ipRocketLink™ Model 3101 Series
ADSL2+ WiFi Four-Port Router

Getting Started Guide

Important
This is a Class B device and is intended for use in a light industrial (commercial) or residential environment. It is not intended for use in a heavy industrial environment.

Sales Office: **+1 (301) 975-1000**
Technical Support: **+1 (301) 975-1007**
E-mail: **support@patton.com**
WWW: **www.patton.com**

Part Number: **07M3101-GS, Rev. C**
Revised: **September 21, 2011**

Patton Electronics Company, Inc.
7622 Rickenbacker Drive
GaithersbuModel 3101, MD 20879 USA
Tel: +1 (301) 975-1000
Fax: +1 (301) 869-9293
Support: +1 (301) 975-1007
Web: www.patton.com
E-mail: support@patton.com

Trademark Statement

Warranty Information

Patton Electronics warrants all Model 3101 components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of the shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If the product fails to perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall Patton Electronics be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. Patton Electronics specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

Summary Table of Contents

Table of Contents

List of Figures

List of Tables

About this guide

This guide describes how to set up and manage the ipRocketLink™ Model 3101 ADSL2/2+ WiFi Router.

Audience

This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

Structure

This guide contains the following chapters and appendices:

- Chapter 1 on page 17 provides information about Model 3101 features and capabilities
- Chapter 2 on page 23 provides information on typical applications
- Chapter 3 on page 25 describes how to install and set up the Model 3101
- Chapter 4 on page 31 describes how to log into the unit and view device information and statistics
- Chapter 5 on page 37 explains how to configure advanced features for the Model 3101
- Chapter 6 on page 90 explains how to configure wireless settings for the Model 3101
- Chapter 7 on page 105 describes how to run diagnostic tests and manage system settings
- Chapter 8 on page 112 contains information on contacting Patton technical support for assistance
- Appendix A on page 115 contains compliance information for the router
- Appendix B on page 117 contains specifications for the router

For best results, read the contents of this guide *before* you install the router.

Precautions

Notes, cautions, and warnings, which have the following meanings, are used throughout this guide to help you become aware of potential problems. ***Warnings*** are intended to prevent safety hazards that could result in personal injury. ***Cautions*** are intended to prevent situations that could result in property damage or impaired functioning.

Note A note presents additional information or interesting sidelights.

The alert symbol and IMPORTANT heading calls attention to important information.

The alert symbol and CAUTION heading indicate a potential hazard. Strictly follow the instructions to avoid property damage.

The shock hazard symbol and CAUTION heading indicate a potential electric shock hazard. Strictly follow the instructions to avoid property damage caused by electric shock.

The alert symbol and WARNING heading indicate a potential safety hazard. Strictly follow the warning instructions to avoid personal injury.

The shock hazard symbol and WARNING heading indicate a potential electric shock hazard. Strictly follow the warning instructions to avoid injury caused by electric shock.

Safety when working with electricity

- **Do not open the device when the power cord is connected. For systems without a power switch and without an external power adapter, line voltages are present within the device when the power cord is connected.**
- **For devices with an external power adapter, the power adapter shall be a listed *Limited Power Source* The mains outlet that is utilized to power the device shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker in compliance with local regulatory requirements.**
- **For AC powered devices, ensure that the power cable used meets all applicable standards for the country in which it is to be installed.**
- **For AC powered devices which have 3 conductor power plugs (L1, L2 & GND or Hot, Neutral & Safety/Protective Ground), the wall outlet (or socket) must have an earth ground.**
- **For DC powered devices, ensure that the interconnecting cables are rated for proper voltage, current, anticipated temperature, flammability, and mechanical serviceability.**
- **WAN, LAN & PSTN ports (connections) may have hazardous voltages present regardless of whether the device is powered ON or OFF. PSTN relates to interfaces such as telephone lines, FXS, FXO, DSL, xDSL, T1, E1, ISDN, Voice, etc. These are known as "hazardous network voltages" and to avoid electric shock use caution when working near these ports. When disconnecting cables for these ports, detach the far end connection first.**
- **Do not work on the device or connect or disconnect cables during periods of lightning activity.**

This device contains no user serviceable parts. This device can only be repaired by qualified service personnel.

This device is NOT intended nor approved for connection to the PSTN. It is intended only for connection to customer premise equipment.

In accordance with the requirements of council directive 2002/96/EC on Waste of Electrical and Electronic Equipment (WEEE), ensure that at end-of-life you separate this product from other waste and scrap and deliver to the WEEE collection system in your country for recycling.

Electrostatic Discharge (ESD) can damage equipment and impair electrical circuitry. It occurs when electronic printed circuit cards are improperly handled and can result in complete or intermittent failures. Do the following to prevent ESD:

- **Always follow ESD prevention procedures when removing and replacing cards.**
- **Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to safely channel unwanted ESD voltages to ground.**
- **To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of the chassis.**

General observations

- Clean the case with a soft slightly moist anti-static cloth
- Place the unit on a flat surface and ensure free air circulation
- Avoid exposing the unit to direct sunlight and other heat sources
- Protect the unit from moisture, vapors, and corrosive liquids

Typographical conventions used in this document

This section describes the typographical conventions and terms used in this guide.

General conventions

The procedures described in this manual use the following text conventions:

Table 1. General conventions

Convention	Meaning
Garamond blue type	Indicates a cross-reference hyperlink that points to a figure, graphic, table, or section heading. Clicking on the hyperlink jumps you to the reference. When you have finished reviewing the reference, click on the **Go to Previous View** button in the Adobe® Acrobat® Reader toolbar to return to your starting point.
Garamond bold type	Indicates the names of command buttons that execute an action.
< >	Angle brackets indicate function and keyboard keys, such as <SHIFT>, <CTRL>, <C>, and so on.

Chapter 1 General Information

Chapter contents

Model 3101 Series Overview

Patton's Model 3101 Series ipRocketLink™ ADSL2/2+ bridge/routers are the perfect choice for users or service providers who need triple-play ready ADSL CPE with advanced routing functionality. Based on International Telecommunications Union (ITU) and American National Standard Institute (ANSI) standards G.992.1, G.992.2, G.992.3, G.992.5 and ANSI T1.413 Issue 2, the Patton ipRocketLink bridge/routers enable providers to deliver scalable bandwidth, up to 24 Mbps, to the most demanding voice, video and data applications. The ipRocketLink likewise supports G.Handshaking per ITU G.994.1.

The ipRocketLink is designed specifically to be compatible with the most popular DSLAMs in the market. Just set the units to their default mode, send them to the remote location and plug them in. The ipRocketLink will use the ADSL-aware CAC and automatically detect the ATM PVCs and start working.

The ipRocketLink line of ADSL bridge/routers come standard with support for IPoA, PPPoA, PPPoE, and multi-protocol encapsulation over ATM. Up to eight PVCs can be configured and ATM QoS applied via a simple traffic class configuration. In addition to supporting standard RIPv1 and v2 routing, the ipRocketLink can be configured with static routes. Bridging, including Spanning Tree is supported, as well as the ability to log into standard service provider networks with PPPoE using PAP/CHAP authentication. ipRocketLink routers support many advanced firewall features including ACLs and intrusion detection with blacklisting of offenders. Common features such as DHCP and NAT/PAT with application level gateway (ALG) also come standard.

Features

The Model 3101 Series supports the following features:

- **ADSL2/2+**—Support bandwidth hungry multimedia applications up to 24 Mbps at extended distances.
- **QoS Bridge/Router**—Support for advanced routing with QoS and bridging including Spanning Tree and 802.1p/Q.
- **Unmatched Connectivity**—The 3101 comes standard with USB and WiFi interfaces and with an Ethernet or 4-port Ethernet switch.
- **Software Upgradeable**—Software upgrades make it easy to keep the ipRocketLink™ in service for years.
- **NetLink™ Plug-and-Play**—Just plug them in and the link comes up in seconds. With support for CAC, connection to the DSLAM is a snap.
- **SNMP/HTTP**—The ipRocketLink Model Series supports SNMP and HTTP/WWW-based management.

Models

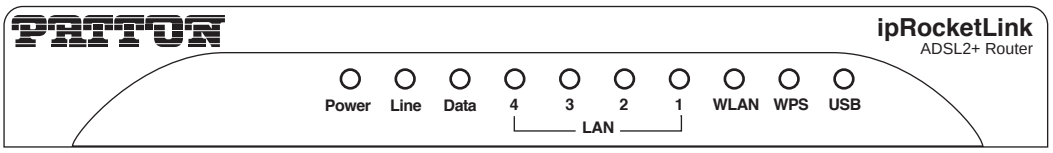
There are three different model types for the Model 3101 Series:

- 3101/**1I*x*** – ADSL2+ modem/router with single Ethernet port
- 3101/**4I*x*** – ADSL2+ modem/router with four Ethernet ports
- 3101/**4IWU*x*** – ADSL2+ modem/router with four Ethernet ports, WiFi, andUSB

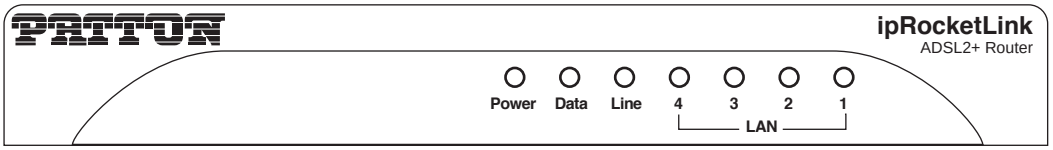
> **Note** The ***x*** in the model code represents the annex type. 3101 models are available for Annex A, Annex B, or Annex M.

Front Panel

Model 3101/4IWU



Model 3101/4I



Model 3101/1I

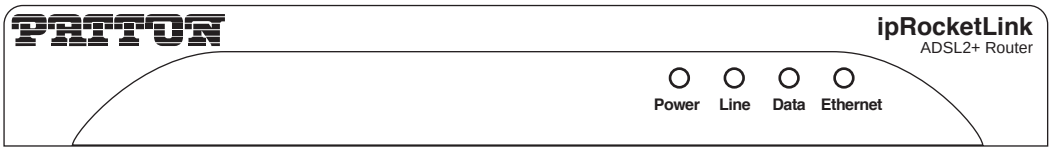


Figure 1. Model 3101 Series front panels

LEDs

Table 2. LED Descriptions

LED	Color	Status	Description
Power	Green	On	The device is powered on and operating normally.
		Blink	The software is upgrading.
		Off	The device is powered off.
	Red	On	The device is initiating.
		Blink	The software us upgrading.
Line	Green	On	DSL link has been established.
		Blink slowly	No DSL link detected.
		Blink quickly	The DSL line is training.
		Off	The device is powered off.
Data	Green	On	PPP/DHCP takes effect.
		Blink slowly	PPP/DHCP is negotiating.
		Blink quickly	Data is being transmitted.
	Red	On	The Internet authentication fails or the device is in bridge mode.
Ethernet (1-4)	Green	On	The Ethernet interface is connected.
		Blink	Data is being transmitted through the ETH interface.
		Off	The Ethernet interface is disconnected.

Table 2. LED Descriptions

LED	Color	Status	Description
WLAN (/4IWU model only)	Green	On	WLAN is enabled.
		Blink	Data is being transmitted through the WiFi.
		Off	WLAN is disabled.
WPS (/4IWU model only)	Green	On	Connection succeeds under WiFi Protected Setup.
		Blink	Negotiation is in progress under WiFi Protected Setup.
		Off	WiFi Protected Setup is disabled.
USB (/4IWU model only)	Green	On	A 3G or USB connection has been established.
		Blink	Data is being transmitted.
		Off	No signal is detected.

Rear Panel

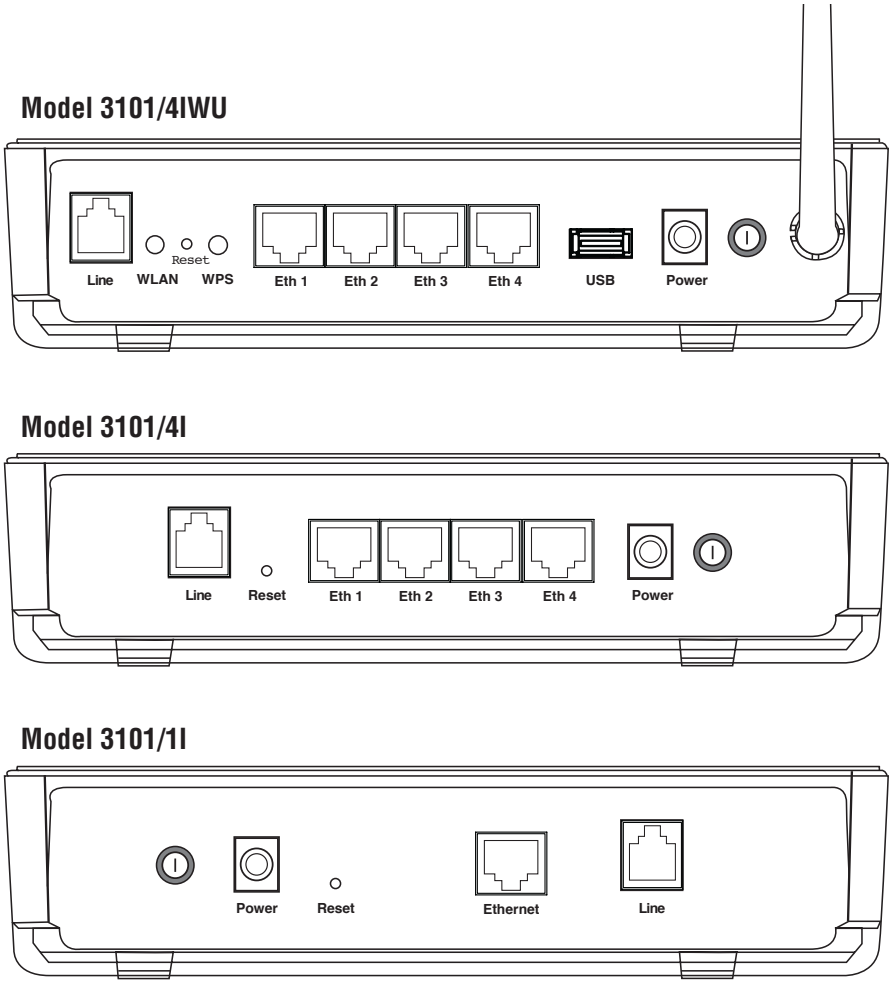


Figure 2. Model 3101 rear panel

Ports

Table 3. Port Descriptions

Port	Description
	Interface for connecting antennas
Line	RJ-11 port for connecting to ADSL telephone line
WLAN	WLAN switch for enabling/disabling the WLAN function
Reset	You may need to reset the Model 3101 if you lose network connectivity or if you can no longer communicate with the Model 3101 via the web interface. Press the Reset button for at least 1 second and then release to restart the unit with factory default settings.
WPS (/4IWU model)	Use this button to enable WiFi Protected Setup (WPS) Push-Button Configuration (PBC) mode. If WPS is enabled, press this button to start negotiation of PBC mode.
Ethernet (1-4)	RJ-45 port for connecting the unit to an Ethernet LAN (for example, a PC or switch). The Model 3101 has four LAN ports.
USB (/4IWU model)	USB port for connecting the unit to a 3G network card or USB storage device
Power	Interface for connecting the power adapter

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, 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.

The power specification is 12V, 1A. If the power adapter does not match the specification, it may damage the device.

Chapter 2 Applications Overview

Chapter contents

Typical applications

You may use the Model 3101 for the following applications:

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

The Model 3101excels in manageability:

- NetLinkPlug-and-play automatically facilitates remote unit configuration using standard ADSL CAC.
- Ethernet/USB/WiFi ports facilitates local management
- UPnP makes unit discovery a snap
- With SNMP and HTTP/web management, the ipRocketLink can be managed from virtually any location in the world
- RocketLink™ bridges/routers are software upgradeable with TFTP/FTP

Figure 3. 3101 application

Chapter 3 Installation and Initial Configuration

Chapter contents

Installation Overview

The Model 3101 maintains several separate interfaces– Ethernet LAN, ADSL (WAN), and a wireless LAN interface.

Planning the Installation

Location requirements

Place the 3101 in a location where it can be connected to the various devices as well as to a power source. The 3101 should not be located where it will be exposed to moisture or excessive heat. Make sure the cables and power cord are placed safely out of the way so they do not create a tripping hazard. As with any electrical appliance, observe common sense safety procedures. The 3101 can be placed on a shelf or desktop. Ideally, you should be able to see the LED indicators on the front if you need to view them for troubleshooting.

Wireless operation

Many environmental factors can affect the effective wireless function of the 3101. If this is your first time setting up a wireless network device, read and consider the points listed below. The access point can be placed on a shelf or desktop, ideally you should be able to see the LED indicators on the front if you need to view them for troubleshooting.

Designed to go up to 100 meters indoors and up to 300 meters outdoors, Wireless LAN lets you access your network from anywhere you want. However, the number of walls, ceilings, or other objects that the wireless signals must pass through can limit signal range. Typical ranges vary depending on the types of materials and background RF noise in your home or business.

Installing the Model 3101

WARNING

Do not work on the system or connect or disconnect cables during periods of lightning activity.

WARNING

Do not place any objects on top of or near the vent holes on the Model 3101 case.

CAUTION

The interconnecting cables must be acceptable for external use and must be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

To set up the Model 3101 (Figure 4):

1. Connect the **Line** port of the 3101 using a straight-through RJ-11 cable.
2. Connect an **Ethernet** port of the 3101 to the network card of the PC via an Ethernet cable.
3. Plug one end of the power adapter to the wall outlet and connect the other end to the **Power** port on the 3101.

Figure 4 displays the installation diagram for connecting the 3101.

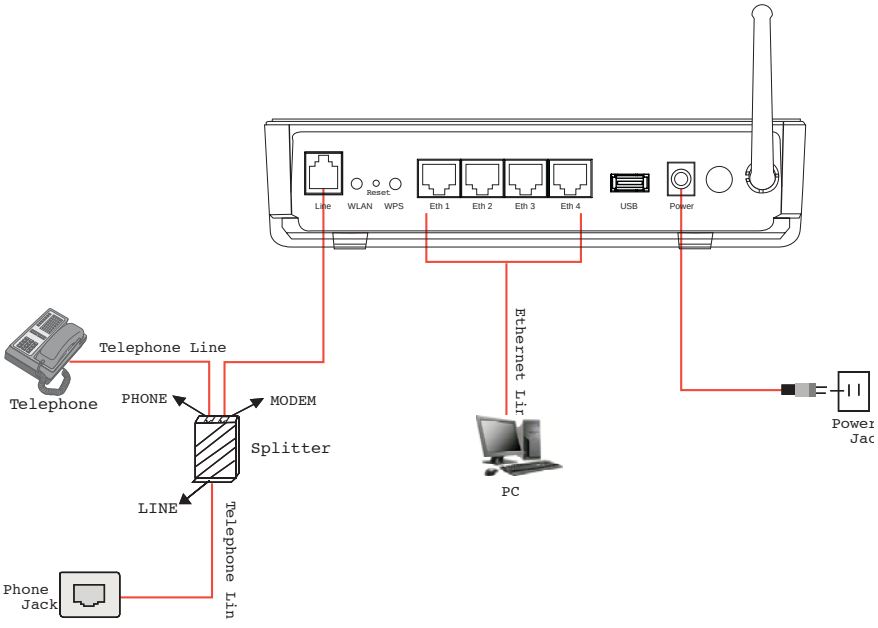


Figure 4. Model 3101 installation diagram (/4IWU model shown)

Resetting the Model 3101

You may press the Reset button while the unit is on to reset to the original factory settings. Use a ballpoint pen or paper clip to gently push the reset button. Remember that this will delete any settings stored in flash memory including user account information and LAN IP settings.

The device settings will be restored to the factory default IP address *192.168.1.1* and the subnet mask *255.255.255.0.* The default management username is *admin* and the default password is *admin*.

Configuration Overview

The Model 3101 Series leverages a wide range of compelling broadband-based applications and services and includes an operating system, drivers and remote management capabilities. The 3101delivers a set of highly integrated solutions, required for the home and small of company, such as:

- IP Routing and Bridging
- Asynchronous Transfer Mode (ATM) and Digital Subscriber Line (DSL) support
- Point-to-Point Protocol (PPP)
- Network/Port Address Translation (NAT/PAT)
- Quality of Service (QoS)
- Wireless LAN Security: WPA, 802.1x, RADIUS client (/4IWU model)
- Virtual Private Network (VPN): IPSec
- Secure Socket Layer Virtual Private Network (SSL VPN)
- Universal Plug-and-Play
- File Server for Network Attached Storage (NAS) devices
- Print Server
- Web Filtering
- Management and Control: Web-based Management (WBM), Simple Network Management Protocol(SNMP), Command Line Interface (CLI), TR-069WAN Management Protocol, TR-064-LAN-Side DSL CPE Configuration
- Remote Update
- System Statistics and Monitoring

Setting Up the 3101 for Configuration

Connecting your computer or home network to the 3101 is a simple procedure, varying slightly depending on your operating system. This chapter will help you to seamlessly integrate 3101 with your computer or home network. The Windows default network settings dictate that in most cases the setup procedure described below will be unnecessary. For example, the default DHCP setting in Windows 2000 is 'client', requiring no further modification.

However, it is advised to follow the setup procedure described below to verify that all communication parameters are valid and that the physical cable connections are correct. The setup procedure consists of three consecutive configuration stages:

- "WAN and LAN Connections" on page 29
- "PC Network Configuration" on page 30
- "Device Access and Information" on page 31

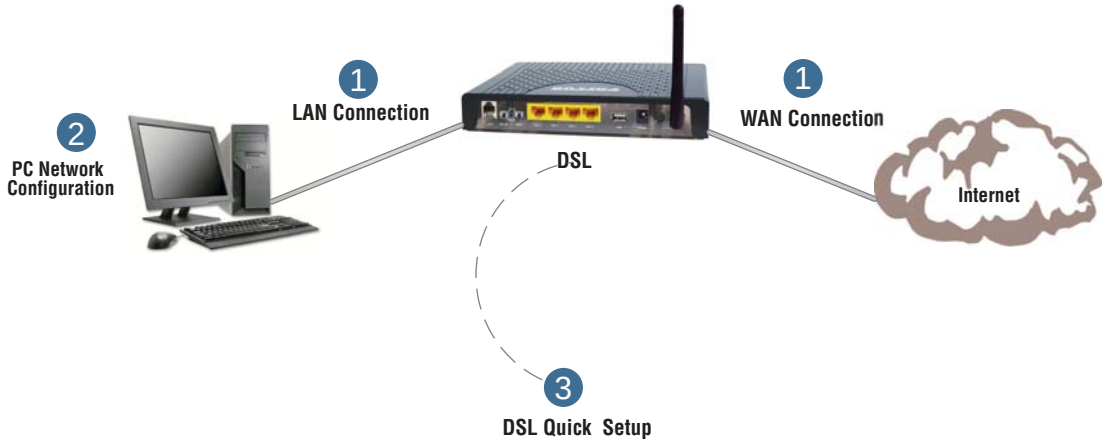


Figure 5. Typical setup diagram

WAN and LAN Connections

WAN

To connect the 3101 to the Internet, use a straight-through RJ-11 cable to connect the **Line** port on the unit to a DSL wall socket.

LAN

Your computer can connect to the 3101 using an Ethernet port on the unit (all models) or the wireless antenna (/4IWU model). Use an Ethernet cable to connect an **Ethernet** port on the unit to a PC network card.

PC Network Configuration

Each network interface on the PC should either be configured with a statically defined IP address and DNS address, or should be instructed to automatically obtain an IP address using the Network DHCP server. 3101 provides a DHCP server on its LAN and it is recommended to configure your LAN to obtain its IP and DNS server IP automatically. This configuration principle is identical but performed differently on each operating system. Figure 6 displays the **TCP/IP Properties** dialog box as it appears in WTCP/IP configuration instructions for all supported operating systems.

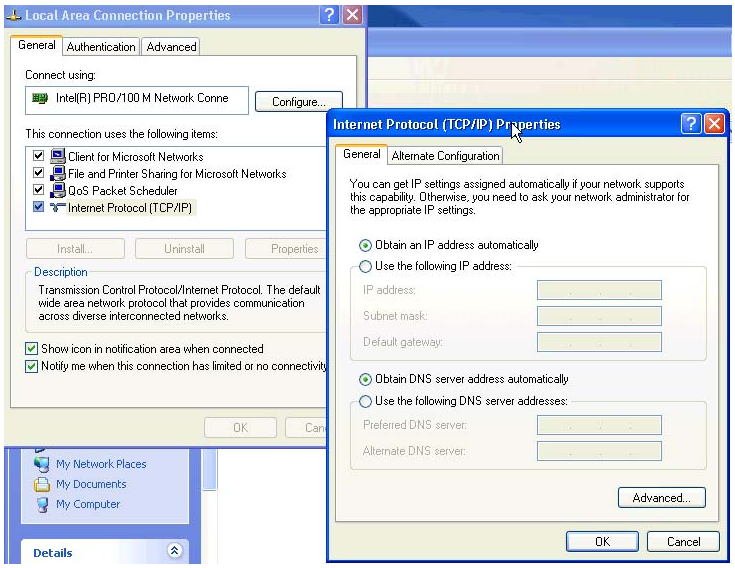


Figure 6. TCP/IP Settings (Windows XP OS)

Windows XP

1. From the **Start** menu, select **Control Panel > Network Connections**.
2. Right-click on the Ethernet connection icon and select **Properties**. The **Local Area Connection Properties** window displays.
3. Click on the **General** tab and select **Internet Protocol (TCP/IP)**. Click **Properties**. The **Internet Protocol (TCP/IP) Properties** window displays (Figure 6).
4. Select the **Obtain an IP address automatically** radio button, and select the **Obtain DNS server address automatically** radio button. Click **OK** to save the settings.

Linux

1. Log into the system as a super-user, by entering "**su**" at the prompt.
2. Type "**ifconfig**" to display the network devices and allocated IP addresses.
3. Type "**pump -i <dev>**", where <*dev*> is the network device name.
4. Type "**ifconfig**" again to view the newly allocated IP address.
5. Make sure no firewall is active on device <*dev*>.

Chapter 4 Device Access and Information

Chapter contents

Overview

This chapter describes how to access the Model 3101 Series Web Management Interface (WMI), which allows you to configure and control all of the 3101 features and system parameters, using a user-friendly graphical interface. This user-friendly approach is also implemented in the WMI's documentation structure, which is based directly on the WMI's structure.

See the following sections for information on managing the 3101 through the WMI:

- "Logging In" on page 32 for accessing the WMI
- "Viewing Device Information" on page 33 for viewing device statistics
- Chapter 5, "Advanced Configuration" on page 37 for setting up advanced features
- Chapter 7, "System Management" on page 105 for testing the DSL line and managing system settings
- Chapter 6, "Wireless Configuration" on page 90 for configuring the wireless and USB storage features of the /4IWU version of the Model 3101

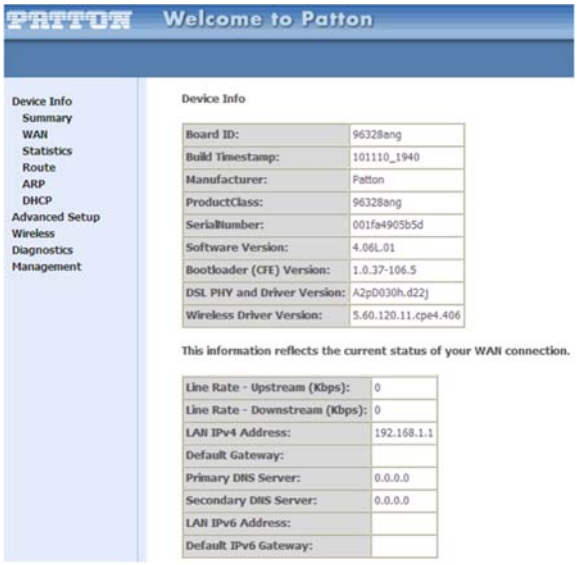


Figure 7. WMI home page

Logging In

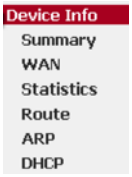
To log into the 3101's WMI for the first time:

1. Launch a Web browser on your computer.
2. Browse to "**http://192.168.1.1**" (the 3101's default IP address).The login page displays.
3. Enter a username and password. The default *superuser* username and password are both **admin**. The default *operator/common* username and password are both **user**. It is recommended to change these default values after logging into the 3101 for the first time.
4. Click **OK** to login, or click **Cancel** to exit the login interface.

After logging into the 3101 with the *superuser* username, you can query, configure, modify all configurations. You may need to reboot the 3101 for some configurations to take effect.

Viewing Device Information

The **Device Info** section of the WMI provides an overview of the unit's interface statistics, connection status, and routes.



Summary

Click **Device Info > Summary** (Figure 7 on page 32) to view the unit's software versions and DSL status: Board ID, Software Version, and the information of your WAN connection such as the upstream rate and the LAN IPv4 address.

WAN Interface

Click **Device Info > WAN** (Figure 8) to view the WAN interface settings, such as the connection status, IPv4 address, and connected time.

Interface	Description	Type	VlanMuxId	Igmp	NAT	Firewall	Status	IPv4 Address	IPv6 Address
atm0	br_0_8_35	Bridge	Disabled	Disabled	Disabled	Disabled	Unconfigured	0.0.0.0	

Figure 8. WMI: WAN Interface Info

Statistics

The **Device Info > Statistics** menu provides LAN, WAN, ATM, and ADSL information.

LAN

In the **Device Info > Statistics** menu, click **LAN** (Figure 9) to view the LAN interface statistics. You can query information on packets received on the Ethernet and Wireless interfaces (where applicable). Click **Reset Statistics** to return the values to zero.

Statistics -- LAN

Interface	Received				Transmitted			
	Bytes	Pkts	Errs	Drops	Bytes	Pkts	Errs	Drops
eth4	0	0	0	0	0	0	0	0
eth3	0	0	0	0	0	0	0	0
eth2	0	0	0	0	0	0	0	0
eth1	293092	2934	0	0	3159590	3552	0	0
wlan	0	0	0	0	0	0	0	0

Reset Statistics

Figure 9. WMI: LAN Statistics

WAN

In the **Device Info > Statistics** menu, click **WAN** (Figure 10) to view the WAN interface statistics. You can query information on packets recevied on the WAN interfaces. Click **Reset Statistics** to return the values to zero.

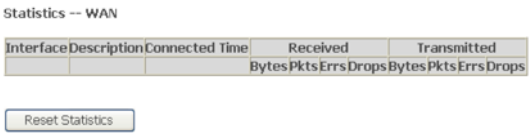


Figure 10. WMI: WAN Statistics

xTM

In the **Device Info > Statistics** menu, click **xTM** (Figure 11) to view the ATM interface statistics. You can query information on packets recevied on the xTM interfaces. Click **Reset Statistics** to return the values to zero.

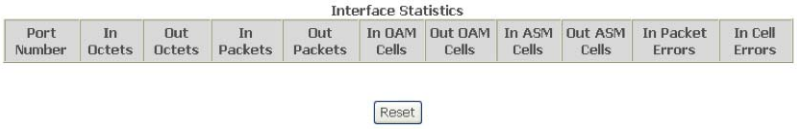


Figure 11. WMI: ATM Statistics

xDSL

In the **Device Info** > **Statistics** menu, click **xDSL** (Figure 12) to view the DSL interface statistics.

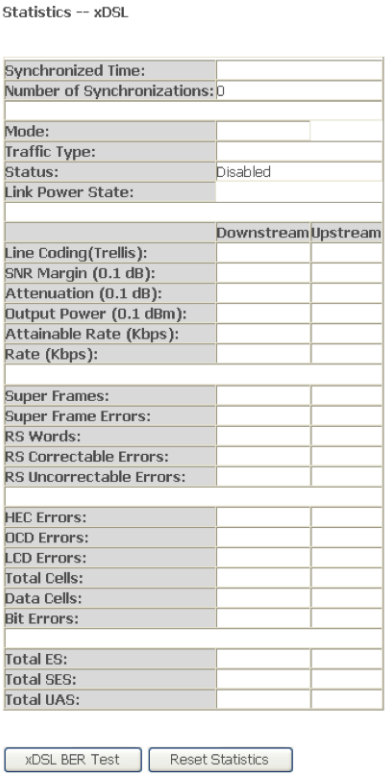


Figure 12. WMI: xDSL Statistics

xDSL BER Test. Click **xDSL BER Test** on the xDSL Statistics page to run a Bit Error Rate (BER) Test on the DSL line. Select a time from the **Tested Time (sec)** drop-down menu and click **Start** to begin the test. The **Tested Time** choices are: 1, 5, 10, 20, 60, 120, 180, 240, 300, and 360.

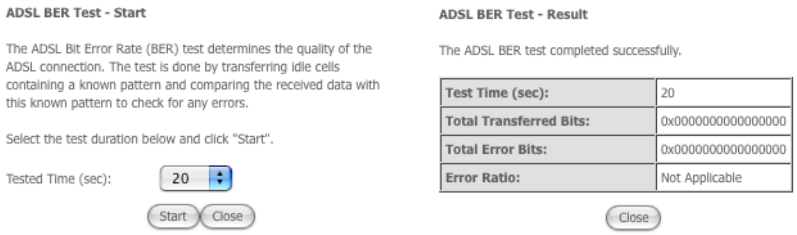
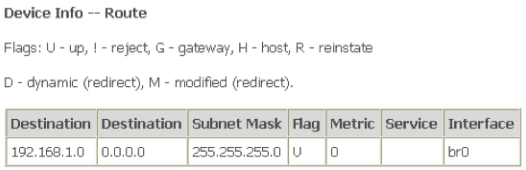


Figure 13. WMI: ADSL BER Test

Note If the **Error Ratio** reaches up to "**e-5**", you will not be able to access the Internet.

Route

Click **Device Info > Route** (Figure 14) to view route table information.


Device Info -- Route

Flags: U - up, ! - reject, G - gateway, H - host, R - reinstate

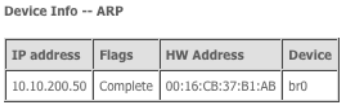
D - dynamic (redirect), M - modified (redirect).

Destination	Destination	Subnet Mask	Flag	Metric	Service	Interface
192.168.1.0	0.0.0.0	255.255.255.0	U	0		br0

Figure 14. WMI: Route Info

ARP

Click **Device Info > ARP** (Figure 15) to view MAC and IP information of equipment attached to the 3101.


Device Info -- ARP

IP address	Flags	HW Address	Device
10.10.200.50	Complete	00:16:CB:37:B1:AB	br0

Figure 15. WMI: ARP Info

DHCP

Click **Device Info > DHCP** (Figure 15) to view the host name, the IP address assigned by the DHCP server, the MAC address which is corresponding to the IP address, and the DHCP lease time.

Hostname	MAC Address	IP Address	Expires In
gjdoc-d0cf4a448	08:00:27:75:75:2c	192.168.1.2	22 hours, 10 minutes, 8 seconds

Figure 16. WMI: DHCP Info

Chapter 5 Advanced Configuration

Chapter contents

Overview

The **Advanced Setup** section of the WMI allows you to configure features (see figure 17) for the 3101.

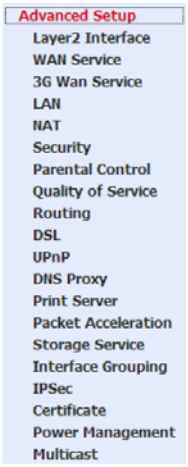


Figure 17. Advanced Setup Menu

Layer2 Interface Setup

Click **Advanced Setup > Layer2 Interface > ATM Interface** (Figure 21) to configure, modify, and remove DSL ATM interfaces.

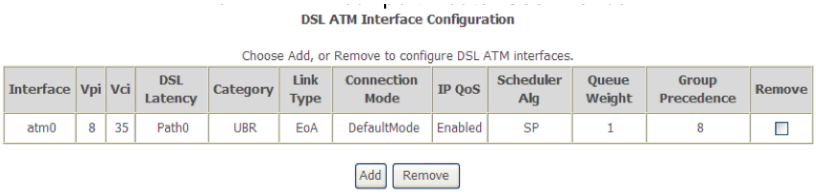


Figure 18. WMI: DSL ATM Interface Configuration

In the main DSL ATM interface list, you can click **Add** to configure a new ATM PVC identifier.

Figure 19. WMI: ATM PVC Configuration

On the **ATM PVC Configuration** page, you can set the VPI and VCI values, elect the DSL latency, link type (EoA is for PPPoE, IPoE, and Bridge.), connection mode, encapsulation mode, service category, and IP QoS scheduler algorithm.

- **VPI (Virtual Path Identifier):** The virtual path between two points in an ATM network, and its valid value is from 0 to 255.
- **VCI (Virtual Channel Identifier):** The virtual channel between two points in an ATM network, ranging from 32 to 65535 (1 to 31 are reserved for known protocols).
- **Select DSL Latency:** You may select *Path0* and *Path1.*
- **Select DSL Link Type:** You may select *EoA* (for PPPoE, IPoE, and Bridge), *PPoA* or *IPoA.*
- **Select Connection Mode:** You may select the *Default Mode* or the *VLAN MUX Mode.*
- **Encapsulation Mode:** You may select *LLC/SNAP-BRIDGING* or *VC/MUX* in the drop-down list.
- **Service Category:** You may select *UBR Without PCR*, *UBR With PCR*, *UBR on Realtime VBR*, or *Realtime VBR* in the drop-down list.
- **Select IP QoS Scheduler Algorithm:** You may select *Strict Priority* and *Weighted Fair Queuing*.

Note QoS cannot be set for CBR and Realtime VBR.

Click the **Apply/Save** button to enable the new settings to take effect (figure 20).

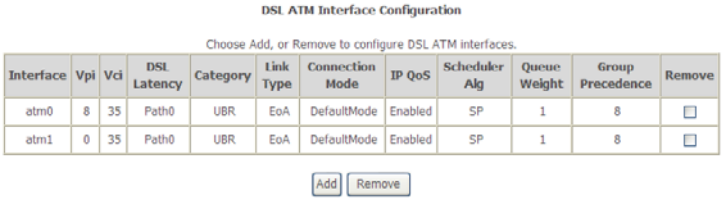


Figure 20. WMI: DSL ATM Interface Configuration

To delete an interface, select the checkbox for that interface and click **Remove**.

WAN Service Setup

Click **Advanced Setup** > **WAN Service** (Figure 21) to configure, modify, and remove a WAN service.

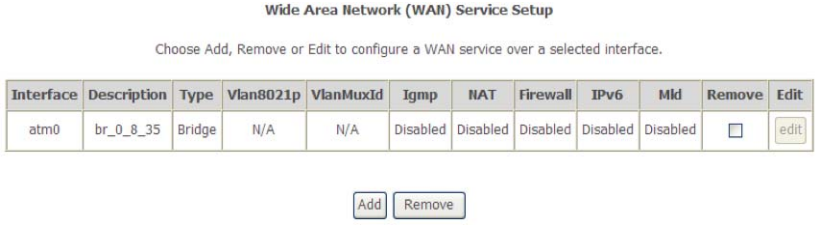


Figure 21. WMI: WAN Service Configuration

In the main WAN service list, you can click **Add** to configure a new WAN service, click **Edit** to modify an existing WAN connection, or select the checkbox for a connection and click **Remove** to delete an existing WAN connection.Refer to the following sections to configure different types of WAN connections.

PPP over Ethernet (PPPoE)

To create a new PPPoE connection:

1. Click **Add** from the main WAN service page to configure a new connection. (Before you can add a new PPPoE service, make sure that you have created a proper ATM PVC configuration. See figure 19 on page 39). The following page displays. Click **Next** to continue.

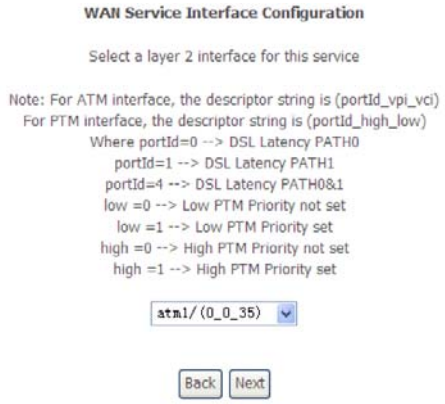


Figure 22. WMI: Select Layer2 Interface

2. On the **Connection Type** page (Figure 23), select the radio button for **PPP over Ethernet (PPPoE).** Click **Next** to continue.

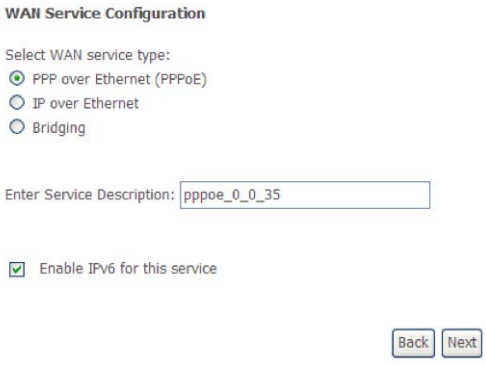


Figure 23. WMI: PPPoE Connection Type

3. On the **PPP Username and Password** page, provide information for the PPP username, password, service name, and authentication method.

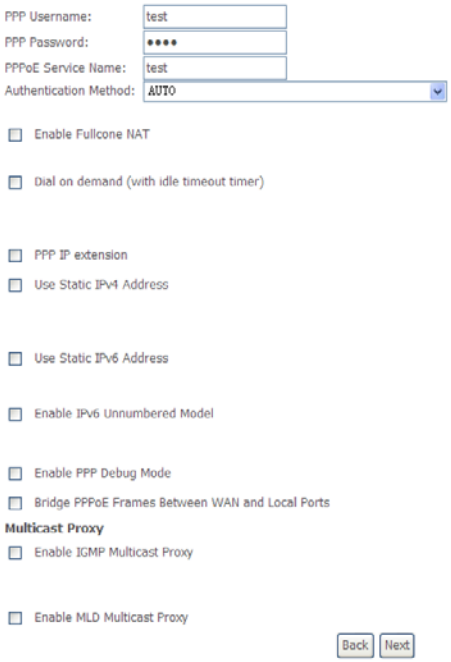


Figure 24. WMI: PPP Information

– **PPP Username**: The valid username provided by your ISP.

– **PPP Password:** The valid password provided by your ISP.

– **PPPoE Service Name:** Enter the service name provided by your ISP. If the ISP does not provide a service name, do not enter any information.

– **Authentication Method:** Select from AUTO, PAP, CHAP, MSCHAP. (Default = AUTO)

– **Enable Fullcone NAT:** With NAT, 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.

– **Dial on demand (with idle timeout timer):** If enabled, enter the **Idle Timeout** value in minutes. If the 3101 doesn't detect the flow continuously within the allotted time, the unit will automatically disconnect the PPPoE connection. Once it detects the flow (such as access to a webpage), the 3101 will restart the PPPoE connection. If disabled, the 3101 will perform PPPoE dial-up all the time. Unless the 3101 is powered off and DSLAM or uplink equipment are operating abnormally, the PPPoA connnection will stay up.

– **PPP IP Extension:** Enable this option if you want to configure a DMZ Host. If enabled, the WAN IP address obtained by the 3101 through built-in dial-up can be directly assigned to the PC connected to the 3101 (at this time, the 3101 has only one PC). If disabled, the 3101 obtains the WAN IP address.

– **Use Static IPv4 Address:** If enabled, the 3101 uses this IP as the WAN IP address. If disabled, the 3101 obtains an IP address assigned through uplink equipment.

– **Use Static IPv6 Address:** If enabled, the 3101 uses this IP as the WAN IP address. If disabled, the 3101 obtains an IP address assigned through uplink equipment.

– **Enable IPv6 Unnumbered Model:** Enable or disable this function.

– **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:** Enable this function if you want PPPoE mode to support IPTV.

– **Enable MLD Multicast Proxy:** Enable or disable this function.

Click **Next** to continue.

4. On the **Routing-Default Gateway** page (Figure 25), select a preferred WAN interface as the system default gateway. Click **Next** to continue.

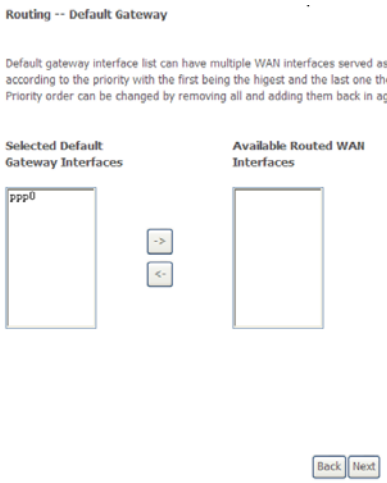


Figure 25. WMI: Routing - Default Gateway

5. On the **DNS Configuration** page (Figure 26) you may obtain the DNS server addresses from the selected WAN interface or manually enter the static DNS server addresses. If only a PVC with IPoA or static MER protocol is configured, you must manually enter the static DNS server addresses. Click **Next** to continue.

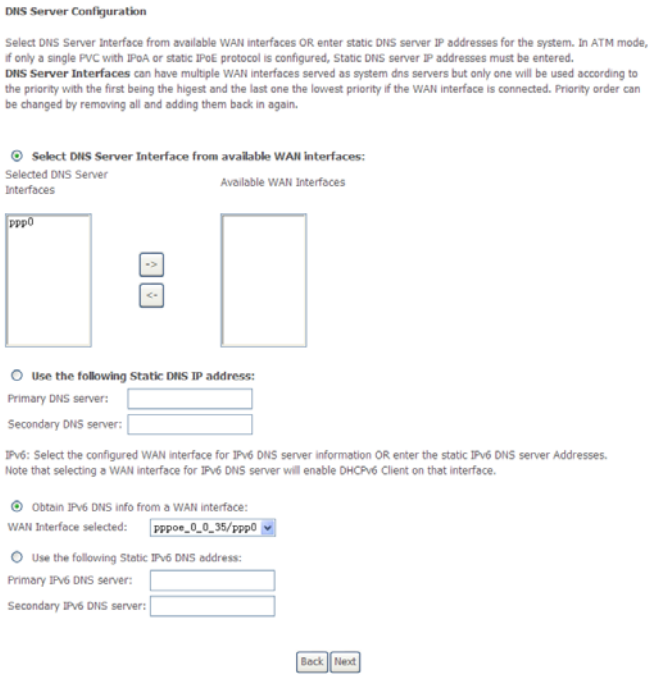


Figure 26. WMI: DNS Server Configuration

6. The final connection configuration page (Figure 27) shows an summary of the PPPoE connection. Click **Save** to keep your settings. You will need to reboot the unit to activate this WAN service.

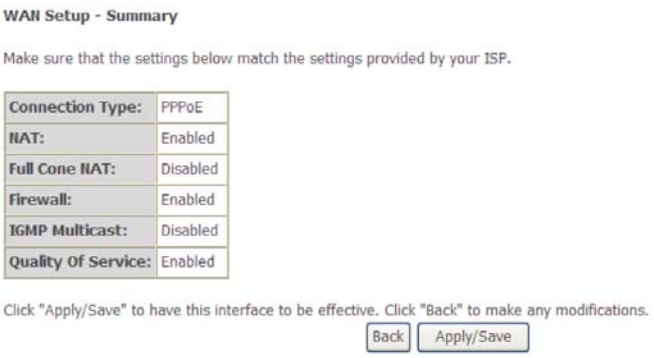


Figure 27. WMI: PPPoE Connection Summary

MAC Encapsulation Routing (MER) (IPoE)

To create a new MER WAN service:

1. Click **Add** from the main WAN service page to configure a new connection. (Before you can add a new PPPoE service, make sure that you have created a proper ATM PVC configuration. See figure 19 on page 39). The following page displays. Click **Next** to continue.

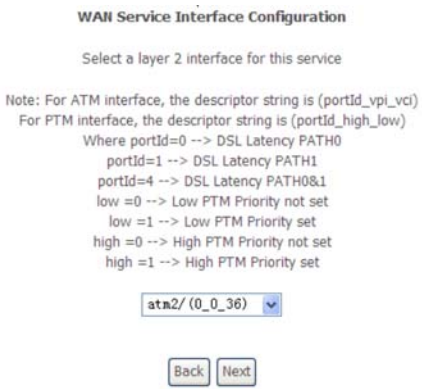


Figure 28. WMI: Select Layer2 Interface

2. On the **Connection Type** page (Figure 23), select the radio button for **IP over Ethernet (IPoE).** Click **Next** to continue.

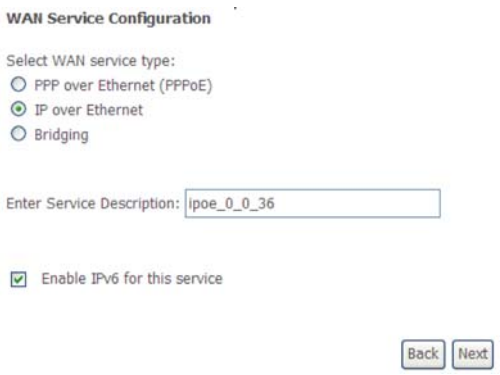


Figure 29. WMI: IPoE Connection Type

3. On the **WAN IP Settings** page (Figure 30 on page 46), you may may select obtain an IP address automatically or manually enter the IP address provided by your ISP. If you enable IPv6 for this WAN service, you should also enter the next-hop IPV6 address. Click **Next** to continue.

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,** enter the WAN IP address, subnet mask and gateway IP address.

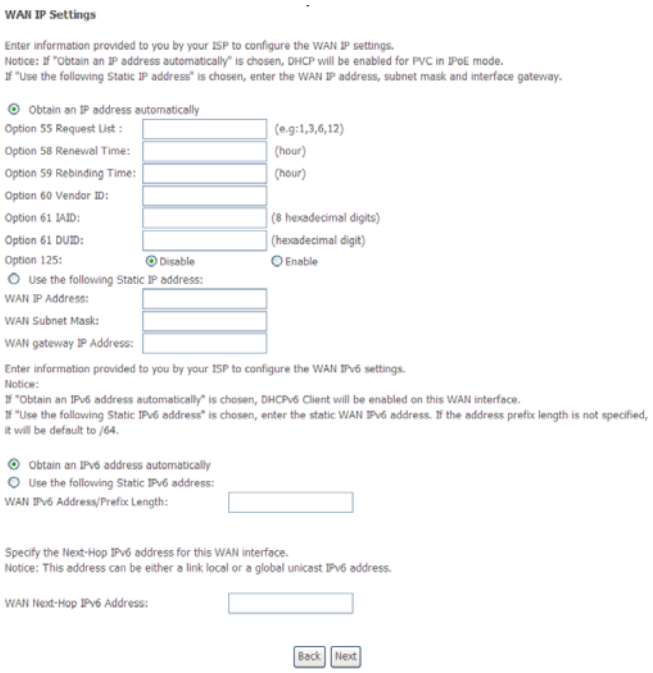


Figure 30. WMI: WAN IP Settings

4. On the **Network Address Translation Settings** page (Figure 31), you may modify NAT Settings and select to enable IGMP Multicast.

   – **Enable NAT:** Select to enable the NAT functions of the 3101. If you do not enable NAT, you must add a route on the uplink equipment; otherwise, the access to the Internet will fail. It is recommended to enable NAT.

   – **Enable Firewall:** Enable/disable IP filtering.

   – **Enable IGMP Multicast:** Enable IGMP if you need MER mode to support IPTV.

   Click **Next** to continue.

Figure 31. WMI: NAT Settings

5. On the **Routing-Default Gateway** page (Figure 25), select a preferred WAN interface as the system default gateway. Click **Next** to continue.

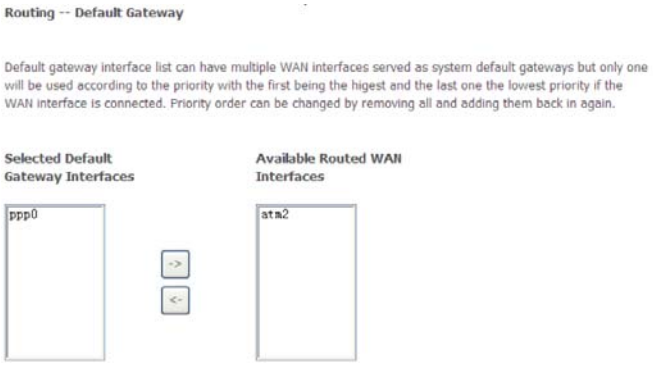


Figure 32. WMI: Routing - Default Gateway

6. On the **DNS Configuration** page (Figure 26) you may obtain the DNS server addresses from the selected WAN interface or manually enter the static DNS server addresses. If only a PVC with IPoA or static MER protocol is configured, you must manually enter the static DNS server addresses. Click **Next** to continue.

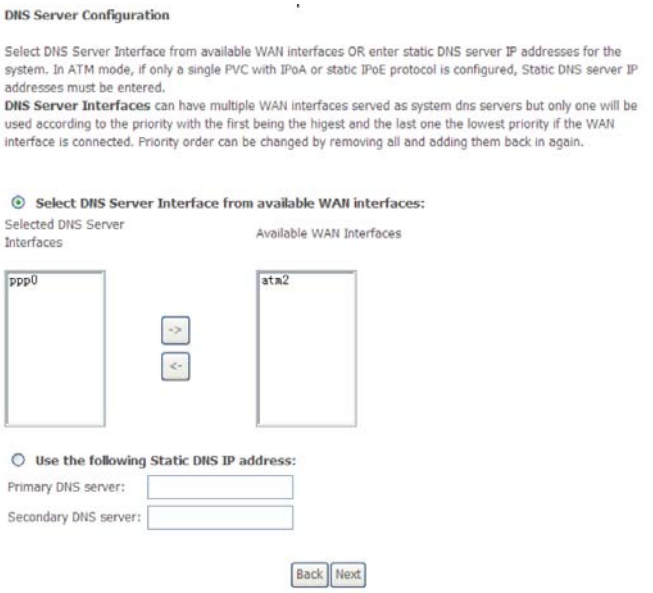


Figure 33. WMI: DNS Server Configuration

7. The final connection configuration page (Figure 34) shows an summary of the IPoE settings. Click **Save** to keep your settings. You will need to reboot the unit to activate this WAN service.

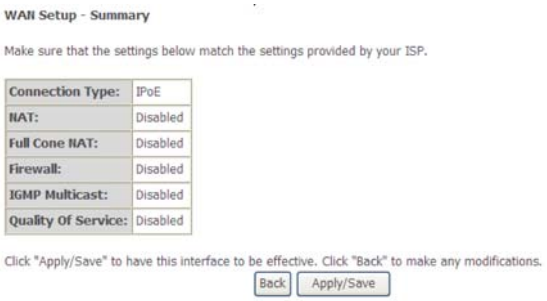


Figure 34. WMI: MER (IPoE) Connection Summary

PPP over ATM (PPPoA)

To create a new PPPoA connection:

1. Click **Advanced Setup > Layer2 Interface > ATM Interface** to configure, modify, and remove DSL ATM interfaces. In the main DSL ATM interface list, you can click **Add** to configure a new ATM PVC identifier for PPPoA mode.

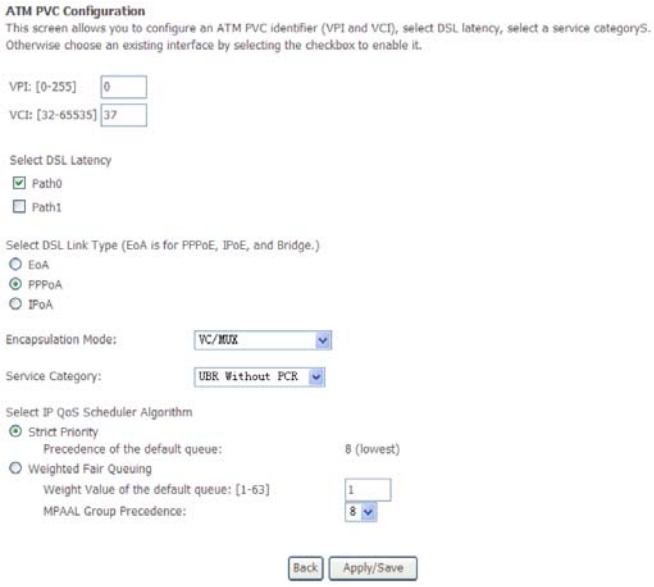


Figure 35. WMI: ATM PVC Configuration

2. On the **ATM PVC Configuration** page (Figure 35), select the DSL link type for **PPoA** and select **VC/MUX** as the encapsulation mode (according to the uplink equipment). Click the **Apply/Save** button for the settings to take effect. The DSL ATM Interface list displays.

3. Click **Add** from the main WAN service page to configure a new connection. The following page displays. Click **Next** to continue.

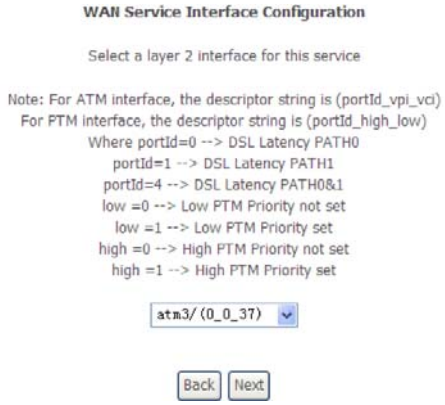


Figure 36. WMI: Select Layer2 Interface

4. On the **Service Configuration** page (Figure 23), modify the service description**.** Click **Next** to continue.

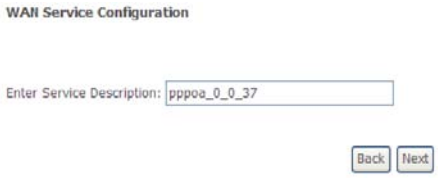


Figure 37. WMI: PPPoA Service Description

5. On the **PPP Username and Password** page, provide information for the PPP username, password, service name, and authentication method.

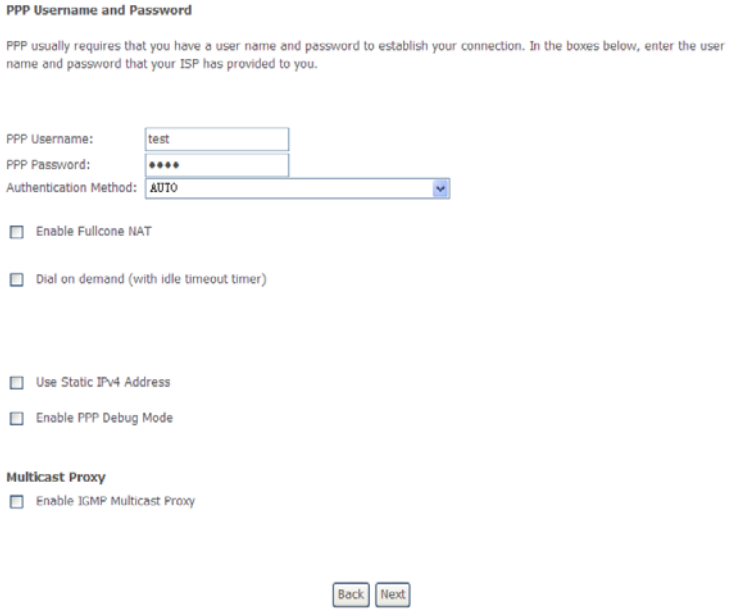


Figure 38. WMI: PPP Information

– **PPP Username**: The valid username provided by your ISP.

– **PPP Password:** The valid password provided by your ISP.

– **Authentication Method:** Select from AUTO, PAP, CHAP, MSCHAP. (Default = AUTO)

– **Enable Fullcone NAT:** With NAT, 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.

– **Dial on demand (with idle timeout timer):** If enabled, enter the **Idle Timeout** value in minutes. If the 3101 doesn't detect the flow continuously within the allotted time, the unit will automatically disconnect the PPPoA connection. Once it detects the flow (such as access to a webpage), the 3101 will restart the PPPoA connection. If disabled, the 3101 will perform PPPoA dial-up all the time. Unless the 3101 is powered off and DSLAM or uplink equipment are operating abnormally, the PPPoA connnection will stay up.

– **Use Static IPv4 Address:** If enabled, the 3101 uses this IP as the WAN IP address. If disabled, the 3101 obtains an IP address assigned through uplink equipment.

– **Enable PPP Debug Mode:** Enable or disable this function.

– **Enable IGMP Multicast Proxy:** Enable this function if you want PPPoA mode to support IPTV.

Click **Next** to continue.

6. On the **Routing-Default Gateway** page (Figure 25), select a preferred WAN interface as the system default gateway. Click **Next** to continue.

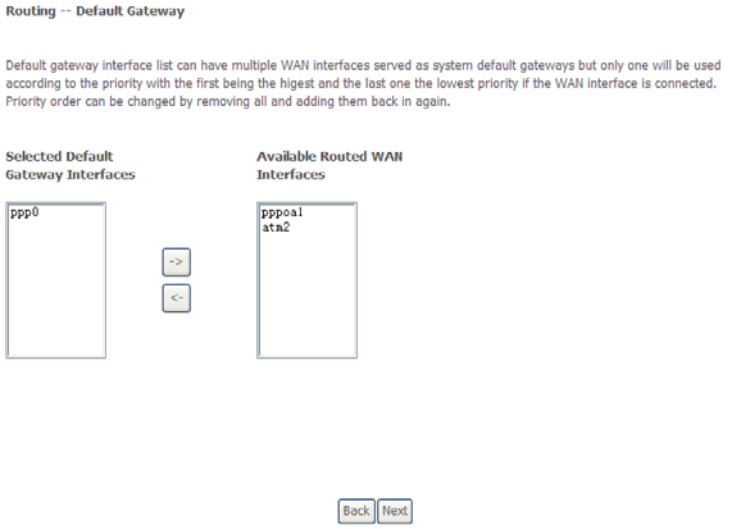


Figure 39. WMI: Routing - Default Gateway

7. On the **DNS Configuration** page (Figure 26) you may obtain the DNS server addresses from the selected WAN interface or manually enter the static DNS server addresses. If only a PVC with IPoA or static MER protocol is configured, you must manually enter the static DNS server addresses. Click **Next** to continue.

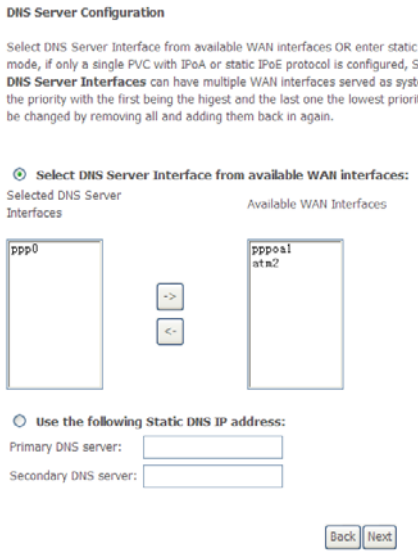


Figure 40. WMI: DNS Server Configuration

8. The final connection configuration page (Figure 27) shows an summary of the PPPoA connection. Click **Save** to keep your settings. You will need to reboot the unit to activate this WAN service.

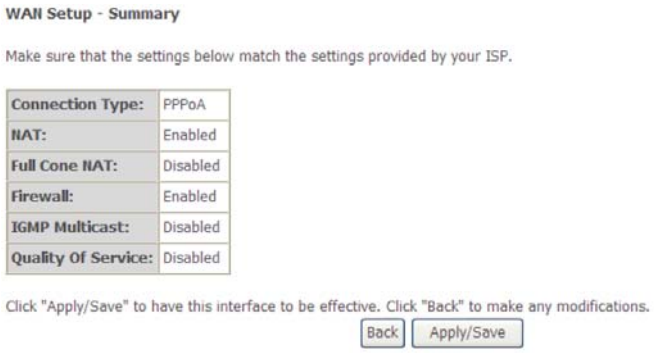


Figure 41. WMI: PPPoA Connection Summary

IP over ATM (IPoA)

To create a new IPoA connection:

1. Click **Advanced Setup > Layer2 Interface > ATM Interface** to configure, modify, and remove DSL ATM interfaces. In the main DSL ATM interface list, you can click **Add** to configure a new ATM PVC identifier for PPPoA mode.

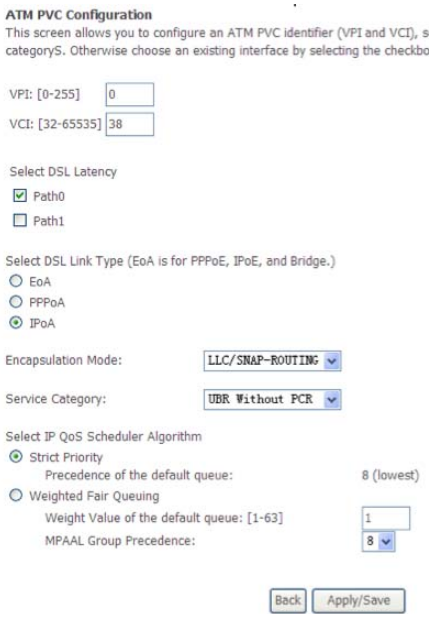


Figure 42. WMI: ATM PVC Configuration

2. On the **ATM PVC Configuration** page (Figure 42), select the DSL link type for **IPoA** and select **LLC/SNAP-ROUTING** as the encapsulation mode (according to the uplink equipment). Click the **Apply/Save** button for the settings to take effect. The DSL ATM Interface list displays.
3. Click **Add** from the main WAN service page to configure a new connection. The following page displays. Click **Next** to continue.

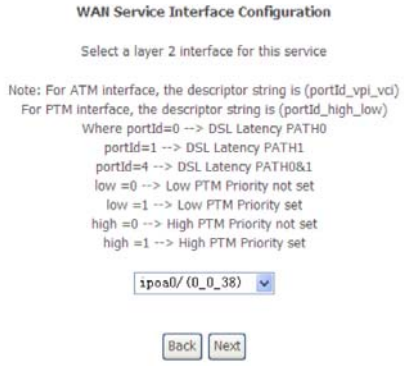


Figure 43. WMI: Select Layer2 Interface

4. On the **Service Configuration** page (Figure 44), modify the service description. Click **Next** to continue.

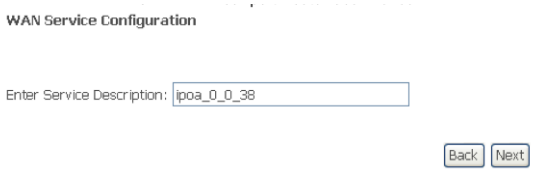


Figure 44. WMI: IPoA Service Description

5. On the **WAN IP Settings** page, enter the WAN IP address and the WAN subnet mask provided by your ISP. Click **Next** to continue.

Figure 45. WMI: WAN IP Settings

6. On the **Network Address Translation Settings** page (Figure 46), you may modify NAT Settings and select to enable IGMP Multicast.

   – **Enable NAT:** Select to enable the NAT functions of the 3101. If you do not enable NAT, you must add a route on the uplink equipment; otherwise, the access to the Internet will fail. It is recommended to enable NAT.

   – **Enable Firewall:** Enable/disable IP filtering.

   – **Enable IGMP Multicast:** Enable IGMP if you need MER mode to support IPTV.

   Click **Next** to continue.

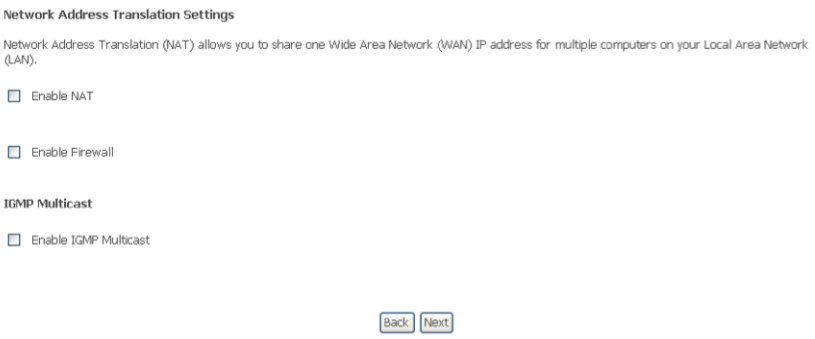


Figure 46. WMI: NAT Settings

7. On the **Routing-Default Gateway** page (Figure 47), select a preferred WAN interface as the system default gateway. Click **Next** to continue.

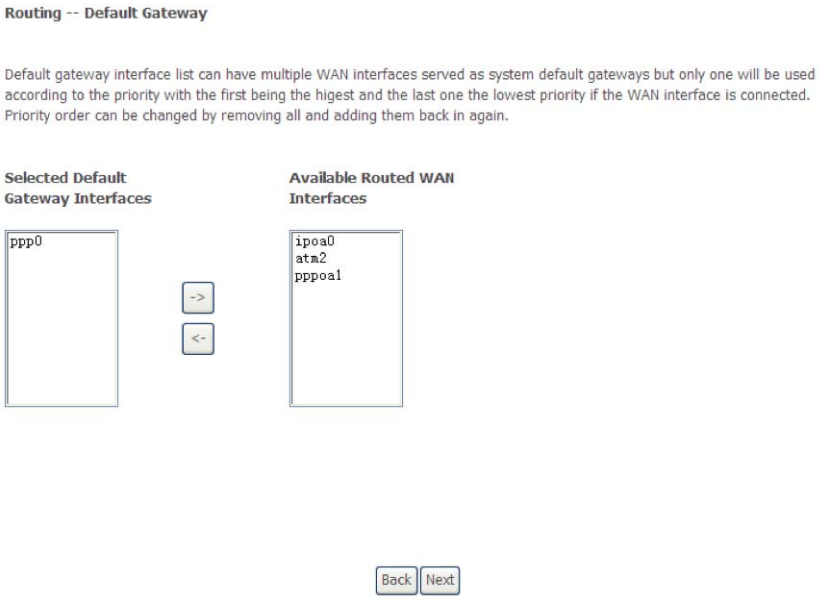


Figure 47. WMI: Routing - Default Gateway

8. On the **DNS Configuration** page (Figure 48) you should use a static DNS IP address for IPoA mode. Select the proper DNS server interface and enter the primary DNS server and the secondary DNS server. Click **Next** to continue.

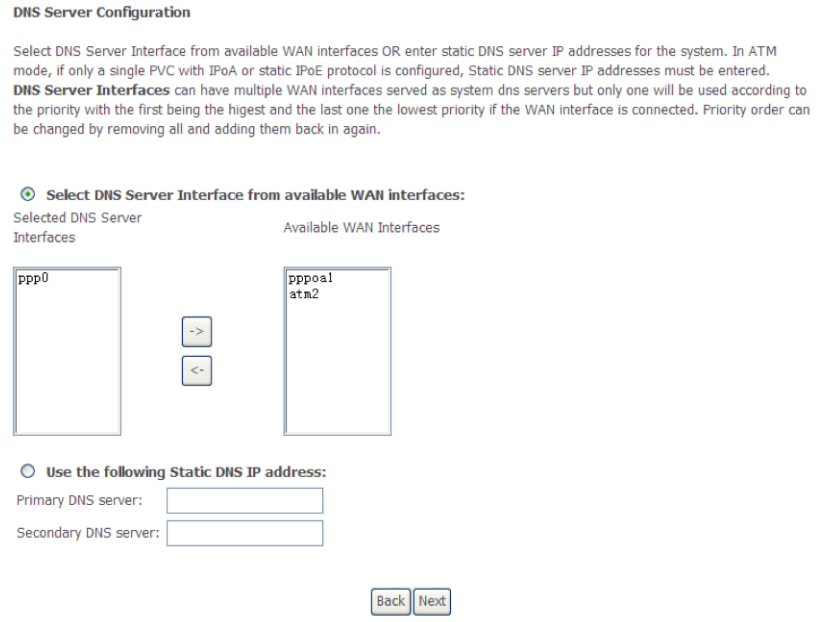


Figure 48. WMI: DNS Server Configuration

9. The final connection configuration page (Figure 49) shows an summary of the IPoA connection. Click **Save** to keep your settings. You will need to reboot the unit to activate this WAN service.

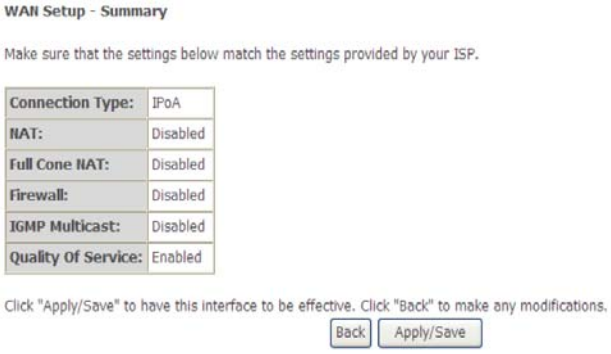


Figure 49. WMI: IPoA Connection Summary

Bridging

To create a new bridge connection:

1. Click **Add** from the main WAN service page to configure a new connection. (Before you can add a new PPPoE service, make sure that you have created a proper ATM PVC configuration. See figure 19 on page 39). The following page displays. Click **Next** to continue.

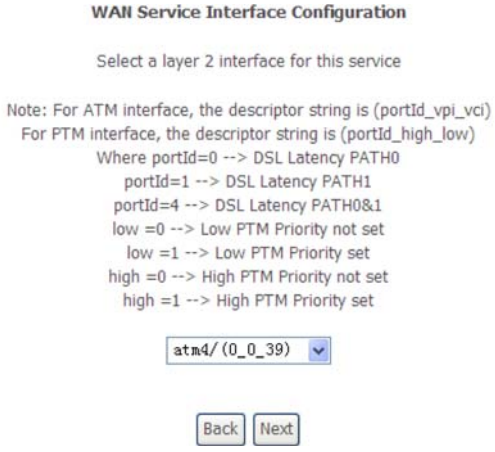


Figure 50. WMI: Select Layer2 Interface

2. On the **Connection Type** page (Figure 51), select the radio button for **Bridging** and select **LLC/SNAP-ROUTING** as the **Encapsulation Mode**. Click **Next** to continue.

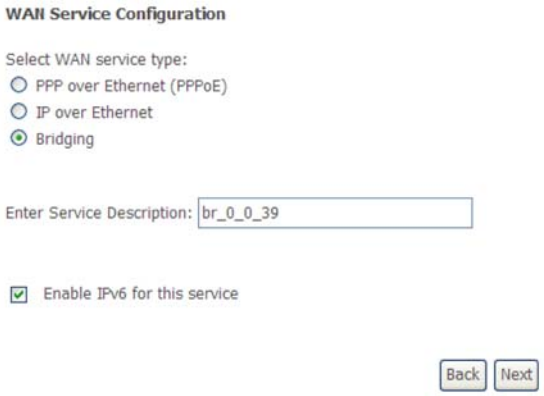


Figure 51. WMI: Bridging Connection Type

3. The final connection configuration page (Figure 52) shows an summary of the Bridging connection. Click **Save** to keep your settings. You will need to reboot the unit to activate this WAN service.

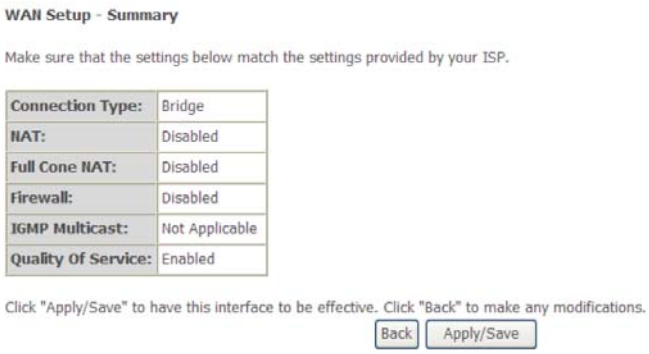


Figure 52. WMI: Bridging Connection Summary

3G WAN Service Setup

Click **Advanced Setup > 3G WAN Service** (Figure 53) to configure a 3G connection.

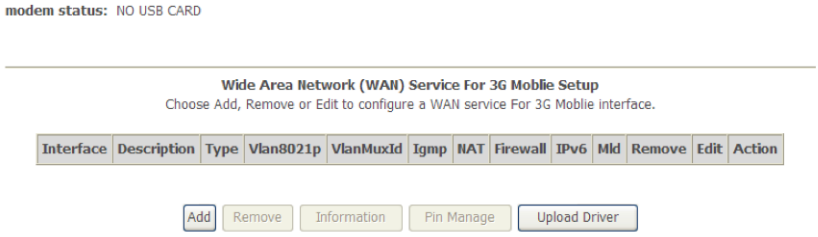


Figure 53. WMI: 3G Connection Setup

If you want to access the Internet through a 3G connection, a 3G network card is required. Connect the 3G network card to the USB interface of the 3101.

- **Information:** Click this button to display the information of the 3G network card.
- **Upload Driver:** For an unsupported USB dongle, click this button to upload the new driver for supporting the USB. The driver is a text file.

Click **Pin Manage**, and the following page displays.

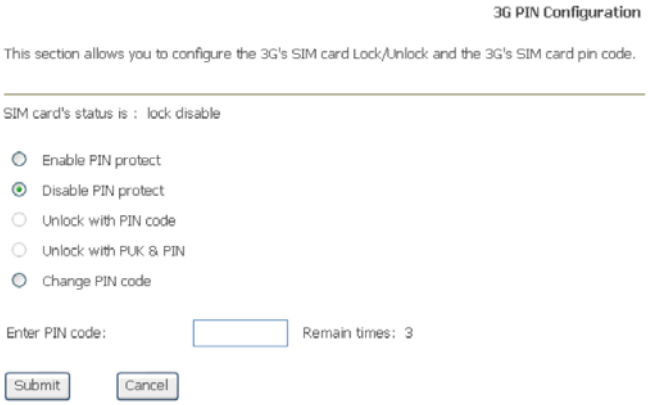


Figure 54. WMI: 3G Pin Configuration

- **Enable PIN protect:** If enabled, you need to enter the PIN code when rebooting or inserting the USB.
- **Unlock with PIN code:** If disabled, you need to enter PIN code when using 3G.
- **Unlock with PUK & PIN:** If disabled, you need to enter PUK code when failing to enter the PIN code for 3 times.
- **Change PIN code:** Select this radio button to modify the PIN code.

After proper settings, click **Submit** for the new settings to take effect.

Click **Add** in the **WAN Service For 3G Moblie Setup** to display the following page.

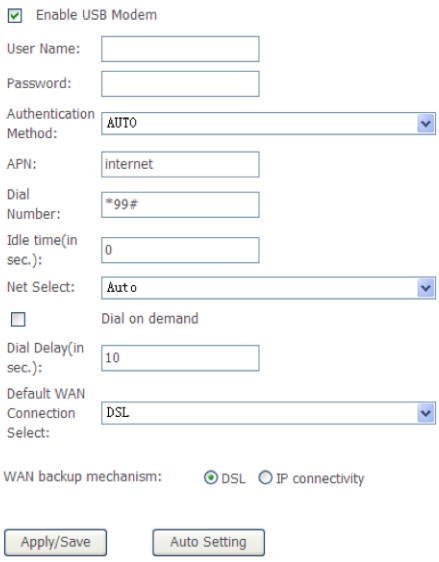


Figure 55. WMI: 3G USB Modem Setup

In the **3G WAN Service** page, you may configure the settings of the 3G USB modem.

- **Enable USB Modem:** f you want to access the Internet through the 3G network card, you must enable the USB modem.
- **User Name:** Username provided by your 3G ISP.
- **Password:** Password provided by your 3G ISP.
- **Authentication Method:** Select a proper authentication method in the drop- down list. You can select Auto, PAP, CHAP, or MSCHAP.
- **APN:** APN (Access Point Name) is used to identify the service type. Enter the APN provided by your 3G ISP.
- **Dial Number:** Enter the dial number provided by your 3G ISP.
- **Idle time (in sec.):** If no traffic for the preset time, the 3G will disconnect automatically.
- **Net Select:** Select the 3G network that is available.You may select EVDO, WCDMA, CDMA2000, TD-SCDMA, GSM, or Auto.
- **Dial on demand:** Within the preset minutes, if the modem does not detect the flow of the user continuously, the modem automatically stops the 3G connection. Once it detects the flow (like access to a webpage), the modem restarts the 3G dialup.
- **Dial Delay (in sec.):** The 3G delays dial after the DSL is disconnected.
- **Default WAN Connection Select:** You can select DSL or 3G from the drop-down list.
- **WAN back mechanism:** The 3G connection is backup for the DSL connection.
  - **DSL:** If the DSL is disconnected, the 3G starts to dial.
  - **IP connectivity:** If the system fails to ping the specified IP address, the 3G starts to dial.

Click the **Apply/Save** button to save the settings.You may also click the **Auto setting** button to automatically configure the 3G connection. After clicking the **Apply/Save** button, the following page displays.

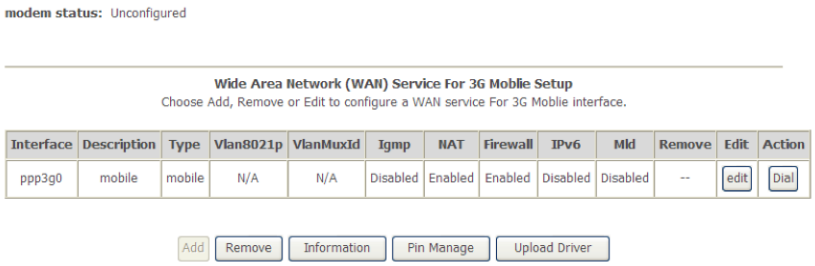


Figure 56. WMI: Adding a 3G WAN Service

If the 3G network card is installed, you may click the button on the **ction**column to establish or disconnect the 3G connection.

Note When there is no DSL WAN connection, insert the 3G network card, and then system will perform dial-up automatically. If the DSL WAN connection and the 3G connection coexist, the DSL WAN

connection takes priority over the 3G connection. When the DSL WAN connection starts to perform dial-up, the 3G connection will be disconnected. If the DSL WAN connection has established, you may manually perform 3G dial-up, and then the DSL WAN connection will be disconnected.

LAN Setup

Click **Advanced Setup** > **LAN** (Figure 57) to define an IP address for the 3101 and configure the DHCP server.

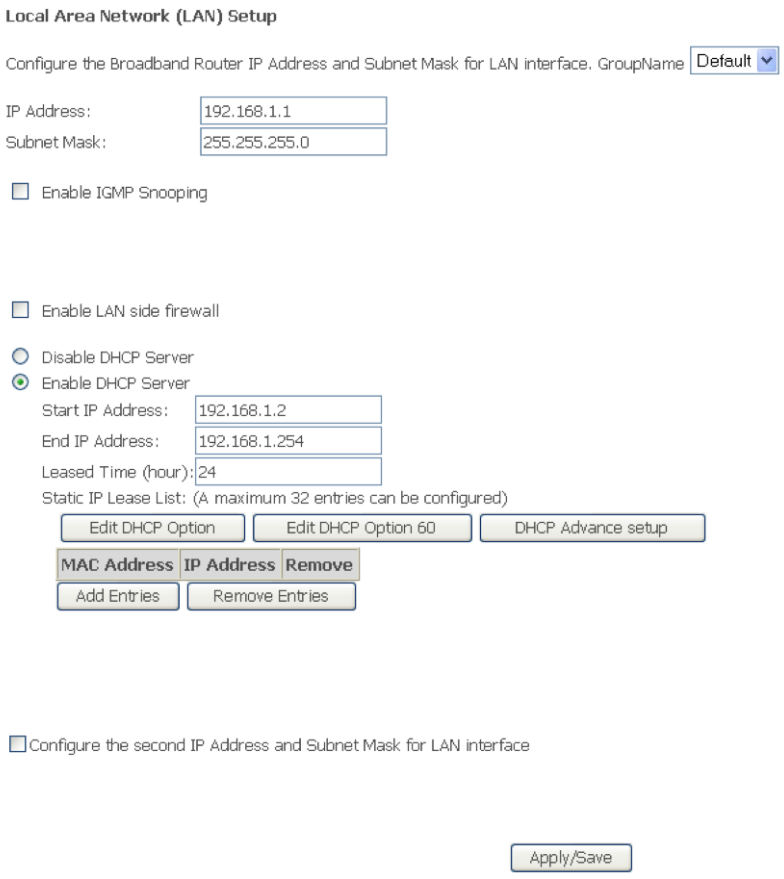


Figure 57. WMI: LAN Interface Configuration

Configuring the private IP address for the 3101

On the **LAN Setup** page (Figure 57), you can change the device's IP address. The preset IP address is *192.168.1.1*. This is the private IP address of the 3101 and the address that the device can be reached on in the local network. The IP address under which the 3101 can be reached from outside the LAN is assigned by the Internet Service Provider.

If you want to assign a different IP address to the 3101, enter it in the **IP Address** field. Adjust the **Subnet Mask** if necessary. You should use an address from a block that is reserved for private use (192.168.1.1-192.168.255.254).

Note New settings can only be made after the 3101 has been rebooted. If necessary, reconfigure the IP address on your PC (including one that is statically assigned) so that it matches the new configuration.

Enabling IGMP Snooping

IGMP snooping enables the router to forward multicast traffic intelligently, instead of flooding all ports in the VLAN. With IGMP snooping, the router listens to IGMP membership reports, queries and leave messages to identify the switch ports that are members of multicast groups. Multicast traffic will only be forwarded to ports identified as members of the specific multicast group or groups.

Select the checkbox to **Enable IGMP Snooping** (Figure 58) on the **LAN Setup** page (Figure 57 on page 59).

Figure 58. WMI: IGMP Snooping

Enabling the LAN Side Firewall

The firewall can prevent unexpected traffic on the Internet from your host to the LAN. Select the checkbox to **Enable LAN Side Firewall** on the **LAN Setup** page (Figure 57 on page 59).

Configuring the DHCP Server

The Model 3101 has a DHCP server for which the factory setting is active. Consequently, the IP addresses of the PCs are automatically assigned by the 3101.

To activate the DHCP server, select **Enable DHCP Server** (Figure 59) on the **LAN Setup** page (Figure 57 on page 59). Define the range of IP addresses the 3101 should use to automatically assign IP addresses to the PCs. Enter valid addresses for the **Start IP Address** and the **End IP Address.** If the DHCP server is active, you can define a lease time. The **Leased Time** determines the period for which the PCs retain the IP addresses assigned to them without changing them.

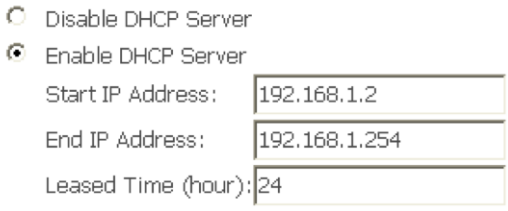


Figure 59. WMI: DHCP Server

Editing the DHCP Option

Click the **Edit DHCP Option** button in the **Local Area Network (LAN) Setup** page to display the **DHCP Option Setup** page. On this page, you can add, edit or delete the DHCP options, and these options will be sent to the DHCP client.

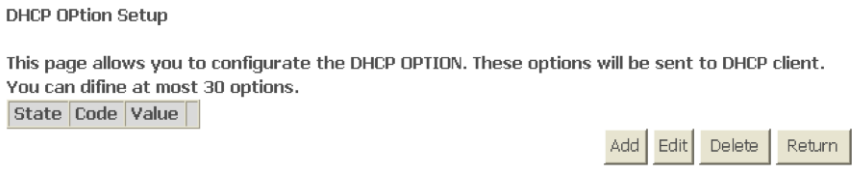


Figure 60. WMI: DHCP Option

Editing the DHCP Option 60

Click the **Edit DHCP Option 60** button in the **Local Area Network (LAN) Setup** page to display the **DHCP Option Setup 60** page. On this page, you can add, edit or delete the DHCP 60 options.

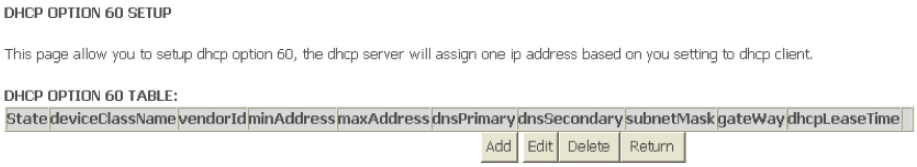


Figure 61. WMI: DHCP Option 60

Configuring the DHCP Static IP Lease List

The lease list of static IP address can reserve the static IP addresses for the hosts with the specific MAC addresses. When a host whose MAC address is in the lease list of static IP address requests the DHCP server for an IP address, the DHCP server assigns the reserved IP address to the host. Click the**Add Entries** button in the **Local Area Network (LAN) Setup** page to display the **DHCP Static IP Lease** page.

Figure 62. WMI: DHCP Static Lease List

On the **DHCP Static IP Lease** page, enter the MAC address of the LAN host and the static IP address that is reserved for the host, and then click the **Apply/Save** button to apply the settings.

Figure 63. WMI: DHCP Static IP Lease

Configuring the second IP address and subnet mask for a LAN interface

On the **Local Area Network (LAN) Setup** page, you are allowed to set the second IP address and the subnet mask for a LAN interface.

Figure 64. WMI: Second IP Address for LAN Interface

After enabling the second IP Address and Subnet Mask for LAN interface option, enter an IP address and a subnet mask for the LAN interface. Then, click the Apply/Save button to apply the settings.

Setting up IPv6 LAN Auto Configuration

Click on **IPv6 Autoconfig** to set an IP address for the DSL IPv6 router, enable the DHCPv6 server, enable RADVD and enable the MLD snooping function.

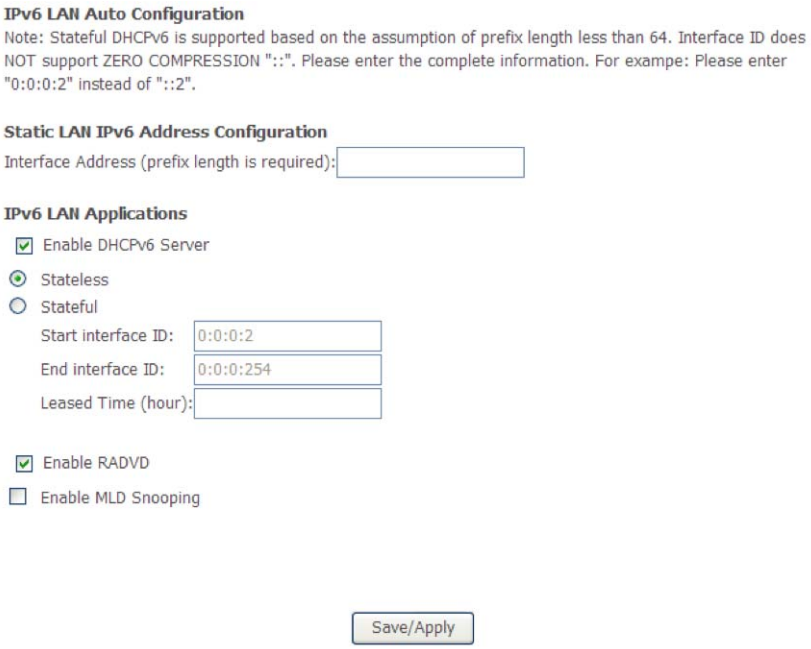


Figure 65. WMI: IPv6 Auto Configuration

- **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 FC2461, 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 ana-

lyzing 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.

Click the **Save/Apply** button to apply the settings.

Network Address Translation (NAT) Setup

Virtual Servers

The firewall can prevent unexpected traffic on the Internet from your host on the LAN. The virtual server 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.

Click **Advanced Setup > NAT > Virtual Servers** (Figure 66) to add or remove a virtual server entry.

Figure 66. WMI: NAT > Virtual Servers

Click the **Add** button to display the **Virtual Servers Configuration** page.

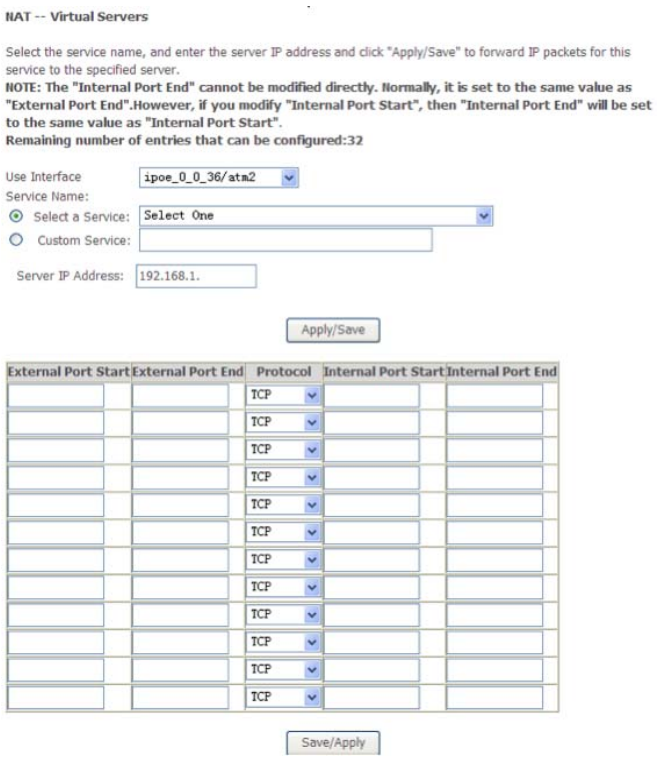


Figure 67. WMI: Adding a Virtual Server

- **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 IP 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.

Click Save/Apply to apply the settings.

Port Triggering

Some applications require ports to be open in the firewall for 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.

Click **Advanced Settings > NAT > Port Triggering** to add or delete a port triggering entry.

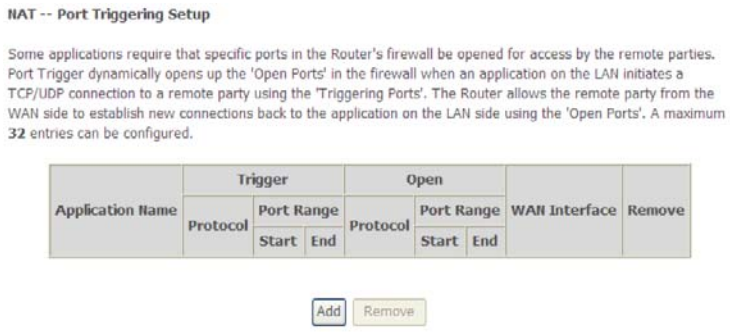


Figure 68. WMI: NAT > Port Triggering

Click the **Add** button to display the **Port Triggering Configuration** page.

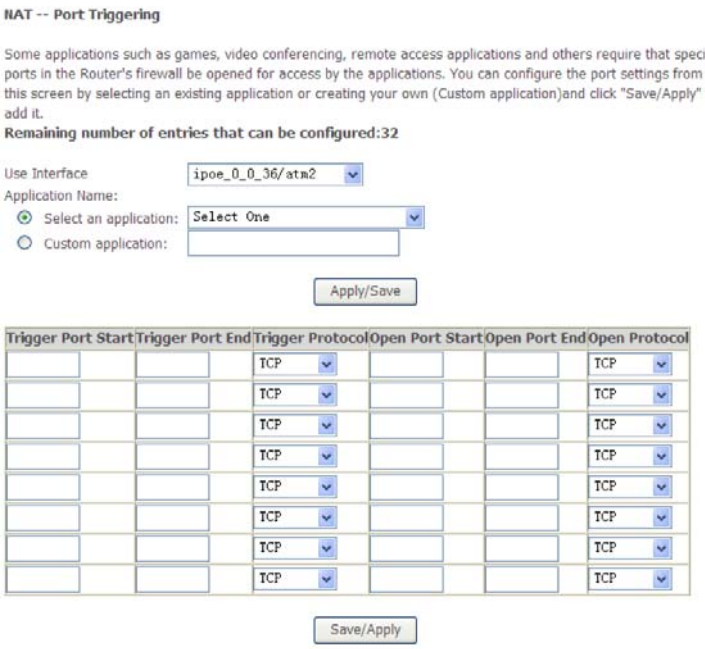


Figure 69. WMI: Adding a Port Triggering Entry

- **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.

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 (ex: 80, 90-140, 180).

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.

Click **Advanced Setup > NAT > DMZ Host** to configure the DMZ host.

Figure 70. WMI: NAT > DMZ Host

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

Multi NAT

Multi-NAT is the term used to describe creating more than one public IP address for your network. Multi-NAT is used in the situation when your ISP provides you with a number of public IP addresses, and you want to use them to provide access from Internet to multiple internal servers. Multi NAT assigns one of the public IPs to the WAN interface of the router; then Multi-NAT is used for the other public IPs, and with them NATed to multiple internal IP addresses.

Click **Advanced Setup > NAT > Multi NAT** to add ore remove a multi-NAT rule.

Figure 71. WMI: Multi-Nat Setup

Click the **Add** button to display the **Multi NAT Configuration** page.

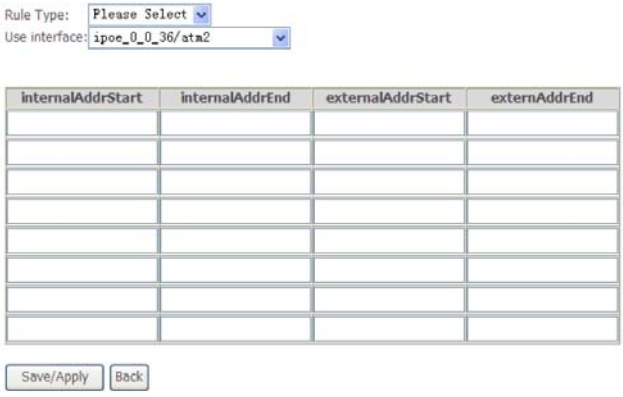


Figure 72. WMI: Adding a Multi-NAT Rule

Select the proper **Rule Type** and **Use Interface** from the drop-down menus, and enter the desired parameters. Click the **Save/Apply** button to apply the settings.

Security Setup

Click **Advanced Setup > Security** to manage IP filtering and MAC filtering for the 3101. By default, the firewall is enabled. The firewall is used to block the file transmission between the Internet and your PC. It serves as a safety guard and permits only the authorized files to be sent to the LAN.

Note If the 3101 is configured for bridge mode, IP filtering is disabled and the IP filtering interface does not display.

IP Filtering

Click **IP Filtering** in the **Security** menu to configure incoming and outgoing IP packet filters.

Outgoing

Click on **Outgoing** under **IP Filtering** in the Security menu to configure outgoing IP filtering rules. By default, all outgoing IP traffic from the LAN is allowed, but some IP traffic can be blocked by setting up filters. Click **Add** to create a new outgoing filter rule. The **Add Outgoing IP Filter** page displays (Figure 74).

Figure 73. WMI: Outgoing IP Filtering

The **Add Outgoing IP Filter** page allows you to create a filter rule to identify outgoing IP traffic by specifying a new filter name and at least one condition below. All of the specified conditions in this filter rule must be satisfied for the rule to take effect. Click **Save/Apply** to save and activate the filter.

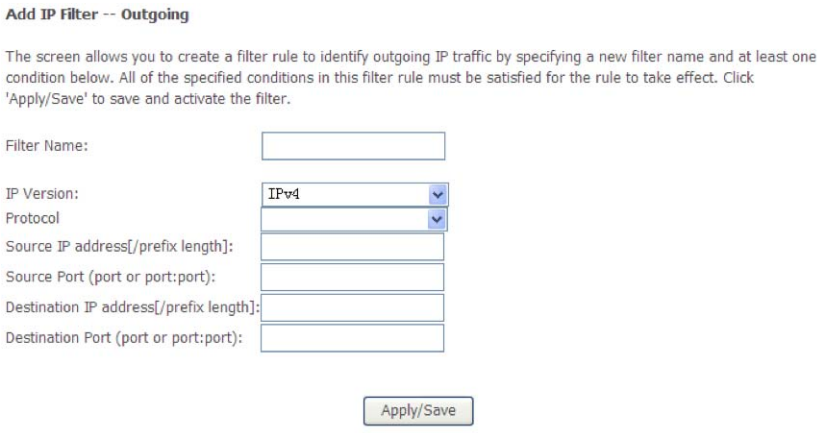


Figure 74. WMI: Adding an outgoing IP filter rule

- **Filter Name:** Enter the name of outgoing filter rule.
- **IP Version:** Select the proper IP version from the drop-down list.
- **Protocol:** Select one: TCP/UDP, TCP, UDP, or ICMP.

- **Source IP Address:** Enter an IP address that the outgoing packet (protocol-selected packet) will block.
- **Source Port:** UPD/TCP source port or a range of ports.
- **Destination IP Address:** The destination IP address of the exterior network.
- **Destination Port:** UPD/TCP destination port or a range of ports.

Incoming

Click on **Incoming** under **IP Filtering** in the Security menu to configure incoming IP filtering rules. The incoming IP filter is used to block and permit IP packet transmisstion from the Internet. When incoming IP filtering rules are enabled on the 3101, you can permit remote individual PC to access various local network services. Click **Add** to create a new incoming filter rule. The **Add Incoming IP Filter** page displays (Figure 76).

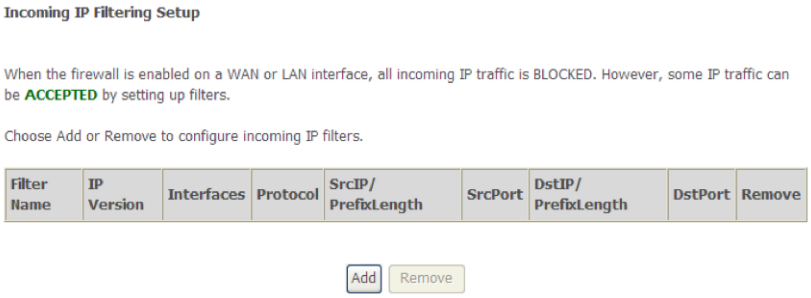


Figure 75. WMI: Incoming IP Filtering

The **Add Incoming IP Filter** page allows you to create a filter rule to identify incoming IP traffic by specifying a new filter name and at least one condition below. You must select at least one WAN interface for the rule. All of the specified conditions in this filter rule must be satisfied for the rule to take effect. Click **Save/Apply** to save and activate the filter.

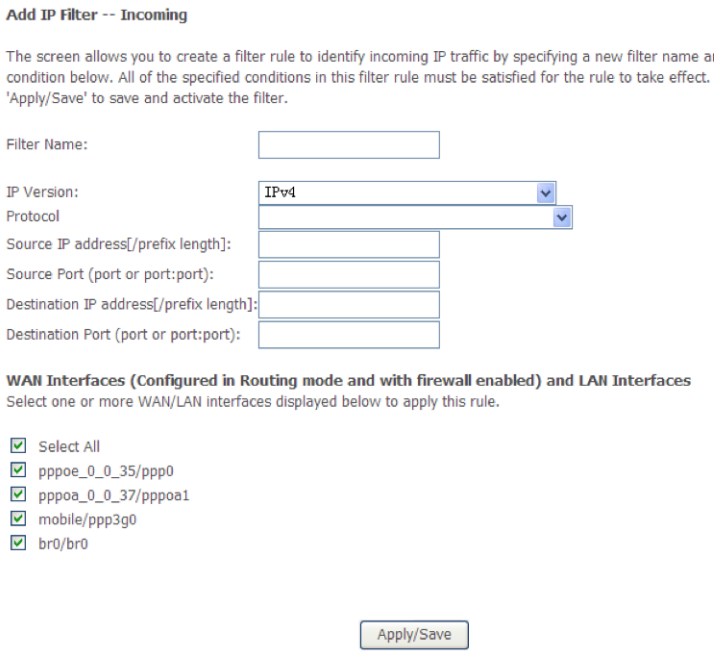


Figure 76. WMI: Adding an incoming IP filter rule

- **Filter Name:** Enter the name of incoming filter rule.
- **IP Version:** Select the proper IP version from the drop-down list.
- **Protocol:** Select one: TCP/UDP, TCP, UDP, or ICMP.
- **Source IP Address:** Enter an IP address that the incoming packet (protocol-selected packet) will allow.
- **Source Port:** UPD/TCP source port or a range of ports.
- **Destination IP Address:** The destination IP address of the exterior network.
- **Destination Port:** UPD/TCP destination port or a range of ports.
- **WAN Interfaces:** Select the boxes to apply the rule to one or more WAN interfaces.

Figure 77 shows an example of how incoming IP filtering works.

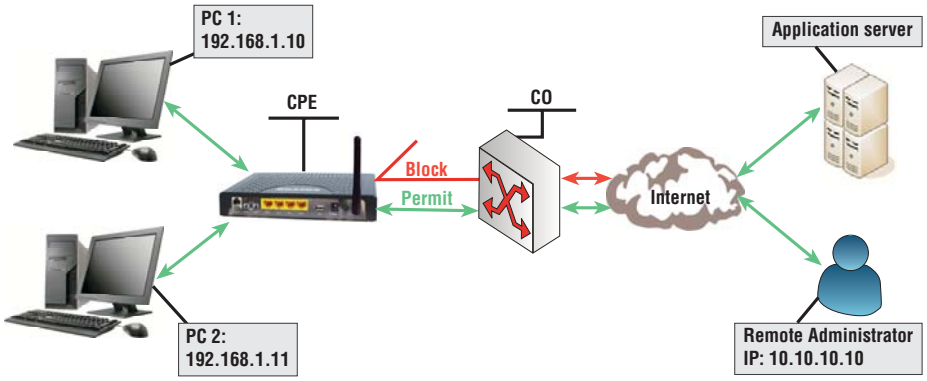


Figure 77. Incoming IP filter application

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 filtering, the 3101 serves as a firewall that works on Layer 2. Click **MAC Filtering** (Figure 78) in the **Security** menu to configure MAC frame filtering.

Note MAC Filtering is only effective on ATM PVCs configured in Bridge mode. If the ATM PVC is configured in another routing mode (such as PPPoE mode), MAC Filtering will not be available in the Security menu.

FORWARDED means that all MAC layer frames will be forwarded except for packets that match any of the specified rules in the following table. **BLOCKED** means that all MAC layer frames will be blocked except for packets that match any of the specified rules in the following table.

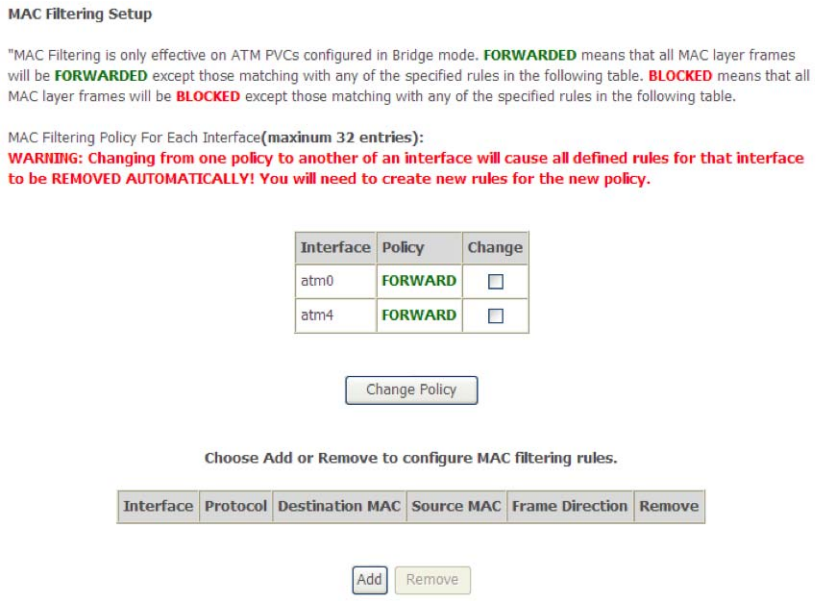


Figure 78. WMI: MAC Filtering

To change the MAC Filtering Global Policy from **FORWARDED** to **BLOCKED**, click **Change Policy**. The **MAC Filtering Global Policy** page displays (Figure 79 on page 70).

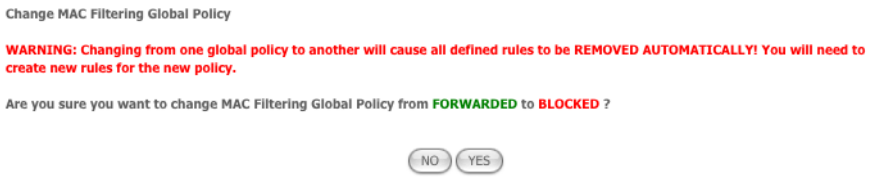


Figure 79. WMI: MAC Filtering Global Policy

Select an option to confirm, and you will return to the **MAC Filtering Setup** page (Figure 78).

Click **Add** to create a new MAC filter rule. The **Add MAC Filter** page displays (Figure 80).

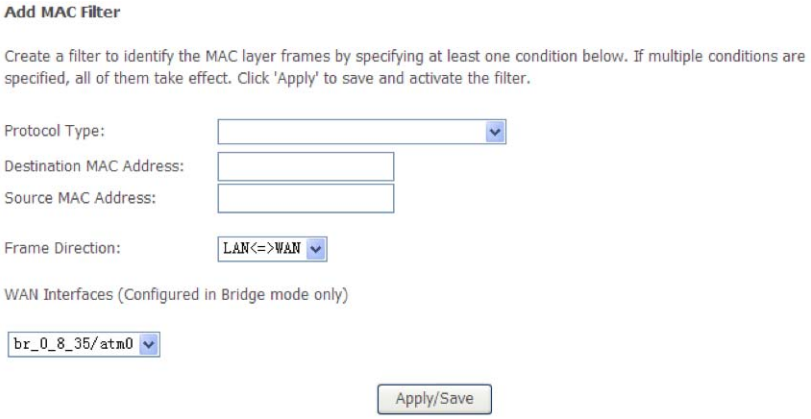


Figure 80. WMI: Adding a MAC Filter

To create a new MAC filter, provide information for the following parameters:

- **Protocol Type:** Select one: PPPoE, IPv4, IPv6, AppleTalk, IPX, NetBEUI or IGMP.
- **Destination MAC Address:** Enter the MAC address of the destination.
- **Source MAC Address:** Enter the MAC address of the source.
- **Frame Direction:** The direction of the transmission frame. Select from: LAN =>WAN (from LAN to WAN), WAN => LAN(from WAN to LAN), and LAN <=> WAN (both directions).
- **WAN Interface (Configured in bridge mode only):** Select to apply the rule to one or more WAN interfaces.

Click **Apply/Save** to apply the new filtering rule.

Parental Control Setup

Time Restriction

Click **Advanced Setup > Parental Control > Time Restriction** to configure access time restrictions. The parental control feature allows you to configure restrictions on certain times/days when the 3101 may not be accessed from specified devices. Click **Add** to configure a new time of day restriction policy. The **Access Time Restriction Configuration** page displays (Figure 82 on page 72).

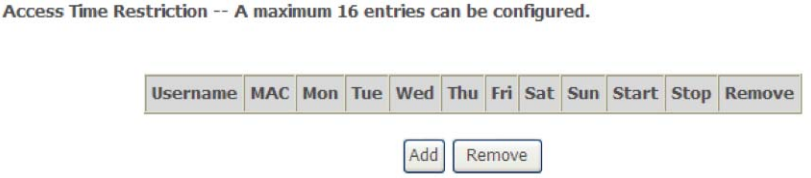


Figure 81. WMI: Access Time Restriction

To restrict access to the 3101 from a specified user/device for certain times/days, provide information for the following parameters. Click **Apply/Save** to apply the settings.

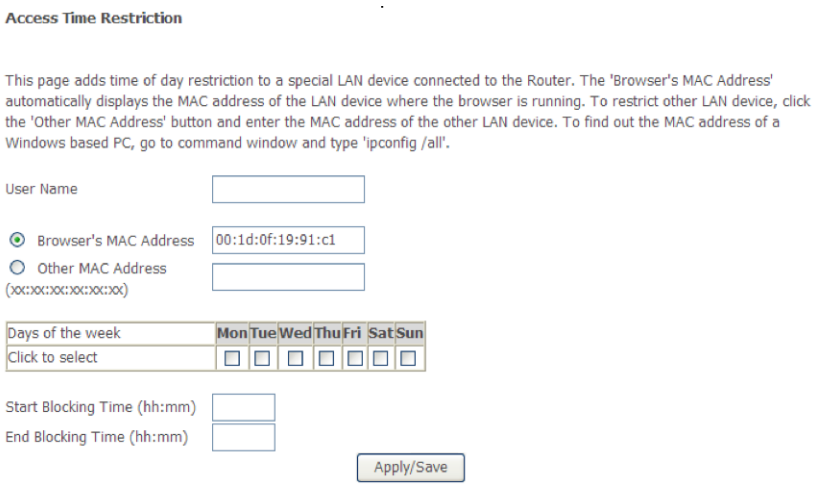


Figure 82. WMI: Adding an Access Time Restriction Policy

- **User Name:** The name of the user you want to prevent from accessing the unit.
- **Browser's MAC Address**: The MAC address of the LAN device where the browser is currently running (default setting).
- **Other MAC Address:** The MAC address of a different LAN device you want to restrict. (To find out the MAC address of a Windows-based PC, enter *ipconfig /all* in the PC's command window).
- **Days of the Week:** Select the boxes of the day(s) you want to restrict access for the device.
- **Start** and **End Blocking Time:** Enter the time range that the device will be restricted.

URL Filter

Click **Advanced Setup > Parental Control > URL Filter** to prevent LAN users from accessing specific websites in the WAN.

Figure 83. WMI: URL Filter List

Select the **Exlude** URL list type or the **Include** URL list type. If you select the **Exlude** URL list type, the URLs in the list are not accessible. If you select the **Include** URL list type, you are allowed to access the the URLs in the list.

Click **Add** to enter a new URL Filter entry. The **Add URL Filter** page displays (Figure 84 on page 73).

Figure 84. WMI: URL Filter Setup

On the **Add URL Filter** page, enter the URL address and the corresponding port number. For example, enter the URL address *http://www.google.com* and the port number, then click the **Apply/Save** button. The following page displays:

Figure 85. WMI: Completing a URL Filter Entry

Quality of Service (QoS) Setup

Click **Advanced Setup** > **Quality of Service** to manage traffic for the 3101. Many communication and multimedia applications require large, high-speed bandwidths to transfer data between the local network and the Internet. However, for many applications, there is often only one Internet connection available with limited capacity. QoS (Quality of Service) divides this capacity between the different applications and provides underlayed, continuous data transfer where data packets with higher priority are given preference.

Refer to the following sections to enable and configure QoS:

- "Queue Management" on page 73
- "Queue Configuration" on page 74
- "QoS Classification" on page 75

Queue Management

The **Queue Management Configuration** page (Figure 86 on page 74) is the default page that displays when you click on **Quality of Service** in the **Advanced Setup** menu. From this page, you can enable or disable QoS and set the default DSCP Mark. By default ,the system enables QoS and sets a default DSCP mark to automatically mark incoming traffic without reference to a particular classifier. Click **Apply/Save** to activate any changes.

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.

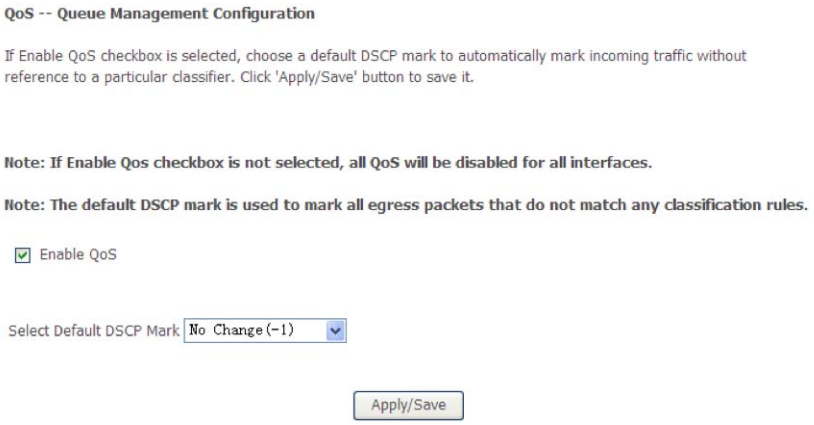


Figure 86. WMI: Enable QoS

Queue Configuration

Click **Queue Config** (Figure 87) in the **Quality of Service** menu to add or remove a QoS rule. The lower integer value for precedence indicates the higher priority.

Figure 87. WMI: QoS Queue Configuration

Click **Add** on the **QoS Queue Setup** page to create a new queue entry and assign it to a specific network interface.

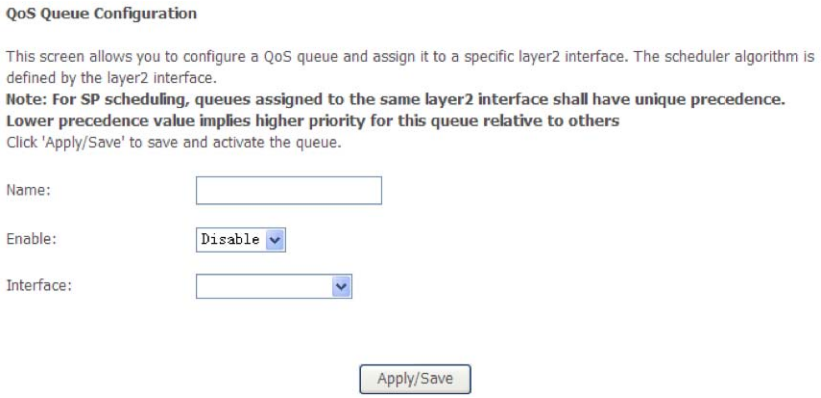


Figure 88. WMI: Add QoS Queue Entry

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

Click **Apply/Save** to save and activate the queue.

QoS Classification

Click **QoS Classification** in the **Quality of Service** menu to configure QoS classification rules.

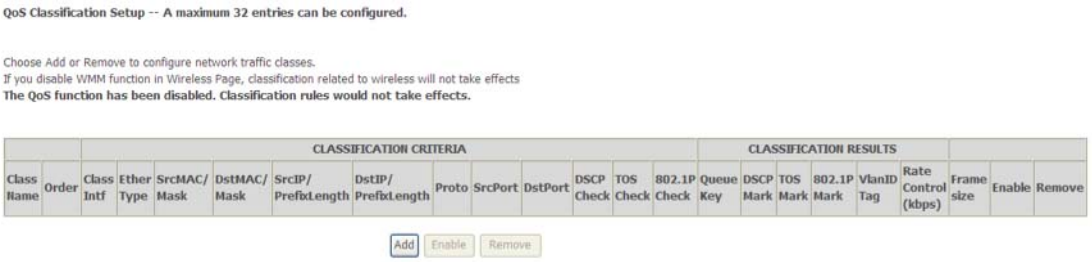


Figure 89. WMI: QoS Classification Table

Click **Add** to create a new trafflic class rule. The **Add Network Traffic Class Rule** page displays (Figure 90 on page 76). On this page, enter the traffic name, select the rule order and the rule status, and specify the classification criteria and the classification results. Click **Apply/Save** to apply the settings.

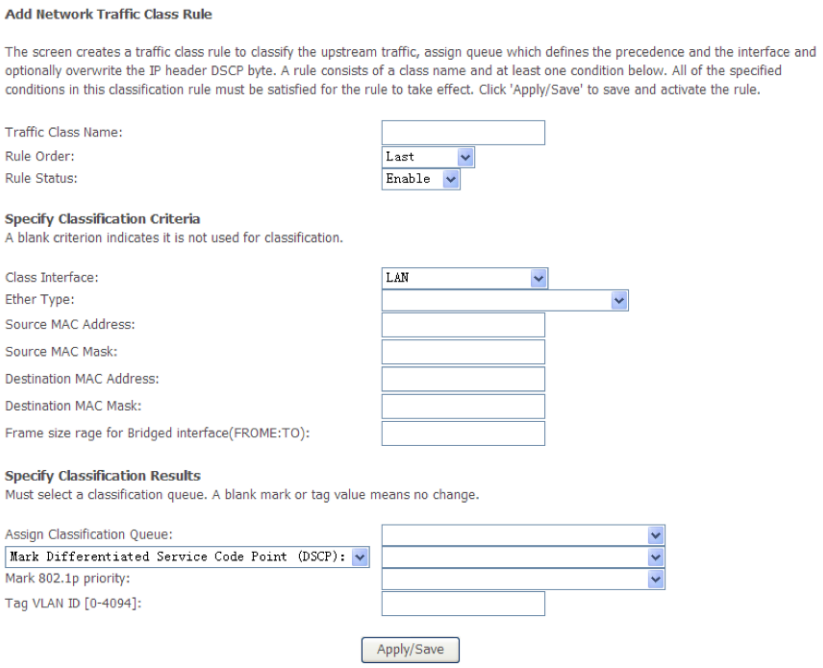


Figure 90. WMI: Add Network Traffic Class Rule

Routing Setup

Click **Advanced Setup > Routing** to manage the default gateway, static route, and Routing Information Protocol (RIP) settings. Refer to the following sections:

- "Default Gateway" on page 77
- "Static Route" on page 77
- "Policy Routing" on page 78

Default Gateway

The **Routing–Default Gateway** page (Figure 91) is the default page that displays when you click on **Routing** in the **Advanced Setup** menu. From this page, you can modify the default gateway settings. Select a proper WAN interface in the list of **Available Routed WAN Interfaces** as the system default gateway. Click **Apply/Save** to activate any changes.

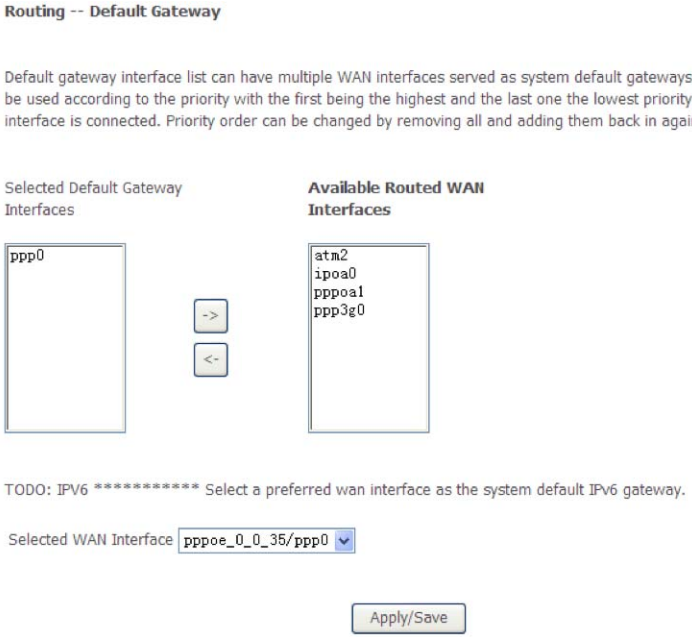


Figure 91. WMI: Routing - Default Gateway

Static Route

Click **Routing > Static Route** to view current route entries. Click **Add** to create a new static route entry. The **Routing–Static Route Add** page displays (Figure 92).

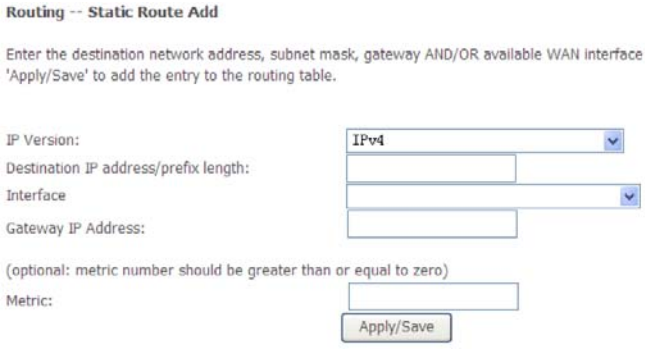


Figure 92. WMI: Adding a Static Route

On this page, you can add or remove a static routing rule of IPV4 or IPv6.

- **IP Version:** Select the IP version to be IPv4 or IPv6.
- **Destination IP address/prefix length:** Enter the destination IP address.
- **Interface:** Select the proper interface for the rule.

- **Gateway IP Address:** The next-hop IP address.
- **Metric:** The metric value of routing.

Click **Apply/Save** to apply the settings.

Policy Routing

Click **Routing > Policy Routing** to add or remove a static policy rule. Click the **Add** button to enter the policy name, source IP and default gateway, and select the physical LAN port and interface on the **Policy Routing Setup** page (Figure 93). Click the **Apply/Save** button to save the configuration.

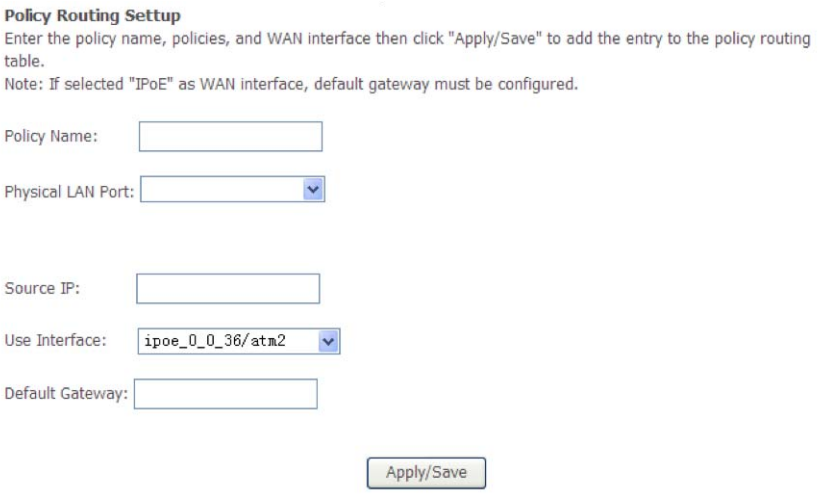


Figure 93. WMI: Adding a Policy Routing Rule

DSL Setup

Click **Advanced Setup > DSL** to configure DSL settings. The factory default settings are typically sufficient for normal DSL operation. Click **Apply/Save** to activate any changes..

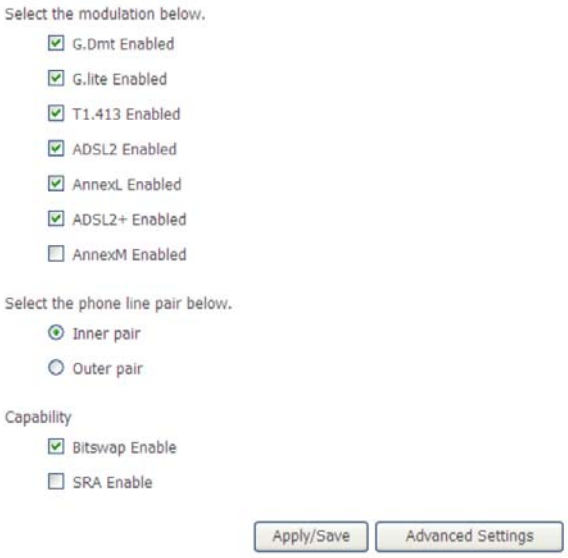


Figure 94. WMI: DSL Settings

Universal Plug & Play (UPnP) Setup

Click **Advanced Setup > UPnP** to activate the UPnP capability on the 3101. PCs with UPnP (Universal Plug & Play) can offer their own network services and automatically use services offered in the network. Click **Apply/Save** to activate any changes.

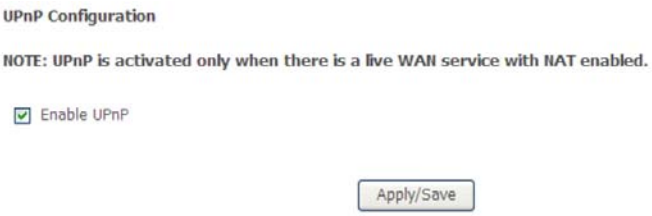


Figure 95. WMI: UPnP Configuration

Domain Name System (DNS) Proxy Setup

Click **Advanced Setup > DNS Proxy** to configure the DNS proxy function. After enabling the DNS proxy function, enter the host name of the broadband router and the domain name of the LAN network. Then, click **Apply/Save** to apply the settings.

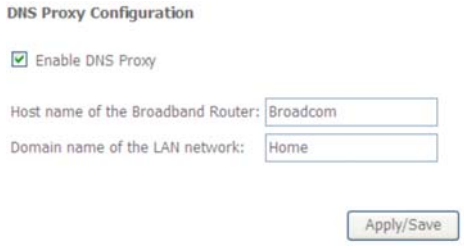


Figure 96. WMI: DNS Proxy Configuration

Print Server Setup

Click **Advanced Setup > Printer Server** (Figure 97) to enable printer support. Select the checkbox to **Enable on-board print server**. Enter the **Printer Name**, **Make**, and **Model** for the network printer. Click **Apply/Save** to activate your changes.

Figure 97. WMI: Enable Print Server

Packet Acceleration Setup

Click **Advanced Setup > Packet Acceleration** (Figure 98) to enable packet flow accelerator. Click **Apply/Save** to activate any changes.

Figure 98. WMI: Packet Acceleration

Storage Service Setup

Storage Device Info

Click **Advanced Setup > Storage Service > Storage Device Info** to display information about the storage device that connects to the DSL router.

Figure 99. WMI: Storage Device Info

User Accounts

Click **Advanced Setup > Storage Service > User Accounts** to add/delete user accounts on the storage service.

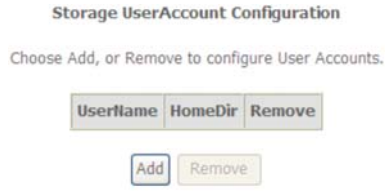


Figure 100. WMI: Storage User Accounts

Click the **Add** button to set up a new user account. The following page displays. Enter a username, password and volume name for the new account. Click **Apply/Save** to activate the new account.

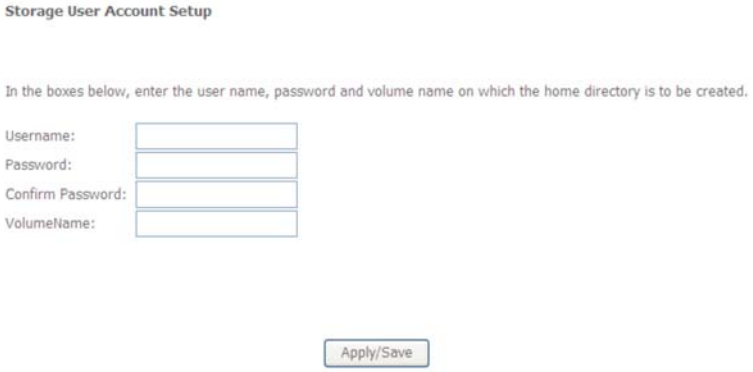


Figure 101. WMI: Adding a Storage User Account

Interface Grouping Setup

Click **Advanced Setup > Interface Grouping** to configure mapping groups.

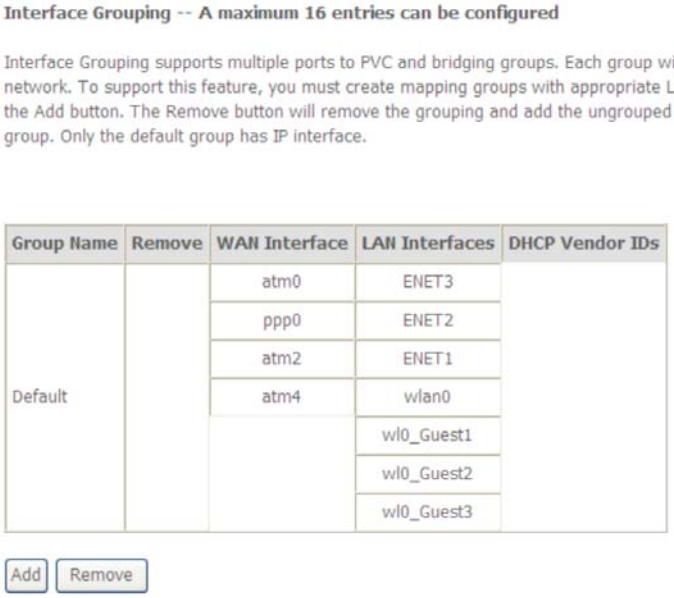


Figure 102. WMI: Interface Grouping Entries

Interface grouping supports multiple ports to PVC and bridging groups. Each group will perform as an independent network. To support this feature, you must create mapping groups with the appropriate LAN and WAN interfaces using the **Add** button. The **Remove** button will delete the grouping and add the ungrouped interfaces to the default group. Only the default group has IP interface.

Click the **Add** button to display the **Interface Grouping Configuration** page (Figure 103 on page 82). Follow the on-screen configuration steps to configure the parameters of the interface grouping. Click **Apply/Save** to apply the settings.

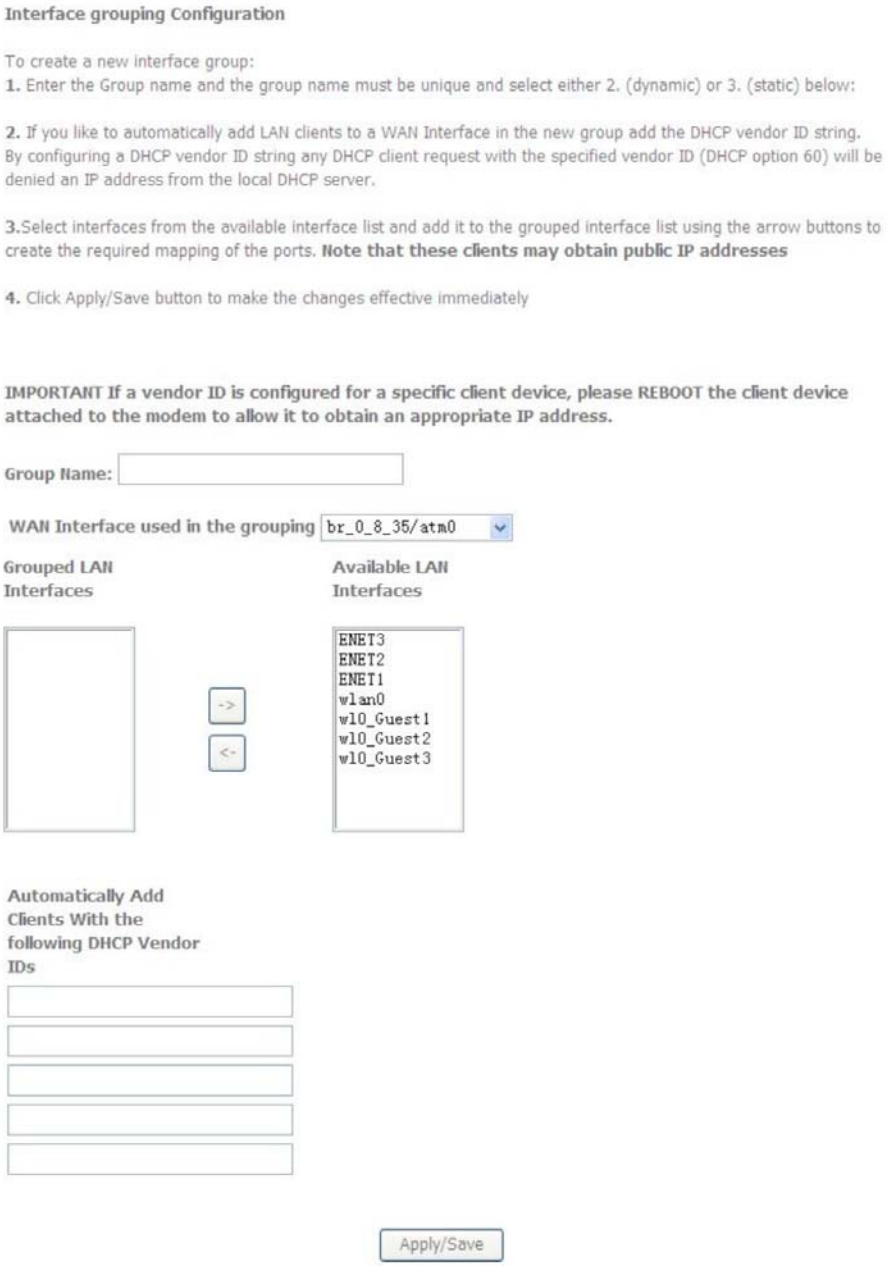


Figure 103. WMI: Interface Grouping Configuration

IPSec Setup

Click **Advanced Setup** > **IPSec** to configure IPSec tunnel mode connections.

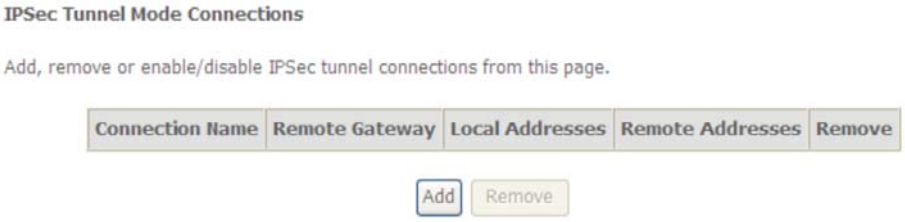


Figure 104. WMI: IPSec Tunnel Connections

Click the **Add** button to display the **IPSec Settings** page. Enter information for the IPSec connection name, tunnel mode, and remote IPSec gateway address. If you need to configure the advanced settings of this IPSec tunnel connection, click the **Show Advanced Settings** button to display more configuation options. Click **Apply/Save** to the settings.

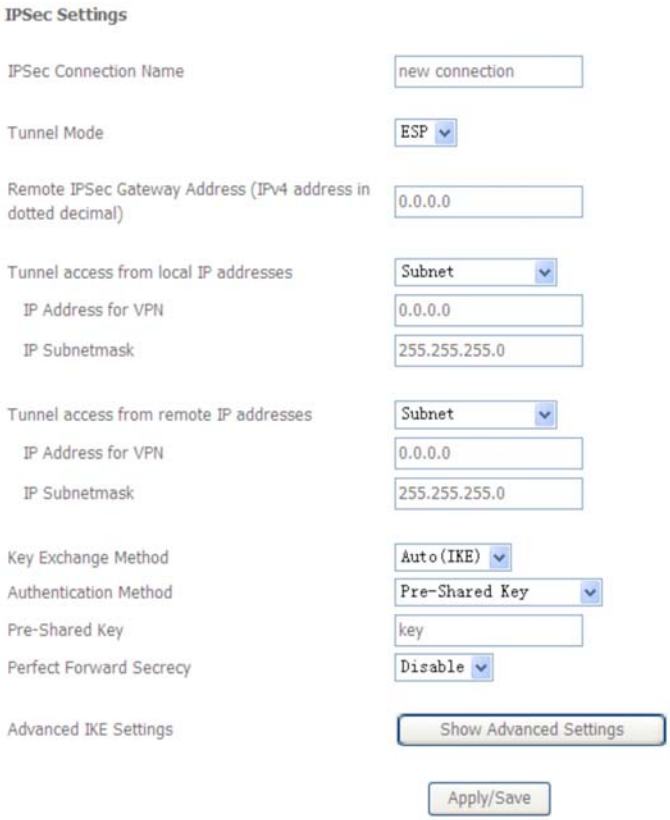


Figure 105. WMI: IPSec Tunnel Connections

Certificate Setup

Click **Advanced Setup > Certificate** to request or import a certificate to help identify your device to other devices or verify certificates from other devices.

Local Certificates

The **Local Certificates** page (Figure 106) is the default page that displays when you click on **Certificate** in the **Advanced Setup** menu. Local certificates are used by peers to verify your identity. From this page, you can create a certificate request (page 84) or import a certificate (page 86).

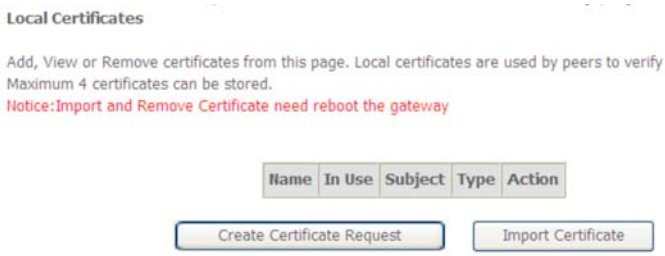


Figure 106. WMI: Local Certificates

Create Certificate Request

On the **Local Certificates** page, click **Create Certificate Request** (Figure 107) to create a new certificate request, have it signed by a certificate authority, and load the signed certificate.

Figure 107. WMI: Create Local Certificate Request

Enter information for the following fields:

- **Certificate Name:** Enter a name for the new certificate. The system will create an SSL certificate in the specified certificate repository (administrator's or domain's repository) by using a private key file and a corresponding certificate file.
- **Common Name:** Enter the Fully Qualified Domain Name (FQDN) used for DNS lookups of your server (for example, www.mydomain.com). Browsers use this information to identify your Web site. Some browsers will refuse to establish a secure connection with your site if the server name does not match the common name in the certificate. Do not include "http://" or any port numbers or pathnames in the common name. Do not use wildcard characters such as * or ?, and do not use an IP address.
- **Organization Name:** Enter the name of the organization to which the entity belongs (such as the name of a company).

- **State/Province Name:** Enter the name of the state or province where your organization's head office is located. Provide the full name of the state or province.
- **Country/Region Name:** Select the two-letter ISO abbreviation for your country (for example, GB for the United Kingdom).

Click **Apply** to generate the certificate request. Wait several seconds while the system creates the request. The **Certificate Signing Request** page displays (Figure 108).

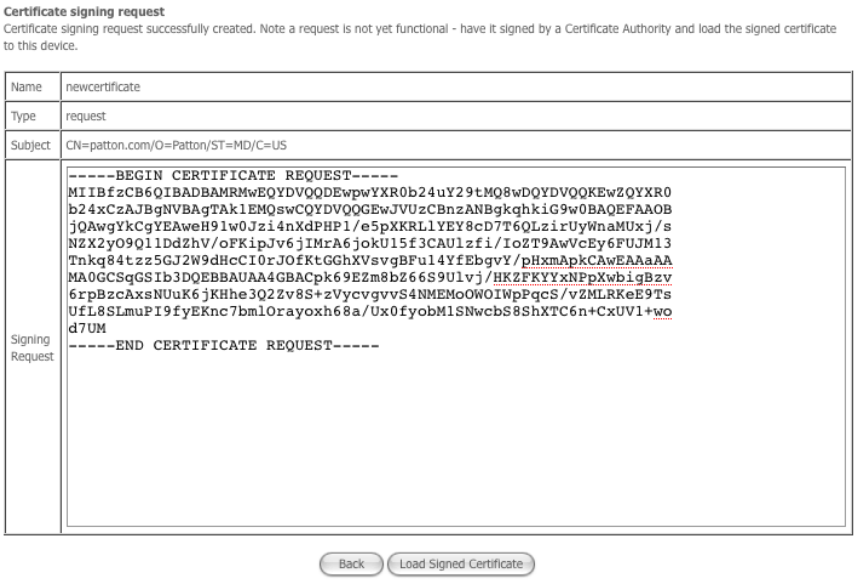


Figure 108. WMI: Certificate Signing Request

You need to submit the certificate request to a certificate authority that will sign the request. Then, load the signed certificate to the 3101. Click **Load Signed Certificate** to display the **Load Certificate** page (Figure 109). Paste the signed certificate and click **Apply** and to create the new certificate.

Figure 109. WMI: Load Certificate

Import Certificate

On the **Local Certificates** page, click **Import Certificate** (Figure 110) to paste an existing certificate and private key.

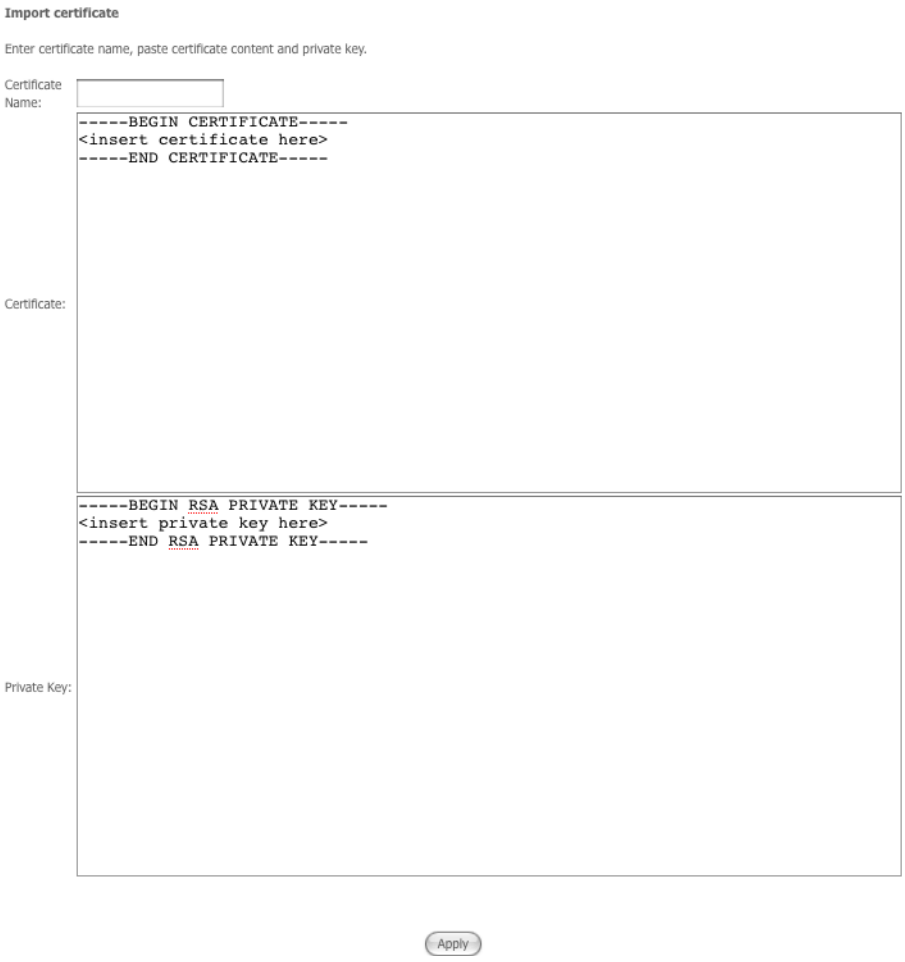


Figure 110. WMI: Import Local Certificate

Click **Apply** to add the certificate.

Trusted CA Certificates

Click **Certificate > Trusted CA** to display the **Trusted CA (Certificate Authority) Certificates** page. CA certificates are used by the 3101 to verify peers' certificates. From this page, you can import a CA certificate.

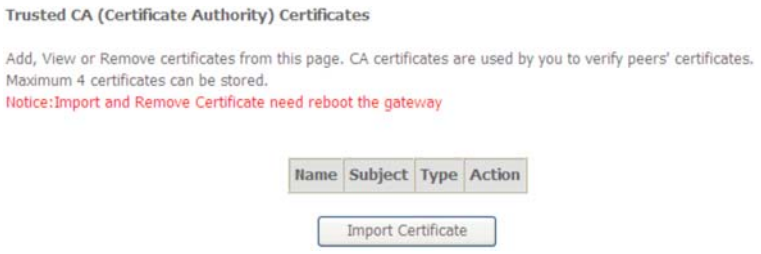


Figure 111. WMI: Trusted CA Certificates

Click **Import Certificate** (Figure 112) to paste an existing certificate. Click **Apply** to add the certificate.

Figure 112. WMI: Import CA Certificate

Power Management

Click **Advanced Setup > Power Management** to control hardware modules and power consumption.

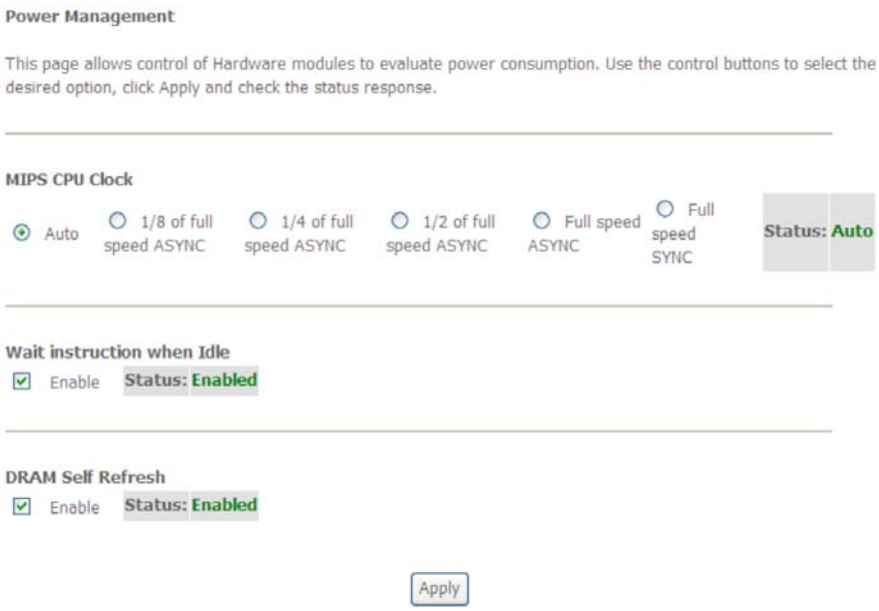


Figure 113. WMI: Power Management

Use the radio buttons to select desired options. Click **Apply** to save the settings.

Multicast Setup

Click **Advanced Setup > Multicast** to configure the multicast parameters of the IPv4 and IPv6. Click **Apply/ Save** to apply the settings.

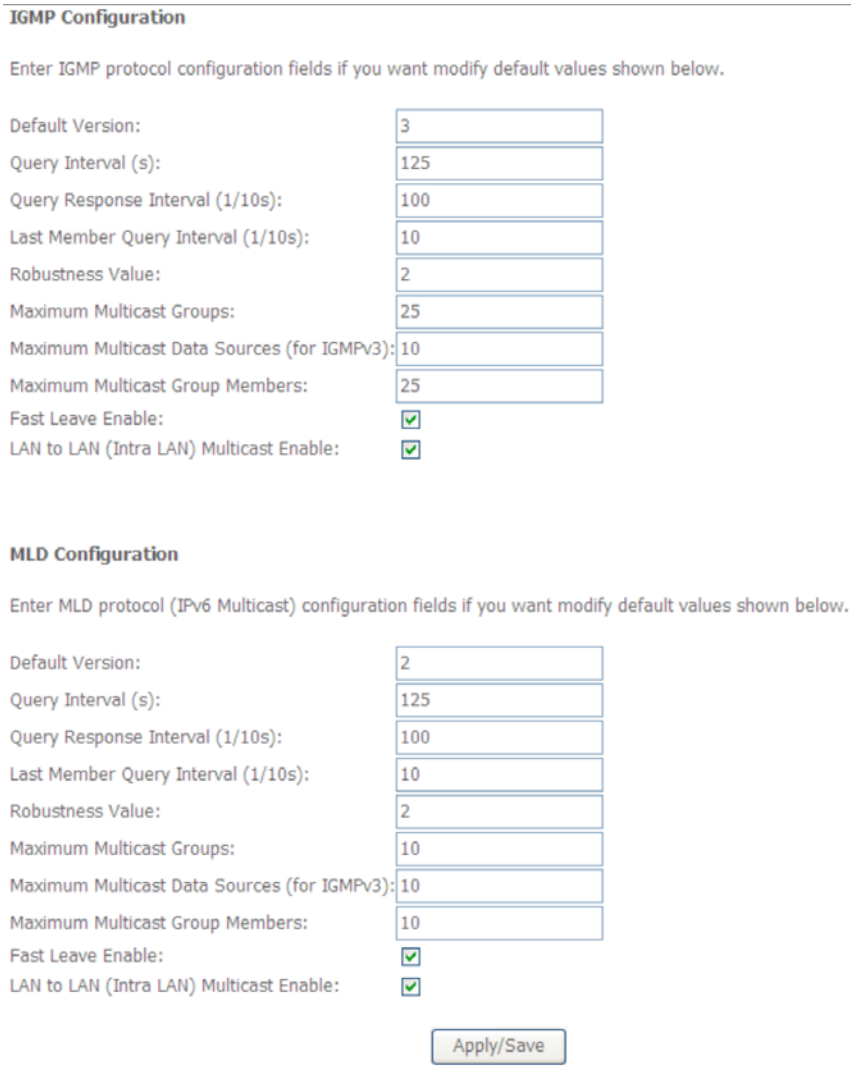


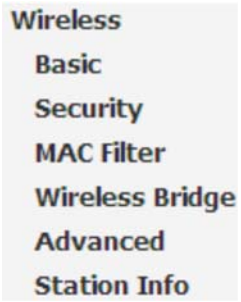
Figure 114. WMI: Multicast Configuration

Chapter 6 Wireless Configuration

Chapter contents

Overview

Click **Wireless** in the navigation menu to view wireless configuration options for the 3101.



See the following sections for setup instructions:

Basic Wireless Setup

Click **Basic** in the **Wireless** menu to configure basic wireless features for the 3101. The **Wireless** -- **Basic** page displays (Figure 115). From this page, you can enable or disable the wireless LAN interface, hide the network from active scans, set the wireless network name (also known as SSID), and restrict the channel set based on country requirements. Click **Apply/Save** to activate any changes.

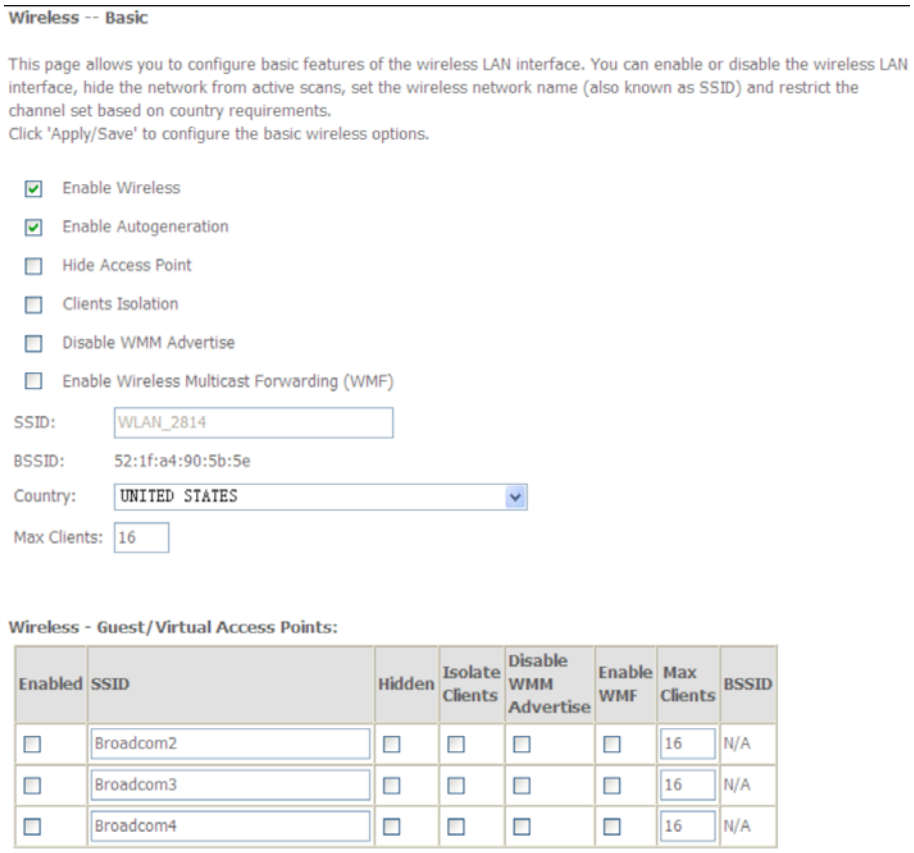


Figure 115. WMI: Basic Wireless Configuration

- **Enable Wireless: If you want to make wireless available, you must check this box first.** Otherwise, the Hide Access Point SSID, Country, Enable Wireless Guest Network, and Guest SSID box will not be displayed.
- **Enable Autogeneration:** After enabling this function, it will automatically set the SSID and the encryption mode.
- **Hide Access Point:** Check this box if you want to hide any access point for your router, so a station cannot obtain the SSID through passive scanning.
- **Clients Isolation:** When many clients connect to the same access point, they can access each other. If you want to disable the access between clients which connect the same access point, you can check this box.
- **Disable WMM Advertise:** Wi-Fi Multimedia (WMM) provides high-performance multimedia voice and video data transfers. Check this box if you want to turn this feature off.
- **Enable Wireless Multicast Forwarding (WMF):** Enabling this option improves the transmission quality of video service such as IPTV.
- **SSID:** Enter the identification name for the wireless network. The SSID is the network name shared among all points in a wireless network. The SSID must be identical for all points in the wireless network. It is case-sensitive and must not exceed 32 characters. Make sure that this setting is the same for all points in your wireless network. For added security, you should change the default SSID to a unique name.
- **BSSID:** Display the MAC address of the wireless interface.
- **Country:** Select the name of the country where you configure the gateway. This parameter further specifies your wireless connection. For example, the channel will adjust according to nations to adapt to each nation's frequency provision.
- **Max Clients:** Specify the maximum wireless client stations to link with the access point. Once the clients exceed the max value, all other clients will be refused.
- **Wireless - Guest/Virtual Access Points:** If you want to make Guest/Virtual network function be available, you have to check those boxes in the table below. In the current software version, three virtual access points can be configured. The configuration is the same as the main SSID (Service Set Identification), has the unique name, the limit of clients, etc..

Wireless Security Setup

Click **Security** in the **Wireless** menu to configure security features of the wireless LAN for the 3101. The **Wireless -- Security** page displays (Figure 116). On this page, you can configure the network security settings through the Wi-Fi Protected Setup (WPS) method (see "WPS Setup" on page 94) or by setting the network authentication mode (see "Manual Setup AP" on page 94). Click **Apply/Save** to activate any changes.

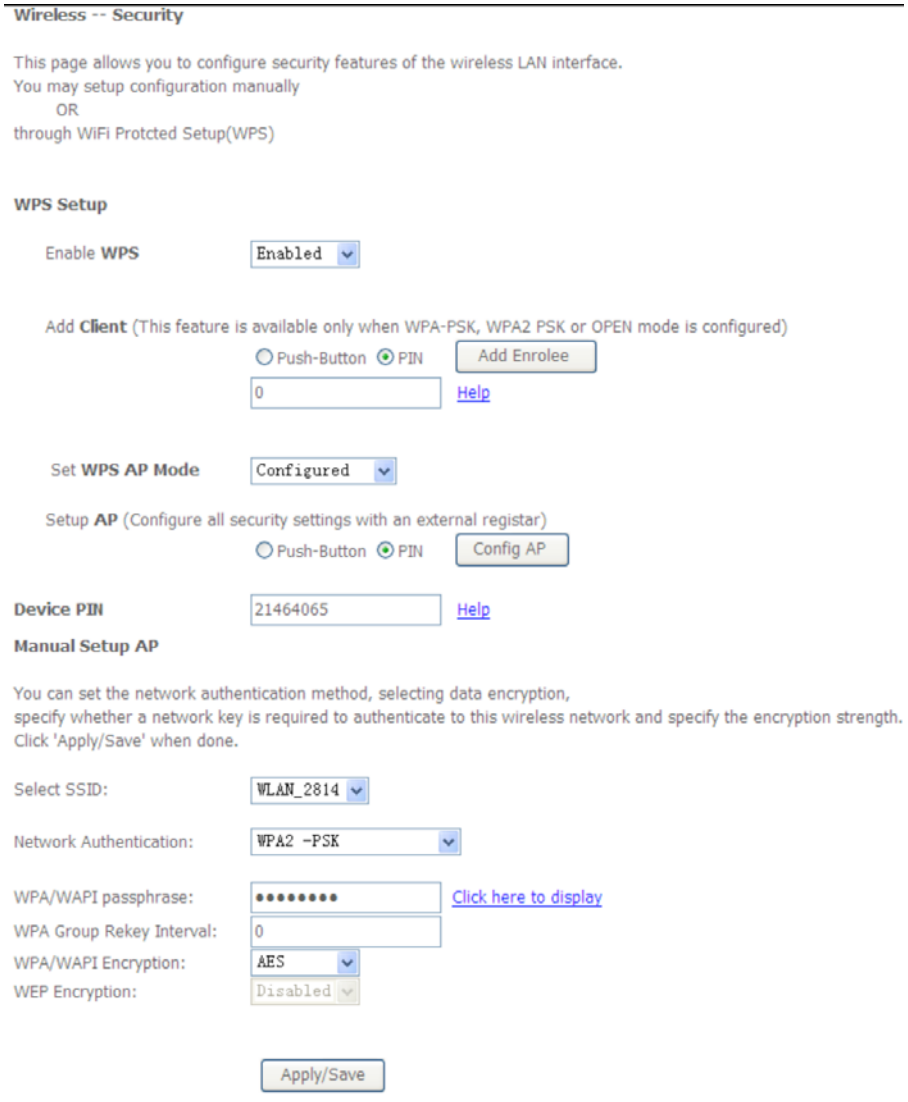


Figure 116. WMI: Wireless Security Configuration

WPS Setup

Figure 117. WMI: WPS Configuration

There are 2 primary methods used in the Wi-Fi Protected Setup (WPS):

- PIN entry, a mandatory method of setup for all WPS certified devices
- Push button configuration (PBC), an actual push button on the hardware or through a simulated push button in the software. (This is an optional method on wireless client).

If you are using the PIN method, you will need a Registrar (access point/wireless router) to initiate the registration between a new device and an active access point/wireless router. The PBC method may also need a Registrar when used in a special case where the PIN is all zeros

In order to use the push-button for WPS authentication, you must ensure that the network card supports the function. If it supports the WPS push-button, you do not need to configure it. Press the WPS button directly to enable the WPS function.

Manual Setup AP

The Manual Setup AP page provides nine types of network authentication modes, including Open, Shared, 802.1X, WPA, WPA-PSK, WPA2, WPA2-PSK, Mixed WPA2/WPA, and Mixed WPA2/WPA-PSK.

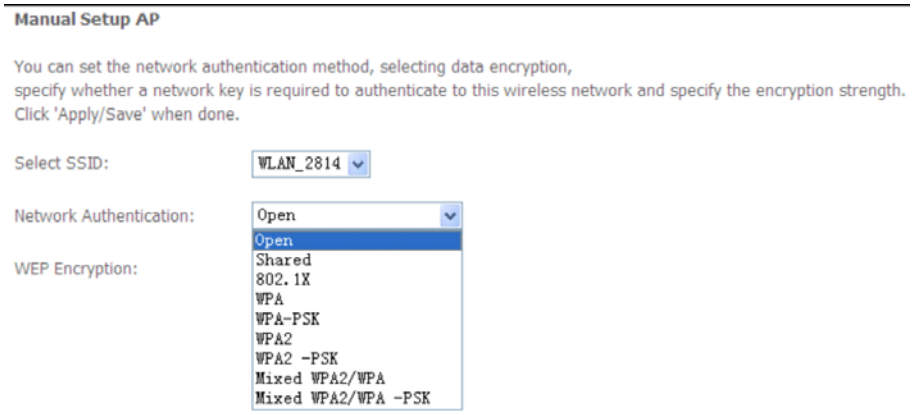


Figure 118. WMI: Manual Setup AP

Provide information for the following parameters:

- **Select SSID:** Select the wireless LAN SSID to configure security features.
- **Network Authentication:** Select the authentication mode for the selected SSID. Authentication configuration fields display automatically when you select a mode from this menu. Refer to the following sections for more information on configuring selected network authentication modes:
  - "Open or Shared" on page 95
  - "802.1X" on page 96
  - "WPA" on page 97
  - "WPA-PSK, WPA2-PSK, or Mixed WPA2/WPA-PSK" on page 98
  - "WPA2 or Mixed WPA2/WPA" on page 99

Open or Shared

When you select **Open** or **Shared** as the **Network Authentication** mode (Figure 119), provide information for the following parameters:

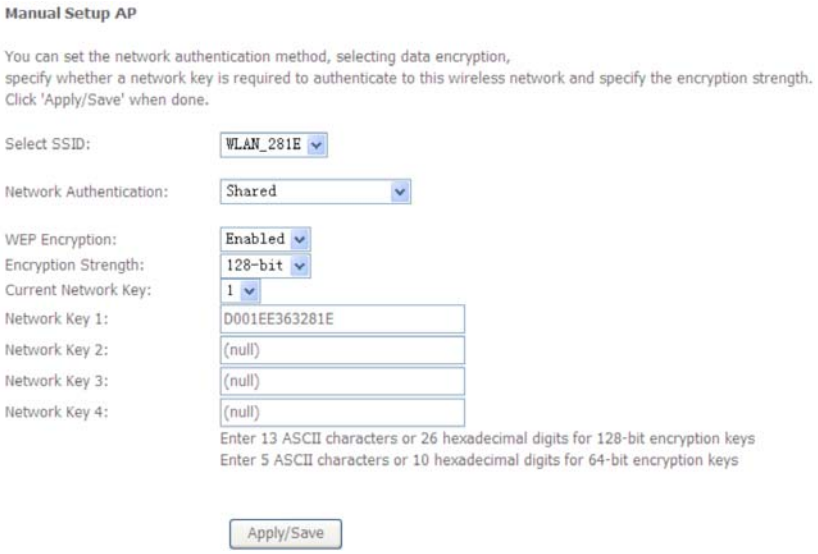


Figure 119. WMI: Wireless Security – Shared Authentication Mode

- **WEP Encryption:** Set to Enabled.
- **Encryption Strength:** Select the data security level: 64-bit or 128-bit.
- **Current Network Key:** Select the Network Key (the fields listed below this option) you want to use.
- **Network Key (1-4):** For 64-bit encryption, enter five ASCII characters or ten hexadecimal digits for the Network Key field(s). For 128-bit encryption, enter thirteen ASCII characters or twenty-six hexadecimal digits. The system allows you to enter up to four WEP keys.

Click **Apply/Save** to activate your changes.

802.1X

When you select **802.1X** as the **Network Authentication** mode (Figure 120), you are required to enter information for the RADIUS server. RADIUS server is short for a Remote Authentication Dial-in User Service server, which is most commonly a third party server, used for authenticating wireless clients that want to connect to an access point. The wireless client contacts an access point (a RADIUS client), which in turn communicates with the RADIUS server. The RADIUS server performs the authentication by verifying the client's credentials, and determining whether the device is authorized to connect to the access point's LAN. If the RADIUS server accepts the client, it responds by exchanging data with the access point, including security keys for subsequent encrypted sessions.

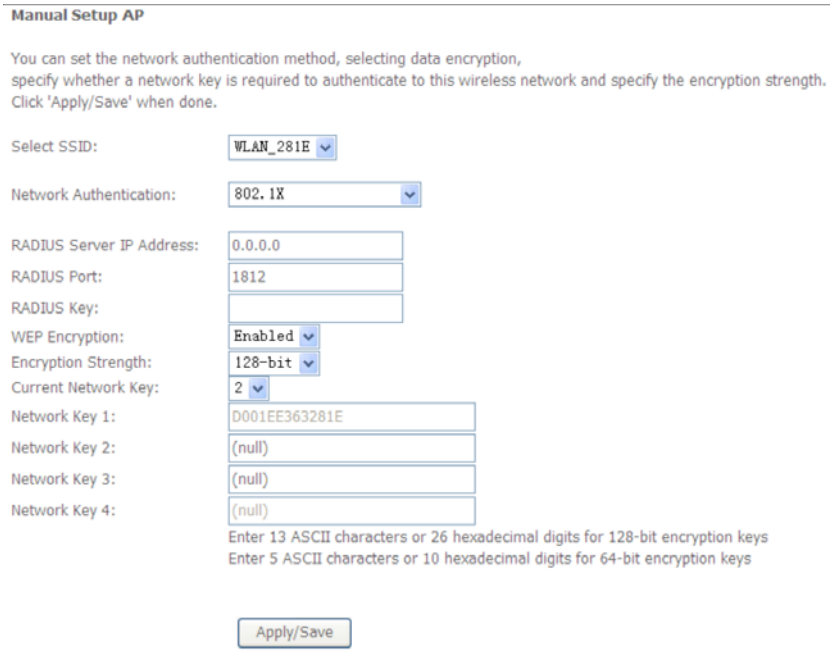


Figure 120. WMI: Wireless Security – 802.1X Authentication Mode

To configure 802.1X, provide information for the following parameters:

- **RADIUS Server IP Address:** Enter the IP Address of the authentication server.
- **RADIUS Port:** Enter the port number of the authentication server. The default port number is 1812.
- **RADIUS Key:** Enter the same key as the RADIUS server.
- **WEP Encryption:** Set to Enabled.
- **Encryption Strength:** Select the data security level: 64-bit or 128-bit.
- **Current Network Key:** Select the Network Key (the fields listed below this option) you want to use.
- **Network Key (1-4):** For 64-bit encryption, enter five ASCII characters or ten hexadecimal digits for the Network Key field(s). For 128-bit encryption, enter thirteen ASCII characters or twenty-six hexadecimal digits. The system allows you to enter up to four WEP keys.

Click **Apply/Save** to activate your changes.

WPA

When you select **WPA** as the **Network Authentication** mode (Figure 121), provide information for the following parameters:

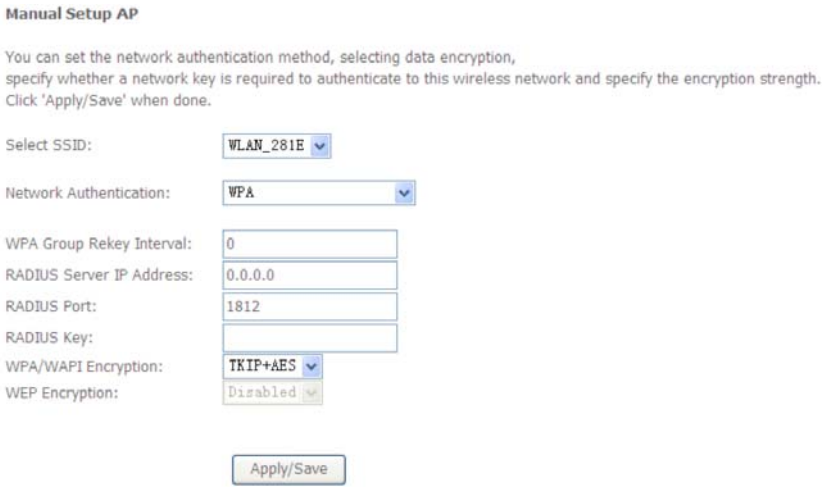


Figure 121. WMI: Wireless Security – WPA Authentication Mode

- **WPA Group Rekey Interval:** Enter a value for the time that the WPA key must change. If the value is set to 0, the change is done automatically between the server and the client.
- **RADIUS Server IP Address:** Enter the IP Address of the authentication server.
- **RADIUS Port:** Enter the port number of the authentication server. The default port number is 1812.
- **RADIUS Key:** Enter the same key as the RADIUS server.
- **WPA/WAPI Encryption:** Select one: TKIP, AES or TKIP + AES. TKIP is the default option. TKIP + AES encryption mode means the access point will automatically adjust to use TKIP or AES according to the wireless clients.

Click **Apply/Save** to activate your changes.

WPA-PSK, WPA2-PSK, or Mixed WPA2/WPA-PSK

When you select **WPA-PSK**, **WPA2-PSK**, or **Mixed WPA2/WPA-PSK** as the **Network Authentication** mode (Figure 122), provide information for the following parameters:

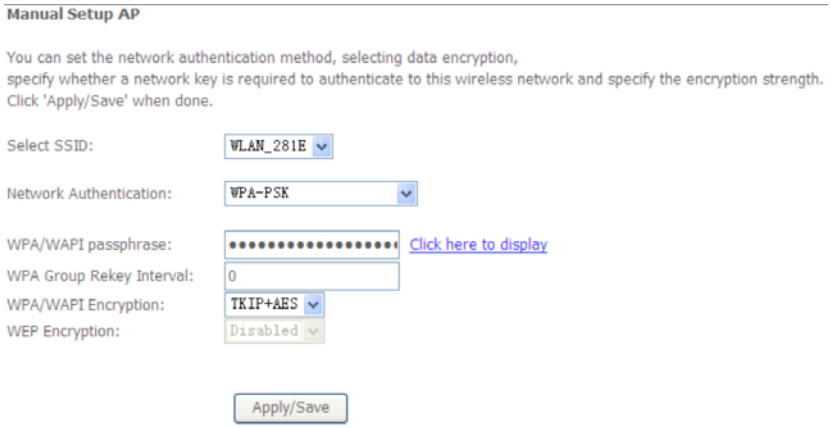


Figure 122. WMI: Wireless Security – WPA-PSK Authentication Mode

- **WPA/WAPI passphrase:** Enter the password for WPA station.
- **WPA Group Rekey Interval:** Enter a value for the time that the WPA key must change. If the value is set to 0, the change is done automatically between the server and the client.
- **WPA/WAPI Encryption:** Select one: TKIP, AES or TKIP + AES. (Default options are: TKIP for WPA-PSK, AES for WPA2-PSK, and TKIP + AES for Mixed WPA2/WPA-PSK). TKIP + AES encryption mode means the access point will automatically adjust to use TKIP or AES according to the wireless clients.

Click **Apply/Save** to activate your changes.

WPA2 or Mixed WPA2/WPA

When you select **WPA2** or **Mixed WPA2/WPA** as the **Network Authentication** mode (Figure 123), provide information for the following parameters:

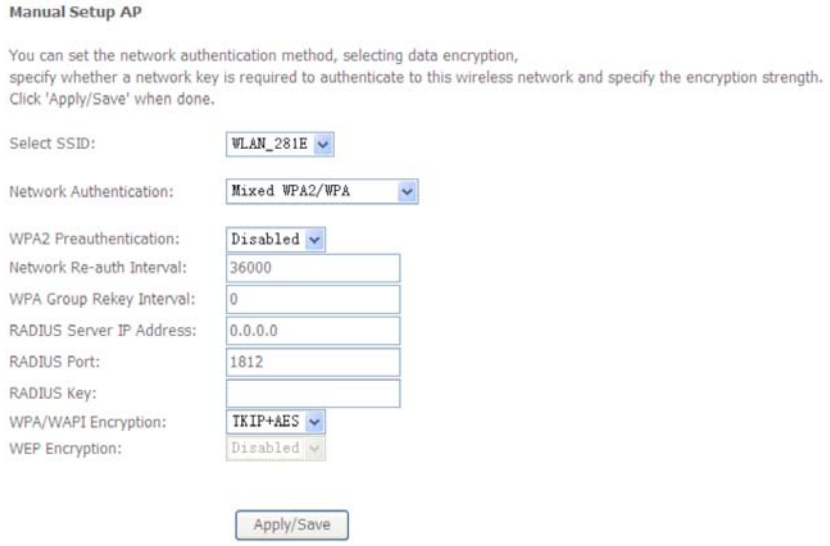


Figure 123. WMI: Wireless Security – Mixed WPA2/WPA Authentication Mode

- **WPA2 Preauthentication:** Select to enable or disable preauthentication.
- **Network Re-auth Interval:** Specify the timer of re-authentication between the server and the client.
- **WPA Group Rekey Interval:** Enter a value for the time that the WPA key must change. If the value is set to 0, the change is done automatically between the server and the client. s
- **RADIUS Server IP Address:** Enter the IP Address of the authentication server.
- **RADIUS Port:** Enter the port number of the authentication server. The default port number is 1812.
- **RADIUS Key:** Enter the same key as the RADIUS server.
- **WPA Encryption:** Select one: TKIP, AES or TKIP + AES. (Default options are: AES for WPA2 and TKIP + AES for Mixed WPA2/WPA). TKIP + AES encryption mode means the access point will automatically adjust to use TKIP or AES according to the wireless clients.

Click **Apply/Save** to activate your changes.

MAC Filter Setup

Click **MAC Filter** in the **Wireless** menu to allow or reject access to the wireless network for wireless clients.The **Wireless -- MAC Filter** page displays (Figure 124). From this page, you can create a list of MAC addresses that are banned from accessing the 3101or allowed to associate with the 3101.

Figure 124. WMI: MAC Filter Configuration

Provide information for the following parameters:

- **MAC Restrict Mode: The function can be turned on/off.** Click **Disabled** to disable the MAC filter feature. Click **Allow** or **Deny** to enable the feature. You can filter wireless users according to their MAC address, either by allowing or denying access.
- Click **Allow** and **Add** to add a wireless MAC address to the filter list. Enter the MAC address as *XX:XX:XX:XX:XX:XX* and click **Save/Apply** to add the MAC address to the wireless MAC address filters.
- Click **Deny** to ban a MAC address from the Wireless Access Control List.
- To delete a MAC address from the filter list, select the box for the device in the Remove column in the MAC Filter table and click **Remove**.

Wireless Bridge Setup

Click **Wireless Bridge** in the **Wireless** menu to configure wireless bridge features for the 3101. The **Wireless -- Bridge** page displays (Figure 125). The Wireless Distribution System (WDS) allows you to extend the range of your wireless network by introducing one or more WDS-enabled devices into your wireless network. You can only establish WDS links with WDS-enabled devices.

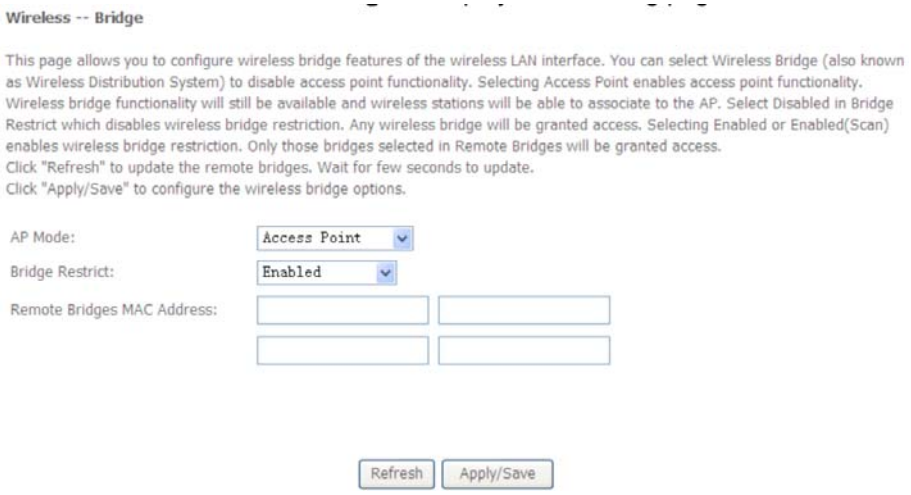


Figure 125. WMI: Wireless Bridge Configuration

Provide information for the following parameters:

- **AP Mode:** Select the functionality for the unit: Access Point or Wireless Bridge. You can select Wireless Bridge (also known as Wireless Distribution System) to disable access point functionality. Selecting Access Point enables access point functionality and Wireless bridge functionality will still be available. Wireless stations will be able to associate with the access point.
- **Bridge Restrict:** Select Disabled in the Bridge Restrict menu to disable the wireless bridge restriction. Any wireless bridge will be granted access. Select Enabled to enable the wireless bridge restriction. Only those bridges selected in the **Remote Bridges** section will be granted access.

You must configure all Bridges Access Point with the same encryption and authentication mode as Open, Shared, WEP, WPA-PSK or WPA2-PSK and the same fixed channel.

Click **Apply/Save** to activate any changes.

Advanced Wireless Setup

Click **Advanced** in the **Wireless** menu to configure advanced wireless features for the 3101. The **Wireless -- Advanced** page displays (Figure 126). Usually, you do not need to change the settings on this page. Click **Apply/Save** to activate any changes.

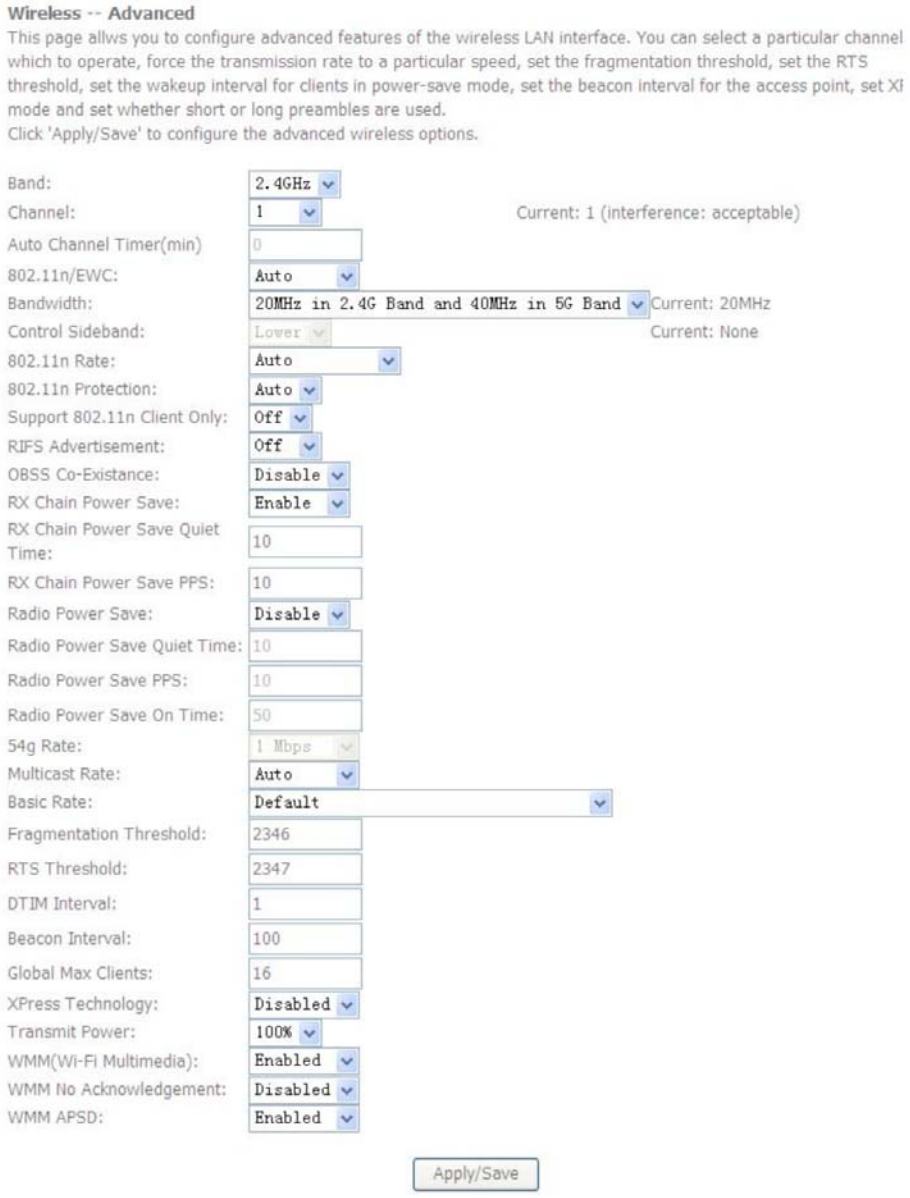


Figure 126. WMI: Advanced Wireless Configuration

Provide information for the following parameters (as needed):

- **Band:** Select 802.11b/g using wireless frequency band range. The radio frequency will remain at 2.4GHz.

- **Channel:** Select 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. The 3101 supports auto channeling functionalty.
- **Auto Channel Timer:** Specify the time limit (in minutes) for auto channeling.
- **802.11n/EWC:** Select **disable** 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**.
- **Control Sideband:** If you select **20MHz in Both Bands** or **20MHz in 2.4G Band** and **40MHz in 5G Band** the service of control sideband does not work. When you select **40MHz in Both Bands** as the bandwidth, more configuration options display. Then you can select **Lower** or **Upper** as the value of sideband. As the control sideband, when you select **Lower** the channel is 1~7. When you select **Upper,** the channel is 5~11.
- **802.11n Rate/54g Rate**: Select the 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 3101 automatically use the fastest possible data rate and enable the Auto-Fallback feature. Auto-Fallback will negotiate the best possible connection speed between the 3101 and a wireless client. The default value is Auto.
- **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.
- **Support 802.11n Client Only:** Only stations that are configured in 802.11n mode can associate.
- **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 3101 automatically use the fastest possible data rate and enable the Auto-Fallback feature. Auto-Fallback will negotiate the best possible connection speed between the 3101 and a wireless client. The default value is **Auto**.
- **Basic Rate:** Select the basic transmission rate ability for the access point.
- **Fragmention Threshold:** Packets that are larger than this value are fragmented into multiple packets. It is recommended 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:** Keep this value at the default setting of 2347. If you encounter inconsistent data flow, it is recommended to decrease this value by only a small amount. If a network packet is smaller than the preset RTS threshold size, the RTS/CTS mechanism will not be enabled. The 3101 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 the 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). The default value (100) is recommended.

- **XPress Technology:** Select Enable or Disable. This feature is special acceleration technology for IEEE802.11g. The default is Disabled.
- **Transmit Power:** Adjust the transmission range. This tool can be helpful for security purposes if you want to limit the transmission range.
- **WMM (Wi-Fi Multimedia):** Select whether WMM is enabled or disabled. Before you disable WMM, understand that all QoS queues/traffic classes that relate to wireless will not take effect.
- **WMM No Acknowledgement:** Select to enable or disable ACK in a WMM packet. By default, the 'Ack Policy' for each access category is set to Disabled, meaning that an acknowledgement packet is returned for every packet received. This provides a more reliable transmission but increases traffic load, which decreases performance. Disabling the acknowledgement feature can be useful for voice applications where the transmission speed is important and packet loss is tolerable.
- **WMM APSD:** (Automatic Power Save Delivery) Select Enabled for the unit to use very low power consumption. WMM Power Save is an improvement to the 802.11e amendment adding advanced power management functionality to WMM.

Station Info

Click **Station Info** in the **Wireless** menu to view authenticated wireless stations and their status about association and authentication. The **Wireless -- Authenticated Stations** page displays (Figure 127).

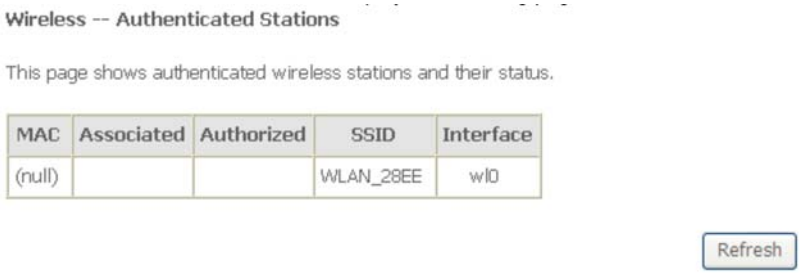


Figure 127. WMI: Authenticated Stations

Click **Refresh** to update the table of associated wireless stations.

Chapter 7 System Management

Chapter contents

Overview

This chapter provides information on testing connections and configuring typical system settings.

For information about testing the DSL connection for the unit, see "Running Diagnostic Tests" on page 106.

For information about configuring device settings, see "Managing System Settings" on page 106.

Running Diagnostic Tests

Click **Diagnostics** in the navigation menu to test the DSL connection for the 3101. The **Diagnostics** page (Figure 128) lists individual tests for testing the connection. If a test displays a FAIL status, click **Rerun Diagnostic Tests** at the bottom of this page to make sure the fail status is consistent. If the test continues to fail, click the **Help** link next to the test status and follow the troubleshooting procedures. Click **Next Connection** to view test results for another configured connection.

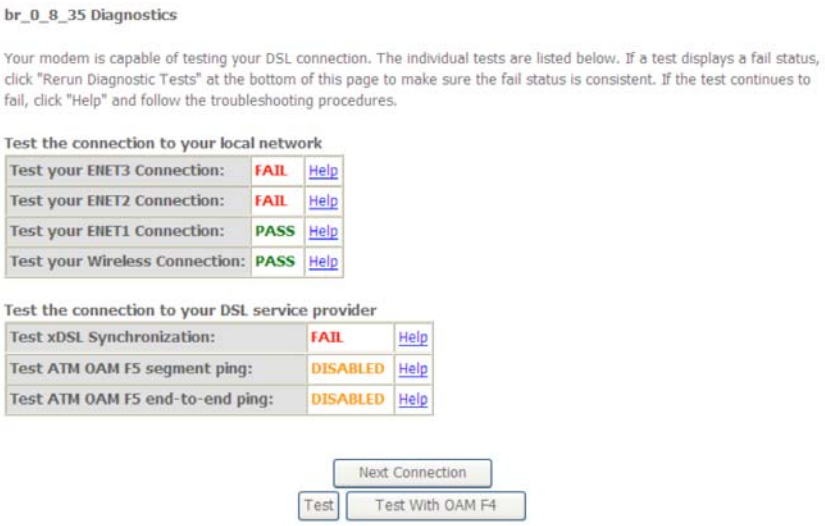
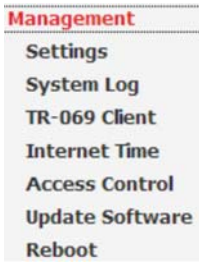


Figure 128. WMI: Diagnostic Tests

Managing System Settings

Click **Management** in the navigation menu to view system configuration options for the 3101.



See the following sections for information:

- "Settings" on page 107
- "System Log" on page 108
- "TR-069 Client" on page 109
- "Access Control" on page 110
- "Update Software" on page 111
- "Save/Reboot" on page 111

Settings

Click **Settings** in the **Management** menu to backup, restore, and update system configuration files.

Backup

Click **Backup** under **Settings** in the Management menu to create a backup file of the current configuration. Click **Backup Settings** (Figure 129) to display the **Save File** prompt. Select the location to save the backup file and click **OK**.

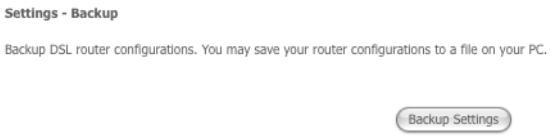


Figure 129. WMI: Backup Settings

Update

Click **Update** under **Settings** in the Management menu to update 3101 setting using a saved configuration file. Click **Browse** (Figure 130) to select a saved configuration file. Click **Update Settings** to apply the file's settings.

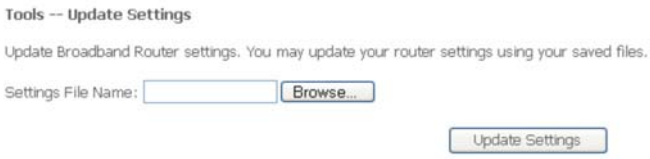


Figure 130. WMI: Update Settings

Restore Default

Click **Restore Default** under **Settings** in the Management menu to restore the 3101 with the default factory settings. Click **Restore Default Settings** (Figure 131) to display the confirmation prompt. Click **OK** to restore the default settings.

Figure 131. WMI: Restore Default Settings

System Log

Click **System Log** in the **Management** menu to view and configure logging for the 3101. The **System Log** page displays (Figure 132).

Figure 132. WMI: System Log

Click **View Security Log** to view and configure security logging for the 3101. Click the **Close** button to exit.

Figure 133. WMI: Security Log

From the **System Log** page, click **Configure System Log** to modify log options. The **System Log Configuration** page displays (Figure 134). Click the **Apply/Save** button to apply the settings.

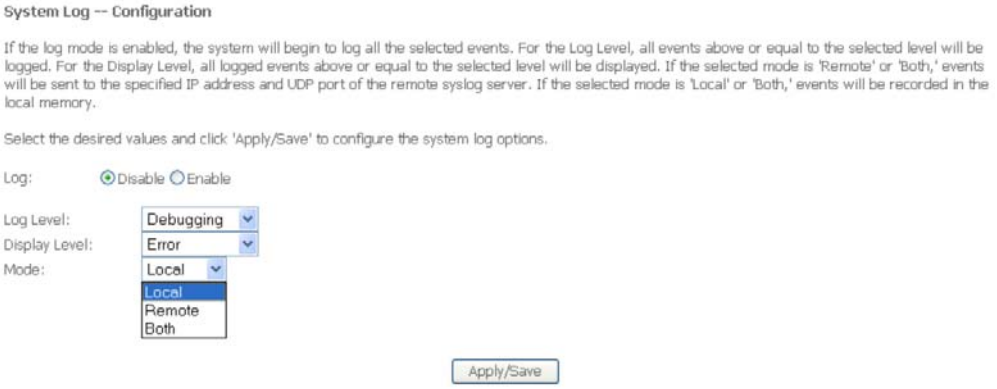


Figure 134. WMI: System Log Configuration

On this page, you can set 3 types of system log modes, including **Local, Remote** and **Both.**

- **Local:** When selecting Local, the events are recorded in the local memory.
- **Remote:** When selecting Remote, the events are sent to the specified IP address and UDP port of the remote system log server.
- **Both:** When selecting Both, the events are recorded in the local memory or sent to the specified IP address and UDP port of the remote system log server.

Note If you want to log all the events, you need to select the **Debugging** log level.

Click **View System Log** to view and configure logging for the 3101. Click the **Close** button to exit.

Figure 135. WMI: System Log

TR-069 Client

Click **TR-069 Client** in the **Management** menu to manage ACS (Auto Configuration Server) connections and other stand-alone routers and LAN-side client devices. The **TR-069 Client Configuration** page displays (Figure 136). Click **Apply/Save** to activate any changes.

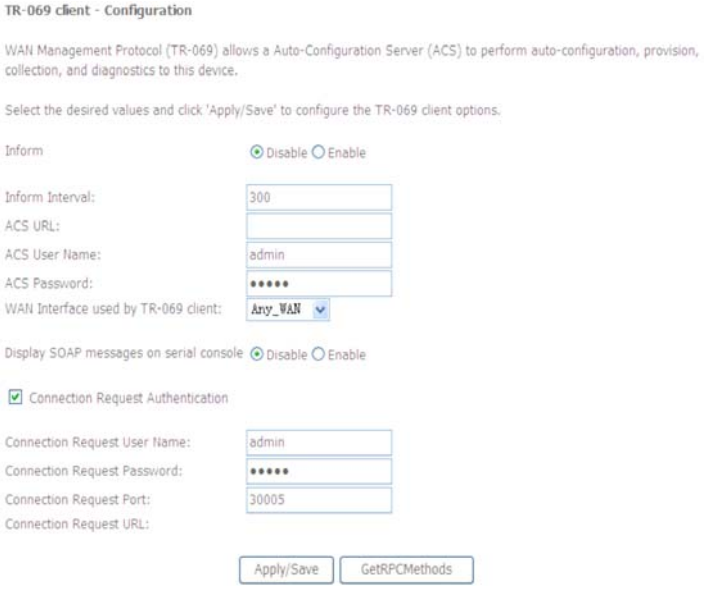


Figure 136. WMI: TR-069 Client Configuration

- **Inform:** If Enabled,the 3101 will accept the commands from ACS. If Disabled, the 3101 will not accept the commands from ACS.
- **Inform Interval:** Specify the number of seconds that the 3101 allows the ACS to connect.
- **ACS URL:** Enter the URL address for the ACS.
- **ACS User Name:** Enter the ACS username provided by the TR-069 Service.
- **ACS Password:** Enter the ACS password provided by the TR-069 Service.
- **Display SOAP messages on serial console:** If Enabled, the SOAP (Simple Object Access Protocol) information will display on the serial console.
- **Connection Request Authentication:** Select this box to enable and display the Connection Request User Name and Password.
- **Connection Request User Name:** Enter the Connection Request username provided by the TR-069 Service.
- **Connection Request Password:** Enter the Connection Request password provided by the TR-069 Service.

Access Control

The **Access Control** options in the **Management** menu allow you to enable/disable services and change passwords.

Services

Click **Services** under **Access Control** in the Management menu to enable and disable LAN and WAN services (Figure 137). Supported services for LAN/WAN include: FTP, HTTP, ICMP, SSH, TELNET and TFTP. Click **Apply/Save** to activate any changes.

Figure 137. WMI: Access Control–Services

Passwords

Click **Passwords** under **Access Control** in the Management menu to modify passwords for accounts (Figure 138). Click **Apply/Save** to activate any changes.

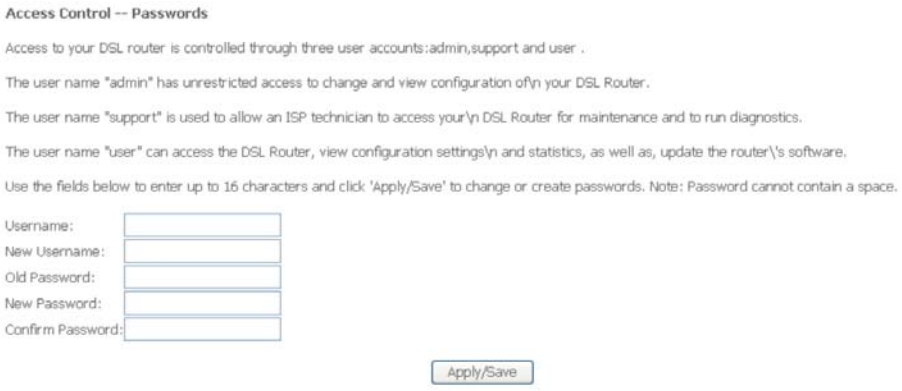


Figure 138. WMI: Access Control–Passwords

Update Software

Click **Update Software** in the **Management** menu to update the firmware for the 3101(Figure 139). Click **Browse** to select the new software image file. Click **Update Software** to apply the update. Wait a few minutes while the 3101 reboots.

Note While the software update is in progress, do not shut down the router. After the software update completes, the router automatically reboots. Make sure that the new software is correct, and do not use other software to update the router.

Figure 139. WMI: Update Software

Save/Reboot

Click **Save/Reboot** in the **Management** menu to save session changes and restart the 3101 (Figure 140).

Figure 140. WMI: Save/Reboot

Chapter 8 Contacting Patton for assistance

Chapter contents

Introduction

This chapter contains the following information:

- "Contact information"—describes how to contact Patton technical support for assistance.
- "Warranty Service and Returned Merchandise Authorizations (RMAs)"—contains information about the RAS warranty and obtaining a return merchandise authorization (RMA).

Contact information

Patton Electronics offers a wide array of free technical services. If you have questions about any of our other products we recommend you begin your search for answers by using our technical knowledge base. Here, we have gathered together many of the more commonly asked questions and compiled them into a searchable database to help you quickly solve your problems.

Patton support headquarters in the USA

- Online support: available at **www.patton.com**
- E-mail support: e-mail sent to **support@patton.com** will be answered within 1 business day
- Telephone support: standard telephone support is available five days a week—from **8:00 am** to **5:00 pm EST** (**1300** to **2200 UTC/GMT**)—by calling **+1 (301) 975-1007**
- Fax: **+1 (253) 663-5693**

Alternate Patton support for Europe, Middle East, and Africa (EMEA)

- Online support: available at **www.patton-inalp.com**
- E-mail support: e-mail sent to **support@patton-inalp.com** will be answered within 1 business day
- Telephone support: standard telephone support is available five days a week—from **8:00 am** to **5:00 pm CET** (**0900** to **1800 UTC/GMT**)—by calling **+41 (0)31 985 25 55**
- Fax: **+41 (0)31 985 25 26**

Warranty Service and Returned Merchandise Authorizations (RMAs)

Patton Electronics is an ISO-9001 certified manufacturer and our products are carefully tested before shipment. All of our products are backed by a comprehensive warranty program.

> **Note** If you purchased your equipment from a Patton Electronics reseller, ask your reseller how you should proceed with warranty service. It is often more convenient for you to work with your local reseller to obtain a replacement. Patton services our products no matter how you acquired them.

Warranty coverage

Our products are under warranty to be free from defects, and we will, at our option, repair or replace the product should it fail within one year from the first date of shipment. Our warranty is limited to defects in workmanship or materials, and does not cover customer damage, lightning or power suModel 3101e damage, abuse, or unauthorized modification.

Out-of-warranty service

Patton services what we sell, no matter how you acquired it, including malfunctioning products that are no longer under warranty. Our products have a flat fee for repairs. Units damaged by lightning or other catastrophes may require replacement.

Returns for credit

Customer satisfaction is important to us, therefore any product may be returned with authorization within 30 days from the shipment date for a full credit of the purchase price. If you have ordered the wrong equipment or you are dissatisfied in any way, please contact us to request an RMA number to accept your return. Patton is not responsible for equipment returned without a Return Authorization.

Return for credit policy

- Less than 30 days: No Charge. Your credit will be issued upon receipt and inspection of the equipment.
- 30 to 60 days: We will add a 20% restocking charge (crediting your account with 80% of the purchase price).
- Over 60 days: Products will be accepted for repairs only.

RMA numbers

RMA numbers are required for all product returns. You can obtain an RMA by doing one of the following:

- Completing a request on the RMA Request page in the *Support* section at **www.patton.com**
- By calling **+1 (301) 975-1007** and speaking to a Technical Support Engineer
- By sending an e-mail to **returns@patton.com**

All returned units must have the RMA number clearly visible on the outside of the shipping container. Please use the original packing material that the device came in or pack the unit securely to avoid damage during shipping.

Shipping instructions

The RMA number should be clearly visible on the address label. Our shipping address is as follows:

Patton Electronics Company
RMA#: xxxx
7622 Rickenbacker Dr.
GaithersbuModel 3101, MD 20879-4773 USA

Patton will ship the equipment back to you in the same manner you ship it to us. Patton will pay the return shipping costs.

Appendix A **Compliance**

Chapter contents

Compliance

EMC

- EN55022, Class B
- EN55024
- EN61000-3-2
- EN61000-3-3

Low-Voltage Directive (Safety)

- IEC/EN60950-1, 2nd Edition

PSTN

- This device is not intended nor approved for connection to the PSTN

CE Notice (Declaration of Conformity)

Patton Electronics, Inc declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The Declaration of Conformity may be obtained from Patton Electronics, Inc at www.patton.com/certifications.

The safety advice in the documentation accompanying this device shall be obeyed. The conformity to the above directive is indicated by CE mark on the device.

Authorized European Representative

D R M Green
European Compliance Services Limited.
Avalon House, Marcham Road
Abingdon,
Oxon OX14 1UD, UK

Appendix B **Specifications**

Chapter contents

Ethernet Interface

Model 3101/1I: One 10/100 Base-TX Ethernet port, IEEE 802.3/3u

Model 3101/4I: 4-port 10/100 Base-TX Ethernet port, IEEE 802.3/3u

Model 3101/4IWU: 4-port 10/100 Base-TX Ethernet port, IEEE 802.3/3u; One USB 2.0 device port, type B connector

WiFi Interface

IEEE 802.11b/g

WEP: 64 or 128 bits key length

WPA/WPA2 (Wi-Fi Protected Access) in PSK mode or using EAP with RADIUS

Access control list based on MAC address

ADSL Interface

One pair (2-wire) loop, 100 Ohm line impedance with RJ-11 connector

ITU-T G.992.1, G.992.2, G.992.3, G.992.5 and ANSI T1.413 Issue 2

OAM

Local: Telnet or WWW management via Ethernet

Remote: Telnet or WWW management

ATM

ATM cells over ADSL, AAL5

8 PVCs in bridge mode and 5 PVCs in router mode

UBR, CBR, rt-VBR, nrt-VBR and GFR traffic classes

ADSL-aware CAC (Connection Admission Control)

F5 AIS, RDI, and loopback cells

Payload encapsulation: RFC2684/RFC1483—Multiprotocol Encapsulation over ATM Adaptation Layer 5, FC2225/RFC1577—Classical IP and ARP over ATM (IPoA), RFC2364—PPP over AAL5 (PPPoA)

Bridging

RFC2684/RFC1483 bridged PDU encapsulation

IEEE 802.1D transparent bridging and spanning tree

ZIPB (Zero Installation PPP Bridge)

Routing

RFC2684/RFC1483 routed PDU encapsulation

Point-to-Point Protocol (including PPPoA and PPPoE) and user authentication via PAP or CHAP

TCP, UDP, ARP, RARP, IPCP, ICMP, IGMP

IP routing: static route, RIP v1 and v2

NAT/PAT with extensive ALG supports

DNS relay agent; Layer 2 tunneling protocol (L2TP)

Security

Built-in firewall with protection against DOS attacks with blacklisting, IP spoofing, and other common types of attacks

Packet filtering at MAC layer (raw filter) and IP layer, including stateful inspection

Configuration and Management

SNMP v1 agent – over IP, ILMI VCC or HDLC/EOC

DHCP client, server and relay for IP management

Universal Plug and Play (UPnP) support (Model 3101/4IWU)

Telnet with CLI (command line interface) or Web/HTTP

TR-069 or HTTP for firmware upgrade and configuration

AC Adapter

Input 110/220VAC, 50/60Hz

Output 12V 1.5A

Power consumption: Less than 6 Watts

Environment

Temp: 0-40°C

Storage Temp: -20-70°C

Humidity: 5–95% (non condensing)

Physical Dimensions

180W x 125D x 32H mm (/4I and /1I models)

195W x 145D x 35H mm (/4WU model)

USB Drivers

Driver support for Microsoft Windows 98, 98SE, ME, 2000, XP, Linux, MAC OS 8, 9 and X