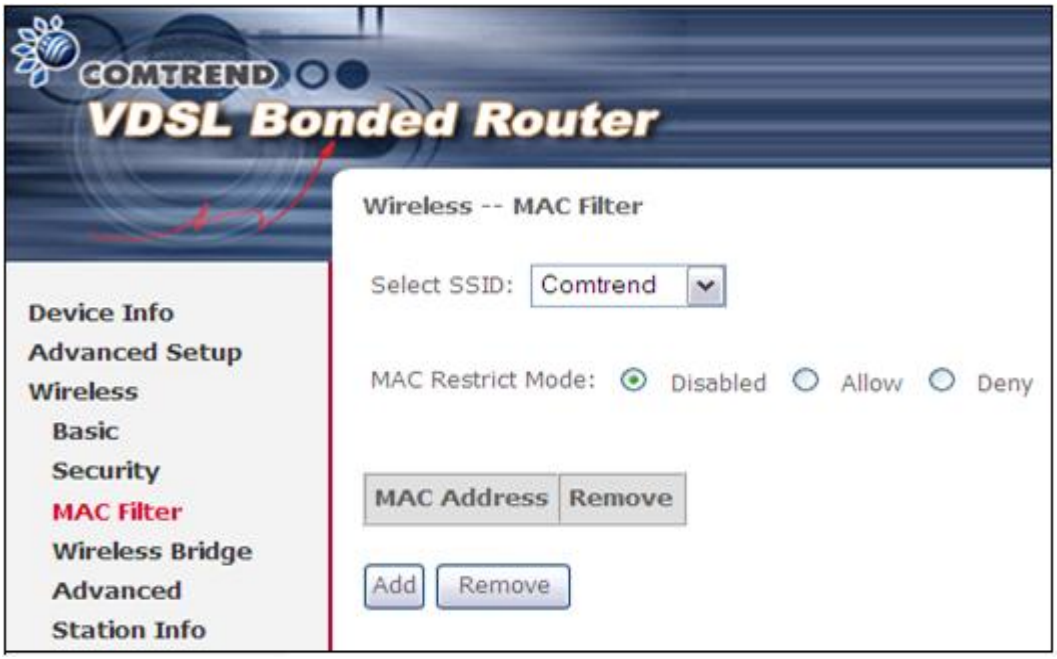
6.3 MAC Filter

This option allows access to the router to be restricted based upon MAC addresses. To add a MAC Address filter, click the Add button shown below. To delete a filter, select it from the MAC Address table below and click the Remove button.



Option	Description
Select SSID	Select the wireless network name from the drop-down box. SSID stands for Service Set Identifier. All stations must be configured with the correct SSID to access the WLAN. If the SSID does not match, that user will not be granted access.
MAC Restrict Mode	Disabled: MAC filtering is disabled. Allow: Permits access for the specified MAC addresses. Deny: Rejects access for the specified MAC addresses.
MAC Address	Lists the MAC addresses subject to the MAC Restrict Mode. A maximum of 60 MAC addresses can be added. Every network device has a unique 48-bit MAC address. This is usually shown as xx.xx.xx.xx.xx.xx, where xx are hexadecimal numbers.

After clicking the Add button, the following screen appears.
Input the MAC address in the box provided and click Save / Apply.

6.4 Wireless Bridge

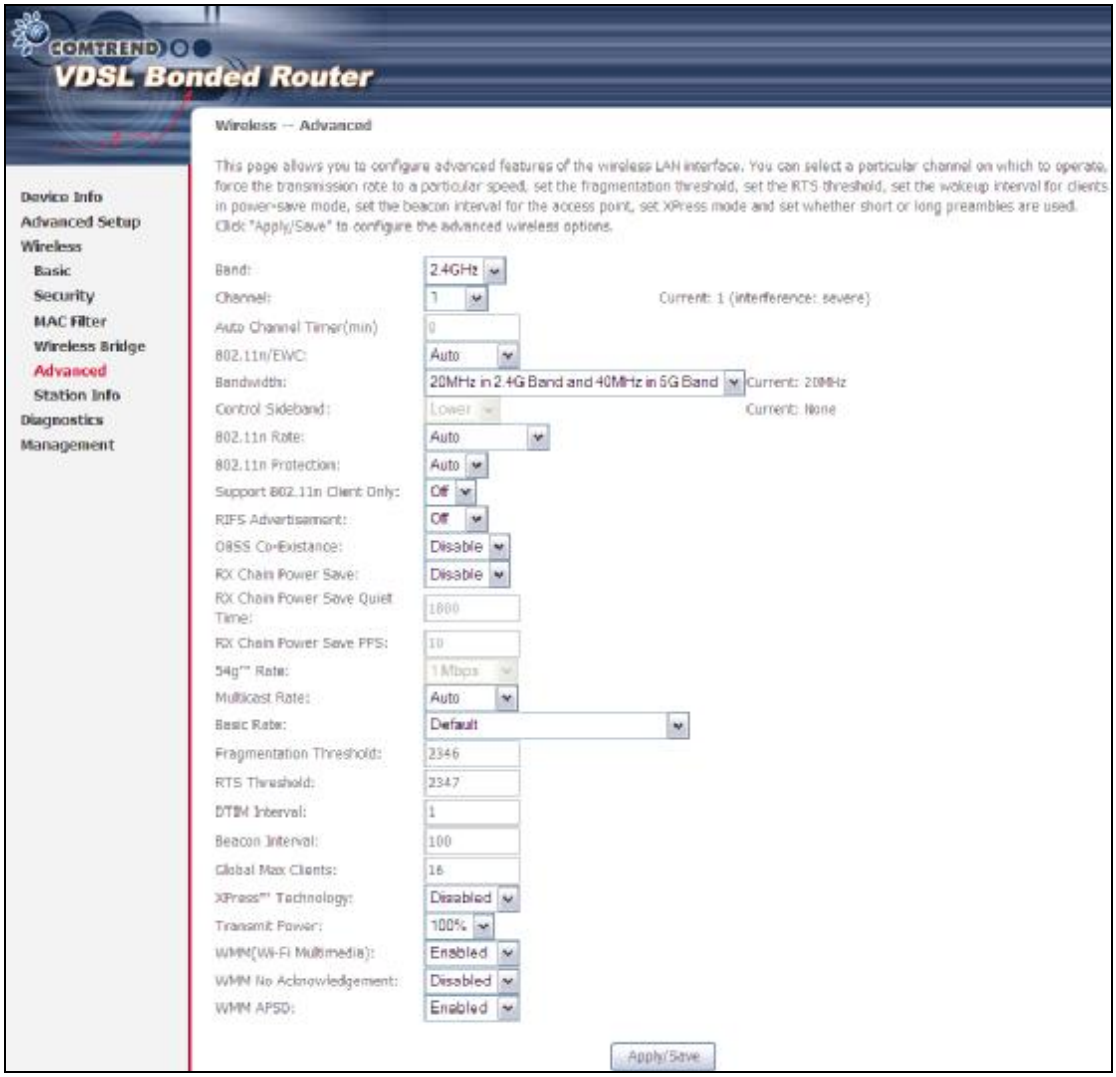
This screen allows for the configuration of wireless bridge features of the WLAN interface. See the table beneath for detailed explanations of the various options.

Click Save / Apply to implement new configuration settings.

Feature	Description
AP Mode	Selecting Wireless Bridge (aka Wireless Distribution System) disables Access Point (AP) functionality, while selecting Access Point enables AP functionality. In Access Point mode, wireless bridge functionality will still be available and wireless stations will be able to associate to the AP.
Bridge Restrict	Selecting Disabled disables wireless bridge restriction, which means that any wireless bridge will be granted access. Selecting Enabled or Enabled (Scan) enables wireless bridge restriction. Only those bridges selected in the Remote Bridges list will be granted access. Click Refresh to update the station list when Bridge Restrict is enabled.

6.5 Advanced

The Advanced screen allows you to configure advanced features of the wireless LAN interface. You can select a particular channel on which to operate, force the transmission rate to a particular speed, set the fragmentation threshold, set the RTS threshold, set the wakeup interval for clients in power-save mode, set the beacon interval for the access point, set XPress mode and set whether short or long preambles are used. Click Save / Apply to set new advanced wireless options.



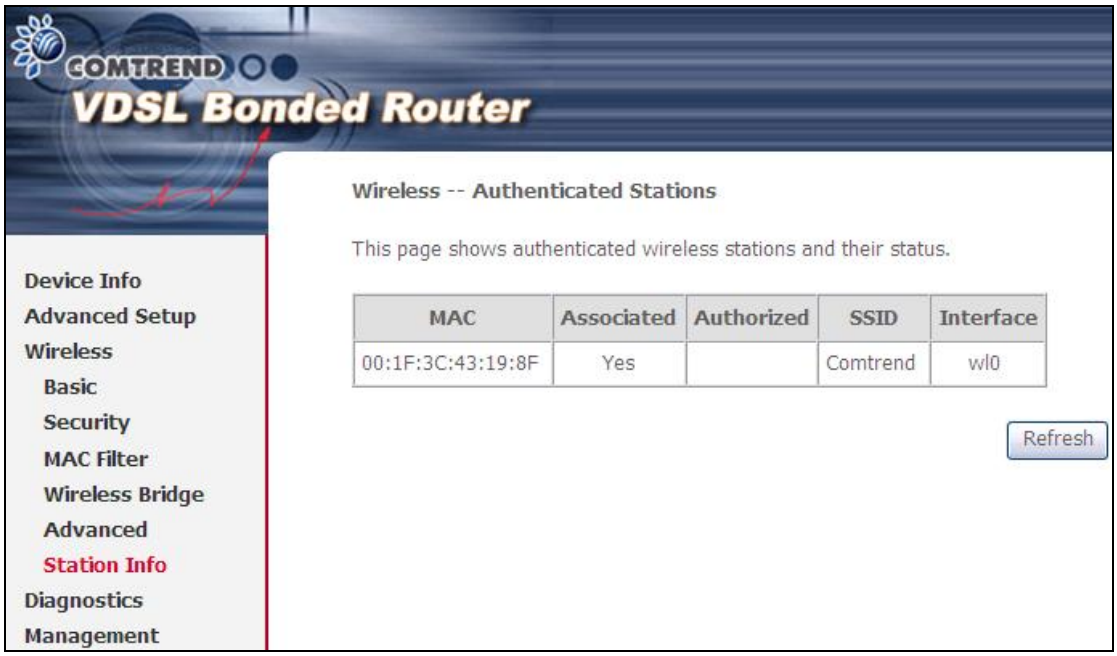
Field	Description
Band	Set to 2.4 GHz for compatibility with IEEE 802.11x standards. The new amendment allows IEEE 802.11n units to fall back to slower speeds so that legacy IEEE 802.11x devices can coexist in the same network. IEEE 802.11g creates data-rate parity at 2.4 GHz with the IEEE 802.11a standard, which has a 54 Mbps rate at 5 GHz. (IEEE 802.11a has other differences compared to IEEE 802.11b or g, such as offering more channels.)
Channel	Drop-down menu that allows selection of a specific channel.
Auto Channel Timer (min)	Auto channel scan timer in minutes (0 to disable)

Field	Description
802.11n/EWC	An equipment interoperability standard setting based on IEEE 802.11n Draft 2.0 and Enhanced Wireless Consortium (EWC)
Bandwidth	Select 20GHz or 40GHz bandwidth. 40GHz bandwidth uses two adjacent 20GHz bands for increased data throughput.
Control Sideband	Select Upper or Lower sideband when in 40GHz mode.
802.11n Rate	Set the physical transmission rate (PHY).
802.11n Protection	Turn Off for maximized throughput. Turn On for greater security.
RIFS Advertisement	Reduced Interframe Space is the creation of a short time delay between PDUs to improve wireless efficiency.
OBSS Co-Existence	Co-existence between 20 MHZ AND 40 MHZ overlapping Basic Service Set (OBSS) in WLAN.
RX Chain Power Save	Enabling this feature turns off one of the Receive chains, going from 2x2 to 2x1 to save power.
RX Chain Power Save Quiet Time	The number of seconds the traffic must be below the PPS value below before the Rx Chain Power Save feature activates itself.
RX Chain Power Save PPS	The maximum number of packets per seconds that can be processed by the WLAN interface for a duration of Quiet Time, described above, before the Rx Chain Power Save feature activates itself.
Support 802.11n Client Only	Turn Off to allow 802.11b/g clients access to the router. Turn On to prohibit 802.11b/g clients access to the router.
54g Rate	Drop-down menu that specifies the following fixed rates: Auto: Default. Uses the 11 Mbps data rate when possible but drops to lower rates when necessary. 1 Mbps, 2Mbps, 5.5Mbps, or 11Mbps fixed rates. The appropriate setting is dependent on signal strength.
Multicast Rate	Setting for multicast packet transmit rate (1-54 Mbps)
Basic Rate	Setting for basic transmission rate.
Fragmentation Threshold	A threshold, specified in bytes, that determines whether packets will be fragmented and at what size. On an 802.11 WLAN, packets that exceed the fragmentation threshold are fragmented, i.e., split into, smaller units suitable for the circuit size. Packets smaller than the specified fragmentation threshold value are not fragmented. Enter a value between 256 and 2346. If you experience a high packet error rate, try to slightly increase your Fragmentation Threshold. The value should remain at its default setting of 2346. Setting the Fragmentation Threshold too low may result in poor performance.
RTS Threshold	Request to Send, when set in bytes, specifies the packet size beyond which the WLAN Card invokes its RTS/CTS mechanism. Packets that exceed the specified RTS threshold trigger the RTS/CTS mechanism. The NIC transmits smaller packet without using RTS/CTS. The default setting of 2347 (maximum length) disables RTS Threshold.

Field	Description
DTIM Interval	Delivery Traffic Indication Message (DTIM) is also known as Beacon Rate. The entry range is a value between 1 and 65535. A DTIM is a countdown variable that informs clients of the next window for listening to broadcast and multicast messages. When the AP has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value. AP Clients hear the beacons and awaken to receive the broadcast and multicast messages. The default is 1.
Beacon Interval	The amount of time between beacon transmissions in milliseconds. The default is 100 ms and the acceptable range is 1 – 65535. The beacon transmissions identify the presence of an access point. By default, network devices passively scan all RF channels listening for beacons coming from access points. Before a station enters power save mode, the station needs the beacon interval to know when to wake up to receive the beacon (and learn whether there are buffered frames at the access point).
Global Max Clients	The maximum number of clients that can connect to the router.
Xpress ™ Technology	Xpress Technology is compliant with draft specifications of two planned wireless industry standards.
Transmit Power	Set the power output (by percentage) as desired.
WMM (Wi-Fi Multimedia)	The technology maintains the priority of audio, video and voice applications in a Wi-Fi network. It allows multimedia service get higher priority.
WMM No Acknowledgement	Refers to the acknowledge policy used at the MAC level. Enabling no Acknowledgement can result in more efficient throughput but higher error rates in a noisy Radio Frequency (RF) environment.
WMM APSD	This is Automatic Power Save Delivery. It saves power.

6.6 Station Info

This page shows authenticated wireless stations and their status. Click the Refresh button to update the list of stations in the WLAN.

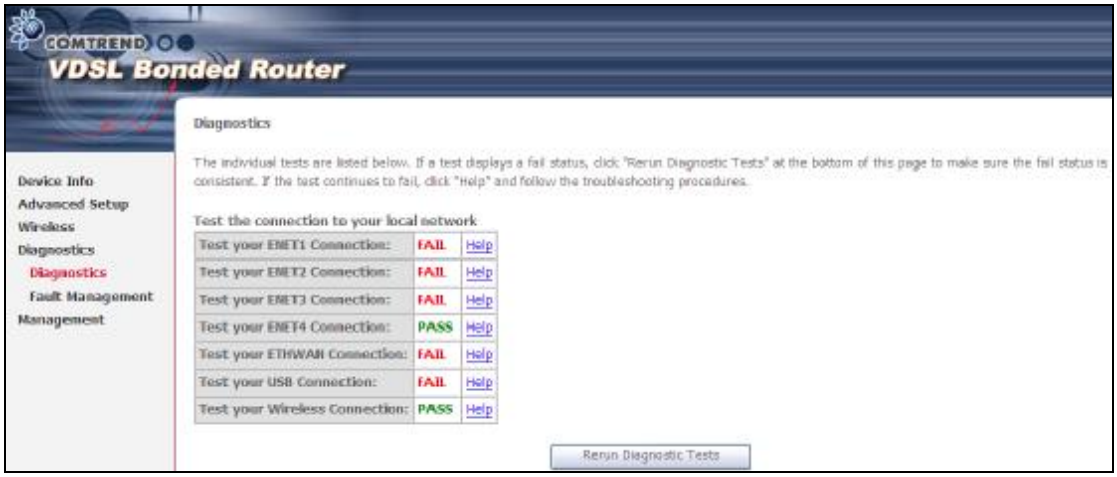


Consult the table below for descriptions of each column heading.

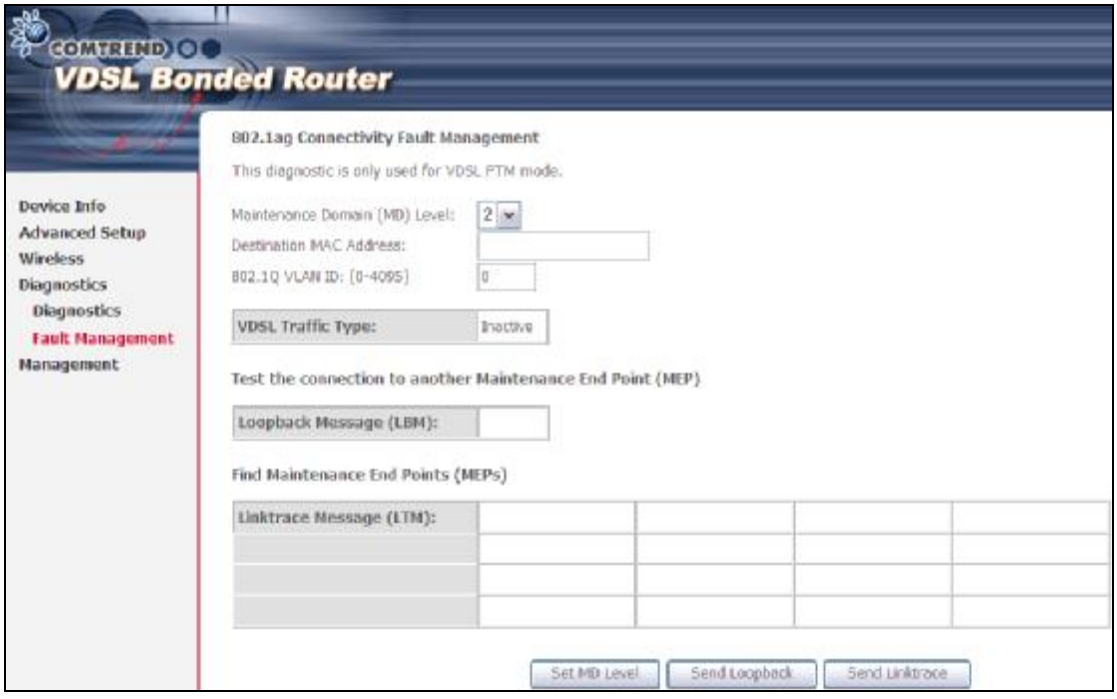
Heading	Description
MAC	Lists the MAC address of all the stations.
Associated	Lists all the stations that are associated with the Access Point, along with the amount of time since packets were transferred to and from each station. If a station is idle for too long, it is removed from this list.
Authorized	Lists those devices with authorized access.
SSID	Lists which SSID of the modem that the stations connect to.
Interface	Lists which interface of the modem that the stations connect to.

Chapter 7 Diagnostics

The first Diagnostics screen is a dashboard that shows overall connection status. If a test displays a fail status, click the button to retest and confirm the error. If a test continues to fail, click Help and follow the troubleshooting procedures.



The second Diagnostics screen (Fault Management) is used for VDSL diagnostics.



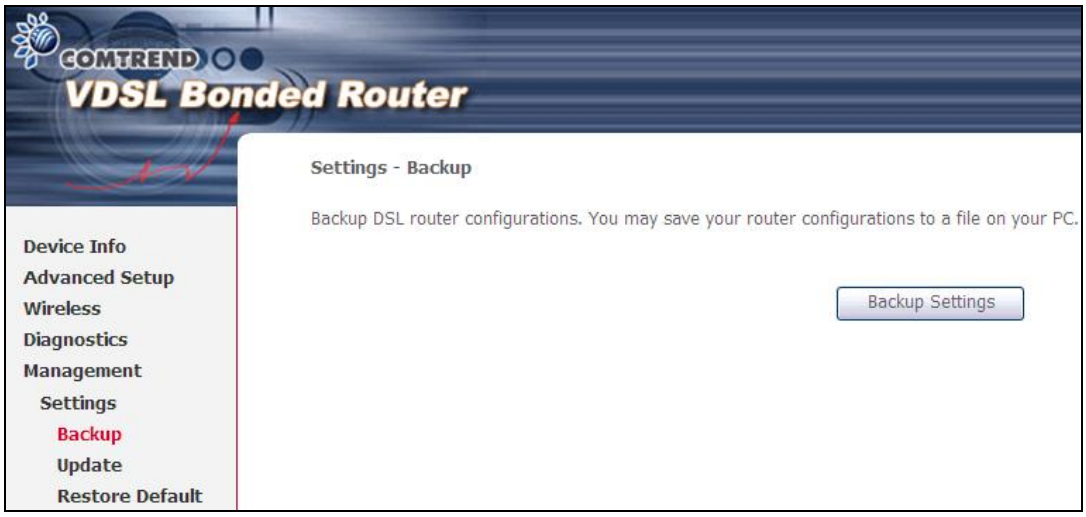
Chapter 8 Management

8.1 Settings

This includes 8.1.1 Backup Settings, 8.1.2 Update Settings, and 8.1.3 Restore Default screens.

8.1.1 Backup Settings

To save the current configuration to a file on your PC, click Backup Settings. You will be prompted for backup file location. This file can later be used to recover settings on the Update Settings screen, as described below.



8.1.2 Update Settings

This option recovers configuration files previously saved using Backup Settings. Enter the file name (including folder path) in the Settings File Name box, or press Browse... to search for the file, then click Update Settings to recover settings.

8.1.3 Restore Default

Click Restore Default Settings to restore factory default settings.

After Restore Default Settings is clicked, the following screen appears.

DSL Router Restore

The DSL Router configuration has been restored to default settings and the router is rebooting.

Close the DSL Router Configuration window and wait for 2 minutes before reopening your web browser. If necessary, reconfigure your PC's IP address to match your new configuration.

Close the browser and wait for 2 minutes before reopening it. It may also be necessary, to reconfigure your PC IP configuration to match any new settings.

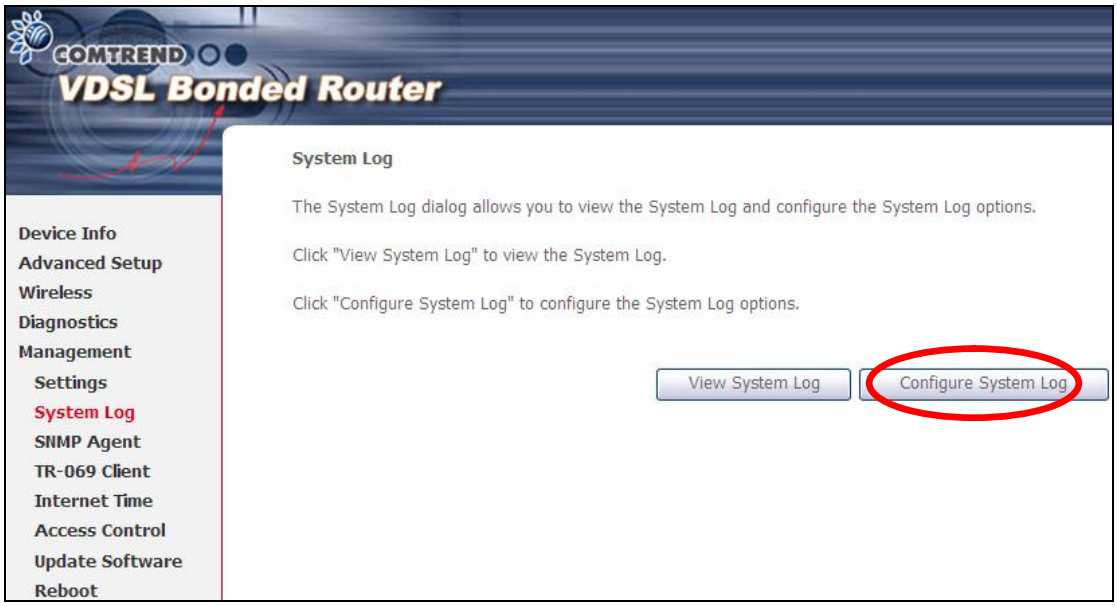
NOTE:	**This entry has the same effect as the Reset button. The NEXUSLINK 3111u board hardware and the boot loader support the reset to default. If the Reset button is continuously pressed for more than 5 seconds, the boot loader will erase the configuration data saved in flash memory.**

8.2 System Log

This function allows a system log to be kept and viewed upon request.

Follow the steps below to configure, enable, and view the system log.

STEP 1: Click Configure System Log, as shown below (circled in Red).



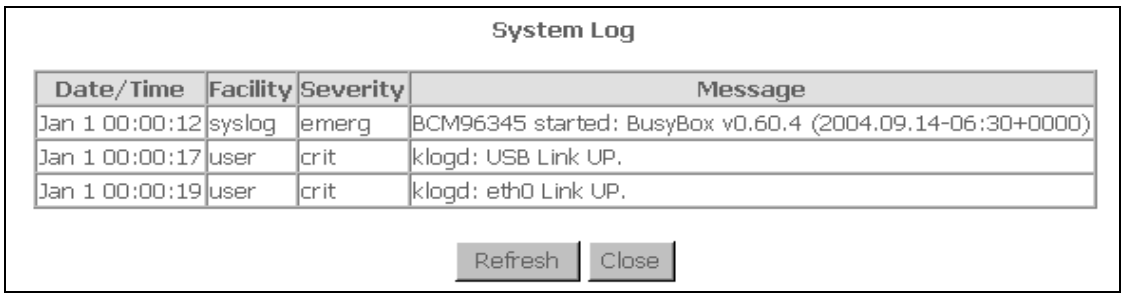
STEP 2: Select desired options and click Apply / Save.

Consult the table below for detailed descriptions of each system log option.

Option	Description
Log	Indicates whether the system is currently recording events. The user can enable or disable event logging. By default, it is disabled. To enable it, select the Enable radio button and then click Apply / Save.

Option	Description
Log Level	Allows you to configure the event level and filter out unwanted events below this level. The events ranging from the highest critical level "Emergency" down to this configured level will be recorded to the log buffer on the NEXUSLINK 3111u SDRAM. When the log buffer is full, the newer event will wrap up to the top of the log buffer and overwrite the old event. By default, the log level is "Debugging", which is the lowest critical level. The log levels are defined as follows: • Emergency = system is unusable • Alert = action must be taken immediately • Critical = critical conditions • Error = Error conditions • Warning = normal but significant condition • Notice= normal but insignificant condition • Informational= provides information for reference • Debugging = debug-level messages Emergency is the most serious event level, whereas Debugging is the least important. For instance, if the log level is set to Debugging, all the events from the lowest Debugging level to the most critical level Emergency level will be recorded. If the log level is set to Error, only Error and the level above will be logged.
Display Level	Allows the user to select the logged events and displays on the View System Log window for events of this level and above to the highest Emergency level.
Mode	Allows you to specify whether events should be stored in the local memory, or be sent to a remote system log server, or both simultaneously. If remote mode is selected, view system log will not be able to display events saved in the remote system log server. When either Remote mode or Both mode is configured, the WEB UI will prompt the user to enter the Server IP address and Server UDP port.

STEP 3: Click View System Log. The results are displayed as follows.



8.3 SNMP Agent

Simple Network Management Protocol (SNMP) allows a management application to retrieve statistics and status from the SNMP agent in this device. Select the Enable radio button, configure options, and click Save / Apply to activate SNMP.

8.4 TR-069 Client

WAN Management Protocol (TR-069) allows an Auto-Configuration Server (ACS) to perform auto-configuration, provision, collection, and diagnostics to this device. Select desired values and click Apply / Save to configure TR-069 client options.

The table below is provided for ease of reference.

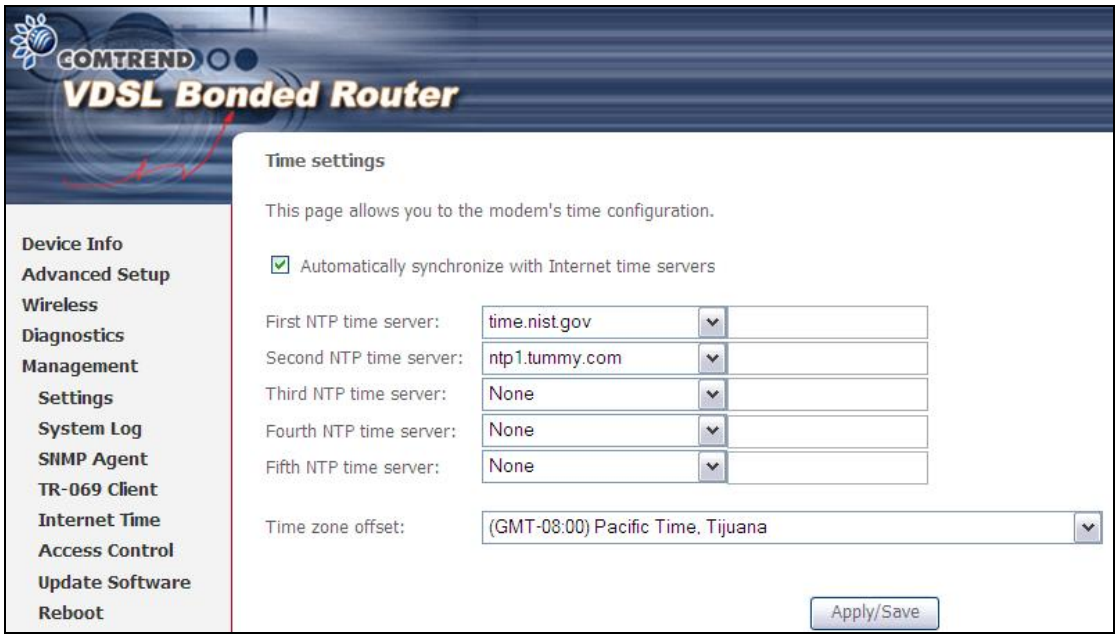
Option	Description
Inform	Disable/Enable TR-069 client on the CPE.
Inform Interval	The duration in seconds of the interval for which the CPE MUST attempt to connect with the ACS and call the Inform method.
ACS URL	URL for the CPE to connect to the ACS using the CPE WAN Management Protocol. This parameter MUST be in the form of a valid HTTP or HTTPS URL. An HTTPS URL indicates that the ACS supports SSL. The "host" portion of this URL is used by the CPE for validating the certificate from the ACS when using certificate-based authentication.
ACS User Name	Username used to authenticate the CPE when making a connection to the ACS using the CPE WAN Management Protocol. This username is used only for HTTP-based authentication of the CPE.
ACS Password	Password used to authenticate the CPE when making a connection to the ACS using the CPE WAN Management Protocol. This password is used only for HTTP-based authentication of the CPE.
WAN Interface used by TR-069 client	Choose Any_WAN, LAN, Loopback or a configured connection.

Option	Description
Display SOAP messages on serial console	Enable/Disable SOAP messages on serial console. This option is used for advanced troubleshooting of the device.
Connection Request	
Authorization	Tick the checkbox þ to enable.
User Name	Username used to authenticate an ACS making a Connection Request to the CPE.
Password	Password used to authenticate an ACS making a Connection Request to the CPE.
URL	IP address and port the ACS uses to connect to NEXUSLINK 3111u.

The Get RPC Methods button forces the CPE to establish an immediate connection to the ACS. This may be used to discover the set of methods supported by the ACS or CPE. This list may include both standard TR-069 methods (those defined in this specification or a subsequent version) and vendor-specific methods. The receiver of the response MUST ignore any unrecognized methods.

8.5 Internet Time

This option automatically synchronizes the router time with Internet timeservers. To enable time synchronization, tick the corresponding checkbox þ, choose your preferred time server(s), select the correct time zone offset, and click Save / Apply.



NOTE: Internet Time must be activated to use Parental Control.
In addition, this menu item is not displayed when in Bridge mode since the router would not be able to connect to the NTP timeserver.

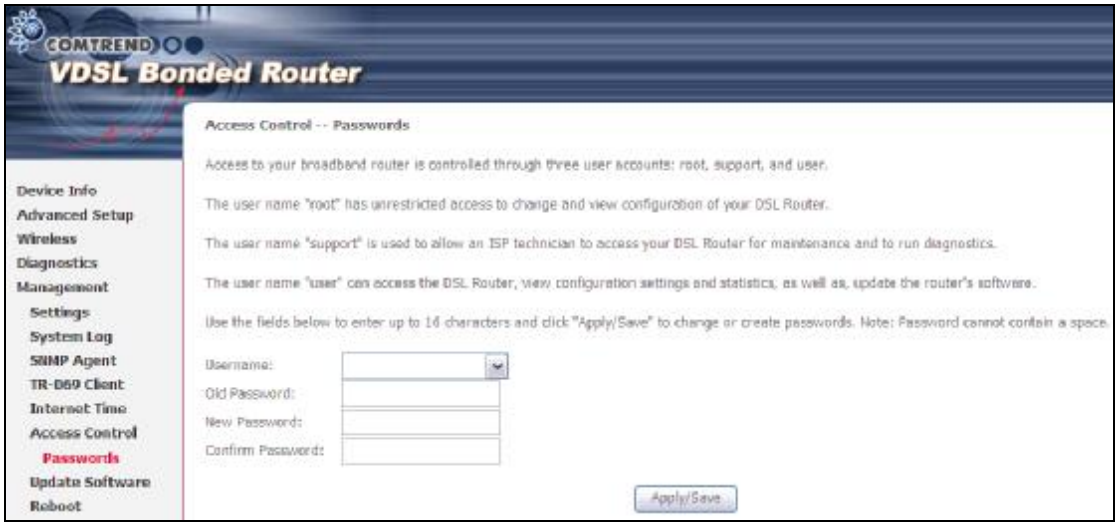
8.6 Access Control

8.6.1 Passwords

This screen is used to configure the user account access passwords for the device. Access to the NEXUSLINK 3111u is controlled through the following three user accounts:

- **root - unrestricted access to change and view the configuration.**
- **support - used for remote maintenance and diagnostics of the router**
- **user - can view configuration settings & statistics and update firmware.**

Use the fields below to change password settings. Click Save / Apply to continue.



NOTE: Passwords can be up to 16 characters in length.

8.7 Update Software

This option allows for firmware upgrades from a locally stored file.

STEP 1: Obtain an updated software image file from your ISP.

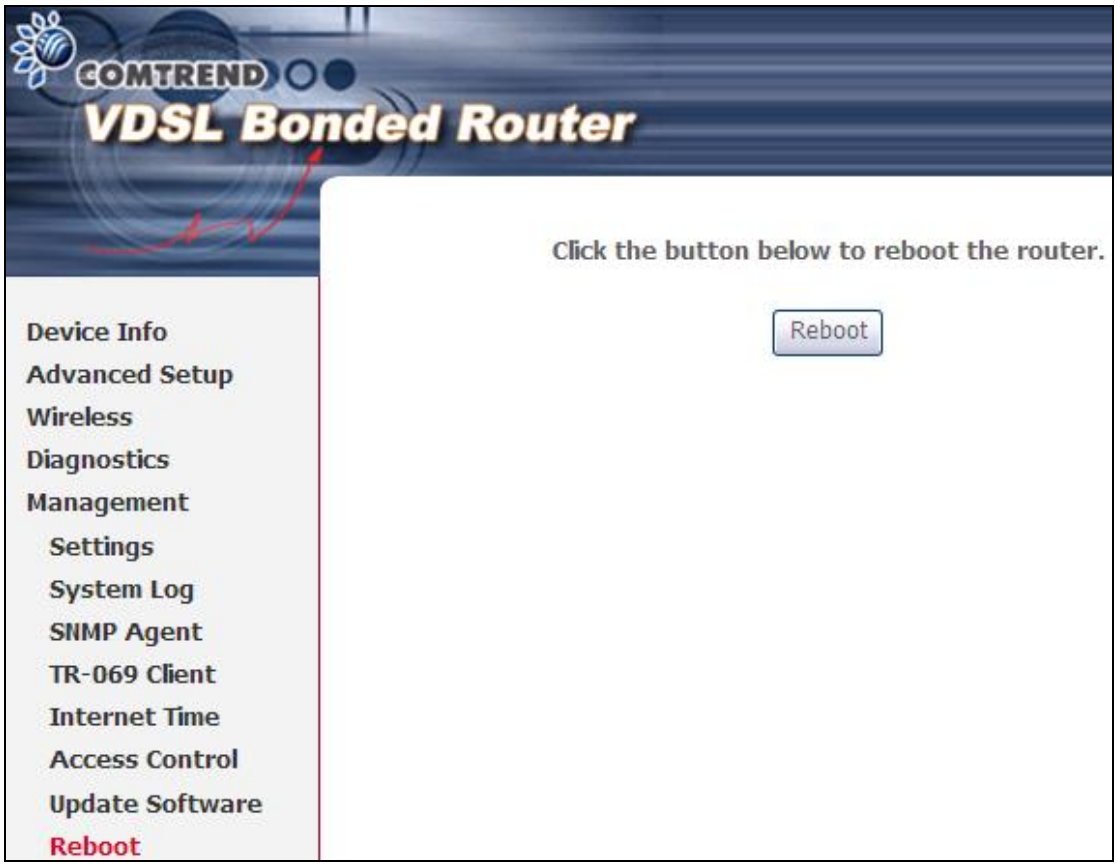
STEP 2: Enter the path and filename of the firmware image file in the **Software File Name** field or click the Browse button to locate the image file.

STEP 3: Click the **Update Software** button once to upload and install the file.

NOTE:	The update process will take about 2 minutes to complete. The device will reboot and the browser window will refresh to the default screen upon successful installation. It is recommended that you compare the **Software Version** on the Chapter 4 Device Information screen with the firmware version installed, to confirm the installation was successful.

8.8 Reboot

To save the current configuration and reboot the router, click **Save / Reboot**.



NOTE: You may need to close the browser window and wait for 2 minutes before reopening it. It may also be necessary, to reset your PC IP configuration.

Appendix A - Firewall

STATEFUL PACKET INSPECTION
Refers to an architecture, where the firewall keeps track of packets on each connection traversing all its interfaces and makes sure they are valid. This is in contrast to static packet filtering which only examines a packet based on the information in the packet header.

DENIAL OF SERVICE ATTACK
Is an incident in which a user or organization is deprived of the services of a resource they would normally expect to have. Various DoS attacks the device can withstand are ARP Attack, Ping Attack, Ping of Death, Land, SYN Attack, Smurf Attack, and Tear Drop.

TCP/IP/PORT/INTERFACE FILTER
These rules help in the filtering of traffic at the Network layer (i.e. Layer 3). When a Routing interface is created, Enable Firewall must be checked. Navigate to Advanced Setup à Security à IP Filtering.

OUTGOING IP FILTER
Helps in setting rules to DROP packets from the LAN interface. By default, if the Firewall is Enabled, all IP traffic from the LAN is allowed. By setting up one or more filters, specific packet types coming from the LAN can be dropped.

Example 1:	**Filter Name**	**: Out_Filter1**
	Protocol	**: TCP**
	Source IP address	**: 192.168.1.45**
	Source Subnet Mask	**: 255.255.255.0**
	Source Port	**: 80**
	Dest. IP Address	**: NA**
	Dest. Subnet Mask	**: NA**
	Dest. Port	**: NA**

This filter will Drop all TCP packets coming from the LAN with IP Address/Subnet Mask of 192.168.1.45/24 having a source port of 80 irrespective of the destination. All other packets will be Accepted.

Example 2:	**Filter Name**	**: Out_Filter2**
	Protocol	**: UDP**
	Source IP Address	**: 192.168.1.45**
	Source Subnet Mask	**: 255.255.255.0**
	Source Port	**: 5060:6060**
	Dest. IP Address	**: 172.16.13.4**
	Dest. Subnet Mask	**: 255.255.255.0**
	Dest. Port	**: 6060:7070**

This filter will drop all UDP packets coming from the LAN with IP Address / Subnet Mask of 192.168.1.45/24 and a source port range of 5060 to 6060, destined to 172.16.13.4/24 and a destination port range of 6060 to 7070.

INCOMING IP FILTER
Helps in setting rules to Allow or Deny packets from the WAN interface. By default, all incoming IP traffic from the WAN is Blocked, if the Firewall is Enabled. By setting up one or more filters, specific packet types coming from the WAN can be Accepted.

Example 1:

Filter Name	: In_Filter1
Protocol	: TCP
Policy	: Allow
Source IP Address	: 210.168.219.45
Source Subnet Mask	: 255.255.0.0
Source Port	: 80
Dest. IP Address	: NA
Dest. Subnet Mask	: NA
Dest. Port	: NA
Selected WAN interface	: br0

This filter will ACCEPT all TCP packets coming from WAN interface "br0" with IP Address/Subnet Mask 210.168.219.45/16 with a source port of 80, irrespective of the destination. All other incoming packets on this interface are DROPPED.

Example 2:

Filter Name	: In_Filter2
Protocol	: UDP
Policy	: Allow
Source IP Address	: 210.168.219.45
Source Subnet Mask	: 255.255.0.0
Source Port	: 5060:6060
Dest. IP Address	: 192.168.1.45
Dest. Sub. Mask	: 255.255.255.0
Dest. Port	: 6060:7070
Selected WAN interface	: br0

This rule will ACCEPT all UDP packets coming from WAN interface "br0" with IP Address/Subnet Mask 210.168.219.45/16 and a source port in the range of 5060 to 6060, destined to 192.168.1.45/24 and a destination port in the range of 6060 to 7070. All other incoming packets on this interface are DROPPED.

MAC LAYER FILTER

These rules help in the filtering of Layer 2 traffic. MAC Filtering is only effective in Bridge mode. After a Bridge mode connection is created, navigate to Advanced Setup à Security à MAC Filtering in the WUI.

Example 1:

Global Policy	: Forwarded
Protocol Type	: PPPoE
Dest. MAC Address	: 00:12:34:56:78:90
Source MAC Address	: NA
Src. Interface	: eth1
Dest. Interface	: eth2

Addition of this rule drops all PPPoE frames going from eth1 to eth2 with a Destination MAC Address of 00:12:34:56:78:90 irrespective of its Source MAC Address. All other frames on this interface are forwarded.

Example 2:

Global Policy	: Blocked
Protocol Type	: PPPoE
Dest. MAC Address	: 00:12:34:56:78:90
Source MAC Address	: 00:34:12:78:90:56
Src. Interface	: eth1
Dest. Interface	: eth2

Addition of this rule forwards all PPPoE frames going from eth1 to eth2 with a Destination MAC Address of 00:12:34:56:78 and Source MAC Address of 00:34:12:78:90:56. All other frames on this interface are dropped.

DAYTIME PARENTAL CONTROL

This feature restricts access of a selected LAN device to an outside Network through the NEXUSLINK 3111u, as per chosen days of the week and the chosen times.

Example:	**User Name**	**: FilterJohn**
	Browser's MAC Address	**: 00:25:46:78:63:21**
	Days of the Week	**: Mon, Wed, Fri**
	Start Blocking Time	**: 14:00**
	End Blocking Time	**: 18:00**

With this rule, a LAN device with MAC Address of 00:25:46:78:63:21 will have no access to the WAN on Mondays, Wednesdays, and Fridays, from 2pm to 6pm. On all other days and times, this device will have access to the outside Network.

Appendix B - Pin Assignments

ETHERNET Ports (RJ45)

ETHERNET LAN Ports (10/100Base-T)

Pin	Signal name	Signal definition
1	TXP	Transmit data (positive lead)
2	TXN	Transmit data (negative lead)
3	RXP	Receive data (positive lead)
4	NC	Not used
5	NC	Not used
6	RXN	Receive data (negative lead)
7	NC	Not used
8	NC	Not used

Table 1

Signals for ETHERNET WAN port (10/1001000Base-T)

Pin	Signal name	Signal definition
1	TRD+(0)	Transmit/Receive data 0 (positive lead)
2	TRD-(0)	Transmit/Receive data 0 (negative lead)
3	TRD+(1)	Transmit/Receive data 1 (positive lead)
4	TRD+(2)	Transmit/Receive data 2 (positive lead)
5	TRD-(2)	Transmit/Receive data 2 (negative lead)
6	TRD-(1)	Transmit/Receive data 1 (negative lead)
7	TRD+(3)	Transmit/Receive data 3 (positive lead)
8	TRD-(3)	Transmit/Receive data 3 (negative lead)

Table 2

Appendix C - Specifications

Hardware Interface

- RJ-14 X1 for VDSL Bonded,
- RJ-45 X 4 for LAN, (10/100 BaseT auto-sense)
- RJ-45 X 1 for Flex Port, (10/100/1000 BaseT auto-sense)
- Reset Button X 1,
- Power switch X 1,
- USB host X 1

Dual WAN Interface

VDSL WAN

- Comply with G.993.2 (supporting profile 8a, 8b, 8c, 8d, 12a, 12b)
- MULTI-DSL bonded : up to 12a profile

GbE WAN

- 10/100/1000 Mbps
- RJ45 connector

LAN Interface

- Standard IEEE 802.3, IEEE 802.3u
- MDI/MDX support Yes
- Multiple Subnets on LAN

Wireless Interface

- IEEE802.11b/g/n
- 64, 128-bit Wired Equivalent Privacy (WEP) Data Encryption
- 11 Channels (US, Canada)/ 13 Channels (Europe)/ 14 Channels (Japan)
- Up to 300Mbps data rate
- Multiple BSSID
- MAC address filtering, WDS, WEP, WPA, WPA2, IEEE 802.1x
- 10,25,50,100mW@22MHz channel bandwidth output power level can be selected according to the environment

ATM Attributes

- RFC 2684 (RFC 1483) Bridge/Route;
- RFC 2516 (PPPoE); RFC 2364 (PPPoA); RFC 1577 (IPoA)
- Support up to 8 PVCs
- AAL type AAL5
- ATM service class UBR/CBR/VBR-rt/VBR-nrt
- ATM UNI support UNI 3.1/4.0
- OAM F4/F5

PTM Attributes

- ATM Adaptation Layer: Ethernet packet format
- Support 8 flows
- Support preemption and dual latency
- Support IEEE 802.1ag Ethernet CFM (Connectivity Fault Management)
- Support PTM shaping Latency.....Yes

Management

- Compliant with TR-069/TR-098/TR-104/TR-111 remote management protocols, SNMP, Telnet, Web-based management, Configuration backup and restoration,
- Software upgrade via HTTP / TFTP / FTP server

Networking Protocols

- RFC2684 VC-MUX, LLC/SNAP encapsulations for bridged or routed packet
- RFC2364 PPP over AAL5
- IPoA, PPPoA, PPPoE, Multiple PPPoE sessions on single PVC, PPPoE pass-through
- PPPoE filtering of on-PPPoE packets between WAN and LAN
- Transparent bridging between all LAN and WAN interfaces
- 802.1p/802.1q VLAN support
- Spanning Tree Algorithm
- IGMP Proxy V1/V2/V3, IGMP Snooping V1/V2/V3, Fast leave
- Static route, RIP v1/v2, ARP, RARP, SNTP, DHCP Server/Client/Relay,
- DNS Relay, Dynamic DNS,
- IPv6 subset

Security Functions

- PAP, CHAP, Packet and MAC address filtering, SSH,
- VPN termination
- Three level login: local admin, local user and remote technical support access

QoS

- Packet level QoS classification rules,
- Priority queuing using ATM TX queues,
- IP TOS/Precedence,
- 802.1p marking,
- DiffServ DSCP marking
- Src/dest MAC addresses classification

Firewall/Filtering

- Stateful Inspection Firewall
- Stateless Packet Filter
- Day-time Parental Control
- URI/URL filtering
- Denial of Service (DOS): ARP attacks, Ping attacks, Ping of Death, LAND,SYNC, Smurf, Unreachable, Teardrop
- TCP/IP/Port/interface filtering rules Support both incoming and outgoing filtering

NAT/NAPT

- Support Port Triggering and Port forwarding
- Symmetric port-overloading NAT, Full-Cone NAT
- Dynamic NAPT (NAPT N-to-1)
- Support DMZ host
- Virtual Server
- VPN Passthrough (PPTP, L2TP, IPSec)

Application Layer Gateway (ALG)

SIP, H.323, Yahoo messenger, ICQ, RealPlayer, Net2Phone, NetMeeting, MSN, X-box, Microsoft DirectX games and etc.

Power Supply .....Input: 100 - 240 Vac
Output: 12 Vdc / 1.5 A

Environment Condition

Operating temperature .....0 ~ 40 degrees Celsius
Relative humidity .....5 ~ 95% (non-condensing)

Dimensions .....205 mm (W) x 48 mm (H) x 145 mm (D)

Certifications..... FCC Part 15, FCC Part 68

Kit Weight

(1*NEXUSLINK 3111u, 1*RJ14 cable, 1*RJ45 cable, 1*power adapter, 1*CD-ROM) = 1.0 kg

NOTE: Specifications are subject to change without notice

Appendix D - SSH Client

Unlike Microsoft Windows, Linux OS has a ssh client included. For Windows users, there is a public domain one called "putty" that can be downloaded from here:

http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

To access the ssh client you must first enable SSH access for the LAN or WAN from the Management à Access Control à Services menu in the web user interface.

To access the router using the Linux ssh client

For LAN access, type: ssh -l root 192.168.1.1

For WAN access, type: ssh -l support *WAN IP address*

To access the router using the Windows "putty" ssh client

For LAN access, type: putty -ssh -l root 192.168.1.1

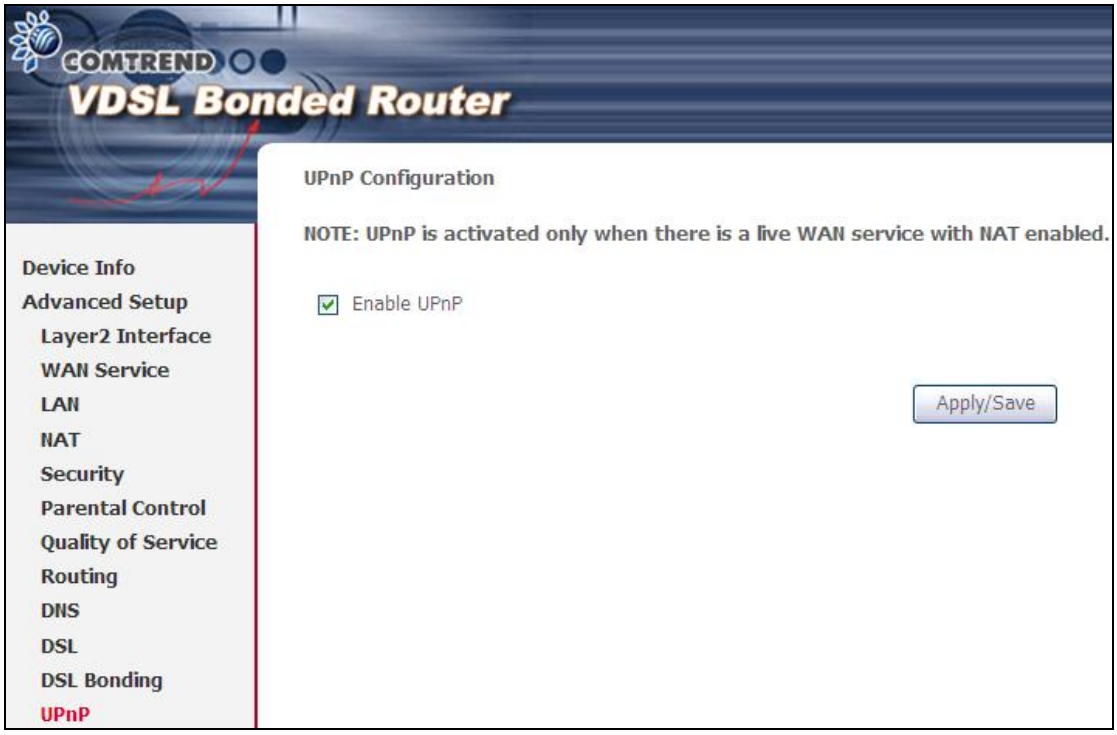
For WAN access, type: putty -ssh -l support *WAN IP address*

NOTE: The *WAN IP address* can be found on the Device Info à WAN screen

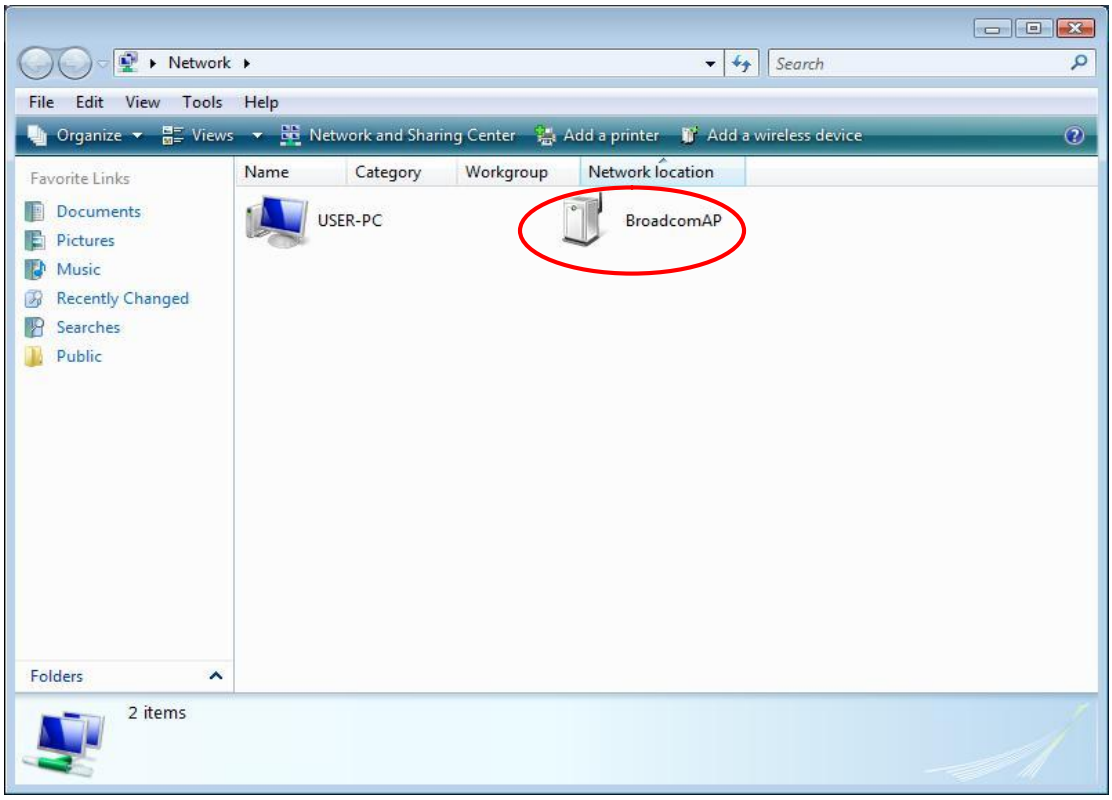
Appendix E - WSC External Registrar

Follow these steps to add an external registrar using the web user interface (WUI) on a personal computer running the Windows Vista operating system:

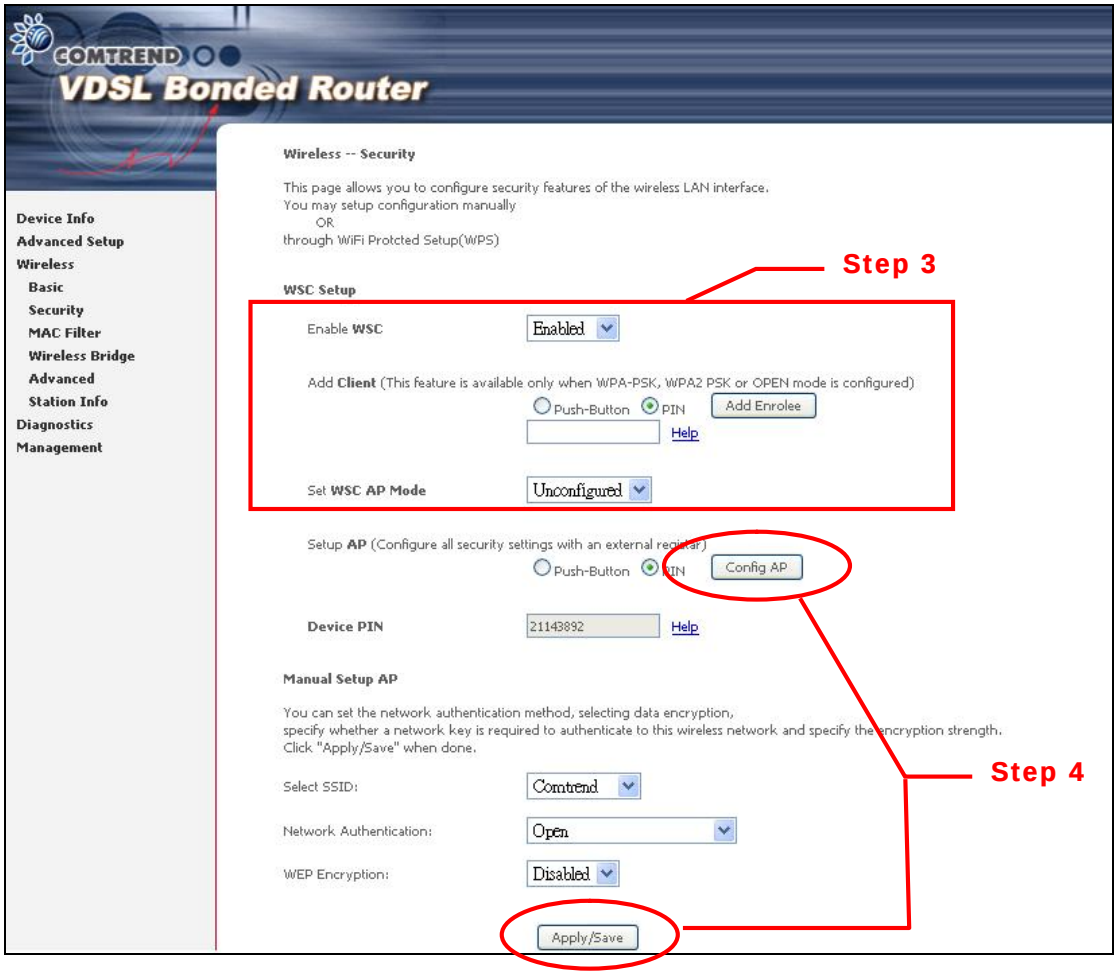
Step 1: Enable UPnP on the Advanced Setup.



Step 2: Open the Network folder and look for the BroadcomAP icon.

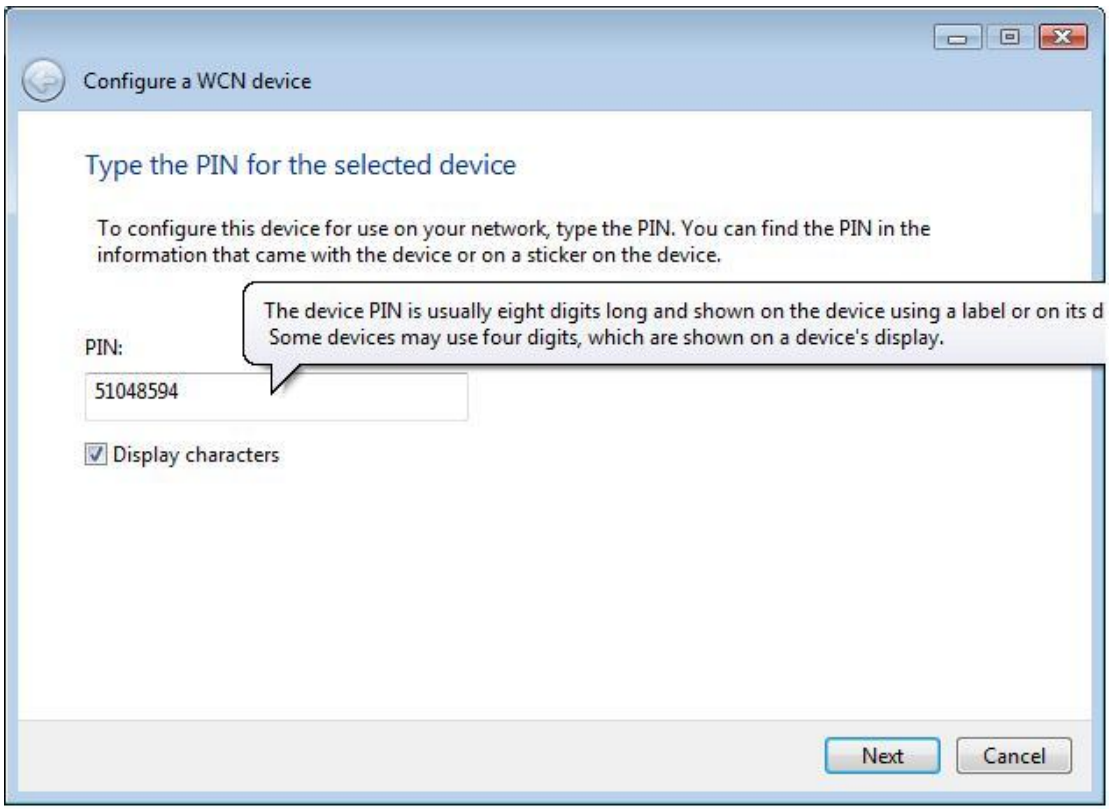


Step 3: On the Wireless à Security screen, enable WSC by selecting Enabled from the drop down list box and set the WSC AP Mode to Unconfigured.

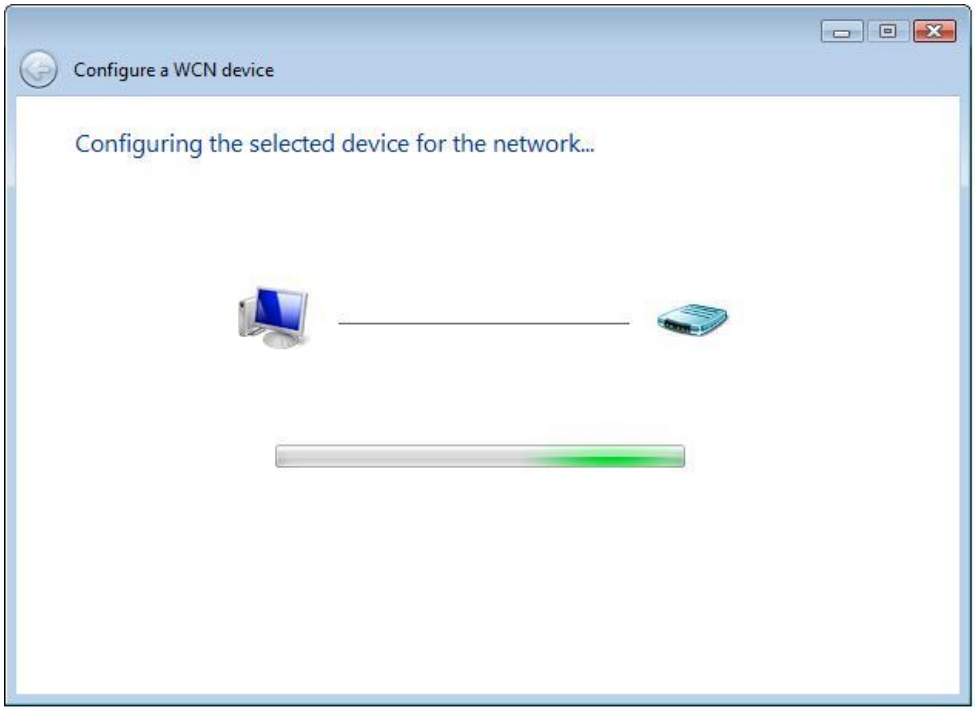


Step 4: Click the Save / Apply button at the bottom of the screen. The screen will go blank while the router applies the new Wireless settings. When the screen returns, press the Config AP button, as shown above.

Step 5: Now return to the Network folder and click the BroadcomAP icon. A dialog box will appear asking for the Device PIN number. Enter the Device PIN as shown on the Wireless à Security screen. Click Next.



Step 6: Windows Vista will attempt to configure the wireless security settings.



Step 7: If successful, the security settings will match those in Windows Vista.

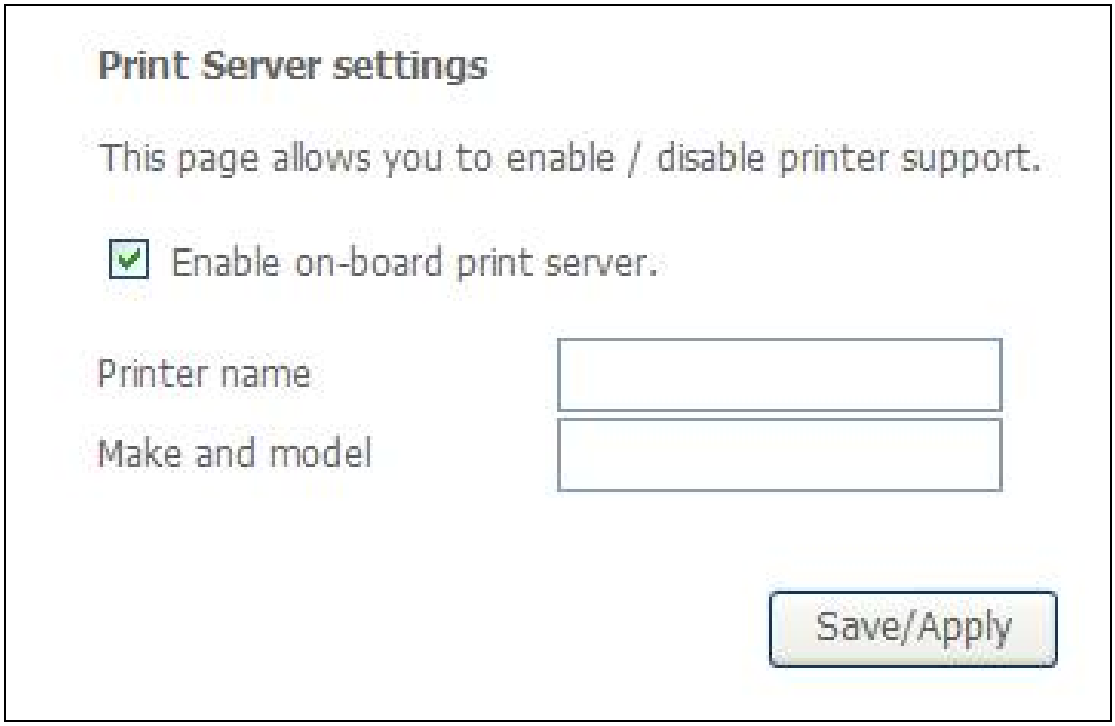
Appendix F - Printer Server

These steps explain the procedure for enabling the Printer Server.

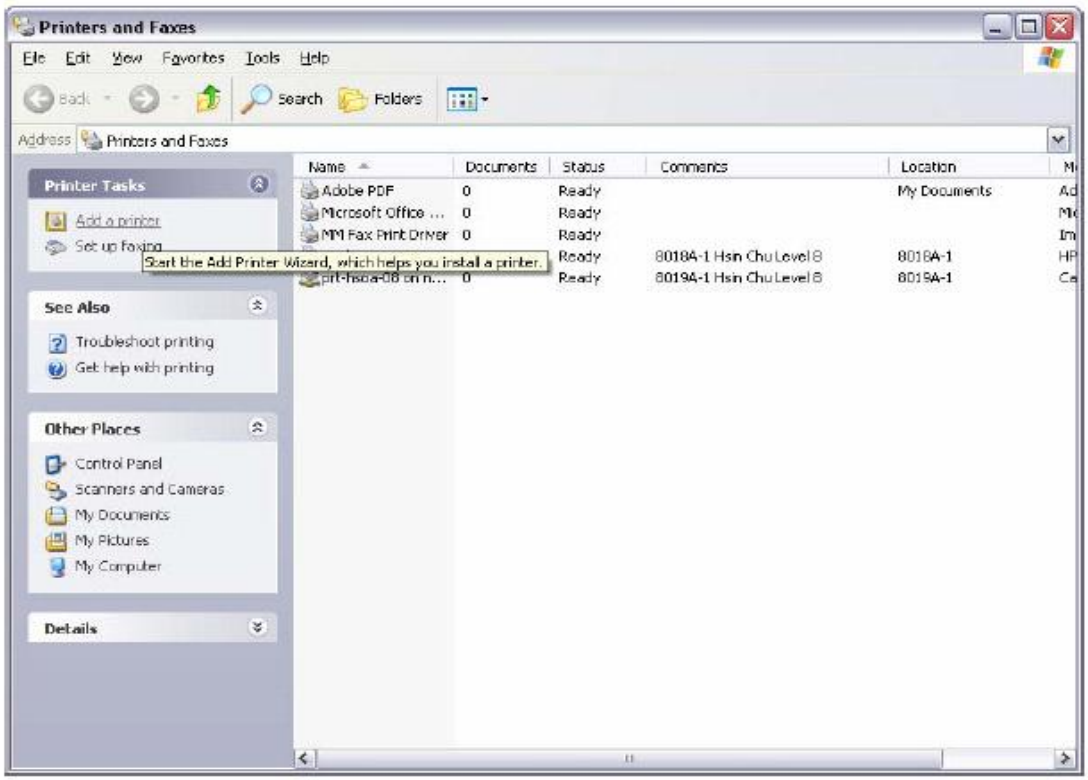
NOTE:	**This function only applies to models with an USB host port.**

STEP 1: Enable Print Server from Web User Interface. Select Enable on-board print server checkbox þ and enter Printer name and Make and model

NOTE:	**The Printer name can be any text string up to 40 characters.** **The Make and model can be any text string up to 128 characters.**

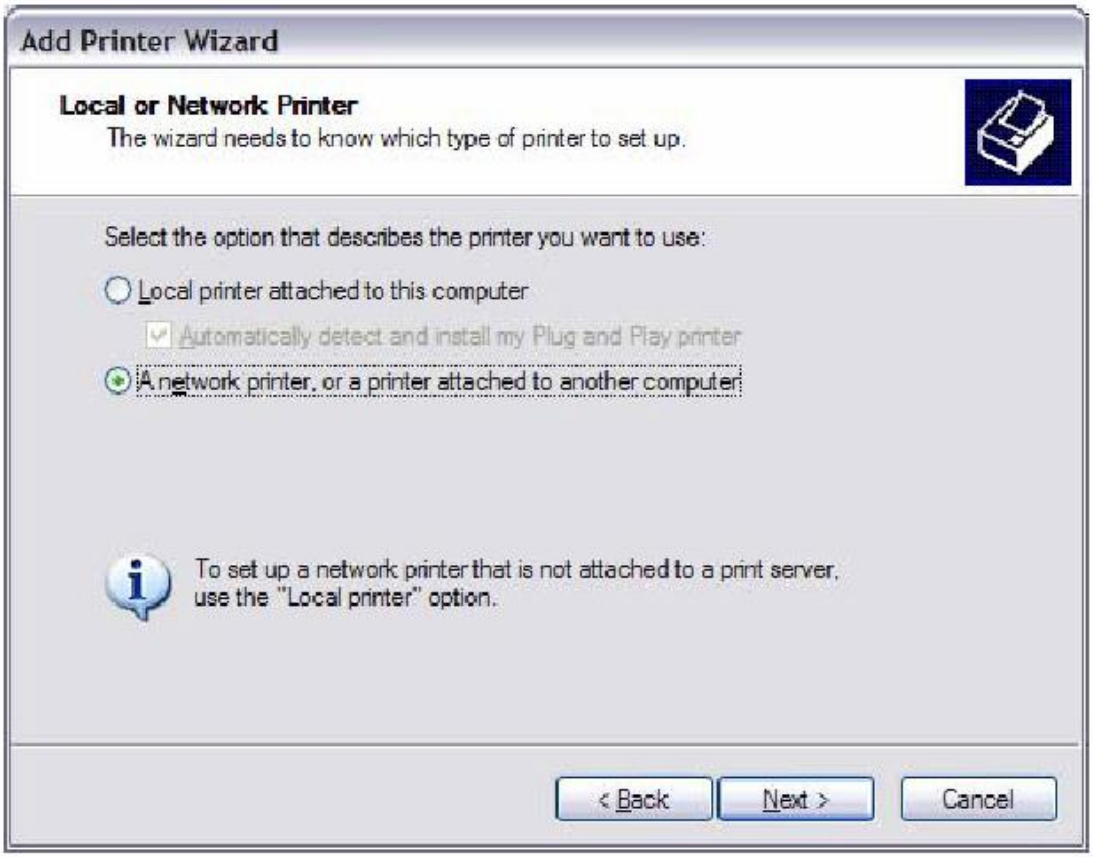


STEP 2: Go to the Printers and Faxes application in the Control Panel and select the Add a printer function (as located on the side menu below).



STEP 3: Click Next to continue when you see the dialog box below.

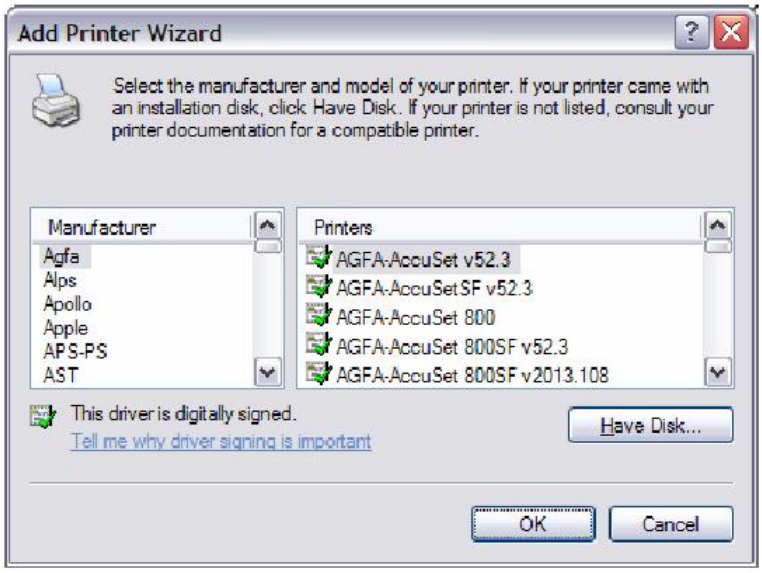
STEP 4: Select Network Printer and click Next.



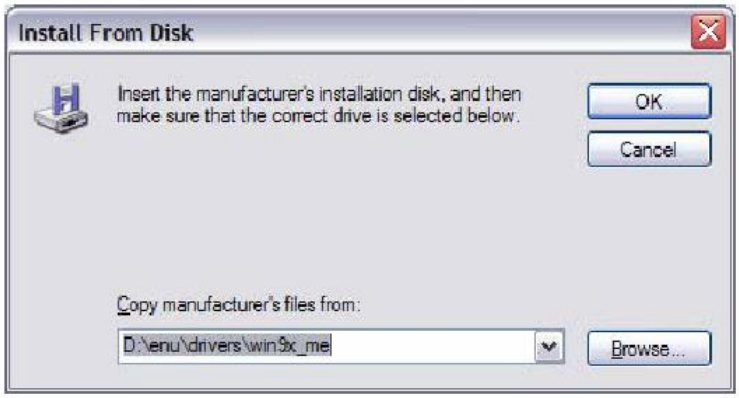
STEP 5: Select Connect to a printer on the Internet and enter your printer link. (e.g. http://192.168.1.1:631/printers/hp3845) and click Next.

NOTE:	**The printer name must be the same name entered in the VDSL modem WEB UI "printer server setting" as in step 1.**

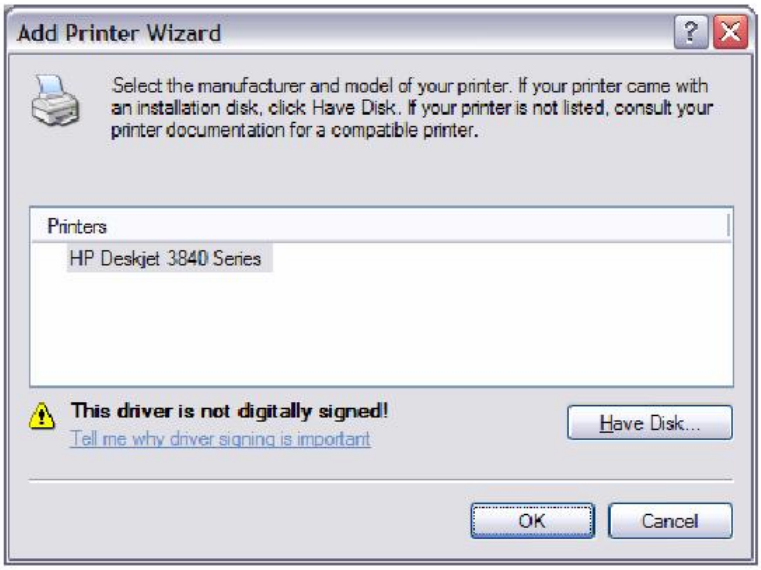
STEP 6: Click Have Disk and insert the printer driver CD.



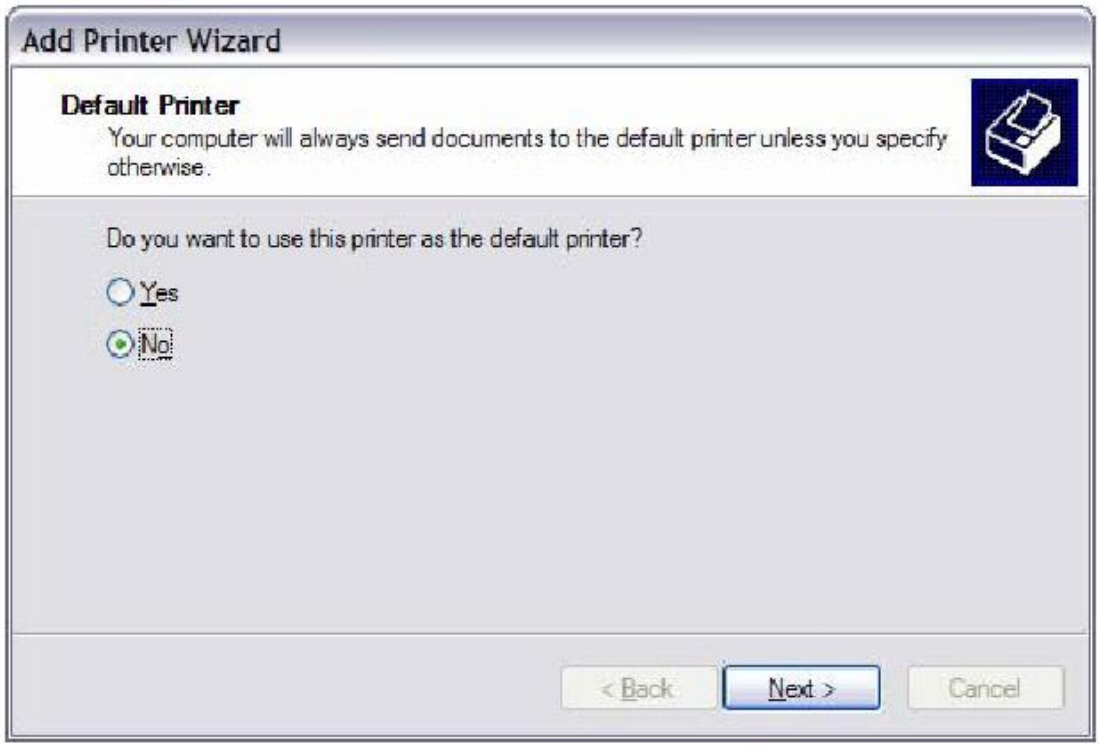
STEP 7: Select driver file directory on CD-ROM and click OK.



STEP 8: Once the printer name appears, click OK.

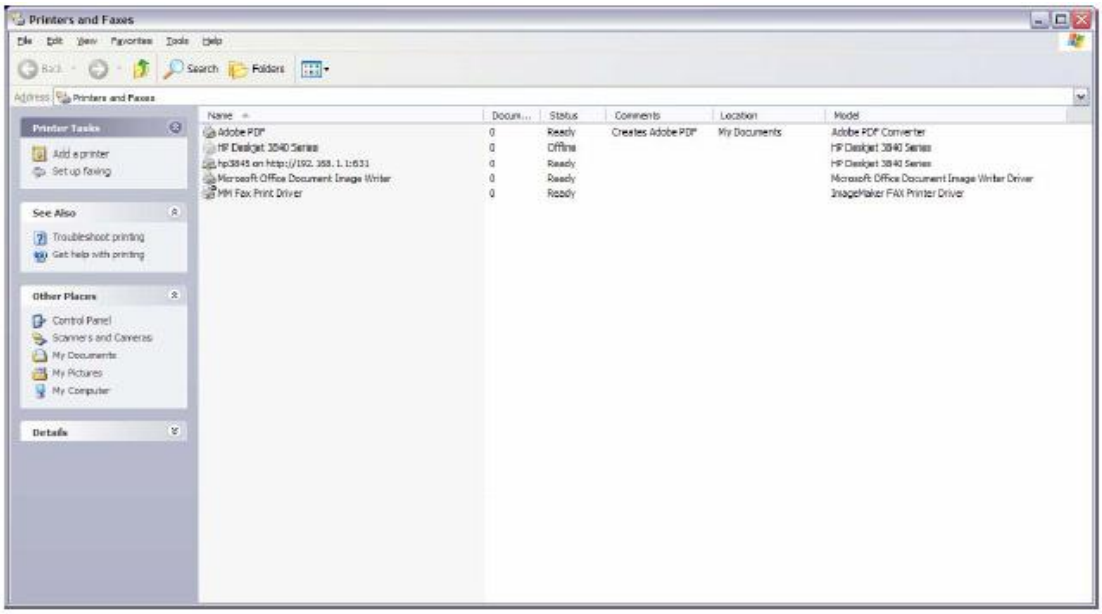


STEP 9: Choose Yes or No for default printer setting and click Next.



STEP 10: Click Finish.

STEP 11: Check the status of printer from Windows Control Panel, printer window. Status should show as Ready.



Appendix G - Connection Setup

Creating a WAN connection is a two-stage process.

1 - Setup a Layer 2 Interface (ATM, PTM or Ethernet).
2 - Add a WAN connection to the Layer 2 Interface.

The following sections describe each stage in turn.

G1 ~ Layer 2 Interfaces

Every layer2 interface operates in one of three modes: Default, VLAN Mux or MSC. A short introduction to each of these three modes is included below for reference. It is important to understand the differences between these connection modes, as they determine the number and types of connections that may be configured.

DEFAULT MODE

In this mode there is a 1:1 relationship between interfaces and WAN connections, in that an interface in default mode supports just one connection. However, unlike the multiple connection modes described below, it supports all five connection types. The figure below shows the five connection types available in ATM default mode.

Interface	Description	Type	Vlan8021p	VlanMuxId	ConnId	Igmp	NAT	Firewall	IPv6	Mld	Remove	Edit
atm0	br_0_0_35	Bridge	N/A	N/A	N/A	Disabled	N/A	Disabled	Disabled	Disabled	☐	Edit
atm1	ipoe_0_0_36	IPoE	N/A	N/A	N/A	Disabled	Enabled	Enabled	Disabled	Disabled	☐	Edit
ipoa0	ipoa_0_0_33	IPoA	N/A	N/A	N/A	Disabled	Enabled	Enabled	Disabled	Disabled	☐	Edit
ppp0	pppoe_0_0_37	PPPoE	N/A	N/A	N/A	Disabled	Enabled	Enabled	Disabled	Disabled	☐	Edit
pppoa1	pppoa_0_0_34	PPPoA	N/A	N/A	N/A	Disabled	Enabled	Enabled	Disabled	Disabled	☐	Edit

Add Remove

VLAN MUX MODE

This mode uses VLAN tags to allow for multiple connections over a single interface. PPPoE, IPoE, and Bridge are supported while PPPoA and IPoA connections are not. The figure below shows multiple connections over a single VLAN Mux interface.

Wide Area Network (WAN) Service Setup

Choose Add, Remove or Edit to configure a WAN service over a selected interface.

Interface	Description	Type	Vlan8021p	VlanMuxId	ConnId	Igmp	NAT	Firewall	IPv6	Mld	Remove	Edit
atm0.100	br_0_0_35.100	Bridge	2	100	N/A	Disabled	N/A	Disabled	Disabled	Disabled	☐	Edit
atm0.101	ipoe_0_0_35.101	IPoE	2	101	N/A	Disabled	Enabled	Enabled	Disabled	Disabled	☐	Edit
ppp0.102	pppoe_0_0_35.102	PPPoE	2	102	N/A	Disabled	Enabled	Enabled	Disabled	Disabled	☐	Edit

Add Remove

MSC MODE

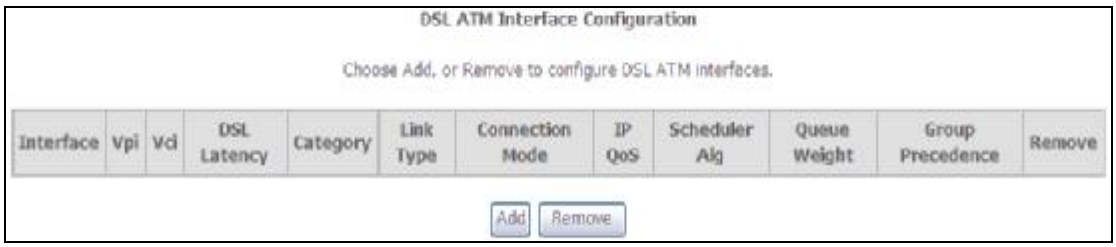
Multi-Service Connection (MSC) mode supports multiple connections over a single interface. As with VLAN Mux mode, PPPoA and IPoA connection types are not supported, while Bridging is unavailable for Ethernet WAN interfaces. After adding WAN connections to an interface, you must also create an Interface Group to connect LAN/WAN interfaces (see section G3 ~ More About MSC Mode).

G1.1 ATM Interfaces

Follow these procedures to configure an ATM interface.

NOTE:	**The NEXUSLINK 3111u supports up to 8 ATM interfaces.**

STEP 1: Go to Advanced Setup à Layer2 Interface à ATM Interface.

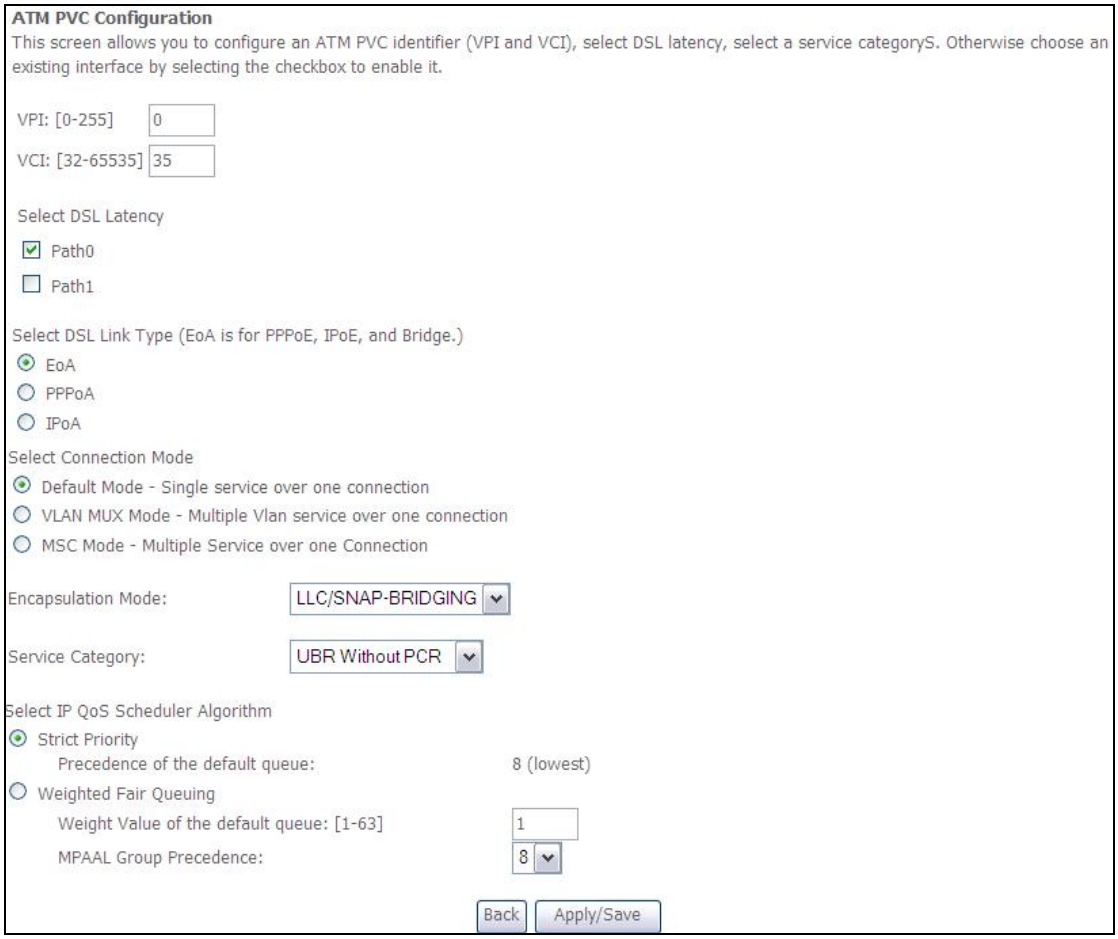


This table is provided here for ease of reference.

Heading	Description
Interface	WAN interface name.
VPI	ATM VPI (0-255)
VCI	ATM VCI (32-65535)
DSL Latency	{Path0} à portID = 0 {Path1} à port ID = 1 {Path0&1} à port ID = 4
Category	ATM service category
Link Type	Choose EoA (for PPPoE, IPoE, and Bridge), PPPoA, or IPoA.
Connection Mode	Default Mode – Single service over one connection Vlan Mux Mode – Multiple Vlan service over one connection MSC Mode – Multiple Service over one Connection
IP QoS	Quality of Service (QoS) status
Scheduler Alg	The algorithm used to schedule the dequeue behavior.
Queue Weight	The weight of the specified queue.
Group Precedence	The Precedence of the specified group.
Remove	Select items for removal

STEP 2: Click Add to proceed to the next screen.

NOTE:	**To add WAN connections to one interface type, you must delete existing connections from the other interface type using the remove button.**



There are many settings here including: VPI/VCI, DSL Latency, DSL Link Type, Encapsulation Mode, Service Category, Connection Mode and Quality of Service.

The table below shows xDSL Link Type availability with each Connection Mode.

	xDSL Link Type		
Connection Mode	**EoA***	**PPPoA**	**IPoA**
Default Mode	**OK**	**OK**	**OK**
VLAN Mux Mode	**OK**	**X**	**X**
MSC Mode	**OK**	**X**	**X**

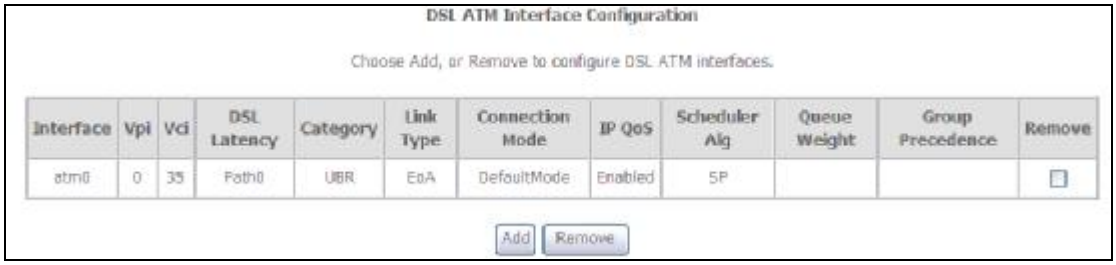
*** EoA includes PPPoE, IPoE, and Bridge link types.**

Here are the available encapsulations for each xDSL Link Type:

- **EoA- LLC/SNAP-BRIDGING, VC/MUX**
- **PPPoA- VC/MUX, LLC/ENCAPSULATION**
- **IPoA- LLC/SNAP-ROUTING, VC MUX**

STEP 3: Click Apply/Save to confirm your choices.

On the next screen, check that the ATM interface is added to the list. For example, an ATM interface on PVC 0/35 in Default Mode with an EoA Link type is shown below.



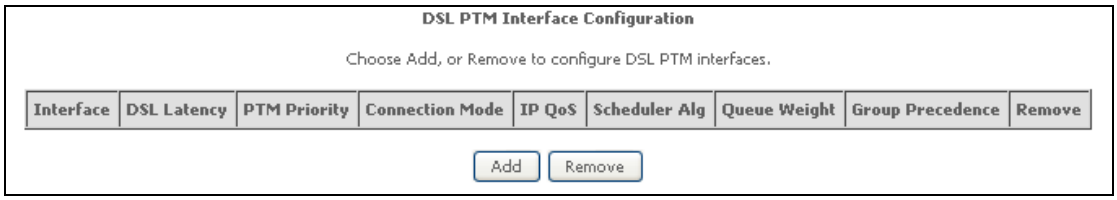
To add a WAN connection, go to section G2 ~ WAN Connections.

G1.2 PTM Interfaces

Follow these procedures to configure a PTM interface.

NOTE:	**The NEXUSLINK 3111u supports up to four PTM interfaces.**

STEP 4: Go to Advanced Setup à Layer2 Interface à PTM Interface.

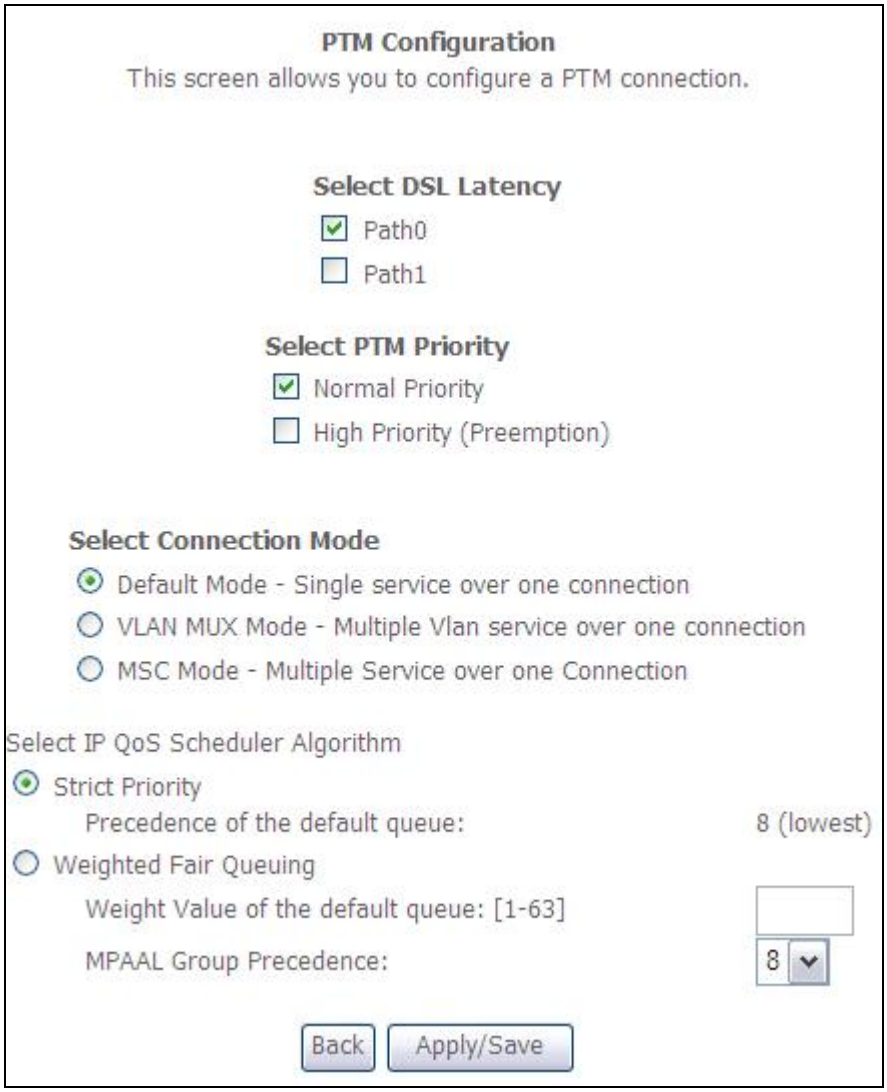


This table is provided here for ease of reference.

Heading	Description
Interface	WAN interface name.
DSL Latency	{Path0} à portID = 0 {Path1} à port ID = 1 {Path0&1} à port ID = 4
PTM Priority	Normal or High Priority (Preemption).
Connection Mode	Default Mode – Single service over one interface. Vlan Mux Mode – Multiple Vlan services over one interface. MSC Mode – Multiple Services over one interface.
IP QoS	Quality of Service (QoS) status.
Scheduler Alg	The algorithm used to schedule the dequeue behavior.
Queue Weight	The weight of the specified queue.
Group Precedence	The Precedence of the specified group.
Remove	Select interfaces to remove.

STEP 5: Click Add to proceed to the next screen.

NOTE:	**To add WAN connections to one interface type, you must delete existing connections from the other interface type using the remove button.**

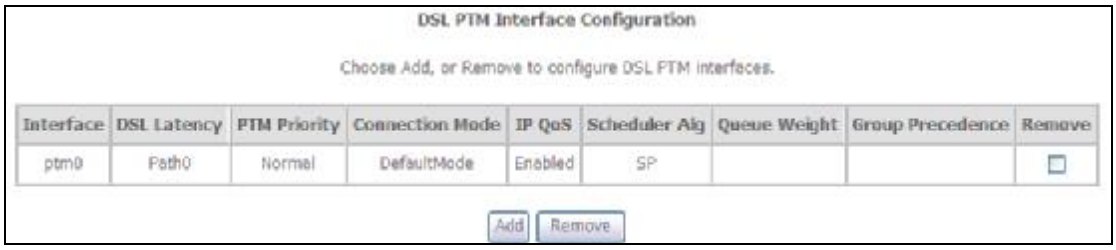


There are many settings that can be configured here including:
DSL Latency, PTM Priority, Connection Mode and Quality of Service.

STEP 6: Click Apply / Save to confirm your choices.

On the next screen, check that the PTM interface is added to the list.

For example, an PTM interface in Default Mode is shown below.



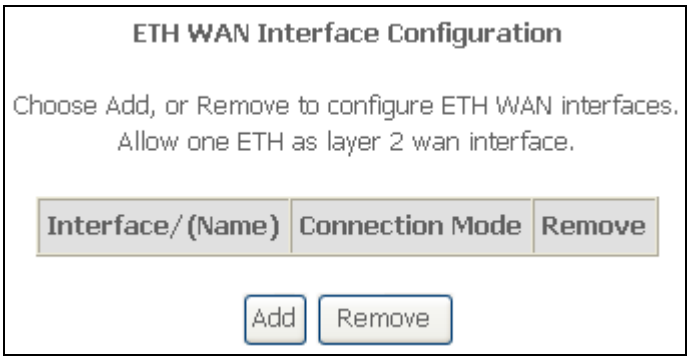
To add a WAN connection, go to section G2 ~ WAN Connections.

G1.3 Ethernet WAN Interface

Some models of the NEXUSLINK 3111u support a single Ethernet WAN interface over the ETH WAN port. Follow these procedures to configure an Ethernet WAN interface.

NOTE:	**To add WAN connections to one interface type, you must delete existing connections from the other interface type using the remove button.**

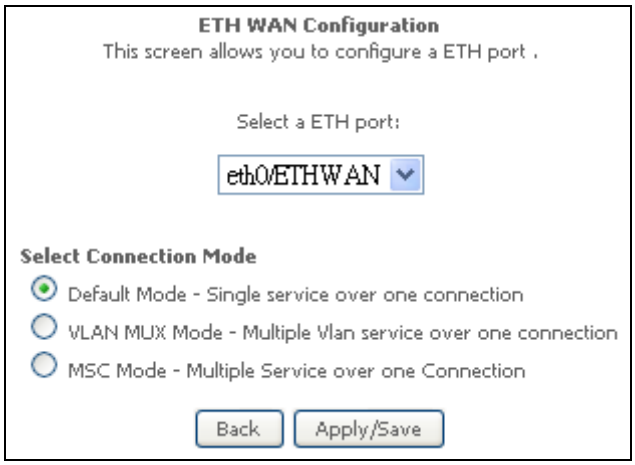
STEP 1: Go to Advanced Setup à Layer2 Interface à ETH Interface.



This table is provided here for ease of reference.

Heading	Description
Interface/ (Name)	ETH WAN Interface
Connection Mode	Default Mode – Single service over one connection Vlan Mux Mode – Multiple Vlan service over one connection MSC Mode – Multiple Service over one Connection
Remove	Select the checkbox and click Remove to remove the connection.

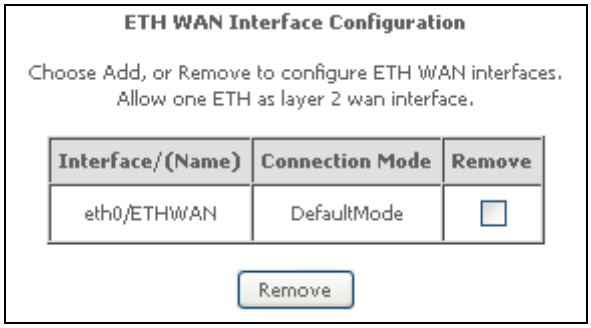
STEP 2: Click Add to proceed to the next screen.



STEP 3: Select a Connection Mode from the options shown above.

STEP 4: Click Apply / Save to confirm your choice.

The figure below shows an Ethernet WAN interface configured in Default Mode.



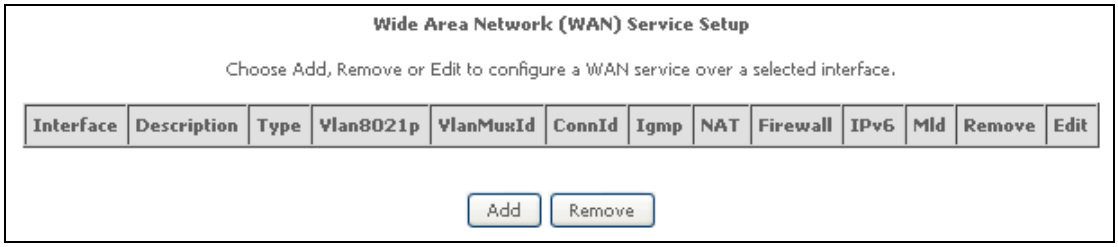
To add a WAN connection, go to section G2 ~ WAN Connections.

G2 ~ WAN Connections

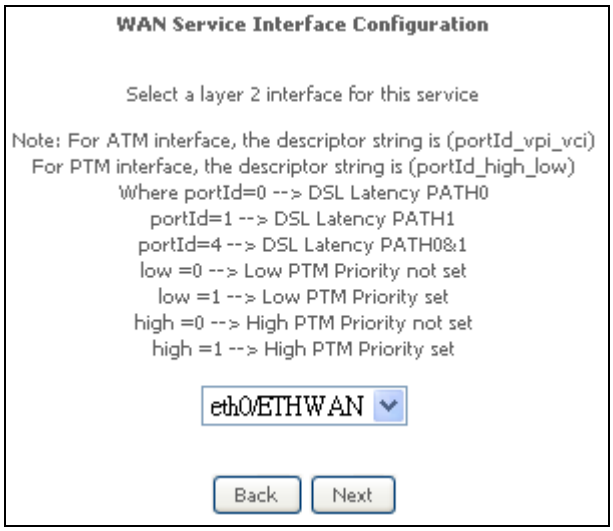
In Default Mode, the NEXUSLINK 3111u supports one WAN connection for each interface, up to a maximum of 8 connections. VLAN Mux and MSC support up to 16 connections.

To setup a WAN connection follow these instructions.

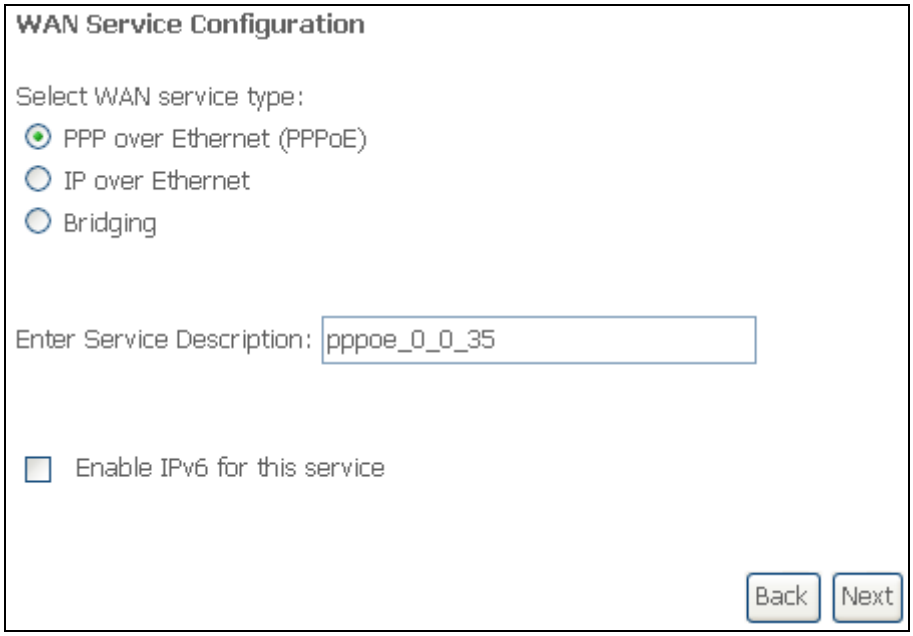
STEP 1: Go to the Advanced Setup à WAN Service screen.



STEP 2: Click Add to create a WAN connection. The following screen will display.

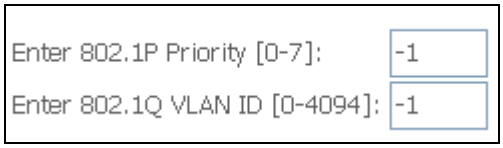


STEP 3: **Choose a layer 2 interface from the drop-down box and click Next. The WAN Service Configuration screen will display as shown below.**



NOTE:	**The WAN services shown here are those supported by the layer 2 interface you selected in the previous step. If you wish to change your selection click the Back button and select a different layer 2 interface.**

STEP 4: **For VLAN Mux Connections only, you must enter Priority & VLAN ID tags.**



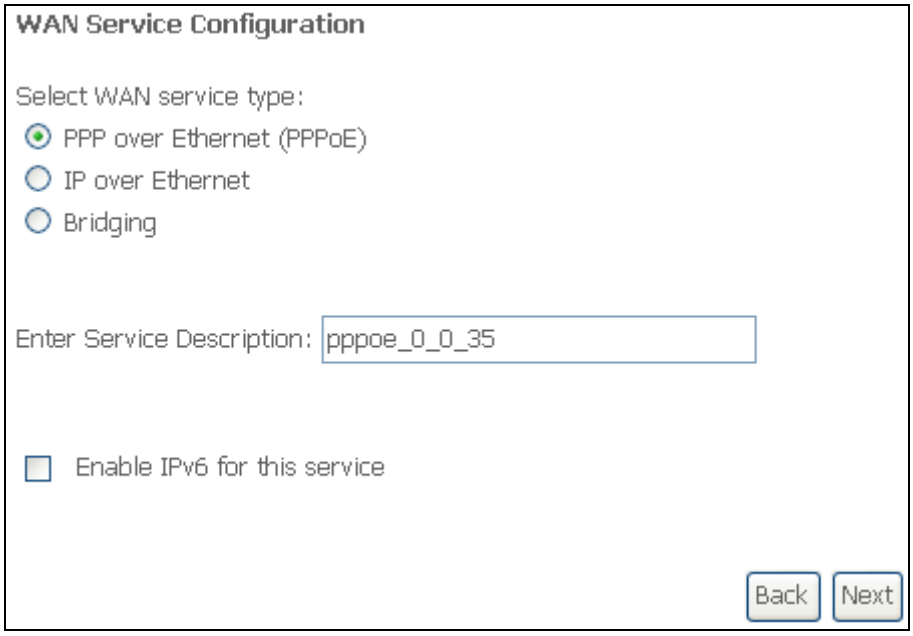
STEP 5: **You will now follow the instructions specific to the WAN service type you wish to establish. This list should help you locate the correct procedure:**

(1) For G2.1 PPP over ETHERNET (PPPoE), go to page 123.
(2) For G2.2 IP over ETHERNET (IPoE), go to page 128.
(3) For G2.3 Bridging, go to page 133.
(4) For G2.4 PPP over ATM (PPPoA), go to page 134.
(5) For G2.5 IP over ATM (IPoA), go to page 137.

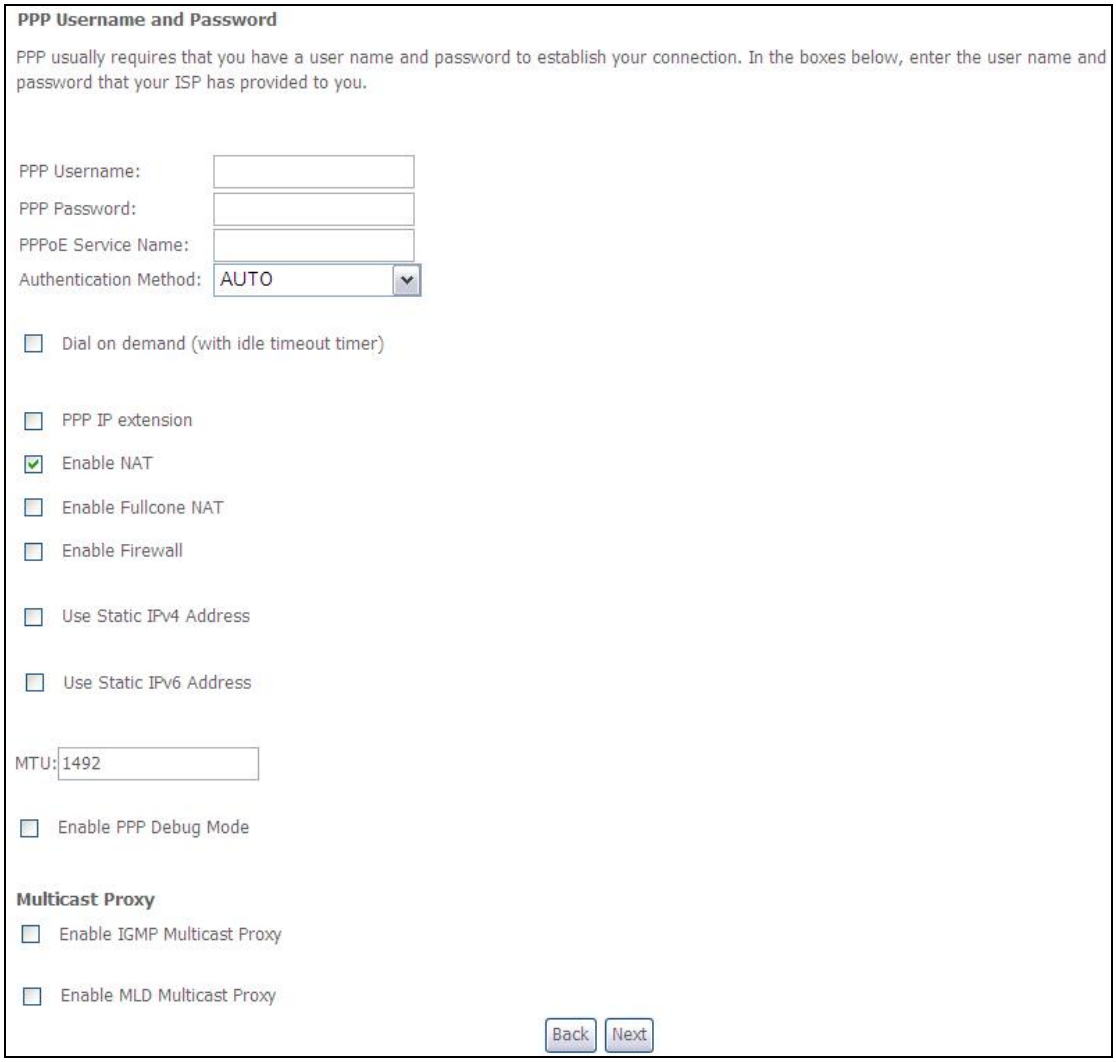
The subsections that follow continue the WAN service setup procedure.

G2.1 PPP over ETHERNET (PPPoE)

STEP 1: Select the PPP over Ethernet radio button and click Next. You can also enable IPv6 by ticking the checkbox þ at the bottom of this screen.



STEP 2: On the next screen, enter the PPP settings as provided by your ISP. Click Next to continue or click Back to return to the previous step.



The settings shown above are described below.

PPP SETTINGS

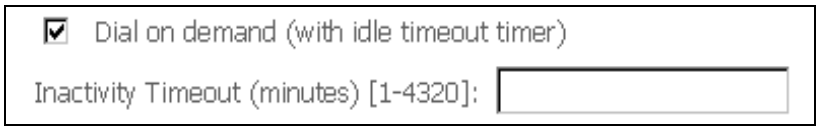
The PPP Username, PPP password and the PPPoE Service Name entries are dependent on the particular requirements of the ISP. The user name can be a maximum of 256 characters and the password a maximum of 32 characters in length. For Authentication Method, choose from AUTO, PAP, CHAP, and MSCHAP.

ENABLE FULLCONE NAT

This option becomes available when NAT is enabled. Known as one-to-one NAT, all requests from the same internal IP address and port are mapped to the same external IP address and port. An external host can send a packet to the internal host, by sending a packet to the mapped external address.

DIAL ON DEMAND

The NEXUSLINK 3111u can be configured to disconnect if there is no activity for a period of time by selecting the Dial on demand checkbox þ. You must also enter an inactivity timeout period in the range of 1 to 4320 minutes.



PPP IP EXTENSION

The PPP IP Extension is a special feature deployed by some service providers. Unless your service provider specifically requires this setup, do not select it.

PPP IP Extension does the following:

- **Allows only one PC on the LAN.**
- **Disables NAT and Firewall.**
- **The device becomes the default gateway and DNS server to the PC through DHCP using the LAN interface IP address.**
- **The device extends the IP subnet at the remote service provider to the LAN PC. i.e. the PC becomes a host belonging to the same IP subnet.**
- **The device bridges the IP packets between WAN and LAN ports, unless the packet is addressed to the device's LAN IP address.**
- **The public IP address assigned by the remote side using the PPP/IPCP protocol is actually not used on the WAN PPP interface. Instead, it is forwarded to the PC LAN interface through DHCP. Only one PC on the LAN can be connected to the remote, since the DHCP server within the device has only a single IP address to assign to a LAN device.**

ENABLE NAT

If the LAN is configured with a private IP address, the user should select this checkbox þ. The NAT submenu will appear in the Advanced Setup menu after reboot. On the other hand, if a private IP address is not used on the LAN side (i.e. the LAN side is using a public IP), this checkbox þ should not be selected to free up system resources for better performance.

ENABLE FIREWALL

If this checkbox þ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox þ should not be selected to free up system resources for better performance.

USE STATIC IPv4 ADDRESS

Unless your service provider specially requires it, do not select this checkbox þ. If selected, enter the static IP address in the IPv4 Address field. Don't forget to adjust the IP configuration to Static IP Mode as described in 3.2 IP Configuration.

USE STATIC IPv6 ADDRESS

This option displays when IPv6 is enabled. Unless your service provider specially requires it, do not select this checkbox þ. If selected, enter the static IP address in the IPv6 Address field along with a value for Prefix Length. Don't forget to adjust the IP configuration to Static IP Mode as described in 3.2 IP Configuration.

MTU

Maximum Transmission Unit. The size (in bytes) of largest protocol data unit which the layer can pass onwards. This value is 1492 for PPPoE.

ENABLE PPP DEBUG MODE

When this option is selected, the system will put more PPP connection information into the system log. This is for debugging errors and not for normal usage.

ENABLE IGMP MULTICAST PROXY
Tick the checkbox þ to enable Internet Group Membership Protocol (IGMP) multicast. This protocol is used by IPv4 hosts to report their multicast group memberships to any neighboring multicast routers.

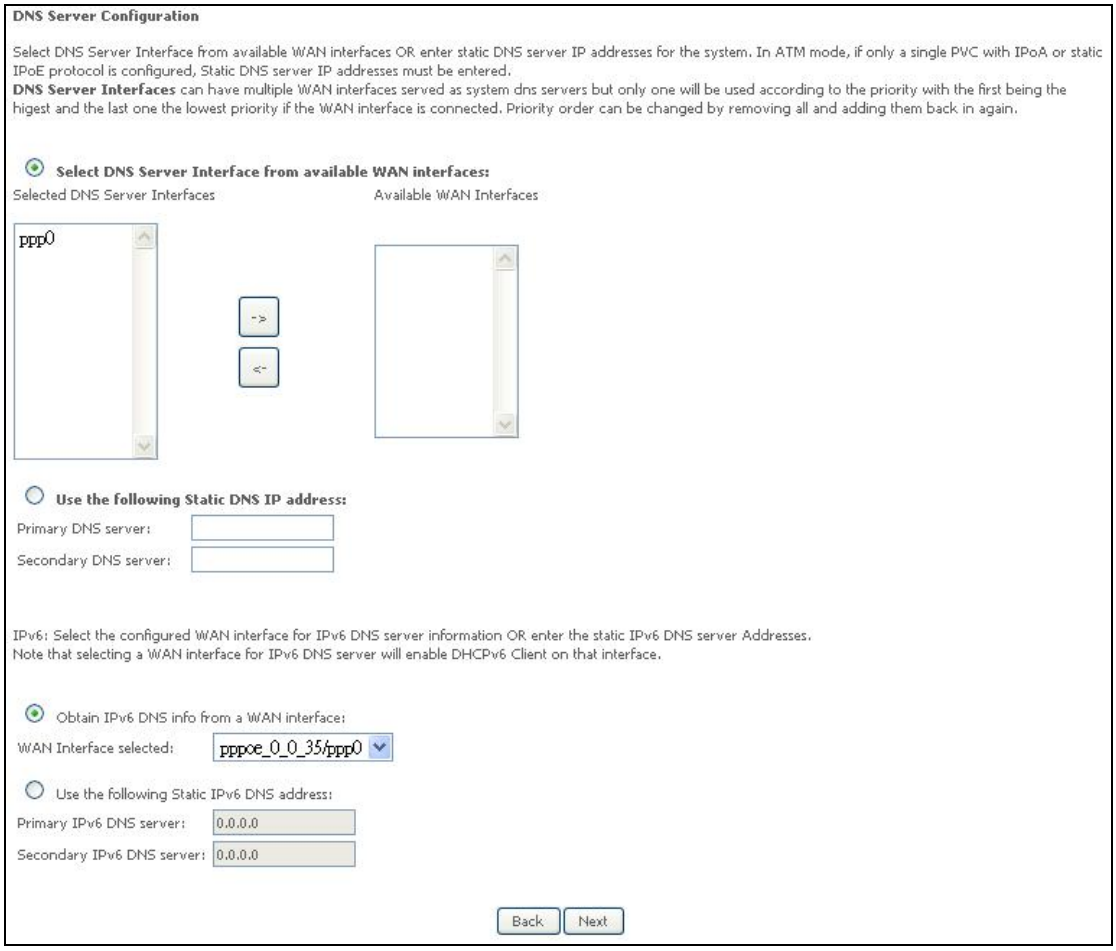
ENABLE MLD MULTICAST PROXY
This option displays when IPv6 is enabled. Tick the checkbox þ to enable Multicast Listener Discovery (MLD). This protocol is used by IPv6 hosts to report their multicast group memberships to any neighboring multicast routers.

STEP 3: Choose an interface to be the default gateway.

Click Next to continue or click Back to return to the previous step.

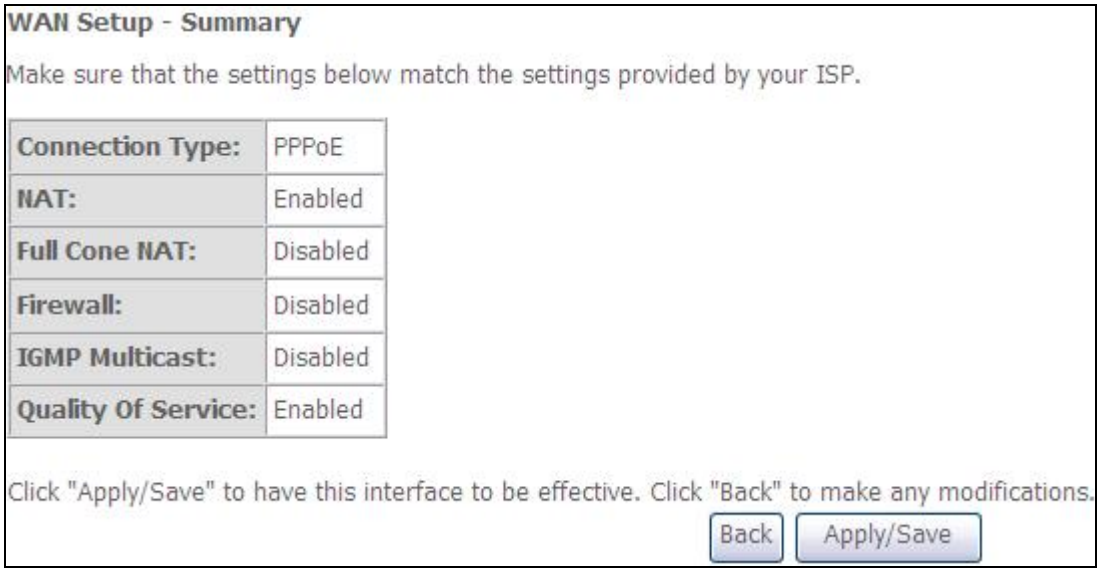
STEP 4:

Select DNS Server Interface from available WAN interfaces OR enter static DNS server IP addresses for the system. In ATM mode, if only a single PVC with IPoA or static IPoE protocol is configured, Static DNS server IP addresses must be entered.



Click Next to continue or click Back to return to the previous step.

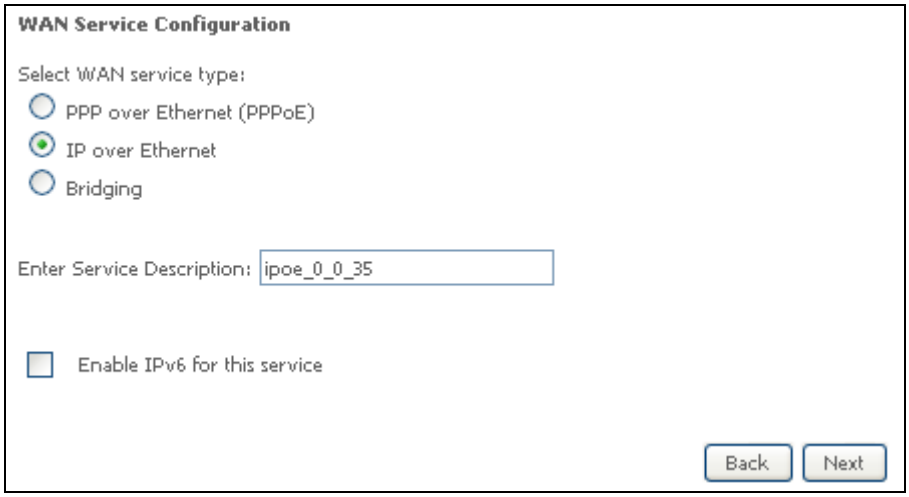
STEP 5: The WAN Setup - Summary screen shows a preview of the WAN service you have configured. Check these settings and click Apply / Save if they are correct, or click Back to modify them.



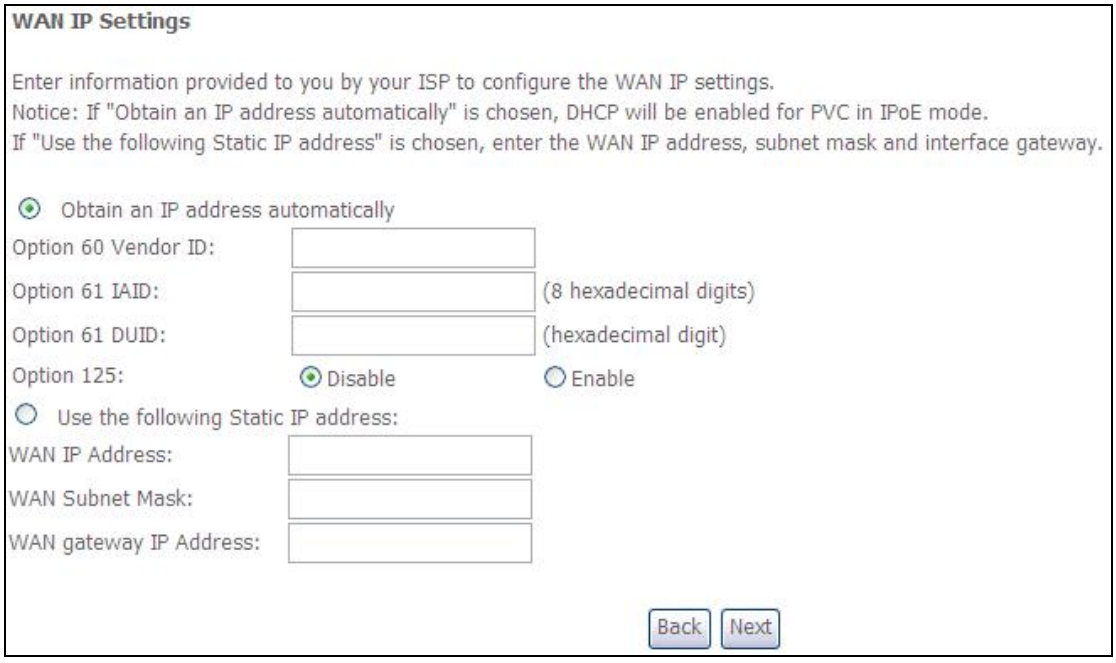
After clicking Apply / Save, the new service should appear on the main screen. To activate it you must reboot. Go to Management à Reboot and click Reboot.

G2.2 IP over ETHERNET (IPoE)

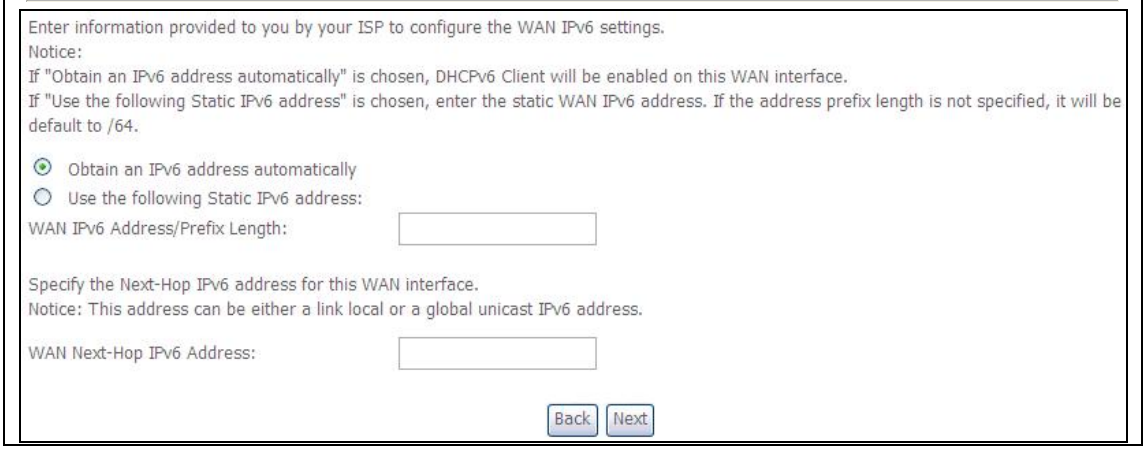
STEP 1: Select the IP over Ethernet radio button and click Next. You can also enable IPv6 by ticking the checkbox þ at the bottom of this screen.



STEP 2: The WAN IP settings screen provides access to the DHCP server settings. You can select the Obtain an IP address automatically radio button to enable DHCP (use the DHCP Options only if necessary). However, if you prefer, you can instead use the Static IP address method to assign WAN IP address, Subnet Mask and Default Gateway manually.

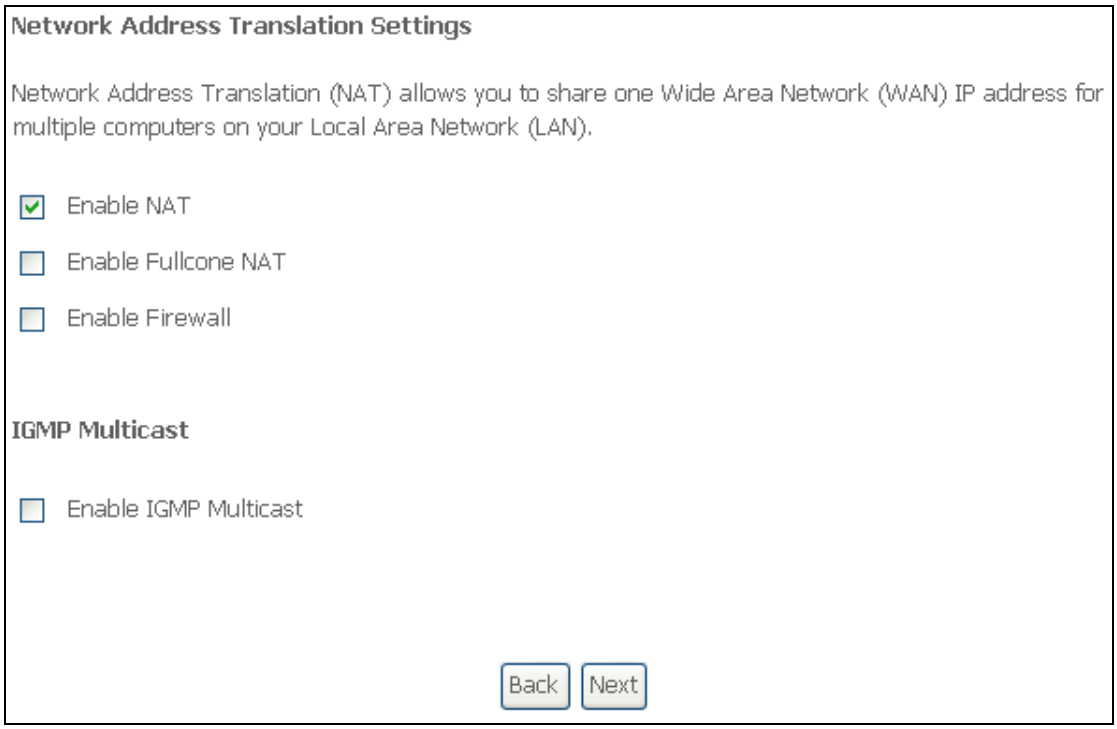


NOTE: **If IPv6 networking is enabled, an additional set of instructions, radio buttons, and text entry boxes will appear at the bottom of the screen. These configuration options are quite similar to those for IPv4 networks.**



Click Next to continue or click Back to return to the previous step.

STEP 3: **This screen provides access to NAT, Firewall and IGMP Multicast settings. Enable each by selecting the appropriate checkbox þ. Click Next to continue or click Back to return to the previous step.**



ENABLE NAT

If the LAN is configured with a private IP address, the user should select this checkbox þ. The NAT submenu will appear in the Advanced Setup menu after reboot. On the other hand, if a private IP address is not used on the LAN side (i.e. the LAN side is using a public IP), this checkbox þ should not be selected, so as to free up system resources for improved performance.

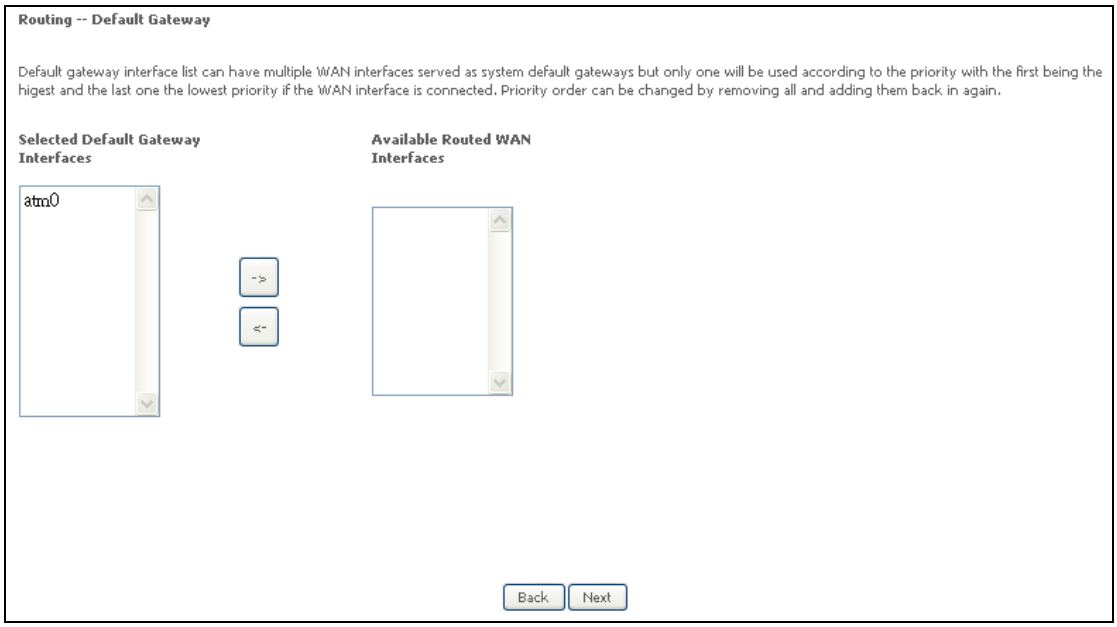
ENABLE FULLCONE NAT
This option becomes available when NAT is enabled. Known as one-to-one NAT, all requests from the same internal IP address and port are mapped to the same external IP address and port. An external host can send a packet to the internal host, by sending a packet to the mapped external address.

ENABLE FIREWALL
If this checkbox þ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox þ should not be selected so as to free up system resources for better performance.

ENABLE IGMP MULTICAST
Tick the checkbox þ to enable Internet Group Membership Protocol (IGMP) multicast. IGMP is a protocol used by IPv4 hosts to report their multicast group memberships to any neighboring multicast routers.

ENABLE MLD MULTICAST PROXY
This option displays when IPv6 is enabled. Tick the checkbox þ to enable Multicast Listener Discovery (MLD). This protocol is used by IPv6 hosts to report their multicast group memberships to any neighboring multicast routers.

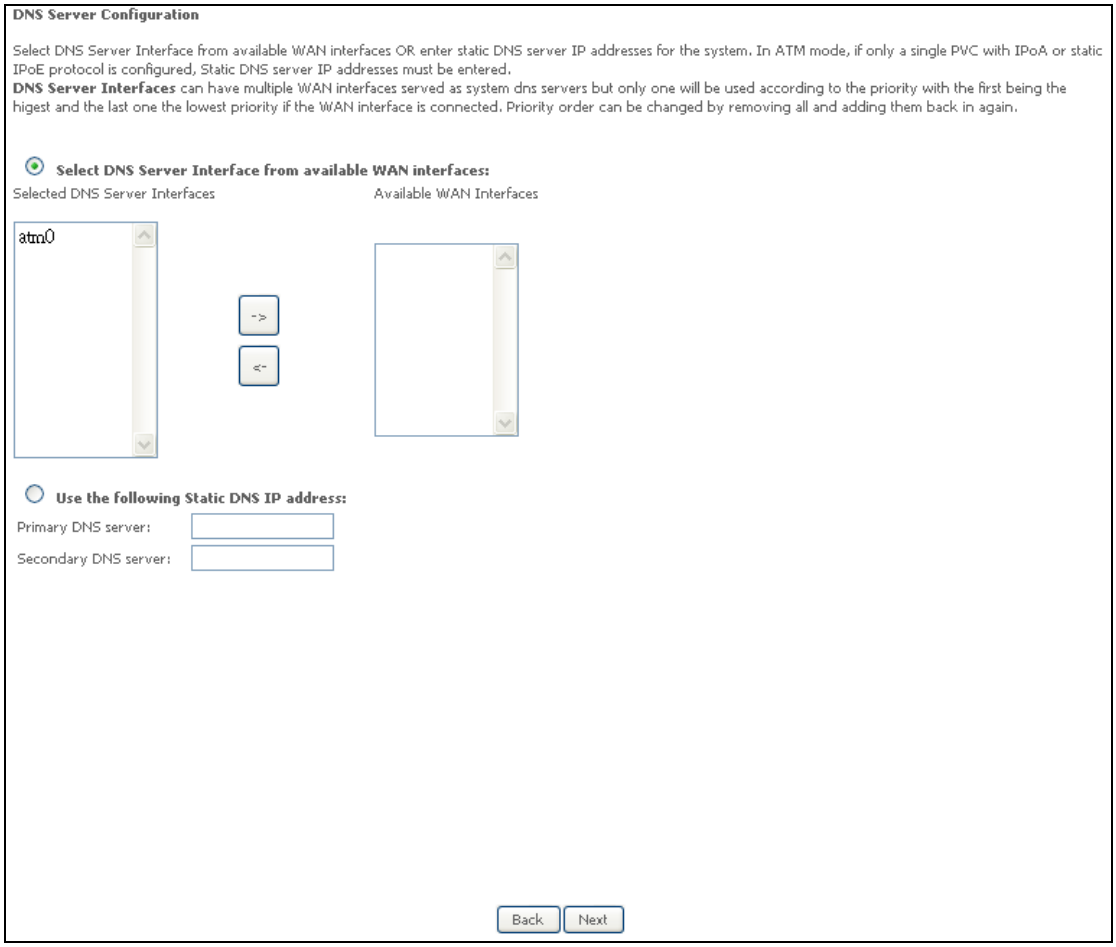
STEP 4: Choose an interface to be the default gateway.



Click Next to continue or click Back to return to the previous step.

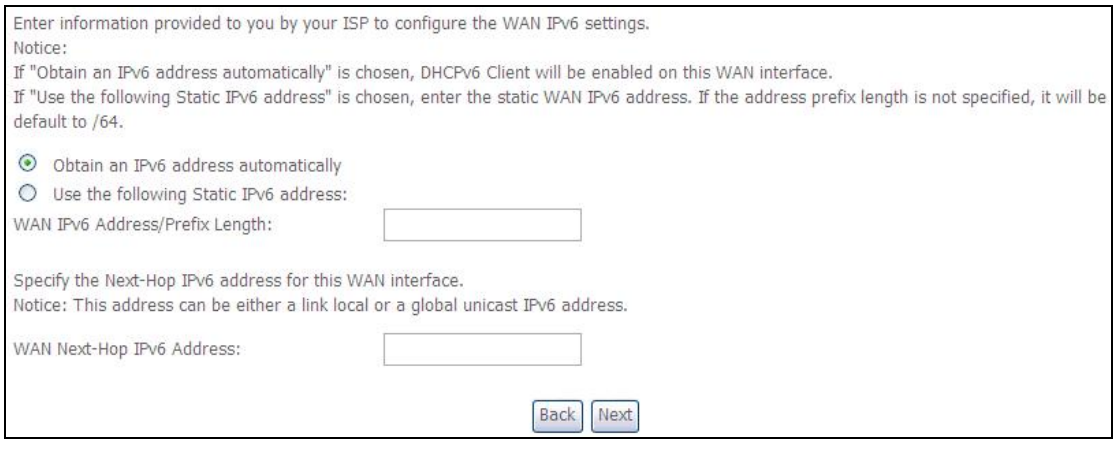
STEP 5:

Select DNS Server Interface from available WAN interfaces OR enter static DNS server IP addresses for the system. In ATM mode, if only a single PVC with IPoA or static IPoE protocol is configured, Static DNS server IP addresses must be entered.



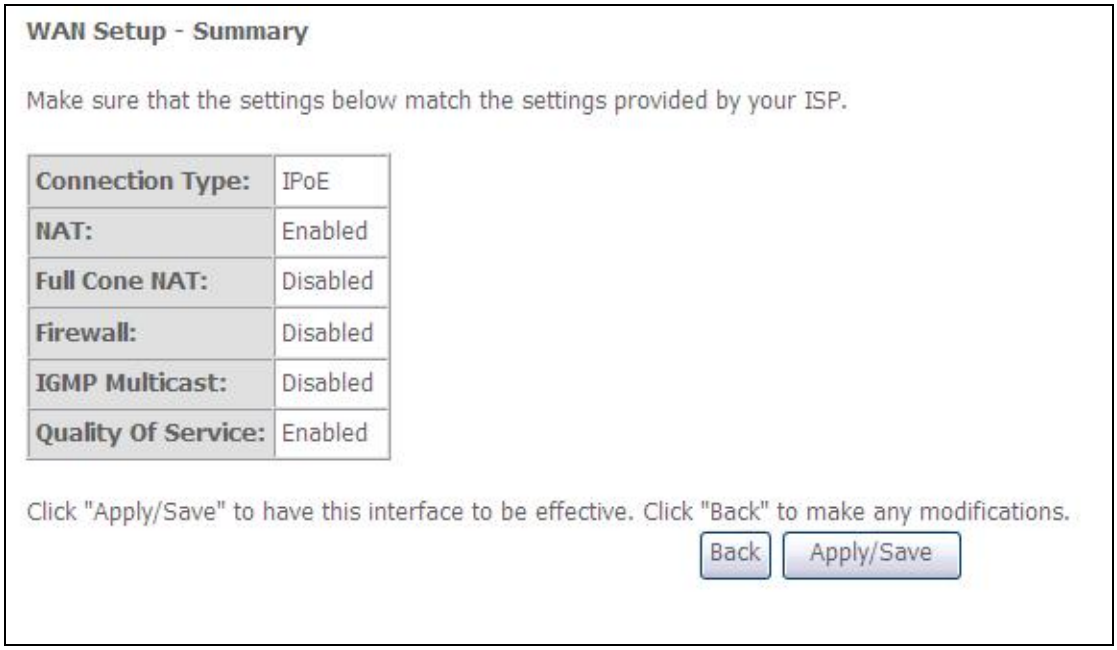
Click Next to continue or click Back to return to the previous step.

If IPv6 is enabled, an additional set of options will be shown.



Click Next to continue or click Back to return to the previous step.

STEP 6: The WAN Setup - Summary screen shows a preview of the WAN service you have configured. Check these settings and click Apply / Save if they are correct, or click Back to modify them.

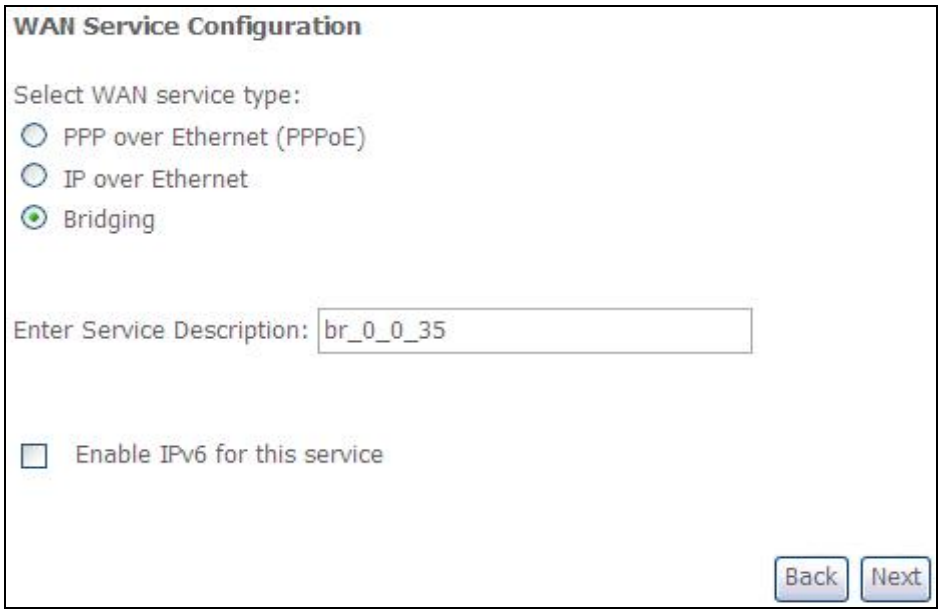


After clicking Apply / Save, the new service should appear on the main screen. To activate it you must reboot. Go to Management à Reboot and click Reboot.

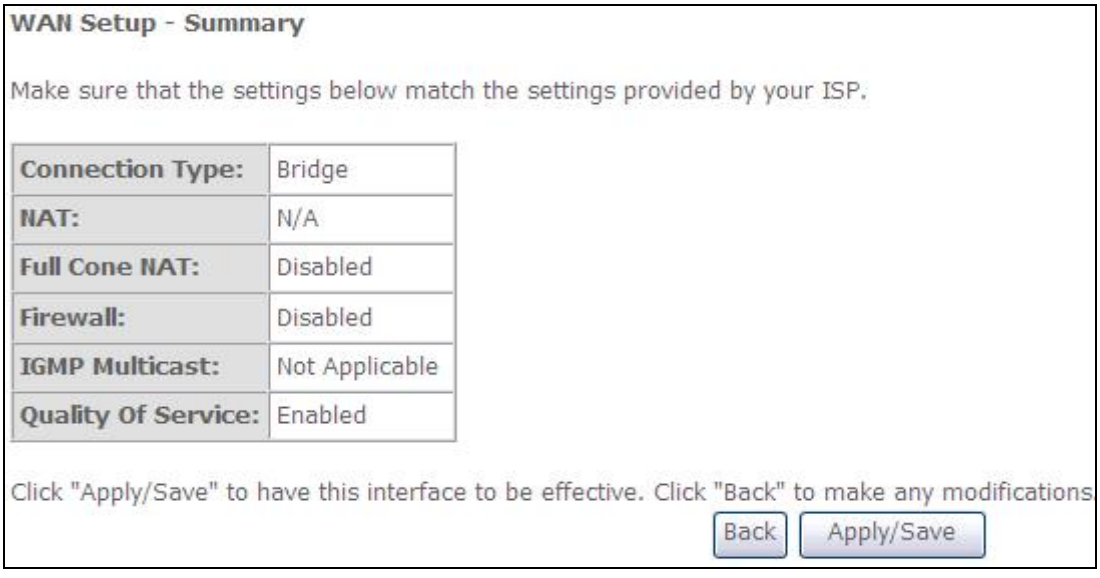
G2.3 Bridging

NOTE:	This connection type is not available on the Ethernet WAN interface.

STEP 1: **Select the Bridging radio button and click Next. You can also enable IPv6 by ticking the checkbox þ at the bottom of this screen.**



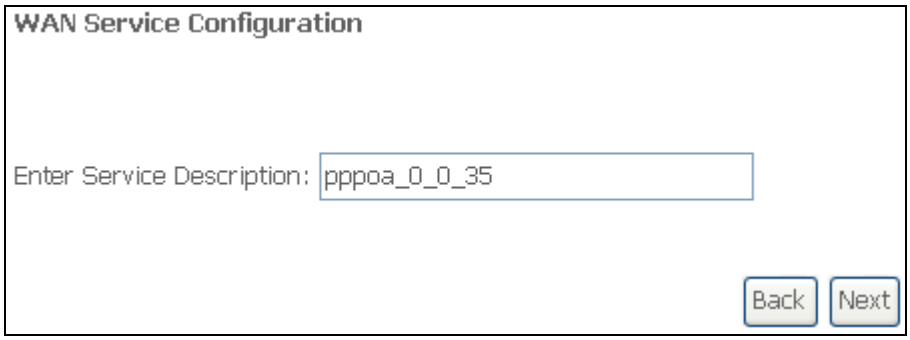
STEP 2: **The WAN Setup - Summary screen shows a preview of the WAN service you have configured. Check these settings and click Apply / Save if they are correct, or click Back to return to the previous screen.**



After clicking Apply / Save, the new service should appear on the main screen. To activate it you must reboot. Go to Management à Reboot and click Reboot.

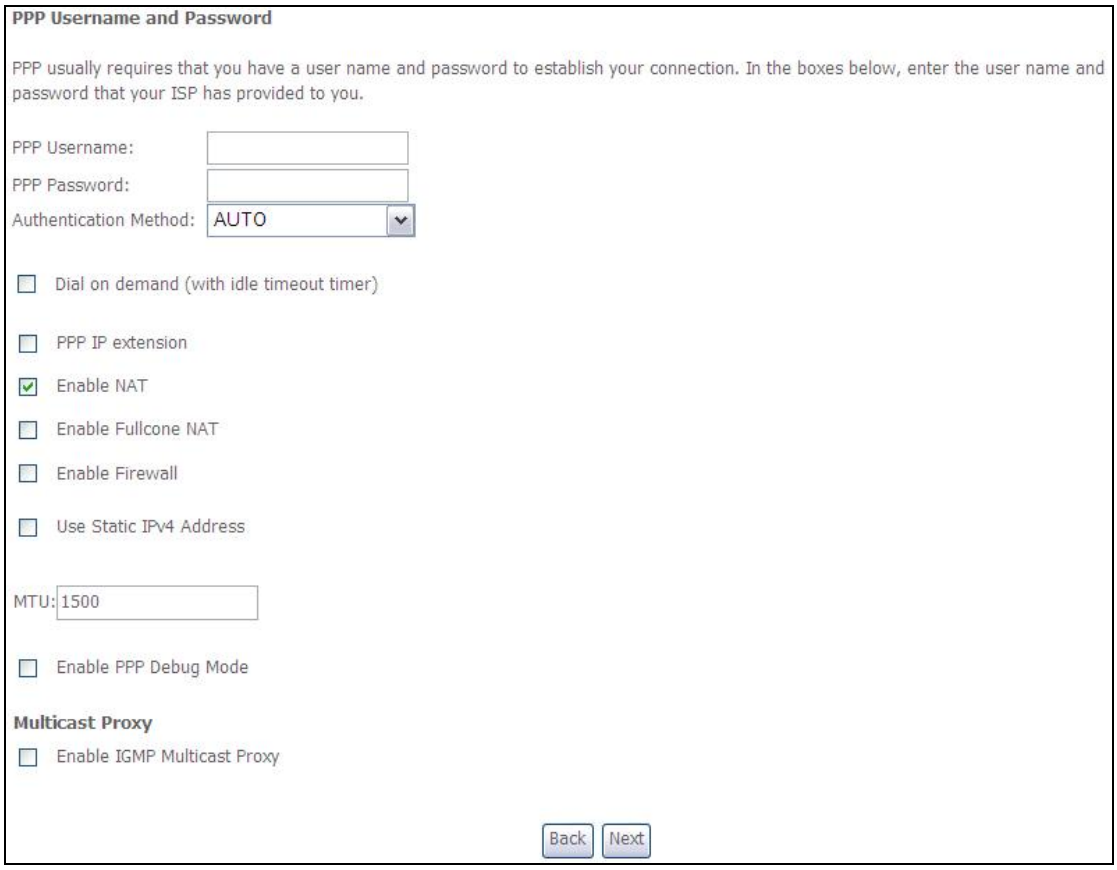
NOTE:	If this bridge connection is your only WAN service, the NEXUSLINK 3111u will be inaccessible for remote management or technical support from the WAN.

G2.4 PPP over ATM (PPPoA)



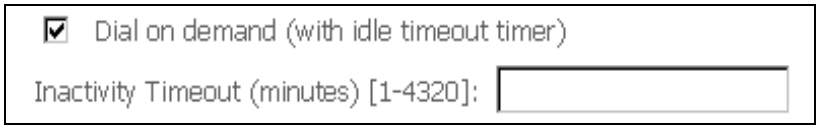
STEP 1: Click Next to continue.

STEP 2: On the next screen, enter the PPP settings as provided by your ISP. Click Next to continue or click Back to return to the previous step.



PPP SETTINGS
The PPP username and password are dependent on the requirements of the ISP. The user name can be a maximum of 256 characters and the password a maximum of 32 characters in length. (Authentication Method: AUTO, PAP, CHAP, or MSCHAP.)

DIAL ON DEMAND
The NEXUSLINK 3111u can be configured to disconnect if there is no activity for a period of time by selecting the Dial on demand checkbox þ. You must also enter an inactivity timeout period in the range of 1 to 4320 minutes.



PPP IP EXTENSION

The PPP IP Extension is a special feature deployed by some service providers. Unless your service provider specifically requires this setup, do not select it.

PPP IP Extension does the following:

- **Allows only one PC on the LAN.**
- **Disables NAT and Firewall.**
- **The device becomes the default gateway and DNS server to the PC through DHCP using the LAN interface IP address.**
- **The device extends the IP subnet at the remote service provider to the LAN PC. i.e. the PC becomes a host belonging to the same IP subnet.**
- **The device bridges the IP packets between WAN and LAN ports, unless the packet is addressed to the device's LAN IP address.**
- **The public IP address assigned by the remote side using the PPP/IPCP protocol is actually not used on the WAN PPP interface. Instead, it is forwarded to the PC LAN interface through DHCP. Only one PC on the LAN can be connected to the remote, since the DHCP server within the device has only a single IP address to assign to a LAN device.**

ENABLE NAT

If the LAN is configured with a private IP address, the user should select this checkbox þ. The NAT submenu will appear in the Advanced Setup menu after reboot. On the other hand, if a private IP address is not used on the LAN side (i.e. the LAN side is using a public IP), this checkbox þ should not be selected to free up system resources for better performance.

ENABLE FULLCONE NAT

This option becomes available when NAT is enabled. Known as one-to-one NAT, all requests from the same internal IP address and port are mapped to the same external IP address and port. An external host can send a packet to the internal host, by sending a packet to the mapped external address.

ENABLE FIREWALL

If this checkbox þ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox þ should not be selected to free up system resources for better performance.

USE STATIC IPv4 ADDRESS

Unless your service provider specially requires it, do not select this checkbox þ. If selected, enter the static IP address in the IP Address field. Also, don't forget to adjust the IP configuration to Static IP Mode as described in 3.2 IP Configuration.

MTU

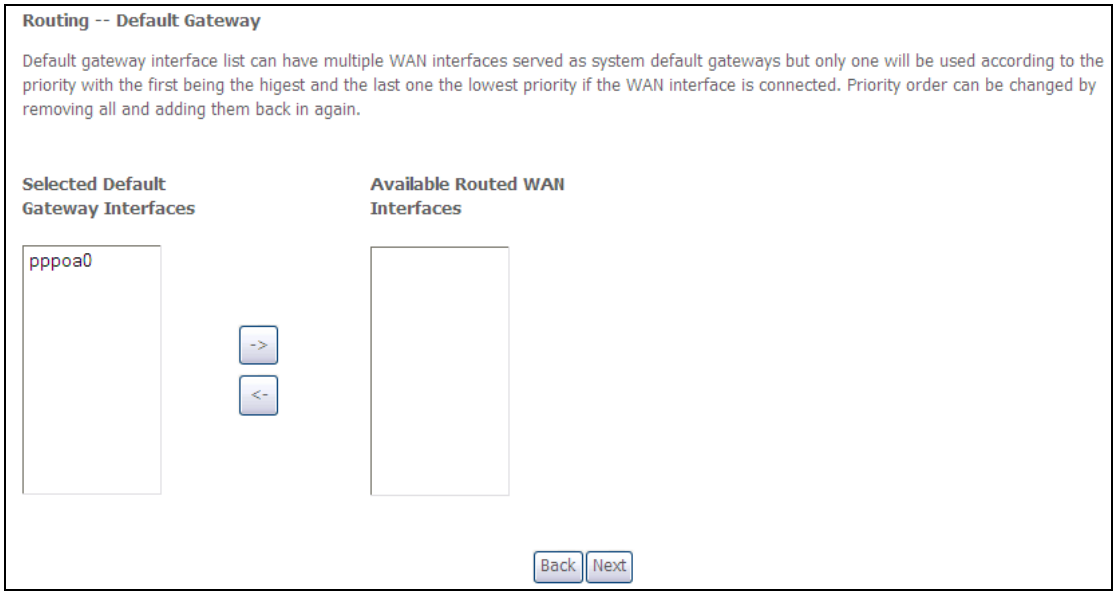
Maximum Transmission Unit. The size (in bytes) of largest protocol data unit which the layer can pass onwards. This value is 1500 for PPPoA.

ENABLE PPP DEBUG MODE

When this option is selected, the system will put more PPP connection information into the system log. This is for debugging errors and not for normal usage.

ENABLE IGMP MULTICAST PROXY
Tick the checkbox þ to enable Internet Group Membership Protocol (IGMP) multicast. IGMP is a protocol used by IPv4 hosts to report their multicast group memberships to any neighboring multicast routers.

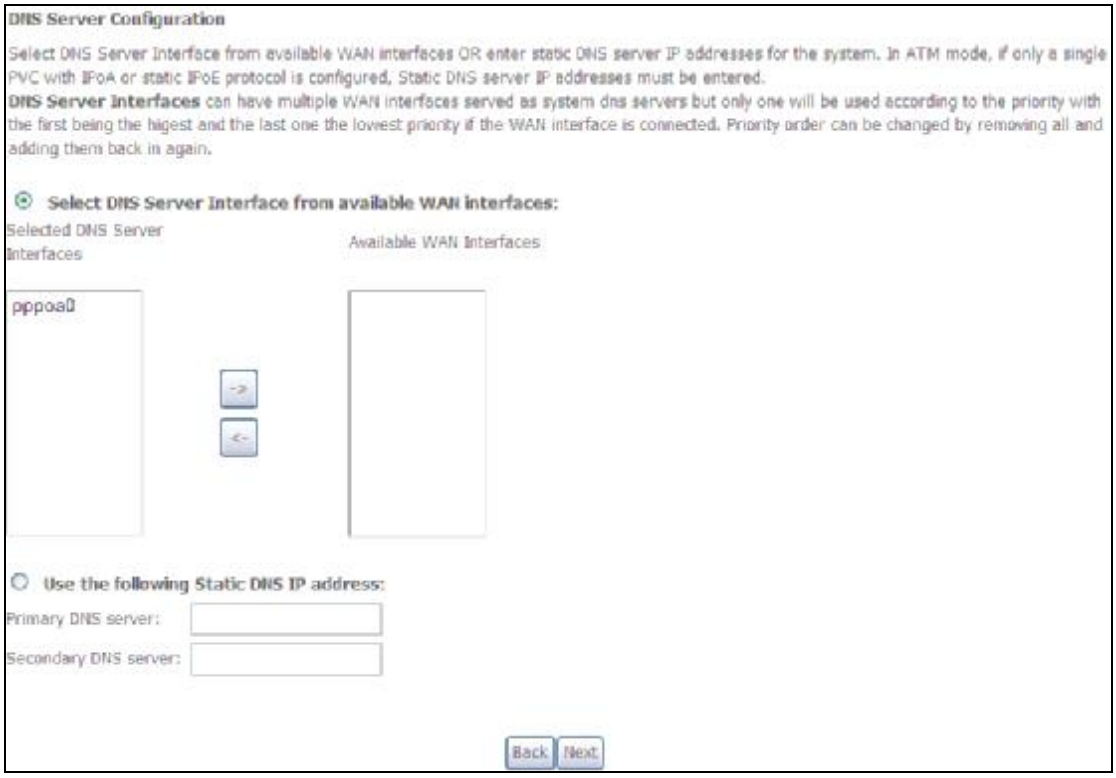
STEP 3: Choose an interface to be the default gateway.



Click Next to continue or click Back to return to the previous step.

STEP 4:

Select DNS Server Interface from available WAN interfaces OR enter static DNS server IP addresses for the system. In ATM mode, if only a single PVC with IPoA or static IPoE protocol is configured, Static DNS server IP addresses must be entered.

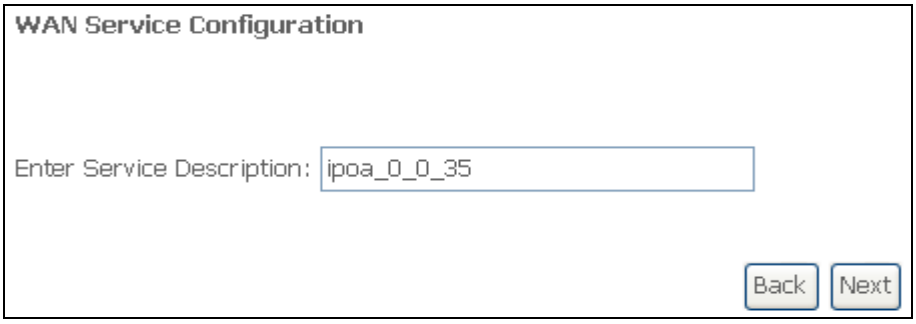


Click Next to continue or click Back to return to the previous step.

STEP 5: The WAN Setup - Summary screen shows a preview of the WAN service you have configured. Check these settings and click Apply / Save if they are correct, or click Back to modify them.

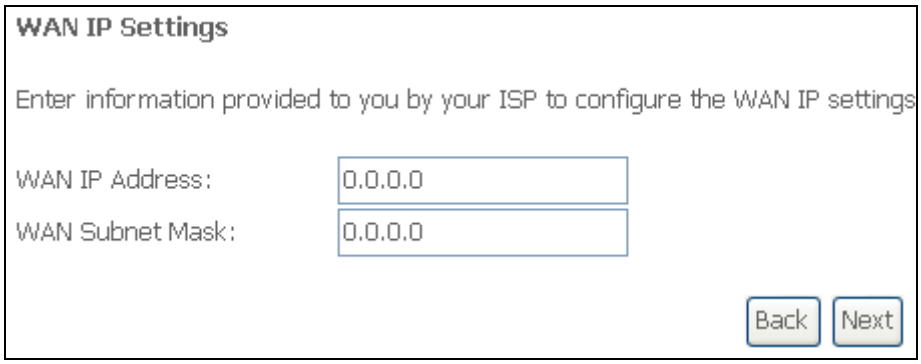
After clicking Apply / Save, the new service should appear on the main screen. To activate it you must reboot. Go to Management à Reboot and click Reboot.

G2.5 IP over ATM (IPoA)

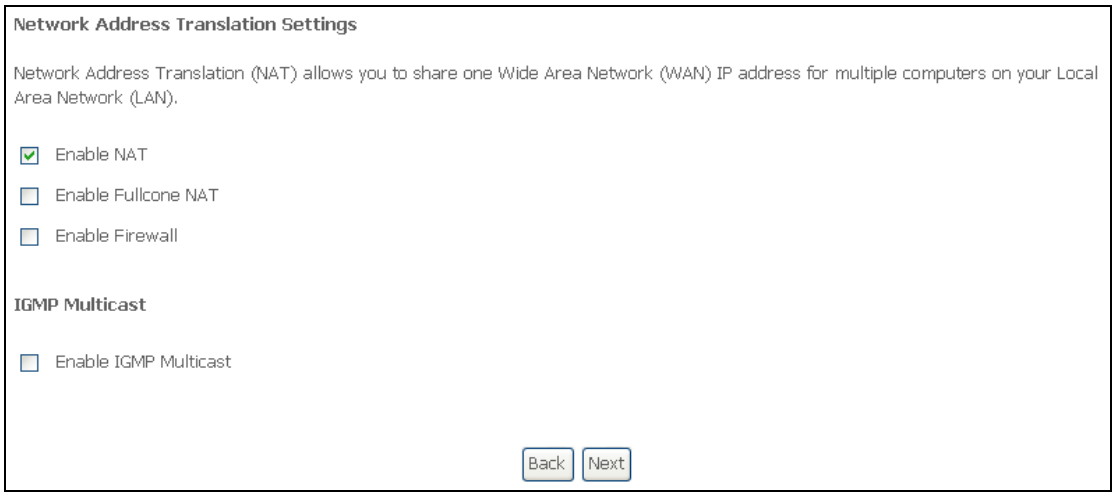


STEP 1: Click Next to continue.

STEP 2: Enter the WAN IP settings provided by your ISP. Click Next to continue.



STEP 3: This screen provides access to NAT, Firewall and IGMP Multicast settings. Enable each by selecting the appropriate checkbox þ. Click Next to continue or click Back to return to the previous step.



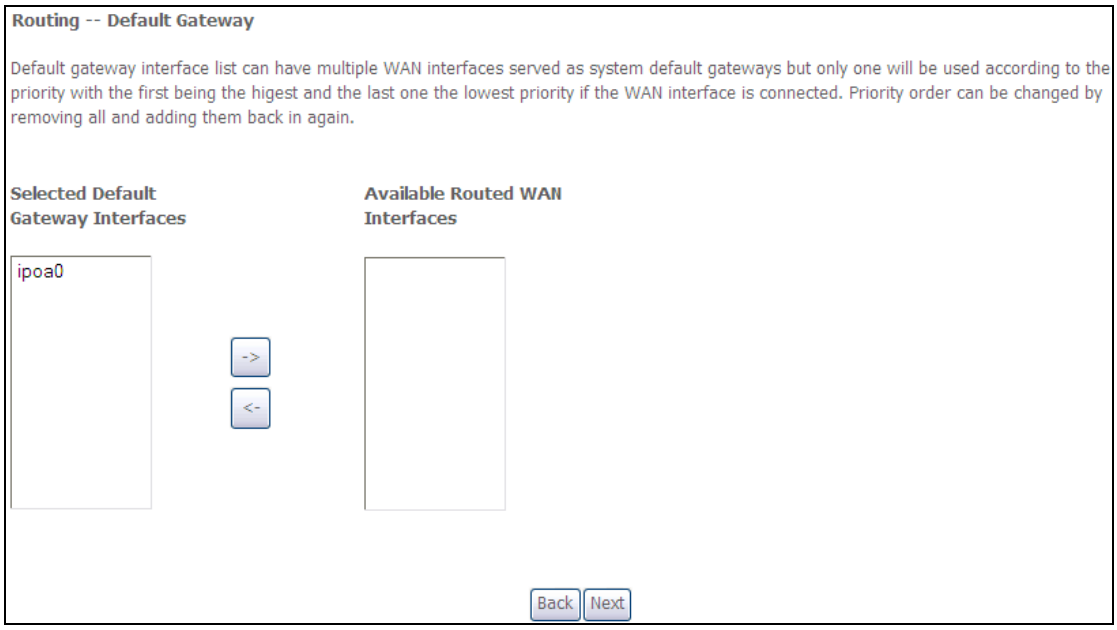
ENABLE NAT
If the LAN is configured with a private IP address, the user should select this checkbox þ. The NAT submenu will appear in the Advanced Setup menu after reboot. On the other hand, if a private IP address is not used on the LAN side (i.e. the LAN side is using a public IP), this checkbox þ should not be selected, so as to free up system resources for improved performance.

ENABLE FULLCONE NAT
This option becomes available when NAT is enabled. Known as one-to-one NAT, all requests from the same internal IP address and port are mapped to the same external IP address and port. An external host can send a packet to the internal host by sending a packet to the mapped external address.

ENABLE FIREWALL
If this checkbox þ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox þ should not be selected so as to free up system resources for better performance.

ENABLE IGMP MULTICAST
Tick the checkbox þ to enable Internet Group Membership Protocol (IGMP) multicast. IGMP is a protocol used by IPv4 hosts to report their multicast group memberships to any neighboring multicast routers.

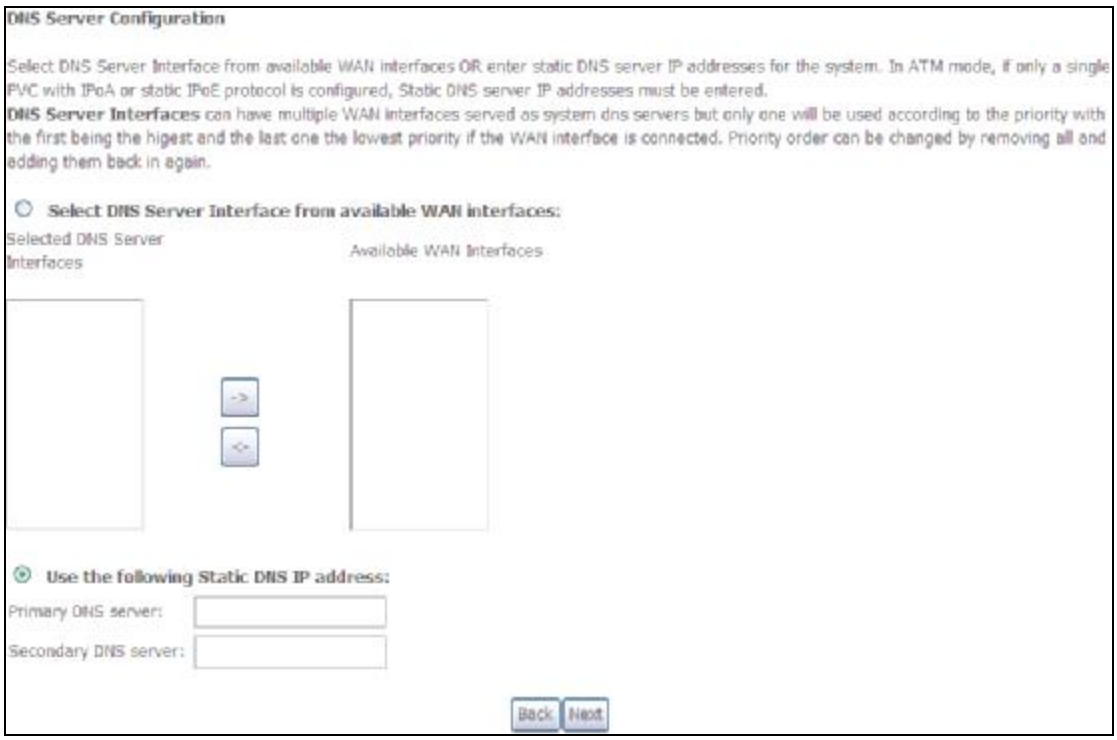
STEP 4: Choose an interface to be the default gateway.



Click Next to continue or click Back to return to the previous step.

STEP 5:

Select DNS Server Interface from available WAN interfaces OR enter static DNS server IP addresses for the system. In ATM mode, if only a single PVC with IPoA or static IPoE protocol is configured, Static DNS server IP addresses must be entered.



Click Next to continue or click Back to return to the previous step.

STEP 7: The WAN Setup - Summary screen shows a preview of the WAN service you have configured. Check these settings and click Apply / Save if they are correct, or click Back to modify them.

After clicking Apply / Save, the new service should appear on the main screen. To activate it you must reboot. Go to Management à Reboot and click Reboot.

G3 ~ More About MSC Mode

The procedure for WAN connection setup in MSC mode is as follows:

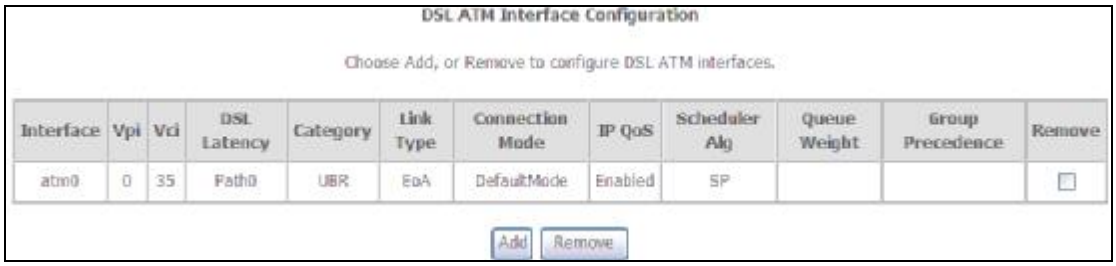
STEP 1: Create a Layer2 interface in MSC connection mode.

STEP 2: Add WAN connections to the interface (Bridge, PPPoE or IPoE).

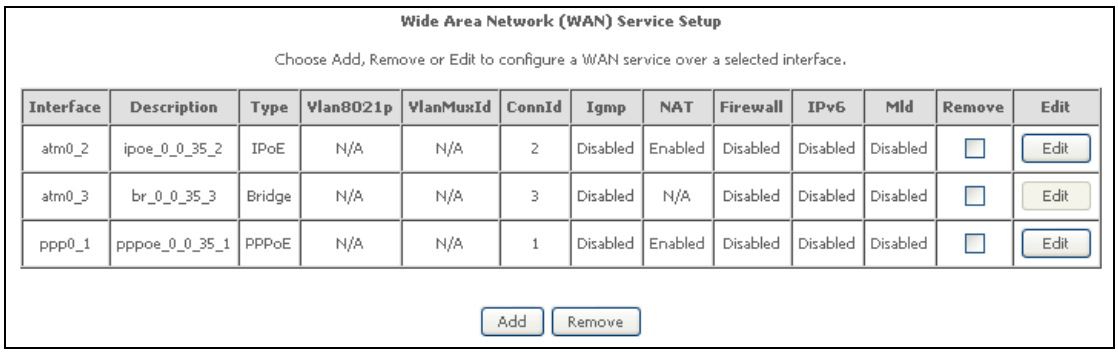
STEP 3: Use 5.16 Interface Grouping to connect LAN and WAN interfaces.

These three steps are repeated below with screenshots added for reference.

STEP 1: Create a Layer2 interface in MSC connection mode.



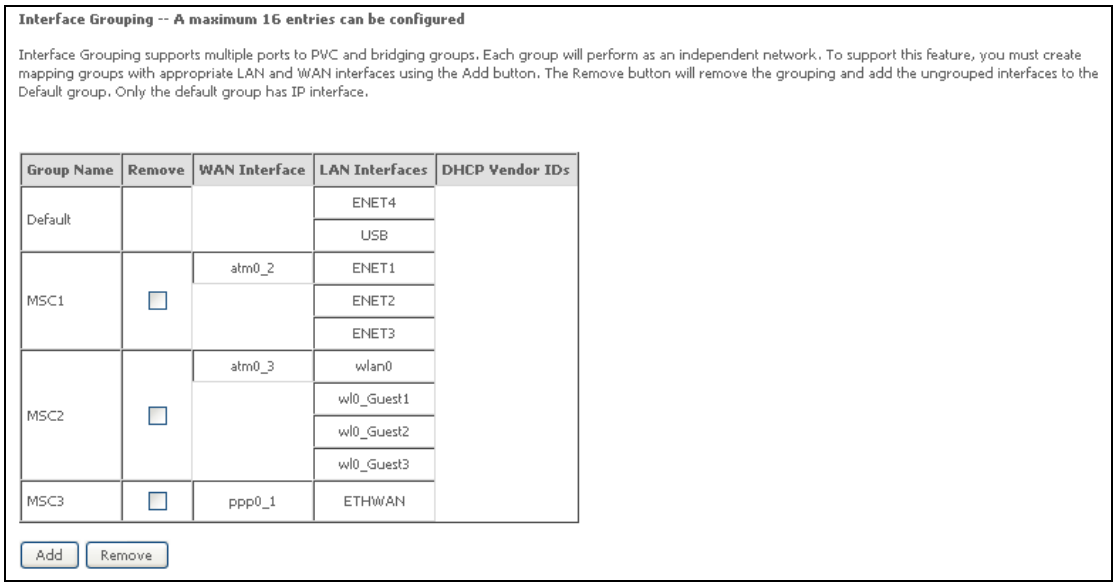
STEP 2: Add WAN connections to the interface (Bridge, PPPoE or IPoE).



NOTES: If QoS is configured on the first MSC connection, it will be configured by default for all subsequent connections.

If a MSC connection is removed every other MSC connection should be removed to avoid potential configuration problems.

STEP 3: Use 5.16 Interface Grouping to connect LAN and WAN interfaces.



Interface Grouping -- A maximum 16 entries can be configured

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 appropriate LAN and WAN interfaces using the Add button. The Remove button will remove the grouping and add the ungrouped interfaces to the Default group. Only the default group has IP interface.

Group Name	Remove	WAN Interface	LAN Interfaces	DHCP Vendor IDs
Default			ENET4	
			USB	
MSC1	☐	atm0_2	ENET1	
			ENET2	
			ENET3	
MSC2	☐	atm0_3	wlan0	
			wl0_Guest1	
			wl0_Guest2	
			wl0_Guest3	
MSC3	☐	ppp0_1	ETHWAN	

Add Remove

See the instructions in 5.16 Interface Grouping for help with this final step.

FCC Interference Statement

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the 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

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement

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 20cmbetween the radiator & your body

FCC Caution: The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.