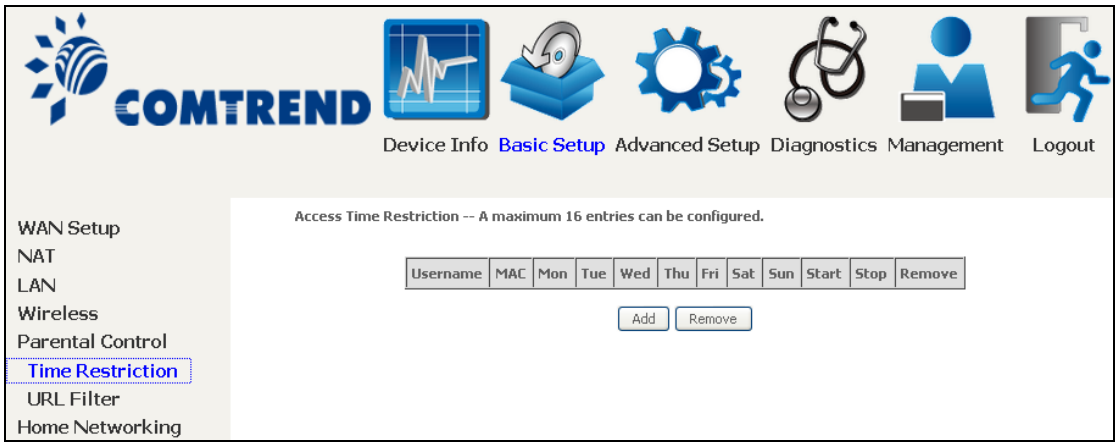
5.5 Parental Control

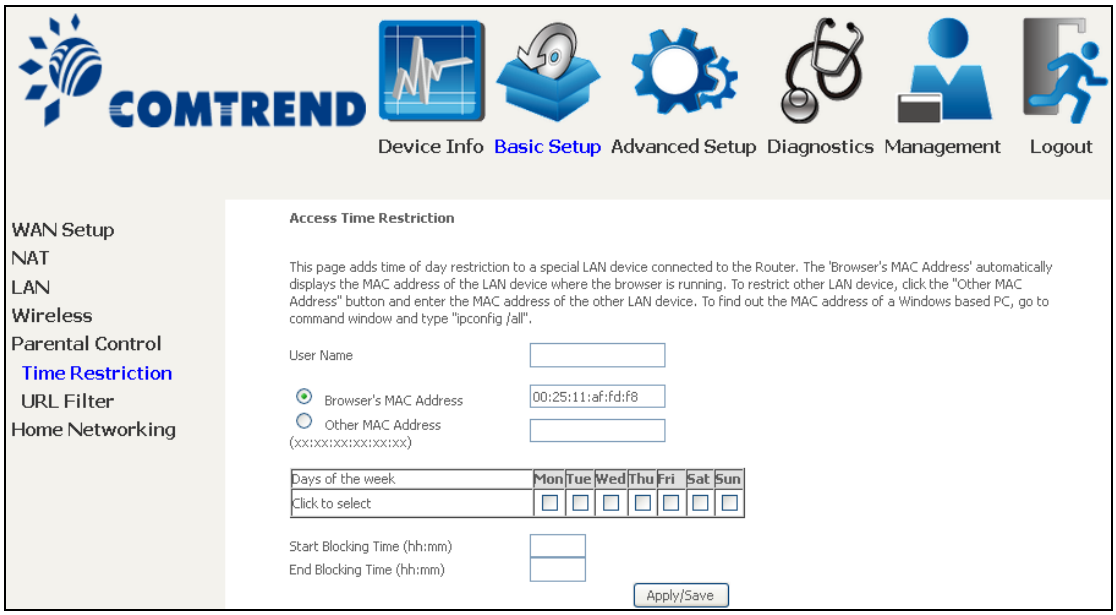
This selection provides WAN access control functionality.

5.5.1 Time Restriction

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



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



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

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

5.5.2 URL Filter

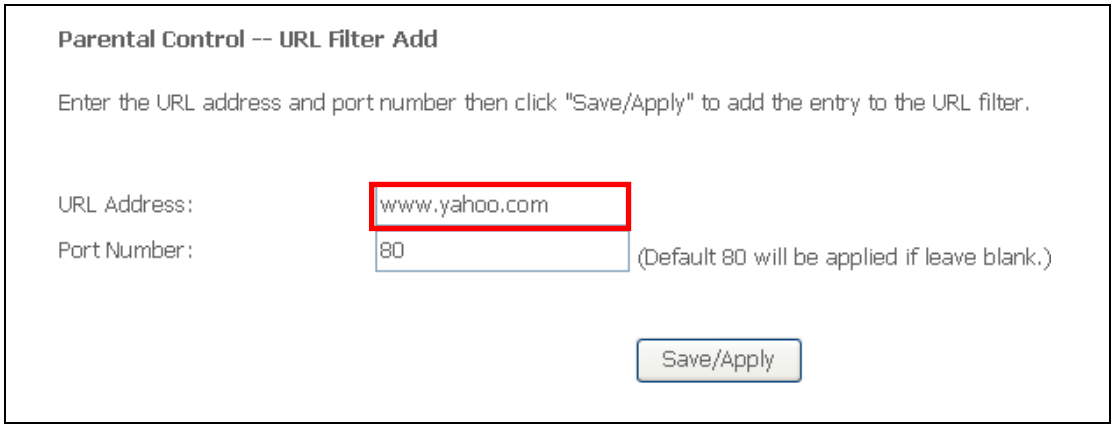
This screen allows for the creation of a filter rule for access rights to websites based on their URL address and port number.

Select URL List Type: Exclude or Include.

Tick the **Exclude** radio button to deny access to the websites listed.

Tick the **Include** radio button to restrict access to only those listed websites.

Then click **Add** to display the following screen.



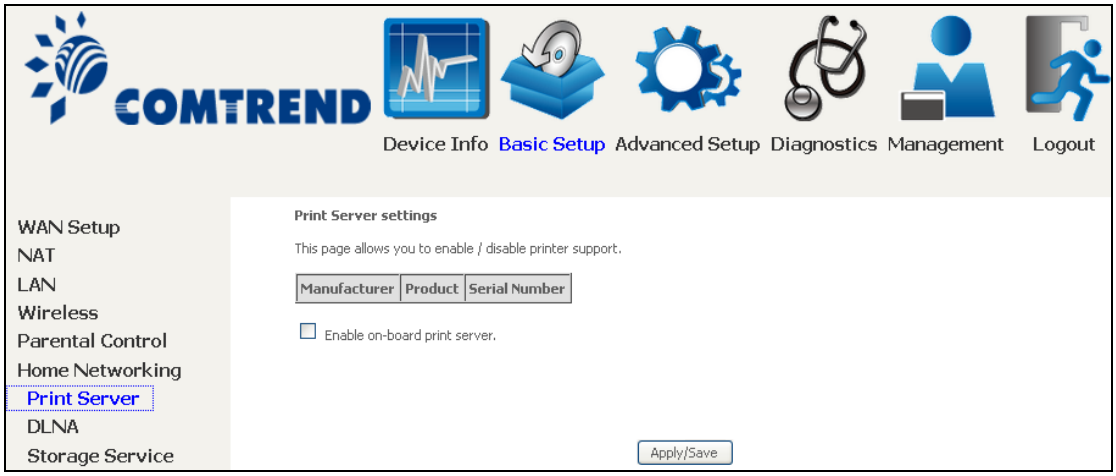
Enter the URL address and port number then click **Save/Apply** to add the entry to the URL filter. URL Addresses begin with “www”, as shown in this example.

A maximum of 100 entries can be added to the URL Filter list.

5.6 Home networking

5.6.1 Print Server

This page allows you to enable or disable printer support.

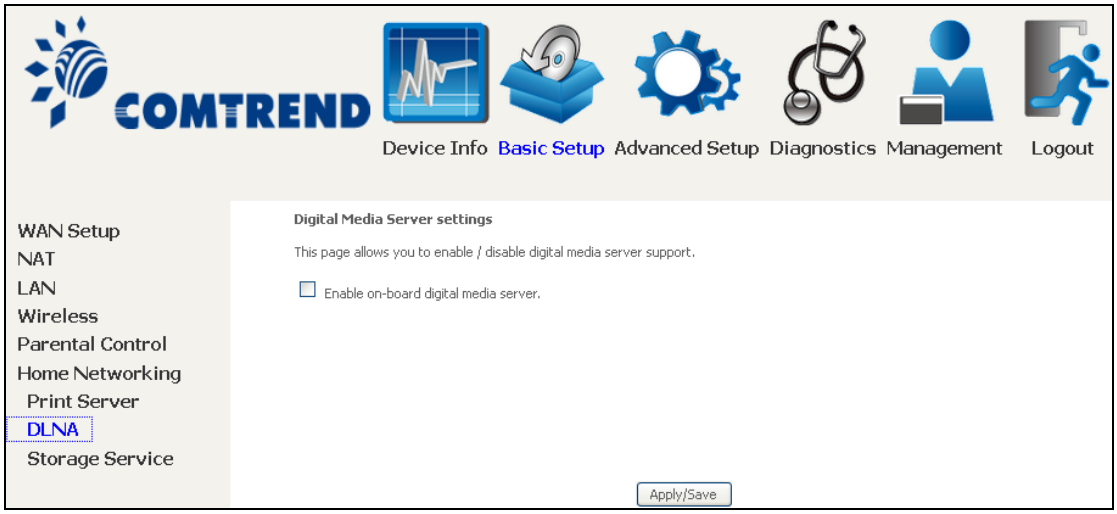


Please reference **Appendix G** to see the procedure for enabling the Printer Server.

5.6.2 DLNA

Enabling DLNA allows users to share digital media, like pictures, music and video, to other LAN devices from the digital media server.

Insert USB drive to the USB host port on the back of router. Modify media library path to the corresponding path of the USB drive and click Apply/Save to enable the DLNA media server.



5.6.3 Storage Service

Enabling Samba service allows the user to share files on the storage device. Different levels of user access can be configured after samba security mode is enabled. This page also displays storage devices attached to USB host.

Display after storage device attached (for your reference).

Volumename	FileSystem	Total Space	Free Space	Actions
usb1_1	fat	30517 MB	19419 MB	Safely remove

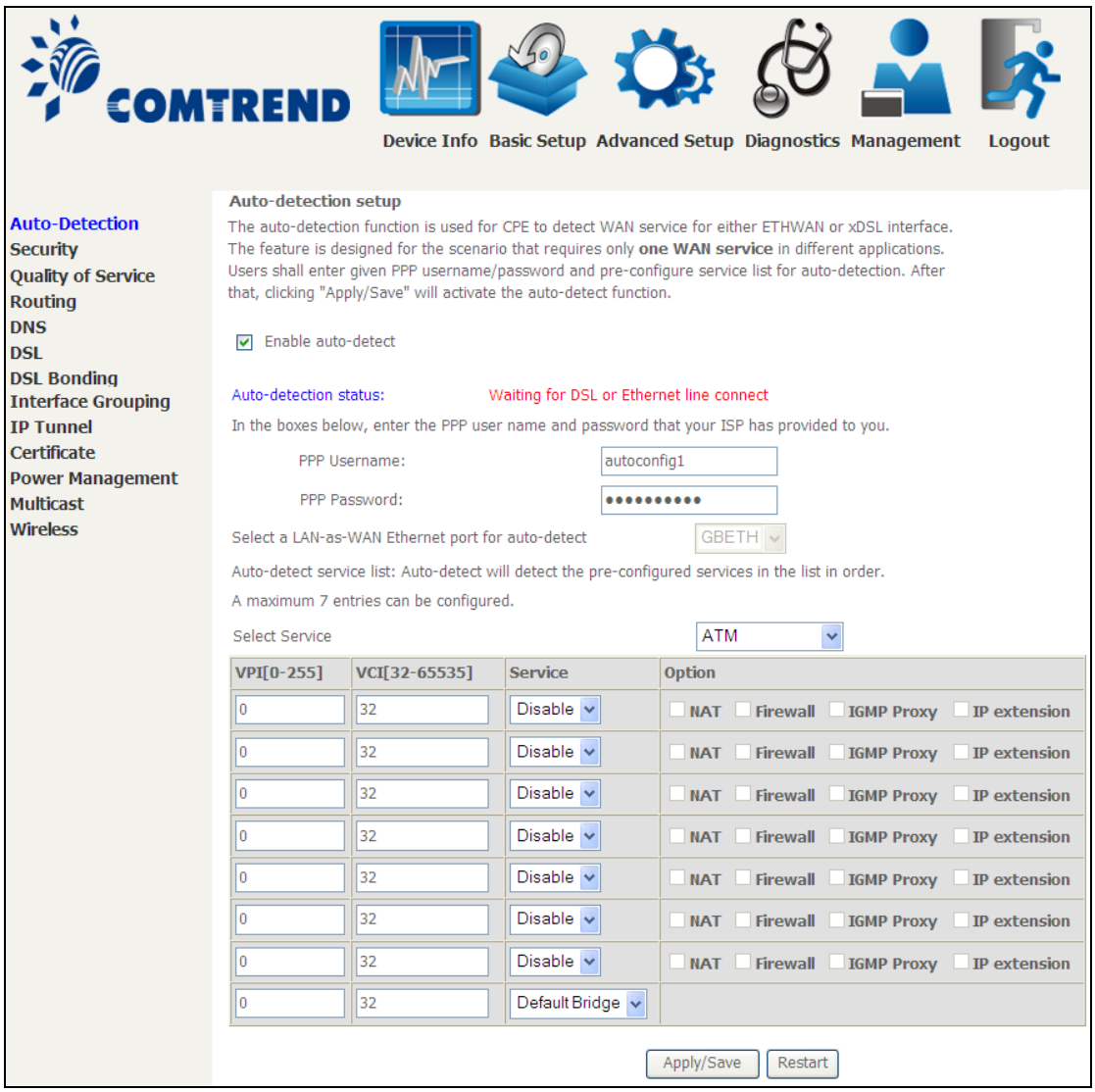
Chapter 6 Advanced Setup

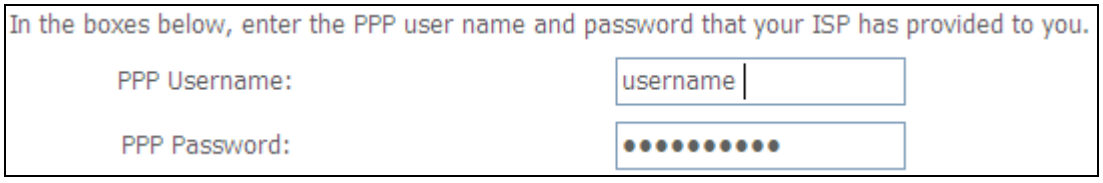
You can reach this page by clicking on the following icon located at the top of the screen.

6.1 Auto-detection setup

The auto-detection function is used for CPE to detect WAN service for either ETHWAN or xDSL interface. The feature is designed for the scenario that requires only **one WAN service** in different applications.

The Auto Detection page simply provides a checkbox allowing users to enable or disable the feature. Check the checkbox to display the following configuration options.

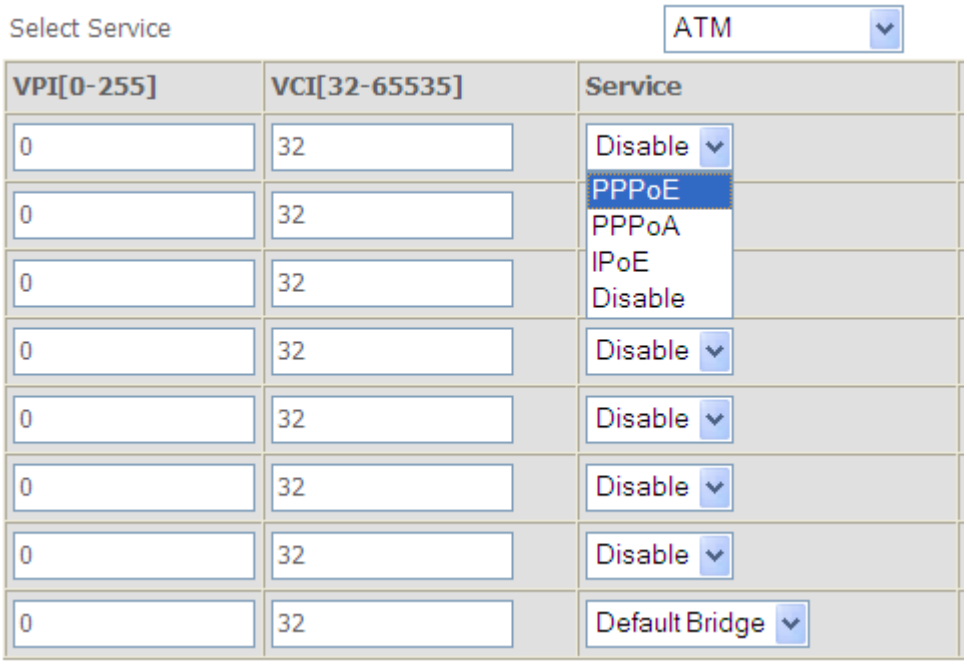




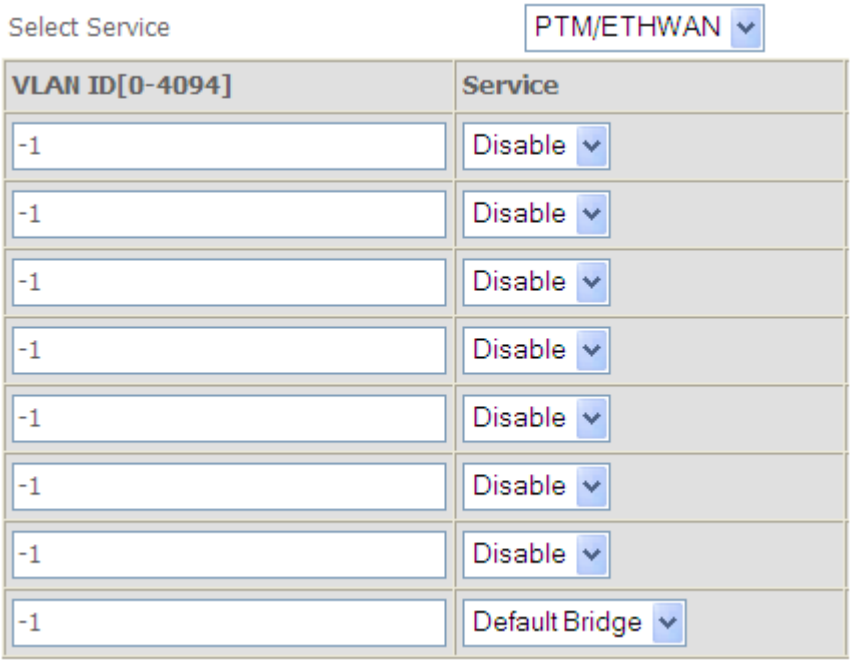
Enter the PPP username/password given by your service provider for PPP service detection.

Select a LAN-as-WAN Ethernet port for auto-detect:

Select the Ethernet Port that will be used as ETHWAN during auto-detection.



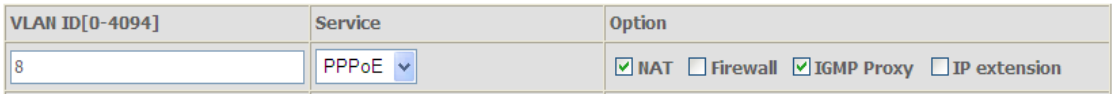
WAN services list for ATM mode: A maximum of 7 WAN services with corresponding PVC are required to be configured for ADSL ATM mode. The services will be detected in order. Users can modify the 7 pre-configured services and select **disable** to ignore any of those services to meet their own requirement and also reduce the detection cycle.



WAN services list for PTM mode: A maximum of 7 WAN services with corresponding VLAN ID (-1 indicates no VLAN ID is required for the service) are required to be configured for ADSL/VDSL PTM mode and ETHWAN. The services will be detected in order. Users can modify the 7 pre-configured services and select **disable** to ignore any of the services to meet their own requirement and also reduce the detection cycle.

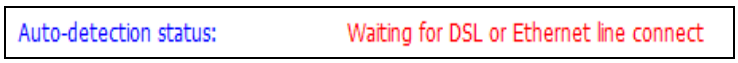
Click "Apply/Save" to activate the auto-detect function.

Options for each WAN service: These options are selectable for each WAN service. Users can pre-configure both WAN services and other provided settings to meet their deployed requirements.



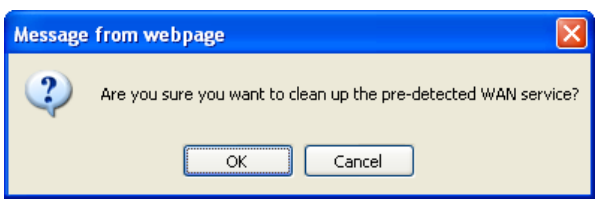
Auto Detection status and Restart

The Auto-detection status is used to display the real time status of the Auto-detection feature.



The **Restart** button is used to detect all the WAN services that are either detected by the auto-detection feature or configured manually by users.

The following window will pop up upon clicking the **Restart** button. Click the **OK** button to proceed.



Auto Detection notice

Note: The following description concerning ETHWAN is for multiple LAN port devices only.

1) This feature will automatically detect one WAN service only. If customers require multiple WAN services, manual configuration is required.
2) If a physical ETHWAN port is detected, the Auto Detection for ETHWAN will be fixed on the physical ETHWAN port and cannot be configured for any LAN port; if the physical ETHWAN port is not detected, the Auto Detection for ETHWAN will be configured to the 4th LAN port by default and allows it to be configured for any LAN port as well.
3) For cases in which both the DSL port and ETHWAN port are plugged in at the same time, the DSL WAN will have priority over ETHWAN. For example, the ETHWAN port is plugged in with a WAN service detected automatically and then the DSL port is plugged in and linked up. The Auto Detection feature will clear the WAN service for ETHWAN and re-detect the WAN service for DSL port.
4) If none of the pre-configured services are detected, a Bridge service will be created.

6.2 Security

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

6.2.1 IP Filtering

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

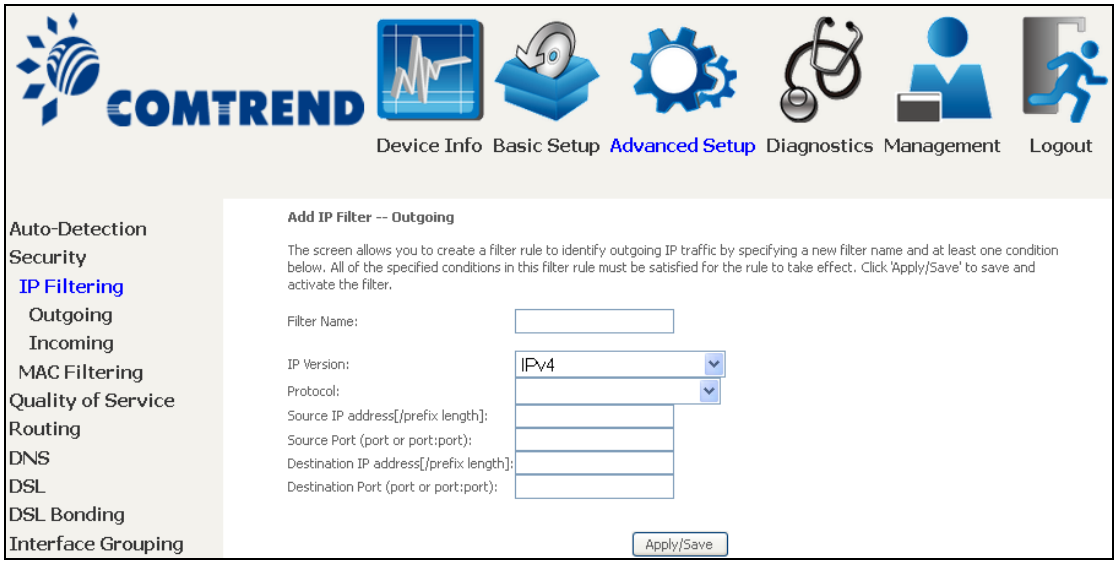
NOTE:	This function is not available when in bridge mode. Instead, MAC Filtering performs a similar function.

OUTGOING IP FILTER

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

To add a filter (to block some outgoing IP traffic), click the **Add** button.

On the following screen, enter your filter criteria and then click **Apply/Save**.

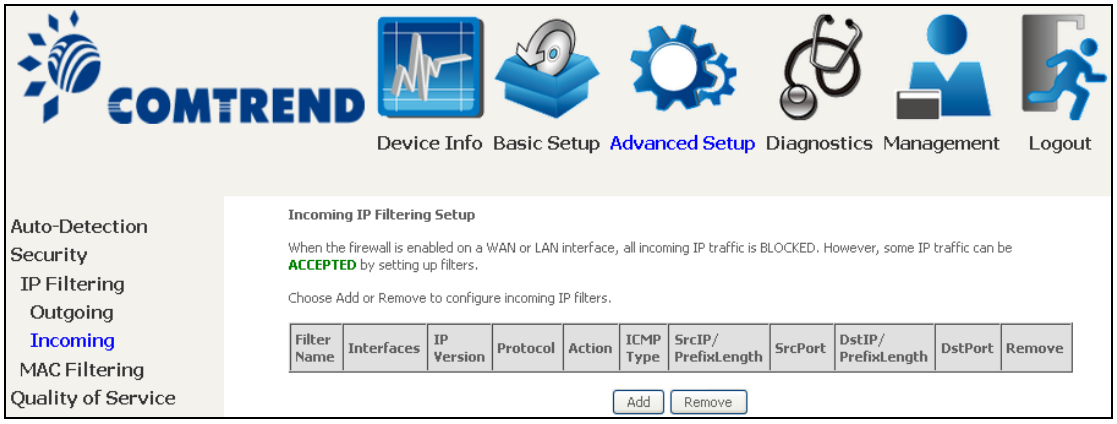


Consult the table below for field descriptions.

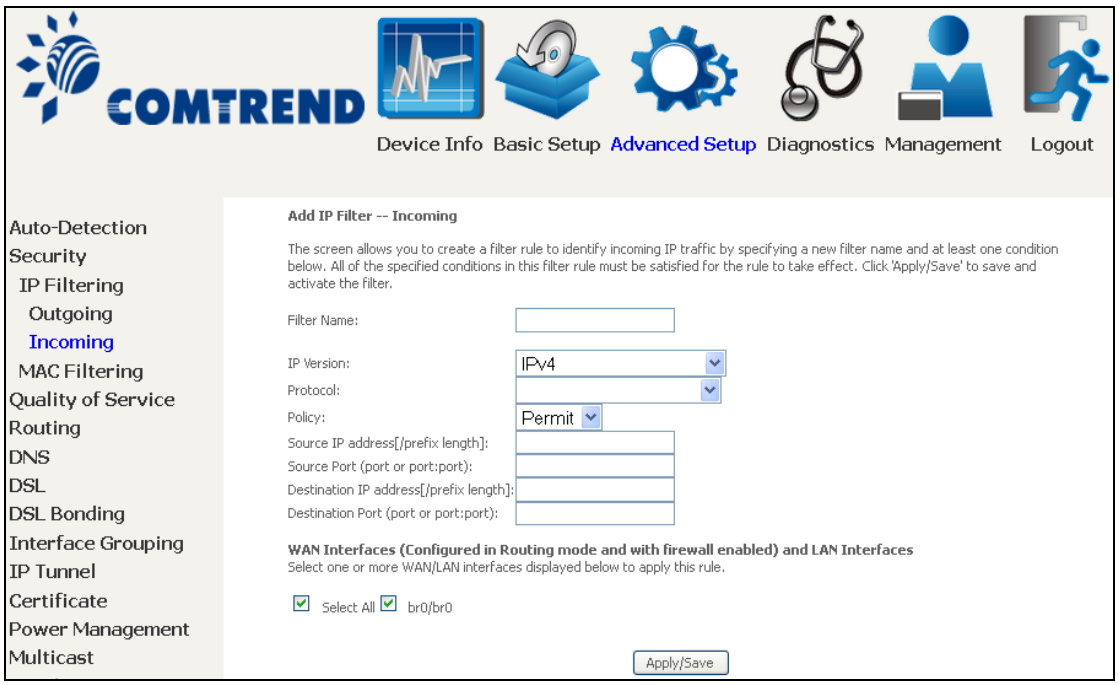
Field	Description
Filter Name	The filter rule label
IP Version	Select from the drop down menu.
Protocol	TCP, TCP/UDP, UDP, or ICMP.
Source IP address	Enter source IP address.
Source Port (port or port:port)	Enter source port number or range.
Destination IP address	Enter destination IP address.
Destination Port (port or port:port)	Enter destination port number or range.

INCOMING IP FILTER

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



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



Consult the table below for field descriptions.

Field	Description
Filter Name	The filter rule label.
IP Version	Select from the drop down menu.
Protocol	TCP, TCP/UDP, UDP, or ICMP.
Policy	Permit/Drop packets specified by the firewall rule.
Source IP address	Enter source IP address.
Source Port (port or port:port)	Enter source port number or range.
Destination IP address	Enter destination IP address.
Destination Port (port or port:port)	Enter destination port number or range.

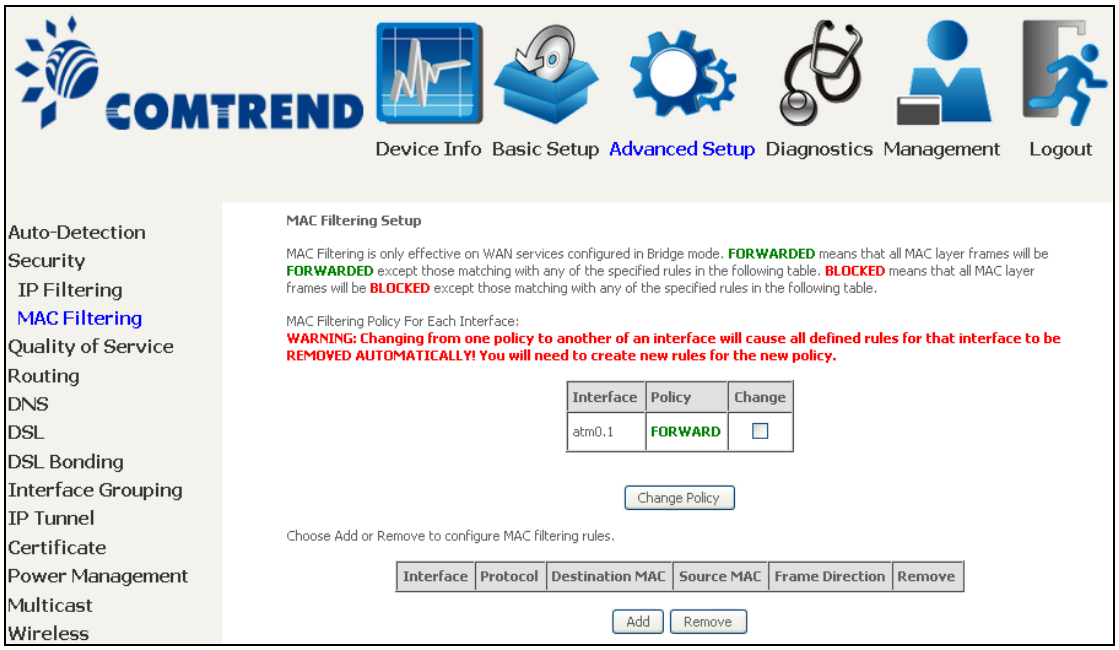
At the bottom of this screen, select the WAN and LAN Interfaces to which the filter rule will apply. You may select all or just a subset. WAN interfaces in bridge mode or without firewall enabled are not available.

6.2.2 MAC Filtering

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

Each network device has a unique 48-bit MAC address. This can be used to filter (block or forward) packets based on the originating device. MAC filtering policy and rules for the NexusLink 3112u can be set according to the following procedure.

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



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

Click **Save / Apply** to save and activate the filter rule.

Consult the table below for detailed field descriptions.

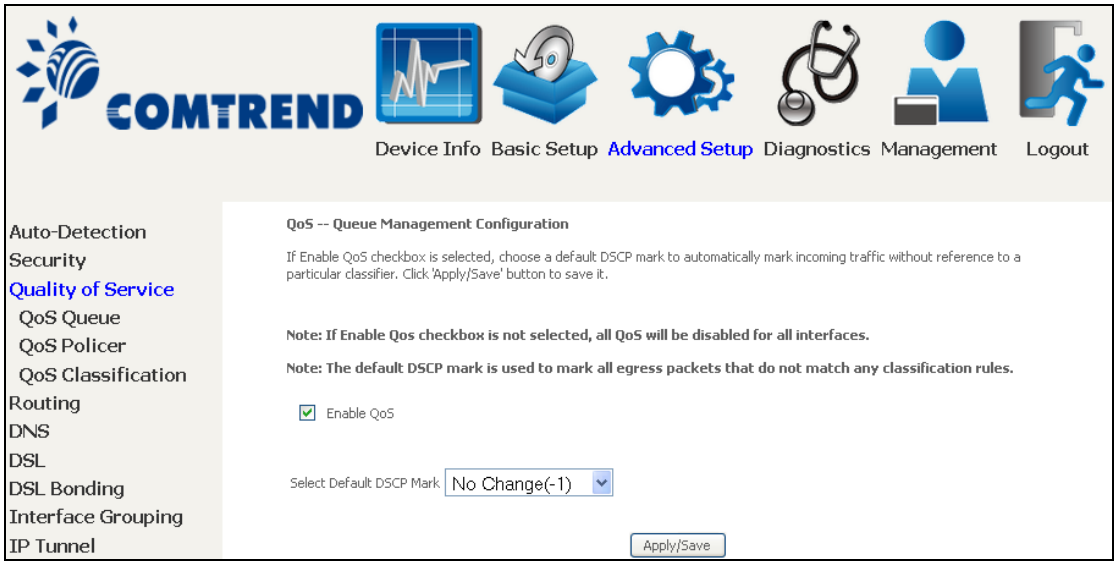
Field	Description
Protocol Type	PPPoE, IPv4, IPv6, AppleTalk, IPX, NetBEUI, IGMP
Destination MAC Address	Defines the destination MAC address
Source MAC Address	Defines the source MAC address
Frame Direction	Select the incoming/outgoing packet interface
WAN Interfaces	Applies the filter to the selected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

6.3 Quality of Service (QoS)

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

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

Click Apply/Save to activate QoS.



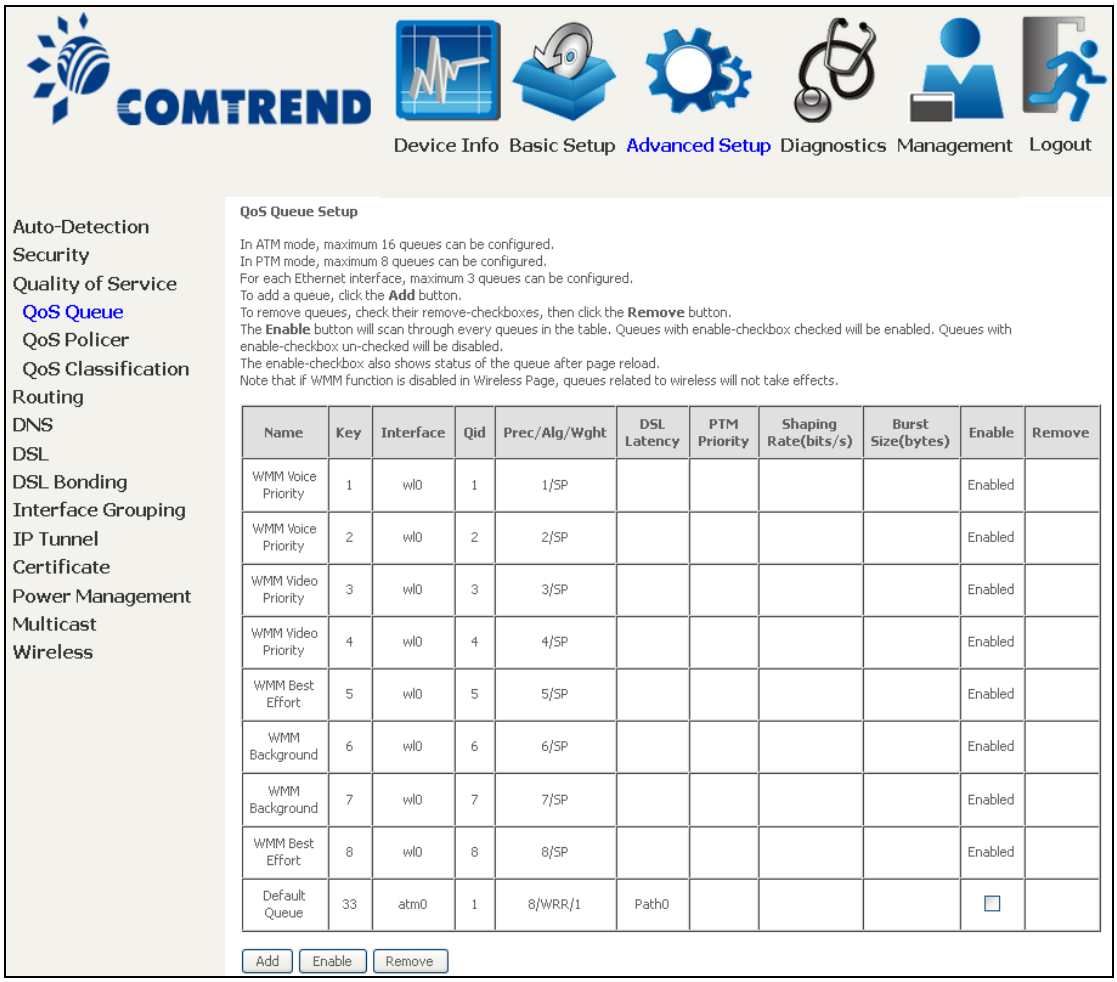
QoS and DSCP Mark are defined as follows:
Quality of Service (QoS): This provides different priority to different users or data flows, or guarantees a certain level of performance to a data flow in accordance with requests from Queue Prioritization.

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

6.3.1 QoS Queue Setup

Configure queues with different priorities to be used for QoS setup.

In ATM mode, maximum 16 queues can be configured.
In PTM mode, maximum 8 queues can be configured.
For each Ethernet interface, maximum 3 queues can be configured.



To add a queue, click the **Add** button.

To remove queues, check their remove-checkboxes (for user created queues), then click the **Remove** button.
The **Enable** button will scan through every queues in the table. Queues with enable-checkbox checked will be enabled. Queues with enable-checkbox un-checked will be disabled.

The enable-checkbox also shows status of the queue after page reload.

Note that if WMM function is disabled in Wireless Page, queues related to wireless will not take effect. This function follows the Differentiated Services rule of IP QoS.
You can create a new Queue entry by clicking the **Add** button.
Enable and assign an interface and precedence on the next screen. Click **Save / Reboot** on this screen to activate it.

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

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

Name: Identifier for this Queue entry.

Enable: Enable/Disable the Queue entry.

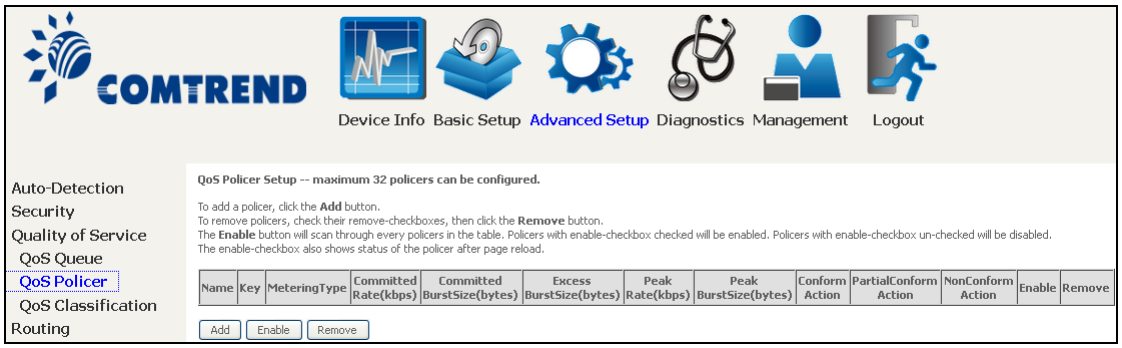
Interface: Assign the entry to a specific network interface (QoS enabled).

6.3.2 QoS Policer

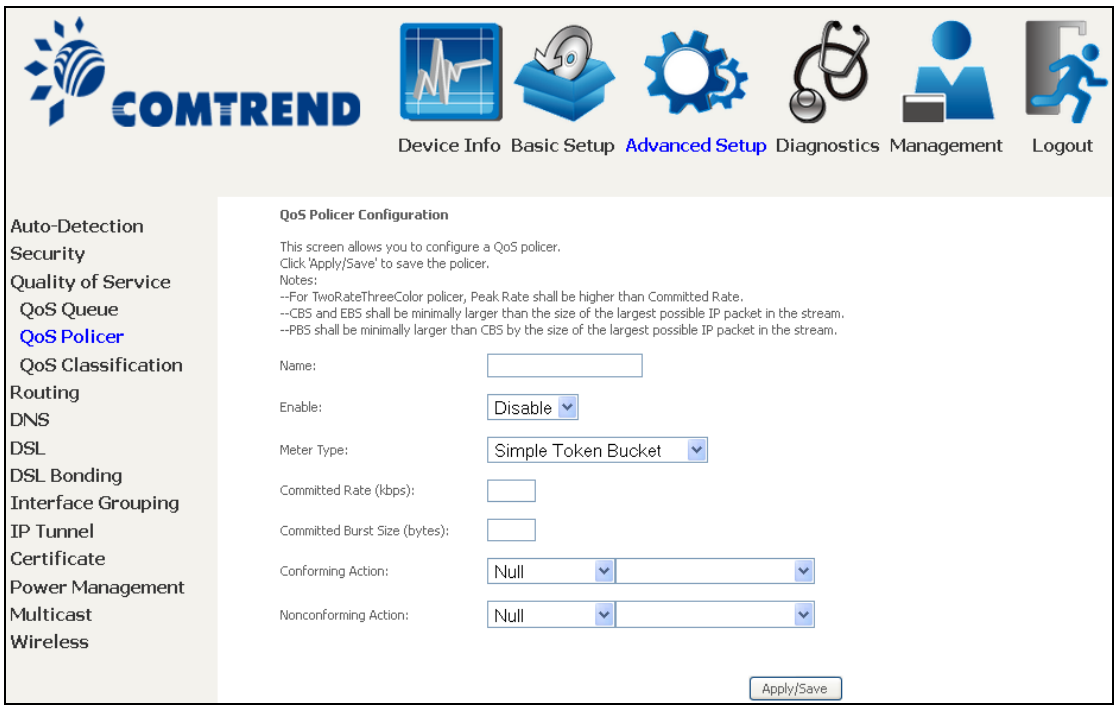
To remove policers, check their remove-checkboxes, then click the **Remove** button.

The **Enable** button will scan through every policers in the table. Policers with enable-checkbox checked will be enabled. Policers with enable-checkbox un-checked will be disabled.

The enable-checkbox also shows status of the policer after page reload.



To add a policer, click the **Add** button.



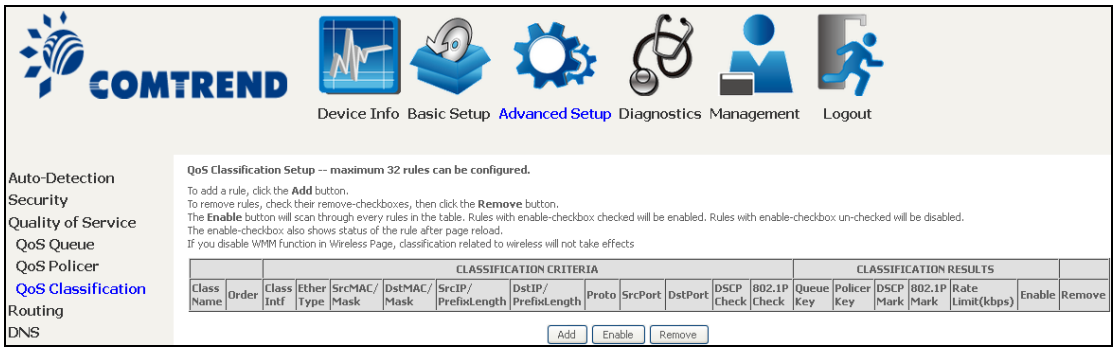
Click **Apply / Save** to save the policer.

Field	Description
Name	Name of this policer rule
Enable	Enable/Disable this policer rule
Meter Type	Meter type used for this policer rule

Field	Description
Committed Rate (kbps)	Defines the rate allowed for committed packets
Committed Burst Size (bytes)	Maximum amount of packets that can be processed by this policer
Conforming Action	Defines action to be taken if packets match this policer
Nonconforming Action	Defines actions to be taken if packets do not match this policer

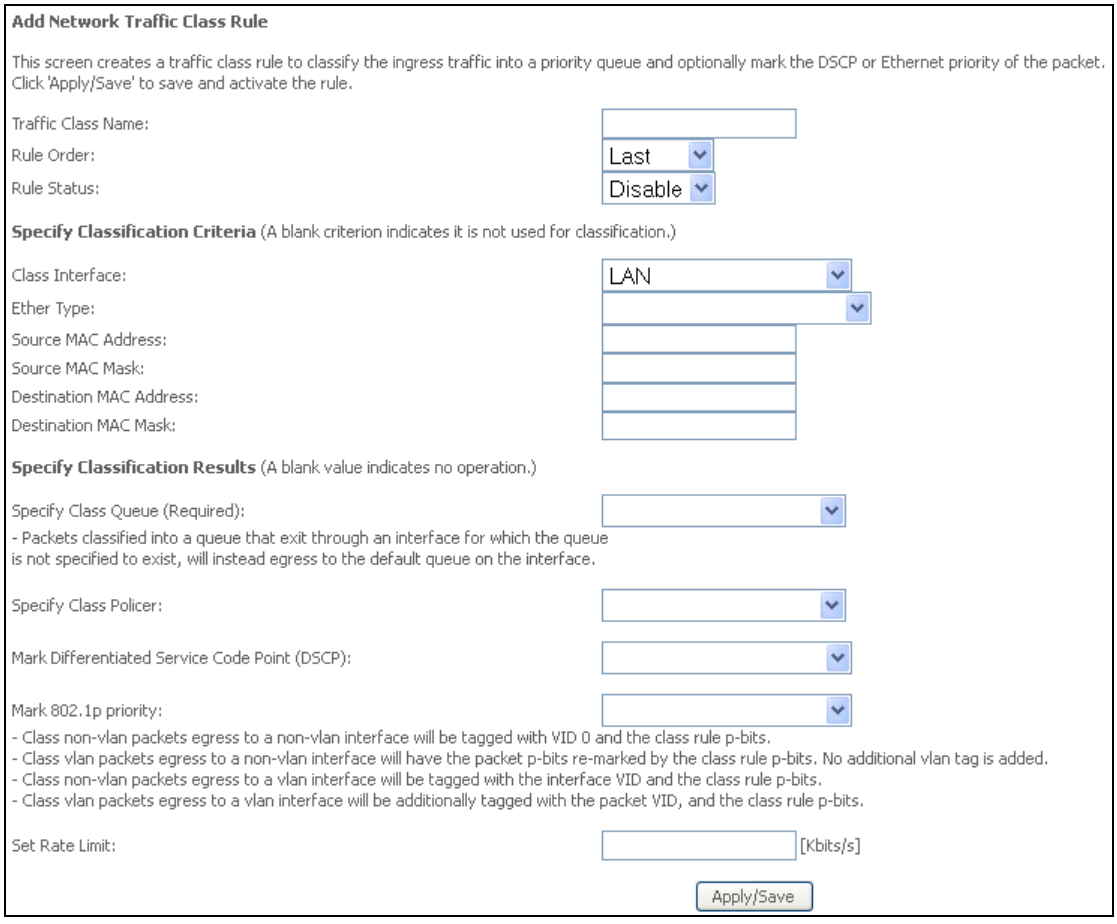
6.3.3 QoS Classification

The network traffic classes are listed in the following table.



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

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



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

Field	Description
Traffic Class Name	Enter a name for the traffic class.
Rule Order	Last is the only option.
Rule Status	Disable or enable the rule.
Classification Criteria	
Class Interface	Select an interface (i.e. Local, eth0-4, wl0)
Ether Type	Set the Ethernet type (e.g. IP, ARP, IPv6).
Source MAC Address	A packet belongs to SET-1, if a binary-AND of its source MAC address with the Source MAC Mask is equal to the binary-AND of the Source MAC Mask and this field.
Source MAC Mask	This is the mask used to decide how many bits are checked in Source MAC Address.
Destination MAC Address	A packet belongs to SET-1 then the result that the Destination MAC Address of its header binary-AND to the Destination MAC Mask must equal to the result that this field binary-AND to the Destination MAC Mask.
Destination MAC Mask	This is the mask used to decide how many bits are checked in Destination MAC Address.
Classification Results	
Specify Class Queue	Packets classified into a queue that exit through an interface for which the queue is not specified to exist, will instead egress to the default queue on the interface.
Specify Class Policer	Packets classified into a policer will be marked based on the conforming action of the policer
Mark Differentiated Service Code Point	The selected Code Point gives the corresponding priority to packets that satisfy the rule.
Mark 802.1p Priority	Select between 0-7. Lower values have higher priority.
Set Rate Limit	The data transmission rate limit in kbps.

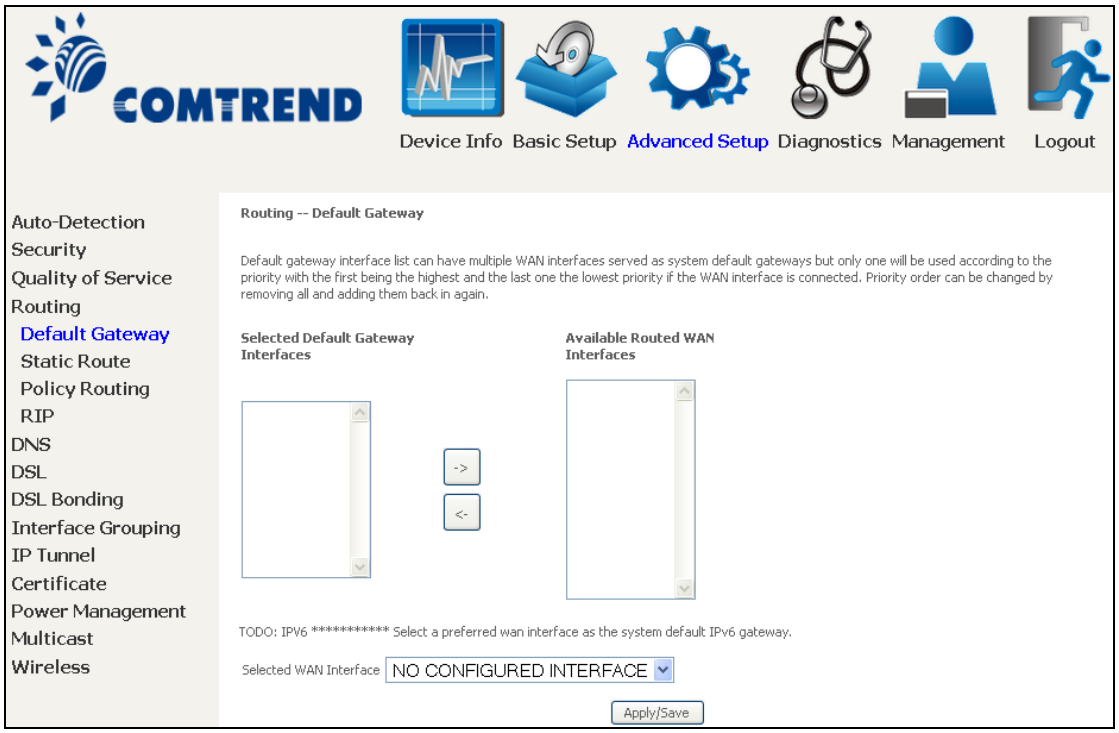
6.4 Routing

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

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

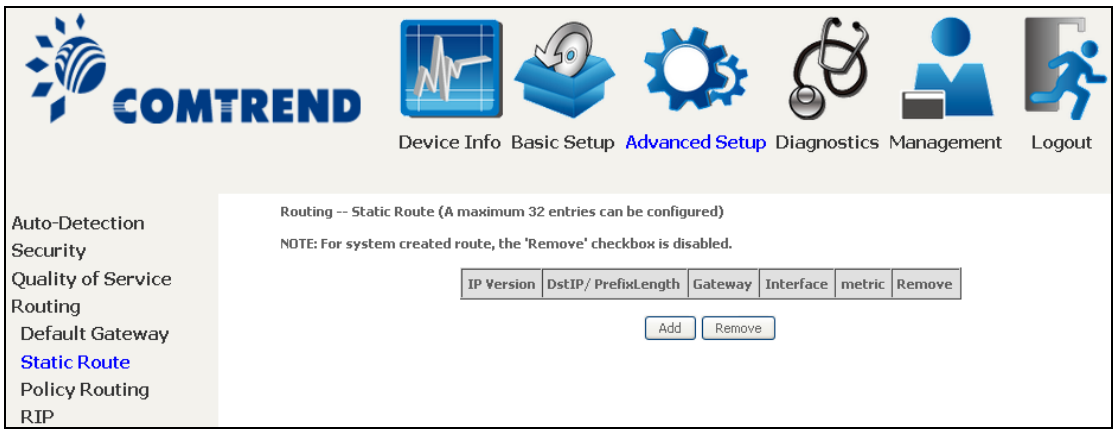
6.4.1 Default Gateway

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 highest 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.

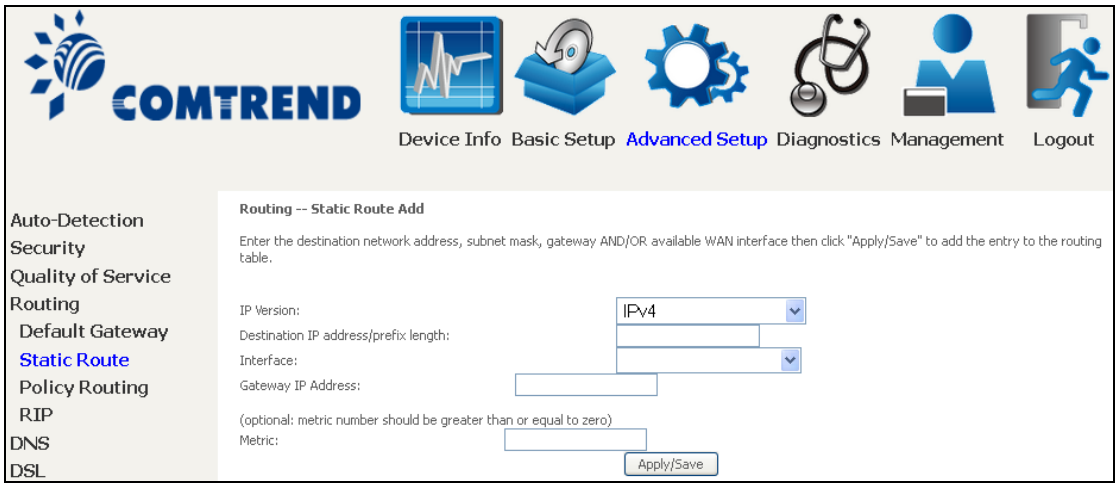


6.4.2 Static Route

This option allows for the configuration of static routes by destination IP.
Click **Add** to create a static route or click **Remove** to delete a static route.



After clicking **Add** the following will display.



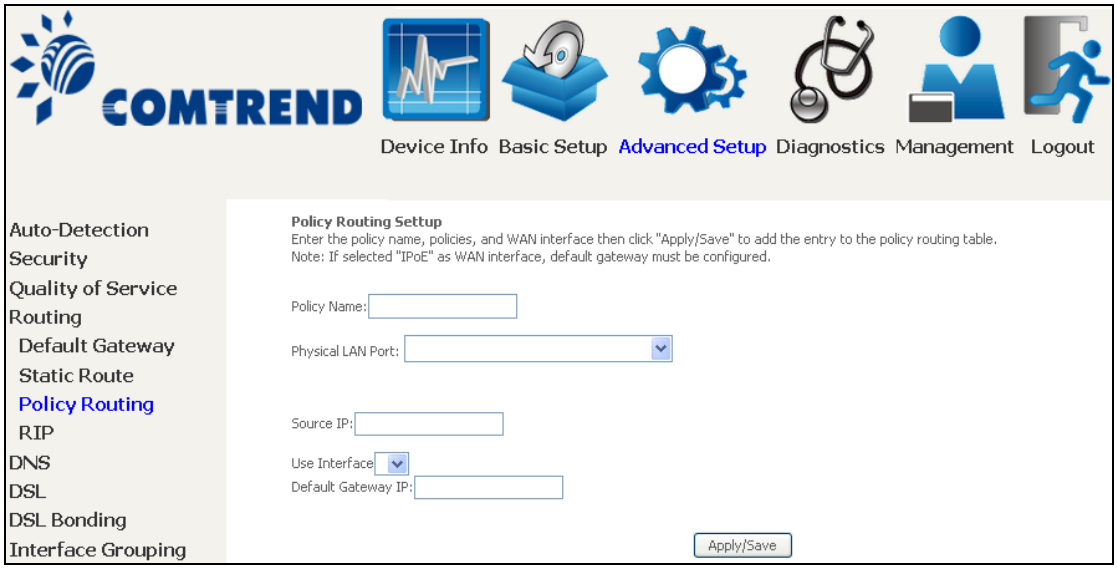
- **IP Version:** Select the IP version to be IPv4.
- **Destination IP address/prefix length:** Enter the destination IP address.
- **Interface:** select the proper interface for the rule.
- **Gateway IP Address:** The next-hop IP address.
- **Metric:** The metric value of routing.

After completing the settings, click **Apply/Save** to add the entry to the routing table.

6.4.3 Policy Routing

This option allows for the configuration of static routes by policy.
Click **Add** to create a routing policy or **Remove** to delete one.

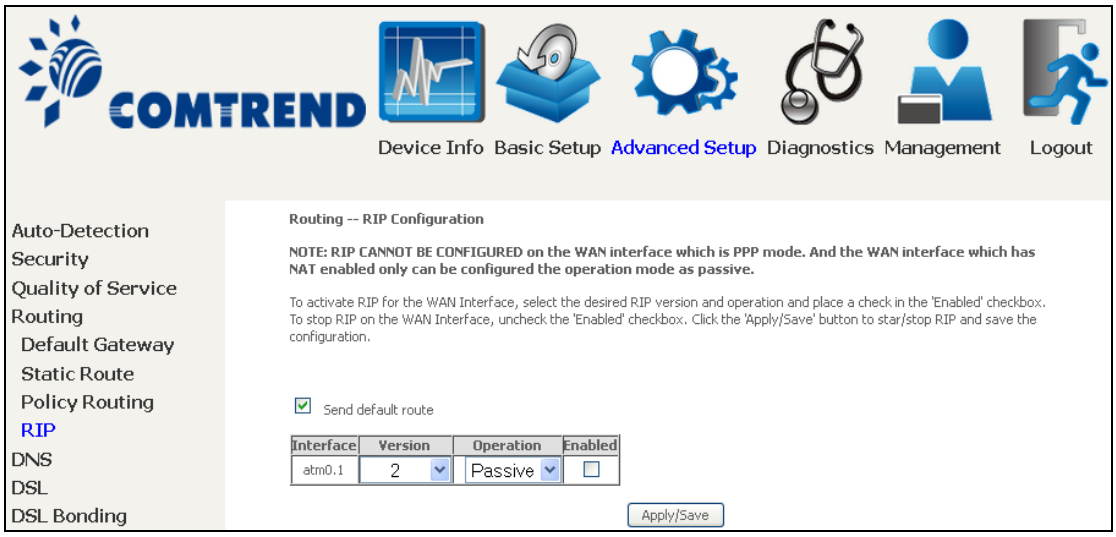
On the following screen, complete the form and click **Apply**/**Save** to create a policy.



Field	Description
Policy Name	Name of the route policy
Physical LAN Port	Specify the port to use this route policy
Source IP	IP Address to be routed
Use Interface	Interface that traffic will be directed to
Default Gateway IP	IP Address of the default gateway

6.4.4 RIP

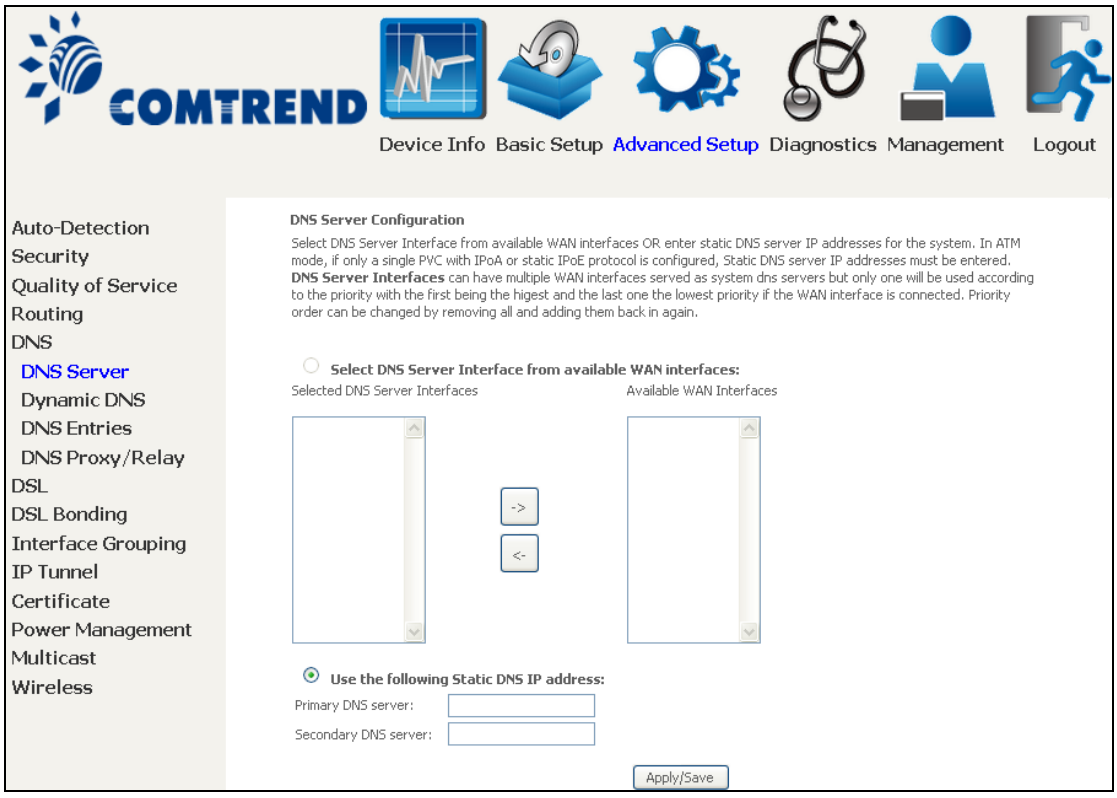
To activate RIP, configure the RIP version/operation mode and select the **Enabled** checkbox ☑ for at least one WAN interface before clicking **Save / Apply**.



6.5 DNS

6.5.1 DNS Server

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 highest 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.



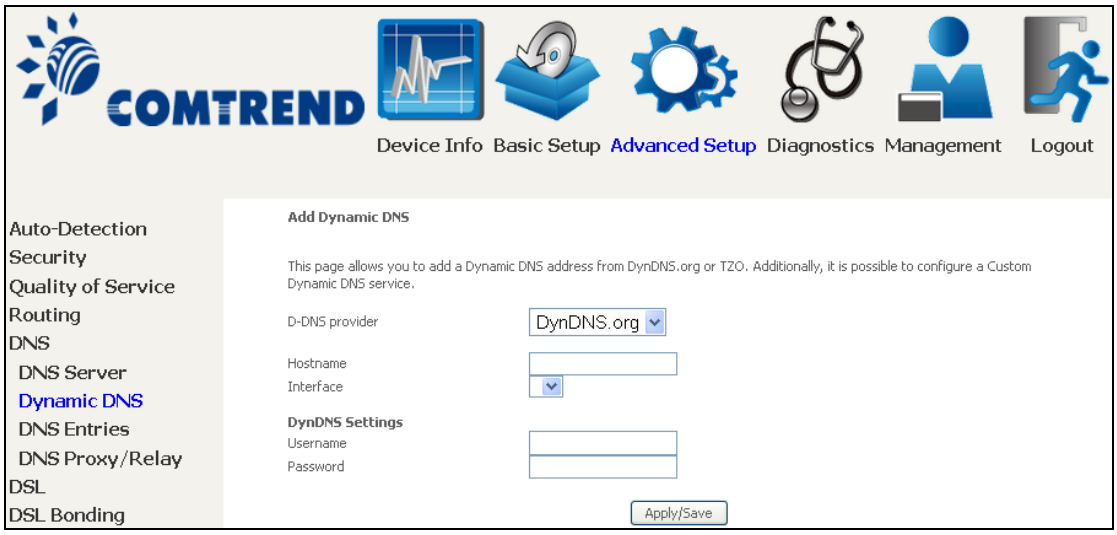
Click **Apply / Save** to save the new configuration.

NOTE:	You must reboot the router to make the new configuration effective.

6.5.2 Dynamic DNS

The Dynamic DNS service allows you to map a dynamic IP address to a static hostname in any of many domains, allowing the NexusLink 3112u to be more easily accessed from various locations on the Internet.

To add a dynamic DNS service, click **Add**. The following screen will display.



Click Apply/Save to save your settings.

Consult the table below for field descriptions.

Field	Description
D-DNS provider	Select a dynamic DNS provider from the list
Hostname	Enter the name of the dynamic DNS server
Interface	Select the interface from the list
Username	Enter the username of the dynamic DNS server
Password	Enter the password of the dynamic DNS server

6.5.3 DNS Entries

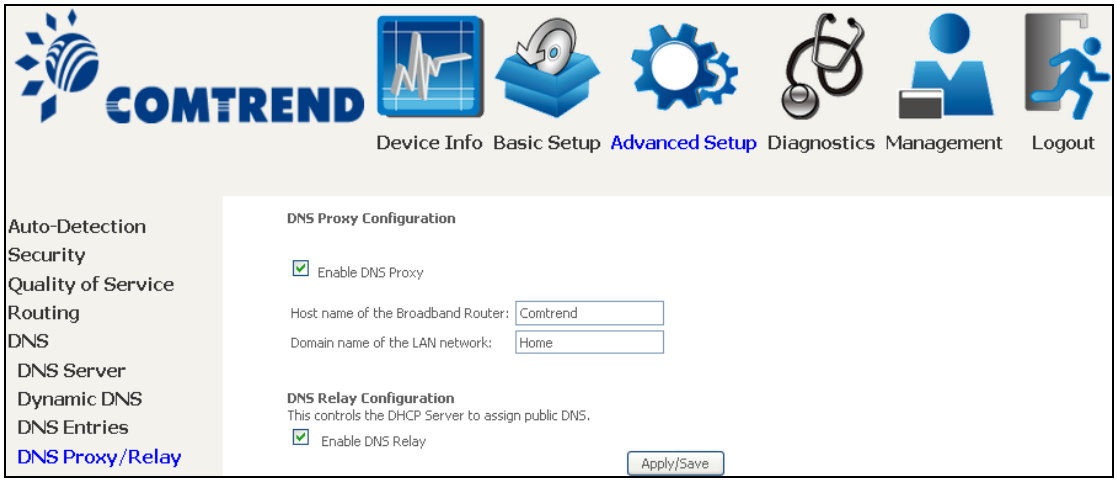
The DNS Entry page allows you to add domain names and IP address desired to be resolved by the DSL router.

Choose Add or Remove to configure DNS Entry. The entries will become active after save/reboot.

Enter the domain name and IP address that needs to be resolved locally, and click the **Add Entry** button.

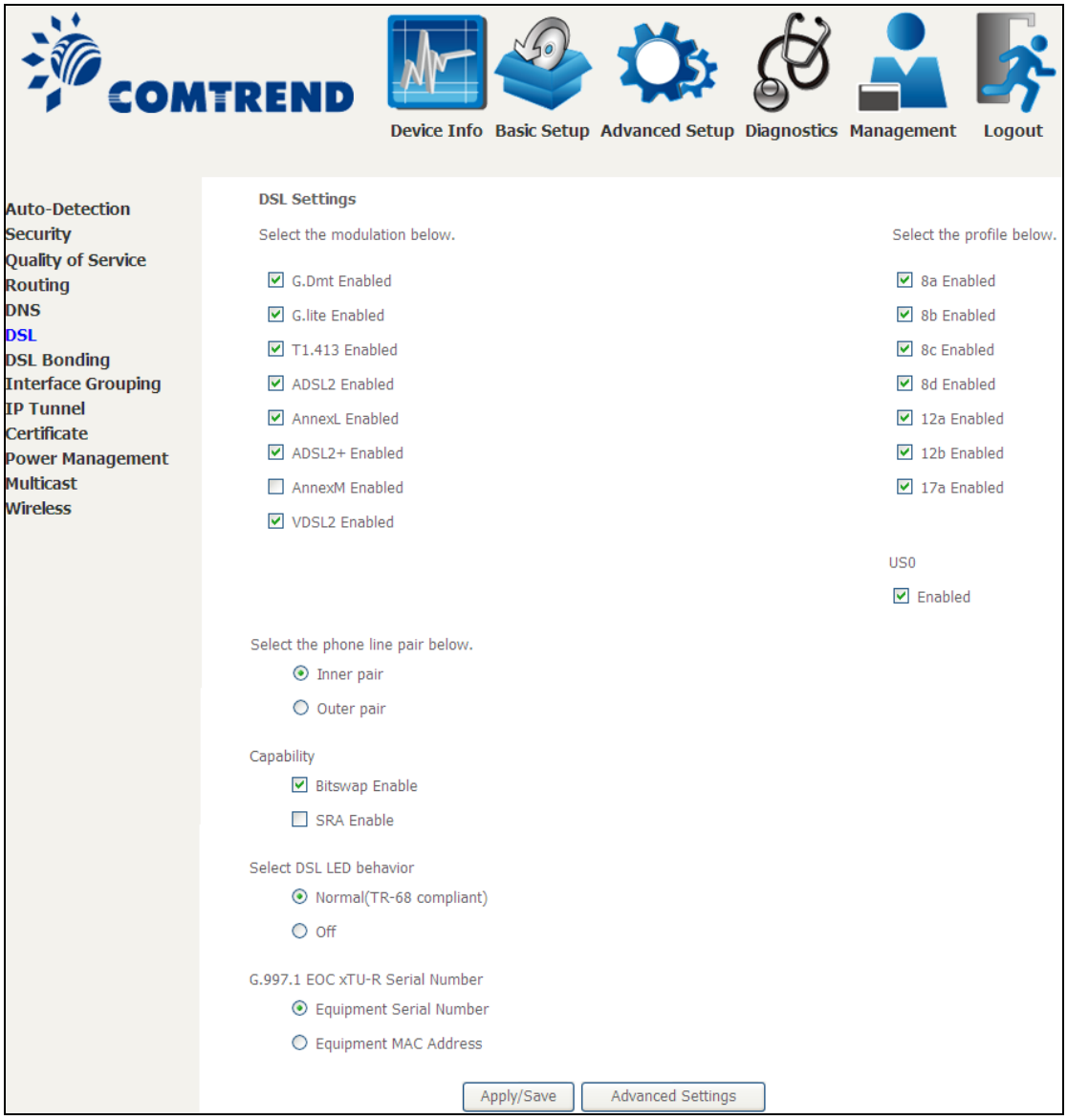
6.5.4 DNS Proxy / Relay

DNS proxy receives DNS queries and forwards DNS queries to the Internet. After the CPE gets answers from the DNS server, it replies to the LAN clients. Configure DNS proxy with the default setting, when the PC gets an IP via DHCP, the domain name, Home, will be added to PC's DNS Suffix Search List, and the PC can access route with "Comtrend.Home".



6.6 DSL

The DSL Settings screen allows for the selection of DSL modulation modes.
For optimum performance, the modes selected should match those of your ISP.

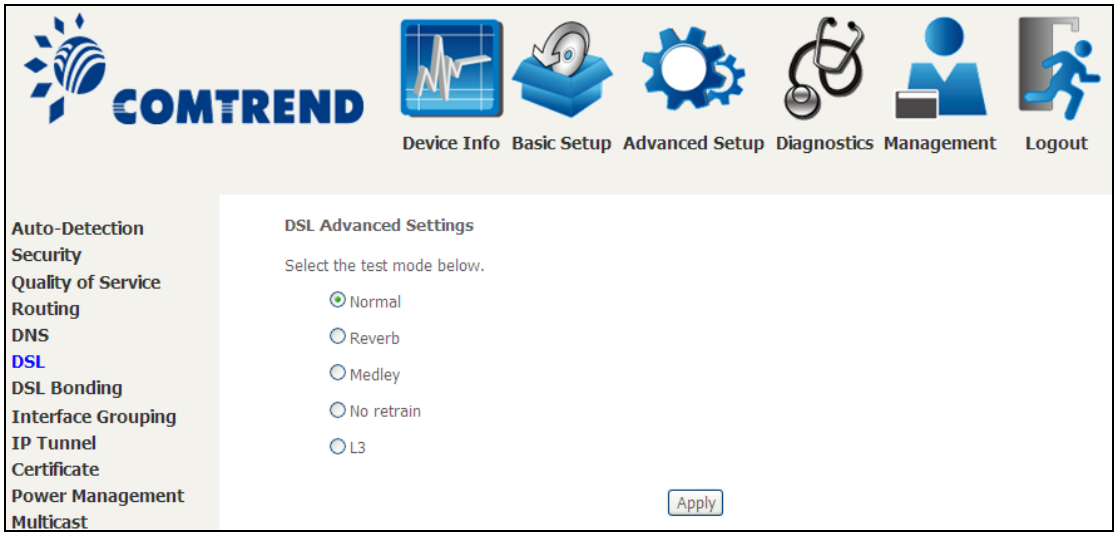


DSL Mode	Data Transmission Rate - Mbps (Megabits per second)	
G.Dmt	Downstream: 12 Mbps	Upstream: 1.3 Mbps
G.lite	Downstream: 4 Mbps	Upstream: 0.5 Mbps
T1.413	Downstream: 8 Mbps	Upstream: 1.0 Mbps
ADSL2	Downstream: 12 Mbps	Upstream: 1.0 Mbps
AnnexL	Supports longer loops but with reduced transmission rates	
ADSL2+	Downstream: 24 Mbps	Upstream: 1.0 Mbps
AnnexM	Downstream: 24 Mbps	Upstream: 3.5 Mbps

DSL Mode	Data Transmission Rate - Mbps (Megabits per second)
VDSL2	Downstream: 100 Mbps Upstream: 60 Mbps
Options	**Description**
Inner/Outer Pair	Select the inner or outer pins of the twisted pair (RJ11 cable)
Bitswap Enable	Enables adaptive handshaking functionality
SRA Enable	Enables Seamless Rate Adaptation (SRA)
Select DSL LED behavior	Normal (TR-68 compliant): Select this option for DSL LED to operate normally (See menu 2.2 LED Indicator) Off:DSL LED will always be OFF
G997.1 EOC xTU-R Serial Number	Select Equipment Serial Number or Equipment MAC Address to use router's serial number or MAC address in ADSL EOC messages

Advanced DSL Settings

Click **Advanced Settings** to reveal additional options.

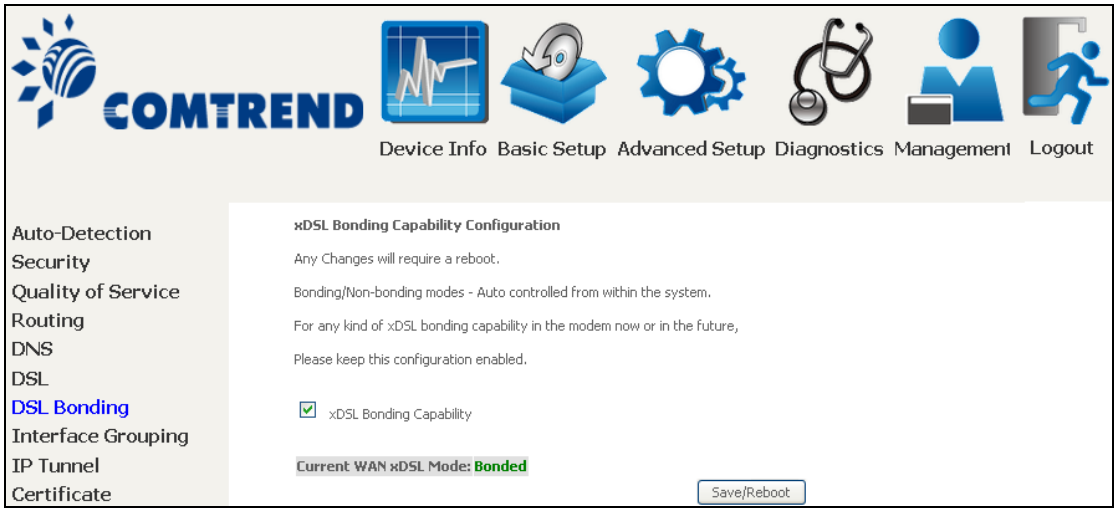


On this screen you select the required test mode, then click the **Apply** button.

Field	Description
Normal	DSL line signal is detected and sent normally
Reverb	DSL line signal is sent continuously in reverb mode
Medley	DSL line signal is sent continuously in medley mode
No Retrain	DSL line signal will always be on even when DSL line is unplugged
L3	DSL line is set in L3 power mode

6.7 DSL Bonding

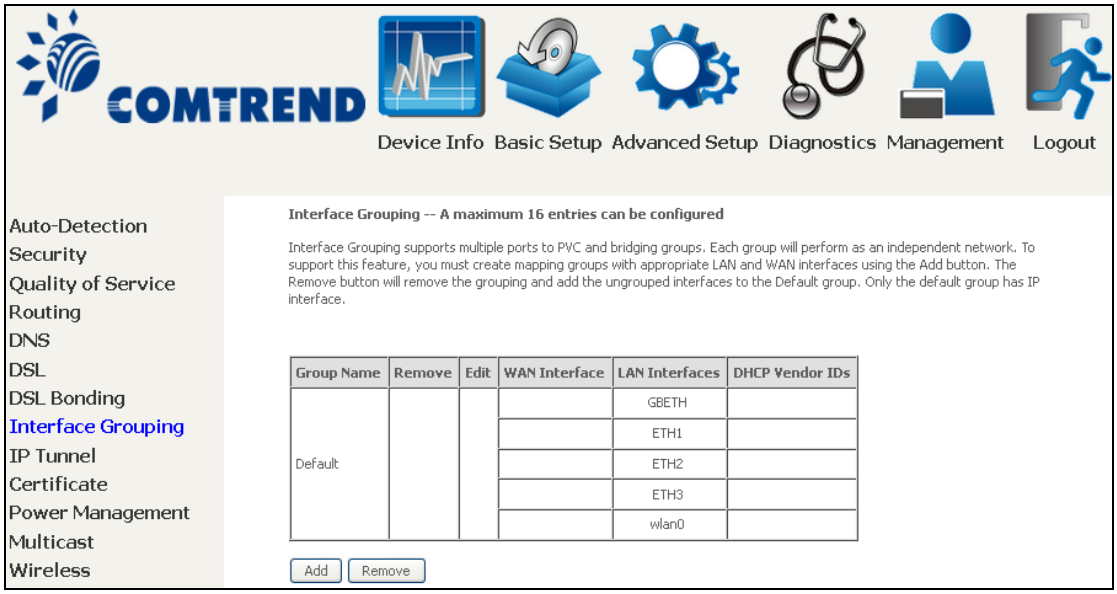
This screen displays the current status of DSL bonding mode. Bonding status is detected automatically.



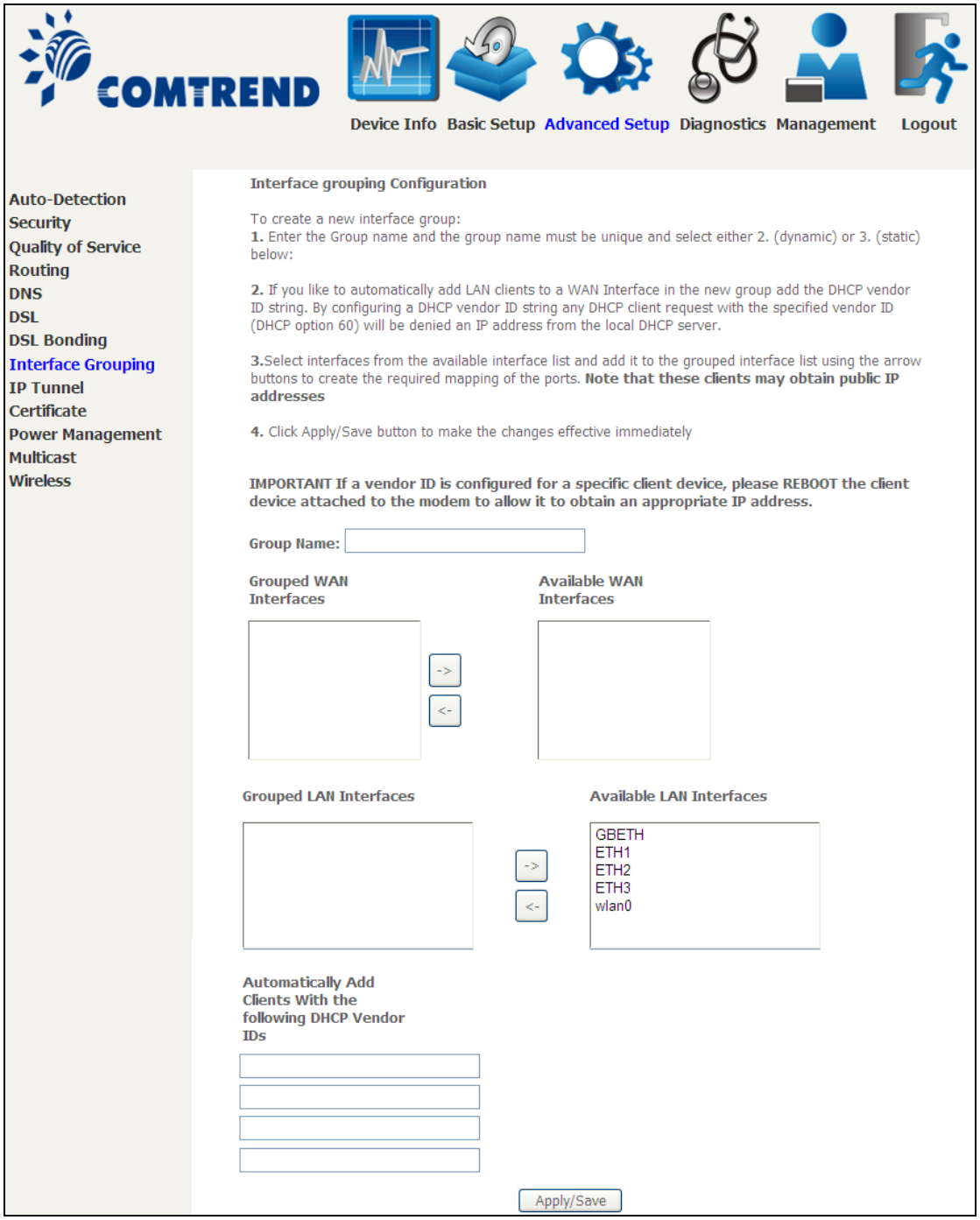
NOTE: This configuration doesn't take effect until router is rebooted.

6.8 Interface Grouping

Interface Grouping supports multiple ports to PVC and bridging groups. Each group performs as an independent network. To use this feature, you must create mapping groups with appropriate LAN and WAN interfaces using the **Add** button.
The **Remove** button removes mapping groups, returning the ungrouped interfaces to the Default group. Only the default group has an IP interface.



To add an Interface Group, click the **Add** button. The following screen will appear. It lists the available and grouped interfaces. Follow the instructions shown onscreen.



Automatically Add Clients With Following DHCP Vendor IDs:

Add support to automatically map LAN interfaces to PVC's using DHCP vendor ID (option 60). The local DHCP server will decline and send the requests to a remote DHCP server by mapping the appropriate LAN interface. This will be turned on when Interface Grouping is enabled.

For example, imagine there are 4 PVCs (0/33, 0/36, 0/37, 0/38). VPI/VCI=0/33 is for PPPoE while the other PVCs are for IP set-top box (video). The LAN interfaces are ETH1, ETH2, ETH3, and GBETH.

The Interface Grouping configuration will be:

1. Default: ETH1, ETH2, ETH3, and GBETH.
2. Video: nas_0_36, nas_0_37, and nas_0_38. The DHCP vendor ID is "Video".

If the onboard DHCP server is running on "Default" and the remote DHCP server is running on PVC 0/36 (i.e. for set-top box use only). LAN side clients can get IP addresses from the CPE's DHCP server and access the Internet via PPPoE (0/33).

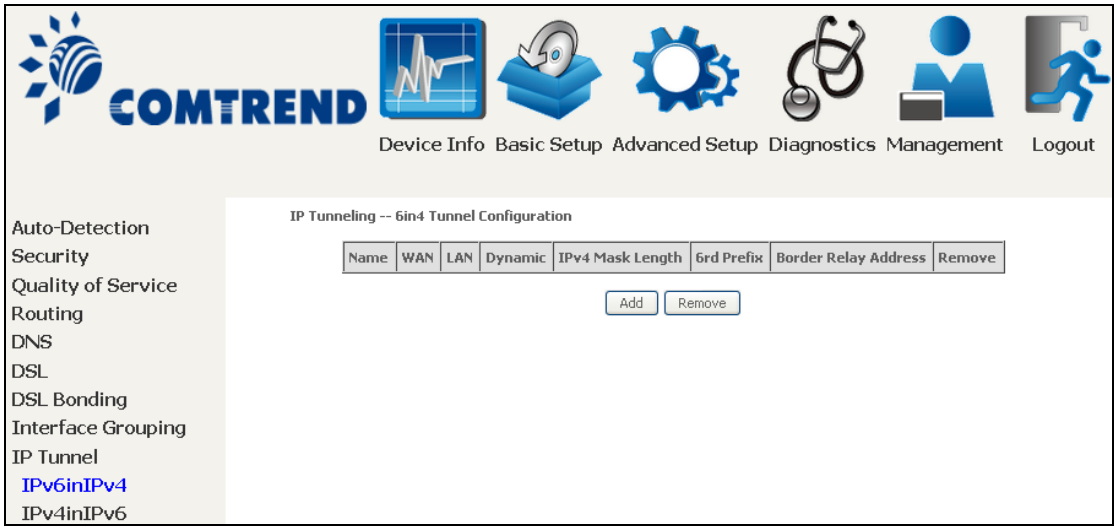
If a set-top box is connected to ETH1 and sends a DHCP request with vendor ID "Video", the local DHCP server will forward this request to the remote DHCP server. The Interface Grouping configuration will automatically change to the following:

1. Default: ETH2, ETH3, and GBETH
2. Video: nas_0_36, nas_0_37, nas_0_38, and ETH1.

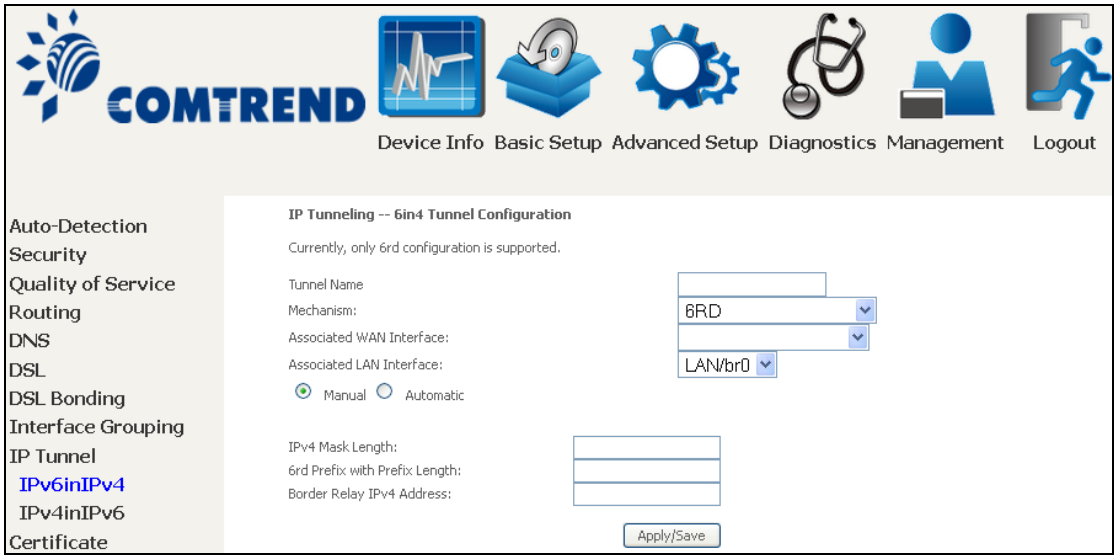
6.9 IP Tunnel

6.9.1 IPv6inIPv4

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



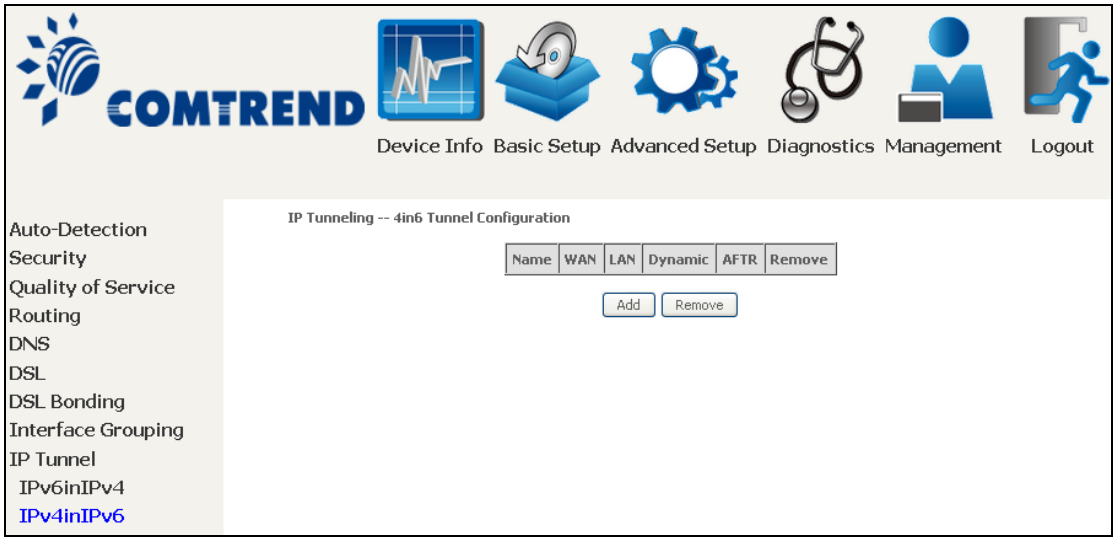
Click the **Add** button to display the following.



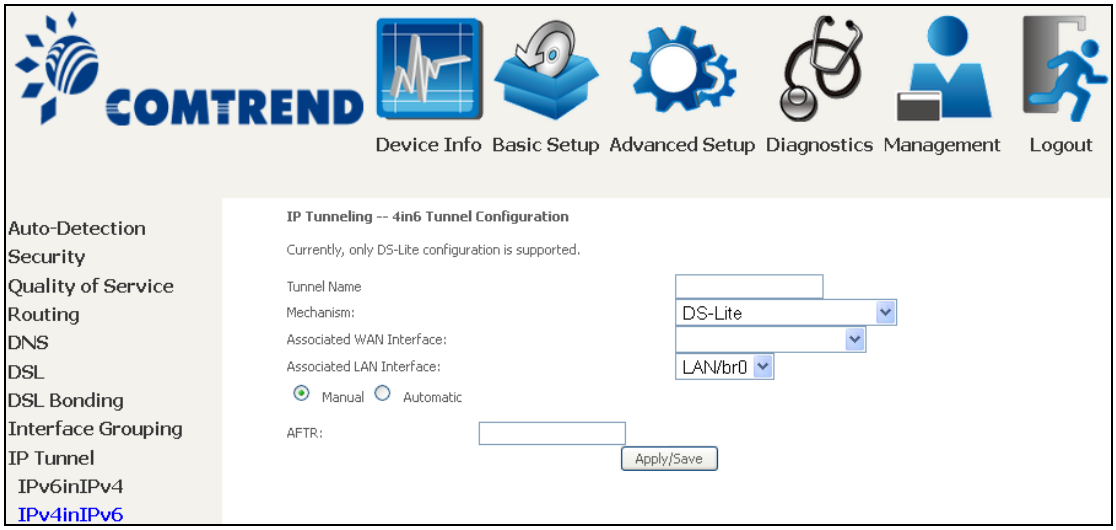
Options	Description
Tunnel Name	Input a name for the tunnel
Mechanism	Mechanism used by the tunnel deployment
Associated WAN Interface	Select the WAN interface to be used by the tunnel
Associated LAN Interface	Select the LAN interface to be included in the tunnel
Manual/Automatic	Select automatic for 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.



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

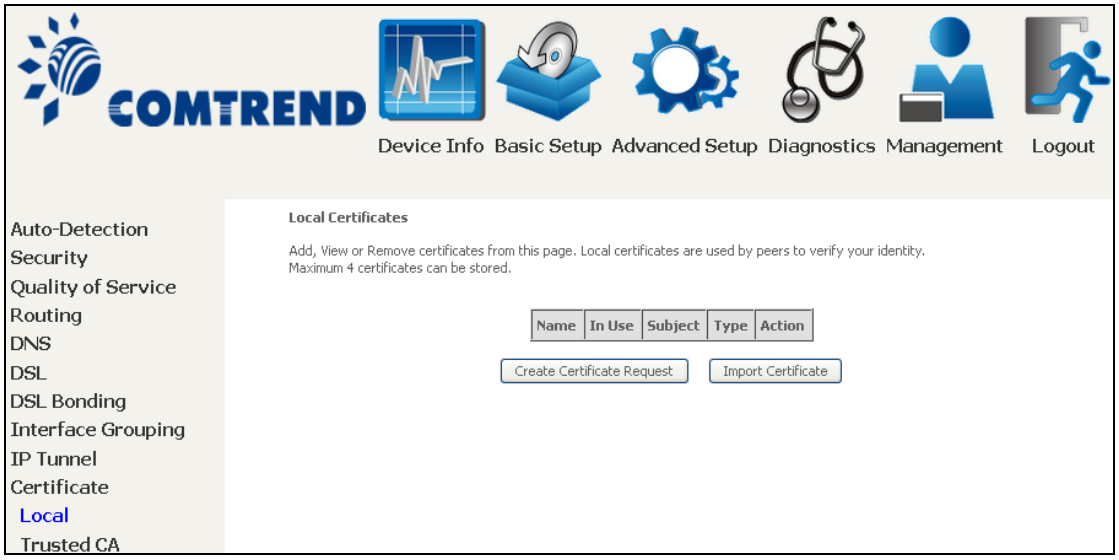


Options	Description
Tunnel Name	Input a name for the tunnel
Mechanism	Mechanism used by the tunnel deployment
Associated WAN Interface	Select the WAN interface to be used by the tunnel
Associated LAN Interface	Select the LAN interface to be included in the tunnel
Manual/Automatic	Select automatic for 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



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.

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.

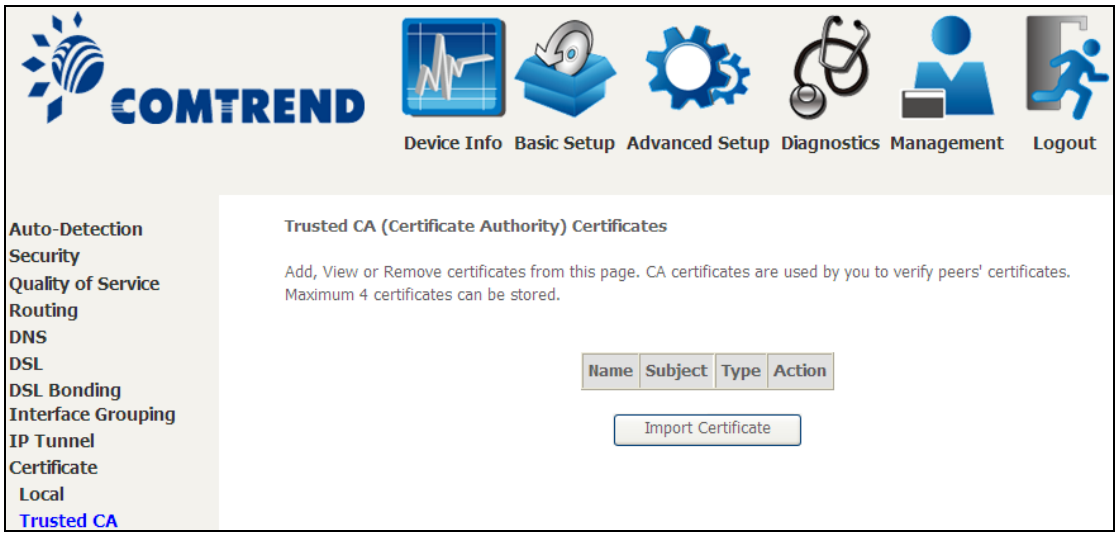
IMPORT CERTIFICATE

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

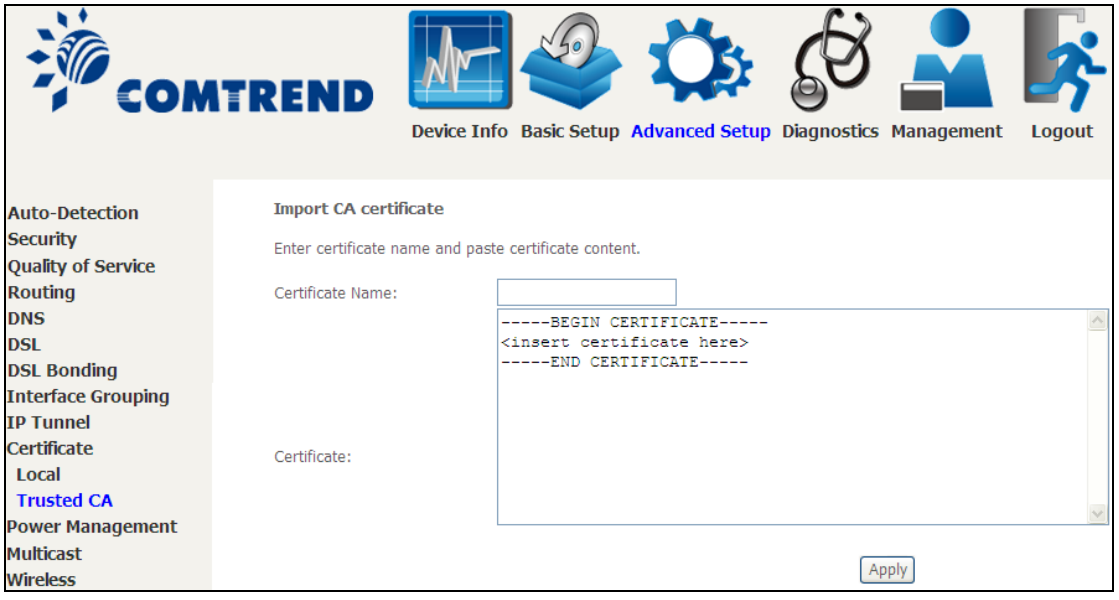
Enter a certificate name and click the **Apply** button to import the certificate and its private key.

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.



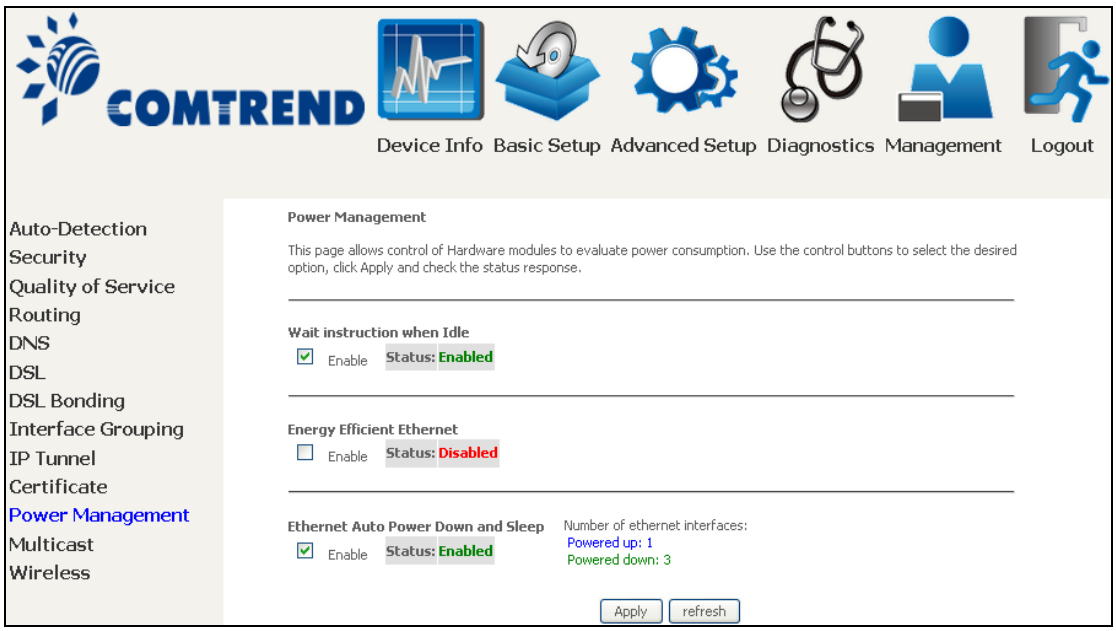
Click **Import Certificate** to paste the certificate content of your trusted CA. The CA certificate content will be provided by your vendor/ISP/ITSP and is used to authenticate the Auto-Configuration Server (ACS) that the CPE will connect to.



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

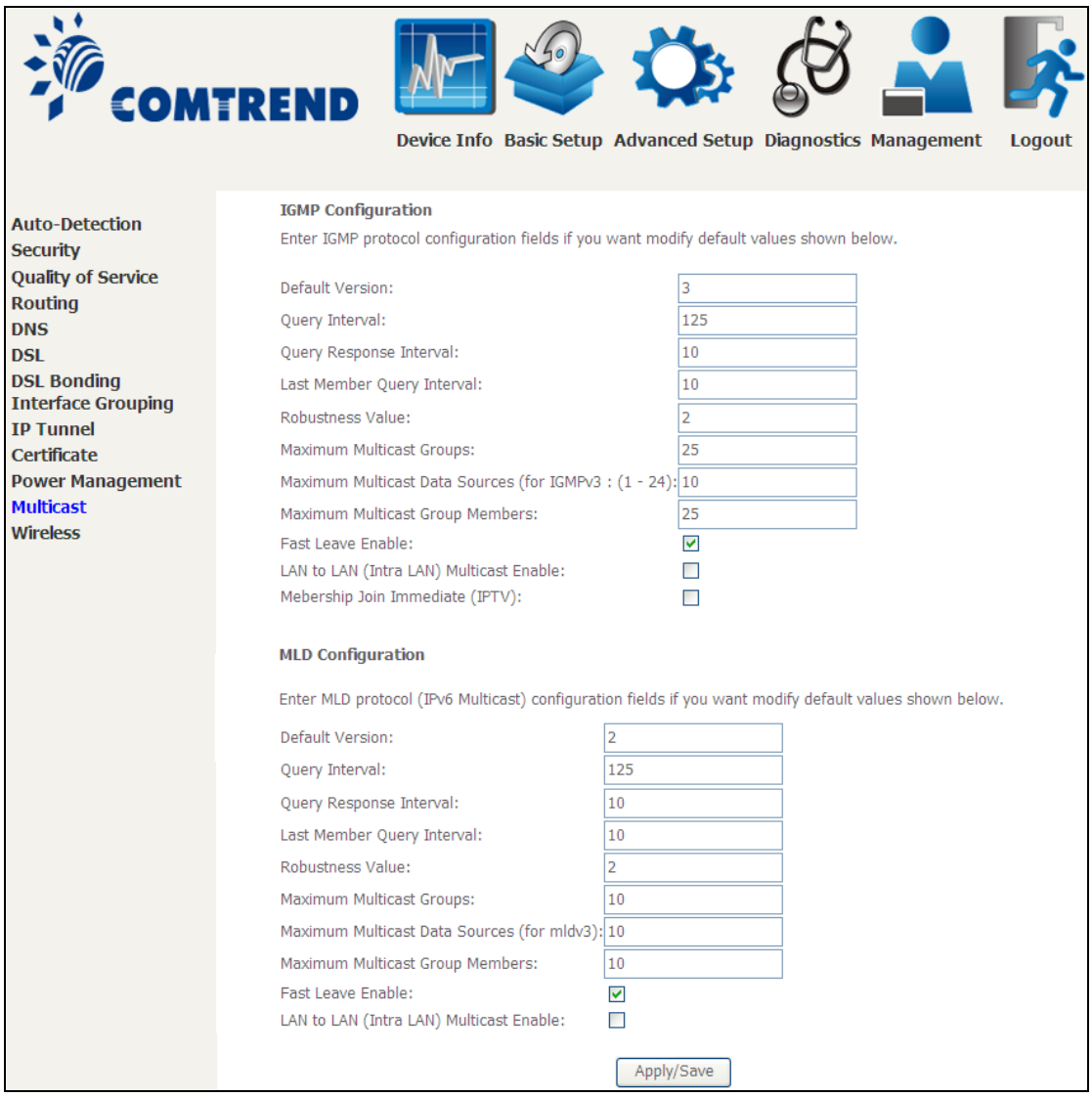
6.11 Power Management

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.



6.12 Multicast

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



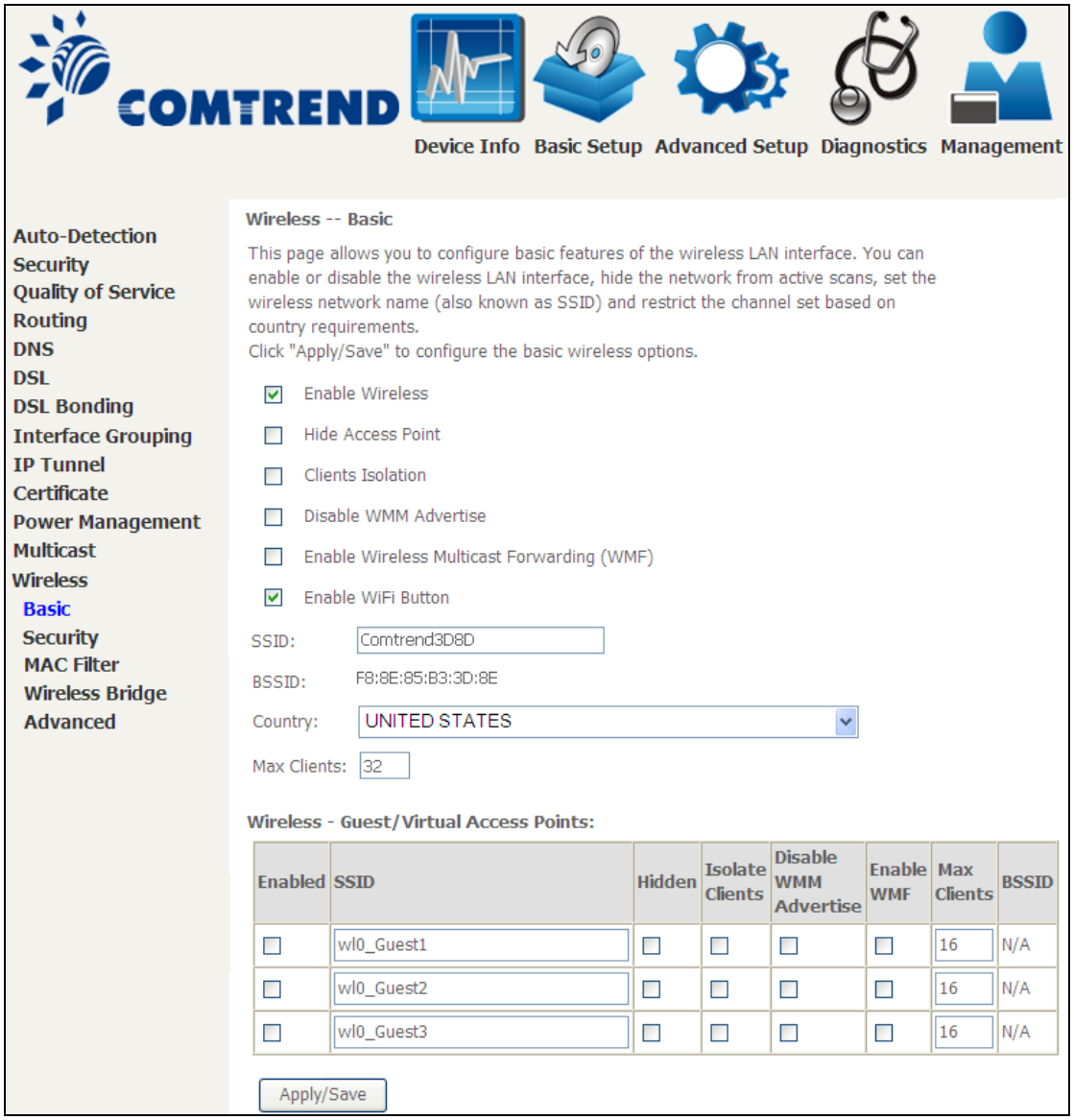
Field	Description
Default Version	Define IGMP using version with video server.
Query Interval	The query interval is the amount of time in seconds between IGMP General Query messages sent by the router (if the router is the querier on this subnet). The default query interval is 125 seconds.

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.
LAN to LAN (Intra LAN) Multicast Enable	This will activate IGMP snooping for cases where multicast data source and player are all located on the LAN side.
Membership to join Immediate (IPTV)	Enable IGMP immediate join feature for multicast membership group.

6.13 Wireless

6.13.1 Basic

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.



Click **Apply/Save** to apply the selected wireless options.

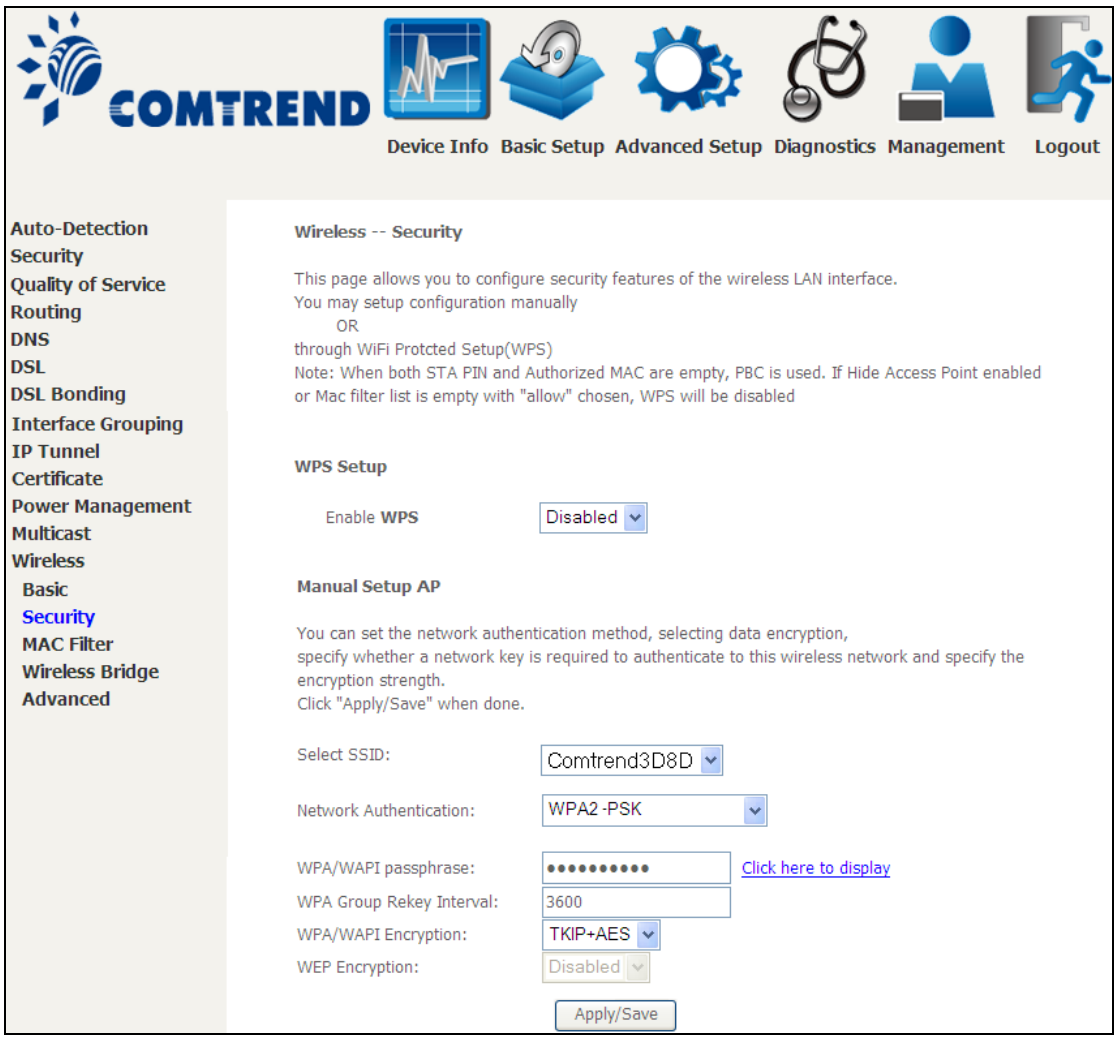
Consult the table below for descriptions of these options.

Option	Description
Enable Wireless	A checkbox ☑ that enables or disables the wireless LAN interface. When selected, a set of basic wireless options will appear.

Option	Description
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.
Enable WiFi Button	Select the checkbox ☑ to enable the WiFi button.
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
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

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



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

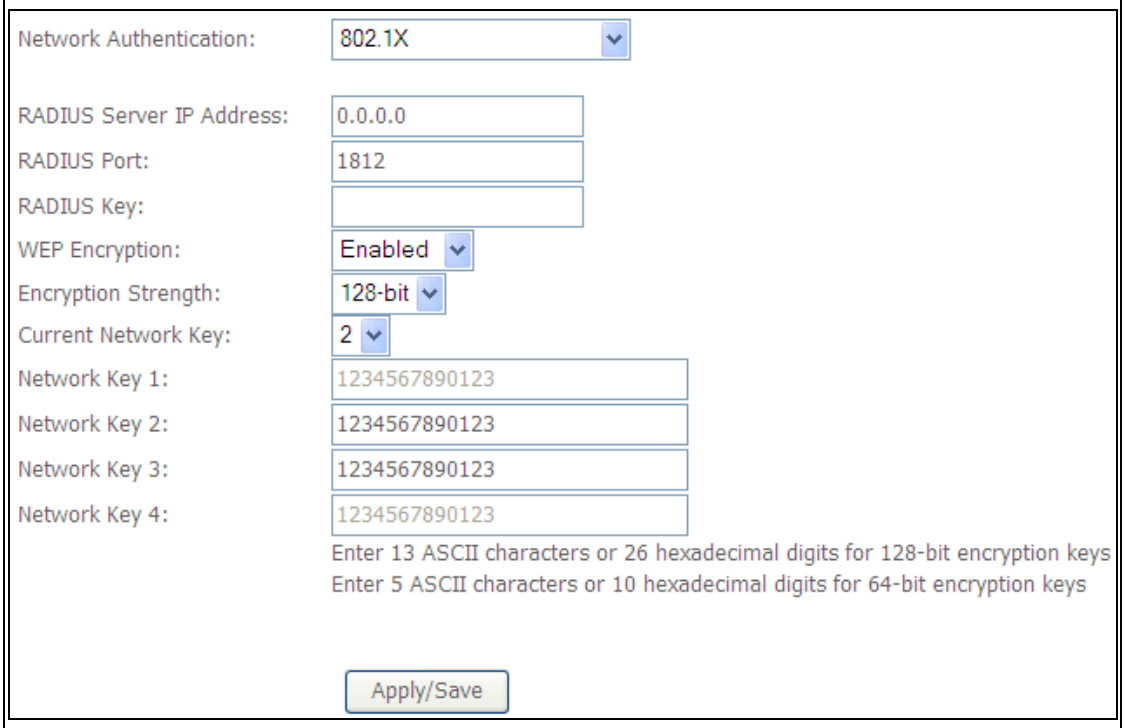
WIRELESS SECURITY

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

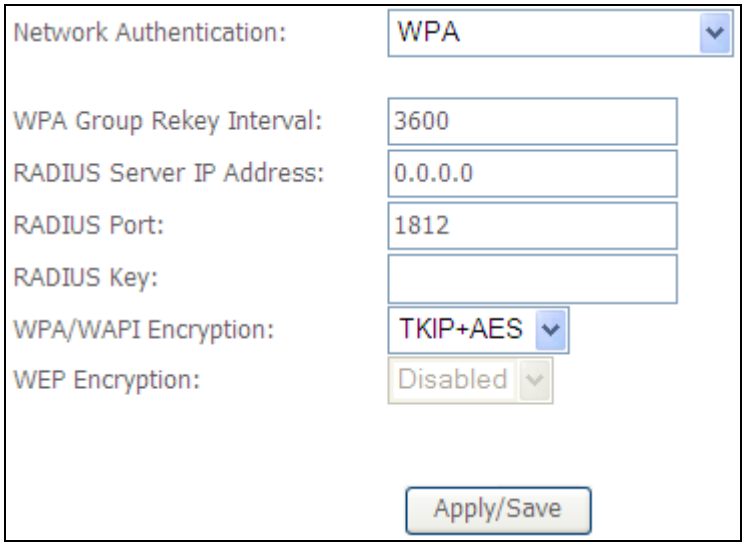
Select SSID
Select the wireless network name from the drop-down box. SSID stands for Service Set Identifier. All stations must be configured with the correct SSID to access the WLAN. If the SSID does not match, that client will not be granted access.

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.

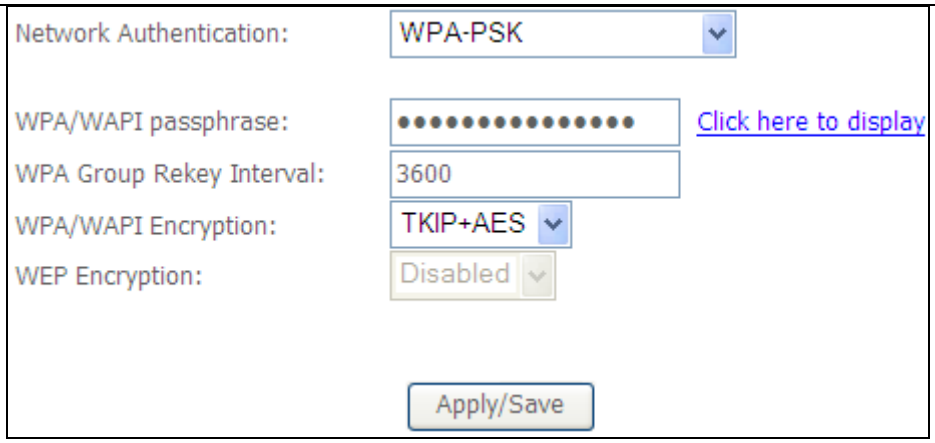
Each authentication type has its own settings. For example, selecting 802.1X authentication will reveal the RADIUS Server IP address, Port and Key fields. WEP Encryption will also be enabled as shown below.



The settings for WPA authentication are shown below.



The settings for WPA-PSK authentication are shown next.



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

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 3112u 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. You must choose either the Push-Button or PIN configuration method for Steps 6 and 7.

I. Setup

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

Step 2: Set the WPS AP Mode. **Configured** is used when the NexusLink 3112u will assign security settings to clients. **Unconfigured** is used when an external client assigns security settings to the NexusLink 3112u.

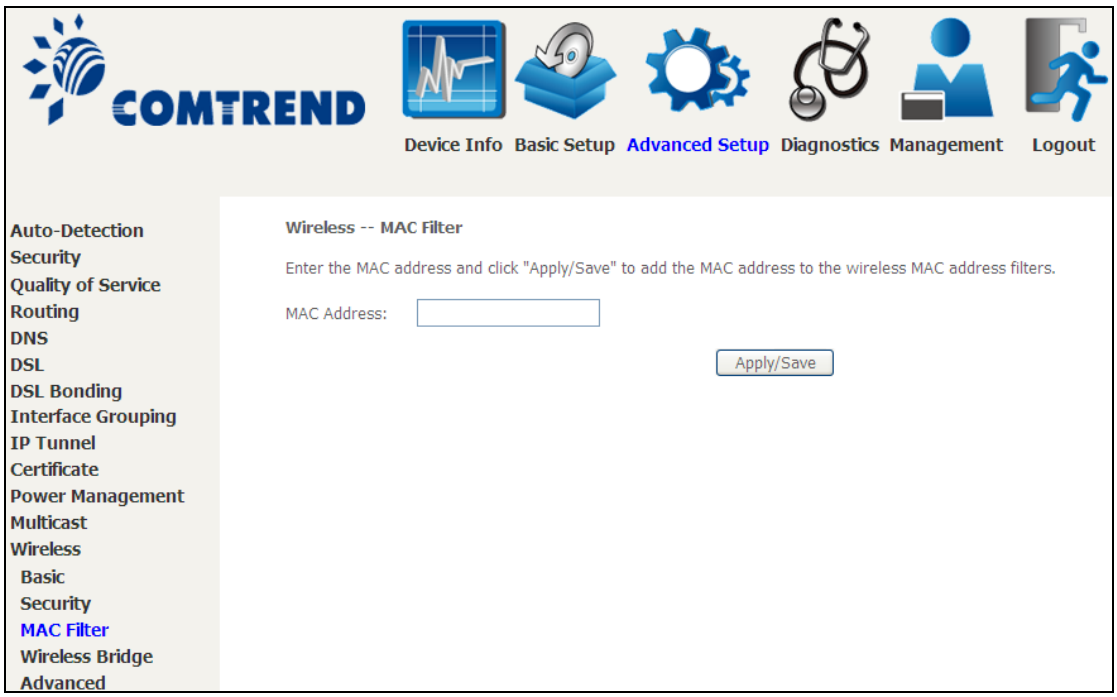
NOTES:	Your client may or may not have the ability to provide security settings to the NexusLink 3112u. If it does not, then you must set the WPS AP mode to Configured. Consult the device documentation to check its capabilities. In addition, using Windows 7, you can add an external registrar using the **Config AP** button (Appendix F - WPS OPERATION has detailed instructions).

6.13.4 MAC Filter

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

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

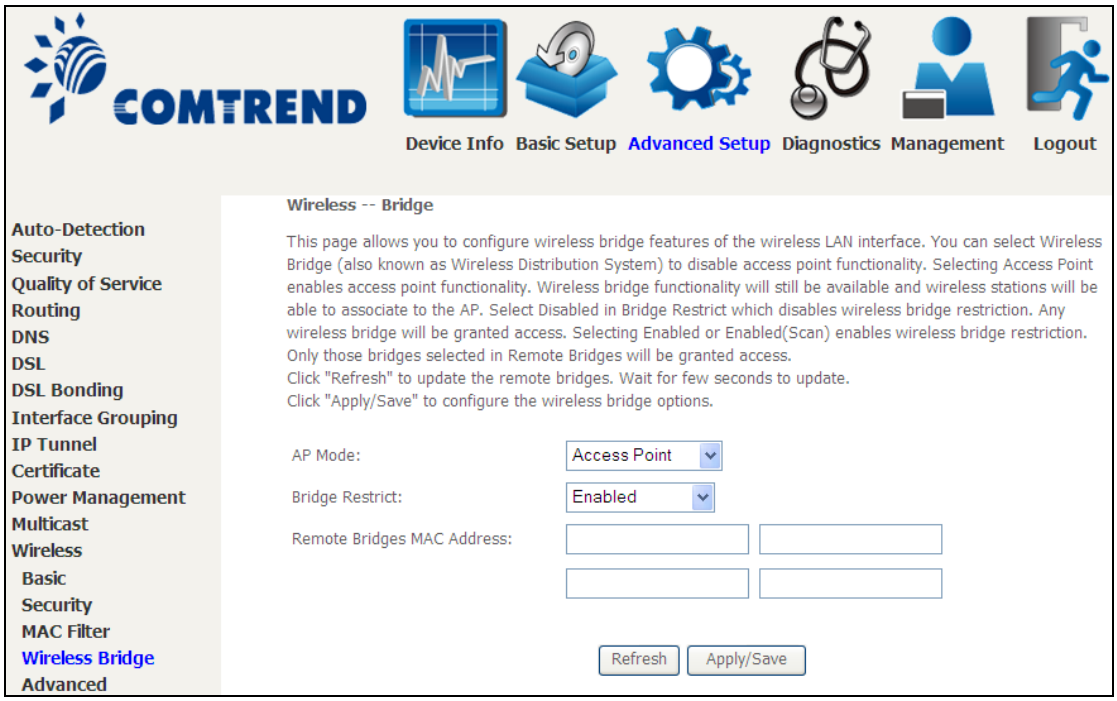
After clicking the **Add** button, the following screen appears.



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

6.13.5 Wireless Bridge

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

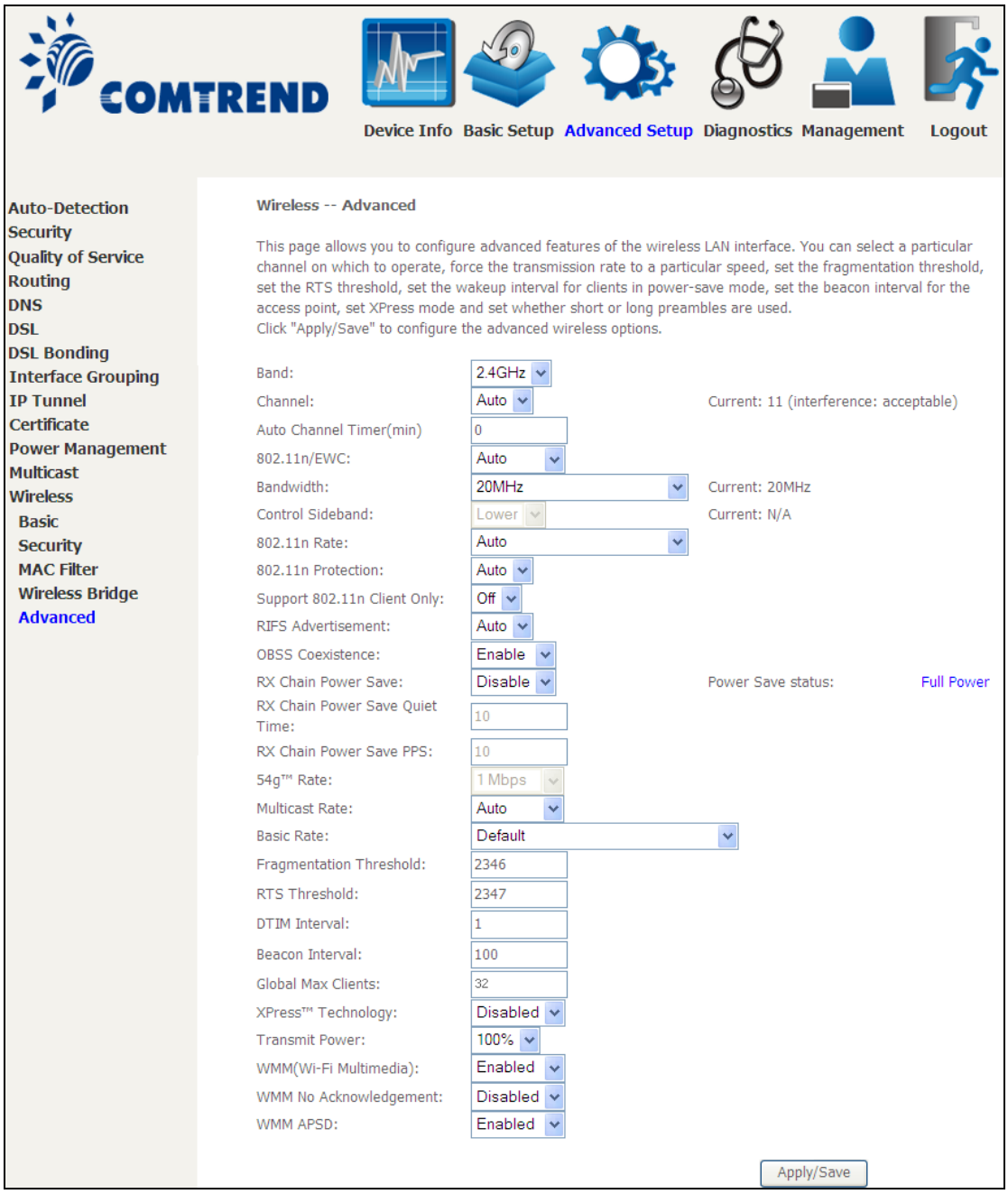


Click **Apply/Save** to implement new configuration settings.

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

6.13.6 Advanced

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



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

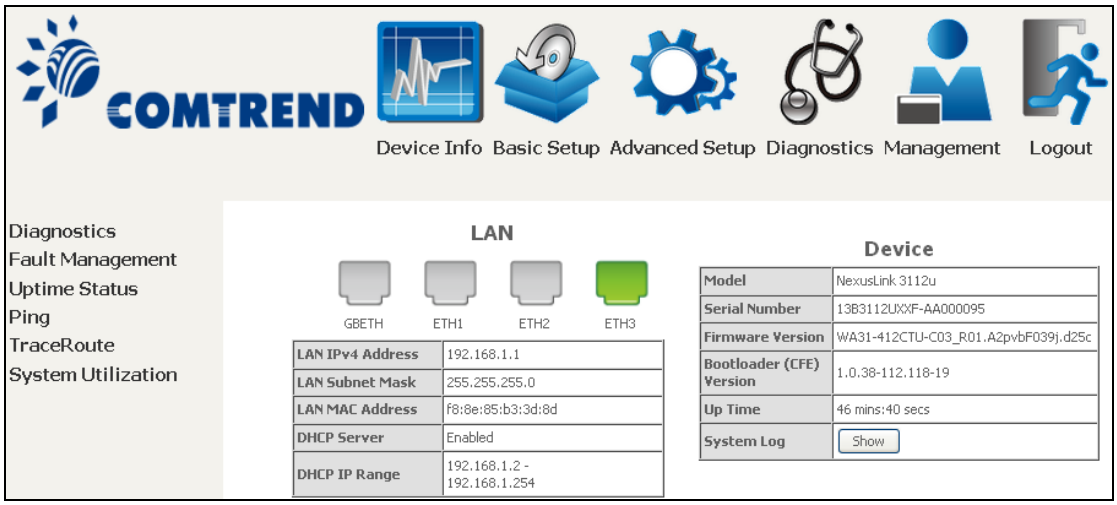
Field	Description
Fragmentation Threshold	A threshold, specified in bytes, that determines whether packets will be fragmented and at what size. On an 802.11 WLAN, packets that exceed the fragmentation threshold are fragmented, i.e., split into, smaller units suitable for the circuit size. Packets smaller than the specified fragmentation threshold value are not fragmented. Enter a value between 256 and 2346. If you experience a high packet error rate, try to slightly increase your Fragmentation Threshold. The value should remain at its default setting of 2346. Setting the Fragmentation Threshold too low may result in poor performance.
RTS Threshold	Request to Send, when set in bytes, specifies the packet size beyond which the WLAN Card invokes its RTS/CTS mechanism. Packets that exceed the specified RTS threshold trigger the RTS/CTS mechanism. The NIC transmits smaller packet without using RTS/CTS. The default setting of 2347 (maximum length) disables RTS Threshold.
DTIM Interval	Delivery Traffic Indication Message (DTIM) is also known as Beacon Rate. The entry range is a value between 1 and 65535. A DTIM is a countdown variable that informs clients of the next window for listening to broadcast and multicast messages. When the AP has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value. AP Clients hear the beacons and awaken to receive the broadcast and multicast messages. The default is 1.
Beacon Interval	The amount of time between beacon transmissions in milliseconds. The default is 100 ms and the acceptable range is 1 – 65535. The beacon transmissions identify the presence of an access point. By default, network devices passively scan all RF channels listening for beacons coming from access points. Before a station enters power save mode, the station needs the beacon interval to know when to wake up to receive the beacon (and learn whether there are buffered frames at the access point).
Global Max Clients	The maximum number of clients that can connect to the router.
Xpress ™ Technology	Xpress Technology is compliant with draft specifications of two planned wireless industry standards.
Transmit Power	Set the power output (by percentage) as desired.
WMM (Wi-Fi Multimedia)	The technology maintains the priority of audio, video and voice applications in a Wi-Fi network. It allows multimedia service get higher priority.
WMM No Acknowledgement	Refers to the acknowledge policy used at the MAC level. Enabling no Acknowledgement can result in more efficient throughput but higher error rates in a noisy Radio Frequency (RF) environment.
WMM APSD	This is Automatic Power Save Delivery. It saves power.

Chapter 7 Diagnostics

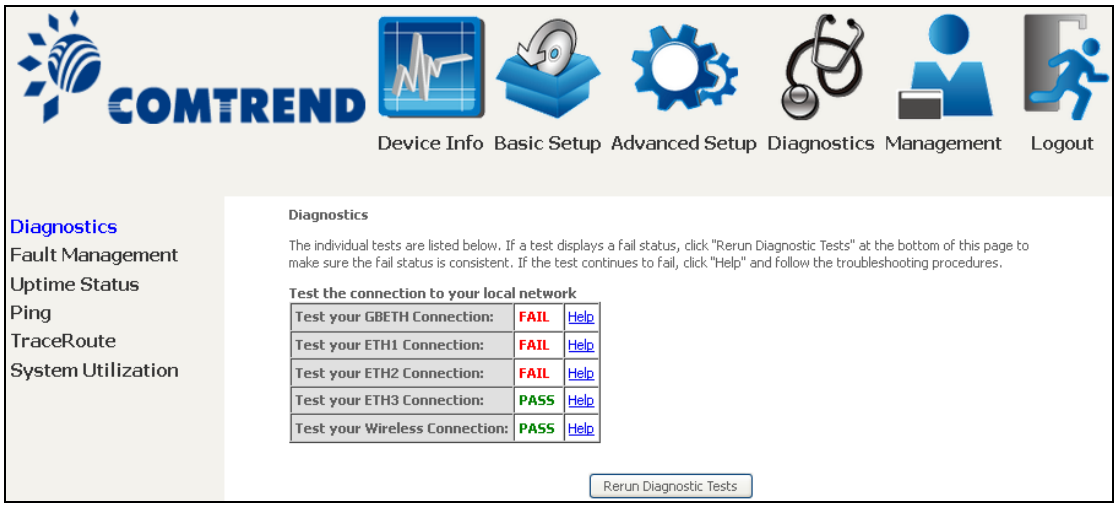
You can reach this page by clicking on the following icon located at the top of the screen.

7.1 Diagnostics – Individual Tests

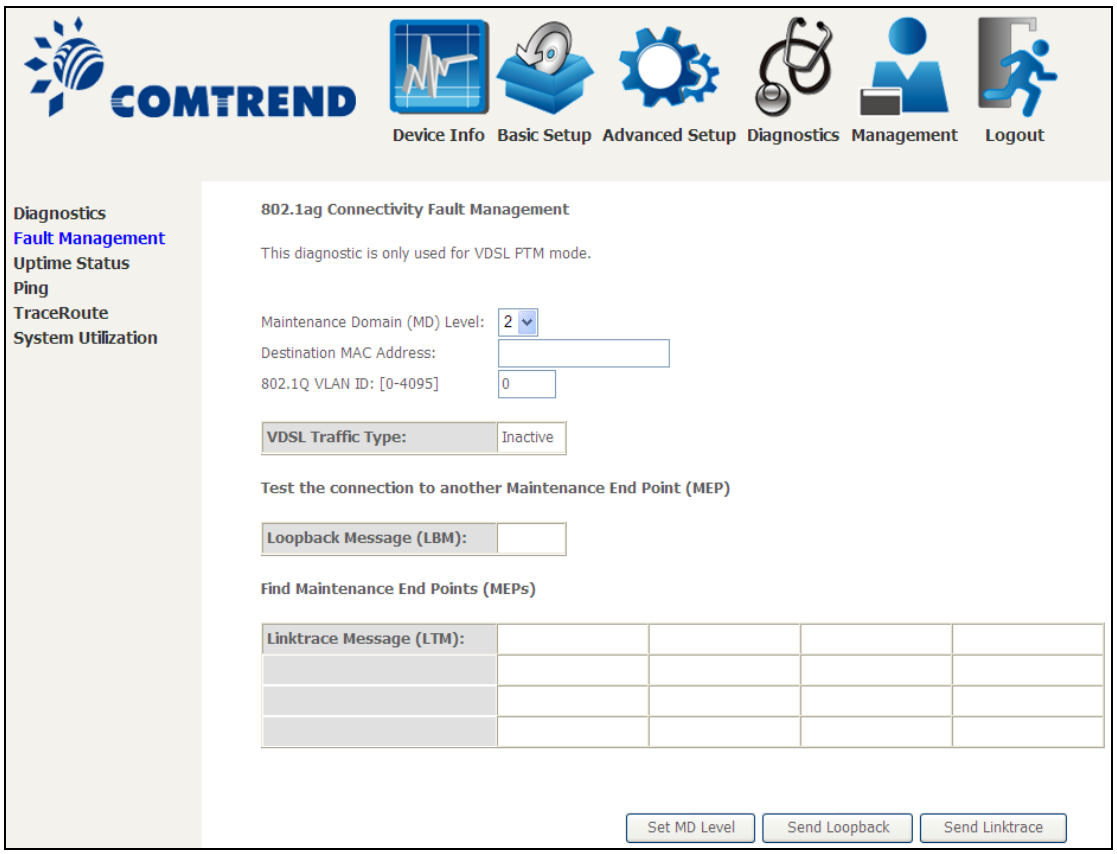
The first Diagnostics screen is a dashboard that shows overall connection status.



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



7.2 Fault Management



Item	Description
Maintenance Domain (MD) Level	Management space on the network, the larger the domain, the higher the level value
Destination MAC Address	Destination MAC address for sending the loopback message
802.1Q VLAN ID: [0-4095]	802.1Q VLAN used in VDSL PTM mode

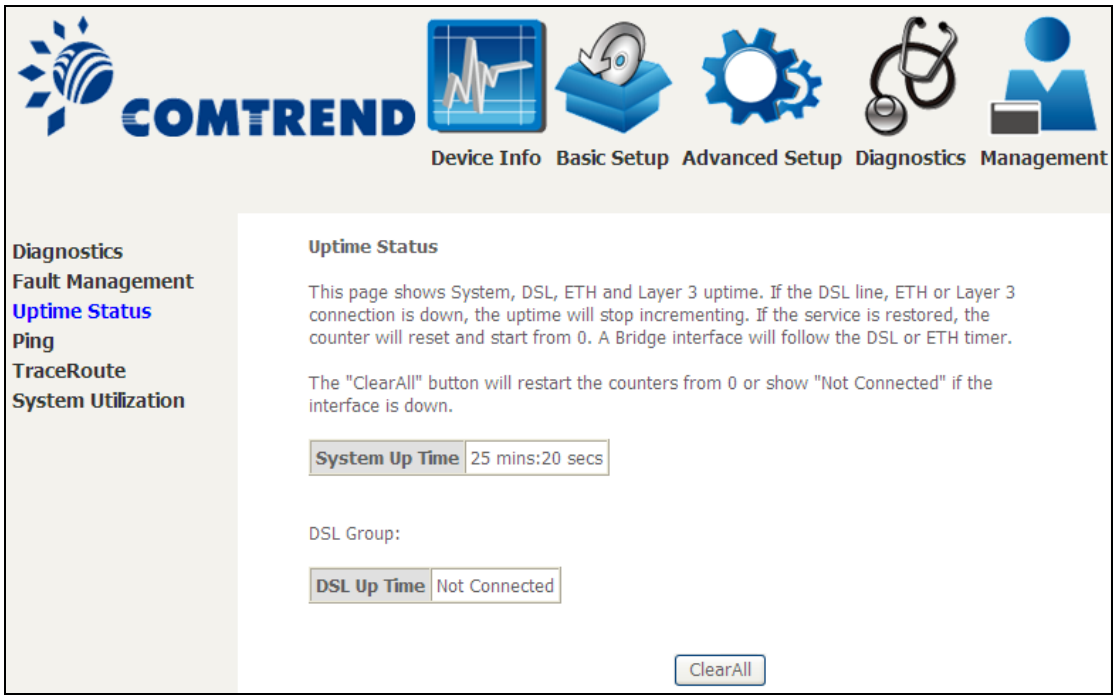
Set MD Level
Save the Maintenance domain level.

Send Loopback
Send loopback message to destination MAC address.

Send Linktrace
Send traceroute message to destination MAC address.

7.3 Uptime Status

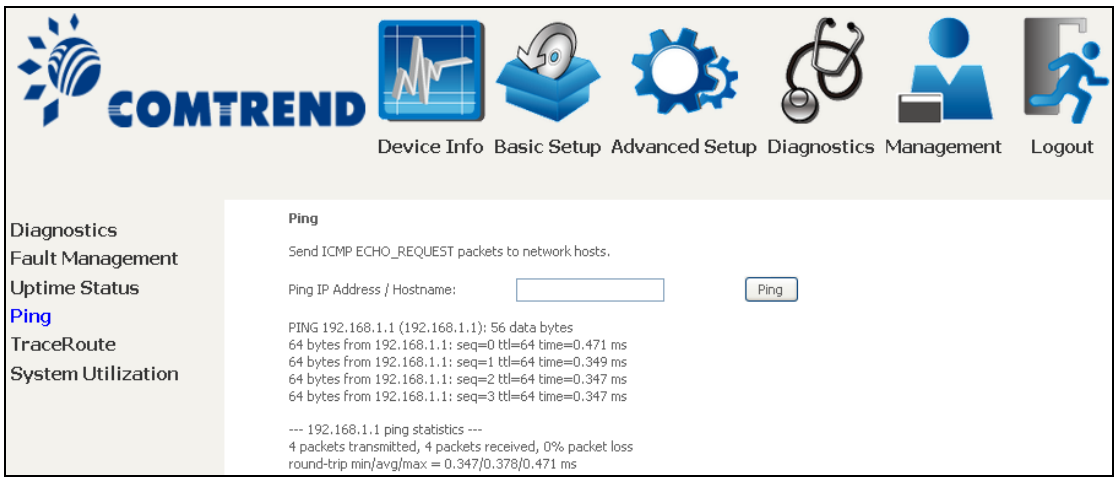
This page shows System, DSL, ETH and Layer 3 uptime. If the DSL line, ETH or Layer 3 connection is down, the uptime will stop incrementing. If the service is restored, the counter will reset and start from 0. A Bridge interface will follow the DSL or ETH timer.



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

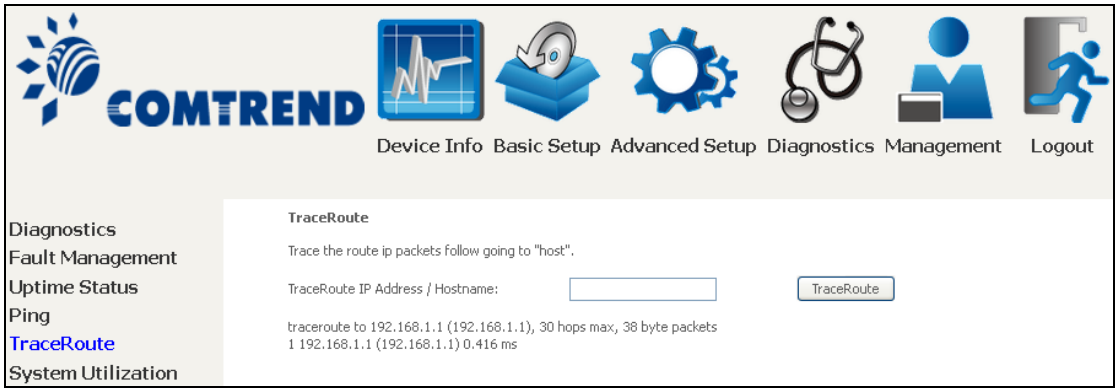
7.4 Ping

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



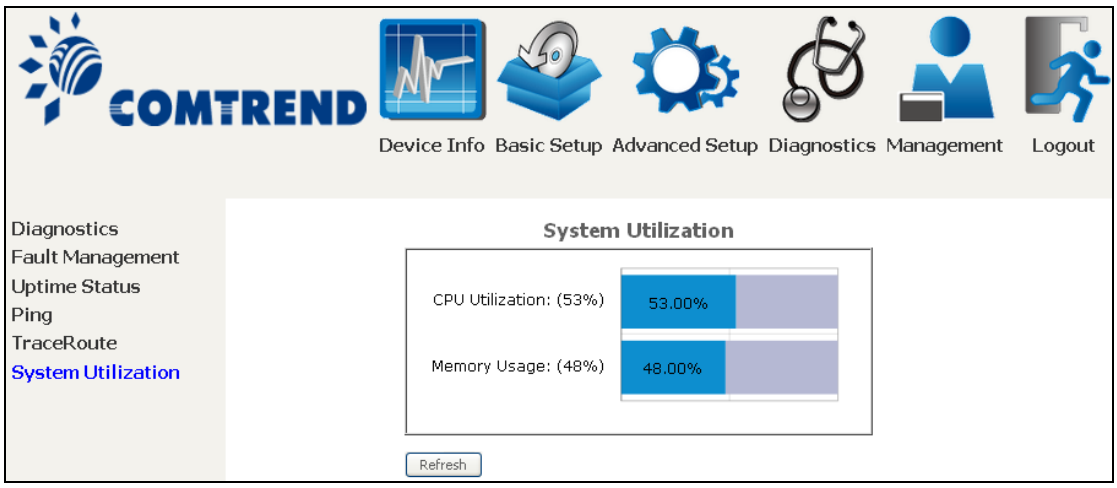
7.5 Trace Route

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.



7.6 System Utilization

Click "Start" button to initialize CPU and Memory utilization calculation.
Please wait 10 seconds for the test to run.



Chapter 8 Management

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

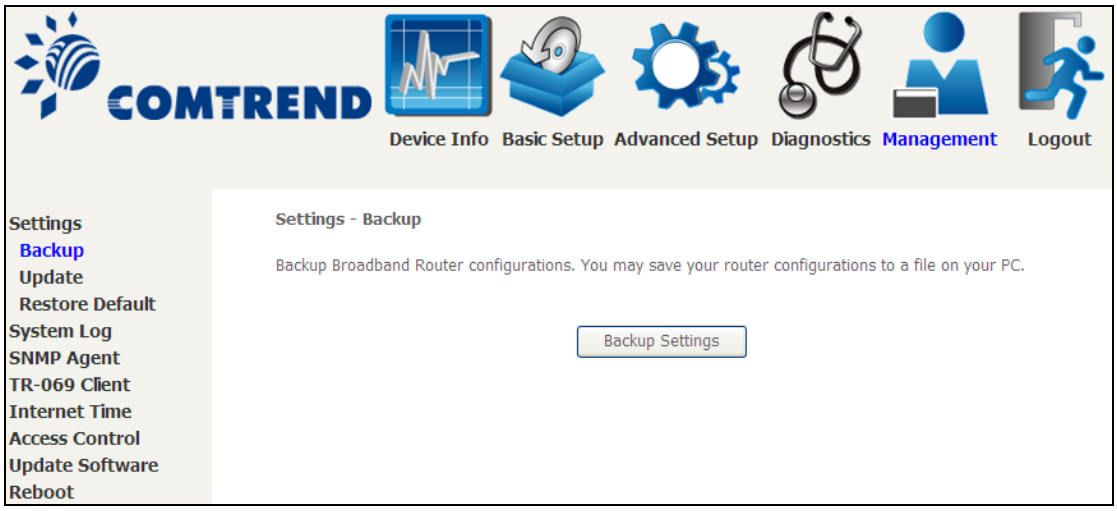
The Management menu has the following maintenance functions and processes:

8.1 Settings

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

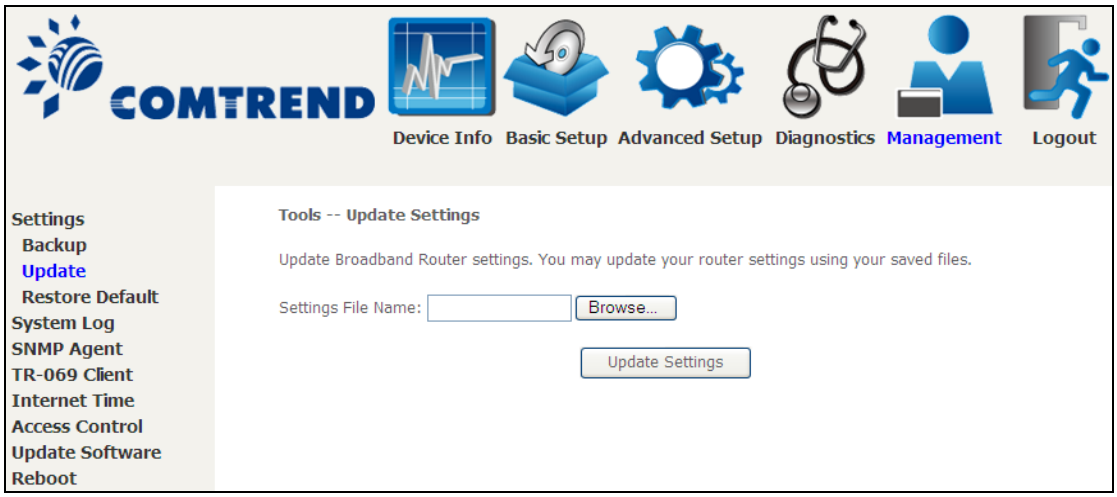
8.1.1 Backup Settings

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



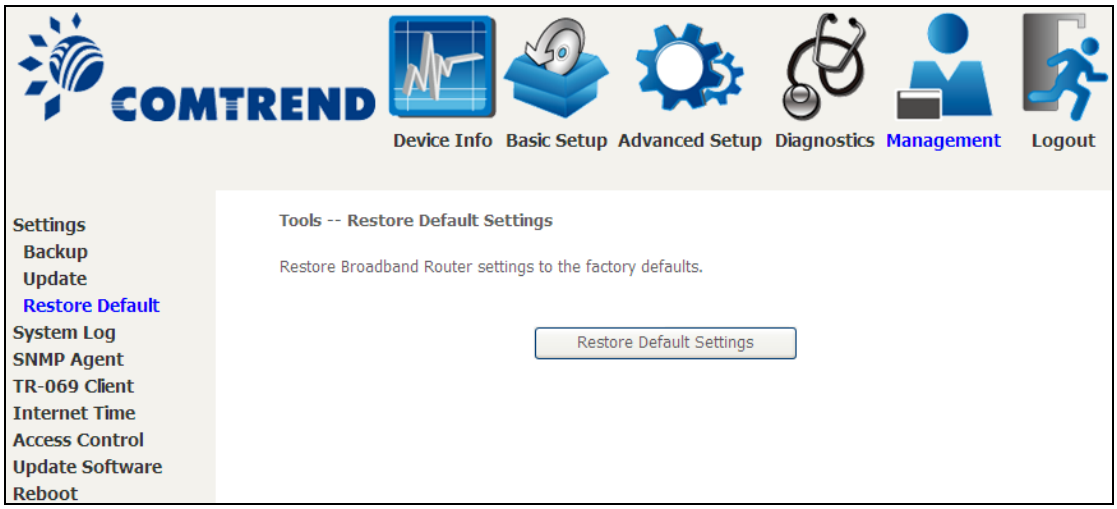
8.1.2 Update Settings

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

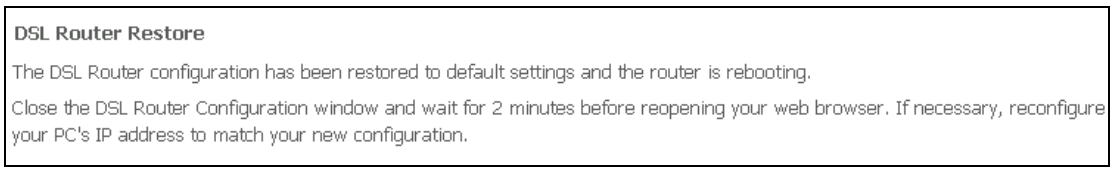


8.1.3 Restore Default

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



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



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.

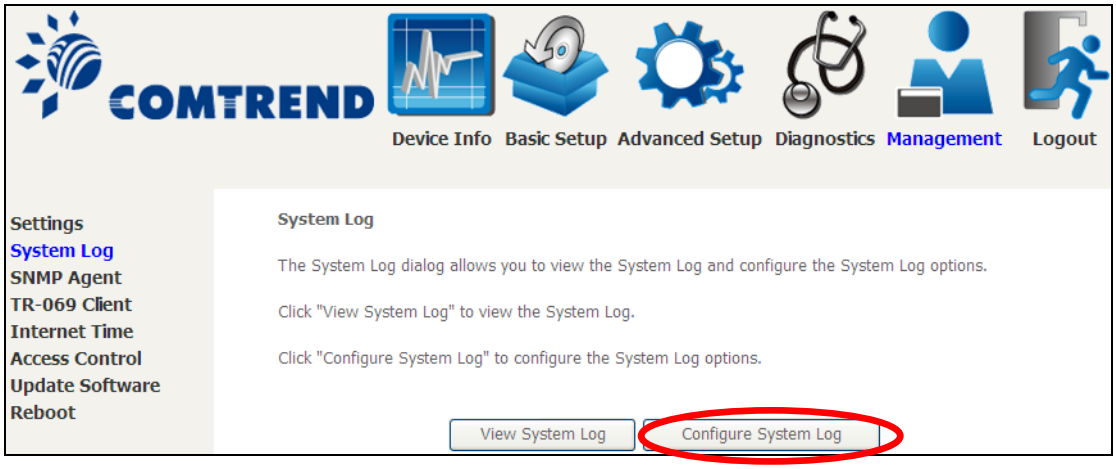
NOTE:	This entry has the same effect as the **Reset** button. The NexusLink 3112u board hardware and the boot loader support the reset to default. If the **Reset** button is continuously pressed for more than 10 seconds, the boot loader will erase the configuration data saved in flash memory.

8.2 System Log

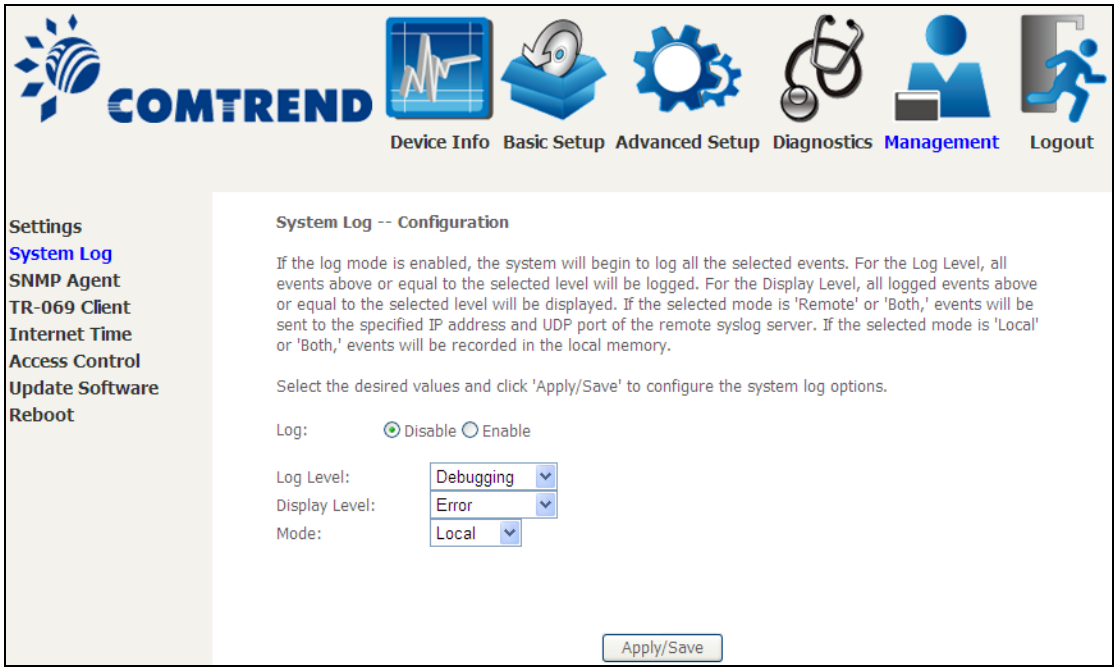
This function allows a system log to be kept and viewed upon request.

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

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



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



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

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

Option	Description
Log Level	Allows you to configure the event level and filter out unwanted events below this level. The events ranging from the highest critical level "Emergency" down to this configured level will be recorded to the log buffer on the NexusLink 3112u 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.