COMTREND CORPORATION

WAP-5813n

Gigabit Wireless Router

User Manual

Version C1.0, May 20, 2009

260097-001

Preface

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

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

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

Important Safety Instructions

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

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

CAUTION:

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

WARNING

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

Copyright

NOTE: This document is subject to change without notice.

Protect Our Environment

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

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

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Chapter 1 Introduction

The WAP-5813n Gigabit Wireless Router provides wired and wireless access for high-bandwidth applications in the home or office. It is designed to connect to an ADSL or GPON (Gigabit-Capable Passive Optical Network) modem. It includes one 10/100/1000 Base-T Gigabit Ethernet WAN port and four 10/100/1000 Base-T Gigabit Ethernet LAN ports. It also has TR-068 compliant color panels and LED indicators, for easy installation and use.

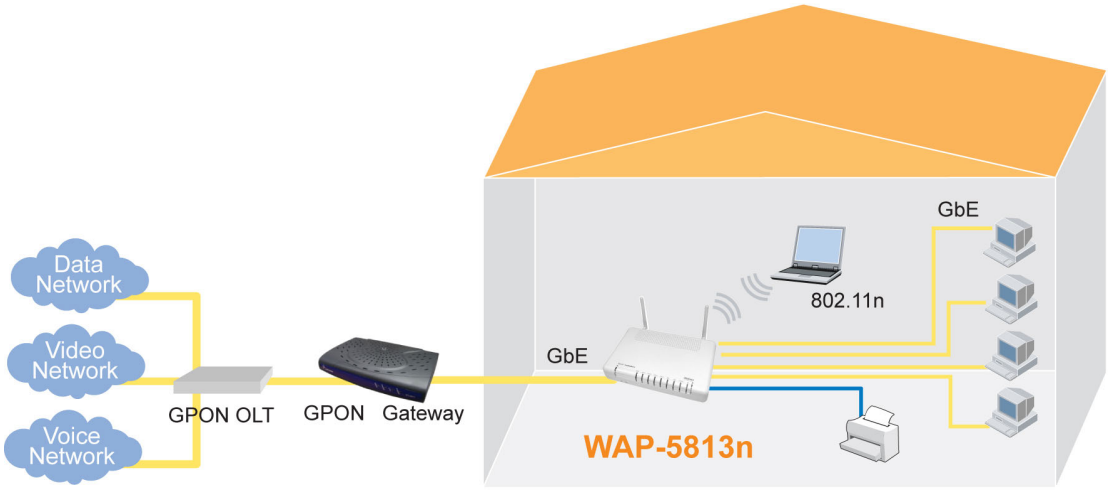
An integrated 802.11n (draft) WLAN Access Point (AP) supports faster connections and increased range, without sacrificing compatibility with older wireless devices. WPS (Wi-Fi Protected Setup) and Wi-Fi On/Off buttons are included for easy wireless network setup. WPA data encryption, Firewall and VPN passthrough options are provided for state-of-the-art network security.

1.1 Features

- Integrated 802.11n AP (802.11b/g backward-compatible)
- WPA/WPA2 and 802.1x
- RADIUS client
- Static routing
- NAT/PAT
- IGMP Proxy
- Applications Diagram
- Web-based management
- Supports remote administration
- WMM & UPnP
- IP filtering
- Dynamic IP assignment
- Parental Control
- DHCP Server/Client
- DNS Relay
- Configuration backup and restoration
- FTP/TFTP server

1.2 Application

The following diagram depicts the application of the WAP-5813n with GPON.



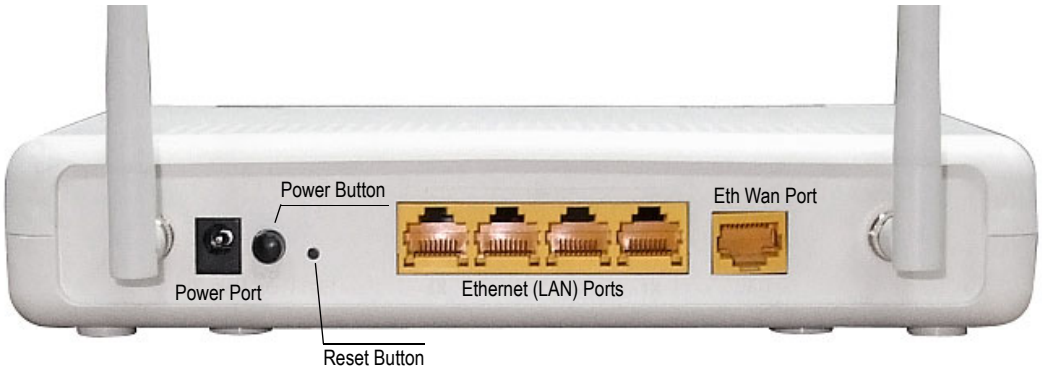
Chapter 2 Installation

2.1 Hardware Setup

Follow the instructions below to complete the hardware setup.

BACK PANEL

The figure below shows the back panel of the device.



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

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

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

NOTE:	If pressed down for more than 20 seconds, the WAP-5813n will go into a firmware update state (CFE boot mode). The firmware can then be updated using an Internet browser pointed to the default IP address.

ETHERNET (LAN) PORTS
Use RJ-45 cable to connect up to four network devices. These ports are auto-sensing MDI/X and either straight-through or crossover cable can be used.

ETH WAN PORT
Use RJ45 straight through or crossover MDI/X cable to connect to Ethernet WAN.

FRONT PANEL

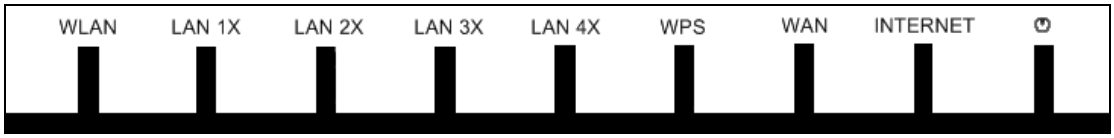
The Wi-Fi & WPS buttons are located on the bottom-left of the front panel, as shown.

WI-FI BUTTON
Press this button to enable/disable the wireless LAN (WLAN).

WPS BUTTON
Press this button to begin searching for WPS clients. These clients must also enable WPS push button mode. When WPS is available the WPS LED will be ON.

2.2 LED Indicators

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



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

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: **1234** , password: **1234**)
- User access (username: **user**, password: **user**)

- WAN IP address: none
- Remote WAN access: **disabled**
- Remote (WAN) access (username: **support**, password: **support**)

- WLAN access: **disabled**
- Service Set Identifier (SSID): WLAN_67E1

This device supports the following connection types.

- PPP over Ethernet (PPPoE)
- IP over Ethernet (IPoW)
- Bridging

The following connections are configured by default.

Interface	Type	Vlan Tag	Vlan Mux	IGMP	NAT	FIREWALL
eth0.3	IPoW	4	3	N	Y	N
ppp0.6	PPPoE	1	6	N	Y	Y

Technical Note

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

3.2 IP Configuration

DHCP MODE

When the WAP-5813n powers up, the onboard DHCP server will switch on. Basically, the DHCP server issues and reserves IP addresses for LAN devices, such as your PC.

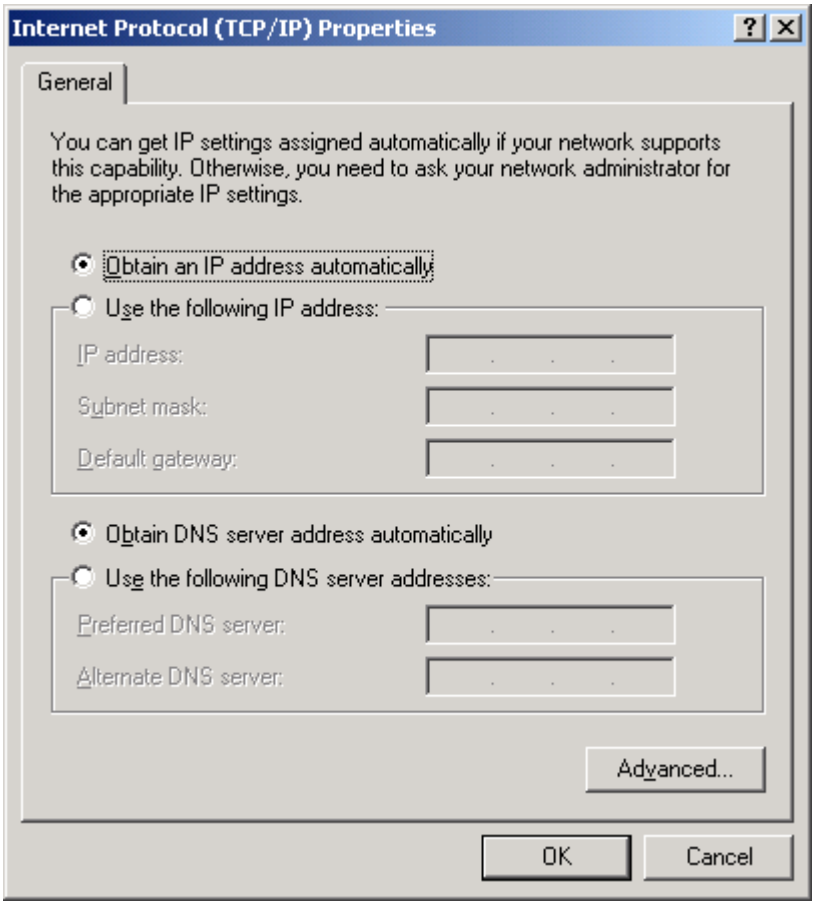
To obtain an IP address from the DCHP server, follow the steps provided below.

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

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

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

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



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

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

STATIC IP MODE

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

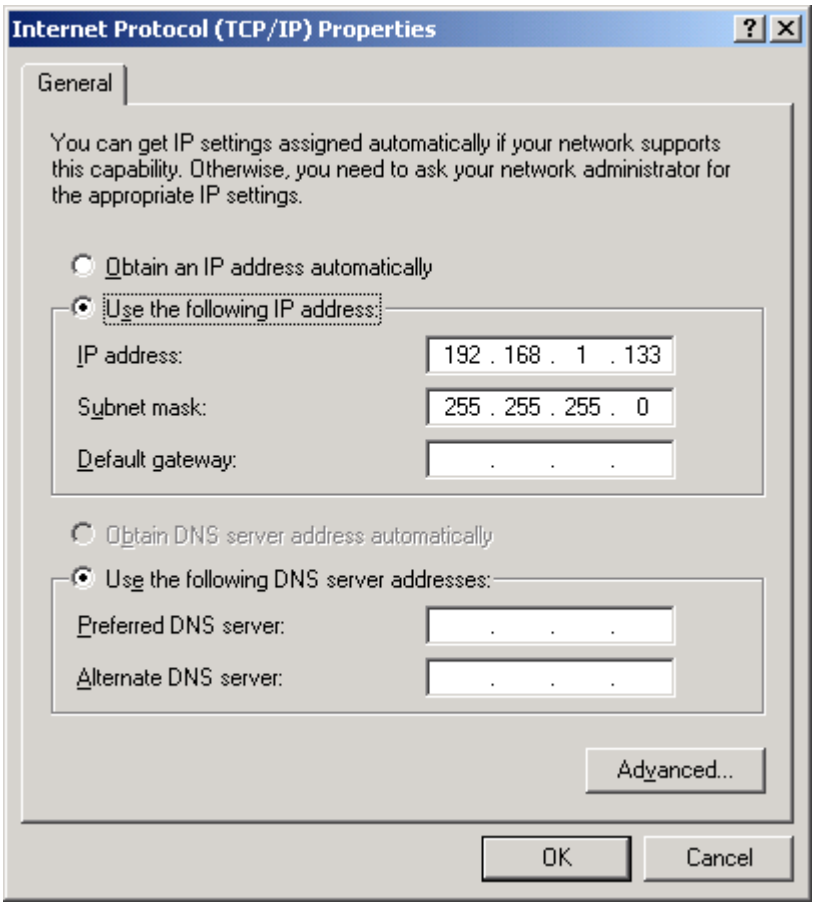
Follow these steps to configure your PC IP address to use subnet 192.168.1.x.

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

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

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

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



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

3.3 Login Procedure

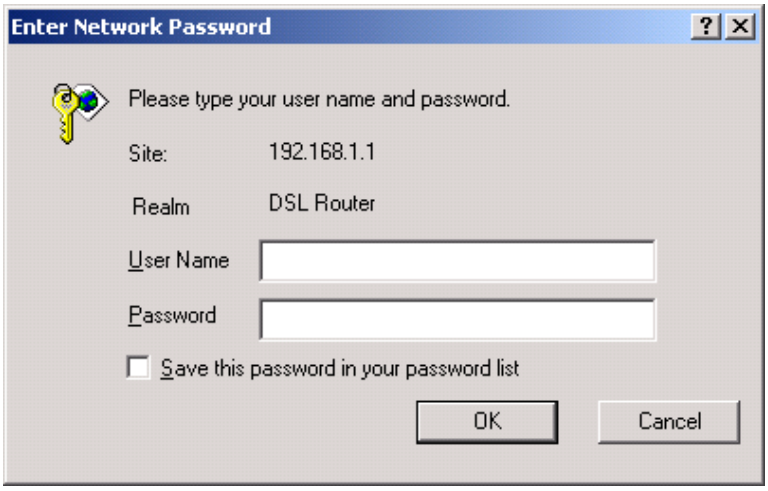
Perform the following steps to login to the web user interface.

NOTE:	The default settings can be found in section 3.1.

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.

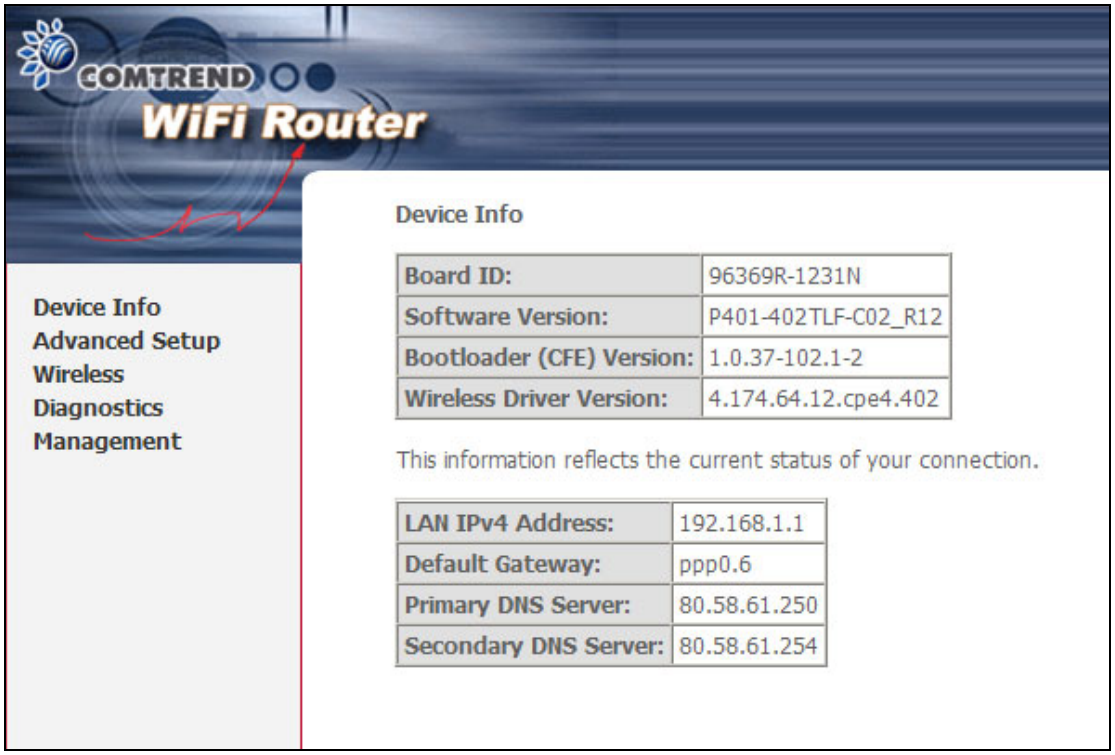
STEP 2: A dialog box will appear, such as the one below. Enter the default username and password, as defined in section 3.1 Default Settings.



Click **OK** to continue.

NOTE:	The login password can be changed later (see section 8.5.1)

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



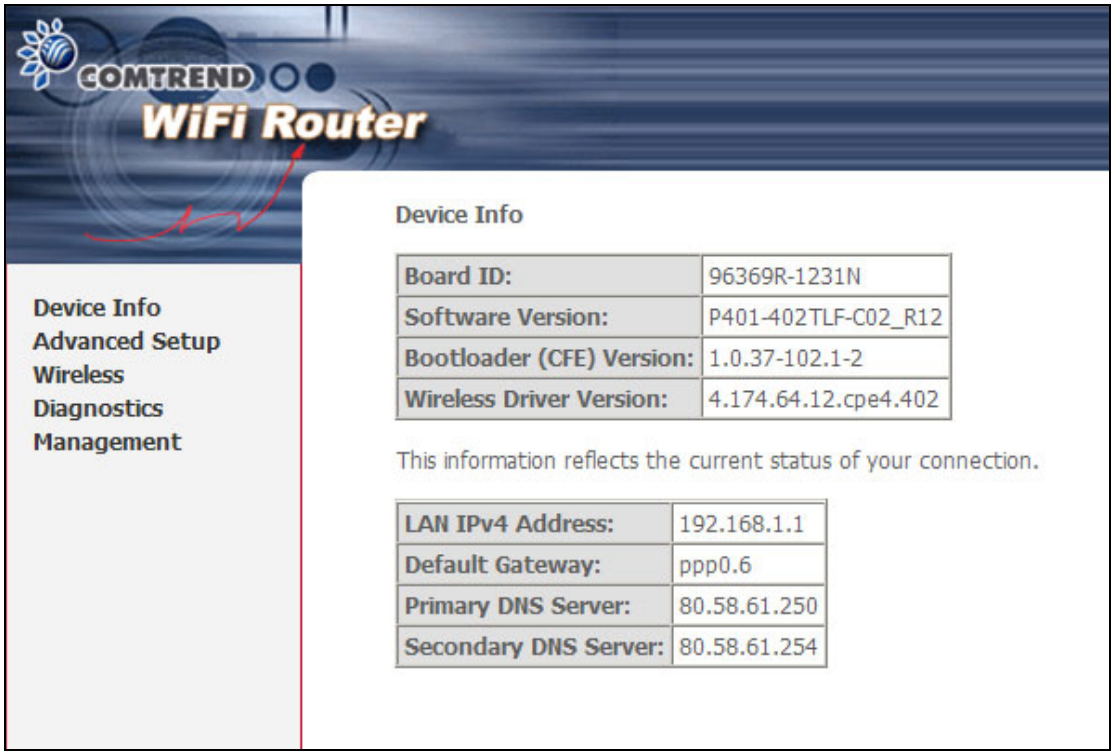
Chapter 4 Device Information

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

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

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

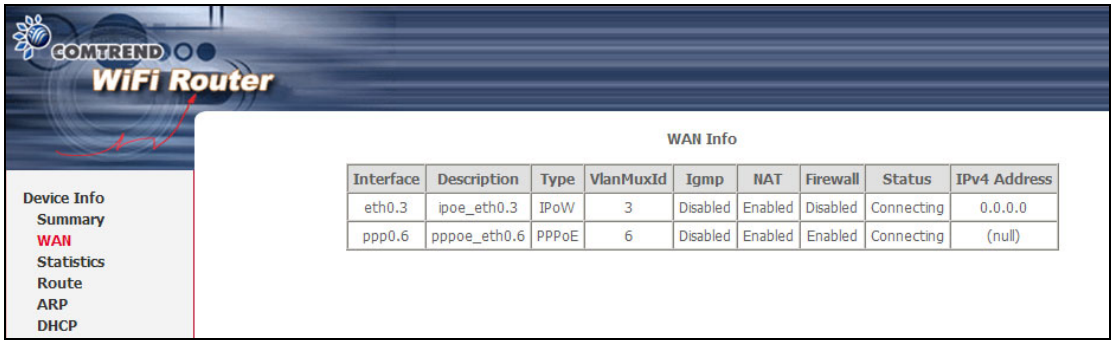
The Device Info Summary screen will display at startup.



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

4.1 WAN

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



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

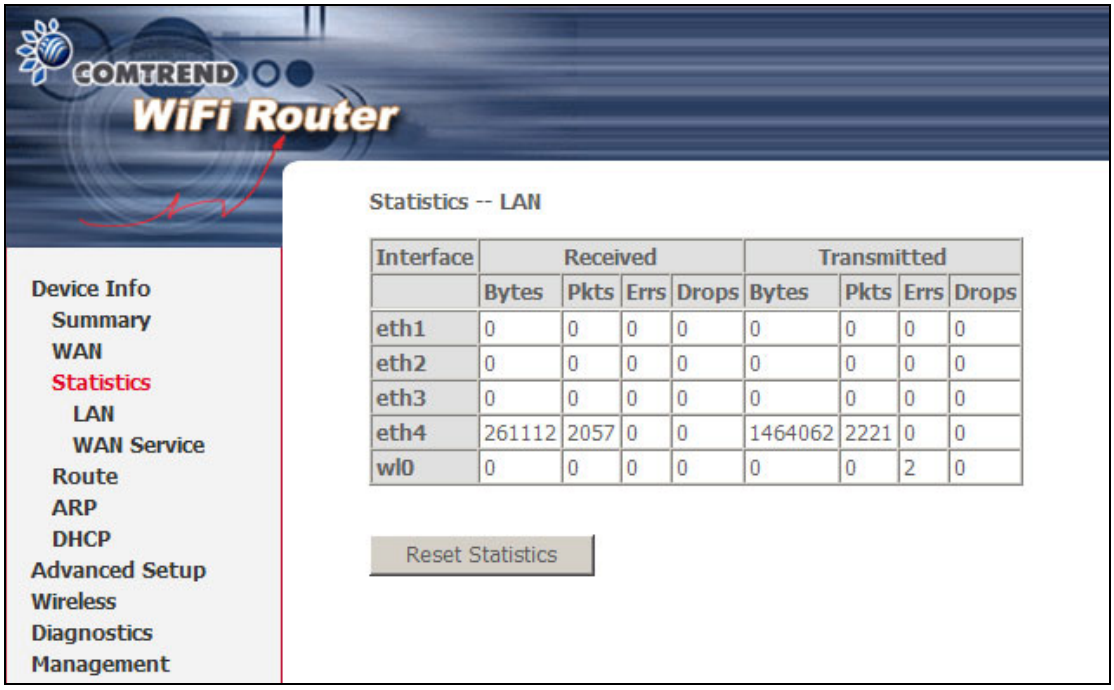
4.2 Statistics

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

NOTE:	These screens are updated every 15 seconds.

4.2.1 LAN Statistics

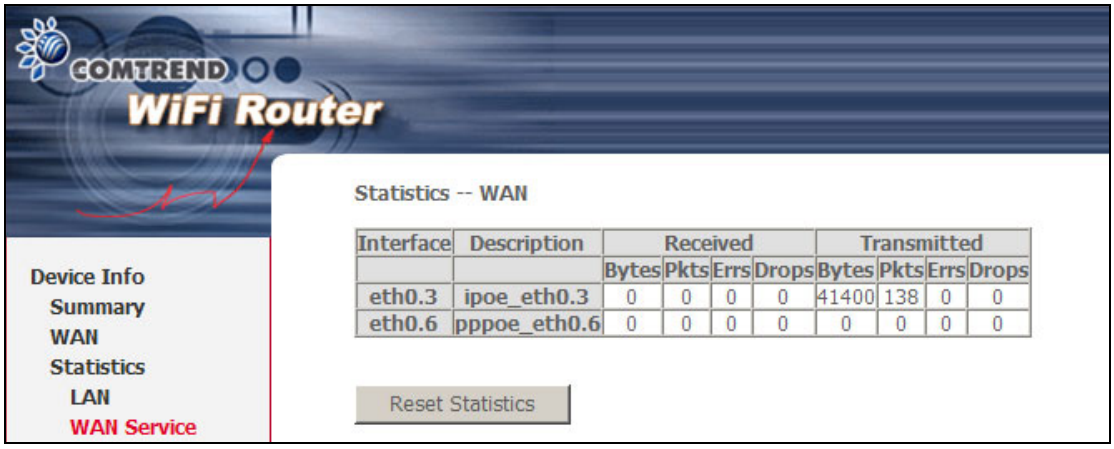
This screen shows data traffic statistics for each LAN interface.



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

4.2.2 WAN Statistics

This screen shows data traffic statistics for each WAN interface.



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

4.3 Route

Choose **Route** to display the routes that the WAP-5813n has found.

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

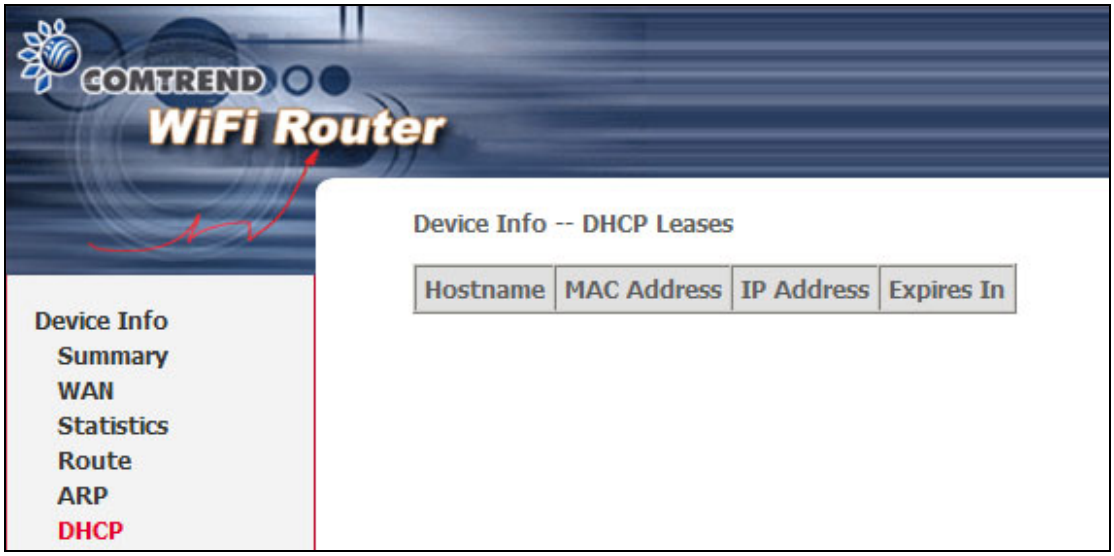
4.4 ARP

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

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

4.5 DHCP

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



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

Chapter 5 Advanced Setup

This chapter explains the following screens:

5.1 ETH WAN INTERFACE	5.2 WAN
5.3 LAN	5.4 NAT
5.5 Security	5.6 Parental Control
5.7 Routing	5.8 DNS
5.9 UPnP	5.10 Interface Grouping
5.11 Certificate	

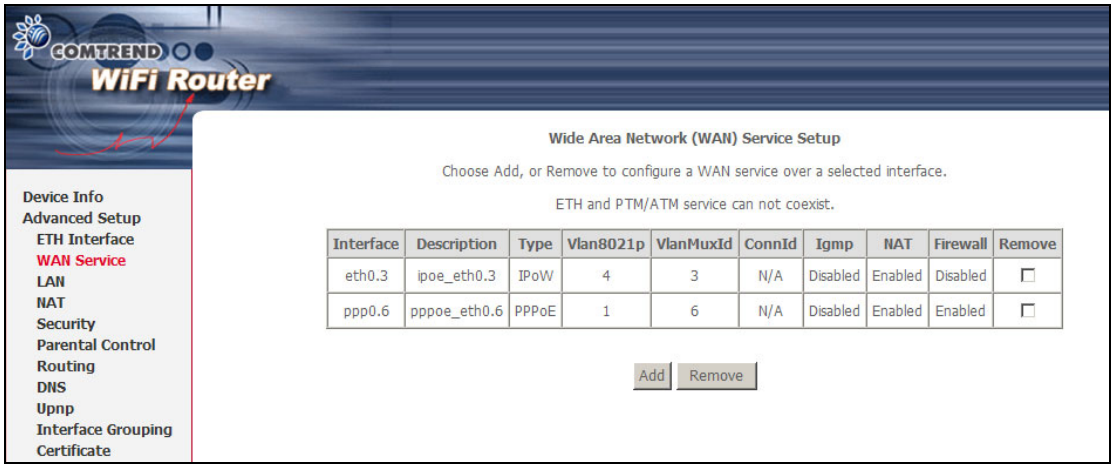
5.1 ETH WAN INTERFACE

This screen displays the Ethernet WAN Interface configuration.

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

5.2 WAN

This screen allows for the configuration of WAN interfaces.



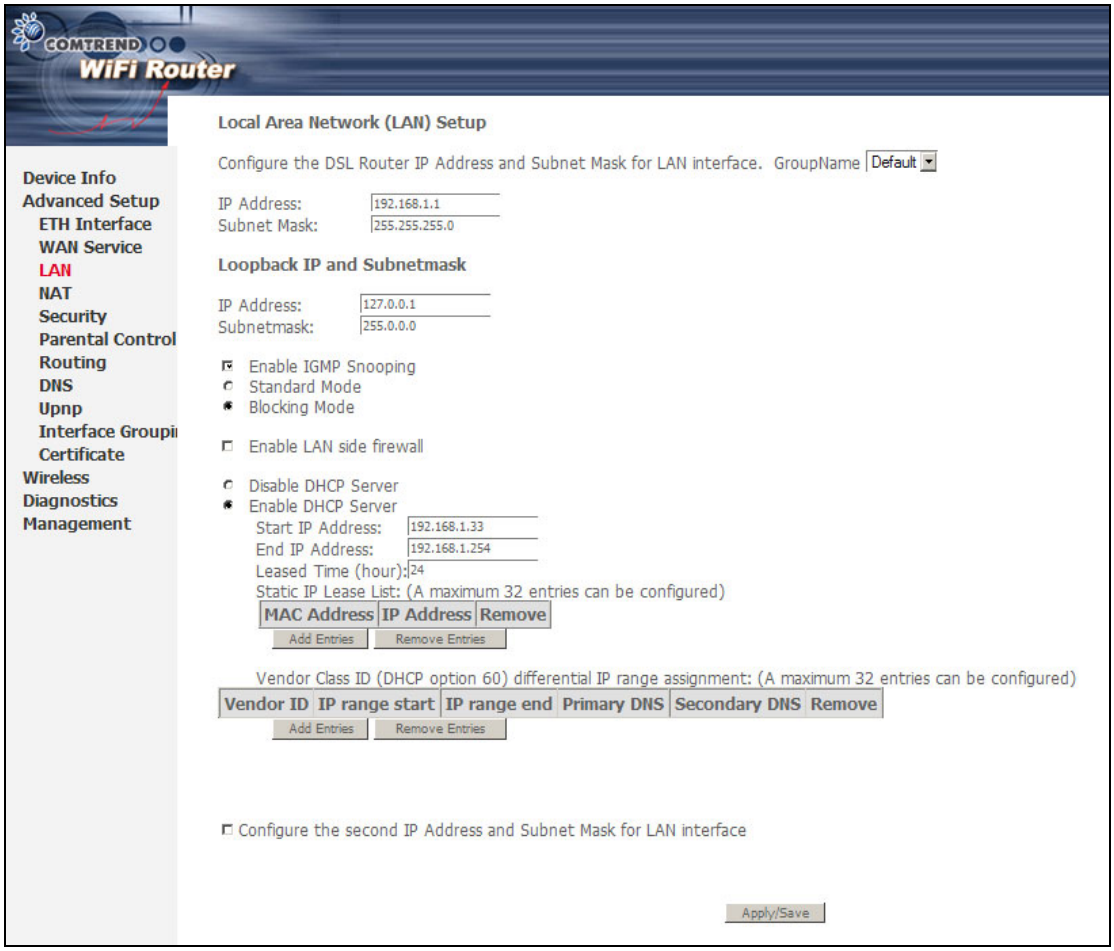
Heading	Description
Interface	Name of the interface for WAN
Description	Name of the WAN connection
Type	Shows the connection type
Vlan8021p	VLAN ID is used for VLAN Tagging (IEEE 802.1Q)
VlanMuxId	Shows 802.1Q VLAN ID
IGMP	Shows Internet Group Management Protocol (IGMP) status
NAT	Shows Network Address Translation (NAT) status
Firewall	Shows the status of Firewall
Status	Lists the status of DSL link
IPv4 Address	Shows WAN IPv4 address

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

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

5.3 LAN

From this screen, LAN interface settings can be configured.



NOTE: NAT is enabled so the **DHCP Server Relay** option is hidden above. (see underlined notes below).

Consult the field descriptions below for more details.

LOCAL AREA NETWORK (LAN) SETUP

GroupName: You can ignore this checkbox.

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

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

LOOPBACK IP AND SUBNETMASK

IP Address: Enter the IP address.

Subnet Mask: Enter the subnet mask.

Enable IGMP Snooping: Enable by ticking the checkbox ☑.

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

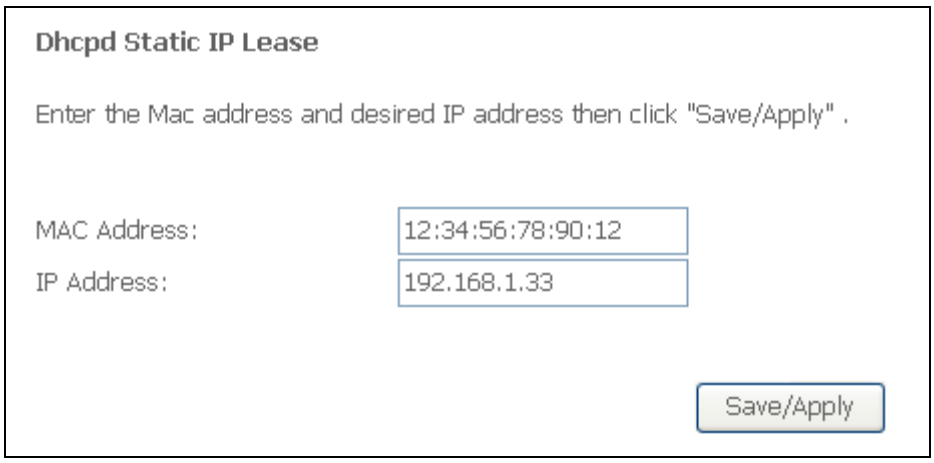
Blocking Mode**:** In blocking mode, the multicast data traffic will be blocked and not flood to all bridge ports when there are no client subscriptions to any multicast group.

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

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

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

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

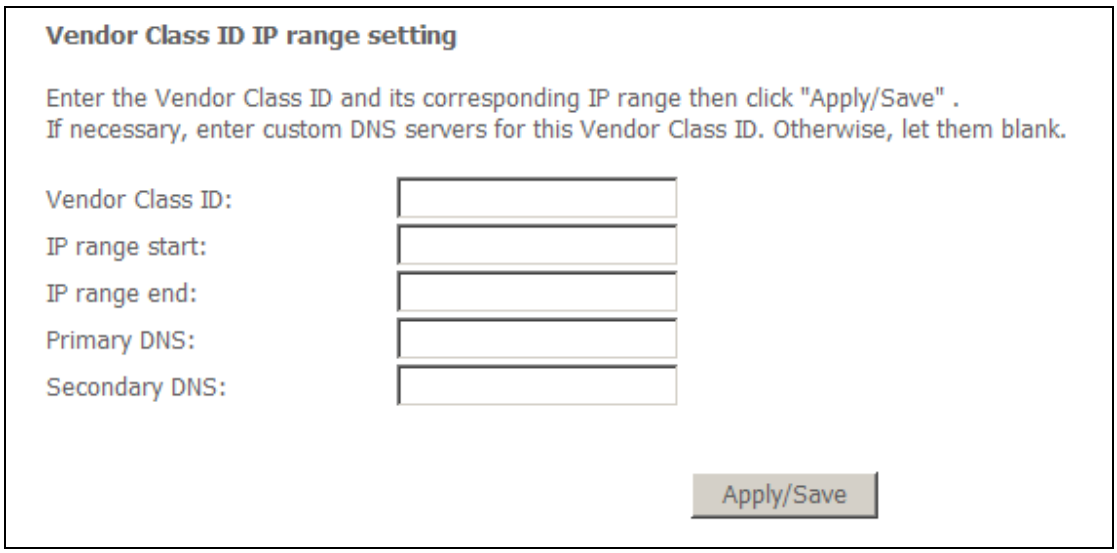


To remove an entry, tick the corresponding checkbox ☑ in the Remove column and then click the **Remove Entries** button, as shown below.

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

Vendor Class ID: A maximum 32 entries can be configured. To remove an entry, tick the corresponding checkbox ☑ in the Remove column and then click the **Remove Entries** button.

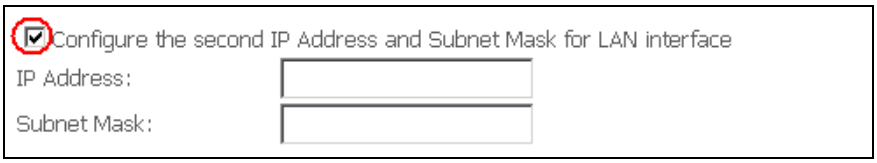
To add an entry, click **Add Entries**. The following screen will display.



Enter appropriate information for each setting and then click **Apply/Save**.

2ND LAN INTERFACE

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



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

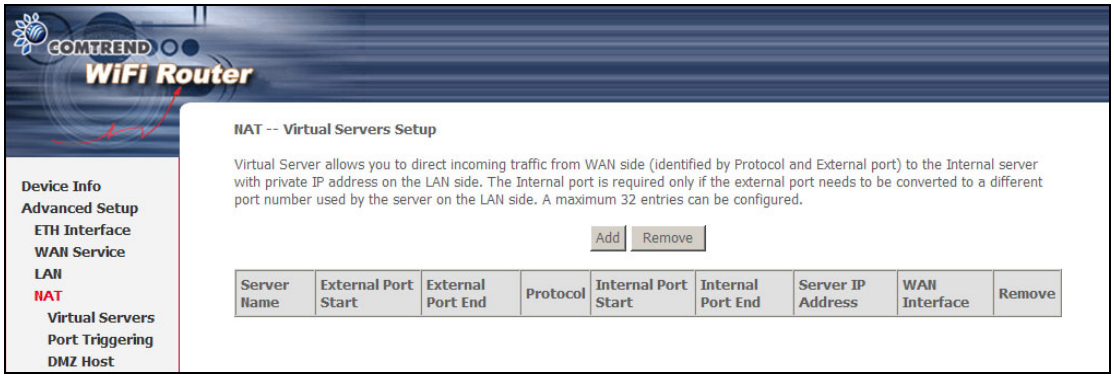
Subnet Mask: Enter the secondary subnet mask for the LAN port.

5.4 NAT

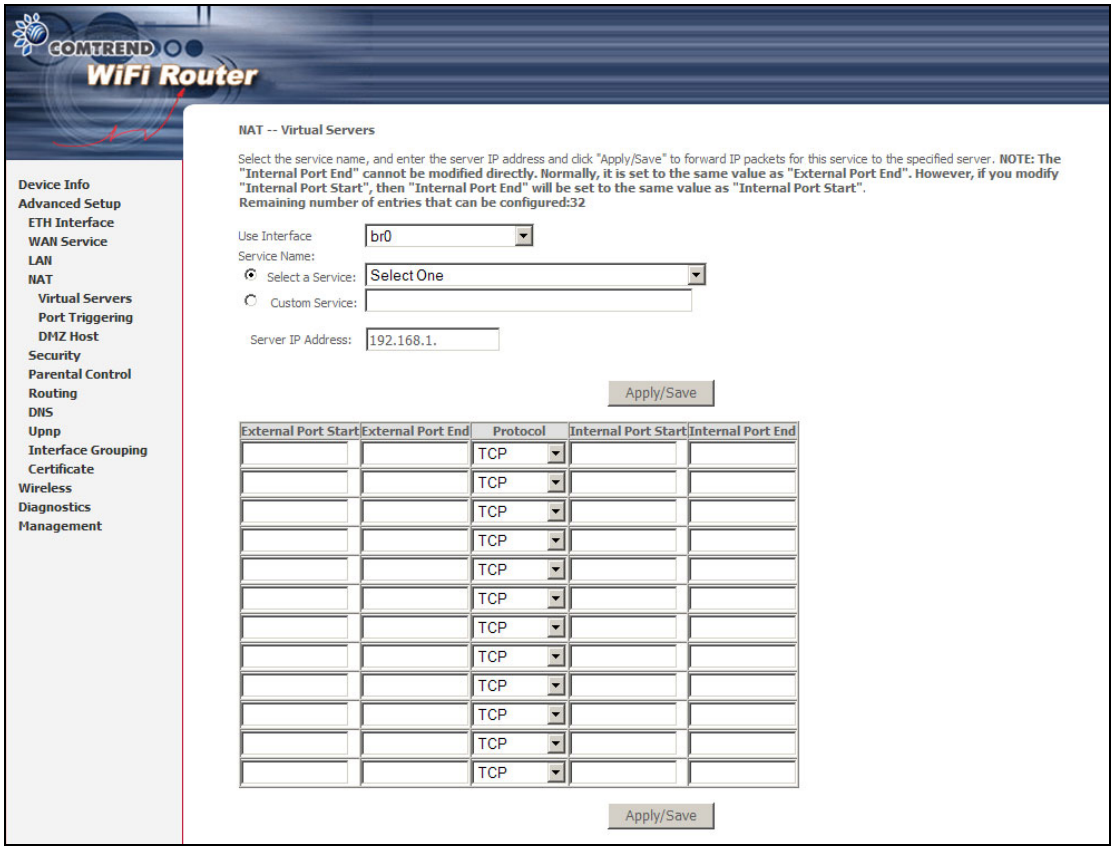
To display this option, NAT must be enabled in at least one PVC shown on the Advanced Setup - WAN screen. (*NAT is not an available option in Bridge mode*)

5.4.1 Virtual Servers

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



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



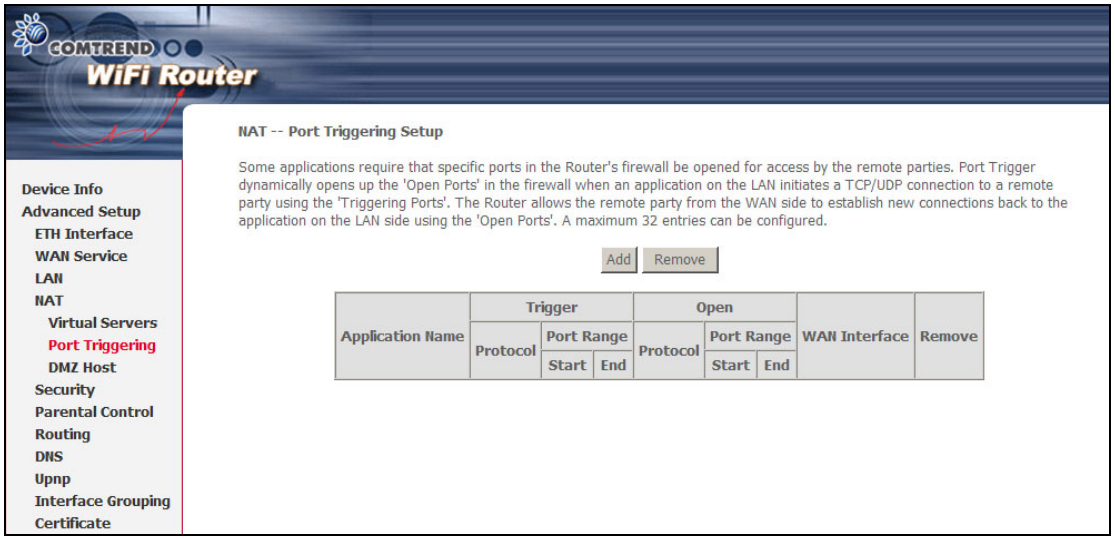
Consult the table below for field and header descriptions.

Field/Header	Description
Use Interface	Select the WAN interface from the drop-down box.
Select a Service **Or** Custom Server	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.

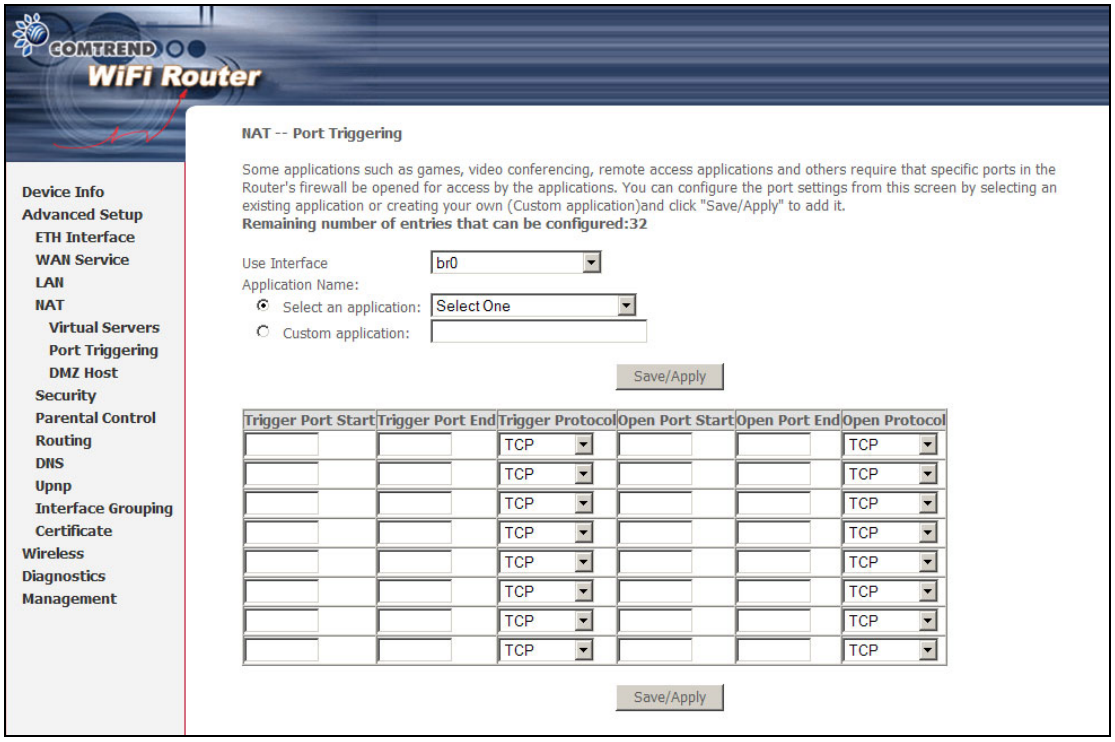
Field/Header	Description
External Port End	Enter the ending external port number (when you select Custom Server). When a service is selected, the port ranges are automatically configured.
Protocol	TCP, TCP/UDP, or UDP.
Internal Port Start	Enter the internal port starting number (when you select Custom 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.

5.4.2 Port Triggering

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



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



Consult the table below for field and header descriptions.

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

5.4.3 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**.

5.5 Security

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

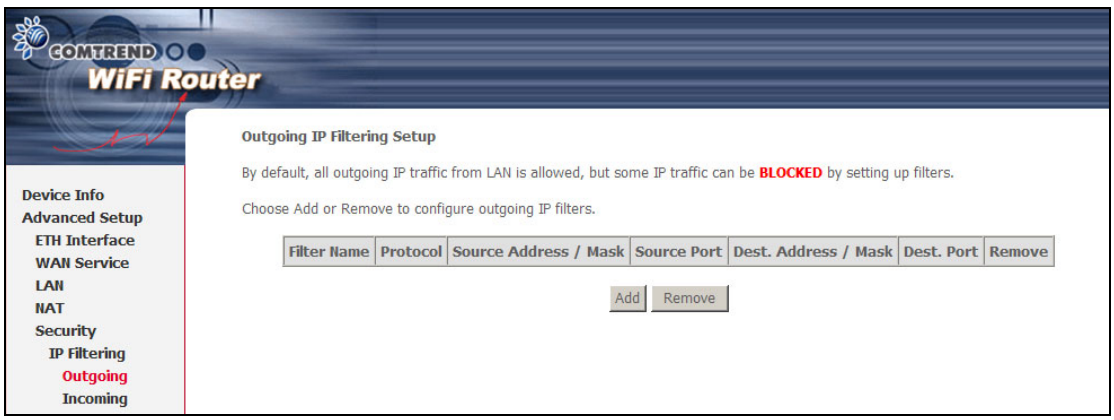
5.5.1 IP Filtering

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

NOTE:	This function is not available when in bridge mode. Instead, MAC Filtering (pg. 30) performs a similar function.

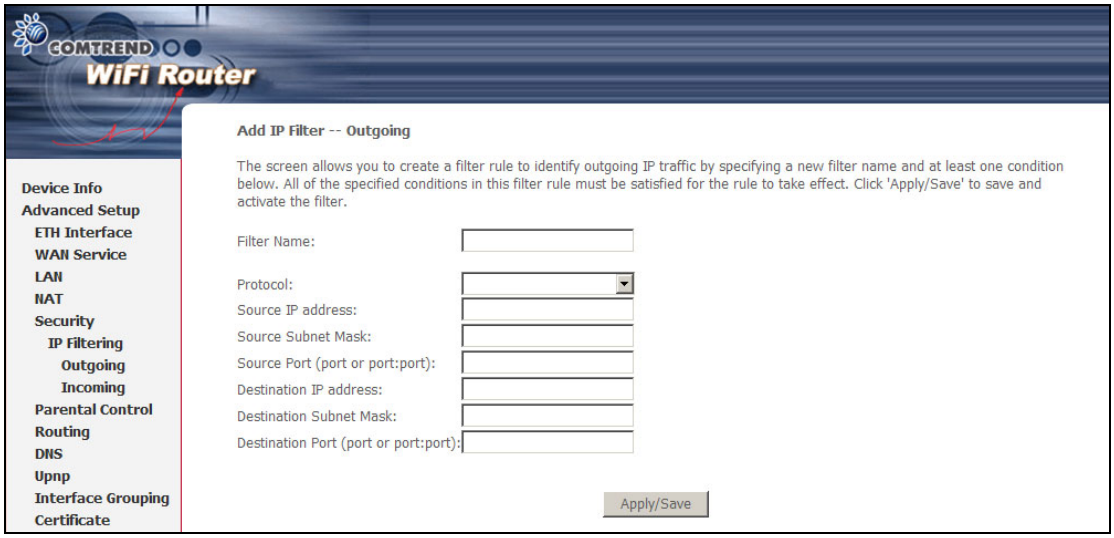
OUTGOING IP FILTER

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



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

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

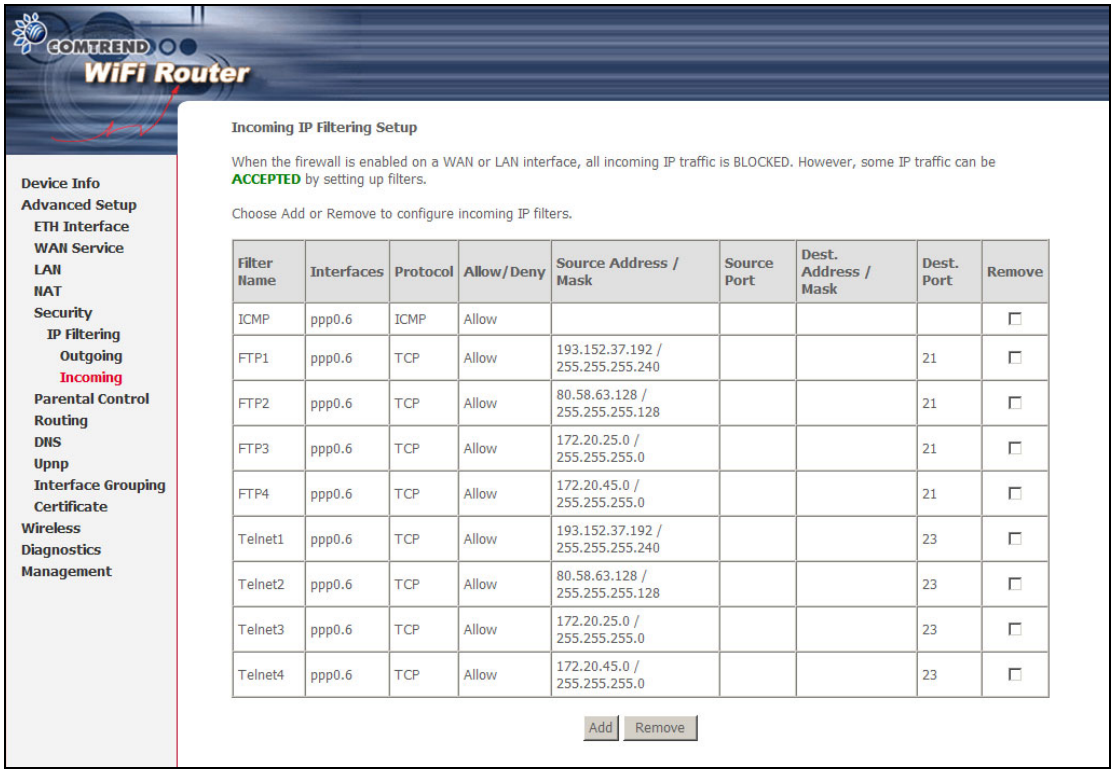


Consult the table below for field descriptions.

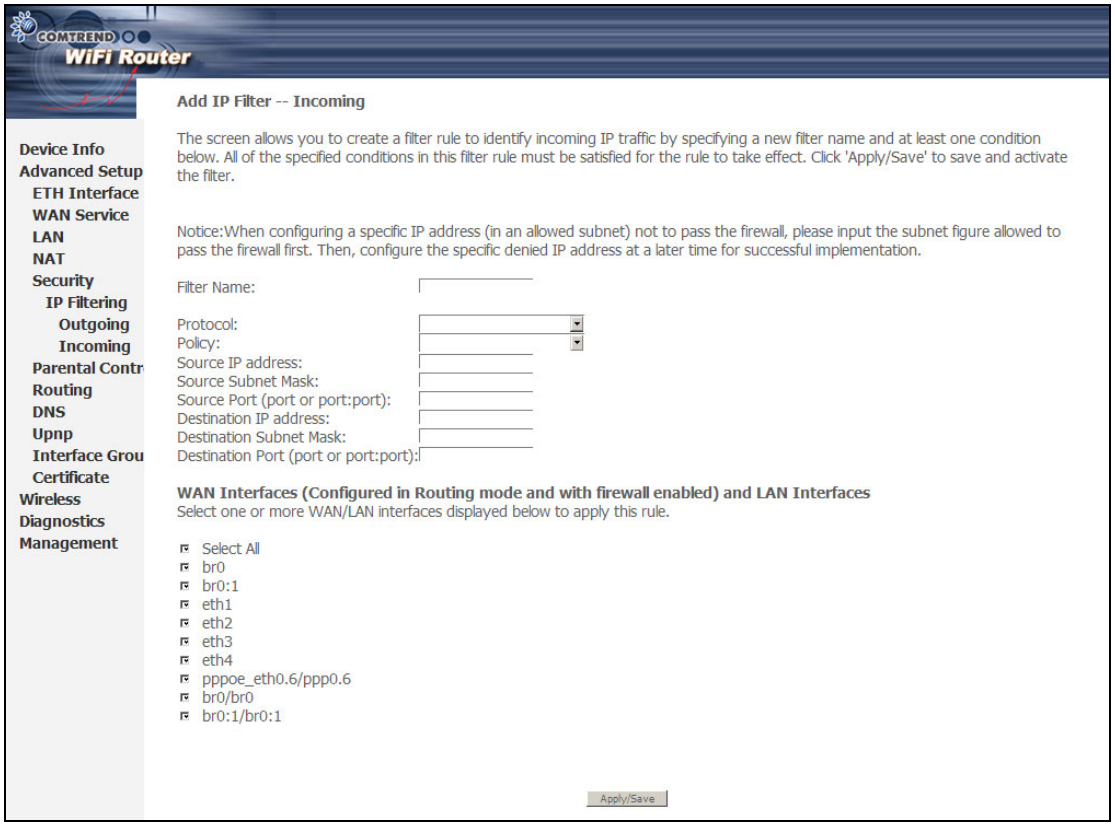
Field	Description
Filter Name	The filter rule label
Protocol	TCP, TCP/UDP, UDP, or ICMP.
Source IP address	Enter source IP address.
Source Subnet Mask	Enter source subnet mask.
Source Port (port or port:port)	Enter source port number or range.
Destination IP address	Enter destination IP address.
Destination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

INCOMING IP FILTER

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



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



Consult the table below for field descriptions.

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

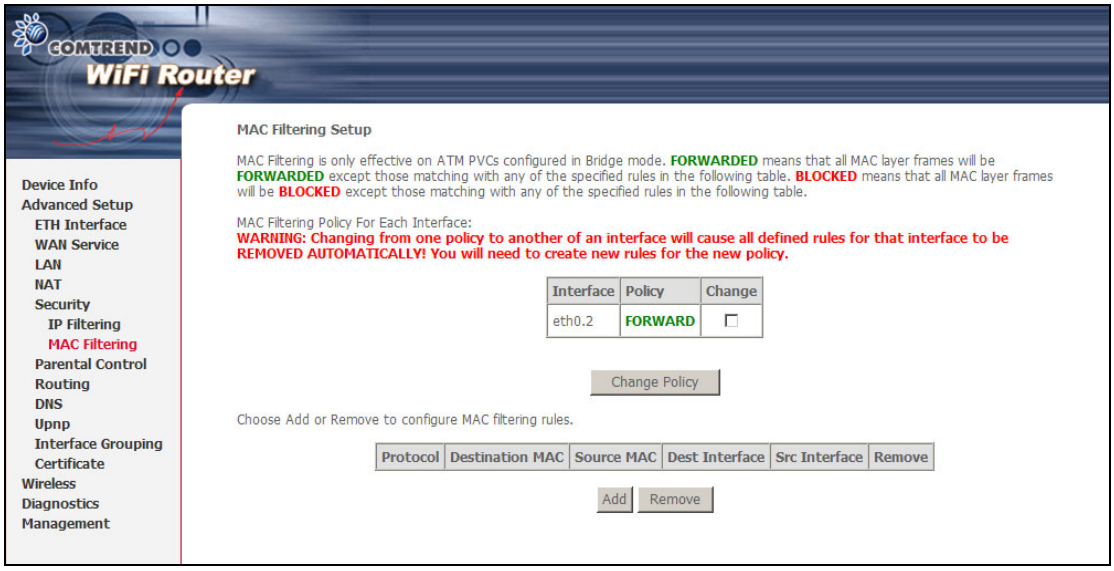
At the bottom of this screen, select the WAN and LAN Interfaces to which the filter rule will apply. You may select all or just a subset. WAN interfaces in bridge mode or without firewall enabled are not available.

5.5.2 MAC Filtering

NOTE: This option is only available in bridge mode. Other modes use IP Filtering (pg. 27) to perform a similar function.

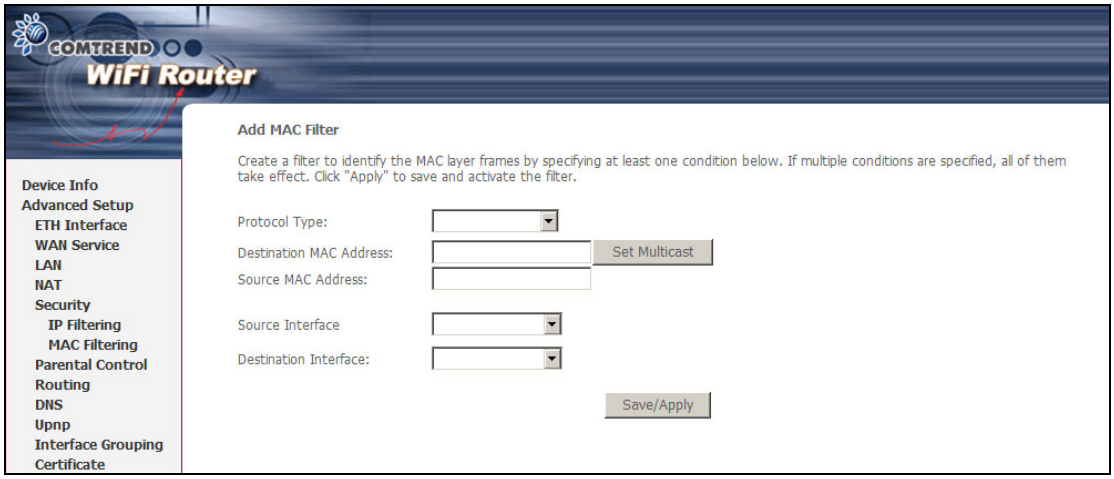
Each network device has a unique 48-bit MAC address. This can be used to filter (block or forward) packets based on the originating device. MAC filtering policy and rules for the WAP-5813n can be set according to the following procedure.

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



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

them must be met. Click **Save/Apply** to save and activate the filter rule.



Consult the table below for detailed field descriptions.

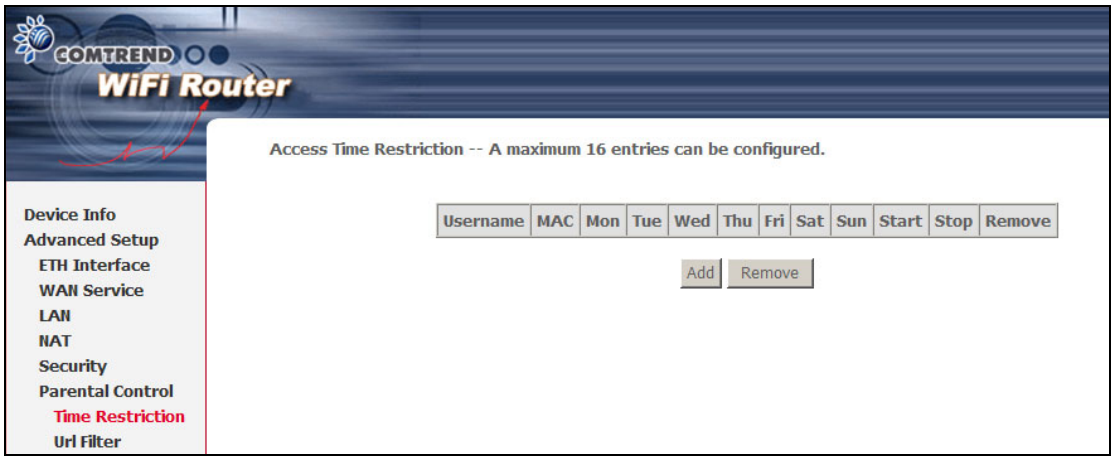
Field	Description
Protocol Type	PPPoE, IPv4, IPv6, AppleTalk, IPX, NetBEUI, IGMP
Destination MAC Address	Defines the destination MAC address
Source MAC Address	Defines the source MAC address
Source/Destination Interfaces	Applies the filter to selected WAN interfaces.

5.6 Parental Control

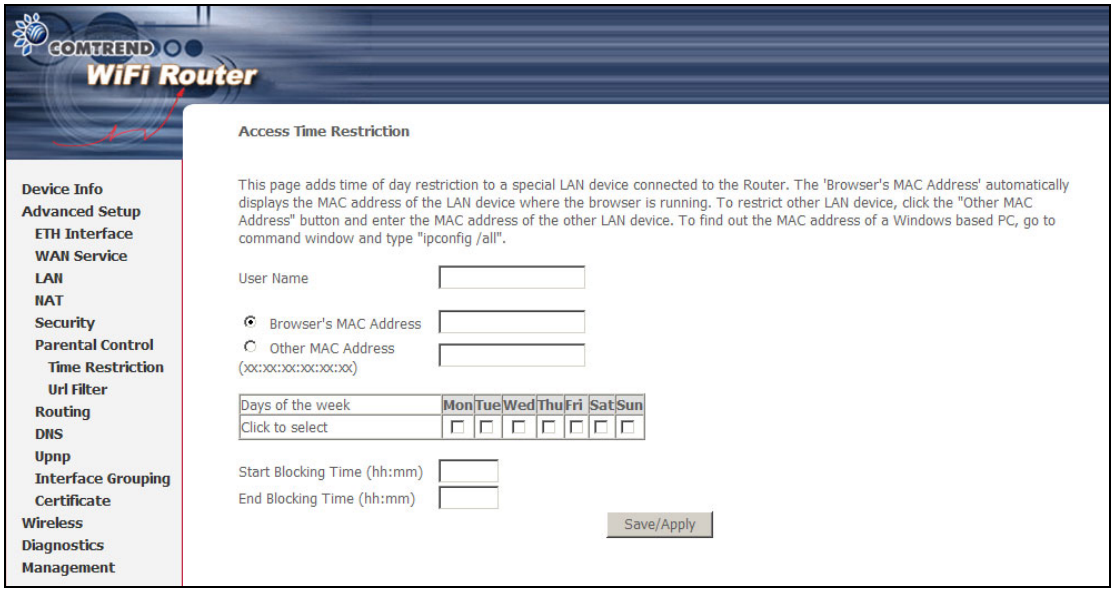
This selection provides WAN access control functionality.

5.6.1 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 8.4, so that the scheduled times match your local time.



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



See below for field descriptions. Click **Save/Apply** 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.

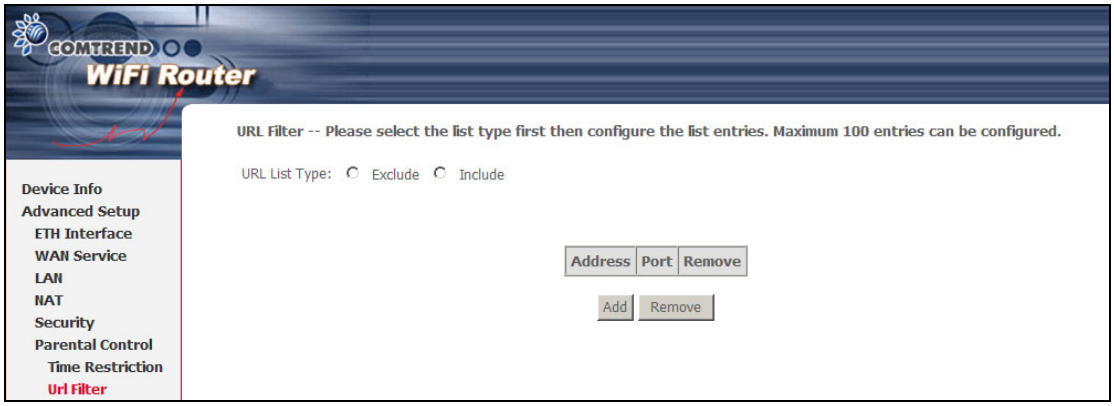
Days of the Week: The days the restrictions apply.

Start Blocking Time: The time the restrictions start.

End Blocking Time: The time the restrictions end.

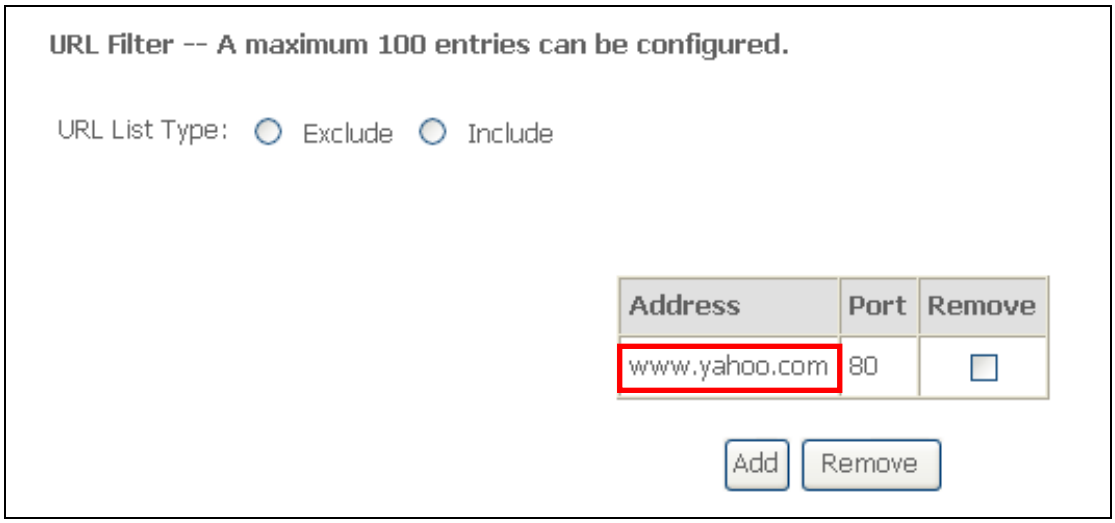
5.6.2 URL Filter

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



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

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



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

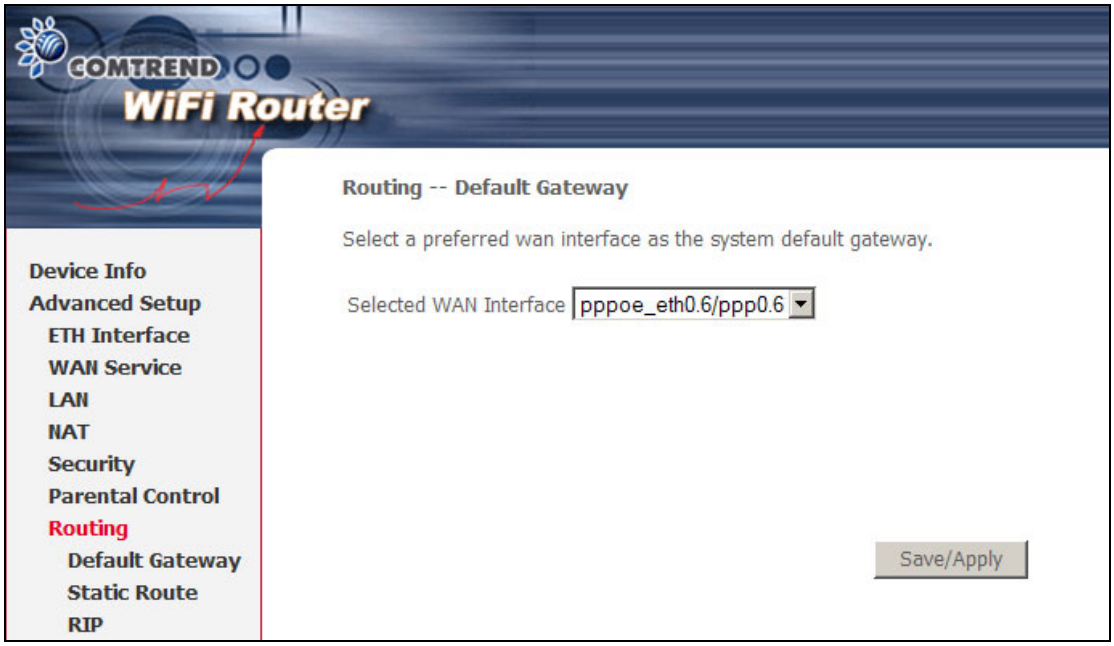
5.7 Routing

This option allows for **Default Gateway, Static Route,** and **RIP** configuration.

NOTE:	In bridge mode, the **RIP** screen is hidden while the **Default Gateway** and **Static Route** configuration screens are shown but ineffective.

5.7.1 Default Gateway

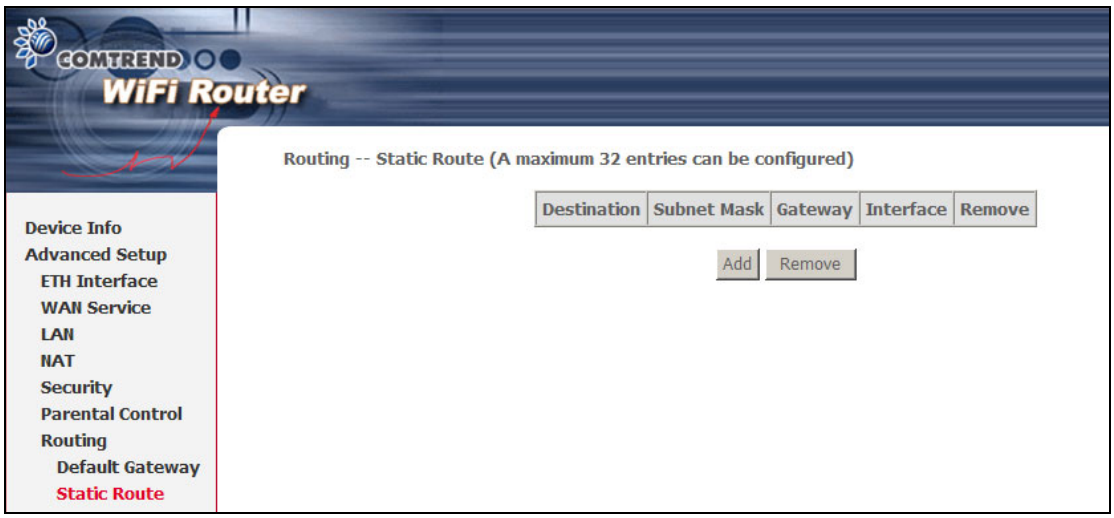
Select a WAN Interface as the default gateway and click **Save/Apply**.



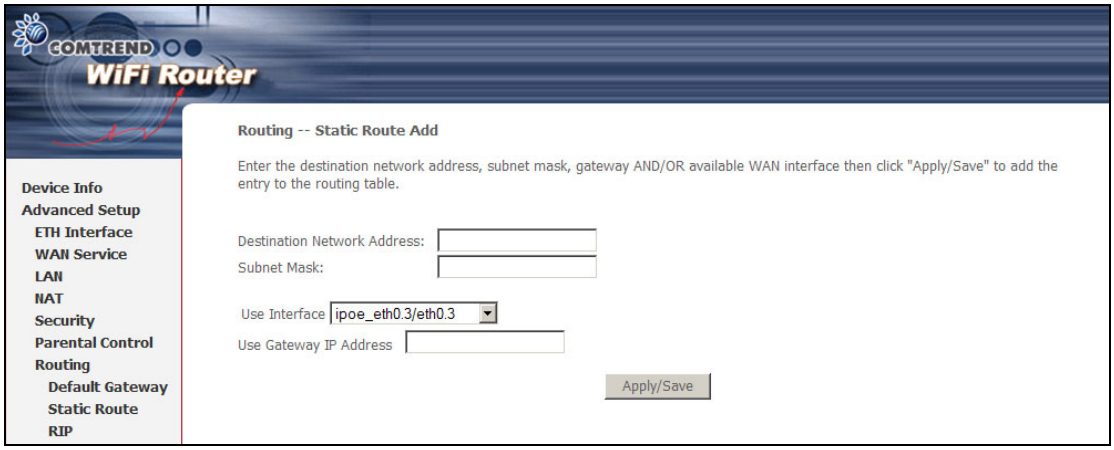
NOTE: After enabling the Automatic Assigned Default Gateway, the device must be rebooted to activate the assigned default gateway.

5.7.2 Static Route

This option allows for the configuration of static routes. Click **Add** to create a new static route. Click **Remove** to delete the selected static route.



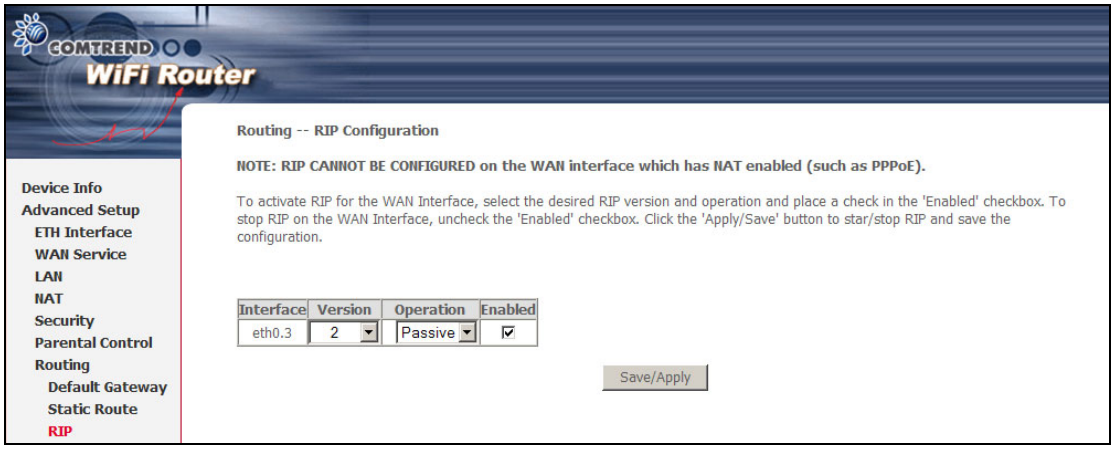
Click the **Add** button to display the following screen.



Enter Destination Network Address, Subnet Mask, Gateway IP Address, and/or WAN Interface. Then click **Apply/Save** to add the entry to the routing table.

5.7.3 RIP

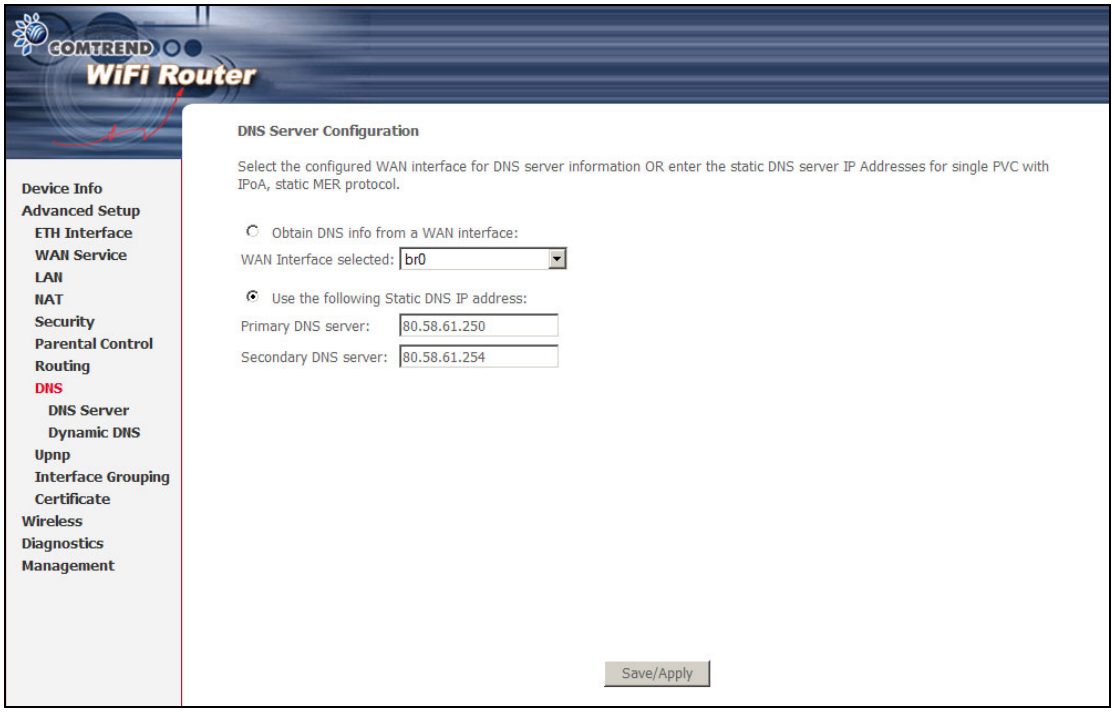
To activate RIP, configure the RIP version/operation mode and select the **Enabled** checkbox ☑ for at least one WAN interface before clicking **Save/Apply**.



5.8 DNS

5.8.1 DNS Server

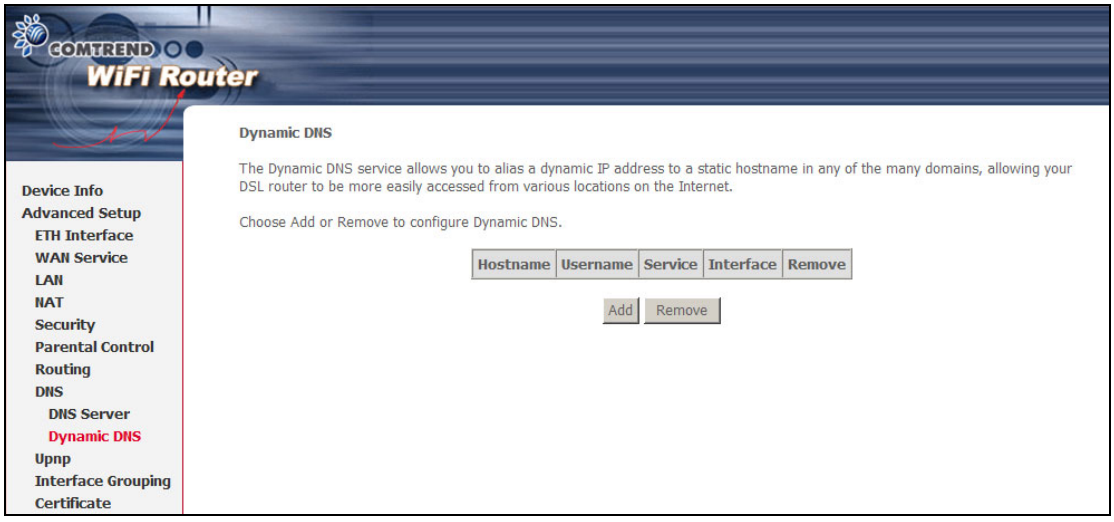
To obtain DNS information from a WAN interface, select the first radio button and then choose a WAN interface from the drop-down box. For Static DNS, select the second radio button and enter the IP Address of the primary (and secondary) DNS server(s). Click **Save/Apply** to save the new configuration.



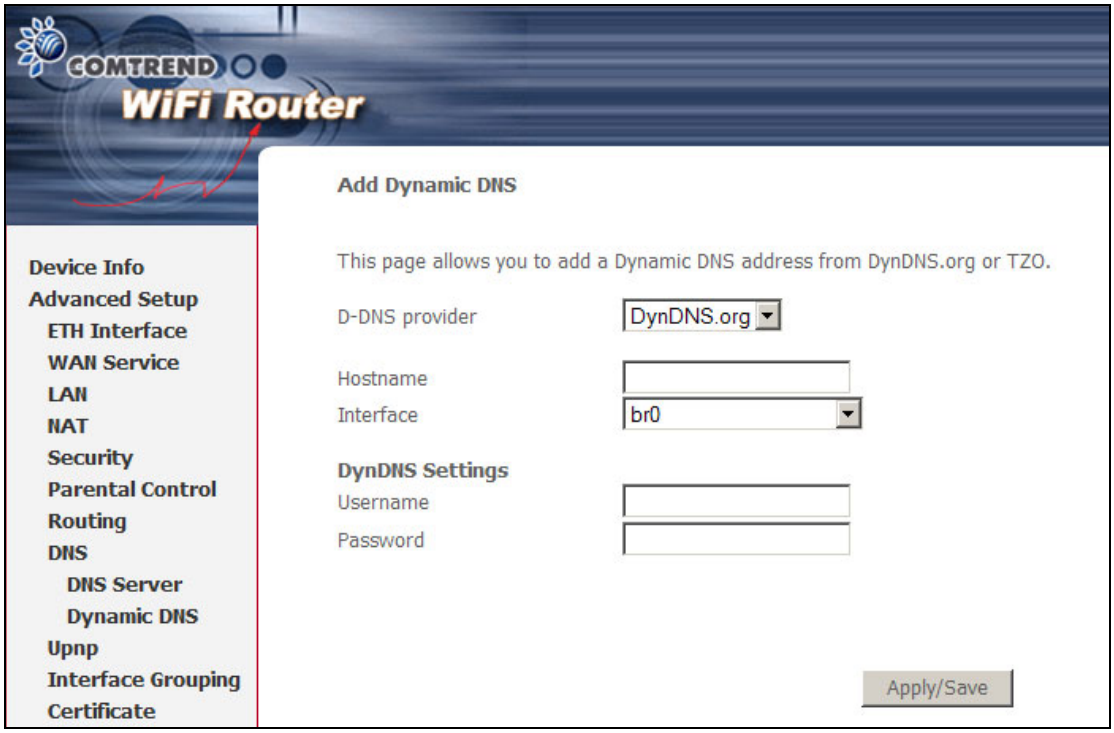
NOTE: You must reboot the router to make the new configuration effective.

5.8.2 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 WAP-5813n to be more easily accessed from various locations on the Internet.



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

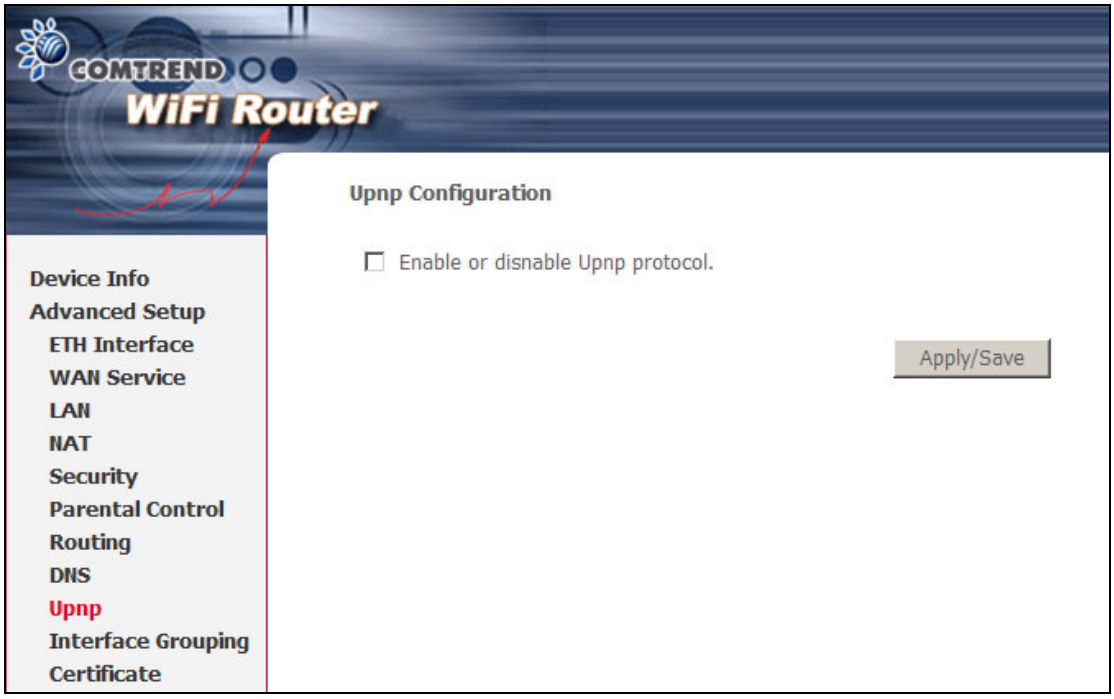


Consult the table below for field descriptions.

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

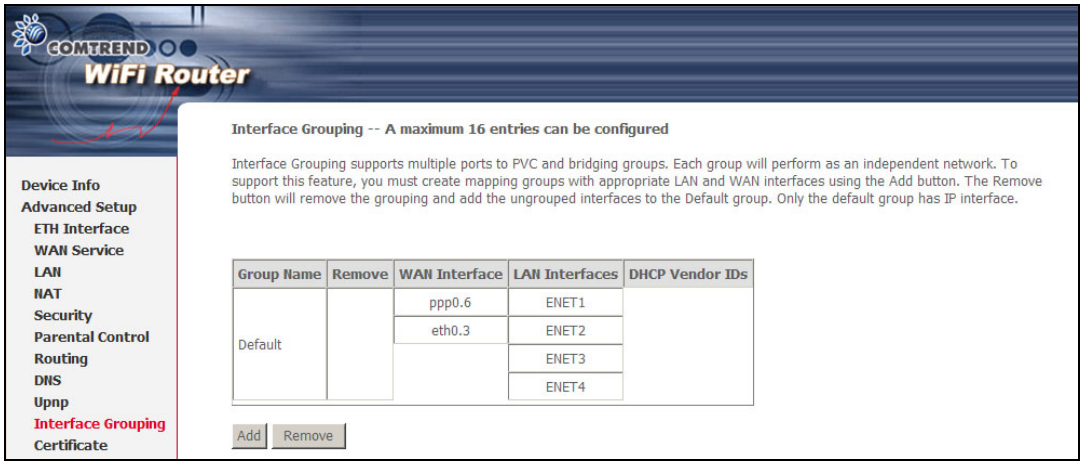
5.9 UPnP

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

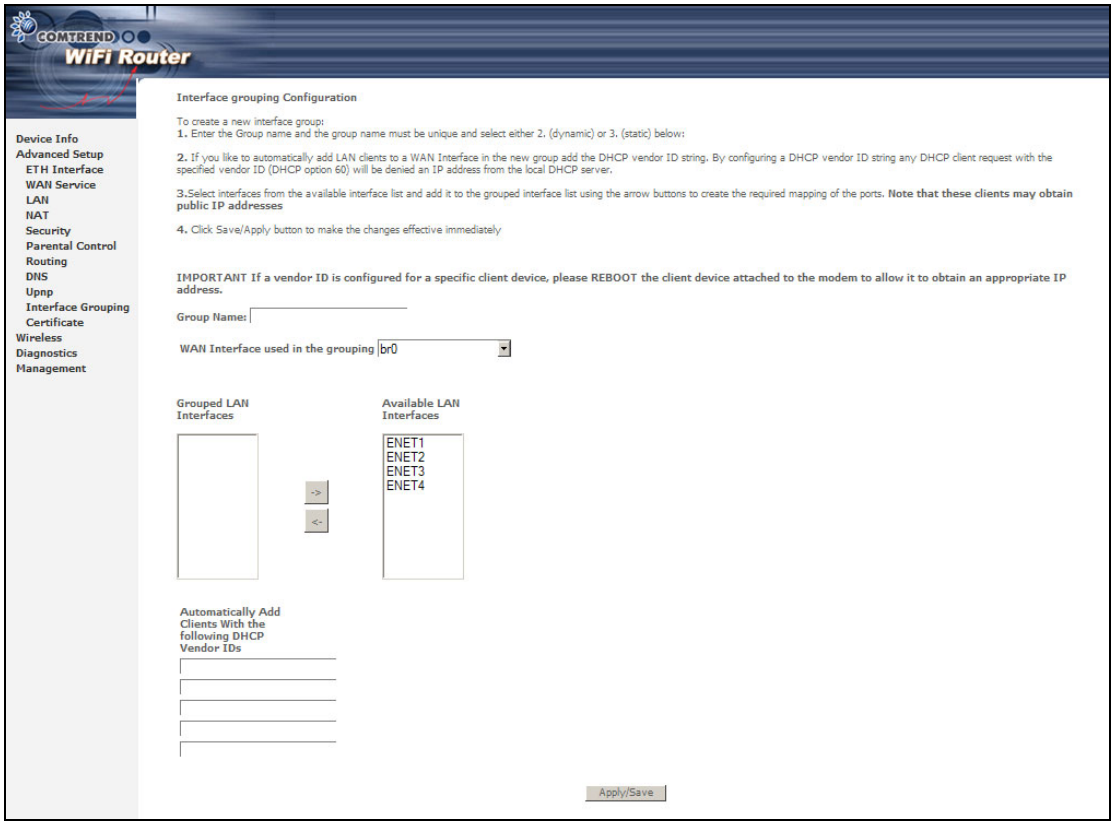


5.10 Interface Grouping

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



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



Automatically Add Clients With the 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 and the others are for IP set-top box (video). The LAN interfaces are ENET1, ENET2, ENET3, and ENET4.

The Interface Grouping configuration will be:

1. Default: ENET1, ENET2, ENET3, and ENET4.
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 ISP's DHCP server is running on PVC 0/36. It is for set-top box use only. On the LAN side, the PC can get IP address from the CPE's DHCP server and access the Internet via PPPoE (0/33).

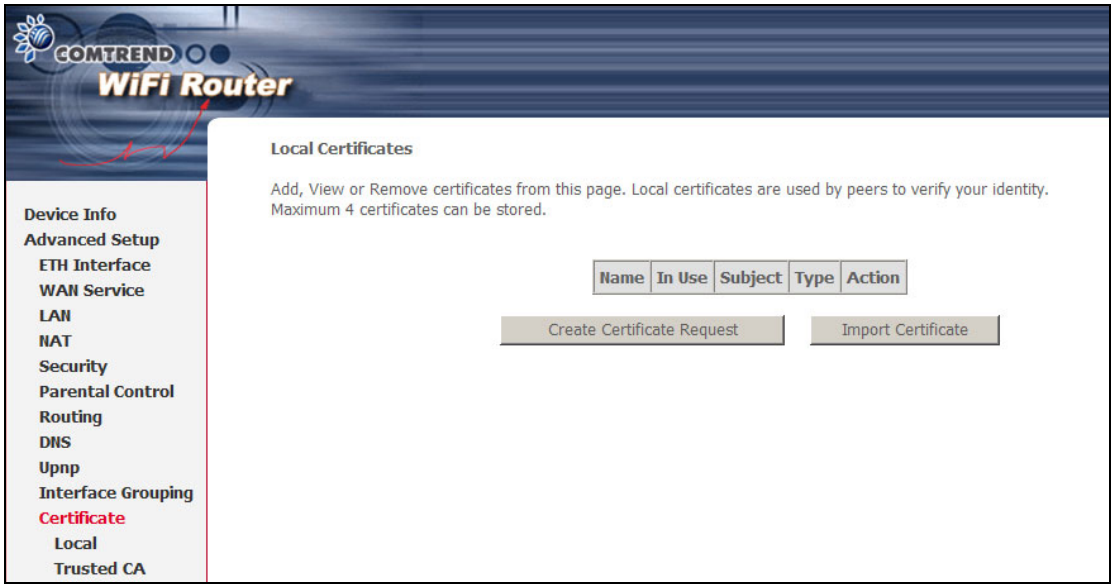
If the set-top box is connected with interface "ENET1" and sends a DHCP request with vendor id "Video", the CPE's DHCP server will forward this request to ISP's DHCP server. Then the CPE will change the port-mapping configuration automatically. The port-mapping configuration will become:

1. Default: ENET2, ENET3, and ENET4.
2. Video: nas_0_36, nas_0_37, nas_0_38, and ENET1.

5.11 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.

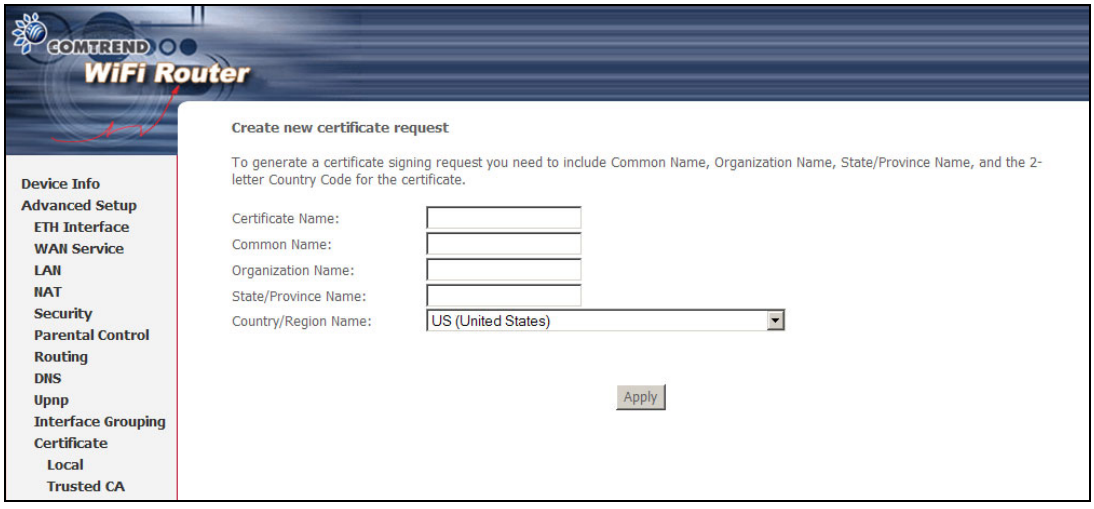
5.11.1 Local



CREATE CERTIFICATE REQUEST

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

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

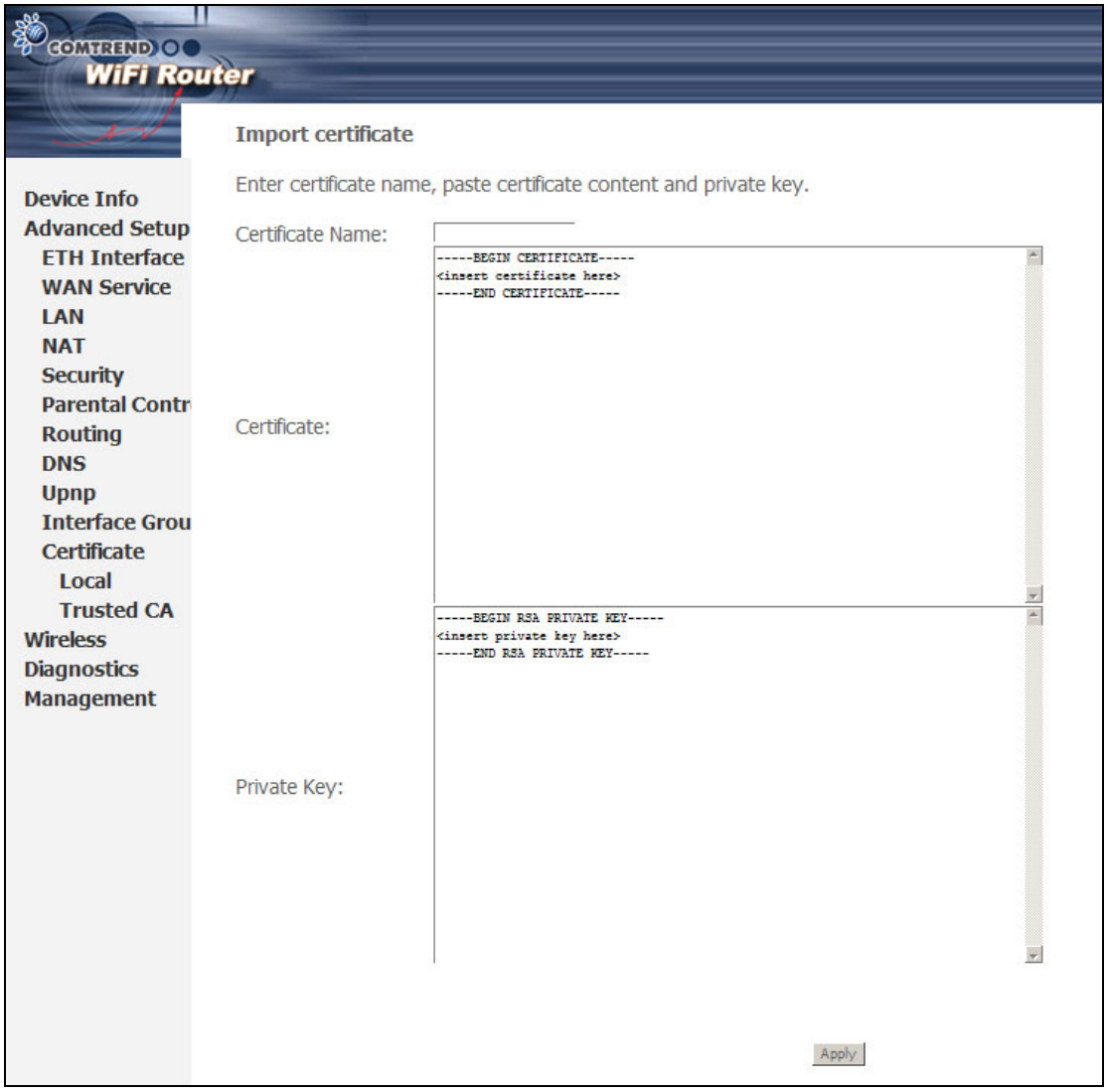


The following table is provided for your reference.

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

IMPORT CERTIFICATE

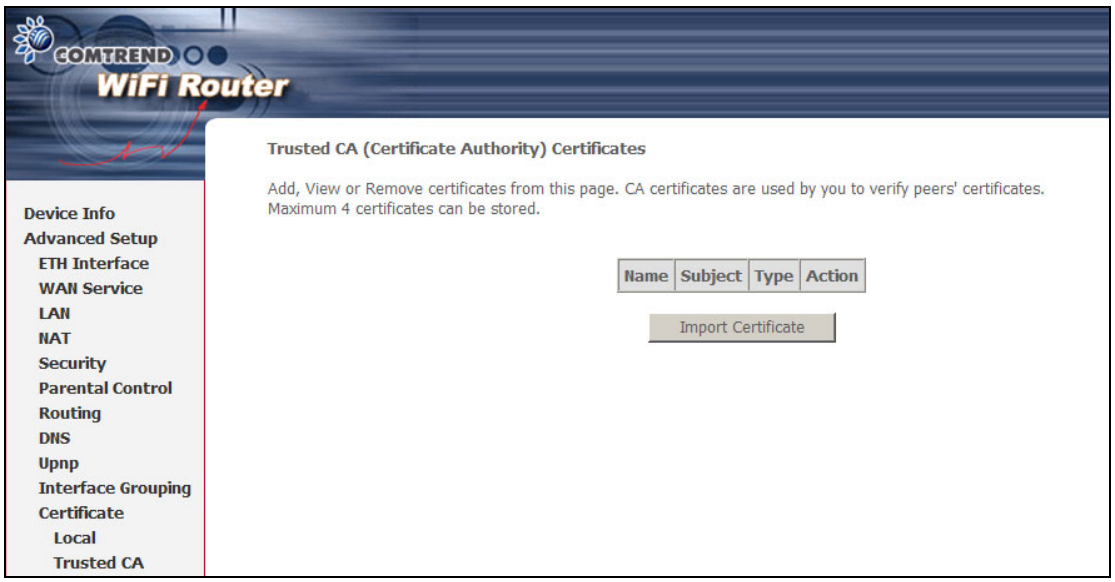
Click **Import Certificate** to paste the certificate content and the private key provided by your vendor/ISP/ITSP into the corresponding boxes shown below.



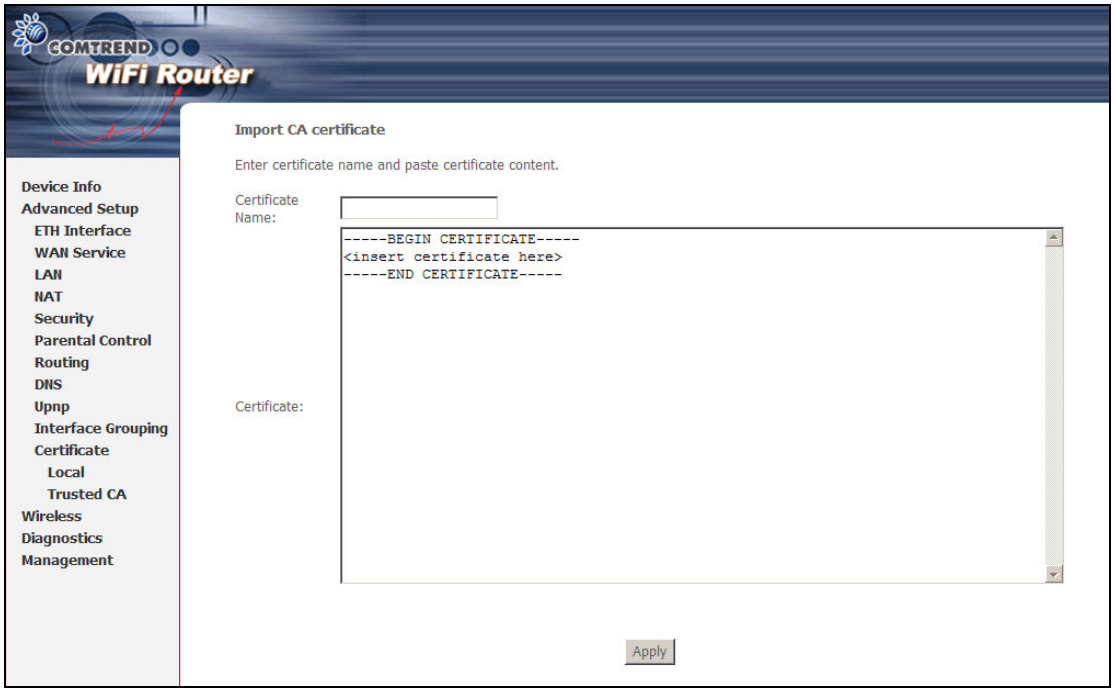
Enter a certificate name and click **Apply** to import the local certificate.

5.11.2 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.



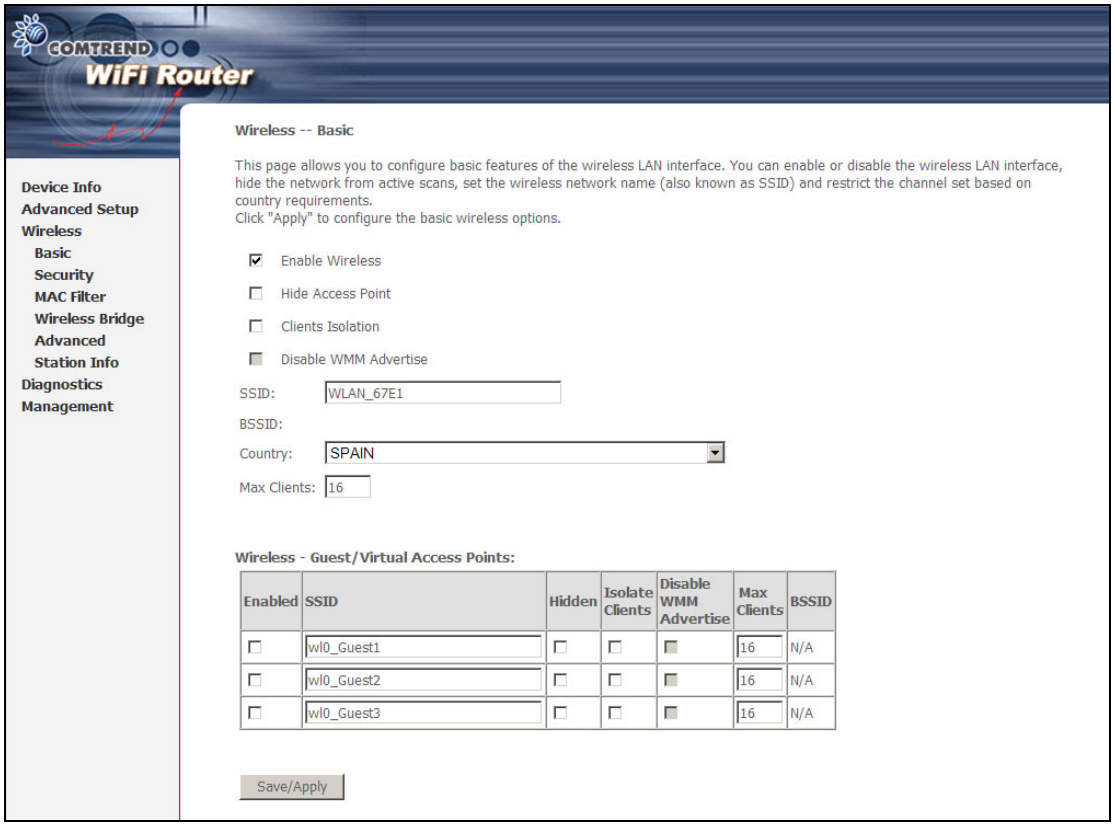
Enter a certificate name and click **Apply** to import the CA certificate.

Chapter 6 Wireless

The Wireless menu provides access to the wireless options discussed below.

6.1 Basic

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



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

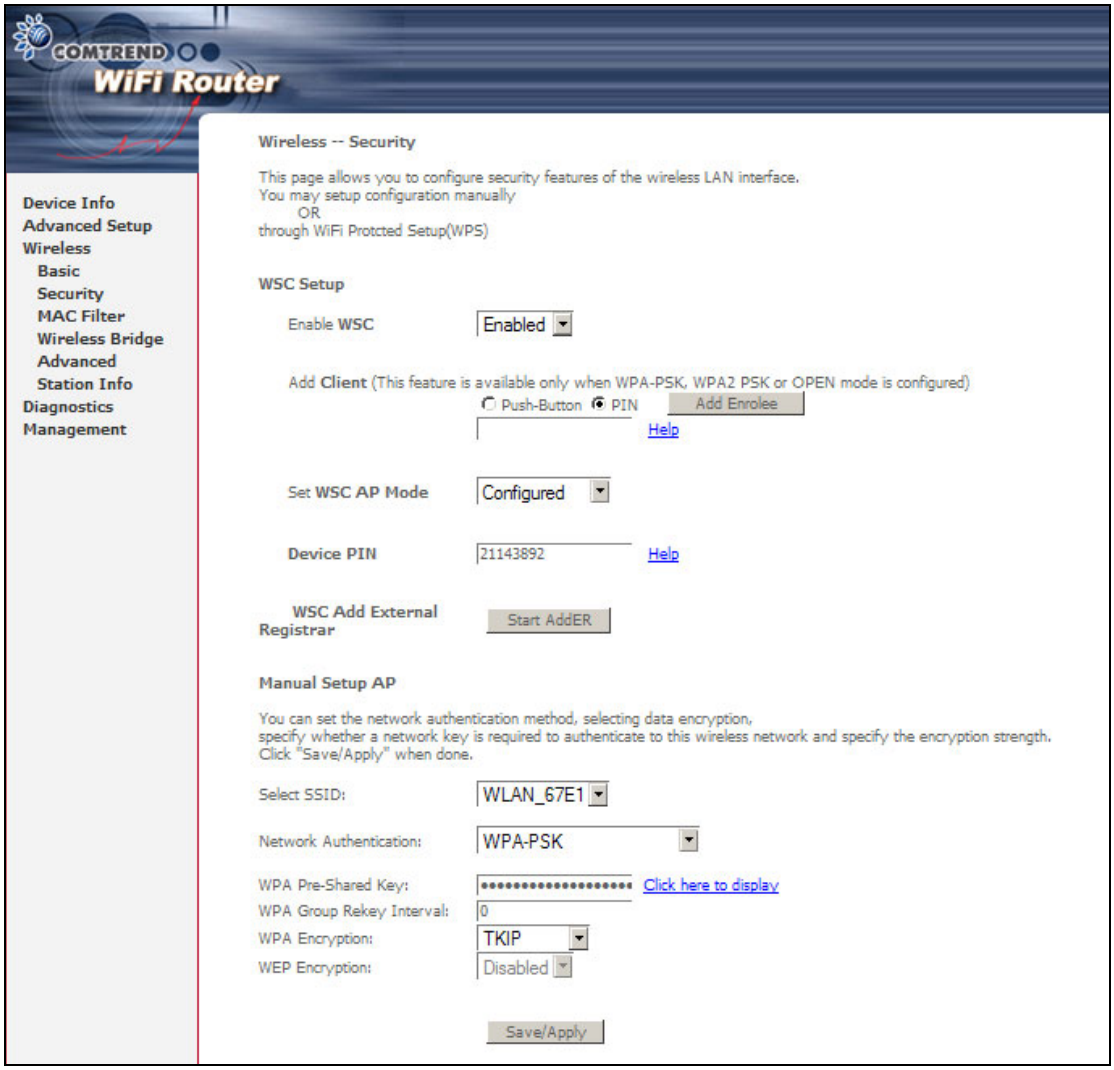
Consult the table below for descriptions of these options.

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

Option	Description
Clients Isolation	When enabled, it prevents client PCs from seeing one another in My Network Places or Network Neighborhood. Also, prevents one wireless client communicating with another wireless client.
Disable WMM Advertise	Stops the router from 'advertising' its Wireless Multimedia (WMM) functionality, which provides basic quality of service for time-sensitive applications (e.g. VoIP, Video).
SSID [1-32 characters]	Sets the wireless network name. SSID stands for Service Set Identifier. All stations must be configured with the correct SSID to access the WLAN. If the SSID does not match, that user will not be granted access.
BSSID	The BSSID is a 48-bit identity used to identify a particular BSS (Basic Service Set) within an area. In Infrastructure BSS networks, the BSSID is the MAC (Media Access Control) address of the AP (Access Point); and in Independent BSS or ad hoc networks, the BSSID is generated randomly.
Country	A drop-down menu that permits worldwide and specific national settings. Local regulations limit channel range: US= worldwide, Japan=1-14, Jordan= 10-13, Israel= 1-13
Max Clients	The maximum number of clients that can access the router.
Wireless - Guest / Virtual Access Points	This router supports multiple SSIDs called Guest SSIDs or Virtual Access Points. To enable one or more Guest SSIDs select the checkboxes ☑ in the **Enabled** column. To hide a Guest SSID select its checkbox ☑ in the **Hidden** column. Do the same for **Isolate Clients** and **Disable WMM Advertise**. For a description of these two functions, see the previous entries for "Clients Isolation" and "Disable WMM Advertise". Similarly, for **Max Clients** and **BSSID**, consult the matching entries in this table. **NOTE:** Remote wireless hosts cannot scan Guest SSIDs.

6.2 Security

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



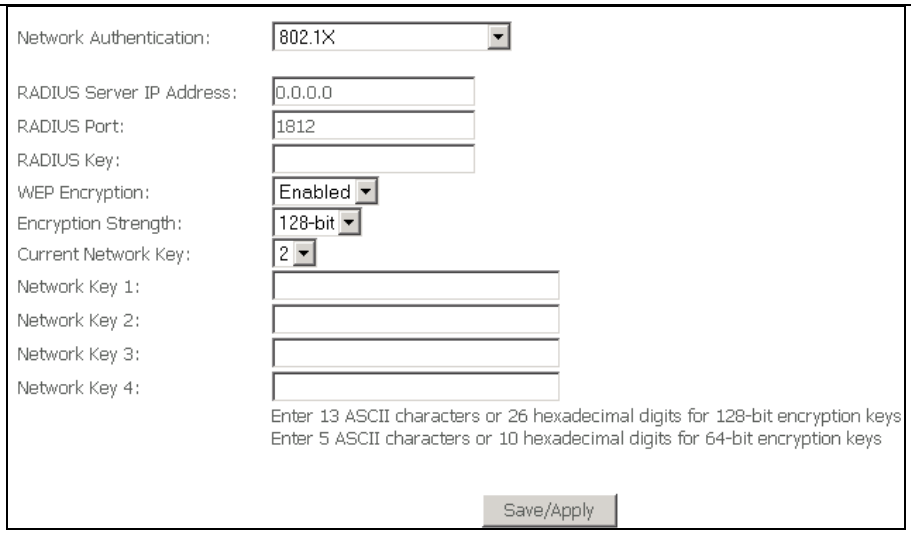
Click **Save/Apply** to implement new configuration settings.

WIRELESS SECURITY

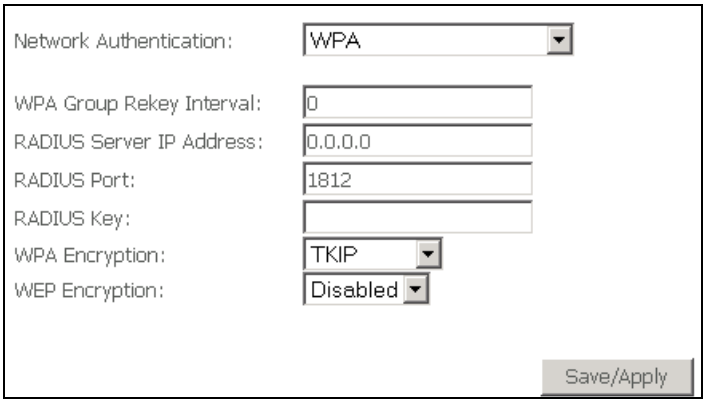
Wireless security settings can be configured according to Wi-Fi Protected Setup (WPS) or Manual Setup. The WPS method configures security settings automatically (see section 6.2.1) while the Manual Setup method requires that the user configure these settings using the Web User Interface (see the table below).

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

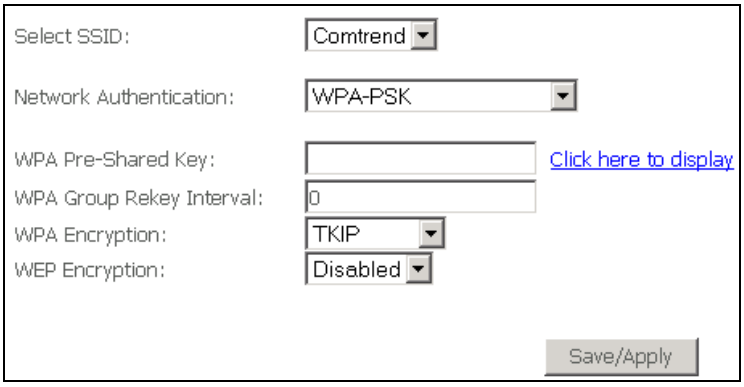
Network Authentication
This option specifies whether a network key is used for authentication to the wireless network. If network authentication is set to Open, then no authentication is provided. Despite this, the identity of the client is still verified. Each authentication type has its own settings.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



The settings for WPA authentication are shown below.



The settings for WPA-PSK authentication are shown next.



WEP Encryption

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

Security options include authentication and encryption services based on the wired equivalent privacy (WEP) algorithm. WEP is a set of security services used to protect 802.11 networks from unauthorized access, such as eavesdropping; in this case, the capture of wireless network traffic. When data encryption is enabled,

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

6.2.1 WPS

Wi-Fi Protected Setup (WPS) is an industry standard that simplifies wireless security setup for certified network devices. Every WPS certified device has both a PIN number and a push button, located on the device or accessed through device software. The WAP-5813n has both a WPS button on the rear panel and a virtual button accessed from the web user interface (WUI).

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

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

To configure security settings with WPS, follow the procedures below. You must choose either the Push-Button or PIN configuration method for Steps 6 and 7.

I. Setup

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

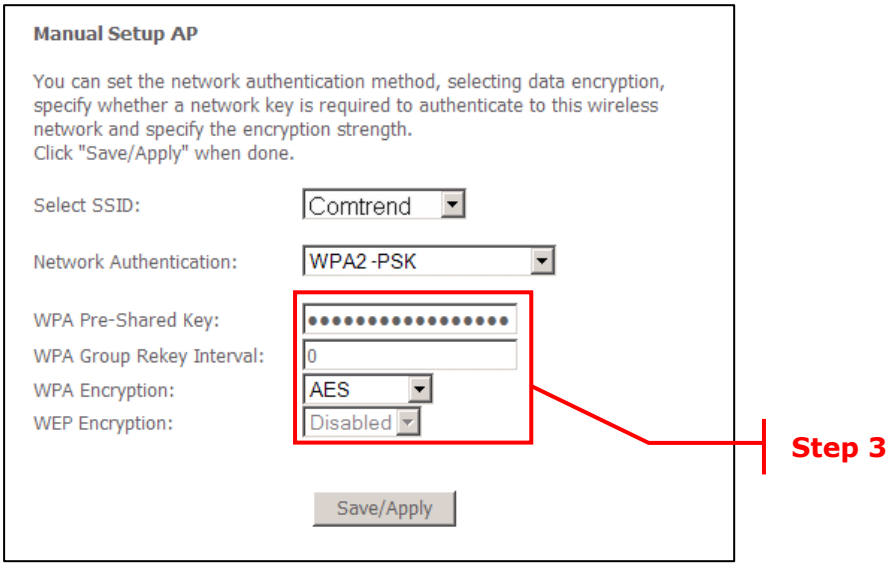
Step 2: Set the WSC AP Mode. **Configured** is used when the WAP-5813n will assign security settings to clients. **Unconfigured** is used when an external client assigns security settings to the WAP-5813n.

NOTES: Your client may or may not have the ability to provide security settings to the WAP-5813n. If it does not, then you must set the WSC AP mode to Configured. Consult the device documentation to check its capabilities.

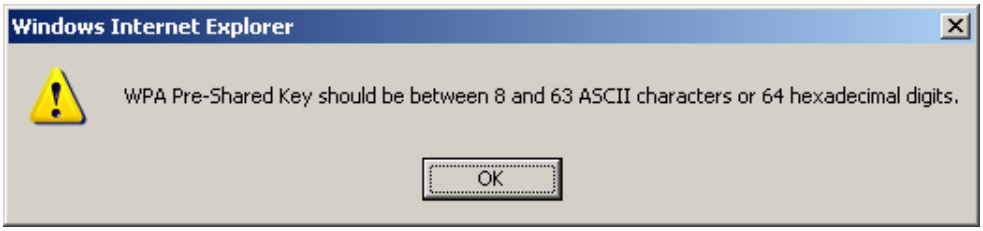
In addition, using Windows Vista, you can add an external registrar using the **StartAddER** button (Appendix E has detailed instructions).

II. NETWORK AUTHENTICATION

Step 3: Select Open, WPA-PSK, WPA2-PSK, or Mixed WPA2/WPA-PSK network authentication mode from the Manual Setup AP section of the Wireless Security screen. The example below shows WPA2-PSK mode.



Step 4: For the Pre-Shared Key (PSK) modes, enter a WPA Pre-Shared Key. You will see the following dialog box if the Key is too short or too long.



Step 5: Click the **Save/Apply** button at the bottom of the screen.

IIIa. PUSH-BUTTON CONFIGURATION

The WPS push-button configuration provides a semi-automated configuration

method. The WPS button on the rear panel of the router can be used for this purpose or the Web User Interface (WUI) can be used exclusively.

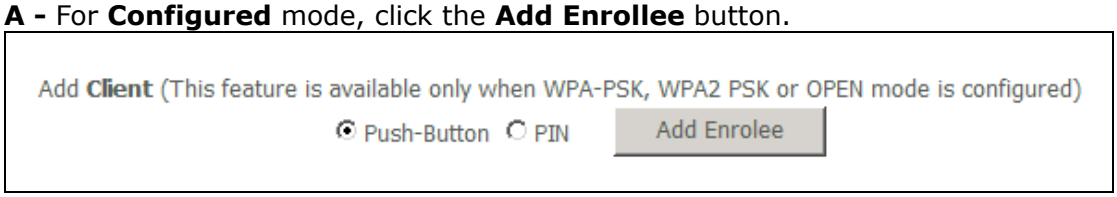
The WPS push-button configuration is described in the procedure below. It is assumed that the Wireless function is Enabled and that the router is configured as the Wireless Access Point (AP) of your WLAN. In addition, the wireless client must also be configured correctly and turned on, with WPS function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

NOTE:	The wireless AP on the router searches for 2 minutes. If the router stops searching before you complete Step 7, return to Step 6.

Step 6: **First method: WPS button**
Press the WPS button on the rear panel of the router. The WPS LED will blink to show that the router has begun searching for the client.

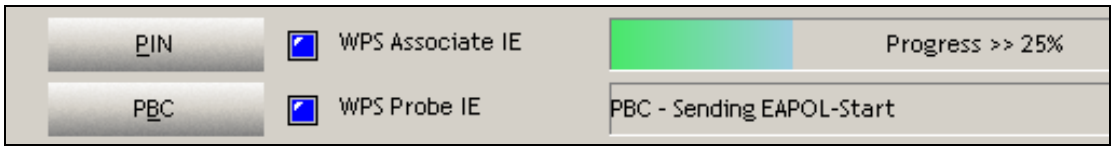
Second method: WUI virtual button
Select the Push-Button radio button in the WSC Setup section of the Wireless Security screen, as shown in **A** or **B** below, and then click the appropriate button based on the WSC AP mode selected in step 2.

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



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

Step 7: Go to your WPS wireless client and activate the push-button function. A typical WPS client screenshot is shown below as an example.



Now go to Step 8 (part IV. Check Connection) to check the WPS connection.

IIIb. WPS – PIN CONFIGURATION

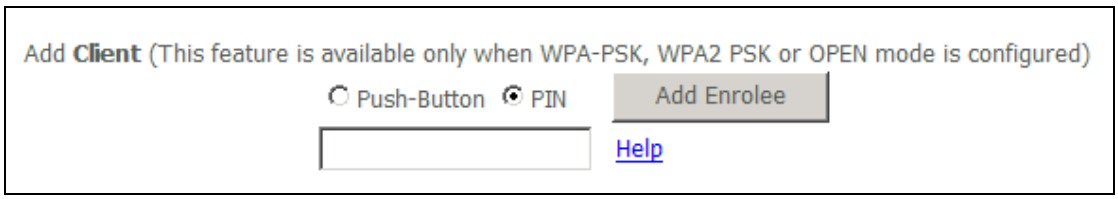
Using this method, security settings are configured with a personal identification number (PIN). The PIN can be found on the device itself or within the software. The PIN may be generated randomly in the latter case. To obtain a PIN number for your client, check the device documentation for specific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

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

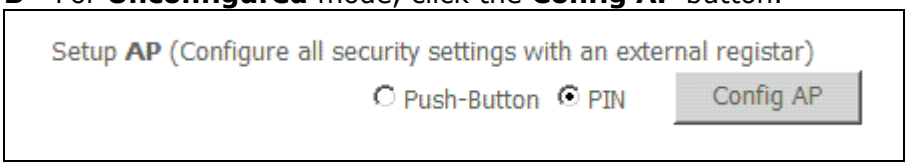
NOTE:	Unlike the push-button method, the pin method has no set time limit. This means that the router will continue searching until it finds a client.

Step 6: Select the PIN radio button in the WSC Setup section of the Wireless Security screen, as shown in **A** or **B** below, and then click the appropriate button based on the WSC AP mode selected in step 2.

A - For **Configured** mode, enter the client PIN in the box provided and then click the **Add Enrollee** button (see below).

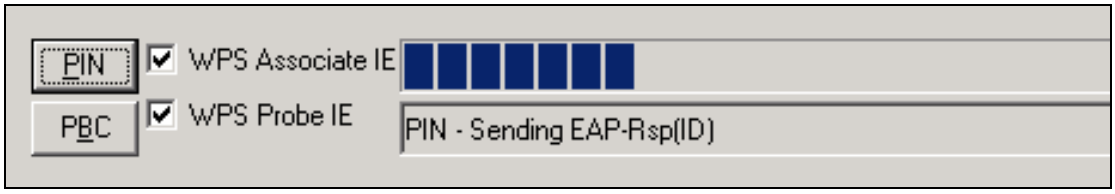


B - For **Unconfigured** mode, click the **Config AP** button.



Step 7: Activate the PIN function on the wireless client. For **Configured** mode, the client must be configured as an Enrollee. For **Unconfigured** mode, the client must be configured as the Registrar. This is different from the External Registrar function provided in Windows Vista.

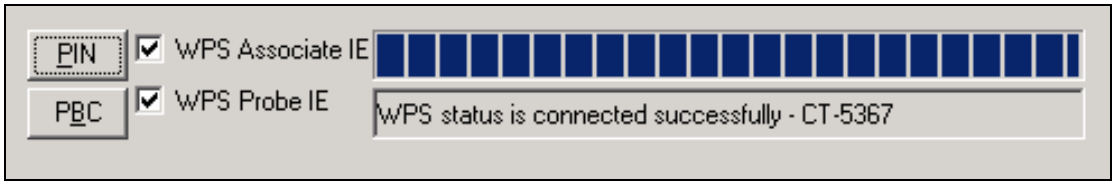
The figure below provides an example of a WPS client PIN function in-progress.



Now go to Step 8 (part IV. Check Connection) to check the WPS connection.

IV. CHECK CONNECTION

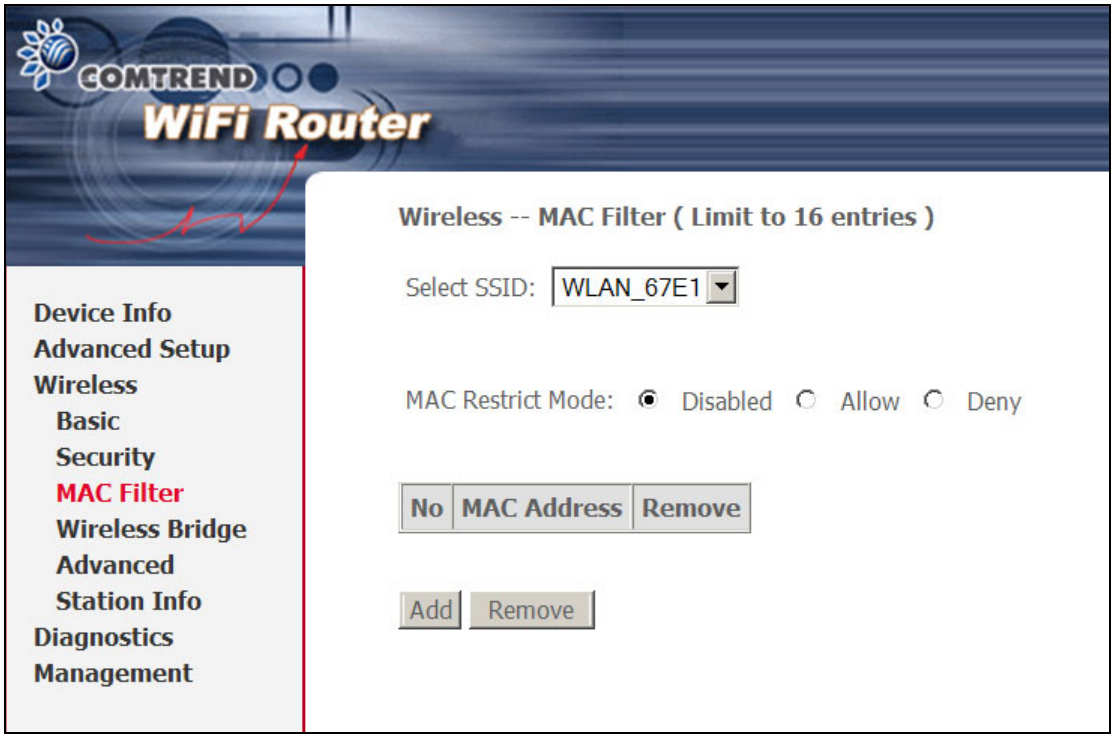
Step 8: If the WPS setup method was successful, you will be able access the wireless AP from the client. The client software should show the status. The example below shows that the connection established successfully.



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

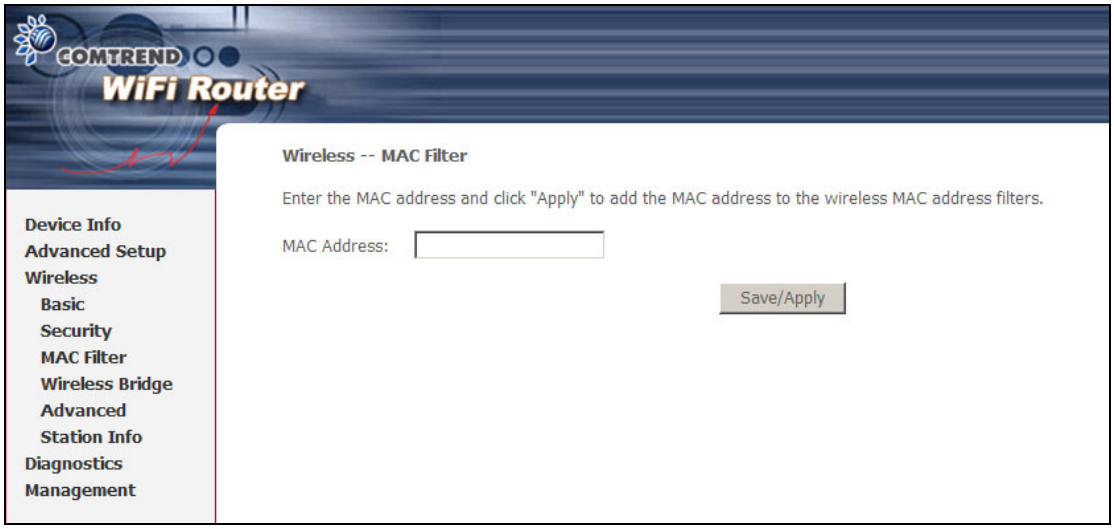
6.3 MAC Filter

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



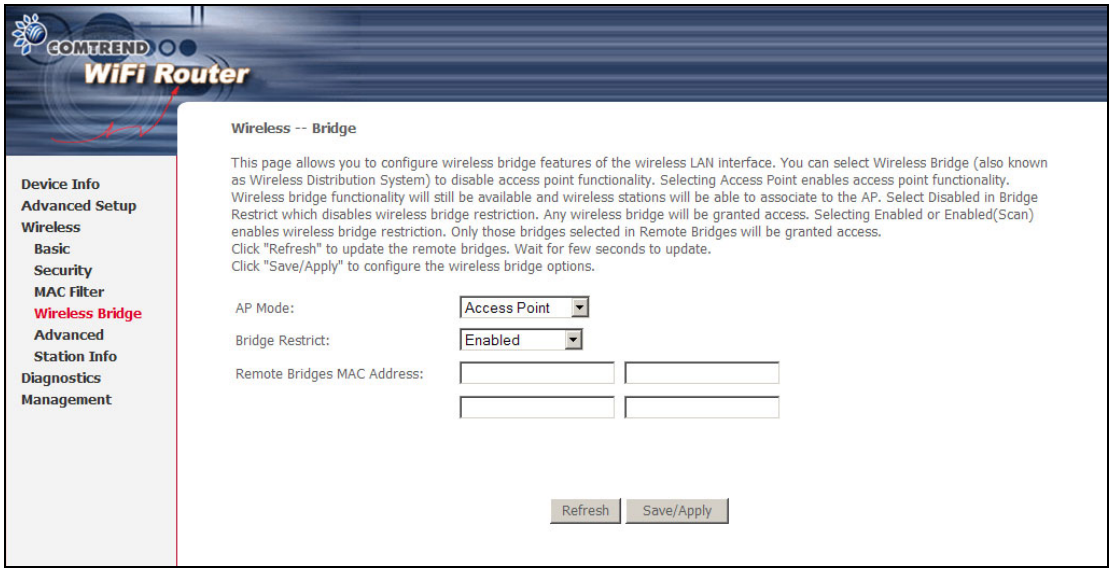
Option	Description
Select SSID	Select the wireless network name from the drop-down box. SSID stands for Service Set Identifier. All stations must be configured with the correct SSID to access the WLAN. If the SSID does not match, that user will not be granted access.
MAC Restrict Mode	Disabled: MAC filtering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

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



6.4 Wireless Bridge

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



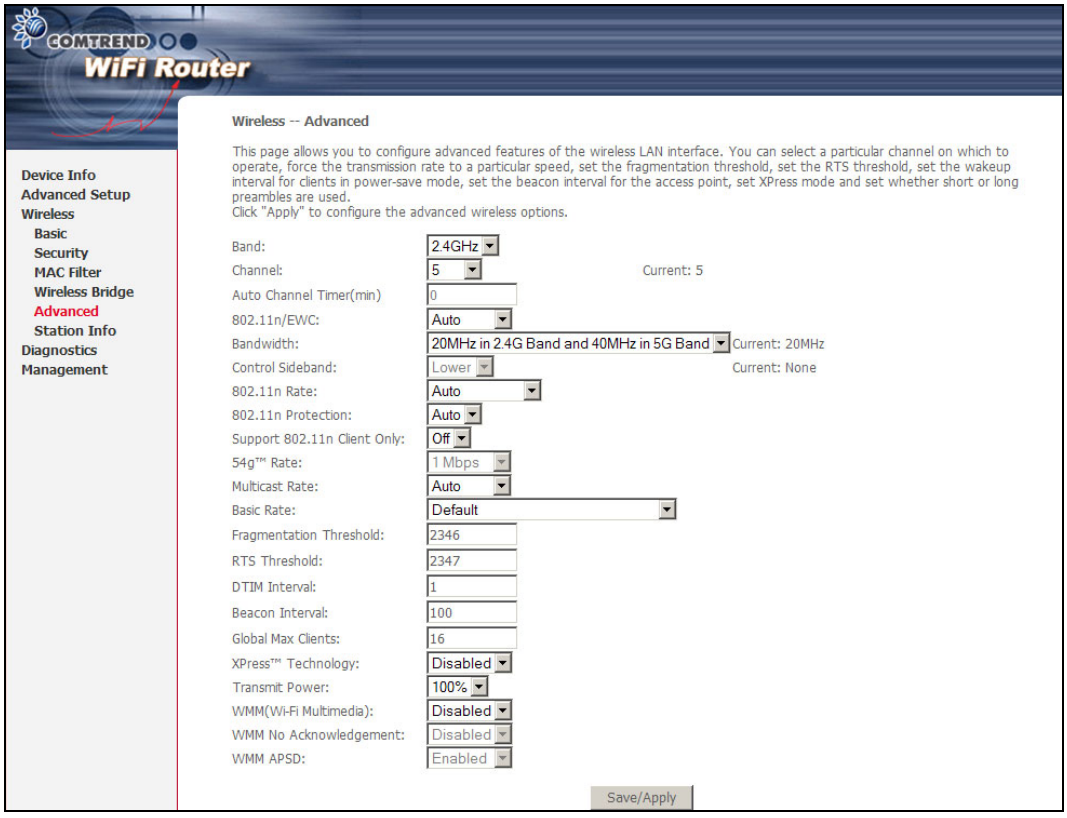
Click **Save/Apply** to implement new configuration settings.

Feature	Description
AP Mode	Selecting **Wireless Bridge** (aka Wireless Distribution System) disables Access Point (AP) functionality, while selecting **Access Point** enables AP functionality. In **Access Point** mode, wireless bridge functionality will still be available and wireless stations will be able to associate to the AP.

Feature	Description
Bridge Restrict	Selecting **Disabled** disables wireless bridge restriction, which means that any wireless bridge will be granted access. Selecting **Enabled** or **Enabled (Scan)** enables wireless bridge restriction. Only those bridges selected in the Remote Bridges list will be granted access. Click **Refresh** to update the station list when Bridge Restrict is enabled.

6.5 Advanced

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



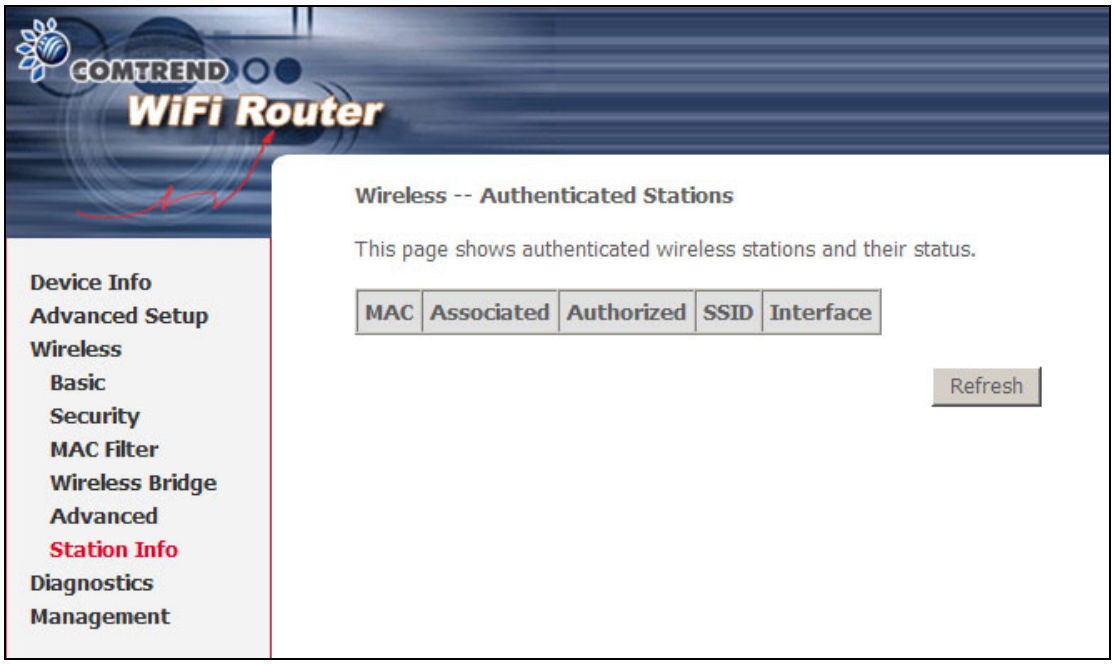
Field	Description
Band	Set to 2.4 GHz for compatibility with IEEE 802.11x standards. The new amendment allows IEEE 802.11n units to fall back to slower speeds so that legacy IEEE 802.11x devices can coexist in the same network. IEEE 802.11g creates data-rate parity at 2.4 GHz with the IEEE 802.11a standard,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

Field	Description
Auto Channel Timer (min)	Auto channel scan timer in minutes (0 to disable)
802.11n/EWC	An equipment interoperability standard setting based on IEEE 802.11n Draft 2.0 and Enhanced Wireless Consortium (EWC)
Bandwidth	Select 20GHz or 40GHz bandwidth. 40GHz bandwidth uses two adjacent 20GHz bands for increased data throughput.
Control Sideband	Select Upper or Lower sideband when in 40GHz mode.
802.11n Rate	Set the physical transmission rate (PHY).
802.11n Protection	Turn Off for maximized throughput. Turn On for greater security.
Support 802.11n Client Only	Turn Off to allow 802.11b/g clients access to the router. Turn On to prohibit 802.11b/g clients access to the router.
54g Rate	Drop-down menu that specifies the following fixed rates: Auto: Default. Uses the 11 Mbps data rate when possible but drops to lower rates when necessary. 1 Mbps, 2Mbps, 5.5Mbps, or 11Mbps fixed rates. The appropriate setting is dependent on signal strength.
Multicast Rate	Setting for multicast packet transmit rate (1-54 Mbps)
Basic Rate	Setting basic transmission rate.
Fragmentation Threshold	A threshold, specified in bytes, that determines whether packets will be fragmented and at what size. On an 802.11 WLAN, packets that exceed the fragmentation threshold are fragmented, i.e., split into, smaller units suitable for the circuit size. Packets smaller than the specified fragmentation threshold value are not fragmented. Enter a value between 256 and 2346. If you experience a high packet error rate, try to slightly increase your Fragmentation Threshold. The value should remain at its default setting of 2346. Setting the Fragmentation Threshold too low may result in poor performance.
RTS Threshold	Request to Send, when set in bytes, specifies the packet size beyond which the WLAN Card invokes its RTS/CTS mechanism. Packets that exceed the specified RTS threshold trigger the RTS/CTS mechanism. The NIC transmits smaller packet without using RTS/CTS. The default setting of 2347 (maximum length) disables RTS Threshold.
DTIM Interval	Delivery Traffic Indication Message (DTIM) is also known as Beacon Rate. The entry range is a value between 1 and 65535. A DTIM is a countdown variable that informs clients of the next window for listening to broadcast and multicast messages. When the AP has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value. AP Clients hear the beacons and awaken to receive the broadcast and multicast messages. The default is 1.

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

6.6 Station Info

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



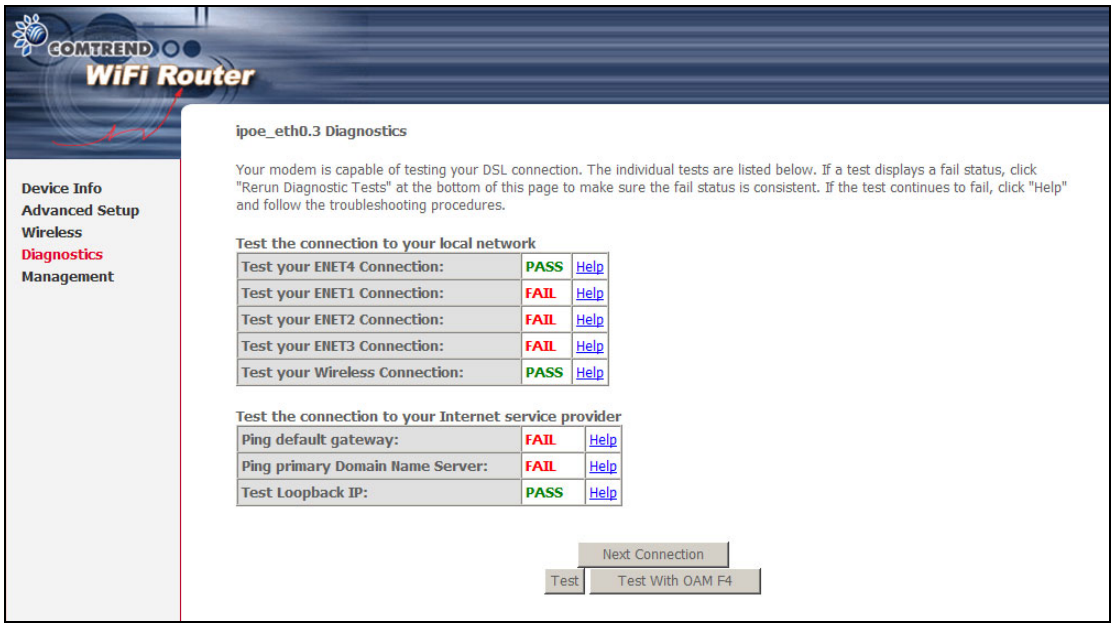
Consult the table below for descriptions of each column heading.

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

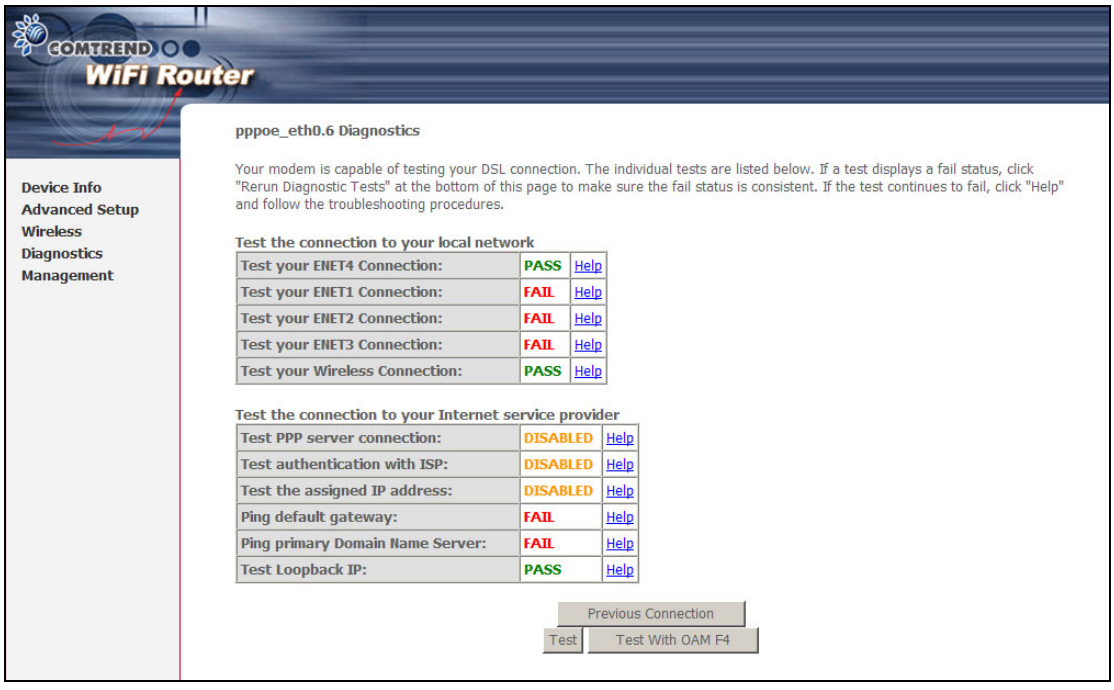
Chapter 7 Diagnostics

Diagnostics screens for IPoW and PPPoE connection types are shown below.

IPoW Connection



PPPoE Connection



The Diagnostics menu provides feedback on the connection status of the WAP-5813n. If a test displays a fail status, click the **Test** button to retest and confirm the error. If the test continues to fail, click Help and follow the troubleshooting procedures provided.

Chapter 8 Management

The Management menu has the following maintenance functions and processes:

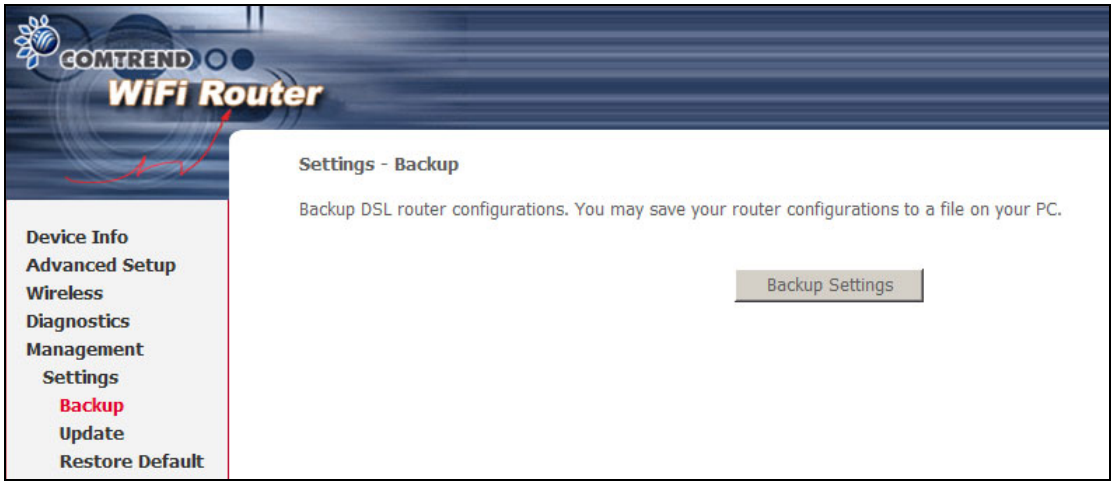
8.1 Settings	8.2 System Log
8.3 TR-069 Client	8.4 Internet Time
8.5 Access Control	8.6 Update Software
8.7 Save and Reboot	

8.1 Settings

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

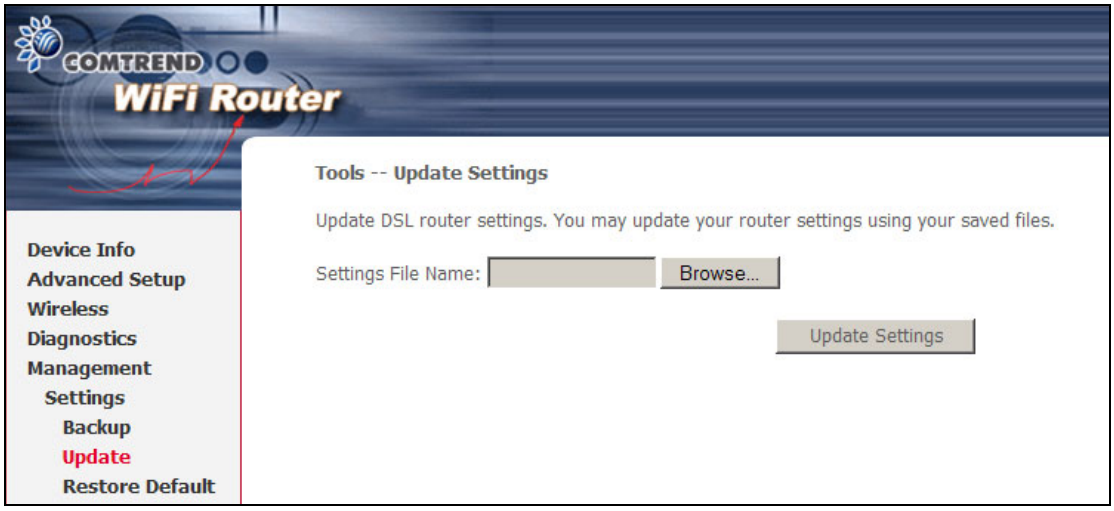
8.1.1 Backup Settings

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



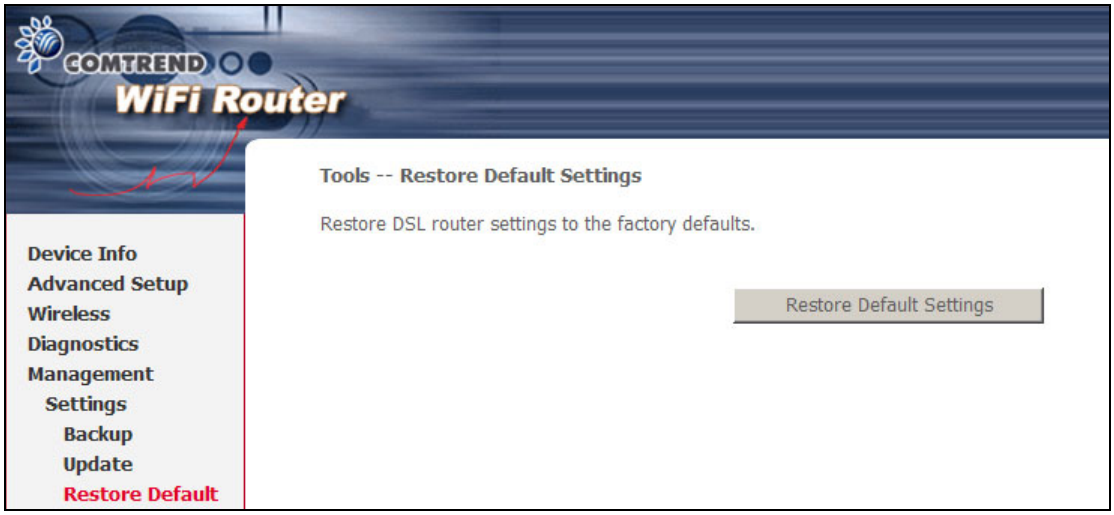
8.1.2 Update Settings

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

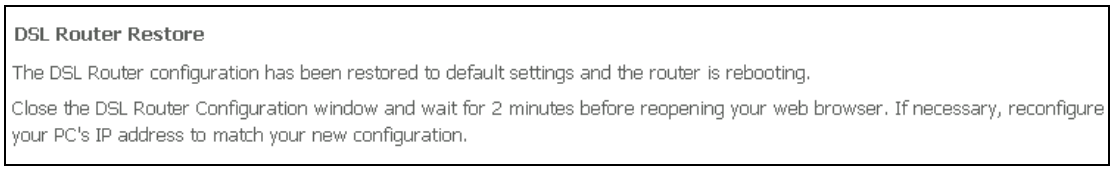


8.1.3 Restore Default

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



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



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

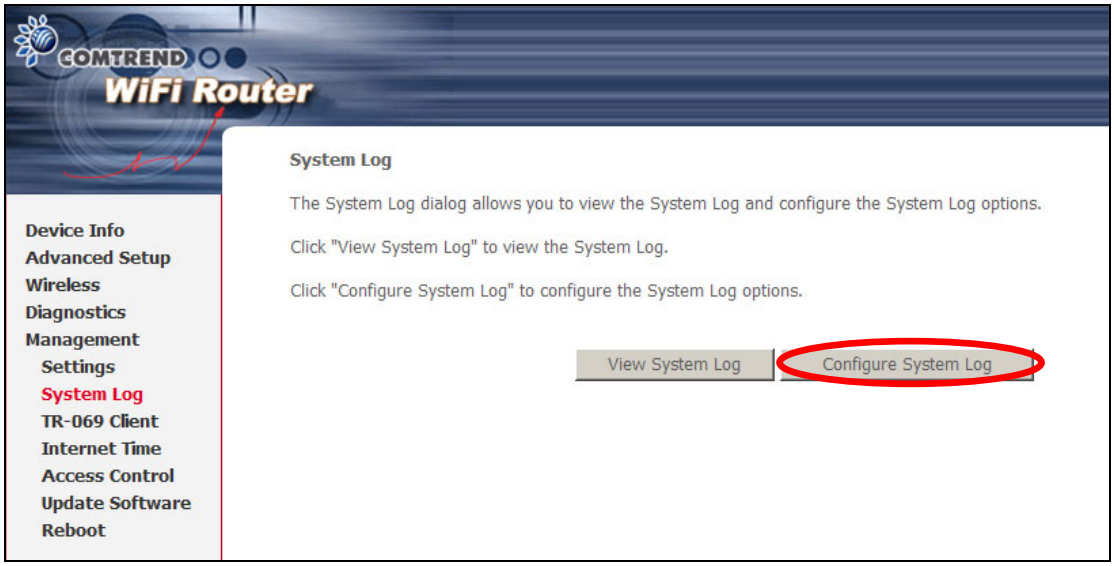
NOTE:	This entry has the same effect as the **Reset** button. The WAP-5813n board hardware and the boot loader support the reset to default. If the **Reset** button is continuously pressed for more than 5 seconds, the boot loader will erase the configuration data saved in flash memory.

8.2 System Log

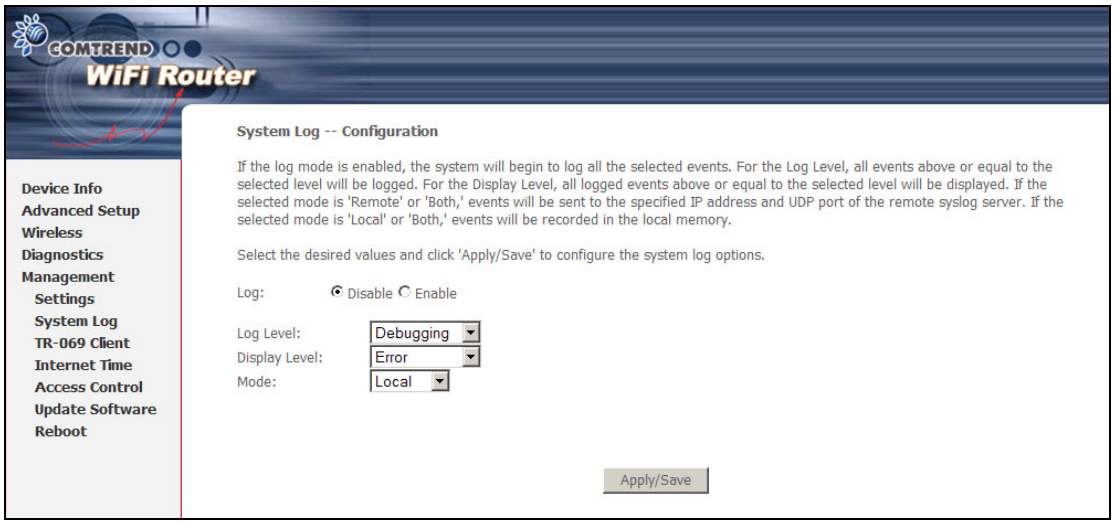
This function allows a system log to be kept and viewed upon request.

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

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



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

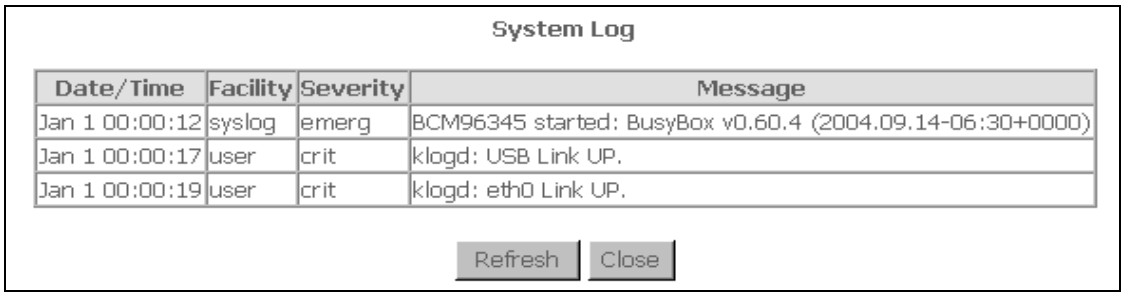


Consult the table below for detailed descriptions of each system log option.

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

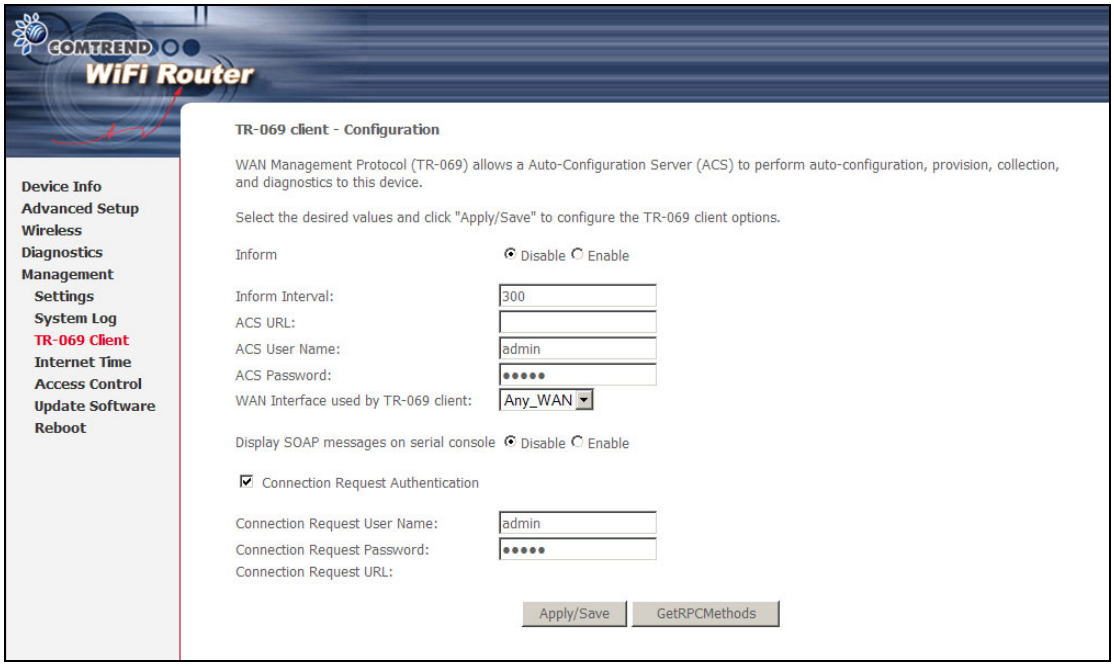
Option	Description
Log Level	Allows you to configure the event level and filter out unwanted events below this level. The events ranging from the highest critical level "Emergency" down to this configured level will be recorded to the log buffer on the WAP-5813n SDRAM. When the log buffer is full, the newer event will wrap up to the top of the log buffer and overwrite the old event. By default, the log level is "Debugging", which is the lowest critical level. The log levels are defined as follows: • Emergency = system is unusable • Alert = action must be taken immediately • Critical = critical conditions • Error = Error conditions • Warning = normal but significant condition • Notice= normal but insignificant condition • Informational= provides information for reference • Debugging = debug-level messages Emergency is the most serious event level, whereas Debugging is the least important. For instance, if the log level is set to Debugging, all the events from the lowest Debugging level to the most critical level Emergency level will be recorded. If the log level is set to Error, only Error and the level above will be logged.
Display Level	Allows the user to select the logged events and displays on the **View System Log** window for events of this level and above to the highest Emergency level.
Mode	Allows you to specify whether events should be stored in the local memory, or be sent to a remote system log server, or both simultaneously. If remote mode is selected, view system log will not be able to display events saved in the remote system log server. When either Remote mode or Both mode is configured, the WEB UI will prompt the user to enter the Server IP address and Server UDP port.

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



8.3 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.

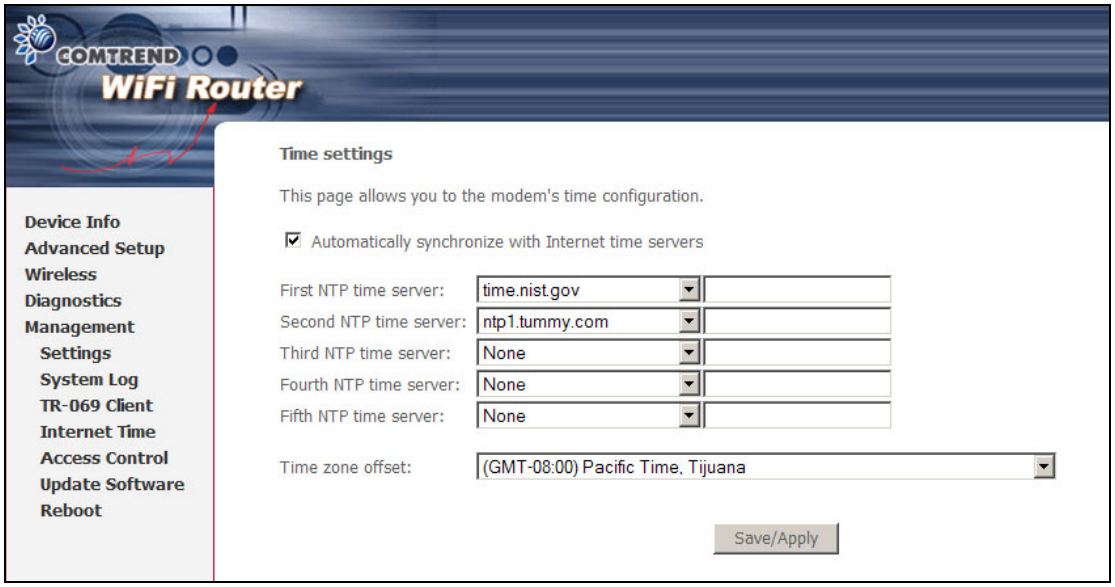


Option	Description
Inform	Disable/Enable TR-069 client on the CPE.
Inform Interval	The duration in seconds of the interval for which the CPE MUST attempt to connect with the ACS and call the Inform method.
ACS URL	URL for the CPE to connect to the ACS using the CPE WAN Management Protocol. This parameter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

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

8.4 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 **Save/Apply**.



NOTE: Internet Time must be activated to use Parental Control (page 31). In addition, this menu item is not displayed when in Bridge mode since the router would not be able to connect to the NTP timeserver.

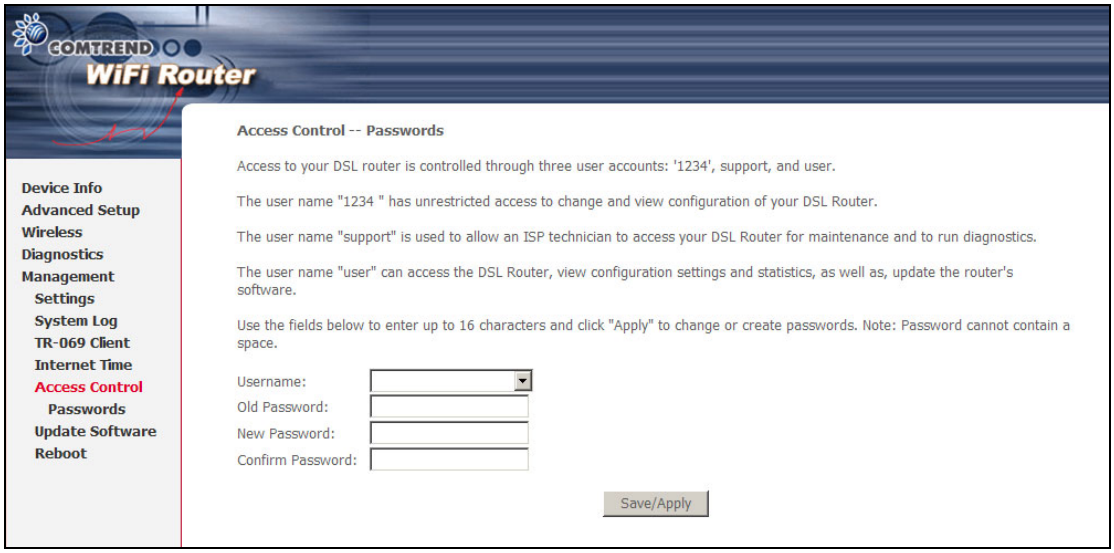
8.5 Access Control

8.5.1 Passwords

This screen is used to configure the user account access passwords for the device. Access to the WAP-5813n is controlled through the following three user accounts:

- **1234** - this has unrestricted access to change and view the configuration.
- **support** - used for remote maintenance and diagnostics of the router
- **user** - this has limited access. This account can view configuration settings and statistics, as well as, update the router firmware.

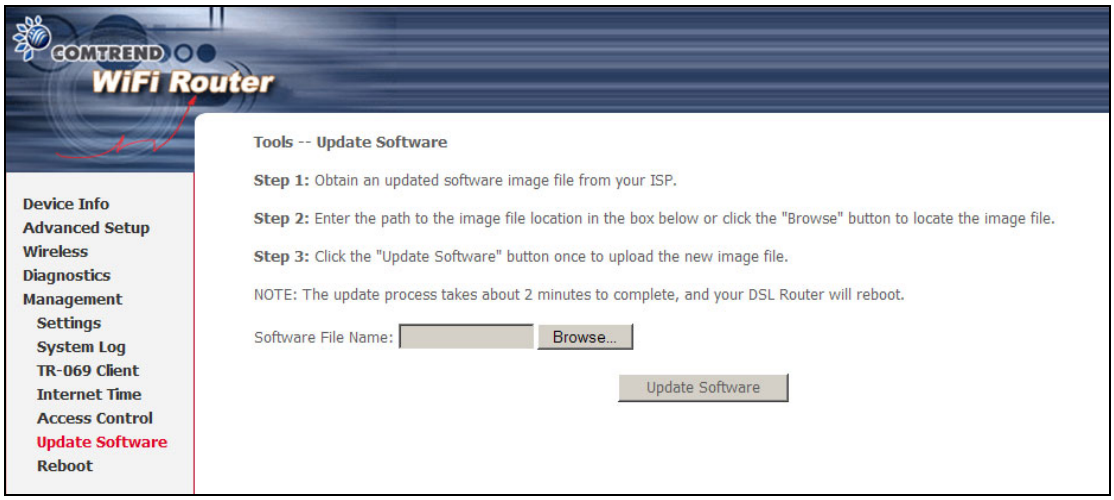
Use the fields below to change password settings. Click **Save/Apply** to continue.



NOTE: Passwords must be 16 characters or less.

8.6 Update Software

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



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

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

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

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

8.7 Save and Reboot

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

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

Appendix A – Firewall

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

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

TCP/IP/PORT/INTERFACE FILTER
These rules help in the filtering of traffic at the Network layer (i.e. Layer 3). When a Routing interface is created, **Enable Firewall** must be checked. Navigate to Advanced Setup → 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 WAP-5813n, as per chosen days of the week and the chosen times.

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

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

Appendix B – Pin Assignments

ETHERNET Ports (RJ45)

Pin	Definition	Pin	Definition
1	Transmit data+	5	NC
2	Transmit data-	6	Receive data-
3	Receive data+	7	NC
4	NC	8	NC

Appendix C – Specifications

Hardware Interface

RJ-45 X 1 for WAN (Giga Ethernet), RJ-45 X 4 for LAN (Giga Ethernet), WPS Button X 1, Power Switch X 1, Wi-Fi On/Off Button X 1, Reset Button X 1

LAN Interface

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

WLAN Interface

Standard ..... IEEE802.11n (IEEE802.11b/g compatible)
Encryption..... 64/128-bit Wired Equivalent Privacy (WEP)
Channels..... 11 (US, Canada)/ 13 (Europe)/ 14 (Japan)
Data Rate ..... Up to 300Mbps
WPA/WPA2..... Yes
IEEE 802.1x ..... Yes
WMM..... Yes
WPS..... Yes
MAC Filtering ..... Yes
Optional..... Afterburner mode (Turbo mode)***

Management

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

Routing Functions

PPPoE, IPoA, Static route, RIP v1/v2, NAT/PAT, DMZ, DHCP Server/Relay/Client, DNS Proxy, ARP, IGMP Proxy

Security Functions

Authentication protocol : PAP, CHAP
Port Triggering/Forwarding, Packet and MAC address filtering, DoS Protection, SSH, VPN

Application Passthrough

PPTP, L2TP, IPSec, VoIP, Yahoo messenger, ICQ, RealPlayer, NetMeeting, MSN, X-box

Power Supply..... Input: 100 - 240 Vac
Output: 12 Vdc / 1.0 A

Environment Condition

Operating temperature..... 0 ~ 50 degrees Celsius
Relative humidity ..... 5 ~ 95% (non-condensing)

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

Kit Weight

(1*WAP-5813n, 1*RJ45 cable, 1*power adapter, 1*CD-ROM) = 1.0 kg

Certifications ..... CE 0197,CE

NOTE: Specifications are subject to change without notice

Appendix D – SSH Client

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

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

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

To access the router using the Linux ssh client

For LAN access, type: ssh -l root 192.168.1.1

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

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

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

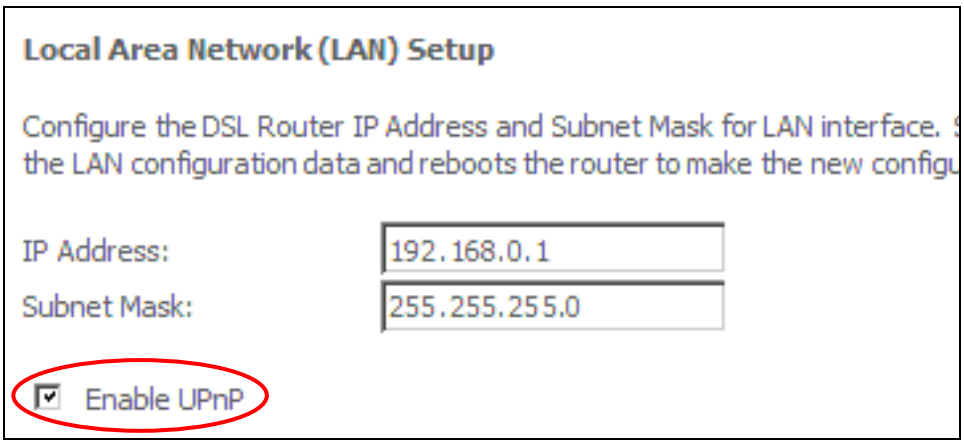
For WAN access, type: putty -ssh -l support *WAN IP address*

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

Appendix E – WSC External Registrar

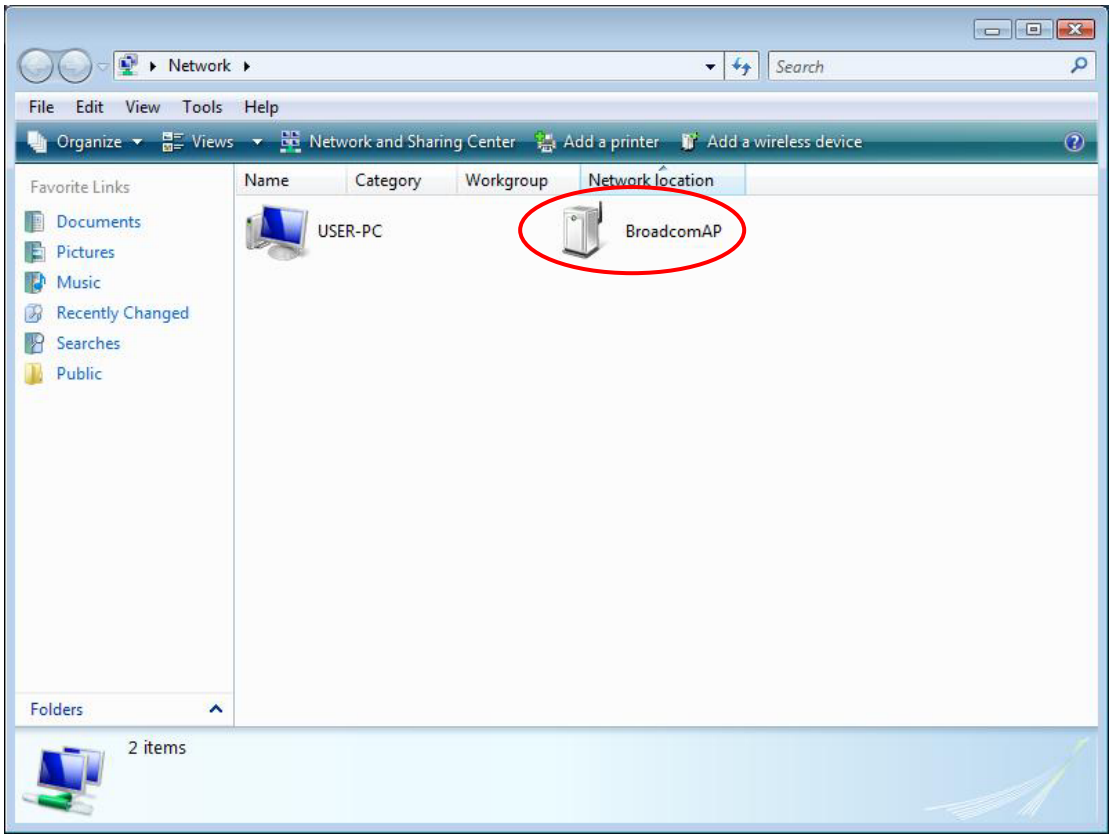
Follow these steps to add an external registrar using the web user interface (WUI) on a personal computer running the Windows Vista operating system:

Step 1: Enable UPnP on the Advanced Setup → LAN screen in the WUI.

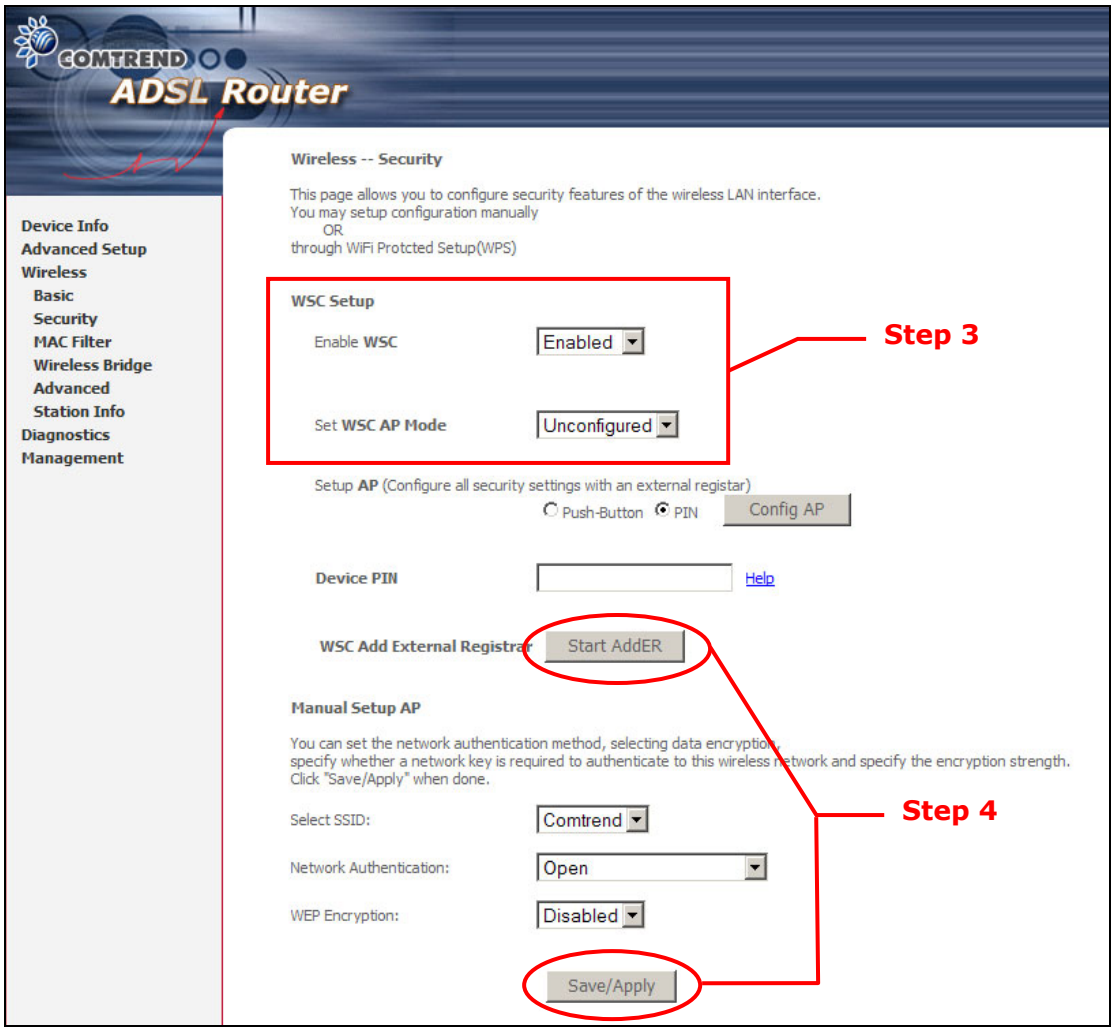


NOTE: A PVC must exist to see this option.

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

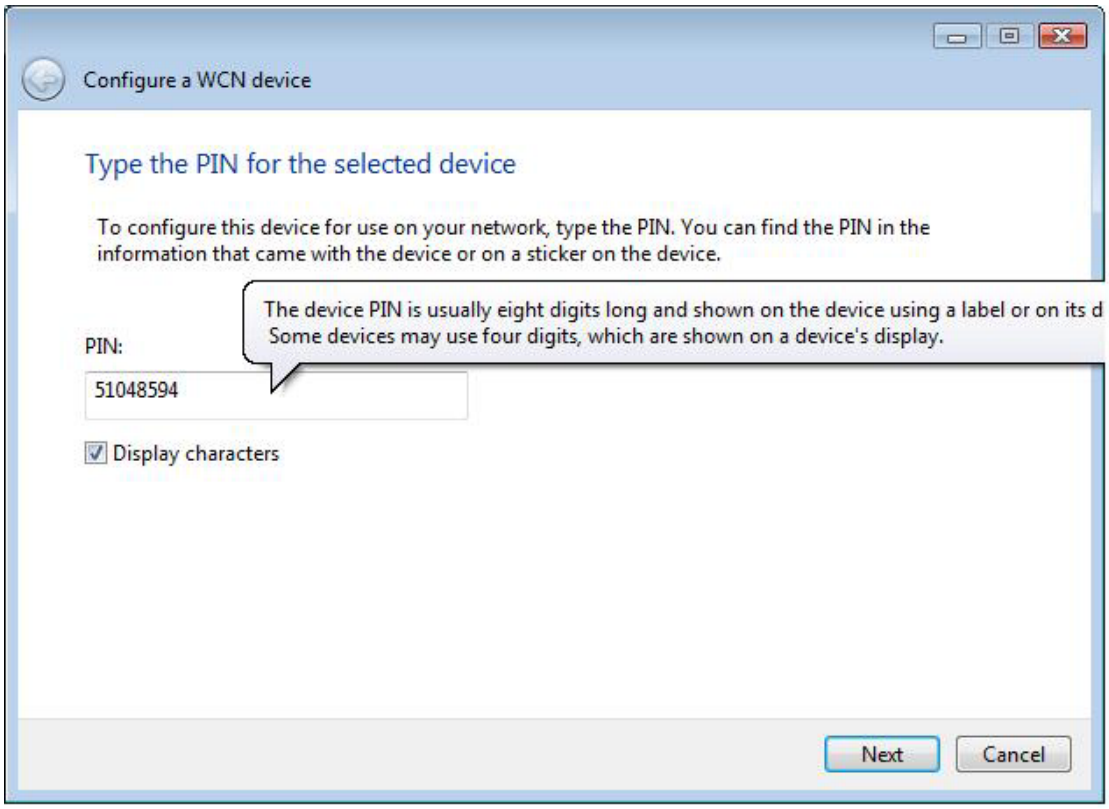


Step 3: On the Wireless → Security screen, enable WSC by selecting **Enabled** from the drop down list box and set the WSC AP Mode to Unconfigured.

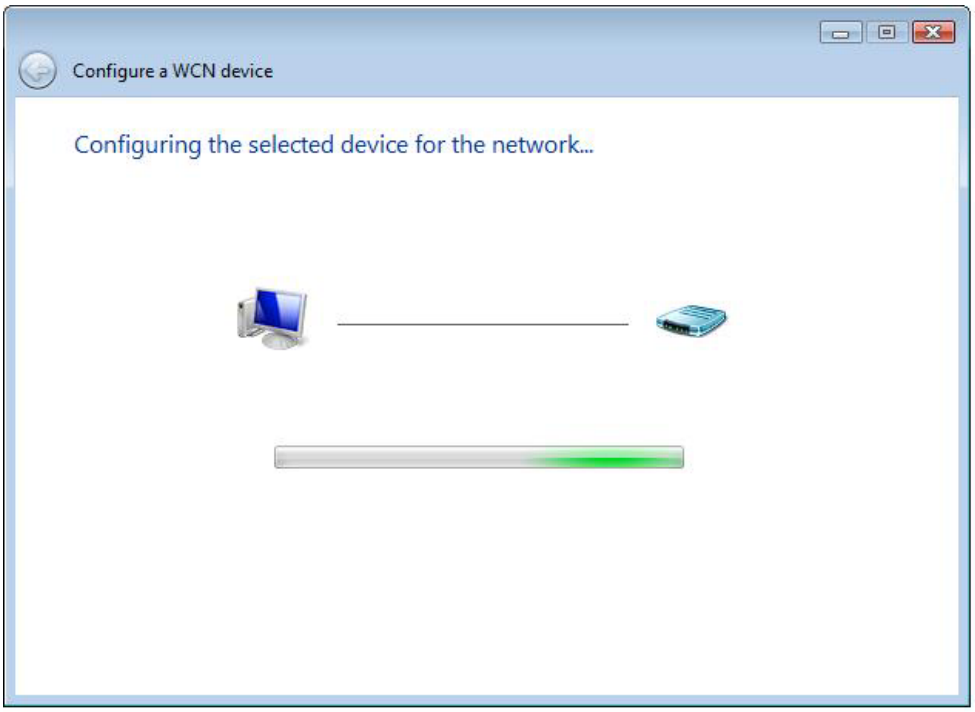


Step 4: Click the **Save/Apply** button at the bottom of the screen. The screen will go blank while the router applies the new Wireless settings. When the screen returns, press the **Start AddER** button, as shown above.

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



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



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