Ubee DDW3612 Wireless Cable Modem Gateway

Firmware Version: 8.9.1002

Subscriber User Guide

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Contents

1 Introduction

Welcome to the Ubee family of data networking products. This guide is specific to the **DDW3612 Wireless Cable Modem Gateway**. This document serves the following purposes:

- ❑ To define all relevant device compliance standards and physical specifications.
- ❑ To provide user level instructions and explain device features.
- ❑ To provide installation instructions and troublehsooting information.

1.1 Device Overview

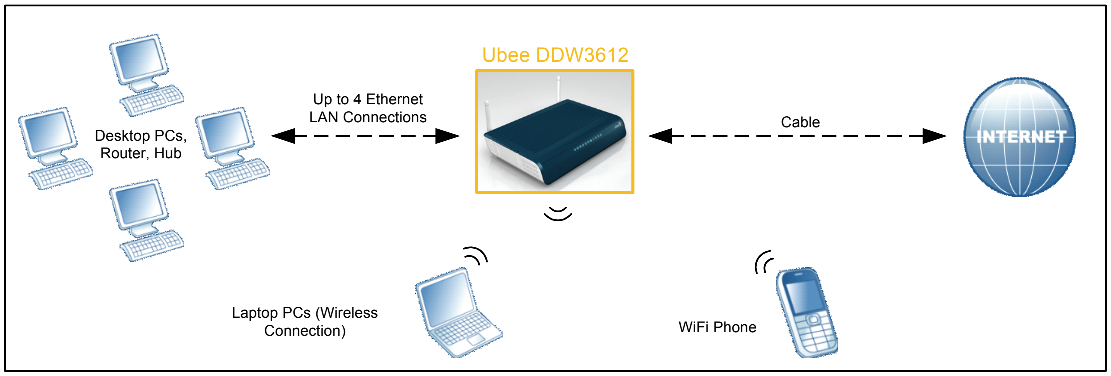
This section contains the following subsections:

- ❑ Application Diagram (p. 2).
- ❑ Physical Specifications, Standards, Firmware Operations (p. 2).
- ❑ Default Values (p. 4).
- ❑ LED Operational Summary (p. 5).

Note: Some features described in this document may not be fully tested and supported in your specific firmware release version. Where possible, features supported only by specific versions are indicated in this document. See the Release Notes/Letter of Operational Considerations accompanying your firmware for further details.

1.1.1 Application Diagram

The following graphic depicts the general connection topology and use of the DDW3612.


Ubee DDW3612
Up to 4 Ethernet LAN Connections
Desktop PCs, Router, Hub
Cable
INTERNET
Laptop PCs (Wireless Connection)
WiFi Phone

1.1.2 Physical Specifications, Standards, Firmware Operations

The following list provides the features and specifications of the DDW3612 Wireless Cable Modem Gateway.

Interfaces

- Cable: F-Connector, Female
- LAN: 4 10/100/1000 Mbps RJ-45 Ports
- USB: 1 USB 2.0 Port

Standards/Certifications

- DOCSIS 3.0/Euro DOCSIS 3.0 Certified
- DOCSIS/Euro DOCSIS 1.0/1.1/2.0 Certified
- CE/ FCC Class B

Downstream*

- Maximum Data Rate per Channel (up to 8 channels):
- DOCSIS = 30 Mbps (64 QAM), 42 Mbps (256 QAM), EuroDOCSIS = 41 Mbps (64 QAM), 55 Mbps (256 QAM)
- Total Max Bandwidth (8 Channels): DOCSIS = 343 (304) Mbps, EuroDOCSIS 444 (400) Mbps
- Symbol Rate: 6952 Ksps

- ❑ RF Input Power: -15 to +15dBmV (64 QAM), -15 to +15dBmV (256 QAM)
- ❑ Input Impedance: 75 Ω

Upstream*

- ❑ Frequency Range: 5MHz ~ 65MHz
- ❑ Modulation A-TDMA: QPSK, 8, 16, 32, 64QAM, S-CMDA: QPSK, 8, 16, 32, 64, 128QAM
- ❑ Max B/W of 4 Channels = 122.88 (108) Mbps, B/W Per Channel (up to 4 channels) = [QPSK 0.32 ~ 10.24 Mbps, 8 QAM 0.48 ~ 15.36 Mbps, 16 QAM 0.64 ~ 20.48 Mbps, 32 QAM 0.80 ~ 25.60 Mbps, 64 QAM 0.96 ~ 30.72 Mbps, 128 QAM/TCM 30.72 Mbps]
- ❑ Symbol Rate: 160, 320, 640, 1280, 2560, 5120 Ksps
- ❑ RF Output Power: TDMA/ATDMA: +8dBmV to +54dBmV (32/64 QAM). ATDMA Only: +8dBmV to +55dBmV (8/16 QAM), +8dBmV to +58dBmV (QPSK). S-CDMA: +8dBmV to +53dBmV (all modulations)

*Actual speeds can vary based on factors including network configuration and speed.

Security

- ❑ VPN Pass-Through (IPSec/L2TP/PPTP)
- ❑ NAT Firewall, MAC/IP/Port Filtering, Parental Control
- ❑ Stateful Packet Inspection (SPI), DoS Attack Protection
- ❑ WPS/ WPA/ WPA2/ WPA-PSK& 64/128-bit WEP Encryption
- ❑ TACACS or RADIUS Authentication

Wireless and Network

- ❑ Supports 4 SSIDs, 802.11b/g/n compliant with speeds up to 300 Mbps
- ❑ DHCP Client/Server / Static IP network assignment
- ❑ RIPv1/ v2
- ❑ Ethernet 10/100/1000 BaseT / full-duplex auto-negotiate functionality, IPv4 to IPv6 support.

Device Management

- ❑ Customer premises equipment (CPE)
- ❑ Supports IEEE 802.11e Wi-Fi Multimedia (WMM) and UAPSD (power savings)
- ❑ Web-Based Configuration
- ❑ Telnet Remote Management
- ❑ Secure Firmware Upgrade via TFTP
- ❑ Configuration Backup and Restore
- ❑ SNMP Support
- ❑ Interoperability with main CMTS products

Physical and Environmental

- ❑ Dimensions: 172.2(W) x 254(D) x 42(H) mm
- ❑ Weight: 500 g
- ❑ Power: 12V/1.5A

- ☐ Operating Temperature: 0°C ~ 40°C
- ☐ Humidity: 5~90% (non-condensing)

1.1.3 Default Values

This device is pre-configured with the following parameters:

Local Port Address: 192.168.0.1, Web Interface: http://192.168.0.1

Operation Mode: NAT Mode (WAN setting)

Subnet Mask: 255.255.255.0

Wireless Defaults:

- ☐ **Primary SSID** (subscriber-managed) = DDW3612 plus last 2 characters of the cable modem's MAC Address (UPPER case, if letters).
  Example: **`DDW3612BE`**

  Note: If the subscriber changes the SSID, the device does not revert to this default SSID upon any reset of the device, except in the case of a manual reset to restore factory default settings. The device **MAC address** can be found on the device label, or refer to Cable Modem - Information (p. 12).

- ☐ **WPA Pre-shared Key** = DDW3612 plus the last 6 characters (3 octets) of the cable modem's MAC address.
  Example: `DDW3612`**`7CD4BE`**

- ☐ **WPS PIN** = 12345670

- ☐ **Device Nam**e = UbeeAP

Web Interface Logins (also used for telnet access):

Standard User/Consumer Web Interface Login:

Username: user

Password: user

1.1.4 LED Operational Summary

The following table describes what the device LEDs indicate.

LED Position			LED1	LED2	LED3	LED4	LED5	LED6	LED7	LED8	LED9	LED10	LED11
LED Color			Green	Green/ Blue	Green/ Blue	Green/ Blue	Green/ Blue	Green	Green	Green	Green/ Blue	Green/ Blue	Green
LED Label:			USB Host	Eth-4	Eth-3	Eth-2	Eth-1	WPS	Wi-Fi	Online	US	DS	Power
CM Initialization	1	Power ON	On	On	On	On	On	Off	Off	On	On	On	On
	2	Load Image	Off	On, if connects	On, if connects	On, if connects	On, if connects	Off	Off	Off	Off	Off	Off
	3	H/W Check	Off	On, if connects	On, if connects	On, if connects	On, if connects	Off	On	Flash	Flash	Flash	On
	4	DS Locked and Sync OK	Off	On, if connects	On, if connects	On, if connects	On, if connects	Off	On	Flash	Flash	1) On, Blue with channel bonding 2) On, Green without channel bonding	On
	5	US Ranging	Off	On, if connects	On, if connects	On, if connects	On, if connects	Off	On	Flash	Flash	1) On, Blue with channel bonding 2) On, Green without channel bonding	On
	6	US Ranging OK	Off	On, if connects	On, if connects	On, if connects	On, if connects	Off	On	Flash	1) On, Blue with channel bonding 2) On, Green without channel bonding	1) On, Blue with channel bonding 2) On, Green without channel bonding	On
	7	Registration OK	Off	On, if connects	On, if connects	On, if connects	On, if connects	Off	On	On	1) On, Blue with channel bonding 2) On, Green without channel bonding	1) On, Blue with channel bonding 2) On, Green without channel bonding	On
	8	NACO Enable (network access)	Off	On, if connects	On, if connects	On, if connects	On, if connects	Off	On	On	1) On, Blue with channel bonding 2) On, Green without channel bonding	1) On, Blue with channel bonding 2) On, Green without channel bonding	On
	9	NACO Disable	Off	On, if connects	On, if connects	On, if connects	On, if connects	Off	On	Off	1) On, Blue with channel bonding 2) On, Green without channel bonding	1) On, Blue with channel bonding 2) On, Green without channel bonding	On
CM Operation	1	Attached CPE	On Green	On Green, if connect, Blue if speed linked at 1000 mbps (gibabit ethernet)	On, if connect, Blue (same as explained to left).	On, if connects, Blue (same as explained to left).	On, if connects, Blue (same as explained to left).	On	On	On	1) On, Blue with channel bonding 2) On, Green without channel bonding	1) On, Blue with channel bonding 2) On, Green without channel bonding	On
	2	CPE Data Tx/Rx	Flash	Flash, if connects		Flash, if connects	Flash, if connects	Flash	Flash	On	1) On, Blue with channel bonding 2) On, Green without channel bonding	1) On, Blue with channel bonding 2) On, Green without channel bonding	On

2 Installation Instructions

This chapter explains how to setup the device and access the web interface for the DDW3612 Wireless Cable Modem Gateway.

2.1 Complete Prerequisite Tasks/Connect the Device

Complete the following tasks to install the DDW3612 Wireless Cable Modem Gateway and access the web interface.

Important: Subscribers must contact their service provider to enable internet access. Typically, the service provider initially connects and configures the device. These steps are also provided below. If you wish to confirm the setup, or add devices to your network, refer to “Validate Connectivity/Connect Devices to the Network” on page 10.

- ❑ Remove all contents from the device packaging.
- ❑ Have a Windows PC available and powered on. The Windows PC must have an ethernet network adapter/ethernet port. The PC must also have an internet browser installed (Netscape or Internet Explorer).
- ❑ Connect the power adapter that is included with the product package to the DDW3612 Wireless Cable Modem Gateway and to the power outlet. Do not use any other power adapter except the one included with the product package.
- ❑ Connect a coaxial cable to the cable wall outlet. Connect the other end to the Cable/RF port on the back of the cable modem.
- ❑ Connect one end of a network cable to your computer’s Ethernet port. Connect the other end to one of the LAN ports on the cable modem.

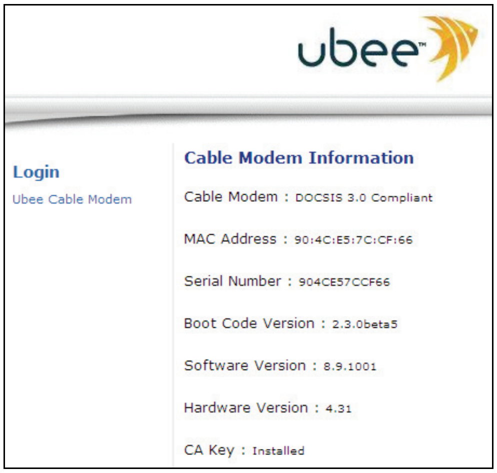
2.2 Access the Web Interface

Use the following procedure to access the web interface using Internet Explorer from a Windows computer.

1. From the computer, launch an internet browser (Internet Explorer or Netscape).
2. In the internet browser, enter the following address and press <**Enter/Return**>:

```
http://192.168.0.1
```

3. The Cable Modem Information Screen displays key information about the device.



Cable Modem Information

Cable Modem : DOCSIS 3.0 Compliant

MAC Address : 90:4C:E5:7C:CF:66

Serial Number : 904CE57CCF66

Boot Code Version : 2.3.0beta5

Software Version : 8.9.1001

Hardware Version : 4.31

CA Key : Installed

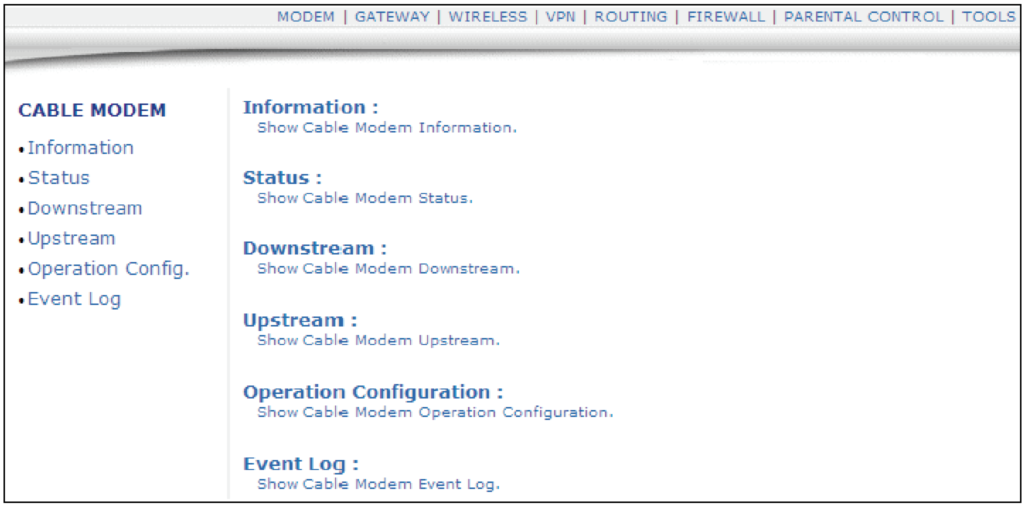
4. Click **Ubee Cable Modem** under **Login** to the left side of the screen to access the web interface.

5. At the login window, enter the user credentials:

   ❑ **Standard User/Consumer - Web Interface Login**:
   Username: user
   Password: user

6. Click **OK** and the web interface is displayed.

Note: The username and password must be entered in lower case letters.



Information :
Show Cable Modem Information.

Status :
Show Cable Modem Status.

Downstream :
Show Cable Modem Downstream.

Upstream :
Show Cable Modem Upstream.

Operation Configuration :
Show Cable Modem Operation Configuration.

Event Log :
Show Cable Modem Event Log.

7. Accessing the web interface is an initial way to validate the installation. No extra steps are required at this point for a basic LAN and/or wireless network.

8. Proceed to page 10 to test network connectivity and/or to add both Ethernet LAN

devices and wireless devices to the network.

Note: The web interface allows you to customize the configurations and capabilities the device. For full explanation of all web interface functions, refer to page 12.

2.3 Validate Connectivity/Connect Devices to the Network

To confirm network/internet operations, or to connect an **Ethernet** device to the network (for example, a computer, gaming console, etc.), do the following:

1. Make sure the Ethernet device (computer, gaming console) to add to the network is connected to the cable modem and powered on. Refer to page 7, if needed.
2. Use the device LEDs to confirm operations. The PWR, DS, US, Online, and Wifi LEDs are solidly lit in normal operations, as is the LAN LEDs that have devices connected to their associated ports. Refer to “LED Operational Summary” on page 5 for more detailed information.
3. Open a web browser and go to any web site to validate network connectivity (for example, http://www.wikipedia.org).
4. If the connected device is a gaming console, perform any online task supported by the console (for example, log into gaming server, play online game, download content, etc.).
5. Refer to page 11 for troubleshooting information if needed.

2.3.1 Connect/Validate Wireless Clients

To confirm operations or to connect wireless devices to the network (for example, a laptop computer), do the following:

1. Use the device LEDs to confirm operations. The WiFi LED must be solidly lit. The PWR, DS, US, and Online LEDs are also solidly lit in normal operations. Refer to “LED Operational Summary” on page 5 for more detailed information.
2. Connect a wireless device to the cable modem (for example, a laptop computer). Use the following steps:
   - ❑ **Access the wireless networking feature on your wireless device**. On a Windows computer, for example, double-click the Wireless Networking icon in the system tray (lower-right side of the Windows desktop).
   - ❑ **Click View Wireless Networks**. The device is shipped with a default SSID. The SSID is the name of the wireless network broadcast from the device so that wireless clients can connect to it.
3. **Double-click your SSID in the wireless networks window**.
   The default SSID = **DDW3612** plus the **last 2 characters of the cable modem’s MAC Address** (UPPER case, if letters). Refer to the device’s bottom label to view the MAC address or refer to “Cable Modem - Information” on page 12.

   Example: `DDW3612BE`

   Note: If the subscriber changes the SSID, the device does not revert to this default SSID upon any reset of the device, except in the case of a manual reset to restore factory default settings. The device **MAC address** can be found on the device label, or refer to “Cable Modem - Information” on page 12.

4. **When prompted, enter the Network Key**.
   The Network Key = **DDW3612** plus the **last 6 characters (3 octets) of the cable modem's MAC address** (upper or lower case).
   Example: `DDW3612`**`7CD4BE`**

   The device **MAC address** can be found on the device label, or refer to "Cable Modem - Information" on page 12.

5. Confirm connectivity by opening a web browser and going to any web site (for example, http://www.wikipedia.org).

Note: If having wireless issues or questions, refer to "Wireless Network Deployment and Troubleshooting" on page 52.

2.3.2 Additional Troubleshooting Information

Use the following tips for troubleshooting the installation.

- ❑ None of the LEDs are on when I power on the Wireless LAN Cable Modem.
  - ❑ Check the connection between the power adapter and the cable modem. Power off cable modem and wait for 5 seconds and power on the modem again. If the problem still exists, there may have a hardware problem.
- ❑ The Ethernet 1, 2, 3, or 4 LED on the cable modem is not lit.
  - ❑ Try restarting the computer so that is could re-establish a connection with the cable modem.
  - ❑ Check for a resource conflict (Windows users only). To do this: (1) Right-click on the My Computer icon on your desktop and choose Properties. (2) Click the Device Manager tab and look for a yellow exclamation point or red X over the NIC in the Network Adapters field. If you see either one, you may have an IRQ conflict. Refer to the manufacturers documentation or you cable service provider for further assistance.
  - ❑ Verify that TCP/IP is the default protocol for your network interface card (NIC).
  - ❑ Power cycle the cable modem by removing the power adapter from the electrical outlet and plugging it back in. Wait several minutes for the cable modem to re-establish communications with your cable service provider.
- ❑ General Connectivity Issues:
  - ❑ If your PC is connected to a hub or gateway, try connecting the PC directly into an Ethernet port on the cable modem.
  - ❑ If you are using a cable splitter, try removing the splitter and connect the cable modem directly to the cable wall outlet. Wait several minutes for the cable modem to re-establish communications with the cable service provider.
  - ❑ The Ethernet cable may be damaged. Try another cable.
- ❑ If none of these suggestions work, contact your cable service provider for further assistance.

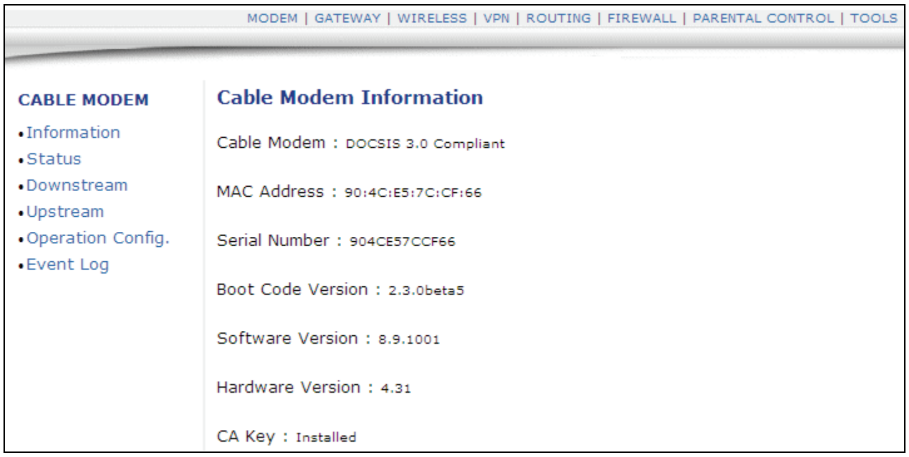
3 Web User Interface Instructions

This chapter explains how to use all web interface functions for the device.

3.1 Cable Modem - Information

This section explains how to use the **Information** screen of the web interface. The **Information** screen displays the device’s core software configuration.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Information** link from the left side of the screen. Field explanations are listed below the following screen example.


MODEM | GATEWAY | WIRELESS | VPN | ROUTING | FIREWALL | PARENTAL CONTROL | TOOLS
CABLE MODEM
•Information
•Status
•Downstream
•Upstream
•Operation Config.
•Event Log

Cable Modem Information

Cable Modem : DOCSIS 3.0 Compliant

MAC Address : 90:4C:E5:7C:CF:66

Serial Number : 904CE57CCF66

Boot Code Version : 2.3.0beta5

Software Version : 8.9.1001

Hardware Version : 4.31

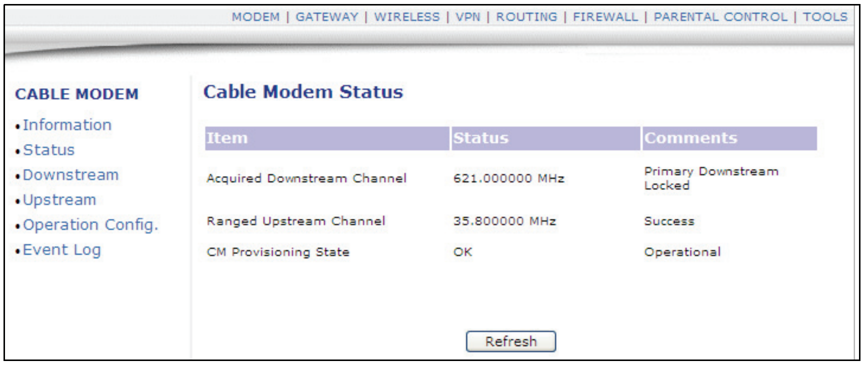
CA Key : Installed

Label	Description
Cable Modem	The current DOCSIS standard of the device.
MAC Address	The unique Media Access Control (MAC) hardware address of cable modem.
Serial Number	The unique manufacturer serial number of the device.
Boot Code Version	The boot software code version of the device.
Software Version	The general software version of the device.
Hardware Version	The internal version number that identifies the hardware design.
CA Key	The device installs a Certificate Authority (CA) key that is transferred from the service provider’s server after the cable modem is authenticated. The key is used to secure communication between the service provider and the cable modem.

3.2 Cable Modem - Status

This section explains how to use the **Status** screen of the web interface. The **Status** screen displays the device's general connection information.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Status** link from the left side of the screen. Field explanations are listed below the following screen example.



Cable Modem Status

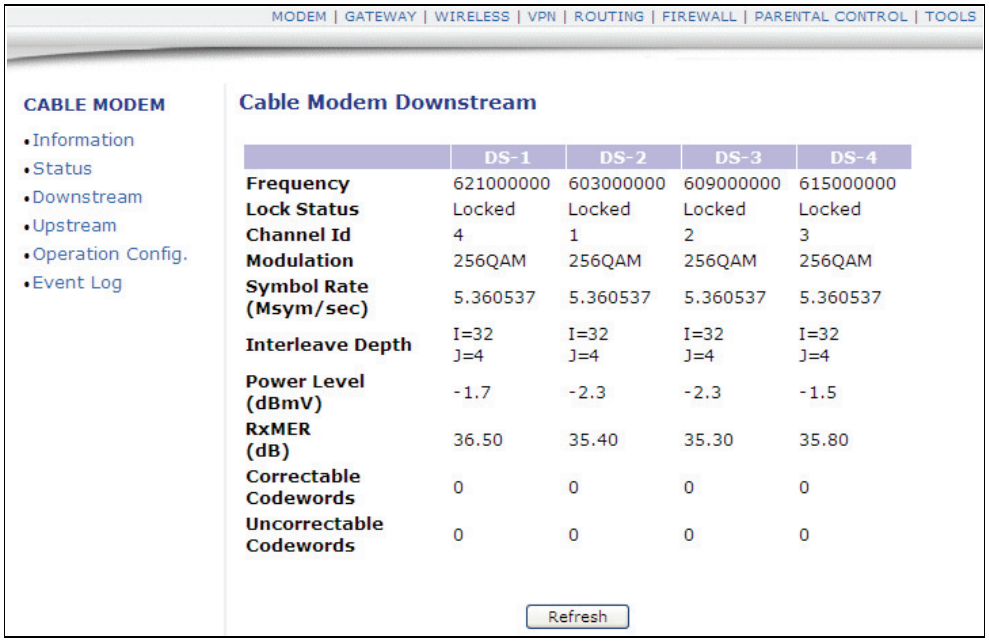
Item	Status	Comments
Acquired Downstream Channel	621.000000 MHz	Primary Downstream Locked
Ranged Upstream Channel	35.800000 MHz	Success
CM Provisioning State	OK	Operational

Label	Description
Acquired Downstream Channel	Displays a Downstream channel that the cable modem is trying to lock to and the progress.
Ranged Upstream Channel	Displays an Upstream channel that the device is trying to range with and the progress.
CM Provisioning State	After the physical initialization, the cable modem will be configured by a DHCP server from the service provider. Once the cable modem obtains an IP address, the cable modem's status is OK. The Status column also shows the connection progress. The Comments column displays the messages indicating connection error information, if errors occur.
Refresh	Click to refresh the status information.

3.3 Cable Modem - Downstream

This section explains how to use the **Downstream** screen of the web interface. The **Downstream** screen displays detailed information on the device's connection to downstream channels from the service provider.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Downstream** link from the left side of the screen. Field explanations are listed below the following screen example.



Cable Modem Downstream

	DS-1	DS-2	DS-3	DS-4
Frequency	621000000	603000000	609000000	615000000
Lock Status	Locked	Locked	Locked	Locked
Channel Id	4	1	2	3
Modulation	256QAM	256QAM	256QAM	256QAM
Symbol Rate (Msym/sec)	5.360537	5.360537	5.360537	5.360537

Interleave Depth	I=32
	J=4
		I=32
		J=4
			I=32
			J=4
				I=32
				J=4

Power Level (dBmV)	-1.7	-2.3	-2.3	-1.5
RxMER (dB)	36.50	35.40	35.30	35.80
Correctable Codewords	0	0	0	0
Uncorrectable Codewords	0	0	0	0

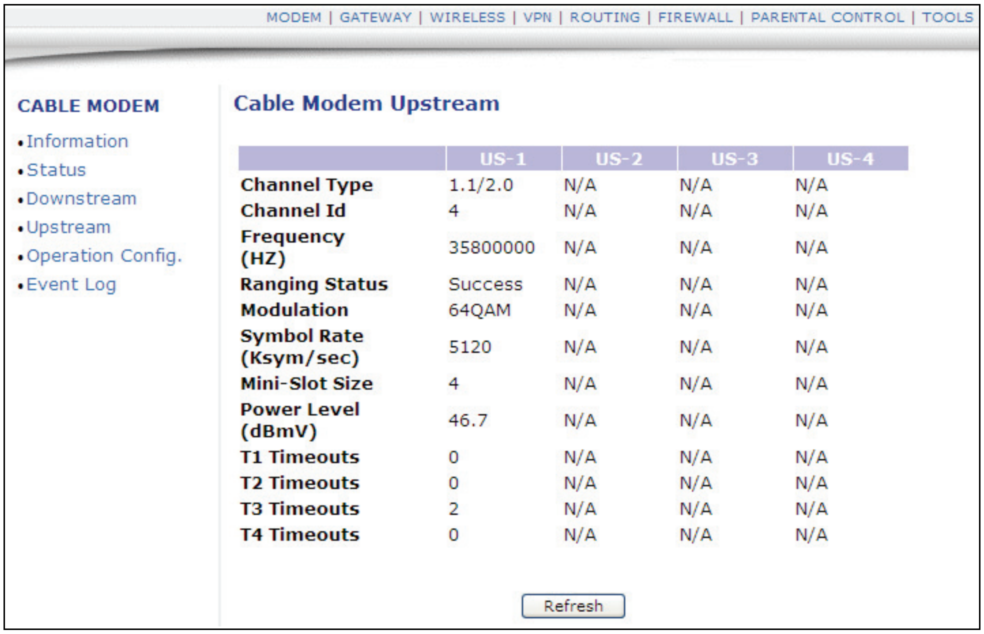
Label	Description
Frequency	Displays the downstream channel frequency on which the cable modem is scanning.
Lock Status	Displays if the cable modem succeeded in locking to a downstream channel.
Channel ID	Displays the downstream channel ID.
Modulation	Displays the modulation method that's required for the downstream channel to lock on to by the cable modem. This method is determined by the service provider.
Symbol Rate	Displays the symbol rate. The current cable modem downstream symbol rates are: QAM64 is 5056941 sym/sec, QAM256 is 5360537 sym/sec.
Interleave Depth	Displays the current cable modem downstream Interleave depth (4/8/16/32/64/128/other).
Power Level	Displays the receiver power level after ranging process.

Label	Description
RxMER	The Receiver Modulation Error Ratio is used to quantify the performance of a digital radio receiver in a communications system using digital modulation.
Correctable Codewords	Displays the quantity of codewords which are correctable.
Uncorrectable Codewords	Displays the quantity of codewords which are not correctable.

3.4 Cable Modem - Upstream

This section explains how to use the **Upstream** screen of the web interface. The **Upstream** screen displays detailed information on the device's connection to upstream channels to the service provider.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Upstream** link from the left side of the screen. Field explanations are listed below the following screen example.



Cable Modem Upstream

	US-1	US-2	US-3	US-4
Channel Type	1.1/2.0	N/A	N/A	N/A
Channel Id	4	N/A	N/A	N/A
Frequency (HZ)	35800000	N/A	N/A	N/A
Ranging Status	Success	N/A	N/A	N/A
Modulation	64QAM	N/A	N/A	N/A
Symbol Rate (Ksym/sec)	5120	N/A	N/A	N/A
Mini-Slot Size	4	N/A	N/A	N/A
Power Level (dBmV)	46.7	N/A	N/A	N/A
T1 Timeouts	0	N/A	N/A	N/A
T2 Timeouts	0	N/A	N/A	N/A
T3 Timeouts	2	N/A	N/A	N/A
T4 Timeouts	0	N/A	N/A	N/A

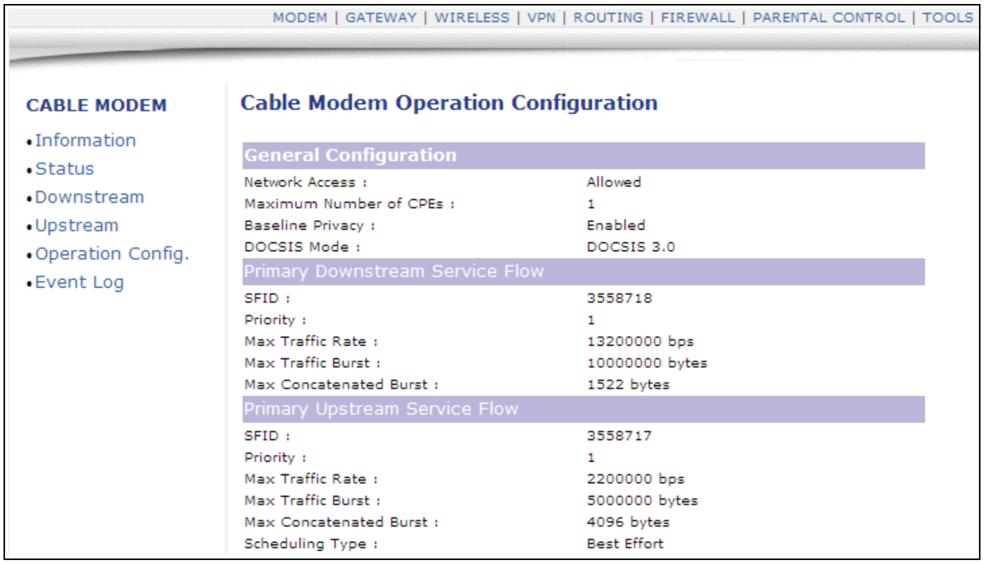
Label	Description
US-1 to US-4	Upstream Channels.
Channel Type	Displays the channel type.
Channel ID	Displays the current cable modem upstream channel ID.
Frequency	Displays the current cable modem upstream frequency (Hz).
Ranging Status	Displays the upstream ranging status.

Label	Description
Modulation	Displays the current cable modem upstream modulation type (QPSK/ QAM8 /QAM16/ QAM32/ QAM64/ QAM128/ QAM256).
Symbol Rate	Displays the symbol rate (Ksym/sec).
Upstream Mini-Slot Size	Displays the current cable modem upstream mini-slot size in Timebase Ticks of 6.25.
Power Level	Displays the current cable modem upstream transmit power (dBmV).
T-1 through T-4 Timeouts	T-1-Displays DHCP time expiration, T-2-Displays DHCP time expiration, T-3-Displays RNG-RSP time expiration, T-4-Displays RNG time expiration.

3.5 Cable Modem - Operation Config

This section explains how to use the **Operation Config** screen of the web interface. The **Operation Config** screen displays general information on the device's active operational capabilities.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Operation Config** link from the left side of the screen. Field explanations are listed below the following screen example.



Cable Modem Operation Configuration

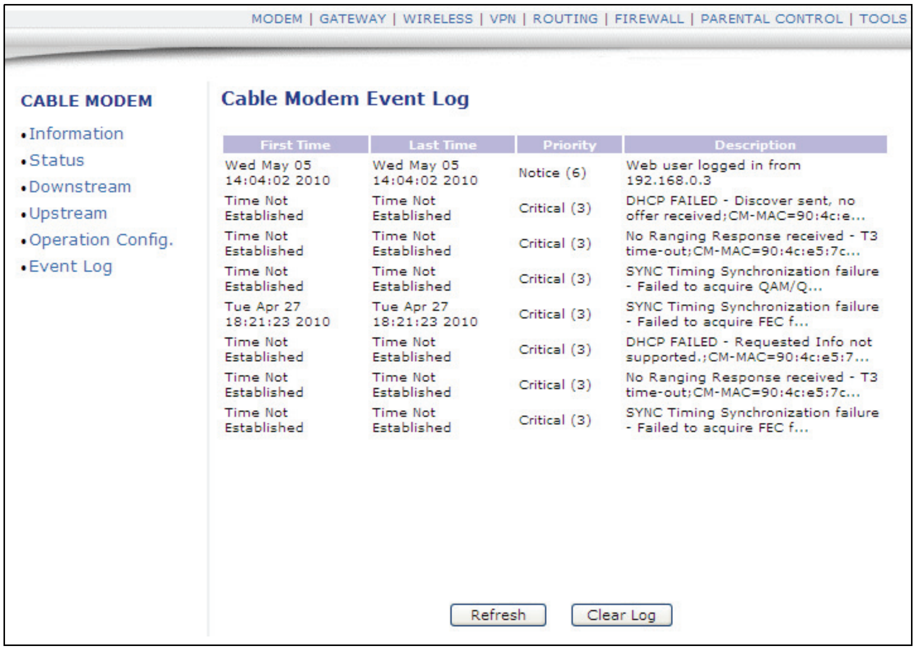
General Configuration	
Network Access :	Allowed
Maximum Number of CPEs :	1
Baseline Privacy :	Enabled
DOCSIS Mode :	DOCSIS 3.0
Primary Downstream Service Flow	
SFID :	3558718
Priority :	1
Max Traffic Rate :	13200000 bps
Max Traffic Burst :	10000000 bytes
Max Concatenated Burst :	1522 bytes
Primary Upstream Service Flow	
SFID :	3558717
Priority :	1
Max Traffic Rate :	2200000 bps
Max Traffic Burst :	5000000 bytes
Max Concatenated Burst :	4096 bytes
Scheduling Type :	Best Effort

Label	Description
Network Access	Displays the status of cable modem, Denied means no connectivity is established. Allowed means connectivity is established to Internet.
Maximum Number of CPEs	Displays the maximum number of Ethernet devices that can be connected (LAN side) to access the network/internet at the same time.
Baseline Privacy	Displays highlighted device configurations, like PHS Enabled and the other examples shown in the screen example.
DOCSIS Mode	Displays the DOCSIS version used in the device.
Primary Downstream Service Flow	
SFID	Displays the frequency ID of the downstream service flow.
Priority	Displays the use priority of the frequency ID.
Max Traffic Rate	Displays the max data rate as enabled by the service provider.
Max Traffic Burst	Displays the max data rate as enabled by the service provider for downstream data bursts.
Max Concatenated Burst	Displays the max data rate per downstream burst.
Primary Upstream Service Flow	
SFID	Displays the frequency ID of the upstream service flow
Priority	Displays the use priority of the frequency ID.
Max Traffic Rate	Displays the max data rate as enabled by the service provider.
Max Traffic Burst	Displays the max data rate as enabled by the service provider for upstream data bursts.
Min Traffic Rate	Displays the minimum data rate as enabled by the service provider.
Max Concatenated Burst	Displays the max data rate per upstream burst.
Scheduling Type	Displays the data scheduling type.

3.6 Cable Modem - Event Log

This section explains how to use the **Event Log** screen of the web interface. The **Event Log** screen displays log information that may be useful to diagnose operational issues with the device.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Event Log** link from the left side of the screen. Field explanations are listed below the following screen example.



Cable Modem Event Log

First Time	Last Time	Priority	Description
Wed May 05 14:04:02 2010	Wed May 05 14:04:02 2010	Notice (6)	Web user logged in from 192.168.0.3
Time Not Established	Time Not Established	Critical (3)	DHCP FAILED - Discover sent, no offer received;CM-MAC=90:4c:e...
Time Not Established	Time Not Established	Critical (3)	No Ranging Response received - T3 time-out;CM-MAC=90:4c:e5:7c...
Time Not Established	Time Not Established	Critical (3)	SYNC Timing Synchronization failure - Failed to acquire QAM/Q...
Tue Apr 27 18:21:23 2010	Tue Apr 27 18:21:23 2010	Critical (3)	SYNC Timing Synchronization failure - Failed to acquire FEC f...
Time Not Established	Time Not Established	Critical (3)	DHCP FAILED - Requested Info not supported.;CM-MAC=90:4c:e5:7...
Time Not Established	Time Not Established	Critical (3)	No Ranging Response received - T3 time-out;CM-MAC=90:4c:e5:7c...
Time Not Established	Time Not Established	Critical (3)	SYNC Timing Synchronization failure - Failed to acquire FEC f...

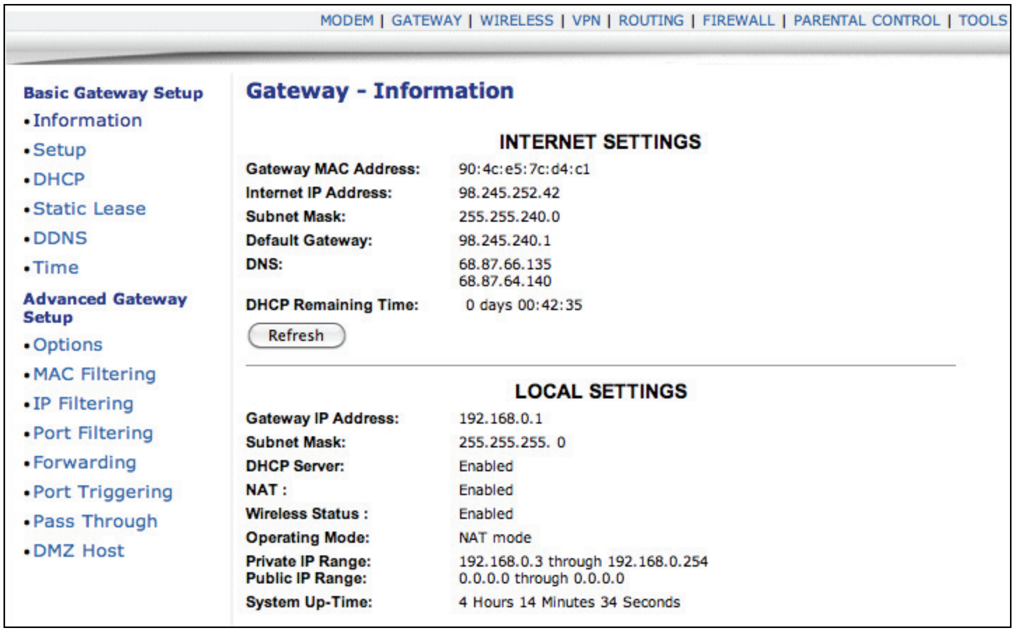
Label	Description
First Time	Displays the time of the event.
Last Time	Displays the last time of the event.
Priority	Displays the event log severity.
Description	Displays a detailed description of the event log.
Refresh	Refreshes the event log record.

3.7 Gateway

This chapter explains how to use the **Gateway** functions of the web interface. The Gateway functions provide the majority of configuration for the device including WAN IP addresses, LAN IP addresses, DHCP, and DDNS. Also, advanced setting like DMZ, MAC filtering, and port forwarding are provided.

3.7.1 Gateway - Information

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen. Then select **Information**.
3. The **Information** fields are defined following this screen example.



Gateway - Information

INTERNET SETTINGS

Gateway MAC Address: 90:4c:e5:7c:d4:c1
Internet IP Address: 98.245.252.42
Subnet Mask: 255.255.240.0
Default Gateway: 98.245.240.1
DNS: 68.87.66.135
68.87.64.140
DHCP Remaining Time: 0 days 00:42:35

LOCAL SETTINGS

Gateway IP Address: 192.168.0.1
Subnet Mask: 255.255.255. 0
DHCP Server: Enabled
NAT : Enabled
Wireless Status : Enabled
Operating Mode: NAT mode
Private IP Range: 192.168.0.3 through 192.168.0.254
Public IP Range: 0.0.0.0 through 0.0.0.0
System Up-Time: 4 Hours 14 Minutes 34 Seconds

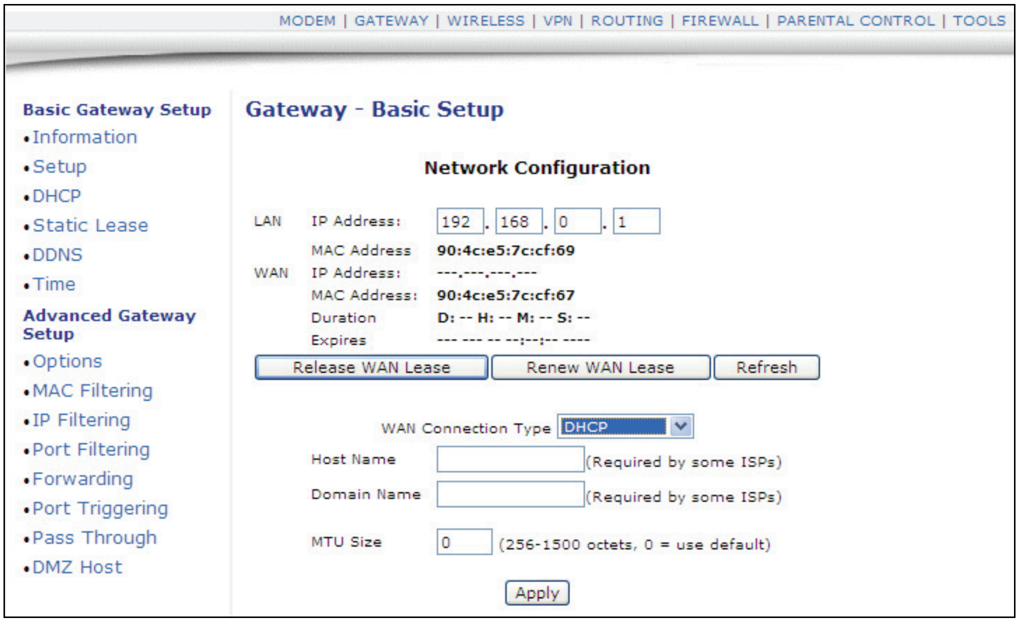
Label	Description
	Internet Settings
Gateway MAC Address	Displays the Media Access Control (MAC) address of the residential gateway.
Internet IP Address	Displays the Internet IP address obtained from the service provider.
Subnet Mask	Displays the subnet mask of the Internet IP address.
Default Gateway	Displays the default gateway IP address.
DNS	Displays the DNS server IP address.
DHCP Remaining Time	Displays the remaining DHCP lease time before expiration
Refresh	Click to refresh the information.

Label	Description
	Local Settings
Gateway IP Address	Displays the local IP address of the LAN interface.
Subnet Mask	Displays the subnet mask value.
DHCP Server	Displays the status of the DHCP sever feature (Enabled/Disabled).
NAT	Displays the status of the NAT feature (Enabled/Disabled).
Wireless Status	Displays the status of the wireless feature (Enabled/Disabled).
Operating Mode	Displays what mode the router is working in (Bridge, NAT, Router, or NAT Router). **Note**: Firewall menu options are not available when the device is in Bridge mode. Firewall options are available only when the device is in NAT, NATRoute, or Route modes.
Private IP Range	Displays the private IP address assigned to DHCP client.
Public IP DHCP Server Range	Displays the Public IP DHCP Server Range.
Public IP Total Range	Displays the Public IP DHCP Server Range.
System Up-Time	Displays the accumulated time since the last power cycle.

3.7.2 Gateway - Setup

The **Setup** option allows you to make basic configurations to the device.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **Setup** from the left side of the screen. The **Setup** fields are explained following this screen example.



Gateway - Basic Setup

Network Configuration

LAN IP Address: 192 . 168 . 0 . 1
MAC Address 90:4c:e5:7c:cf:69
WAN IP Address: ---.---.---.---
MAC Address: 90:4c:e5:7c:cf:67
Duration D: -- H: -- M: -- S: --
Expires --- --- -- --:--:-- ----

WAN Connection Type DHCP
Host Name (Required by some ISPs)
Domain Name (Required by some ISPs)
MTU Size 0 (256-1500 octets, 0 = use default)

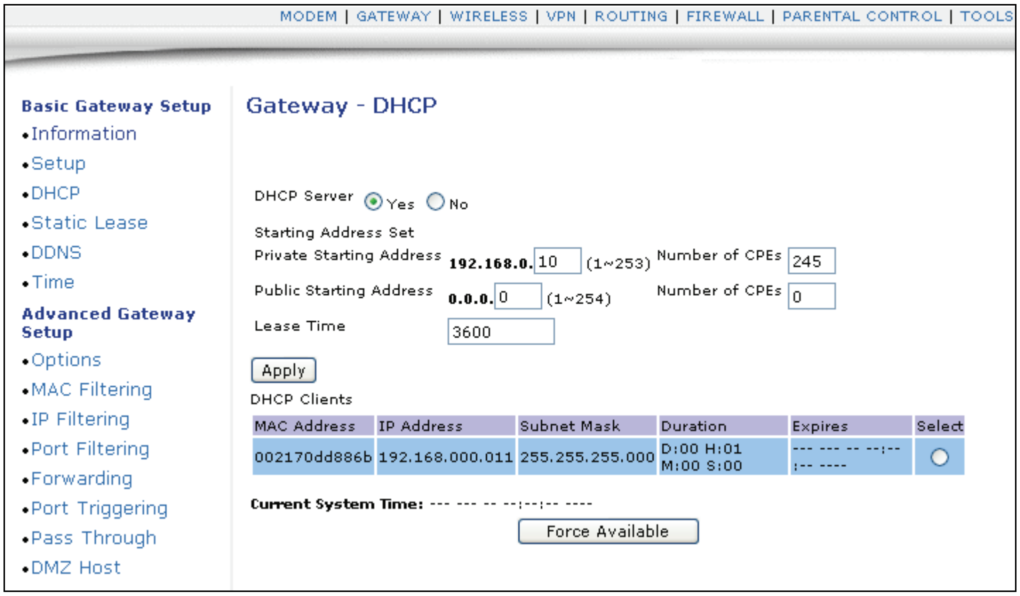
Label	Description
LAN IP Address	Defines the local IP address, which will be the default gateway address for all wired LAN hosts that connect to the DDW3612 Wireless Cable Modem Gateway.
LAN MAC Address	Displays the LAN interface’s hardware address.
WAN IP Address	Displays the current WAN public IP address that is obtained from the service provider.
WAN MAC Address	Displays the WAN interface’s hardware address.
Duration	Displays the accumulated time since successfully acquiring a WAN public IP address.
Expires	Displays the remaining time before the expiration of the WAN IP address, if applicable.
Release WAN Lease	Click to release the WAN public IP address.
Renew WAN Lease	Click to renew the WAN IP address.
Refresh	Click to refresh the status of this page.

Label	Description
WAN Connection Type	Select the WAN connection type. For each type, different data entry is required, as explained below: 1. DHCP: The WAN interface is set to be a DHCP client, and the IP address is assigned by the service provider's DHCP server. 2. Static IP: For Static IP, you must manually enter the IP address for the WAN interface. 3. PPTP (DHCP): For Point to Point Tunneling Protocol (PPTP), you must enter a username, password, and the PPTP server's IP address.
Host Name	Enter the host name for the router. This may be required by some service providers.
Domain Name	Enter the domain for the router. This may be required by some service providers.
MTU Size	Enter the Maximum Transmission Unit size, which defines the largest size of the packet or frame that the device can transfer (256-1500). If this is not given by the Service Provider, leave it as is using 0 for the default.
Apply	Click to save all changes made in the screen.

3.7.3 Gateway - DHCP

The **DHCP** option allows you to configure DHCP-specific behavior on the device.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **DHCP** from the left side of the screen. The **DHCP** fields are explained following this screen example.



Gateway - DHCP

DHCP Server ● Yes ○ No

Starting Address Set

Private Starting Address **192.168.0.** 10 (1~253) Number of CPEs 245

Public Starting Address **0.0.0.** 0 (1~254) Number of CPEs 0

Lease Time 3600

DHCP Clients

MAC Address	IP Address	Subnet Mask	Duration	Expires	Select
002170dd886b	192.168.000.011	255.255.255.000	D:00 H:01 M:00 S:00	--- --- -- --:-- :-- ----	○

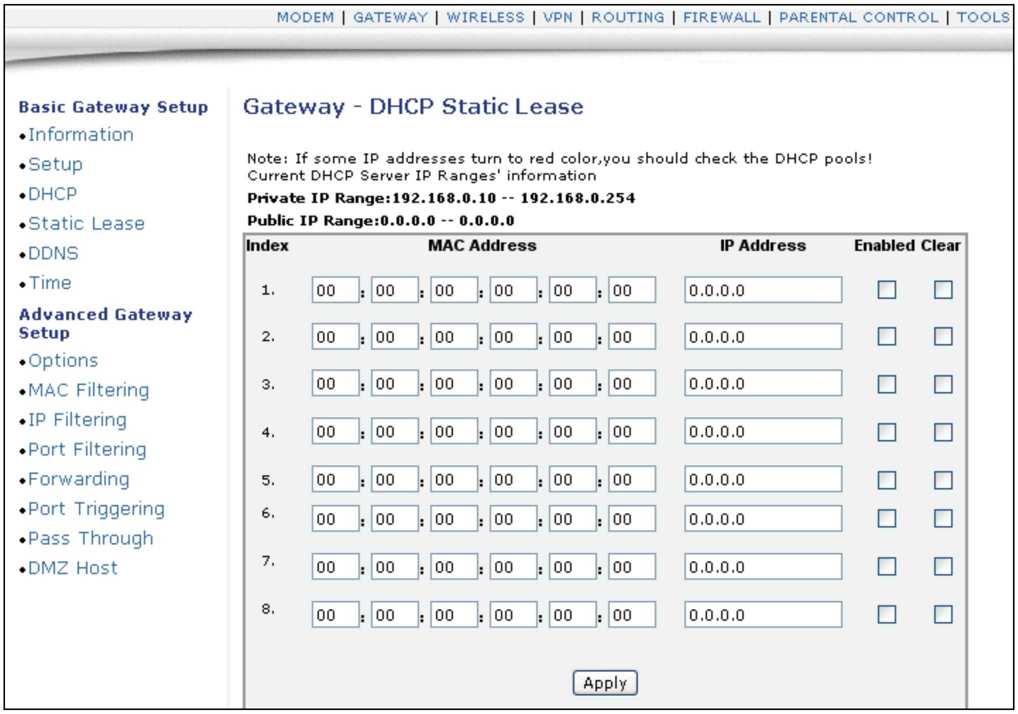
Current System Time: --- --- -- --:--:-- ----

Label	Description
DHCP Server	Select Yes to enable or No to disable DHCP on the device. If No is selected, all of the static DHCP rules in this screen are ignored.
Private Starting Address	Define the starting private IP address for the pool of IP addresses that may be used by connecting clients. Private addresses are translated to public IPs in order to be used on the network.
Public Starting Address	Define the starting public IP address. Public addresses can be recognized on the network.
Number of CPEs	Define the maximum number of Customer Premises equipment (CPE) that can connect to the network, via the DDW3612 Wireless Cable Modem Gateway.
Lease Time	Enter the time in minutes between 1 and 71582788. This field defines the DHCP lease time duration. A DHCP user's PC gets an IP address with a lease time. When the lease time expires, the PC must connect to the DHCP server and be reissued another, unused IP address.
DHCP Clients	This list to shows all DHCP clients currently connected to the wireless router, either via Ethernet link, or via wireless connection. Each client is also listed with the following information: ♦ MAC Address / IP Address / Subnet Mask ♦ Duration / Expires: Duration displays the accumulated time since the client acquired the IP address. Expires is the time until the IP expires and must be recycled. If the IP address is reserved to a certain host, it will show "STATIC IP ADDRESS." ♦ Select: Click the Select radio button to reserve the current private IP address to be assigned to this host statically.
Apply	Click Apply to save all changes.
Force Available	Click Force Available to activate a selected rule in the DHCP Clients List and assign IP addresses. Note: The Select checkbox must be clicked.

3.7.4 Gateway - Static Lease

The **Static Lease** option allows you to assign static IP addresses to clients on your network within a range.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **Static Lease** from the left side of the screen. The **Static Lease** fields are explained following this screen example.



Gateway - DHCP Static Lease

Note: If some IP addresses turn to red color,you should check the DHCP pools!
Current DHCP Server IP Ranges' information
Private IP Range:192.168.0.10 -- 192.168.0.254
Public IP Range:0.0.0.0 -- 0.0.0.0

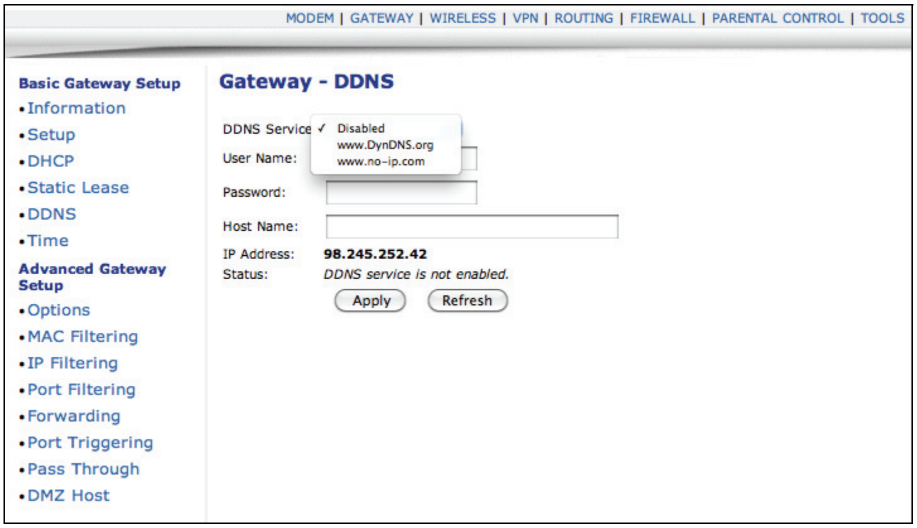
Index	MAC Address	IP Address	Enabled	Clear
1.	00 : 00 : 00 : 00 : 00 : 00	0.0.0.0	□	□
2.	00 : 00 : 00 : 00 : 00 : 00	0.0.0.0	□	□
3.	00 : 00 : 00 : 00 : 00 : 00	0.0.0.0	□	□
4.	00 : 00 : 00 : 00 : 00 : 00	0.0.0.0	□	□
5.	00 : 00 : 00 : 00 : 00 : 00	0.0.0.0	□	□
6.	00 : 00 : 00 : 00 : 00 : 00	0.0.0.0	□	□
7.	00 : 00 : 00 : 00 : 00 : 00	0.0.0.0	□	□
8.	00 : 00 : 00 : 00 : 00 : 00	0.0.0.0	□	□

Label	Description
Index	Index number of the each client that connects to your network.
MAC Address	This field is populated with the MAC address of the client that you may want to assign a static IP address to.
IP Address	Enter a specific IP address to assign to the specific client/host.
Enabled	Click Enabled to activate this rule.
Clear	Click Clear to delete the rule.
Apply	Click Apply to save all screen changes.

3.7.5 Gateway - DDNS

The Dynamic Domain Name Service (DDNS) option allows you to configure your registered Domain Name with a dynamic IP address.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **DDNS** from the left side of the screen. The **DDNS** fields are explained following this screen example.



Gateway - DDNS

DDNS Service ✓ Disabled
www.DynDNS.org
www.no-ip.com

User Name:

Password:

Host Name:

IP Address: 98.245.252.42

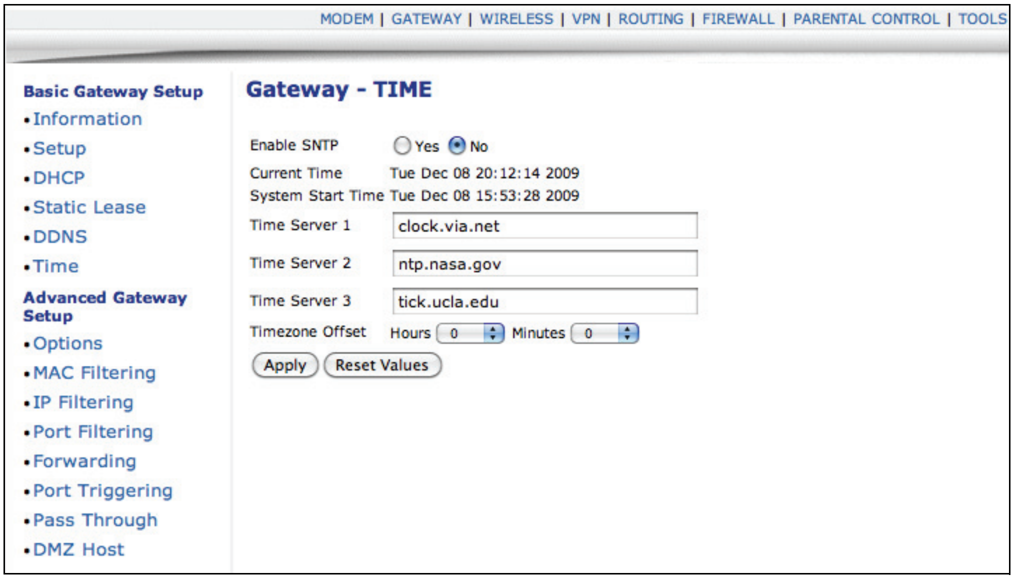
Status: *DDNS service is not enabled.*

Label	Description
DDNS Service	Select the service provider used for your DDNS Service or Disabled. www. DyDNS.org www.no-ip.com
User Name	Input your DDNS account username as subscribed to the service provider.
Password	Enter your password for the above account.
Host Name	Input the host name, as specified by the DDNS service provider.
IP address/Status	These fields are automatically populated once the User Name and Password are entered.
Apply	Click Apply to save all screen changes.
Refresh	Click to refresh the page.

3.7.6 Gateway - Time

The **Time** option allows you to configure the system time obtained from network servers via Simple Network Time Protocol (SNTP). The device must be reset for any changes to take effect.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **Time** from the left side of the screen. The **Time** fields are explained following this screen example.



Gateway - TIME

Enable SNTP ○ Yes ● No

Current Time Tue Dec 08 20:12:14 2009

System Start Time Tue Dec 08 15:53:28 2009

Time Server 1 clock.via.net

Time Server 2 ntp.nasa.gov

Time Server 3 tick.ucla.edu

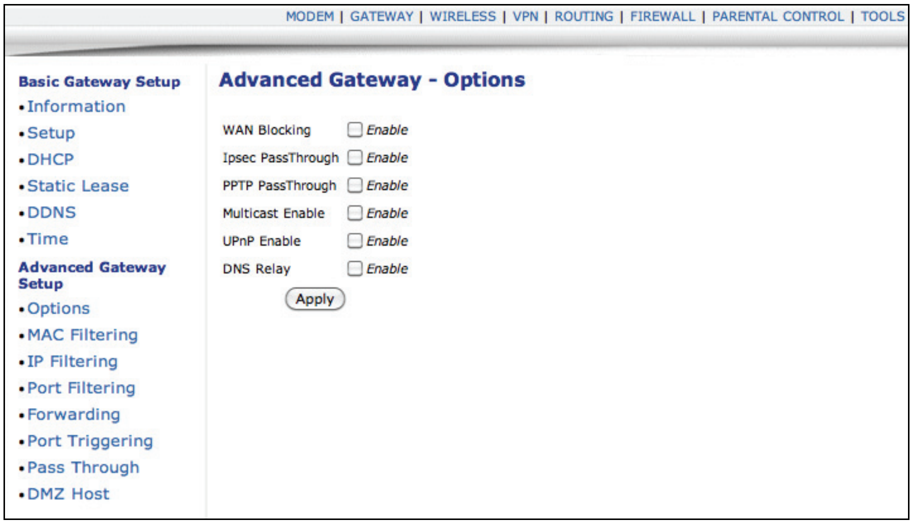
Timezone Offset Hours 0 Minutes 0

Label	Description
Enable SNTP	Click Yes to enable SNTP (Network Time Protocol). Click No to disable the feature. SNTP is a protocol for synchronizing the clocks of computing devices over networks.
Current Time	Displays the current system time.
System Start Time	Displays the accumulated time since system was started.
Time Server 1	Defines the Time server IP address or Domain name. Use the one provided, or enter an alternative choice.
Time Server 2	Defines the Time server IP address or Domain name. Use the one provided, or enter an alternative choice.
Time Server 3	Defines the Time server IP address or Domain name. Use the one provided, or enter an alternative choice.
Time Zone Offset	If needed, define the time zone offset in Hours and Minutes. For example: 8 means GMT + 08, -1 means GMT -01.
Apply	Click Apply to save all screen changes
Reset Values	Click Reset Values to reset the screen to factory defaults.

3.7.7 Gateway - Options

The **Options** selection allows you to define what networking protocols are enabled or disabled on the device.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **Options** from the left side of the screen. The **Options** fields are explained following this screen example.



Advanced Gateway - Options

WAN Blocking □ Enable
Ipsec PassThrough □ Enable
PPTP PassThrough □ Enable
Multicast Enable □ Enable
UPnP Enable □ Enable
DNS Relay □ Enable

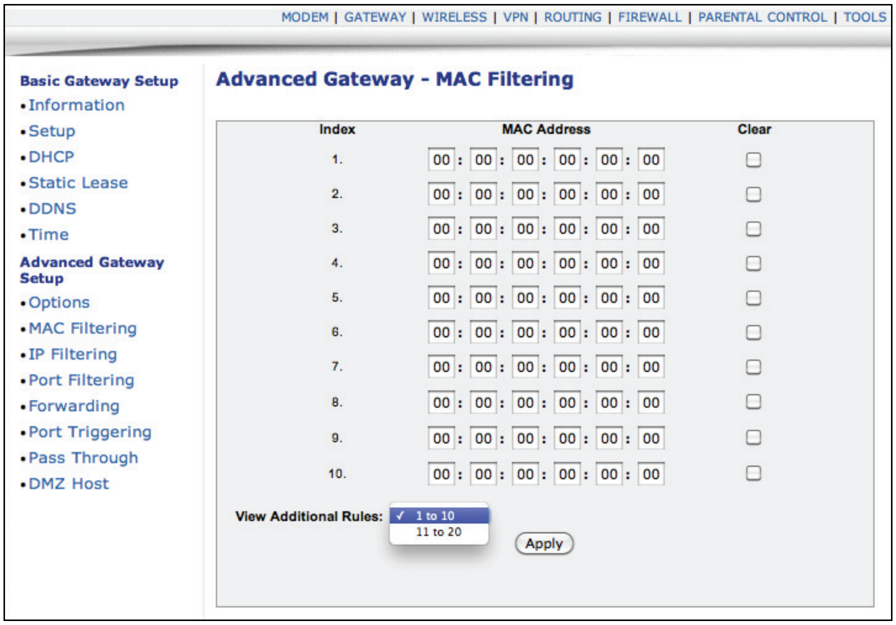
Label	Description
WAN Blocking	Select Enable to block connection requests initialized from Internet users.
Ipsec PassThrough	If Internet users initialize an IPSec VPN request to a host located behind the router, NAT makes this attempt fail. Select Enable to force the router to redirect the IPSec request to the local host.
PPTP PassThrough	If Internet users initialize a PPTP VPN request to a host located behind the router, NAT will make this attempt fail. Select Enable to force the router to redirect the PPTP request to the local host.
Multicast Enable	Multicast optimizes the bandwidth utilization compared with unicast especially video streaming applications. Select Enable to enable multicast.

UPnP Enable	Select Enable to activate Universal Plug and Play (UPnP). A UPnP device can dynamically join a network, obtain an IP address, convey its capabilities, and learn about other devices on the network. In turn, a device can leave a network smoothly and automatically when it is no longer in use.
DNS Relay	
Apply	Click Apply to save all screen changes.

3.7.8 Gateway - Mac Filtering

The **MAC Filtering** option allows you to filter MAC addresses in order to block internet traffic from specific network devices on the LAN. This filtering establishes a black list. Any host listed on this list will not be able to access the network/internet through the DDW3612 Wireless Cable Modem Gateway.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **MAC Filtering** from the left side of the screen. The **MAC Filtering** fields are explained following this screen example.



Advanced Gateway - MAC Filtering

Index	MAC Address	Clear
1.	00 : 00 : 00 : 00 : 00 : 00	□
2.	00 : 00 : 00 : 00 : 00 : 00	□
3.	00 : 00 : 00 : 00 : 00 : 00	□
4.	00 : 00 : 00 : 00 : 00 : 00	□
5.	00 : 00 : 00 : 00 : 00 : 00	□
6.	00 : 00 : 00 : 00 : 00 : 00	□
7.	00 : 00 : 00 : 00 : 00 : 00	□
8.	00 : 00 : 00 : 00 : 00 : 00	□
9.	00 : 00 : 00 : 00 : 00 : 00	□
10.	00 : 00 : 00 : 00 : 00 : 00	□

View Additional Rules: ✓ 1 to 10 / 11 to 20

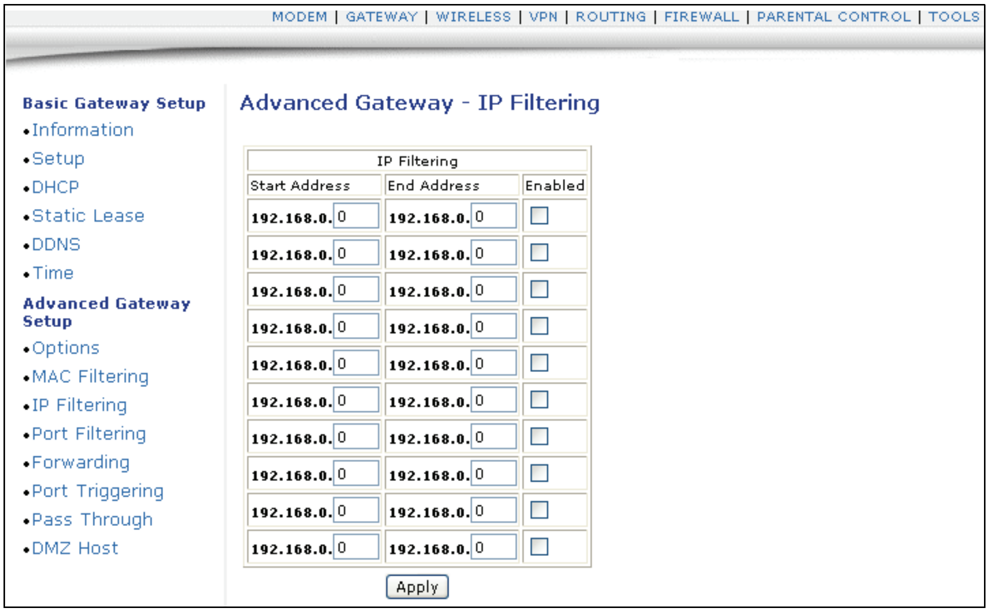
Label	Description
Index	The Index number of the rule.
MAC Address	Enter the MAC address to block.

Clear	Select Clear to delete the filtering rule.
View Additional Rules:	Select from the pull-down to display the remaining 10 rules, if they exist. 20 rules total are supported.
Apply	Click Apply to save all screen changes.

3.7.9 Gateway - IP Filtering

The **IP Filtering** option allows you to filter IP addresses in order to block internet traffic to specific network devices on the LAN. Any host listed on this list will not be accessible to internet traffic.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **IP Filtering** from the left side of the screen. The **IP Filtering** fields are explained following this screen example.



Advanced Gateway - IP Filtering

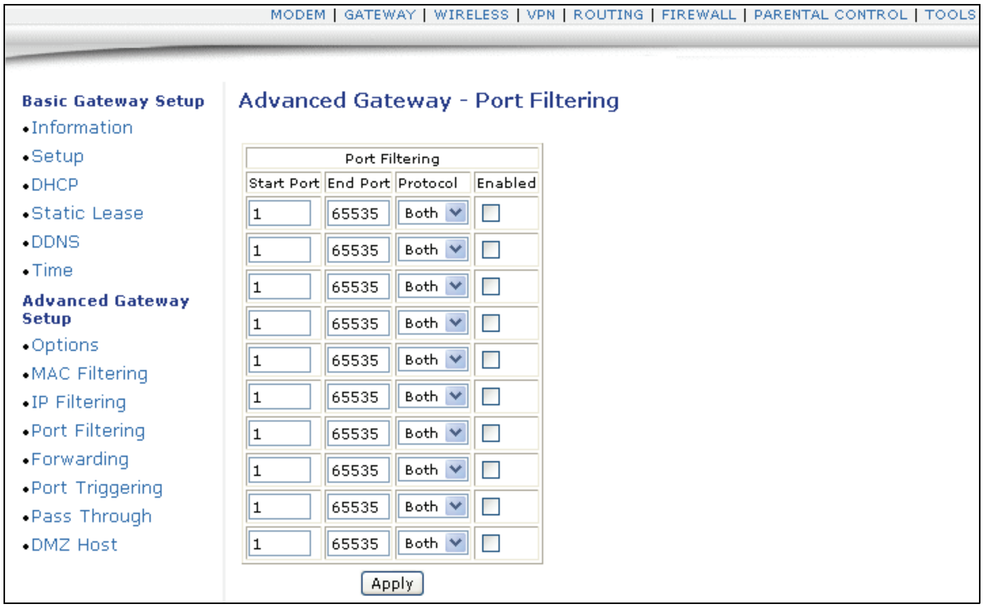
IP Filtering		
Start Address	End Address	Enabled
192.168.0.0	192.168.0.0	□
192.168.0.0	192.168.0.0	□
192.168.0.0	192.168.0.0	□
192.168.0.0	192.168.0.0	□
192.168.0.0	192.168.0.0	□
192.168.0.0	192.168.0.0	□
192.168.0.0	192.168.0.0	□
192.168.0.0	192.168.0.0	□
192.168.0.0	192.168.0.0	□
192.168.0.0	192.168.0.0	□

Label	Description
Start Address	Enter the start IP address.
End Address	Enter the end IP address.
Enabled	Select Enabled to activate the rule.
Apply	Click Apply to save all screen changes.

3.7.10 Gateway - Port Filtering

The **Port Filtering** option allows you to configure port filters in order to block specific internet services on specific ports to all devices on the LAN.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **Port Filtering** from the left side of the screen. The **Port Filtering** fields are explained following this screen example.



Advanced Gateway - Port Filtering

Port Filtering

Start Port	End Port	Protocol	Enabled
1	65535	Both	□
1	65535	Both	□
1	65535	Both	□
1	65535	Both	□
1	65535	Both	□
1	65535	Both	□
1	65535	Both	□
1	65535	Both	□
1	65535	Both	□
1	65535	Both	□

Label	Description
Start Port	Enter the start port.
End Port	Enter the end port.
Protocol	Select the protocol type, or select Both for UDP and TCP.
Enabled	Select Enabled to active the rule and filter out all traffic on the specified ports.
Apply	Click Apply to save all screen changes.

3.7.11 Gateway - Forwarding

Port forwarding settings may be required to resolve issues where data is sent out from a local host to the internet but the return path of expected data is not being received by your local host. Or, you have an application or service running on your local network (on a local host) that cannot be accessed from the internet directly (e.g. a request to a local audio server). Port forwarding simply tells the cable modem to which computer on the local area network to send the data. Here are some examples:

- ❑ **XBOX/PlaySation**—Some games/applications may require port forwarding.
- ❑ **Home Security Systems**—Some security systems that use the internet may require port forwarding.
- ❑ **Audio Servers/VOIP**—Port forwarding may be required to fully enable these applications/services.

Note: If your host system(s)/applications do **not** have communications issues with the internet, Forwarding is **not** needed.

You will need two major pieces of information to setup forwarding:

- ❑ **IP address(s) of local host systems** (e.g. XBOX) for which you need to setup a port forwarding rule. See the continuing discussion below for how to obtain the IP address(s).
- ❑ The **port numbers** that a local host's application listens to for incoming requests/data (e.g. a game or other service). These port numbers should be available in the documentation associated with the application. You can also refer to http://portforward.com for more information.

The following tasks are recommended to support the setup of forwarding rules:

- ❑ Enable UPNP (Universal Plug and Play). This may resolve the issue you have without the need to set forwarding rules. Access the web interface of the cable modem, see page 7. Select **Gateway** from the top menu, then **Options** from the left menu. Select the option to enable UPNP. Test your local host/application (e.g. XBOX) to determine correct functionality. If it is still not properly communicating, continue with forwarding.
- ❑ "Tools - Client List" on page 64—Use this option to obtain the MAC and IP address of the internal host for which you are setting up a forwarding rule. You will also need these for the following task.
- ❑ "Gateway - Static Lease" on page 24—Before setting up forwarding, you are recommended to assign a Static IP lease to the client/host to which you are setting up forwarding. This way, the IP does not change and disrupt your forwarding rules. For example, if you are hosting a web server in your internal network and you wish to setup a forwarding rule for it, you should assign a static IP lease to that system to keep the IP from renewing and disrupting the forwarding rule.

Setup Port Forwarding (XBOX example):

To setup Port Forwarding, use the following procedure:

1. Access the web interface. Refer to page 7, if needed.

2. Click the **Gateway** link from the top of the screen. Click **Forwarding** from the left side of the screen. The **Forwarding** fields are explained following this screen example.

3. The example below shows how to setup an XBOX running Modern Warfare 2. Since multiple ports are used for XBOX and this particular game, a separate forwarding rule is setup for each port. Multiple ports and forwarding rules may not be the case for other applications, however. Note the following:

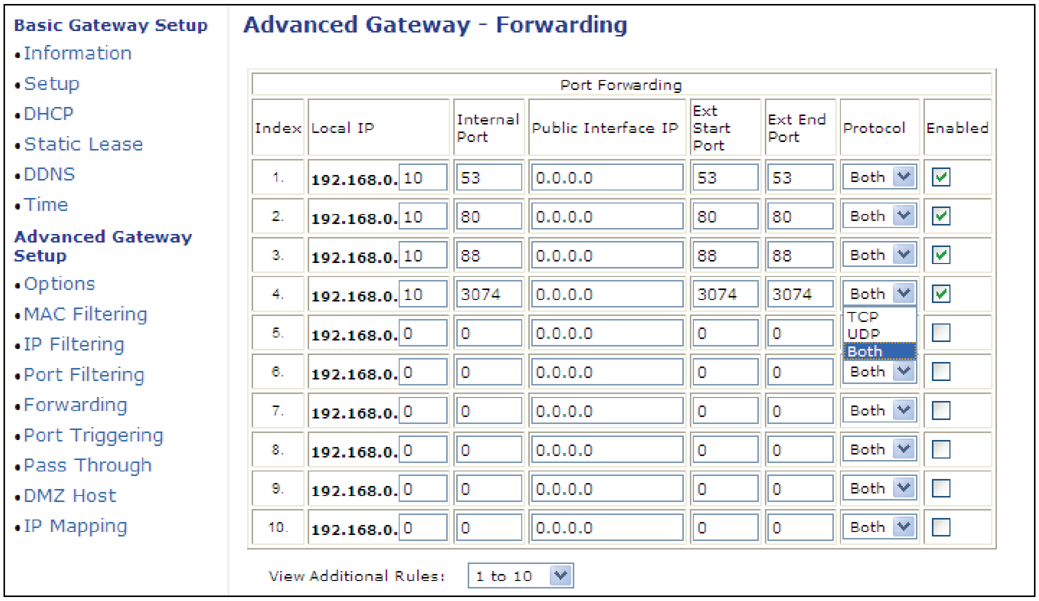
   ❑ The **XBOX IP** is entered in the Local IP field. Notice how the IP is entered in 4 rows, one row for each port used by the XBOX.

   ❑ The **ports** used by the XBOX are defined in the Internal Port field. The same ports used by the XBOX are also defined in the External Port Start and End fields.

   ❑ Keep in mind that you may want to setup some applications/services to listen on one internal port, while external internet users who want to access that application address it using another port, such as an Audio server. Using the screen example below, **Internal Ports** are the ports that local servers listen to. **External Ports** are the ports that the cable modem listens to from the WAN.

   ❑ Port Forwarding rules are created per port. So a rule set up for port 53 will only work for port 53. A port can only be used by one program at a time.

   ❑ For detailed information on port forwarding, including how to set it up for specific applications using specific network devices (for example, cable modems), refer to: http://portforward.com or consult your host device or application user manual.



Advanced Gateway - Forwarding

Port Forwarding

Index	Local IP	Internal Port	Public Interface IP	Ext Start Port	Ext End Port	Protocol	Enabled
1.	192.168.0.10	53	0.0.0.0	53	53	Both	☑
2.	192.168.0.10	80	0.0.0.0	80	80	Both	☑
3.	192.168.0.10	88	0.0.0.0	88	88	Both	☑
4.	192.168.0.10	3074	0.0.0.0	3074	3074	Both	☑
5.	192.168.0.0	0	0.0.0.0	0	0	TCP UDP Both	☐
6.	192.168.0.0	0	0.0.0.0	0	0	Both	☐
7.	192.168.0.0	0	0.0.0.0	0	0	Both	☐
8.	192.168.0.0	0	0.0.0.0	0	0	Both	☐
9.	192.168.0.0	0	0.0.0.0	0	0	Both	☐
10.	192.168.0.0	0	0.0.0.0	0	0	Both	☐

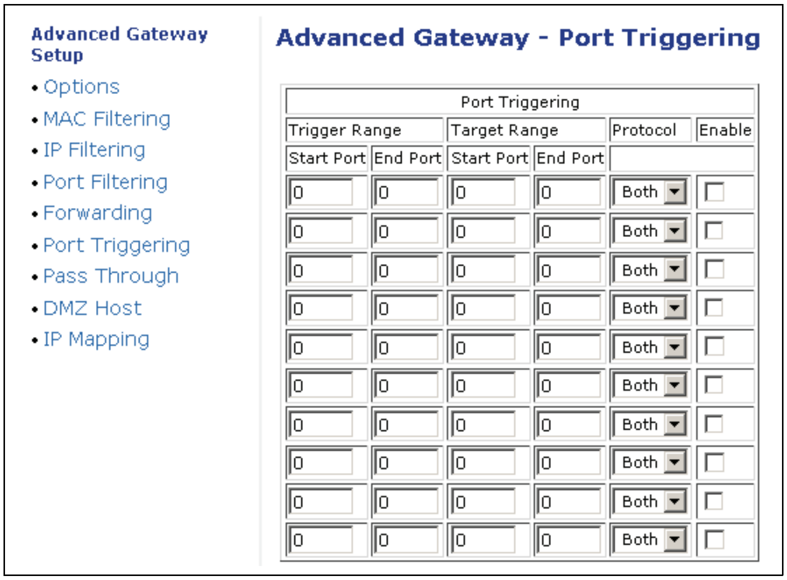
View Additional Rules: 1 to 10

Label	Description
Index	Displays the Index number of the rule.
Local IP	Enter the last digits of the IP address of the server for which to setup the forwarding rule.
Internal Port	Enter the port number listened to by the server host located in your LAN.
Public Interface IP	Normally, this field is not modified unless you wish to designate another router on the network to forward data through.
Ext. Start Port	Define the port number to start the range of ports to publish to the Internet.
Ext. End Port	Define the port number to end the range of ports published to Internet. Note: Be very careful with ranges. Ports within a range will not be usable by other applications that may require them. It is common and safer to enter the same port number as the start and end of the range.
Protocol	Select the protocol type, UDP, TCPIP, or Both.
Enabled	Select to enable this rule.
Apply	Click to save.
Port Map	Click to show a list of common applications and their ports.

3.7.12 Gateway - Port Triggering

The **Port Triggering** option allows you to configure dynamic triggers to specific devices on the LAN. This allows for special applications that require specific port numbers with bi-directional traffic to function properly. Applications such as video conferencing, voice, gaming, and some messaging program features may require these special settings. Refer to page 35 for more information on how to setup Port Triggering.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **Port Triggering** from the left side of the screen. The **Port Triggering** fields are explained following this screen example.



Advanced Gateway - Port Triggering

Port Triggering					
Trigger Range		Target Range		Protocol	Enable
Start Port	End Port	Start Port	End Port		
0	0	0	0	Both	□
0	0	0	0	Both	□
0	0	0	0	Both	□
0	0	0	0	Both	□
0	0	0	0	Both	□
0	0	0	0	Both	□
0	0	0	0	Both	□
0	0	0	0	Both	□
0	0	0	0	Both	□
0	0	0	0	Both	□

Label	Description
Trigger Range	The trigger port is a port (or a range of ports) that triggers the router to record the IP address of the LAN computer that sent the traffic to a server on the WAN.
Start Port	Enter a port number or the starting port number in a range of port numbers.
End Port	Enter a port number or the ending port number in a range of port numbers.
Target Range	Target Range is a port (or a range of ports) that a server on the WAN uses when it responds to service requests. The router forwards the traffic with this port (or range of ports) to the client computer on the LAN that requested the service
Start Port	Enter a port number or the starting port number in a range of port numbers.

End Port	Enter a port number or the ending port number in a range of port numbers.
Protocol	Define the protocol type for this rule, UDP, TCP, or Both.
Enable	Click to activate this rule.
Apply	Click to save.

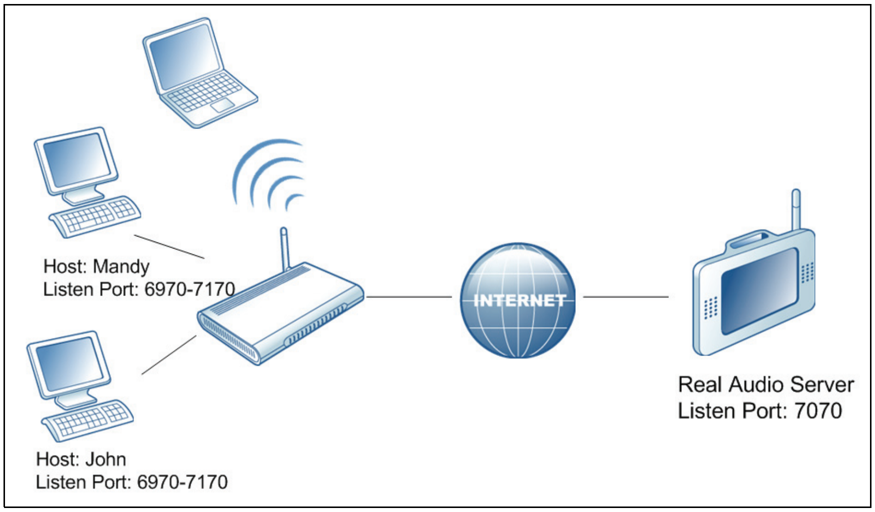
3.7.13 Additional Information - Port Triggering

Some services use a dedicated range of ports on the client side and a dedicated range of ports on the server side. With regular port forwarding you set a forwarding rule to forward a service to the IP address of a LAN side host. The problem is that port forwarding forwards a service to a **single** LAN IP address.

With port triggering, we define 2 kinds of ports: Trigger Port and Target Port. Trigger port is defined as the service request with a specific destination port number sent from a LAN side host. Target Port is defined as the ports this specific application requires a LAN host to listen to. Thus, the server returns responses to these ports.

Example:

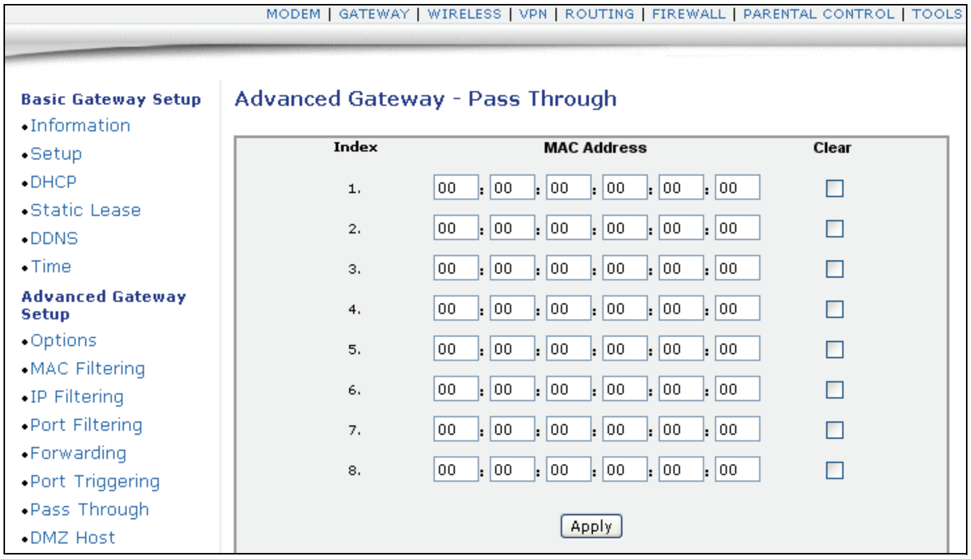
1. John requests a file from the Real Audio server (port 7070). Port 7070 is a “trigger” port and causes the wireless router to record John’s computer IP address. The DDW3612 Wireless Cable Modem Gateway associates John's computer IP address with the "target" port range of 6970-7170.
2. The Real Audio server responds to a port number ranging between 6970-7170.
3. The DDW3612 Wireless Cable Modem Gateway forwards the traffic to John’s computer IP address.
4. Only John can connect to the Real Audio server until the connection is closed or times out.



3.7.14 Gateway - Pass Through

The **Pass Through** option allows you to configure a pass through table. Devices in the pass through table are treated as bridge devices, storing and forwarding data between LAN interconnections.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **Pass Through** from the left side of the screen. The **Pass Through** fields are explained following this screen example.



Advanced Gateway - Pass Through

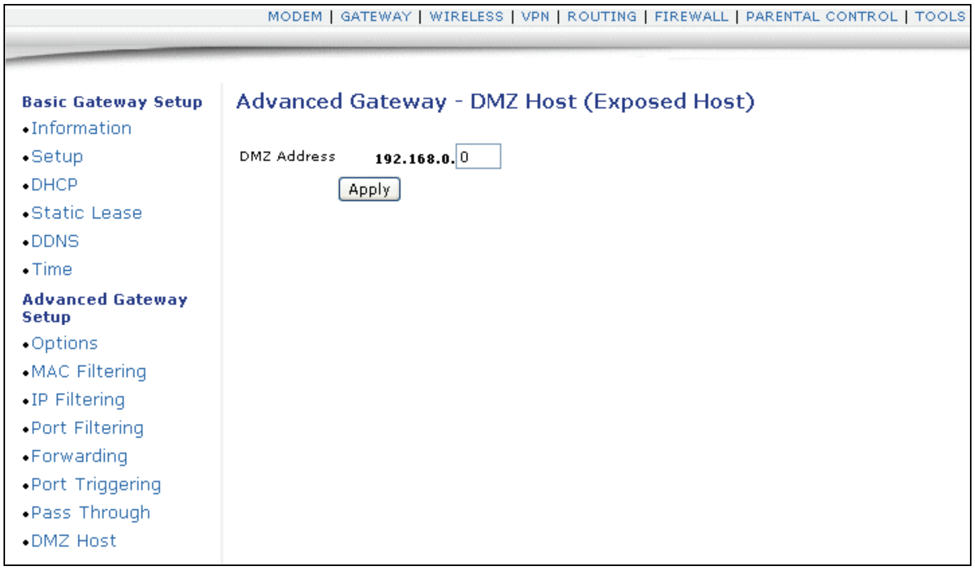
Index	MAC Address	Clear
1.	00 : 00 : 00 : 00 : 00 : 00	□
2.	00 : 00 : 00 : 00 : 00 : 00	□
3.	00 : 00 : 00 : 00 : 00 : 00	□
4.	00 : 00 : 00 : 00 : 00 : 00	□
5.	00 : 00 : 00 : 00 : 00 : 00	□
6.	00 : 00 : 00 : 00 : 00 : 00	□
7.	00 : 00 : 00 : 00 : 00 : 00	□
8.	00 : 00 : 00 : 00 : 00 : 00	□

Label	Description
Index	Index number of the pass through rule.
MAC Address	Input the host’s MAC address.
Clear	Select the box to delete this rule.
Apply	Click to save.

3.7.15 Gateway - DMZ Host

The **DMZ Host** option allows you to configure a host IP address to be exposed or visible to the WAN (public internet). This may be used when applications do not work with port triggers, or for other networking strategies.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Gateway** link from the top of the screen.
3. Click **DMZ Host** from the left side of the screen. The **DMZ Host** fields are explained following this screen example.



Advanced Gateway - DMZ Host (Exposed Host)

DMZ Address 192.168.0. 0

Label	Description
DMZ Address	Enter the DMZ host IP address.
Apply	Click to save.

3.8 Wireless

This chapter contains instructions for all wireless configuration settings.

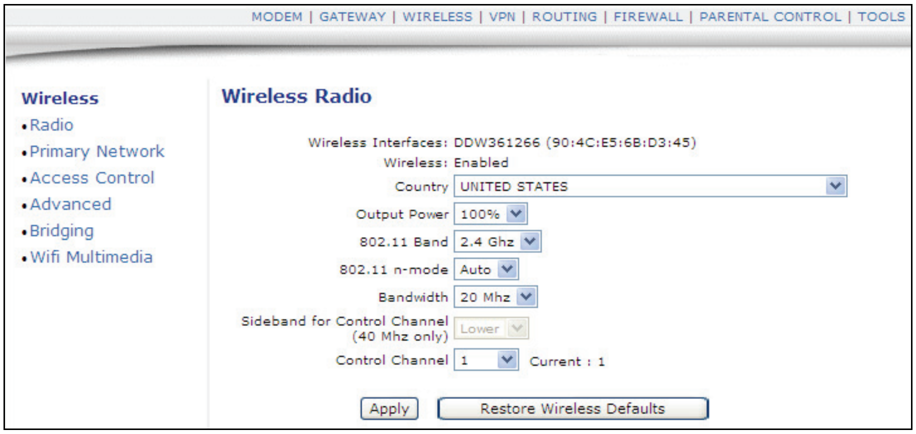
1. Access the web interface. Refer to page 7, if needed.
2. Click the **Wireless** link from the top of the screen.

Note: If having wireless issues or questions, refer to “Wireless Network Deployment and Troubleshooting” on page 52.

3.8.1 Wireless - Radio

The **Radio** option allows you to configure the wireless radio including the current country, channel number, and bandwidth control.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Wireless** link from the top of the screen.
3. Click **Radio** from the left side of the screen. The **Radio** fields are explained following this screen example.


MODEM | GATEWAY | WIRELESS | VPN | ROUTING | FIREWALL | PARENTAL CONTROL | TOOLS
Wireless
•Radio
•Primary Network
•Access Control
•Advanced
•Bridging
•Wifi Multimedia
Apply
Restore Wireless Defaults

Wireless Radio

Wireless Interfaces: DDW361266 (90:4C:E5:6B:D3:45)
Wireless: Enabled
Country UNITED STATES
Output Power 100%
802.11 Band 2.4 Ghz
802.11 n-mode Auto
Bandwidth 20 Mhz
Sideband for Control Channel (40 Mhz only) Lower
Control Channel 1 Current : 1

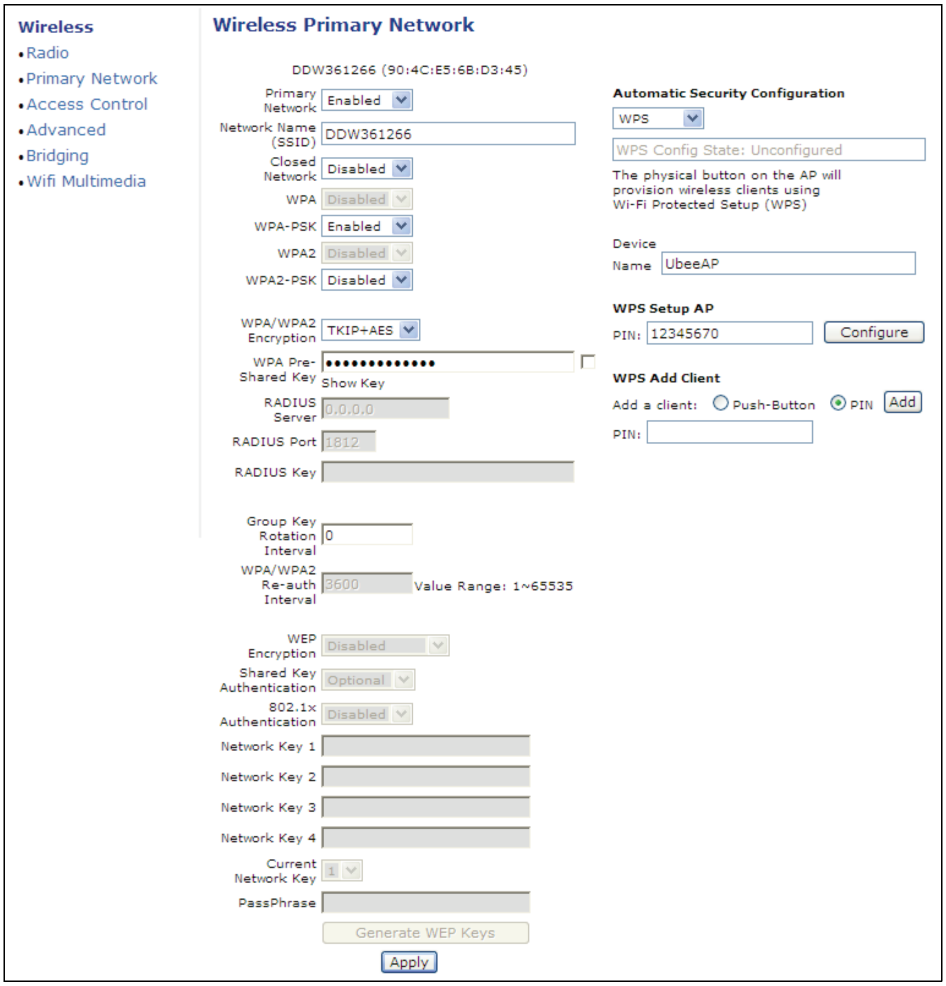
Label	Description
Wireless Interfaces	Displays the Wireless name / MAC address.
Wireless	Displays the wireless radio’s status, Enabled or Disabled.
Country	Select the country where you use this device.
Output Power	Set the percent of the Output Power for the radio.
802.11 Band	You can choose 2.4Ghz or 5 Ghz. **Note**: The distance coverage for 5Ghz is less than 2.4Ghz.

802.11 n-Mode	Select Auto to use 802.11 n mode when possible. This mode has a significant increase in the maximum raw OSI physical layer data rate from 54 Mbit/s to a maximum of 600 Mbit/s with the use of four spatial streams when at a channel width of 40 MHz.
Bandwidth	You have the options of 20Mhz and 40Mhz. If choosing 20Mhz, the sideband label should not be set. And if choosing 40 Mhz, the sideband should set to lower or upper 20Mhz. 40 MHz channels doubles the channel width. This allows for a doubling of the PHY data rate over a single 20 MHz channel.
Sideband for Control Channel (40 Mhz only)	Only when using 40Mhz Bandwidth, should you choose the Lower or Upper 20Mhz.
Control Channel	Select a specific channel 1-11 to deploy the wireless network. This allows you to set the operating frequency/channel depending on your particular region. Channel selection can have an impact on wireless networking performance. For more information, refer to "Wireless Channel Selection" on page 55.
Apply	Click to save.
Restore Wireless Defaults	Click to restore the factory default settings for wireless configurations.

3.8.2 Wireless - Primary Network

The **Primary Network** option allows you to configure a variety of wireless security settings.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Wireless** link from the top of the screen.
3. Click **Primary Network** from the left side of the screen. The **Primary Network** fields are explained following this screen example. **Note**: Wireless default values are discussed in “Default Values” on page 4.



DDW361266 (90:4C:E5:6B:D3:45)

Primary Network: Enabled

Network Name (SSID): DDW361266

Closed Network: Disabled

WPA: Disabled

WPA-PSK: Enabled

WPA2: Disabled

WPA2-PSK: Disabled

WPA/WPA2 Encryption: TKIP+AES

WPA Pre-Shared Key: ••••••••••••• □ Show Key

RADIUS Server: 0.0.0.0

RADIUS Port: 1812

RADIUS Key:

Group Key Rotation Interval: 0

WPA/WPA2 Re-auth Interval: 3600 Value Range: 1~65535

WEP Encryption: Disabled

Shared Key Authentication: Optional

802.1x Authentication: Disabled

Network Key 1:

Network Key 2:

Network Key 3:

Network Key 4:

Current Network Key: 1

PassPhrase:

Automatic Security Configuration: WPS

WPS Config State: Unconfigured

The physical button on the AP will provision wireless clients using Wi-Fi Protected Setup (WPS)

Device Name: UbeeAP

WPS Setup AP PIN: 12345670

Add a client: ○ Push-Button ● PIN

PIN:

Label	Description
Primary Network	Select to Enable or Disable the primary network.
Network Name	Enter the unique SSID of the cable modem, or accept the default. Refer to page 4 for more information on the SSID.
Closed Network	If Enable is selected, the selected SSID is hidden and is undiscoverable by wireless clients unless manually setup on the client. If Disabled, the SSID is discoverable.

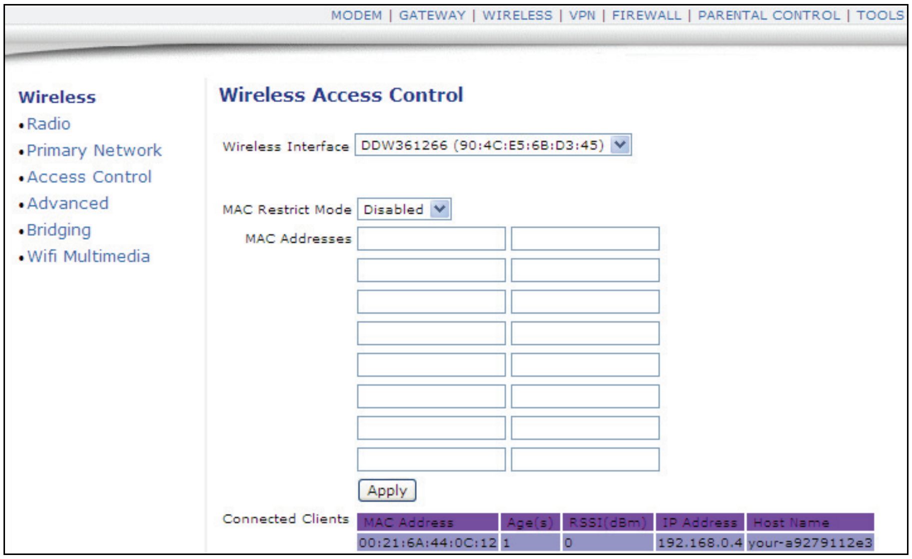
Label	Description
WPA	Wi-Fi Protected Access (WPA) is a subset of the IEEE 802.11i standard. Key differences between WPA and WEP are user authentication and improved data encryption.
WPA-PSK	If you don't have an external RADIUS server you should use WPA-PSK (WPA Pre-Shared Key) that only requires a single (identical) password entered into wireless gateway and wireless client. As long as the passwords match, a client will be granted access to the wireless LAN.
WPA2	Advanced protocol, certified through Wi-Fi Alliance's WPA2 program, implements the mandatory elements of 802.11i. In particular, it introduces a new AES-based algorithm, CCMP, that is considered fully secure.
WPA2-PSK	If you don't have an external RADIUS server you should use WPA2-PSK (WPA Pre-Shared Key) that only requires a single (identical) password entered into wireless gateway and wireless client. As long as the passwords match, a client will be granted access to the wireless LAN.
WPA/WPA2 Encryption	Switch to enable or disable WPA/WPA2 encryption.
WPA Pre-Shared Key	The encryption mechanisms used for WPA and WPA-PSK are the same. The only difference between the two is that WPA-PSK uses a simple common password, instead of user-specific credentials. Refer to page 4 for the default value of the shared key.
RADIUS Server	Input the IP address of RADIUS server, if used.
RADIUS Port	Enter a RADIUS port number when WPA or 802.1x network authentication is selected.
RADIUS Key	Enter the RADIUS Key when WPA or 802.1x network authentication is selected.
Group Key Rotation Interval	Allows the wireless router to generate the best possible random group key and update all the key-management capable stations periodically.
WPA/WPA2 Re-auth Interval	Wireless router (if using WPA-PSK key management) or RADIUS server (if using WPA key management) sends a new group key out to all clients. The re-keying process is the WPA equivalent of automatically changing the WEP key for a wireless access point and all stations in the WLAN on a periodic basis. Setting of the WPA Group Key Update Timer is also supported in WPA-PSK mode.

Label	Description
WEP Encryption	If you don't have WPA(2)-aware wireless clients, then use WEP key encrypting. A higher bit key offers better security. WEP encryption scrambles the data transmitted between the wireless stations and the DDW3612 Wireless Cable Modem Gateway to keep network communications private. It encrypts unicast and multicast communications in a network. Both the wireless stations and the DDW3612 Wireless Cable Modem Gateway must use the same WEP key. Data Encryption can be set to WEP **128-bit, 64-bit,** or **Disable.**
Shared Key Authentication	Shared Key is an authentication method used by wireless LANs, which follow the IEEE 802.11 standard. Wireless devices authenticate each other by using a secret key that is kept by both devices.
802.1x Authentication	Enable to have the DDW3612 Wireless Cable Modem Gateway authenticate wireless clients.
Network Key 1-4	You can pre-define up to 4 keys for 64-bit or 128-bit (64-bit keys require 10 hexadecimal digits) (128-bit key require 26 hexadecimal digits).
Current Network Key	You can select one of the four pre-defined keys as the current network key.
Passphrase	You can set WEP encryption key by entering a word or group of printable characters in the Passphrase box and click Generate WEP keys. These characters are case sensitive.
Generate WEP Keys	Force the wireless router to generate 4 WEP keys automatically.
Apply	Click to save the wireless configurations.
Automatic Security Configuration	Use this feature to setup WPS (Wifi Protected Setup) for devices connecting to the wireless network.
Device Name	Enter a name for this wireless cable modem for WPS.
PIN	Enter the Personal Identification Number for this wireless cable modem.
Configure	Click this button to apply the WPS-Device Name/PIN Setup.
WPS Add Client/Push Button/PIN	Select which method to have connecting wireless clients connect to the wireless network, Push Button or PIN. If PIN is selected, clients are required to enter the PIN in order to access the wireless cable modem. For push button, a client pushes a button, either on the device or in software on the device, and then on the wireless cable modem to establish secure communications.
Apply	Click Apply to save WPS configurations.

3.8.3 Wireless - Access Control

The **Access Control** option allows you to configure what clients can access your wireless network.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Wireless** link from the top of the screen.
3. Click **Access Control** from the left side of the screen. The **Access Control** fields are explained following this screen example.



Wireless Access Control

Wireless Interface DDW361266 (90:4C:E5:6B:D3:45)

MAC Restrict Mode Disabled

MAC Addresses

Connected Clients

MAC Address	Age(s)	RSSI(dBm)	IP Address	Host Name
00:21:6A:44:0C:12	1	0	192.168.0.4	your-a9279112e3

Label	Description
Wireless Interface	Select the wireless interface in order to set access control parameters.
MAC Restrict Mode	Use this feature to control wireless access to your network by MAC address. Select **Disable** to turn off MAC Restrictions and allow any wireless client to connect to this wireless router. Note, however, if you use other security mechanisms for access to the wireless network, clients must still adhere to those restrictions. Select **Allow** to create a list of wireless clients that can connect to the wireless network. Enter the MAC Addresses of these clients in the MAC Addresses fields. All MAC addresses not on the list, will not be allowed access to your wireless network. Select **Deny** to create a list of wireless clients that you do not want to have access to your wireless network. Enter the MAC Addresses of these clients in the MAC Addresses fields.

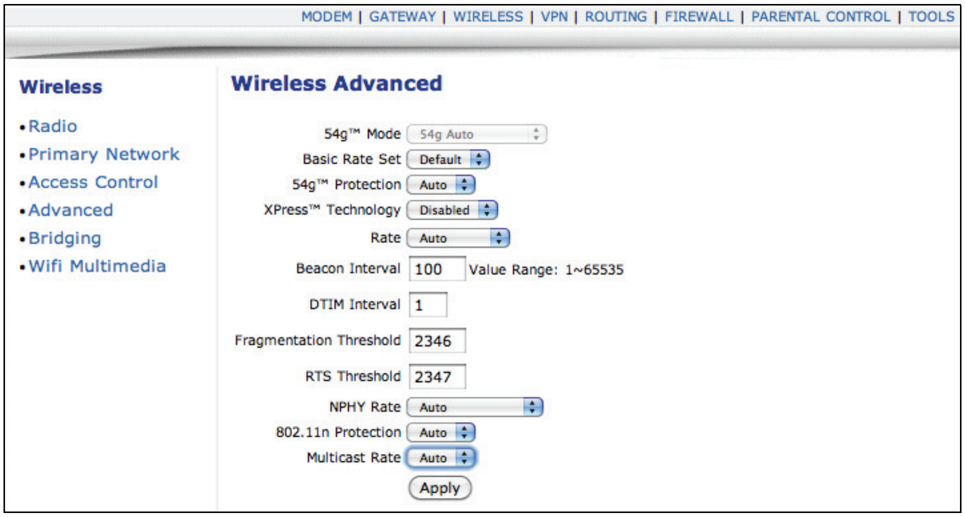
MAC Addresses	Input the MAC addresses. You may consider cutting and pasting MAC addresses from the connected clients list at the bottom of the screen.
Apply	Click to save.
Connected Clients	List of current connected Wireless client listed by MAC address. Fields definitions are: **Age(s)**—The duration since the wireless client's polled values were sent to the wireless router. The values include all information shown on this screen. The lower the number, the more current its data. **RSSI(dBm)**—Received signal strength from the device to the wireless cable modem. This value is commonly used to assist in troubleshooting wireless performance issues. A signal strength of -30dBm to -67dBm is considered optimal. Levels of -67dBm and lower (e.g. -70, -80, etc.) will have a downward impact on wireless data throughput. Refer to "Wireless Network Deployment and Troubleshooting" on page 52 for more information. **IP Address**—The IP address assigned to this wireless client. **Host Name**—The host name of the wireless client.

3.8.4 Wireless - Advanced

The **Advanced** option allows you to configure data rates and WiFi thresholds.

Note: This feature is available when logged into the device using the MSO user login. Refer to page 4 for more information.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Wireless** link from the top of the screen.
3. Click **Advanced** from the left side of the screen. The **Advanced** fields are explained following this screen example.



Wireless Advanced

54g™ Mode: 54g Auto
Basic Rate Set: Default
54g™ Protection: Auto
XPress™ Technology: Disabled
Rate: Auto
Beacon Interval: 100 Value Range: 1~65535
DTIM Interval: 1
Fragmentation Threshold: 2346
RTS Threshold: 2347
NPHY Rate: Auto
802.11n Protection: Auto
Multicast Rate: Auto

Label	Description
54g™ Network Mode	This field can only be set if 802.11-n Mode to set to **Off** in the Radio screen as discussed on page 39. Select which network mode in which to run DDW3612 Wireless Cable Modem Gateway. The options are listed below: 54g auto, for self adaptive connection 54g performance, highest speed 54g LRS, for limited speed 802.11b, for connections to 11b clients only.
Basic Rate Set	Select the Basic Rate Set which is the rate that all wireless clients must support in order to connect to the DDW3612 Wireless Cable Modem Gateway. The options are **All** and **Default**.
54g™ Protection	In **Auto** mode, the DDW3611 will use RTS/CTS to improve 802.1 1g performance in mixed 802.11 b/g networks. Turn protection **Off** to maximize 802.11g throughput under most conditions.
XPress™ Technology	**XPress™** is a standards-based frame-bursting approach to improve 802.11g wireless LAN performance developed by Broadcom. Select to **Enable** or **Disable** this feature. **Additional Information**: When Xpress is turned on, aggregate throughput can improve by up to 27% in 802.11g-only networks, and up to 75% in mixed networks comprised of 802.11g and 802.11b standard equipment.
Rate	Select Auto or select a specific data rate to limit the connection rates of wireless clients.
Beacon Interval	Specify the Beacon Interval from 100 to 6553 5ms. This value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the DDW3611 to keep the network synchronized. A beacon includes information regarding the wireless networks service area, the access point address, the broadcast destination addresses, a time stamp, delivery traffic indicator maps, and the Traffic Indicator Message (TIM).
DTIM Interval	Specify the DTIM interval from 3 to 255ms. This value indicates how often the DDW3611 sends out a Delivery Traffic Indication Message (DTIM). Lower settings result in more efficient networking, while preventing your wireless clients from dropping into power-saving sleep mode. Higher settings allow your wireless clients to enter sleep mode, thus saving power, but interferes with wireless transmissions.
Fragmentation Threshold	Specify the fragmentation threshold packet size between 256-2346 bytes. Fragmentation takes place when a packet's size exceeds the fragmentation threshold.
RTS Threshold	Specify the RTS threshold from 0 to 2347ms. This setting determines how large a packet can be before the DDW3611 coordinates transmission and reception to ensure efficient communication. This value should remain at its default setting of 2347 bytes. If you encounter inconsistent data flow, minor modification to this setting is recommended.

NPHY Rate	Set the Physical Layer (NPHY) rate. These rates are only applicable when the **802.11n mode** is configured as **Automatic**.
802.11n Protection	If you select **Auto**, the DDW3611 will use Request to Send/Clear to Send (RTS/CTS) to improve the performance in 802.11 mixed environments. If you select **Off**, the 802.11 performance will be maximized under most conditions, while the other 802.11 modes (802.11b, etc.) will be secondary.
Multicast Rate	Specify the rate at which multicast packets are transmitted and received on your wireless network.
Apply	Click to submit changes.

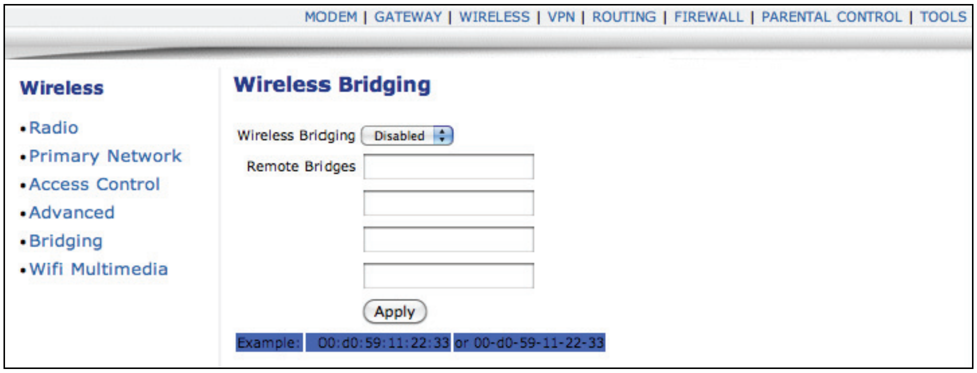
3.8.5 Wireless - Bridging

The **Bridging** option allows you to configure the DDW3612 Wireless Cable Modem Gateway to act as a wireless network bridge and establish wireless links with other wireless access points. To establish a bridge, you need to know the MAC address of the peer device, which must also be in wireless bridging mode. The DDW3612 Wireless Cable Modem Gateway can establish up to four wireless links with other wireless access points. When wireless devices are in wireless bridging mode, they form a WDS (Wireless Distribution System) allowing the computers in one LAN to connect to the computers in the other LAN.

Note: Be careful to avoid bridge loops when you enable bridging devices. Bridge loops cause broadcast traffic to circle the network endlessly, resulting in possible throughput degradation and disruption of communications.

Note: This feature is available when logged into the device using the MSO user login. Refer to page 4 for more information. Also, Firewall menu options are not available when the device is in Bridge mode. Firewall options are available only when the device is in NAT, NATRoute, or Route modes.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Wireless** link from the top of the screen.
3. Click **Bridging** from the left side of the screen. The **Bridging** fields are explained following this screen example.



Wireless Bridging

Wireless Bridging: Disabled

Remote Bridges

Example: 00:d0:59:11:22:33 or 00-d0-59-11-22-33

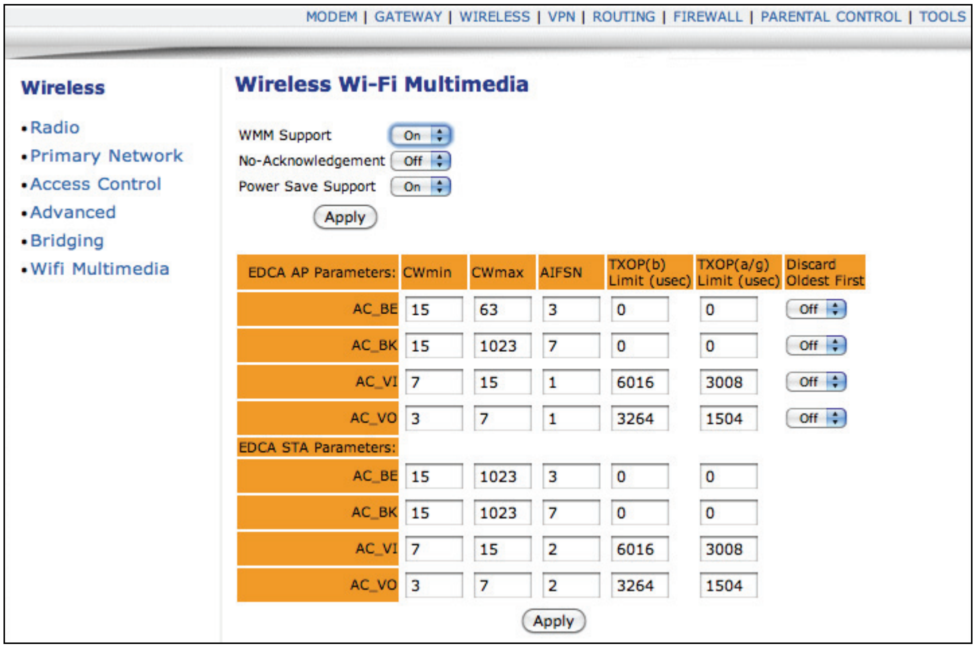
Label	Description
Wireless Bridging	Select Enabled to enable bridging. Select Disabled to disable bridging.
Remote Bridges	Enter the MAC address(es) of other wireless access points that you want to establish a bridge to and from. Keep in mind that these access points must also have bridging enabled.
Apply	Click to save all changes.

3.8.6 Wireless - Wifi Multimedia

The **Wifi Multimedia** option allows you to configure QoS (Quality of Service) to ensure the quality of service in wireless networks. **Wifi Multimedia** controls WLAN transmission priority on packets to be transmitted over the wireless network. WMM QoS prioritizes wireless traffic according to the delivery requirements of the individual user and applications. Refer to page 50 for more information on **Wifi Multimedia**.

Note: This feature is available when logged into the device using the MSO user login. Refer to page 4 for more information.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Wireless** link from the top of the screen.
3. Click **Wifi Multimedia** from the left side of the screen. The **Wifi Multimedia** fields are explained following this screen example.



Wireless Wi-Fi Multimedia

WMM Support: On
No-Acknowledgement: Off
Power Save Support: On

EDCA AP Parameters:	CWmin	CWmax	AIFSN	TXOP(b) Limit (usec)	TXOP(a/g) Limit (usec)	Discard Oldest First
AC_BE	15	63	3	0	0	Off
AC_BK	15	1023	7	0	0	Off
AC_VI	7	15	1	6016	3008	Off
AC_VO	3	7	1	3264	1504	Off
EDCA STA Parameters:						
AC_BE	15	1023	3	0	0	
AC_BK	15	1023	7	0	0	
AC_VI	7	15	2	6016	3008	
AC_VO	3	7	2	3264	1504	

Label	Description
WMM Support	Select On or Off to turn on or off WMM support.
No Acknowledgement	Select On or Off to turn on or off the acknowledgement of data frames. In QoS mode, frames to send can have two values: QosAck and QosNoAck. Frames with QosNoAck are not acknowledged, thus avoiding the retransmission of highly time-critical data.

Power Save Support	Select On or Off to turn on or off power savings. WMM Power Save increases the efficiency and flexibility of data transmission. Specifically, the wireless client device can "doze" between packets to save power, while the wireless access point buffers downlink frames. The application chooses the time to wake up and receive data packets to maximize power conservation without sacrificing Quality of Service.
EDCA-AP Parameters	Enhanced Distributed Channel Access - Access Point. In this area of the screen, four Access Categories (ACs) are listed to prioritize wireless network traffic. Refer to the next row below.
AC-BE **AC-BK** **AC-VI** **AC-VO**	The Wi-Fi Multimedia feature prioritizes traffic according to four access categories (ACs): **AC-BE**—Best Effort, medium throughput and delay. Most traditional IP data is sent to this queue. **AC-BK**—Background, high throughput. Bulk data that requires maximum throughput and is not time-sensitive is sent to this queue (for example, FTP data). **AC-VI**—Video **AC-VO**—Voice
CWmin/CWmax/AIFSN	For each AC, set the following fields: CWmin/CWmax AIFS—Interframe Space Back off Counter
TXOP (b) Limit (usec)/TXOP (a/g) Limit (usec)/Discard Oldest First	Enter a TXOP limit. Each AC is assigned a Transmit Opportunity (TXOP). A TXOP is a bounded time interval during which a station can send as many frames as possible (as long as the duration of the transmissions does not extend beyond the maximum duration of the TXOP). If a frame is too large to be transmitted in a single TXOP, it should be fragmented into smaller frames. The use of TXOP reduces the problem of low rate stations gaining an inordinate amount of channel time in the legacy 802.11 DCF MAC. A TXOP time interval of 0 means it is limited to a single MSDU or MMPDU.
EDCA STA Parameters	These settings are used for receiving terminals.
CWmin/CWmax/AIFSN **TXOP (b) Limit (usec)/TXOP (a/g) Limit (usec)**	Refer to the rows above for definitions of these fields.
Apply	Click to save all changes.

3.8.7 Additional Information - WiFi MultiMedia (WMM)

WMM QoS is a part of the IEEE 802.11e QoS enhancement to certified WiFi wireless networks. On wireless access points without WMM QoS, all traffic streams are given the same access priority to the wireless network. If the introduction of another traffic stream creates a data transmission demand that exceeds the current network capacity, then the new traffic stream reduces the throughput of the other traffic streams. A WMM QoS capability in a network may assign access categories (ACs) to various streams of packets. The assigned AC of a stream of packets may depend on the packets' priority, for example, as assigned by an application, and may be referred to as a user priority (UP). An AC may include a common set of enhanced distributed channel access (EDCA) parameters that may be used by QoS to contend for a channel in order to transmit packets with certain priorities.

Different ACs may be associated with different power saving parameters. One such power saving parameter may be, for example, the delivery mechanism used by an access point (AP) to deliver packets to a station (STA) that is operating in a reduced power mode. For example, one delivery mechanism may be the “legacy” power save mechanism of the IEEE 802.11 standard: “ANSI/IEEE Std. 802.11, Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements—Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications” (published 1999; reaffirmed June 2003). Another delivery mechanism may be the automatic power save delivery (APSD) mechanism, e.g., unscheduled APSD (UAPSD) or scheduled APSD (S-APSD), as defined in 802.11e. A QoS station (QSTA) may define all or some of the ACs as trigger-enabled and/or delivery-enabled. A trigger- and delivery-enabled AC may use UAPSD as the default delivery mechanism, whereas an AC that is neither trigger- nor delivery-enabled may use the “legacy” power save delivery mechanism.

3.9 Wireless Network Deployment and Troubleshooting

This section provides the following information which may be useful in understanding, deploying, and troubleshooting wireless environments:

❑ “Wireless Speeds and Performance” on page 52

❑ “Received Signal Strength” on page 52

❑ “Estimating Wireless Cable Modem to Wireless Client Distances” on page 53

❑ “Wireless Channel Selection” on page 55

3.9.1 Wireless Speeds and Performance

This section provides various topics on managing wireless speeds and performance:

❑ “Received Signal Strength” on page 52

❑ “Estimating Wireless Cable Modem to Wireless Client Distances” on page 53

❑ “Wireless Channel Selection” on page 55

3.9.1.1 Received Signal Strength

Received signal strength (RSSI) is measured from connected wireless client devices to the wireless cable modem. This value can significantly impact wireless speeds/performance. It is determined by:

❑ materials (e.g. open air, concrete, trees, etc.)
❑ distance between wireless clients and the wireless cable modem
❑ wireless capabilities of the client devices

To determine the received signal strength, refer to “Wireless - Access Control” on page 44 and review the **RSSI** value. A signal strength of -30dBm to -67dBm is considered optimal. Levels of -67dBm and lower (e.g. -70, -80, etc.) will have a downward impact on wireless data throughput. See the following sections for more information:

3.9.1.2 Estimating Wireless Cable Modem to Wireless Client Distances

This section provides some guidelines on how far a wireless cable modem can be placed in varying environments from wireless client devices. These variances include the capabilities of wireless clients and the types of material through which the wireless signal must pass. When the wireless cable modem and wireless clients reach the distance threshold between each other, network performance degrades.

1. Connect a wireless client to the wireless cable modem. Refer to “Connect/Validate Wireless Clients” on page 10 if needed.
2. Place the wireless client at around one meter (three feet) away from the wireless cable modem.
3. Obtain the **RSSI** value for the connected client. Refer to “Wireless - Access Control” on page 44. This value will be used in the formula further below.
4. Use the table below to determine what materials the wireless signal must travel through in order to reach the desired wireless coverage distance.

Attenuation Considerations at 2.4GHz

Material	Attenuation
Connector/Cable	3.5dB
Free Space	.24dB / foot
Interior Drywall	3dB to 4dB
Cubicle Wall	2dB to 5dB
Wood Door (Hollow/Solid)	3dB to 4dB
Brick, Concrete Wall (Note 1)	6dB to 18db
Glass Window (not tinted)	2dB to 3dB
Double Pane Coated Glass	13dB
Bullet Proof Glass	10dB
Steel / Fire Exit Door	13dB to 19dB
Human Body	3dB
Trees (Note 2)	.15dB / foot
Note 1: Different types of concrete materials are used in different parts of the world and the thickness and coating differ depending on whether it is used in floors or interior or exterior walls.	**Note 2**: The attenuation caused by trees varies significantly depending upon the shape and thickness of the foliage.

5. Using the attenuation value from the materials table above, enter it in the following formula. Additional explanation is provided further below.

Formula:

(Transmit Power, **use -30dBm**) **–** (Receiver Sensitivity, **use RSSI value**) **=** Allowable Free Space Loss

Allowable Free Space Loss **÷** Materials Attenuation Value **=** Optimal Distance in Feet Between the Cable Modem and a Wireless Client

Example:

(-30dBm) **-** (-67dBm) **=** 37dBm (allowable free space loss for a 54Mbps connection)

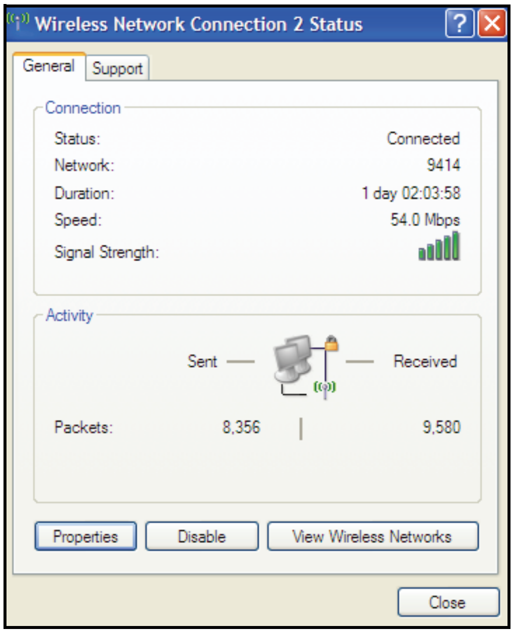
37dBm **÷** .24db/foot (for open space) **=** 154.16 feet

6. Once you know the optimal feet distance between individual wireless clients and the wireless cable modem, you can resolve and prevent some performance issues.

7. To check the wireless signal strength and speed, use the following steps for a Windows computer connected wirelessly to the wireless cable modem. If the wireless computer is not connected, refer to “Connect/Validate Wireless Clients” on page 10.

   ❑ Double-click the Wireless networking icon in the system tray.

   ❑ Review the speed and signal strength in the Status window.



Wireless Network Connection 2 Status

General Support

Connection

Status:	Connected
Network:	9414
Duration:	1 day 02:03:58
Speed:	54.0 Mbps
Signal Strength:	

Activity

	Sent	Received
Packets:	8,356	9,580

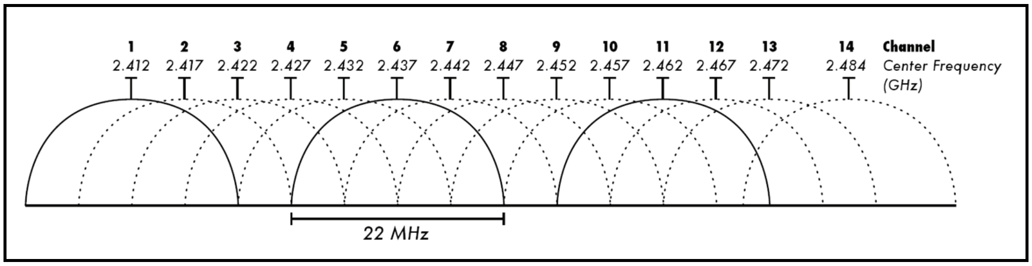
3.9.1.3 Wireless Channel Selection

In some environments, it may be necessary to change the wireless channel on which the wireless cable modem operates. This may especially be the case in computing environments, test environments, and other environments where they may be several wireless access points operating in the 2.4Ghz range.

In some cases, you may want to segment your wireless traffic where a group of devices operates on one channel and another group operates on another channel, and so on. This is done by configuring the channel on each wireless access point individually (if you have multiples). If you only have control over one wireless device in an environment where they may be several, you can change the wireless channel on your device to one that is not heavily used.

Note: To change the wireless broadcast channel, refer to “Wireless - Radio” on page 39.

The diagram below show the channels available for selection in the Americas. Each available channel is 22Mhz wide. Since channels overlap, it is always best to choose channels that have the least overlap (typically 1, 6, and 11 in the Americas, and 1, 5, 9, and 13 in Europe). Overlapping channels are one possible source for wireless network performance issues.


1 2 3 4 5 6 7 8 9 10 11 12 13 14 Channel
2.412 2.417 2.422 2.427 2.432 2.437 2.442 2.447 2.452 2.457 2.462 2.467 2.472 2.484 Center Frequency (GHz)
22 MHz

Source: Wikipedia.org, and IEEE article IEEE 802.11n-2009

3.10 Parental Control

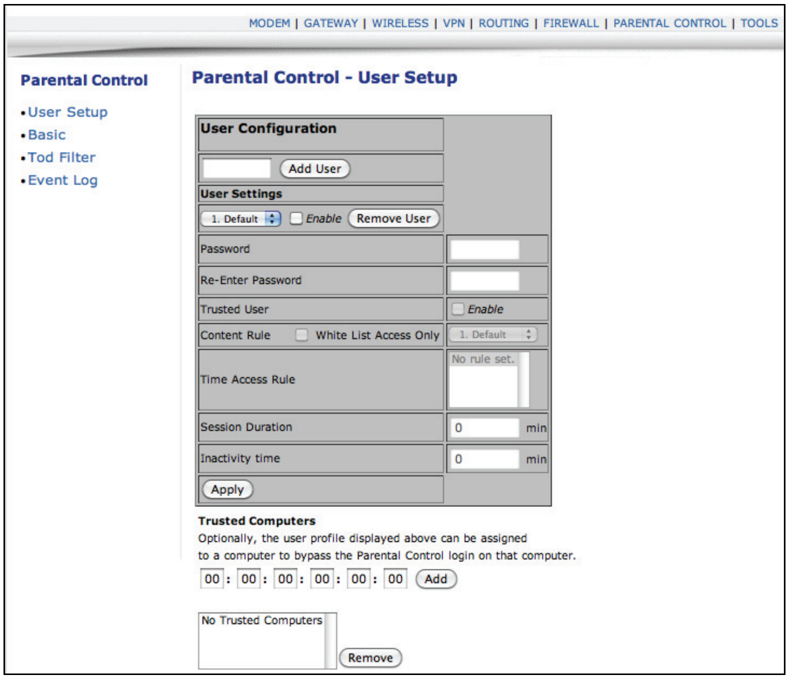
This chapter provides instructions for controlling the internet access of users on the DDW3612 Wireless Cable Modem Gateway network. These parental control features include defining user/password access, defining the what times users are allowed to access the internet, blocking certain web sites, and blocking certain sites by keywords.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Parental Control** link from the top of the screen.

3.10.1 Parental Control - User Setup

The **User Setup** option allows the configuration of user accounts that can or cannot connect to your wireless or wired network, and the parameters of the connection.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Parental Control** link from the top of the screen.
3. Click **User Setup** from the left side of the screen. The **User Setup** fields are explained following this screen example. Note: To enable Parental Control, refer to page 59.



Parental Control - User Setup

User Configuration

User Settings

1. Default ☐ Enable

Password	
Re-Enter Password	
Trusted User	☐ Enable
Content Rule ☐ White List Access Only	1. Default
Time Access Rule	No rule set.
Session Duration	0 min
Inactivity time	0 min

Trusted Computers
Optionally, the user profile displayed above can be assigned to a computer to bypass the Parental Control login on that computer.

00 : 00 : 00 : 00 : 00 : 00

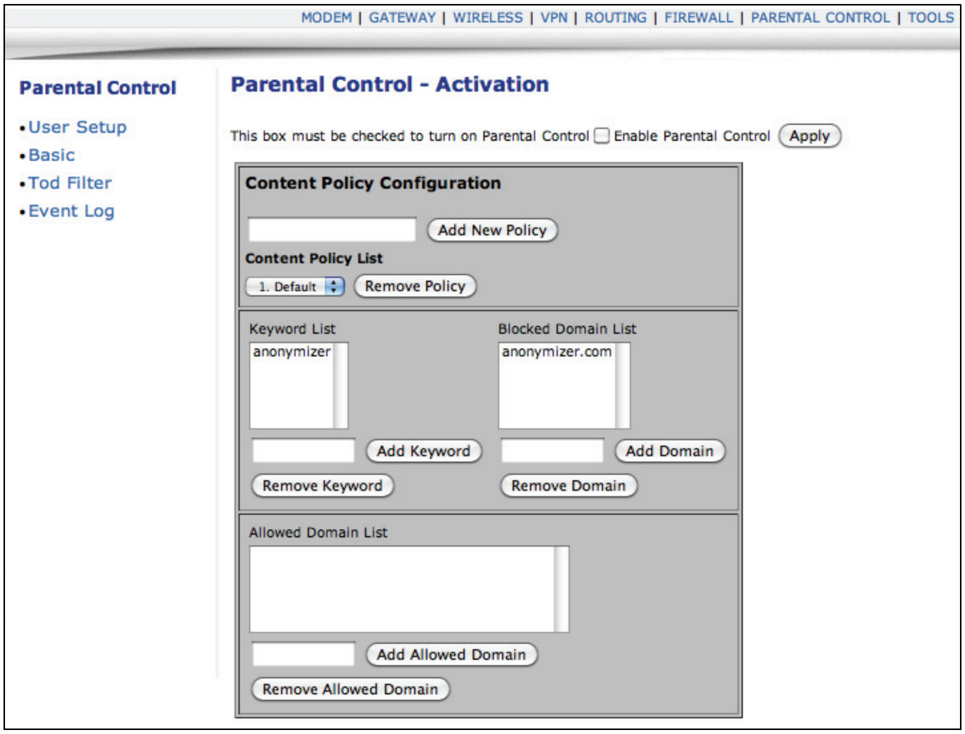
No Trusted Computers

Label	Description
User Configuration/Add User/Remove User/Enable	Select an existing user account to edit from the User Settings pop-up menu. Or, enter a new user name and click the Add button. To activate the user, click the Enable button. To remove a user, select a user from the pop-up menu and click the Remove button.
Password	Enter the password for this user. It is required when this user tries to access the Internet via the wireless router.
Re-Enter Password	Re-enter the password as required.
Trusted User	Click the Enable checkbox to allow the selected user to be trusted user. That means the user is now limited to timing and content when visiting Internet, as defined in the following fields.
Content Rule	Select from the pop-up menu an existing content rule that defines what kind of websites the user can visit or not.
White List Access Only	If you have created a content rule which defines a black list and white list, then you can select the White List Access Only checkbox to force the wireless modem to execute the policy for the selected user
Time Access Rule	Select a defined time access rule to apply to the selected user.
Session Duration	Enter a time in minutes for the user’s session expiration. Upon expiration, the user can log back in for the same session duration.
Inactivity Time	Enter the time out value when a user has no activity on the Internet. When the time expires, the user interface to the internet cancelled.
Apply	Click to save all changes.
Trusted Computers	Define the trusted hosts that will bypass the Parental Control Process.
Add	Enter the trusted host’s MAC address and click the Add button to save.
Remove	To remove a trusted computer, highlight it from the list and click the Remove button.

3.10.2 Parental Control - Basic Settings

The **Basic** option allows basic selection of rules which block certain Internet content and certain Web sites. When you change your Parental Control settings, you must click on the appropriate "Apply," "Add," or "Remove" button for your new settings to take effect. Refresh your browser's display to see the currently active settings.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Parental Control** link from the top of the screen.
3. Click **Basic** from the left side of the screen. The **Basic** fields are explained following this screen example.



This box must be checked to turn on Parental Control □ Enable Parental Control

Content Policy List: 1. Default

Keyword List: anonymizer

Blocked Domain List: anonymizer.com

Label	Description
Enable Parental Control	Click the Enable checkbox to activate the Parental Control feature.
Apply	Click to save all changes in the screen and activate Parental Control, if enabled.
Content Policy Configuration	This part of the screen allows you to configure the internet content access policy.
Add New Policy	Enter a policy name and click Add New Policy to create a new policy.
Content Policy List/Remove Policy	Select from the list an existing policy to edit or remove. If removing a policy, select it from the list and click the Remove Policy button.

Keyword List/ Add Keyword/ Remove Keyword	Enter keywords to use in order to filter out web site addresses (URLs) containing those words. Enter a keyword and click the Add Keyword button. To remove a keyword, select it from the list and click Remove Keyword.
Blocked Domain List/ Add Domain/ Remove Domain	Enter web domains (for example, unwanted.com) to use in order to filter out access to those domains. Enter a domain and click the Add Domain button. To remove a domain, select it from the list and click Remove Domain.
Allowed Domain List	This list allows users to visit specific sites. This list restricts users to these sites only.
Add Allowed Domain	Enter a domain name and click Add Allowed Domain.
Remove Allowed Domain	To remove a domain, highlight it from the list and click Remove Allowed Domain.

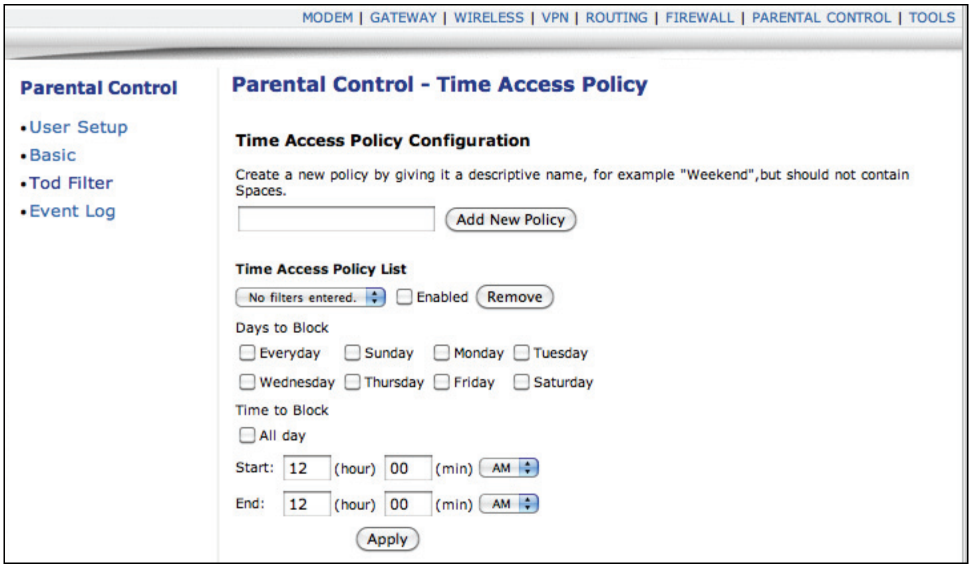
3.10.3 Parental Control - Tod Filter

The **Tod Filter** option allows the configuration of time-based access policies to block all internet traffic at specified times.

1. Access the web interface. Refer to page 7, if needed.

2. Click the **Parental Control** link from the top of the screen.

3. Click **Tod Filter** from the left side of the screen. The **Tod Filter** fields are explained following this screen example.


MODEM | GATEWAY | WIRELESS | VPN | ROUTING | FIREWALL | PARENTAL CONTROL | TOOLS
Parental Control
•User Setup
•Basic
•Tod Filter
•Event Log
Add New Policy
Remove
Apply

Parental Control - Time Access Policy

Time Access Policy Configuration

Create a new policy by giving it a descriptive name, for example "Weekend",but should not contain Spaces.

Time Access Policy List

No filters entered. □ Enabled

Days to Block

□ Everyday □ Sunday □ Monday □ Tuesday

□ Wednesday □ Thursday □ Friday □ Saturday

Time to Block

□ All day

Start: 12 (hour) 00 (min) AM

End: 12 (hour) 00 (min) AM

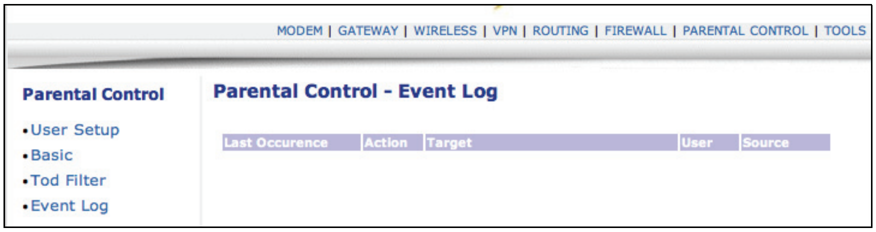
Label	Description
Add New Policy	Enter a policy name and click the Add New Policy button.
Time Access Policy List	Select a policy to edit from the drop-down list.

Enable/Remove	Select the Enabled checkbox to activate this policy. If the checkbox is unselected, the policy is not active. To remove a policy, select the policy from the drop-down list and click the Remove button.
Days to Block	Select the days to block Internet access. The internet access times for the days selected to block are defined in the following fields.
Time to Block	
All Day	Select All Day to eliminate all access during the days selected to block. Or, enter a specific time range in the Start and End fields.
Apply	Click to save all changes.

3.10.4 Parental Control - Event Log

The **Event Log** option displays Parental Control event log reporting.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Parental Control** link from the top of the screen.
3. Click **Event Log** from the left side of the screen. The **Event Log** fields are explained following this screen example.


MODEM | GATEWAY | WIRELESS | VPN | ROUTING | FIREWALL | PARENTAL CONTROL | TOOLS
Parental Control
•User Setup
•Basic
•Tod Filter
•Event Log

Parental Control - Event Log

Last Occurence	Action	Target	User	Source

Label	Description
Last Occurrence	Displays the time when the last event occurred.
Action	Displays what is done by parental control, including dropping or permitting access requests.
Target	Displays the destination IP address of a certain access request.
User	Displays the user who triggered this event log.
Source	Displays the source IP address of this event.
Refresh/Clear Log	Click Refresh to update the log with the most currently recorded events. Click Clear to empty the displayed log entries.

3.11 Tools

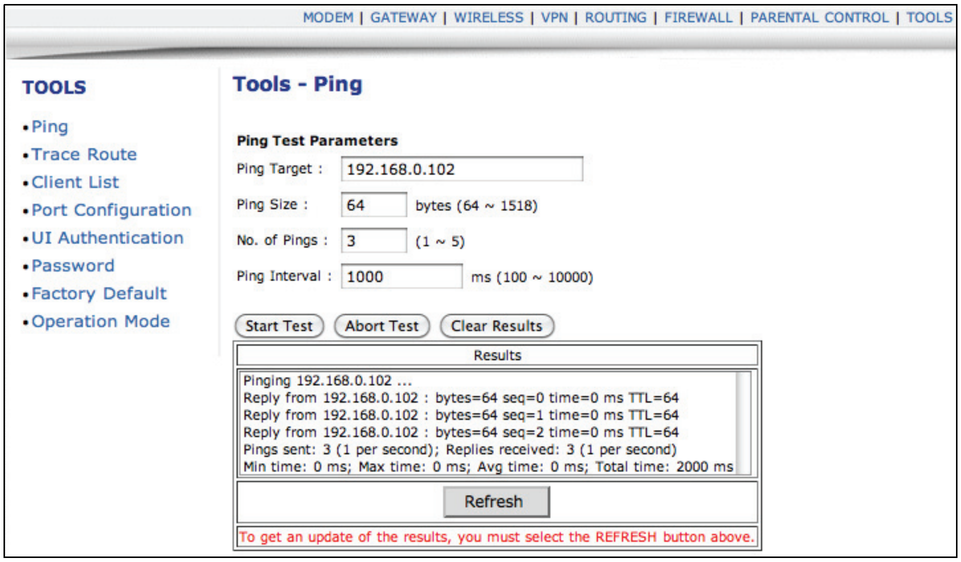
This chapter contains instructions for using a variety of tools to evaluate and diagnose the DDW3612 Wireless Cable Modem Gateway.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Tools** link from the top of the screen.

3.11.1 Tools - Ping

The **Ping** option provides a Ping utility to test connectivity.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Tools** link from the top of the screen.
3. Click **Ping** from the left side of the screen. The **Ping** fields are explained following this screen example.



Tools - Ping

Ping Test Parameters

Ping Target : 192.168.0.102

Ping Size : 64 bytes (64 ~ 1518)

No. of Pings : 3 (1 ~ 5)

Ping Interval : 1000 ms (100 ~ 10000)

```
Pinging 192.168.0.102 ...
Reply from 192.168.0.102 : bytes=64 seq=0 time=0 ms TTL=64
Reply from 192.168.0.102 : bytes=64 seq=1 time=0 ms TTL=64
Reply from 192.168.0.102 : bytes=64 seq=2 time=0 ms TTL=64
Pings sent: 3 (1 per second); Replies received: 3 (1 per second)
Min time: 0 ms; Max time: 0 ms; Avg time: 0 ms; Total time: 2000 ms
```

To get an update of the results, you must select the REFRESH button above.

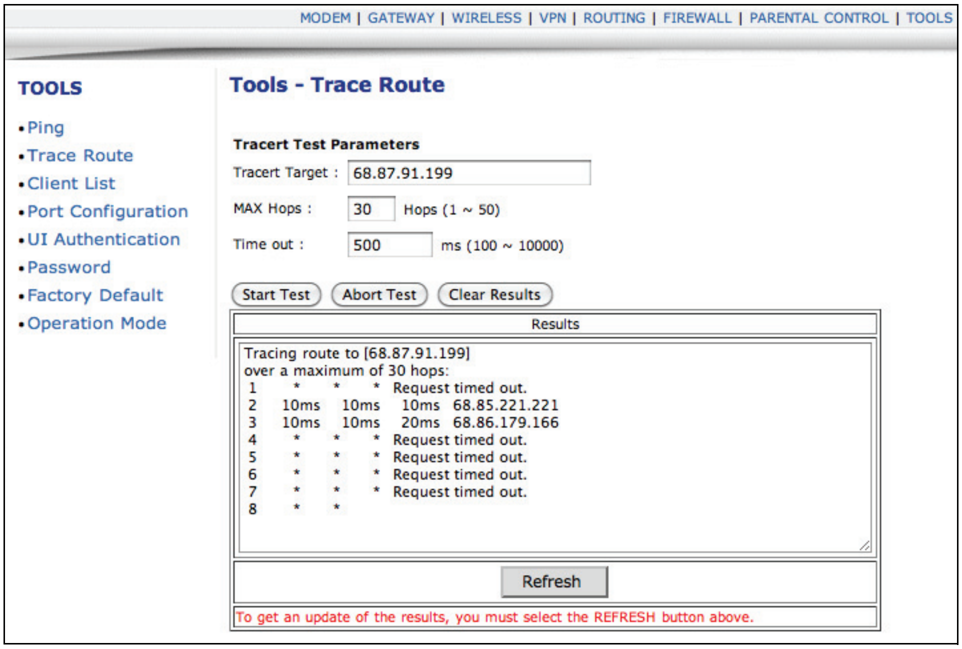
Label	Description
Ping Target	Enter the IP address to which you want to send a ping. A ping tests the network connectivity between devices by sending a test message to a specific device. You can also confirm the size of data sent is the same as received.
Ping Size	Enter the packet size to send for the ping operation.
No. of Pings	Enter the number of ping commands to send to the ping target.

Ping Interval	Define the interval between ping operations in milliseconds.
Start Test/Abort Test/Clear Results	Click Start to start the ping test. Click Abort Test to cancel the test. Click Clear Results to clear the displayed ping results.
Results/Refresh	The Results area of the screen displays the ping results. Click Refresh to update the screen with on-going ping tests.

3.11.2 Tools - Trace Route

The **Trace Route** option is a utility to test the route that data is taking to and from the DDW3612 Wireless Cable Modem Gateway.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Tools** link from the top of the screen.
3. Click **Trace Route** from the left side of the screen. The **Trace Route** fields are explained following this screen example.



Tools - Trace Route

Tracert Test Parameters

Tracert Target : 68.87.91.199

MAX Hops : 30 Hops (1 ~ 50)

Time out : 500 ms (100 ~ 10000)

```
Tracing route to [68.87.91.199]
over a maximum of 30 hops:
1     *      *      *   Request timed out.
2    10ms   10ms   10ms  68.85.221.221
3    10ms   10ms   20ms  68.86.179.166
4     *      *      *   Request timed out.
5     *      *      *   Request timed out.
6     *      *      *   Request timed out.
7     *      *      *   Request timed out.
8     *      *
```

To get an update of the results, you must select the REFRESH button above.

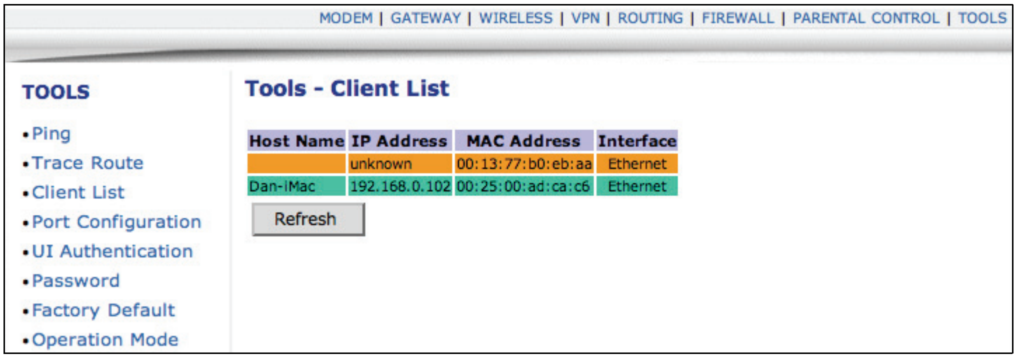
Label	Description
Tracert Target	Enter the specific IP address or domain (e.g. yahoo.com) to which you want to trace a route.
MAX Hops	Define the MAX hops. Hops is the number routers that the trace route traverses.

Time Out	Enter the expiration time for this trace route operation.
Start Test/Abort Test/Clear Results	Click Start to start the trace route test. Click Abort Test to cancel the test. Click Clear Results to clear the displayed trace route results.
Results/Refresh	This Results area of the screen displays the trace route results. Click Refresh to update the screen with on-going trace route tests.

3.11.3 Tools - Client List

The **Client List** option displays connected computers to the DDW3612 Wireless Cable Modem Gateway.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Tools** link from the top of the screen.
3. Click **Client List** from the left side of the screen. The **Client List** fields are explained following this screen example.



Tools - Client List

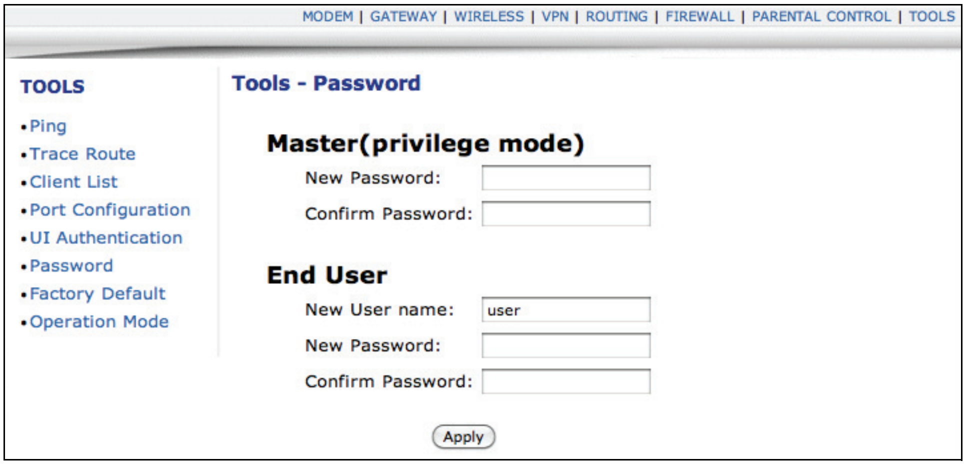
Host Name	IP Address	MAC Address	Interface
	unknown	00:13:77:b0:eb:aa	Ethernet
Dan-iMac	192.168.0.102	00:25:00:ad:ca:c6	Ethernet

Label	Description
Hostname/IP Address/MAC Address	DHCP Clients currently connected to the DDW3612 Wireless Cable Modem Gateway are displayed in this list and are identified by the hostname, IP address, and MAC address of the connected devices.
Interface	The method that clients are connected to the device is displayed (for example, ethernet LAN, Wireless).
Refresh	Click to refresh the client list. This may be useful when testing network connectivity between connecting clients and the DDW3612 Wireless Cable Modem Gateway.

3.11.4 Tools - Password

The **Password** option allows you to change the password for the **user** login on the DDW3612 Wireless Cable Modem Gateway. This login is used to access this web interface.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Tools** link from the top of the screen.
3. Click **Password** from the left side of the screen. The **Password** fields are explained following this screen example.



Tools - Password

Master(privilege mode)

New Password:

Confirm Password:

End User

New User name: user

New Password:

Confirm Password:

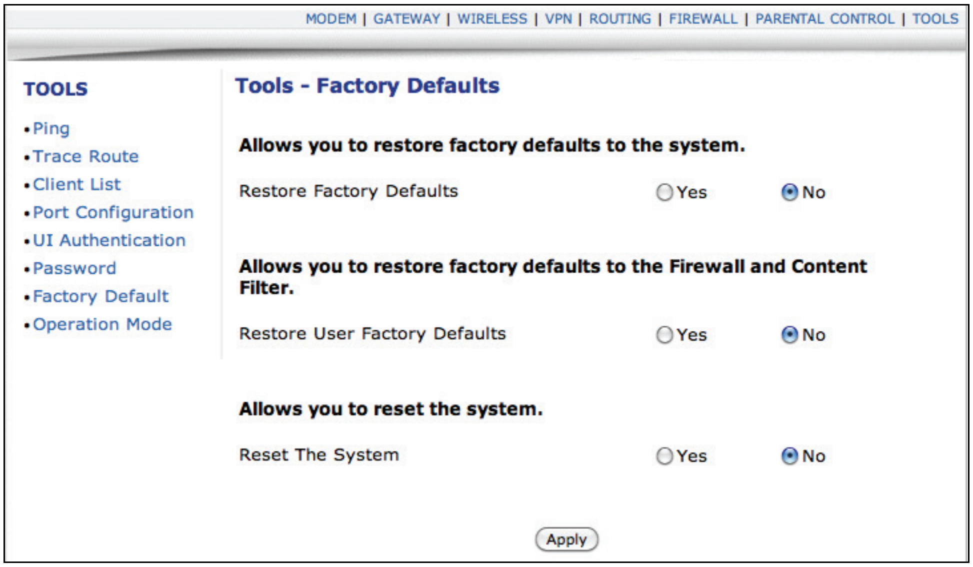
Label	Description
Master **New Password/Confirm Password**	N/A for end users.
End User **New User Name/Password/Confirm Password**	Enter a new user name, if desired for the **user** account to the web interface of the DDW3612 Wireless Cable Modem Gateway. See page 4 for more information. Enter the new Password. Re-enter the password to Confirm. Click Apply to save the changes.

3.11.5 Tools - Factory Default

The **Factory Default** option allows you to restore factory defaults to the system. All parameters set in the device will be reset. Select the items to reset and select the option to **Reset the System**.

Note: Restoring factory defaults to the system resets the **user** and **mso** logins to the device. Refer to page 4 for the default values.

1. Access the web interface. Refer to page 7, if needed.
2. Click the **Tools** link from the top of the screen.
3. Click **Factory Default** from the left side of the screen. The **Factory Default** fields are explained following this screen example.



Tools - Factory Defaults

Allows you to restore factory defaults to the system.

Restore Factory Defaults ○ Yes ● No

Allows you to restore factory defaults to the Firewall and Content Filter.

Restore User Factory Defaults ○ Yes ● No

Allows you to reset the system.

Reset The System ○ Yes ● No

Label	Description
Restore Factory Defaults	Select Yes to have the wireless router reset all configured options in the device to factory default settings.
Restore User Factory Defaults	Select Yes to restore the wireless router to default settings for the firewall and content filter settings. This operation does not require a reset of the system, discussed below.
Reset The system	Select Yes to power cycle and rest the wireless router.
Apply	Click Apply to complete the options selected in this screen.