FXS** | Functions |
|---|---|
| Green | Line is registered |
| Green **Slow** blinking | Calling, Talking, Ringing |

| **POWER** | Functions |
|---|---|
| Green | Start complete |
| Red | In CFE mode |

| **2.4G WIRELESS** | Functions |
|---|---|
| Green | Function open |
| Green off | Function close |
| Green blinking | DATA |

| **5G WIRELESS** | Functions |
|---|---|
| Green | Function open |
| Green off | Function close |
| Green blinking | DATA |

### 3.1.2 Rear Panel and Side Panel

Figure 2 Rear Panel


Figure 3 Side panel

The following table describes the interfaces or the buttons.

| Interface | Description |
|---|---|
| LAN | RJ-45 port, for connecting the router to a PC or another network device. |
| USB3.0 | Connect the devices to router through USB port. |
| WAN | Device management port |
| Reset | Press the button for at least 1 second and then release it. System restores the factory default settings. |
| Power | Power interface, for connecting the power adapter. |
| On/Off | Power switch. |

| Interface | Description |
|---|---|
| SFP | Insert SFP module to access network through fiber optic cable |
| WiFi | Wifi switch |

**Warning:**

*Do not press the **Reset** button unless you want to clear the current settings. The **Reset** button is in a small circular hole on the rear panel. If you want to restore the default settings, please press the **Reset** button gently for 1 second with a fine needle inserted into the hole and then release the button. The system reboots and returns to the factory defaults.*

### 3.1.3 Connecting the Device

**Step 1** Connect the **WAN** port of the router with a telephone cable.

**Step 2** Connect the **LAN** port of the router to the network card of the PC through an Ethernet cable.

**Step 3** Plug the power adapter to the wall outlet and then connect the other end of it to the **Power** port of the router.

# 4 PC Network Configuration and Login

## 4.1 PC Network Configuration

Each network interface on the PC should either be configured with a statically defined IP address .
The IP address should be set 10.10.0.X.

## 4.2 Logging In to the Router

To log in to the Router, do as follows:

Open a Web browser on your computer.

Enter ***https://100.100.100.100*** (the default IP address of the Router) in the address bar. The login page appears.

Enter the the password. It should be the last six digits of SN


Figure 4 Login page

After logging in to the Router as a super user, you can query, configure, and modify all the settings, and diagnose the system.

# 5 Web-Based Management

This chapter describes how to use Web-based management of the Router, which allows you to configure and control all of Router features and system parameters in a user-friendly GUI.

## 5.1 Device Information

Choose **Device Info**, and the submenus of **Device Info** are shown as below:


### 5.1.1 Summary

Choose **Device Info > Summary**, and the following page appears.

Device Info

| | |
|---|---|
| Board ID: | BCM963178DVT_Hs |
| Model Name: | HT-178AX-V2 |
| MAC Address: | 00:B8:C2:D6:DD:5D |
| Serial Number: | 021018000001 |
| Build Timestamp: | 20230919_0744 |
| Software Version: | 2.0.0.3-HT-178AX-V2-OS-OPENINFRA-debug |
| Bootloader Version: | U-Boot 2019.07 |
| DSL PHY and Driver Version: | A2pv6L047f1.d27n |
| Wireless Driver Version: | 17.10.188.75 |
| Voice Service Version: | Voice |
| Uptime: | 0D 0H 35M 26S |

This information reflects the current status of your WAN connection.

| | |
|---|---|
| Line Rate - Upstream (Kbps): | 0 |
| Line Rate - Downstream (Kbps): | 0 |
| LAN IPv4 Address: | 10.10.0.138 |
| Default Gateway: | Inactive |
| Primary DNS Server: | 0.0.0.0 |
| Secondary DNS Server: | 0.0.0.0 |
| LAN IPv6 ULA Address: | |
| LAN IPv6 Global Address: | |
| Default IPv6 Gateway: | eth4.1 |
| Date/Time: | Tue Sep 19 08:19:47 2023 |

This page displays the device information such as the board ID, software version, and the information of your WAN connection such as the upstream rate and the LAN address.

### 5.1.2 WAN

Choose **Device Info > WAN** and the following page appears.

WAN Info

| Interface | Description | Type | VlanMuxId | IPv6 | Igmp Proxy | Igmp Source | MLD Proxy | MLD Source | NAT | Firewall | IPv4 Status | IPv4 Address | IPv6 Status | IPv6 Address | Uptime |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| eth4.1 (Ethernet) | ipoe_eth4_eth4 | IPoE | Disabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | ServiceDown | | ServiceDown | | 0D 0H 0M 0S |

This page displays the information of the WAN interface, such as the connection status, and the IP address.

### 5.1.3 Statistics

### 5.1.4 LAN

Choose **Device Info > Statistics > LAN** and the following page appears.

Statistics -- LAN&WLAN

| Interface | Received | | | | | | | | Transmitted | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | | | | Multicast | | Unicast | Broadcast | Total | | | | Multicast | | Unicast | Broadcast |
| | Bytes | Pkts | Errs | Drops | Bytes | Pkts | Pkts | Pkts | Bytes | Pkts | Errs | Drops | Bytes | Pkts | Pkts | Pkts |
| eth0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| eth1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| eth2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| eth3 | 5091 | 29 | 0 | 0 | 4256 | 25 | 0 | 4 | 8494 | 118 | 0 | 0 | 8430 | 117 | 0 | 1 |
| wl1.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Reset Statistics

In this page, you can view the statistical information about the recevied and transmitted data packets of the Ethernet.

Click **Reset Statistics** to restore the values to zero and recount them.

### 5.1.5 WAN Service

Choose **Device Info > Statistics > WAN Service** and the following page appears.

Statistics -- WAN

| Interface | Description | Received | | | | | | | | Transmitted | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | | Multicast | | Unicast | Broadcast | Total | | | | Multicast | | Unicast | Broadcast |
| | | Bytes | Pkts | Errs | Drops | Bytes | Pkts | Pkts | Pkts | Bytes | Pkts | Errs | Drops | Bytes | Pkts | Pkts | Pkts |
| eth4.1 | cpe-ipintf-4 | 346165 | 2807 | 0 | 0 | 15941 | 94 | 2658 | 55 | 3220857 | 4616 | 0 | 0 | 648 | 8 | 4607 | 1 |

Reset Statistics

In this page, you can view the statistical information about the recevied and transmitted data packets of the WAN interface.

Click **Reset Statistics** to restore the values to zero and recount them. Route

Choose **Device Info > Route** and the following page appears.

**Device Info -- Route**

Flags: U - up, ! - reject, G - gateway, H - host, R - reinstate
D - dynamic (redirect), M - modified (redirect).

| Destination | Gateway | Subnet Mask | Flag | Metric | Interface |
|---|---|---|---|---|---|
| 100.100.100.0 | 0.0.0.0 | 255.255.255.0 | U | 0 | eth4.1 |
| 192.168.1.0 | 0.0.0.0 | 255.255.255.0 | U | 0 | br0 |

In this page, you can view the route table information.

### 5.1.6 ARP

Choose **Device Info > ARP** and the following page appears.

**Device Info -- ARP**

| IP address | Flags | HW Address | Device |
|---|---|---|---|
| 100.100.100.106 | Complete | 48:02:2a:f0:92:a3 | eth4.1 |

In this page, you can view the MAC address and IP address information of the device connected to the router.

## 5.2 Advanced Setup

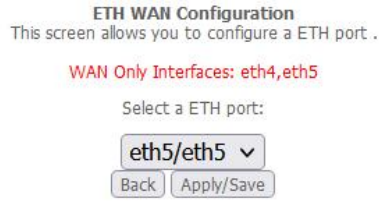
Choose **Advanced Setup** and the submenus of **Advanced Setup** are shown as below:


## 5.2.1 Layer2 Interface

### 5.2.1.1 ETH Interface

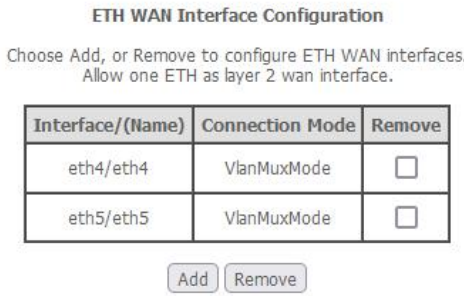
Choose **Advanced Setup** > **Layer2 Interface > ETH Interface** . In this page, you can add or remove to configure DSL ETH Interfaces.


Click **Add** to add ETH Interface and the following page appears.




In this page, you can configuration the ETH interface Click Apply/Save.

Click **Apply/Save** to save the configuration, and return the following page:




If you want to remove this Interface, please select the **Remove** check box and click **Remove**.

## 5.2.2 WAN Service

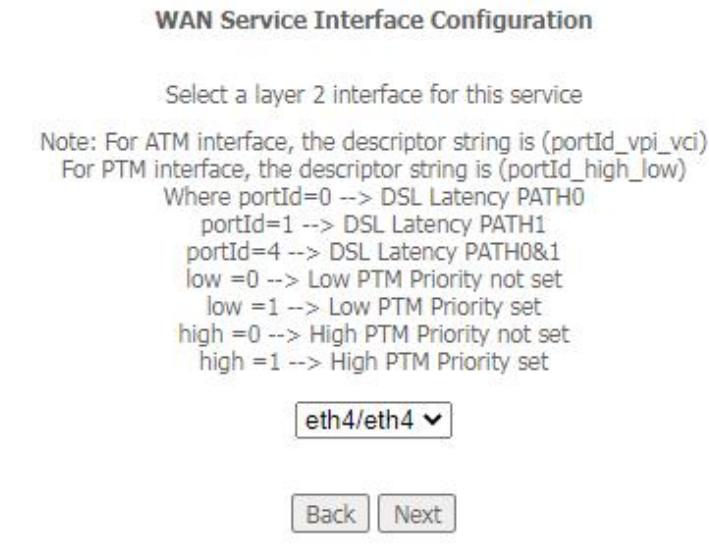
Choose **Advanced Setup** > **WAN Service,** and the following page appears.


In this page, you are allowed to add, remove, or edit a WAN service.

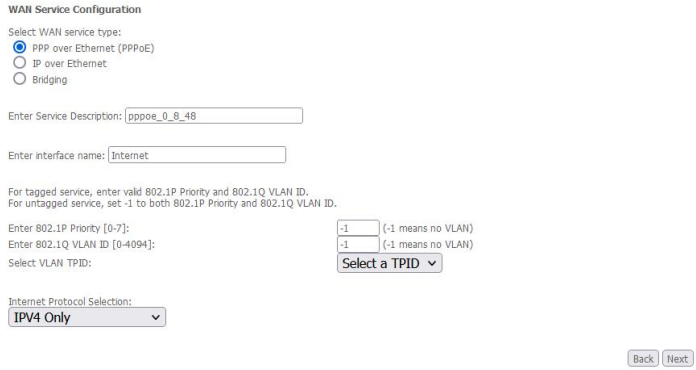
### 5.2.2.1 Adding a PPPoE WAN Service by GUI

This section describes the steps for adding the PPPoE WAN service.

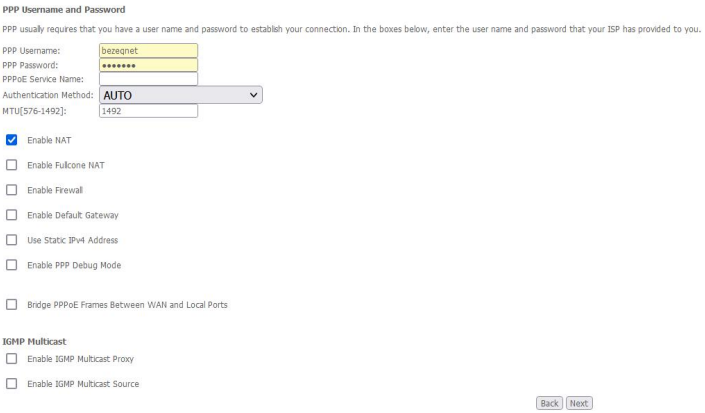
**Step1** In the **Wide Area Network (WAN) Service Setup** page, click the **Add** button to display the following page. (At first, you must add a proper ATM interface for this WAN service.)




**Step2** In this page, you can select a ETH Interface for the WAN service. After selecting the ATM interface, click **Next** to display the following page.




**Step3** In this page, select the WAN service type to be **PPP over Ethernet (PPPoE)**. Click **Next** to display the following page.

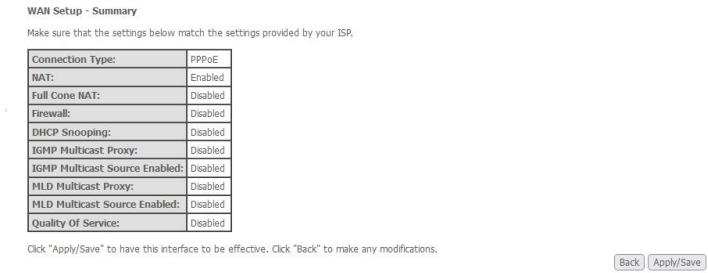



**Step4** In this page, you can modify the PPP username, PPP password, PPPoE service name and authentication method.

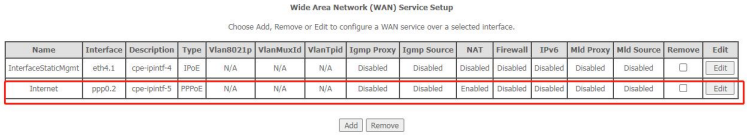
- **PPP Username:** The correct user name provided by your ISP.
- **PPP Password:** The correct password provided by your ISP.

- **PPPoE Service Name:** If your ISP provides it to you, please enter it. If not, do not enter any information.
- **Authentication Method:** The value can be AUTO, PAP, CHAP, or MSCHAP. Usually, you can select AUTO.
- **Enable NAT:**. NAT is one where all requests from the same internal IP address and port are mapped to the same external IP address and port.
- **Enable Fullcone NAT:**. NAT is one where all requests from the same internal IP address and port are mapped to the same external IP address and port. Furthermore, any external host can send a packet to the internal host, by sending a packet to the mapped external address.
- **Enable Firewall :** Used to control whether remote access is allowed
- **Enable Default Gateway :** Set that wan connection as the default gateway
- **Use Static IPv4 Address:** If this function is disabled, the modem obtains an IP address assigned by an uplink equipment such as BAS, through PPPoE dial-up. If this function is enabled, the modem uses this IP address as the WAN IP address.
- **Enable PPP Debug Mode:**Enable or disable this function.
- **Bridge PPPoE Frames Between WAN and Local Ports:**Enable or disable this function.
- **Enable IGMP Multicast Proxy:**If you want PPPoE mode to support IPTV, enable it.
- **Enable IGMP Multicast Source: i**f enable it, allow this interface accept the Multicast Source.

**Step5** After setting the parameters, click **Next** to display the following page.



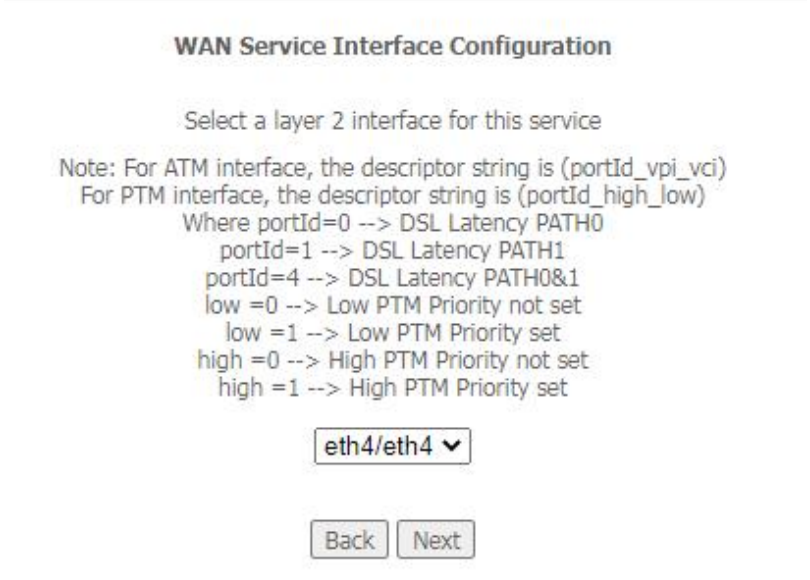
**Step6** In this page, it displays the information about the PPPoE settngs. Click **Apply/Save** to save and apply the settings.



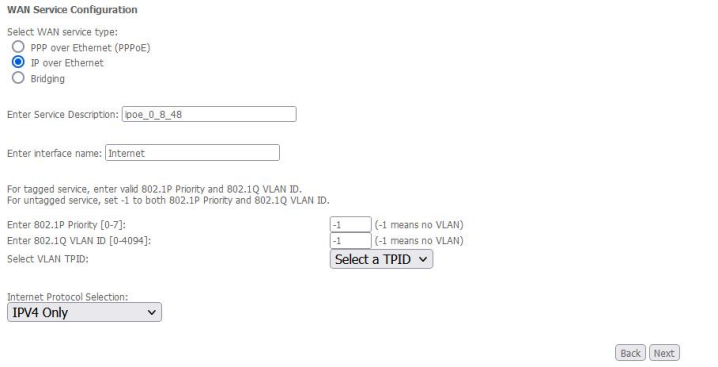

## Adding a MER (IPoE) WAN service by GUI

This section describes the steps for adding the MER WAN service.

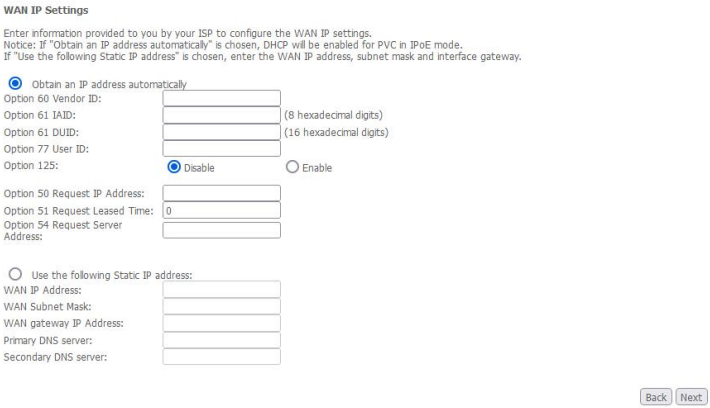
**Step1** In the **Wide Area Network (WAN) Service Setup** page, click the **Add** button to display the following page. (At first, you must add a ATM interface for this WAN service.)



**Step2** Select an ETH Interface, and then click **Next** to display the following page.




**Step3** In this page, select the WAN service type to be IP over Ethernet, enter the service description for this service. After finishing setting, click **Next** to display the following page.



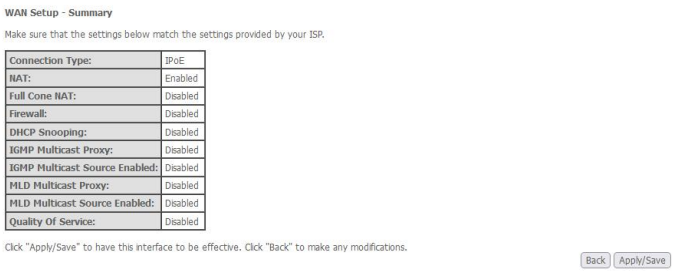
**Step4** In this page, you may modify the WAN IP settings. You may select obtain an IP address automatically or manually enter the IP address provided by your ISP. Click **Next** and the following page appears.

**Note:**

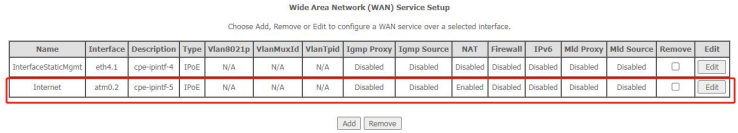
*If selecting **Obtain an IP address automatically**, DHCP will be enabled for PVC in MER mode.*

*If selecting **Use the following Static IP address**, please enter the WAN IP address, subnet mask and gateway IP address.*


**Step5** In this page, click **Next** to display the following page.



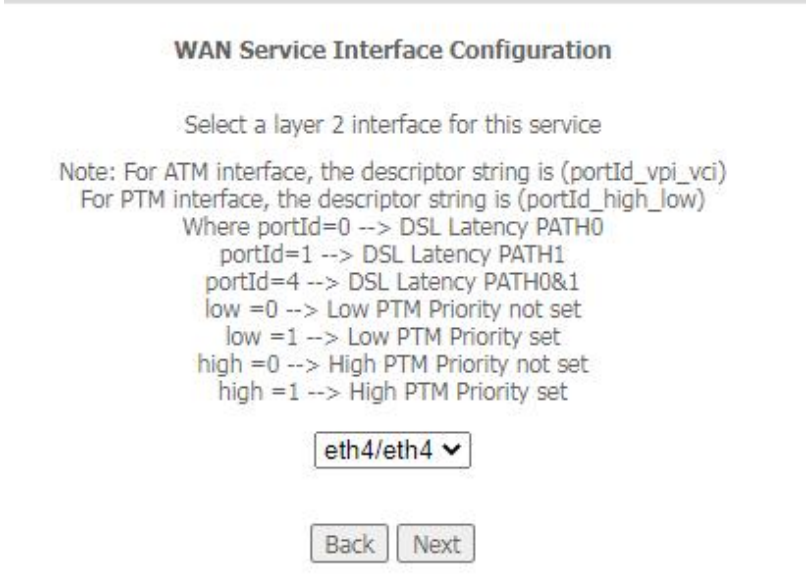
**Step6** In this page, it displays the information about the IPoE settngs.Click **Apply/Save** to save and apply the setting.



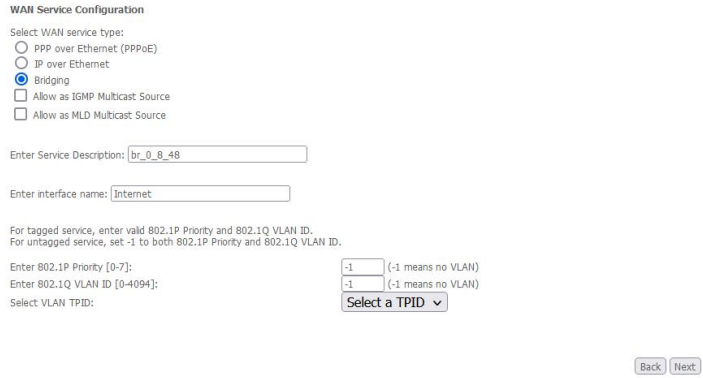

### 5.2.2.2 Adding a Bridge WAN service by GUI

This section describes the steps for adding the Bridge WAN service.

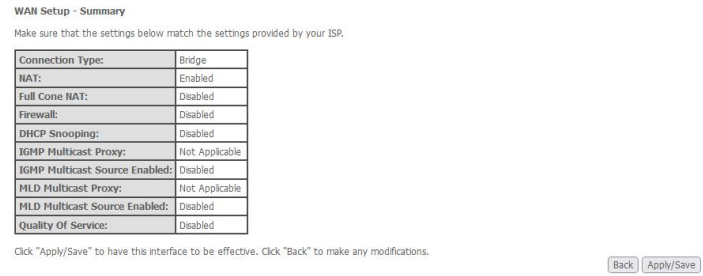
**Step1** In the **Wide Area Network (WAN) Service Setup** page, click the **Add** button to display the following page. (At first, you must add a proper ATM interface for this WAN service.) Click the **Add** button to display the following page.



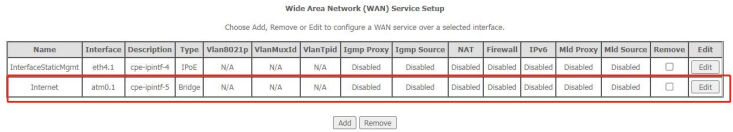
**Step2** Select the proper ETH Interface and then click **Next** to display the following page.




**Step3** In this page, you can select the WAN service type, and modify the service description for this service. After finishing setting, click **Next** to display the following page.




**Step4** In this page, it displays the information about the bridge settngs. Click **Apply/Save** to save and apply the settings. You can modify the settings by clicking the **Back** button if necessary.




### 5.2.3 IPV6

Choose **Advanced Setup > IPV6**, and the following page appears.


In the **IPV6 enable or disable control setting** page, Click **Apply/Save** to save and apply the settings.

### 5.2.4 LAN Configuration

#### 5.2.4.1 IPv4 Autoconfiguration

Choose **Advanced Setup >IPv4 Autoconfig**, and the following page appears.

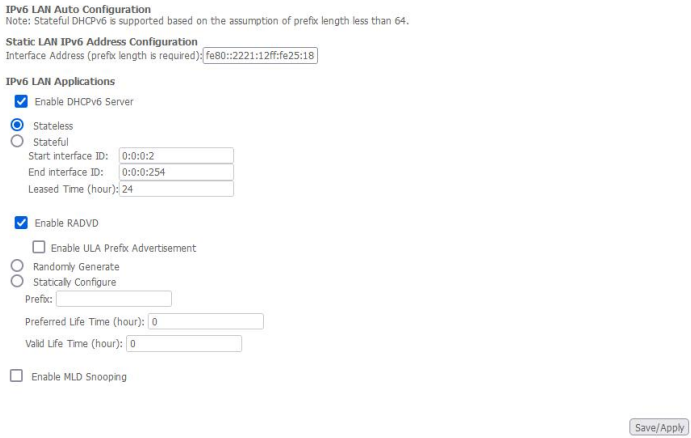
**Local Area Network (LAN)**

| | |
|---|---|
| LAN IP: | 10.10.0.138 |
| LAN mask: | 255.255.255.0 |
| Start IP Address: | 10.10.0.1 |
| End IP Address: | 10.10.0.64 |
| Primary DNS server: | 10.10.0.138 |
| Secondary DNS server: | 0.0.0.0 |
| Leased Time (secends): | 86400 |

In this page, only show the settings. User can't config it.

#### 5.2.4.2 IPv6 Autoconfiguration

Click **Advanced Setup > LAN >IPv6 Autoconfig**, and the following page appears.




In this page, you can set an IP address for the DSL IPv6 router, enable the DHCPv6 server, enable RADVD and enable the MLD snooping function.

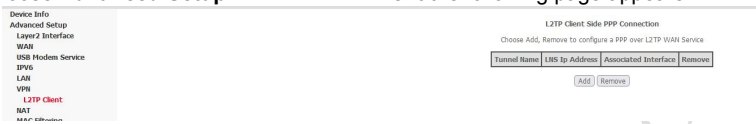
- **Enable DHCPv6 Server:** WIDE-DHCPv6 is an open-source implementation of dynamic host configuration protocol for IPv6 (DHCPv6) originally developed by the KAME project. The implementation mainly complies with the following standards: RFC3315, RFC3319, RFC3633, RFC3646, RFC4075, RFC 4272 etc.
- **Enable RADVD:** The router advertisement daemon (RADVD) is run by Linux or BSD systems acting as IPv6 routers. It sends router advertisement messages, specified by RFC2461, to a local Ethernet LAN periodically and when requested by a node sending a router solicitation message. These messages are required for IPv6 stateless auto-configuration.
- **Enable MLD Snooping**: Multicast Listener Discovery Snooping (MLD Snooping) is an IPv6 multicast constraining mechanism that runs on Layer 2 devices to manage and control IPv6 multicast groups. By analyzing received MLD messages, a Layer 2 device running MLD Snooping establishes mappings between ports and multicast MAC addresses and forwards IPv6 multicast data based on these mappings.

After finishing setting, click the **Save/Apply** button to apply the settings.

## 5.2.5 VPN

### 5.2.5.1 L2TP Client

Choose **Advanced Setup >VPN> L2TP Client** the following page appears.




**Step1** In the **L2TP Client Side PPP Connection** page.Cick the **Add** button to display the following page.


**Step2** In this page, you can modify the **Tunnel Name**, **L2TP Server Ip Address**, **Wan Interface**.

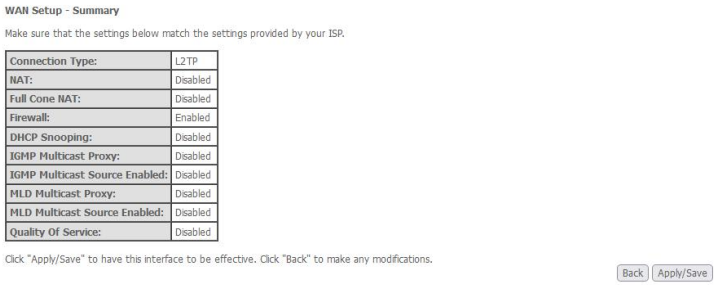
- **Tunnel Name:** The name of the Tunnel
- **L2TP Server Ip Address:** Set the address of the L2TP server.
- **Wan Interface**: Select an existing wan connection, and then build an L2TP channel on this wan connection.

**Step3** After setting the parameters, click **Next** to display the following page.

**Step4** In this page, you can modify the **PPP Username**, **PPP Password**, **Enable Firewall, Enable Default Gateway**.

- **PPP Username:** The correct user name provided by your ISP.
- **PPP Password:** The correct password provided by your ISP.
- **Enable Firewall :** Used to control whether remote access is allowed
- **Enable Default Gateway :** Set that wan connection as the default gateway

**Step5** After setting the parameters, click **Next** to display the following page.


WAN Setup - Summary

Make sure that the settings below match the settings provided by your ISP.

| | |
|---|---|
| Connection Type: | L2TP |
| NAT: | Disabled |
| Full Cone NAT: | Disabled |
| Firewall: | Enabled |
| DHCP Snooping: | Disabled |
| IGMP Multicast Proxy: | Disabled |
| IGMP Multicast Source Enabled: | Disabled |
| MLD Multicast Proxy: | Disabled |
| MLD Multicast Source Enabled: | Disabled |
| Quality Of Service: | Disabled |

Click "Apply/Save" to have this interface to be effective. Click "Back" to make any modifications.

Back Apply/Save

**Step6** In this page, it displays the information about the PPPoE settngs. Click **Apply/Save** to save and apply the settings.

## 5.2.6 NAT

### 5.2.6.1 Port Forwarding

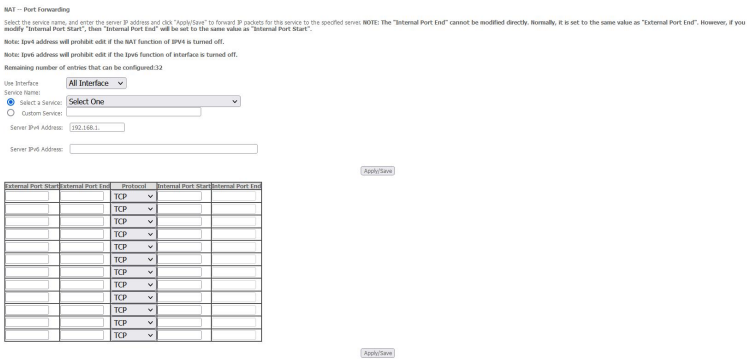
Firewall can prevent unexpected traffic on the Internet from your host on the LAN. The Port Forwarding can create a channel that can pass through the firewall. In that case, the host on the Internet can communicate with a host on your LAN within certain port range.

Choose **Advanced Setup > NAT > Port Forwarding**, and the following page appears.


In this page, you are allowed to add or remove a Port Forwarding entry.

To add a Port Forwarding, do as follows:

**Step 1** Click the **Add** button to display the following page.




- **Use interface**: Select an interface that you want to configure.
- **Select a Service**: Select a proper service in the drop-down list.
- **Custom Server**: Enter a new service name to establish a user service type.
- **Server IPv4 Address**: Assign an IP address to virtual server.
- **Server IPv6 Address**: Assign an IP address to virtual server.

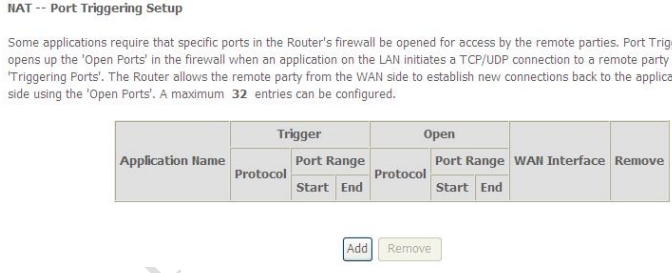
- **External Port Start**: When selecting a service, the port number will automatically be displayed. You can modify it if necessary.
- **External Port End**: When selecting a service, the port number will automatically be displayed. You can modify it if necessary.
- **Protocol**: You may select TCP/UDP, TCP, or UDP in the drop-down list.
- **Internal Port Start**: When selecting a service, the port number will automatically be displayed. You can modify it if necessary.
- **Internal Port End**: When selecting a service, the port number will automatically be displayed. You can modify it if necessary.

**Step 2** After finishing setting, click **Save/Apply** to save and apply the settings.

### 5.2.6.2 Port Triggering

Some applications need some ports to be opened in the firewall for the remote access. When an application initializes a TCP/UDP to connect to a remote user, port triggering dynamically opens the open ports of the firewall.

Choose **Advanced Settings > NAT > Port Triggering**, and the following page appears.


NAT -- Port Triggering Setup

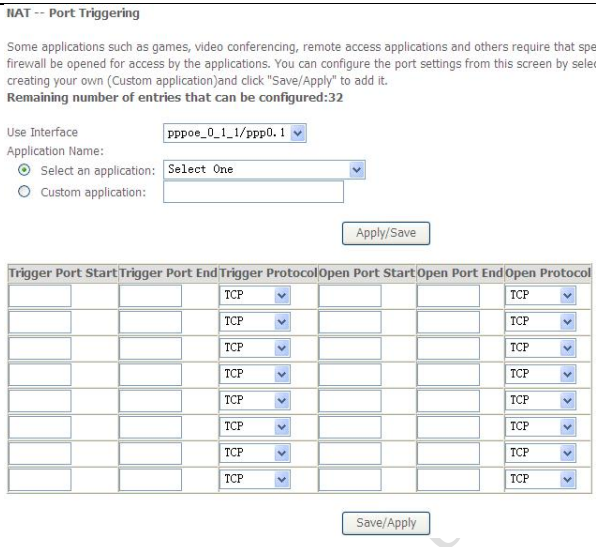
Some applications require that specific ports in the Router's firewall be opened for access by the remote parties. Port Trigger dynamically opens up the 'Open Ports' in the firewall when an application on the LAN initiates a TCP/UDP connection to a remote party using the 'Triggering Ports'. The Router allows the remote party from the WAN side to establish new connections back to the application on the LAN side using the 'Open Ports'. A maximum 32 entries can be configured.

| Application Name | Trigger | | | Open | | | WAN Interface | Remove |
|---|---|---|---|---|---|---|---|---|
| | Protocol | Port Range | | Protocol | Port Range | | | |
| | | Start | End | | Start | End | | |

Add Remove

In this page, you may add or remove an entry of port triggering.

Click the **Add** button to display the following page.




- **Use interface**: Select an interface that you want to configure.
- **Select an application:** Select a proper application in the drop-down list.
- **Custom application:** Manually define an application.
- **Trigger port Start:** The start port number that LAN uses to trigger the open port.
- **Trigger port End:** The end port number that LAN uses to trigger the open port.
- **Trigger Protocol:** Select the application protocol. You may select TCP/UDP, TCP, or UDP.
- **Open Port Start:** The start port number that is opened to WAN.
- **Open Port End:** The end port number that is opened to WAN.
- **Open Protocol:** Select the proper protocol that is opened to WAN. You may select TCP/UDP, TCP, or UDP.

After finishing setting, click **Save/Apply** to apply the settings.

**Note:**

You can use a single port number, several port numbers separated by commas, port blocks consisting of two port numbers separated by a dash, or any combination of these, for example 80, 90-140, 180.

#### 5.2.6.3 DMZ Host

DMZ allows all the ports of a PC on your LAN to be exposed to the Internet. Set the IP address of the PC to be DMZ host, so that the DMZ host will not be blocked by firewall.

Choose **Advanced Setup > NAT > DMZ host** to display the following page.


In this page, enter the IP address of the DMZ host.

After finishing the settings, click the **Apply/Save** button to apply the settings.

If you want to clear the DMZ function of the host, please delete the IP address of the host in the field of **DMZ Host IP Address**, and then click the **Apply/Save** button.

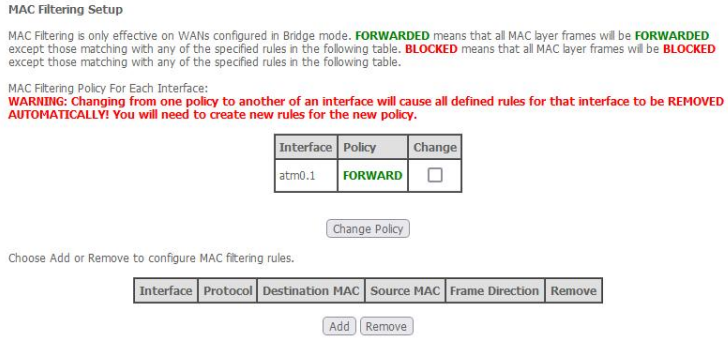
### 5.2.7 MAC Filtering

In some cases, you may want to manage Layer2 MAC address to block or permit a computer within the home network. When you enable MAC filter rules, the Router serves as a firewall that works at layer 2.

**Note:**

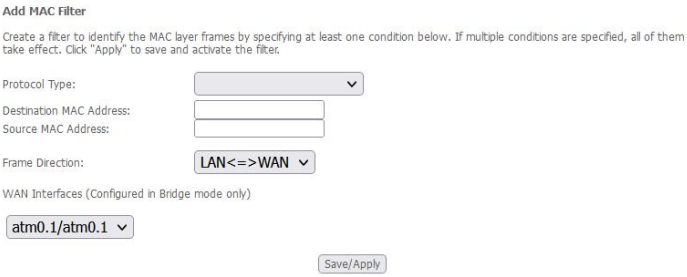
MAC filtering is only effective on ATM PVCs configured in bridge mode.

Choose **Advanced Setup** > **MAC Filtering** and the following page appears.




In this page, you can add or remove the MAC filtering rule. You may change the MAC filtering policy from **FORWARDED** to **BLOCKED** by clicking the **Change Policy** button.

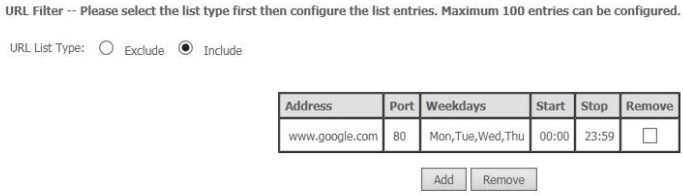
Click the **Add** button to display the following page.




- **Protocol Type**: Select the proper protocol type.
- **Destination MAC Address**: Enter the destination MAC address.
- **Source MAC Address**: Enter the source MAC address.
- **Frame Direction**: The direction of transmission frame.

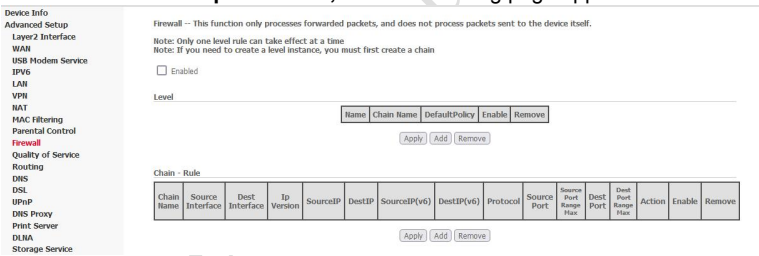
- **WAN Interface (Configured in bridge mode only)**: Select the proper WAN interface in the drop-down list.

After finishing setting, click **Apply/Save** to save and apply the filtering rule.




## 5.2.8 Firewall

Choose **Advanced Setup** > **Firewall,** and the following page appears.



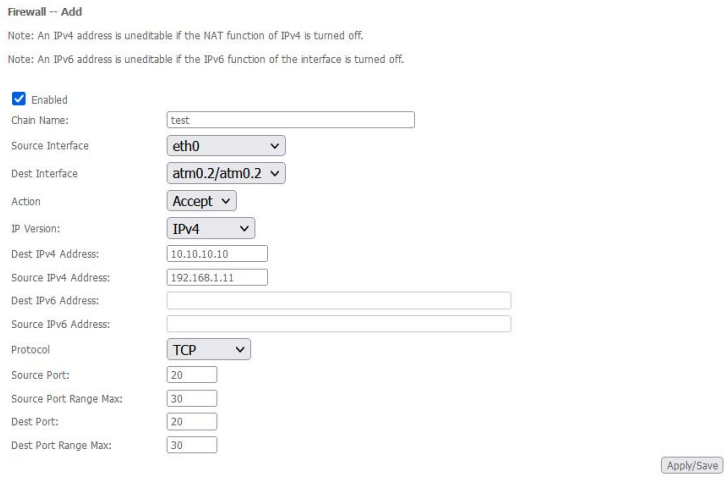

In this page, you are allowed to add, remove, or edit a level and Chain rule.

Note: If you need to create a level instance, you must first create a chain

### 5.2.8.1 Adding a Chain Rule

This section describes the steps for adding the chain rule.

**Step1** In the **Chain - Rule** page, click the **Add** button to display the following page.




**Step2** In this page, you can modify follow parameters.

- **Chain Name:** The name of the chain.
- **Source Interface:**Select an interface which the packet receive.
- **Dest Interface:** Select the interface from which the packet is sent.
- **Action:** Set the processing action for the packets matching the rule..Accept or Drop.
- **IP Version:**. IP Version.
- **Dest IPv4 Address:**. Dest IPv4 Addresss of packet.
- **Source IPv4 Address :** Source IPv4 Address of packet.
- **Dest IPv6 Address:**. Dest IPv6 Addresss of packet.
- **Source IPv6 Address :** Source IPv6 Address of packet.
- **Protocol:** TCP or UDP
- **Source Port:** Source Port
- **Source Port Range Max:** Source Port Range Max
- **Dest Port:** Dest Port
- **Dest Port Range Max:** Dest Port Range Max
-

**Step3** After setting the parameters, Click **Apply/Save** to save and apply the settings.


### 5.2.8.2 Adding a Level Rule

This section describes the steps for adding the Level rule.

**Step1** In the **Level** page, click the **Add** button to display the following page.


**Step2** In this page, you can modify follow parameters.

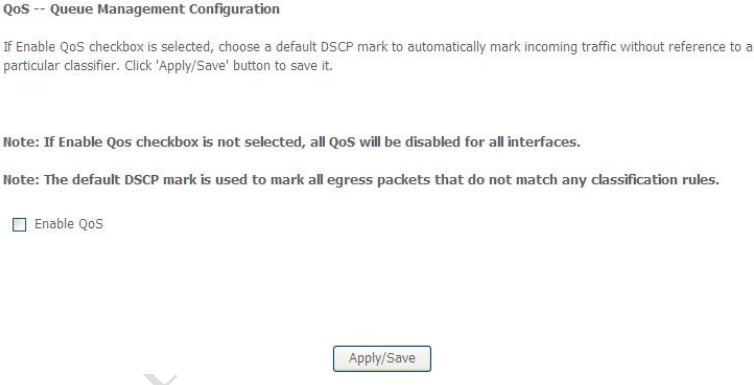
- **Enable :** enable this level.
- **Level name:**The name the level.
- **Select Chain:** Select a chain to associate this level.
- **DefaultPolicy:** Default Policy.

**Step4** After setting the parameters, Click **Apply/Save** to save and apply the settings.

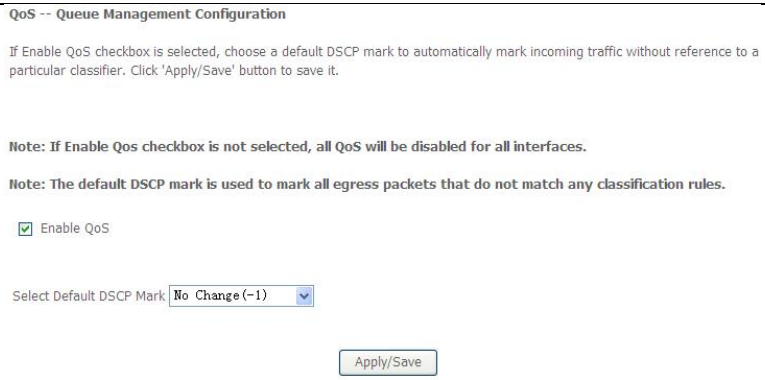

### 5.2.9 Quality of Service

**Enabling QoS**

Choose **Advance Setup > Quality of Service** and the following page appears.




Select **Enable QoS** to enable QoS and configure the default DSCP mark.




In this page, enable the QoS function and select the default DSCP mark. After finishing setting, click **Apply/Save** to save and apply the settings.

**Note:**

If the **Enable Qos** checkbox is not selected, all QoS will be disabled for all interfaces. The default DSCP mark is used to mark all egress packets that do not match any classification rules.

## Queue Configuration

Choose **Advanced Setup** > **Quality of Service** > **QoS Queue**, and the following page appears.

**QoS Queue Setup**

In ATM mode, maximum 16 queues can be configured.
In PTM mode, maximum 8 queues can be configured.
For each Ethernet interface, maximum 8 queues can be configured.
For each Ethernet WAN interface, maximum 8 queues can be configured.
To add a queue, click the **Add** button.
To remove queues, check their remove-checkboxes, then click the **Remove** button.
The **Enable** button will scan through every queues in the table. Queues with enable-checkbox checked will be enabled. Queues with enable-checkbox un-checked will be disabled.
The enable-checkbox also shows status of the queue after page reload.

Note: Ethernet LAN queue configuration only takes effect when all the queues of the interface have been configured.

| Name | Key | Interface | Qid | Prec/Alg/Wght | DSL Latency | PTM Priority | Shaping Rate (bps) | Min Bit Rate(bps) | Burst Size (bytes) | Enable | Remove |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LAN Q8 | 1 | eth1 | 8 | 1/SP | | | | | | ☑ | ☐ |
| LAN Q7 | 2 | eth1 | 7 | 2/SP | | | | | | ☑ | ☐ |
| LAN Q6 | 3 | eth1 | 6 | 3/SP | | | | | | ☑ | ☐ |
| LAN Q5 | 4 | eth1 | 5 | 4/SP | | | | | | ☑ | ☐ |
| LAN Q4 | 5 | eth1 | 4 | 5/SP | | | | | | ☑ | ☐ |
| LAN Q3 | 6 | eth1 | 3 | 6/SP | | | | | | ☑ | ☐ |
| LAN Q2 | 7 | eth1 | 2 | 7/SP | | | | | | ☑ | ☐ |
| LAN Q1 | 8 | eth1 | 1 | 8/SP | | | | | | ☑ | ☐ |
| LAN Q8 | 9 | eth2 | 8 | 1/SP | | | | | | ☑ | ☐ |

In this page, you can enable, add or remove a QoS rule.

**Note:**

The lower integer value for precedence indicates the higher priority.

Click the **Add** button to display the following page.

**QoS Queue Configuration**

This screen allows you to configure a QoS queue and add it to a selected layer2 interface.

Name:

Enable: Disable

Interface:

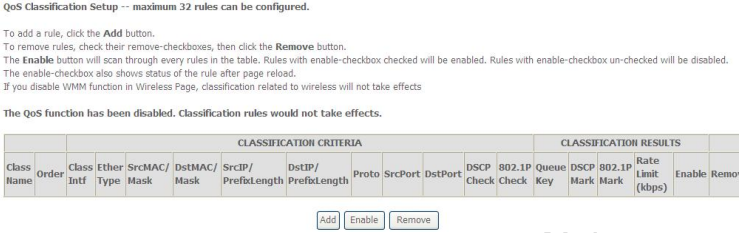
Apply/Save

- **Name:** Enter the name of QoS queue.
- **Enable:** Enable or disable the QoS queue.
- **Interface:** Select the proper interface for the QoS queue.

After finishing setting, click **Apply/Save** to save and apply the settings.

## QoS Classification

Choose **Advanced Setup** > **Quality of Service** > **Qos Classification** and the following page appears.




In this page, you can enable, add or remove a QoS classification rule.

Click the **Add** button to display the following page.

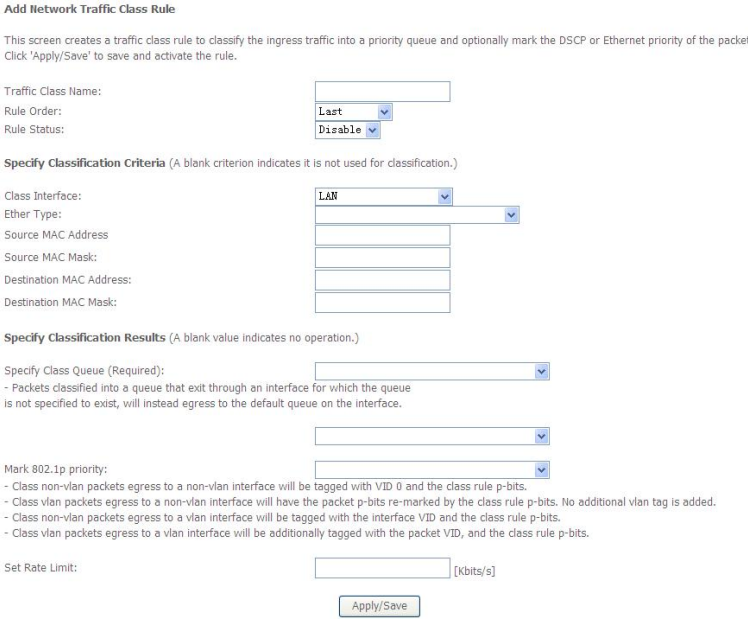
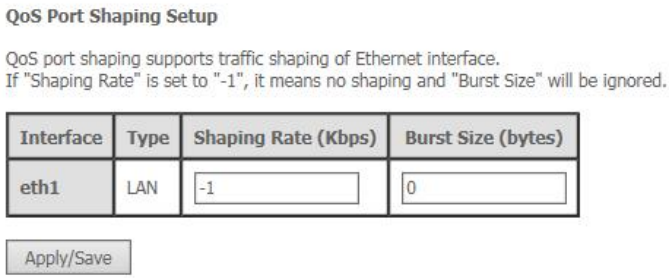


Figure 5

### QoS Port Shaping

**Choose** Advanced Setup **>** Quality of Service > QoS Port Shaping

and the following page appears.




## 5.2.10 Routing

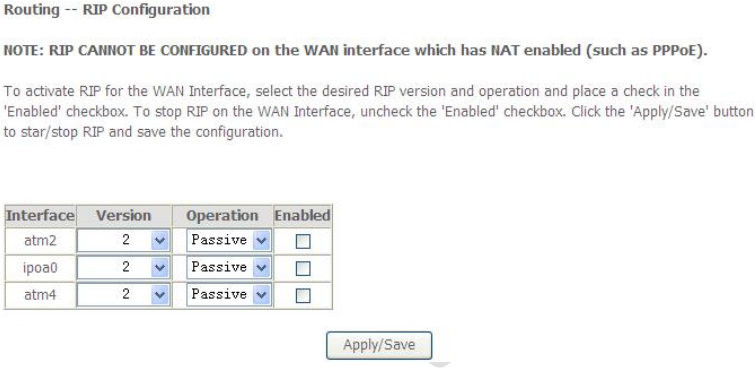
### 5.2.10.1 Adding a Route by GUI

Choose **Advanced Setup** > **Routing** > **Route**, and the following page appears.

**Step1** After setting the parameters, click **Apply/Save** to save and apply the settings.

### RIP

Choose **Advanced Setup > Routing > RIP** and the following page appears.

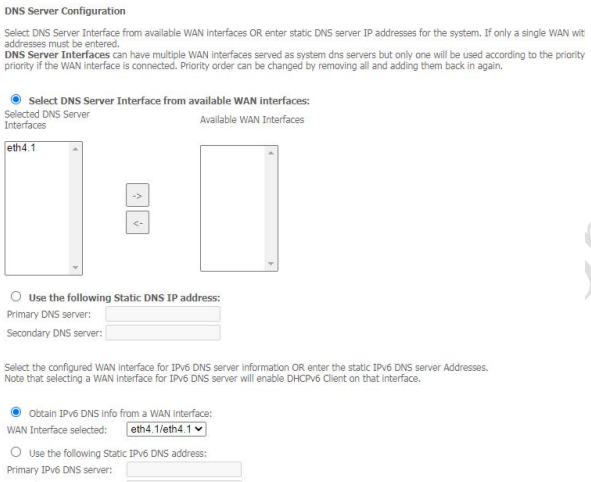



In this page, if you want to configure an individual interface, select the desired RIP version and operation, and then select the **Enabled** checkbox for the interface. After finishing setting, click **Apply/Save** to save and apply the settings.

## 5.2.11 DNS

### 5.2.11.1 Adding a DNS Server by GUI

Choose **Advanced Setup > DNS > DNS Server** and the following page appears.

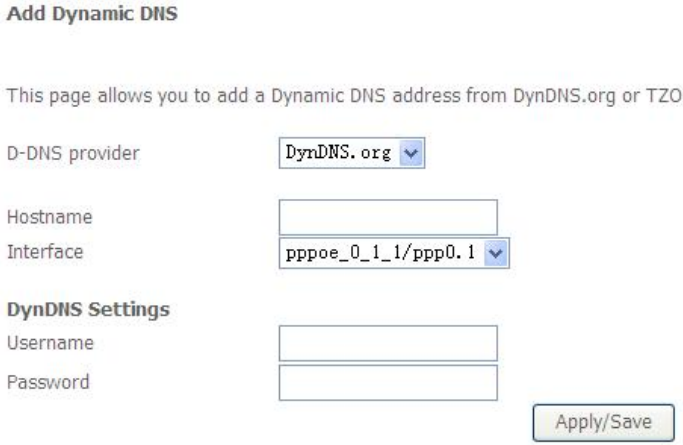



**Step1** After setting the parameters, click **Apply/Save** to save and apply the settings.

## Dynamic DNS

Choose **Advanced Setup > DNS > Dynamic DNS** and the following page appears.


In this page, you are allowed to modify the DDNS settings.
Click the **Add** button to display the following page.

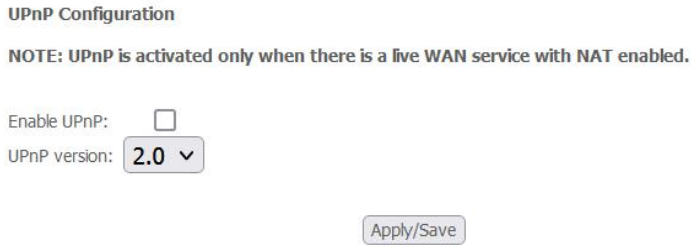



- **D-DNS provider:** Select a proper DDNS server in the drop-down list.
- **Hostname:** It is the domain name and it can be modified.
- **Interface:** The interface that the packets pass through on the Router.
- **Username:** Enter the username for accessing the DDNS management interface.
- **Password:** Enter the password for accessing the DDNS management interface.

After finishing setting, click **Apply/Save** to save and apply the settings.

### 5.2.12 UPnP

Choose **Advanced Setup > UPnP** and the following page appears.




In this page, you can enable or disable the UPnP function.
After finishing setting, click **Apply/Save** to save and apply the settings.

Following is the cli command to enable or disable the upnp:

upnp
    enable
exit

### 5.2.13 Dnsmasq

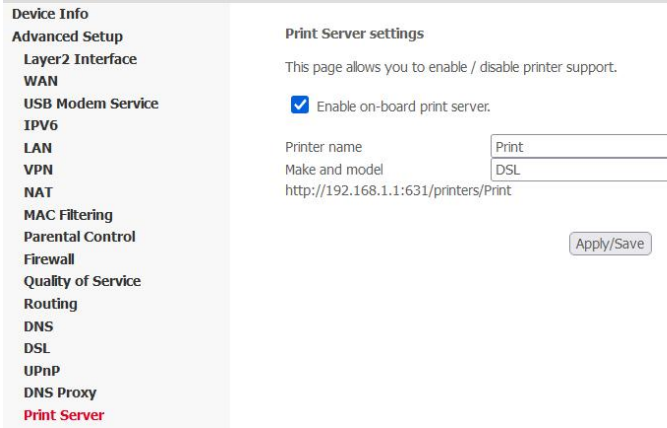
Choose **Advanced Setup > Dnsmasq** and the following page appears.


In this page, you can enable or disable the DNS function.

After enabling the DNS function, enter the host name of the broadband router and the domain name of the LAN network, and then click **Apply/Save** to save and apply the settings.

### 5.2.14 Print Server

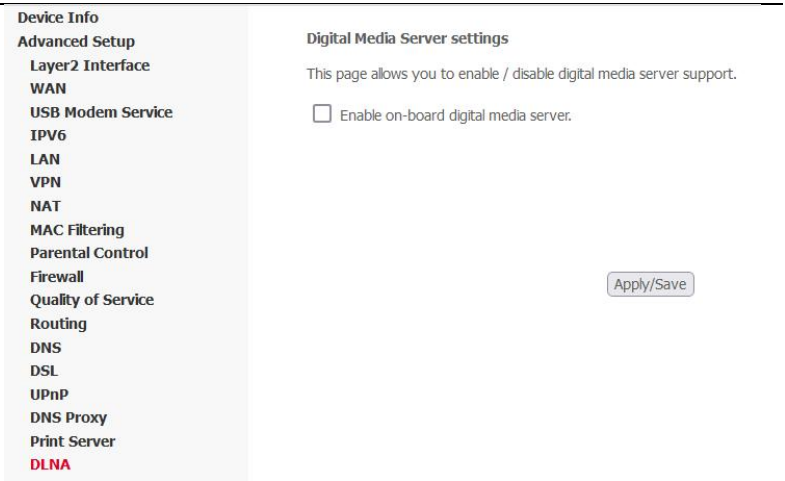
Choose **Advanced Setup > Print Server** and the following page appears.




In this page, you can enable or disable the **Print Server** function.
After enabling the **Print Server** function, enter the Printer name, Make and model, and then click **Apply/Save** to save and apply the settings.

### 5.2.15 DLNA

Choose **Advanced Setup > DLNA** and the following page appears.




In this page, you can enable or disable the **DLNA** function.
After enabling the **DLNA** function, and then click **Apply/Save** to save and apply the settings.

## 5.2.16 Storage Service

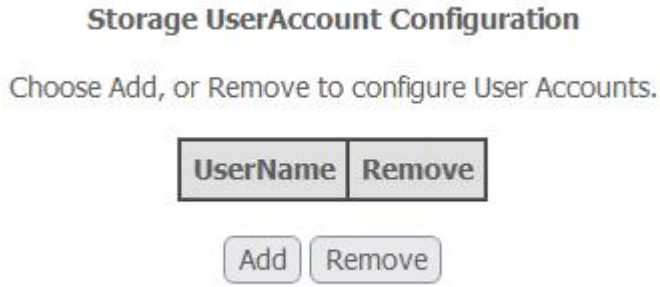
### 5.2.16.1 Storage Device Info

Choose **Advanced Setup > Storage Service > Storage Device Info** and the following page appears.

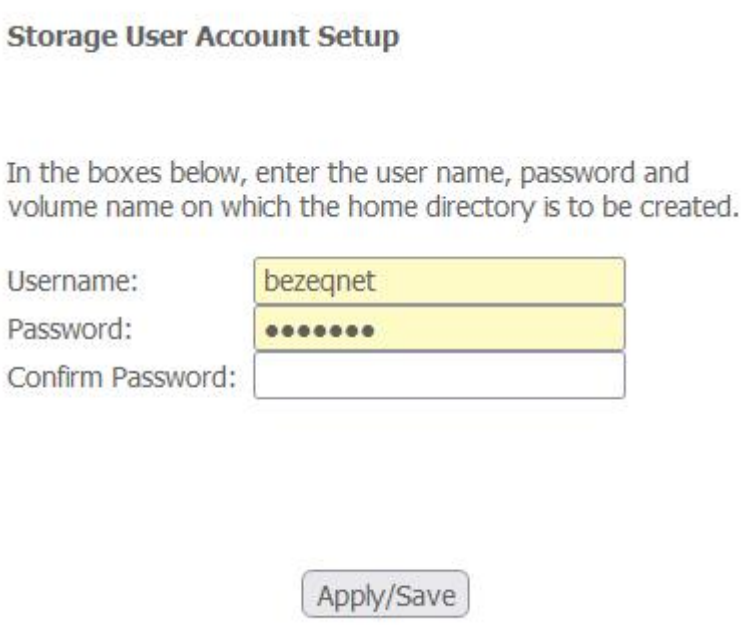

In this page, you can see the detail info about the USB device what plug to the Router.

### 5.2.16.2 Adding a User Account

Choose **Advanced Setup > Storage Service > User Accounts** and the following page appears.




**Step2** In the **Storage UserAccount Configuration** page, click the **Add** button to display the following page.




**Step3** In this page, you can modify the Username, Password.

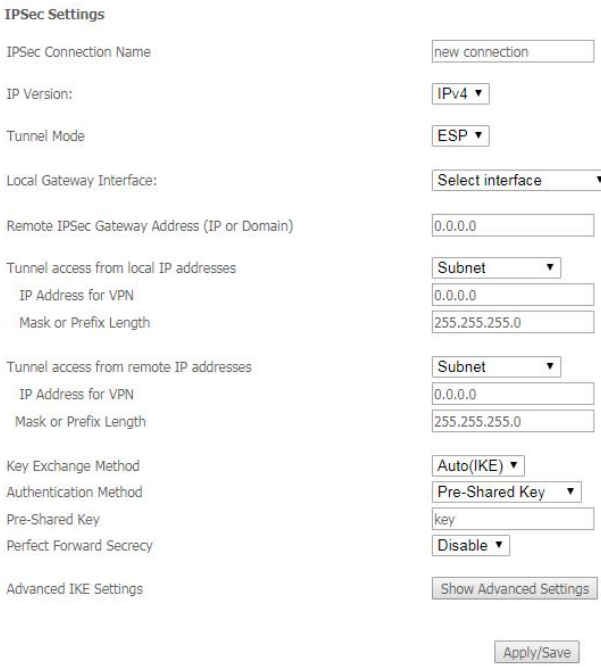
- **Username:** Set the Username to access the USB device.
- **Password:** Set the Password to access the USB device.

**Step4** After setting the parameters, click **Apply/Save** to save and apply the settings.


## 5.2.17 IPSec

Choose **Advanced Setup > IPSec** and the following page appears.


In this page, you can add or remove the IPSec tunnel connections.
Click the **Add New Connection** button to display the following page.

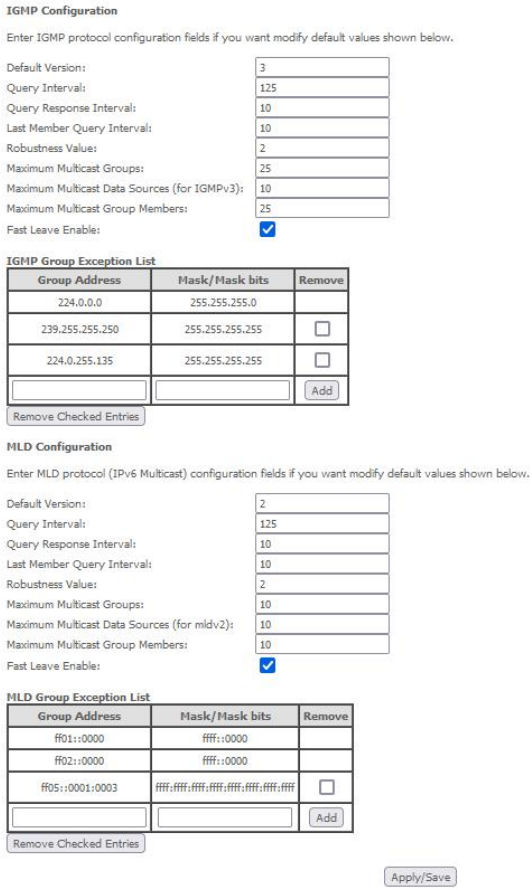



In this page, set the parameters such as the IPSec connection name, tunnel mode, and remote IPSec gateway address.

If you need to configure the advanced settings of this IPSec tunnel connection, please click the **Show Advanced Settings** button to display the other parameters. After finishing setting, click **Apply/Save** to save and apply the settings.

### 5.2.18 Multicast

Choose **Advanced Setup > Multicast** and the following page appears.



**IGMP Configuration**

Enter IGMP protocol configuration fields if you want modify default values shown below.

| | |
|---|---|
| Default Version: | 3 |
| Query Interval: | 125 |
| Query Response Interval: | 10 |
| Last Member Query Interval: | 10 |
| Robustness Value: | 2 |
| Maximum Multicast Groups: | 25 |
| Maximum Multicast Data Sources (for IGMPv3): | 10 |
| Maximum Multicast Group Members: | 25 |
| Fast Leave Enable: | ☑ |

**IGMP Group Exception List**

| Group Address | Mask/Mask bits | Remove |
|---|---|---|
| 224.0.0.0 | 255.255.255.0 | |
| 239.255.255.250 | 255.255.255.255 | ☐ |
| 224.0.255.135 | 255.255.255.255 | ☐ |
| | | Add |

Remove Checked Entries

**MLD Configuration**

Enter MLD protocol (IPv6 Multicast) configuration fields if you want modify default values shown below.

| | |
|---|---|
| Default Version: | 2 |
| Query Interval: | 125 |
| Query Response Interval: | 10 |
| Last Member Query Interval: | 10 |
| Robustness Value: | 2 |
| Maximum Multicast Groups: | 10 |
| Maximum Multicast Data Sources (for mldv2): | 10 |
| Maximum Multicast Group Members: | 10 |
| Fast Leave Enable: | ☑ |

**MLD Group Exception List**

| Group Address | Mask/Mask bits | Remove |
|---|---|---|
| ff01::0000 | ffff::0000 | |
| ff02::0000 | ffff::0000 | |
| ff05::0001:0003 | ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff | ☐ |
| | | Add |

Remove Checked Entries

Apply/Save

In this page, you can configure the multicast parameters.

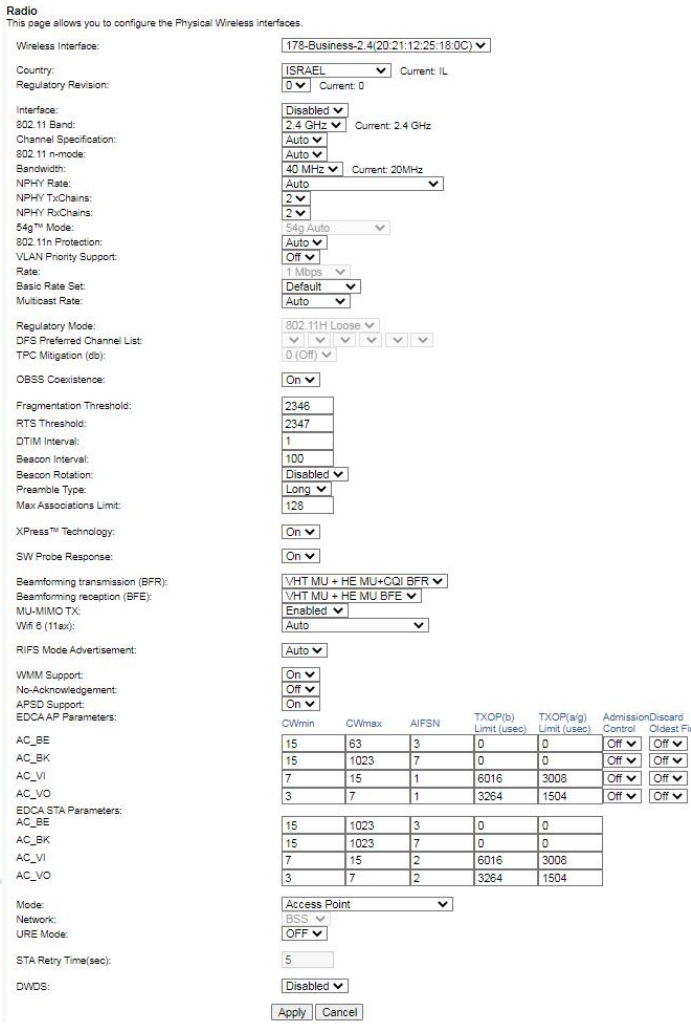
After finishing setting, click **Apply/Save** to save and apply the settings.

## 5.3 Wireless

Choose **Wireless** and the submenus of **Wireless** are shown as below:


### 5.3.1 Radio

Choose **Wireless** > **Radio** to display the following page. This page allows you to configure the advanced features of the wireless LAN interface. Usually, you do not need to change the settings in this page.




- Channel Specification: Fill in the appropriate channel to correspond with your network settings. All devices in your wireless network must use the

same channel in order to work correctly. This router supports auto channeling functionality.

- **802.11 n-mode::** Select **off** 802.11n or **Auto**.
- **Bandwidth:** Select the bandwidth for the network. You can select **20MHz in Both Bands**, **20MHz in 2.4G Band and 40MHz in 5G Band**, or **40MHz in Both Bands, 80MHz in 5G Band, 160MHz in 5G Band**
- **802.11n Protection:** The 802.11n standards provide a protection method so 802.11b/g and 802.11n devices can co-exist in the same network without "speaking" at the same time.
- **Basic Rate Set:** Select the basic transmission rate ability for the AP.
- **Multicast Rate:** Select the multicast transmission rate for the network. The rate of data transmission should be set depending on the speed of your wireless network. You can select from a range of transmission speeds, or you can select **Auto** to have the Router automatically use the fastest possible data rate and enable the Auto-Fallback feature. Auto-Fallback will negotiate the best possible connection speed between the Router and a wireless client. The default value is **Auto**.
- **Fragmentation Threshold:** Packets that are larger than this threshold are fragmented into multiple packets. Try to increase the fragmentation threshold if you encounter high packet error rates. Do not set the threshold too low, since this can result in reduced networking performance.
- **RTS Threshold:** This value should remain at its default setting of 2347.Should you encounter inconsistent data flow, only minor reductions are recommended. Should you encounter inconsistent data flow, only minor reduction of the default value, 2347, is recommended. If a network packet is smaller than the preset RTS threshold size, the RTS/CTS mechanism will not be enabled. The Router sends Request to Send (RTS) frames to a particular receiving station and negotiates the sending of a data frame. After receiving an RTS, the wireless station responds with a Clear to Send (CTS) frame to acknowledge the right to begin transmission. The RTS Threshold value should remain at its default value of 2347.
- **DTIM Interval:** (Delivery Traffic Indication Message) Enter a value between 1 and 255 for the Delivery Traffic Indication Message (DTIM.) A DTIM is a countdown informing clients of the next window for listening to broadcast and multicast messages.
- **Beacon Interval:** A beacon is a packet of information that is sent from a connected device to all other devices where it announces its availability and readiness. A beacon interval is a period of time (sent with the beacon) before sending the beacon again. The beacon interval may be adjusted in milliseconds (ms). Default (100) is recommended.
- **XPress Technology:** Select Enable or Disable. This is a special accelerating technology for IEEE802.11g. The defaule is Disabled.