COMTREND CORPORATION

CT-5374

Multi-DSL WLAN Router

User Manual

Version A2.1, April 30, 2010

261099-005

Preface

This manual provides information related to the installation and operation of this device. The individual reading this manual is presumed to have a basic understanding of telecommunications terminology and concepts.

If you find the product to be inoperable or malfunctioning, please contact technical support for immediate service by email at INT-support@comtrend.com

For product update, new product release, manual revision, or software upgrades, please visit our website at http://www.comtrend.com

Important Safety Instructions

With reference to unpacking, installation, use, and maintenance of your electronic device, the following basic guidelines are recommended:

- Do not use or install this product near water, to avoid fire or shock hazard. For example, near a bathtub, kitchen sink or laundry tub, or near a swimming pool. Also, do not expose the equipment to rain or damp areas (e.g. a wet basement).
- Do not connect the power supply cord on elevated surfaces. Allow it to lie freely. There should be no obstructions in its path and no heavy items should be placed on the cord. In addition, do not walk on, step on, or mistreat the cord.
- Use only the power cord and adapter that are shipped with this device.
- To safeguard the equipment against overheating, make sure that all openings in the unit that offer exposure to air are not blocked.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightening. Also, do not use the telephone to report a gas leak in the vicinity of the leak.
- Never install telephone wiring during stormy weather conditions.

CAUTION:

- To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.
- Always disconnect all telephone lines from the wall outlet before servicing or disassembling this equipment.

WARNING

- Disconnect the power line from the device before servicing.
- Power supply specifications are clearly stated in Appendix C - Specifications.

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NOTE:	This document is subject to change without notice.

Protect Our Environment

This symbol indicates that when the equipment has reached the end of its useful life, it must be taken to a recycling centre and processed separate from domestic waste.

The cardboard box, the plastic contained in the packaging, and the parts that make up this router can be recycled in accordance with regionally established regulations. Never dispose of this electronic equipment along with your household waste; you may be subject to penalties or sanctions under the law. Instead, please be responsible and ask for disposal instructions from your local government.

FCC Compliance

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

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

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
To comply with the FCC RF exposure compliance requirements, this device and its antenna must not be co-located or operating to conjunction with any other antenna or transmitter.
This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Table of Contents

CHAPTER 1 INTRODUCTION 5
1.1 FEATURES 5
1.2 APPLICATION 6

CHAPTER 2 INSTALLATION 7
2.1 HARDWARE SETUP 7
2.2 LED INDICATORS 9

CHAPTER 3 WEB USER INTERFACE 11
3.1 DEFAULT SETTINGS 11
3.2 IP CONFIGURATION 11
3.3 LOGIN PROCEDURE 14

CHAPTER 4 DEVICE INFORMATION 16
4.1 WAN 17
4.2 STATISTICS 17
4.2.1 LAN Statistics 18
4.2.2 WAN Statistics 18
4.2.3 ATM Statistics 19
4.2.4 xDSL Statistics 21
4.3 ROUTE 27
4.4 ARP 28
4.5 DHCP 29

CHAPTER 5 ADVANCED SETUP 30
5.1 LAYER 2 INTERFACE 30
5.1.1 ATM Interface 30
5.1.2 PTM Interface 31
5.1.3 ETH WAN INTERFACE 31
5.2 WAN 32
5.3 LAN 33
5.4 IPV6 LAN HOST 35
5.5 NAT 36
5.5.1 Virtual Servers 36
5.5.2 Port Triggering 38
5.5.3 DMZ Host 39
5.6 SECURITY 40
5.6.1 IP Filtering 40
5.6.2 MAC Filtering 42
5.7 PARENTAL CONTROL 44
5.7.1 Time Restriction 44
5.7.2 URL Filter 45
5.8 QUALITY OF SERVICE (QOS) 46
5.8.1 Queue Management Configuration 46
5.8.2 Queue Configuration 46
5.8.3 QoS Classification 47
5.9 ROUTING 49
5.9.1 Default Gateway 50
5.9.2 Static Route 50
5.9.3 Policy Routing 51
5.9.4 RIP 52
5.9.5 IPv6 Static Route 53
5.10 DNS 54
5.10.1 DNS Server 54
5.10.2 Dynamic DNS 54
5.11 DSL 56
5.12 UPNP 58
5.13 PRINT SERVER 59
5.14 INTERFACE GROUPING 59

5.15 CERTIFICATE 61
5.15.1 Local 62
5.15.2 Trusted CA 63
5.16 POWER MANAGEMENT 65

CHAPTER 6 WIRELESS 66
6.1 BASIC 66
6.2 SECURITY 68
6.2.1 WPS 70
6.3 MAC FILTER 75
6.4 WIRELESS BRIDGE 76
6.5 ADVANCED 77
6.6 STATION INFO 79

CHAPTER 7 DIAGNOSTICS 81

CHAPTER 8 MANAGEMENT 82
8.1 SETTINGS 82
8.1.1 Backup Settings 82
8.1.2 Update Settings 82
8.1.3 Restore Default 83
8.2 SYSTEM LOG 84
8.3 SNMP AGENT 86
8.4 TR-069 CLIENT 87
8.5 INTERNET TIME 88
8.6 ACCESS CONTROL 89
8.6.1 Passwords 89
8.7 UPDATE SOFTWARE 89
8.8 REBOOT 90

APPENDIX A - FIREWALL 91

APPENDIX B - PIN ASSIGNMENTS 94

APPENDIX C - SPECIFICATIONS 95

APPENDIX D - SSH CLIENT 98

APPENDIX E - WSC EXTERNAL REGISTRAR 99

APPENDIX F - PRINTER SERVER 103

APPENDIX G - CONNECTION SETUP 109

Chapter 1 Introduction

The CT-5374 Multi-DSL WLAN Router provides wired and wireless access for high-bandwidth applications in the home or office. It includes four fast Ethernet ports and supports ADSL2/2+ and VDSL2 connections with DSLAM switching. ADSL2+ connections support multiple simultaneous Internet connections while VDSL2 connections are suitable for triple play (Video + Voice + Data) applications.

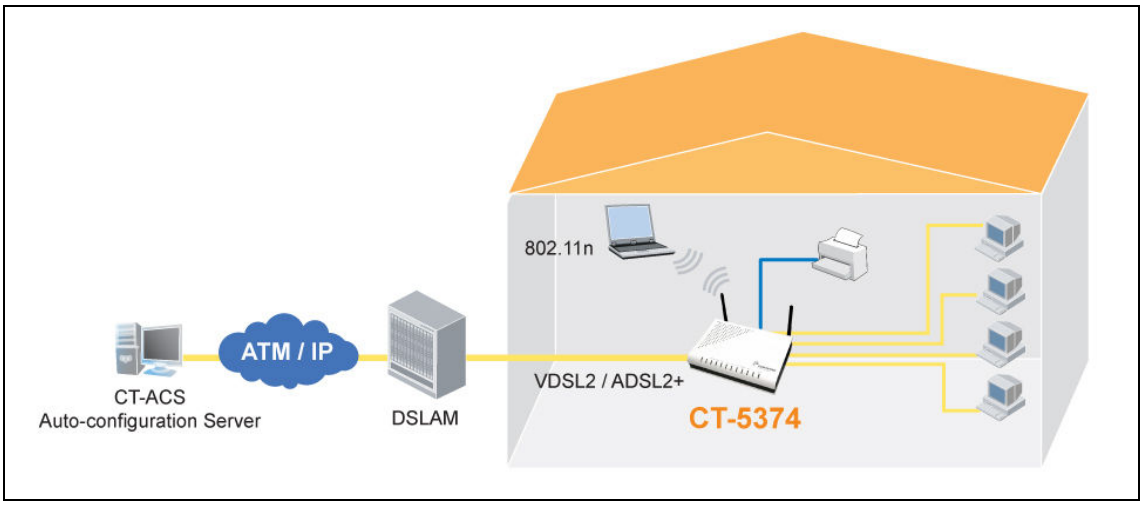
An integrated 802.11n (draft) WLAN Access Point (AP) provides faster wireless connections with increased range, when compared with 802.11b and 802.11g, without sacrificing backwards compatibility with these older wireless standards. WPS (Wi-Fi Protected Setup) and Wi-Fi On/Off buttons are positioned on the front panel for easy wireless network setup and control.

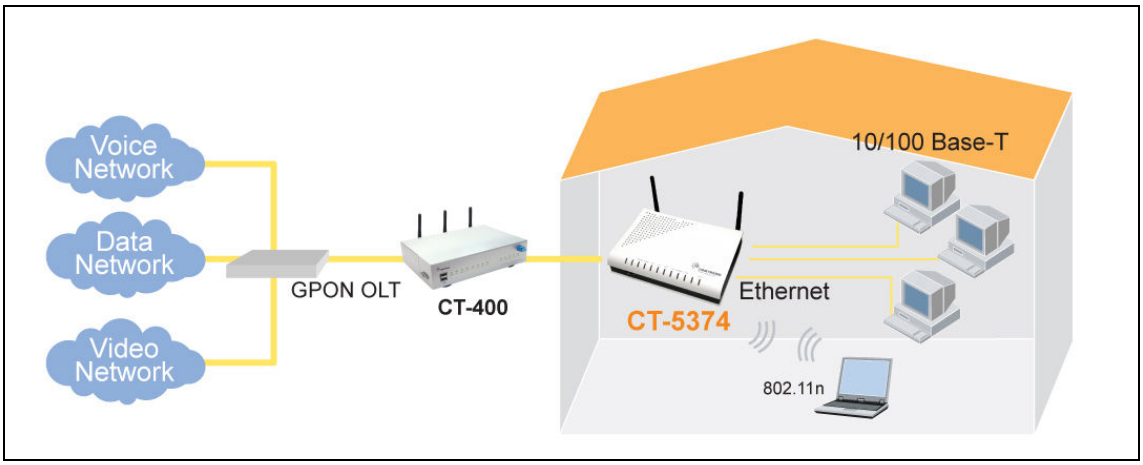
1.1 Features

- Integrated 802.11n AP (802.11b/g backward-compatible)
- VDSL2 17a profile support
- IP and Per-VC packet level QoS
- WPA/WPA2 and 802.1x
- RADIUS client
- Static routing & RIP/RIP v2
- NAT/PAT
- IGMP Proxy and fast leave
- Web-based management
- Supports remote administration
- Configuration backup and restoration
- Firmware upgrade and configuration
- Automatic ADSL2+ / VDSL2 switching based on DSLAM setting
- Auto PVC configuration
- Supports up to 16 VCs
- WMM & UPnP
- IP/MAC filtering
- Dynamic IP assignment
- Parental Control
- DHCP Server/Relay/Client
- DNS Relay/Proxy
- FTP/TFTP server
- TR-069/TR-098/TR-104/TR-111

1.2 Application

The following diagrams depict typical applications of the CT-5374.





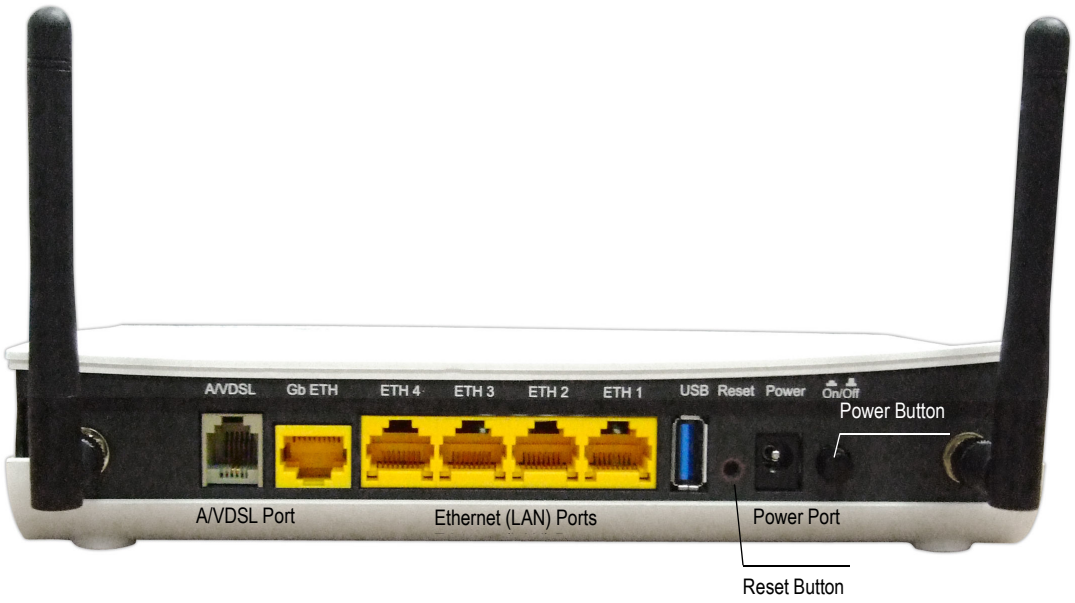
Chapter 2 Installation

2.1 Hardware Setup

Follow the instructions below to complete the hardware setup.

BACK PANEL

The figure below shows the back panel of the device.



Power ON
Press the power button to the OFF position (OUT). Connect the power adapter to the power port. Attach the power adapter to a wall outlet or other AC source. Press the power button to the ON position (IN). If the Power LED displays as expected then the device is ready for setup (see section 2.2 LED Indicators).

Caution 1:	If the device fails to power up, or it malfunctions, first verify that the power cords are connected securely and then power it on again. If the problem persists, contact technical support.
Caution 2:	Before servicing or disassembling this equipment, disconnect all power cords and telephone lines from their outlets.

Reset Button
Restore the default parameters of the device by pressing the Reset button for 5 to 10 seconds. After the device has rebooted successfully, the front panel should display as expected (see section 2.2 LED Indicators for details).

NOTE:	If pressed down for more than 20 seconds, the CT-5374 will go into a firmware update state (CFE boot mode). The firmware can then be updated using an Internet browser pointed to the default IP address.

Ethernet (LAN) Ports
Use 10/100 BASE-T RJ-45 cables to connect up to four network devices. These ports are auto-sensing MDI/X; so either straight-through or crossover cable can be used.

DSL Port
Connect to an ADSL2/2+ or VDSL with this RJ11 Port. This device contains a micro filter which removes the analog phone signal. If you wish, you can connect a regular telephone to the same line by using a POTS splitter.

FRONT PANEL

The Wi-Fi & WPS buttons are located on the bottom-left of the front panel, as shown.

WiFi Switch
Press this button to enable/disable the wireless LAN (WLAN).

WPS Button
Press this button to begin searching for WPS clients. These clients must also enable WPS push button mode (see 6.2.1 WPS for instructions).

2.2 LED Indicators

The front panel LED indicators are shown below and explained in the following table. This information can be used to check the status of the device and its connections.

LED	Color	Mode	Function
INTERNET	Green	On	IP connected and no traffic detected. If an IP or PPPoE session is dropped due to an idle timeout, the light will remain green if an ADSL connection is still present.
		Off	Modem power off, modem in bridged mode or ADSL connection not present. In addition, if an IP or PPPoE session is dropped for any reason, other than an idle timeout, the light is turned off.
		Blink	IP connected and IP Traffic is passing thru the device (either direction)
	Red	On	Device attempted to become IP connected and failed (no DHCP response, no PPPoE response, PPPoE authentication failed, no IP address from IPCP, etc.)
POWER	Green	On	The device is powered up.
		Off	The device is powered down.
	Red	On	POST (Power On Self Test) failure or other malfunction. A malfunction is any error of internal sequence or state that will prevent the device from connecting to the DSLAM or passing customer data.
ETH 1X-4X	Green	On	An Ethernet Link is established.
		Off	An Ethernet Link is not established.
		Blink	Data transmitting or receiving over Ethernet.
WIRELESS	Green	On	The wireless module is ready. (i.e. installed and enabled).
		Off	The wireless module is not ready. (i.e. either not installed or disabled).
		Blink	Data transmitting or receiving over WLAN.
A/DSL	Green	On	xDSL Link is established.
		Off	xDSL Link is not established.
		Blink	fast: xDSL Link is training or data

			transmitting. slow: xDSL training failed.
GbETH	Green (for 10/100 Base-T)	On	Powered device connected to the associated port.
		Off	No activity, modem powered off, no cable or no powered device connected to the associated port.
		Blink	Traffic is passing.
	Amber (for 10/100/1000 Base-T)	On	Powered device connected to the associated port.
		Off	No activity, modem powered off, no cable or no powered device connected to the associated port.
		Blink	Traffic is passing.

Chapter 3 Web User Interface

This section describes how to access the device via the web user interface (WUI) using an Internet browser such as Internet Explorer (version 5.0 and later).

3.1 Default Settings

The factory default settings of this device are summarized below.

- LAN IP address: 192.168.1.1
- LAN subnet mask: 255.255.255.0
- Administrative access (username: **root** , password: **12345**)
- User access (username: **user**, password: **user**)
- Remote (WAN) access (username: **support**, password: **support**)

- WLAN access: **enabled**

Technical Note

During power on, the device initializes all settings to default values. It will then read the configuration profile from the permanent storage section of flash memory. The default attributes are overwritten when identical attributes with different values are configured. The configuration profile in permanent storage can be created via the web user interface or telnet user interface, or other management protocols. The factory default configuration can be restored either by pushing the reset button for more than five seconds until the power indicates LED blinking or by clicking the Restore Default Configuration option in the Restore Settings screen.

3.2 IP Configuration

DHCP MODE

When the CT-5374 powers up, the onboard DHCP server will switch on. Basically, the DHCP server issues and reserves IP addresses for LAN devices, such as your PC.

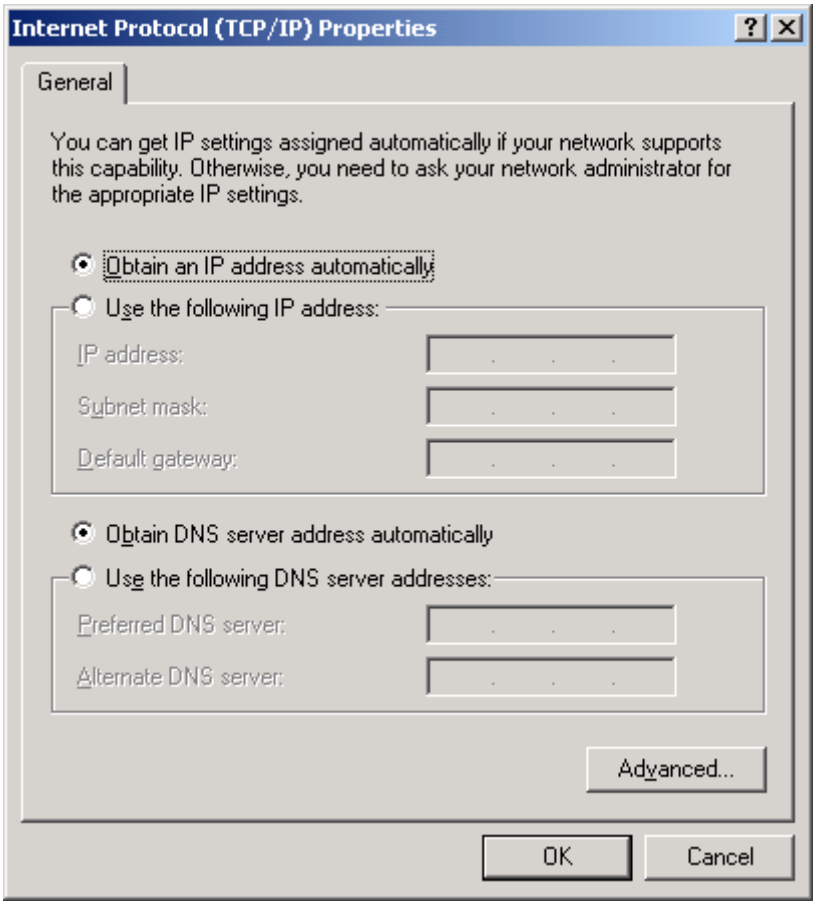
To obtain an IP address from the DCHP server, follow the steps provided below.

NOTE:	The following procedure assumes you are running Windows XP. However, the general steps involved are similar for most operating systems (OS). Check your OS support documentation for further details.

STEP 1: From the Network Connections window, open Local Area Connection (*You may also access this screen by double-clicking the Local Area Connection icon on your taskbar*). Click the **Properties** button.

STEP 2: Select Internet Protocol (TCP/IP) **and click the** Properties button.

STEP 3: Select Obtain an IP address automatically as shown below.



STEP 4: Click **OK** to submit these settings.

If you experience difficulty with DHCP mode, you can try static IP mode instead.

STATIC IP MODE

In static IP mode, you assign IP settings to your PC manually.

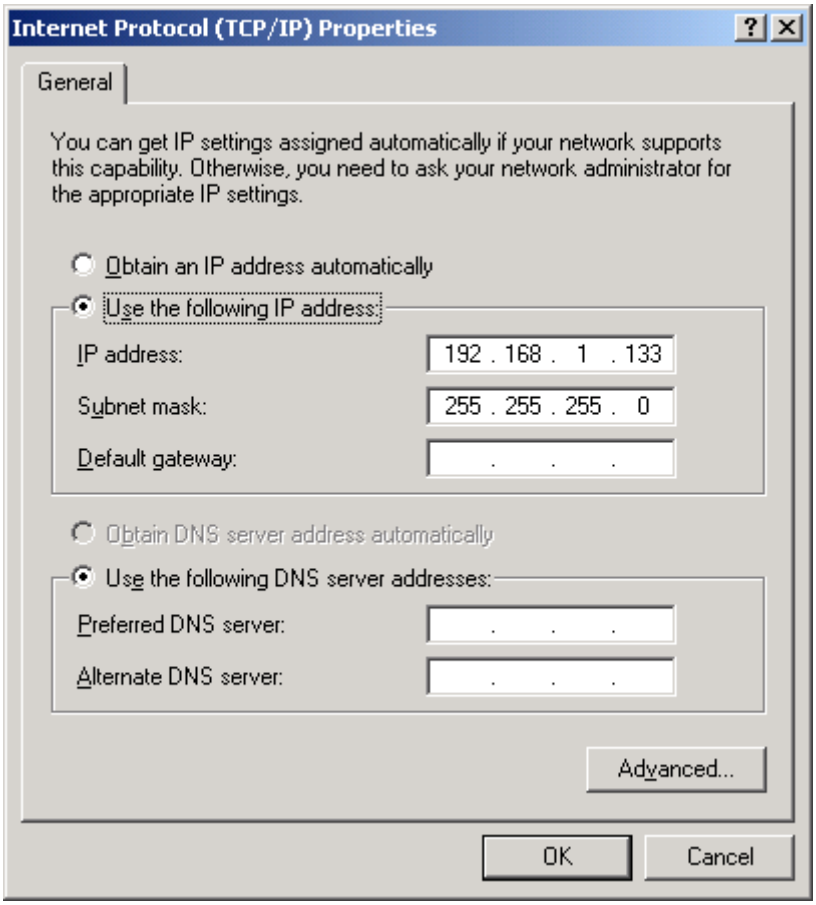
Follow these steps to configure your PC IP address to use subnet 192.168.1.x.

NOTE:	The following procedure assumes you are running Windows XP. However, the general steps involved are similar for most operating systems (OS). Check your OS support documentation for further details.

STEP 1: From the Network Connections window, open Local Area Connection (*You may also access this screen by double-clicking the Local Area Connection icon on your taskbar*). Click the **Properties** button.

STEP 2: Select Internet Protocol (TCP/IP) **and click the** Properties button.

STEP 3: Change the IP address to the 192.168.1.x (1<x<255) subnet with subnet mask of 255.255.255.0. The screen should now display as shown below.



STEP 4: Click **OK** to submit these settings.

3.3 Login Procedure

Perform the following steps to login to the web user interface.

NOTE:	The default settings can be found in 3.1 Default Settings.

STEP 1: Start the Internet browser and enter the default IP address for the device in the Web address field. For example, if the default IP address is 192.168.1.1, type http://192.168.1.1.

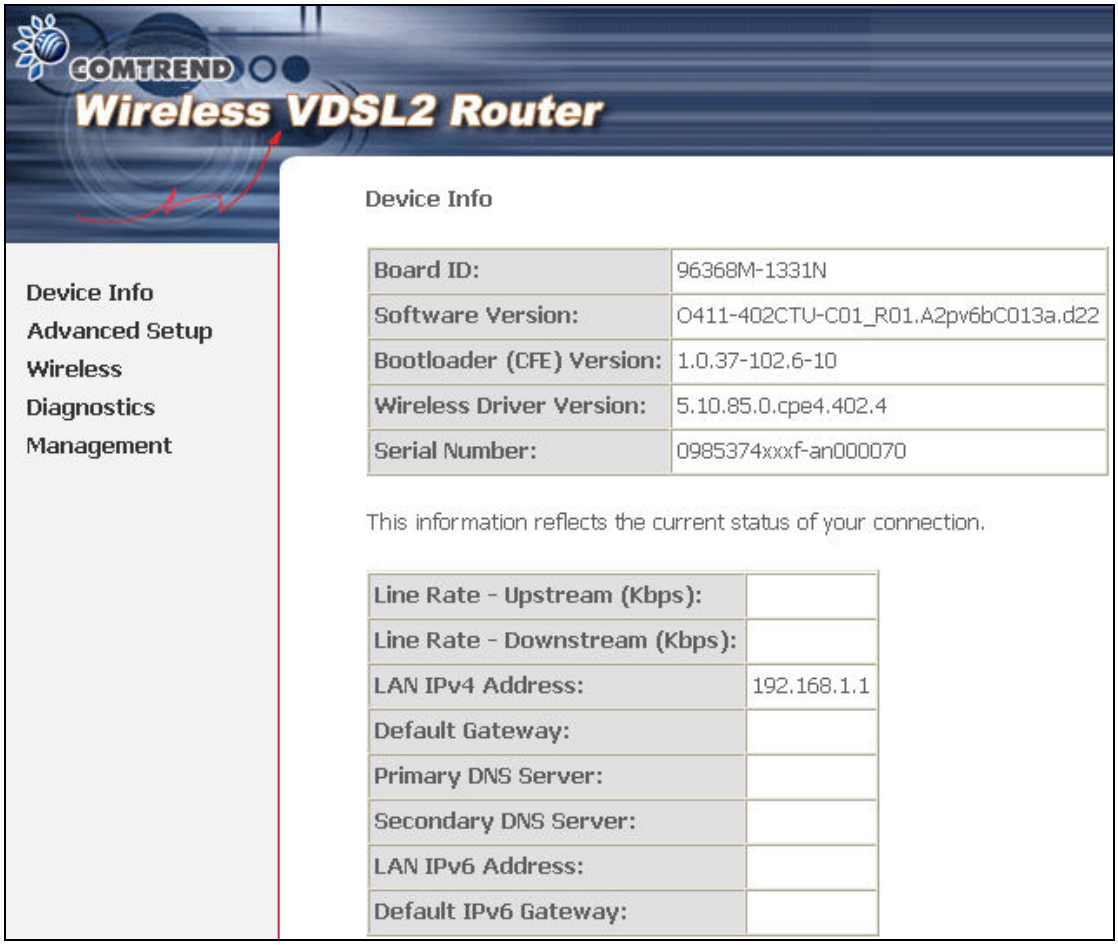
NOTE:	For local administration (i.e. LAN access), the PC running the browser must be attached to the Ethernet, and not necessarily to the device. For remote access (i.e. WAN), use the IP address shown on the Chapter 4 Device Information screen and login with remote username and password.

STEP 2: A dialog box will appear, such as the one below. Enter the default username and password, as defined in section 3.1 Default Settings.

Click **OK** to continue.

NOTE:	The login password can be changed later (see 8.6.1Passwords).

STEP 3: After successfully logging in for the first time, you will reach this screen.



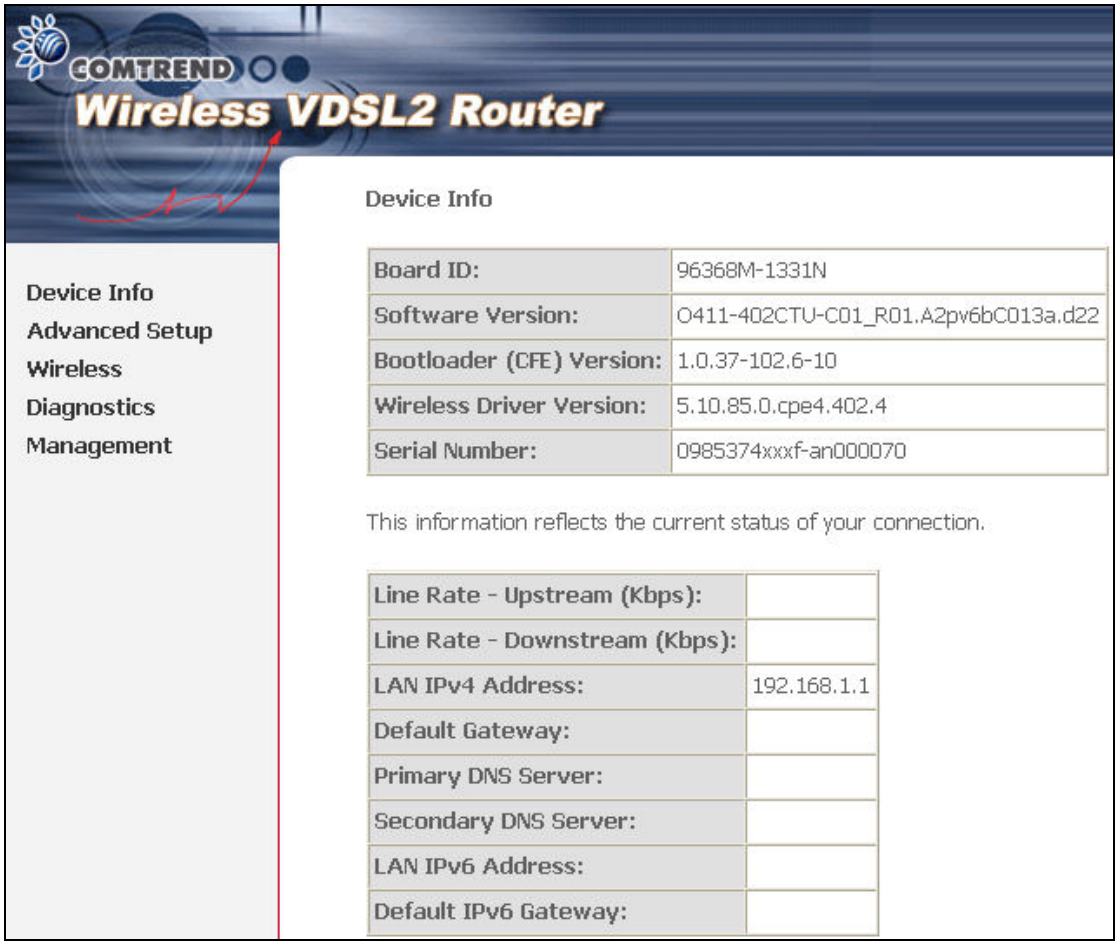
Chapter 4 Device Information

The web user interface window is divided into two frames, the main menu (at left) and the display screen (on the right). The main menu has several options and selecting each of these options opens a submenu with more selections.

NOTE:	The menu items shown are based upon the configured connection(s) and user account privileges. For example, if NAT and Firewall are enabled, the main menu will display the NAT and Security submenus. If either is disabled, their corresponding menu(s) will also be disabled.

Device Info is the first selection on the main menu so it will be discussed first. Subsequent chapters will introduce the other main menu options in sequence.

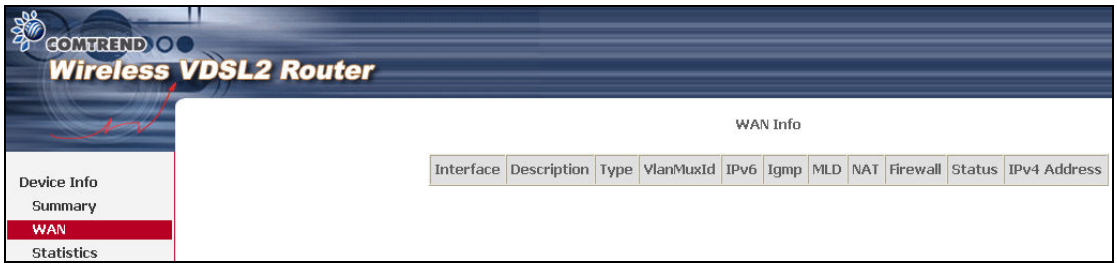
The Device Info Summary screen displays at startup.



This screen shows hardware, software, IP settings and other related information.

4.1 WAN

Select WAN from the Device Info submenu to display the configured PVC(s).



Heading	Description
Interface	Name of the interface for WAN
Description	Name of the WAN connection
Type	Shows the connection type
VlanMuxId	Shows 802.1Q VLAN ID
IPv6	Shows WAN IPv6 address
IGMP	Shows Internet Group Management Protocol (IGMP) status
MLD	Shows Multicast Listener Discovery (MLD) status
NAT	Shows Network Address Translation (NAT) status
Firewall	Shows the status of Firewall
Status	Lists the status of DSL link
IPv4 Address	Shows WAN IPv4 address

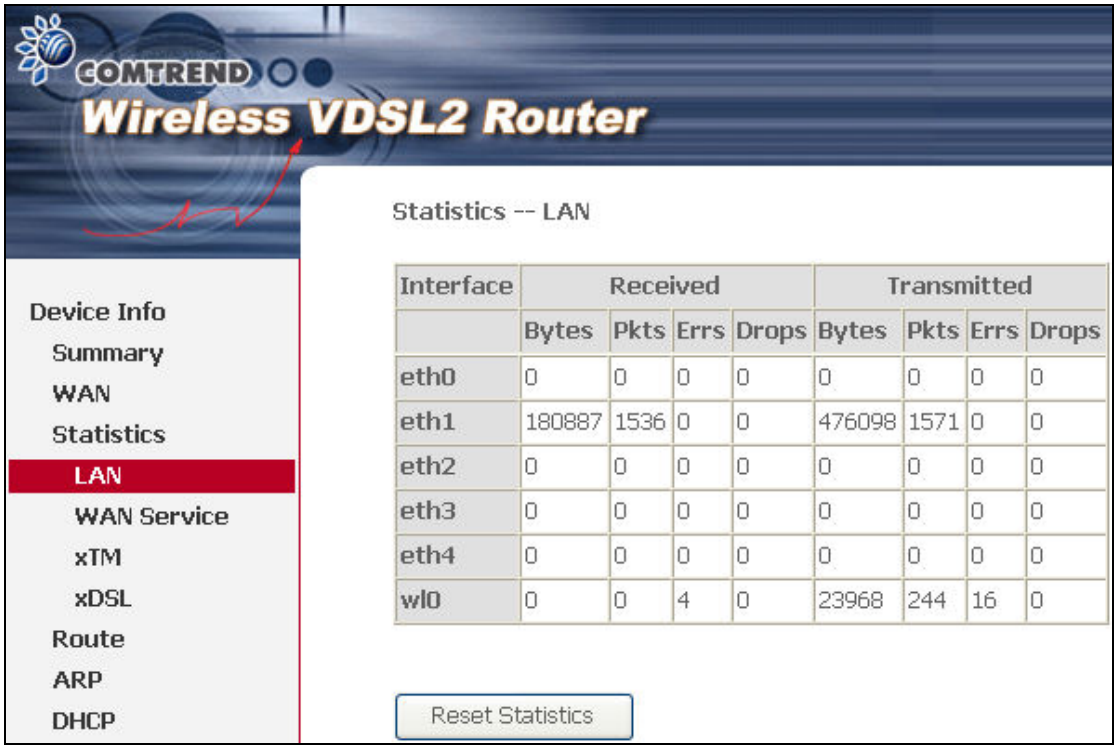
4.2 Statistics

This selection provides LAN, WAN, ATM/PTM and xDSL statistics.

NOTE:	These screens are updated automatically every 15 seconds. Click **Reset Statistics** to perform a manual update.

4.2.1 LAN Statistics

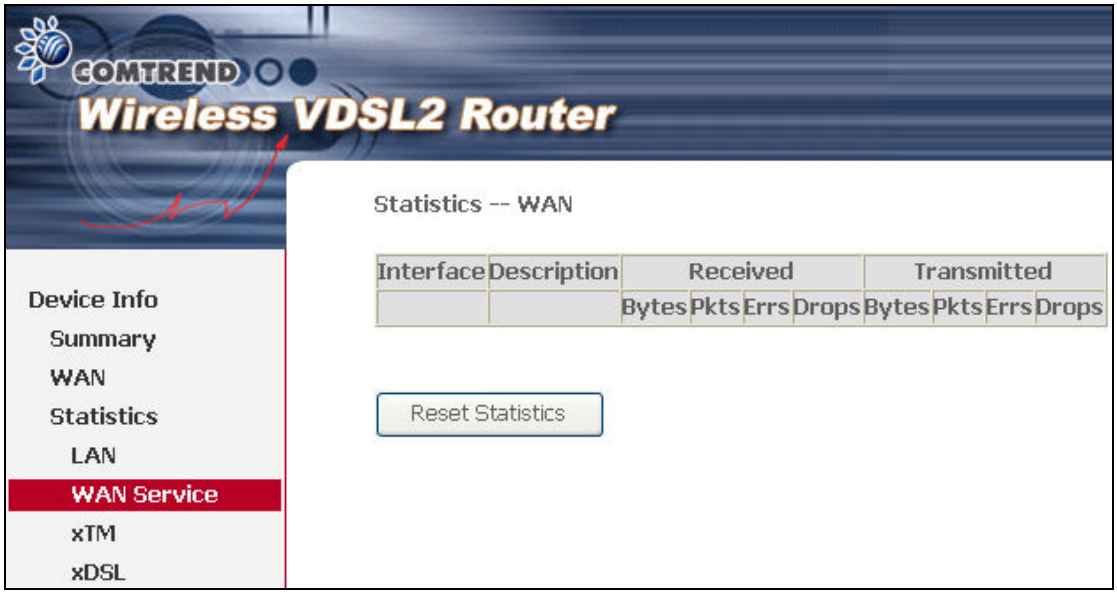
This screen shows data traffic statistics for each LAN interface.



Heading	Description
Interface	LAN interface(s)
Received/Transmitted: - Bytes - Pkts - Errs - Drops	Number of Bytes Number of Packets Number of packets with errors Number of dropped packets

4.2.2 WAN Statistics

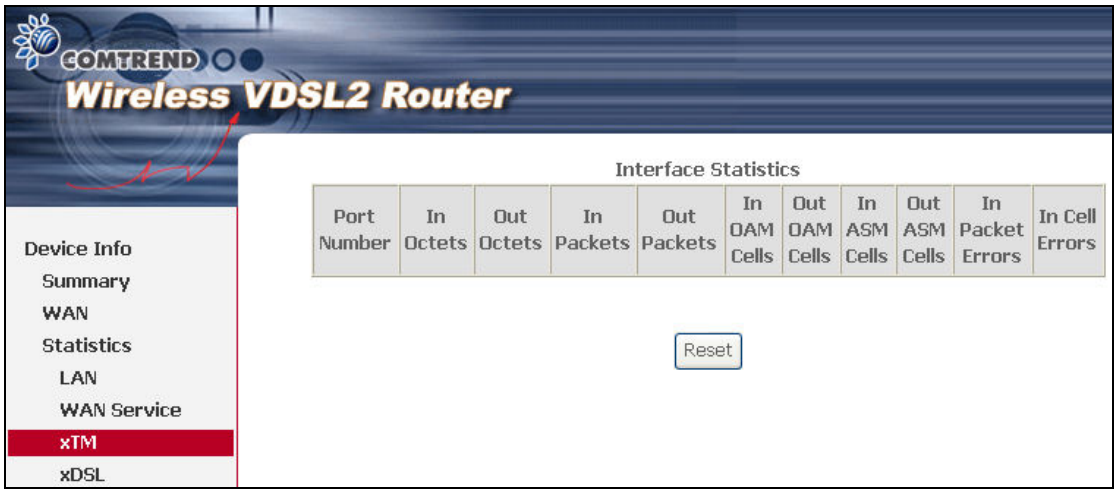
This screen shows data traffic statistics for each WAN interface.



Heading	Description
Interface	WAN interfaces
Description	WAN service label
Received/Transmitted - Bytes - Pkts - Errs - Drops	Number of Bytes Number of Packets Number of packets with errors Number of dropped packets

4.2.3 ATM Statistics

The following figure shows Asynchronous Transfer Mode (ATM) statistics.



ATM Interface Statistics

Heading	Description
Port Number	ATM PORT (0-3)
In Octets	Number of received octets over the interface

Heading	Description
Out Octets	Number of transmitted octets over the interface
In Errors	Number of cells dropped due to uncorrectable HEC errors
In Unknown	Number of received cells discarded during cell header validation, including cells with unrecognized VPI/VCI values, and cells with invalid cell header patterns. If cells with undefined PTI values are discarded, they are also counted here.
In Hec Errors	Number of cells received with an ATM Cell Header HEC error
In Invalid Vpi Vci Errors	Number of cells received with an unregistered VCC address.
In Port Not Enable Errors	Number of cells received on a port that has not been enabled.
In PTI Errors	Number of cells received with an ATM header Payload Type Indicator (PTI) error
In Idle Cells	Number of idle cells received
In Circuit Type Errors	Number of cells received with an illegal circuit type
In OAM RM CRC Errors	Number of OAM and RM cells received with CRC errors
In GFC Errors	Number of cells received with a non-zero GFC.

AAL5 Interface Statistics

Heading	Description
In Octets	Number of received AAL5/AAL0 CPCS PDU octets
Out Octets	Number of received AAL5/AAL0 CPCS PDU octets transmitted
In Ucast Pkts	Number of received AAL5/AAL0 CPCS PDUs passed to a higher-layer for transmission
Out Ucast Pkts	Number of received AAL5/AAL0 CPCS PDUs received from a higher layer for transmission
In Errors	Number of received AAL5/AAL0 CPCS PDUs received that contain an error. These errors include CRC-32 errors.
Out Errors	Number of received AAL5/AAL0 CPCS PDUs that could not be transmitted due to errors.
In Discards	Number of received AAL5/AAL0 CPCS PDUs discarded due to an input buffer overflow condition.
Out Discards	This field is not currently used

AAL5 VCC Statistics

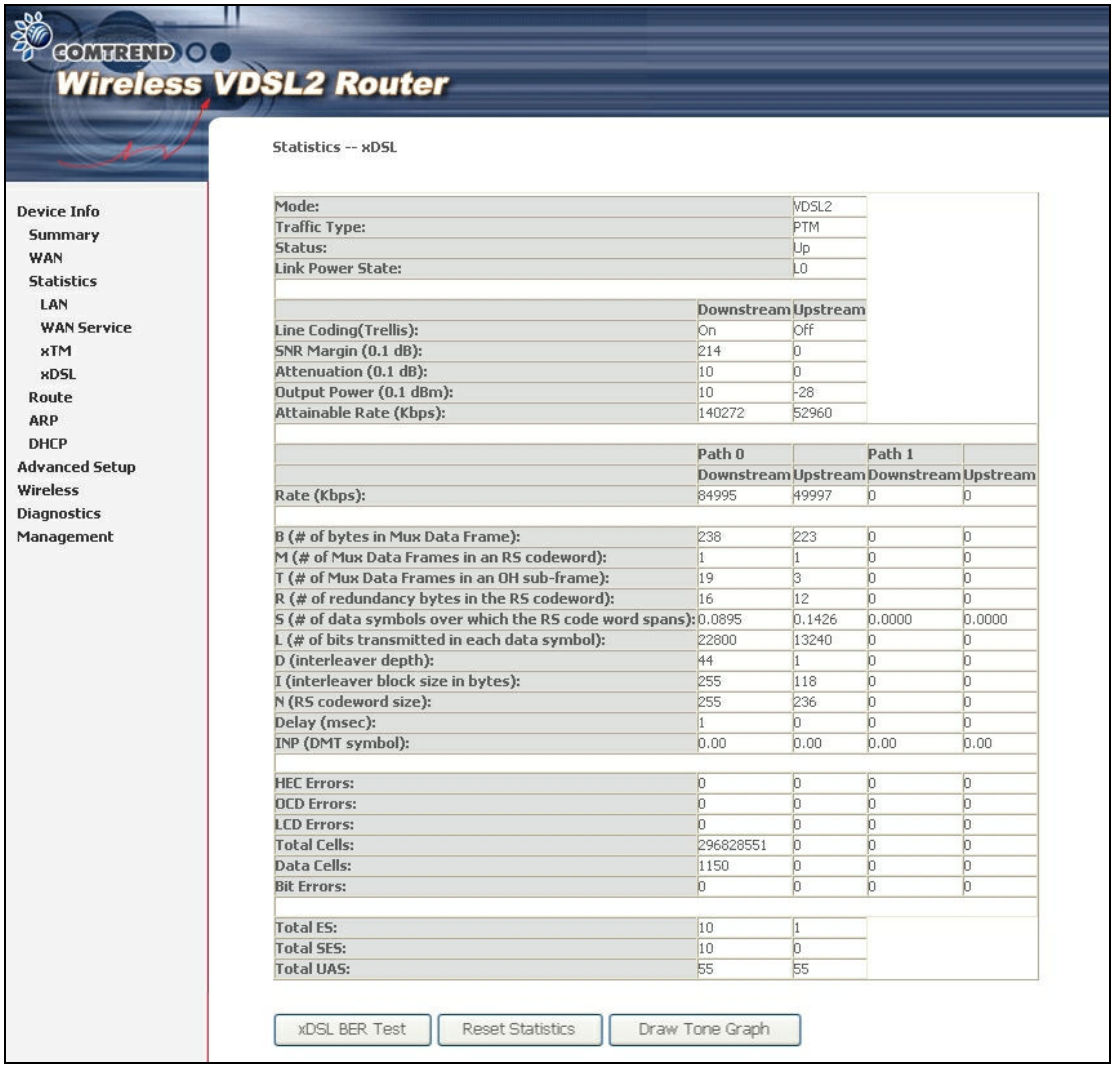
Heading	Description
VPI/VCI	ATM Virtual Path/Channel Identifiers
CRC Errors	Number of PDUs received with CRC-32 errors
SAR Timeouts	Number of partially re-assembled PDUs that were discarded because they were not fully re-assembled within the required period of time. If the re-assembly time is not supported, then this object contains a zero value.

Heading	Description
Oversized SDUs	Number of PDUs discarded because the corresponding SDU was too large
Short Packet Errors	Number of PDUs discarded because the PDU length was less than the size of the AAL5 trailer
Length Errors	Number of PDUs discarded because the PDU length did not match the length in the AAL5 trailer

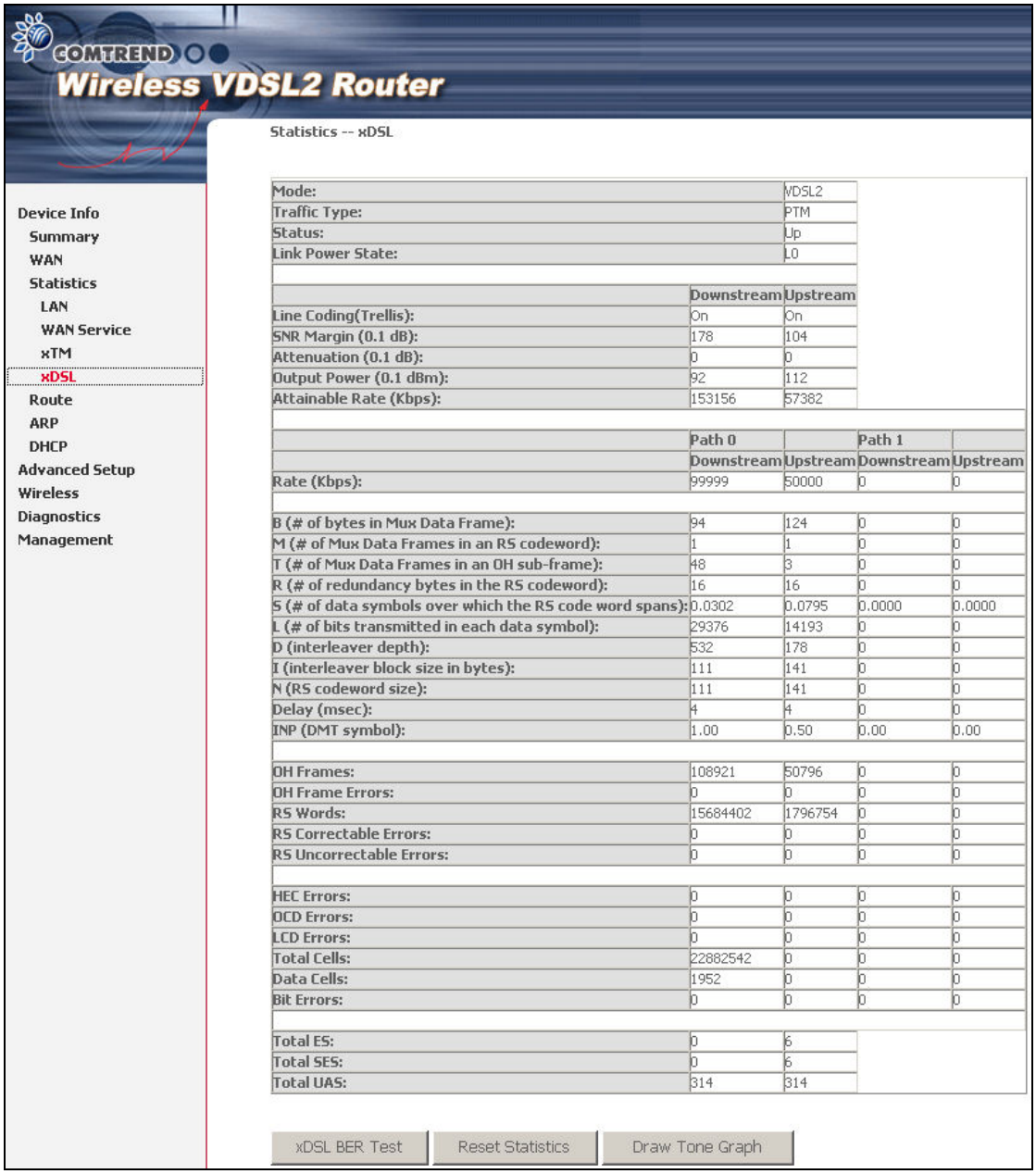
4.2.4 xDSL Statistics

The xDSL Statistics screen displays information corresponding to the xDSL type. The two examples below (VDSL & ADSL) show this variation.

VDSL



ADSL



Click the **Reset Statistics** button to refresh this screen.

Field	Description
Mode	G.Dmt, G.lite, T1.413, ADSL2, ADSL2+,VDSL, VDSL2
Traffic Type	Channel type Interleave or Fast
Status	Lists the status of the DSL link
Link Power State	Link output power state.

Line Coding (Trellis)	Trellis On/Off
SNR Margin (0.1 dB)	Signal to Noise Ratio (SNR) margin
Attenuation (0.1 dB)	Estimate of average loop attenuation in the downstream direction.
Output Power (0.1 dBm)	Total upstream output power
Attainable Rate (Kbps)	The sync rate you would obtain.
Rate (Kbps)	Current sync rates downstream/upstream

In VDSL mode, the following section is inserted.

B	Number of bytes in Mux Data Frame
M	Number of Mux Data Frames in a RS codeword
T	Number of Mux Data Frames in an OH sub-frame
R	Number of redundancy bytes in the RS codeword
S	Number of data symbols the RS codeword spans
L	Number of bits transmitted in each data symbol
D	The interleaver depth
I	The interleaver block size in bytes
N	RS codeword size
Delay	The delay in milliseconds (msec)
INP	DMT symbol

In ADSL2+ mode, the following section is inserted.

MSGc	Number of bytes in overhead channel message
B	Number of bytes in Mux Data Frame
M	Number of Mux Data Frames in FEC Data Frame
T	Mux Data Frames over sync bytes
R	Number of check bytes in FEC Data Frame
S	Ratio of FEC over PMD Data Frame length
L	Number of bits in PMD Data Frame
D	The interleaver depth
Delay	The delay in milliseconds (msec)
INP	DMT symbol

In G.DMT mode, the following section is inserted.

K	Number of bytes in DMT frame
R	Number of check bytes in RS code word
S	RS code word size in DMT frame
D	The interleaver depth
Delay	The delay in milliseconds (msec)

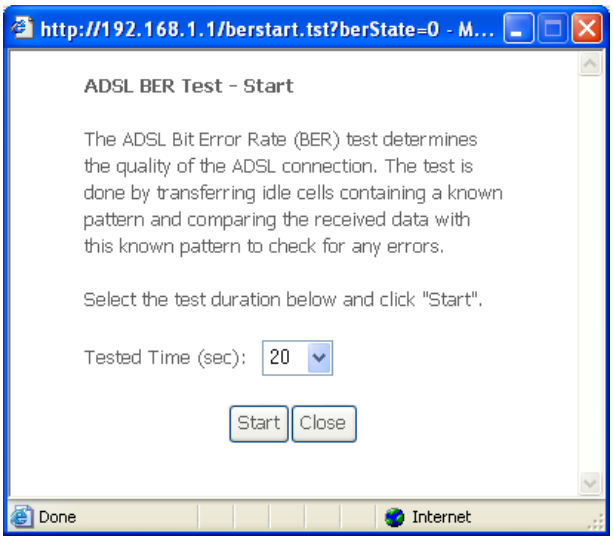
OH Frames	Total number of OH frames
OH Frame Errors	Number of OH frames received with errors
RS Words	Total number of Reed-Solomon code errors
RS Correctable Errors	Total Number of RS with correctable errors
RS Uncorrectable Errors	Total Number of RS words with uncorrectable errors

HEC Errors	Total Number of Header Error Checksum errors
OCD Errors	Total Number of Out-of-Cell Delineation errors
LCD Errors	Total number of Loss of Cell Delineation
Total Cells	Total number of ATM cells (including idle + data cells)
Data Cells	Total number of ATM data cells
Bit Errors	Total number of bit errors

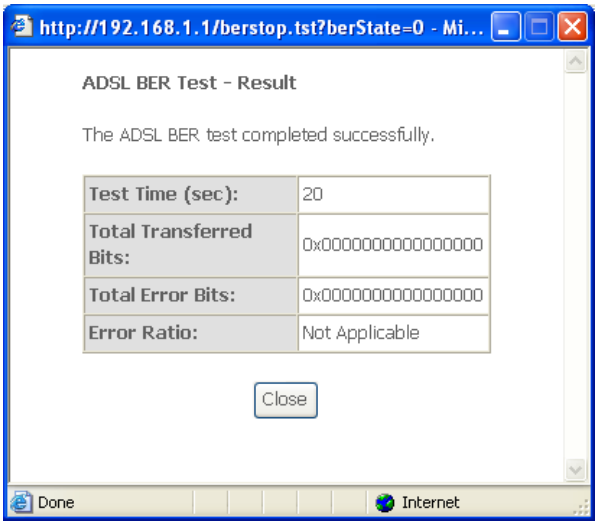
Total ES	Total Number of Errored Seconds
Total SES	Total Number of Severely Errored Seconds
Total UAS	Total Number of Unavailable Seconds

xDSL BER TEST

Click **xDSL BER Test** on the xDSL Statistics screen to test the Bit Error Rate (BER). A small pop-up window will open after the button is pressed, as shown below.

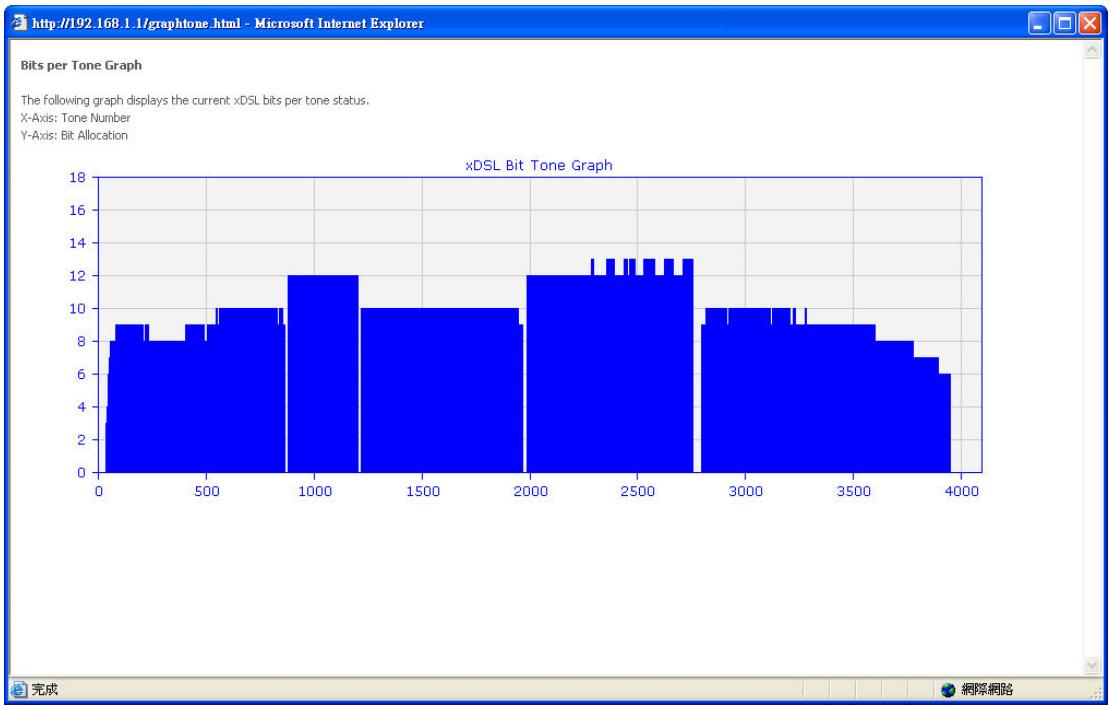


Click **Start** to start the test or click **Close** to cancel the test. After the BER testing is complete, the pop-up window will display as follows.


http://192.168.1.1/berstop.tst?berState=0 - Mi...
ADSL BER Test - Result
The ADSL BER test completed successfully.
Test Time (sec): 20
Total Transferred Bits: 0x0000000000000000
Total Error Bits: 0x0000000000000000
Error Ratio: Not Applicable
Close
Done
Internet

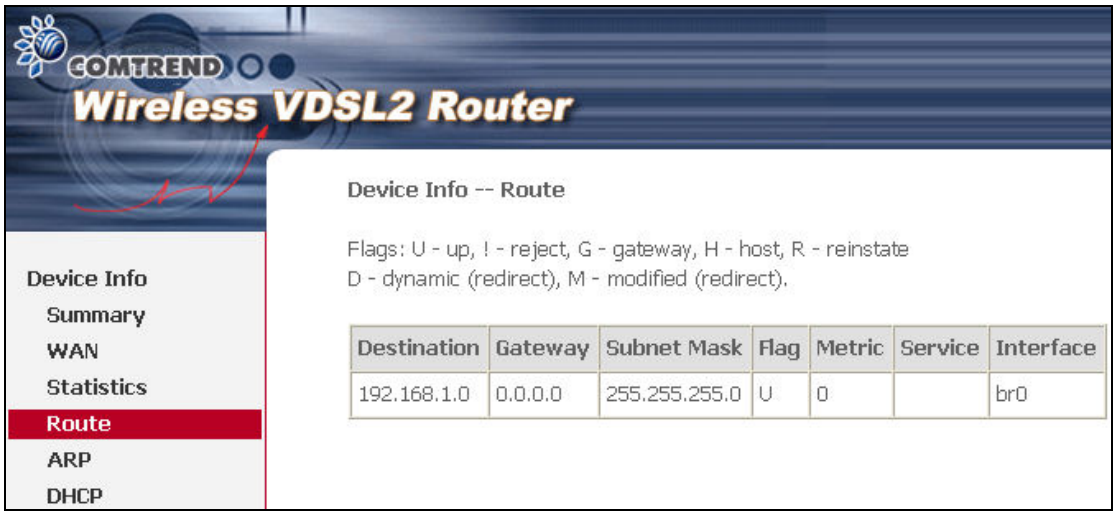
xDSL TONE GRAPH

Click **Draw Tone Graph** on the xDSL Statistics screen and a pop-up window will display the xDSL bits per tone status, as shown below.



4.3 Route

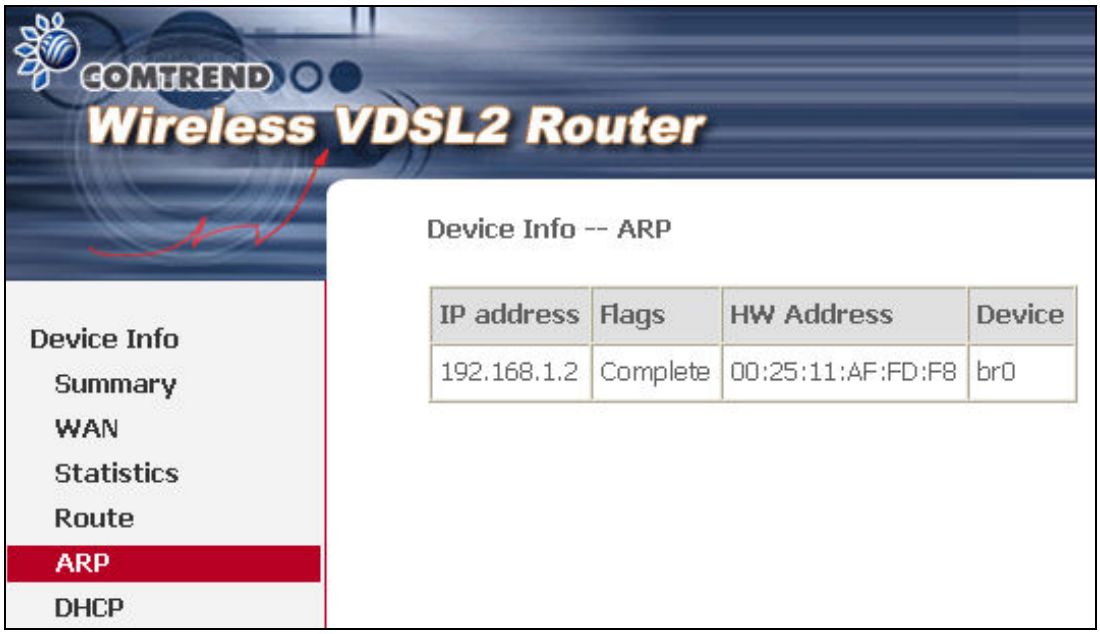
Choose **Route** to display the routes that the CT-5374 has found.



Field	Description
Destination	Destination network or destination host
Gateway	Next hub IP address
Subnet Mask	Subnet Mask of Destination
Flag	U: route is up !: reject route G: use gateway H: target is a host R: reinstate route for dynamic routing D: dynamically installed by daemon or redirect M: modified from routing daemon or redirect
Metric	The 'distance' to the target (usually counted in hops). It is not used by recent kernels, but may be needed by routing daemons.
Service	Shows the WAN connection label
Interface	Shows connection interfaces

4.4 ARP

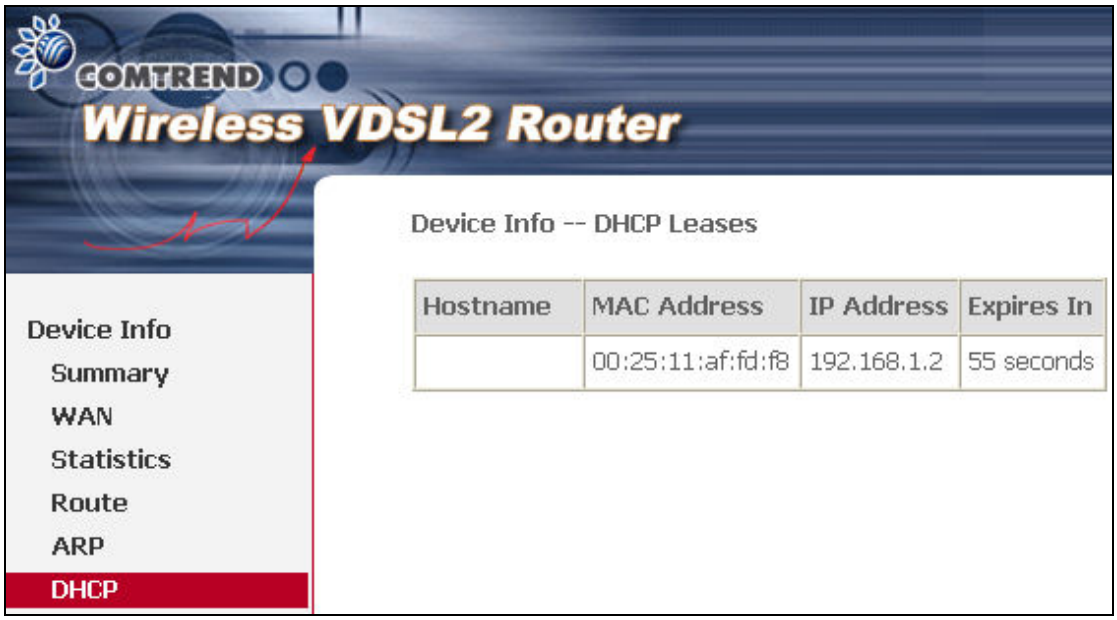
Click **ARP** to display the ARP information.



Field	Description
IP address	Shows IP address of host pc
Flags	Complete, Incomplete, Permanent, or Publish
HW Address	Shows the MAC address of host pc
Device	Shows the connection interface

4.5 DHCP

Click **DHCP** to display all DHCP Leases.



Field	Description
Hostname	Shows the device/host/PC network name
MAC Address	Shows the Ethernet MAC address of the device/host/PC
IP Address	Shows IP address of device/host/PC
Expires In	Shows how much time is left for each DHCP Lease

Chapter 5 Advanced Setup

Click on the link to jump to a specific section:

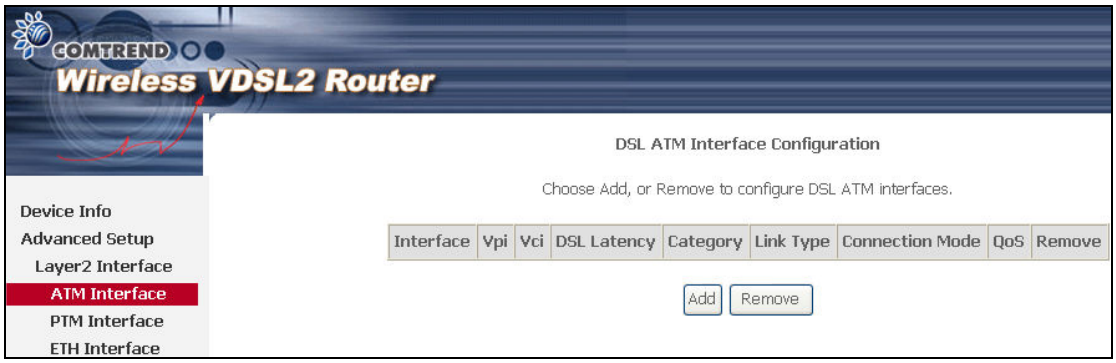
5.1 Layer 2 Interface	5.9 Routing
5.2 WAN	5.10 DNS
5.3 LAN	5.11 DSL
5.4 IPv6 LAN Host	5.12 UPnP
5.5 NAT	5.13 Print Server
5.6 Security	5.14 Interface Grouping
5.7 Parental Control	5.15 Certificate
5.8 Quality of Service (QoS)	5.16 Power Management

5.1 Layer 2 Interface

The ATM, PTM and ETH WAN interface screens are described here.

5.1.1 ATM Interface

Add or remove ATM interface connections here.



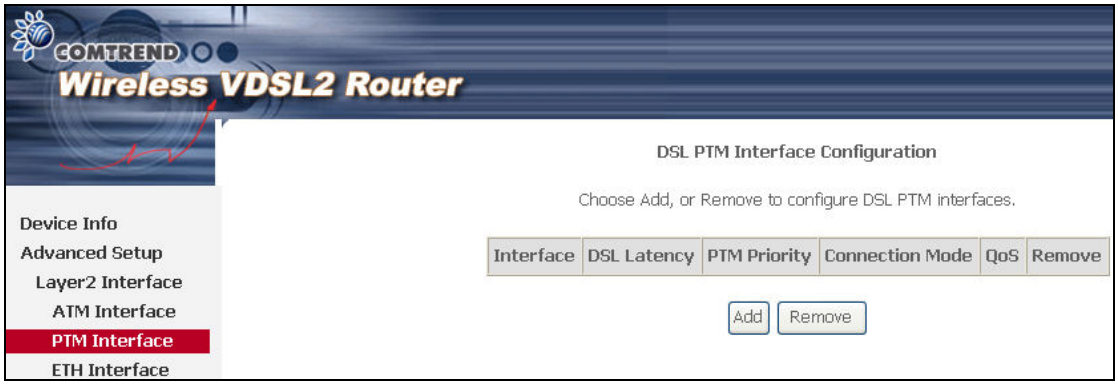
Click **Add** to create a new ATM interface (see Appendix G).

NOTE: Up to 8 ATM interfaces can be created and saved in flash memory.

To remove a connection, select its Remove column radio button and click **Remove**.

5.1.2 PTM Interface

Add or remove PTM interface connections here.

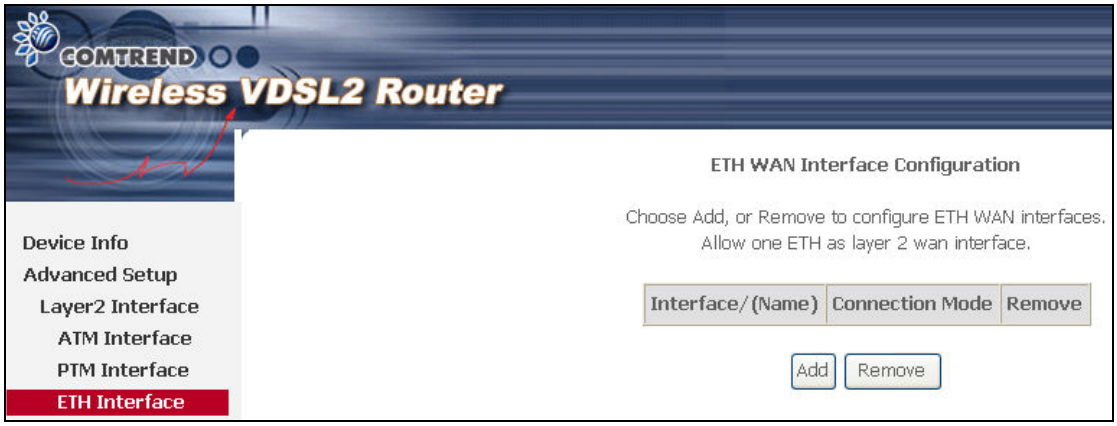


Click **Add** to create a new connection (see Appendix G - Connection Setup). To remove a connection, select its Remove column radio button and click **Remove**.

5.1.3 ETH WAN INTERFACE

This screen displays the Ethernet WAN Interface configuration.

NOTE:	This option only applies to models with an Ethernet WAN port.



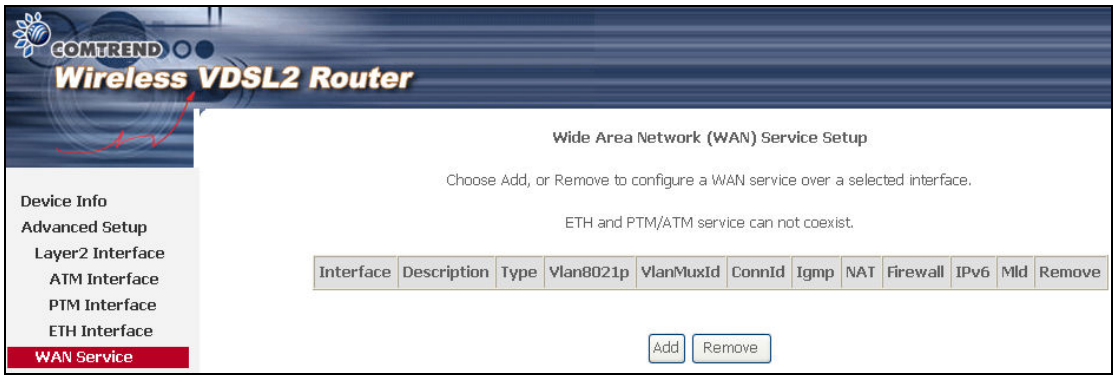
Click **Add** to create a new connection (see Appendix G - Connection Setup).

NOTE:	One Ethernet WAN interface can be created and saved in flash memory.

To remove a connection, select its Remove column radio button and click **remove.**

5.2 WAN

This screen allows for the configuration of WAN interfaces.



Click the **Add** button to create a new connection. For connections on ATM or ETH WAN interfaces see Appendix G - Connection Setup.

NOTE:	ETH and ATM service connections cannot coexist. In Default Mode, up to 8 WAN connections can be configured; while VLAN Mux and MSC Connection Modes support up to 16 WAN connections.

To remove a connection, select its Remove column radio button and click **Remove.**

Heading	Description
Interface	Name of the interface for WAN
Description	Name of the WAN connection
Type	Shows the connection type
Vlan8021p	VLAN ID is used for VLAN Tagging (IEEE 802.1Q)
VlanMuxId	Shows 802.1Q VLAN ID
ConnId	Connection ID
IGMP	Shows Internet Group Management Protocol (IGMP) status
NAT	Shows Network Address Translation (NAT) status
Firewall	Shows the Security status
IPv6	Shows the WAN IPv6 address
MLD	Shows Multicast Listener Discovery (MLD) status
Remove	Select interfaces to remove

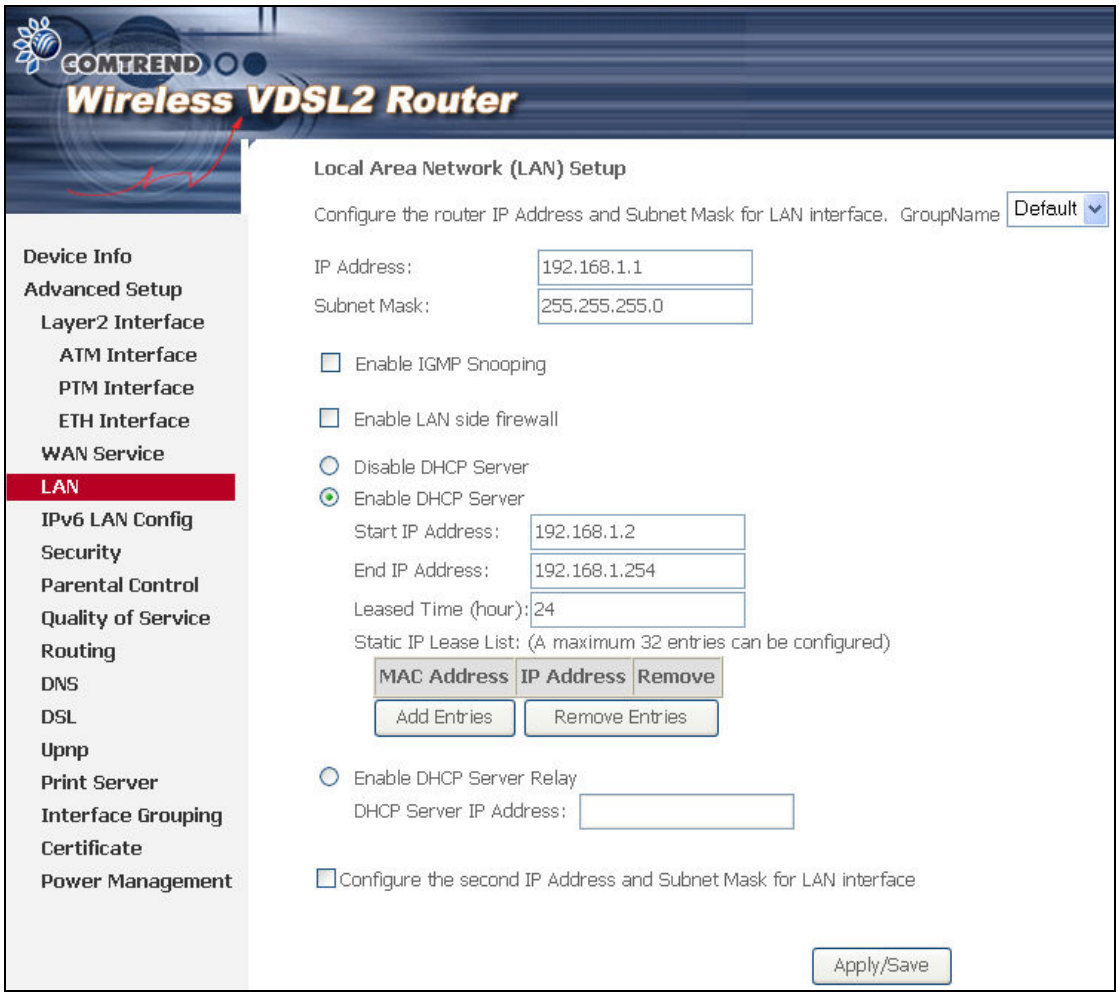
To remove a connection, select its Remove column radio button and click **Remove.**

To **Add** a new WAN connection, click the **Add** button and follow the instructions.

NOTE:	Up to 16 PVC profiles can be configured and saved in flash memory. Also, ETH and PTM/ATM service connections cannot coexist.

5.3 LAN

Configure the LAN interface settings and then click **Apply/Save**.



Consult the field descriptions below for more details.

GroupName: Select an Interface Group.

1st LAN INTERFACE

IP Address: Enter the IP address for the LAN port.

Subnet Mask: Enter the subnet mask for the LAN port.

Enable IGMP Snooping: Enable by ticking the checkbox ☑.

Standard Mode: In standard mode, multicast traffic will flood to all bridge ports when no client subscribes to a multicast group – even if IGMP snooping is enabled.

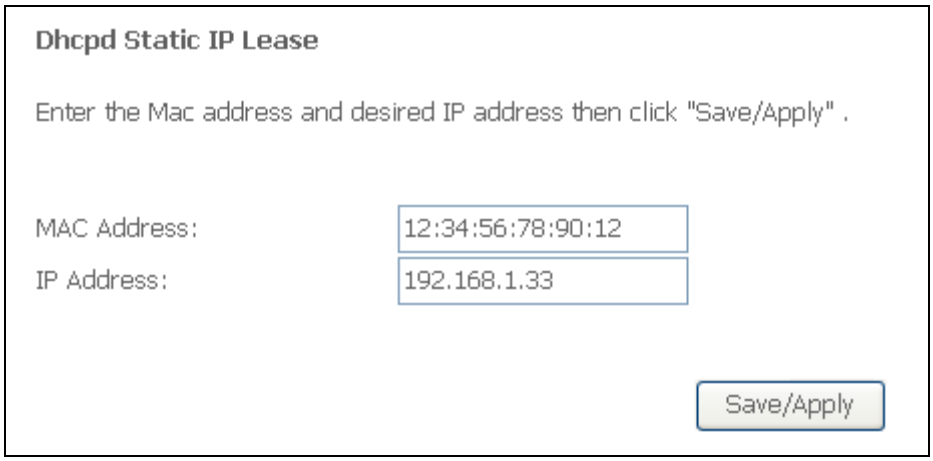
Blocking Mode: In blocking mode, the multicast data traffic will be blocked and not flood to all bridge ports when there are no client subscriptions to any multicast group.

Enable LAN side firewall: Enable by ticking the checkbox ☑.

DHCP Server: To enable DHCP, select **Enable DHCP server** and enter Start and End IP addresses and the Leased Time. This setting configures the router to automatically assign IP, default gateway and DNS server addresses to every PC on your LAN.

Static IP Lease List: A maximum of 32 entries can be configured.

To add an entry, enter MAC address and Static IP and then click **Save/Apply**.

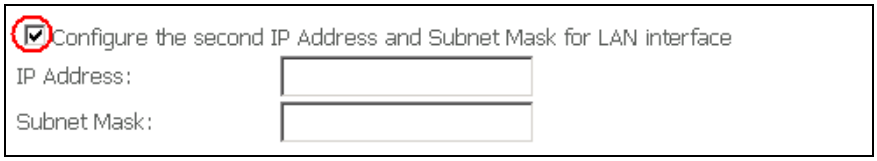


To remove an entry, tick the corresponding checkbox ☑ in the Remove column and then click the **Remove Entries** button, as shown below.

DHCP Server Relay: Enable with checkbox ☑ and enter DHCP Server IP address. This allows the Router to relay the DHCP packets to the remote DHCP server. The remote DHCP server will provide the IP address. *This option is hidden if NAT is enabled or when the router is configured with only one Bridge PVC.*

2ND LAN INTERFACE

To configure a secondary IP address, tick the checkbox ☑ outlined (in RED) below.

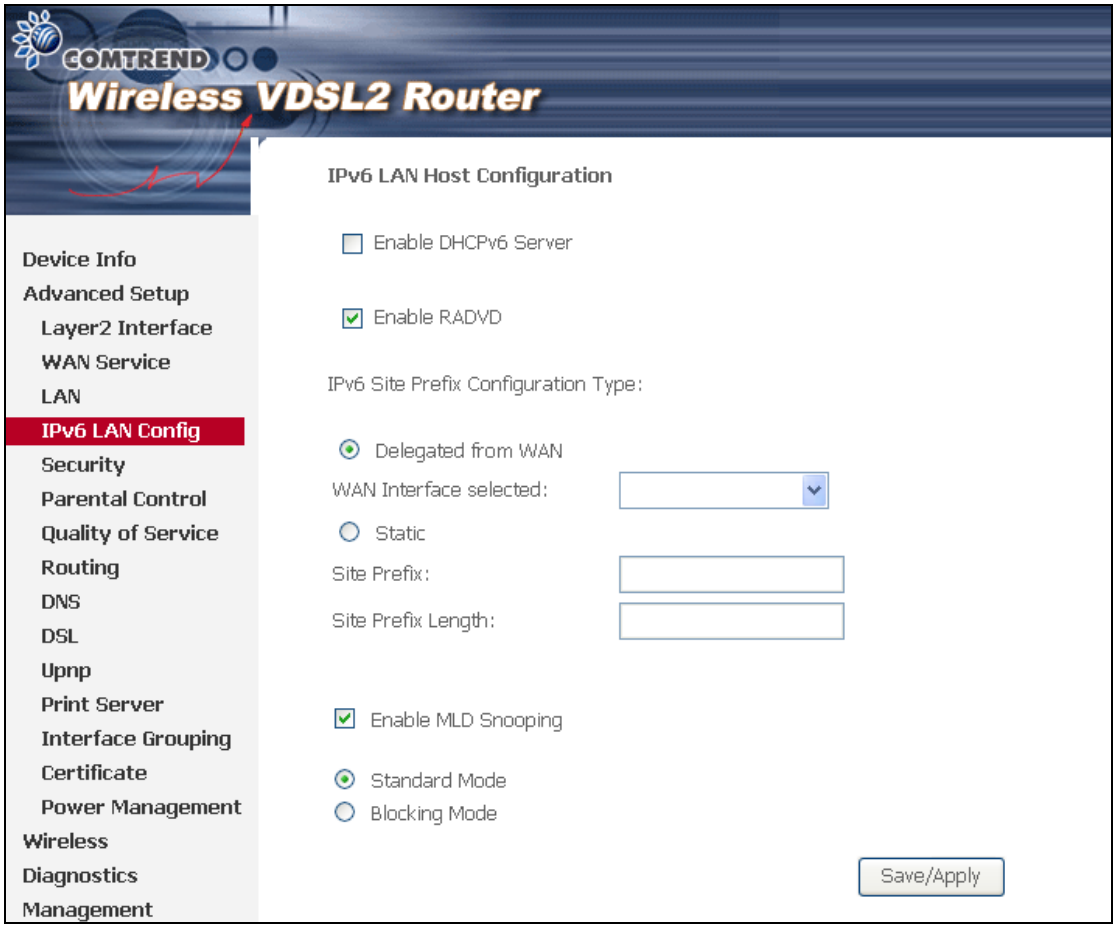


IP Address: Enter the secondary IP address for the LAN port.

Subnet Mask: Enter the secondary subnet mask for the LAN port.

5.4 IPv6 LAN Host

Configure the IPv6 LAN Host options (see below) and then click **Save/Apply**.



DHCPv6 Server: To enable DHCP for IPv6, select the **Enable DHCPv6 server** checkbox ☑. This setting enables the router to assign IP settings to every IPv6-capable LAN device (IPv6 clients).

RADVD: Select the checkbox ☑ to enable the **R**outer **ADV**ertisement **D**aemon. This provides information that IPv6 clients can use for autoconfiguration according to the Neighbour Discovery for IPv6 protocol (RFC2461).

IPv6 Site Prefix
This setting can be delegated from a WAN Interface or assigned statically.

Enable MLD Snooping: Enable by ticking the checkbox ☑.

Standard Mode: In standard mode, multicast traffic will flood to all bridge ports when no client subscribes to a multicast group – even if snooping is enabled.

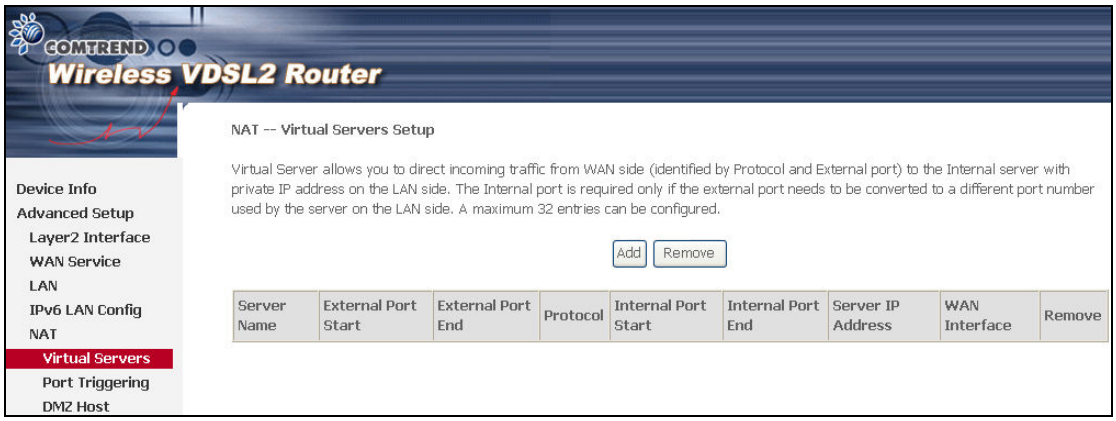
Blocking Mode: In blocking mode, the multicast data traffic will be blocked and not flood to all bridge ports when there are no client subscriptions to any multicast group.

5.5 NAT

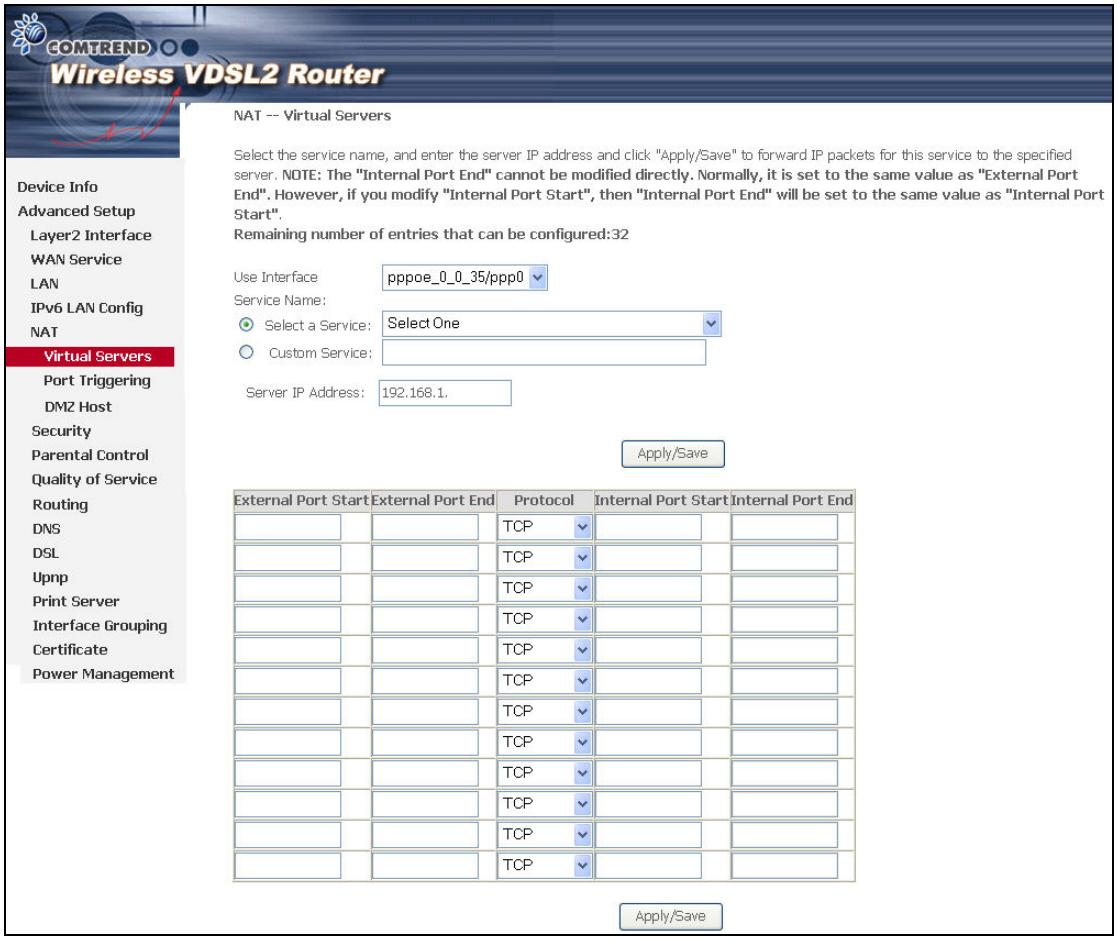
To display this option, NAT must be enabled in at least one PVC shown on the Chapter 5 Advanced Setup - . *NAT is not an available option in Bridge mode*.

5.5.1 Virtual Servers

Virtual Servers allow you to direct incoming traffic from the WAN side (identified by Protocol and External port) to the Internal server with private IP addresses on the LAN side. The Internal port is required only if the external port needs to be converted to a different port number used by the server on the LAN side.
A maximum of 32 entries can be configured.



To add a Virtual Server, click **Add**. The following will be displayed.

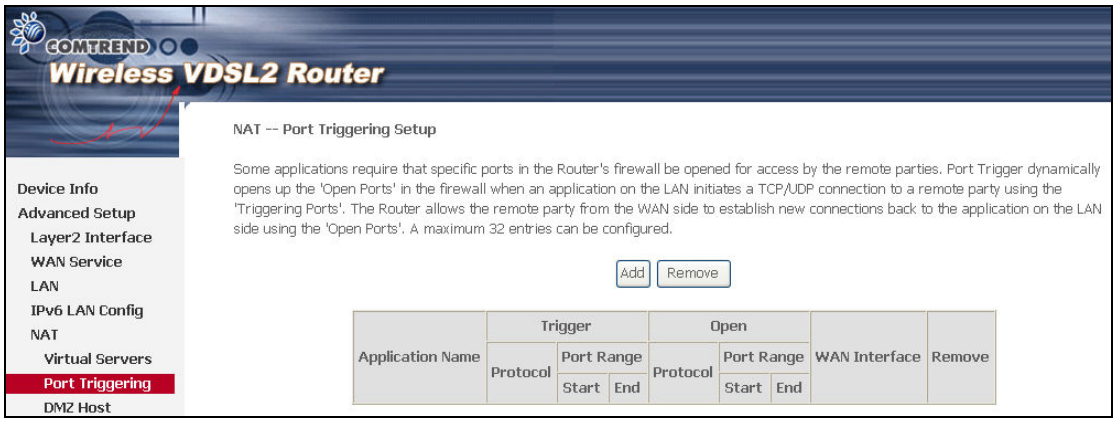


Consult the table below for field and header descriptions.

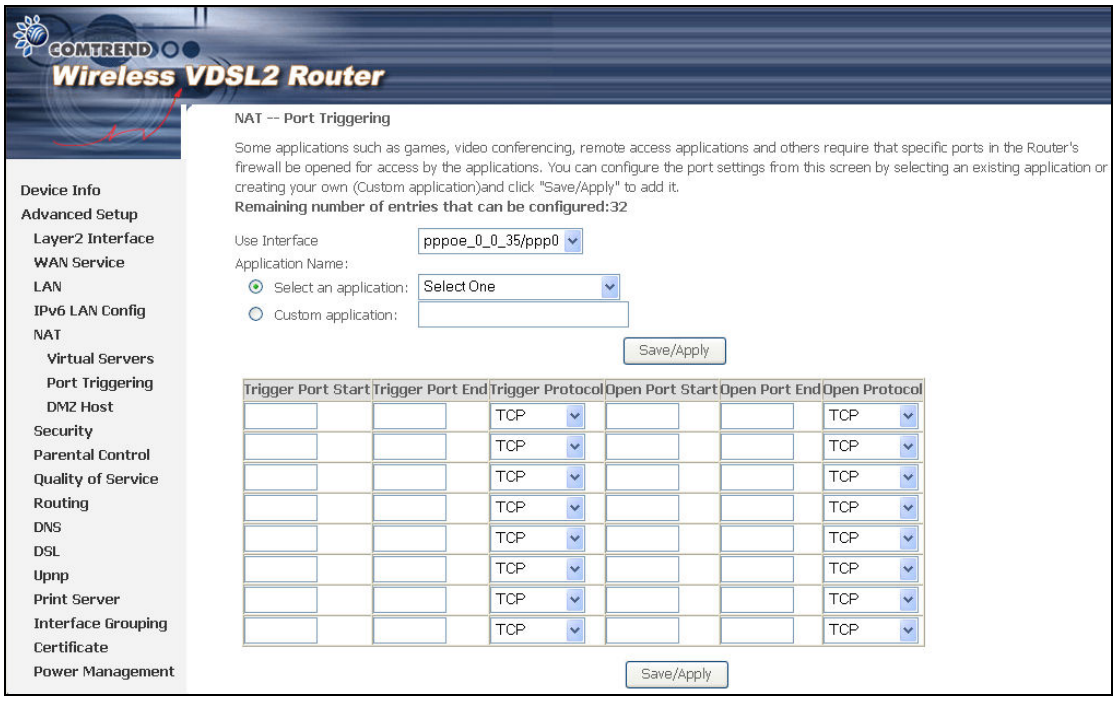
Field/Header	Description
Use Interface	Select a WAN interface from the drop-down box.
Select a Service **Or** Custom Service	User should select the service from the list. **Or** User can enter the name of their choice.
Server IP Address	Enter the IP address for the server.
External Port Start	Enter the starting external port number (when you select Custom Server). When a service is selected, the port ranges are automatically configured.
External Port End	Enter the ending external port number (when you select Custom Server). When a service is selected, the port ranges are automatically configured.
Protocol	TCP, TCP/UDP, or UDP.
Internal Port Start	Enter the internal port starting number (when you select Custom Server). When a service is selected the port ranges are automatically configured
Internal Port End	Enter the internal port ending number (when you select Custom Server). When a service is selected, the port ranges are automatically configured.

5.5.2 Port Triggering

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



To add a Trigger Port, click **Add**. The following will be displayed.



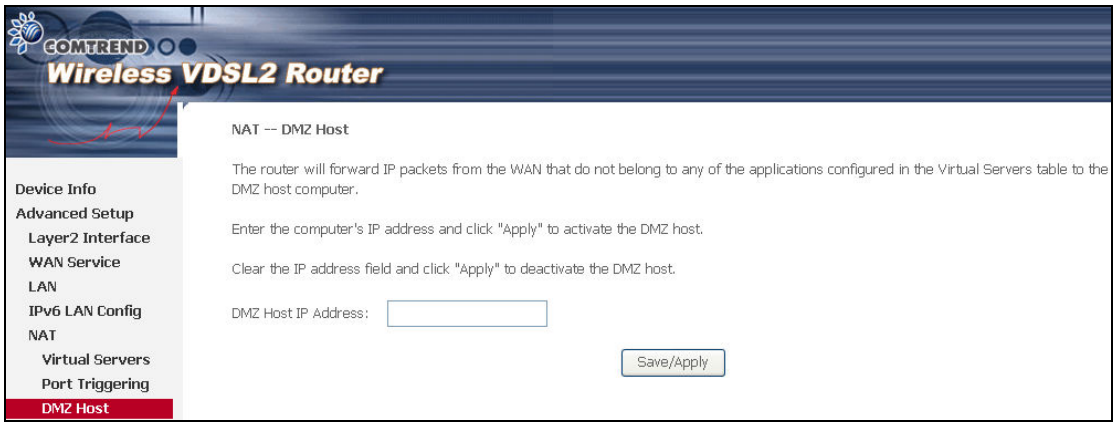
Consult the table below for field and header descriptions.

Field/Header	Description
Use Interface	Select a WAN interface from the drop-down box.
Select an Application **Or** Custom Application	User should select the application from the list. **Or** User can enter the name of their choice.

Field/Header	Description
Trigger Port Start	Enter the starting trigger port number (when you select custom application). When an application is selected, the port ranges are automatically configured.
Trigger Port End	Enter the ending trigger port number (when you select custom application). When an application is selected, the port ranges are automatically configured.
Trigger Protocol	TCP, TCP/UDP, or UDP.
Open Port Start	Enter the starting open port number (when you select custom application). When an application is selected, the port ranges are automatically configured.
Open Port End	Enter the ending open port number (when you select custom application). When an application is selected, the port ranges are automatically configured.
Open Protocol	TCP, TCP/UDP, or UDP.

5.5.3 DMZ Host

The DSL router will forward IP packets from the WAN that do not belong to any of the applications configured in the Virtual Servers table to the DMZ host computer.



To **Activate** the DMZ host, enter the DMZ host IP address and click **Save/Apply**.

To **Deactivate** the DMZ host, clear the IP address field and click **Save/Apply**.

5.6 Security

To display this function, you must enable the firewall feature in WAN Setup.
For detailed descriptions, with examples, please consult Appendix A - Firewall.

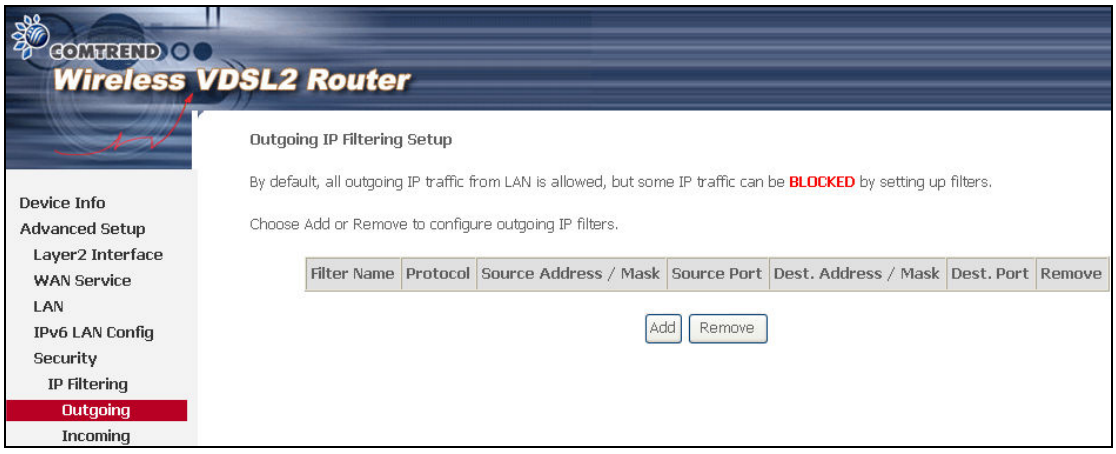
5.6.1 IP Filtering

This screen sets filter rules that limit IP traffic (Outgoing/Incoming). Multiple filter rules can be set and each applies at least one limiting condition. For individual IP packets to pass the filter all conditions must be fulfilled.

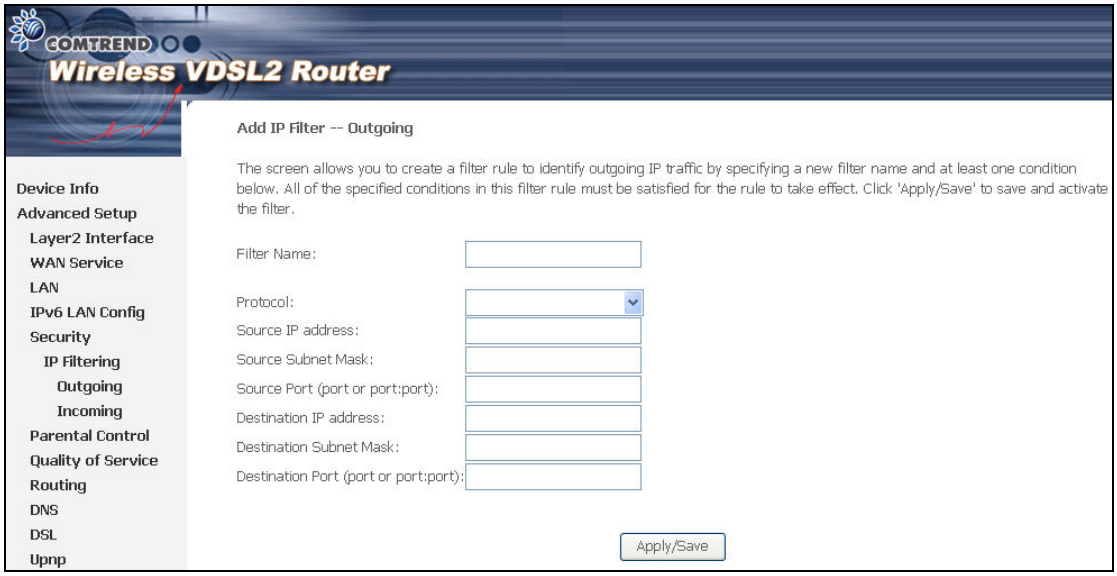
NOTE:	This function is not available when in bridge mode. Instead, 5.6.2 MAC Filtering (pg. 422) performs a similar function.

OUTGOING IP FILTER

By default, all outgoing IP traffic is allowed, but IP traffic can be blocked with filters.



To add a filter (to block some outgoing IP traffic), click the **Add** button.
On the following screen, enter your filter criteria and then click **Apply/Save**.

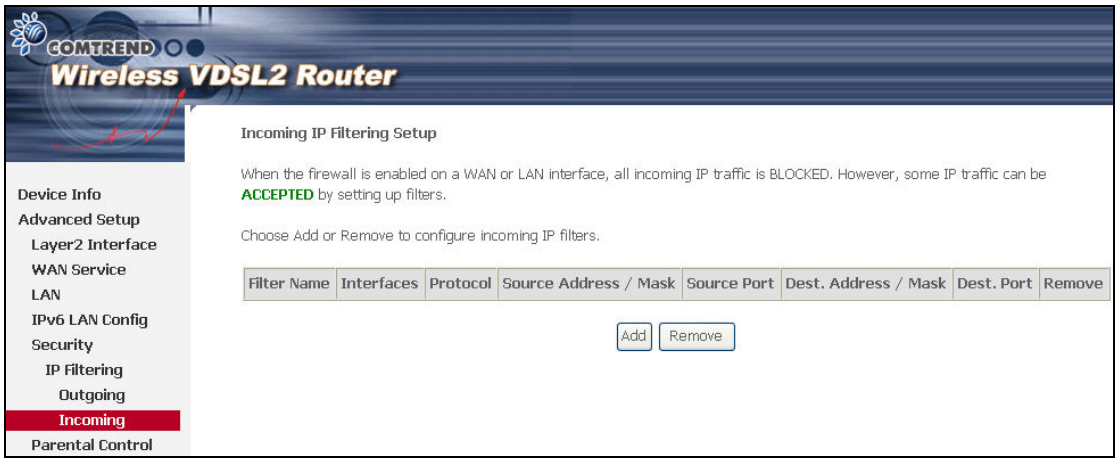


Consult the table below for field descriptions.

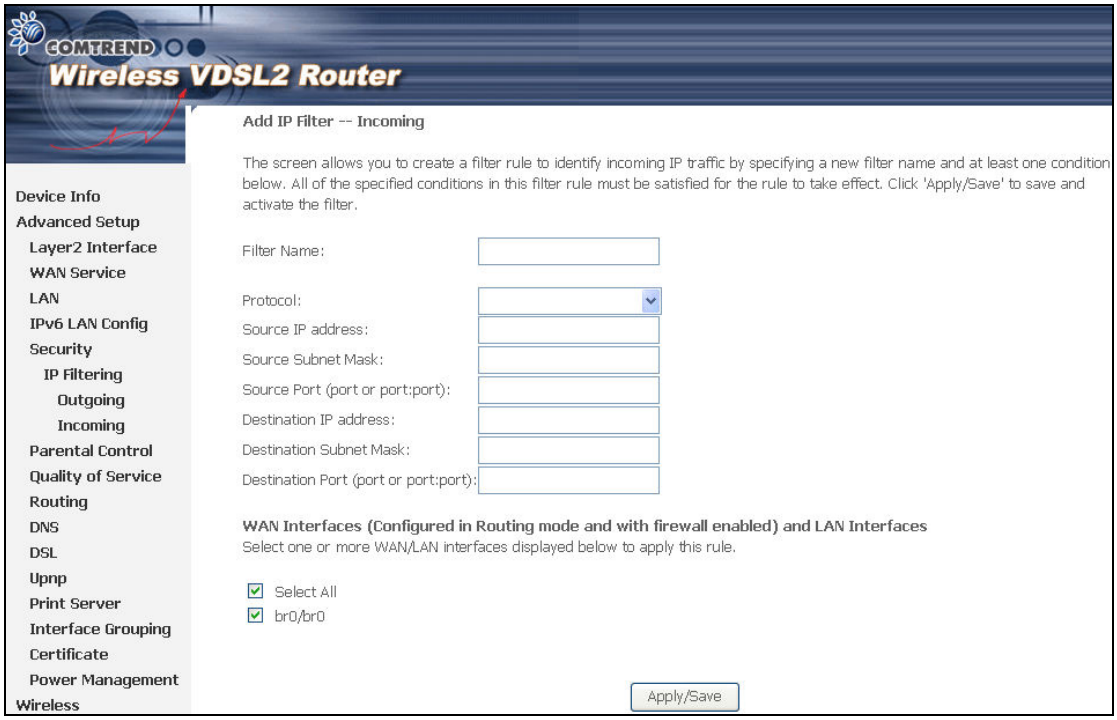
Field	Description
Filter Name	The filter rule label
Protocol	TCP, TCP/UDP, UDP, or ICMP.
Source IP address	Enter source IP address.
Source Subnet Mask	Enter source subnet mask.
Source Port (port or port:port)	Enter source port number or range.
Destination IP address	Enter destination IP address.
Destination Subnet Mask	Enter destination subnet mask.
Destination Port (port or port:port)	Enter destination port number or range.

INCOMING IP FILTER

By default, all incoming IP traffic is blocked, but IP traffic can be allowed with filters.



To add a filter (to allow incoming IP traffic), click the **Add** button.
On the following screen, enter your filter criteria and then click **Apply/Save**.



Consult the table below for field descriptions.

Field	Description
Filter Name	The filter rule label
Protocol	TCP, TCP/UDP, UDP, or ICMP.
Source IP address	Enter source IP address.
Source Subnet Mask	Enter source subnet mask.
Source Port (port or port:port)	Enter source port number or range.
Destination IP address	Enter destination IP address.
Destination Subnet Mask	Enter destination subnet mask.
Destination Port (port or port:port)	Enter destination port number or range.

At the bottom of this screen, select the WAN and LAN Interfaces to which the filter rule will apply. You may select all or just a subset. WAN interfaces in bridge mode or without firewall enabled are not available.

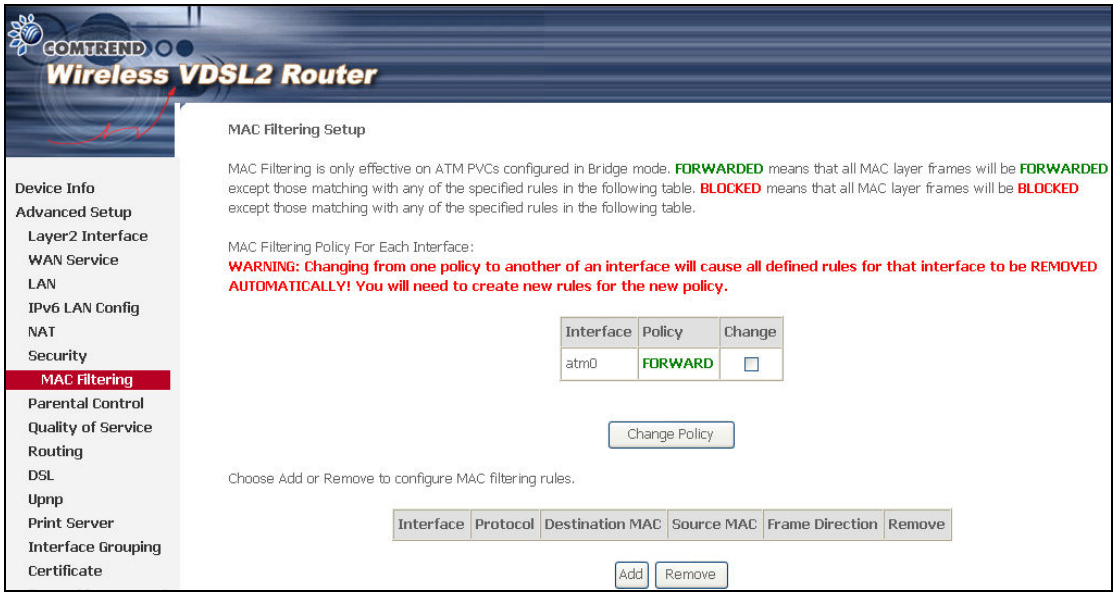
5.6.2 MAC Filtering

NOTE: This option is only available in bridge mode. Other modes use 5.6.1 IP Filtering (pg. 40) to perform a similar function.

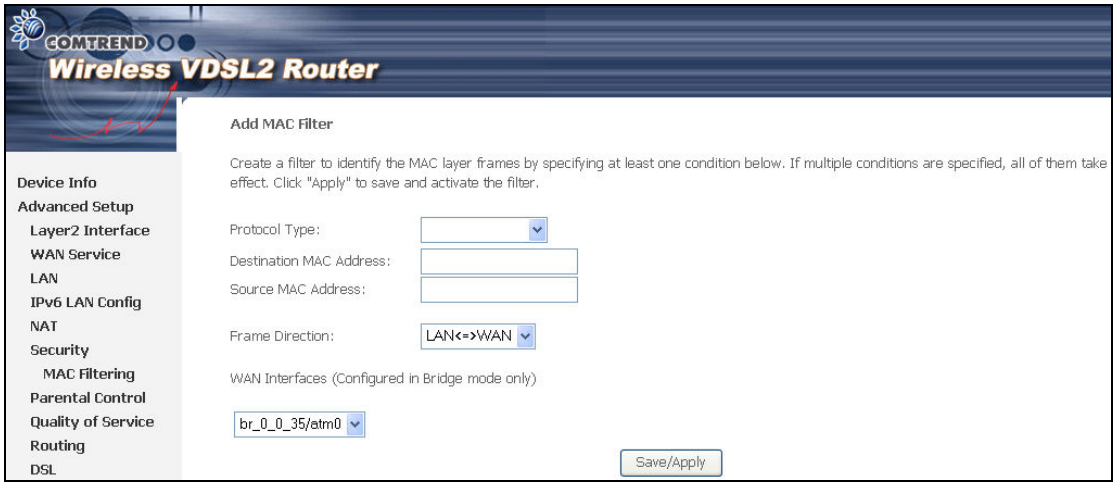
Each network device has a unique 48-bit MAC address. This can be used to filter (block or forward) packets based on the originating device. MAC filtering policy and rules for the CT-5374 can be set according to the following procedure.

The MAC Filtering Global Policy is defined as follows. **FORWARDED** means that all MAC layer frames will be **FORWARDED** except those matching the MAC filter rules. **BLOCKED** means that all MAC layer frames will be **BLOCKED** except those matching the MAC filter rules. The default MAC Filtering Global policy is

FORWARDED. It can be changed by clicking the **Change Policy** button.



Choose **Add** or **Remove** to configure MAC filtering rules. The following screen will appear when you click **Add**. Create a filter to identify the MAC layer frames by specifying at least one condition below. If multiple conditions are specified, all of them must be met. Click **Save/Apply** to save and activate the filter rule.



Consult the table below for detailed field descriptions.

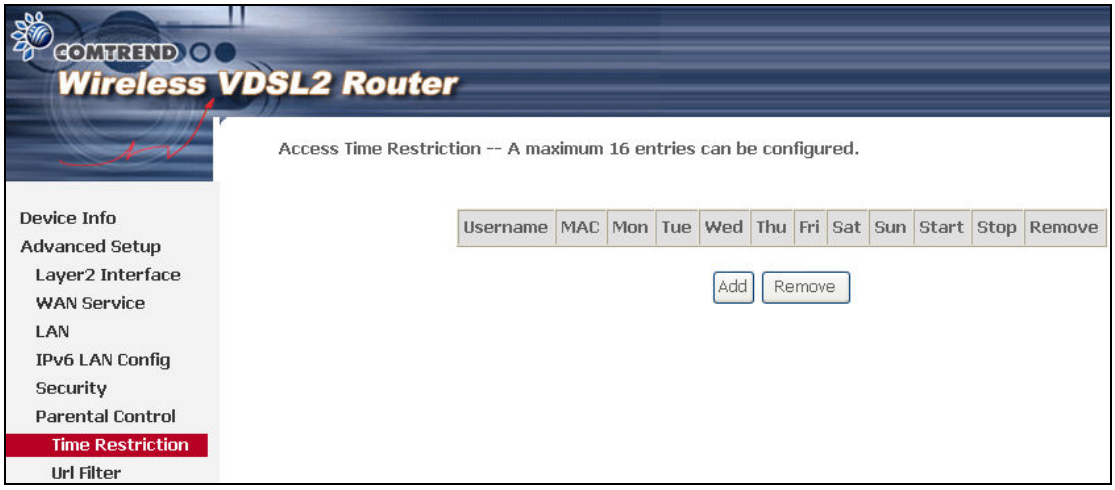
Field	Description
Protocol Type	PPPoE, IPv4, IPv6, AppleTalk, IPX, NetBEUI, IGMP
Destination MAC Address	Defines the destination MAC address
Source MAC Address	Defines the source MAC address
Frame Direction	Select the incoming/outgoing packet interface
WAN Interfaces	Applies the filter to the selected bridge interface.

5.7 Parental Control

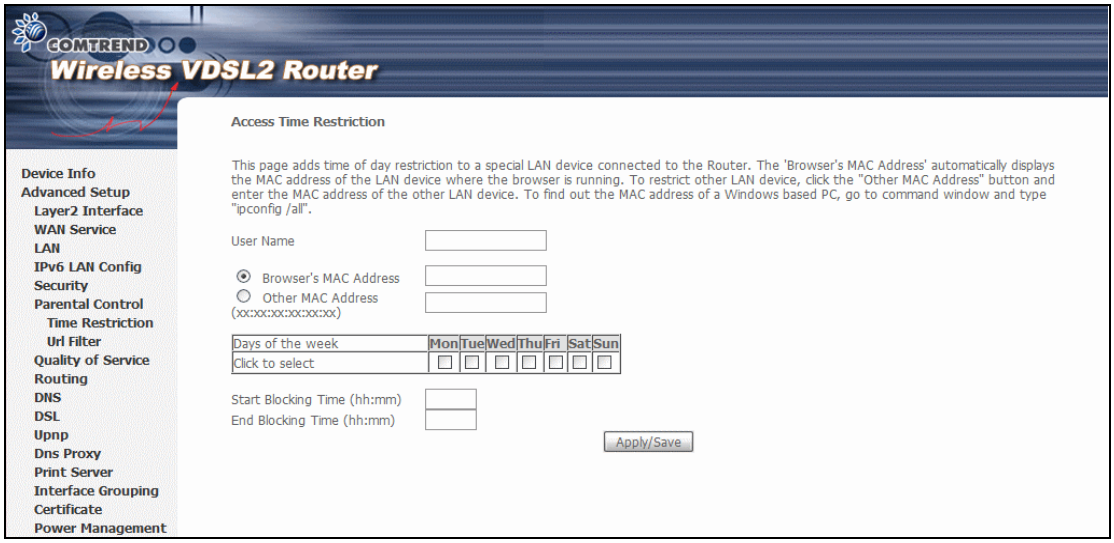
This selection provides WAN access control functionality.

5.7.1 Time Restriction

This feature restricts access from a LAN device to an outside network through the device on selected days at certain times. Make sure to activate the Internet Time server synchronization as described in 8.5 Internet Time, so that the scheduled times match your local time.



Click **Add** to display the following screen.



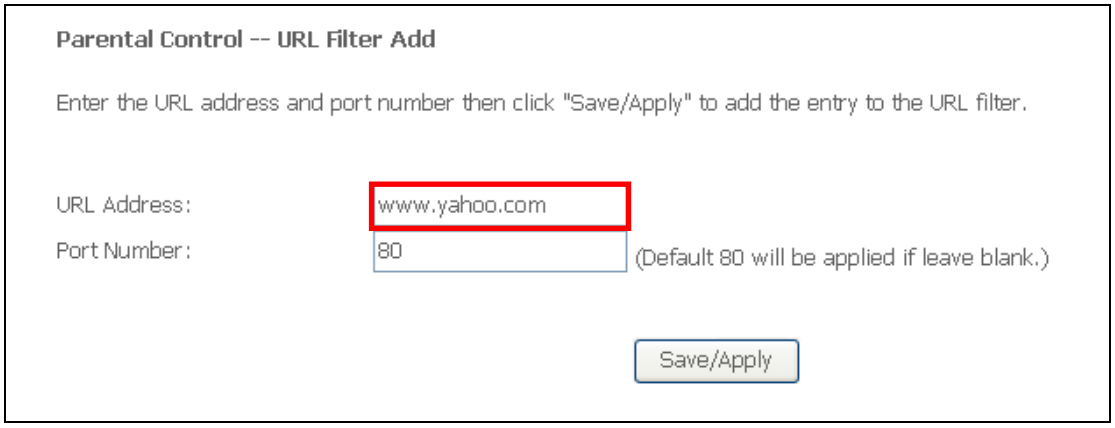
See below for field descriptions. Click **Apply/Save** to add a time restriction.

User Name: A user-defined label for this restriction.
Browser's MAC Address: MAC address of the PC running the browser.
Other MAC Address: MAC address of another LAN device.
Days of the Week: The days the restrictions apply.
Start Blocking Time: The time the restrictions start.
End Blocking Time: The time the restrictions end.

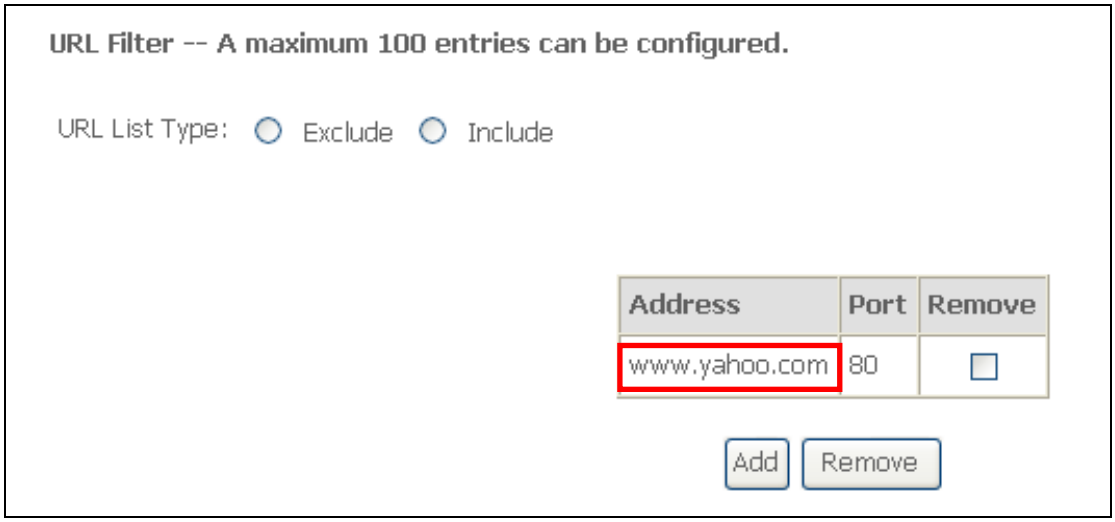
5.7.2 URL Filter

This screen allows for the creation of a filter rule for access rights to websites based on their URL address and port number.

Click **Add** to display the following screen.



Enter the URL address and port number then click **Save/Apply** to add the entry to the URL filter. URL Addresses begin with "www", as shown in this example.



A maximum of 100 entries can be added to the URL Filter list.
Tick the **Exclude** radio button to deny access to the websites listed.
Tick the **Include** radio button to restrict access to only those listed websites.

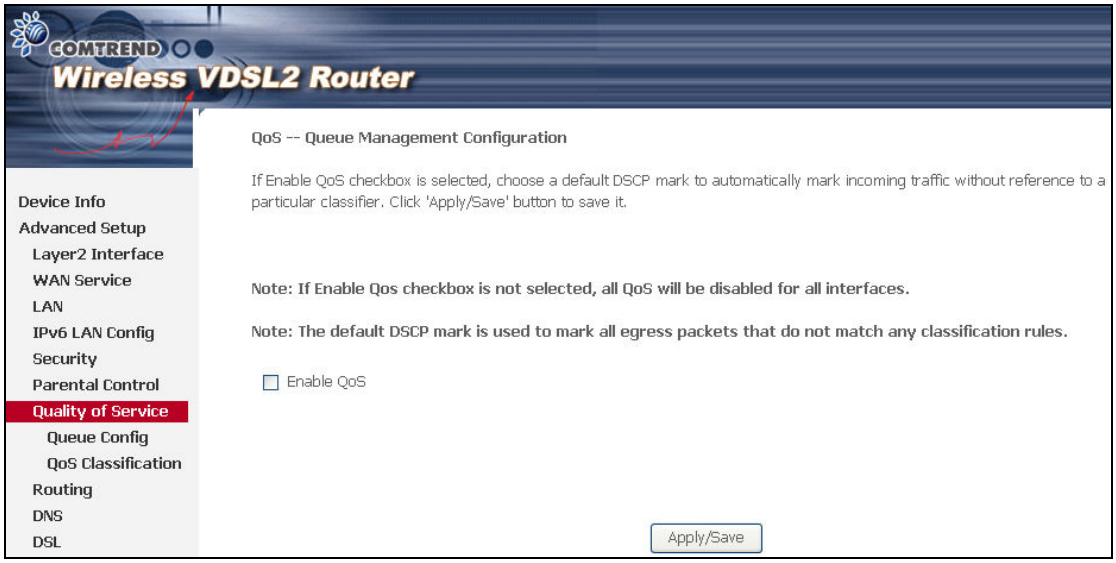
5.8 Quality of Service (QoS)

NOTE: QoS must be enabled in at least one PVC to display this option. (see Appendix G - Connection Setup for detailed PVC setup instructions).

5.8.1 Queue Management Configuration

To Enable QoS tick the checkbox ☑ and select a Default DSCP Mark.

Click **Apply/Save** to activate QoS.



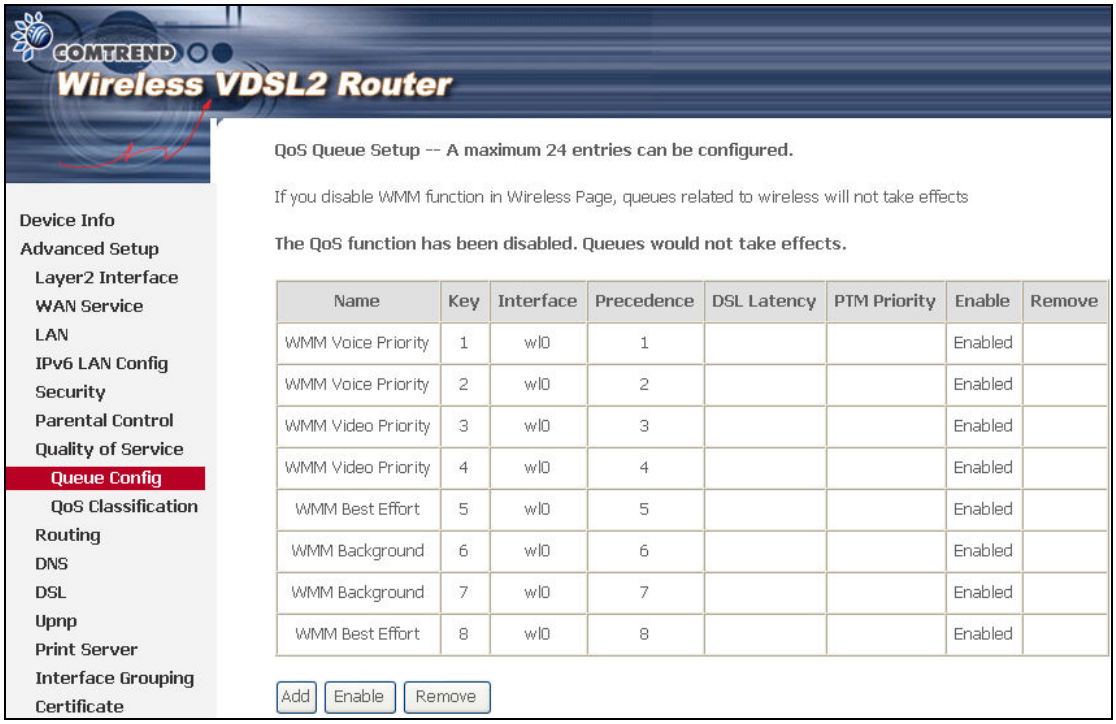
QoS and **DSCP Mark** are defined as follows:

Quality of Service (QoS): This provides different priority to different users or data flows, or guarantees a certain level of performance to a data flow in accordance with requests from Queue Prioritization.

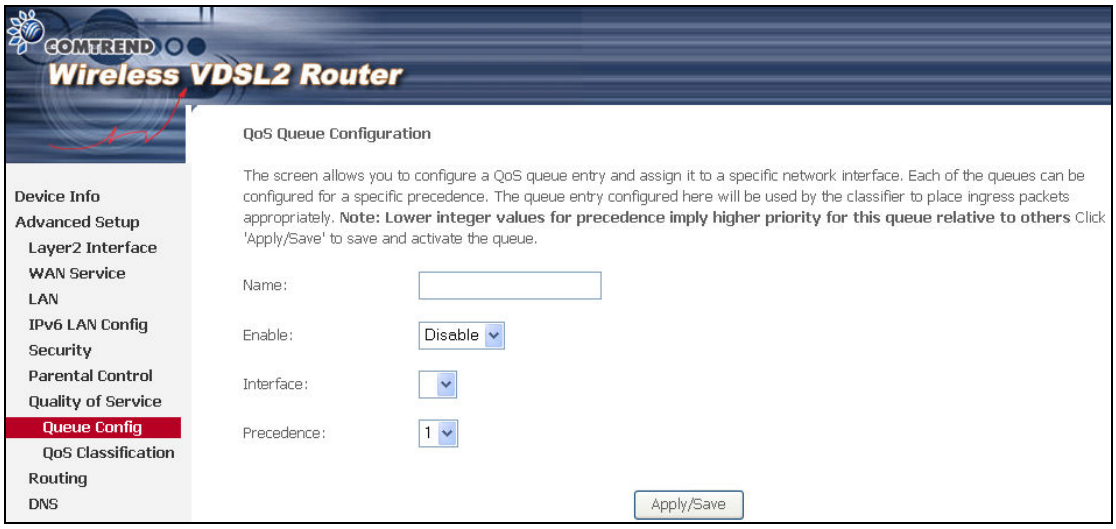
Default Differentiated Services Code Point (DSCP) Mark: This specifies the per hop behavior for a given flow of packets in the Internet Protocol (IP) header that do not match any other QoS rule.

5.8.2 Queue Configuration

This function follows the Differentiated Services rule of IP QoS. You can create a new Queue entry by clicking the **Add** button. Enable and assign an interface and precedence on the next screen. Click **Save/Reboot** on this screen to activate it.



Click **Enable** to activate the QoS Queue. Click **Add** to display the following screen.



Name: Identifier for this Queue entry.

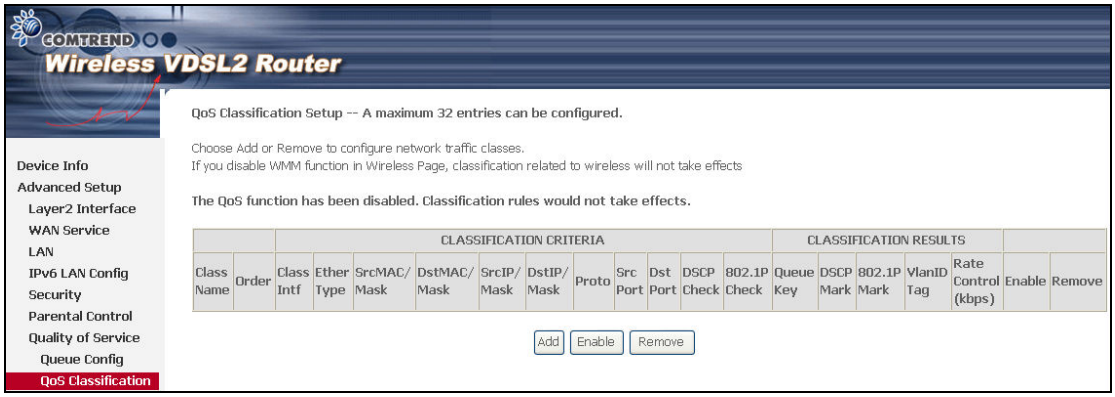
Enable: Enable/Disable the Queue entry.

Interface: Assign the entry to a specific network interface (QoS enabled).

Precedence: Configure precedence for the Queue entry. Lower integer values for precedence imply higher priority for this entry relative to others.

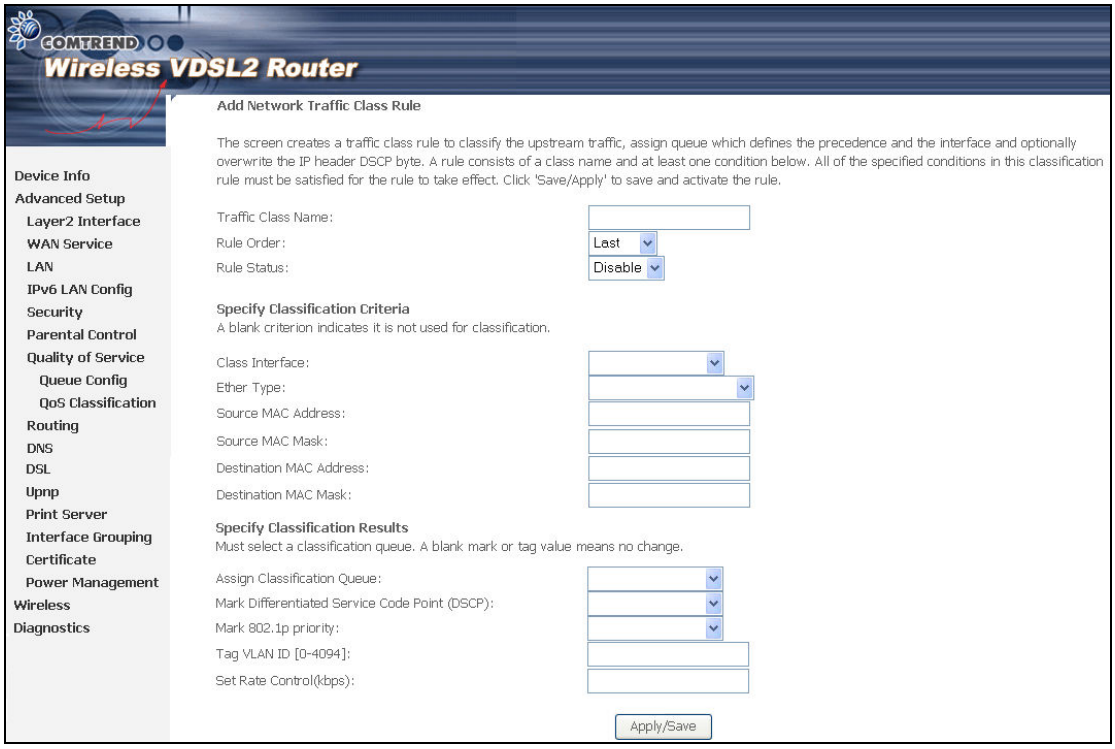
5.8.3 QoS Classification

The network traffic classes are listed in the following table.



Click **Add** to configure a network traffic class rule and **Enable** to activate it. To delete an entry from the list, click **Remove**.

This screen creates a traffic class rule to classify the upstream traffic, assign queuing priority and optionally overwrite the IP header DSCP byte. A rule consists of a class name and at least one logical condition. All the conditions specified in the rule must be satisfied for it to take effect.



Field	Description
Traffic Class Name	Enter a name for the traffic class.
Rule Order	Last is the only option.
Rule Status	Disable or enable the rule.
Classification Criteria	
Class Interface	Select an interface (i.e. Local, eth0-4, wl0)
Ether Type	Set the Ethernet type (e.g. IP, ARP, IPv6).

Field	Description
Source MAC Address	A packet belongs to SET-1, if a binary-AND of its source MAC address with the Source MAC Mask is equal to the binary-AND of the Source MAC Mask and this field.
Source MAC Mask	This is the mask used to decide how many bits are checked in Source MAC Address.
Destination MAC Address	A packet belongs to SET-1 then the result that the Destination MAC Address of its header binary-AND to the Destination MAC Mask must equal to the result that this field binary-AND to the Destination MAC Mask.
Destination MAC Mask	This is the mask used to decide how many bits are checked in Destination MAC Address.
Classification Results	
Assign Classification Queue	The queue configurations are presented in this format: "Interfacename&Prece P&Queue Q" where P and Q are the Precedence and Queue Key values for the corresponding Interface as listed on the Queue Config screen.
Mark Differentiated Service Code Point	The selected Code Point gives the corresponding priority to packets that satisfy the rule.
Mark 802.1p Priority	Select between 0-7. Lower values have higher priority.
Tag VLAN ID	Enter a 802.1Q VLAN ID tag [2-4094]
Set Rate Control	The data transmission rate limit in kbps.

5.9 Routing

This following routing functions are accessed from this menu:
Default Gateway, Static Route, Policy Routing, RIP and **IPv6 Static Route**.

NOTE:	In bridge mode, the **RIP** menu option is hidden while the other menu options are shown but ineffective.