

PBL-6201 (Series) Home Gateway

User Manual



Preface

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

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

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

Important Safety Instructions

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

- Do not use or install this product near water, to avoid fire or shock hazard. For example, near a bathtub, kitchen sink or laundry tub, or near a swimming pool. Also, do not expose the equipment to rain or damp areas (e.g. a wet basement).
- Do not connect the power supply cord on elevated surfaces. Allow it to lie freely. There should be no obstructions in its path and no heavy items should be placed on the cord. In addition, do not walk on, step on, or mistreat the cord.
- Use only the power cord and adapter that are shipped with this device.
- Never install telephone wiring during stormy weather conditions.

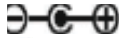
CAUTION:


- Always disconnect all telephone lines from the wall outlet before servicing or disassembling this equipment.
- Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.
- Do not stack equipment or place equipment in tight spaces, in drawers, or on carpets. Be sure that your equipment is surrounded by at least 2 inches of air space.
- To prevent interference with cordless phones, ensure that the gateway is at least 5 feet (1.5m)from the cordless phone base station.
- If you experience trouble with this equipment, disconnect it from the network until the problem has been corrected or until you are sure that equipment is not malfunctioning.

**WARNING**

- Disconnect the power line from the device before servicing
 - For indoor use only
 - Do NOT open the casing
 - Do NOT use near water
 - Do NOT insert sharp objects into the RJ-11 jack
 - Keep away from the fire
 - For use in ventilated environment / space
 - Use 26 AWG or larger cable connect to RJ-11 port
-
- Débranchez l'alimentation électrique avant l'entretien
 - Cet appareil est conçu pour l'usage intérieur seulement
 - N'ouvrez pas le boîtier
 - N'utilisez pas cet appareil près de l'eau
 - N'insérez pas d'objets tranchants dans la prise RJ-11
 - N'approchez pas du feu
 - Veuillez utiliser dans un environnement aéré
 - Veuillez utiliser fil électrique de 26AWG pour port RJ-11

Power Specifications (Alimentation) :

Input : 12Vdc, 3.0A 

Output : USB3.0,  900mA

**User Information**

Any changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

Aucune modification apportée à l'appareil par l'utilisateur, quelle qu'en soit la nature. Tout changement ou modification peuvent annuler le droit d'utilisation de l'appareil par l'utilisateur.

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

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

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class B digital apparatus complies with Canadian ICES-003. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

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

Cet appareil numérique de la classe B est conforme à la norme NMB-003 Canada. Pour réduire le risque d'interférence aux autres utilisateurs, le type d'antenne et son gain doivent être choisis de façon que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pas ce qui est nécessaire pour une communication réussie.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radiation Exposure

FCC

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 30 cm between the radiator and your body.

ISED

This device complies with the ISED radiation exposure limit set forth for an uncontrolled environment. This device should be installed and operated with minimum distance 30 cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

"This product meets the applicable Innovation, Science and Economic development Canada technical specifications".

The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

The Ringer Equivalence Number (REN) indicates the maximum number of devices allowed to be connected to a telephone interface. The termination of an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices not exceed five.

Cet équipement est conforme avec l'exposition aux radiations ISED définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une

distance minimum de 30 cm entre le radiateur et votre corps. Cet émetteur ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ou transmetteur.

les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

Le présent produit est conforme aux spécifications techniques applicables d'Innovation, Sciences et Développement économique Canada.

L'indice d'équivalence de la sonnerie (IES) sert à indiquer le nombre maximal de dispositifs qui peuvent être raccordés à une interface téléphonique. La terminaison d'une interface peut consister en une combinaison quelconque de dispositifs, à la seule condition que la somme des IES de tous les dispositifs n'excède pas cinq.

Certification

- FCC / IC standard
 - Part 15B / ICES-003
 - Part 15C / RSS-247(2.4GHz)
 - Part 15E / RSS-247(5GHz)
 - TIA-968 / IC-CS03
 - UL 62368-1 / CSA 62368-1

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If you wish to download the open source code please see:

<https://www.comtrend.com/gplcddl.html>

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Email: Comtrend support team - opensource@comtrend.com

Postal: Comtrend Corporation
3F-1, 10 Lane 609,
Chongxin Rd., Section 5,
Sanchong Dist,
New Taipei City 24159,
Taiwan
Tel: 886-2-2999-8261

In detail name the product and firmware version for which you request the source code and indicate means to contact you and send you the source code.

PLEASE NOTE WE WILL CHARGE THE COSTS OF A DATA CARRIER AND THE POSTAL CHARGES TO SEND THE DATA CARRIER TO YOU. THE AMOUNT WILL VARY ACCORDING TO YOUR LOCATION AND THE COMTREND SUPPORT TEAM WILL NOTIFY THE EXACT COSTS WHEN REVIEWING THE REQUEST.

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<https://www.comtrend.com/gplcddl.html>

Protect Our Environment



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

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

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Chapter 1 Introduction

PBL-6201 is a Multi-DSL bonding router with Broadcom solution. It provides both ADSL and 35b VDSL bonding and single line. Also provide 2.5 Giga Ethernet port and four Giga Ethernet ports, support WiFi 6 (802.11ax) Wireless solution on frequency band of 2.4GHz (4T4R) & 5GHz (4T4R). PBL-6201 allows easy center management (ACS) by following TR-069.

Chapter 2 Installation

2.1 Hardware Setup



DO NOT STACK

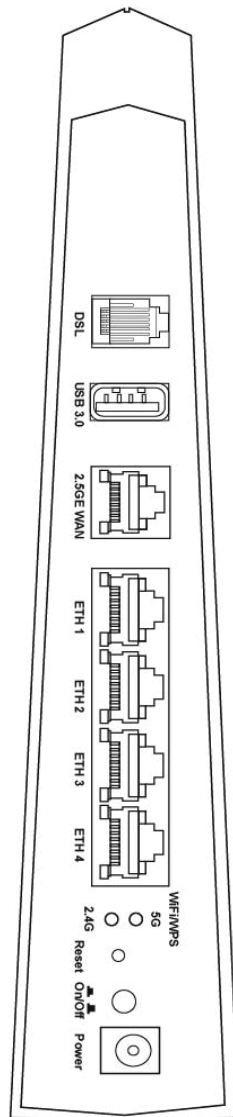
Non-stackable

This device is not stackable – do not place units on top of each other, otherwise damage could occur.

Follow the instructions below to complete the hardware setup.

2.1.1 Back Panel

The figure below shows the back panel of the device.



DSL

Connect to the DSL port with the DSL RJ11 cable. The PBL-6201 supports the following DSL profiles -

ADSL : ADSL, ADSL 2, ADSL 2+.

VDSL : 8a, 8b, 8c, 8d, 12a, 12b, 17a, 30a and 35b.

USB Port

This port can be used to connect the router to a storage device. It can only be used for SAMBA(storage) and for a Printer Server. Support for other devices may be added in future firmware upgrades.

LAN (Ethernet) Ports

You can connect the router to up to four LAN devices using RJ45 cables. The ports are auto-sensing MDI/X and either straight-through or crossover cable can be used.

ETH WAN PORT

This port is designated to be used for Ethernet WAN functionality only. Use 1000-BASE-T RJ-45 cables to connect to Gigabit WAN server, or 10/100BASE-T RJ-45 cables for standard network usage. This ports is auto-sensing MDI/X; so either straight-through or crossover cable can be used.

WiFi On/Off/ WPS Button 5G

Press the 5G button for less than 5 seconds to enable WPS which will allow 2 minutes for WiFi connection.

Press and hold the 5G button > 5 seconds and less than 10 seconds to enable/disable the WiFi function.

WiFi On/Off/ WPS Button 2.4G

Press the 2.4G button for less than 5 seconds to enable WPS which will allow 2 minutes for WiFi connection.

Press and hold the 2.4G button > 5 seconds and less than 10 seconds to enable/disable the WiFi function.

WPS Button

Press the WPS button less than 2 seconds to enable WPS which will allow 2 minutes for WiFi connection.

Reset Button

Restore the default parameters of the device by pressing the Reset button for 10 seconds. After the device has rebooted successfully, the front panel should display as expected (see section [2.1.3 Front Panel](#) for details).

| |
|---|
| NOTE: If pressed down for more than 60 seconds, the PBL-6201 will go into a firmware update state (CFE boot mode). The firmware can then be updated using an Internet browser pointed to the default IP address. |
|---|

Power ON

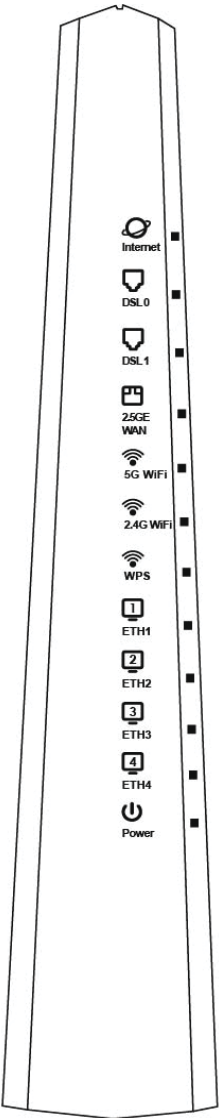
Press the power button to the OFF position (OUT). Connect the power adapter to the power port. Attach the power adapter to a wall outlet or other AC source. Press the power button to the ON position (IN). If the Power LED displays as expected then the device is ready for setup (see section – LED Indicators).

| |
|---|
| Caution 1: If the device fails to power up, or it malfunctions, first verify that the power cords are connected securely and then power it on again. If the problem persists, contact technical support. |
|---|

| |
|--|
| Caution 2: Before servicing or disassembling this equipment, disconnect all power cords and telephone lines from their outlets. |
|--|

2.1.3 Front Panel

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



| LED | Color | Mode | Function |
|----------|-------|-------|---|
| INTERNET | Green | On | IP connected and no traffic detected (the device has a WAN IP address from IPCP or DHCP is up or a static IP address is configured, PPP negotiation is successfully complete. |
| | | Off | Modem power off, modem in WDS mode or WAN connection not present. |
| | | Blink | IP connected and IP Traffic is passing through the device (either direction) |
| | Red | On | Device attempted to become IP connected and failed (no DHCP response, no PPPoE response, PPPoE authentication failed, no IP address from IPCP, etc.) |

| | | | |
|--------------|-------|-------|--|
| DSL0 | Green | On | xDSL (DSL0) Link is established. |
| | | Off | xDSL (DSL0) Link is established. |
| | | Blink | xDSL (DSL0) Link is training. |
| DSL1 | Green | On | xDSL (DSL1) Link is established. |
| | | Off | xDSL (DSL1) Link is established. |
| | | Blink | xDSL (DSL1) Link is training. |
| 2.5G ETH WAN | Green | On | Ethernet WAN is connected. |
| | | Off | Ethernet WAN is not connected. |
| | | Blink | Ethernet WAN is transmitting/ receiving. |
| 5G WiFi | Green | On | Wi-Fi enabled. |
| | | Off | Wi-Fi disabled. |
| | | Blink | Data transmitting or receiving over WLAN. |
| 2.4G WiFi | Green | On | Wi-Fi enabled. |
| | | Off | Wi-Fi disabled. |
| | | Blink | Data transmitting or receiving over WLAN. |
| WPS | Green | On | WPS connection successful. The LED will stay on for 3 minutes. |
| | | Off | No WPS association process ongoing. |
| | | Blink | WPS connection in progress. WPS connection unsuccessful. The LED will keep blinking for 30 sec. |
| ETH 1X-4X | Green | On | An Ethernet Link is established. |
| | | Off | An Ethernet Link is not established. |
| | | Blink | Data transmitting or receiving over Ethernet. |
| POWER | Green | On | The device is powered up. |
| | Red | Off | The device is powered down. |
| | | On | POST (Power On Self Test) failure or other malfunction. A malfunction is any error of internal sequence or state that will prevent the device from connecting to the DSLAM or passing customer data. |

Note:

A malfunction is any error of internal sequence or state that will prevent the device from connecting to the DSLAM or passing customer data. This may be identified at various times such as after power on or during operation through the use of self testing or in operations which result in a unit state that is not expected or should not occur.

IP connected (the device has a WAN IP address from IPCP or DHCP and DSL is up or a static IP address is configured, PPP negotiation has successfully complete – if used – and DSL is up) and no traffic detected. If the IP or PPPoE session is dropped for any other reason, the light is turned off. The light will turn red when it attempts to reconnect and DHCP or PPPoE fails.

Chapter 3 Web User Interface

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

3.1 Default Settings

The factory default settings of this device are summarized below.

- LAN IP address: 192.168.1.1
- LAN subnet mask: 255.255.255.0
- Administrative access (username: **root**, password: **12345**)
- WLAN access: **enabled**

Technical Note

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

3.2 IP Configuration

DHCP MODE

When the PBL-6201 powers up, the onboard DHCP server will switch on. Basically, the DHCP server issues and reserves IP addresses for LAN devices, such as your PC.

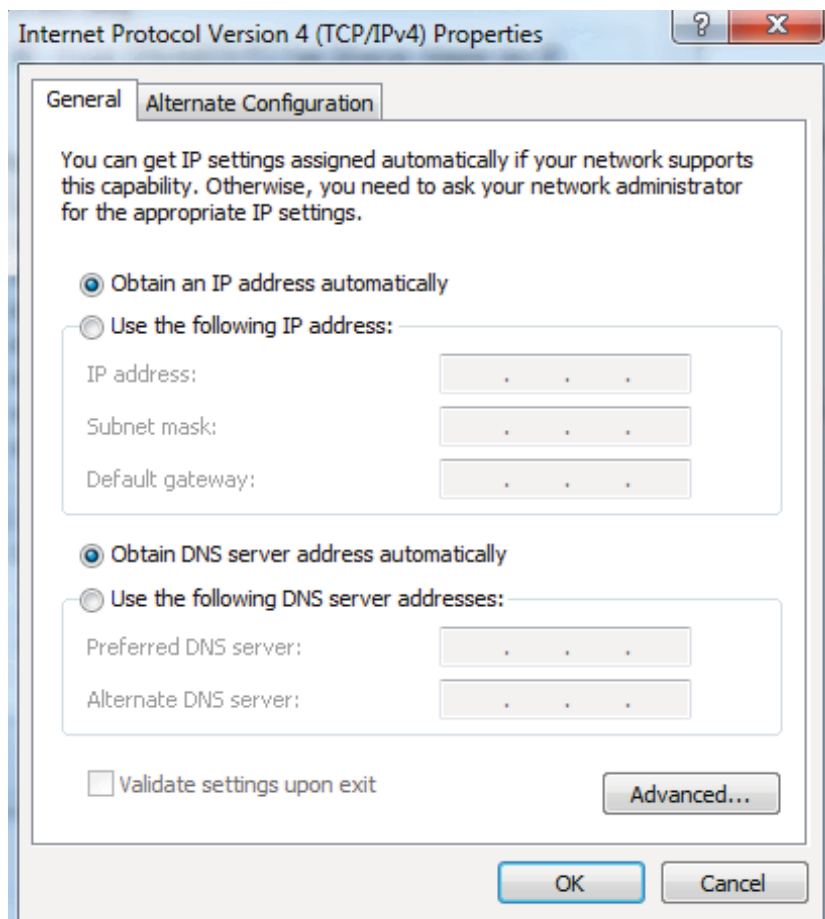
To obtain an IP address from the DHCP server, follow the steps provided below.

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

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

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

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



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

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

STATIC IP MODE

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

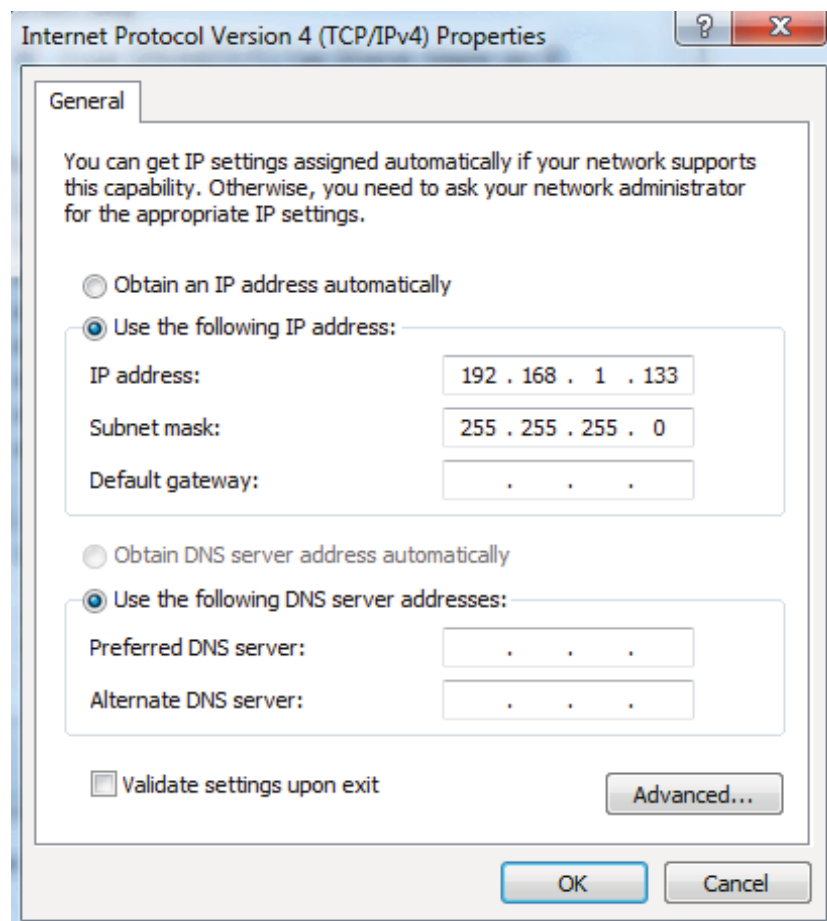
Follow these steps to configure your PC IP address to use subnet 192.168.1.x.

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

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

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

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



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

3.3 Login Procedure

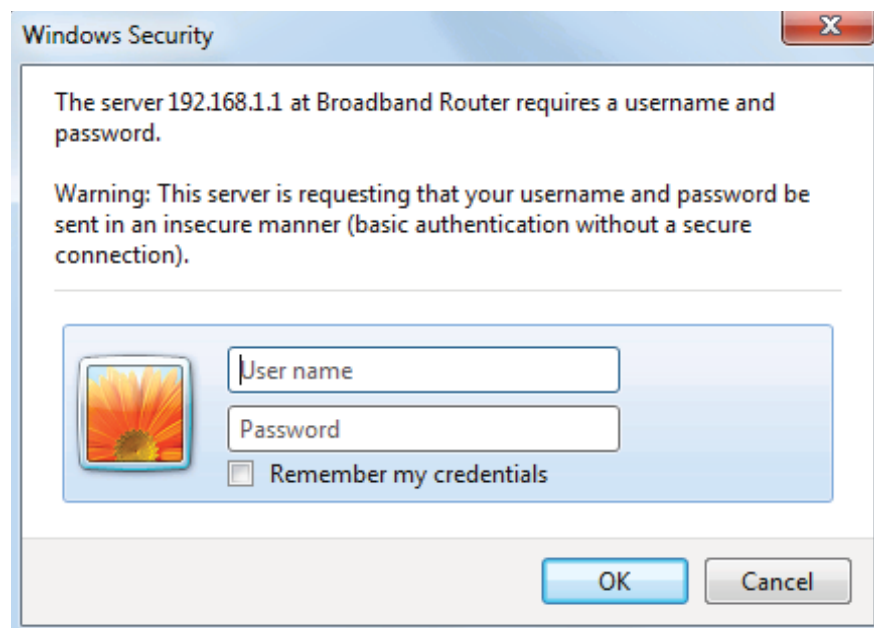
Perform the following steps to login to the web user interface.

NOTE: The default settings can be found in section [3.1 Default Settings](#).

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

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

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



Click **OK** to continue.

NOTE: The login password can be changed later (see section [8.7.1 Accounts](#)).

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

The screenshot displays the Comtrend web management interface. At the top, there are navigation icons for Device Info, Basic Setup, Advanced Setup, Diagnostics, Management, and Logout. A sidebar on the left lists various system information categories. The main content area is divided into several sections:

- Device:** A table listing hardware and software details.
- Wireless:** Two tables showing configuration for 2.4GHz and 5GHz interfaces, including SSID, channel, and security settings.
- LAN:** A visual representation of four Ethernet ports (eth1-eth4) and a table of LAN configuration parameters.
- WAN:** A visual representation of the WAN port status and a table of WAN configuration parameters.

| | |
|--------------------------|--------------------------------------|
| Model | NexusLink 3124u |
| Board ID | 63158MB-187AX |
| Serial Number | 2073124UDXF-AA000006 |
| Firmware Version | HT11-502CTU-C01_R03.AZpvfbK046n.d27h |
| Bootloader (CFE) Version | 1.0.38-163.243-0 |
| Up Time | 37 secs |

| | |
|------------------------|--|
| Driver Version | 17.10.99.27 |
| Primary SSID | Comtrend2461_2.4GHz |
| Status | Enabled |
| Channel | 11 |
| Security | Secure |
| Primary Encryption | WPA2-PSK AES |
| Primary Passphrase/Key | ***** <input type="button" value="Show"/> |

| | |
|------------------------|--|
| Driver Version | 17.10.99.27 |
| Primary SSID | Comtrend2461_5GHz |
| Status | Enabled |
| Channel | 165 |
| Security | Secure |
| Primary Encryption | WPA2-PSK AES |
| Primary Passphrase/Key | ***** <input type="button" value="Show"/> |

| | |
|------------------|-------------------|
| LAN IPv4 Address | 192.168.1.1 |
| LAN Subnet Mask | 255.255.255.0 |
| LAN MAC Address | c8:d1:2a:31:24:61 |
| DHCP Server | Enabled |

| | |
|------------------------|----------|
| Traffic Type | Inactive |
| Upstream Rate (Kbps) | 0 |
| Downstream Rate (Kbps) | 0 |
| Default Gateway | |
| Primary DNS Server | 0.0.0.0 |
| Secondary DNS Server | 0.0.0.0 |

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



Chapter 4 Device Information

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





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

NOTE: The menu items shown are based upon the configured connection(s) and user account privileges. For example, user account has limited access to configuration modification.


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

The Device Info Summary screen displays at startup.







Device Info




Basic Setup




Advanced Setup



Diagnostics



Management



Logout

Summary

WAN

Statistics

Route

ARP

DHCP

NAT Session

IGMP Info

CPU & Memory



Network Map

Wireless


Device


| | |
|--------------------------|-------------------------------------|
| Model | NexusLink 3124u |
| Board ID | 63158MB-187AX |
| Serial Number | 2073124L0XF-AA000006 |
| Firmware Version | HT11-502CTU-C01_R03.AZpvfK046n.d27h |
| Bootloader (CFE) Version | 1.0.38-163.243-0 |
| Up Time | 37 secs |


Wireless


| 2.4GHz Interface | |
|---|--|
| Driver Version | 17.10.99.27 |
| Primary SSID | Comtrend2461_2.4GHz |
| Status | Enabled |
| Channel | 11 |
|  | Secure |
| Primary Encryption | WPA2-PSK AES |
| Primary Passphrase/Key | ***** <input type="button" value="Show"/> |
| 5GHz Interface | |
| Driver Version | 17.10.99.27 |
| Primary SSID | Comtrend2461_5GHz |
| Status | Enabled |
| Channel | 165 |
|  | Secure |
| Primary Encryption | WPA2-PSK AES |
| Primary Passphrase/Key | ***** <input type="button" value="Show"/> |

LAN


100 FD
eth1



Down
eth2


Down
eth3


Down
eth4

| | |
|------------------|-------------------|
| LAN IPv4 Address | 192.168.1.1 |
| LAN Subnet Mask | 255.255.255.0 |
| LAN MAC Address | c8:d1:2a:31:24:61 |
| DHCP Server | Enabled |

WAN


DOWN

| | |
|------------------------|----------|
| Traffic Type | Inactive |
| Upstream Rate (Kbps) | 0 |
| Downstream Rate (Kbps) | 0 |
| Default Gateway | |
| Primary DNS Server | 0.0.0.0 |
| Secondary DNS Server | 0.0.0.0 |

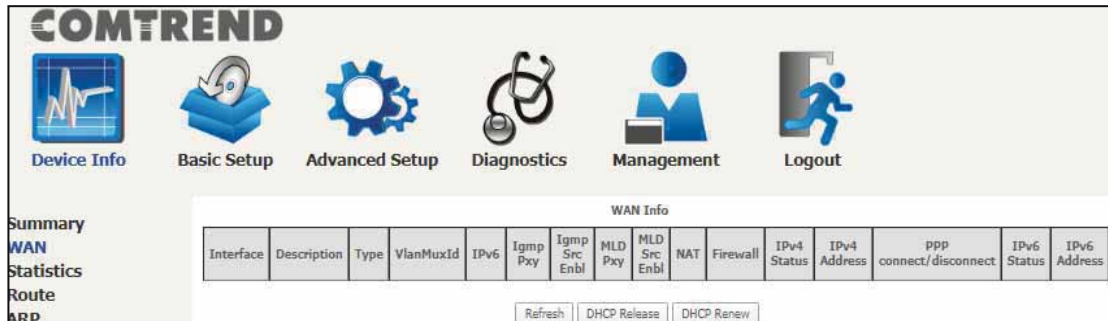
This screen shows hardware, software, IP settings and other related information.

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Leading the **Communication Trend**

4.1 WAN

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



Refresh – Click this button to refresh the screen.

DHCP Release – Click this button to release the IP through IPoE service.

DHCP Renew - Click this button to refresh an IP through IPoE service.

| Item | Description |
|---------------|--|
| Interface | Name of the interface for WAN |
| Description | Name of the WAN connection |
| Type | Shows the connection type |
| VlanMuxId | Shows 802.1Q VLAN ID |
| IPv6 | Shows WAN IPv6 status |
| Igmp Pxy | Shows Internet Group Management Protocol (IGMP) proxy status |
| Igmp Src Enbl | Shows the status of WAN interface used as IGMP source |
| MLD Pxy | Shows Multicast Listener Discovery (MLD) proxy status |
| MLD Src Enbl | Shows the status of WAN interface used as MLD source |
| NAT | Shows Network Address Translation (NAT) status |
| Firewall | Shows the status of Firewall |

| | |
|------------------------|---|
| IPv4 Status | Lists the status of IPv4 connection if WAN enabled IPv4 |
| IPv4 Address | Shows WAN IPv4 address |
| PPP connect/disconnect | Shows the PPP connection status |
| IPv6 Status | Lists the status of IPv6 connection if WAN enabled IPv6 |
| IPv6 Address | Shows WAN IPv6 address |

For your reference, if Manual Mode is enabled in PPP service as shown here.

Fixed MTU
 MTU:

Enable PPP Manual Mode

Enable PPP Debug Mode

Bridge PPPoE Frames Between WAN and Local Ports

IGMP Multicast

Enable IGMP Multicast Proxy

Enable IGMP Multicast Source

Manual PPP connect/disconnect option will become available on the WAN Info page (as shown here).

COMTREND

Device Info
 Basic Setup
 Advanced Setup
 Diagnostics
 Management
 Logout

WAN Info

| Interface | Description | Type | Vlan/Hostid | IPv4 | Ignor Phy | Igmp Src Enbl | MLD Phy | MLD Src Enbl | NAT | Firewall | IPv4 Status | IPv4 Address | PPP connect/disconnect | IPv6 Status | IPv6 Address |
|-----------|-------------|-------|-------------|----------|-----------|---------------|----------|--------------|---------|----------|----------------|--------------|------------------------|-------------|--------------|
| ppp0.1 | ppp-ppp0.1 | ppp0c | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Enabled | Disabled | LowerLayerDown | | Manual | ServiceDown | |

4.2 Statistics

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

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

4.2.1 LAN Statistics

This screen shows data traffic statistics for each LAN interface.

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

Summary
WAN
Statistics
LAN
WAN Service
xTM
xDSL
Route
ARP
DHCP
NAT Session

Statistics -- LAN

| Interface | Received | | | | | | | | Transmitted | | | | | | | |
|-----------|----------|------|------|-------|-----------|---------|-----------|------|-------------|-------|------|-------|-------|-----------|---------|-----------|
| | Total | | | | Multicast | Unicast | Broadcast | | | Total | | | | Multicast | Unicast | Broadcast |
| | Bytes | Pkts | Errs | Drops | Bytes | Pkts | Pkts | Pkts | Bytes | Pkts | Errs | Drops | Bytes | Pkts | Pkts | Pkts |
| eth0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| eth1 | 69157 | 585 | 0 | 0 | 0 | 214 | 241 | 130 | 261764 | 432 | 0 | 0 | 0 | 121 | 306 | 5 |
| eth2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| eth3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| eth4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| eth5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Reset Statistics

| Item | Description |
|-----------------------|--|
| Interface | LAN interface(s) |
| Received/Transmitted: | <ul style="list-style-type: none"> - Bytes - Pkts - Errs - Drops |
| | <ul style="list-style-type: none"> Number of Bytes Number of Packets Number of packets with errors Number of dropped packets |

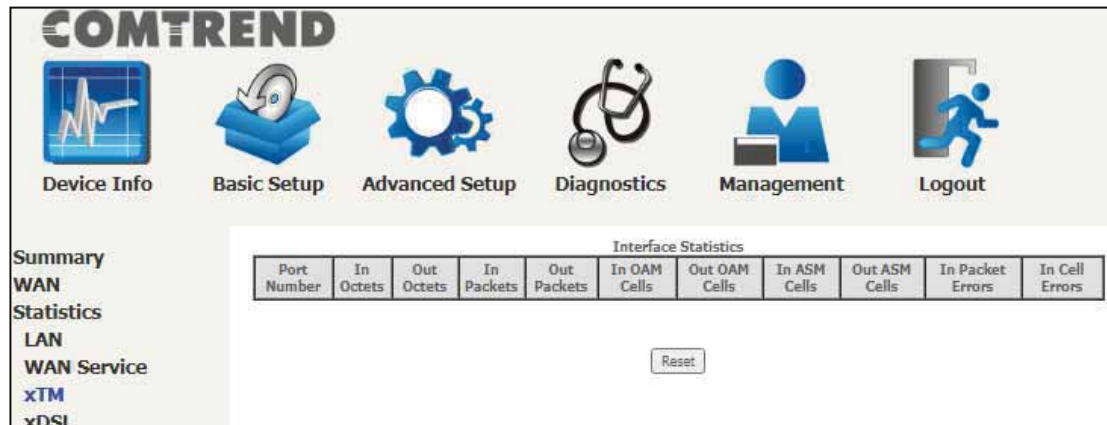
4.2.2 WAN Service

This screen shows data traffic statistics for each WAN interface.

| Item | Description |
|----------------------|--|
| Interface | WAN interfaces |
| Description | WAN service label |
| Received/Transmitted | <ul style="list-style-type: none"> - Bytes - Pkts - Errs - Drops |
| | <ul style="list-style-type: none"> Number of Bytes Number of Packets Number of packets with errors Number of dropped packets |

4.2.3 XTM Statistics

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



XTM Interface Statistics

| Item | Description |
|------------------|--|
| Port Number | ATM PORT (0-1) |
| In Octets | Number of octets received over the interface |
| Out Octets | Number of octets transmitted over the interface |
| In Packets | Number of packets received over the interface |
| Out Packets | Number of packets transmitted over the interface |
| In OAM Cells | Number of OAM Cells received over the interface |
| Out OAM Cells | Number of OAM Cells transmitted over the interface |
| In ASM Cells | Number of ASM Cells received over the interface |
| Out ASM Cells | Number of ASM Cells transmitted over the interface |
| In Packet Errors | Number of packets in Error |
| In Cell Errors | Number of cells in Error |

4.2.4 xDSL Statistics

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

VDSL2

Device Info

Basic Setup

Advanced Setup

Diagnostics

Management

Logout

Summary

WAN

Statistics

LAN

WAN Service

xTM

xDSL

Route

ARP

DHCP

NAT Session

IGMP Info

CPU & Memory

Network Map

Wireless

Statistics -- xDSL

| | | | | |
|--|--|--|-------------------|-----------------|
| Mode: | | | VDSL2 | |
| Traffic Type: | | | PTM | |
| Status: | | | Up | |
| Link Power State: | | | L0 | |
| | | | | |
| | | | Downstream | Upstream |
| PhyR Status: | | | Off | Off |
| Line Coding(Trellis): | | | On | On |
| SNR Margin (0.1 dB): | | | 349 | 384 |
| Attenuation (0.1 dB): | | | 43 | 0 |
| Output Power (0.1 dBm): | | | 105 | -149 |
| Attainable Rate (Kbps): | | | 87459 | 56514 |
| | | | | |
| | | | Path 0 | |
| | | | Downstream | Upstream |
| Rate (Kbps): | | | 29993 | 1047 |
| | | | | |
| B (# of bytes in Mux Data Frame): | | | 31 | 11 |
| M (# of Mux Data Frames in an RS codeword): | | | 1 | 4 |
| T (# of Mux Data Frames in an OH sub-frame): | | | 64 | 48 |
| R (# of redundancy bytes in the RS codeword): | | | 10 | 10 |
| S (# of data symbols over which the RS code word spans): | | | 0.0339 | 0.0339 |
| L (# of bits transmitted in each data symbol): | | | 9904 | 335 |
| D (interleaver depth): | | | 1921 | 17 |
| I (interleaver block size in bytes): | | | 42 | 58 |
| N (RS codeword size): | | | 42 | 58 |
| Delay (msec): | | | 16 | 5 |
| INP (DMT symbol): | | | 7.50 | 2.00 |
| | | | | |
| OH Frames: | | | 15738369 | 3036021 |
| OH Frame Errors: | | | 0 | 0 |
| RS Words: | | | 1748450939 | 148556587 |
| RS Correctable Errors: | | | 0 | 0 |
| RS Uncorrectable Errors: | | | 0 | 0 |
| | | | | |
| HEC Errors: | | | 0 | 0 |
| OCD Errors: | | | 0 | 0 |
| LCD Errors: | | | 0 | 0 |
| Total Cells: | | | 2968014265 | 0 |
| Data Cells: | | | 105397 | 0 |
| Bit Errors: | | | 0 | 0 |
| | | | | |
| Total ES: | | | 0 | 0 |
| Total SES: | | | 0 | 0 |
| Total UAS: | | | 179 | 179 |

xDSL BER Test
Reset Statistics
Draw Graph

ADSL2+

Device Info

Basic Setup

Advanced Setup

Diagnostics

Management

Logout

Statistics -- xDSL

| | | |
|--|-------------------|-----------------|
| Mode: | ADSL_2plus | |
| Traffic Type: | ATM | |
| Status: | Up | |
| Link Power State: | LO | |
| | Downstream | Upstream |
| PhyR Status: | Off | Off |
| Line Coding(Trellis): | On | On |
| SNR Margin (0.1 dB): | 63 | 69 |
| Attenuation (0.1 dB): | 45 | 0 |
| Output Power (0.1 dBm): | 43 | 94 |
| Attainable Rate (Kbps): | 29628 | 1450 |
| | Path 0 | |
| | Downstream | Upstream |
| Rate (Kbps): | 29623 | 1387 |
| MSGc (# of bytes in overhead channel message): | 51 | 18 |
| B (# of bytes in Mux Data Frame): | 243 | 111 |
| M (# of Mux Data Frames in FEC Data Frame): | 1 | 2 |
| T (Mux Data Frames over sync bytes): | 4 | 1 |
| R (# of check bytes in FEC Data Frame): | 0 | 8 |
| S (ratio of FEC over PMD Data Frame length): | 0.2847 | 5.5402 |
| L (# of bits in PMD Data Frame): | 6854 | 335 |
| D (interleaver depth): | 1 | 8 |
| Delay (msec): | 0 | 11 |
| INP (DMT symbol): | 0.00 | 0.50 |
| Super Frames: | 24768 | 4778 |
| Super Frame Errors: | 0 | 355 |
| RS Words: | 0 | 81508 |
| RS Correctable Errors: | 0 | 0 |
| RS Uncorrectable Errors: | 0 | 0 |
| HEC Errors: | 1155 | 370 |
| OCD Errors: | 0 | 0 |
| LCD Errors: | 0 | 0 |
| Total Cells: | 7918529 | 353755 |
| Data Cells: | 42 | 0 |
| Bit Errors: | 0 | 0 |
| Total ES: | 18 | 0 |
| Total SES: | 18 | 0 |
| Total UAS: | 197 | 187 |

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

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Leading the **Communication Trend**

| Item | Description |
|------------------------|---|
| Mode | VDSL, VDSL2 |
| Traffic Type | ATM, PTM |
| Status | Lists the status of the DSL link |
| Link Power State | Link output power state |
| phyR Status | Shows the status of PhyR™ (Physical Layer Re-Transmission) impulse noise protection |
| Line Coding (Trellis) | Trellis On/Off |
| SNR Margin (0.1 dB) | Signal to Noise Ratio (SNR) margin |
| Attenuation (0.1 dB) | Estimate of average loop attenuation in the downstream direction |
| Output Power (0.1 dBm) | Total upstream output power |
| Attainable Rate (Kbps) | The sync rate you would obtain |
| Rate (Kbps) | Current sync rates downstream/upstream |

In ADSL2/VDSL mode, the following section is inserted.

| Item | Description |
|------|--|
| MSGc | Number of bytes in overhead channel message |
| B | Number of bytes in Mux Data Frame |
| M | Number of Mux Data Frames in a RS codeword |
| T | Number of Mux Data Frames in an OH sub-frame |
| R | Number of redundancy bytes in the RS codeword |
| S | Number of data symbols the RS codeword spans |
| L | Number of bits transmitted in each data symbol |
| D | The interleaver depth |
| I | The interleaver block size in bytes |
| N | RS codeword size |

| | |
|-------|----------------------------------|
| Delay | The delay in milliseconds (msec) |
| INP | DMT symbol |

| Item | Description |
|-------------------------|--|
| Super Frames | Total number of super frames |
| Super Frame Errors | Number of super frames received with errors |
| RS Words | Total number of Reed-Solomon code errors |
| RS Correctable Errors | Total Number of RS with correctable errors |
| RS Uncorrectable Errors | Total Number of RS words with uncorrectable errors |

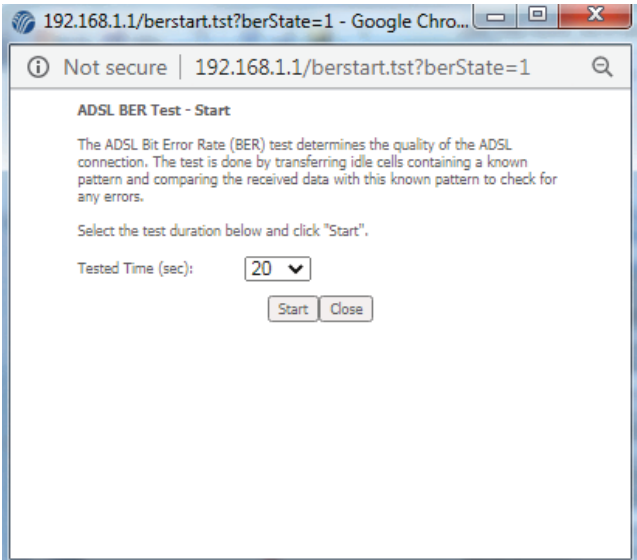
| Item | Description |
|-------------------------|--|
| OH Frames | Total number of OH frames |
| OH Frame Errors | Number of OH frames received with errors |
| RS Words | Total number of Reed-Solomon code errors |
| RS Correctable Errors | Total Number of RS with correctable errors |
| RS Uncorrectable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

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

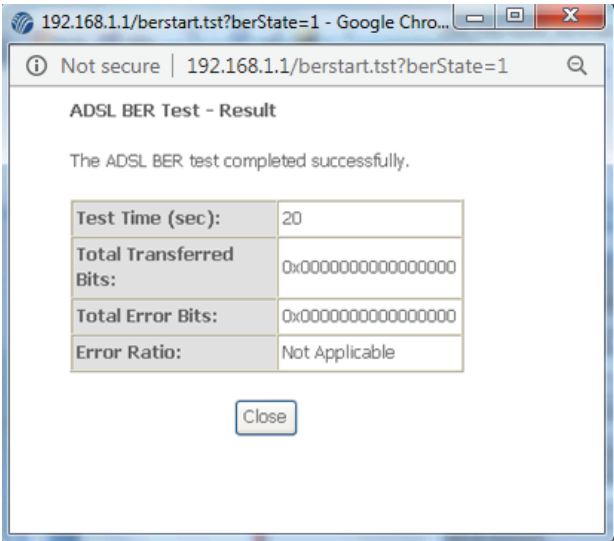
| Item | Description |
|-----------|--|
| Total ES | Total Number of Errored Seconds |
| Total SES | Total Number of Severely Errored Seconds |
| Total UAS | Total Number of Unavailable Seconds |

xDSL BER TEST

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

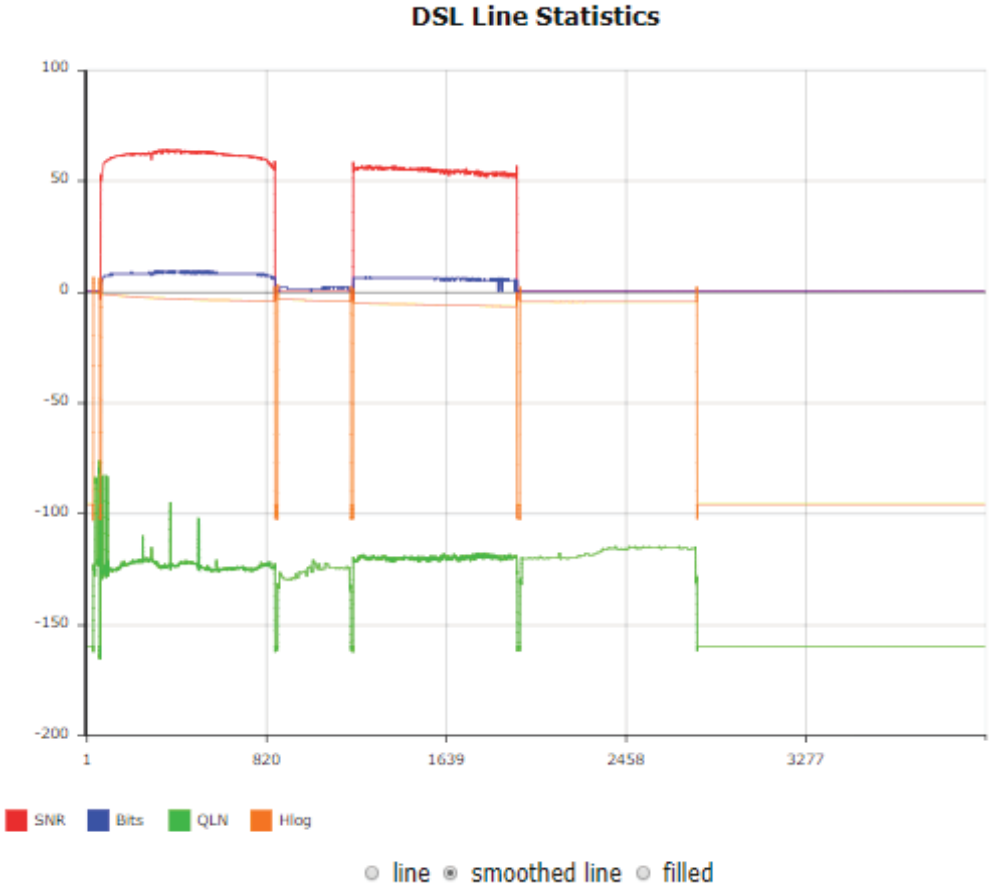


Click **Start** to start the test or click **Close** to cancel the test. After the BER testing is complete, the pop-up window will display as follows.



xDSL TONE GRAPH

Click **Draw Graph** on the xDSL Statistics screen and a pop-up window will display the xDSL statistics graph, including SNR, Bits per tone, QLN and Hlog of the xDSL line connection, as shown below.



4.3 Route

Choose **Route** to display the routes that the PBL-6201 has found.

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

Summary
WAN
Statistics
Route
ARP
DHCP

Device Info -- Route

Flags: U - up, ! - reject, G - gateway, H - host, R - reinstate
D - dynamic (redirect), M - modified (redirect).

| Destination | Gateway | Subnet Mask | Flag | Metric | Service | Interface |
|-------------|---------|---------------|------|--------|-------------|-----------|
| 192.168.1.0 | 0.0.0.0 | 255.255.255.0 | U | 0 | cpe-iptnf-1 | br0 |
| 239.0.0.0 | 0.0.0.0 | 255.0.0.0 | U | 0 | cpe-iptnf-1 | br0 |

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

4.4 ARP

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

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

Summary
WAN
Statistics
Route
ARP

Device Info -- ARP

| IP address | Flags | HW Address | Device |
|-------------|----------|-------------------|--------|
| 192.168.1.6 | Complete | 00:50:ba:24:29:bd | br0 |

| Item | Description |
|------------|---|
| IP address | Shows IP address of host PC |
| Flags | Complete, Incomplete, Permanent, or Publish |
| HW Address | Shows the MAC address of host PC |
| Device | Shows the connection interface |

4.5 DHCP

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

The screenshot shows the COMTREND web interface. At the top, there is a navigation bar with icons and labels for Device Info, Basic Setup, Advanced Setup, Diagnostics, Management, and Logout. On the left side, there is a sidebar menu with links for Summary, WAN, Statistics, Route, ARP, and DHCP. The main content area is titled "Device Info -- DHCP Leases" and displays a table with the following columns: Hostname, MAC Address, IP Address, and Expires In.

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

4.6 NAT Session

This page displays all NAT connection session including both UPD/TCP protocols passing through the device.

Click the "Show All" button to display the following.

| Source IP | Source Port | Destination IP | Destination Port | Protocol | Timeout |
|-------------|-------------|----------------|------------------|----------|---------|
| 192.168.1.2 | 50684 | 192.168.1.1 | 80 | tcp | 83 |
| 127.0.0.1 | 45000 | 127.0.0.1 | 45032 | udp | 27 |
| 192.168.1.2 | 60311 | 192.168.1.1 | 53 | udp | 13 |
| 192.168.1.2 | 50683 | 192.168.1.1 | 80 | tcp | 83 |
| 192.168.1.2 | 53727 | 192.168.1.1 | 53 | udp | 28 |
| 192.168.1.2 | 50690 | 192.168.1.1 | 80 | tcp | 86399 |
| 192.168.1.2 | 50685 | 192.168.1.1 | 80 | tcp | 83 |

| Item | Description |
|------------------|--|
| Source IP | The source IP from which the NAT session is established |
| Source Port | The source port from which the NAT session is established |
| Destination IP | The IP which the NAT session was connected to |
| Destination Port | The port which the NAT session was connected to |
| Protocol | The Protocol used in establishing the particular NAT session |
| Timeout | The time remaining for the TCP/UDP connection to be active |

4.7 IGMP Info

Click **IGMP Info** to display the list of IGMP entries broadcasting through the IGMP proxy enabled WAN connection.

| Item | Description |
|------------------|---|
| Interface | The Source interface from which the IGMP report was received |
| WAN | The WAN interface from which the multicast traffic is received |
| Groups | The destination IGMP group address |
| Member | The Source IP from which the IGMP report was received |
| Timeout | The time remaining before the IGMP report expires |
| Last Report Time | The time of the last received IGMP report |
| Total Time(sec) | Total |
| Total Joins | Total IGMP join packets received for this IGMP address for this client |
| Total Leaves | Total IGMP leave packets received for this IGMP address for this client |

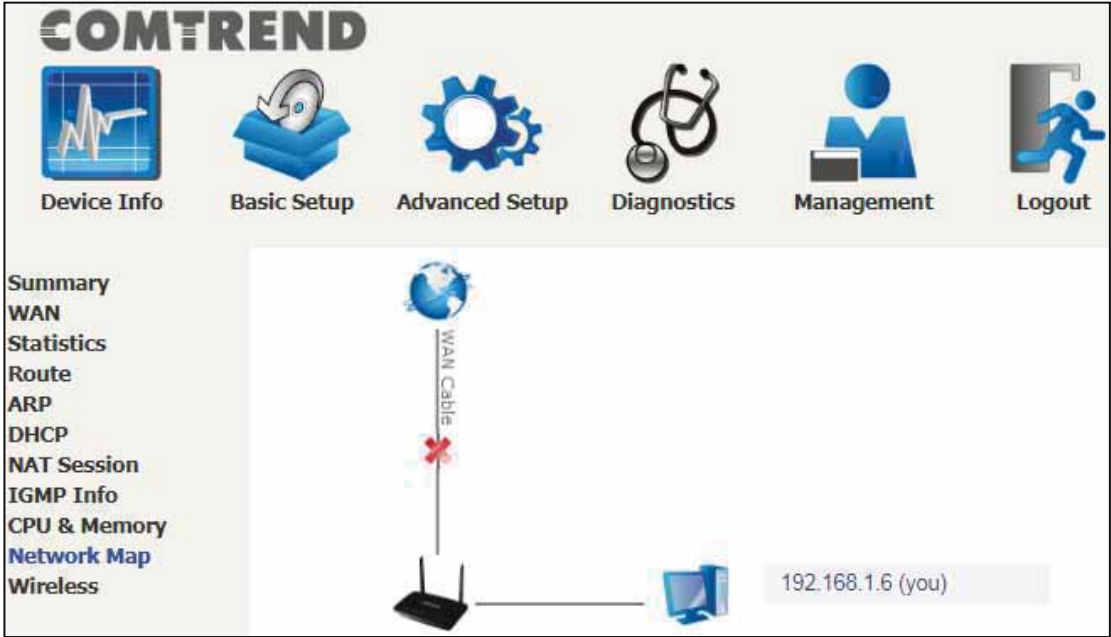
4.8 CPU & Memory

Displays the system performance graphs. Shows the current loading of the CPU and memory usage with dynamic updates.



4.9 Network Map

The network map is a graphical representation of router's wan status and LAN devices.



4.10 Wireless

4.10.1 Station Info

This page shows authenticated wireless stations and their status.

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

Summary
WAN
Statistics
Route
ARP
DHCP
NAT Session
IGMP Info
CPU & Memory
Network Map
Wireless
Station Info
Wifi Insight

Station Info
 This page allows you to configure the Virtual interfaces for each Physical interface.

Wireless Interface: Comtrend2451_2.4GHz(00:90:4C:2C:30:00) ▼
 BSS-MAC (SSID): 00:90:4C:2C:30:00 (Comtrend2451_2.4GHz enabled) ▼

Authenticated Stations:

| MAC Address | Association Time | Authorized | WMM Link | Power Save | APSD Default |
|-------------|------------------|------------|----------|------------|--------------|
|-------------|------------------|------------|----------|------------|--------------|

Consult the table below for descriptions of each column heading.

| Item | Description |
|--------------------|---|
| Wireless Interface | Lists the 5GHz/2.4GHz interface that the station connects to |
| BSS-MAC (SSID) | Lists which SSID of the modem that the stations connect to |
| MAC Address | Lists the MAC address of all the stations. |
| Association Time | Lists all the stations that are associated with the Access Point, along with the amount of time since packets were transferred to and from each station. If a station is idle for too long, it is removed from this list. |
| Authorized | Lists those devices with authorized access |
| WMM Link | Lists those devices that utilize WMM |
| Power Save | Lists those devices that utilize the Power Save Feature |
| APSD Default | Lists those devices that utilize the Automatic Power Save Delivery Feature |

4.10.2 WiFi Insight

This page allows you to configure the WiFi Insight system. The WiFi Insight system allows the wireless interface to collect beacon data from nearby devices and analyze traffic on the connected stations. This data collection requires memory storage and therefore needs to be configured prior to use. To begin, click on the "Start Data Collection" button if no change is needed.

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

Configure
In this page you will be able to configure the WiFi Insight system

Sample Interval
 5 Second 10 Second 15 Second 20 Second

Start/Stop Data Collection
Start Data Collection
 Start collecting data every
 Sunday Monday Tuesday Wednesday Thursday Friday Saturday
From 12:00 AM To 12:00 AM

Database Size
Database Size MB
(Please note that, for example, 2 STA's connected using a 5 seconds sample interval run for 1 hour will occupy approximately 1.30 MB of database)
Once Database size reaches maximum limit Overwrite Older Data Stop Datacollection

Counters

| | |
|--|---|
| <input checked="" type="checkbox"/> Channel Statistics | <input checked="" type="checkbox"/> Packet Retried |
| <input checked="" type="checkbox"/> Chanin Statistics | <input checked="" type="checkbox"/> Queue Utilization |
| <input checked="" type="checkbox"/> Rx CRS Glitches | <input checked="" type="checkbox"/> Queue Length Per Precedence |
| <input checked="" type="checkbox"/> Bad PLCP | <input checked="" type="checkbox"/> Data Throughput |
| <input checked="" type="checkbox"/> Bad FCS | <input checked="" type="checkbox"/> Physical Rate |
| <input checked="" type="checkbox"/> Packet Requested | <input checked="" type="checkbox"/> RTS Fail |
| <input checked="" type="checkbox"/> Packet Stored | <input checked="" type="checkbox"/> Retry Drop |
| <input checked="" type="checkbox"/> Packet Dropped | <input checked="" type="checkbox"/> PS Retry |
| | <input checked="" type="checkbox"/> Acked |

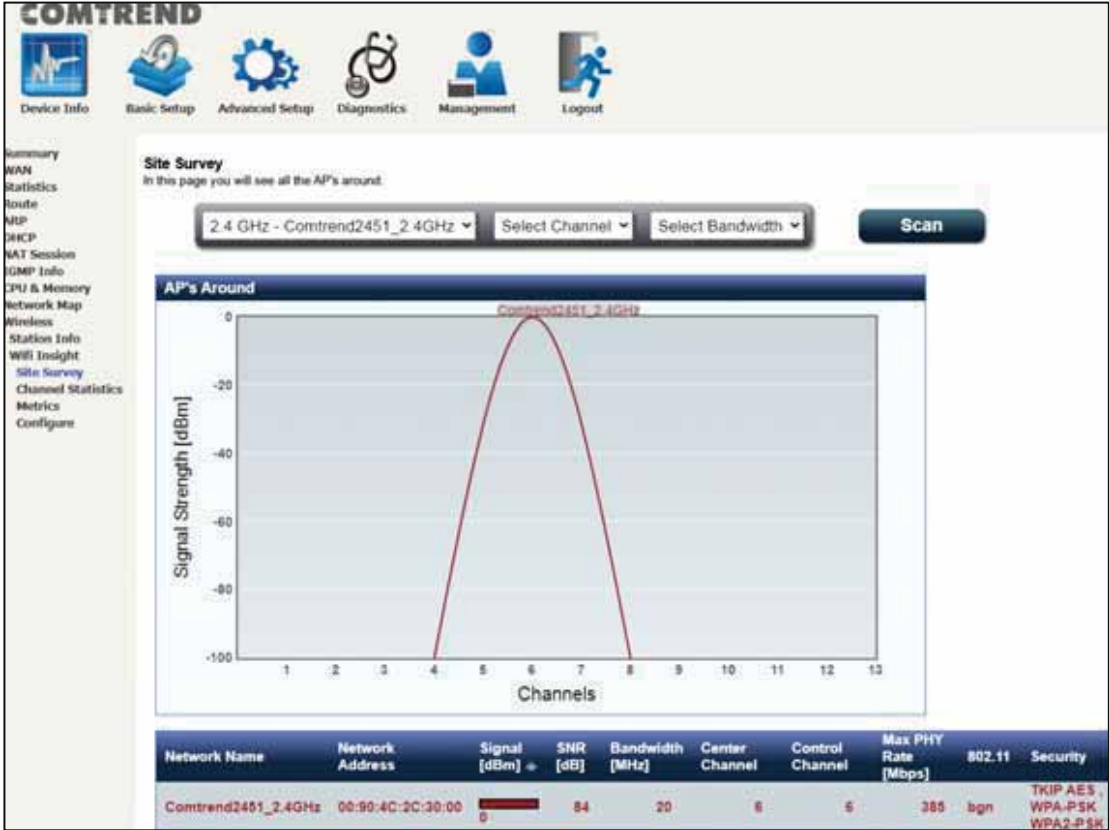
Submit

Export Database
Download Database File: **Save Database to File**

4.10.2.1 Site Survey

The graph displays wireless APs found in your neighborhood by channel collected under the WiFi insight system. Select the wireless interface, channel, bandwidth to check the different display if desired.

2.4GHz



5GHz



4.10.2.2 Channel Statistics

This page allows you to see the WiFi and Non WiFi interference, and also the available capacity. This page is broken down into individual parts below. Click on the drop-down menu to select 2.4GHz or 5GHz interface.

2.4GHz


Channel Statistics
In this page you will see the Wi-Fi and Non Wi-Fi Interference also Available Capacity

2.4 GHz - Comtrend2451_2.4GHz ▾

Current Channel :1
Current Channel BandWidth:20 MHz
Current Available Capacity :0%

Associated Station's
Shows stations associated with AP.

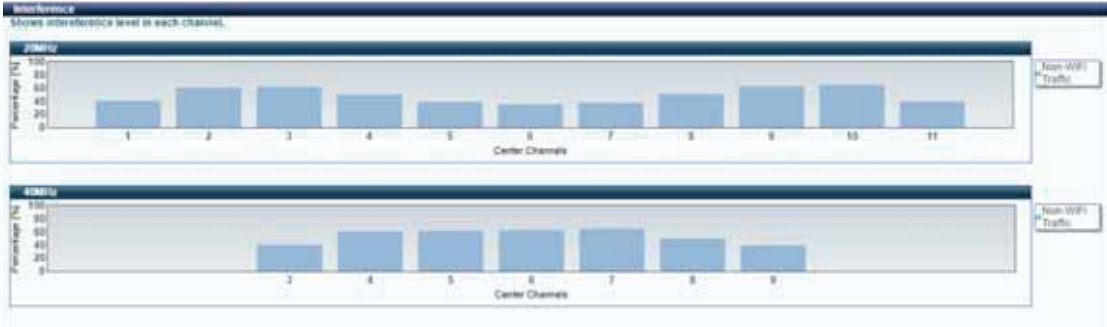
SSID : Comtrend2451_2.4GHz
BSSID : 00:90:4C:2C:30:00
Channel : 1



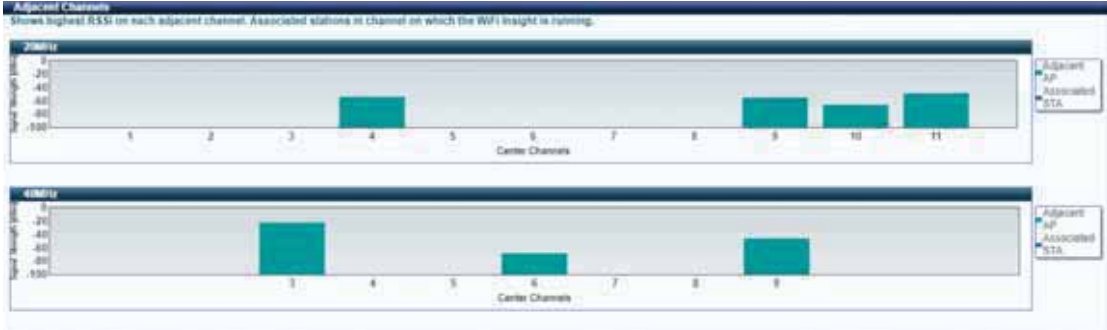
Shows the bandwidth that is available for use in each channel.



Shows interference level in each channel.



Shows the highest RSSI on each adjacent channel. Adjacent AP and associated stations are displayed for checking interference on those channels.



5 GHz


Channel Statistics
In this page you will see the Wi-Fi and Non Wi-Fi Interference also Available Capacity

5 GHz - Comtrend2451_5GHz

Current Channel :64
Current Channel BandWidth:20 MHz
Current Available Capacity :0%

Associated Station's
Shows stations associated with AP.

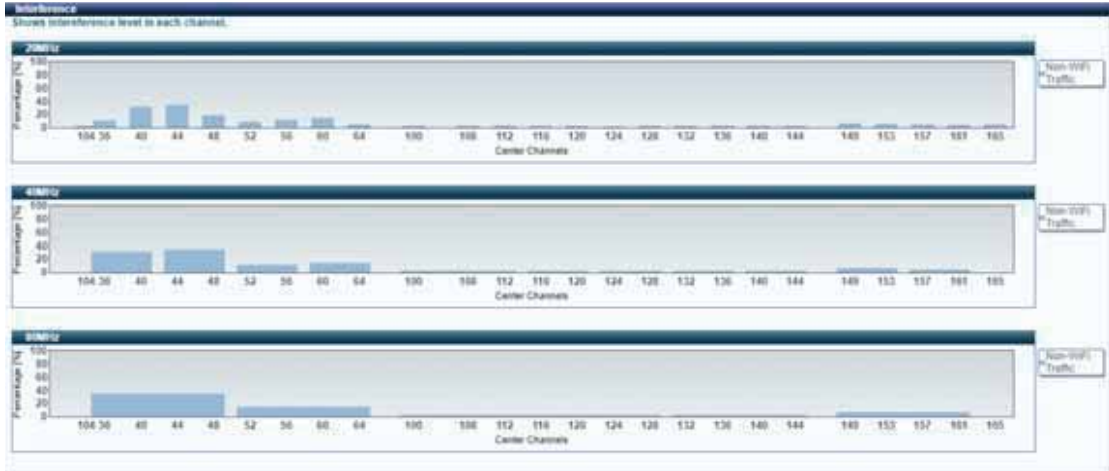
SSID : Comtrend2451_5GHz
BSSID : 00:90:4C:2C:20:77
Channel : 64



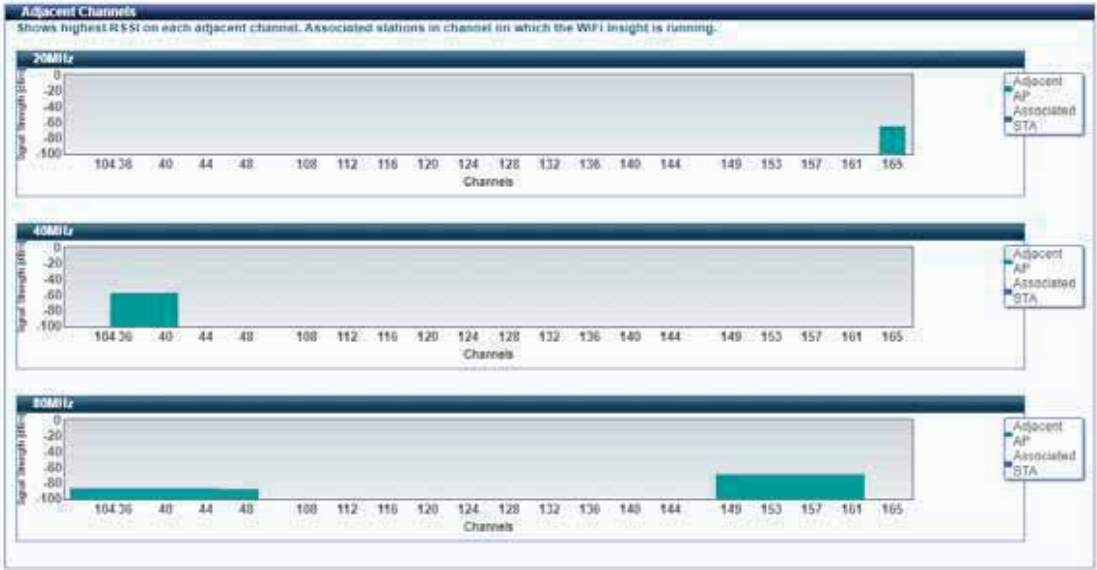
Shows the bandwidth that is available for use in each channel.



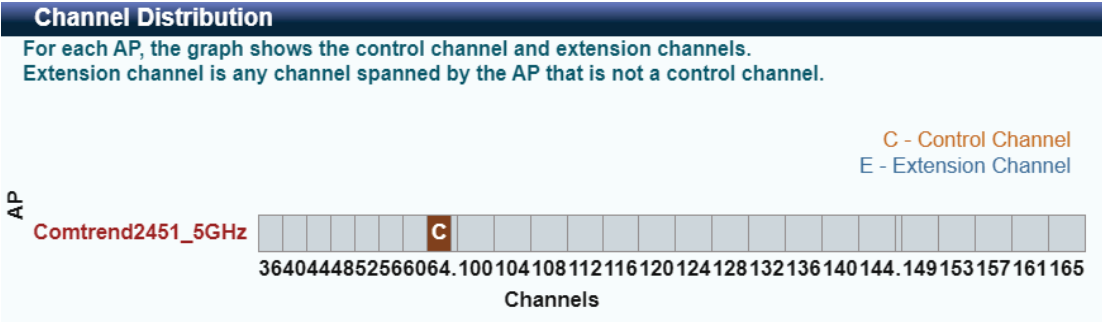
Shows interference level in each channel.



Shows the highest RSSI on each adjacent channel. Adjacent AP and associated stations are displayed for checking interference on those channels.



For each AP, the graph shows the control channel and extension channels. Extension channel is any channel spanned by the AP that is not a control channel.



4.10.2.3 Metrics (Advanced Troubleshooting)

In this page you will see most of the counters like AMPDU(if available), Glitch, Chanim and Packet Queue Statistics. This page is broken down into individual parts below.

Advanced Troubleshooting
 In this page you will see most of the counters like AMPDU(if available), Glitch, Chanim and Packet Queue Statistics

2.4 GHz - Comtrend2451_2.4GHz ▼

Click on the drop-down menu to select 2.4GHz or 5GHz interface.

Shows the rx glitch counters, bad frame check sequence counters received from air over time.

In this page you will see most of the counters like AMPDU(if available), Glitch, Chanim and Packet Queue Statistics



Select the counter of interest to monitor the statistics received over time in the chanim statistics graph.



Lists the associated station to the wireless interface.

4.10.2.4 Configure

This page allows you to configure the WiFi insight system.

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

Configure
In this page you will be able to configure the WiFi insight system.

Sample Interval
 5 Second 10 Second 15 Second 20 Second

Start/Stop Data Collection

 Start collecting data every
 Sunday Monday Tuesday Wednesday Thursday Friday Saturday
 From To

Database Size
 Database Size MB
(Please note that, for example, 2 STA's connected using a 5 seconds sample interval run for 1 hour will occupy approximately 1.30 MB of database)
 Once Database size reaches maximum limit: Overwrite Older Data Stop Datacollection

Counters

| | |
|--|---|
| <input checked="" type="checkbox"/> Channel Statistics | <input checked="" type="checkbox"/> Packet Retried |
| <input checked="" type="checkbox"/> Channel Statistics | <input checked="" type="checkbox"/> Queue Utilization |
| <input checked="" type="checkbox"/> Rx CRS Glitches | <input checked="" type="checkbox"/> Queue Length Per Precedence |
| <input checked="" type="checkbox"/> Bad PLCP | <input checked="" type="checkbox"/> Data Throughput |
| <input checked="" type="checkbox"/> Bad FCS | <input checked="" type="checkbox"/> Physical Rate |
| <input checked="" type="checkbox"/> Packet Requested | <input checked="" type="checkbox"/> RTS Fail |
| <input checked="" type="checkbox"/> Packet Stored | <input checked="" type="checkbox"/> Retry Drop |
| <input checked="" type="checkbox"/> Packet Dropped | <input checked="" type="checkbox"/> PS Retry |
| | <input checked="" type="checkbox"/> Ackind |

Export Database

Sample Interval

Select the desired time interval to collect sampling data with the WiFi insight system.

Start/Stop Data Collection

Start/Stop the data collection process.

Database Size

Define the dedicated database size to be used for the WiFi insight system.

Counters

Define the counters that would be collected by the WiFi insight system.

Export Database

Export and save the collected database file.

Chapter 5 Basic Setup

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



This will bring you to the following screen.

COMTREND

 Device Info
 Basic Setup
 Advanced Setup
 Diagnostics
 Management
 Logout

Device

| | |
|--------------------------|--------------------------------------|
| Model | NexusLink 3124u |
| Board ID | 63158MB-187AX |
| Serial Number | 2073124UDXF-AA000006 |
| Firmware Version | HT11-502CTU-C01_R03.A2pvfbK046n.d27h |
| Bootloader (CFE) Version | 1.0.38-163.243-0 |
| Up Time | 37 secs |

Wireless

| 2.4GHz Interface | |
|------------------------|--|
| Driver Version | 17.10.99.27 |
| Primary SSID | Comtrend2461_2.4GHz |
| Status | Enabled |
| Channel | 11 |
| | Secure |
| Primary Encryption | WPA2-PSK AES |
| Primary Passphrase/Key | ***** <input type="button" value="Show"/> |
| 5GHz Interface | |
| Driver Version | 17.10.99.27 |
| Primary SSID | Comtrend2461_5GHz |
| Status | Enabled |
| Channel | 165 |
| | Secure |
| Primary Encryption | WPA2-PSK AES |
| Primary Passphrase/Key | ***** <input type="button" value="Show"/> |

LAN

100 FD
eth1

Down
eth2

Down
eth3

Down
eth4

| | |
|------------------|-------------------|
| LAN IPv4 Address | 192.168.1.1 |
| LAN Subnet Mask | 255.255.255.0 |
| LAN MAC Address | c8:d1:2a:31:24:61 |
| DHCP Server | Enabled |

WAN

DOWN

| | |
|------------------------|----------|
| Traffic Type | Inactive |
| Upstream Rate (Kbps) | 0 |
| Downstream Rate (Kbps) | 0 |
| Default Gateway | |
| Primary DNS Server | 0.0.0.0 |
| Secondary DNS Server | 0.0.0.0 |

Summary

- WAN
- Statistics
- Route
- ARP
- DHCP
- NAT Session
- IGMP Info
- CPU & Memory
- Network Map
- Wireless

5.1 Wan Setup

Click WAN Setup on the on the left of your screen.
Add or remove ATM, PTM and ETH WAN interface connections here.

The screenshot shows the COMTREND management interface. At the top, there are navigation icons for Device Info, Basic Setup, Advanced Setup, Diagnostics, Management, and Logout. On the left sidebar, there are links for WAN Setup, NAT, LAN, Parental Control, Home Networking, and Wireless. The main content area is titled 'Step 1: Layer 2 Interface' and contains a dropdown menu to 'Select new interface to add' (currently set to 'ATM Interface') with an 'Add' button. Below this are three configuration tables:

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 |
|---------------|-----|-----|-------------|----------|-------------------------|--------------------------------|-----------------------|-----------|-----------|--------|--------|
| [Empty table] | | | | | | | | | | | |

DSL PTM Interface Configuration

| Interface | DSL Latency | PTM Priority | Conn Mode | IP QoS | Remove |
|---------------|-------------|--------------|-----------|--------|--------|
| [Empty table] | | | | | |

ETH WAN Interface Configuration

| Interface/(Name) | Connection Mode | Remove |
|------------------|-----------------|--------|
| [Empty table] | | |

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 | Manual Mode | Remove | Edit |
|---------------|-------------|------|-----------|-----------|----------|------------|-------------|-----|----------|------|-----------|------------|-------------|--------|------|
| [Empty table] | | | | | | | | | | | | | | | |

At the bottom of the interface, there are 'Add' and 'Remove' buttons.

Click **Add** to create a new Layer 2 Interface (see [Appendix F - Connection Setup](#)).

To remove a connection, click the **Remove** button.

5.1.1 WAN Service Setup

This screen allows for the configuration of WAN interfaces.

| Interface | Description | Type | Vlan8021p | VlanMuxId | VlanTpid | Igmp Proxy | Igmp Source | NAT | Firewall | IPv6 | Mld Proxy | Mld Source | Manual Mode | Remove | Edit |
|-----------|--------------|-------|-----------|-----------|----------|------------|-------------|---------|----------|----------|-----------|------------|-------------|--------------------------|------|
| ppp0.1 | pppoe_0_0_35 | PPPoE | N/A | N/A | N/A | Disabled | Disabled | Enabled | Disabled | Disabled | Disabled | Disabled | Disabled | <input type="checkbox"/> | Edit |

Click the **Add** button to create a new connection. For connections on ATM or PTM or ETH WAN interfaces see [Appendix F - Connection Setup](#).

| Interface | Description | Type | Vlan8021p | VlanMuxId | VlanTpid | Igmp Proxy | Igmp Source | NAT | Firewall | IPv6 | Mld Proxy | Mld Source | Manual Mode | Remove | Edit |
|-----------|--------------|-------|-----------|-----------|----------|------------|-------------|---------|----------|----------|-----------|------------|-------------|-------------------------------------|------|
| ppp0.1 | pppoe_0_0_35 | PPPoE | N/A | N/A | N/A | Disabled | Disabled | Enabled | Disabled | Disabled | Disabled | Disabled | Disabled | <input checked="" type="checkbox"/> | Edit |

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

| Item | Description |
|-------------|--|
| Interface | Name of the interface for WAN |
| Description | Name of the WAN connection |
| Type | Shows the connection type |
| Vlan8021p | VLAN ID is used for VLAN Tagging (IEEE 802.1Q) |
| VlanMuxId | Shows 802.1Q VLAN ID |
| VlanTpid | VLAN Tag Protocol Identifier |
| IGMP Proxy | Shows Internet Group Management Protocol (IGMP) Proxy status |
| IGMP Source | Shows the status of WAN interface used as IGMP source |
| NAT | Shows Network Address Translation (NAT) status |
| Firewall | Shows the Security status |
| IPv6 | Shows the WAN IPv6 address |
| MLD Proxy | Shows Multicast Listener Discovery (MLD) Proxy status |
| Mld Source | Shows the status of WAN interface used as MLD source |
| Manual Mode | Indicates the status of the PPP manual connect/disconnect button |
| Remove | Select interfaces to remove |

Edit

Click the Edit button to make changes to the WAN interface

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

NOTE: Up to 16 PVC profiles can be configured and saved in flash memory.

Consult the table below for item descriptions.

| Item | Description |
|---|--|
| Use Interface | Select a WAN interface from the drop-down menu. If you choose All Interface, server rules will be created for all WAN interfaces. |
| Select a Service Or Custom Service | User should select the service from the list. Or User can enter the name of their choice. |
| Server IP Address | Enter the IP address for the server. |
| External Port Start | Enter the starting external port number (when you select Custom Server). When a service is selected, the port ranges are automatically configured. |
| External Port End | Enter the ending external port number (when you select Custom Server). When a service is selected, the port ranges are automatically configured. |
| Protocol | TCP, TCP/UDP, or UDP. |
| Internal Port Start | Enter the internal port starting number (when you select Custom Server). When a service is selected the port ranges are automatically configured |
| Internal Port End | Enter the internal port ending number (when you select Custom Server). When a service is selected, the port ranges are automatically configured. |

5.2.2 Port Triggering

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

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

WAN Setup
NAT
 Virtual Servers
Port Triggering
 DMZ Host
LAN
 Parental Control
 Home Networking
 Wireless

NAT -- Port Triggering Setup

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

Add Remove

| Application Name | Trigger | | | | Open | | | WAN Interface | Remove |
|------------------|----------|------------|-----|----------|------------|-----|--|---------------|--------|
| | Protocol | Port Range | | Protocol | Port Range | | | | |
| | | Start | End | | Start | End | | | |
| | | | | | | | | | |

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

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

WAN Setup
NAT
 Virtual Servers
Port Triggering
 DMZ Host
LAN
 Parental Control
 Home Networking
 Wireless

NAT -- Port Triggering

Some applications such as games, video conferencing, remote access applications and others require that specific ports in the Router's firewall be opened for access by the applications. You can configure the port settings from this screen by selecting an existing application or creating your own (Custom application) and click "Save/Apply" to add it.
 Remaining number of entries that can be configured:32

Use Interface: ppp0.1/ppp0.1

Application Name: Select One

Select an application: Select One
 Custom application:

Save/Apply

| Trigger Port Start | Trigger Port End | Trigger Protocol | Open Port Start | Open Port End | Open Protocol |
|--------------------|------------------|------------------|-----------------|---------------|---------------|
| | | TCP | | | TCP |
| | | TCP | | | TCP |
| | | TCP | | | TCP |
| | | TCP | | | TCP |

Save/Apply

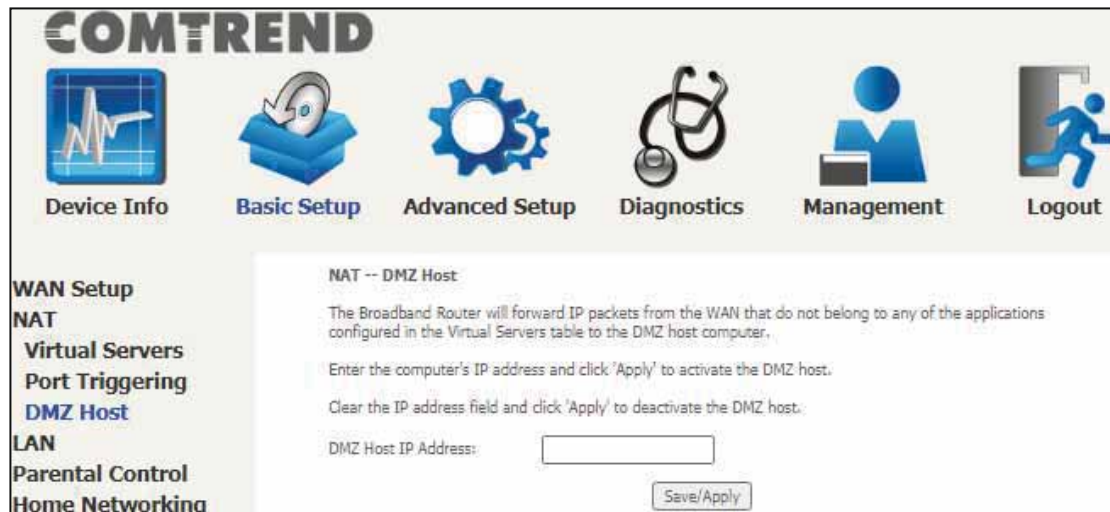
Click **Save/Apply** to save and apply the settings.

Consult the table below for item descriptions.

| Item | Description |
|--|---|
| Use Interface | Select a WAN interface from the drop-down menu. |
| Select an Application Or Custom Application | User should select the application from the list. Or User can enter the name of their choice. |
| Trigger Port Start | Enter the starting trigger port number (when you select custom application). When an application is selected, the port ranges are automatically configured. |
| Trigger Port End | Enter the ending trigger port number (when you select custom application). When an application is selected, the port ranges are automatically configured. |
| Trigger Protocol | TCP, TCP/UDP, or UDP. |
| Open Port Start | Enter the starting open port number (when you select custom application). When an application is selected, the port ranges are automatically configured. |
| Open Port End | Enter the ending open port number (when you select custom application). When an application is selected, the port ranges are automatically configured. |
| Open Protocol | TCP, TCP/UDP, or UDP. |

5.2.3 DMZ Host

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



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

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

5.3 LAN

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

The settings shown above are described below.

GroupName: Select an Interface Group.

1st LAN INTERFACE

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

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

Enable IGMP Snooping: Enable by ticking the checkbox .

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

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

Enable IGMP LAN to LAN Multicast: Select Enable from the drop-down menu to allow IGMP LAN to LAN Multicast forwarding.

Enable LAN side firewall: Enable by ticking the checkbox .

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

Setting TFTP Server: Enable by ticking the checkbox . Then, input the TFTP server address or an IP address.

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

| MAC Address | IP Address | Remove |
|--|------------|---|
| <input type="button" value="Add Entries"/> | | <input type="button" value="Remove Entries"/> |

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

DHCP Static IP Lease

Enter the Mac address and Static IP address then click "Apply/Save" .

MAC Address:

IP Address:

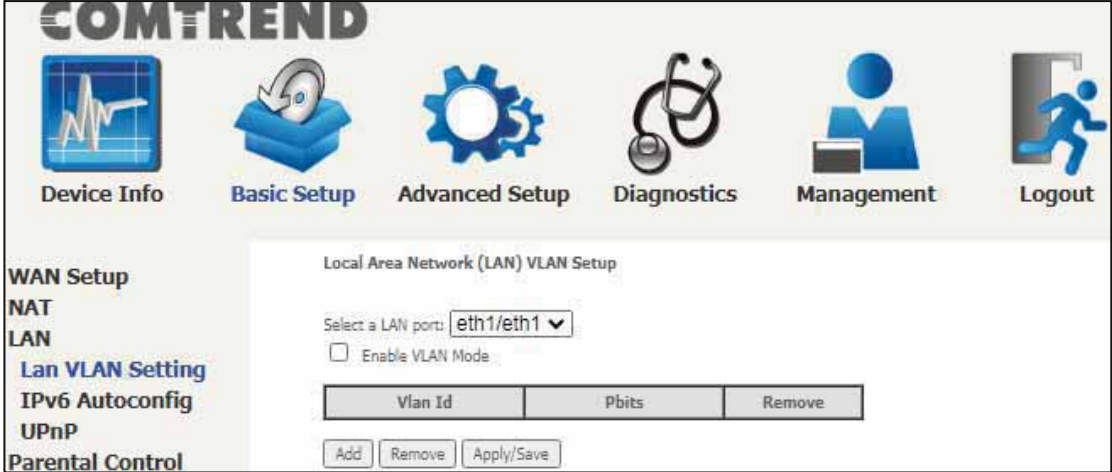
To remove an entry, tick the corresponding checkbox in the Remove column and then click the **Remove Entries** button, as shown below.

| MAC Address | IP Address | Remove |
|--|--------------|---|
| 12:34:56:78:90:12 | 192.168.1.33 | <input checked="" type="checkbox"/> |
| <input type="button" value="Add Entries"/> | | <input type="button" value="Remove Entries"/> |

Select **Enable DHCP Server Relay** (not available if **NAT** enabled), and enter the DHCP Server IP Address. This allows the Router to relay the DHCP packets to the remote DHCP server. The remote DHCP server will provide the IP address.

5.3.1 Lan VLAN Setting

The CPE will tag VLAN on specific LAN port(s) when this feature is used.



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

| Vlan Id | Pbits | Remove |
|----------------------|--------------------------------|--------------------------|
| <input type="text"/> | <input type="text" value="0"/> | <input type="checkbox"/> |

| Item | Description |
|---------|--|
| Vlan ID | The VLAN ID to be supported on the LAN port. |
| Pbits | The VLAN priority bit to be supported on the LAN port. |
| Remove | Tick the checkbox and click the Remove button to delete entries. |

5.3.2 LAN IPv6 Autoconfig

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

The settings shown above are described below.

Static LAN IPv6 Address Configuration

| Item | Description |
|--|--|
| Interface Address (prefix length is required): | Configure static LAN IPv6 address and subnet prefix length |

IPv6 LAN Applications

| Item | Description |
|---------------------|---|
| Stateless | Use stateless configuration |
| Stateful | Use stateful configuration |
| Start interface ID: | Start of interface ID to be assigned to dhcpv6 client |
| End interface ID: | End of interface ID to be assigned to dhcpv6 client |
| Leased Time (hour): | Lease time for dhcpv6 client to use the assigned IP address |

| Item | Description |
|------------------------------------|--|
| Enable RADVD | Enable use of router advertisement daemon |
| Enable ULA Prefix Advertisement | Allow RADVD to advertise Unique Local Address Prefix |
| Randomly Generate | Use a Randomly Generated Prefix |
| Statically Configure Prefix | Specify the prefix to be used |
| Preferred Life Time (hour) | The preferred life time for this prefix |
| Valid Life Time (hour) | The valid life time for this prefix |
| Enable MLD Snooping | Enable/disable IPv6 multicast forward to LAN ports |
| Standard Mode Blocking Mode | <p>In standard mode, IPv6 multicast traffic will flood to all bridge ports when no client subscribes to a multicast group even if MLD snooping is enabled</p> <p>In blocking mode, IPv6 multicast data traffic will be blocked and not flood to all bridge ports when there are no client subscriptions to any multicast group</p> |
| Enable MLD LAN To LAN Multicast | Enable/disable IPv6 multicast between LAN ports |

5.3.3 UPnP

Select the checkbox provided and click **Apply/Save** to enable UPnP protocol.



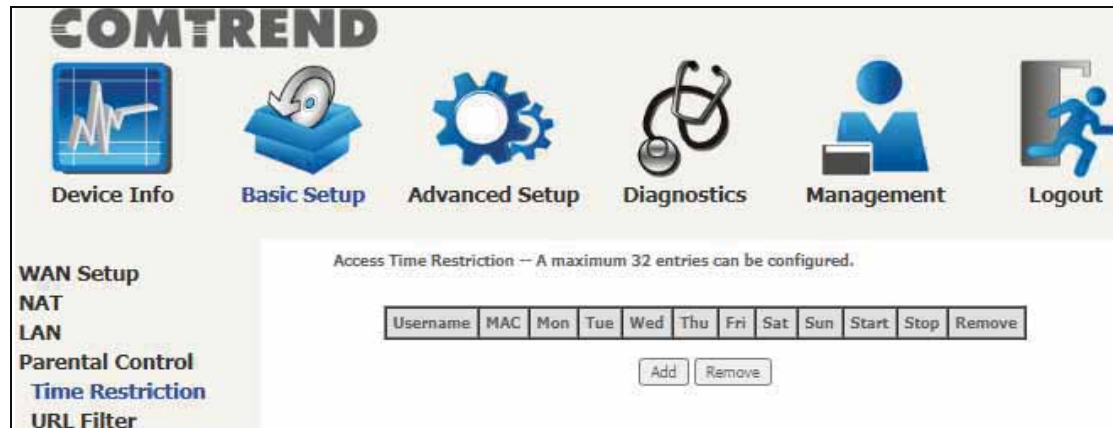
5.4 Parental Control

This selection provides WAN access control functionality.

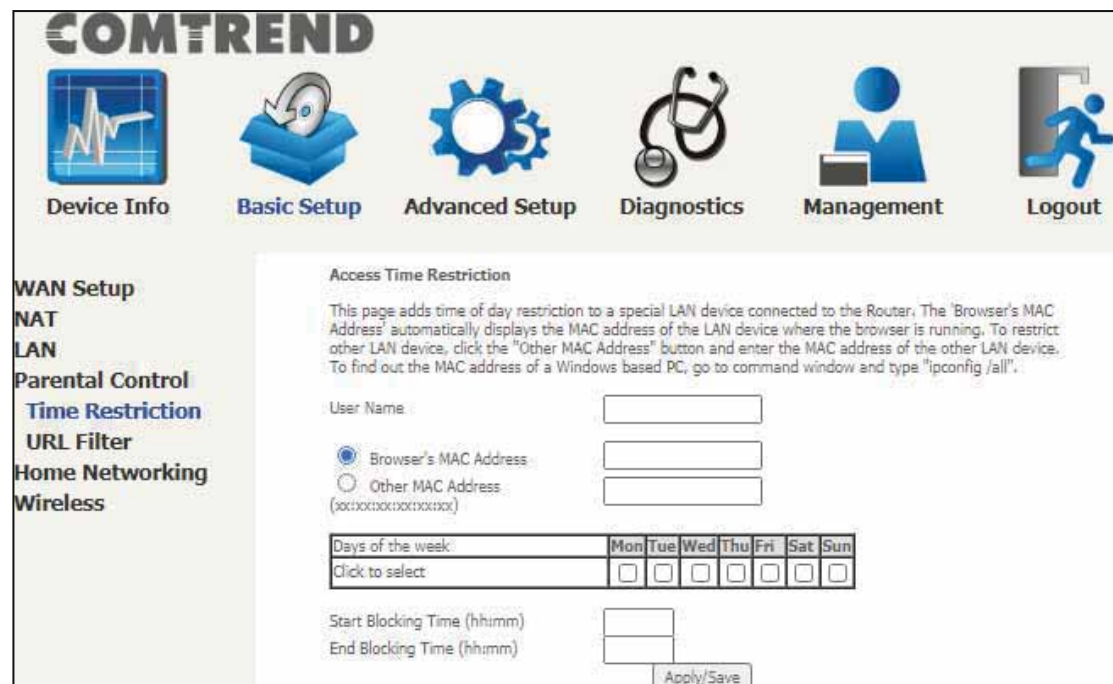
5.4.1 Time Restriction

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.

Clicking on the checkbox in the Enable field allows the user to select all / none entries for Enabling/Disabling.



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



See below for item 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.

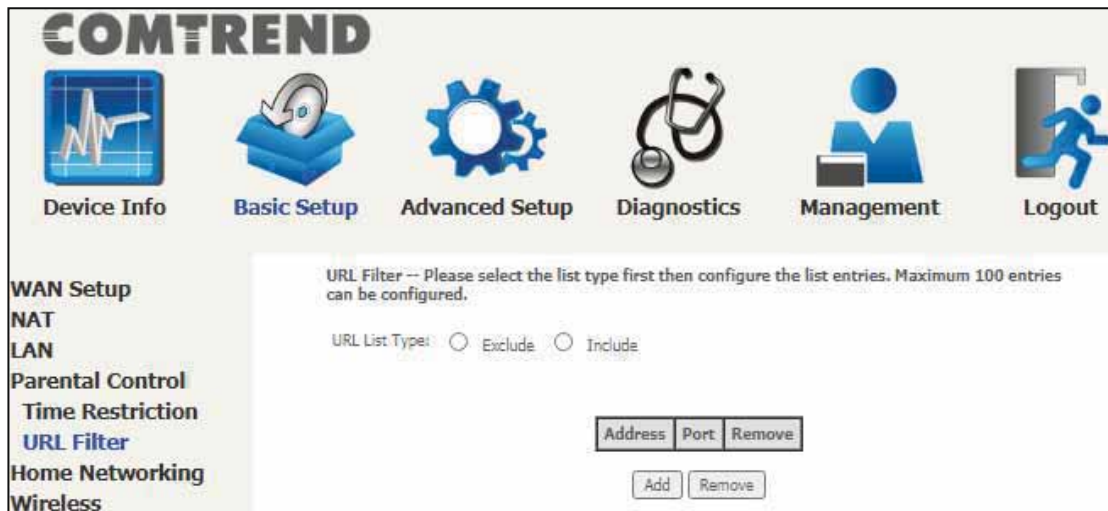
Days of the Week: The days the restrictions apply.

Start Blocking Time: The time the restrictions start.

End Blocking Time: The time the restrictions end.

5.4.2 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.

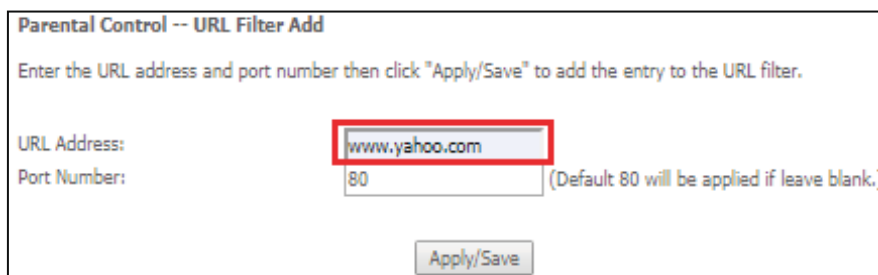


Select URL List Type: Exclude or Include.

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 **Apply/Save** to add the entry to the URL filter. URL Addresses begin with "www", as shown in this example.

URL Filter -- Please select the list type first then configure the list entries.
Maximum 100 entries can be configured.

URL List Type: Exclude Include

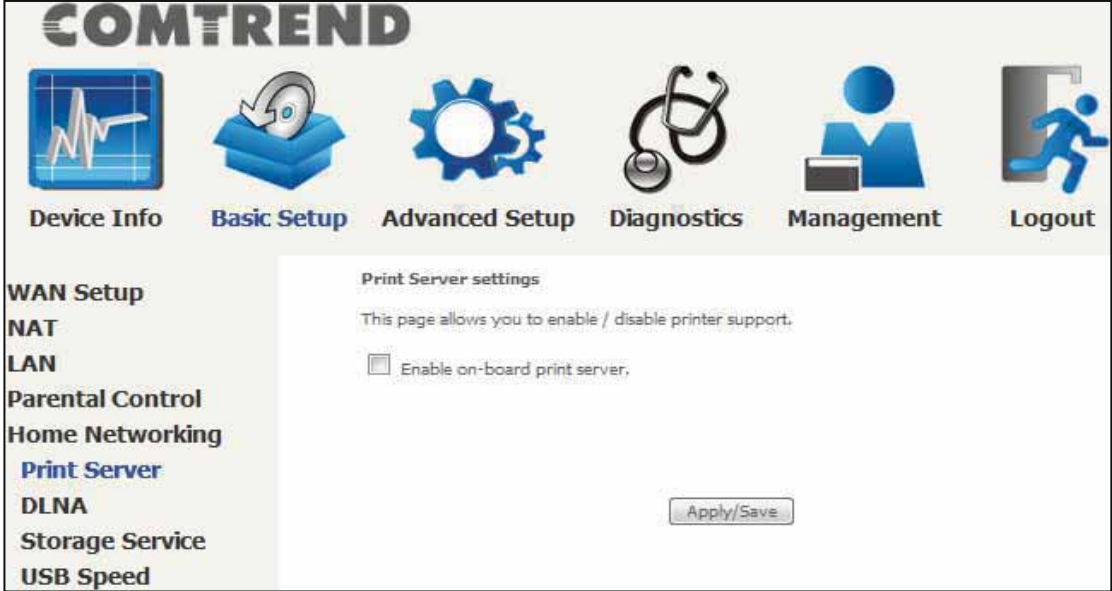
| Address | Port | Remove |
|---------------|------|--------------------------|
| www.yahoo.com | 80 | <input type="checkbox"/> |

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

5.5 Home Networking

5.5.1 Print Server

This page allows you to enable or disable printer support.



Please reference [Appendix E](#) to see the procedure for enabling the Printer Server.

5.5.2 DLNA

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

Insert the USB drive into the USB host port on the back of the router. Click Enable on-board digital media server, a dropdown list of directories found on the USB driver will be available for selection. Select media path from the drop-down list or manually modify the media library path and click **Apply/Save** to enable the DLNA media server.

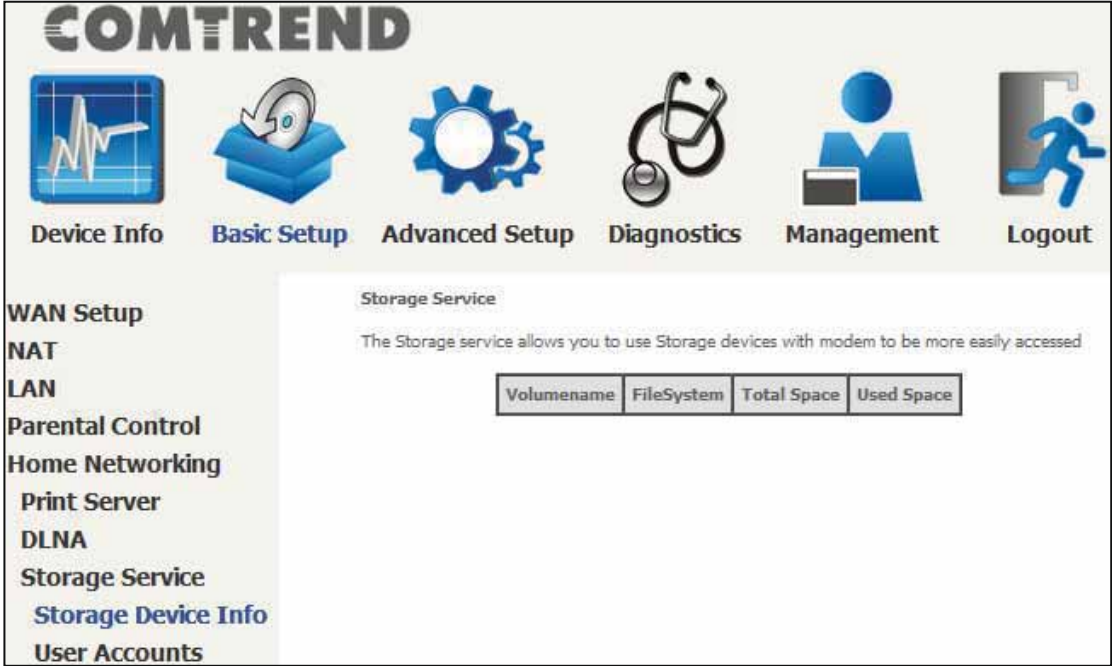


5.5.3 Storage Service

The Storage service allows you to use Storage devices with modem to be more easily accessed.

5.5.3.1 Storage Device Info

This page also displays storage devices attached to the USB host.

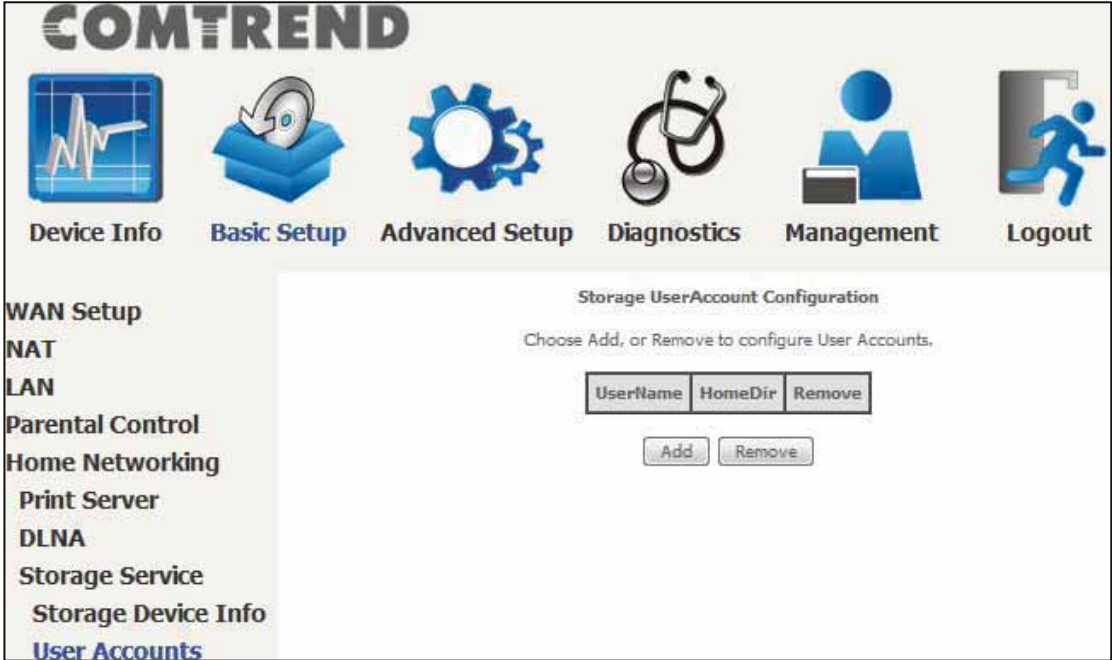


Display after storage device attached (for your reference).

| Volumename | FileSystem | Total Space | Used Space |
|------------|------------|-------------|------------|
| disk1_1 | fat | 962 | 6 |

5.5.3.2 Storage User Accounts

Add a storage account to access the USB device for the samba access system.

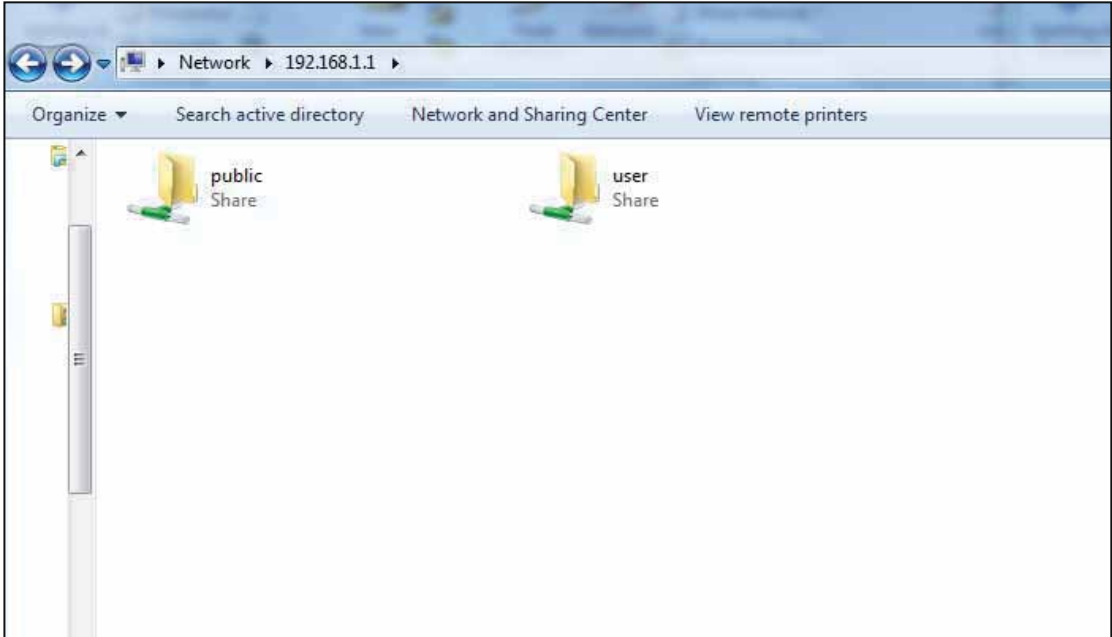


Click the **Add** button to display the following. volumeName would be disk1_1 if only 1 USB has been plugged into the device.



In the boxes provided, enter the user name, password and volume name on which the home directory is to be created. Then click the **Apply/Save** button.

In any windows folder, enter the address \\192.168.1.1 to access the samba folder created. A password prompt will show. Enter username password as configured. Access \\192.168.1.1 again (or refresh the screen), the user folder will now be available for access.



5.5.3.2 Storage User Accounts

This page allows you to enable / disable USB 3.0 device support.
Note: Enabling USB 3.0 can cause interference with the built-in 2.4GHz wireless radio. It is advised leaving the default value as USB 2.0



5.6 Wireless

5.6.1 SSID

This page allows you to configure the Virtual interfaces for each Physical interface.

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

WAN Setup
NAT
LAN
Parental Control
Home Networking
Wireless
SSID
Security

SSID
 This page allows you to configure the Virtual interfaces for each Physical interface.

Wireless Interface: Comtrend2461_2.4GHz(00:90:4C:2C:30:00) ▼

BSS-MAC (SSID): 00:90:4C:2C:30:00 (Comtrend2461_2.4GHz enabled) ▼

BSS Enabled: Enabled ▼

Network Name (SSID): Comtrend2461_2.4GHz

Network Type: Open ▼

AP Isolation: Off ▼

BSS Max Associations Limit: 64

WMM Advertise: Advertise ▼

WMF: On ▼

Apply Cancel

Click the **Apply** button to apply your changes. The settings shown above are described below.

| Item | Description |
|----------------------------|---|
| Wireless Interface | Select which wireless interface to configure |
| BSS-MAC (SSID) | Select desired BSS to configure |
| BSS Enabled | Enable or disable this SSID |
| Network Name (SSID) | Sets the network name (also known as SSID) of this network |
| Network Type | Selecting Closed hides the network from active scans. Selecting Open reveals the network from active scans. |
| AP Isolation | Selecting On enables AP Isolation mode. When enabled, STAs associated with the AP will not be able to communicate with each other. |
| BSS Max Associations Limit | Sets the maximum associations for this BSS |

| | |
|---------------|--|
| WMM Advertise | When WMM is enabled for the radio, selecting On allows WMM to be advertised in beacons and probes for this BSS. Off disables advertisement of WMM in beacons and probes. |
| WMMF | Choose On to enable Wireless Multicast Forwarding on this BSS. Off disables this feature. |

5.6.2 Security

This page allows you to configure security for the wireless LAN interfaces.

The screenshot shows the COMTREND web interface with a navigation menu at the top: Device Info, Basic Setup, Advanced Setup, Diagnostics, Management, and Logout. On the left, a sidebar lists various configuration sections: WAN Setup, NAT, LAN, Parental Control, Home Networking, Wireless, SSID, and Security (which is highlighted). The main content area is titled 'SECURITY' and includes the instruction: 'This page allows you to configure security for the wireless LAN interfaces.' Below this, there are several configuration fields: 'Wireless Interface' (a dropdown menu showing 'Comtrend2461_2.4GHz(00:90:4C:2C:30:00)' and a 'Select' button), '802.11 Authentication' (dropdown: Open), '802.1X Authentication' (dropdown: Disabled), 'WPA' (dropdown: Disabled), 'WPA-PSK' (dropdown: Disabled), 'WPA2' (dropdown: Disabled), 'WPA2-PSK' (dropdown: Enabled), 'WPA3-SAE' (dropdown: Disabled), 'WPA Encryption' (dropdown: AES), 'RADIUS Server' (text input: 0.0.0.0), 'RADIUS Port' (text input: 1812), 'RADIUS Key' (password input: ****), 'WPA passphrase' (password input: ***** with a 'Click here to display' link), 'Protected Management Frames' (dropdown: Capable), 'Network Key Rotation Interval' (text input: 0), 'Pairwise Key Rotation Interval' (text input: 0), and 'Network Re-auth Interval' (text input: 36000). At the bottom of the configuration area are 'Apply' and 'Cancel' buttons.

Click the **Apply** button to apply your changes. For information on each parameter, move the cursor over the parameter that you are interested in (as shown here).

This close-up shows the '802.11 Authentication' dropdown menu. A tooltip box is overlaid on the left, containing the text: '802.11 Authentication: Selects 802.11 authentication method. Open or Shared. OSEN:'. The dropdown menu itself shows 'Open' as the selected option, with 'Disabled' also visible below it.

Chapter 6 Advanced Setup

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



6.1 Security

For detailed descriptions, with examples, please consult [Appendix A - Firewall](#).

6.1.1 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 WDS 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.

The screenshot shows the COMTREND web interface. At the top, there is a navigation bar with icons for Device Info, Basic Setup, **Advanced Setup**, Diagnostics, Management, and Logout. Below this, the 'Security' section is expanded to show 'IP Filtering', with 'Outgoing' selected. The main content area is titled 'Outgoing IP Filtering Setup' and contains the following text:

By default, all outgoing IP traffic from LAN is allowed, but some IP traffic can be **BLOCKED** by setting up filters.

Choose Add or Remove to configure outgoing IP filters.

| Filter Name | IP Version | Protocol | SrcIP/ PrefixLength | SrcPort | DstIP/ PrefixLength | DstPort | Remove |
|--|------------|----------|---------------------|---------|---------------------|---------|--------|
| <input type="button" value="Add"/> <input type="button" value="Remove"/> | | | | | | | |

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 item descriptions.

| Item | 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.

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

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 IP Filtering
 Outgoing
 Incoming
 MAC Filtering
 Quality of Service
 Routing

Incoming IP Filtering Setup

When the firewall is enabled on a WAN or LAN interface, all incoming IP traffic is BLOCKED. However, some IP traffic can be **ACCEPTED** by setting up filters.

Choose Add or Remove to configure incoming IP filters.

| Filter Name | Interfaces | IP Version | Protocol | SrcIP/PrefixLength | SrcPort | DstIP/PrefixLength | DstPort | Remove |
|--|------------|------------|----------|--------------------|---------|--------------------|---------|--------|
| <input type="button" value="Add"/> <input type="button" value="Remove"/> | | | | | | | | |

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**.

COMTREND

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 MAC Filtering
 Quality of Service
 Routing
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 DSL
 DSL Bonding
 DNS Proxy
 Interface Grouping
 IP Tunnel
 IPSec

Add IP Filter -- Incoming

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

Filter Name:

IP Version:

Protocol:

Source IP address[/prefix length]:

Source Port (port or port:port):

Destination IP address[/prefix length]:

Destination Port (port or port:port):

WAN Interfaces (Configured in Routing mode and with firewall enabled) and LAN Interfaces
 Select one or more WAN/LAN interfaces displayed below to apply this rule.

Consult the table below for item descriptions.

| Item | 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 |

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 WDS mode or without firewall enabled are not available.

6.1.2 MAC Filtering

NOTE: This option is only available in WDS 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 PBL-6201 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.

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 IPSec
 Certificate
 Multicast
 Wireless

MAC Filtering Setup

MAC Filtering is only effective on WAN services configured in Bridge mode. **FORWARDED** means that all MAC layer frames will be **FORWARDED** except those matching with any of the specified rules in the following table. **BLOCKED** means that all MAC layer frames will be **BLOCKED** except those matching with any of the specified rules in the following table.

MAC Filtering Policy For Each Interface:
WARNING: Changing from one policy to another of an interface will cause all defined rules for that interface to be REMOVED AUTOMATICALLY! You will need to create new rules for the new policy.

| Interface | Policy | Change |
|-----------|----------------|--------------------------|
| atm0.1 | FORWARD | <input type="checkbox"/> |

Choose Add or Remove to configure MAC filtering rules.

| Interface | Protocol | Destination MAC | Source MAC | Frame Direction | Remove |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

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

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

Consult the table below for detailed item descriptions.

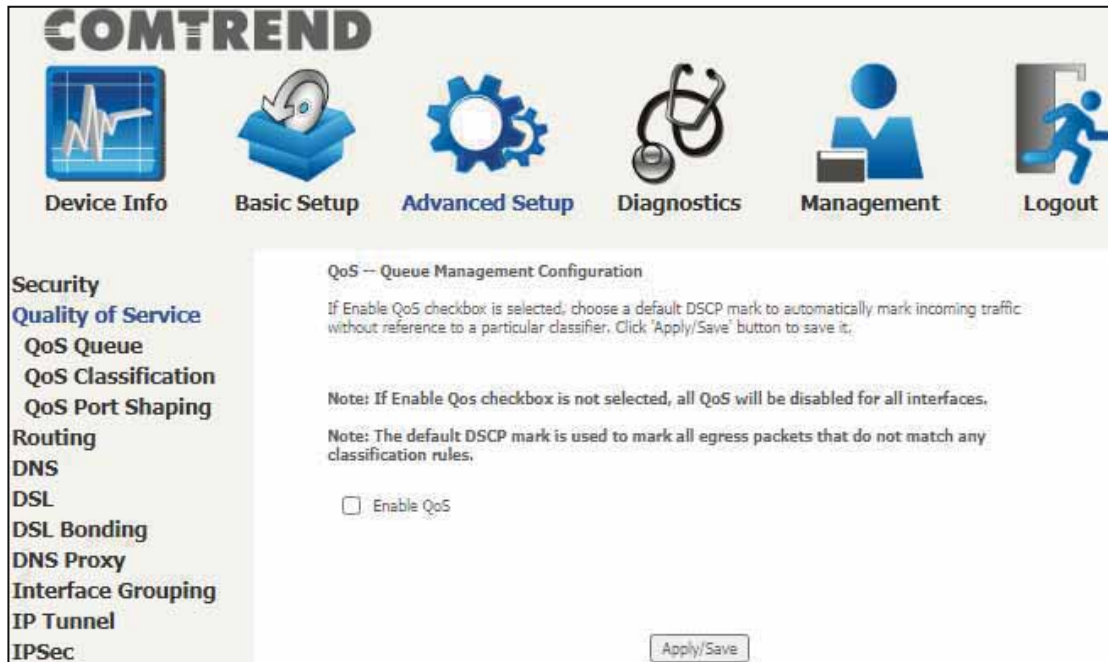
| Item | Description |
|-------------------------|---|
| Protocol Type | PPPoE, IPv4, IPv6, AppleTalk, IPX, NetBEUI, IGMP |
| Destination MAC Address | Defines the destination MAC address |
| Source MAC Address | Defines the source MAC address |
| Frame Direction | Select the incoming/outgoing packet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

6.2 Quality of Service (QoS)

NOTE: QoS must be enabled in at least one PVC to display this option.
(See [Appendix F - 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.

6.2.1 QoS Queue

6.2.1.1 QoS Queue Configuration


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


In PTM mode, a maximum of 8 queues can be configured.

For each Ethernet interface, a maximum of 8 queues can be configured.


For each Ethernet WAN interface, a maximum of 8 queues can be configured.

(Please see the screen on the following page).






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IPSec

Certificate

Multicast

Wireless

QoS Queue Setup

In PTM mode, maximum 8 queues can be configured.
For each Ethernet interface, maximum 8 queues can be configured.
For each Ethernet WAN interface, maximum 8 queues can be configured.
To add a queue, click the Add button.
To remove queues, check their remove-checkboxes, 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: Ethernet LAN queue configuration only takes effect when all the queues of the interface have been configured.

The QoS function has been disabled. Queues would not take effects.

| Name | Key | Interface | Qid | Prec/Alg/Wght | PbmPrio | DropAlg/LoMin/LoMax/HiMin/HiMax | ShapingRate (bps) | MinBitRate(bps) | BurstSize(bytes) | Enable | Remove |
|--------|-----|-----------|-----|---------------|---------|---------------------------------|-------------------|-----------------|------------------|-------------------------------------|--------------------------|
| LAN Q8 | 129 | eth1 | 8 | 1/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q7 | 130 | eth1 | 7 | 2/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q6 | 131 | eth1 | 6 | 3/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q5 | 132 | eth1 | 5 | 4/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q4 | 133 | eth1 | 4 | 5/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q3 | 134 | eth1 | 3 | 6/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q2 | 135 | eth1 | 2 | 7/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q1 | 136 | eth1 | 1 | 8/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q8 | 137 | eth2 | 8 | 1/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q7 | 138 | eth2 | 7 | 2/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q6 | 139 | eth2 | 6 | 3/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q5 | 140 | eth2 | 5 | 4/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q4 | 141 | eth2 | 4 | 5/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q3 | 142 | eth2 | 3 | 6/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q2 | 143 | eth2 | 2 | 7/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q1 | 144 | eth2 | 1 | 8/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q8 | 145 | eth3 | 8 | 1/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q7 | 146 | eth3 | 7 | 2/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q6 | 147 | eth3 | 6 | 3/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q5 | 148 | eth3 | 5 | 4/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q4 | 149 | eth3 | 4 | 5/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q3 | 150 | eth3 | 3 | 6/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q2 | 151 | eth3 | 2 | 7/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q1 | 152 | eth3 | 1 | 8/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q8 | 153 | eth4 | 8 | 1/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q7 | 154 | eth4 | 7 | 2/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q6 | 155 | eth4 | 6 | 3/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q5 | 156 | eth4 | 5 | 4/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q4 | 157 | eth4 | 4 | 5/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q3 | 158 | eth4 | 3 | 6/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q2 | 159 | eth4 | 2 | 7/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q1 | 160 | eth4 | 1 | 8/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q8 | 161 | eth5 | 8 | 1/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q7 | 162 | eth5 | 7 | 2/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q6 | 163 | eth5 | 6 | 3/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q5 | 164 | eth5 | 5 | 4/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q4 | 165 | eth5 | 4 | 5/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q3 | 166 | eth5 | 3 | 6/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q2 | 167 | eth5 | 2 | 7/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LAN Q1 | 168 | eth5 | 1 | 8/SP | | DT | | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

To remove queues, check their remove-checkboxes (for user created queues), then click the **Remove** button.

The **Enable** button will scan through every queue in the table. Queues with the enable-checkbox checked will be enabled. Queues with the 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 the Wireless Page, queues related to wireless will not take effect. This function follows the Differentiated Services rule of IP QoS.

Enable and assign an interface and precedence on the next screen. Click **Apply/Save** on this screen to activate it.

To add a queue, click the **Add** button to display the following screen.

Name: Identifier for this Queue entry.

Enable: Enable/Disable the Queue entry.

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

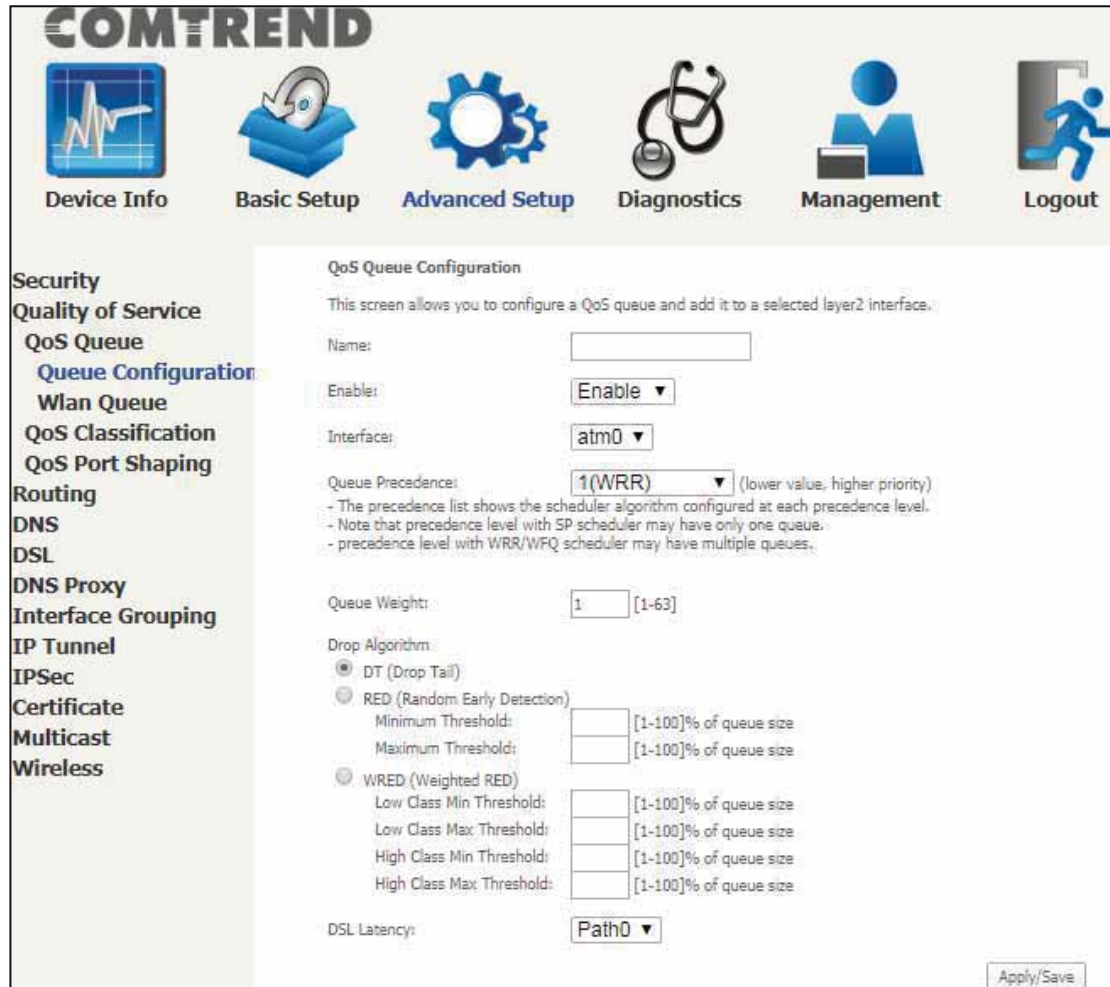
Drop Algorithm: Select the algorithm to be used to ensure that the QoS rule is enforced if the traffic exceeds the configured limit.

Drop Tail: Packets are sent in first come first serve fashion, the tailing traffic would be dropped if they exceed the handling limit.

Random Early Detection: Packets are monitored by configured queue threshold and serving proportion.

WRED: Weighted RED, the assigned monitoring queue would be given different priority and threshold to ensure various priority queues would be served fairly.

After selecting an Interface the following will be displayed.



The precedence list shows the scheduler algorithm for each precedence level. Queues of equal precedence will be scheduled based on the algorithm. Queues of unequal precedence will be scheduled based on SP.

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

6.2.1.2 Wlan Queue

Displays the list of available wireless queues for WMM and wireless data transmit priority.

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QoS Wlan Queue Setup

Note: If WMM function is disabled in Wireless Page, queues related to wireless will not take effects.

The QoS function has been disabled. Queues would not take effects.

| Name | Key | Interface | Qid | Pre/c/Alg/Wght | Enable |
|--------------------|-----|-----------|-----|----------------|---------|
| WMM Voice Priority | 1 | wl0 | 8 | 1/SP | Enabled |
| WMM Voice Priority | 2 | wl0 | 7 | 2/SP | Enabled |
| WMM Video Priority | 3 | wl0 | 6 | 3/SP | Enabled |
| WMM Video Priority | 4 | wl0 | 5 | 4/SP | Enabled |
| WMM Best Effort | 5 | wl0 | 4 | 5/SP | Enabled |
| WMM Background | 6 | wl0 | 3 | 6/SP | Enabled |
| WMM Background | 7 | wl0 | 2 | 7/SP | Enabled |
| WMM Best Effort | 8 | wl0 | 1 | 8/SP | Enabled |
| WMM Voice Priority | 65 | wl1 | 8 | 1/SP | Enabled |
| WMM Voice Priority | 66 | wl1 | 7 | 2/SP | Enabled |
| WMM Video Priority | 67 | wl1 | 6 | 3/SP | Enabled |
| WMM Video Priority | 68 | wl1 | 5 | 4/SP | Enabled |
| WMM Best Effort | 69 | wl1 | 4 | 5/SP | Enabled |
| WMM Background | 70 | wl1 | 3 | 6/SP | Enabled |
| WMM Background | 71 | wl1 | 2 | 7/SP | Enabled |
| WMM Best Effort | 72 | wl1 | 1 | 8/SP | Enabled |

6.2.2 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.

| Item | 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 | |
| Ingress Interface | Select an interface: (i.e. LAN, WAN, local, ETH1, ETH2, ETH3, w10) |
| 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 the Destination MAC Address. |
| Classification Results | |
| Specify Egress Interface | Choose the egress interface from the available list. |
| Specify Egress Queue | Choose the egress queue from the list of available for the specified egress interface. |
| 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. <ul style="list-style-type: none"> - Class non-vlan packets egress to a non-vlan interface will be tagged with VID 0 and the class rule p-bits. - Class vlan packets egress to a non-vlan interface will have the packet p-bits re-marked by the class rule p-bits. No additional vlan tag is added. |

| | |
|----------------|--|
| | <ul style="list-style-type: none">- Class non-vlan packets egress to a vlan interface will be tagged with the interface VID and the class rule p-bits.- Class vlan packets egress to a vlan interface will be additionally tagged with the packet VID, and the class rule p-bits. |
| Set Rate Limit | The data transmission rate limit in kbps. |

6.2.3 QoS Port Shaping

QoS port shaping supports traffic shaping of the Ethernet interface. Input the shaping rate and burst size to enforce QoS rule on each interface. If "Shaping Rate" is set to "-1", it means no shaping and "Burst Size" will be ignored.

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QoS Port Shaping Setup

QoS port shaping supports traffic shaping of Ethernet interface.
If "Shaping Rate" is set to "-1", it means no shaping and "Burst Size" will be ignored.

| Interface | Type | Shaping Rate (Mbps) | Burst Size (bytes) | Enable |
|-----------|------|---------------------|--------------------|--------------------------|
| eth1 | LAN | -1 | 0 | <input type="checkbox"/> |
| eth2 | LAN | -1 | 0 | <input type="checkbox"/> |
| eth3 | LAN | -1 | 0 | <input type="checkbox"/> |
| eth4 | LAN | -1 | 0 | <input type="checkbox"/> |
| eth5 | LAN | -1 | 0 | <input type="checkbox"/> |

Apply/Save

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

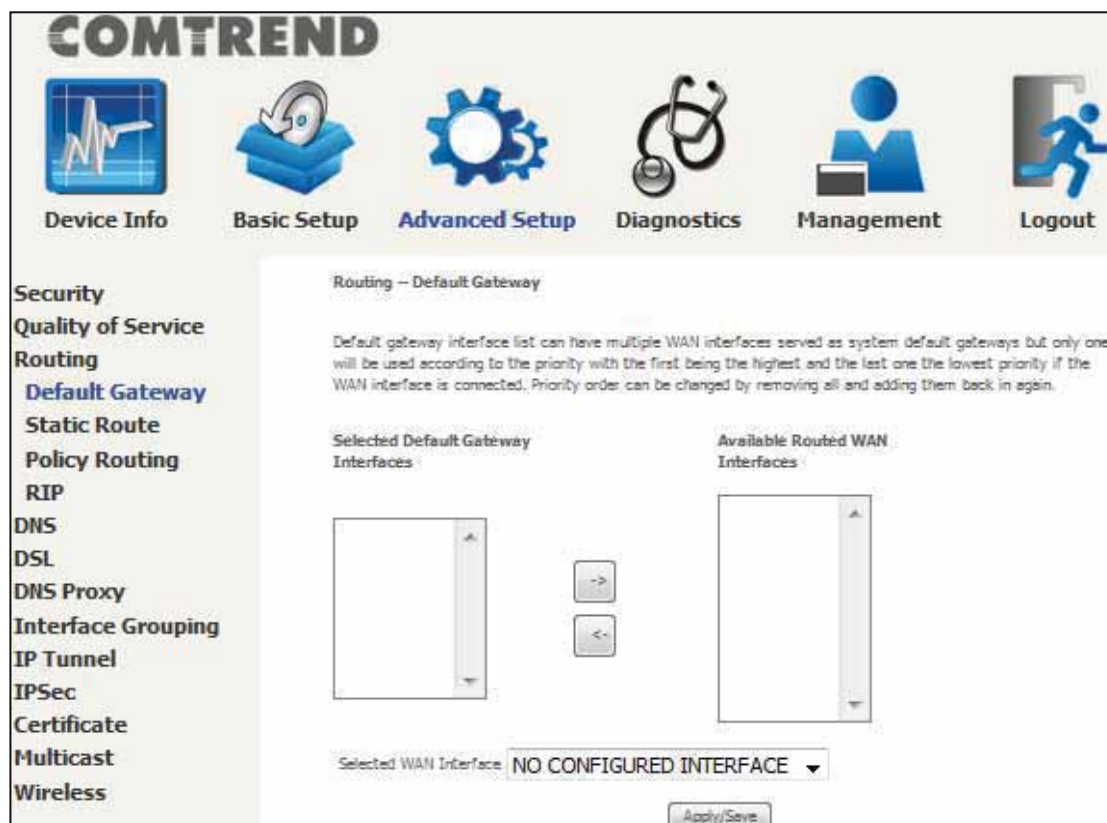
6.3 Routing

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

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

6.3.1 Default Gateway

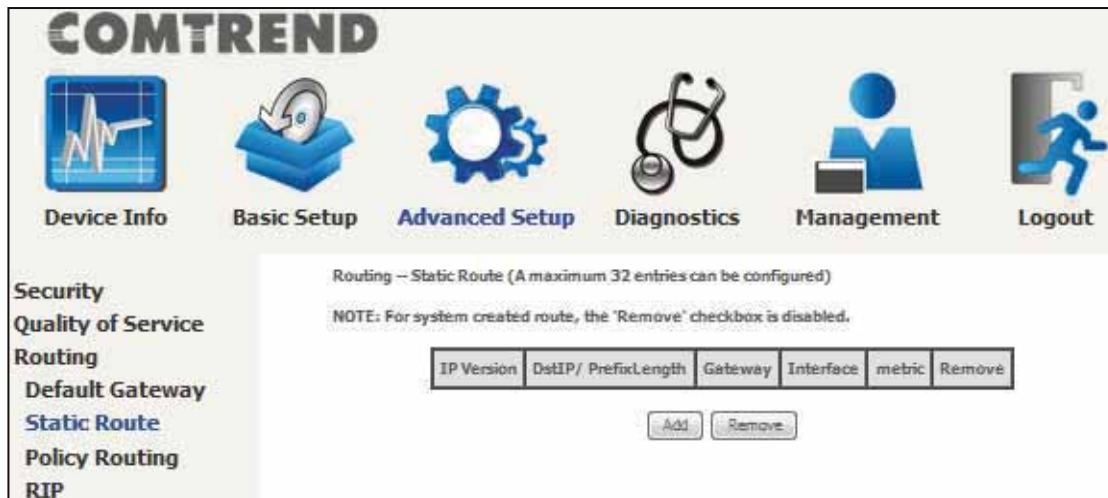
The default gateway interface list can have multiple WAN interfaces served as system default gateways but only one will be used according to the priority with the first being the highest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing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



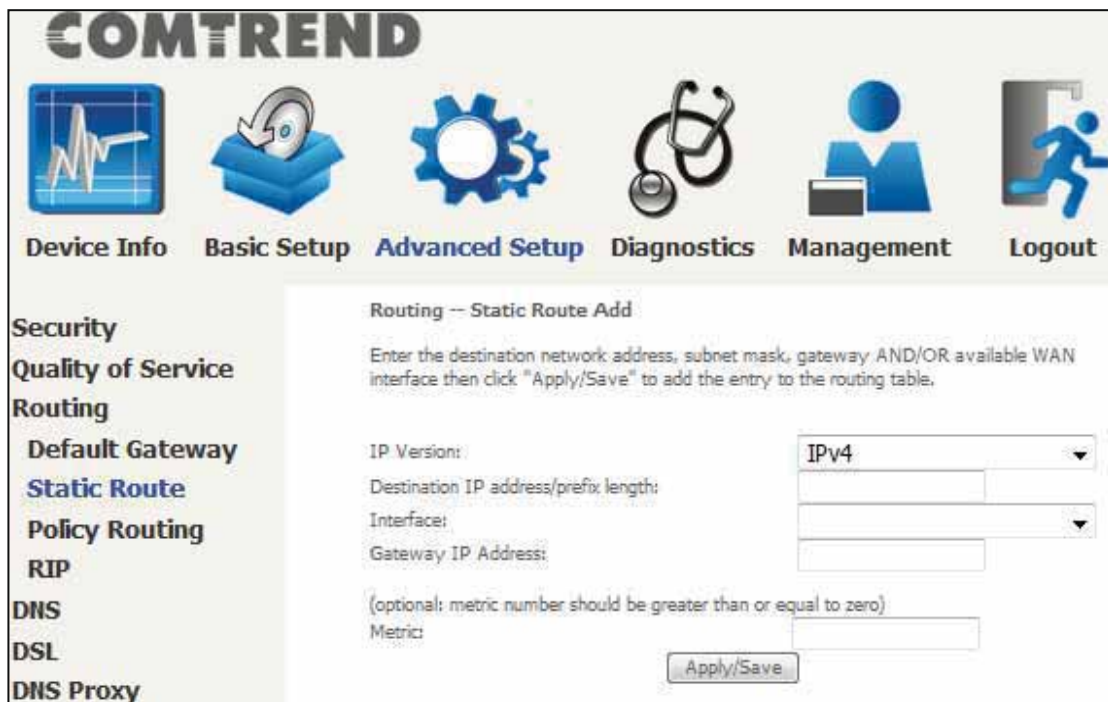
Click **Apply/Save** to apply and save the settings.

6.3.2 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 or IPv6.
- **Destination IP address/prefix length:** Enter the destination IP address.
- **Interface:** Select the proper interface for the rule.
- **Gateway IP Address:** The next-hop IP address.
- **Metric:** The metric value of routing.

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

6.3.3 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.

| Item | 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 |

6.3.4 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**.

COMTREND

Device Info Basic Setup **Advanced Setup** Diagnostics Management Logout

Security
Quality of Service
Routing
 Default Gateway
 Static Route
 Policy Routing
 RIP
DNS
DSL

Routing -- RIP Configuration

NOTE: If selected interface has NAT enabled, only Passive mode is allowed.

To activate RIP for the WAN Interface, select the desired RIP version and operation and place a check in the 'Enabled' checkbox. To stop RIP on the WAN Interface, uncheck the 'Enabled' checkbox. Click the 'Apply/Save' button to star/stop RIP and save the configuration.

| Interface | Version | Operation | Enabled |
|----------------------------------|---------|-----------|---------|
| WAN Interface not exist for RIP. | | | |

6.4 DNS

6.4.1 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.

COMTREND

Device Info Basic Setup **Advanced Setup** Diagnostics Management Logout

Security
Quality of Service
Routing
DNS
DNS Server
Dynamic DNS
DNS Entries
DSL
DSL Bonding
DNS Proxy
Interface Grouping
IP Tunnel
IPSec
Certificate
Multicast
Wireless

DNS Server Configuration

Select DNS Server Interface from available WAN interfaces OR enter static DNS server IP addresses for the system. If only a single WAN with 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.

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:

Obtain IPv6 DNS info from a WAN interface:
WAN Interface selected:

Use the following Static IPv6 DNS address:
Primary IPv6 DNS server:
Secondary IPv6 DNS server:

Apply/Save

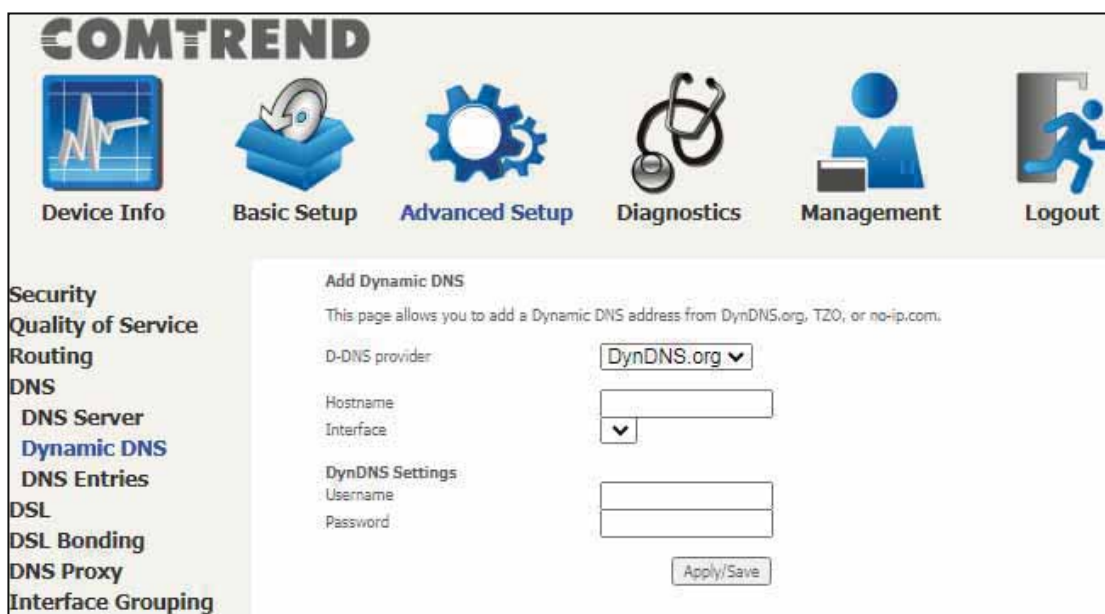
Click **Apply/Save** to save the new configuration.

6.4.2 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 PBL-6201 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.

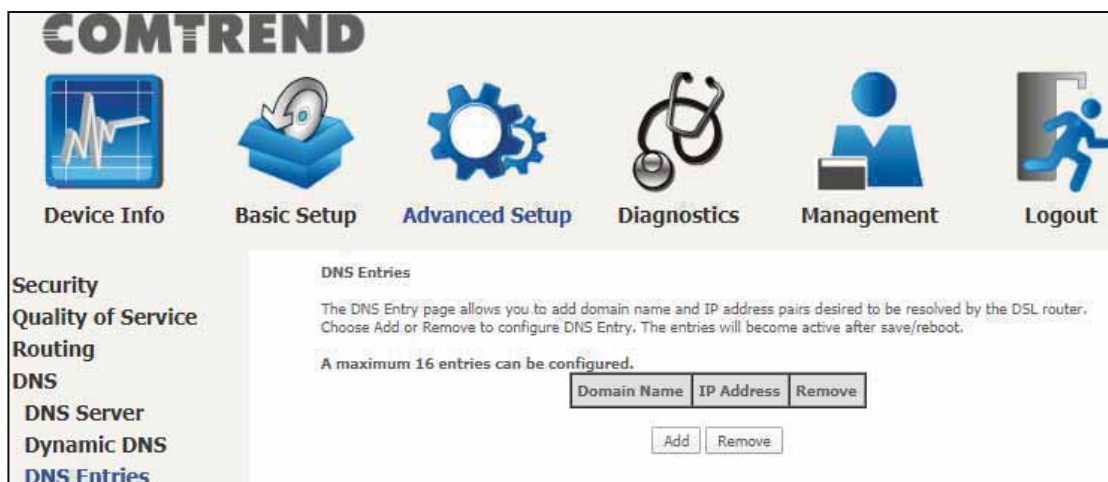
Consult the table below for item descriptions.

| Item | 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 |

6.4.3 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 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.



Click **Apply/Save** to save your settings.

Consult the table below for item descriptions.

| 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 |
| VDSL2 | Downstream: 100 Mbps Upstream: 60 Mbps |

| VDSL Profile | Maximum Downstream Throughput- Mbps (Megabits per second) |
|--------------------------------|---|
| 8a | Downstream 50 |
| 8b | Downstream 50 |
| 8c | Downstream: 50 |
| 8d | Downstream: 50 |
| 12a | Downstream: 68 |
| 12b | Downstream: 68 |
| 17a | Downstream: 100 |
| 30a | Downstream: 100 Mbps Upstream: 100 Mbps |
| 35b | Downstream: 300 Mbps Upstream: 100 Mbps |
| Options | Description |
| US0 | Band between 20 and 138 kHz for long loops to upstream |
| Bitswap Enable | Enables adaptive handshaking functionality |
| SRA Enable | Enables Seamless Rate Adaptation (SRA) |
| 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 |

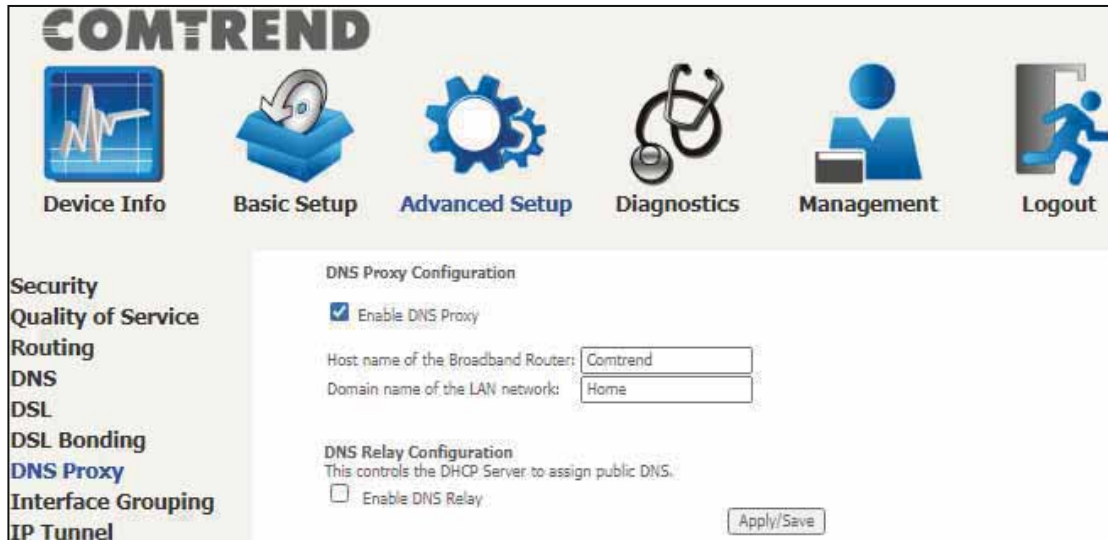
6.6 DSL Bonding

This page displays the bonding status of the connected xDSL line.

The screenshot shows the COMTREND web interface. At the top, there is a navigation bar with the COMTREND logo and six menu items: Device Info, Basic Setup, Advanced Setup, Diagnostics, Management, and Logout. Below the navigation bar is a sidebar menu with the following items: Security, Quality of Service, Routing, DNS, DSL, DSL Bonding (highlighted), DNS Proxy, Interface Grouping, IP Tunnel, and IPSec. The main content area is titled "xDSL Bonding Capability Configuration" and contains the following text: "Any Changes will require a reboot.", "Bonding/Non-bonding modes - Auto controlled from within the system.", "For any kind of xDSL bonding capability in the modem now or in the future, Please keep this configuration enabled.", and a checked checkbox for "xDSL Bonding Capability". Below this, it says "Current WAN xDSL Mode: Bonded" and a "Save/Reboot" button.

6.7 DNS Proxy

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".



6.7 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.

COMTREND

Device Info Basic Setup **Advanced Setup** Diagnostics Management Logout

Security
Quality of Service
Routing
DNS
DSL
DSL Bonding
DNS Proxy
Interface Grouping
IP Tunnel
IPSec
Certificate
Multicast
Wireless

Interface Grouping -- A maximum 16 entries can be configured

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

| Group Name | Remove | WAN Interface | LAN Interfaces | DHCP Vendor IDs | MAC Address |
|------------|--------|---------------|---------------------|-----------------|-------------|
| Default | | | eth1.0 | | |
| | | | eth2.0 | | |
| | | | eth3.0 | | |
| | | | eth4.0 | | |
| | | | eth5.0 | | |
| | | | Comtrend2451_2_4GHz | | |
| | | | Comtrend2451_5GHz | | |

Add Remove

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.



Device Info



Basic Setup



Advanced Setup



Diagnostics



Management



Logout

- Security
- Quality of Service
- Routing
- DNS
- DSL
- DSL Bonding
- DNS Proxy
- Interface Grouping
- IP Tunnel
- IPSec
- Certificate
- Multicast
- Wireless

Interface grouping Configuration

This feature allows you to set ports or devices connected to either LAN or WLAN to use a specific WAN interface. This feature can be either a static or dynamic approach. Using the Vendor ID or Any Port, Any WAN option is an option for a dynamic configuration.

Here are the steps to create an Interface Group feature:

Step 1. Enter the Group Name. Each group name must be unique when creating multiple groups.

Step 2. Select WAN Interface that the group will associate to. Click on the WAN interface from the Available WAN Interfaces column, then move it to the Grouped WAN Interfaces column. Use the Arrow button to move the interfaces between columns.

Step 3. Choose from the 3 options that best suit your needs: [a.] Grouped LAN interface, [b.] Vendor ID OR [c.] MAC address for Any port, Any WAN.

[a.] The Grouped LAN interfaces option designates a port(s) to that specified WAN Interfaces group. Click on the LAN and WLAN interfaces you choose to associate. Use the Arrow button to toggle the LAN/WLAN interfaces to the other column.

[b.] The Vendor ID option will automatically add LAN or WLAN clients port(s) or WLAN SSID to the Grouped LAN Interfaces based on the Vendor ID in the DHCP Discover from the connected LAN client. Add the DHCP Vendor ID string from the LAN Client. If you do not know the Vendor ID, either you can check with the manufacturer or take a packet capture to identify the Vendor ID in the DHCP Discover packet.

[c.] The MAC Address Match List for Any Port, Any WAN option automatically adds LAN or WLAN clients port(s) or WLAN SSID to the Grouped LAN Interfaces based on the MAC Address. Add the MAC address for those devices that need to be associated to the specific WAN Interface. Using the MAC OUI (first 6 characters of the MAC address) is acceptable but you will need to fill in the rest of the MAC address using the "xx" as a wild card. For example, d8:b6:b7:a1:87:fd will have a MAC OUI of d8:b6:b7. To use the wild card you will enter d8:b6:b7:xx:xx:xx.

Step 4. Click Apply/Save button to make the changes effective immediately.

IMPORTANT: If a Vendor ID or MAC address is configured for a specific client device, please REBOOT the client device attached to the modem to allow it to request an IP address and associate the port to the appropriate Group.

Group Name:

Grouped WAN Interfaces



Available WAN Interfaces

Grouped LAN Interfaces



Available LAN Interfaces

Comtrend2451_2.4GHz

Comtrend2451_5GHz

eth1.0

eth2.0

eth3.0

eth4.0

eth5.0

Automatically Add Clients With the following DHCP Vendor IDs

MAC Address Match List for Any Port Any Wan

Apply/Save

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 ETH4.

The Interface Grouping configuration will be:

1. Default: ETH1, ETH2, ETH3, and ETH4.
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).

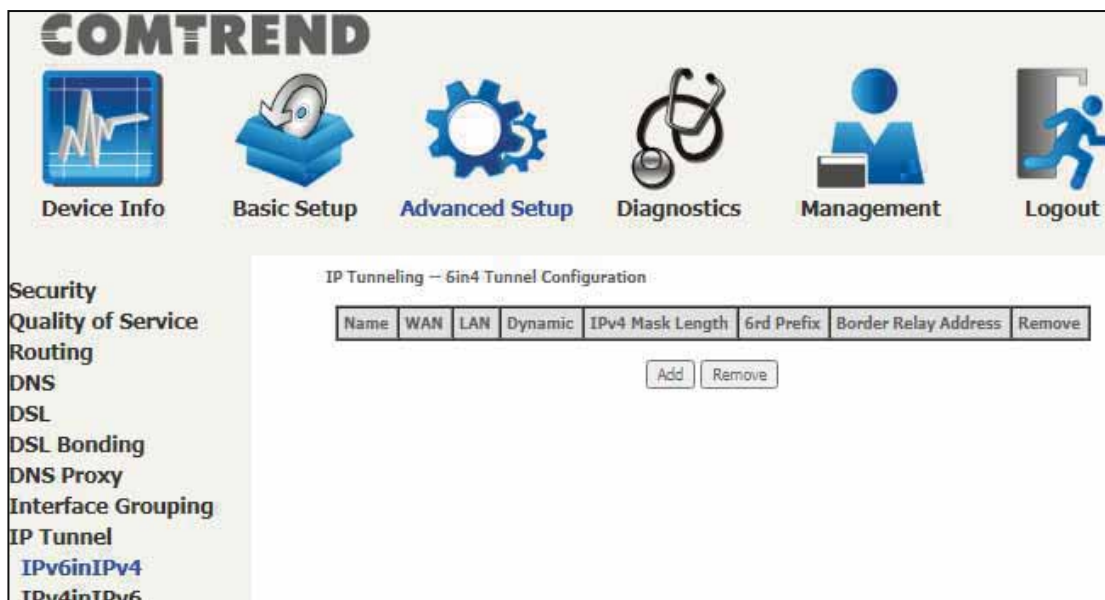
If a set-top box is connected to ETH1 and sends a DHCP request with vendor ID "Video", the local DHCP server will forward this request to the remote DHCP server. The Interface Grouping configuration will automatically change to the following:

1. Default: ETH2, ETH3, and ETH4
2. Video: nas_0_36, nas_0_37, nas_0_38, and ETH1.

6.8 IP Tunnel

6.8.1 IPv6inIPv4

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



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



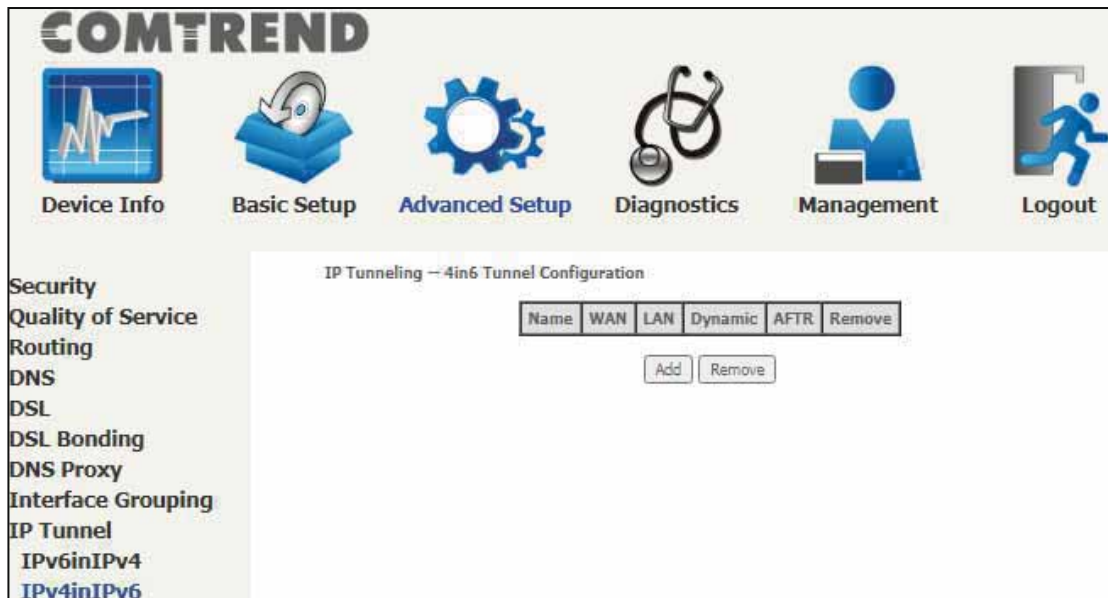
Click **Apply/Save** to apply and save the settings.

| Item | 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 |

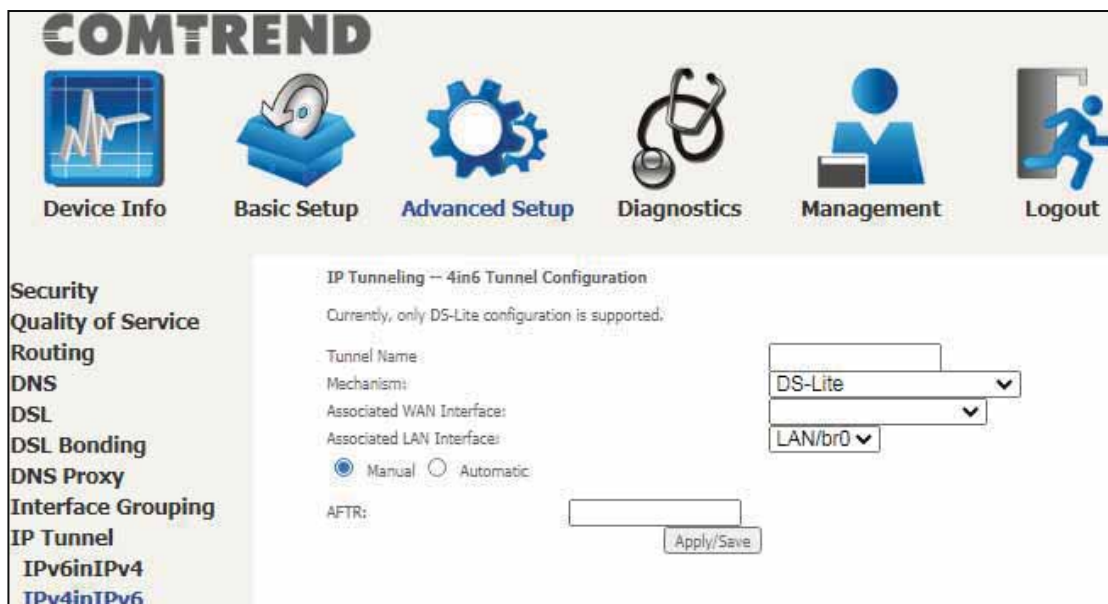
| | |
|--------------------------------|--|
| | tunnel |
| Associated LAN Interface | Select the LAN interface to be included in the tunnel |
| Manual/Automatic | Select automatic for point-to-multipoint tunneling / manual for point-to-point tunneling |
| IPv4 Mask Length | The subnet mask length used for the IPv4 interface |
| IPv6 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 |

6.8.2 IPv4inIPv6

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



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



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

| Item | 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 |

6.8.3 MAP

This page allows you to configure MAP-T and MAP-E entries.

COMTREND

Device Info Basic Setup **Advanced Setup** Diagnostics Management Logout

Security
Quality of Service
Routing
DNS
DSL
DSL Bonding
DNS Proxy
Interface Grouping
IP Tunnel
IPv6inIPv4
IPv4inIPv6
MAP

MAP -- MAP-T/MAP-E Configuration

| Mechanism | WAN | Dynamic | BR Prefix | BMR IPv6 Prefix | BMR IPv4 Prefix | PSID Offset | PSID Length | PSID | Remove |
|-----------|-----|---------|-----------|-----------------|-----------------|-------------|-------------|------|--------|
| | | | | | | | | | |

Add Remove

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

Click **Apply/Save** to apply and save the settings. The settings shown above are described below.

| Item | Description |
|--------------------------|--|
| Mechanism | Choose whether to encapsulate with MAP-E or MAP-T to be used for NAT64 translation |
| Associated WAN Interface | Lists the LAN interfaces available to be used for IP MAP |
| Associated LAN Interface | Lists the LAN interfaces available to be used for IP MAP |
| Manual Automatic | Configure the prefix and relative PSID settings manually The prefix settings will be configured automatically from the mapping interfaces |
| BR IPv6 Prefix | Configure the border relay IPv6 Prefix |
| BMR IPv6 Prefix | Configure the basic mapping rule IPv6 Prefix |
| BMR IPv4 Prefix | Configure the basic mapping rule IPv4 Prefix |
| PSID Offset | Port Set ID offset assigned to the IP MAP |
| PSID Length | Define the port set ID length |
| PSID Value | Define the port set ID value |

6.9 IPSec

6.9.1 IPSec Tunnel Mode Connections

You can add, edit or remove IPSec tunnel mode connections from this page.

The screenshot displays the COMTREND web interface. At the top, there are navigation icons for Device Info, Basic Setup, Advanced Setup, Diagnostics, Management, and Logout. On the left side, a vertical menu lists various configuration categories: Security, Quality of Service, Routing, DNS, DSL, DSL Bonding, DNS Proxy, Interface Grouping, IP Tunnel, IPv6inIPv4, IPv4inIPv6, MAP, and IPSec. The main content area is titled 'IPSec Tunnel Mode Connections' and contains the instruction: 'Add, remove or enable/disable IPSec tunnel connections from this page.' Below this instruction is a table with the following columns: Connection Name, IP Version, Tunnel Mode, Key Exchange Method, Local Gateway Interface, Remote Gateway, Local Addresses, Remote Addresses, and Remove. Underneath the table, there are two buttons: 'Add New Connection' and 'Remove'.

Click **Add New Connection** to add a new IPSec termination rule.

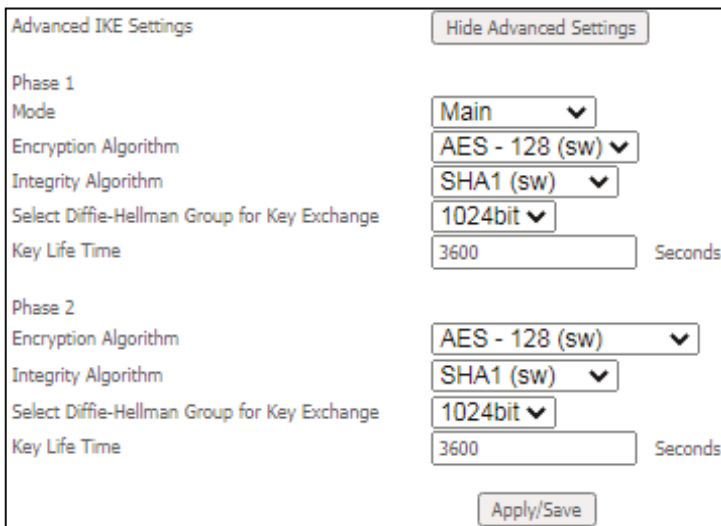
The following screen will display.

| Heading | Description |
|---------------------------------------|---|
| IPsec Connection Name | User-defined label |
| IP Version | Select the corresponding IPv4 / IPv6 version for the IPSEC connection |
| Tunnel Mode | Select tunnel protocol, AH (Authentication Header) or ESP (Encapsulating Security Payload) for this tunnel. |
| Local Gateway Interface | Select from the list of wan interface to be used as gateway for the IPSEC connection |
| Remote IPsec Gateway Address | The location of the Remote IPsec Gateway. IP address or domain name can be used. |
| Tunnel access from local IP addresses | Specify the acceptable host IP on the local side. Choose Single or Subnet . |

| | |
|--|--|
| IP Address/Subnet Mask for VPN | If you chose Single , please enter the host IP address for VPN. If you chose Subnet , please enter the subnet information for VPN. |
| Tunnel access from remote IP addresses | Specify the acceptable host IP on the remote side. Choose Single or Subnet . |
| IP Address/Subnet Mask for VPN | If you chose Single , please enter the host IP address for VPN. If you chose Subnet , please enter the subnet information for VPN. |
| Key Exchange Method | Select from Auto(IKE) or Manual |

For the Auto(IKE) key exchange method, select Pre-shared key or Certificate (X.509) authentication. For Pre-shared key authentication you must enter a key, while for Certificate (X.509) authentication you must select a certificate from the list.

See the tables below for a summary of all available options.

| | |
|--|---|
| Auto(IKE) Key Exchange Method | |
| Pre-Shared Key / Certificate (X.509) | Input Pre-shared key / Choose Certificate |
| Perfect Forward Secrecy | Enable or Disable |
| Advanced IKE Settings | Select Show Advanced Settings to reveal the advanced settings options shown below. |
|  | |
| Advanced IKE Settings | Select Hide Advanced Settings to hide the advanced settings options shown above. |
| Phase 1 / Phase 2 | Choose settings for each phase, the available options are separated with a "/" character. |
| Mode | Main / Aggressive |
| Encryption Algorithm | DES / 3DES / AES 128,192,256 |

| | |
|-----------------------------|--|
| Integrity Algorithm | MD5 / SHA1 |
| Select Diffie-Hellman Group | 768 – 8192 bit |
| Key Life Time | Enter your own or use the default (1 hour) |

The Manual key exchange method options are summarized in the table below.

Manual Key Exchange Method

| | |
|---|--|
| Key Exchange Method | <input type="text" value="Manual"/> |
| Encryption Algorithm | <input type="text" value="AES"/> |
| Encryption Key | <input style="width: 100%;" type="text"/> <small>Hex value: DES - 16 digit, 3DES - 48, AES 32, 48, 64 digit</small> |
| Authentication Algorithm | <input type="text" value="SHA1"/> |
| Authentication Key | <input style="width: 100%;" type="text"/> <small>Hex value: MD5 - 32 digit, SHA1 - 40 digit</small> |
| SPI | <input style="width: 100%;" type="text" value="101"/> <small>Hex value: 100-FFFFFFFF</small> |
| <input type="button" value="Apply/Save"/> | |

| | |
|--------------------------|---------------------------------------|
| Encryption Algorithm | DES / 3DES / AES (aes-cbc) |
| Encryption Key | DES: 16 digit Hex, 3DES: 48 digit Hex |
| Authentication Algorithm | MD5 / SHA1 |
| Authentication Key | MD5: 32 digit Hex, SHA1: 40 digit Hex |
| SPI (default is 101) | Enter a Hex value from 100-FFFFFFFF |

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.

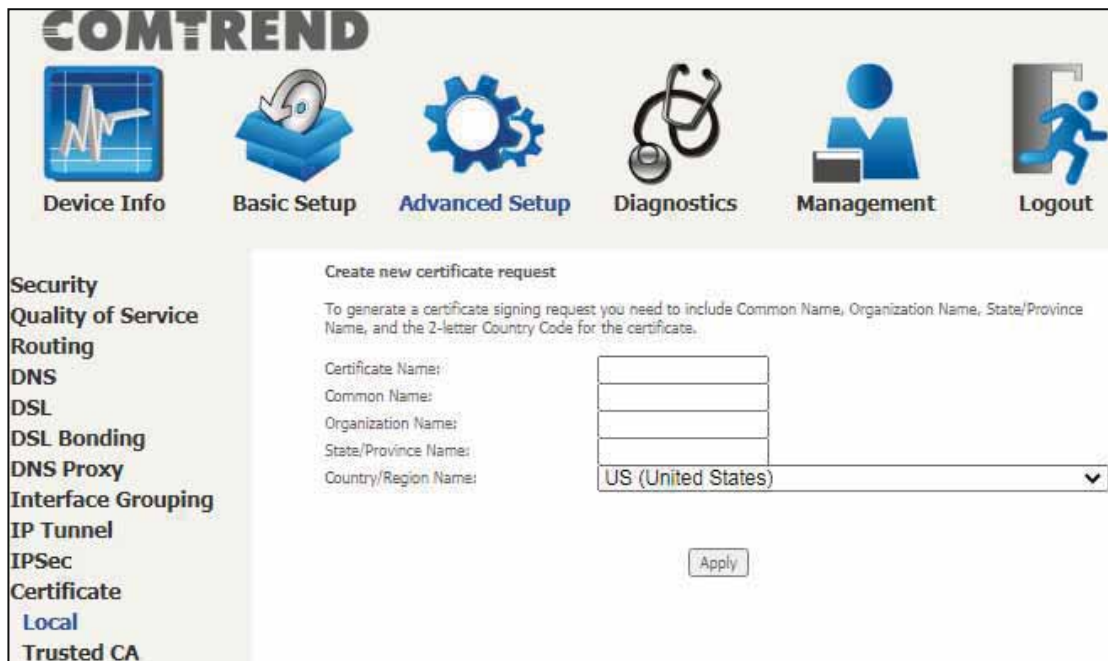
6.10.1 Local

The screenshot shows the COMTREND web interface. At the top, there is a navigation bar with the COMTREND logo and six icons: Device Info, Basic Setup, Advanced Setup, Diagnostics, Management, and Logout. Below the navigation bar is a sidebar menu with the following items: Security, Quality of Service, Routing, DNS, DSL, DSL Bonding, DNS Proxy, Interface Grouping, IP Tunnel, IPsec, Certificate, Local (highlighted), and Trusted CA. The main content area is titled "Local Certificates" and contains the following text: "Add, View or Remove certificates from this page. Local certificates are used by peers to verify your identity. Maximum 4 certificates can be stored." Below this text is a table with the following columns: Name, In Use, Subject, Type, and Action. Below the table are two buttons: "Create Certificate Request" and "Import Certificate".

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 contents of this application form do not affect the basic parameter settings of the product.

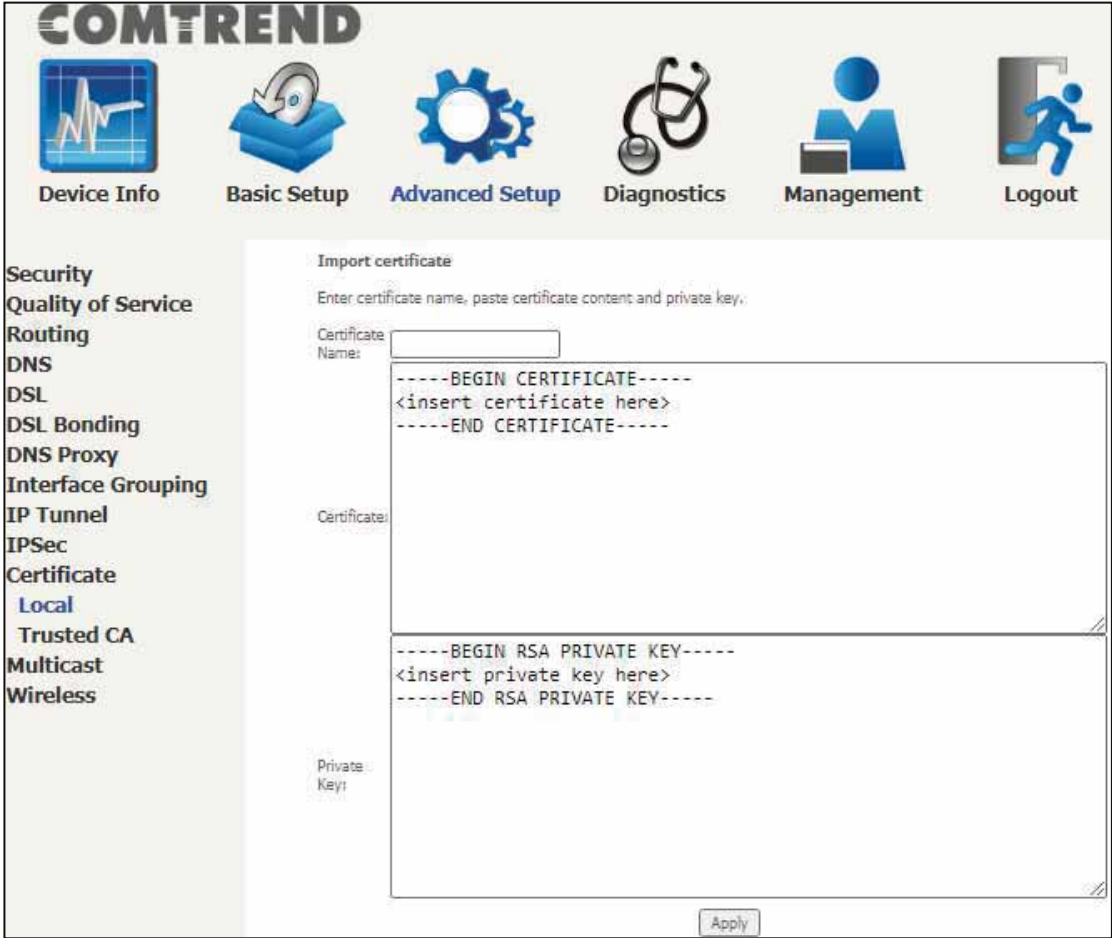


The following table is provided for your reference.

| Item | 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 Multicast

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

The screenshot shows the COMTREND web interface with a navigation menu on the left and a main configuration area. The navigation menu includes: Security, Quality of Service, Routing, DNS, DSL, DSL Bonding, DNS Proxy, Interface Grouping, IP Tunnel, IPsec, Certificate, **Multicast**, and Wireless. The main configuration area is titled 'COMTREND' and contains several sections:

- Multicast Precedence:** A dropdown menu set to 'Disable' with a note 'lower value, higher priority'.
- Multicast Strict Grouping Enforcement:** A dropdown menu set to 'Disable'.
- IGMP Configuration:** A section with the instruction 'Enter IGMP protocol configuration fields if you want modify default values shown below.' It contains several input fields:
 - 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:
- IGMP Group Exception List:** A table with columns 'Group Address', 'Mask/Mask bits', and 'Remove'. It lists three entries:

| Group Address | Mask/Mask bits | Remove |
|-----------------|-----------------|--------------------------|
| 224.0.0.0 | 255.255.255.0 | <input type="checkbox"/> |
| 239.255.255.250 | 255.255.255.255 | <input type="checkbox"/> |
| 224.0.255.135 | 255.255.255.255 | <input type="checkbox"/> |

 Below the table are input fields for 'Add' and 'Remove Checked Entries'.
- MLD Configuration:** A section with the instruction 'Enter MLD protocol (IPv6 Multicast) configuration fields if you want modify default values shown below.' It contains several input fields:
 - 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:
- MLD Group Exception List:** A table with columns 'Group Address', 'Mask/Mask bits', and 'Remove'. It lists three entries:

| Group Address | Mask/Mask bits | Remove |
|-----------------|---|--------------------------|
| ff01::0000 | ffff::0000 | <input type="checkbox"/> |
| ff02::0000 | ffff::0000 | <input type="checkbox"/> |
| ff05::0001:0003 | ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff | <input type="checkbox"/> |

 Below the table are input fields for 'Add' and 'Remove Checked Entries'.

At the bottom right of the configuration area is an 'Apply/Save' button.

Multicast Precedence: Select precedence of multicast packets.

Multicast Strict Grouping Enforcement: Enable/Disable multicast strict grouping.

| Item | 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. |
| 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. |

IGMP Group Exception List / MLD Group Exception List

| Item | Description |
|----------------|---|
| Group Address | This is the delimited list of ignored multicast addresses being queried when sending a Group-Specific or Group-and-Source-Specific Query. |
| Mask/Mask Bits | This is the delimited list of ignored multicast mask being queried when sending a Group-Specific or Group-and-Source-Specific Query. |
| Remove | Allows a user to remove a specific item in the exception list. |

6.12 Wireless

6.12.1 SSID

This page allows you to configure the Virtual interfaces for each Physical interface.

COMTREND

Device Info Basic Setup **Advanced Setup** Diagnostics Management Logout

Security
Quality of Service
Routing
DNS
DSL
DSL Bonding
DNS Proxy
Interface Grouping
IP Tunnel
IPSec
Certificate
Multicast
Wireless
SSID

SSID
 This page allows you to configure the Virtual interfaces for each Physical interface.

Wireless Interface: Comtrend2451_2.4GHz(00:90:4C:2C:30:00) ▼

BSS-MAC (SSID): 00:90:4C:2C:30:00 (Comtrend2451_2.4GHz enabled) ▼

BSS Enabled: Enabled ▼

Network Name (SSID): Comtrend2451_2.4GHz

Network Type: Open ▼

AP Isolation: Off ▼

BSS Max Associations Limit: 64

WMM Advertise: Advertise ▼

WMF: On ▼

Apply Cancel

Click the **Apply** button to apply your changes. The settings shown above are described below.

| Item | Description |
|----------------------------|---|
| Wireless Interface | Select which wireless interface to configure |
| BSS-MAC (SSID) | Select desired BSS to configure |
| BSS Enabled | Enable or disable this SSID |
| Network Name (SSID) | Sets the network name (also known as SSID) of this network |
| Network Type | Selecting Closed hides the network from active scans. Selecting Open reveals the network from active scans. |
| AP Isolation | Selecting On enables AP Isolation mode. When enabled, STAs associated with the AP will not be able to communicate with each other. |
| BSS Max Associations Limit | Sets the maximum associations for this BSS |

| | |
|---------------|--|
| WMM Advertise | When WMM is enabled for the radio, selecting On allows WMM to be advertised in beacons and probes for this BSS. Off disables advertisement of WMM in beacons and probes. |
| WMF | Choose On to enable Wireless Multicast Forwarding on this BSS. Off disables this feature. |

6.12.2 Security

This page allows you to configure security for the wireless LAN interfaces.

The screenshot shows the Comtrend web interface with a navigation menu at the top: Device Info, Basic Setup, **Advanced Setup**, Diagnostics, Management, and Logout. On the left, a sidebar lists various configuration categories: Security, Quality of Service, Routing, DNS, DSL, DSL Bonding, DNS Proxy, Interface Grouping, IP Tunnel, IPSec, Certificate, Multicast, Wireless, SSID, **Security**, WPS, MAC Filtering, WDS, and Advanced. The main content area is titled 'SECURITY' and includes the following configuration options:

- Wireless Interface: Comtrend2451_2.4GHz(00:90:4C:2C:30:00) [Select]
- 802.11 Authentication: Open
- 802.1X Authentication: Disabled
- WPA: Disabled
- WPA-PSK: Disabled
- WPA2: Disabled
- WPA2-PSK: Enabled
- WPA3-SAE: Disabled
- WPA Encryption: AES
- RADIUS Server: 0.0.0.0
- RADIUS Port: 1812
- RADIUS Key: ****
- WPA passphrase: ***** [Click here to display](#)
- Protected Management Frames: Capable
- Network Key Rotation Interval: 0
- Pairwise Key Rotation Interval: 0
- Network Re-auth Interval: 36000

Buttons for 'Apply' and 'Cancel' are located at the bottom of the configuration area.

Click the **Apply** button to apply your changes. For information on each parameter, move the cursor over the parameter that you are interested in (as shown here).

| | |
|--|------------------------------------|
| 802.11 Authentication: Selects 802.11 authentication method. Open or Shared. OSEN: | Open ▼ Disabled ▼ Disabled ▼ |
|--|------------------------------------|

6.12.3 WPS

This page allows you to configure WPS.

Click the **Apply** button to apply your changes. For information on each parameter, move the cursor over the parameter that you are interested in (as shown here).

| | |
|--|---|
| WPS This page allows you to configure WPS. | |
| Wireless Interface: | Comtrend0001_5GHz(02:10:18:01:00:02) ▼ Select |
| WPS Current Mode: WPS current mode | AP with Built-in Registrar |
| WPS Configuration: | Enabled ▼ |

6.12.4 MAC Filtering

This page allows you to configure the MAC Filtering for each Physical interface.

The screenshot shows the COMTREND web interface. At the top, there is a navigation bar with icons for Device Info, Basic Setup, Advanced Setup, Diagnostics, Management, and Logout. Below this, a sidebar menu lists various configuration categories: Security, Quality of Service, Routing, DNS, DSL, DSL Bonding, DNS Proxy, Interface Grouping, IP Tunnel, IPSec, Certificate, Multicast, Wireless, SSID, Security, WPS, MAC Filtering (highlighted), and WDS. The main content area is titled 'MAC Filtering' and contains the following configuration options:

- Wireless Interface: Comtrend2451_2.4GHz(00:90:4C:2C:30:00) ▼
- BSS-MAC (SSID): 00:90:4C:2C:30:00 (Comtrend2451_2.4GHz enabled) ▼
- MAC Restrict Mode: Disabled ▼
- MAC filter based Probe Response: On ▼
- MAC Addresses: A table with 6 rows and 2 columns.

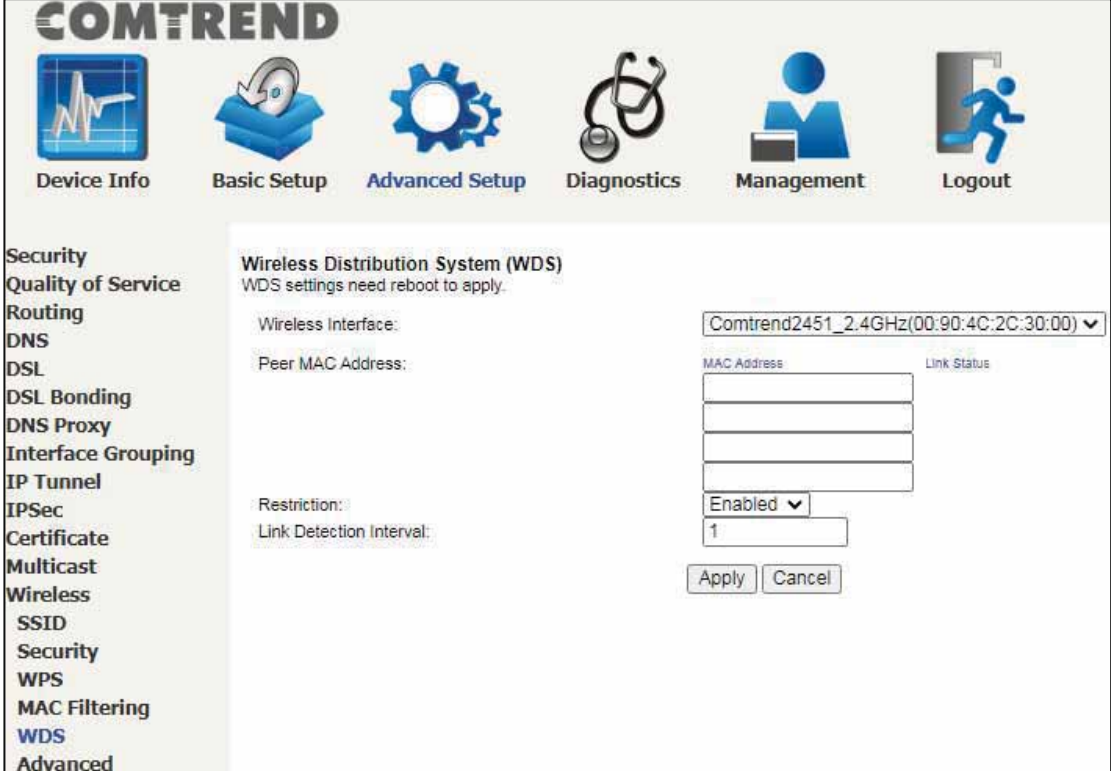
At the bottom of the configuration area are 'Apply' and 'Cancel' buttons.

Click the **Apply** button to apply your changes. For information on each parameter, move the cursor over the parameter that you are interested in (as shown here).

This close-up shows the 'MAC Restrict Mode' dropdown menu. The 'Disabled' option is selected. A tooltip is displayed over the dropdown, containing the text: 'MAC Restrict Mode: Selects whether clients with the specified MAC address are allowed or denied wireless access.'

6.12.5 WDS

The wireless distribution system supports extended networking of wireless access points and can be configured as described below.

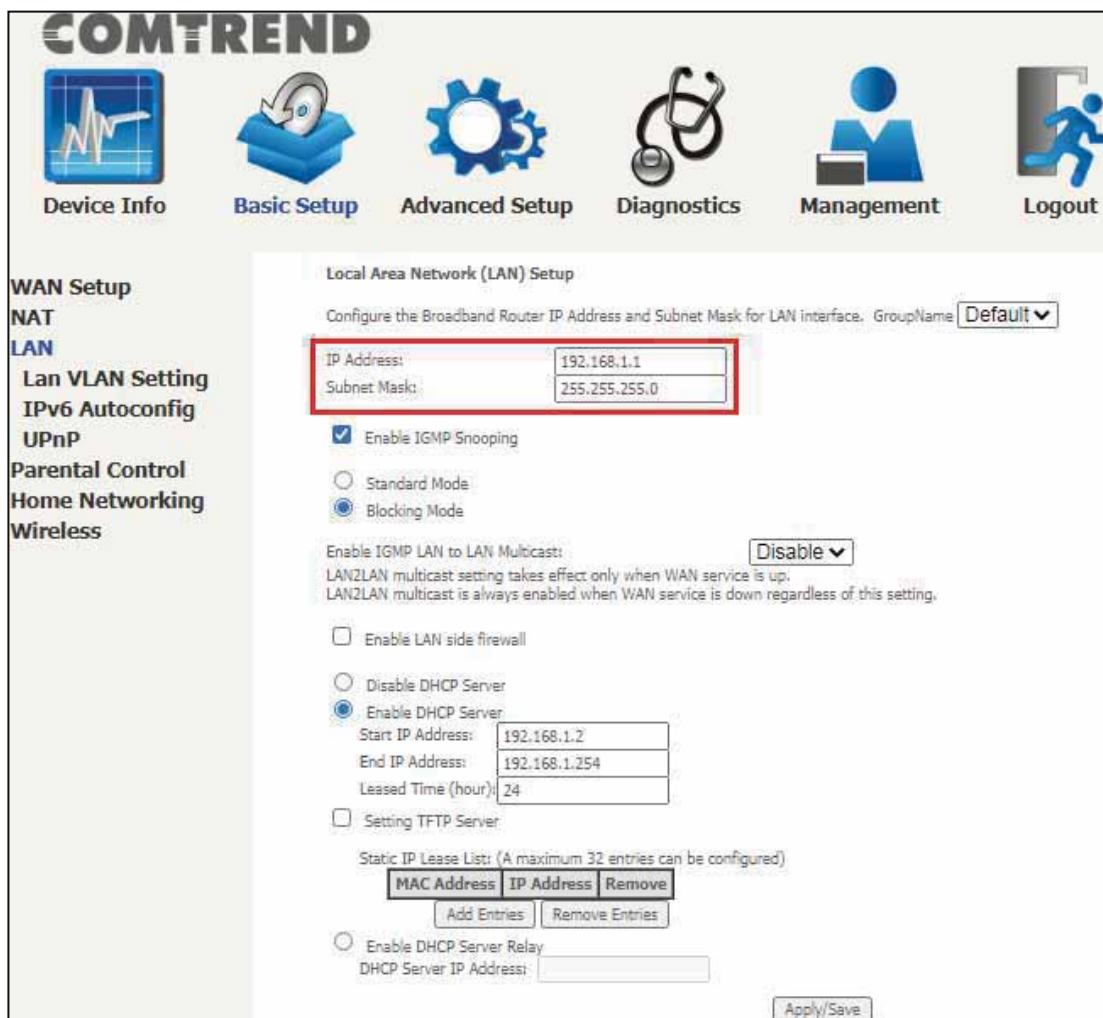


Click the **Apply** button to apply your changes. For information on each parameter, move the cursor over the parameter that you are interested in (as shown here).



Note: With reference to the above setup, please ensure that the conditions below are met, and both devices are rebooted afterwards:

1. Ensure that the first Comtrend device (home router) does not use the same IP address as the second Comtrend wireless device (wireless bridge). See section 5.3 LAN, for details on how to change the IP address.



COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

WAN Setup
NAT
LAN
 Lan VLAN Setting
 IPv6 Autoconfig
 UPnP
 Parental Control
 Home Networking
 Wireless

Local Area Network (LAN) Setup

Configure the Broadband Router IP Address and Subnet Mask for LAN interface. GroupName **Default** ▼

| | |
|--------------|---------------|
| IP Address: | 192.168.1.1 |
| Subnet Mask: | 255.255.255.0 |

Enable IGMP Snooping

Standard Mode
 Blocking Mode

Enable IGMP LAN to LAN Multicast: **Disable** ▼
LAN2LAN multicast setting takes effect only when WAN service is up.
 LAN2LAN multicast is always enabled when WAN service is down regardless of this setting.

Enable LAN side firewall

Disable DHCP Server
 Enable DHCP Server

Start IP Address: 192.168.1.2
 End IP Address: 192.168.1.254
 Leased Time (hour): 24

Setting TFTP Server

Static IP Lease List: (A maximum 32 entries can be configured)

| MAC Address | IP Address | Remove |
|--|------------|--------|
| <input type="button" value="Add Entries"/> <input type="button" value="Remove Entries"/> | | |

Enable DHCP Server Relay
 DHCP Server IP Address:

- 2. Both devices need to have the same fixed channel. See section 6.12.6 [Advanced](#) for details.

The screenshot shows the Comtrend web interface with the following navigation menu items: Device Info, Basic Setup, **Advanced Setup**, Diagnostics, Management, and Logout. The left sidebar contains a list of configuration categories: Security, Quality of Service, Routing, DNS, DSL, DSL Bonding, DNS Proxy, Interface Grouping, IP Tunnel, IPSec, Certificate, Multicast, **Wireless**, SSID, Security, WPS, MAC Filtering, WDS, and **Advanced**. The main content area is titled 'Radio' and includes the following configuration options:

- Wireless Interface: Comtrend2451_2.4GHz(00:90:4C:2C:30:00)
- Interface: Enabled
- 802.11 Band: 2.4 GHz (Current: 2.4 GHz)
- Channel Specification: Auto (Current: 6 ***Interference Level: Acceptable)**
- Bandwidth: 20 MHz (Current: 20MHz)
- VLAN Priority Support: Off
- OBSS Coexistence: Off
- Transmit Power: 100%
- Max Associations Limit: 64
- XPress™ Technology: On
- Beamforming transmission (BFR): Disabled
- Beamforming reception (BFE): Disabled
- MU-MIMO TX: Enabled
- RIFS Mode Advertisement: Auto
- WMM Support: On
- No-Acknowledgement: Off
- APSD Support: On
- Enable IGMP Proxy: Disable
- BandSteering Daemon: Disable
- BSD Role Config: IPAddr, Port Number
- Helper Addr&Port: 192.168.1.2, 9877
- Primary Addr&Port: 192.168.1.1, 9878
- Airtime Fairness: Enable
- Enable 802.11ax: On

Buttons for 'Apply' and 'Cancel' are located at the bottom of the configuration area.

- 3. Both devices need to have a (different) fixed access SSID (Network Name). See section 6.12.1 SSID for details.

The screenshot shows the Comtrend web interface with the following navigation menu items: Device Info, Basic Setup, Advanced Setup, Diagnostics, Management, and Logout. On the left sidebar, the following menu items are listed: Security, Quality of Service, Routing, DNS, DSL, DSL Bonding, DNS Proxy, Interface Grouping, IP Tunnel, IPSec, Certificate, Multicast, Wireless, and SSID. The main content area is titled 'SSID' and contains the following configuration fields:

| | |
|-----------------------------|---|
| Wireless Interface: | Comtrend2451_2.4GHz(00:90:4C:2C:30:00) ▼ |
| BSS-MAC (SSID): | 00:90:4C:2C:30:00 (Comtrend2451_2.4GHz enabled) ▼ |
| BSS Enabled: | Enabled ▼ |
| Network Name (SSID): | Comtrend2451_2.4GHz |
| Network Type: | Open ▼ |
| AP Isolation: | Off ▼ |
| BSS Max Associations Limit: | 64 |
| WMM Advertise: | Advertise ▼ |
| WMM: | On ▼ |

Buttons for 'Apply' and 'Cancel' are located at the bottom of the configuration area.

- 4. Both devices need to have 802.11 Authentication Open and WPA2-PSK/WPA3-SAE disabled. See section 6.12.2 Security for details.

COMTREND

Device Info Basic Setup **Advanced Setup** Diagnostics Management Logout

Security
Quality of Service
Routing
DNS
DSL
DSL Bonding
DNS Proxy
Interface Grouping
IP Tunnel
IPSec
Certificate
Multicast
Wireless
SSID
Security
WPS
MAC Filtering
WDS
Advanced

SECURITY
This page allows you to configure security for the wireless LAN interfaces.

Wireless Interface: Comtrend2451_2.4GHz(00:90:4C:2C:30:00) Select

802.11 Authentication: Open
802.1X Authentication: Disabled
WPA: Disabled
WPA-PSK: Disabled
WPA2: Disabled
WPA2-PSK: Enabled
WPA3-SAE: Disabled

WPA Encryption: AES
RADIUS Server: 0.0.0.0
RADIUS Port: 1812
RADIUS Key: ****
WPA passphrase: ***** [Click here to display](#)
Protected Management Frames: Capable
Network Key Rotation Interval: 0
Pairwise Key Rotation Interval: 0
Network Re-auth Interval: 36000

Apply Cancel

- 5. Both devices (A & B) need to have each other's MAC address. See section 6.12.5 WDS for details.

The screenshot shows the COMTREND web interface. At the top, there is a navigation bar with icons for Device Info, Basic Setup, Advanced Setup, Diagnostics, Management, and Logout. On the left, a sidebar lists various settings categories: Security, Quality of Service, Routing, DNS, DSL, DSL Bonding, DNS Proxy, Interface Grouping, IP Tunnel, IPSec, Certificate, Multicast, Wireless, SSID, Security, WPS, MAC Filtering, WDS (highlighted), and Advanced. The main content area is titled 'Wireless Distribution System (WDS)' and includes a warning: 'WDS settings need reboot to apply.' Below this, there are fields for 'Wireless Interface' (set to 'Comtrend2451_2.4GHz(00:90:4C:2C:30:00)'), 'Peer MAC Address' (with a table of three empty rows), 'Restriction' (set to 'Enabled'), and 'Link Detection Interval' (set to '1'). 'Apply' and 'Cancel' buttons are at the bottom.

- 6. Now make sure to reboot both devices. See section 8.8 Reboot for details.

The screenshot shows the COMTREND web interface. The navigation bar and sidebar are the same as in the previous screenshot. The main content area displays the text 'Click the button below to reboot the router.' with a 'Reboot' button highlighted by a red box.

6.12.6 Advanced

This page allows you to configure the Physical Wireless interfaces.

2.4GHz

COMTREND

Device Info Basic Setup **Advanced Setup** Diagnostics Management Logout

Security
Quality of Service
Routing
DNS
DSL
DSL Bonding
DNS Proxy
Interface Grouping
IP Tunnel
IPSec
Certificate
Multicast
Wireless
SSID
Security
WPS
MAC Filtering
WDS
Advanced

Radio
This page allows you to configure the Physical Wireless interfaces.

Wireless Interface: Comtrend2451_2.4GHz(00:90:4C:2C:30:00) ▼

Interface: Enabled ▼

802.11 Band: 2.4 GHz ▼ Current: 2.4 GHz

Channel Specification: Auto ▼ Current: 6 ***Interference Level: Acceptable

Bandwidth: 20 MHz ▼ Current: 20MHz

VLAN Priority Support: Off ▼

OBSS Coexistence: Off ▼

Transmit Power: 100% ▼

Max Associations Limit: 64

XPress™ Technology: On ▼

Beamforming transmission (BFR): Disabled ▼

Beamforming reception (BFE): Disabled ▼

MU-MIMO TX: Enabled ▼

RIFS Mode Advertisement: Auto ▼

WMM Support: On ▼

No-Acknowledgement: Off ▼

APSD Support: On ▼

Enable IGMP Proxy: Disable ▼

BandSteering Daemon: Disable ▼

| BSD Role Config | IPAddr | Port Number |
|--------------------|-------------|-------------|
| Helper Addr&Port: | 192.168.1.2 | 9877 |
| Primary Addr&Port: | 192.168.1.1 | 9878 |

Airtime Fairness: Enable ▼

Enable 802.11ax: On ▼

Apply Cancel

5GHz

COMTREND

Device Info Basic Setup **Advanced Setup** Diagnostics Management Logout

Security
Quality of Service
Routing
DNS
DSL
DSL Bonding
DNS Proxy
Interface Grouping
IP Tunnel
IPSec
Certificate
Multicast
Wireless
SSID
Security
WPS
MAC Filtering
WDS
Advanced

Radio
This page allows you to configure the Physical Wireless interfaces.

Wireless Interface: Comtrend2451_5GHz(00:90:4C:2C:20:77) ▼

Interface: Enabled ▼
802.11 Band: 5 GHz ▼ Current: 5 GHz
Channel Specification: Auto ▼ Current: 60 ***Interference Level: Acceptable
Bandwidth: 20 MHz ▼ Current: 20MHz
VLAN Priority Support: Off ▼
OBSS Coexistence: Off ▼
Transmit Power: 100% ▼
DFS Channel Selection: DFS Reentry ▼
Max Associations Limit: 64
XPress™ Technology: On ▼
Beamforming transmission (BFR): Disabled ▼
Beamforming reception (BFE): Disabled ▼
MU-MIMO TX: Enabled ▼
RIFS Mode Advertisement: Auto ▼
WMM Support: On ▼
No-Acknowledgement: Off ▼
APSD Support: On ▼
Enable IGMP Proxy: Disable ▼
BandSteering Daemon: Disable ▼
BSD Role Config:
Helper Addr&Port: IPAddr 192.168.1.2 Port Number 9877
Primary Addr&Port: 192.168.1.1 9878
Airtime Fairness: Enable ▼
Enable 802.11ax: On ▼

Apply Cancel

Click the **Apply** button to apply your changes.

For information on each parameter, move the cursor over the parameter that you are interested in (as shown here).

Country: UNITED STATES ▼
Current: US
Regulation: 0 ▼ Current: 0

Restricts the channel set based on country requirements.

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.

The screenshot shows the COMTREND Diagnostics dashboard. At the top, there are navigation icons for Device Info, Basic Setup, Advanced Setup, Diagnostics (selected), Management, and Logout. Below the navigation, there are two main sections: LAN and Device.

LAN Section:

- eth1: 100 FD (Orange icon)
- eth2: Down (Grey icon)
- eth3: Down (Grey icon)
- eth4: Down (Grey icon)

| | |
|------------------|-----------------------------|
| LAN IPv4 Address | 192.168.1.1 |
| LAN Subnet Mask | 255.255.255.0 |
| LAN MAC Address | c8:d1:2a:31:24:61 |
| DHCP Server | Enabled |
| DHCP IP Range | 192.168.1.2 - 192.168.1.254 |

Device Section:

| | |
|--------------------------|--------------------------------------|
| Model | NexusLink 3124u |
| Serial Number | 2073124UXXF-AA000006 |
| Firmware Version | HT11-502CTU-C01_R03.A2pvf5x046n.d27h |
| Bootloader (CFE) Version | 1.0.38-163.243-0 |
| Up Time | 11 mins:44 secs |
| System Log | Show |

Left Sidebar: Diagnostics, Ethernet OAM, Uptime Status, Ping, TraceRoute.

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

The screenshot shows the COMTREND Diagnostics individual tests screen. At the top, there are navigation icons for Device Info, Basic Setup, Advanced Setup, Diagnostics (selected), Management, and Logout. Below the navigation, there are two main sections: Diagnostics and Device.

Diagnostics Section:

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 eth1 Connection: | FAIL | Help |
| Test your eth2 Connection: | PASS | Help |
| Test your eth3 Connection: | FAIL | Help |
| Test your eth4 Connection: | FAIL | Help |
| Test your eth5 Connection: | FAIL | Help |
| Test your Wireless Connection: | PASS,PASS | Help |

[Rerun Diagnostic Tests](#)

Left Sidebar: Diagnostics, Ethernet OAM, Uptime Status, Ping, TraceRoute.

7.2 Ethernet OAM

The Ethernet OAM (Operations, Administration, Management) page provides settings to enable/disable 802.3ah, 802.1ag/Y1.731 OAM protocols.



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: (positive integer)

Auto Event

Variable Retrieval

Link Events

Remote Loopback

Active Mode

| Item | Description |
|--------------------|---|
| 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: [0-7]

MD Name: [e.g. Broadcom]

MA ID: [e.g. BRCM]

Local MEP ID: [1-8191]

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

CCM Transmission

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

Loopback and Linktrace Test

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

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

| | | | |
|-------------------|-----|--|--|
| Loopback Result: | N/A | | |
| Linktrace Result: | N/A | | |
| | | | |
| | | | |
| | | | |

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

| Item | Description |
|-------------------|--|
| 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.

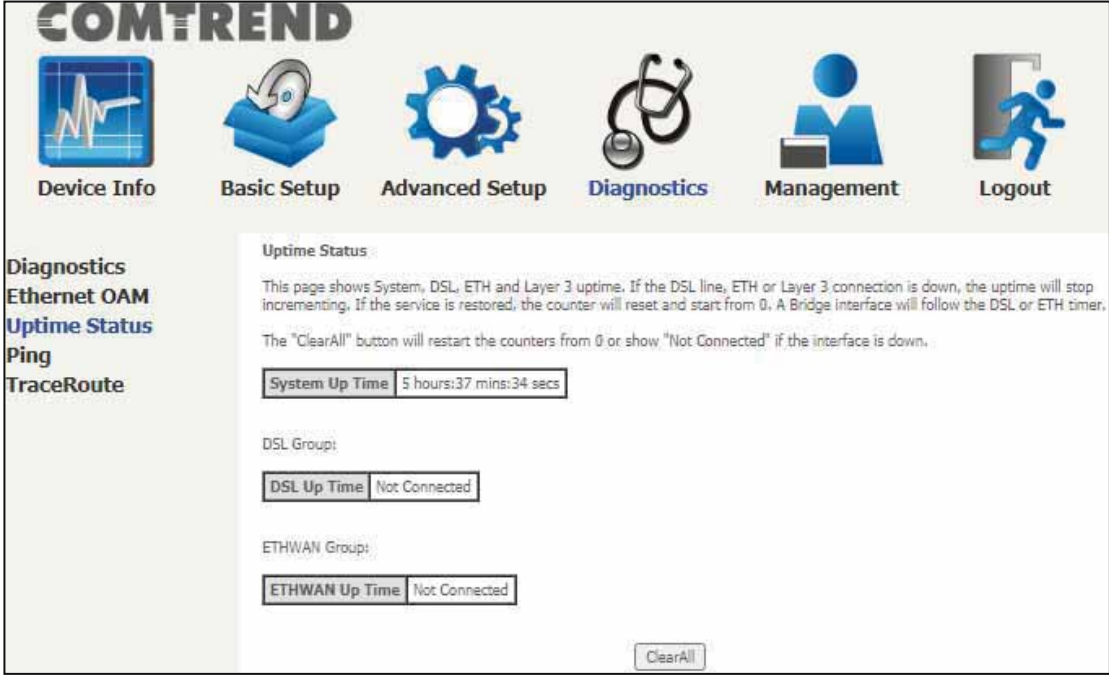
| | |
|---------------|--|
| Remote MEP ID | Maintenance association End Point Identifier for the remote receiver |
|---------------|--|

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 |

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.

COMTREND

Device Info Basic Setup Advanced Setup **Diagnostics** Management Logout

Diagnostics
Ethernet OAM
Uptime Status
Ping
TraceRoute

Ping
Send ICMP ECHO_REQUEST packets to network hosts. Please make sure ICMP is set to be accessible from WAN in Access Control configuration.

Ping IP Address / Hostname:

PING 192.168.1.1 (192.168.1.1): 56 data bytes
64 bytes from 192.168.1.1: seq=0 ttl=64 time=0.264 ms
64 bytes from 192.168.1.1: seq=1 ttl=64 time=0.168 ms
64 bytes from 192.168.1.1: seq=2 ttl=64 time=0.138 ms
64 bytes from 192.168.1.1: seq=3 ttl=64 time=0.151 ms

--- 192.168.1.1 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.138/0.180/0.264 ms

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.



Chapter 8 Management

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



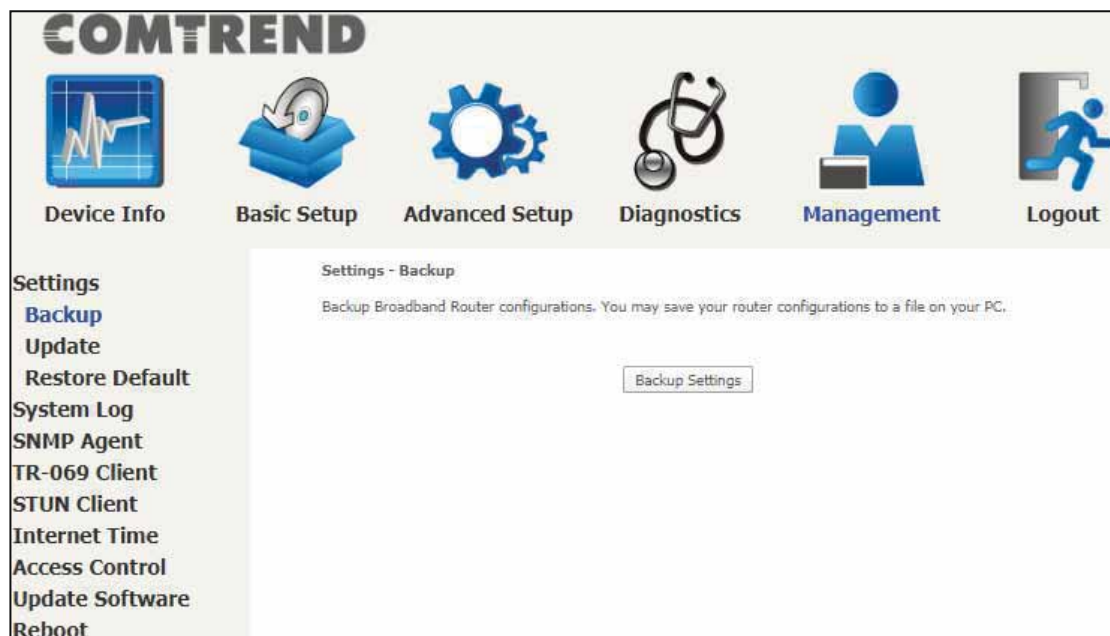
The Management menu has the following maintenance functions and processes:

8.1 Settings

This includes [Backup Settings](#), [Update Settings](#), and [Restore Default](#) screens.

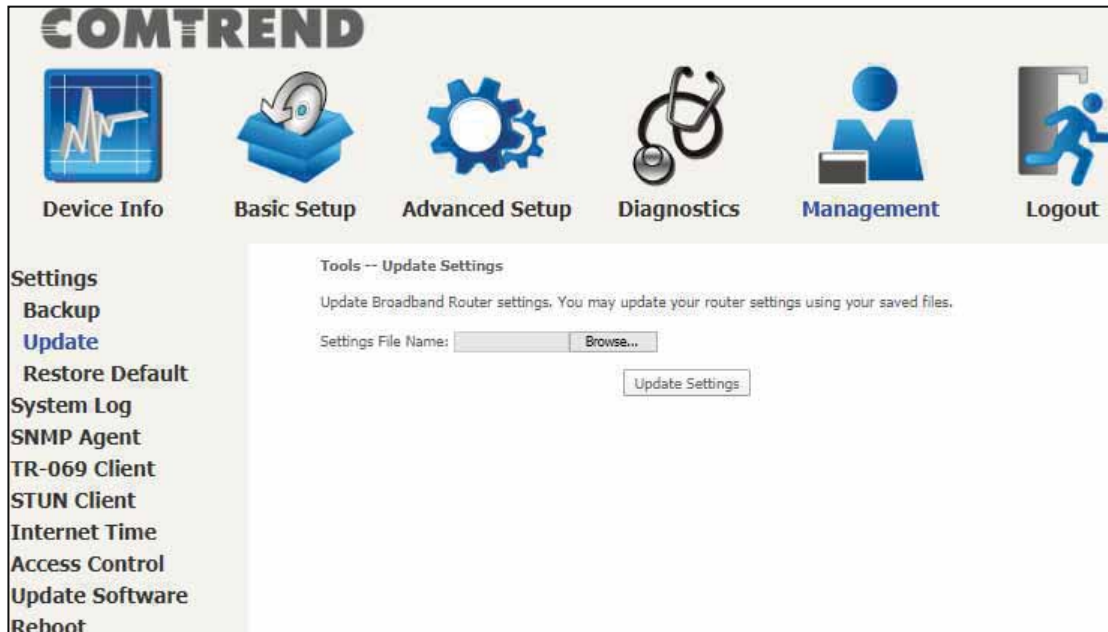
8.1.1 Backup Settings

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.



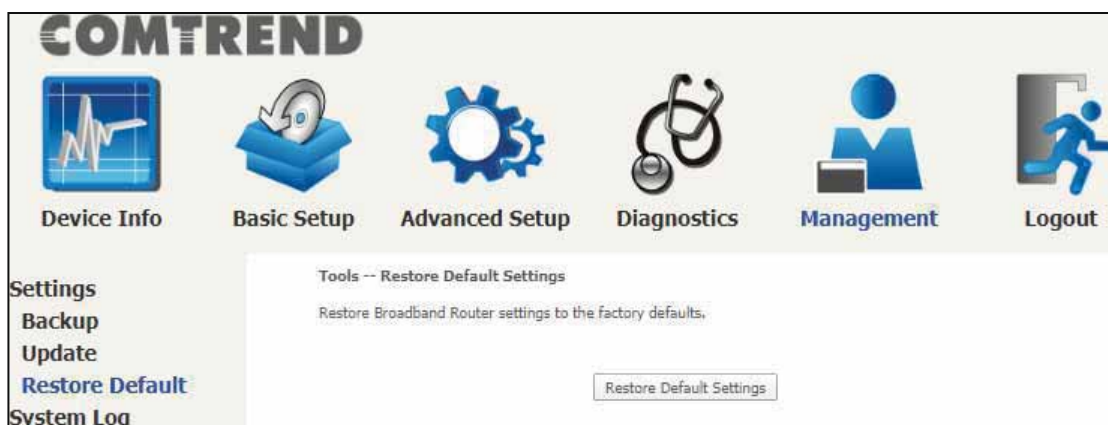
8.1.2 Update Settings

This option recovers configuration files previously saved using **Backup Settings**. Press **Browse...** to search for the file, or enter the file name (including folder path) in the **File Name** box, and 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.

Broadband Router Restore

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

Close the Broadband 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.

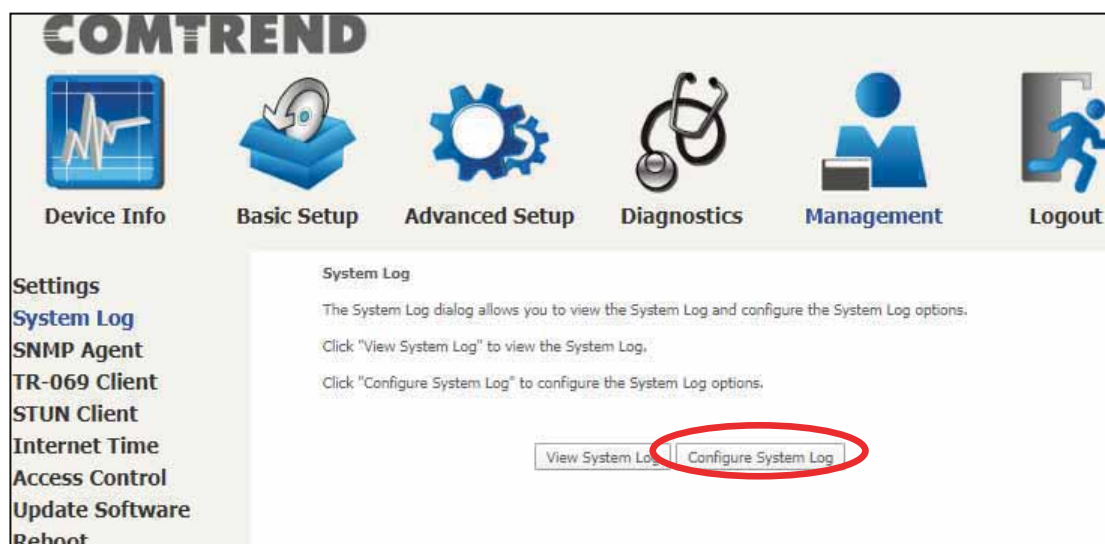
NOTE: This entry has the same effect as the **Reset** button. The PBL-6201 board hardware and the boot loader support the reset to default. If the **Reset** button is continuously pressed for more than 10 seconds, the current configuration data will be erased. If the **Reset** button is continuously pressed for more than 60 seconds, the boot loader will erase all configuration data saved in flash memory and enter bootloader mode.

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.

| Item | 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 . |

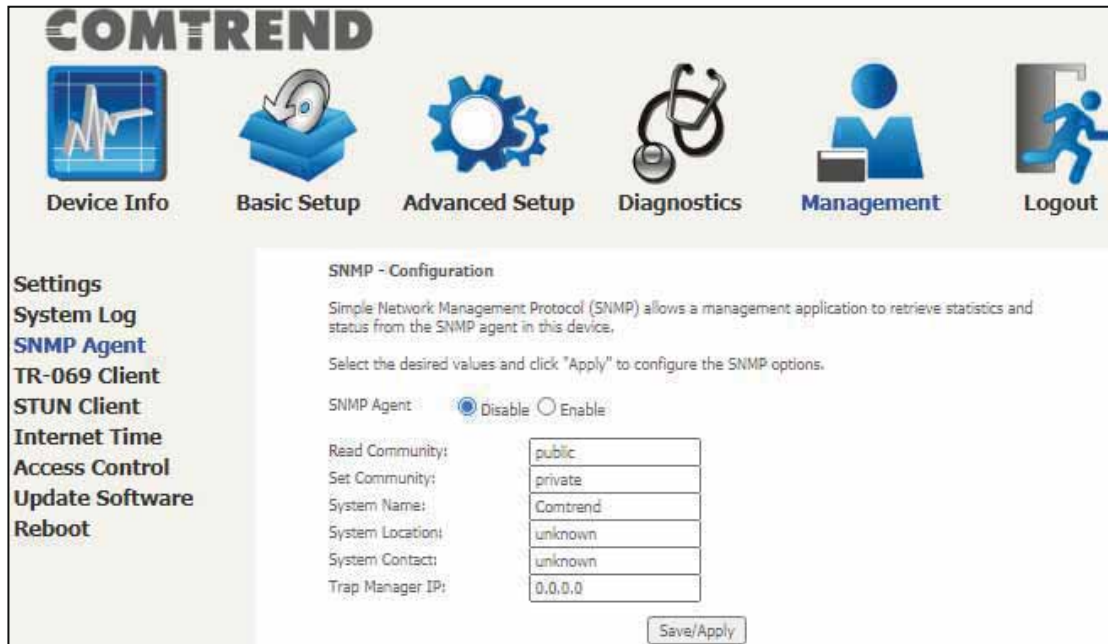
| | |
|----------------------|---|
| <p>Log Level</p> | <p>Allows you to configure the event level and filter out unwanted events below this level. The events ranging from the highest critical level “Emergency” down to this configured level will be recorded to the log buffer on the PBL-6201 SDRAM. When 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.</p> <p>The log levels are defined as follows:</p> <ul style="list-style-type: none"> • 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 <p>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.</p> |
| <p>Display Level</p> | <p>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.</p> |
| <p>Mode</p> | <p>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.</p> |

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. |

8.3 SNMP Agent

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



The settings shown above are described below.

| Item | Description |
|-----------------|--|
| SNMP Agent | Enable or Disable the SNMP Agent |
| Read Community | Default is "public" |
| Set Community | Default is "private" |
| System Name | Default is "Comtrend" |
| System Location | Describes the location of the system |
| System Contact | Describes who should be contacted about the host the agent is running on |
| Trap Manager IP | Trap request supports to monitor and alarm via port 162 from Agent |

8.4 TR-069 Client

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

The table below is provided for ease of reference.

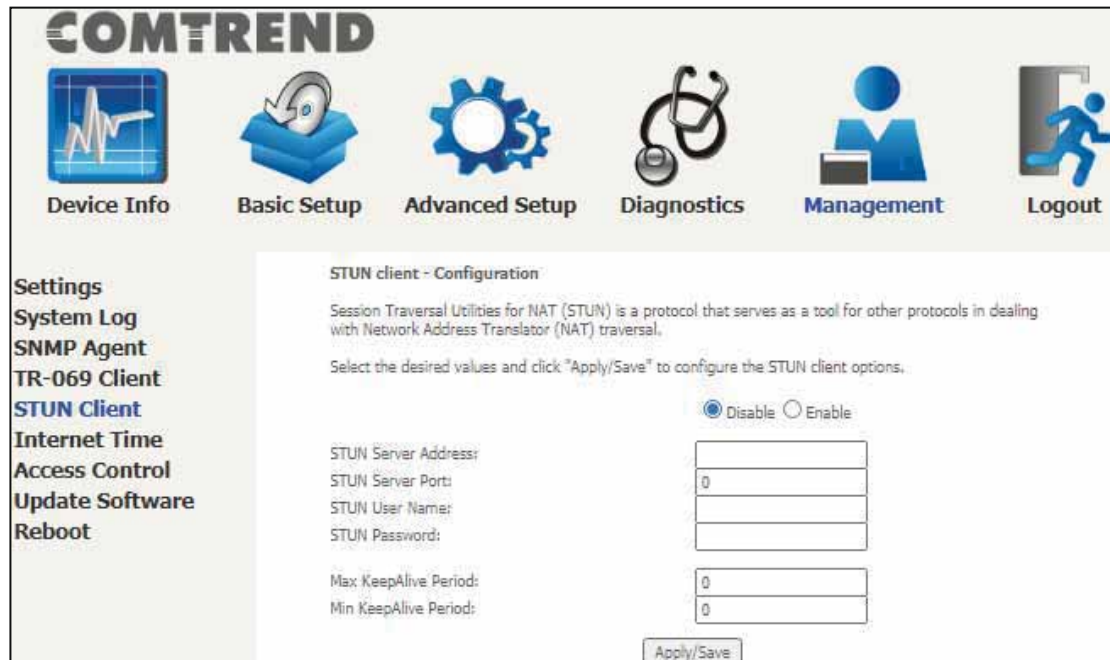
| Item | Description |
|---------------|---|
| Enable TR-069 | Tick the checkbox <input checked="" type="checkbox"/> to enable. |
| OUI-serial | The serial number used to identify the CPE when making a connection to the ACS using the CPE WAN Management Protocol. Select MAC to use the router's MAC address as serial number to authenticate with the ACS or select serial number to use the router's serial number. |
| Inform | Disable/Enable TR-069 client on the CPE. |

| | |
|-------------------------------------|--|
| DHCP Option 43 | Enable/Disable using DHCP option 43 received from WAN server to configure ACS URL. |
| Inform | Disable/Enable TR-069 client on the CPE. |
| Inform Interval | The duration in seconds of the interval for which the CPE MUST attempt to connect with the ACS and call the Inform method. |
| ACS URL | URL for the CPE to connect to the ACS using the CPE WAN Management Protocol. This parameter MUST be in the form of a valid HTTP or HTTPS URL. An HTTPS URL indicates that the ACS supports SSL. The "host" portion of this URL is used by the CPE for validating the certificate from the ACS when using certificate-based authentication. |
| ACS User Name | Username used to authenticate the CPE when making a connection to the ACS using the CPE WAN Management Protocol. This username is used only for HTTP-based authentication of the CPE. |
| ACS Password | Password used to authenticate the CPE when making a connection to the ACS using the CPE WAN Management Protocol. This password is used only for HTTP-based authentication of the CPE. |
| WAN Interface used by TR-069 client | Choose Any_WAN, LAN, Loopback or a configured connection. |
| Connection Request | |
| Authentication | Tick the checkbox <input checked="" type="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 the router. |

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

8.5 STUN Client

Session Traversal Utilities for NAT (STUN) is a protocol that serves as a tool for other protocols in dealing with Network Address Translator (NAT) traversal.



Select the desired values and click the **Apply/Save** button to configure the STUN client options.

The settings shown above are described below.

| Item | Description |
|----------------------|---|
| Disable/Enable | Disable/Enable STUN client. |
| STUN Server Address | IP address of the STUN server. |
| STUN Server Port | Service port of the STUN server. |
| STUN User Name | Account to link to the STUN server. |
| STUN Password | Password of said account to link to the STUN server. |
| Max KeepAlive Period | Maximum period to wait for a packet to be received from the STUN server to keep the link alive. |
| Min KeepAlive Period | Minimum period to send a packet to the STUN server to keep the link alive. |

8.6 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**.

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

Settings
 System Log
 SNMP Agent
 TR-069 Client
 STUN Client
Internet Time
 Access Control
 Update Software
 Reboot

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

Automatically synchronize with Internet time servers

First NTP time server: clock.fmt.he.net
 Second NTP time server: None
 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 [5.4 Parental Control](#). The internet time feature will not operate when the router is in bridged mode, since the router would not be able to connect to the NTP timeserver.

8.7 Access Control

8.7.1 Accounts

This screen is used to configure the user account access passwords for the device. Access to the PBL-6201 is controlled through the following user accounts:

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

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

COMTREND

Device Info Basic Setup Advanced Setup Diagnostics Management Logout

Settings
System Log
SNMP Agent
TR-069 Client
STUN Client
Internet Time
Access Control
Accounts
Services
IP Address
Update Software
Reboot

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:

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

| Feature | root |
|---------------------|---------|
| Account access | Both |
| Add/Remove WAN | Enabled |
| Wireless - Basic | Enabled |
| Wireless - Advanced | Enabled |
| LAN Settings | Enabled |
| Interface Grouping | Enabled |
| NAT Settings | Enabled |
| Update Software | Enabled |
| Security | Enabled |
| Quality of Service | Enabled |
| Management Settings | Enabled |
| Advanced Setup | Enabled |

Note: Passwords may be as long as 16 characters but must not contain a space. Click **Save/Apply** to continue.

8.7.2 Services

The Services option limits or opens the access services over the LAN or WAN. These 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 | Port |
|---------|---------|---------|------|
| HTTP | Lan | LAN | 80 |
| SSH | Lan | LAN | 22 |
| TELNET | Lan | LAN | 23 |
| SNMP | Disable | Disable | 161 |
| HTTPS | Lan | LAN | 443 |
| FTP | Lan | LAN | 21 |
| ICMP | Lan | LAN | 0 |

Apply/Save

Please note that any Comtrend firmware upgrade will not modify any WiFi parameters (including the WiFi power setting). Comtrend's products follow the market's standard requirements.

8.7.3 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**.



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



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.

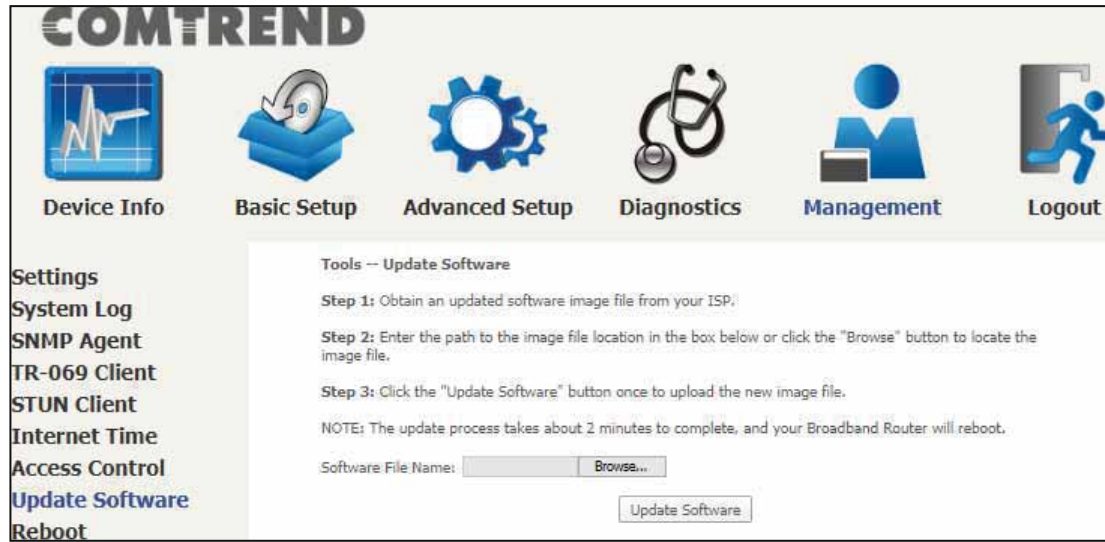
Subnet Mask – Subnet address for the management station.

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

8.7 Update Software

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

Please note that any Comtrend firmware upgrade will not modify any WiFi parameters (including the WiFi power setting). Comtrend's products follow the market's standard requirements.



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

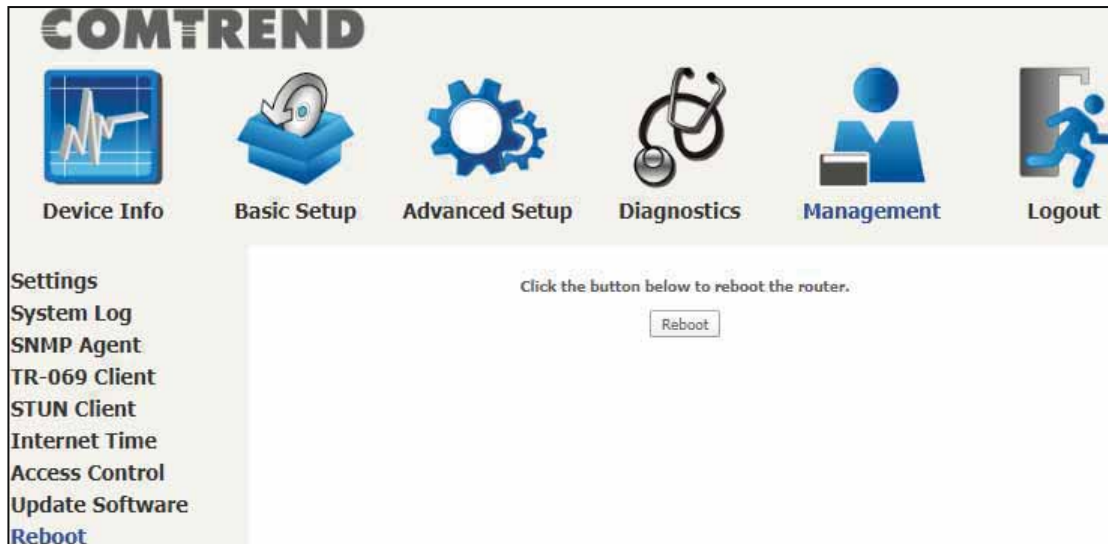
STEP 2: Enter the path and filename of the firmware image file in the **Software File Name** field or click the **Browse** button to locate the image file.

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

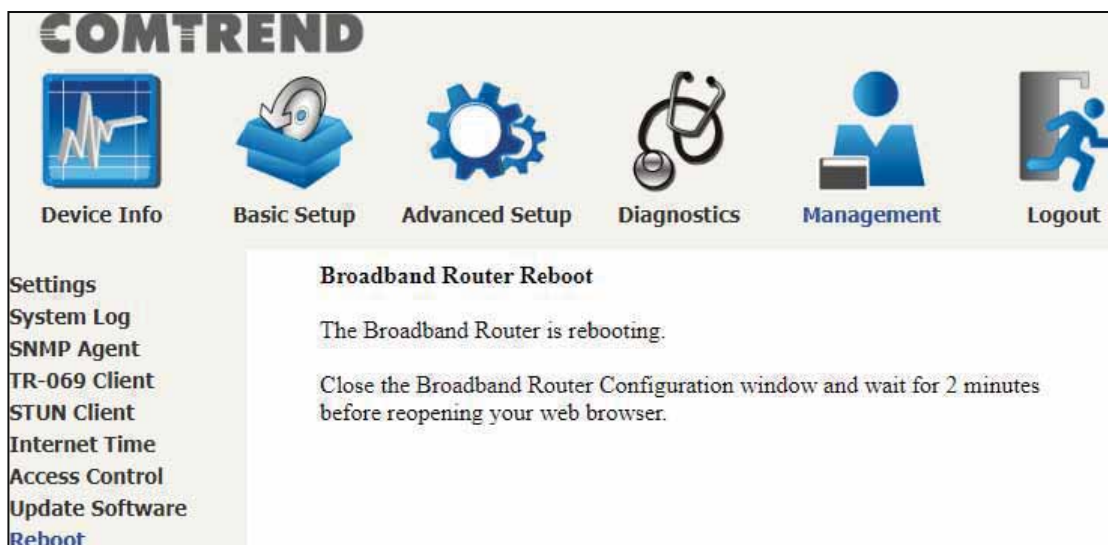
NOTE: The update process will take about 2 minutes to complete. The device will reboot and the browser window will refresh to the default screen upon successful installation. It is recommended that you compare the **Software Version** on the [Device Information](#) screen with the firmware version installed,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

8.8 Reboot

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



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



Chapter 9 Logout

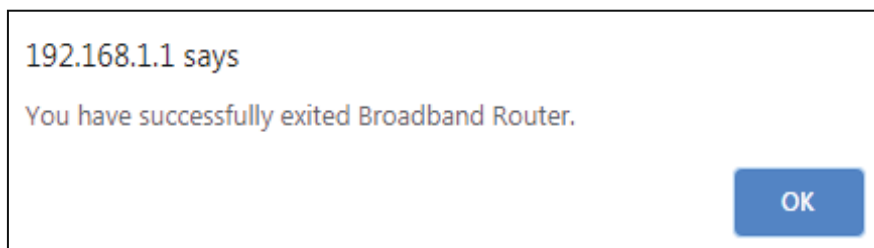
To log out from the device simply click the following icon located at the top of your screen.



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



Upon successful exit, the following message will be displayed.



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 PBL-6201, 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

- RJ-14 X1 for VDSL2 (35b)/ADSL2+ (Annex A) Bonding and Single line
- RJ-45 X 4 for GELAN
- RJ-45 X 1 for 2.5GEWAN
- Reset button X 1
- 2.4G WiFi on/off, WPS button X 1
- 5G WiFi on/off, WPS button X 1
- Internal Antenna X 4
- Power switch X 1

ADSL

- G.994
- G.992.1 (G.dmt) Annexes A
- G.992.2 (G.lite) Annexes A
- ANSI T1.413
- G.992.3 (ADSL2) Annexes A
- G.992.5 (ADSL2+) Annexes A

VDSL

- G.993.2(VDSL2) 35b, 17a, 12a, 12b, 8a, 8b, 8c, 8d
- G.993.5 (G.vector)
- G.998.4 (G.INP)
- SRA (Seamless Rate Adaptation)
- UPBO (Upstream Power Back-off)

2.5Gigabit Ethernet

- IEEE 802.3bz
- 2.5G BASE-T, auto-sense
- Support MDI/MDX

Gigabit Ethernet

- IEEE 802.3, IEEE 802.3u IEEE 802.3ab
- 10/100 /1000 BASE-T, auto-sense
- Support MDI/MDX

Management

- TR-069/TR-104/TR-111/TR-181, SNMP, Telnet, Web- Based Management, Configuration Backup and Restoration
- Software Upgrade via HTTP, TFTP Server, or FTP Server

Networking Protocols

- RFC 2364 (PPPoA), RFC 2684 (RFC 1483) Bridge/Router, RFC 2516 (PPPoE); RFC 1577 (IPoA)
- PPPoE Pass-Through, Multiple PPPoE Sessions on Single WAN Interface
- PPPoE Filtering of Non-PPPoE Packets Between WAN and LAN
- Transparent Bridging Between all LAN and WAN Interfaces
- 802.1p/802.1q VLAN, DSCP
- IGMP Proxy V1/V2/V3, IGMP Snooping V1/V2/V3, Fast leave
- Static route, RIP v1/v2, ARP, RARP, SNTP
- DHCP Server/Client/Relay, DNS Proxy/ Relay, Dynamic DNS, UPnP, DLNA
- IPv6 Dual Stack, IPV6 Rapid Deployment (6RD)

Firewall/Filtering

- Stateful Packet Inspection Firewall
- Stateless Packet Filter
- URI/URL Filtering
- TCP/IP/Port/Interface Filtering Rules Support Both Incoming and Outgoing Filtering

NAT/PAT

- Port Triggering
- Port Forwarding (Virtual Server)
- Symmetric port-overloading NAT, Full-Cone NAT
- DMZ host
- VPN Pass Through (PPTP, L2TP, IPSec)

Wireless

- IEEE 802.11ax, 2.4GHz, 4T4R

Backward compatible with 802.11n/g/b
2412~2462 MHz (Channel 1-11)

- IEEE 802.11ax, 5GHz, 4T4R,

Backward compatible with 802.11ax/ac/n/a

U-NII-1 (5150~5250 MHz)


U-NII-2a (5250~5350 MHz) optional

U-NII-2c/2e (5470~5725 MHz) optional

U-NII-3 (5725~5825 MHz)

- WPA/WPA-PSK, WPA2/WPA2-PSK with TKIP & AES Security Type
- Multiple SSID
- MAC Address Filtering

Power Supply

- External power adapter: 12VDC/ 3.0A
Output: USB3.0,  900mA

Environment

- Operating Temperature: 0°C ~40°C (32°F ~104°F)
- Operating Humidity: 10%~90% non-condensing
- Storage Temperature: -25°C ~65°C (-23°F ~149°F)
- Storage Humidity: 5%~90% non-condensing

Kit Weight

(1* PBL-6201, 1*RJ11 cable, 1*RJ45 cable, 1*power adapter) = 0.8 kg

NOTE: Specifications are subject to change without notice.

NexusLink 3124u is the same as PBL-6201 (for different markets)



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 root 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 root 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.

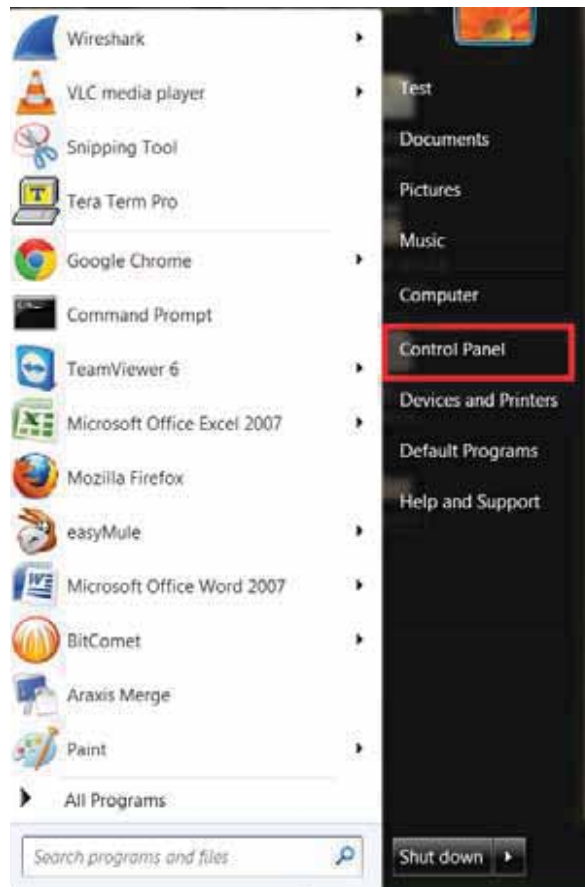
NOTE: This function only applies to models with a USB host port.

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

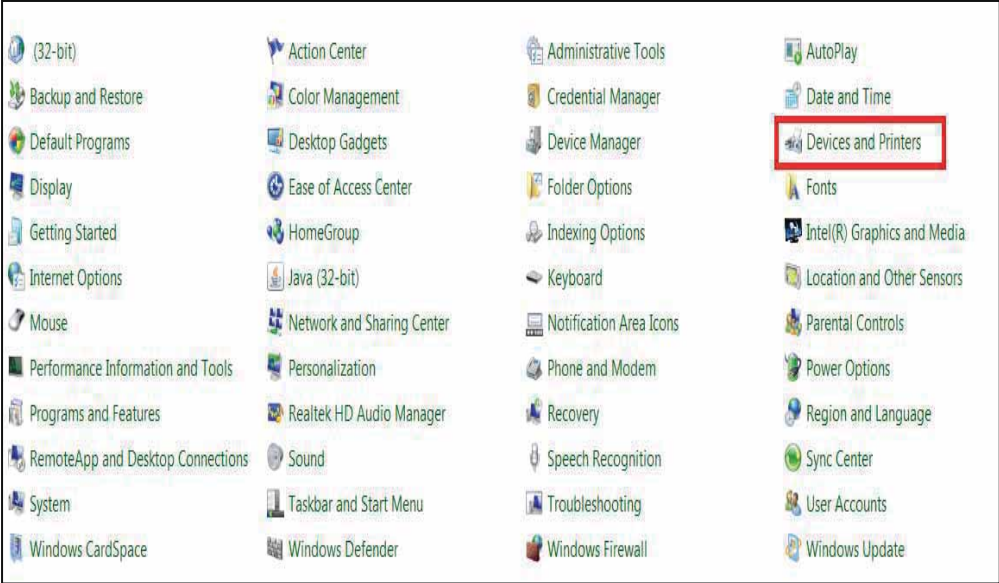
NOTE: The **Printer name** can be any text string up to 40 characters.
The **Make and model** can be any text string up to 128 characters.



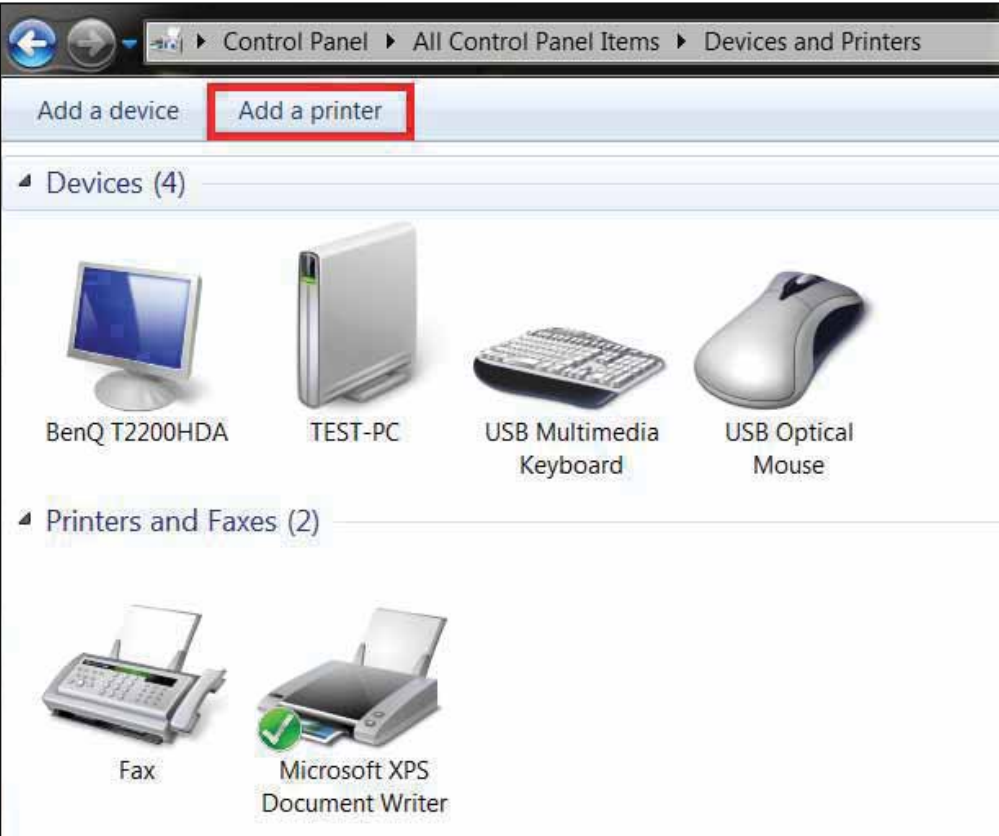
STEP 2: Click the Windows start  button. → Then select **Control Panel**.



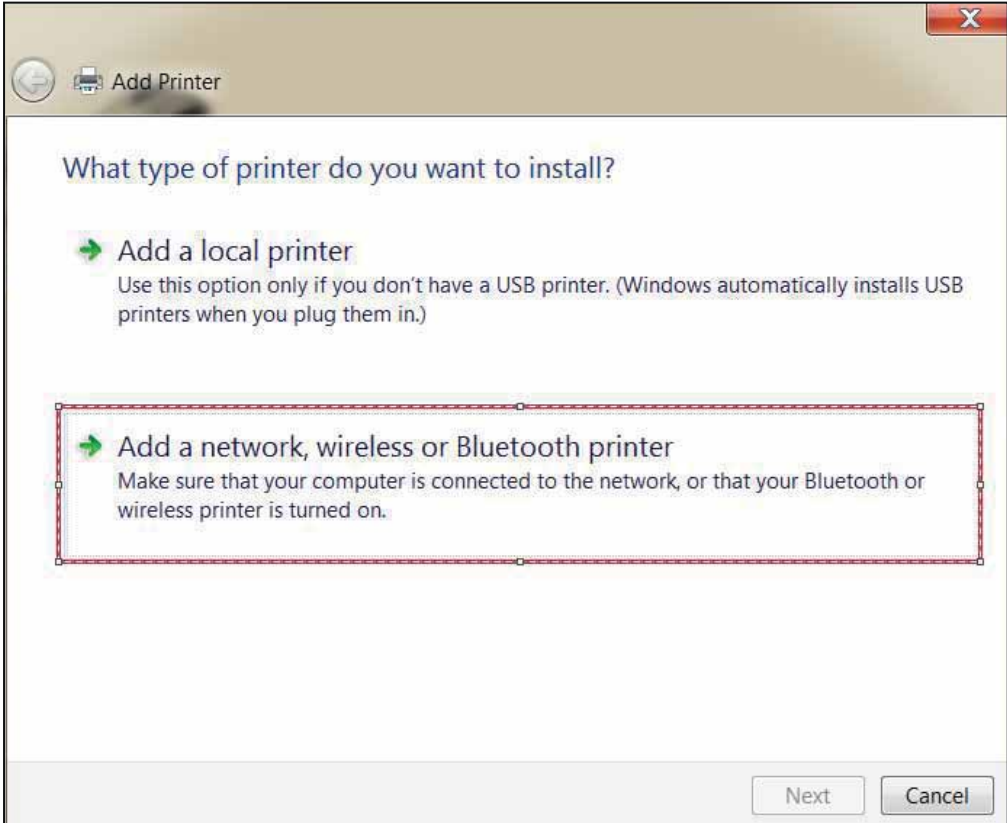
STEP 3: Select **Devices and Printers**.



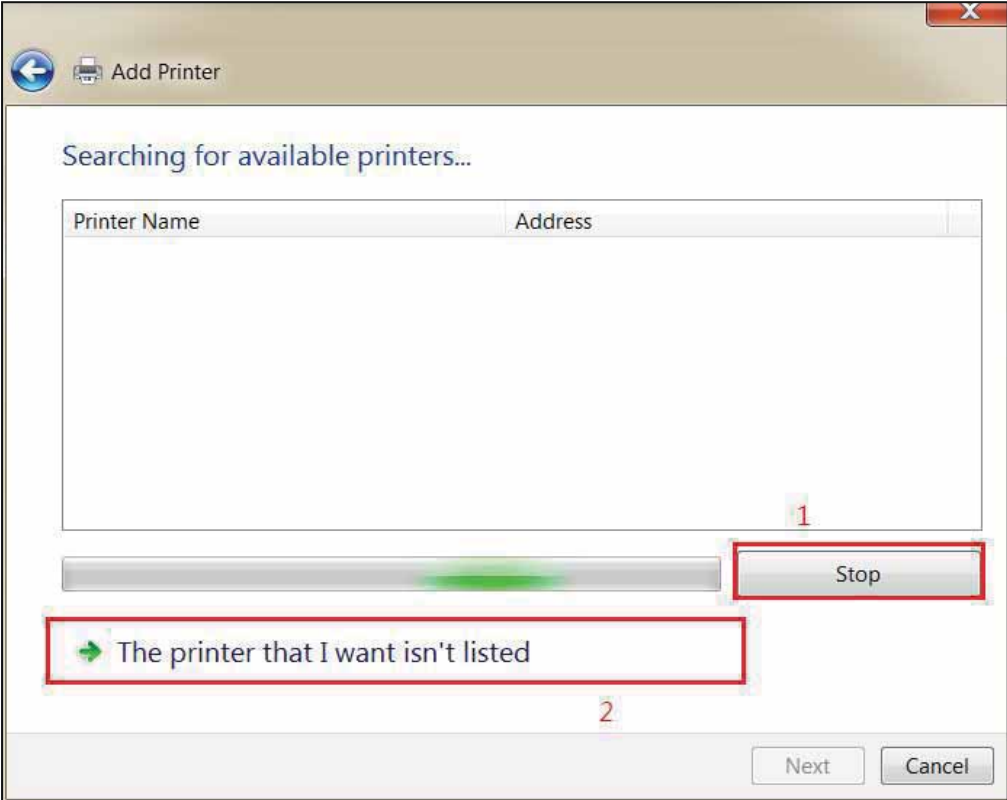
STEP 4: Select **Add a printer**.



STEP 5: Select **Add a network, wireless or Bluetooth printer**.



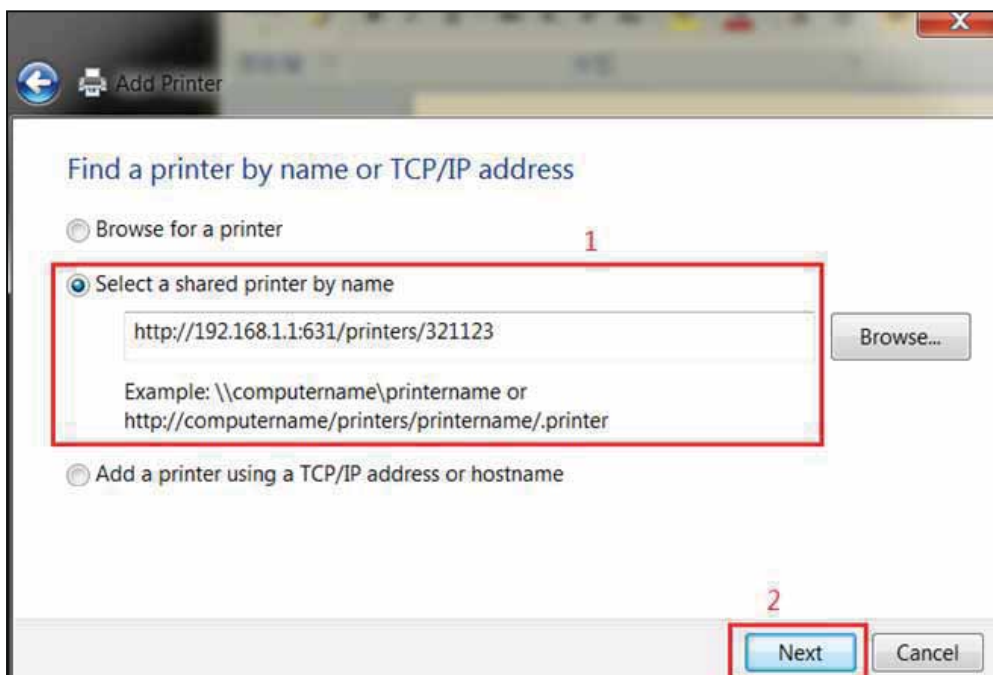
STEP 6: Click the **Stop** button. → Select **The printer that I want isn't listed**.



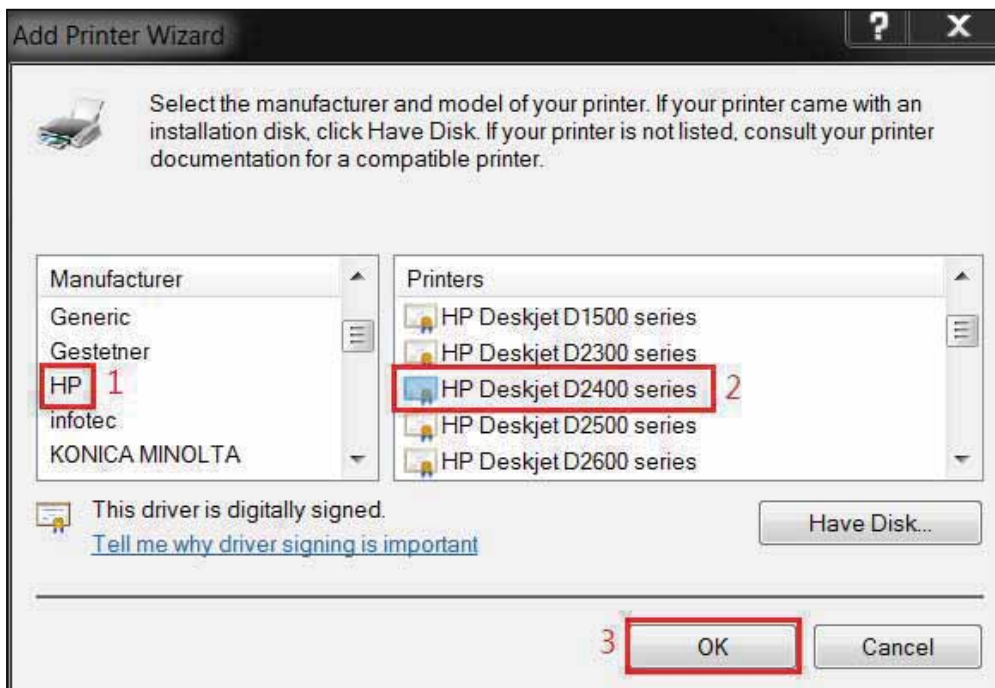
STEP 7: Choose **Select a shared printer by name**. Then input the printer link and click **Next**.

<http://LAN IP:631/printers/>the name of the printer

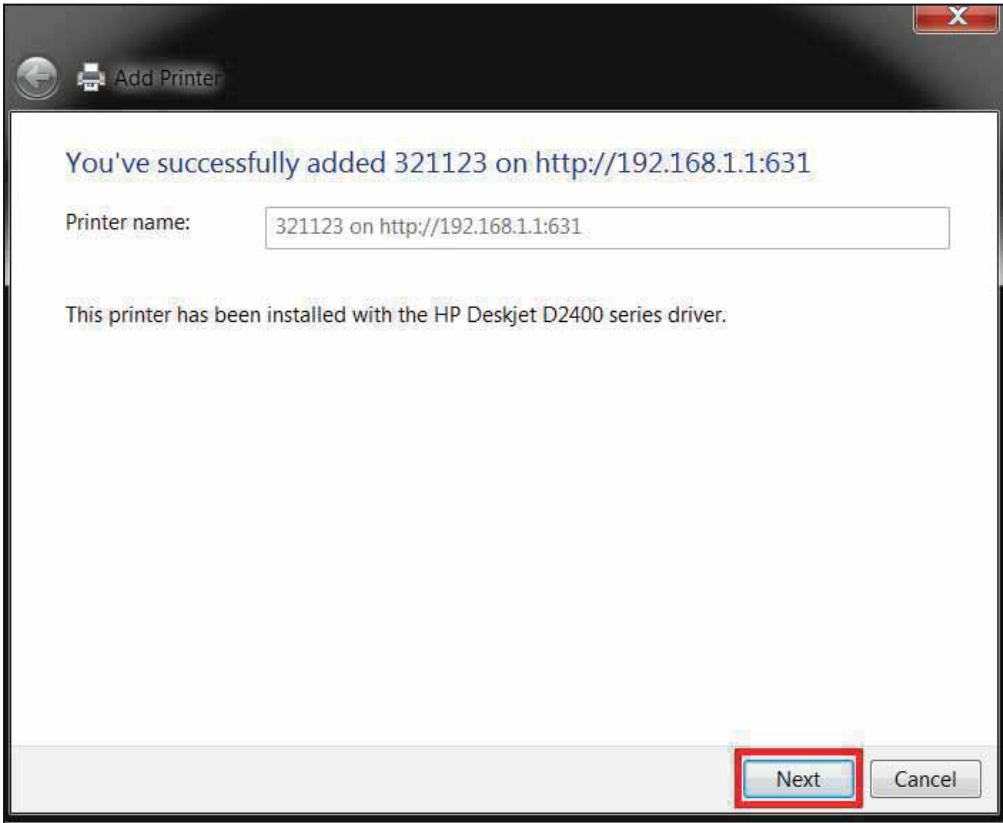
NOTE: The printer name must be the same name inputted in the WEB UI “printer server settings” as in step 1.



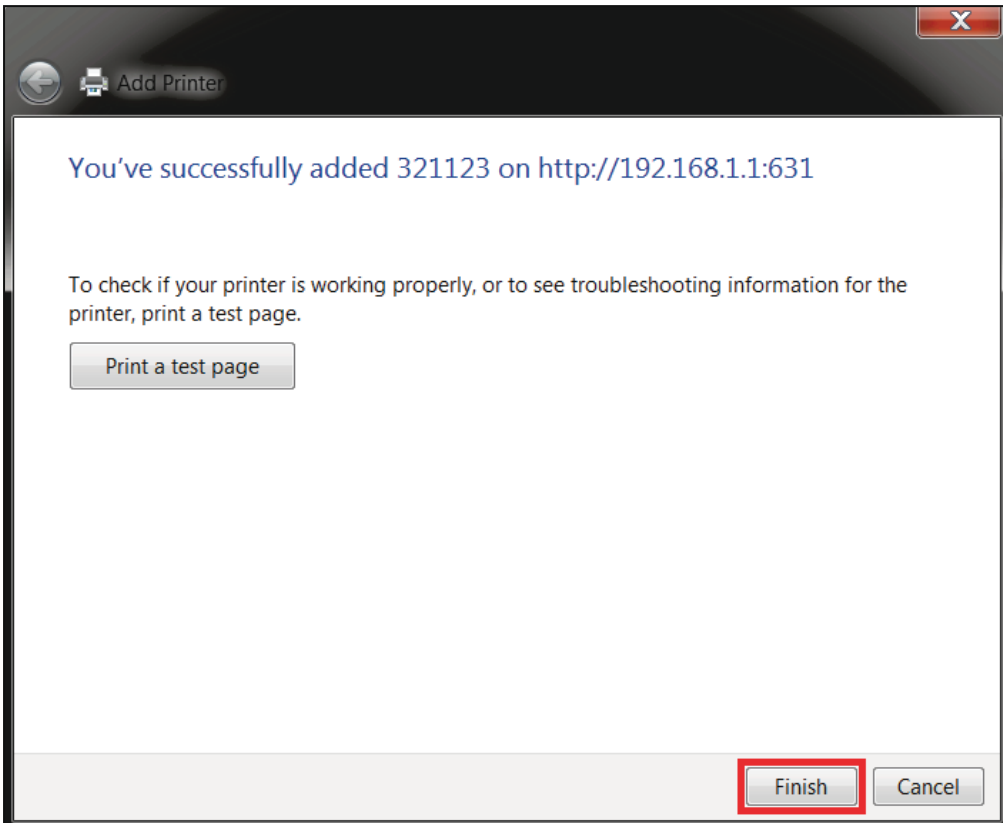
STEP 8: Select the **manufacturer** → and **model** of your printer → then, click **OK**.



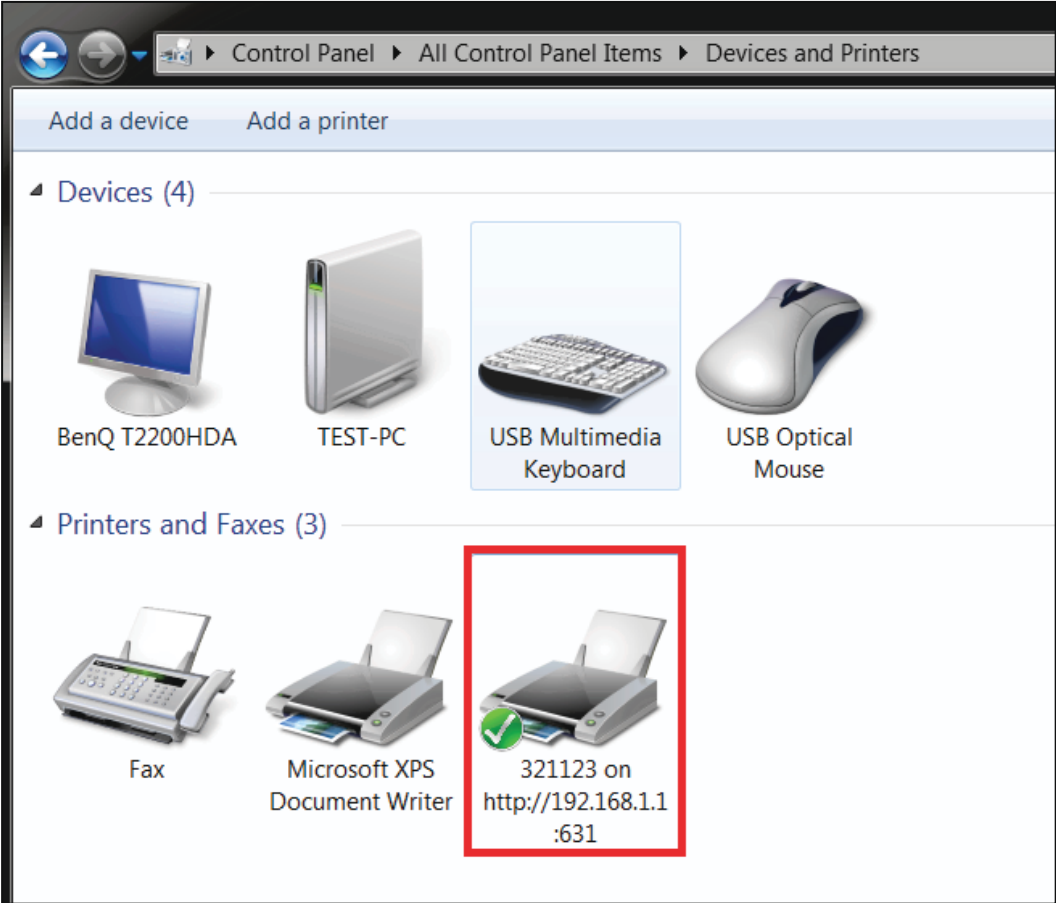
STEP 9: The printer has been successfully installed. Click the **Next** button.



STEP 10: Click Finish (or print a test page if required).



STEP 11: Go to → **Control Panel** → **All Control Panel Items** → **Devices and Printers** to confirm that the printer has been configured.



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 PBL-6201 supports up to 16 ATM interfaces.



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

The screenshot shows the COMTREND web interface with a navigation menu at the top: Device Info, Basic Setup, Advanced Setup, Diagnostics, Management, and Logout. On the left sidebar, there are links for WAN Setup, NAT, LAN, Parental Control, Home Networking, and Wireless. The main content area is titled "Step 1: Layer 2 Interface" and includes a dropdown menu to "Select new interface to add" with "ATM Interface" selected. Below this are three configuration sections: "DSL ATM Interface Configuration" (with a table of columns: Interface, Vpi, Vci, DSL Latency, Category, Peak Cell Rate, Sustainable Cell Rate, Max Burst Size, Link Type, Conn Mode, IP QoS, Remove), "DSL PTM Interface Configuration" (with columns: Interface, DSL Latency, PTM Priority, Conn Mode, IP QoS, Remove), and "ETH WAN Interface Configuration" (with columns: Interface/(Name), Connection Mode, Remove). The bottom section is "Step 2: Wide Area Network (WAN) Service Setup" with a table of columns: Interface, Description, Type, Vlan0/21p, VlanMuxId, VlanType, Igmp Proxy, Igmp Source, NAT, Firewall, IPv6, IPv6 Proxy, IPv6 Source, Manual Mode, Remove, Edit, and buttons for Add and Remove.

This table is provided here for ease of reference.

| Item | Description |
|-----------------------|--|
| Interface | WAN interface name |
| VPI | ATM VPI (0-255) |
| VCI | ATM VCI (32-65535) |
| DSL Latency | {Path0} → portID = 0 |
| 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: [0-255]
 VCI: [32-65535]

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

EoA
 PPPoA
 IPoA

Encapsulation Mode: ▾

Service Category: ▾

Select Scheduler for Queues of Equal Precedence

Round Robin (weight=1)
 Weighted Fair Queuing
 Default Queue Weight: [1-63]

Default Queue Precedence: [1-8] (lower value, higher priority)
 Note: For WFQ, the default queue precedence will be applied to all other queues in the VC.

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: ▾

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 | <input type="button" value="Remove"/> |

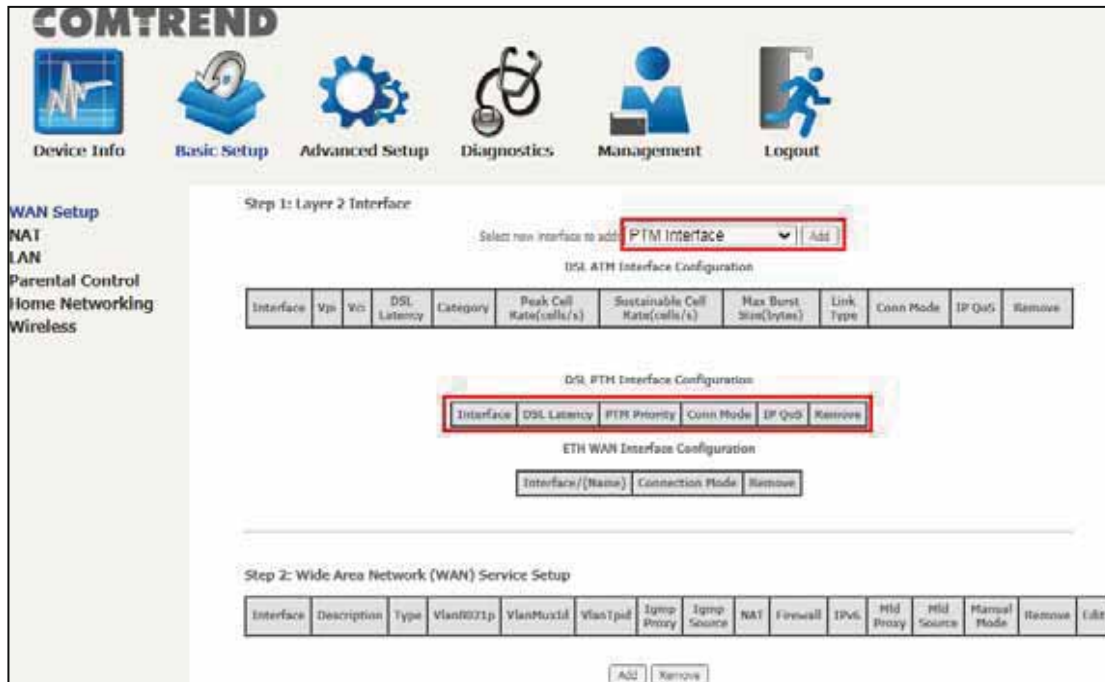
To add a WAN connection go to [Section F2 ~ WAN Connections](#).

F1.2 PTM Interfaces

Follow these procedures to configure a PTM interface.



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



This table is provided here for ease of reference.

| Item | Description |
|-----------------|---|
| Interface | WAN interface name. |
| DSL Latency | {Path0} → portID = 0 |
| 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

Round Robin (weight=1)

Weighted Fair Queuing
 Default Queue Weight: [1-63]

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

Note: For WFQ, the default queue precedence will be applied to all other queues in the VC.

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

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 | <input type="button" value="Remove"/> |

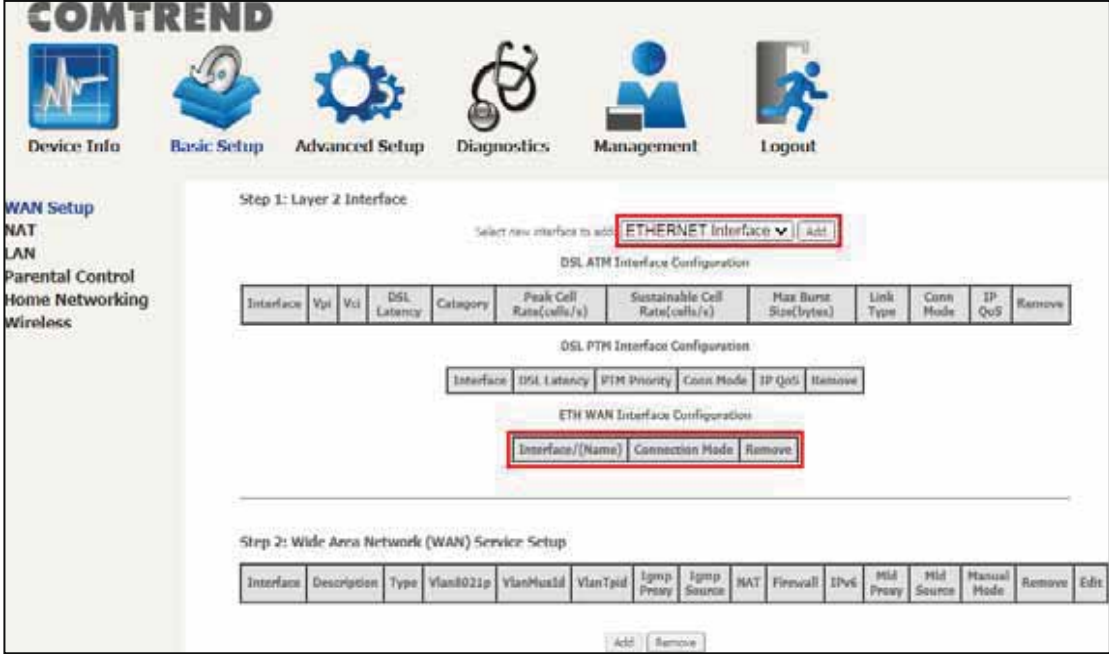
To add a WAN connection go to [Section F2 ~ WAN Connections](#).

F1.3 Ethernet WAN Interface

The PBL-6201 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.

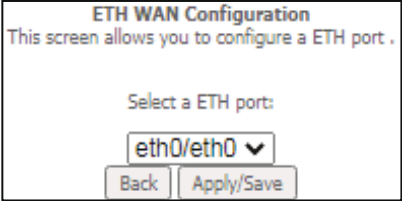


This table is provided here for ease of reference.

| Item | 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.

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.

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

To add a WAN connection go to [Section F2 ~ WAN Connections](#).

F2 ~ WAN Connections

The PBL-6201 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 |
|--|-------------|------|-----------|-----------|----------|------------|-------------|-----|----------|------|-----------|------------|--------|------|
| <input type="button" value="Add"/> <input type="button" value="Remove"/> | | | | | | | | | | | | | | |

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/eth0 ▼

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:

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]:

Enter 802.1Q VLAN ID [0-4094]:

Select VLAN TPID:

Internet Protocol Selection:

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]:

Enter 802.1Q VLAN ID [0-4094]:

Select VLAN 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 [PPP over ETHERNET \(PPPoE\)](#) – IPv4
- (2) For [IP over ETHERNET \(IPoE\)](#) – IPv4
- (3) For [Bridging](#) – IPv4
- (4) For [PPP over ATM \(PPPoA\)](#) – IPv4
- (5) For [IP over ATM \(IPoA\)](#) – IPv4
- (6) For [PPP over ETHERNET \(PPPoE\)](#) – IPv6
- (7) For [IP over ETHERNET \(IPoE\)](#) – IPv6
- (8) [Bridging](#) – IPv6 (Not Supported)
- (9) For [PPP over ATM \(PPPoA\)](#) – IPv6
- (10) [IPoA](#) – IPv6 (Not Supported)

The subsections that follow continue the WAN service setup procedure.

F2.1 PPP over ETHERNET (PPPoE) – IPv4

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

The screenshot shows the 'WAN Service Configuration' interface. It includes a section for selecting the WAN service type, with 'PPP over Ethernet (PPPoE)' selected. Below this is a text field for 'Enter Service Description' containing 'pppoe_eth0'. A note explains that for tagged services, valid 802.1P Priority and 802.1Q VLAN ID values are required, while for untagged services, -1 is used for both. There are input fields for 'Enter 802.1P Priority [0-7]' and 'Enter 802.1Q VLAN ID [0-4094]', both containing '-1'. A dropdown menu for 'Select VLAN TPID' is set to 'Select a TPID'. At the bottom, the 'Internet Protocol Selection' dropdown is set to 'IPv4 Only'. 'Back' and 'Next' buttons are located at the bottom right of the form.

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 ▼

Configure Keep-alive (PPP echo-request) Interval and the Number of retries

Interval:(second)

Number of retries:

Enable Fullcone NAT

Dial on demand (with idle timeout timer)

Enable NAT

Enable Firewall

Use Static IPv4 Address

Fixed MTU

MTU:

Enable PPP Manual Mode

Enable PPP Debug Mode

Bridge PPPoE Frames Between WAN and Local Ports

IGMP Multicast

Enable IGMP Multicast Proxy

Enable IGMP Multicast Source

WAN interface with base MAC.
Notice: Only one WAN interface can be cloned to base MAC address.

Enable WAN interface with base MAC

Back Next

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.

CONFIGURE KEEP-ALIVE

Configures the interval and number of keep alive packets (PPP echo-request) sent by the device for the PPP connection.

Interval (second): Time between sending out each PPP echo-request packet.

Number of retries: Number of retries before PPP connection is 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 PBL-6201 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.

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 MANUAL MODE

Use this button to manually connect/disconnect PPP sessions.

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 PBL-6201 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.

WAN interface with base MAC

Tick the checkbox to enable this function which will hook up the br0 MAC address to this very WAN service.

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 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.

| Selected Default Gateway Interfaces | | Available Routed WAN Interfaces |
|-------------------------------------|--------------------------------------|---------------------------------|
| ppp0.1 | <input type="button" value="->"/> | |
| | <input type="button" value="<-"/> | |

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 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.

Select DNS Server Interface from available WAN interfaces:

| | | |
|--------------------------------|--|--------------------------|
| Selected DNS Server Interfaces | | Available WAN Interfaces |
| ppp0.1 | <input type="button" value="->"/> <input type="button" value="<-"/> | |

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) – IPv4

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 (DHCP/ Static IP)

Bridging

Enter Service Description:

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]:

Enter 802.1Q VLAN ID [0-4094]:

Select VLAN TPID:

Internet Protocol Selection:

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

Option 50 Request IP Address:

Option 51 Request Leased Time:

Option 54 Request Server Address:

Use the following Static IP address:

WAN IP Address:

WAN Subnet Mask:

WAN gateway IP Address:

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

WAN interface with base MAC.
Notice: Only one WAN interface can be cloned to base MAC address.

Enable WAN interface with base MAC

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.

WAN interface with base MAC

Tick the checkbox to enable this function which will hook up the br0 MAC address to this very WAN service.

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 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.

| Selected Default Gateway Interfaces | | Available Routed WAN Interfaces |
|--|--|--|
| atm0.1 | <input type="button" value="→"/> <input type="button" value="←"/> | |

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 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.

Select DNS Server Interface from available WAN interfaces:

| Selected DNS Server Interfaces | | Available WAN Interfaces |
|--------------------------------|--|--------------------------|
| atm0.1 | <input type="button" value="->"/> <input type="button" value="<-"/> | |

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 – IPv4

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

WAN Service Configuration

Select WAN service type:

PPP over Ethernet (PPPoE)
 IP over Ethernet (DHCP/ Static IP)
 Bridging

Allow as IGMP Multicast Source
 Allow as MLD Multicast Source

Enter Service Description:

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]:

Enter 802.1Q VLAN ID [0-4094]:

Select VLAN 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.

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.

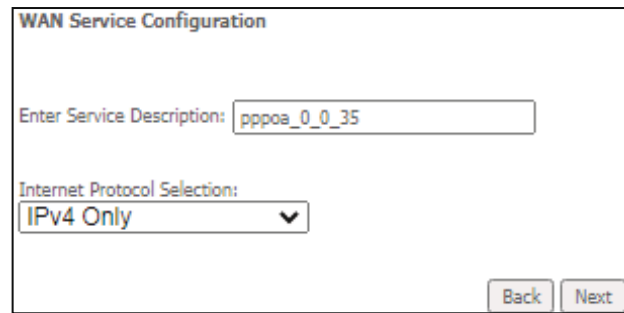
| | |
|--------------------------------|----------------|
| Connection Type: | Bridge |
| NAT: | N/A |
| Full Cone NAT: | Disabled |
| Firewall: | Disabled |
| IGMP Multicast Proxy: | Not Applicable |
| IGMP Multicast Source Enabled: | Disabled |
| MLD Multicast Proxy: | Not Applicable |
| MLD Multicast 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 PBL-6201 will be inaccessible for remote management or technical support from the WAN.

F2.4 PPP over ATM (PPPoA) – IPv4



The image shows a 'WAN Service Configuration' dialog box. It contains a text input field for 'Enter Service Description' with the value 'pppoa_0_0_35'. Below it is a dropdown menu for 'Internet Protocol Selection' currently set to 'IPv4 Only'. At the bottom right are 'Back' and 'Next' buttons.

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 ▼

Configure Keep-alive (PPP echo-request) Interval and the Number of retries

Interval:(second)

Number of retries:

Enable Fullcone NAT

Dial on demand (with idle timeout timer)

Enable NAT

Enable Firewall

Use Static IPv4 Address

Fixed MTU

MTU:

Enable PPP Manual Mode

Enable PPP Debug Mode

IGMP Multicast

Enable IGMP Multicast Proxy

Enable IGMP Multicast Source

WAN interface with base MAC.
Notice: Only one WAN interface can be cloned to base MAC address.

Enable WAN interface with base MAC

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.)

CONFIGURE KEEP-ALIVE

Configures the interval and number of keep alive packets (PPP echo-request) sent by the device for the PPP connection.

Interval (second): Time between sending out each PPP echo-request packet.

Number of retries: Number of retries before PPP connection is 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 PBL-6201 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.

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 [3.2 IP Configuration](#).

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 MANUAL MODE

Use this button to manually connect/disconnect PPP sessions.

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.

WAN interface with base MAC

Tick the checkbox to enable this function which will hook up the br0 MAC address to this very WAN service.

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 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.

| Selected Default Gateway Interfaces | Available Routed WAN Interfaces |
|-------------------------------------|---------------------------------|
| pppoa0 | |

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 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.

Select DNS Server Interface from available WAN interfaces:

Selected DNS Server Interfaces Available WAN Interfaces

| | | |
|--------|----|--|
| pppoa0 | -> | |
| | <- | |

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: | 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.

F2.5 IP over ATM (IPoA) – IPv4

WAN Service Configuration

Enter Service Description:

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:

WAN Subnet Mask:

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

WAN interface with base MAC.
Notice: Only one WAN interface can be cloned to base MAC address.

Enable WAN interface with base MAC

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.

WAN interface with base MAC

Tick the checkbox to enable this function which will hook up the br0 MAC address to this very WAN service.

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

Routing -- Default Gateway

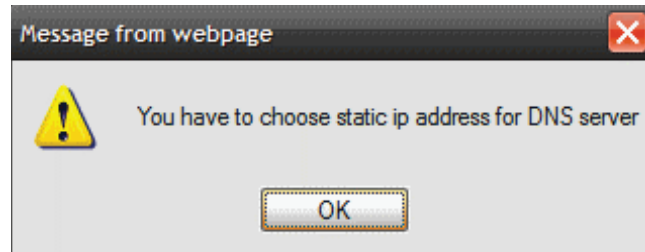
Default gateway interface list can have multiple WAN interfaces served as system default gateways but only one will be used according to the priority with the first being the highest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all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

| Selected Default Gateway Interfaces | Available Routed WAN Interfaces |
|-------------------------------------|---------------------------------|
| ipoa0 | |

Navigation buttons: >, <, Back, Next

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.



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 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.

Select DNS Server Interface from available WAN interfaces:

| | | |
|--------------------------------|--|--------------------------|
| Selected DNS Server Interfaces | | Available WAN Interfaces |
| | <input type="button" value="->"/> <input type="button" value="<-"/> | |

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: | 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.

F2.6 PPP over ETHERNET (PPPoE) – IPv6

STEP 1: Select the PPP over Ethernet radio button. Then select IPv6 only from the drop-down box at the bottom off the screen and click **Next**.

WAN Service Configuration

Select WAN service type:

PPP over Ethernet (PPPoE)
 IP over Ethernet (DHCP/ Static IP)
 Bridging

Enter Service Description:

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]:

Enter 802.1Q VLAN ID [0-4094]:

Select VLAN TPID:

Internet Protocol Selection:

STEP 2: On the next screen, enter the PPP settings as provided by your ISP.

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** ▼

Configure Keep-alive (PPP echo-request) Interval and the Number of retries

Interval:(second)

Number of retries:

Enable Fullcone NAT

Dial on demand (with idle timeout timer)

Enable Firewall

Use Static IPv4 Address

Use Static IPv6 Address

Enable IPv6 Unnumbered Model

Launch Dhcp6c for Address Assignment (IANA)

Launch Dhcp6c for Prefix Delegation (IAPD)

Launch Dhcp6c for Rapid Commit

Fixed MTU

MTU:

Enable PPP Manual Mode

Enable PPP Debug Mode

Bridge PPPoE Frames Between WAN and Local Ports

MLD Multicast

Enable MLD Multicast Proxy

Enable MLD Multicast Source

WAN interface with base MAC.
Notice: Only one WAN interface can be cloned to base MAC address.

Enable WAN interface with base MAC

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.

CONFIGURE KEEP-ALIVE

Configures the interval and number of keep alive packets (PPP echo-request) sent by the device for the PPP connection.

Interval (second): Time between sending out each PPP echo-request packet.

Number of retries: Number of retries before PPP connection is 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 PBL-6201 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.

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](#).

USE STATIC IPv6 ADDRESS

Unless your service provider specially requires it, do not select this checkbox . If selected, enter the static IP address in the **IPv6 Address** field. Don't forget to adjust the IP configuration to Static IP Mode as described in section [3.2 IP Configuration](#).

ENABLE IPv6 UNNUMBERED MODEL

The IP unnumbered configuration command allows you to enable IP processing on a serial interface without assigning it an explicit IP address. The IP unnumbered interface can "borrow" the IP address of another interface already configured on the router, which conserves network and address space.

LAUNCH DHCP6C FOR ADDRESS ASSIGNMENT (IANA)

The Internet Assigned Numbers Authority (IANA) is a department of ICANN responsible for coordinating some of the key elements that keep the Internet running smoothly. Whilst the Internet is renowned for being a worldwide network free from central coordination, there is a technical need for some key parts of the Internet to be globally coordinated, and this coordination role is undertaken by IANA.

Specifically, IANA allocates and maintains unique codes and numbering systems that are used in the technical standards ("protocols") that drive the Internet.

IANA's various activities can be broadly grouped in to three categories:

- **Domain Names**
IANA manages the DNS Root, the .int and .arpa domains, and an IDN practices resource.
- **Number Resources**
IANA coordinates the global pool of IP and AS numbers, providing them to Regional Internet Registries.
- **Protocol Assignments**
Internet protocols' numbering systems are managed by IANA in conjunction with standards bodies.

LAUNCH DHCP6C FOR PREFIX DELEGATION (IAPD)

An Identity Association for Prefix Delegation (IAPD) is a collection of prefixes assigned to a requesting device. A requesting device may have more than one IAPD; for example, one for each of its interfaces.

A prefix-delegating router (DHCPv6 server) selects prefixes to be assigned to a requesting router (DHCPv6 client) upon receiving a request from the client. The server can select prefixes for a requesting client by using static and dynamic assignment mechanisms. Administrators can manually configure a list of prefixes and associated preferred and valid lifetimes for an IAPD of a specific client that is identified by its DUID.

When the delegating router receives a request from a client, it checks if there is a static binding configured for the IAPD in the client's message. If a static binding is present, the prefixes in the binding are returned to the client. If no such binding is found, the server attempts to assign prefixes for the client from other sources.

An IPv6 prefix delegating router can also select prefixes for a requesting router based on an external authority such as a RADIUS server using the Framed-IPv6-Prefix attribute.

LAUNCH DHCP6C FOR RAPID COMMIT

Rapid-Commit; is the process (option) in which a Requesting Router (DHCP Client) obtains "configurable information" (configurable parameters) from a Delegating Router (DHCP Server) by using a rapid DHCPv6 two-message exchange. The messages that are exchanged between the two routers (RR and DR) are called the DHCPv6 "SOLICIT" message and the DHCPv6 "REPLY" message.

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 MANUAL MODE

Use this button to manually connect/disconnect PPP sessions.

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 PBL-6201 supports pass-through PPPoE sessions from the LAN side while simultaneously running a PPPoE client from non-PPPoE LAN devices.

ENABLE MLD MULTICAST PROXY

Multicast Listener Discovery (MLD) is a component of the Internet Protocol Version 6 (IPv6) suite. MLD is used by IPv6 routers for discovering multicast listeners on a directly attached link, much like IGMP is used in IPv4. The protocol is embedded in ICMPv6 instead of using a separate protocol.

ENABLE MLD MULTICAST SOURCE

Click to allow use of this WAN interface as Multicast Listener Discovery (MLD) multicast source.

WAN interface with base MAC

Tick the checkbox to enable this function which will hook up the br0 MAC address to this very WAN service.

STEP 3: Choose an interface to be the default gateway. Also, select a preferred WAN interface as the system default IPv6 gateway (from the drop-down box).

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 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.

| Selected Default Gateway Interfaces | | Available Routed WAN Interfaces |
|-------------------------------------|---|---------------------------------|
| ppp0.1 | <div style="margin-bottom: 5px;">-></div> <div style="margin-bottom: 5px;"><-</div> | |

IPv6: Select a preferred wan interface as the system default IPv6 gateway.

Selected WAN Interface

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.

Select the configured WAN interface for IPv6 DNS server information OR enter the static IPv6 DNS server Addresses. Note that selecting a WAN interface for IPv6 DNS server will enable DHCPv6 Client on that interface.

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 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.

Select DNS Server Interface from available WAN interfaces:

| Selected DNS Server Interfaces | | Available WAN Interfaces |
|--------------------------------|--|--------------------------|
| ppp0.1 | <input type="button" value="->"/> <input type="button" value="-<"/> | |

Use the following Static DNS IP address:

Primary DNS server:

Secondary DNS server:

IPv6: Select the configured WAN interface for IPv6 DNS server information OR enter the static IPv6 DNS server Addresses.
 Note that selecting a WAN interface for IPv6 DNS server will enable DHCPv6 Client on that interface.

Obtain IPv6 DNS info from a WAN interface:

WAN Interface selected:

Use the following Static IPv6 DNS address:

Primary IPv6 DNS Server:

Secondary IPv6 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: | Disabled |
| 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.

F2.7 IP over ETHERNET (IPoE) – IPv6

STEP 1: Select the IP over Ethernet radio button and click **Next**. Then select IPv6 only from the drop-down box at the bottom of the screen and click **Next**.

WAN Service Configuration

Select WAN service type:

PPP over Ethernet (PPPoE)

IP over Ethernet (DHCP/ Static IP)

Bridging

Enter Service Description:

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]:

Enter 802.1Q VLAN ID [0-4094]:

Select VLAN TPID:

Internet Protocol Selection:

STEP 2: The WAN IP settings screen provides access to the DHCP server settings. You can select the **Obtain an IPv6 address automatically** radio button to enable DHCP (use the DHCP Options only if necessary). However, if you prefer, you can use the **Static IPv6 address** method instead to assign WAN IP address, Subnet Mask and Default Gateway manually.

Enter information provided to you by your ISP to configure the WAN IPv6 settings.

Notice: If "Obtain an IPv6 address automatically" is chosen, DHCP client will be enabled on this WAN interface.

If "Use the following Static IPv6 address" is chosen, enter the static WAN IPv6 address. If the address prefix length is not specified, it will be default to /64.

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

Option 50 Request IP Address:

Option 51 Request Leased Time:

Option 54 Request Server Address:

Use the following Static IP address:

WAN IP Address:

WAN Subnet Mask:

WAN gateway IP Address:

Enter information provided to you by your ISP to configure the WAN IPv6 settings.
 Notice:
 If "Obtain an IPv6 address automatically" is chosen, DHCPv6 Client will be enabled on this WAN interface.
 If "Use the following Static IPv6 address" is chosen, enter the static WAN IPv6 address. If the address prefix length is not specified, it will be default to /64.

Obtain an IPv6 address automatically

Dhcpv6 Address Assignment (IANA)

Dhcpv6 Prefix Delegation (IAPD)

Use the following Static IPv6 address:

WAN IPv6 Address/Prefix Length:

Specify the Next-Hop IPv6 address for this WAN interface.
 Notice: This address can be either a link local or a global unicast IPv6 address.

WAN Next-Hop IPv6 Address:

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

DHCP6C FOR ADDRESS ASSIGNMENT (IANA)

The Internet Assigned Numbers Authority (IANA) is a department of ICANN responsible for coordinating some of the key elements that keep the Internet running smoothly. Whilst the Internet is renowned for being a worldwide network free from central coordination, there is a technical need for some key parts of the Internet to be globally coordinated, and this coordination role is undertaken by IANA.

Specifically, IANA allocates and maintains unique codes and numbering systems that are used in the technical standards (“protocols”) that drive the Internet.

IANA’s various activities can be broadly grouped in to three categories:

- **Domain Names**
IANA manages the DNS Root, the .int and .arpa domains, and an IDN practices resource.
- **Number Resources**
IANA coordinates the global pool of IP and AS numbers, providing them to Regional Internet Registries.
- **Protocol Assignments**
Internet protocols’ numbering systems are managed by IANA in conjunction with standards bodies.

DHCP6C FOR PREFIX DELEGATION (IAPD)

An Identity Association for Prefix Delegation (IAPD) is a collection of prefixes assigned to a requesting device. A requesting device may have more than one IAPD; for example, one for each of its interfaces.

A prefix-delegating router (DHCPv6 server) selects prefixes to be assigned to a requesting router (DHCPv6 client) upon receiving a request from the client. The server can select prefixes for a requesting client by using static and dynamic assignment mechanisms. Administrators can manually configure a list of prefixes and associated preferred and valid lifetimes for an IAPD of a specific client that is identified by its DUID.

When the delegating router receives a request from a client, it checks if there is a static binding configured for the IAPD in the client’s message. If a static binding is present, the prefixes in the binding are returned to the client. If no such binding is found, the server attempts to assign prefixes for the client from other sources.

An IPv6 prefix delegating router can also select prefixes for a requesting router based on an external authority such as a RADIUS server using the Framed-IPv6-Prefix attribute.

WAN NEXT-HOP IPv6 ADDRESS

Specify the Next-Hop IPv6 address for this WAN interface.

This address can be either a link local or a global unicast IPv6 address.

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.

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 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 MLD MULTICAST PROXY

Multicast Listener Discovery (MLD) is a component of the Internet Protocol Version 6 (IPv6) suite. MLD is used by IPv6 routers for discovering multicast listeners on a directly attached link, much like IGMP is used in IPv4. The protocol is embedded in ICMPv6 instead of using a separate protocol.

ENABLE MLD MULTICAST SOURCE

Click to allow use of this WAN interface as Multicast Listener Discovery (MLD) multicast source.

Enable WAN interface with base MAC

Enable this option to use the router's base MAC address as the MAC address for this WAN interface.

STEP 4: To choose an interface to be the default gateway. Also, select a preferred WAN interface as the system default IPv6 gateway (from the drop-down box).

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 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.

| Selected Default Gateway Interfaces | | Available Routed WAN Interfaces |
|-------------------------------------|--|---------------------------------|
| atm0.1 | <input type="button" value="->"/> <input type="button" value="<-"/> | |

IPv6: Select a preferred wan interface as the system default IPv6 gateway.

Selected WAN Interface

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.

Select the configured WAN interface for IPv6 DNS server information OR enter the static IPv6 DNS server Addresses. Note that selecting a WAN interface for IPv6 DNS server will enable DHCPv6 Client on that interface.

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 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.

Select DNS Server Interface from available WAN interfaces:

| | | |
|--------------------------------|--|--------------------------|
| Selected DNS Server Interfaces | | Available WAN Interfaces |
| atm0.1 | <input type="button" value="->"/> <input type="button" value="<-"/> | |

Use the following Static DNS IP address:

Primary DNS server:

Secondary DNS server:

IPv6: Select the configured WAN interface for IPv6 DNS server information OR enter the static IPv6 DNS server Addresses. Note that selecting a WAN interface for IPv6 DNS server will enable DHCPv6 Client on that interface.

Obtain IPv6 DNS info from a WAN interface:

WAN Interface selected:

Use the following Static IPv6 DNS address:

Primary IPv6 DNS Server:

Secondary IPv6 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.

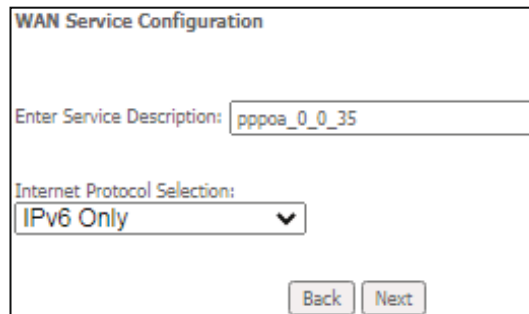
| | |
|--------------------------------|----------|
| Connection Type: | IPoE |
| NAT: | Disabled |
| Full Cone NAT: | Disabled |
| Firewall: | Disabled |
| IGMP Multicast Proxy: | Disabled |
| IGMP Multicast Source Enabled: | Disabled |
| MLD Multicast Proxy: | Disabled |
| MLD Multicast Source Enabled: | 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.

F2.8 PPP over ATM (PPPoA) – IPv6

STEP 1: Select IPv6 Only from the drop-down box at the bottom of this screen and click **Next**.



The screenshot shows a configuration window titled "WAN Service Configuration". It contains a text input field for "Enter Service Description" with the value "pppoa_0_0_35". Below it is a dropdown menu for "Internet Protocol Selection" with "IPv6 Only" selected. At the bottom right, there are "Back" and "Next" buttons.

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: ▼

Configure Keep-alive (PPP echo-request) Interval and the Number of retries

Interval:(second)

Number of retries:

Enable Fullcone NAT

Dial on demand (with idle timeout timer)

Enable Firewall

Use Static IPv4 Address

Use Static IPv6 Address

Enable IPv6 Unnumbered Model

Launch Dhcp6c for Address Assignment (IANA)

Launch Dhcp6c for Prefix Delegation (IAPD)

Launch Dhcp6c for Rapid Commit

Fixed MTU

MTU:

Enable PPP Manual Mode

Enable PPP Debug Mode

MLD Multicast

Enable MLD Multicast Proxy

Enable MLD Multicast Source

WAN interface with base MAC.

Notice: Only one WAN interface can be cloned to base MAC address.

Enable WAN interface with base MAC

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.)

CONFIGURE KEEP-ALIVE

Configures the interval and number of keep alive packets (PPP echo-request) sent by the device for the PPP connection.

Interval (second): Time between sending out each PPP echo-request packet.

Number of retries: Number of retries before PPP connection is 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 PBL-6201 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.

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 [3.2 IP Configuration](#).

USE STATIC IPv6 ADDRESS

Unless your service provider specially requires it, do not select this checkbox . If selected, enter the static IP address in the **IPv6 Address** field.

Don't forget to adjust the IP configuration to Static IP Mode as described in section [3.2 IP Configuration](#).

ENABLE IPv6 UNNUMBERED MODEL

The IP unnumbered configuration command allows you to enable IP processing on a serial interface without assigning it an explicit IP address. The IP unnumbered interface can "borrow" the IP address of another interface already configured on the router, which conserves network and address space.

LAUNCH DHCP6C FOR ADDRESS ASSIGNMENT (IANA)

The Internet Assigned Numbers Authority (IANA) is a department of ICANN responsible for coordinating some of the key elements that keep the Internet running smoothly. Whilst the Internet is renowned for being a worldwide network free from central coordination, there is a technical need for some key parts of the Internet to be globally coordinated, and this coordination role is undertaken by IANA.

Specifically, IANA allocates and maintains unique codes and numbering systems that are used in the technical standards ("protocols") that drive the Internet.

IANA's various activities can be broadly grouped in to three categories:

- **Domain Names**
IANA manages the DNS Root, the .int and .arpa domains, and an IDN practices resource.
- **Number Resources**
IANA coordinates the global pool of IP and AS numbers, providing them to Regional Internet Registries.
- **Protocol Assignments**
Internet protocols' numbering systems are managed by IANA in conjunction with standards bodies.

LAUNCH DHCP6C FOR PREFIX DELEGATION (IAPD)

An Identity Association for Prefix Delegation (IAPD) is a collection of prefixes assigned to a requesting device. A requesting device may have more than one IAPD; for example, one for each of its interfaces.

A prefix-delegating router (DHCPv6 server) selects prefixes to be assigned to a requesting router (DHCPv6 client) upon receiving a request from the client. The server can select prefixes for a requesting client by using static and dynamic assignment mechanisms. Administrators can manually configure a list of prefixes and associated preferred and valid lifetimes for an IAPD of a specific client that is identified by its DUID.

When the delegating router receives a request from a client, it checks if there is a static binding configured for the IAPD in the client's message. If a static binding is present, the prefixes in the binding are returned to the client. If no such binding is found, the server attempts to assign prefixes for the client from other sources.

An IPv6 prefix delegating router can also select prefixes for a requesting router based on an external authority such as a RADIUS server using the Framed-IPv6-Prefix attribute.

LAUNCH DHCP6C FOR RAPID COMMIT

Rapid-Commit; is the process (option) in which a Requesting Router (DHCP Client) obtains "configurable information" (configurable parameters) from a Delegating Router (DHCP Server) by using a rapid DHCPv6 two-message exchange. The messages that are exchanged between the two routers (RR and DR) are called the DHCPv6 "SOLICIT" message and the DHCPv6 "REPLY" message.

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 MANUAL MODE

Use this button to manually connect/disconnect PPP sessions.

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 MLD MULTICAST PROXY

Multicast Listener Discovery (MLD) is a component of the Internet Protocol Version 6 (IPv6) suite. MLD is used by IPv6 routers for discovering multicast listeners on a directly attached link, much like IGMP is used in IPv4. The protocol is embedded in ICMPv6 instead of using a separate protocol.

ENABLE MLD MULTICAST SOURCE

Click to allow use of this WAN interface as Multicast Listener Discovery (MLD) multicast source.

WAN interface with base MAC

Tick the checkbox to enable this function which will hook up the br0 MAC address to this very WAN service.

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 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.

| Selected Default Gateway Interfaces | | Available Routed WAN Interfaces |
|--|---|--|
| <div style="border: 1px solid #ccc; padding: 5px; min-height: 100px;">pppoa0</div> | <div style="border: 1px solid #ccc; width: 30px; height: 30px; margin: 5px auto; display: flex; align-items: center; justify-content: center;">-></div> <div style="border: 1px solid #ccc; width: 30px; height: 30px; margin: 5px auto; display: flex; align-items: center; justify-content: center;"><-</div> | <div style="border: 1px solid #ccc; padding: 5px; min-height: 100px;"></div> |

IPv6: Select a preferred wan interface as the system default IPv6 gateway.

Selected WAN Interface: pppoa_0_0_35/pppoa0

Back
Next

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.

Select the configured WAN interface for IPv6 DNS server information OR enter the static IPv6 DNS server Addresses. Note that selecting a WAN interface for IPv6 DNS server will enable DHCPv6 Client on that interface.

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 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.

Select DNS Server Interface from available WAN interfaces:

| | |
|--|--------------------------|
| Selected DNS Server Interfaces | Available WAN Interfaces |
| pppoa0 | |
| <input type="button" value="->"/> <input type="button" value="<-"/> | |

Use the following Static DNS IP address:

Primary DNS server:

Secondary DNS server:

IPv6: Select the configured WAN interface for IPv6 DNS server information OR enter the static IPv6 DNS server Addresses.
Note that selecting a WAN interface for IPv6 DNS server will enable DHCPv6 Client on that interface.

Obtain IPv6 DNS info from a WAN interface:

WAN Interface selected:

Use the following Static IPv6 DNS address:

Primary IPv6 DNS Server:

Secondary IPv6 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: | Disabled |
| 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.