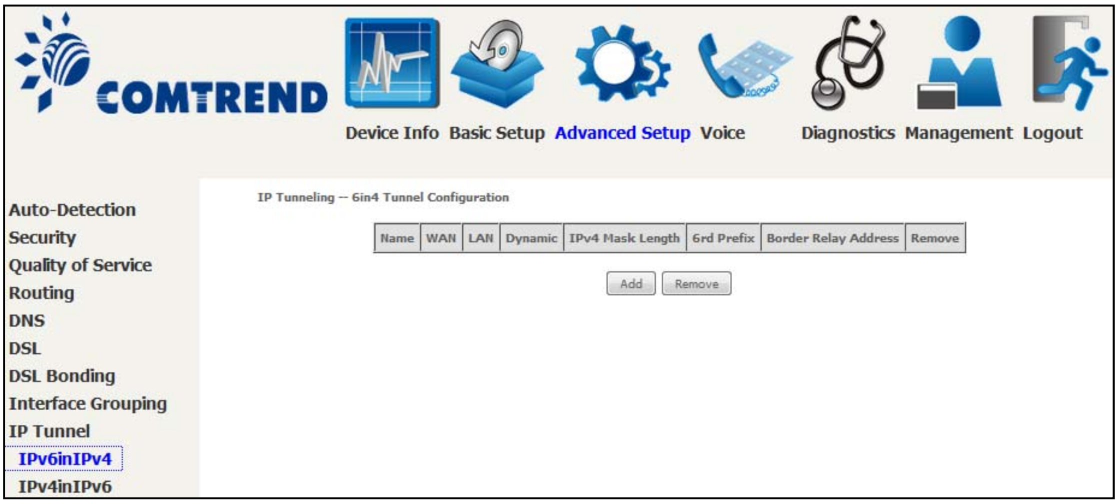
6.9 IP Tunnel

6.9.1 IPv6inIPv4

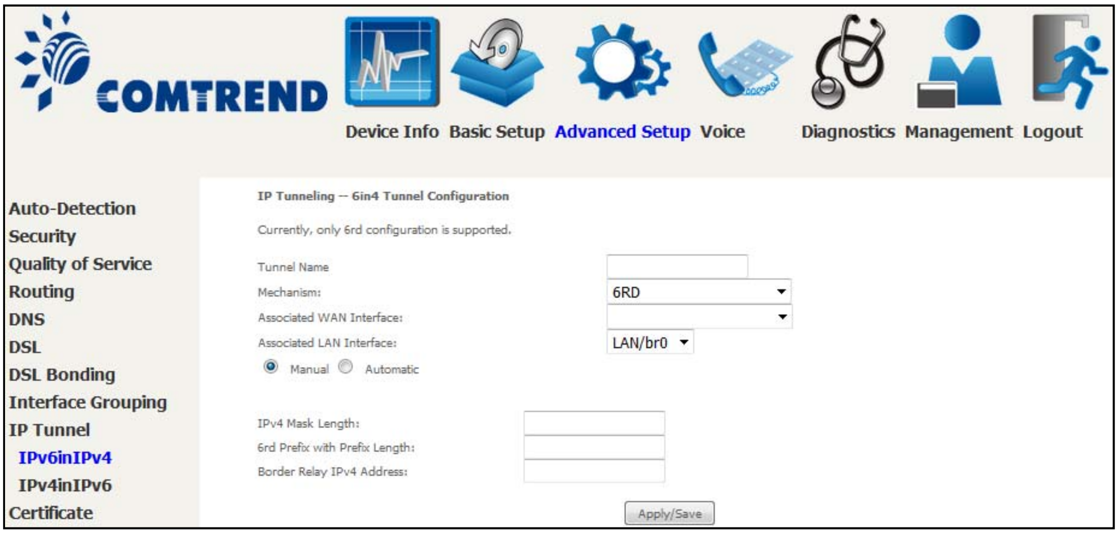
Configure 6in4 tunneling to encapsulate IPv6 traffic over explicitly-configured IPv4 links.



IP Tunneling -- 6in4 Tunnel Configuration

Name	WAN	LAN	Dynamic	IPv4 Mask Length	6rd Prefix	Border Relay Address	Remove

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



IP Tunneling -- 6in4 Tunnel Configuration

Currently, only 6rd configuration is supported.

Tunnel Name

Mechanism: 6RD

Associated WAN Interface:

Associated LAN Interface: LAN/br0

● Manual ○ Automatic

IPv4 Mask Length:

6rd Prefix with Prefix Length:

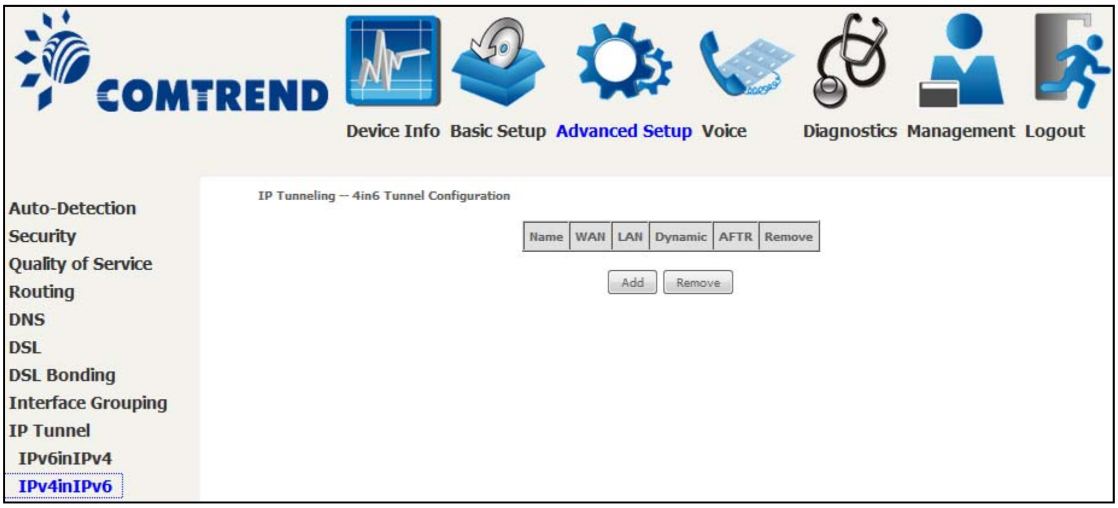
Border Relay IPv4 Address:

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

Options	Description
Tunnel Name	Input a name for the tunnel
Mechanism	Mechanism used by the tunnel deployment
Associated WAN Interface	Select the WAN interface to be used by the tunnel
Associated LAN Interface	Select the LAN interface to be included in the tunnel
Manual/Automatic	Select automatic for point-to-multipoint tunneling / manual for point-to-point tunneling
IPv4 Mask Length	The subnet mask length used for the IPv4 interface
6rd Prefix with Prefix Length	Prefix and prefix length used for the IPv6 interface
Border Relay IPv4 Address	Input the IPv4 address of the other device

6.9.2 IPv4inIPv6

Configure 4in6 tunneling to encapsulate IPv4 traffic over an IPv6-only environment.

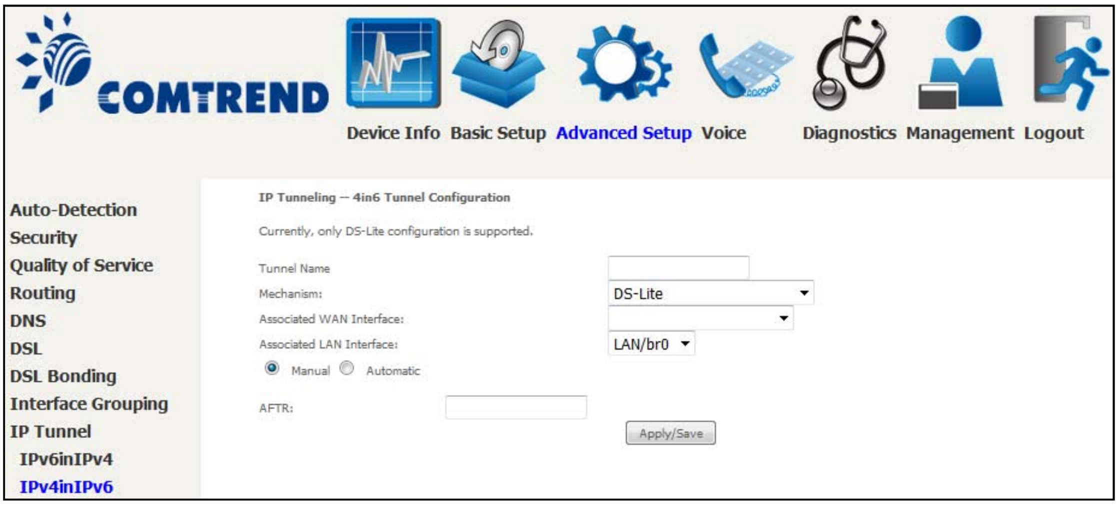


IP Tunneling -- 4in6 Tunnel Configuration

Name	WAN	LAN	Dynamic	AFTR	Remove

Add Remove

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



IP Tunneling -- 4in6 Tunnel Configuration

Currently, only DS-Lite configuration is supported.

Tunnel Name

Mechanism: DS-Lite

Associated WAN Interface:

Associated LAN Interface: LAN/br0

● Manual ○ Automatic

AFTR:

Apply/Save

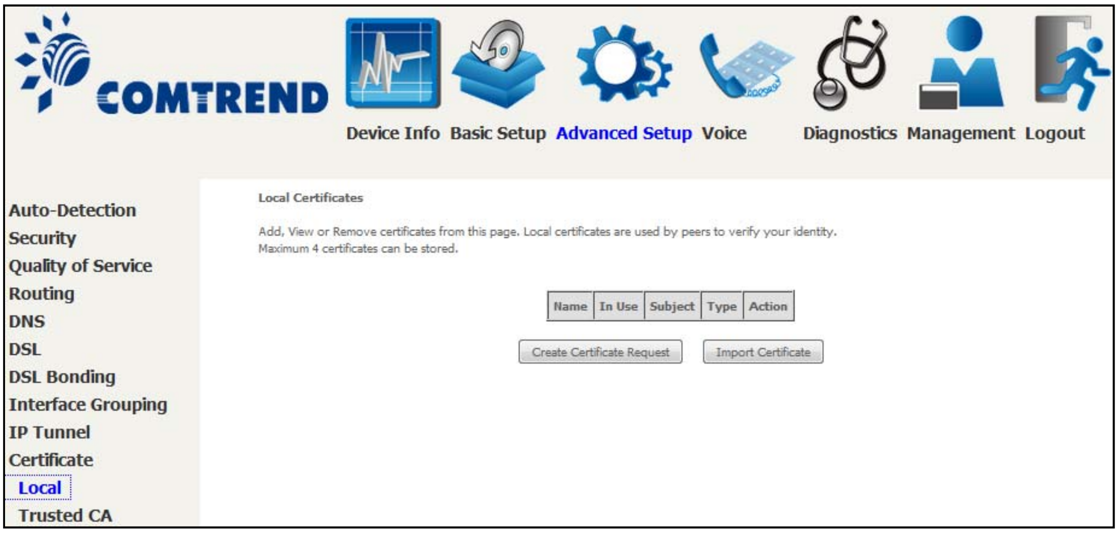
Click **Apply/Save** to apply and save the settings.

Options	Description
Tunnel Name	Input a name for the tunnel
Mechanism	Mechanism used by the tunnel deployment
Associated WAN Interface	Select the WAN interface to be used by the tunnel
Associated LAN Interface	Select the LAN interface to be included in the tunnel
Manual/Automatic	Select automatic for point-to-multipoint tunneling / manual for point-to-point tunneling
AFTR	Address of Address Family Translation Router

6.10 Certificate

A certificate is a public key, attached with its owner's information (company name, server name, personal real name, contact e-mail, postal address, etc) and digital signatures. There will be one or more digital signatures attached to the certificate, indicating that these entities have verified that this certificate is valid.

6.10.1 Local



Local Certificates

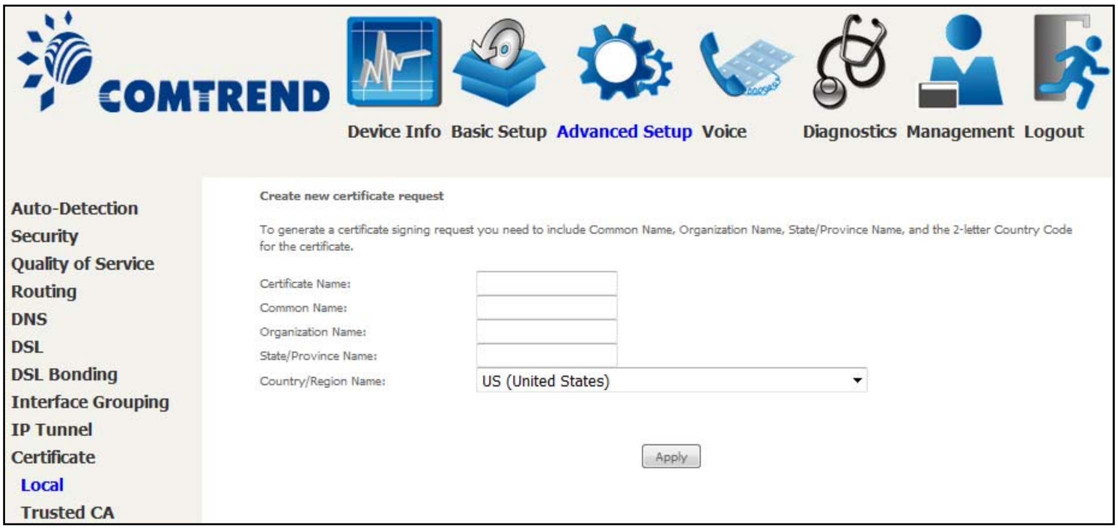
Add, View or Remove certificates from this page. Local certificates are used by peers to verify your identity.
Maximum 4 certificates can be stored.

Name	In Use	Subject	Type	Action

CREATE CERTIFICATE REQUEST

Click **Create Certificate Request** to generate a certificate-signing request.

The certificate-signing request can be submitted to the vendor/ISP/ITSP to apply for a certificate. Some information must be included in the certificate-signing request. Your vendor/ISP/ITSP will ask you to provide the information they require and to provide the information in the format they regulate. Enter the required information and click **Apply** to generate a private key and a certificate-signing request.



Create new certificate request

To generate a certificate signing request you need to include Common Name, Organization Name, State/Province Name, and the 2-letter Country Code for the certificate.

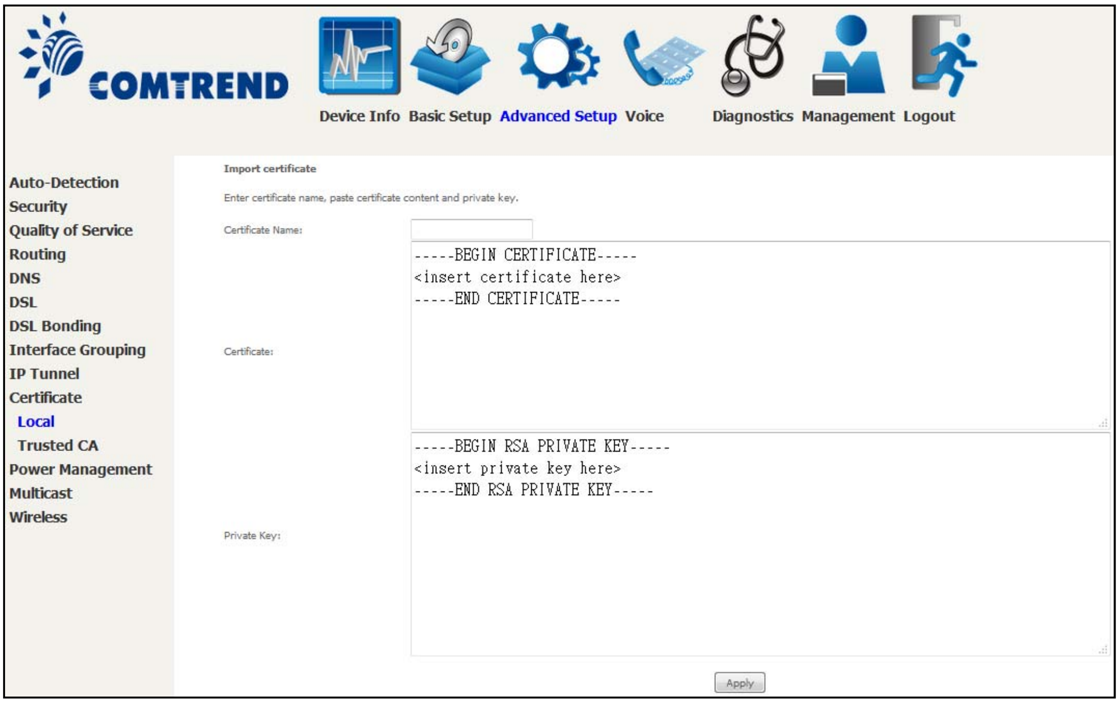
Certificate Name:	
Common Name:	
Organization Name:	
State/Province Name:	
Country/Region Name:	US (United States)

The following table is provided for your reference.

Field	Description
Certificate Name	A user-defined name for the certificate.
Common Name	Usually, the fully qualified domain name for the machine.
Organization Name	The exact legal name of your organization. Do not abbreviate.
State/Province Name	The state or province where your organization is located. It cannot be abbreviated.
Country/Region Name	The two-letter ISO abbreviation for your country.

IMPORT CERTIFICATE

Click **Import Certificate** to paste the certificate content and the private key provided by your vendor/ISP/ITSP into the corresponding boxes shown below.



Import certificate

Enter certificate name, paste certificate content and private key.

Certificate Name:

Certificate:

```
-----BEGIN CERTIFICATE-----
<insert certificate here>
-----END CERTIFICATE-----
```

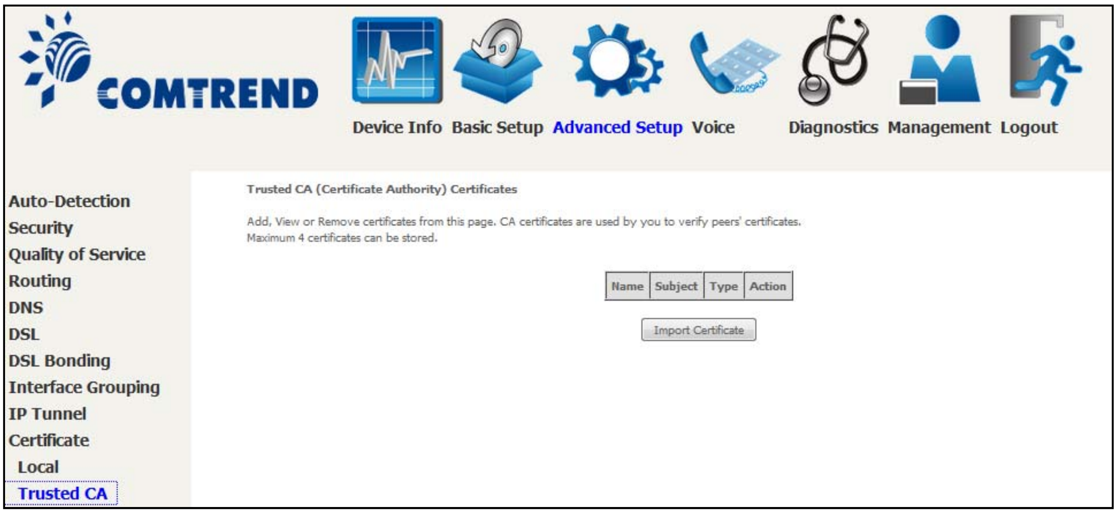
Private Key:

```
-----BEGIN RSA PRIVATE KEY-----
<insert private key here>
-----END RSA PRIVATE KEY-----
```

Enter a certificate name and click the **Apply** button to import the certificate and its private key.

6.10.2 Trusted CA

CA is an abbreviation for Certificate Authority, which is a part of the X.509 system. It is itself a certificate, attached with the owner information of this certificate authority; but its purpose is not encryption/decryption. Its purpose is to sign and issue certificates, in order to prove that these certificates are valid.

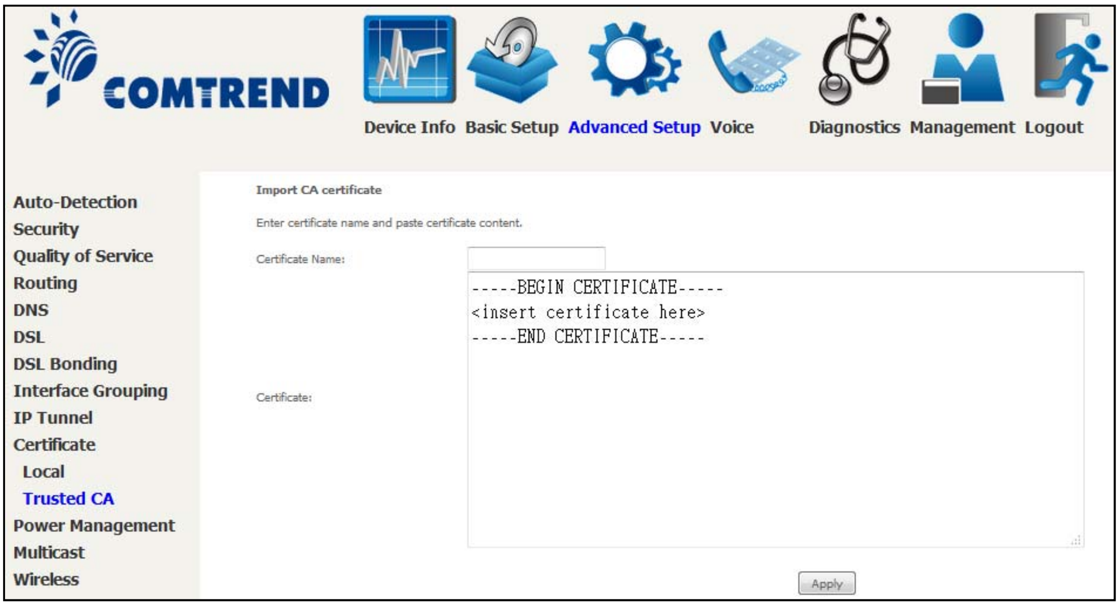


Trusted CA (Certificate Authority) Certificates

Add, View or Remove certificates from this page. CA certificates are used by you to verify peers' certificates.
Maximum 4 certificates can be stored.

Name	Subject	Type	Action

Click **Import Certificate** to paste the certificate content of your trusted CA. The CA certificate content will be provided by your vendor/ISP/ITSP and is used to authenticate the Auto-Configuration Server (ACS) that the CPE will connect to.



Import CA certificate

Enter certificate name and paste certificate content.

Certificate Name:

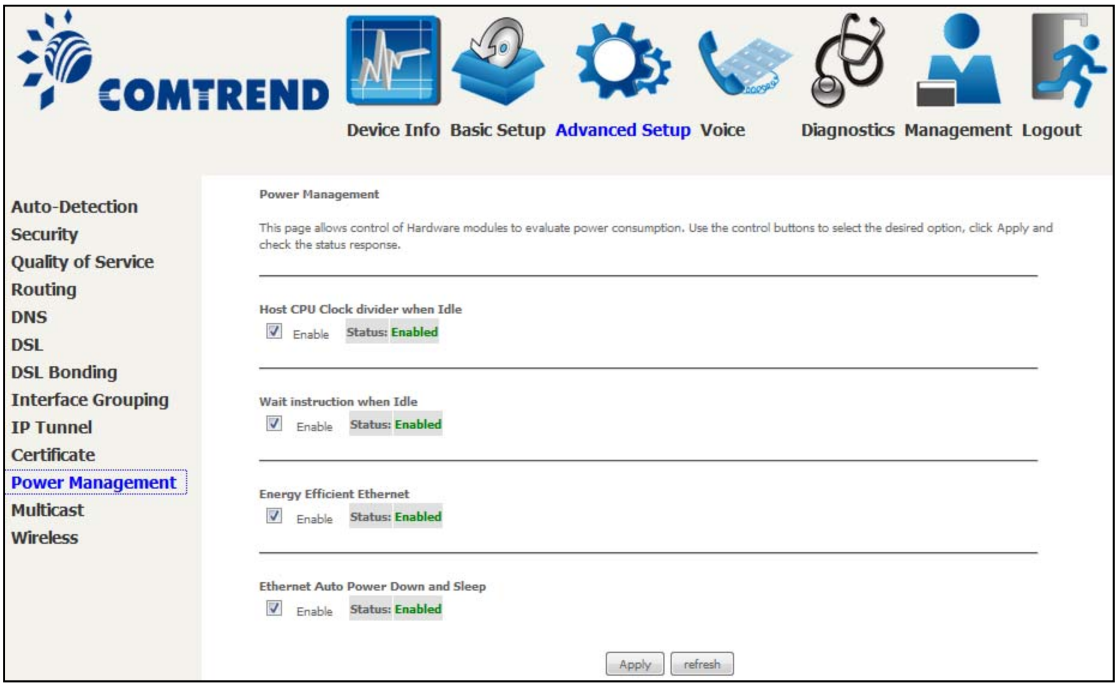
Certificate:

```
-----BEGIN CERTIFICATE-----
<insert certificate here>
-----END CERTIFICATE-----
```

Enter a certificate name and click **Apply** to import the CA certificate.

6.11 Power Management

This screen allows for control of hardware modules to evaluate power consumption. Use the buttons to select the desired option, click **Apply** and check the response.



Power Management

This page allows control of Hardware modules to evaluate power consumption. Use the control buttons to select the desired option, click Apply and check the status response.

Host CPU Clock divider when Idle
☑ Enable Status: Enabled

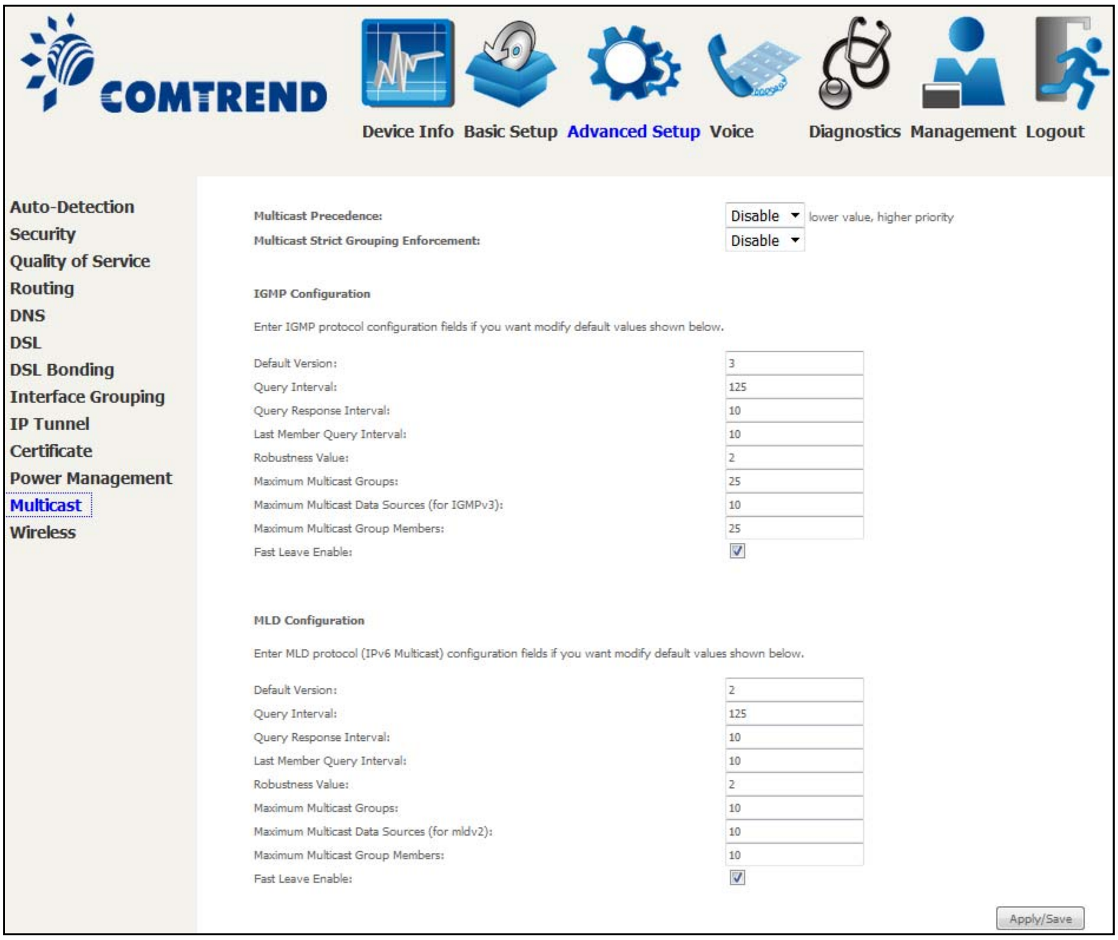
Wait instruction when Idle
☑ Enable Status: Enabled

Energy Efficient Ethernet
☑ Enable Status: Enabled

Ethernet Auto Power Down and Sleep
☑ Enable Status: Enabled

6.12 Multicast

Input new IGMP or MLD protocol configuration fields if you want modify default values shown. Then click **Apply/Save**.



Multicast Precedence: Disable ▾ lower value, higher priority
Multicast Strict Grouping Enforcement: Disable ▾

IGMP Configuration

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

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

MLD Configuration

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

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

Multicast Precedence:

Select precedence of multicast packets.

Multicast Strict Grouping Enforcement:

Enable/Disable multicast strict grouping.

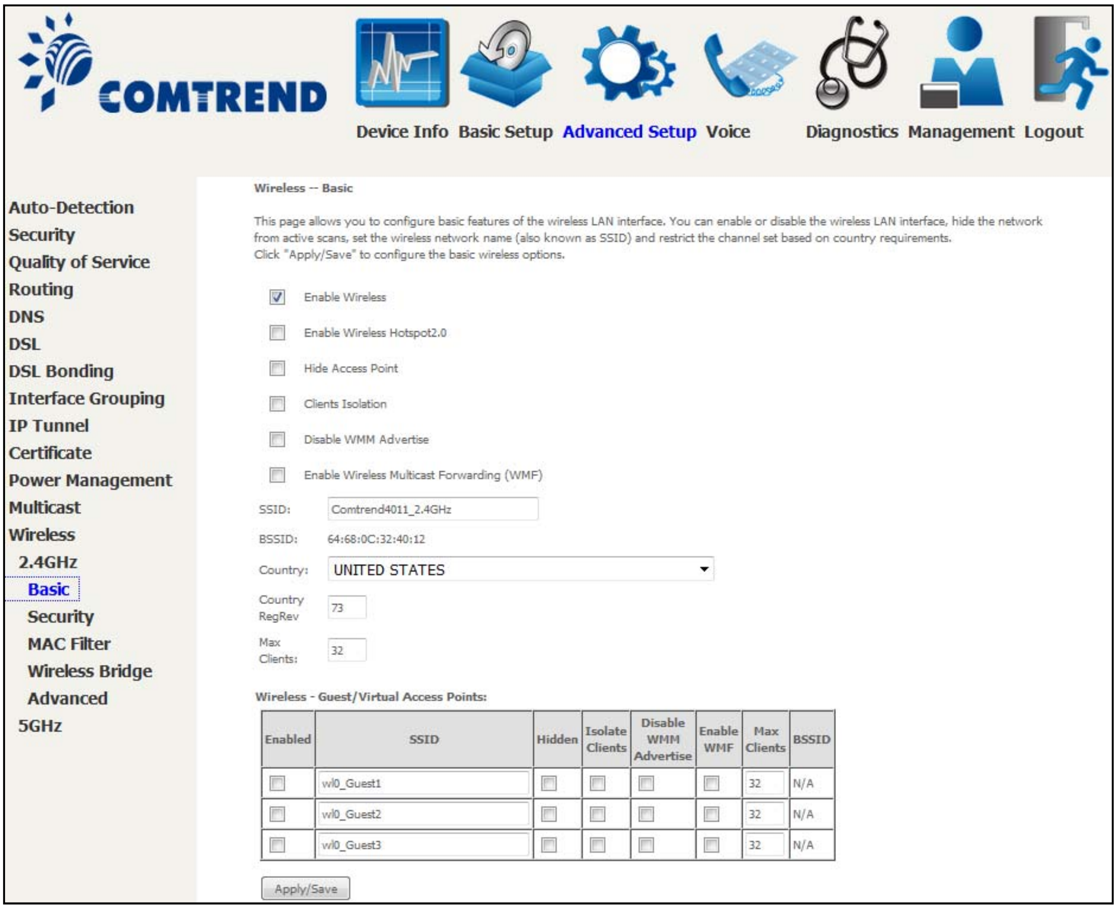
Field	Description
Default Version	Define IGMP using version with video server.
Query Interval	The query interval is the amount of time in seconds between IGMP General Query messages sent by the router (if the router is the querier on this subnet). The default query interval is 125 seconds.

Field	Description
Query Response Interval	The query response interval is the maximum amount of time in seconds that the IGMP router waits to receive a response to a General Query message. The query response interval is the Maximum Response Time field in the IGMP v2 Host Membership Query message header. The default query response interval is 10 seconds and must be less than the query interval.
Last Member Query Interval	The last member query interval is the amount of time in seconds that the IGMP router waits to receive a response to a Group-Specific Query message. The last member query interval is also the amount of time in seconds between successive Group-Specific Query messages. The default last member query interval is 10 seconds.
Robustness Value	The robustness variable is a way of indicating how susceptible the subnet is to lost packets. IGMP can recover from robustness variable minus 1 lost IGMP packets. The robustness variable should be set to a value of 2 or greater. The default robustness variable value is 2.
Maximum Multicast Groups	Setting the maximum number of Multicast groups.
Maximum Multicast Data Sources (for IGMPv3)	Define the maximum multicast video stream number.
Maximum Multicast Group Members	Setting the maximum number of groups that ports can accept.
Fast Leave Enable	When you enable IGMP fast-leave processing, the switch immediately removes a port when it detects an IGMP version 2 leave message on that port.

6.13 Wireless

6.13.1 Basic 2.4GHz

The Basic option allows you to configure basic features of the wireless LAN interface. Among other things, you can enable or disable the wireless LAN interface, hide the network from active scans, set the wireless network name (also known as SSID) and restrict the channel set based on country requirements.



Wireless -- Basic

This page allows you to configure basic features of the wireless LAN interface. You can enable or disable the wireless LAN interface, hide the network from active scans, set the wireless network name (also known as SSID) and restrict the channel set based on country requirements.
Click "Apply/Save" to configure the basic wireless options.

☑ Enable Wireless

□ Enable Wireless Hotspot2.0

□ Hide Access Point

□ Clients Isolation

□ Disable WMM Advertise

□ Enable Wireless Multicast Forwarding (WMF)

SSID: Comtrend4011_2.4GHz

BSSID: 64:68:0C:32:40:12

Country: UNITED STATES

Country RegRev: 73

Max Clients: 32

Wireless - Guest/Virtual Access Points:

Enabled	SSID	Hidden	Isolate Clients	Disable WMM Advertise	Enable WMF	Max Clients	BSSID
□	wl0_Guest1	□	□	□	□	32	N/A
□	wl0_Guest2	□	□	□	□	32	N/A
□	wl0_Guest3	□	□	□	□	32	N/A

Apply/Save

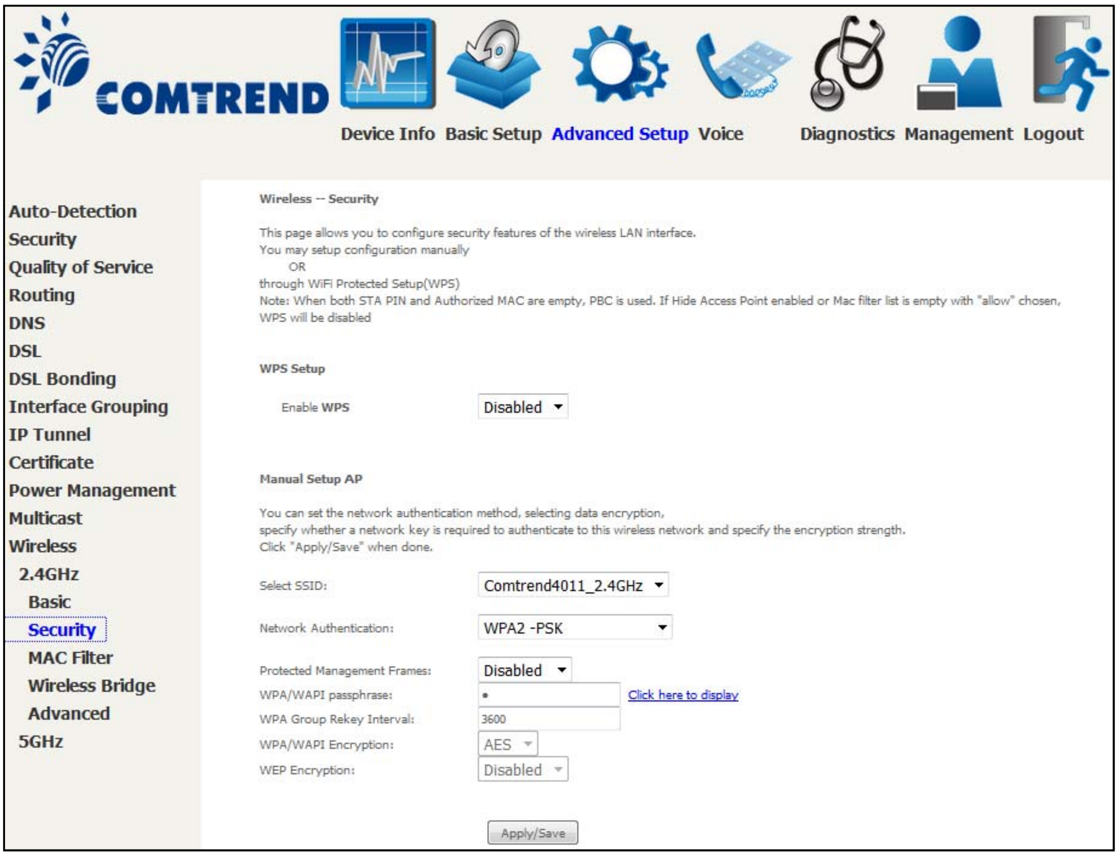
Click **Apply/Save** to configure the basic wireless options.

Consult the table below for descriptions of these options.

Option	Description
Enable Wireless	A checkbox ☑ that enables or disables the wireless LAN interface. When selected, a set of basic wireless options will appear.
Enable Wireless Hotspot2.0	Enable Wireless Hotspot 2.0 (Wi-Fi Certified Passpoint) on the wireless interface.
Hide Access Point	Select Hide Access Point to protect the access point from detection by wireless active scans. To check AP status in Windows XP, open **Network Connections** from the **start** Menu and select **View Available Network Connections**. If the access point is hidden, it will not be listed there. To connect a client to a hidden access point, the station must add the access point manually to its wireless configuration.
Clients Isolation	When enabled, it prevents client PCs from seeing one another in My Network Places or Network Neighborhood. Also, prevents one wireless client communicating with another wireless client.
Disable WMM Advertise	Stops the router from 'advertising' its Wireless Multimedia (WMM) functionality, which provides basic quality of service for time-sensitive applications (e.g. VoIP, Video).
Enable Wireless Multicast Forwarding	Select the checkbox ☑ to enable this function.
SSID [1-32 characters]	Sets the wireless network name. 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.
BSSID	The BSSID is a 48-bit identity used to identify a particular BSS (Basic Service Set) within an area. In Infrastructure BSS networks, the BSSID is the MAC (Media Access Control) address of the AP (Access Point); and in Independent BSS or ad hoc networks, the BSSID is generated randomly.
Country	A drop-down menu that permits worldwide and specific national settings. Local regulations limit channel range: US= worldwide, Japan=1-14, Jordan= 10-13, Israel= 1-13
Country RegRev	Wireless country code for transmit power limit.
Max Clients	The maximum number of clients that can access the router.
Wireless - Guest / Virtual Access Points	This router supports multiple SSIDs called Guest SSIDs or Virtual Access Points. To enable one or more Guest SSIDs select the checkboxes ☑ in the **Enabled** column. To hide a Guest SSID select its checkbox ☑ in the **Hidden** column. Do the same for **Isolate Clients** and **Disable WMM Advertise**. For a description of these two functions, see the previous entries for "Clients Isolation" and "Disable WMM Advertise". Similarly, for **Enable WMF**, **Max Clients** and **BSSID**, consult the matching entries in this table. **NOTE:** Remote wireless hosts cannot scan Guest SSIDs.

6.13.2 Security 2.4GHz

The following screen appears when Wireless Security is selected. The options shown here allow you to configure security features of the wireless LAN interface.



Wireless -- Security

This page allows you to configure security features of the wireless LAN interface.
You may setup configuration manually
OR
through WiFi Protected Setup(WPS)
Note: When both STA PIN and Authorized MAC are empty, PBC is used. If Hide Access Point enabled or Mac filter list is empty with "allow" chosen, WPS will be disabled

WPS Setup

Enable **WPS**: Disabled

Manual Setup AP

You can set the network authentication method, selecting data encryption,
specify whether a network key is required to authenticate to this wireless network and specify the encryption strength.
Click "Apply/Save" when done.

Select SSID: Comtrend4011_2.4GHz
Network Authentication: WPA2 -PSK
Protected Management Frames: Disabled
WPA/WAPI passphrase: • Click here to display
WPA Group Rekey Interval: 3600
WPA/WAPI Encryption: AES
WEP Encryption: Disabled

Please see 6.13.3 for WPS setup instructions.

Click **Apply/Save** to implement new configuration settings.

WIRELESS SECURITY

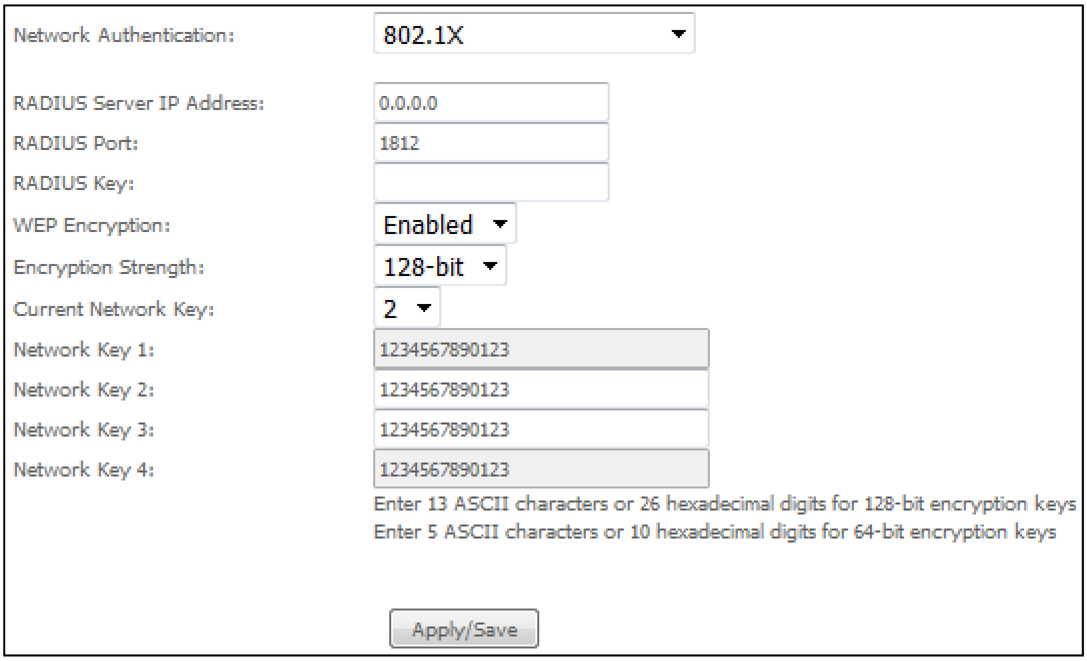
Setup requires that the user configure these settings using the Web User Interface (see the table below).

Select SSID
Select the wireless network name from the drop-down menu. 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 client will not be granted access.

Network Authentication
This option specifies whether a network key is used for authentication to the wireless network. If network authentication is set to Open, then no authentication is provided. Despite this, the identity of the client is still verified. Each authentication type has its own settings. For example, selecting 802.1X authentication will reveal the RADIUS Server IP address, Port and Key fields. WEP Encryption will also be enabled as shown below. Different authentication type pops up different settings requests.

Choosing **802.1X**, enter RADIUS Server IP address, RADIUS Port, RADIUS key and Current Network Key.

Also, enable WEP Encryption and select Encryption Strength.

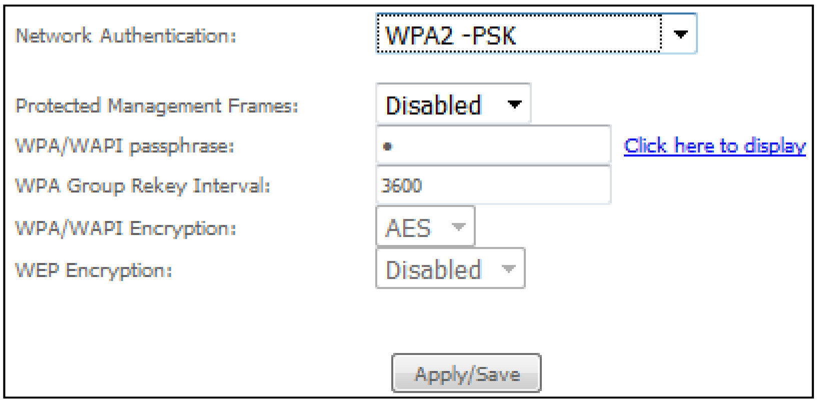


Network Authentication:	802.1X
RADIUS Server IP Address:	0.0.0.0
RADIUS Port:	1812
RADIUS Key:	
WEP Encryption:	Enabled
Encryption Strength:	128-bit
Current Network Key:	2
Network Key 1:	1234567890123
Network Key 2:	1234567890123
Network Key 3:	1234567890123
Network Key 4:	1234567890123

Enter 13 ASCII characters or 26 hexadecimal digits for 128-bit encryption keys
Enter 5 ASCII characters or 10 hexadecimal digits for 64-bit encryption keys

Select the Current Network Key and enter 13 ASCII characters or 26 hexadecimal digits for 128-bit encryption keys and enter 5 ASCII characters or 10 hexadecimal digits for 64-bit encryption keys.

Choosing **WPA2-PSK**, you must enter WPA Pre-Shared Key and Group Rekey Interval.



Network Authentication:	WPA2 -PSK
Protected Management Frames:	Disabled
WPA/WAPI passphrase:	•
WPA Group Rekey Interval:	3600
WPA/WAPI Encryption:	AES
WEP Encryption:	Disabled

WEP Encryption

This option specifies whether data sent over the network is encrypted. The same network key is used for data encryption and network authentication. Four network keys can be defined although only one can be used at any one time. Use the Current Network Key list box to select the appropriate network key.

Security options include authentication and encryption services based on the wired equivalent privacy (WEP) algorithm. WEP is a set of security services used to protect 802.11 networks from unauthorized access, such as eavesdropping; in this case, the capture of wireless network traffic. When data encryption is enabled, secret shared encryption keys are generated and used by the source station and the destination station to alter frame bits, thus avoiding disclosure to eavesdroppers. Under shared key authentication, each wireless station is assumed to have received a secret shared key over a secure channel that is independent from the 802.11 wireless network communications channel.
Encryption Strength
This drop-down list box will display when WEP Encryption is enabled. The key strength is proportional to the number of binary bits comprising the key. This means that keys with a greater number of bits have a greater degree of security and are considerably more difficult to crack. Encryption strength can be set to either 64-bit or 128-bit. A 64-bit key is equivalent to 5 ASCII characters or 10 hexadecimal numbers. A 128-bit key contains 13 ASCII characters or 26 hexadecimal numbers. Each key contains a 24-bit header (an initiation vector) which enables parallel decoding of multiple streams of encrypted data.

6.13.3 WPS 2.4GHz

Wi-Fi Protected Setup (WPS) is an industry standard that simplifies wireless security setup for certified network devices. Every WPS certified device has both a PIN number and a push button, located on the device or accessed through device software. The NexusLink 3240 has a WPS button on the device.

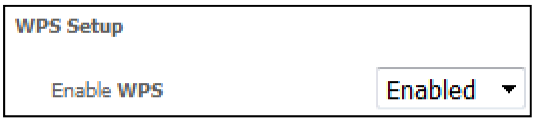
Devices with the WPS logo (shown here) support WPS. If the WPS logo is not present on your device it still may support WPS, in this case, check the device documentation for the phrase "Wi-Fi Protected Setup".

NOTE:	WPS is only available in Open, WPA-PSK, WPA2-PSK and Mixed WPA2/WPA-PSK network authentication modes. Other authentication modes do not use WPS so they must be configured manually.

To configure security settings with WPS, follow the procedures below.

I. Setup

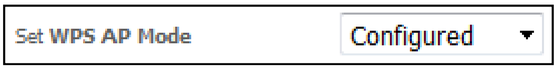
Step 1: Enable WPS by selecting **Enabled** from the drop down list box shown.



WPS Setup

Enable WPS Enabled

Step 2: Set the WPS AP Mode. **Configured** is used when the NexusLink 3240 will assign security settings to clients. **Unconfigured** is used when an external client assigns security settings to the NexusLink 3240.



Set WPS AP Mode Configured

NOTES:	Your client may or may not have the ability to provide security settings to the NexusLink 3240. If it does not, then you must set the WPS AP mode to Configured. Consult the device documentation to check its capabilities.

IIa. PUSH-BUTTON CONFIGURATION

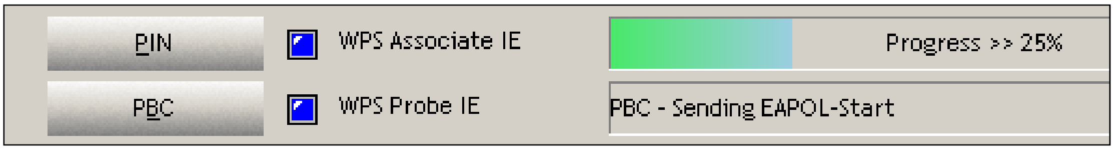
The WPS push-button configuration provides a semi-automated configuration method. The WPS button on the front panel of the router can be used for this purpose.

The WPS push-button configuration is described in the procedure below. It is assumed that the Wireless function is Enabled and that the router is configured as the Wireless Access Point (AP) of your WLAN. In addition, the wireless client must also be configured correctly and turned on, with WPS function enabled.

NOTE: The wireless AP on the router searches for 2 minutes. If the router stops searching before you complete Step 4, return to Step 3.

Step 3: Press WPS button
Press the WPS button on the front panel of the router. The WPS LED will blink to show that the router has begun searching for the client.

Step 4: Go to your WPS wireless client and activate the push-button function. A typical WPS client screenshot is shown below as an example.



PBC - Sending EAPOL-Start

Now go to Step 7 (part III. Check Connection) to check the WPS connection.

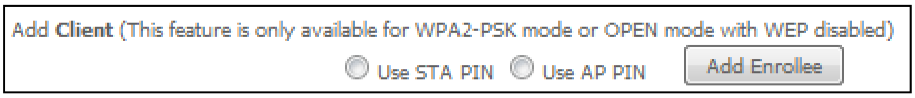
IIb. WPS – PIN CONFIGURATION

Using this method, security settings are configured with a personal identification number (PIN). The PIN can be found on the device itself or within the software. The PIN may be generated randomly in the latter case. To obtain a PIN number for your client, check the device documentation for specific instructions.

The WPS PIN configuration is described in the procedure below. It is assumed that the Wireless function is Enabled and that the router is configured as the Wireless Access Point (AP) of your wireless LAN. In addition, the wireless client must also be configured correctly and turned on, with WPS function enabled.

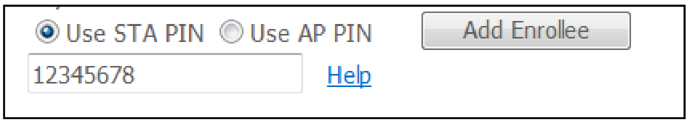
Step 5: Select the PIN radio button in the WSC Setup section of the Wireless Security screen, as shown in **A** or **B** below, and then click the appropriate button based on the WSC AP mode selected in step 2.

A - For **Configured** mode, click the **Add Enrollee** button.



Add **Client** (This feature is only available for WPA2-PSK mode or OPEN mode with WEP disabled)

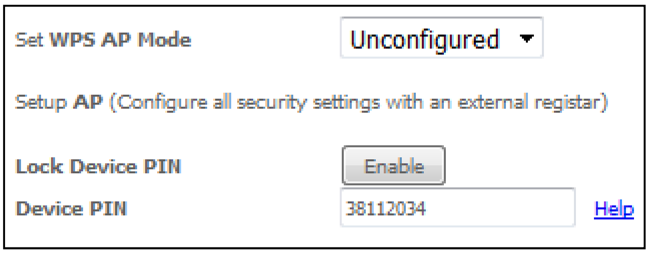
Enter STA PIN: a Personal Identification Number (PIN) has to be read from either a sticker or the display on the new wireless device. This PIN must then be inputted at representing the network, usually the Access Point of the network.



● Use STA PIN ○ Use AP PIN

12345678

B - For **Unconfigured** mode, click the **Config AP** button.



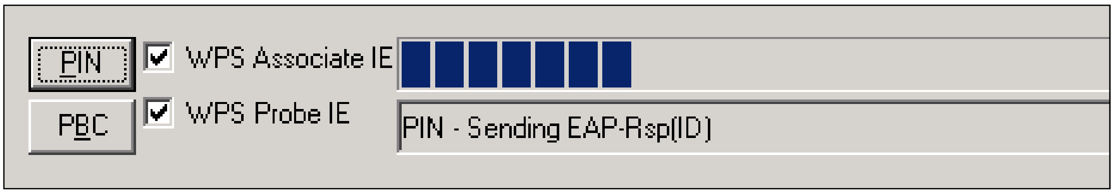
Set WPS AP Mode: Unconfigured

Setup AP (Configure all security settings with an external registar)

Device PIN: 38112034

Step 6: Activate the PIN function on the wireless client. For **Configured** mode, the client must be configured as an Enrollee. For **Unconfigured** mode, the client must be configured as the Registrar. This is different from the External Registrar function provided in Windows Vista.

The figure below provides an example of a WPS client PIN function in-progress.



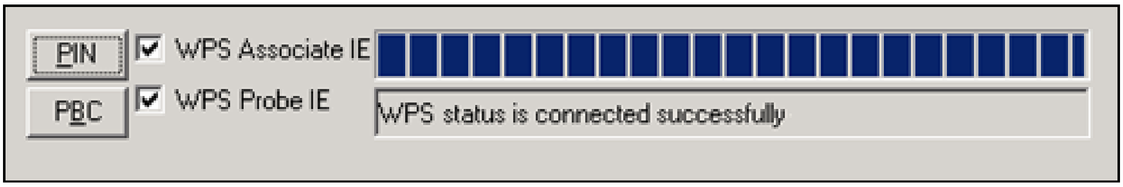
☑ WPS Associate IE

☑ WPS Probe IE

PIN - Sending EAP-Rsp(ID)

III. CHECK CONNECTION

Step 7: If the WPS setup method was successful, you will be able access the wireless AP from the client. The client software should show the status. The example below shows that the connection established successfully.



☑ WPS Associate IE

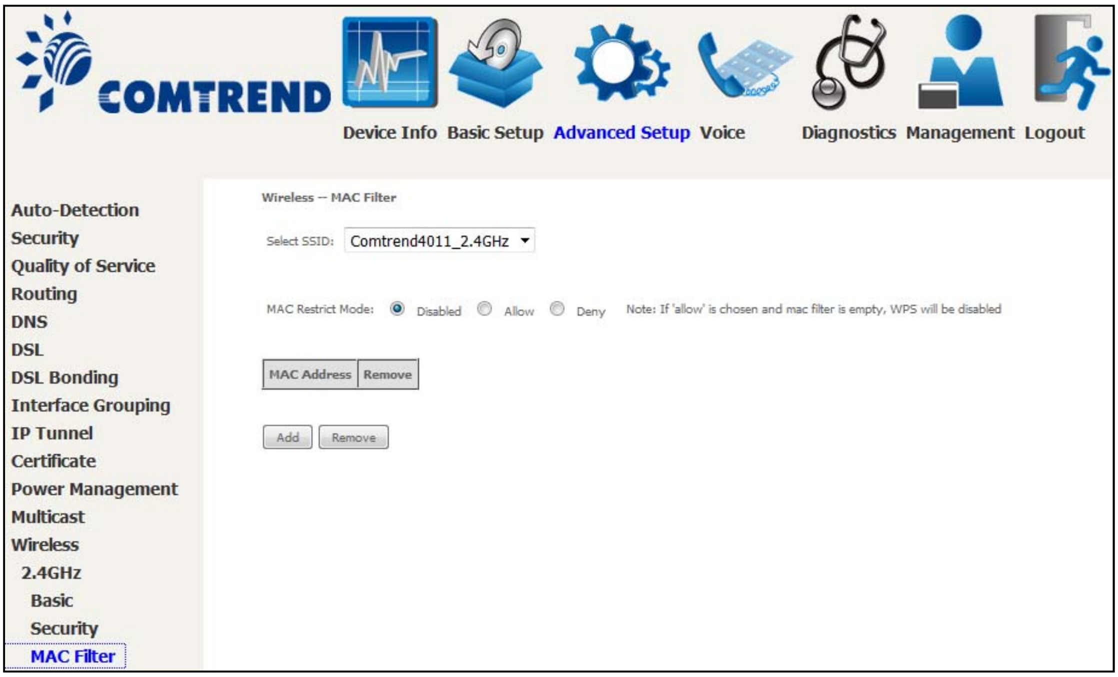
☑ WPS Probe IE

WPS status is connected successfully

You can also double-click the Wireless Network Connection icon from the Network Connections window (or the system tray) to confirm the status of the new connection.

6.13.4 MAC Filter 2.4GHz

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.



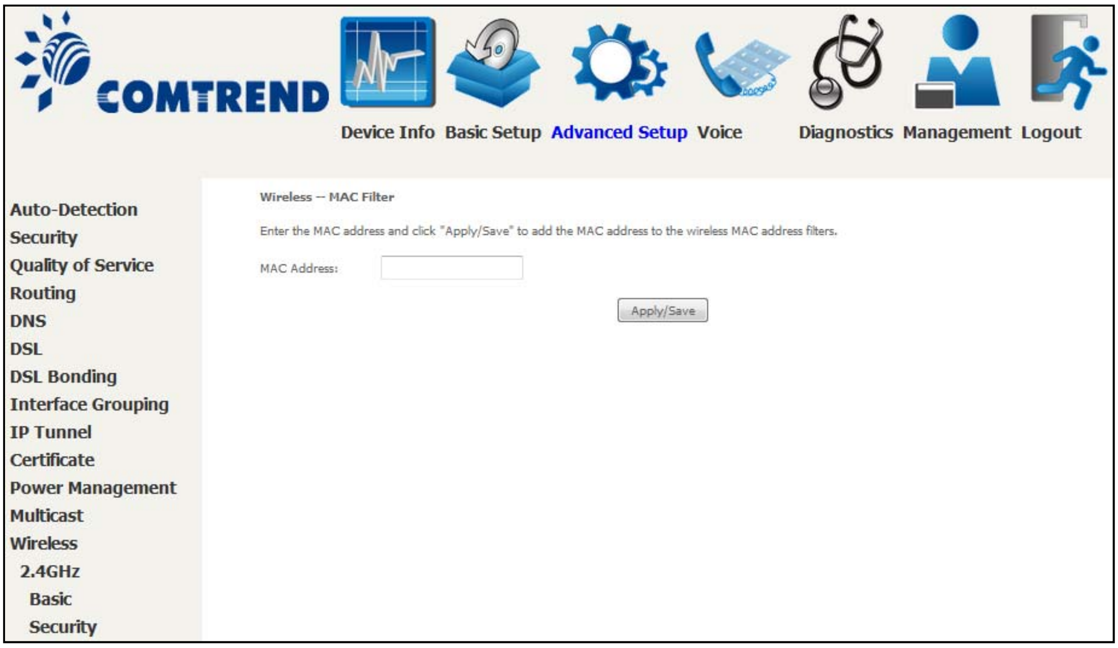
Wireless -- MAC Filter

Select SSID: Comtrend4011_2.4GHz

MAC Restrict Mode: ● Disabled ○ Allow ○ Deny Note: If 'allow' is chosen and mac filter is empty, WPS will be disabled

Option	Description
Select SSID	Select the wireless network name from the drop-down menu. 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.



Wireless -- MAC Filter

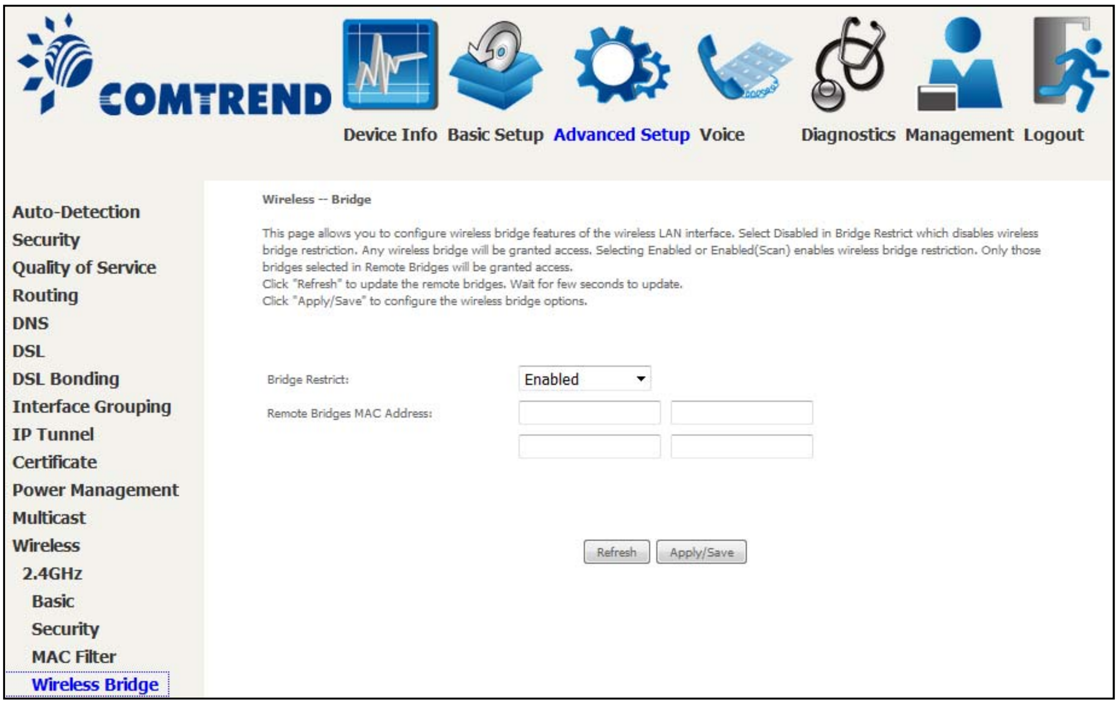
Enter the MAC address and click "Apply/Save" to add the MAC address to the wireless MAC address filters.

MAC Address:

Enter the MAC address in the box provided and click **Apply/Save.**

6.13.5 Wireless Bridge 2.4GHz

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



Wireless -- Bridge

This page allows you to configure wireless bridge features of the wireless LAN interface. Select Disabled in Bridge Restrict which disables wireless bridge restriction. Any wireless bridge will be granted access. Selecting Enabled or Enabled(Scan) enables wireless bridge restriction. Only those bridges selected in Remote Bridges will be granted access.
Click "Refresh" to update the remote bridges. Wait for few seconds to update.
Click "Apply/Save" to configure the wireless bridge options.

Bridge Restrict: Enabled

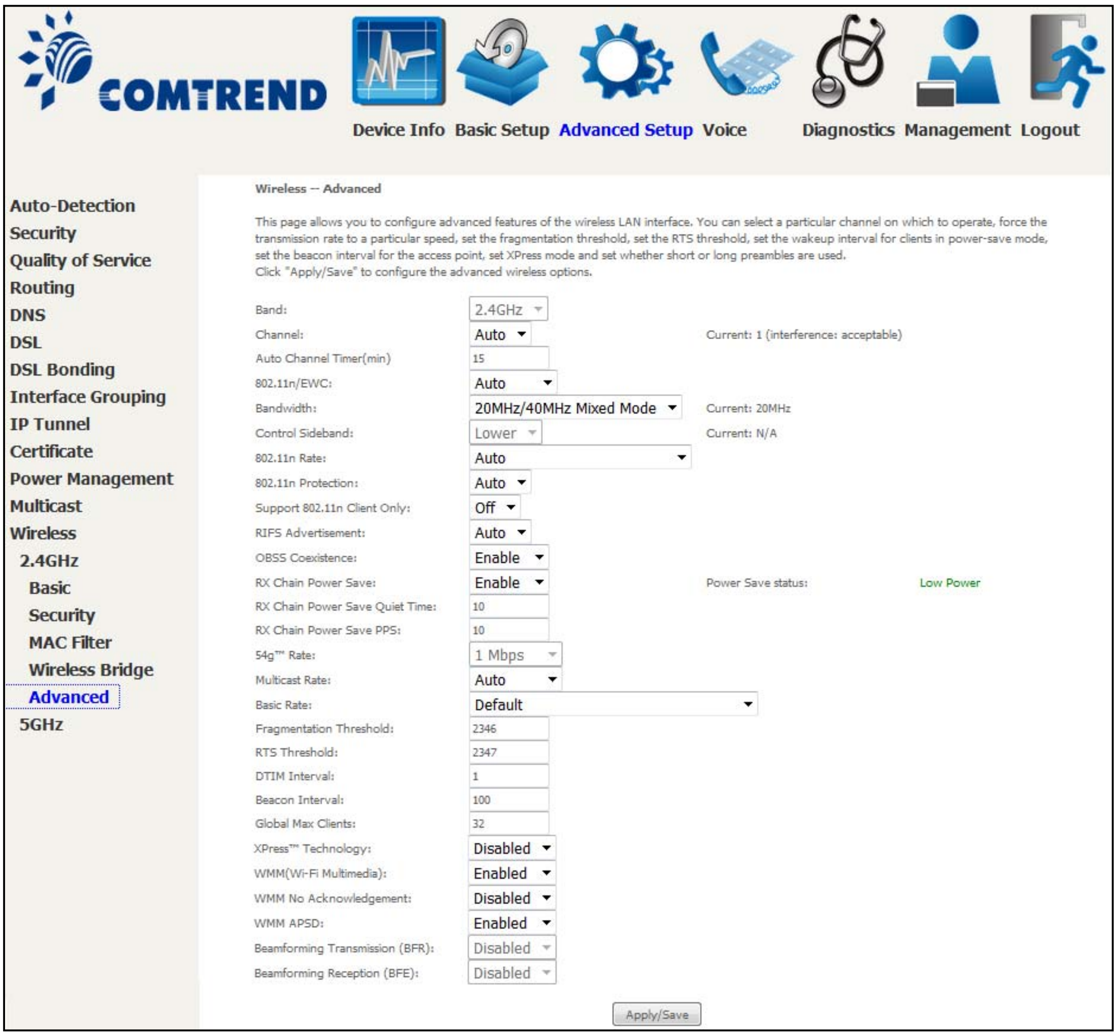
Remote Bridges MAC Address:

Click **Apply/Save** to implement new configuration settings.

Feature	Description
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.
Remote Bridges MAC Address	Enter the list of MAC addresses allowed to act as wireless bridge clients.

6.13.6 Advanced 2.4GHz

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 **Apply/Save** to set new advanced wireless options.



Wireless -- Advanced

This page 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 "Apply/Save" to configure the advanced wireless options.

Band:	2.4GHz		
Channel:	Auto	Current: 1 (interference: acceptable)	
Auto Channel Timer(min)	15		
802.11n/EWC:	Auto		
Bandwidth:	20MHz/40MHz Mixed Mode	Current: 20MHz	
Control Sideband:	Lower	Current: N/A	
802.11n Rate:	Auto		
802.11n Protection:	Auto		
Support 802.11n Client Only:	Off		
RIFS Advertisement:	Auto		
OBSS Coexistence:	Enable		
RX Chain Power Save:	Enable	Power Save status:	Low Power
RX Chain Power Save Quiet Time:	10		
RX Chain Power Save PPS:	10		
54g™ Rate:	1 Mbps		
Multicast Rate:	Auto		
Basic Rate:	Default		
Fragmentation Threshold:	2346		
RTS Threshold:	2347		
DTIM Interval:	1		
Beacon Interval:	100		
Global Max Clients:	32		
XPress™ Technology:	Disabled		
WMM(Wi-Fi Multimedia):	Enabled		
WMM No Acknowledgement:	Disabled		
WMM APSD:	Enabled		
Beamforming Transmission (BFR):	Disabled		
Beamforming Reception (BFE):	Disabled		

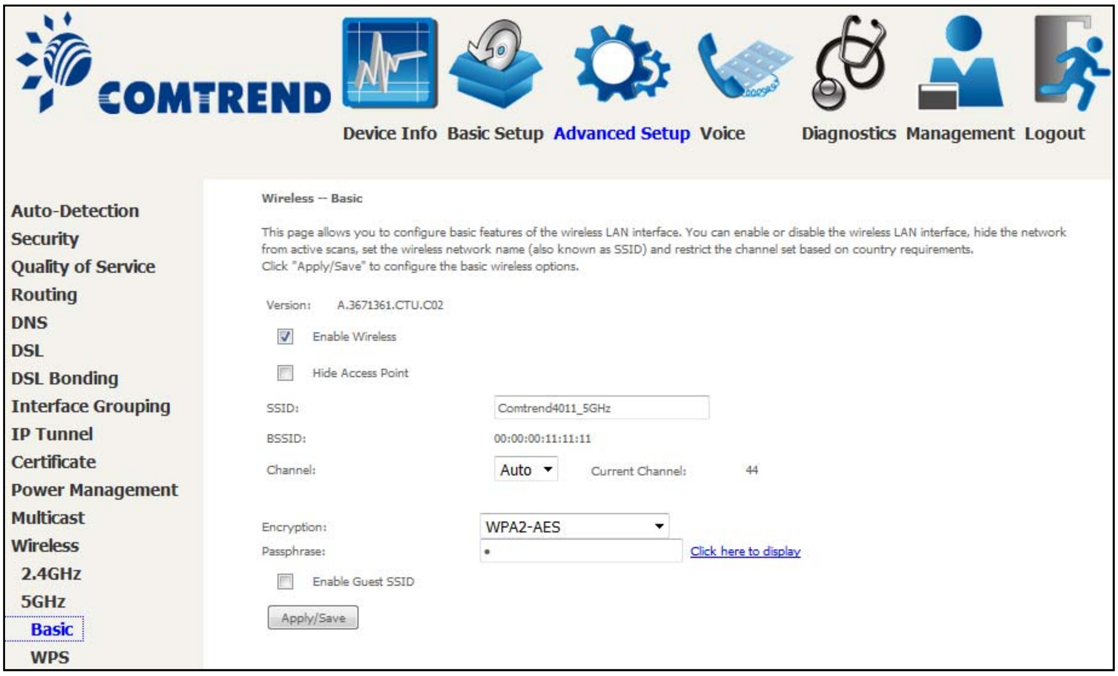
Field	Description
Band	Set to 2.4 GHz for compatibility with IEEE 802.11x standards. The new amendment allows IEEE 802.11n units to fall back to slower speeds so that legacy IEEE 802.11x devices can coexist in the same network. IEEE 802.11g creates data-rate parity at 2.4 GHz with the IEEE 802.11a standard, 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.

Field	Description
Auto Channel Timer (min)	Auto channel scan timer in minutes (0 to disable)
802.11n/EWC	An equipment interoperability standard setting based on IEEE 802.11n Draft 2.0 and Enhanced Wireless Consortium (EWC)
Bandwidth	Select 20MHz or 40MHz bandwidth. 40MHz bandwidth uses two adjacent 20MHz bands for increased data throughput.
Control Sideband	Select Upper or Lower sideband when in 40MHz mode.
802.11n Rate	Set the physical transmission rate (PHY).
802.11n Protection	Turn Off for maximized throughput. Turn On for greater security.
Support 802.11n Client Only	Turn Off to allow 802.11b/g clients access to the router. Turn On to prohibit 802.11b/g client's access to the router.
RIFS Advertisement	One of several draft-n features designed to improve efficiency. Provides a shorter delay between OFDM transmissions than in802.11a or g.
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.
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.

Field	Description
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.
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.
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.
Beamforming Transmission (BFR)	Enable beamforming signal enhance for wireless transmission.
Beamforming Reception (BFE)	Enable beamforming signal enhance for wireless reception.

6.13.7 Basic 5GHz

The Basic option allows you to configure basic features of the wireless LAN interface. Among other things, you can enable or disable the wireless LAN interface, hide the network from active scans, set the wireless network name (also known as SSID) and restrict the channel set based on country requirements.



Wireless -- Basic

This page allows you to configure basic features of the wireless LAN interface. You can enable or disable the wireless LAN interface, hide the network from active scans, set the wireless network name (also known as SSID) and restrict the channel set based on country requirements.
Click "Apply/Save" to configure the basic wireless options.

Version: A.3671361.CTU.C02

☑ Enable Wireless

□ Hide Access Point

SSID: Comtrend4011_5GHz

BSSID: 00:00:00:11:11:11

Channel: Auto ▾ Current Channel: 44

Encryption: WPA2-AES ▾

Passphrase: • Click here to display

□ Enable Guest SSID

Apply/Save

Click **Apply/Save** to configure the basic wireless options.

Consult the table below for descriptions of these options.

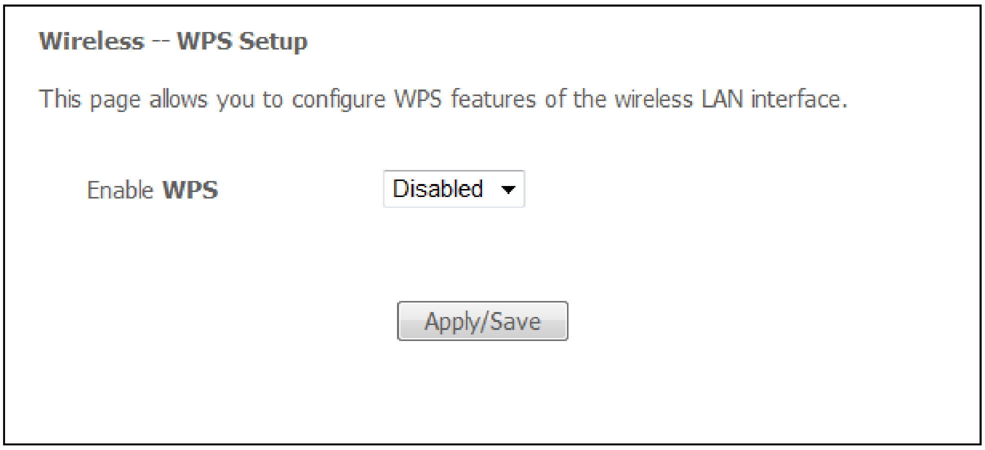
Option	Description
Enable Wireless	A checkbox ☑ that enables or disables the wireless LAN interface. When selected, a set of basic wireless options will appear.
Hide Access Point	Select Hide Access Point to protect the access point from detection by wireless active scans. To check AP status in Windows XP, open **Network Connections** from the **start** Menu and select **View Available Network Connections**. If the access point is hidden, it will not be listed there. To connect a client to a hidden access point, the station must add the access point manually to its wireless configuration.
SSID [1-32 characters]	Sets the wireless network name. 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.

Option	Description
BSSID	The BSSID is a 48-bit identity used to identify a particular BSS (Basic Service Set) within an area. In Infrastructure BSS networks, the BSSID is the MAC (Media Access Control) address of the AP (Access Point); and in Independent BSS or ad hoc networks, the BSSID is generated randomly.
Channel	Drop-down menu that allows selection of a specific channel.
Encryption	The encryption mode used for the wireless LAN interface.
Passphrase	Enter a passphrase of at least 8 digits is required for WPA2 mode and mixed mode wireless encryption.
Enable Guest SSID	Click Enable Guest SSID to enable an additional SSID to provide varied access.

6.13.8 WPS 5GHz

Refer to 6.13.3 for WPS setup procedure.

WPS can be disabled / enabled by selecting the corresponding option and click "**Apply/Save**"

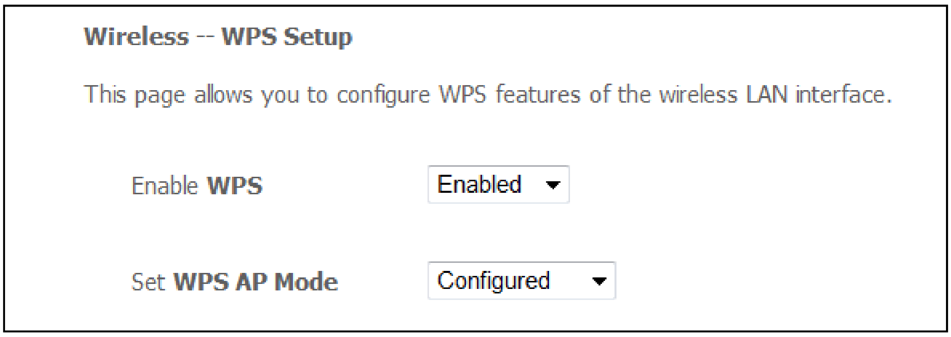


Wireless -- WPS Setup

This page allows you to configure WPS features of the wireless LAN interface.

Enable WPS: Disabled

a. When enabled in configured mode, use Push button or PIN to allow client connection.



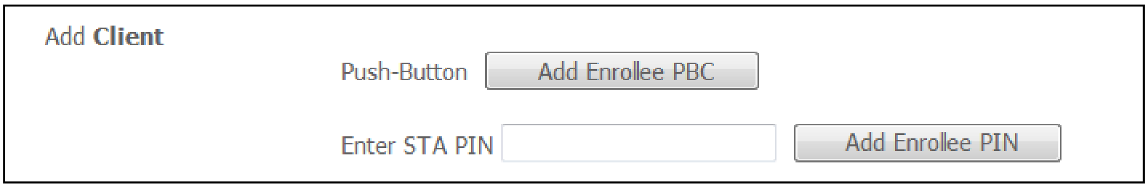
Wireless -- WPS Setup

This page allows you to configure WPS features of the wireless LAN interface.

Enable WPS: Enabled

Set WPS AP Mode: Configured

To activate Push button, click on the "Add Enrollee PBC" button or use the 5G Wifi On/Off & WPS button on the front panel.



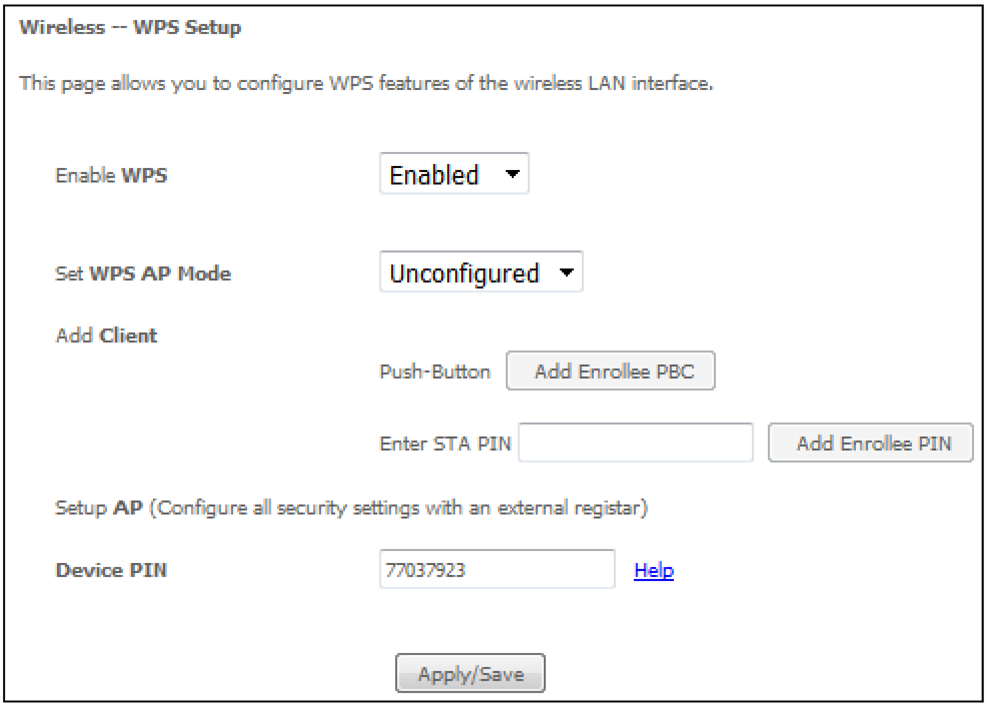
Add **Client**

Push-Button [Add Enrollee PBC]

Enter STA PIN [ ] [Add Enrollee PIN]

Enter the STA PIN and click the "Add Enrollee PIN" button to active PIN mode connection

b. When enabled in unconfigured mode, enter the Device PIN to the external registrar for PIN mode setup.



Wireless -- WPS Setup

This page allows you to configure WPS features of the wireless LAN interface.

Enable **WPS**: Enabled

Set **WPS AP Mode**: Unconfigured

Add **Client**

Push-Button [Add Enrollee PBC]

Enter STA PIN [ ] [Add Enrollee PIN]

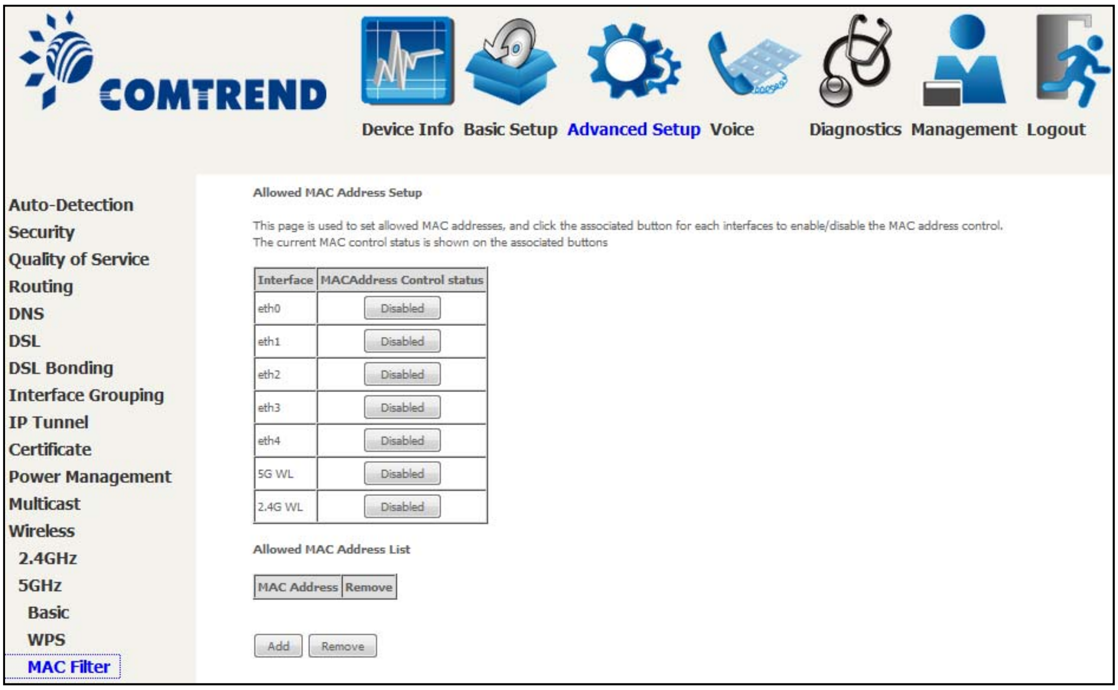
Setup **AP** (Configure all security settings with an external registar)

Device PIN: 77037923 Help

[Apply/Save]

6.13.9 MAC Filter 5GHz

This page is used to set allowed MAC addresses, and click the associated button for each interface to enable/disable the MAC address control.
The current MAC control status is shown on the associated buttons.



Allowed MAC Address Setup

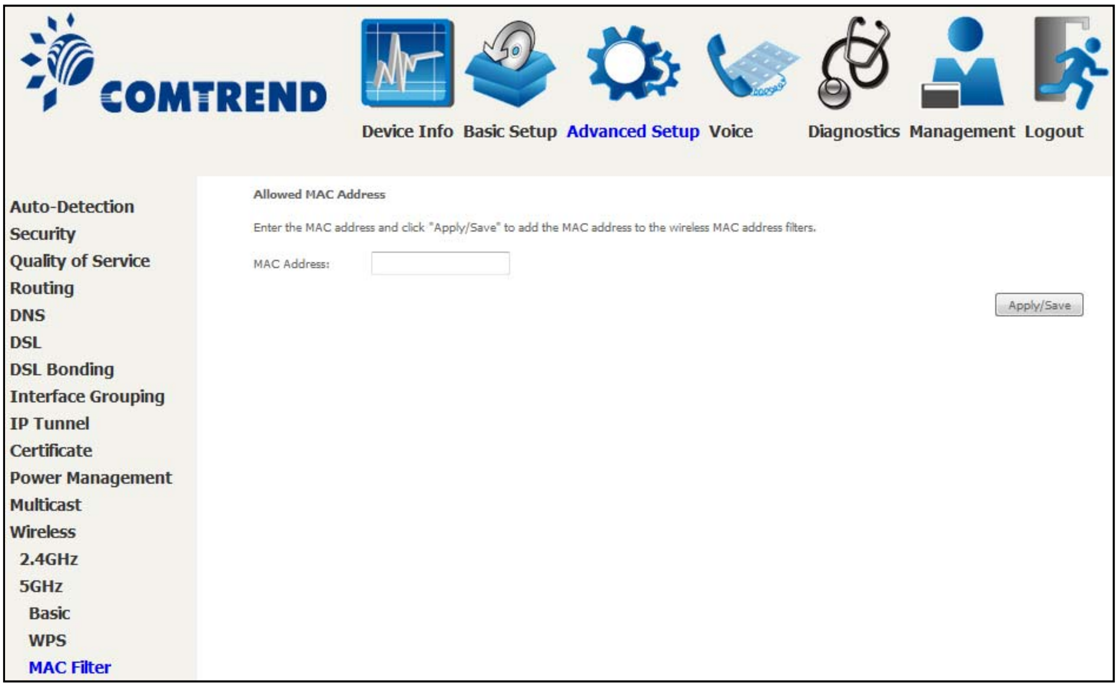
This page is used to set allowed MAC addresses, and click the associated button for each interfaces to enable/disable the MAC address control.
The current MAC control status is shown on the associated buttons

Interface	MACAddress Control status
eth0	Disabled
eth1	Disabled
eth2	Disabled
eth3	Disabled
eth4	Disabled
5G WL	Disabled
2.4G WL	Disabled

Allowed MAC Address List

MAC Address	Remove

After clicking the **Add** button, the following screen appears.



Allowed MAC Address

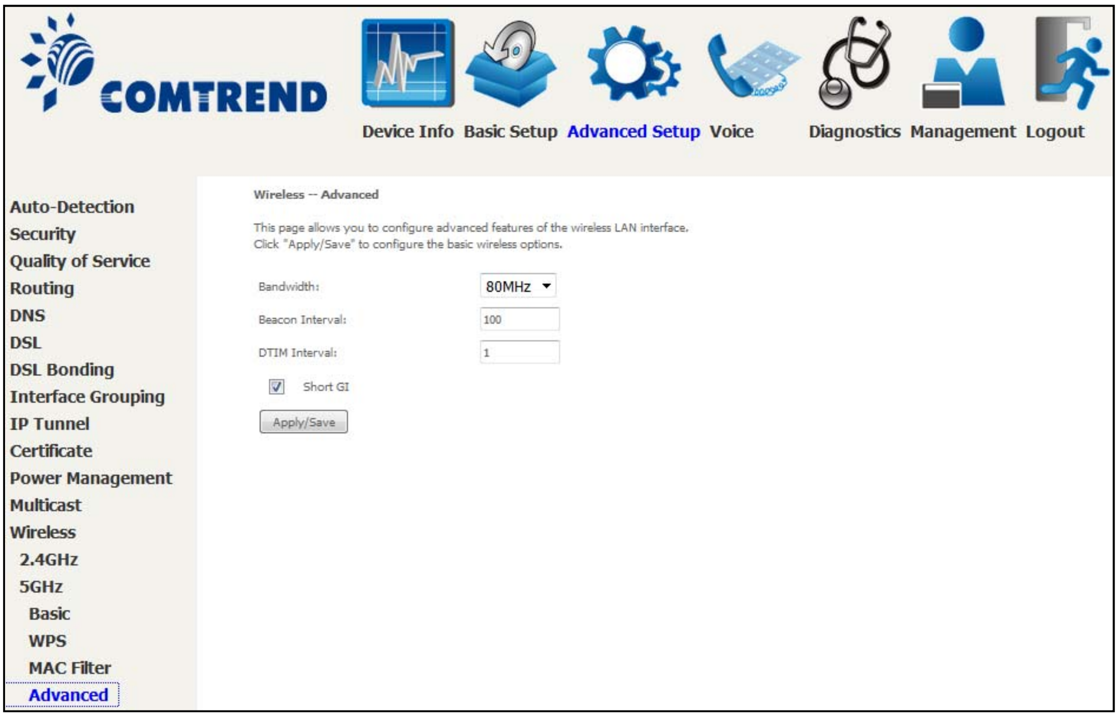
Enter the MAC address and click "Apply/Save" to add the MAC address to the wireless MAC address filters.

MAC Address:

Enter the MAC address in the box provided and click **Apply/Save.**

6.13.10 Advanced 5GHz

This page allows you to configure advanced features of the wireless LAN interface. Click **Apply/Save** to configure the basic wireless options.



Wireless -- Advanced

This page allows you to configure advanced features of the wireless LAN interface.
Click "Apply/Save" to configure the basic wireless options.

Bandwidth: 80MHz

Beacon Interval: 100

DTIM Interval: 1

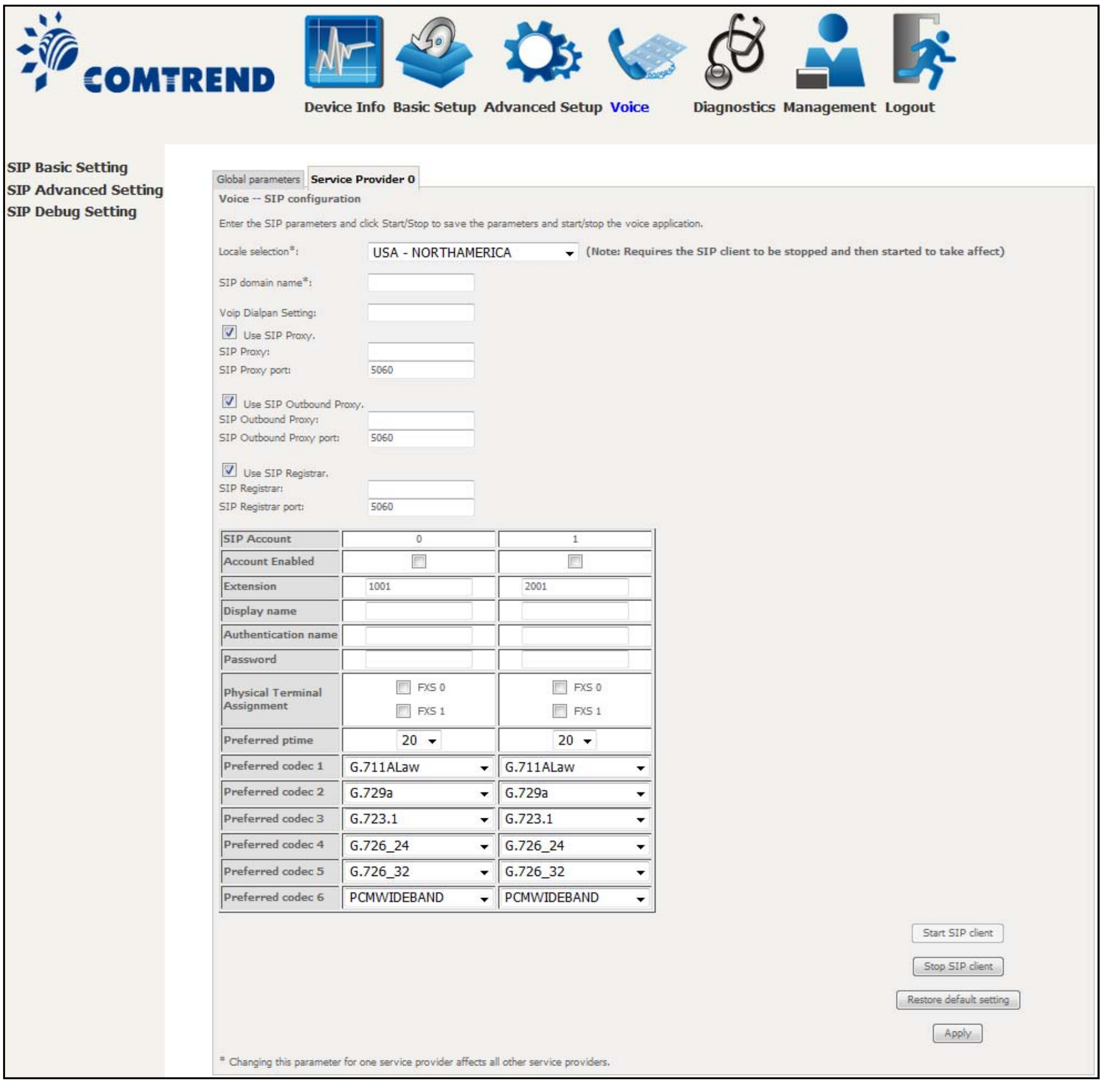
☑ Short GI

Field	Description
Bandwidth	Select the bandwidth used on the 5G interface. 80MHz is selected by default.
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).
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.
Short GI	Enable/Disable use of short guard interval.

Chapter 7 Voice

This chapter first describes the various options for configuration of the SIP voice service. It then provides detailed instructions for making telephone calls using VoIP (Voice over IP) or PSTN (Public Switched Telephone Network) services. Session Initiation Protocol (SIP) is a peer-to-peer protocol used for Internet conferencing, telephony, events notification, presence and instant messaging.

SIP is designed to address the functions of signaling and session management within a packet telephony network. Signaling allows call information to be carried across network boundaries. Session management provides the ability to control the attributes of an end-to-end call.



Voice -- SIP configuration

Enter the SIP parameters and click Start/Stop to save the parameters and start/stop the voice application.

Locale selection*: USA - NORTHAMERICA (Note: Requires the SIP client to be stopped and then started to take affect)

SIP domain name*:

Voip Dialpan Setting:

☑ Use SIP Proxy.
SIP Proxy:
SIP Proxy port: 5060

☑ Use SIP Outbound Proxy.
SIP Outbound Proxy:
SIP Outbound Proxy port: 5060

☑ Use SIP Registrar.
SIP Registrar:
SIP Registrar port: 5060

SIP Account	0	1
Account Enabled	□	□
Extension	1001	2001
Display name		
Authentication name		
Password		
Physical Terminal Assignment	□ FXS 0 □ FXS 1	□ FXS 0 □ FXS 1
Preferred ptime	20	20
Preferred codec 1	G.711ALaw	G.711ALaw
Preferred codec 2	G.729a	G.729a
Preferred codec 3	G.723.1	G.723.1
Preferred codec 4	G.726_24	G.726_24
Preferred codec 5	G.726_32	G.726_32
Preferred codec 6	PCMWIDEBAND	PCMWIDEBAND

* Changing this parameter for one service provider affects all other service providers.

NOTE: The SIP standard is set by the Internet Engineering Task Force (IETF).

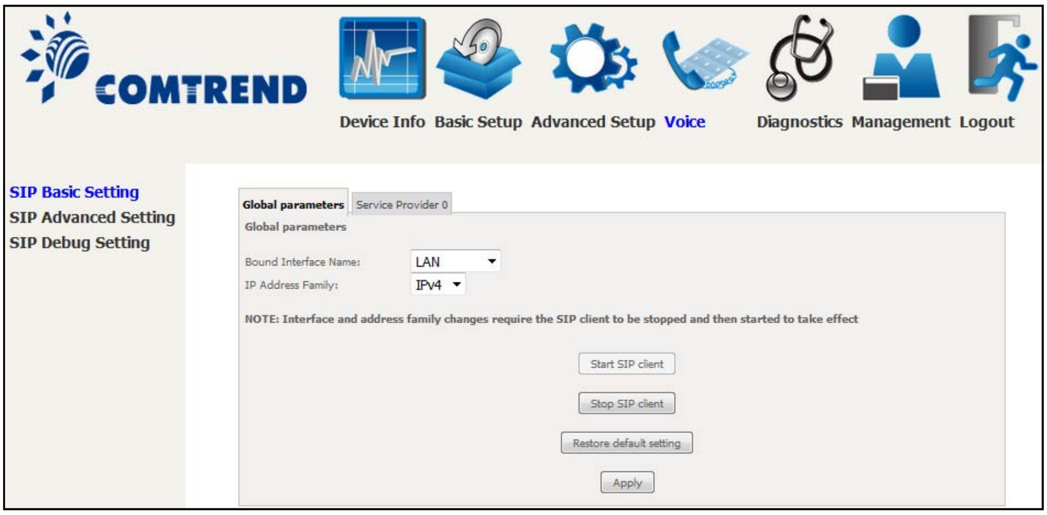
The SIP standard defines the following agents/servers:

- User Agents (**UA**) - SIP phone clients (hardware or software)
- Proxy Server – relays data between **UA** and external servers
- Registrar Server - a server that accepts register requests from **UA**
- Redirect Server – provides an address lookup service to **UA**

The following subsections present **Basic**, **Advanced** and **Debug** SIP screens. Each screen provides various options for customizing the SIP configuration.

7.1 SIP Basic Setting – Global Parameters

A common parameter setting.



Global parameters

Bound Interface Name: LAN

IP Address Family: IPv4

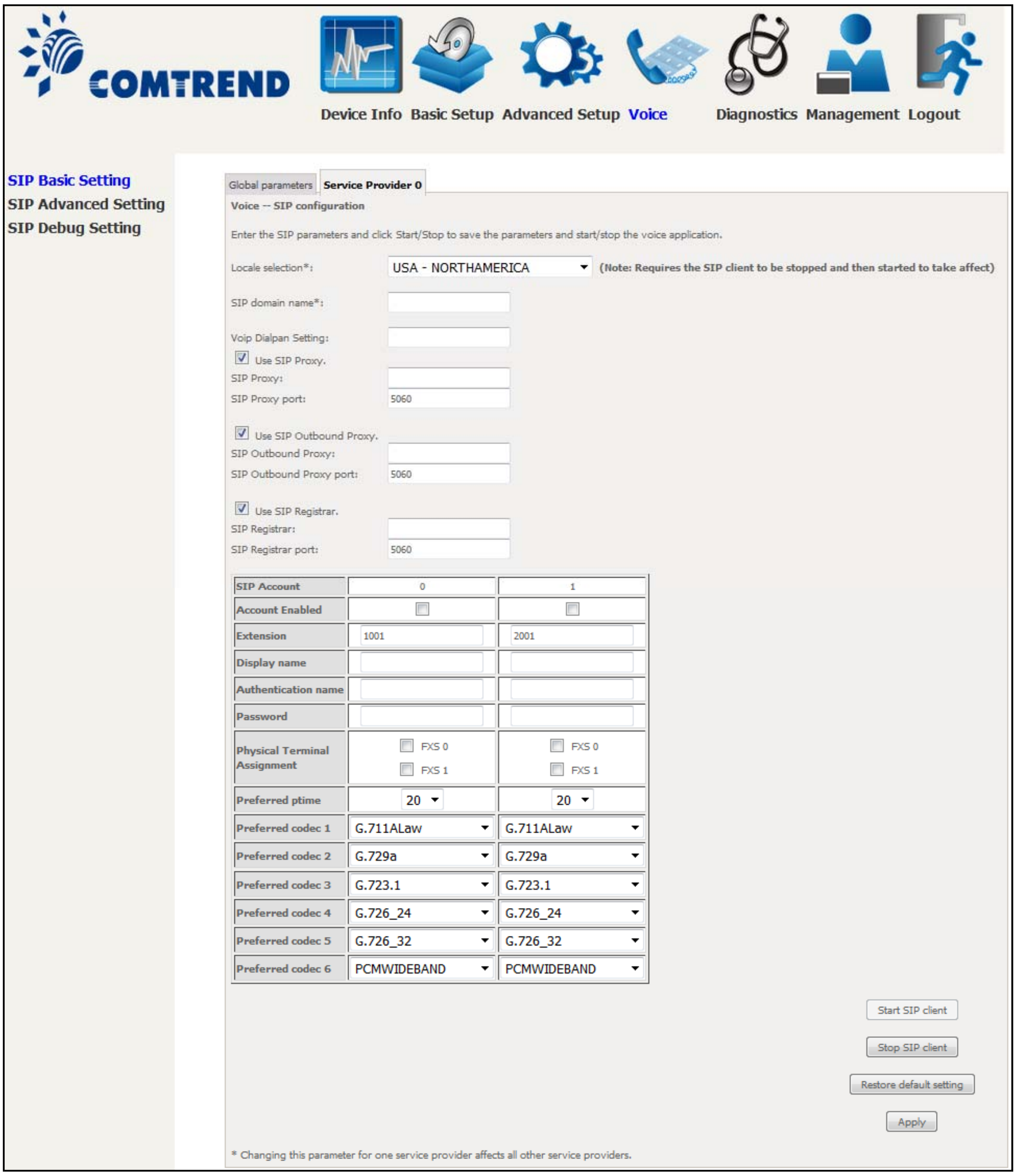
NOTE: Interface and address family changes require the SIP client to be stopped and then started to take effect

Bound Interface Name:
Select a WAN interface to send SIP control messages.

IP Address Family:
Select to use IPv4 or IPv6 for VoIP messages.

7.2 SIP Basic Setting – Service Provider

Enter the SIP parameters and click Start/Stop to save the parameters and start/stop the voice application.



Voice -- SIP configuration

Enter the SIP parameters and click Start/Stop to save the parameters and start/stop the voice application.

Locale selection*: USA - NORTHAMERICA (Note: Requires the SIP client to be stopped and then started to take affect)

SIP domain name*:

Voip Dialpan Setting:

☑ Use SIP Proxy.

SIP Proxy:

SIP Proxy port: 5060

☑ Use SIP Outbound Proxy.

SIP Outbound Proxy:

SIP Outbound Proxy port: 5060

☑ Use SIP Registrar.

SIP Registrar:

SIP Registrar port: 5060

SIP Account	0	1
Account Enabled	□	□
Extension	1001	2001
Display name		
Authentication name		
Password		
Physical Terminal Assignment	□ FXS 0 □ FXS 1	□ FXS 0 □ FXS 1
Preferred ptime	20	20
Preferred codec 1	G.711ALaw	G.711ALaw
Preferred codec 2	G.729a	G.729a
Preferred codec 3	G.723.1	G.723.1
Preferred codec 4	G.726_24	G.726_24
Preferred codec 5	G.726_32	G.726_32
Preferred codec 6	PCMWIDEBAND	PCMWIDEBAND

* Changing this parameter for one service provider affects all other service providers.

Once settings are configured click **Apply** to begin using the service.

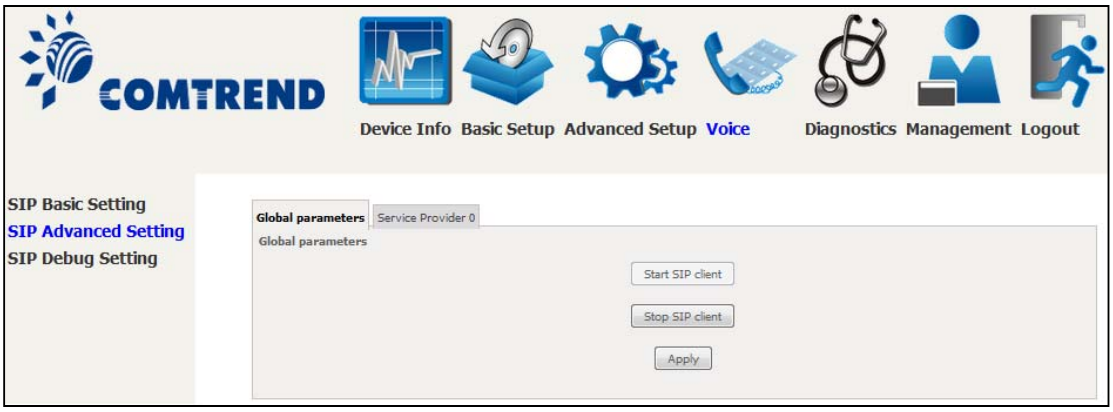
Field	Description
Locale Selection	Sets tone, ring type and physical characteristics for specific countries.
SIP domain name	Provided by your VoIP provider.

Field	Description
VoIP Dialplan Setting	A dial plan establishes the expected sequence of digits dialed on subscriber premises equipment, such as telephones, in private branch exchange (PBX) systems, or in other telephone switches to effect access to specific telephone networks for telephone calls, and to effect or activate specific telephone system features. In private branch exchanges in the U.S. a dial plan may specify the dialing for the following destinations: • Internal extension numbers of two, three, or four digits. • Local numbers of seven or ten digits, which may be preceded by a 9, if required to access an outside line. • Long distance numbers of eleven digits, consisting of a 1, a three-digit area code, and a seven-digit number; preceded by a 9 if required. • International numbers of any length starting with 011 and preceded by a 9 if required. Similarly, telephony service operators may provide dialing sequences for special services, such as directory assistance and emergency services. PBX equipment, carrier switching systems, or end-user telephones may specify a variable-length dial plan or a fixed-length dial plan.
Use SIP proxy	Enable the SIP proxy by selecting the checkbox ☑ and setting proxy parameters.
SIP Proxy	Input IP address or domain name of the SIP proxy server, used for VoIP service.
SIP Proxy port	This value is set by your VoIP provider.

Field	**Description**
Use SIP Outbound Proxy	Enable the SIP outbound proxy by selecting the checkbox ☑ and setting outbound proxy parameters. It forwards the requests if you cannot reach SIP proxy directly.
SIP Outbound Proxy port	This value is set by your VoIP provider.
Use SIP Registrar	Enable the SIP Registrar proxy by selecting the checkbox ☑
SIP Registrar	Input IP address or domain name of the SIP proxy server, used for VOIP service.
SIP Registrar Port	This value is set by your VoIP provider.
FYI: *A proxy is an intermediary program that acts as both a server and a client for the purpose of making requests on behalf of other clients. Requests are serviced internally or transferred to other servers. A proxy interprets and, if necessary, rewrites a request message before forwarding it.*	
SIP Account 1 & 2	**Ports FXS1 & FXS2**
SIP Account	Map SIP accounts to physical ports. “0” represents to FXS1 and “1” represents to FXS2.
Extension	The line extension number.
Display Name	The caller ID display name.
Authentication Name	The authentication username for the Registrar/Proxy, given by VoIP provider.
Authentication Password	The authentication password for the Registrar/proxy, given by VoIP provider.
Physical Terminal Assignment	Connect the FXS port to the physical port.
Preferred ptime	The time period used to digitally sample the analog voice signal. The default is 20 ms.
Preferred codec 1-6	Choose from G.711MuLaw/ALaw, G.729a, G.723.1, G.726_24/32, or GSM_AMR codecs

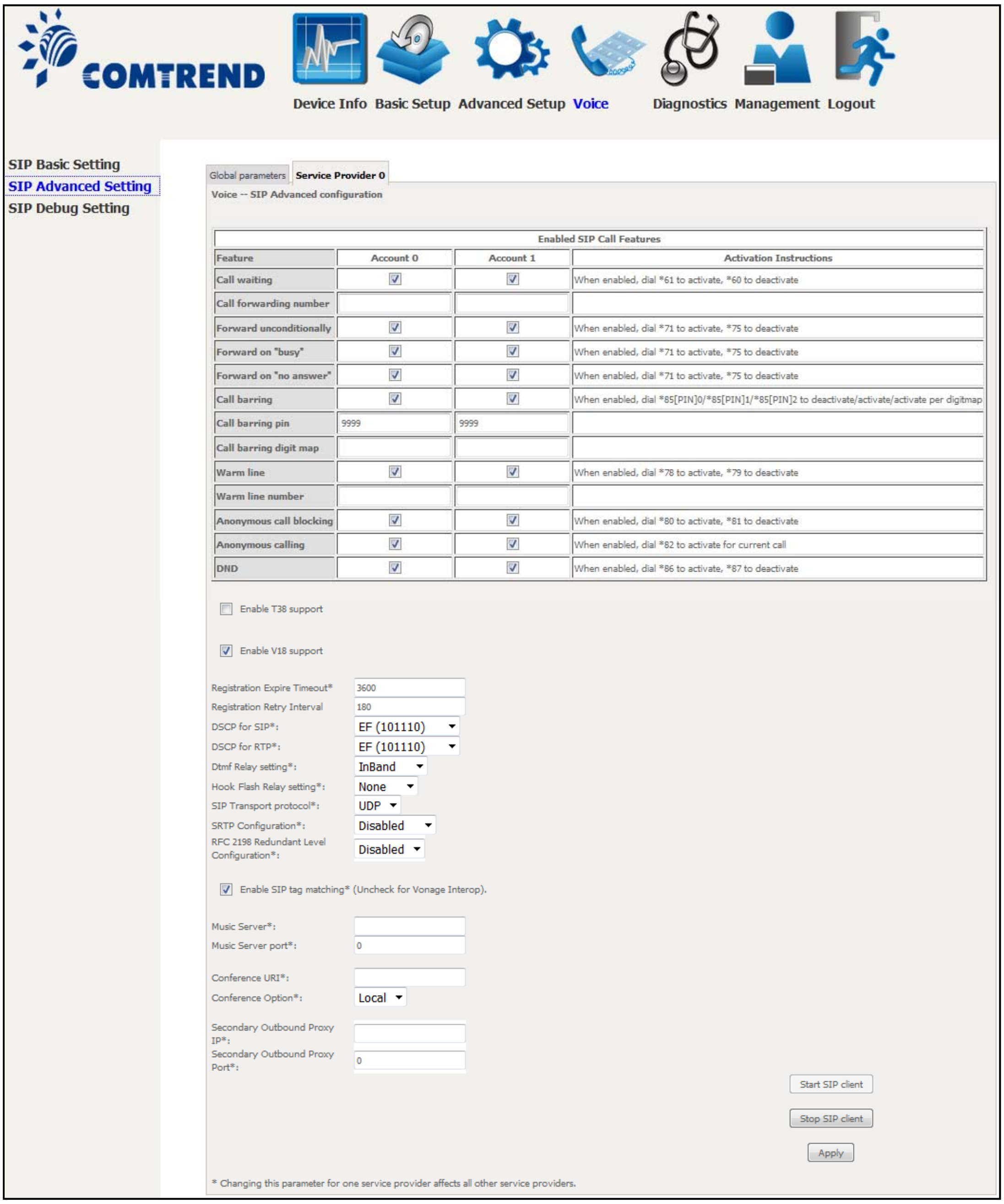
7.3 SIP Advanced Setting – Global Parameters

This screen contains the advanced SIP configuration settings.



7.4 SIP Advanced Setting – Service Provider

Configure your settings based on your service provider.



Voice -- SIP Advanced configuration

Enabled SIP Call Features			
Feature	Account 0	Account 1	Activation Instructions
Call waiting	☑	☑	When enabled, dial *61 to activate, *60 to deactivate
Call forwarding number			
Forward unconditionally	☑	☑	When enabled, dial *71 to activate, *75 to deactivate
Forward on "busy"	☑	☑	When enabled, dial *71 to activate, *75 to deactivate
Forward on "no answer"	☑	☑	When enabled, dial *71 to activate, *75 to deactivate
Call barring	☑	☑	When enabled, dial *85[PIN]0/*85[PIN]1/*85[PIN]2 to deactivate/activate/activate per digitmap
Call barring pin	9999	9999	
Call barring digit map			
Warm line	☑	☑	When enabled, dial *78 to activate, *79 to deactivate
Warm line number			
Anonymous call blocking	☑	☑	When enabled, dial *80 to activate, *81 to deactivate
Anonymous calling	☑	☑	When enabled, dial *82 to activate for current call
DND	☑	☑	When enabled, dial *86 to activate, *87 to deactivate

☐ Enable T38 support

☑ Enable V18 support

Registration Expire Timeout*	3600
Registration Retry Interval	180
DSCP for SIP*:	EF (101110)
DSCP for RTP*:	EF (101110)
Dtmf Relay setting*:	InBand
Hook Flash Relay setting*:	None
SIP Transport protocol*:	UDP
SRTP Configuration*:	Disabled
RFC 2198 Redundant Level Configuration*:	Disabled

☑ Enable SIP tag matching* (Uncheck for Vonage Interop).

Music Server*:	
Music Server port*:	0
Conference URI*:	
Conference Option*:	Local
Secondary Outbound Proxy IP*:	
Secondary Outbound Proxy Port*:	0

* Changing this parameter for one service provider affects all other service providers.

These settings are described in the tables below. Once configuration is complete, click **Apply** to begin using the service.

NOTE:	Some of these options can also be set using telephone keypad commands, as described in the call command list in section 7.7 Telephone Calls

Line 1 & 2	Ports FXS1 & FXS2
Call waiting	Tick the checkbox ☑ to enable this option.

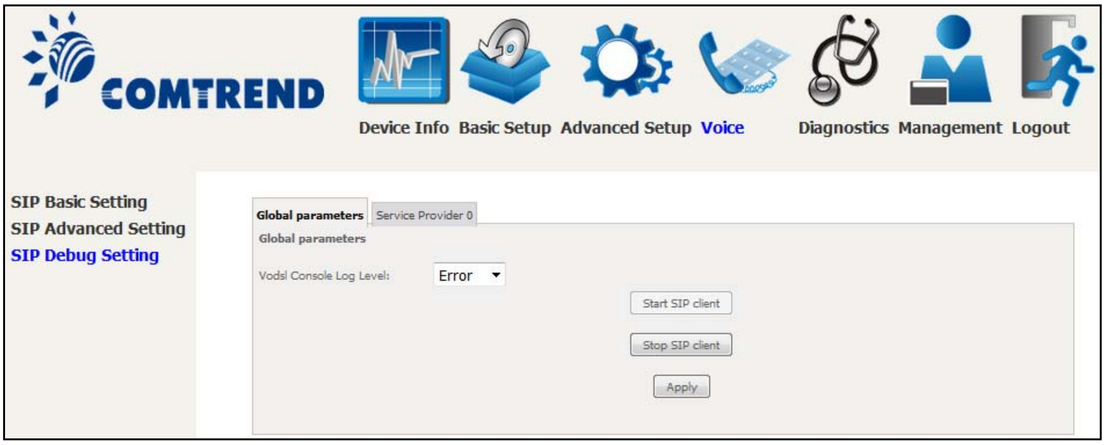
Line 1 & 2	Ports FXS1 & FXS2
Call forwarding number	Enter the forwarding phone number.
Forward unconditionally	Tick the checkbox ☑ to enable this option.
Forward on “busy”	Tick the checkbox ☑ to enable this option.
Forward on “no answer”	Tick the checkbox ☑ to enable this option.
Call barring	Tick the checkbox ☑ to enable this option. Call Barring allows you to bar certain types of calls from being made from your phone and also allows you to bar incoming calls.
Call barring pin	The default setting for the Call Barring PIN code is the same as the four-digit PIN code.
Call barring digit map	Set the dial plan for call barring.
Warm line	When the Warm Line function is in use, the user can dial a number. Otherwise the system will divert incoming calls from an outside line to the Warm Line Number after a set wait time.
Warm line number	Define warm line number.
Anonymous call blocking	Tick the checkbox ☑ to enable this option.
Anonymous calling	Tick the checkbox ☑ to enable this option.
DND (Do Not Disturb)	Tick the checkbox ☑ to enable this option.

Enable T38 support	Enable or disable T38 Fax mode support with this checkbox ☑. You can plug a fax machine into either phone port to send or receive faxes. Functionality depends upon FAX support by your VoIP service provider.
Enable V18 support	Enable or disable for V18 support with this checkbox ☑.
Registration Expire Timeout	The time period the user would like the registration to be valid for the Registrar/ Proxy Server. The default is 3600 seconds.

Registration Retry Interval	The time interval between re-registration attempts.
DSCP for SIP	Diff Serv Code Point (DSCP) for SIP.
DSCP for RTP	Diff Serv Code Point (DSCP) for RTP.
Dtmf Relay setting	Set the special use of RTP packets to transmit digit events.
Hook Flash Relay setting	Set flash hook event will be sent via which signal.
SIP Transport protocol	SIP control message will be sent via which protocol.
SRTP Configuration	Enable or disable for Security RTP support.
RFC 2198 Redundant Level Configuration	Enable or disable for RFC 2198 support.
Enable SIP tag matching (Uncheck for Vonage Interop).	Since CPE rely on the *tags* for *matching* purposes, implementations which support Replacements MUST support the *SIP* specification, which requires *tags.*
Music Server	Set music server address for on-hold state.
Music Server port	Set music server port for on-hold state.
Conference URI	Set conference URI.
Conference Option	Set conference option.
Secondary Outbound Proxy IP	Set secondary outbound address.
Secondary Outbound Proxy Port	Set secondary outbound port.

7.5 SIP Debug Setting – Global Parameters

A common parameter setting.

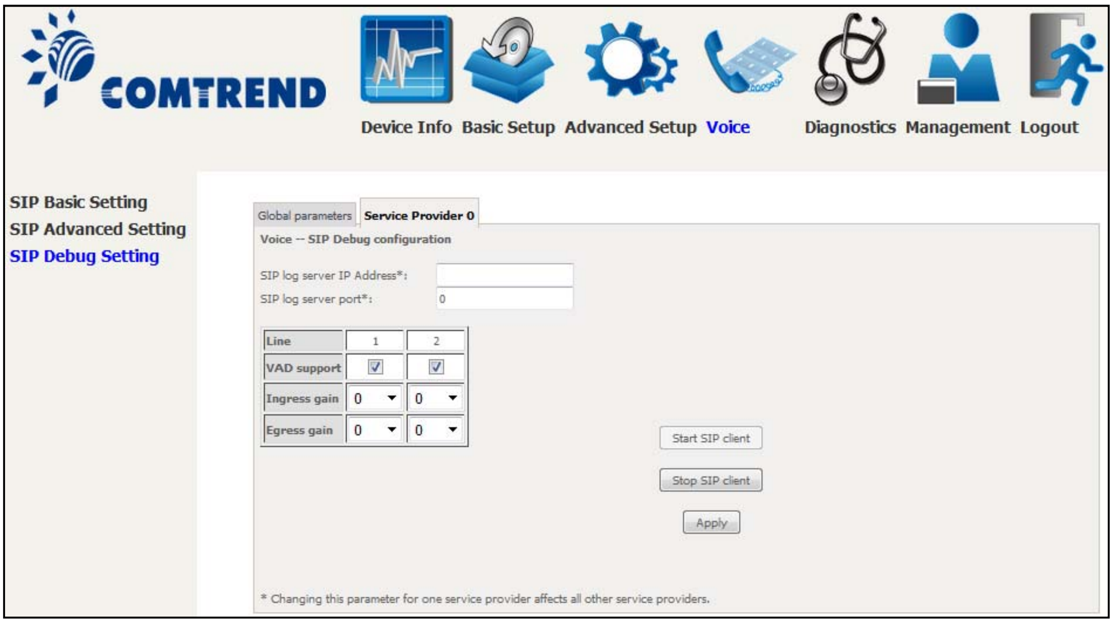


Vodsl Console Log Level: Error

Vodsl Console Log Level:
The log level allows users select what message will be shown in the log. It is separated into 3 levels (Error, Notice and Debug).

7.6 SIP Debug Setting – Service Provider

Configure your settings based on your service provider.



Voice -- SIP Debug configuration

SIP log server IP Address*:

SIP log server port*: 0

Line	1	2
VAD support	☑	☑
Ingress gain	0	0
Egress gain	0	0

Start SIP client

Stop SIP client

Apply

* Changing this parameter for one service provider affects all other service providers.

Once settings are configured, click **Apply** to begin using the service.

Checkbox ☑	**Description**
SIP log server IP address & port	Enter the IP address and port of the SIP log server.
Enable Vad Support	Select the checkbox ☑ to enable VAD support. Adjust the volume for incoming (Ingress) or outgoing (Egress) gain with the drop-down boxes.
Ingress gain	Enhances the volume of speaking (the volume heard from the other side).
Egress gain	Enhances the volume of hearing.

7.7 Telephone Calls

To make a call, simply dial the number. The dial plan (i.e. the dialed digits) is normally customized for each installation. The default dial plan allows for dialing of 4-digit extensions or direct IP addresses. For shorter extension numbers (e.g. 3-digits) adding a “#” at the end.
When a Call Server (SIP Proxy Server) is configured into the system, the dialed digits are translated and routed by the Call Server to the correct destination as registered with the Call Server.
If no Call Server is configured, calls can still be made using 4-digit extensions, rather than using full IP addresses. The originator translates the dialed-digits to a destination device as follows:

First Digit:	Line identifier (for multi-line gateways)
Remaining digits:	Host number part of an IP address. The Network number part is considered to be the same as the caller’s IP address.

For example, if a caller at address 10.136.64.33/24 dials “2023”, the call will be placed to the second line at address 10.136.64.23. All devices have to be on the same Class C subnet (24-bit subnet mask).

To dial an IP address directly, dial the IP address digits using * on the keypad as the dot. Complete the address with a final * or #. When using IP address dialing it is not possible to specify which line at a gateway is called, so the gateway always routes IP-address dialed calls to the first line.
Network busy tone (fast busy) will be played for unknown or unreachable destinations. To answer a call, pick up the phone or press the hands free button.

Caller ID

The Call Manager delivers Calling Number when placing calls. The calling number is transmitted to the analog line for CLASS recognition.

Call Hold

To put a call on hold, press flash then hang up (optional). To return to the original call, press flash or pick up the phone. The phone will issue a short ring burst every 30 seconds or so while on-hook to remind you that a call is on hold.

Call Transfer

- To transfer a call, press flash then dial the new number.
- To transfer immediately, hang up (blind transfer).
- To transfer with consultation, wait for the party to answer, consult, and hang up.
- To abort the transfer (if the third party does not answer); press flash to return to the original call.

Conference Calling

To turn a two-party call into a three-party conference call, press flash and dial the third party. Wait for the party to answer, then press flash. To drop the third party and return to a two-party call, press flash again. To drop yourself out of the conference, hang up. The call will be transferred (so that the other two parties remain connected to each other). In conference mode, the conference initiator performs the audio bridge/mixing function – there are only two voice streams established.

Call Waiting

If call waiting is enabled on a line, and you hear the call waiting tone during a call, press flash to answer the second call. The first call is automatically placed on hold. To switch between calls, press flash again.

- To disable the call waiting feature, dial *60.
- To enable the call waiting feature, dial *61.

Call forward feature settings (Busy or All) takes priority over the call-waiting feature. The call-waiting feature is ignored on new incoming calls if there is already a call on hold or in conference.

Call Forward Number

- To set the call forward number, dial *74 then the number. Note that this does not actually enable forwarding; to do so, select the call forward action as described below.
- To disable all call forwarding features, dial *70

Call Forward No Answer

- To enable call forward on no answer, dial *71. Incoming calls will be forwarded if unanswered for 18 seconds.

Call Forward Busy

- To enable call forward if busy, dial *72. Incoming calls will be immediately forwarded if the phone is off-hook.

Call Forward All

- To enable call forward for all calls, dial *73.
- To disable the “forward all calls” feature, dial *75.

Previous settings for Call Forward Busy or No Answer are not modified.

Call Return

- To call the last known incoming caller (unanswered or not), dial *69.

Redial

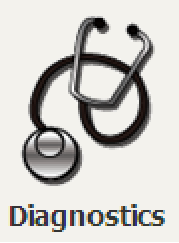
- To redial the last outgoing number, dial *68.

VoIP to PSTN

- To dial a regular phone call over PSTN, you must first dial ##.

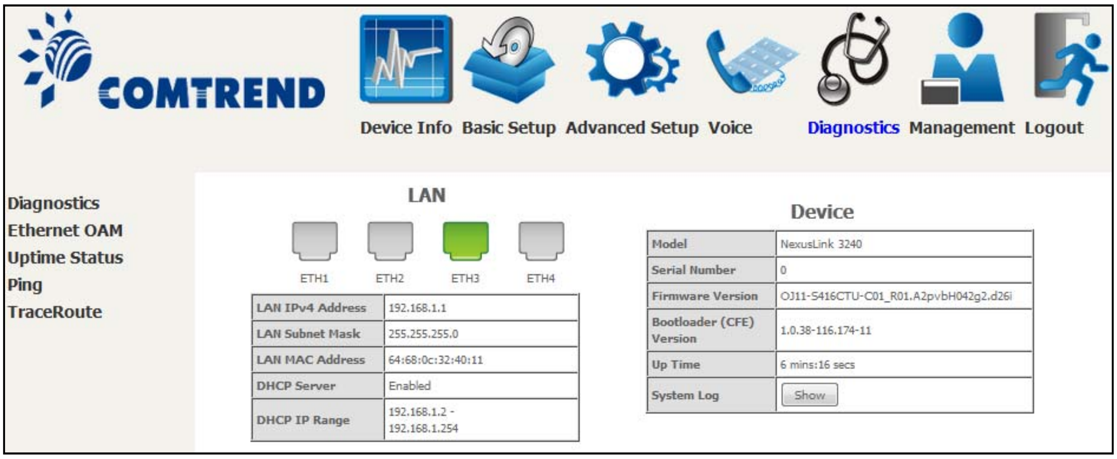
Chapter 8 Diagnostics

You can reach this page by clicking on the following icon located at the top of the screen.



8.1 Diagnostics – Individual Tests

The first Diagnostics screen is a dashboard that shows overall connection status.



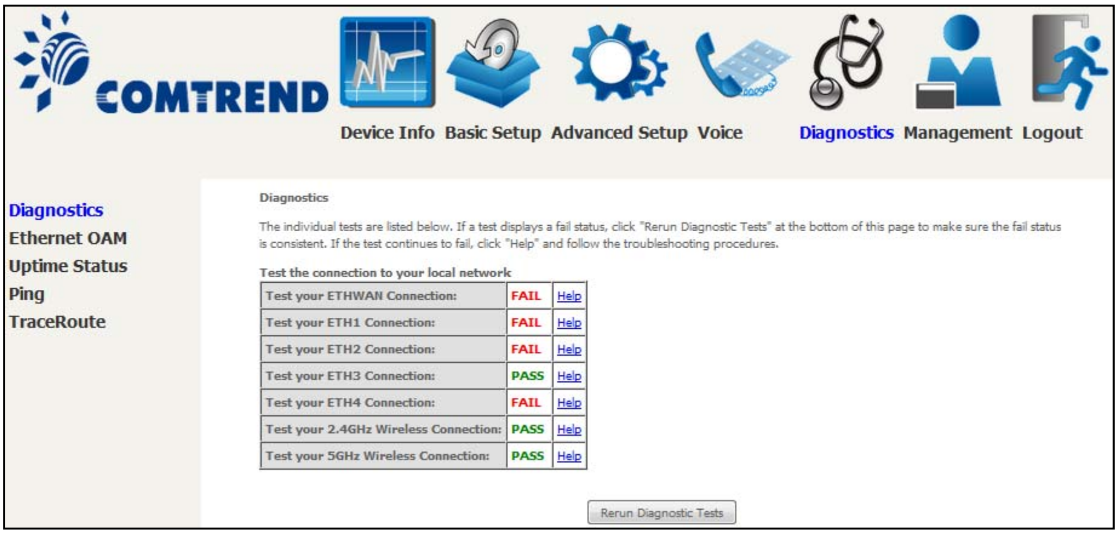
LAN

LAN IPv4 Address	192.168.1.1
LAN Subnet Mask	255.255.255.0
LAN MAC Address	64:68:0c:32:40:11
DHCP Server	Enabled
DHCP IP Range	192.168.1.2 - 192.168.1.254

Device

Model	NexusLink 3240
Serial Number	0
Firmware Version	OJ11-S416CTU-C01_R01.A2pvbH042g2.d26i
Bootloader (CFE) Version	1.0.38-116.174-11
Up Time	6 mins:16 secs
System Log	Show

Click the Diagnostics Menu item on the left side of the screen to display the individual connections.



Diagnostics

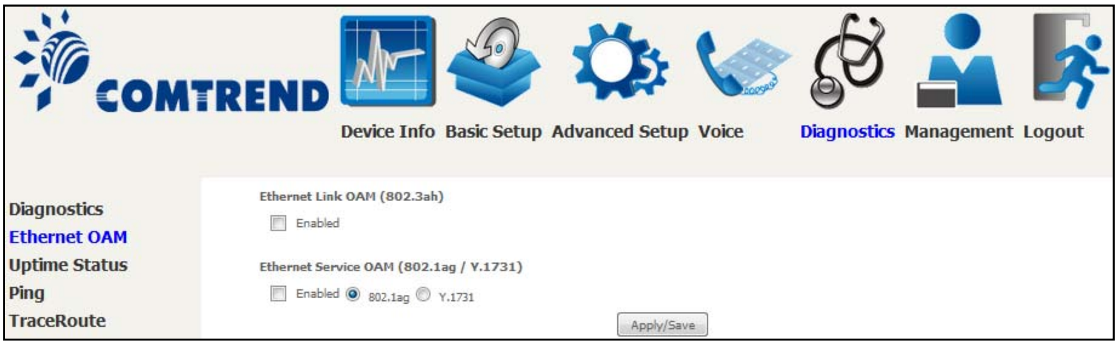
The individual tests are listed below. If a test displays a fail status, click "Rerun Diagnostic Tests" at the bottom of this page to make sure the fail status is consistent. If the test continues to fail, click "Help" and follow the troubleshooting procedures.

Test the connection to your local network

Test your ETHWAN Connection:	FAIL	Help
Test your ETH1 Connection:	FAIL	Help
Test your ETH2 Connection:	FAIL	Help
Test your ETH3 Connection:	PASS	Help
Test your ETH4 Connection:	FAIL	Help
Test your 2.4GHz Wireless Connection:	PASS	Help
Test your 5GHz Wireless Connection:	PASS	Help

8.2 Ethernet OAM

The Ethernet OAM page provides settings to enable/disable 802.3ah, 802.1ag/Y1.731 OAM protocols.



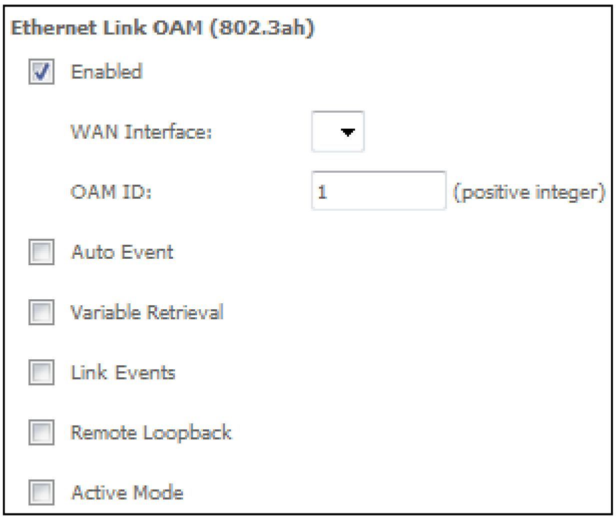
Ethernet Link OAM (802.3ah)

□ Enabled

Ethernet Service OAM (802.1ag / Y.1731)

□ Enabled ● 802.1ag ○ Y.1731

To enable Ethernet Link OAM (802.3 ah), click Enabled to display the full configuration list. At least one option must be enabled for 802.1ah.



Ethernet Link OAM (802.3ah)

☑ Enabled

WAN Interface:

OAM ID: 1 (positive integer)

□ Auto Event

□ Variable Retrieval

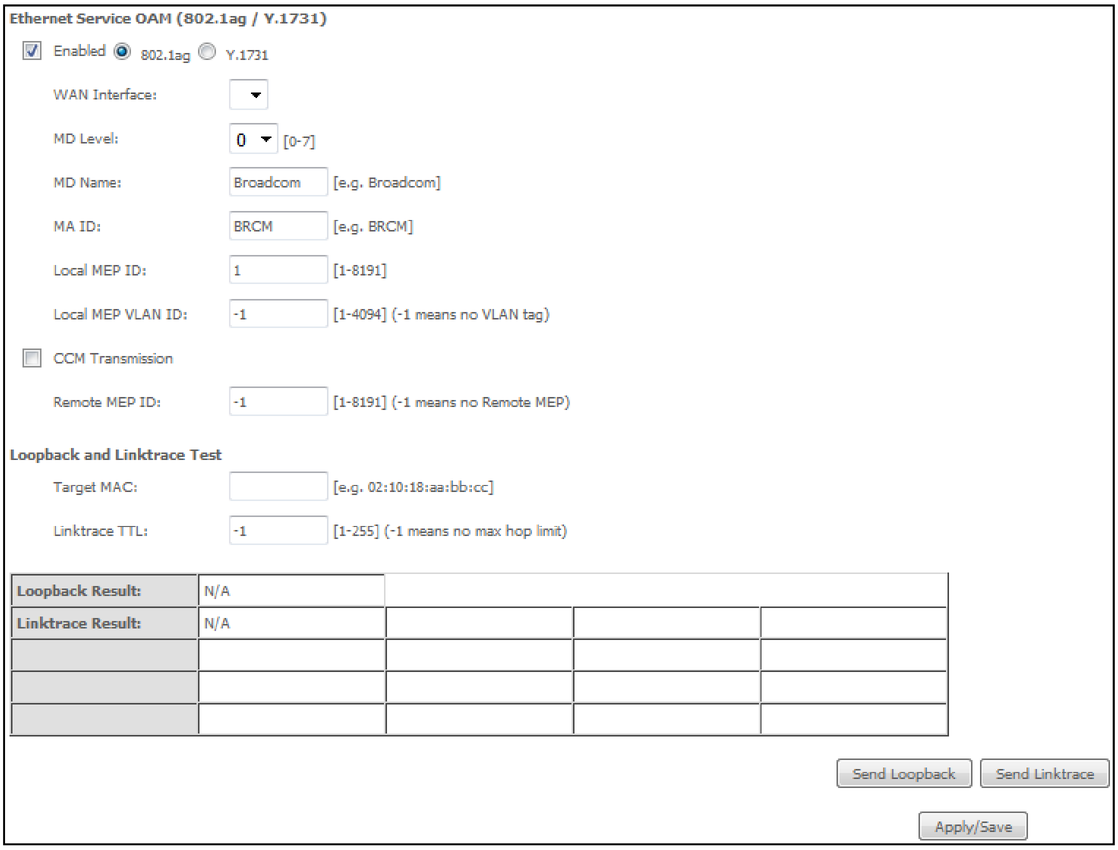
□ Link Events

□ Remote Loopback

□ Active Mode

WAN Interface	Select layer 2 WAN interface for outgoing OAM packets
OAM ID	OAM Identification number
Auto Event	Supports OAM auto event
Variable Retrieval	Supports OAM variable retrieval
Link Events	Supports OAM link events
Remote Loopback	Supports OAM remove loopback
Active mode	Supports OAM active mode

To enable Ethernet Service OAM (802.1ag/Y1731), click Enabled to display the full configuration list.



Ethernet Service OAM (802.1ag / Y.1731)

☑ Enabled ● 802.1ag ○ Y.1731

WAN Interface:

MD Level: 0 [0-7]

MD Name: Broadcom [e.g. Broadcom]

MA ID: BRCM [e.g. BRCM]

Local MEP ID: 1 [1-8191]

Local MEP VLAN ID: -1 [1-4094] (-1 means no VLAN tag)

□ CCM Transmission

Remote MEP ID: -1 [1-8191] (-1 means no Remote MEP)

Loopback and Linktrace Test

Target MAC: [e.g. 02:10:18:aa:bb:cc]

Linktrace TTL: -1 [1-255] (-1 means no max hop limit)

Loopback Result:	N/A			
Linktrace Result:	N/A			

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

WAN Interface	Select from the list of WAN Interfaces to send OAM packets
MD Level	Maintenance Domain Level
MD Name	Maintenance Domain name
MA ID	Maintenance Association Identifier
Local MEP ID	Local Maintenance association End Point Identifier
Local MEP VLAN ID	VLAN IP used for Local Maintenance End point

Click CCM Transmission to enable CPE sending Continuity Check Message (CCM) continuously.

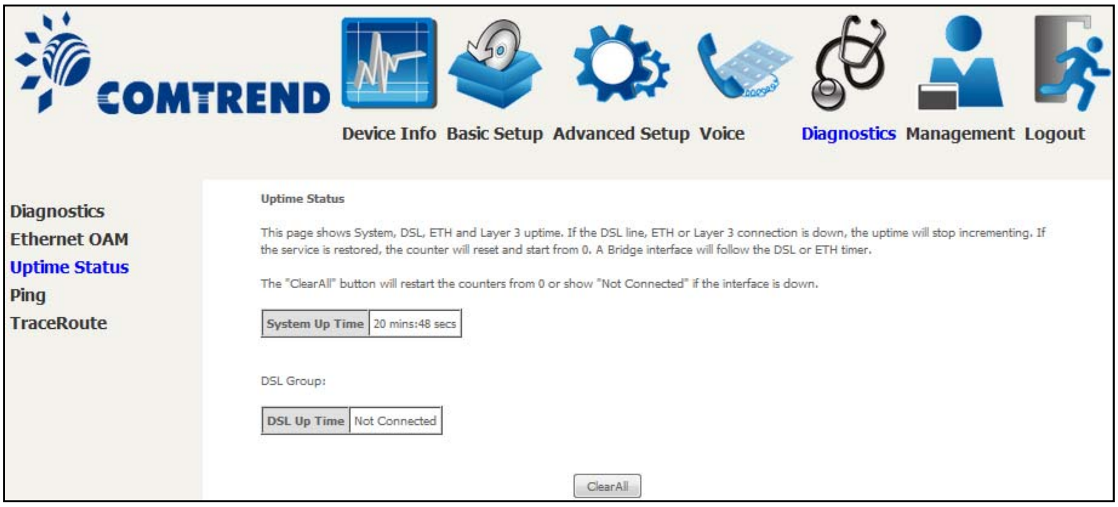
Remote MEP ID	Maintenance association End Point Identifier for the remote receiver

To perform Loopback/Linktrace OAM test, enter the Target MAC of the destination and click “Send Loopback” or “Send Linktrace” button.

Target MAC	MAC Address of the destination to send OAM loopback/linktrace packet
Linktrace TTL	Time to Live value for the loopback/linktrace packet

8.3 Uptime Status

This page shows System, DSL, ETH and Layer 3 uptime. If the DSL line, ETH or Layer 3 connection is down, the uptime will stop incrementing. If the service is restored, the counter will reset and start from 0. A Bridge interface will follow the DSL or ETH timer.



Uptime Status

This page shows System, DSL, ETH and Layer 3 uptime. If the DSL line, ETH or Layer 3 connection is down, the uptime will stop incrementing. If the service is restored, the counter will reset and start from 0. A Bridge interface will follow the DSL or ETH timer.

The "ClearAll" button will restart the counters from 0 or show "Not Connected" if the interface is down.

System Up Time	20 mins:48 secs

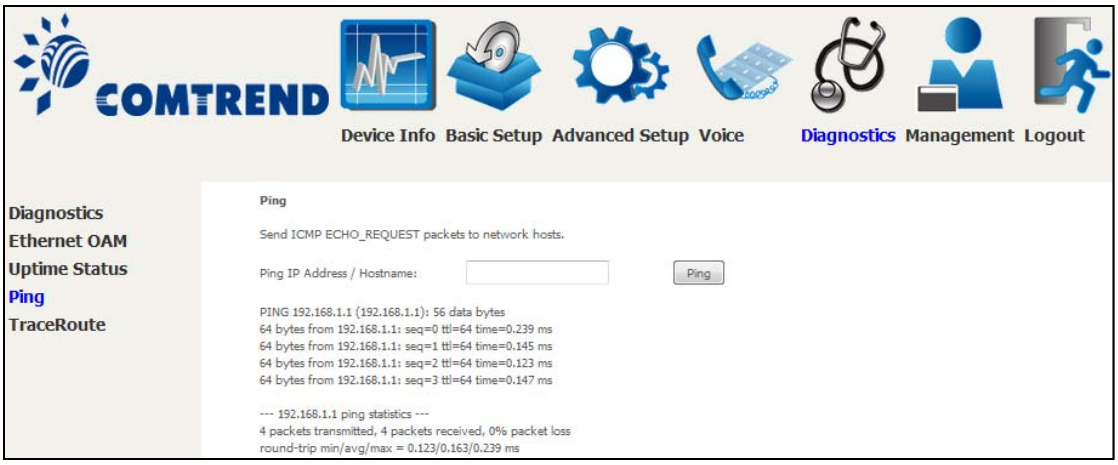
DSL Group:

DSL Up Time	Not Connected

The "ClearAll" button will restart the counters from 0 or show "Not Connected" if the interface is down.

8.4 Ping

Input the IP address/hostname and click the **Ping** button to execute ping diagnostic test to send the ICMP request to the specified host.



Ping

Send ICMP ECHO_REQUEST packets to network hosts.

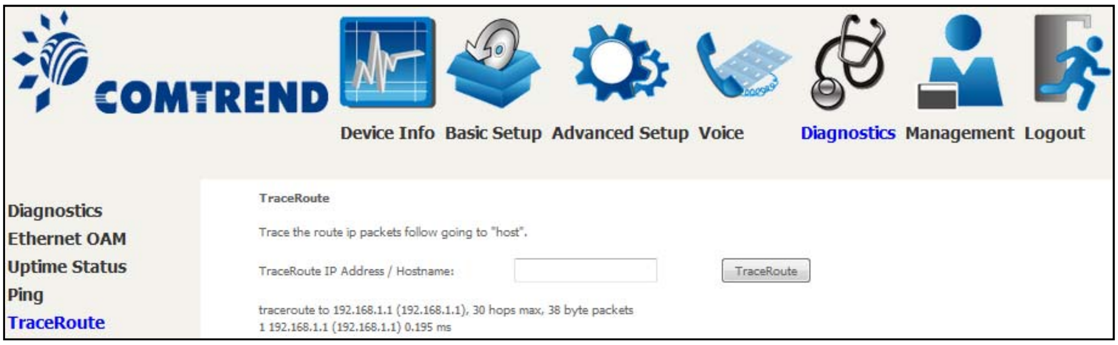
Ping IP Address / Hostname: [ ] Ping

```
PING 192.168.1.1 (192.168.1.1): 56 data bytes
64 bytes from 192.168.1.1: seq=0 ttl=64 time=0.239 ms
64 bytes from 192.168.1.1: seq=1 ttl=64 time=0.145 ms
64 bytes from 192.168.1.1: seq=2 ttl=64 time=0.123 ms
64 bytes from 192.168.1.1: seq=3 ttl=64 time=0.147 ms

--- 192.168.1.1 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.123/0.163/0.239 ms
```

8.5 Trace Route

Input the IP address/hostname and click the **TraceRoute** button to execute the trace route diagnostic test to send the ICMP packets to the specified host.



Trace the route ip packets follow going to "host".

TraceRoute IP Address / Hostname: [   ] [TraceRoute]

```
traceroute to 192.168.1.1 (192.168.1.1), 30 hops max, 38 byte packets
1 192.168.1.1 (192.168.1.1) 0.195 ms
```

Chapter 9 Management

You can reach this page by clicking on the following icon located at the top of the screen.

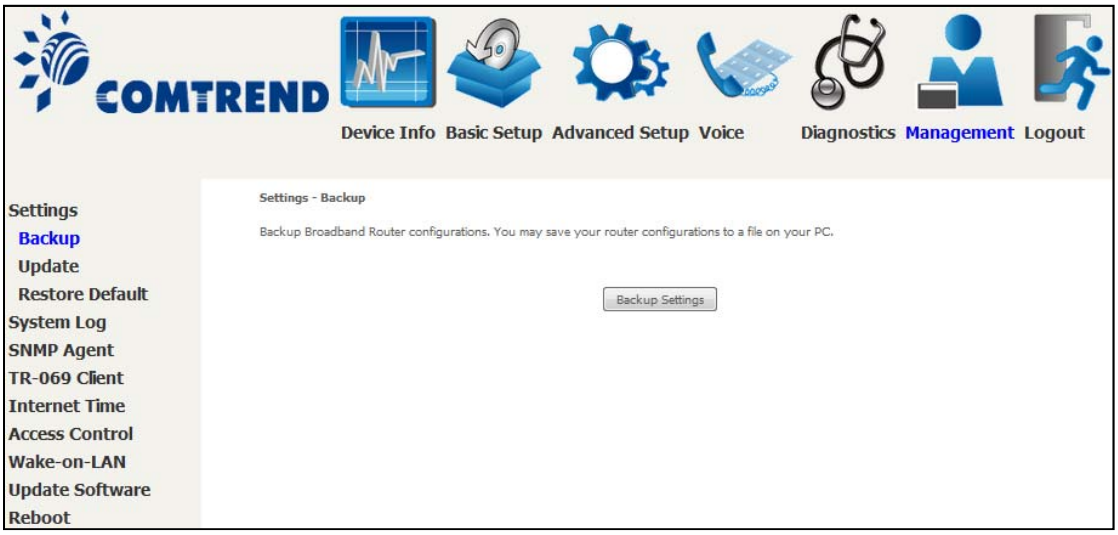
The Management menu has the following maintenance functions and processes:

9.1 Settings

This includes Backup Settings, Update Settings, and Restore Default screens.

9.1.1 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.

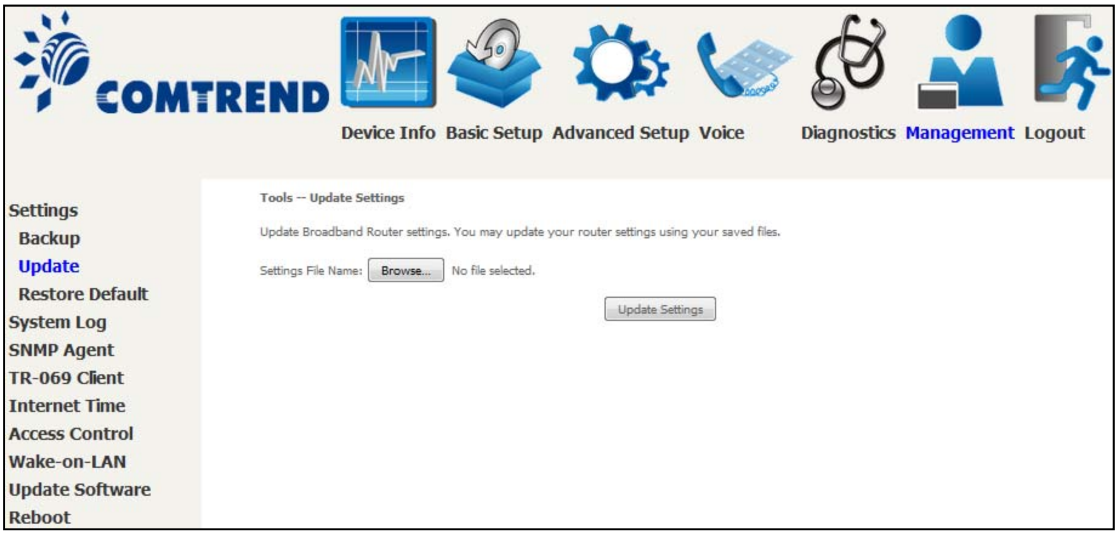


Settings - Backup

Backup Broadband Router configurations. You may save your router configurations to a file on your PC.

9.1.2 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.



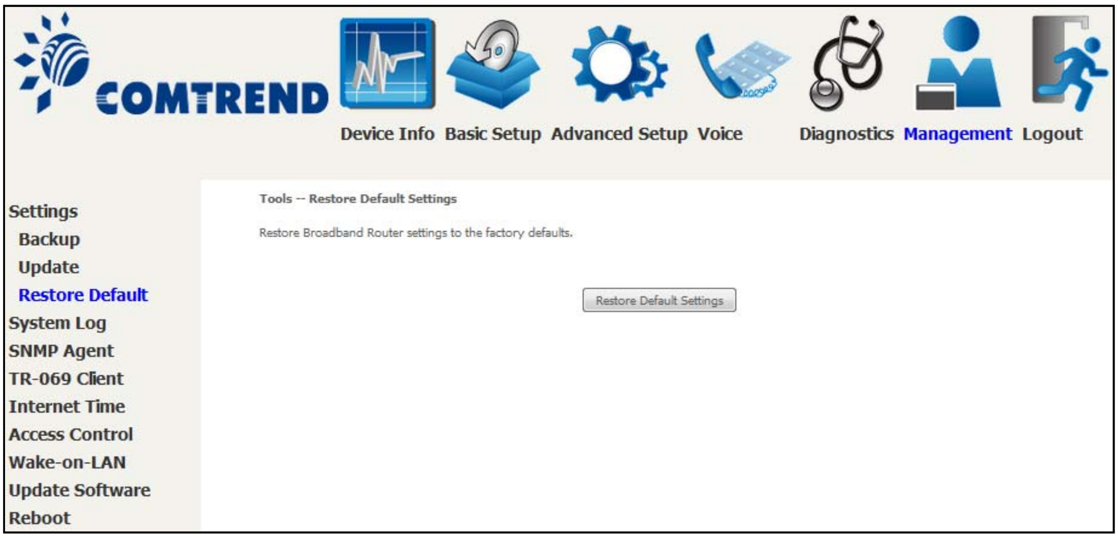
Tools -- Update Settings

Update Broadband Router settings. You may update your router settings using your saved files.

Settings File Name: No file selected.

9.1.3 Restore Default

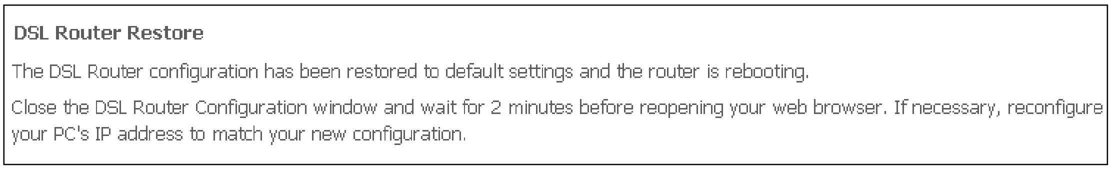
Click **Restore Default Settings** to restore factory default settings.



Tools -- Restore Default Settings

Restore Broadband Router settings to the factory defaults.

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.

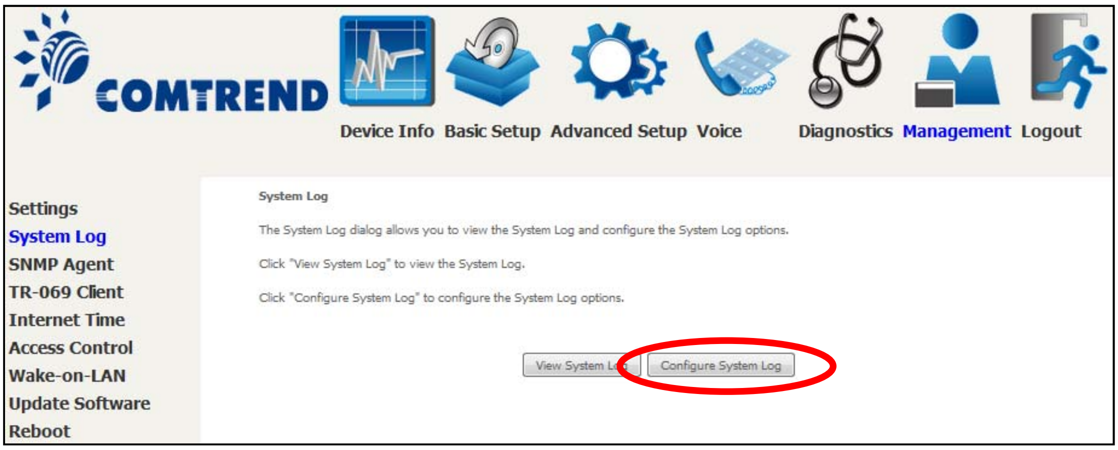
NOTE: This entry has the same effect as the **Reset** button. The NexusLink 3240 board hardware and the boot loader support the reset to default. If the **Reset** button is continuously pressed for more than 10 seconds, the current configuration data will be erased. If the **Reset** button is continuously pressed for more than 60 seconds, the boot loader will erase all configuration data saved in flash memory and enter bootloader mode.

9.2 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**).



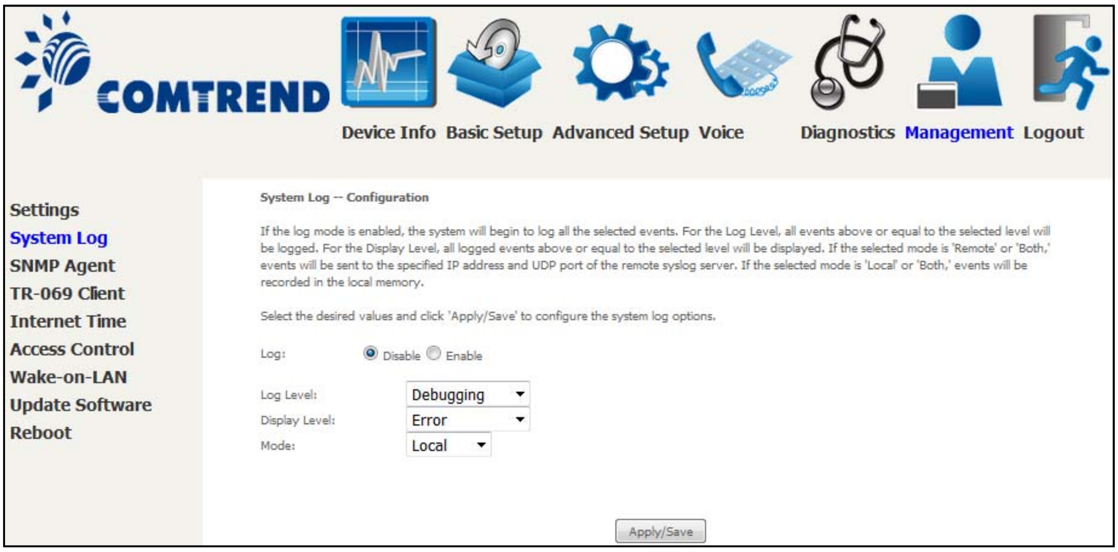
System Log

The System Log dialog allows you to view the System Log and configure the System Log options.

Click "View System Log" to view the System Log.

Click "Configure System Log" to configure the System Log options.

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



System Log -- Configuration

If the log mode is enabled, the system will begin to log all the selected events. For the Log Level, all events above or equal to the selected level will be logged. For the Display Level, all logged events above or equal to the selected level will be displayed. If the selected mode is 'Remote' or 'Both,' events will be sent to the specified IP address and UDP port of the remote syslog server. If the selected mode is 'Local' or 'Both,' events will be recorded in the local memory.

Select the desired values and click 'Apply/Save' to configure the system log options.

Log: ● Disable ○ Enable

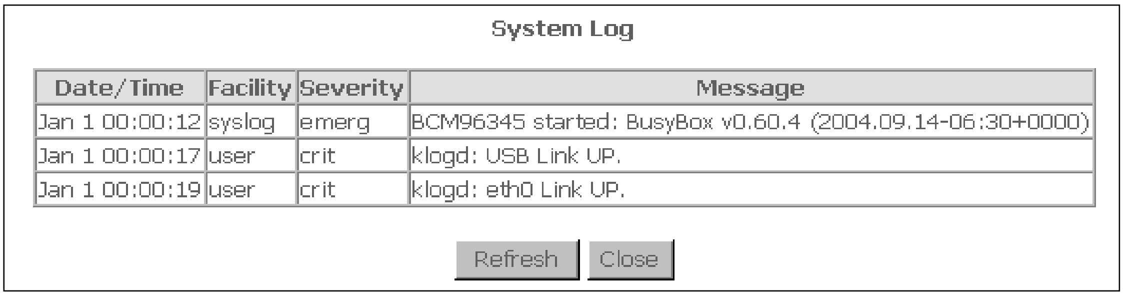
Log Level: Debugging
Display Level: Error
Mode: Local

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 3240 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.

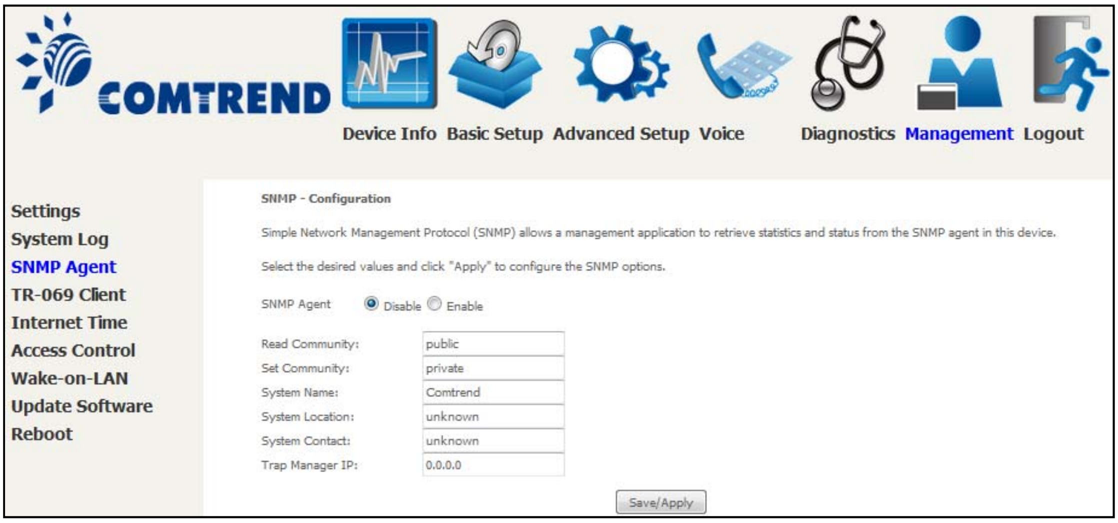


System Log

Date/Time	Facility	Severity	Message
Jan 1 00:00:12	syslog	emerg	BCM96345 started: BusyBox v0.60.4 (2004.09.14-06:30+0000)
Jan 1 00:00:17	user	crit	klogd: USB Link UP.
Jan 1 00:00:19	user	crit	klogd: eth0 Link UP.

9.3 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.



SNMP - Configuration

Simple Network Management Protocol (SNMP) allows a management application to retrieve statistics and status from the SNMP agent in this device.

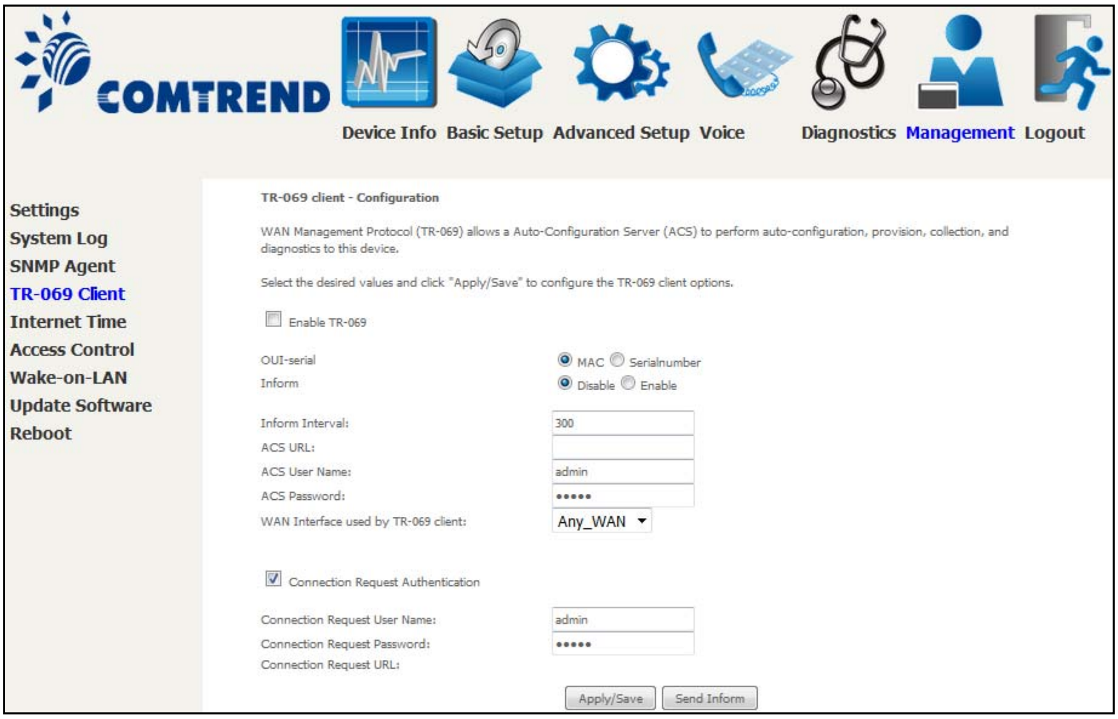
Select the desired values and click "Apply" to configure the SNMP options.

SNMP Agent ● Disable ○ Enable

Read Community:	public
Set Community:	private
System Name:	Comtrend
System Location:	unknown
System Contact:	unknown
Trap Manager IP:	0.0.0.0

9.4 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.



TR-069 client - Configuration

WAN Management Protocol (TR-069) allows a Auto-Configuration Server (ACS) to perform auto-configuration, provision, collection, and diagnostics to this device.

Select the desired values and click "Apply/Save" to configure the TR-069 client options.

□ Enable TR-069

OUI-serial	● MAC ○ Serialnumber
Inform	● Disable ○ Enable
Inform Interval:	300
ACS URL:	
ACS User Name:	admin
ACS Password:	•••••
WAN Interface used by TR-069 client:	Any_WAN ▾

☑ Connection Request Authentication

Connection Request User Name:	admin
Connection Request Password:	•••••
Connection Request URL:	

Apply/Save | Send Inform

The table below is provided for ease of reference.

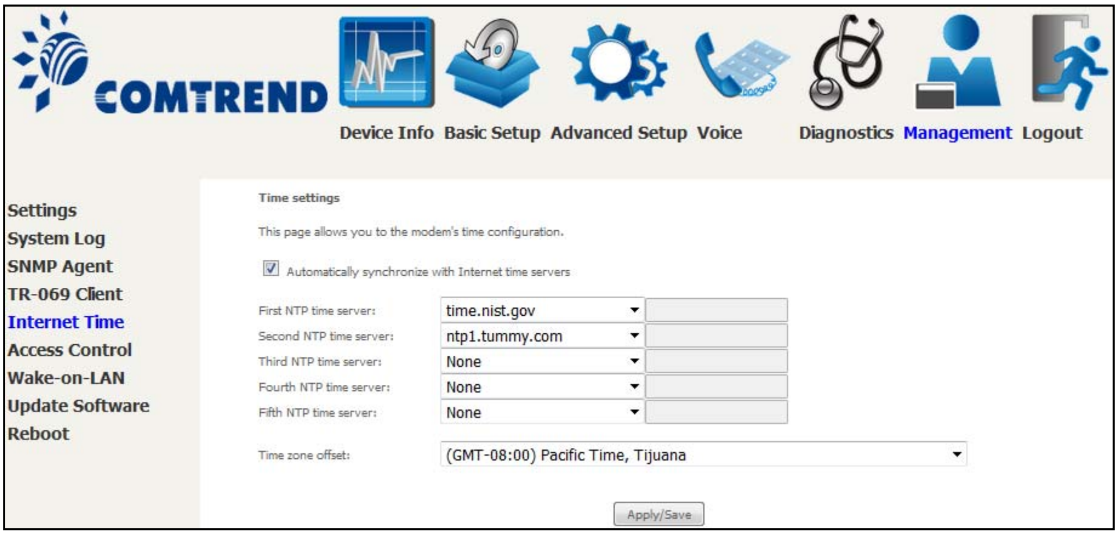
Option	Description
Enable TR-069	Tick the checkbox ☑ to enable.
OUI-serial	The serial number used to identify the CPE when making a connection to the ACS using the CPE WAN Management Protocol. Select MAC to use the router's MAC address as serial number to authenticate with ACS or select serial number to use router's serial number.
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.

Option	**Description**
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.
Connection Request	
Authentication	Tick the checkbox ☑ 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 router.

The **Send Inform** button forces the CPE to establish an immediate connection to the ACS.

9.5 Internet Time

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



Time settings

This page allows you to the modem's time configuration.

☑ Automatically synchronize with Internet time servers

First NTP time server:	time.nist.gov
Second NTP time server:	ntp1.tummy.com
Third NTP time server:	None
Fourth NTP time server:	None
Fifth NTP time server:	None
Time zone offset:	(GMT-08:00) Pacific Time, Tijuana

Apply/Save

NOTE: Internet Time must be activated to use See 5.5 Parental Control. The internet time feature will not operate when router is in bridged mode, since the route would not be able to connect to the NTP timeserver.

9.6 Access Control

9.6.1 Accounts

This screen is used to configure the user account access passwords for the device. Access to the NexusLink 3240 is controlled through the following user accounts:

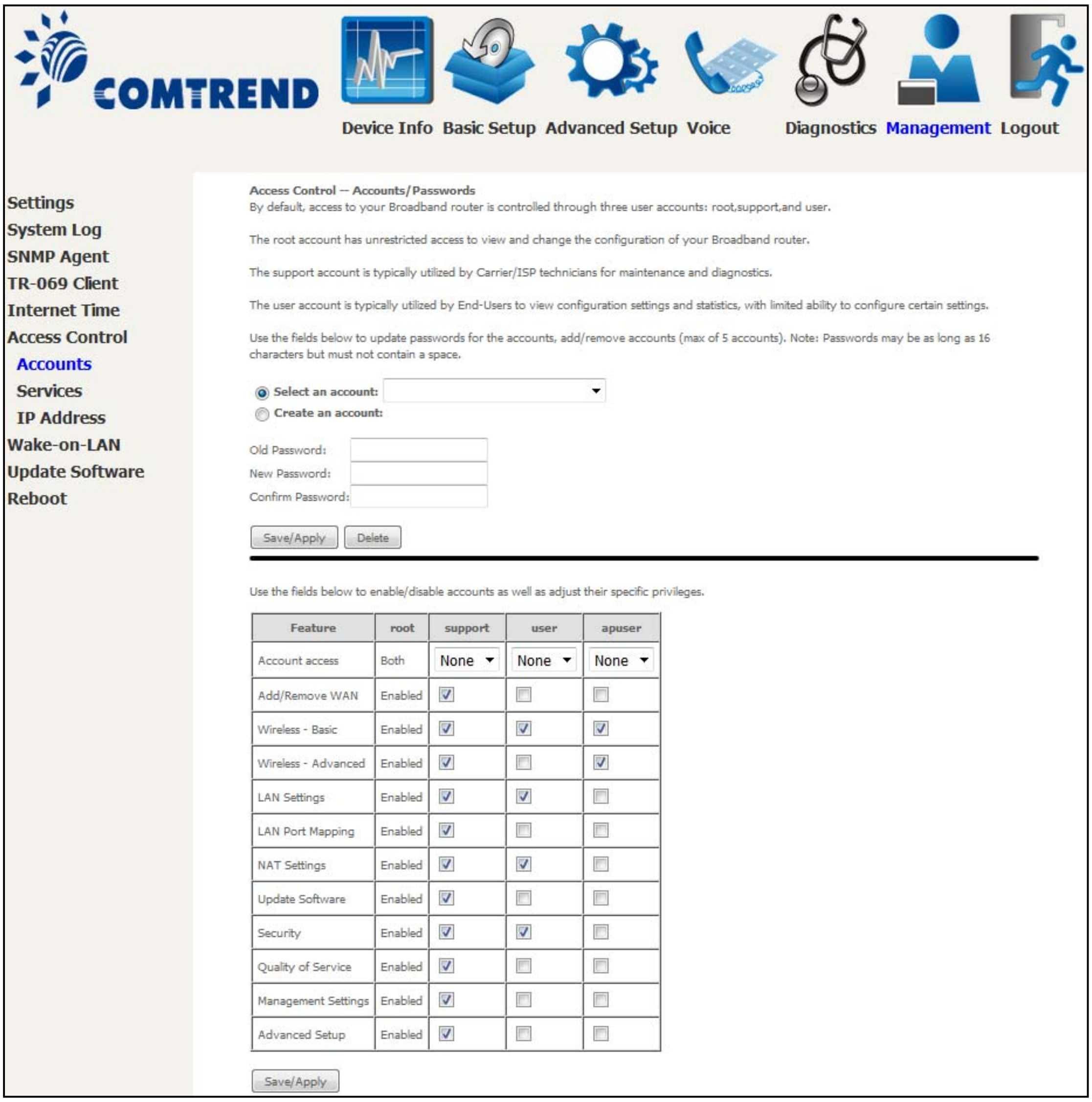
- The root account has unrestricted access to view and change the configuration of your Broadband router.

- The support account is typically utilized by Carrier/ISP technicians for maintenance and diagnostics.

- The user account is typically utilized by End-Users to view configuration settings and statistics, with limited ability to configure certain settings.

- The apuser account is typically utilized by End-Users to view configuration settings and statistics, with limited ability to configure wireless settings.

Use the fields to update passwords for the accounts, add/remove accounts (max of 5 accounts) as well as adjust their specific privileges.



Access Control -- Accounts/Passwords

By default, access to your Broadband router is controlled through three user accounts: root,support,and user.

The root account has unrestricted access to view and change the configuration of your Broadband router.

The support account is typically utilized by Carrier/ISP technicians for maintenance and diagnostics.

The user account is typically utilized by End-Users to view configuration settings and statistics, with limited ability to configure certain settings.

Use the fields below to update passwords for the accounts, add/remove accounts (max of 5 accounts). Note: Passwords may be as long as 16 characters but must not contain a space.

● Select an account:

○ Create an account:

Old Password:

New Password:

Confirm Password:

Save/Apply Delete

Use the fields below to enable/disable accounts as well as adjust their specific privileges.

Feature	root	support	user	apuser
Account access	Both	None	None	None
Add/Remove WAN	Enabled	☑	□	□
Wireless - Basic	Enabled	☑	☑	☑
Wireless - Advanced	Enabled	☑	□	☑
LAN Settings	Enabled	☑	☑	□
LAN Port Mapping	Enabled	☑	□	□
NAT Settings	Enabled	☑	☑	□
Update Software	Enabled	☑	□	□
Security	Enabled	☑	☑	□
Quality of Service	Enabled	☑	□	□
Management Settings	Enabled	☑	□	□
Advanced Setup	Enabled	☑	□	□

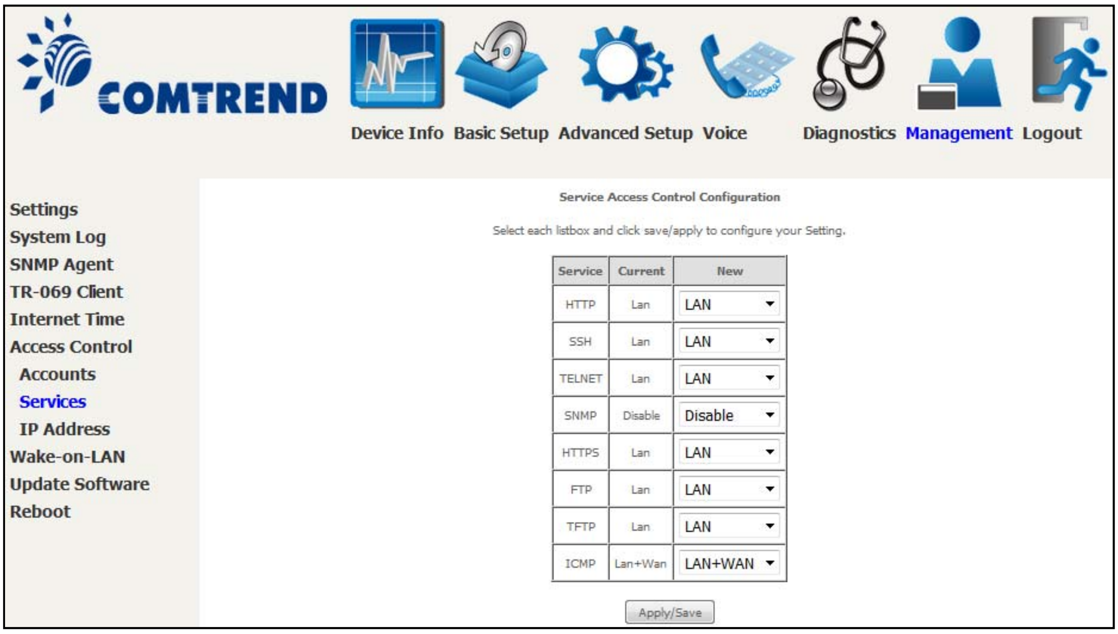
Save/Apply

Note: Passwords may be as long as 16 characters but must not contain a space.

Click **Save / Apply** to continue.

9.6.2 Services

The Services option limits or opens the access services over the LAN or WAN. The access services available are: HTTP, SSH, TELNET, SNMP, HTTPS, FTP, TFTP and ICMP. Enable a service by selecting its dropdown listbox. Click **Apply/Save** to activate.



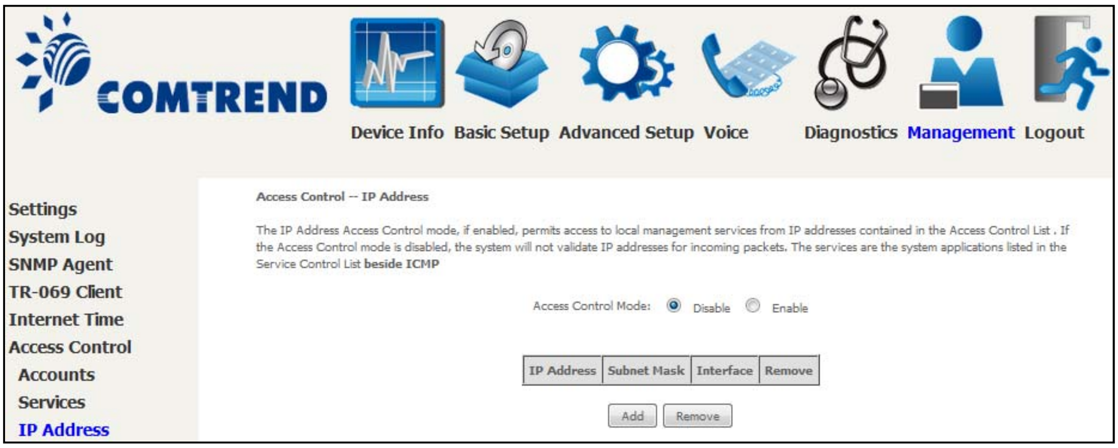
Service Access Control Configuration

Select each listbox and click save/apply to configure your Setting.

Service	Current	New
HTTP	Lan	LAN
SSH	Lan	LAN
TELNET	Lan	LAN
SNMP	Disable	Disable
HTTPS	Lan	LAN
FTP	Lan	LAN
TFTP	Lan	LAN
ICMP	Lan+Wan	LAN+WAN

9.6.3 IP Address

The IP Address Access Control mode, if enabled, permits access to local management services from IP addresses contained in the Access Control List. If the Access Control mode is disabled, the system will not validate IP addresses for incoming packets. The services are the system applications listed in the Service Control List **beside ICMP**.



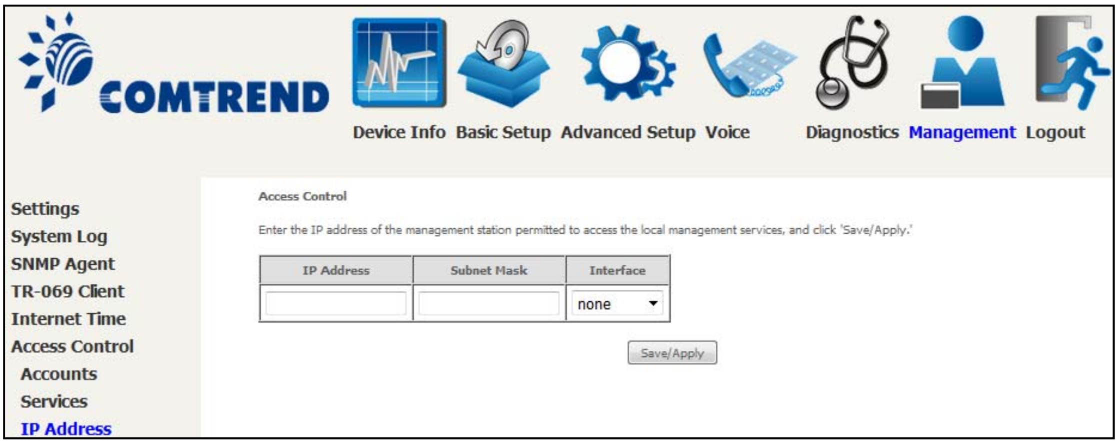
Access Control -- IP Address

The IP Address Access Control mode, if enabled, permits access to local management services from IP addresses contained in the Access Control List . If the Access Control mode is disabled, the system will not validate IP addresses for incoming packets. The services are the system applications listed in the Service Control List **beside ICMP**

Access Control Mode: ● Disable ○ Enable

IP Address	Subnet Mask	Interface	Remove

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



Access Control

Enter the IP address of the management station permitted to access the local management services, and click 'Save/Apply.'

IP Address	Subnet Mask	Interface
		none

Configure the address and subnet of the management station permitted to access the local management services, and click **Save/Apply**.

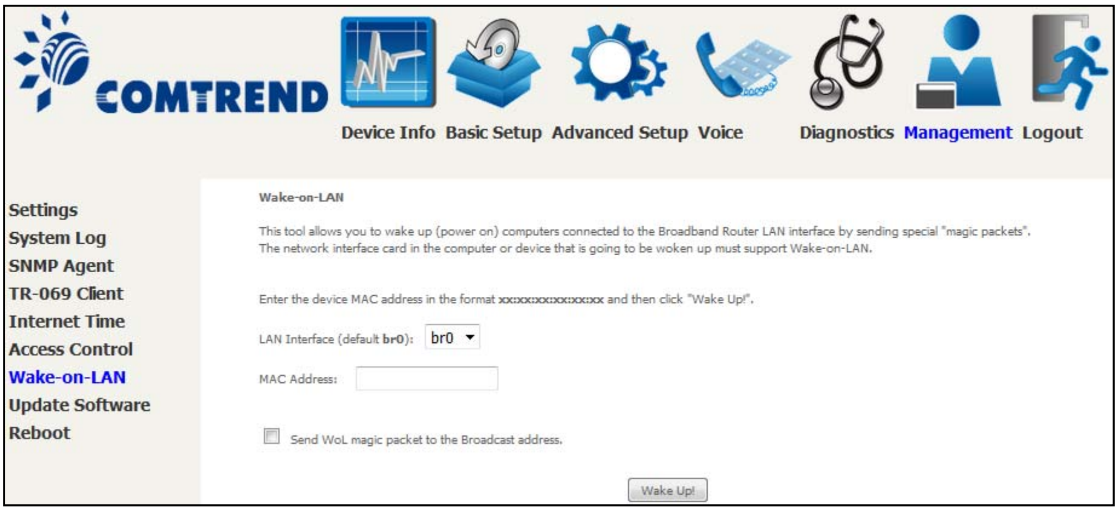
IP Address – IP address of the management station.

Subnet Mask – Subnet address for the management station.

Interface – Access permission for the specified address, allowing the address to access the local management service from none/lan/wan/lan&wan interfaces.

9.7 Wake-on-LAN

This tool allows you to wake up (power on) computers connected to the Broadband Router LAN interface by sending special "magic packets".
The network interface card in the computer or device that is going to be woken up must support Wake-on-LAN.



Wake-on-LAN

This tool allows you to wake up (power on) computers connected to the Broadband Router LAN interface by sending special "magic packets".
The network interface card in the computer or device that is going to be woken up must support Wake-on-LAN.

Enter the device MAC address in the format xx:xx:xx:xx:xx:xx and then click "Wake Up!".

LAN Interface (default **br0**): br0

MAC Address:

□ Send WoL magic packet to the Broadcast address.

LAN Interface – Select the LAN interface to send the Wake-on-LAN packet.

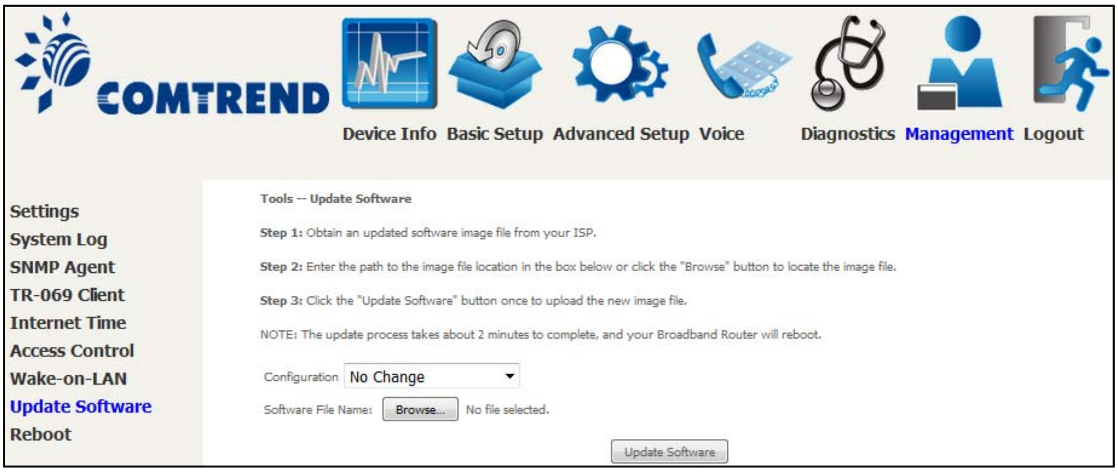
MAC Address – Specify the MAC address of the device that is going to be woken up.

Click "**Send WoL magic packet to the Broadcast address**" if the WoL packets should be sent to the broadcast address.

Click the **Wake Up!** button to send the magic packet out to the LAN interface.

9.8 Update Software

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



Tools -- Update Software

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

Step 2: Enter the path to the image file location in the box below or click the "Browse" button to locate the image file.

Step 3: Click the "Update Software" button once to upload the new image file.

NOTE: The update process takes about 2 minutes to complete, and your Broadband Router will reboot.

Configuration: No Change

Software File Name: No file selected.

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

STEP 2: Select the configuration from the drop-down menu.

Configuration options:

No change – upgrade software directly.

Erase current config – If the router has save_default configuration, this option will erase the current configuration and restore to save_default configuration after software upgrade.

Erase All – Router will be restored to factory default configuration after software upgrade.

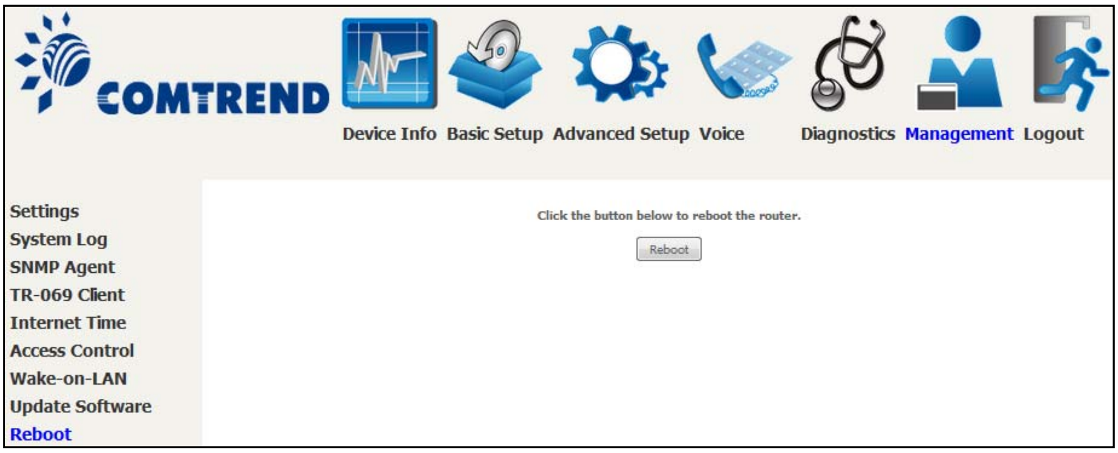
STEP 3: Enter the path and filename of the firmware image file in the **Software File Name** field or click the Browse button to locate the image file.

STEP 4: 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 Device Information screen with the firmware version installed, to confirm the installation was successful.

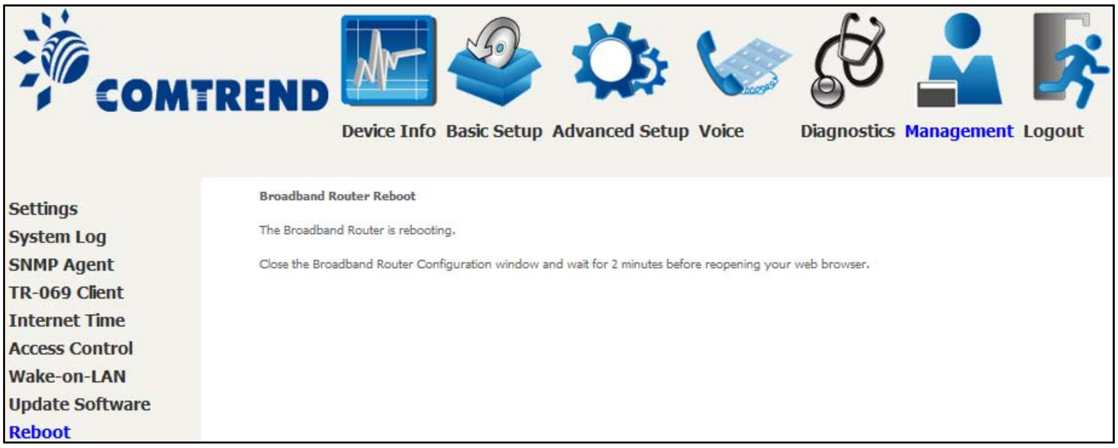
9.9 Reboot

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



Click the button below to reboot the router.

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.



Broadband Router Reboot

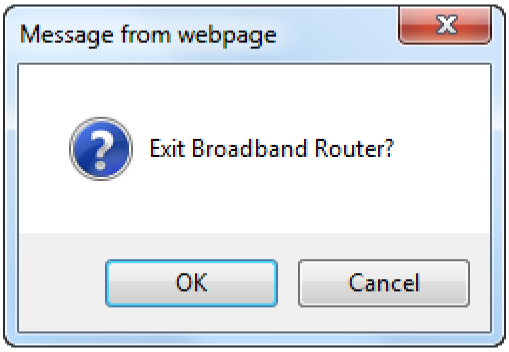
The Broadband Router is rebooting.

Close the Broadband Router Configuration window and wait for 2 minutes before reopening your web browser.

Chapter 10 Logout

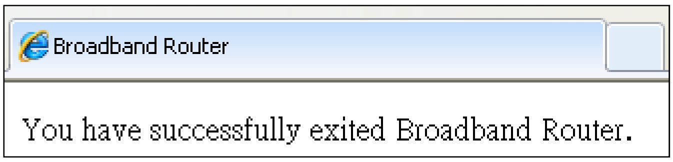
To log out from the device simply click the following icon located at the top of your screen.

When the following window pops up, click the **OK** button to exit the router.



Exit Broadband Router?

Upon successful exit, the following message will be displayed.



You have successfully exited Broadband Router.

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 → Security → 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 → Security → 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 3240, 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

Giga ETHERNET Ports (RJ45)

Pin	Name	Description
1	BI_DA+	Bi-directional pair A +
2	BI_DA-	Bi-directional pair A -
3	BI_DB+	Bi-directional pair B +
4	BI_DC+	Bi-directional pair C +
5	BI_DC-	Bi-directional pair C -
6	BI_DB-	Bi-directional pair B -
7	BI_DD+	Bi-directional pair D +
8	BI_DD-	Bi-directional pair D -

Appendix C – Specifications

Hardware Interface

RJ-14 X 1 for ADSL2+ bonding/VDSL2, RJ-45 X 4 for LAN, RJ-45 X 1 for WAN, FXS X 2, Reset Button X 1, WPS/WiFi on/off button x2, Internal Wi-Fi Antennas X 2, External Wi-Fi Antennas X 2, Power Switch X 1, USB 3.0 Host X 1

WAN Interface

ADSL2+: single line and bonding

VDSL2 17a, single line and bonding

10/100/1000 Base T, IEEE 802.3, IEEE 802.3u IEEE 802.3ab

LAN Interface

Standard	IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
10/100/1000 BaseT	Auto-sense
MDI/MDX support	Yes

WLAN Interface

Standard	IEEE802.11b/g/n
Encryption	64/128-bit Wired Equivalent Privacy (WEP)
Channels	11 (US, Canada)/ 13 (Europe)/ 14 (Japan)
Data Rate	Up to 300Mbps
WEP	Yes
WPA	Yes
IEEE 802.1x	Yes
MAC Filtering	Yes

ATM Attributes

RFC 2684 (RFC 1483) Bridge/Route; RFC 2516 (PPPoE);
RFC 2364 (PPPoA); RFC 1577 (IPoA)

PVCs	16
AAL type	AAL5
ATM service class	UBR/CBR/VBR
ATM UNI support	UNI 3.1/4.0
OAM F4/F5	Yes

Management

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

Bridge Functions

Transparent bridging	Yes
VLAN support	Yes
Spanning Tree Algorithm	Yes

IGMP Proxy .... Yes

Routing Functions

Static route, RIP v1/v2, NAT/PAT, DHCP Server/Relay, DNS Proxy, ARP,

Security Functions

Authentication protocols: PAP, CHAP
TCP/IP/Port filtering rules, Packet and MAC address filtering, Access Control,

QoS

IP QoS, L3 policy-based QoS, ToS

Environment Condition

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

Dimensions .... 280 mm (W) x 35 mm (H) x 210 mm (D)

Kit Weight

(1* NexusLink 3240, 1*RJ11 cable, 1*RJ45 cable, 1*power adapter) = 1.2 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 → Access Control → 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

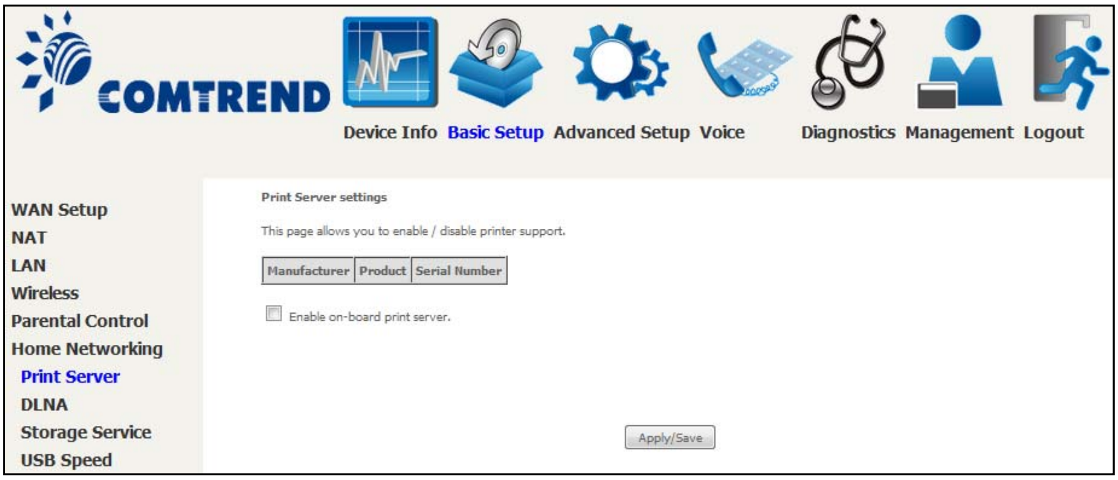
For WAN access, type: putty -ssh -l support *WAN IP address*

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

Appendix E - Printer Server

These steps explain the procedure for enabling the Printer Server.

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



Print Server settings

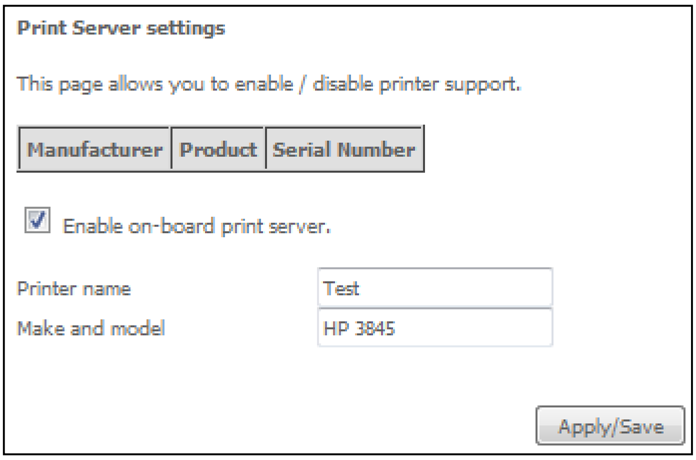
This page allows you to enable / disable printer support.

Manufacturer	Product	Serial Number

□ Enable on-board print server.

STEP 1: Enable Print Server from Web User Interface. Select Enable on-board print server checkbox ☑ and enter Printer name and Make and model. Click the **Apply/Save** button.

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.



Print Server settings

This page allows you to enable / disable printer support.

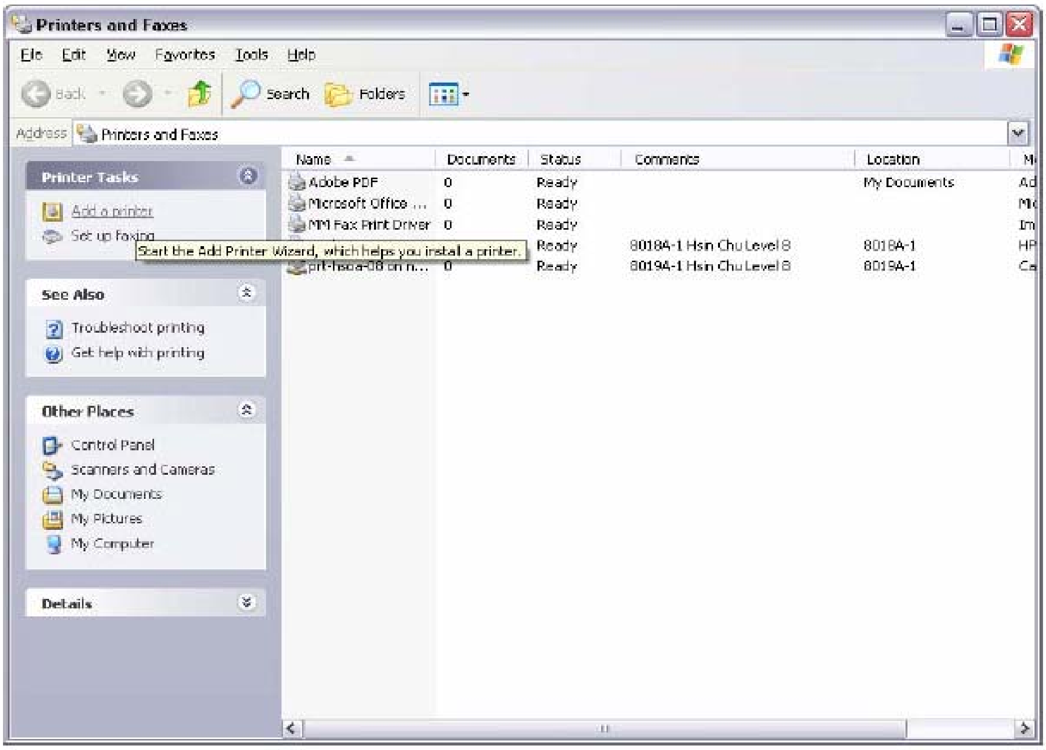
Manufacturer	Product	Serial Number

☑ Enable on-board print server.

Printer name: Test

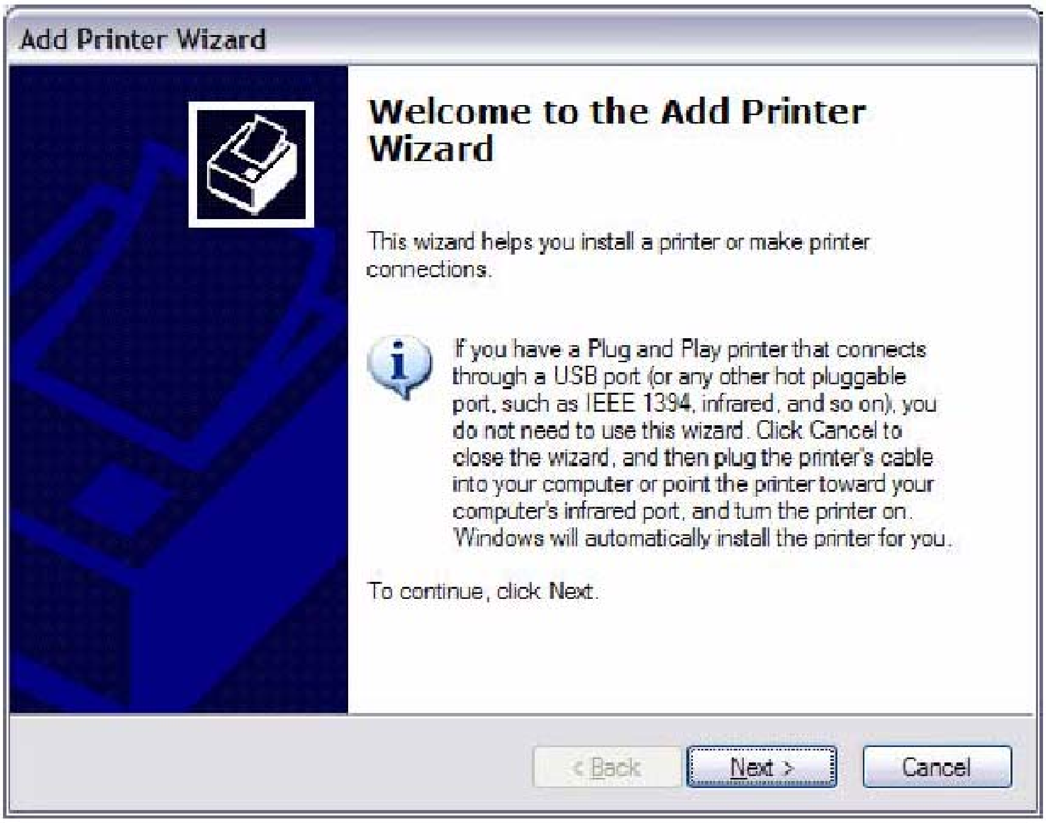
Make and model: HP 3845

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).



Name	Documents	Status	Comments	Location	M
Adobe PDF	0	Ready		My Documents	Ad
Microsoft Office ...	0	Ready			Mi
MM Fax Print Driver	0	Ready			Im
		Ready	8018A-1 Hsin Chu Level 8	8018A-1	HP
prt-hsda-08 on n...	0	Ready	8019A-1 Hsin Chu Level 8	8019A-1	Ca

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



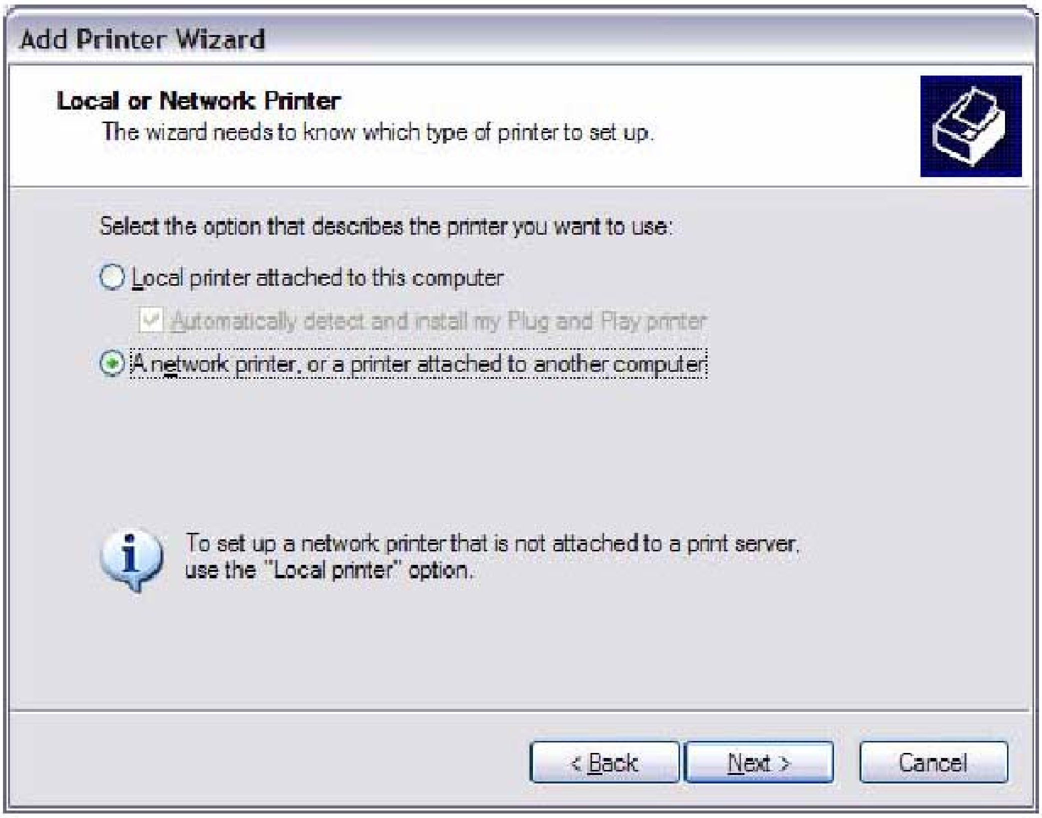
Welcome to the Add Printer Wizard

This wizard helps you install a printer or make printer connections.

If you have a Plug and Play printer that connects through a USB port (or any other hot pluggable port, such as IEEE 1394, infrared, and so on), you do not need to use this wizard. Click Cancel to close the wizard, and then plug the printer's cable into your computer or point the printer toward your computer's infrared port, and turn the printer on. Windows will automatically install the printer for you.

To continue, click Next.

STEP 4: Select **Network Printer** and click **Next**.



Add Printer Wizard

Local or Network Printer

The wizard needs to know which type of printer to set up.

Select the option that describes the printer you want to use:

○ Local printer attached to this computer

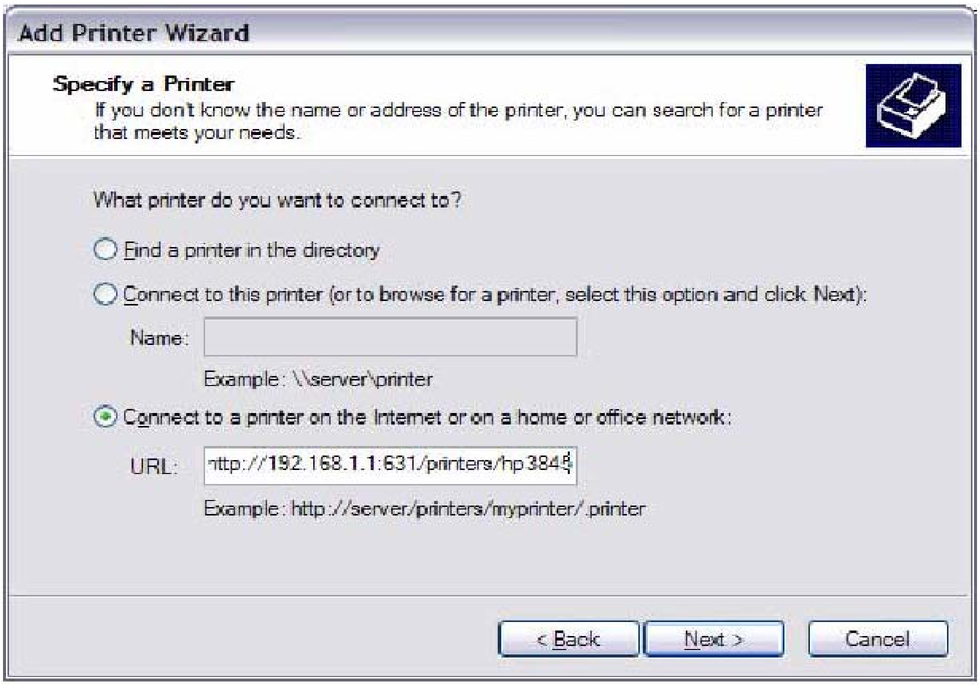
☑ Automatically detect and install my Plug and Play printer

● A network printer, or a printer attached to another computer

To set up a network printer that is not attached to a print server, use the "Local printer" option.

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 ADSL modem WEB UI "printer server setting" as in step 1.



Add Printer Wizard

Specify a Printer

If you don't know the name or address of the printer, you can search for a printer that meets your needs.

What printer do you want to connect to?

○ Find a printer in the directory

○ Connect to this printer (or to browse for a printer, select this option and click Next):

Name:

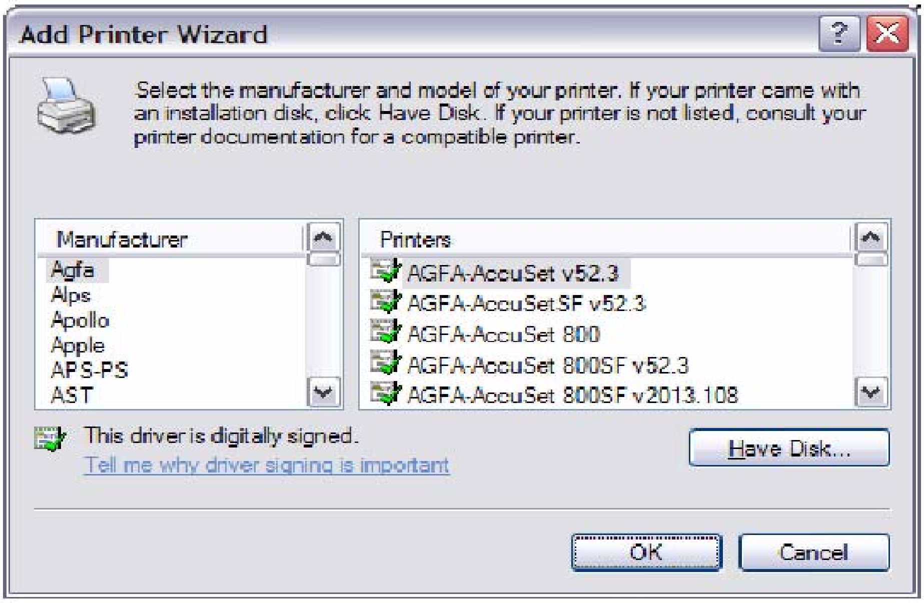
Example: \\server\printer

● Connect to a printer on the Internet or on a home or office network:

URL: http://192.168.1.1:631/printers/hp3845

Example: http://server/printers/myprinter/.printer

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



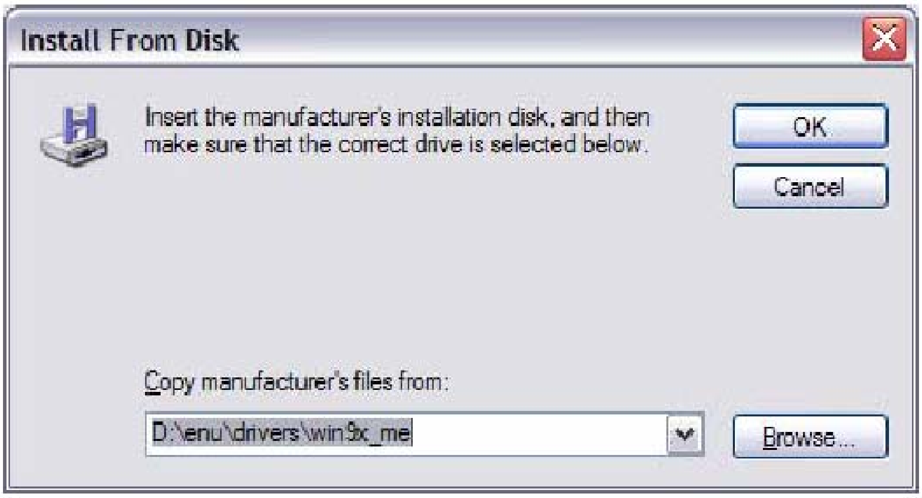
Add Printer Wizard

Select the manufacturer and model of your printer. If your printer came with an installation disk, click Have Disk. If your printer is not listed, consult your printer documentation for a compatible printer.

Manufacturer	Printers
Agfa	AGFA-AccuSet v52.3
Alps	AGFA-AccuSet SF v52.3
Apollo	AGFA-AccuSet 800
Apple	AGFA-AccuSet 800SF v52.3
APS-PS	AGFA-AccuSet 800SF v2013.108
AST	

This driver is digitally signed.
Tell me why driver signing is important

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



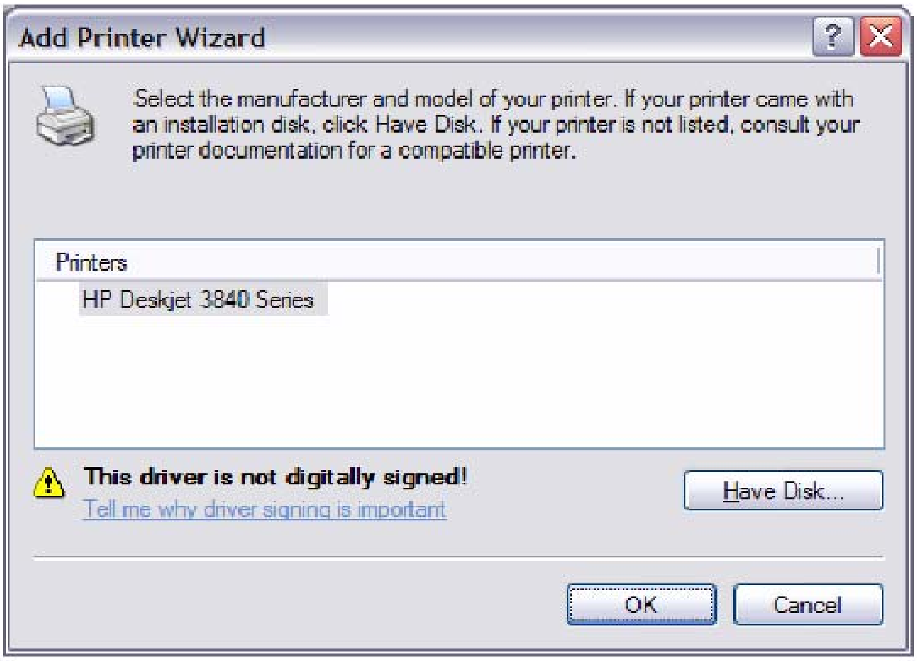
Install From Disk

Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.

Copy manufacturer's files from:

D:\enu\drivers\win9x_me

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



Add Printer Wizard

Select the manufacturer and model of your printer. If your printer came with an installation disk, click Have Disk. If your printer is not listed, consult your printer documentation for a compatible printer.

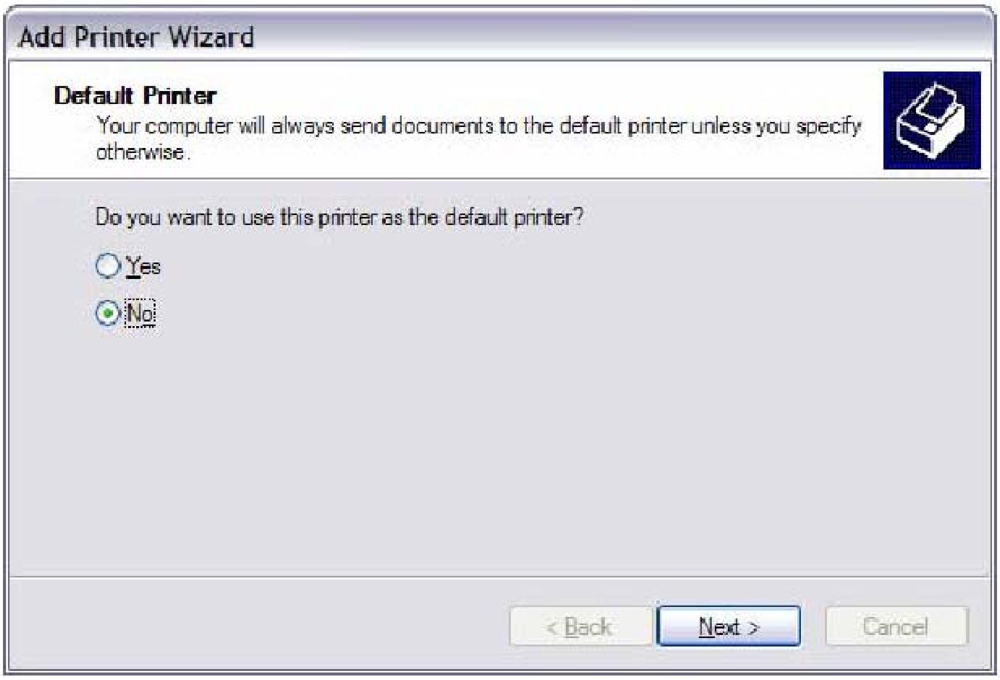
Printers

HP Deskjet 3840 Series

This driver is not digitally signed!

Tell me why driver signing is important

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



Add Printer Wizard

Default Printer

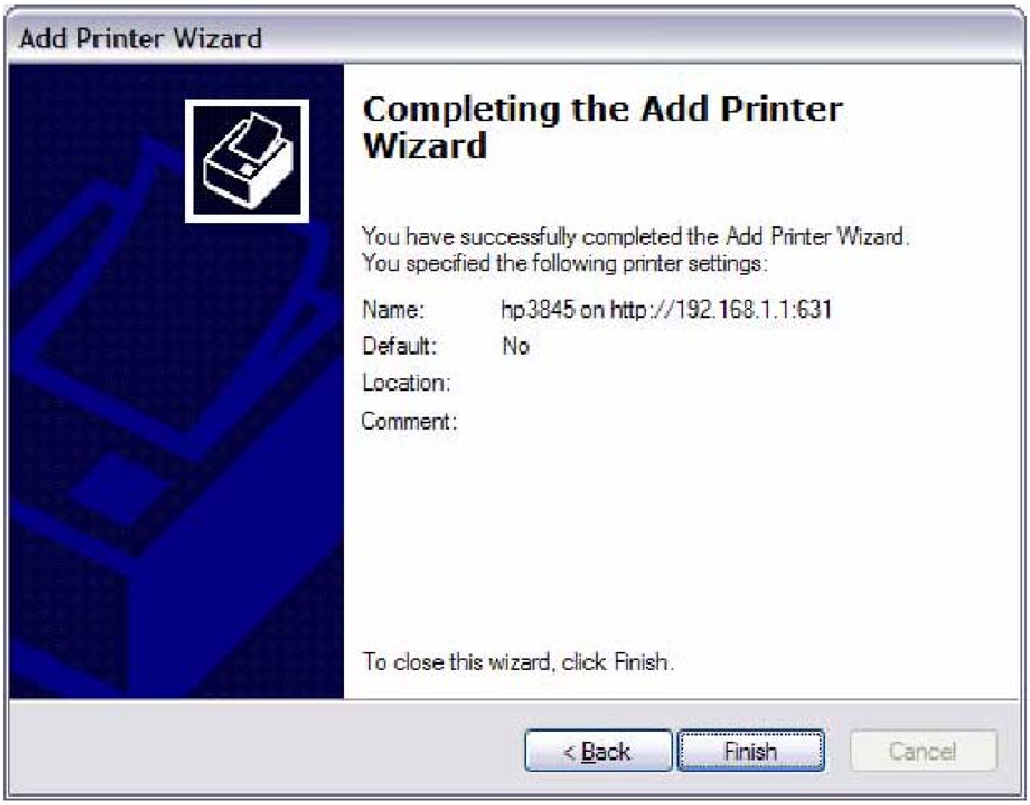
Your computer will always send documents to the default printer unless you specify otherwise.

Do you want to use this printer as the default printer?

○ Yes

● No

STEP 10: Click Finish.



Add Printer Wizard

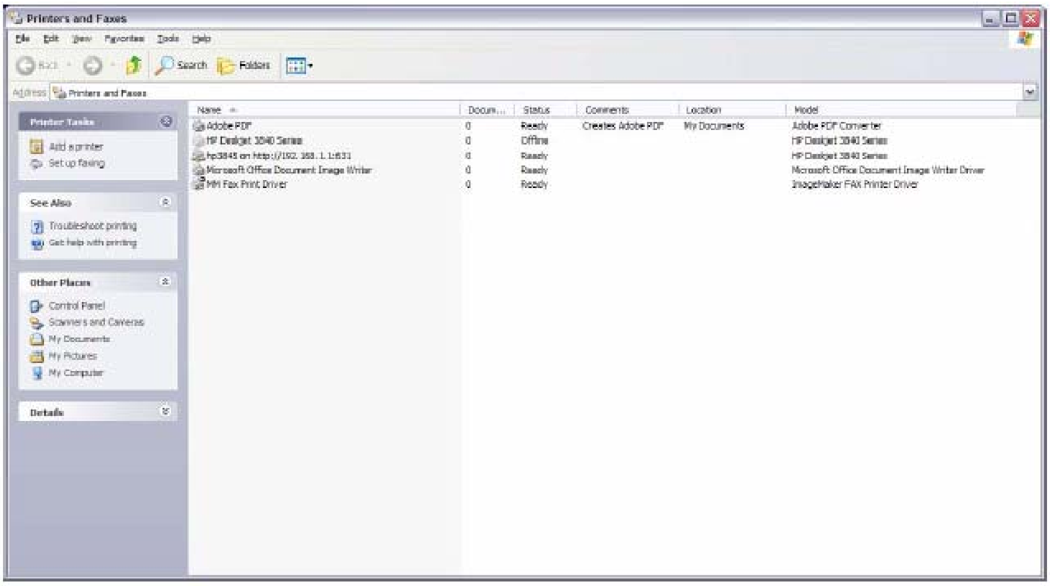
Completing the Add Printer Wizard

You have successfully completed the Add Printer Wizard.
You specified the following printer settings:

Name: hp3845 on http://192.168.1.1:631
Default: No
Location:
Comment:

To close this wizard, click Finish.

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



Printers and Faxes

Name	Docum...	Status	Comments	Location	Model
Adobe PDF	0	Ready	Creates Adobe PDF	My Documents	Adobe PDF Converter
HP Deskjet 3840 Series	0	Offline			HP Deskjet 3840 Series
hp3845 on http://192.168.1.1:631	0	Ready			HP Deskjet 3840 Series
Microsoft Office Document Image Writer	0	Ready			Microsoft Office Document Image Writer Driver
MM Fax Print Driver	0	Ready			ImageMaker FAX Printer Driver

Appendix F - 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.

F1 ~ Layer 2 Interfaces

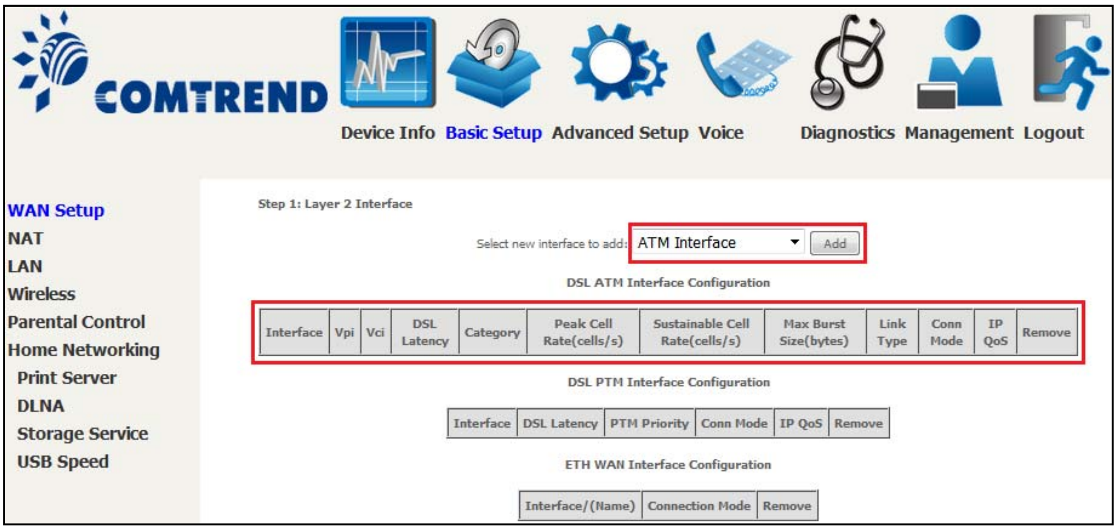
Every layer2 interface operates in Multi-Service Connection (VLAN MUX) mode, which supports multiple connections over a single interface. Note that PPPoA and IPoA connection types are not supported for Ethernet WAN interfaces. After adding WAN connections to an interface, you must also create an Interface Group to connect LAN/WAN interfaces.

F1.1 ATM Interfaces

Follow these procedures to configure an ATM interface.

NOTE: The NexusLink 3240 supports up to 16 ATM interfaces.

STEP 1: Go to Basic Setup Basic Setup → WAN Setup → Select ATM Interface from the drop-down menu.



Step 1: Layer 2 Interface

Select new interface to add: ATM Interface [Add]

DSL ATM Interface Configuration

Interface	Vpi	Vci	DSL Latency	Category	Peak Cell Rate(cells/s)	Sustainable Cell Rate(cells/s)	Max Burst Size(bytes)	Link Type	Conn Mode	IP QoS	Remove

DSL PTM Interface Configuration

Interface	DSL Latency	PTM Priority	Conn Mode	IP QoS	Remove

ETH WAN Interface Configuration

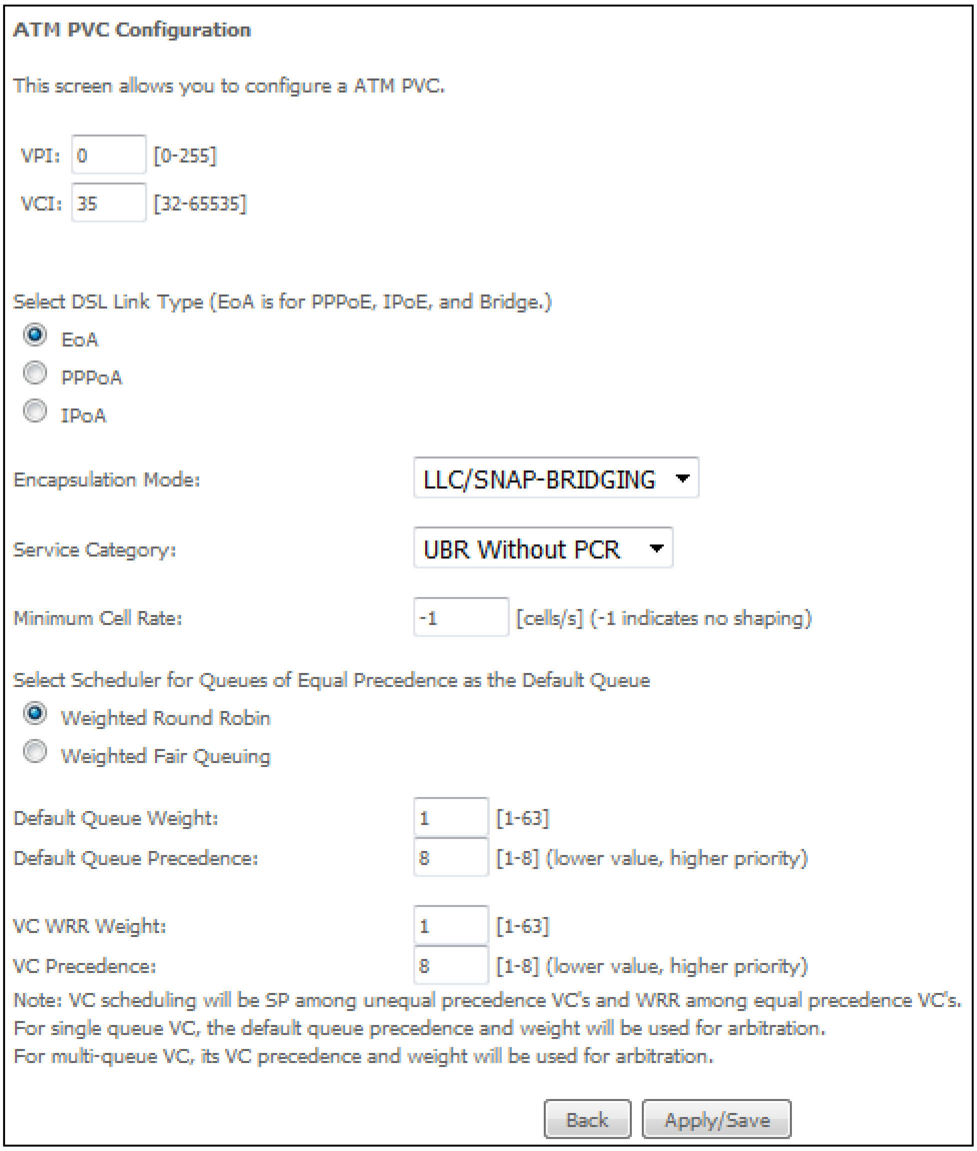
Interface/(Name)	Connection Mode	Remove

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} → portID = 0 {Path1} → port ID = 1 {Path0&1} → port ID = 4
Category	ATM service category
Peak Cell Rate	Maximum allowed traffic rate for the ATM PCR service connection
Sustainable Cell Rate	The average allowable, long-term cell transfer rate on the VBR service connection
Max Burst Size	The maximum allowable burst size of cells that can be transmitted continuously on the VBR service connection
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
IP QoS	Quality of Service (QoS) status
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.



ATM PVC Configuration

This screen allows you to configure a ATM PVC.

VPI: 0 [0-255]

VCI: 35 [32-65535]

Select DSL Link Type (EoA is for PPPoE, IPoE, and Bridge.)

● EoA
○ PPPoA
○ IPoA

Encapsulation Mode: LLC/SNAP-BRIDGING

Service Category: UBR Without PCR

Minimum Cell Rate: -1 [cells/s] (-1 indicates no shaping)

Select Scheduler for Queues of Equal Precedence as the Default Queue

● Weighted Round Robin
○ Weighted Fair Queuing

Default Queue Weight: 1 [1-63]

Default Queue Precedence: 8 [1-8] (lower value, higher priority)

VC WRR Weight: 1 [1-63]

VC Precedence: 8 [1-8] (lower value, higher priority)

Note: VC scheduling will be SP among unequal precedence VC's and WRR among equal precedence VC's.
For single queue VC, the default queue precedence and weight will be used for arbitration.
For multi-queue VC, its VC precedence and weight will be used for arbitration.

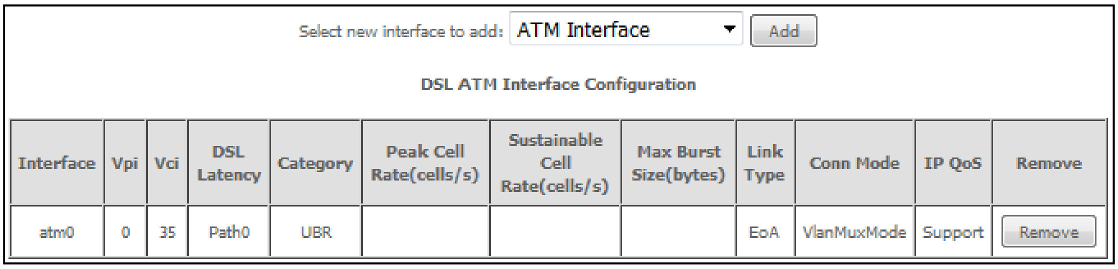
There are many settings here including: VPI/VCI, DSL Link Type, Encapsulation Mode, Service Category and Queue Weight.

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.



Select new interface to add: ATM Interface [Add]

DSL ATM Interface Configuration

Interface	Vpi	Vci	DSL Latency	Category	Peak Cell Rate(cells/s)	Sustainable Cell Rate(cells/s)	Max Burst Size(bytes)	Link Type	Conn Mode	IP QoS	Remove
atm0	0	35	Path0	UBR				EoA	VlanMuxMode	Support	Remove

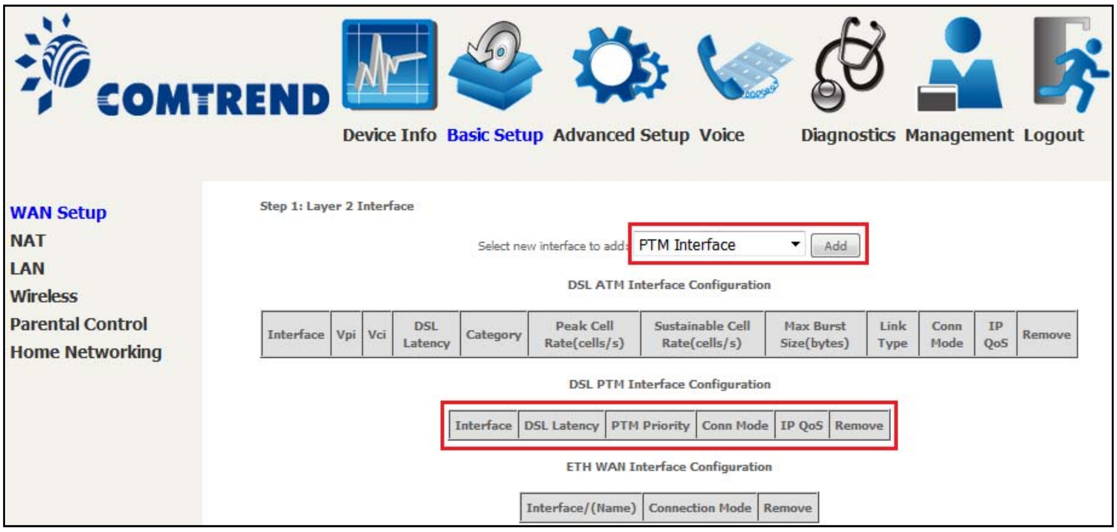
To add a WAN connection go to Section F2 ~ WAN Connections.

F1.2 PTM Interfaces

Follow these procedures to configure a PTM interface.

NOTE: The NexusLink 3240 supports up to four PTM interfaces.

STEP 1: Go to Basic Setup → WAN Setup → Select PTM Interface from the drop-down menu.



Step 1: Layer 2 Interface

Select new interface to add: PTM Interface [Add]

DSL ATM Interface Configuration

Interface	Vpi	Vci	DSL Latency	Category	Peak Cell Rate(cells/s)	Sustainable Cell Rate(cells/s)	Max Burst Size(bytes)	Link Type	Conn Mode	IP QoS	Remove

DSL PTM Interface Configuration

Interface	DSL Latency	PTM Priority	Conn Mode	IP QoS	Remove

ETH WAN Interface Configuration

Interface/(Name)	Connection Mode	Remove

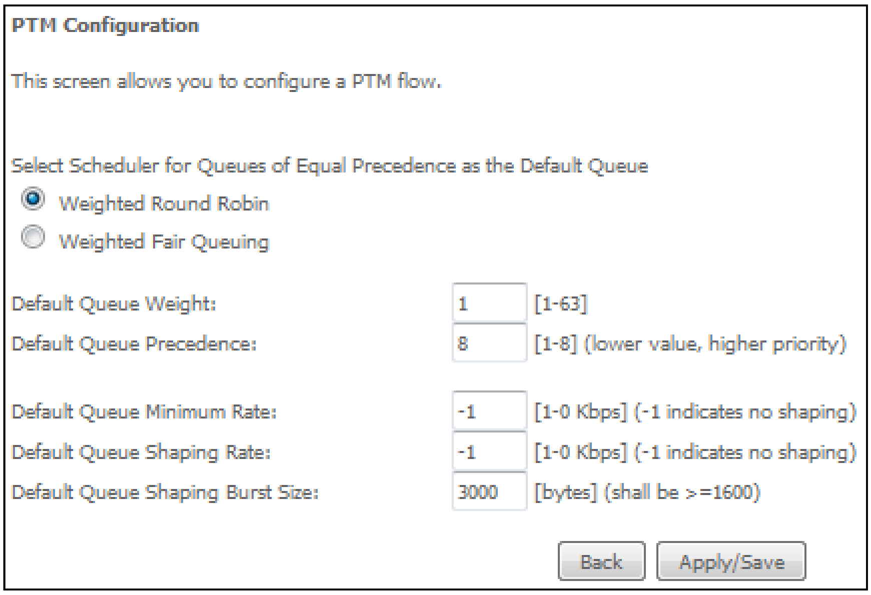
This table is provided here for ease of reference.

Heading	Description
Interface	WAN interface name.

Heading	Description
DSL Latency	{Path0} → portID = 0 {Path1} → port ID = 1 {Path0&1} → 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.
IP QoS	Quality of Service (QoS) status.
Remove	Select interfaces to remove.

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.



PTM Configuration

This screen allows you to configure a PTM flow.

Select Scheduler for Queues of Equal Precedence as the Default Queue

● Weighted Round Robin

○ Weighted Fair Queuing

Default Queue Weight: 1 [1-63]

Default Queue Precedence: 8 [1-8] (lower value, higher priority)

Default Queue Minimum Rate: -1 [1-0 Kbps] (-1 indicates no shaping)

Default Queue Shaping Rate: -1 [1-0 Kbps] (-1 indicates no shaping)

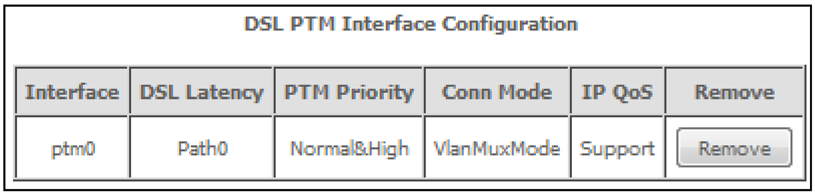
Default Queue Shaping Burst Size: 3000 [bytes] (shall be >=1600)

Default PTM interface Quality of Service can be configured here, including Scheduler, Queue Weight and Rate Limit.

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

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

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



DSL PTM Interface Configuration

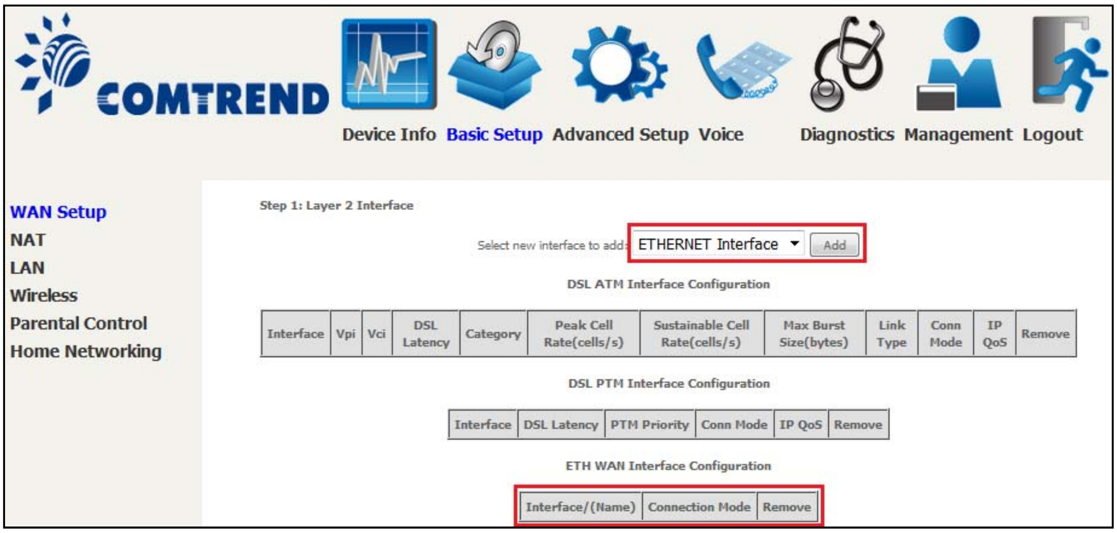
Interface	DSL Latency	PTM Priority	Conn Mode	IP QoS	Remove
ptm0	Path0	Normal&High	VlanMuxMode	Support	Remove

To add a WAN connection go to Section F2 ~ WAN Connections.

F1.3 Ethernet WAN Interface

The NexusLink 3240 supports a single Ethernet WAN interface over the ETH WAN port. Follow these procedures to configure an Ethernet interface.

STEP 1: Go to Basic Setup → WAN Setup → Select ETHERNET Interface from the drop-down menu.



Step 1: Layer 2 Interface

Select new interface to add: ETHERNET Interface

DSL ATM Interface Configuration

Interface	Vpi	Vci	DSL Latency	Category	Peak Cell Rate(cells/s)	Sustainable Cell Rate(cells/s)	Max Burst Size(bytes)	Link Type	Conn Mode	IP QoS	Remove

DSL PTM Interface Configuration

Interface	DSL Latency	PTM Priority	Conn Mode	IP QoS	Remove

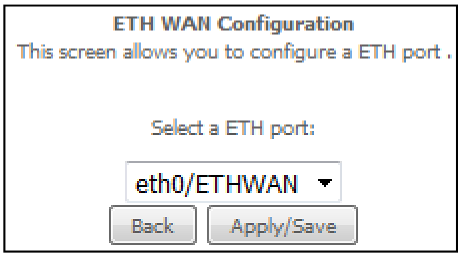
ETH WAN Interface Configuration

Interface/(Name)	Connection Mode	Remove

This table is provided here for ease of reference.

Heading	Description
Interface/ (Name)	WAN interface name.
Connection Mode	Default Mode – Single service over one interface. Vlan Mux Mode – Multiple Vlan services over one interface.
Remove	Select interfaces to remove.

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



ETH WAN Configuration

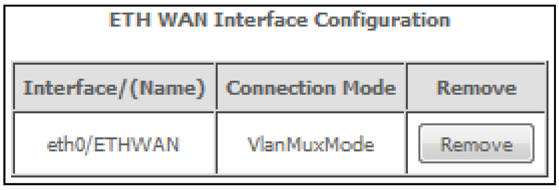
This screen allows you to configure a ETH port .

Select a ETH port:

eth0/ETHWAN

STEP 3: Select an Ethernet port and Click **Apply/Save** to confirm your choices.

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



ETH WAN Interface Configuration

Interface/(Name)	Connection Mode	Remove
eth0/ETHWAN	VlanMuxMode	Remove

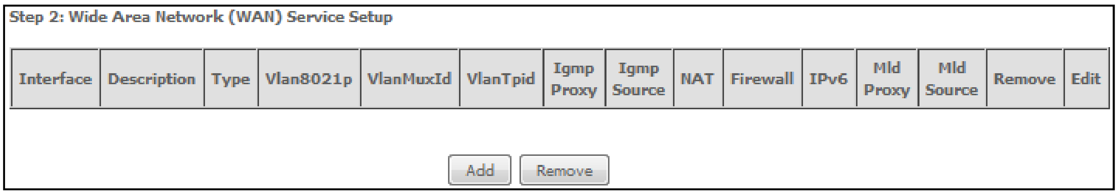
To add a WAN connection go to Section F2 ~ WAN Connections.

F2 ~ WAN Connections

The NexusLink 3240 supports one WAN connection for each interface, up to a maximum of 16 connections.

To setup a WAN connection follow these instructions.

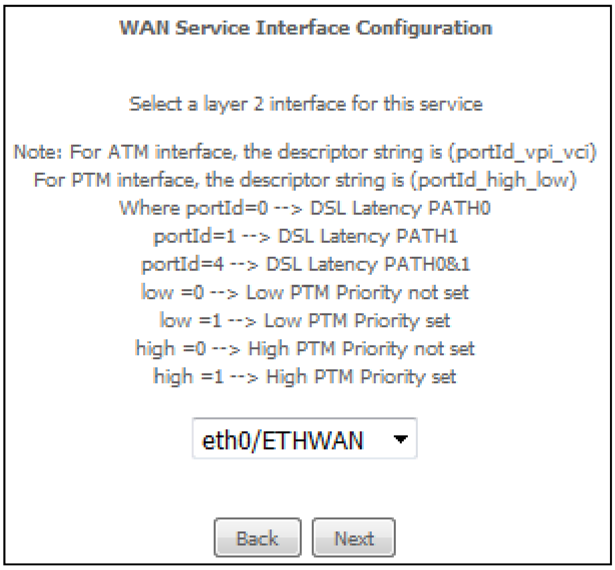
STEP 1: Go to Basic Setup → WAN Setup.



Step 2: Wide Area Network (WAN) Service Setup

Interface	Description	Type	Vlan8021p	VlanMuxId	VlanTpid	Igmp Proxy	Igmp Source	NAT	Firewall	IPv6	Mld Proxy	Mld Source	Remove	Edit

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



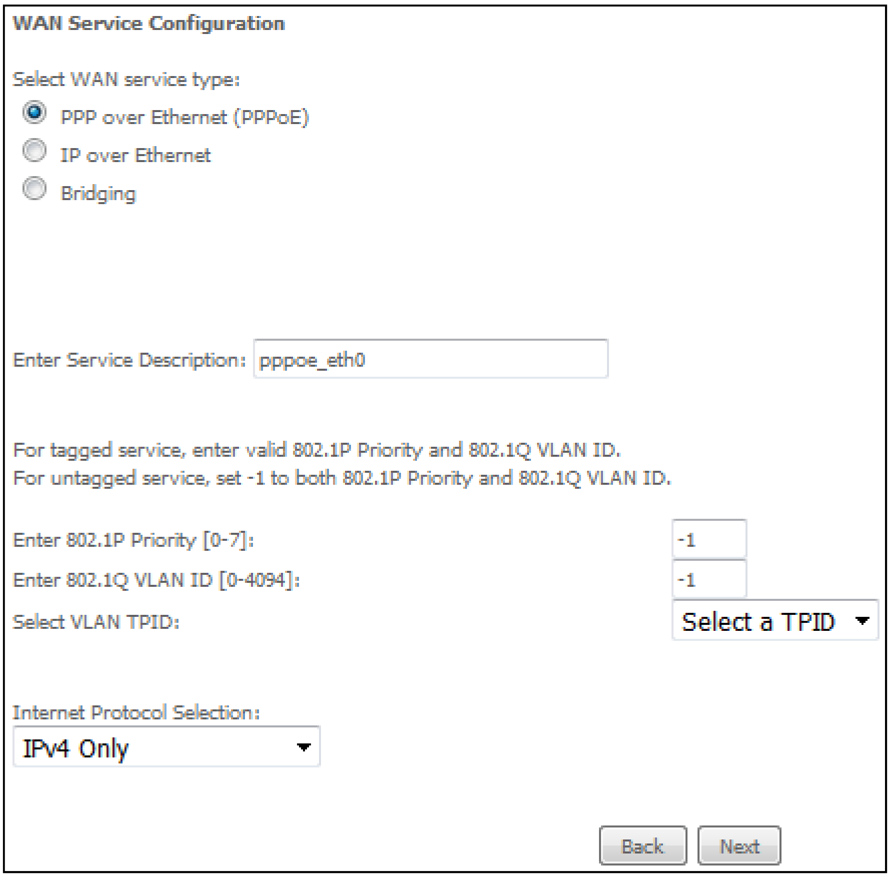
WAN Service Interface Configuration

Select a layer 2 interface for this service

Note: For ATM interface, the descriptor string is (portId_vpi_vci)
For PTM interface, the descriptor string is (portId_high_low)
Where portId=0 --> DSL Latency PATH0
portId=1 --> DSL Latency PATH1
portId=4 --> DSL Latency PATH0&1
low =0 --> Low PTM Priority not set
low =1 --> Low PTM Priority set
high =0 --> High PTM Priority not set
high =1 --> High PTM Priority set

eth0/ETHWAN

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.



WAN Service Configuration

Select WAN service type:

● PPP over Ethernet (PPPoE)

○ IP over Ethernet

○ Bridging

Enter Service Description: pppoe_eth0

For tagged service, enter valid 802.1P Priority and 802.1Q VLAN ID.
For untagged service, set -1 to both 802.1P Priority and 802.1Q VLAN ID.

Enter 802.1P Priority [0-7]: -1

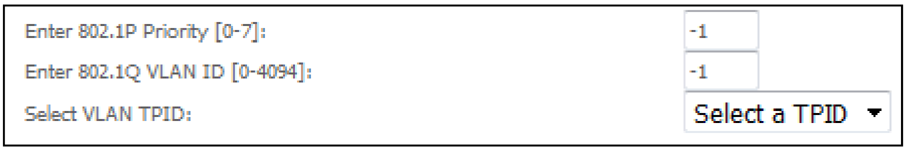
Enter 802.1Q VLAN ID [0-4094]: -1

Select VLAN TPID: Select a TPID

Internet Protocol Selection: IPv4 Only

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.



Enter 802.1P Priority [0-7]: -1

Enter 802.1Q VLAN ID [0-4094]: -1

Select VLAN TPID: Select a TPID

Select a TPID if VLAN tag Q-in-Q is used.

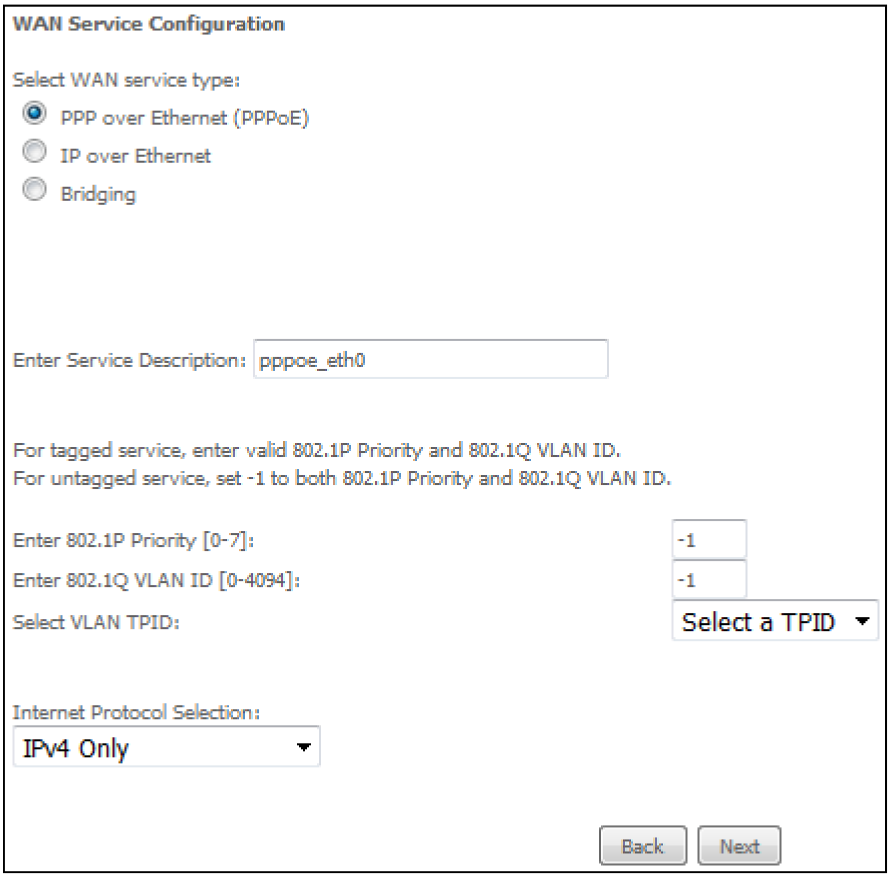
STEP 5: You will now follow the instructions specific to the WAN service type you wish to establish. This list should help you locate the correct procedure:

(1) For F2.1 PPP over ETHERNET (PPPoE), go to page 186.
(2) For F2.2 IP over ETHERNET (IPoE), go to page 192.
(3) For F2.3 Bridging, go to page 198.
(4) For F2.4 PPP over ATM (PPPoA), go to page 200.
(5) For F2.5 IP over ATM (IPoA), go to page 206.

The subsections that follow continue the WAN service setup procedure.

F2.1 PPP over ETHERNET (PPPoE)

STEP 1: Select the PPP over Ethernet radio button and click **Next**. You can also enable IPv6 by selecting from the drop-down box at the bottom of this screen.



WAN Service Configuration

Select WAN service type:

● PPP over Ethernet (PPPoE)

○ IP over Ethernet

○ Bridging

Enter Service Description: pppoe_eth0

For tagged service, enter valid 802.1P Priority and 802.1Q VLAN ID.
For untagged service, set -1 to both 802.1P Priority and 802.1Q VLAN ID.

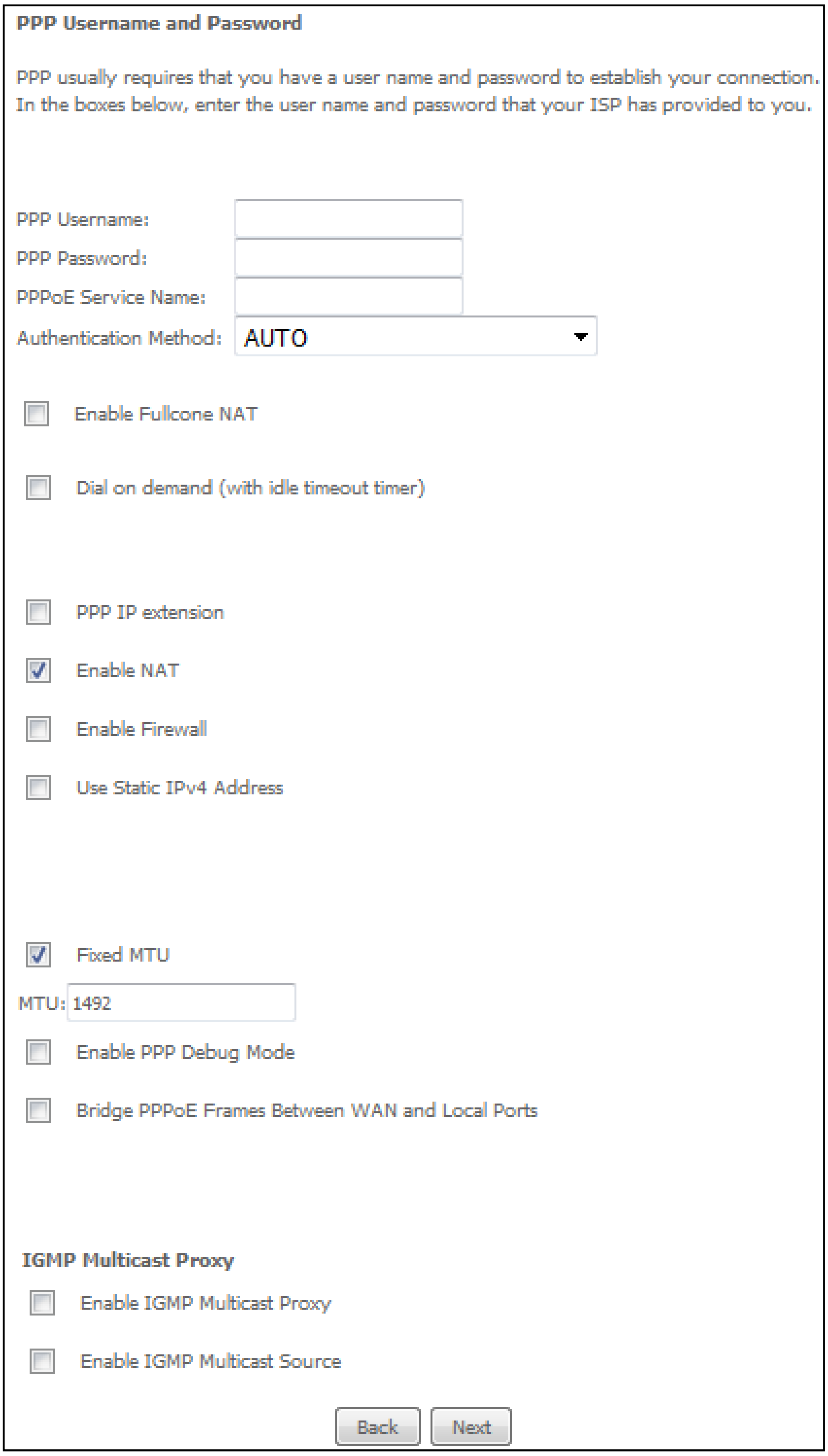
Enter 802.1P Priority [0-7]: -1

Enter 802.1Q VLAN ID [0-4094]: -1

Select VLAN TPID: Select a TPID

Internet Protocol Selection: IPv4 Only

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 Username and Password

PPP usually requires that you have a user name and password to establish your connection. In the boxes below, enter the user name and password that your ISP has provided to you.

PPP Username:

PPP Password:

PPPoE Service Name:

Authentication Method: AUTO

□ Enable Fullcone NAT

□ Dial on demand (with idle timeout timer)

□ PPP IP extension

☑ Enable NAT

□ Enable Firewall

□ Use Static IPv4 Address

☑ Fixed MTU

MTU: 1492

□ Enable PPP Debug Mode

□ Bridge PPPoE Frames Between WAN and Local Ports

IGMP Multicast Proxy

□ Enable IGMP Multicast Proxy

□ Enable IGMP Multicast Source

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

The settings shown above are described below.

PPP SETTINGS

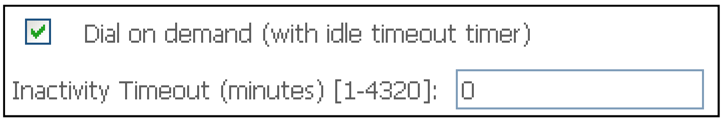
The PPP Username, PPP password and the PPPoE Service Name entries are dependent on the particular requirements of the ISP. The user name can be a maximum of 256 characters and the password a maximum of 32 characters in length. For Authentication Method, choose from AUTO, PAP, CHAP, and MSCHAP.

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 3240 can be configured to disconnect if there is no activity for a period of time by selecting the **Dial on demand** checkbox ☑. You must also enter an inactivity timeout period in the range of 1 to 4320 minutes.



☑ Dial on demand (with idle timeout timer)

Inactivity Timeout (minutes) [1-4320]: 0

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 ☑. 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 ☑ should not be selected to free up system resources for better performance.

ENABLE FIREWALL

If this checkbox ☑ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox ☑ 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 ☑. 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 section 3.2 IP Configuration.

FIXED 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.

BRIDGE PPPOE FRAMES BETWEEN WAN AND LOCAL PORTS

(This option is hidden when PPP IP Extension is enabled)
When Enabled, this creates local PPPoE connections to the WAN side. Enable this option only if all LAN-side devices are running PPPoE clients, otherwise disable it. The NexusLink 3240 supports pass-through PPPoE sessions from the LAN side while simultaneously running a PPPoE client from non-PPPoE LAN devices.

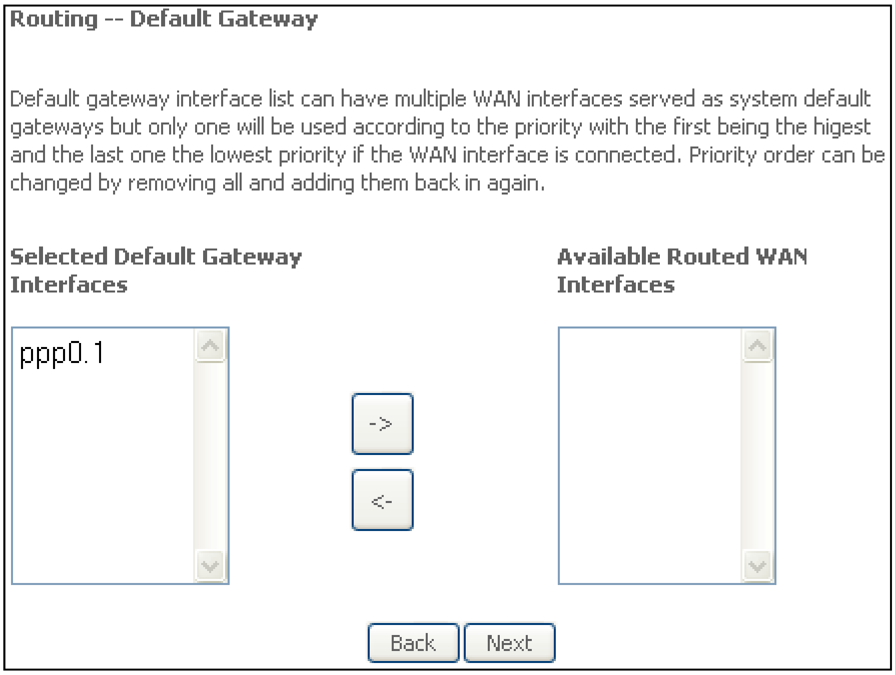
ENABLE IGMP MULTICAST PROXY

Tick the checkbox ☑ 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 IGMP Multicast Source

Enable the WAN interface to be used as IGMP multicast source.

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



Routing -- Default Gateway

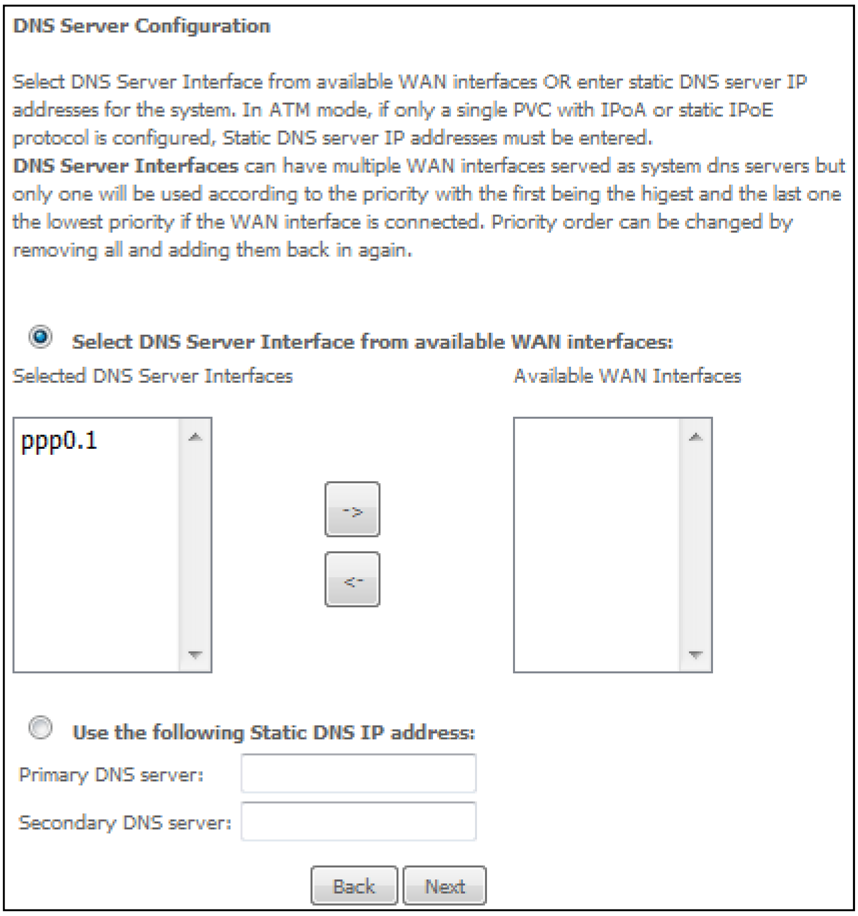
Default gateway interface list can have multiple WAN interfaces served as system default gateways but only one will be used according to the priority with the first being the higest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

Selected Default Gateway Interfaces: ppp0.1

Available Routed WAN Interfaces:

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.



DNS Server Configuration

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.
DNS Server Interfaces can have multiple WAN interfaces served as system dns servers but only one will be used according to the priority with the first being the higest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

● **Select DNS Server Interface from available WAN interfaces:**

Selected DNS Server Interfaces: ppp0.1

Available WAN Interfaces:

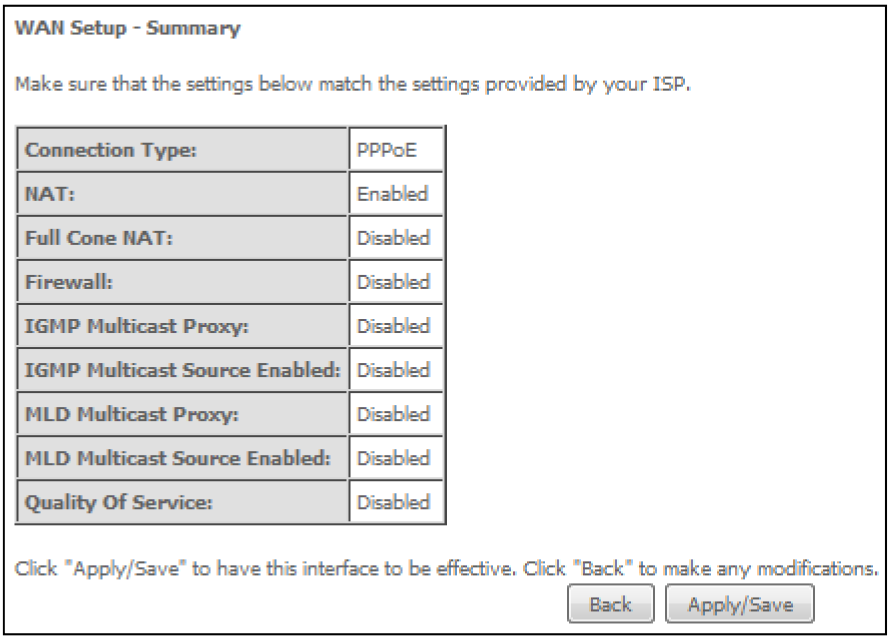
○ **Use the following Static DNS IP address:**

Primary DNS server:

Secondary DNS server:

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.



WAN Setup - Summary

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

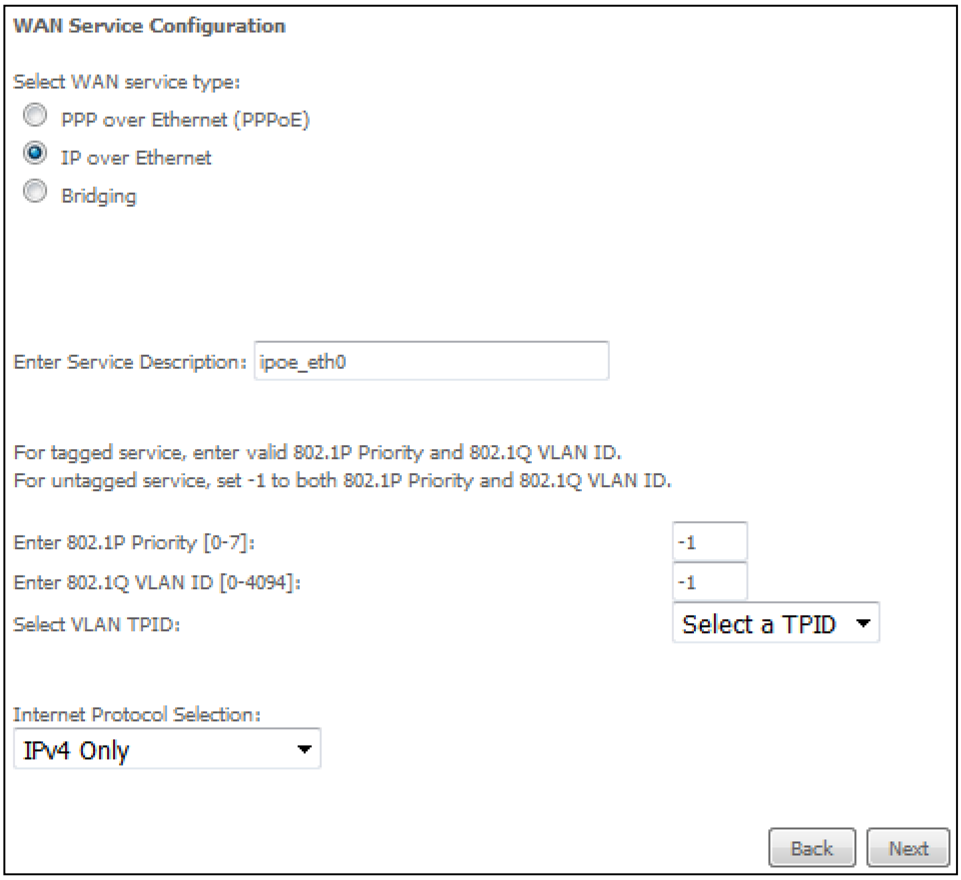
Connection Type:	PPPoE
NAT:	Enabled
Full Cone NAT:	Disabled
Firewall:	Disabled
IGMP Multicast Proxy:	Disabled
IGMP Multicast Source Enabled:	Disabled
MLD Multicast Proxy:	Disabled
MLD Multicast Source Enabled:	Disabled
Quality Of Service:	Disabled

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

After clicking **Apply/Save**, the new service should appear on the main screen.

F2.2 IP over ETHERNET (IPoE)

STEP 1: ***Select the IP over Ethernet radio button and click **Next.**



WAN Service Configuration

Select WAN service type:

○ PPP over Ethernet (PPPoE)

● IP over Ethernet

○ Bridging

Enter Service Description: ipoe_eth0

For tagged service, enter valid 802.1P Priority and 802.1Q VLAN ID.
For untagged service, set -1 to both 802.1P Priority and 802.1Q VLAN ID.

Enter 802.1P Priority [0-7]: -1

Enter 802.1Q VLAN ID [0-4094]: -1

Select VLAN TPID: Select a TPID

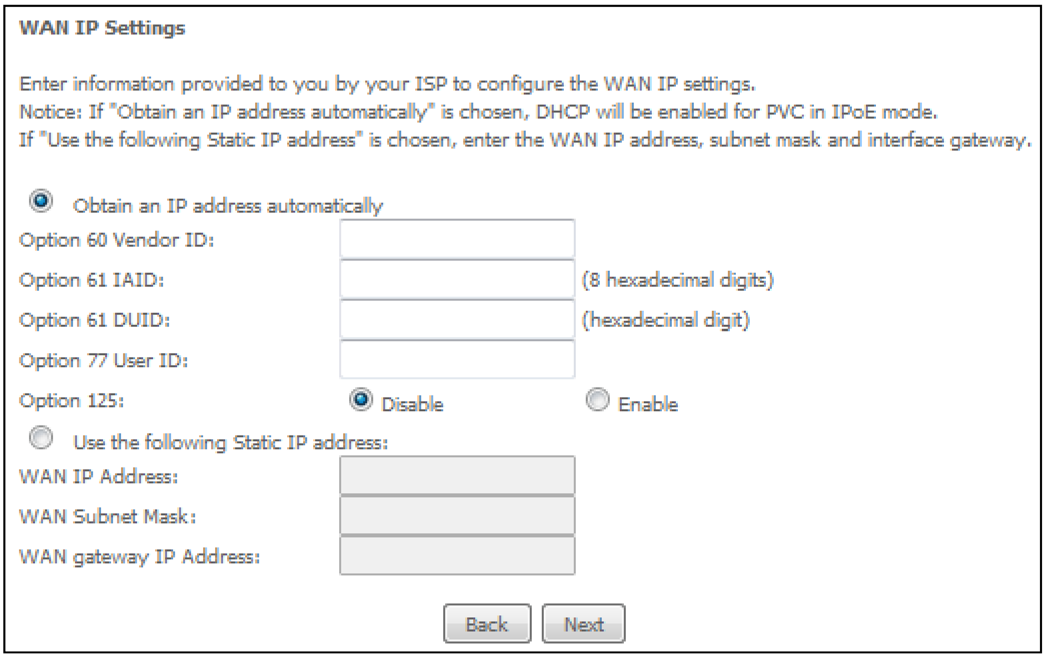
Internet Protocol Selection: IPv4 Only

*

For tagged service, enter valid 802.1P Priority and 802.1Q VLAN ID.

For untagged service, set -1 to both 802.1P Priority and 802.1Q VLAN ID.

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 use the **Static IP address** method instead to assign WAN IP address, Subnet Mask and Default Gateway manually.



WAN IP Settings

Enter information provided to you by your ISP to configure the WAN IP settings.
Notice: If "Obtain an IP address automatically" is chosen, DHCP will be enabled for PVC in IPoE mode.
If "Use the following Static IP address" is chosen, enter the WAN IP address, subnet mask and interface gateway.

● Obtain an IP address automatically

Option 60 Vendor ID:		
Option 61 IAID:		(8 hexadecimal digits)
Option 61 DUID:		(hexadecimal digit)
Option 77 User ID:		
Option 125:	● Disable	○ Enable

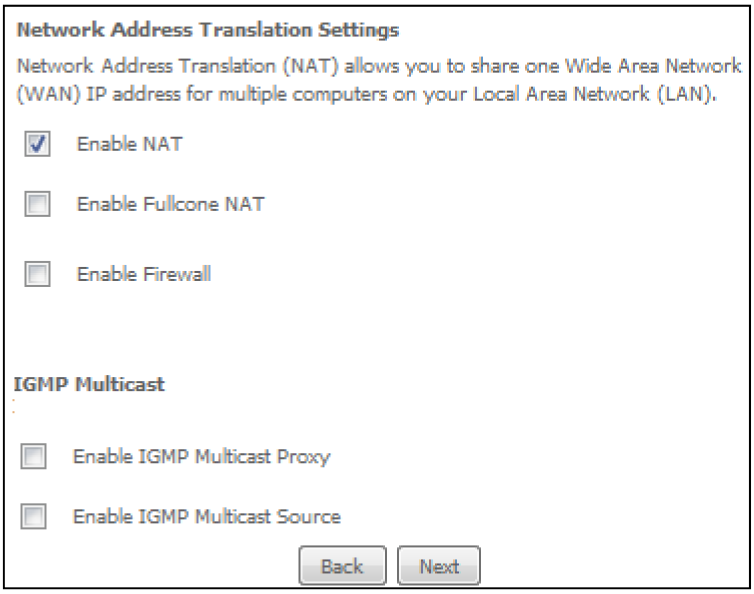
○ Use the following Static IP address:

WAN IP Address:	
WAN Subnet Mask:	
WAN gateway IP Address:	

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



Network Address Translation Settings

Network Address Translation (NAT) allows you to share one Wide Area Network (WAN) IP address for multiple computers on your Local Area Network (LAN).

☑ Enable NAT

□ Enable Fullcone NAT

□ Enable Firewall

IGMP Multicast

□ Enable IGMP Multicast Proxy

□ Enable IGMP Multicast Source

ENABLE NAT
If the LAN is configured with a private IP address, the user should select this checkbox ☑. 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 ☑ 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.

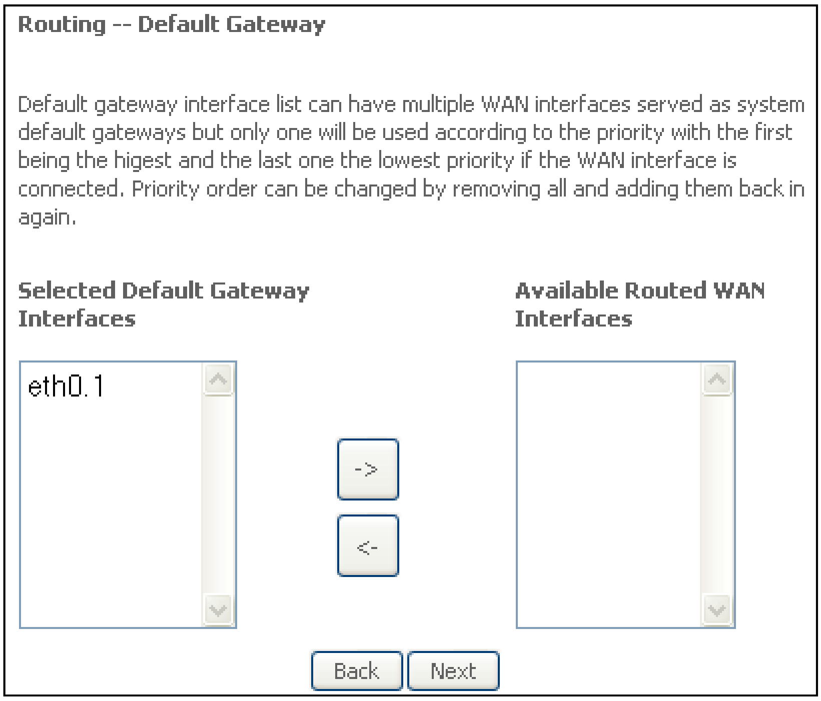
ENABLE FIREWALL
If this checkbox ☑ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox ☑ should not be selected so as to free up system resources for better performance.

ENABLE IGMP MULTICAST PROXY
Tick the checkbox ☑ 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 IGMP Multicast Source

Enable the WAN interface to be used as IGMP multicast source.

STEP 4: To choose an interface to be the default gateway.



Routing -- Default Gateway

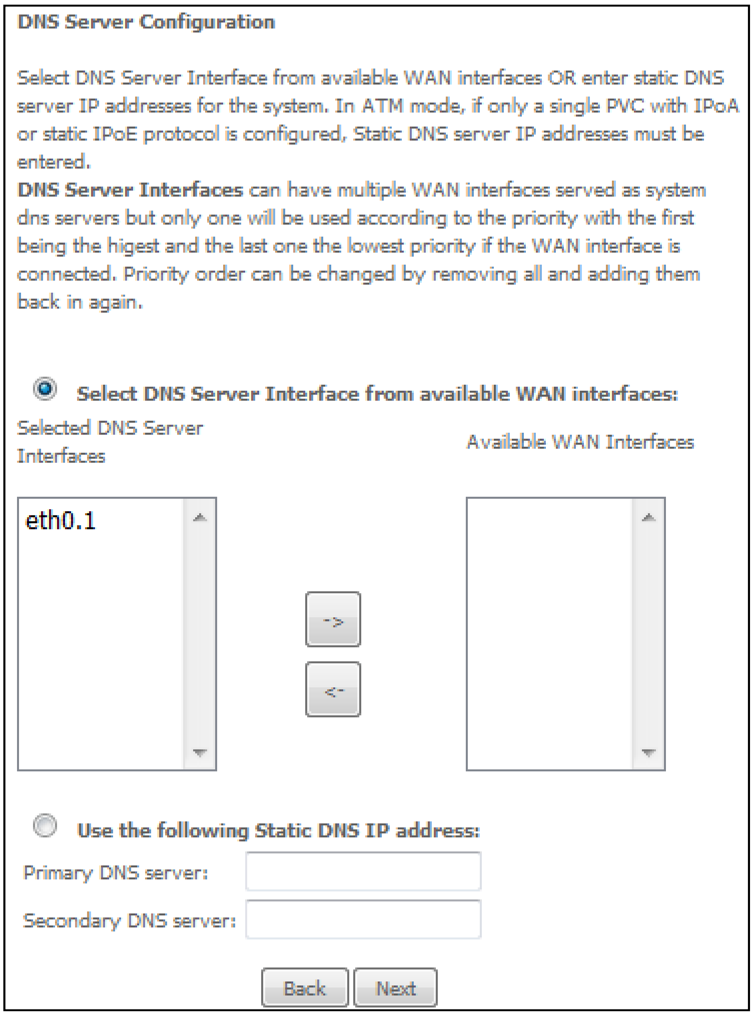
Default gateway interface list can have multiple WAN interfaces served as system default gateways but only one will be used according to the priority with the first being the higest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

Selected Default Gateway Interfaces: eth0.1

Available Routed WAN Interfaces:

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.



DNS Server Configuration

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.

DNS Server Interfaces can have multiple WAN interfaces served as system dns servers but only one will be used according to the priority with the first being the higest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

● **Select DNS Server Interface from available WAN interfaces:**

Selected DNS Server Interfaces: eth0.1

Available WAN Interfaces:

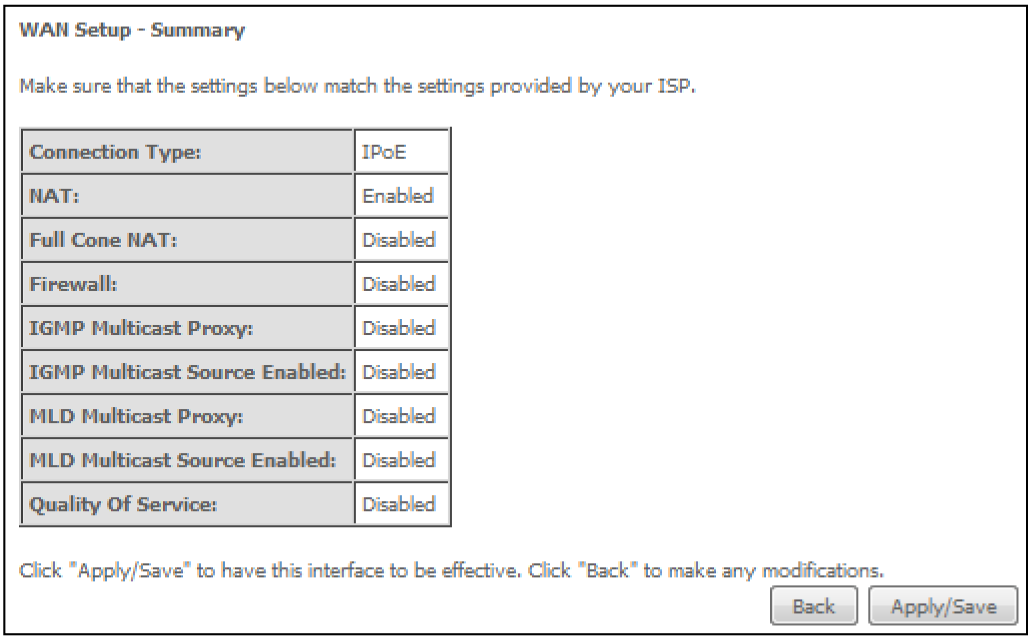
○ **Use the following Static DNS IP address:**

Primary DNS server:

Secondary DNS server:

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.



WAN Setup - Summary

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

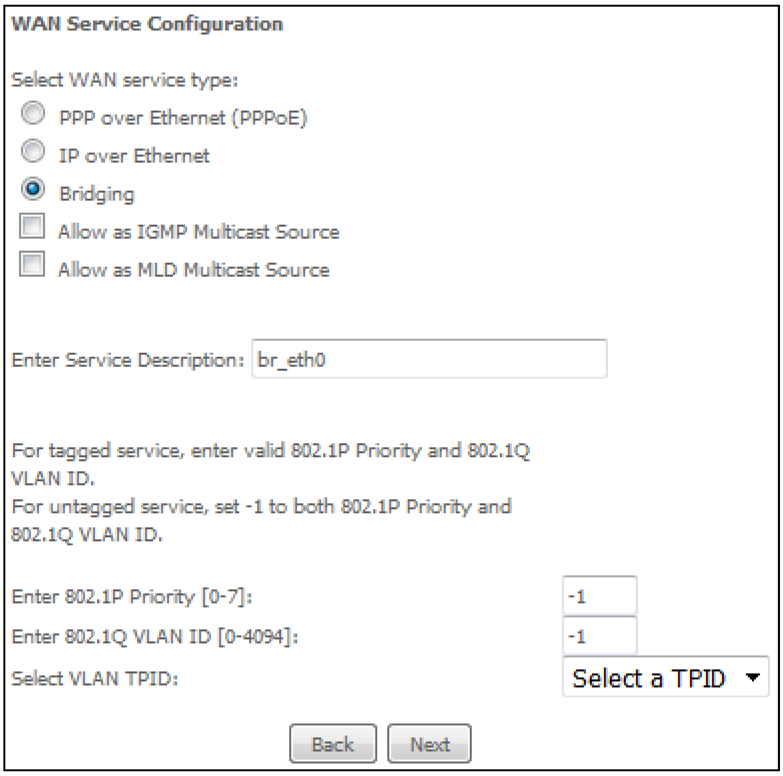
Connection Type:	IPoE
NAT:	Enabled
Full Cone NAT:	Disabled
Firewall:	Disabled
IGMP Multicast Proxy:	Disabled
IGMP Multicast Source Enabled:	Disabled
MLD Multicast Proxy:	Disabled
MLD Multicast Source Enabled:	Disabled
Quality Of Service:	Disabled

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

After clicking **Apply/Save**, the new service should appear on the main screen.

F2.3 Bridging

STEP 1: *Select the Bridging radio button and click **Next**.



WAN Service Configuration

Select WAN service type:

○ PPP over Ethernet (PPPoE)

○ IP over Ethernet

● Bridging

□ Allow as IGMP Multicast Source

□ Allow as MLD Multicast Source

Enter Service Description: br_eth0

For tagged service, enter valid 802.1P Priority and 802.1Q VLAN ID.
For untagged service, set -1 to both 802.1P Priority and 802.1Q VLAN ID.

Enter 802.1P Priority [0-7]: -1

Enter 802.1Q VLAN ID [0-4094]: -1

Select VLAN TPID: Select a TPID

Allow as IGMP Multicast Source

Click to allow use of this bridge WAN interface as IGMP multicast source.

Allow as MLD Multicast Source

Click to allow use of this bridge WAN interface as MLD multicast source.

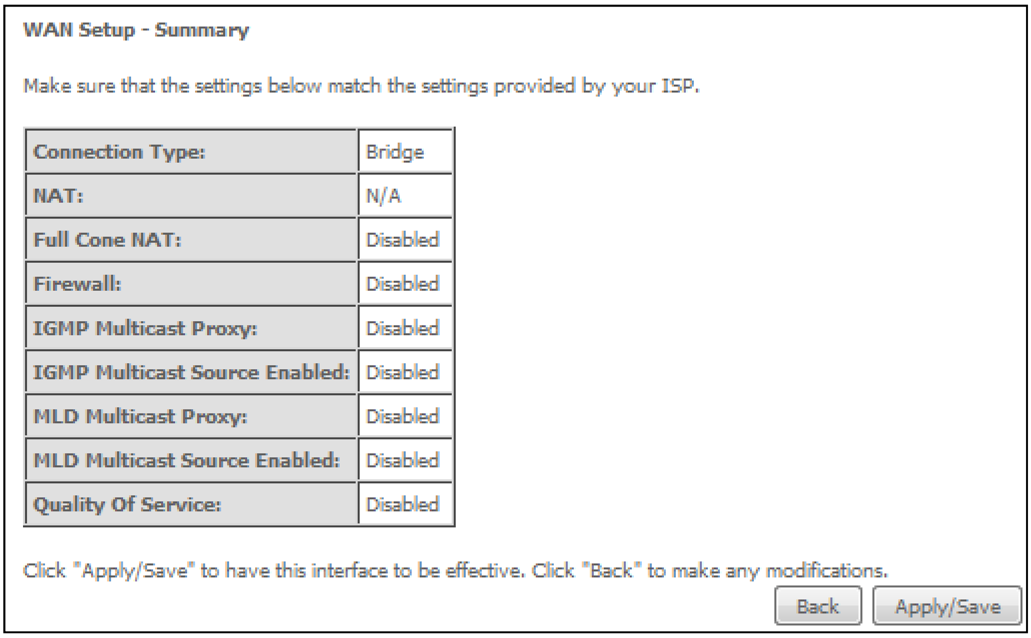
*

For tagged service, enter valid 802.1P Priority and 802.1Q VLAN ID.

For untagged service, set -1 to both 802.1P Priority and 802.1Q VLAN ID.

For VLAN tag Q-in-Q service, select the TPID from the list.

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.



WAN Setup - Summary

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

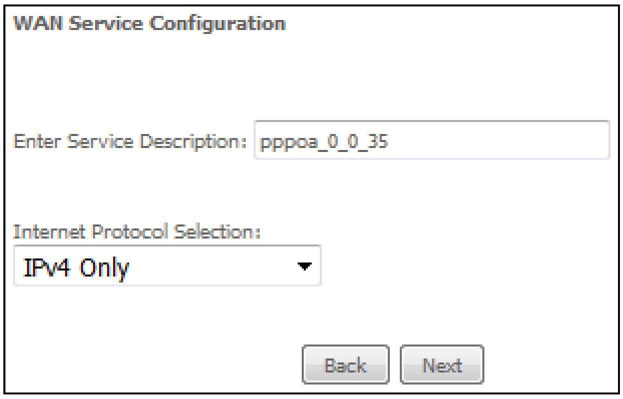
Connection Type:	Bridge
NAT:	N/A
Full Cone NAT:	Disabled
Firewall:	Disabled
IGMP Multicast Proxy:	Disabled
IGMP Multicast Source Enabled:	Disabled
MLD Multicast Proxy:	Disabled
MLD Multicast Source Enabled:	Disabled
Quality Of Service:	Disabled

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

After clicking **Apply/Save**, the new service should appear on the main screen.

NOTE: If this bridge connection is your only WAN service, the NexusLink 3240 will be inaccessible for remote management or technical support from the WAN.

F2.4 PPP over ATM (PPPoA)



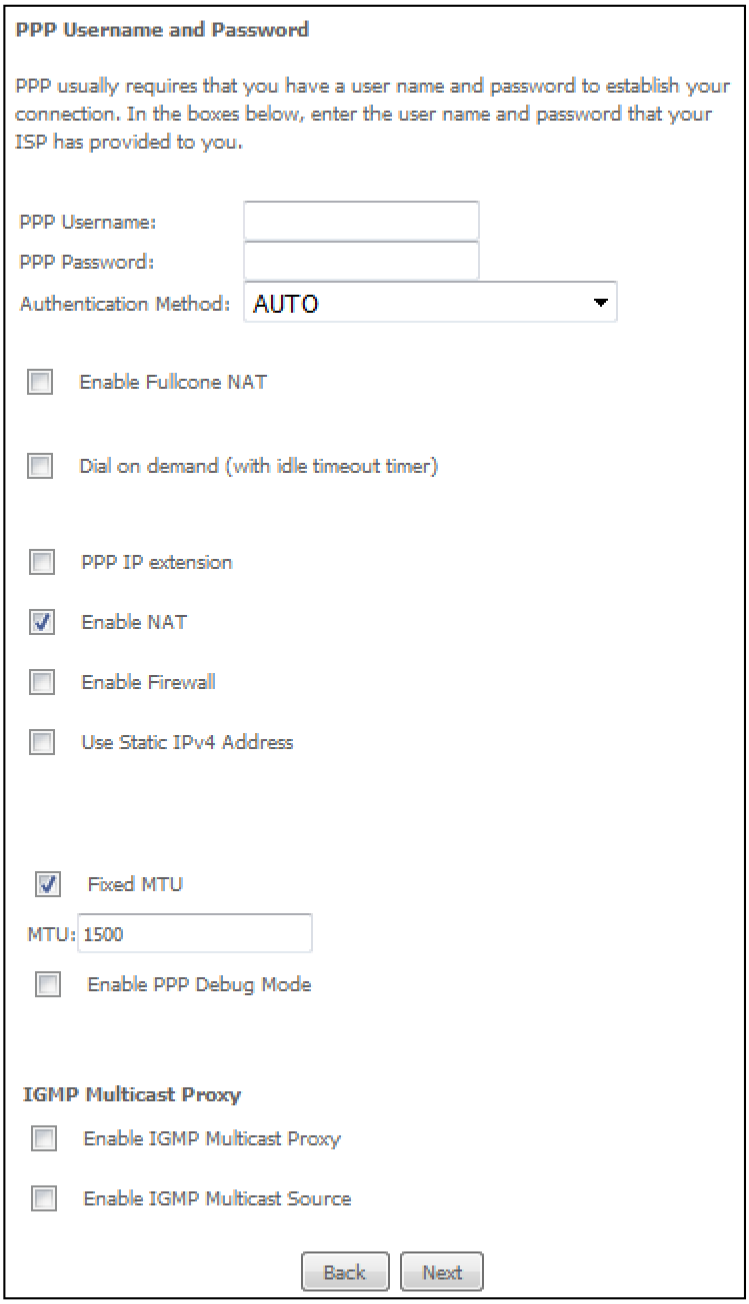
WAN Service Configuration

Enter Service Description: pppoa_0_0_35

Internet Protocol Selection: IPv4 Only

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 Username and Password

PPP usually requires that you have a user name and password to establish your connection. In the boxes below, enter the user name and password that your ISP has provided to you.

PPP Username:

PPP Password:

Authentication Method: AUTO

□ Enable Fullcone NAT

□ Dial on demand (with idle timeout timer)

□ PPP IP extension

☑ Enable NAT

□ Enable Firewall

□ Use Static IPv4 Address

☑ Fixed MTU

MTU: 1500

□ Enable PPP Debug Mode

IGMP Multicast Proxy

□ Enable IGMP Multicast Proxy

□ Enable IGMP Multicast Source

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.)

KEEP ALIVE INTERVAL

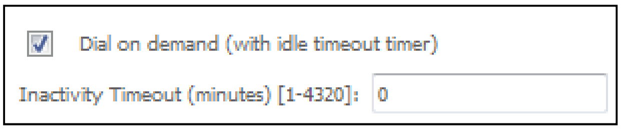
This option configures the interval between each PPP LCP request and the amount of time to wait for the PPP server to reply to the LCP request. If the time expired on all requests, the current PPP session would be dropped.

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 3240 can be configured to disconnect if there is no activity for a period of time by selecting the **Dial on demand** checkbox ☑. You must also enter an inactivity timeout period in the range of 1 to 4320 minutes.



☑ Dial on demand (with idle timeout timer)

Inactivity Timeout (minutes) [1-4320]: 0

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 ☑. 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 ☑ should not be selected to free up system resources for better performance.

ENABLE FIREWALL

If this checkbox ☑ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox ☑ 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 ☑. 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 Section 3.2.

Fixed MTU

Fixed 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.

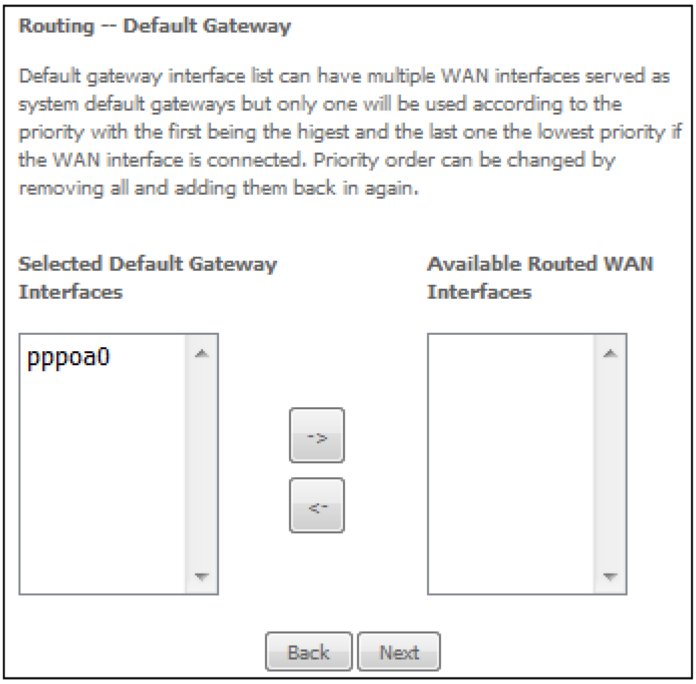
ENABLE IGMP MULTICAST PROXY

Tick the checkbox ☑ 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 IGMP Multicast Source

Enable the WAN interface to be used as IGMP multicast source.

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



Routing -- Default Gateway

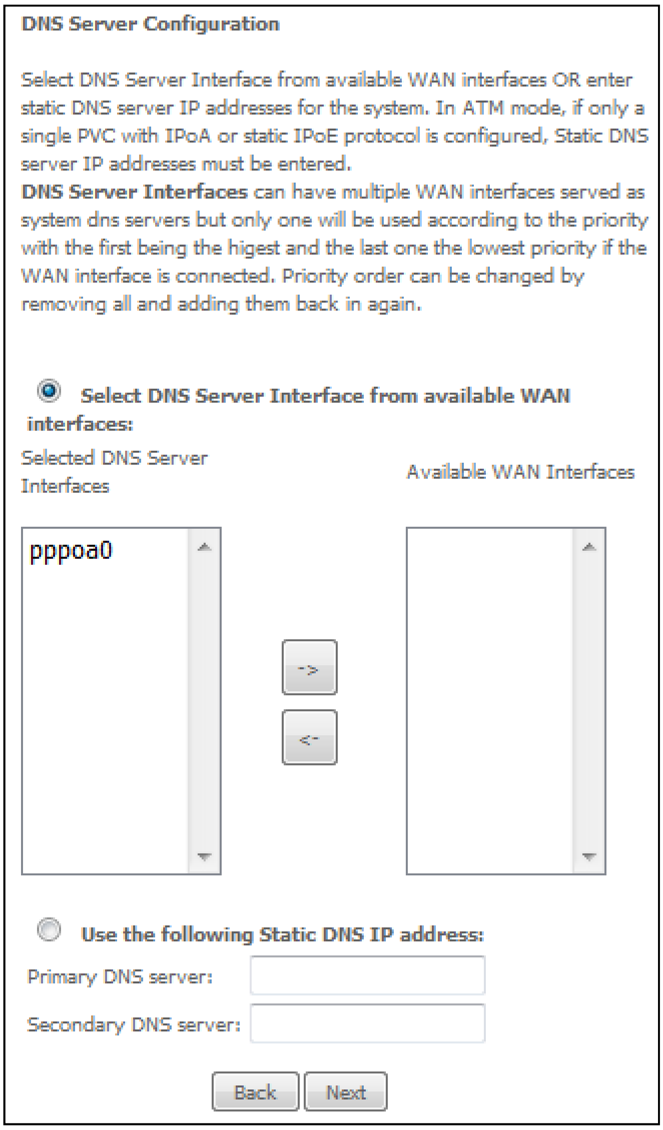
Default gateway interface list can have multiple WAN interfaces served as system default gateways but only one will be used according to the priority with the first being the higest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

Selected Default Gateway Interfaces: pppoa0

Available Routed WAN Interfaces:

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.



DNS Server Configuration

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.
DNS Server Interfaces can have multiple WAN interfaces served as system dns servers but only one will be used according to the priority with the first being the higest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

● **Select DNS Server Interface from available WAN interfaces:**

Selected DNS Server Interfaces: pppoa0

Available WAN Interfaces:

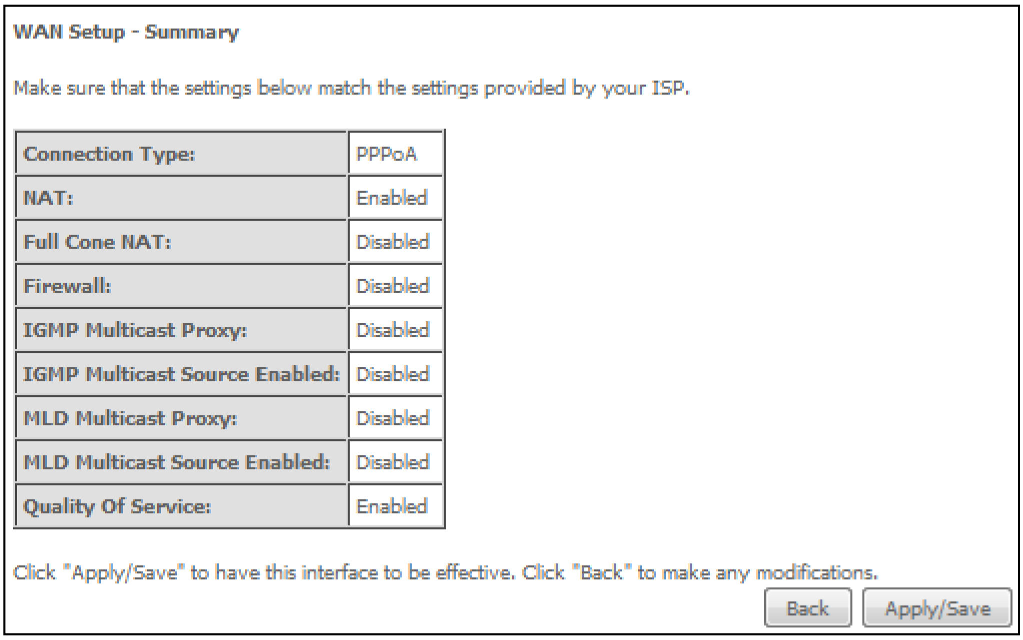
○ **Use the following Static DNS IP address:**

Primary DNS server:

Secondary DNS server:

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.



WAN Setup - Summary

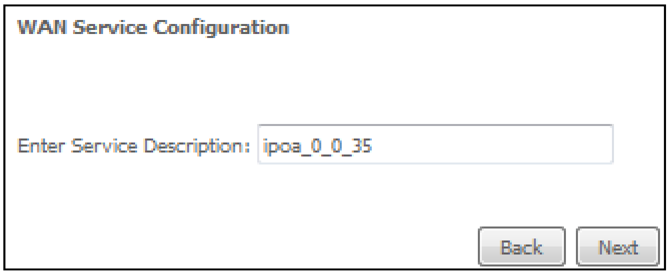
Make sure that the settings below match the settings provided by your ISP.

Connection Type:	PPPoA
NAT:	Enabled
Full Cone NAT:	Disabled
Firewall:	Disabled
IGMP Multicast Proxy:	Disabled
IGMP Multicast Source Enabled:	Disabled
MLD Multicast Proxy:	Disabled
MLD Multicast Source Enabled:	Disabled
Quality Of Service:	Enabled

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

After clicking **Apply/Save**, the new service should appear on the main screen.

F2.5 IP over ATM (IPoA)

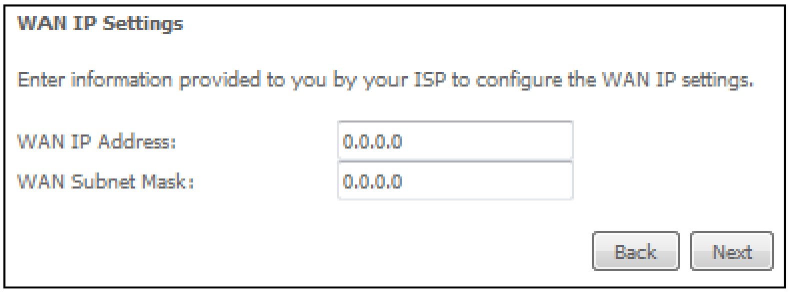


WAN Service Configuration

Enter Service Description: ipoa_0_0_35

STEP 1: Click **Next** to continue.

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



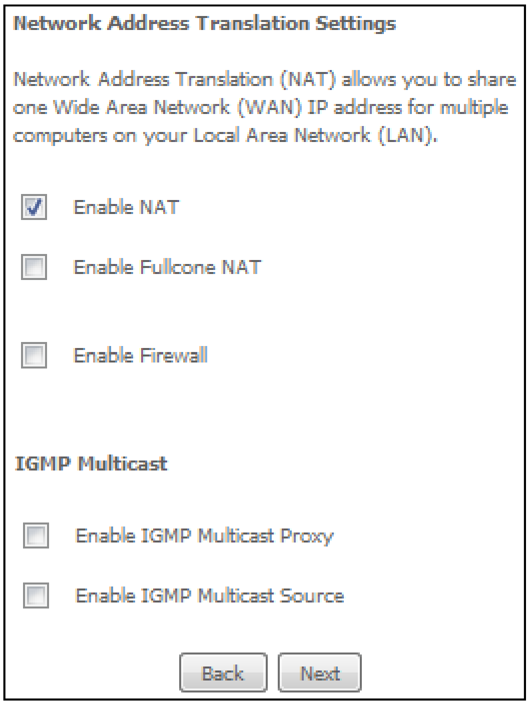
WAN IP Settings

Enter information provided to you by your ISP to configure the WAN IP settings.

WAN IP Address: 0.0.0.0

WAN Subnet Mask: 0.0.0.0

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



Network Address Translation Settings

Network Address Translation (NAT) allows you to share one Wide Area Network (WAN) IP address for multiple computers on your Local Area Network (LAN).

☑ Enable NAT

□ Enable Fullcone NAT

□ Enable Firewall

IGMP Multicast

□ Enable IGMP Multicast Proxy

□ Enable IGMP Multicast Source

ENABLE NAT

If the LAN is configured with a private IP address, the user should select this checkbox ☑. 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 ☑ 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 ☑ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox ☑ should not be selected so as to free up system resources for better performance.

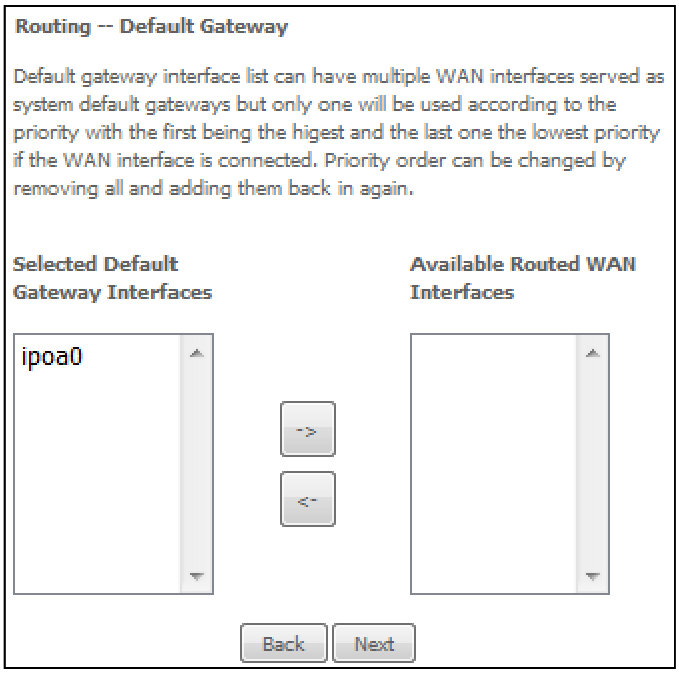
ENABLE IGMP MULTICAST PROXY

Tick the checkbox ☑ 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 IGMP Multicast Source

Enable the WAN interface to be used as IGMP multicast source.

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



Routing -- Default Gateway

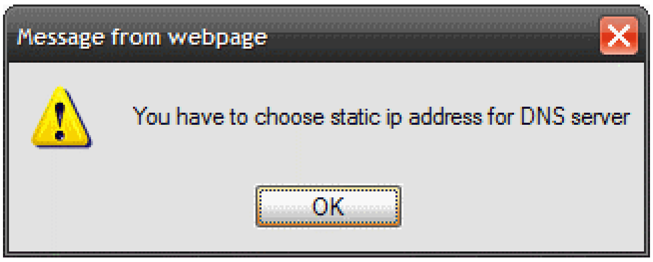
Default gateway interface list can have multiple WAN interfaces served as system default gateways but only one will be used according to the priority with the first being the higest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

Selected Default Gateway Interfaces: ipoa0

Available Routed WAN Interfaces:

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

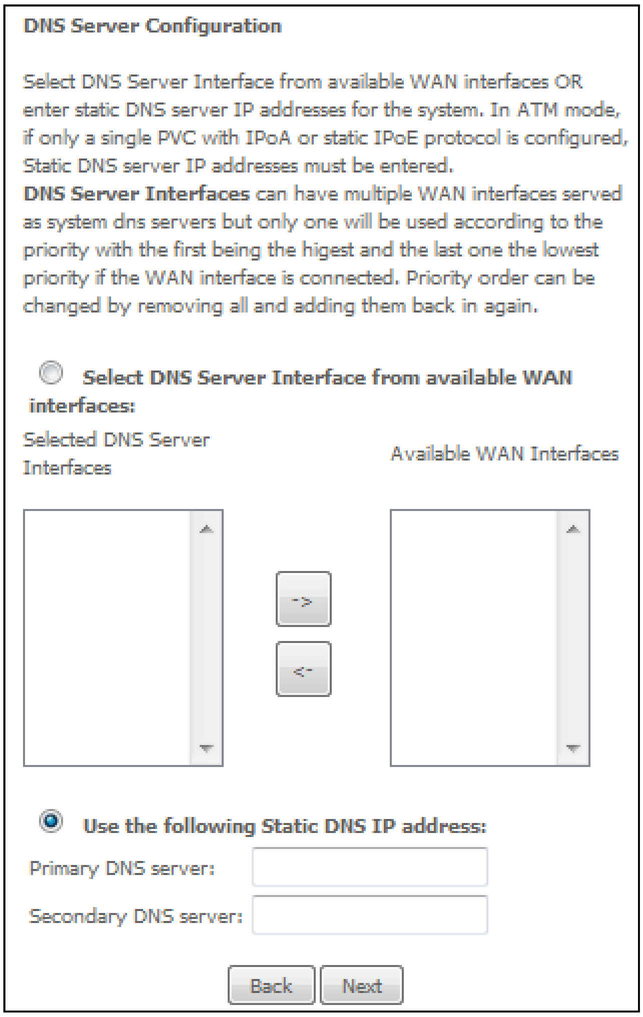
NOTE: If the DHCP server is not enabled on another WAN interface then the following notification will be shown before the next screen.



Message from webpage

You have to choose static ip address for DNS server

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.



DNS Server Configuration

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.
DNS Server Interfaces can have multiple WAN interfaces served as system dns servers but only one will be used according to the priority with the first being the higest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

○ **Select DNS Server Interface from available WAN interfaces:**

Selected DNS Server Interfaces

Available WAN Interfaces

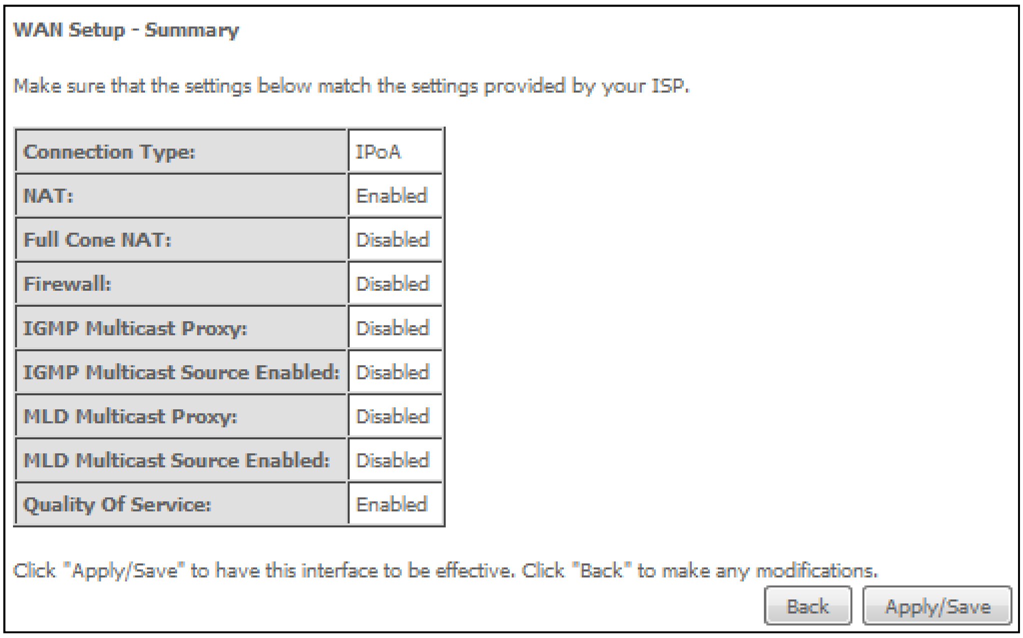
● **Use the following Static DNS IP address:**

Primary DNS server:

Secondary DNS server:

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.



WAN Setup - Summary

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

Connection Type:	IPoA
NAT:	Enabled
Full Cone NAT:	Disabled
Firewall:	Disabled
IGMP Multicast Proxy:	Disabled
IGMP Multicast Source Enabled:	Disabled
MLD Multicast Proxy:	Disabled
MLD Multicast Source Enabled:	Disabled
Quality Of Service:	Enabled

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

After clicking **Apply/Save**, the new service should appear on the main screen.