5354

Docsis 3.0 Cable Modem /Router with Wireless N User Manual

VER: 1.0

Contents

1 Safety Precautions 1
2 Overview 2
2.1 Application 2
2.2 Features 2
2.3 Standards Compatibility and Compliance 3
3 Hardware Description and Hardware Installation 4
3.1 Hardware Description 4
3.1.1 Front Panel 4
3.1.2 Rear Panel 5
3.2 Hardware Installation 5
3.2.1 Connecting the Device 5
4 PC Network Configuration and Login 6
4.1 PC Network Configuration 6
4.2 Logging In to the 5354 Cable Modem 8
5 Web-Based Management 9
5.1 Status 9
5.1.1 Software 9
5.1.2 Connection 10
5.1.3 Security 11
5.1.4 Diagnostics 11
5.2 Basic 12
5.2.1 Setup 13
5.2.2 DHCP 15
5.2.3 DHCPv6 16
5.2.4 LAN IPv6 17
5.2.5 DDNS 17
5.2.6 Backup/Restore 18
5.3 Advanced 20
5.3.1 Options 20
5.3.2 IP Filtering 22
5.3.3 MAC Filtering 22
5.3.4 Port Filtering 23

5.3.5 Forwarding 24
5.3.6 Port Triggers 25
5.3.7 DMZ Host 25
5.3.8 RIP Setup 26
5.4 Firewall 29
5.4.1 Basic 29
5.4.2 Event Log 30
5.5 Parental Control 31
5.5.1 User Setup 32
5.5.2 Basic 32
5.5.3 ToD Filter 33
5.5.4 Event Log 34
5.6 VPN 34
5.6.1 Basic 35
5.6.2 IPsec 35
5.6.3 L2TP/PPTP 36
5.6.4 Event Log 37
5.7 Wireless 37
5.7.1 Radio 38
5.7.2 Primary Network 40
5.7.3 Guest Network 43
5.7.4 Advanced 44
5.7.5 Access Control 46
5.7.6 WMM 47
5.7.7 Bridging 49
5.7.8 Media 49
5.8 USB 50
5.8.1 USB Basic 50
5.8.2 Approved Devices 51
5.8.3 Storage Basic 52
5.8.4 Storage Advanced 52
5.8.5 Media Server 53
5.9 Logout 54
6 Q&A 55

1 Safety Precautions

Read the following information carefully before operating the device. Please follow the following precaution items to protect the device from risks and damage caused by fire and electric power:

- Use volume labels to mark the type of power.
- Use the power adapter that is packed within the device package.
- Pay attention to the power load of the outlet or prolonged lines. An overburden power outlet or damaged lines and plugs may cause electric shock or fire accident. Check the power cords regularly. If you find any damage, replace it at once.
- Proper space left for heat dissipation is necessary to avoid any damage caused by overheating to the device. The holes on the device are designed for heat dissipation to ensure that the device works normally. Do not cover these heat dissipation holes.
- Do not put this device close to a place where a heat source exits or high temperature occurs. Avoid the device from direct sunshine.
- Do not put this device close to a place where is over damp or watery. Do not spill any fluid on this device.
- Do not connect this device to any PC or electronic product, unless our customer engineer or your broadband provider instructs you to do this, because any wrong connection may cause any power or fire risk.
- Do not place this device on an unstable surface or support.
- The screen of the coaxial cable is intended to be connected to earth in the building installation.

2 Overview

The 5354 is targeted towards DOCSIS/EuroDOCSIS3.0 cable modem, eMTA and gateway. With eight downstream channels and four upstream channels, it supports up to 400Mbs/160Mbs. The 5354 incorporates a variety of industry standard peripheral interfaces including dual IEEE802.3 10/100/1000Mbps interface, one with integrated GPHY, and dual USB2.0 interfaces(Host and Host/Device) with integrated PHYs. The 5354 supports WLAN access. It complies with IEEE 802.11,802.11b/g and 802.11n specifications, WEP, WPA, and WPA2 security specifications. The WLAN of the 5354 supports 2T2R.

2.1 Application

- Home gateway
- SOHOs
- Small enterprises
- Higher data rate broadband sharing
- Audio and video streaming and transfer
- PC file and application sharing
- Network and online gaming

2.2 Features

- User-friendly GUI for web configuration
- Several pre-configured popular games. Just enable the game and the port settings are automatically configured.
- Compatible with all standard Internet applications
- WLAN with high-speed data transfer rates of up to 300 Mbps, compatible with IEEE 802.11b/g/n, 2.4GHz compliant equipment
- IP routing and bridging
- Network/port address translation (NAT/PAT)
- Wireless LAN security: WPA, 802.1x, RADIUS client
- Universal plug-and-play(UPnP)
- File server for network attached storage (NAS) devices
- Web filtering

- Remote update
- System statistics and monitoring

2.3 Standards Compatibility and Compliance

- Support application level gateway (ALG)
- DOCSIS/EuroDOCSIS3.0
- IEEE 802.3
- IEEE 802.3u
- IEEE 802.11b
- IEEE 802.11g
- IEEE 802.11n

3 Hardware Description and Hardware Installation

3.1 Hardware Description

3.1.1 Front Panel

The following table describes the indicators on the front panel.

Indicator	Color	Status	Description
Power	Green	On	The device is powered on and the device operates normally.
		Off	The device is powered off.
D/S	Green	On	CM has locked D/S frequency
		Blink	CM scan D/S frequency
		Off	Device is powered off.
U/S	Green	On	CM has locked U/S frequency
		Blink	CM is range and scan U/S frequency
		Off	Device is powered off or CM scan D/S frequency.
Ethernet 1/2/3/4	Green	On	The Ethernet interface is connected.
		Blink	Data is being transmitted through the Ethernet interface.
		Off	The Ethernet interface is disconnected.
WLAN	Green	On	WLAN is enabled.
		Blink	Data is being transmitted through the wireless interface.
		Off	WLAN is disabled.
WPS	Green	On	Connection succeeds under Wi-Fi Protected Setup.
		Blink	Negotiation is in progress under Wi-Fi Protected Setup.
		Off	Wi-Fi Protected Setup is disabled.
USB	Green	On	The connection of USB flash disk has established.
		Off	No signal is detected.

3.1.2 Rear Panel

The following table describes the interfaces or the buttons on the rear panel.

Interface	Description
Antenna	The antenna interface, for connecting the antennas.
Cable	RF cable port, for connecting HFC cable.
Reset	Press the button for at least 1 second and then release it. System restores the factory default settings.
Eth 4~1	RJ-45 port, for connecting the router to a PC or another network device.
USB 0~1	USB port, for connecting other USB storage devices.
Power	Power interface, for connecting the power adapter.

⚠ **Warning:**

*Do not press the **Reset** button unless you want to clear the current settings. The **Reset** button is in a small circular hole on the rear panel. If you want to restore the default settings, please press the **Reset** button gently for 1 second with a fine needle inserted into the hole and then release the button. The system reboots and returns to the factory defaults.*

3.2 Hardware Installation

3.2.1 Connecting the Device

Please follow the steps below to connect the device.

Step1 Connect the **Cable** port of the CMRG with HFC cable.

Step2 Connect the **Eth** port of the CMRG to the network card of the PC via an Ethernet cable.

Step3 Plug one end of the power adapter to the wall outlet and connect the other end to the **Power** port of the CMRG.

4 PC Network Configuration and Login

4.1 PC Network Configuration

Each network interface on the PC should either be configured with a statically defined IP address and DNS address, or be instructed to automatically obtain an IP address using the network DHCP server. 5354 provides a DHCP server on its LAN and it is recommended to configure your LAN to automatically obtain its IP address and DNS server IP address.

The configuration principle is identical but should be carried out differently on each operating system.

The following displays the **TCP/IP Properties** dialog box on Windows XP.

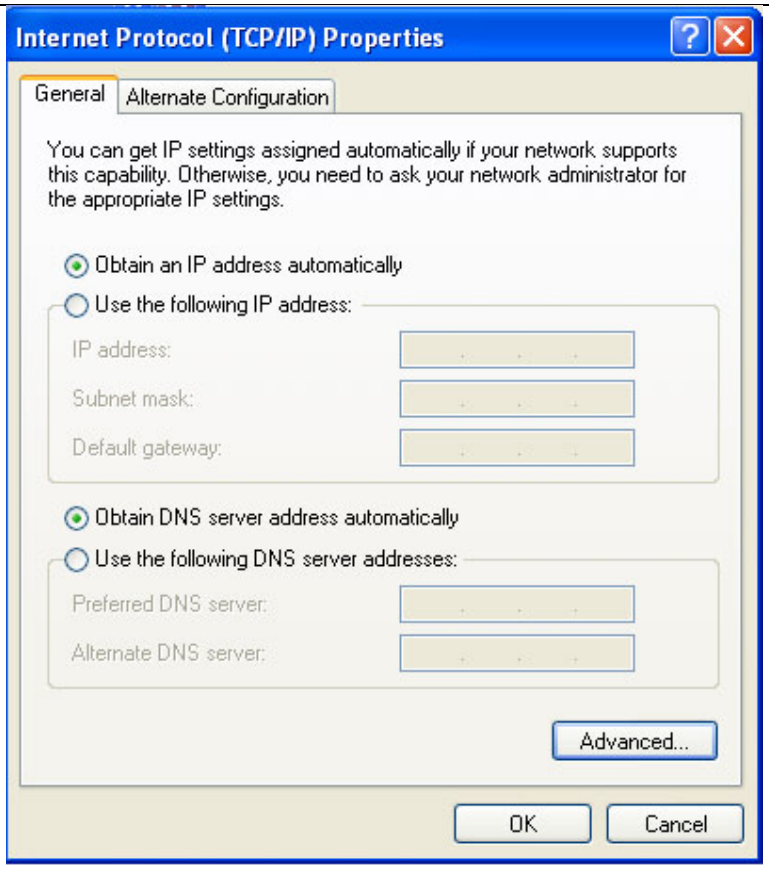

Figure 1 IP and DNS configuration

TCP/IP configuration steps for Windows XP are as follows:

Step1 Choose **Start** > **Control Panel** > **Network Connections**.

Step2 Right-click the Ethernet connection icon and choose **Properties**.

Step3 On the **General** tab, select the **Internet Protocol (TCP/IP)** component and click **Properties**.

Step4 The **Internet Protocol (TCP/IP) Properties** window appears.

Step5 Select the **Obtain an IP address automatically** radio button.

Step6 Select the **Obtain DNS server address automatically** radio button.

Step7 Click **OK** to save the settings.

4.2 Logging In to the 5354 Cable Modem

To log in to the 5354cable modem, do as follows:

Step1 Open a Web browser on your computer.

Step2 Enter ***http://192.168.100.1*** (the default IP address of the 5354cable modem) in the address bar. The login page appears.

Step3 Enter the user name and the password. The default Username is **admin** and the Password is **admin**.

Step4 Click **Login** to log in to the 5354 cable Modem.

Figure 2 Login page

After logging in to the 5354 cable modem, you can query, configure, and modify all the settings, and diagnose the system.

5 Web-Based Management

This chapter describes how to use Web-based management of the Cable Modem, which allows you to configure and control all of cable modem residential gateway features and system parameters in a user-friendly GUI.

5.1 Status

Choose **Status**, and the submenus of **Status** are shown as below.

Figure 3 Submenus of status

5.1.1 Software

Choose **Status > Software** , and the following page appears.

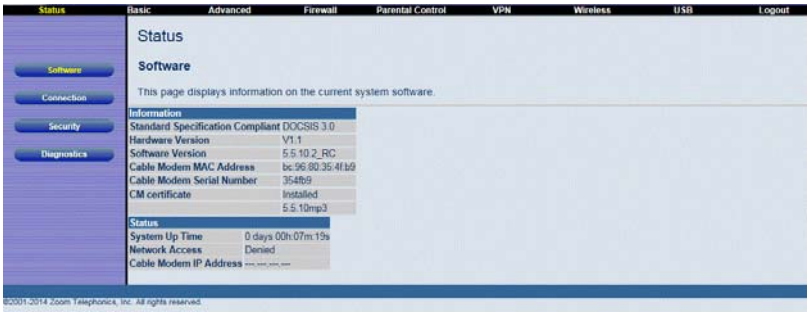

Figure 4 Software page

This page displays information about the hardware version, software version, MAC address, cable modem IP address, serial number, system “up” time, and network registration status.

5.1.2 Connection

Choose **Status > Connection** and the following page appears.

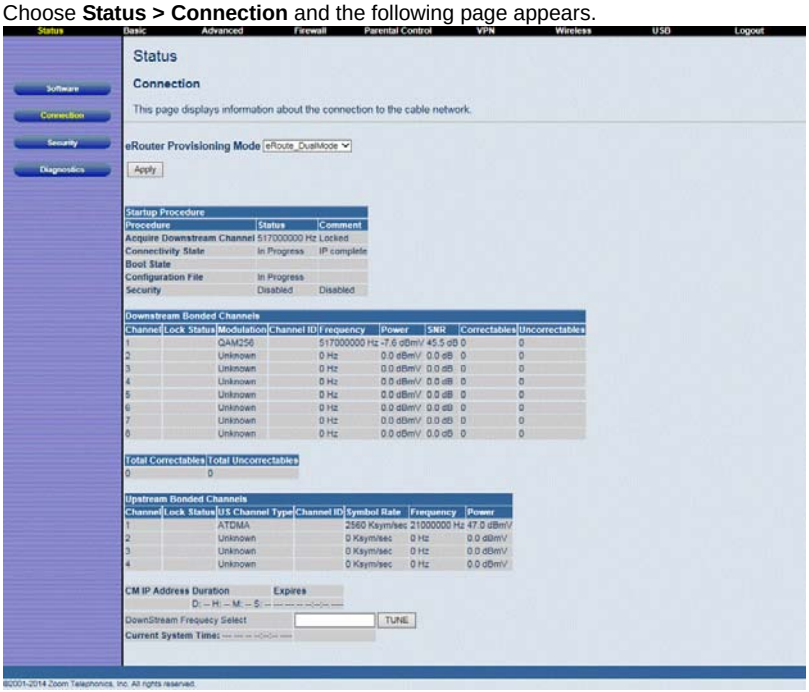

Figure 5 Connection information

This page displays information about the RF upstream and downstream channels, including downstream channel frequencies, upstream channel IDs, and upstream and downstream signal power and modulation.

This page also displays IP lease information, including the current IP address of the cable modem, the duration of both leases, the expiration time of both leases, and the current system time from the DOCSIS timeserver.

The information on this page can be refreshed at any time by clicking your web browser's Refresh button.

5.1.3 Security

Choose **Status > Connection** and the following page appears.

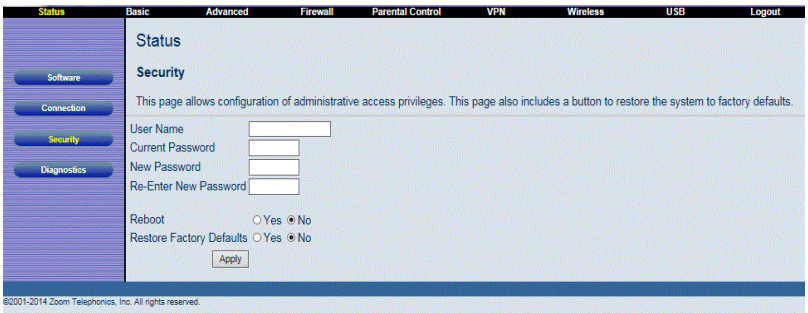

Figure 6 Security configuration

To restore factory defaults, select the Yes radio button and click Apply. This will cause the device to reset. The factory default password is "Broadcom" and is case sensitive.

Note that you can also change the security password from this page by entering a new password in both the New Password and Re-Enter New Password fields, and the current password in the Current User ID Password field. Clicking Apply will change the password. You do NOT have to restore factory defaults to change the password.

5.1.4 Diagnostics

Choose **Status > Diagnostics** and the following page appears.

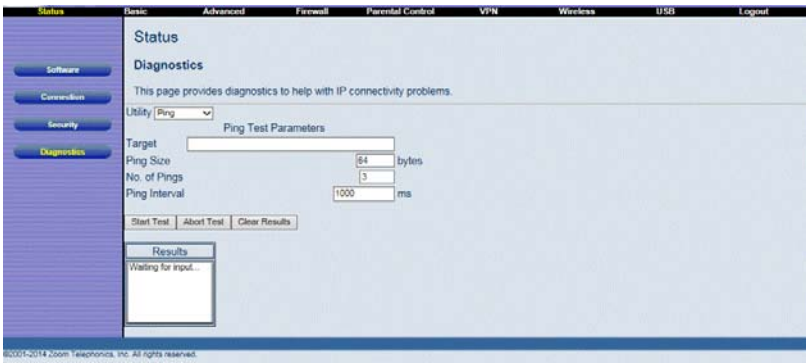

Figure 7 Diagnostic information

Two utilities are provided for troubleshooting network connectivity: Ping and Traceroute.

Ping allows you to check connectivity between the CMRG and devices on the LAN.

Traceroute allows you to map the network path from the CMRG to a public host. Selecting Traceroute from the drop-down Utility list will present alternate controls for the traceroute utility: To run either utility, make any changes to the default parameters and select Start Test to begin. The window will automatically be refreshed as the results are displayed in the Results table.

5.2 Basic

Choose **Basic** and the submenus of **Basic** are shown as below.

Figure 8 Submenus of basic

5.2.1 Setup

Choose **Basic > Setup** , and the following page appears.

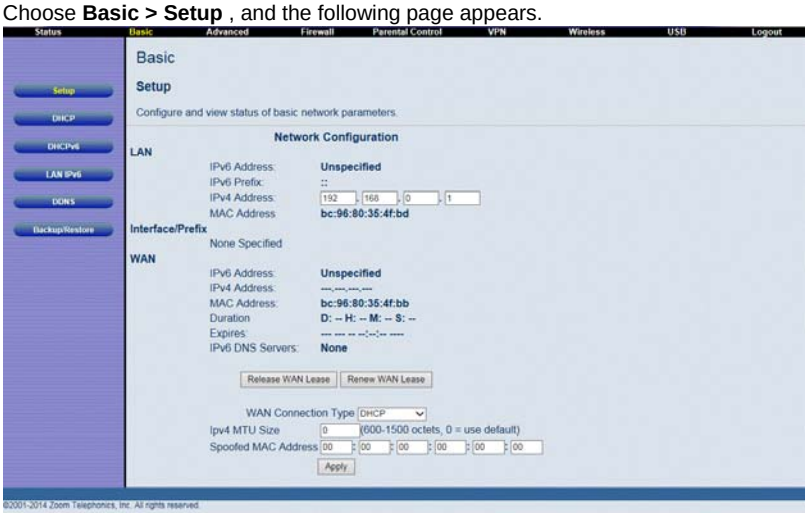

Figure 9 Setup configuration

Enter the information from the Required Information section as indicated:

1.If your ISP uses DHCP, select “DHCP” for the WAN Connection Type, and enter Host Name and Domain name if required. OR

If your ISP uses static IP addressing, select “Static IP” for the WAN Connection Type, and enter the information provided by your ISP for Static IP Address, Static IP Mask, Default Gateway, Primary DNS, and Secondary DNS.

2.Enter a unicast MAC address in the Spoofed MAC Address field. Your ISP may require this to be your PC’s MAC address. If not, you can simply supply the WAN side MAC address of the router as your CPE and leave the spoofed MAC address entry set to all 0’s, since there will be no spoofing required.

3.Select the Apply button. This will reset the CMRG.

At this point, the CMRG is configured for basic use. To connect to the Internet, you must do the following:

1.Power up the CMRG and wait for it to register with the CMTS and obtain an Internet-routable IP address

2.Get an IP lease from the internal DHCP server for each PC attached to the CMRG.

Note that communication on the LAN will work regardless of whether the WAN connection provided by the cable modem is up. However, you will not be able to access the Internet until the WAN connection is enabled and has an IP address.

Some configurations settings are retrieved only once from non-volatile storage when the CMRG first powers up. One such setting is changing the Static WAN IP address parameters. Any changes to these settings will force the CMRG to reset so that the new configuration can be read from non-volatile storage.

When this mandatory reset is required, the web interface will notify as follows:

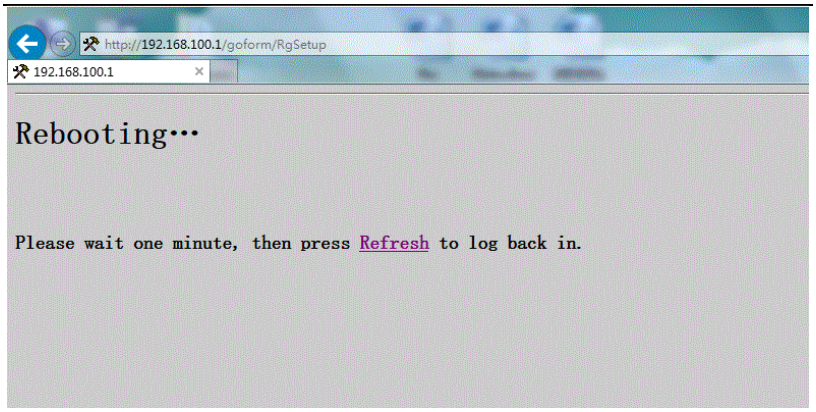

Figure 10 Reload page

Simply wait for the modem to reboot and click on the “Refresh” link to re-enter the web interface where you made your last change.

Most configuration items may be changed on the fly without a reboot.

5.2.2 DHCP

Choose **Basic > DHCP,** and the following page appears.

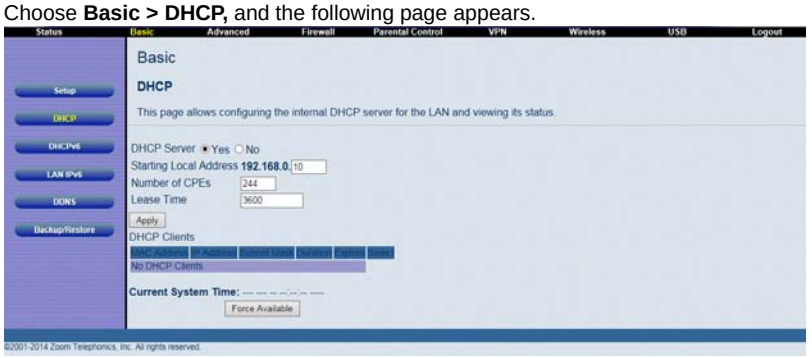

Figure 11 DHCP configuration

This page allows configuration and status of the optional internal DHCP server for the LAN.

If you have your own DHCP server servicing the LAN side (or choose to “hardcode” all of your PC’s IP addresses), you can disable the internal DHCP server by selecting the No radio button. If you do this, make sure the IP address assigned to the CMRG is on the same subnet as the external DHCP server (the subnet mask is always 255.255.255.0), or you won’t be able to access the CMRG from the LAN. The IP address of the CMRG can be set from the Basic Setup page.

You can also set the starting IP address for IP leases available to the LAN, and change the number of PCs supported on the LAN. In the case above, addresses 192.168.0.2 through 192.168.0.9 can be used as hard-coded IP addresses with no fear of IP address conflict with the DHCP pool. Configured WINS server addresses can also be passed to CPEs behind the CMRG via DHCP.

5.2.3 DHCPv6

Choose **Basic > DHCPv6** , and the following page appears.

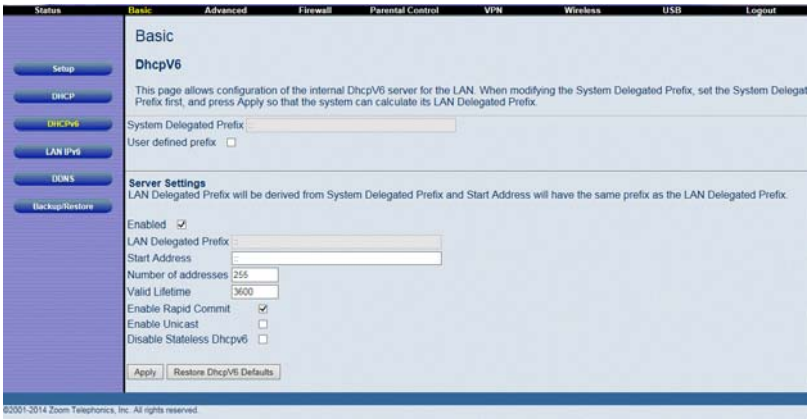

Figure 12 DHCPv6 configuration

This page allows configuration of the internal DhcpV6 server for the LAN. When modifying the System Delegated Prefix, set the System Delegated Prefix first, and press Apply so that the system can calculate its LAN Delegated Prefix.

5.2.4 LAN IPv6

Choose **Basic > LAN IPv6** , and the following page appears.

Figure 13 LAN IPv6 information

This page displays information related to IPv6 on the LAN.

5.2.5 DDNS

Choose **Basic > DDNS** , and the following page appears.

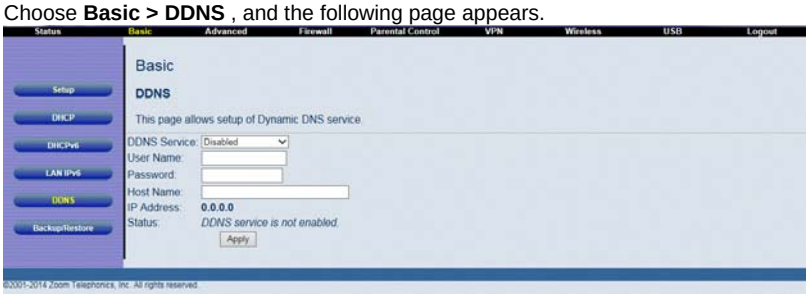

Figure 14 DDNS setup

This page is used to configure DDNS. Dynamic DNS (DDNS) allows a dynamic IP address to be aliased to a static, pre-defined host name so that the host can be

easily contacted by other hosts on the internet even if its IP address changes. The CMRG supports a dynamic DNS client compatible with the Dynamic DNS service (http://www.dyndns.com/).

To activate the DDNS client:

1. Go to the DynDNS website and create an account for the Dynamic DNS service. You will create a username and password, and be asked to choose a host name for your server, and the dynamic DNS domain to which your host will be assigned. You will also be asked for your host's current IP address. This is the WAN IP address that has been assigned to your CMRG during provisioning. (See WAN IP Address on the Basic / Setup web page.)
2. Enter your account information on the Basic / DDNS web page, enable the service by selecting www.DynDNS.org from the DDNS Service drop-down list, and click Apply.
3. The DDNS client will notify the DDNS service whenever the WAN IP address changes so that your chosen host name will be resolved properly by inquiring hosts. The current status of the service is shown at the bottom of the DDNS web page.

5.2.6 Backup/Restore

Choose **Basic > Backup/Restore** and the following page appears.

Figure 15 Backup/Restore setup

In this page, you can save the current CMRG configuration settings to a local PC. You can then later restore these settings if you need restore a particular configuration, or to recover from changes you may have made that have had an undesirable effect.

To backup the current configuration, click Backup and follow the prompts.

To restore a previous configuration, click Browse and use the navigation window to locate the file. (Usually GatewaySettings.bin, unless you rename it before saving.) Once the file has been located, click Restore to restore the settings. Note that once the settings are restored, the device will reboot.

5.3 Advanced

Choose **Advanced** and the submenus of **Advanced** are shown as below.

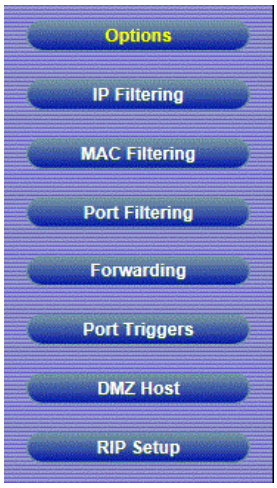

Figure 16 Submenus of advanced

5.3.1 Options

Choose **Advanced > Options** to display the following page.

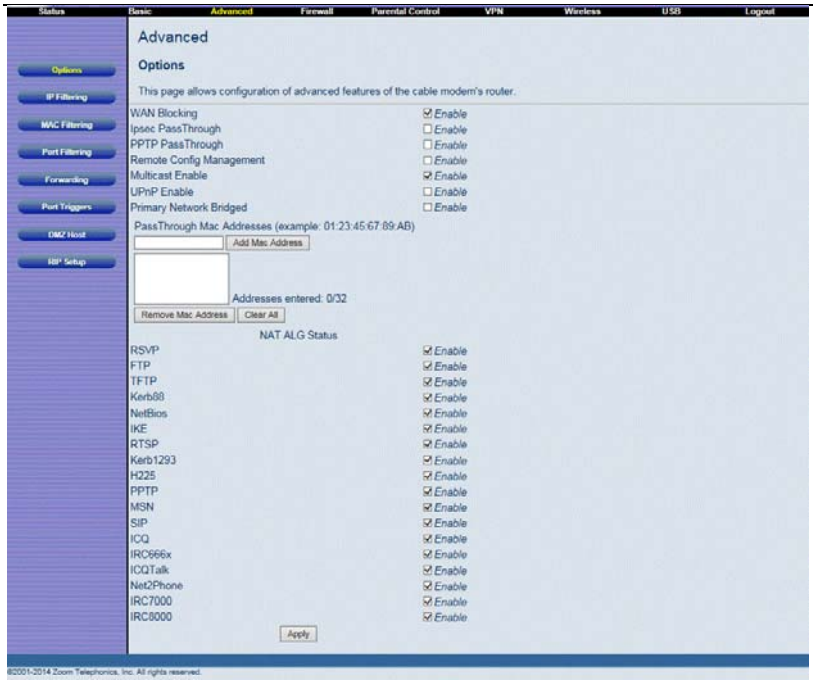

Figure 17 Options configuration

This page allows you to configure the accessible features.

To enable a feature, click the appropriate check box until it is “checked”. When you are satisfied with your selections, click on the Apply button. These features can be modified on the fly without a system reset.

“WAN Blocking” prevents the CMRG or the PCs behind it from being visible to the WAN. For instance, pings to the CMRG’s WAN IP address or the PCs behind it are not returned. Therefore, it will be more difficult for hacker to discover your WAN IP address to begin an attack on your private LAN.

“IpSec” and “PPTP” (Point-to-Point Tunneling Protocol) pass-through modes enable these protocols to be used through the CMRG such that a VPN device (or software) may communicate properly with the WAN.

“Remote Configuration Management” allows the CMRG to be administered (configured) from the WAN via surfing to the WAN IP address on port 8080 of the CMRG from anywhere on the Internet (e.g. at the browser URL window enter http://WanIPAddress:8080/ to access the CMRG remotely).

“Multicast Enable” allows multicast specific traffic (denoted by a multicast specific

address) to be passed to and from the PC's on the private network behind the CMRG. "UPnP Enable" enables the UPnP agent in the CMRG. If you are running a CPE application that requires UPnP, check this box.

5.3.2 IP Filtering

Choose **Advanced > IP Filtering** to display the following page.

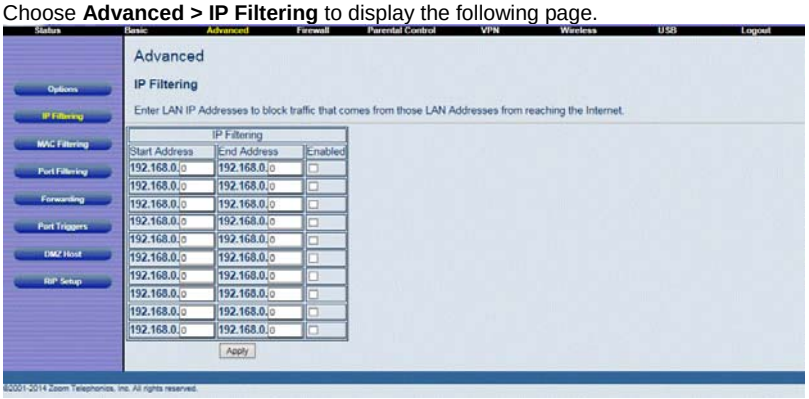

Figure 18 IP Filtering configuration

This page allows you to configure the CMRG to prevent local PCs from getting access to the WAN by specifying those IP addresses that should be filtered.

By entering starting and ending IP address ranges, you can configure which local PCs are denied access to the WAN. Note that you only need to enter the LSB (Least-significant byte) of the IP address; the upper bytes of the IP address are set automatically from the CMRG IP address. To activate the IP address filter, you must also check the "enable" box and click apply. The enable box allows you to store filter settings commonly used but not have them active.

5.3.3 MAC Filtering

Choose **Advanced > MAC Filtering** to display the following page.

Figure 19 MAC filtering configuration

This page is used to prevent PCs from sending outgoing TCP/UDP traffic to the WAN via their MAC address

This is useful for the fact that the MAC address of a specific NIC card never changes, unlike its IP address which can be assigned via DHCP server or hard-coded to various addresses over time.

5.3.4 Port Filtering

Choose **Advanced > Port Filtering** to display the following page.

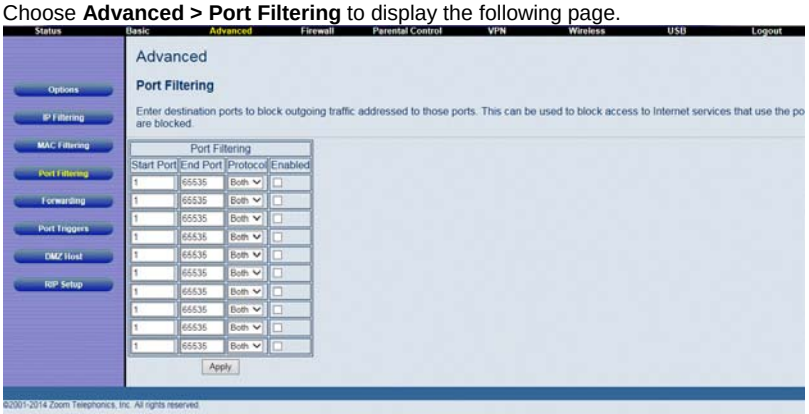

Figure 20 Port Filtering configuration

This page is used to prevent PCs from sending outgoing TCP/UDP traffic to the WAN on specific IP port numbers.

By specifying a starting and ending port range, you may determine what TCP/UDP traffic is allowed out to the WAN on a per-port basis. Note the specified port ranges are blocked for ALL PCs and this setting is not IP address or MAC address specific. For instance, if you would like to block all PCs on the private LAN from accessing HTTP sites (or “web surfing”), you would set the “Start Port” to 80, the “End Port” to 80, the “Protocol” to TCP, check the “Enabled” box, and click Apply.

5.3.5 Forwarding

Choose **Advanced > Forwarding** to display the following page.

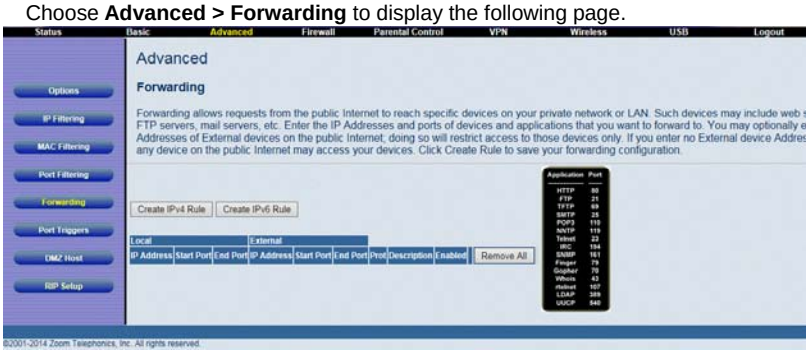

Figure 21 Forwarding

This allows for incoming requests on specific port numbers to reach web servers, FTP servers, mail servers, etc. so they can be accessible from the public internet. A table of commonly used port numbers is also provided.

Forwarding allows you to run a publicly accessible server on the LAN by specifying the mapping of TCP/UDP ports to a local PC

To specify a mapping, you must enter the range of port numbers that should be forwarded locally, and the IP address to which traffic to those ports should be sent. If only a single port specification is desired, enter the same port number in the “start” and “end” locations for that IP address. A table of commonly used Port numbers is supplied on the page for convenience.

If both external and Local/internal port numbers are present, the Local port number is a mandatory field and the external port number is optional. If the external port number is used, the RG will perform a translation from external port number to internal port number.

5.3.6 Port Triggers

Choose **Advanced > Port Triggers** to display the following page.

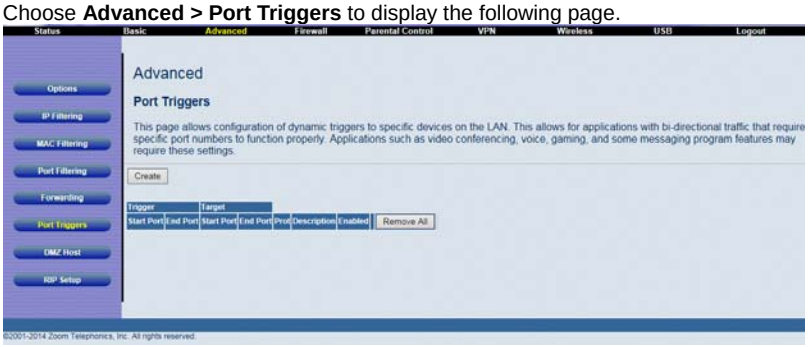

Figure 22 Port Triggers

Port Triggers are similar to Port Forwarding except that they are not static ports held open all the time. When the CMRG detects outgoing data on a specific IP port number set in the “Trigger Range”, the resulting ports set in the “Target Range” are opened for incoming (or sometimes referred to as bi-directional ports) data. If no outgoing traffic is detected on the “Trigger Range” ports for 10 minutes, the “Target Range” ports will close. This is a safer method for opening specific ports for special applications (e.g. video conferencing programs, interactive gaming, file transfer in chat programs, etc.) because they are dynamically triggered and not held open constantly or erroneously left open via the router administrator and exposed for potential hackers to discover.

5.3.7 DMZ Host

Choose **Advanced > DMZ Host** to display the following page.

Figure 23 DMZ Host setup

DMZ (De-militarized Zone) hosting (also commonly referred to as “Exposed Host”) allows you to specify the “default” recipient of WAN traffic that NAT is unable to translate to a known local PC. This can also be described as a computer or small sub-network that sits between the trusted internal private LAN, and the untrusted public Internet.

You may configure one PC to be the DMZ host. This setting is generally used for PC’s using “problem” applications that use random port numbers and do not function correctly with specific port triggers or port forwarding setups mentioned earlier. If a specific PC is set as a DMZ Host, remember to set this back to “0” when finished with the needed application, since this PC will be effectively exposed to the public Internet, though still protected from Denial of Service (DoS) attacks via the Firewall.

5.3.8 RIP Setup

Choose **Advanced > RIP Setup** to display the following page.

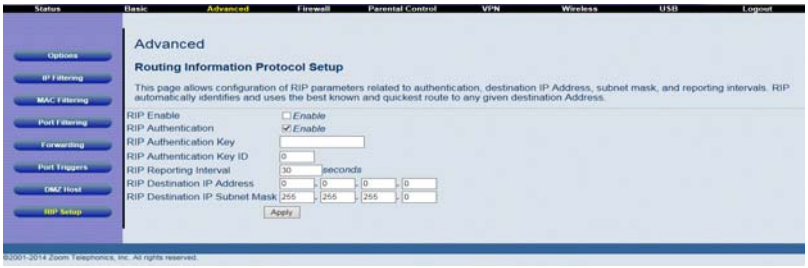

Figure 24 RIP Setup

RIP (Router Information Protocol) is used in WAN networks to identify and use the best known and quickest route to given destination addresses to help reduce network congestion and delays.

NOTE: RIP messaging will only be sent upstream when running in Static IP Addressing mode on the Basic – Setup page. You must enable Static IP Addressing and the set the Wan IP network information! RIP is normally a function that is tightly controlled via the ISP. RIP Authentication Keys and IDs are normally held as secret information from the end user to prevent unauthorized RIP settings.

RIP is a protocol that requires negotiation from both sides of the network (i.e. CMRG and CMTS). The ISP would normally set this up because of their knowledge of their CMTS settings to match the configuration in the CMRG.

To enable the CMRG to perform RIP, do the following (this example uses BRCMV2 as the RIP Authentication Key and 1 as the Key ID):

1.) To turn on RIP MD5 Authentication, check the “Enable” box.

2.) To specify a RIP MD5 Authentication Key String, type “BRCMV2” for this example.
key name = a string value to match CMTS key name value

3.) To specify a RIP MD5 Auth Key ID, type “1”
key number = a number to match the CMTS key number value

4.) To change the RIP annoucement interval, type in a number in seconds.reporting interval by default = 30 seconds

5.) To specify a RIP unicast destination IP address, enter the IP address and subnet mask.

To enable the CMTS for RIPv2 with MD-5 authentication (Cisco uBR example shown below):

1.) The following steps go through configuring RIPv2 for a Cisco CMTS. The network number used in this configuration will vary from network to network so use the network number that matches your set-up.

```
7223#configure terminal
7223(config)#key chain ubr
7223(config-keychain)#key 1
7223(config-keychain-key)#key-str BRCMV2
7223(config-keychain-key)#exit
7223(config-keychain)#exit
7223(config)#router rip
7223(config-router)#ver 2
```

```
7223(config-router)#no validate-update
7223(config-router)#passive-interface cable 2/0
7223(config-router)#network 10.0.0.0
7223(config-router)#exit
7223(config)#inter cable 2/0
7223(config-if)#ip rip receive ver 2
7223(config-if)#ip rip authentication mode md5
7223(config-if)#ip rip authentication key-chain ubr
7223(config-if)#exit
7223(config)#exit
```

In this example, we have named the key chain ‘ubr’. This was chosen arbitrarily. You can use any name you like as long as you specify the correct name when specifying which key chain to use for RIPv2 authentication.

2.) The next step is enable RIP debugging to ensure that the CMTS is receiving and authenticating messages from the residential gateway.

```
7223#debug ip rip
RIP protocol debugging is on
7223#term mon
```

The CMTS is now configured to accept RIPv2 messages. If the CMRG is registered on the CMTS, you should see messages that are similar to the message below:

```
00:28:41: RIP: received packet with MD5 authentication
00:28:41: RIP: received v2 update from 10.24.81.148 on Cable2/0
00:28:41:      10.24.81.0/24 via 10.24.81.148 in 1 hops
```

The CMRG has broadcast that is connected to the network 10.24.81.0/24 through the interface 10.24.81.148. This information is not very useful to the CMTS because it already knows that the network 10.24.81.0/24 is connected directly to one of its interfaces (Cable2/0). It ignores this message and doesn’t add any information to the IP routing table. Here is the IP routing table after the CMTS has received RIPv2 messages:

```
7223#sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
```

```
          * - candidate default, U - per-user static route, o - ODR
          P - periodic downloaded static route
Gateway of last resort is 10.24.95.17 to network 0.0.0.0
10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
  C        10.24.80.0/24 is directly connected, Cable2/0
  C        10.24.81.0/24 is directly connected, Cable2/0
  C        10.24.95.16/28 is directly connected, FastEthernet0/0
  S*    0.0.0.0/0 [1/0] via 10.24.95.17
```

In the example above, the CMRG was set up to send RIPv2 messages to the CMTS. The CMTS was also set up to receive these messages.

5.4 Firewall

Choose **Firewall** and the submenus of **Firewall** are shown as below.

Figure 25 submenus of Firewall

5.4.1 Basic

Choose **Firewall > Basic** to display the following page.

This page is used to block or exclusively allow different types of data through the CMRG from the WAN to the LAN.

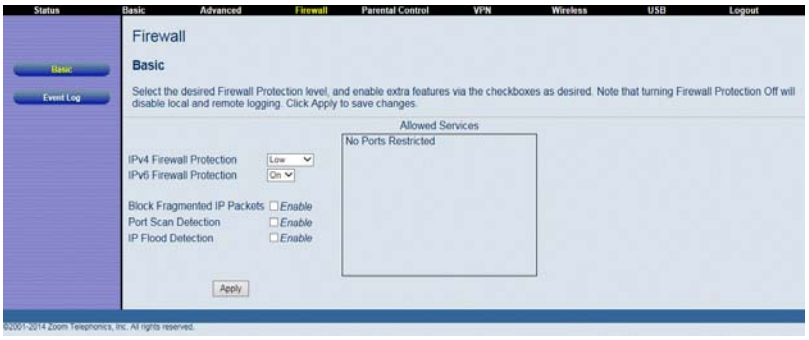

Figure 26 Basic configuration

The “low” setting does not block any services/ports, however it does protect against invalid packets and well known attacks. The “medium” setting will cause the firewall to drop a packet unless it is on a specific port of allowed services, The allowed services are listed on the same page. The “high” setting is similar to “medium”, but allows access to even fewer services. The “off” setting allows all traffic to pass.

Block Fragmented IP packets prevents all fragmented IP packets from passing through the firewall. Port Scan Detection detects and blocks port scan activity originating on both the LAN and WAN. IP Flood Detection detects and blocks packet floods originating on both the LAN and WAN. The Apply button must be clicked in order to activate any of the checkbox items. All of these settings can be activated on-the-fly without a CMRG reboot.

5.4.2 Event Log

Choose **Firewall > Event Log** to display the following page.

Figure 27 Event Log configuration

Configure the router to log a record of events to a local sysLog server on your LAN, and/or set up email alerts to warn of the events. First, select the events that you want logged and/or you want to be warned about. Second, enter the address of your local SysLog server, if you have one. Third, enter the email address and SMTP information where you want warnings to be sent, if applicable. Finally, click Apply for the settings to take effect. Note that you can view the most recent entries of the log information you have selected at the bottom of the page.

5.5 Parental Control

Choose **Parental Control** and the submenus of **Parental Control** are shown as below.

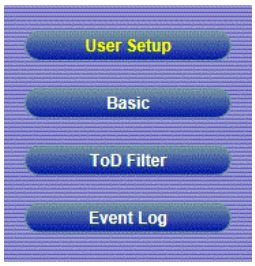

Figure 28 Submenus of Parental Control

5.5.1 User Setup

Choose **VPN > Basic** to display the following page.

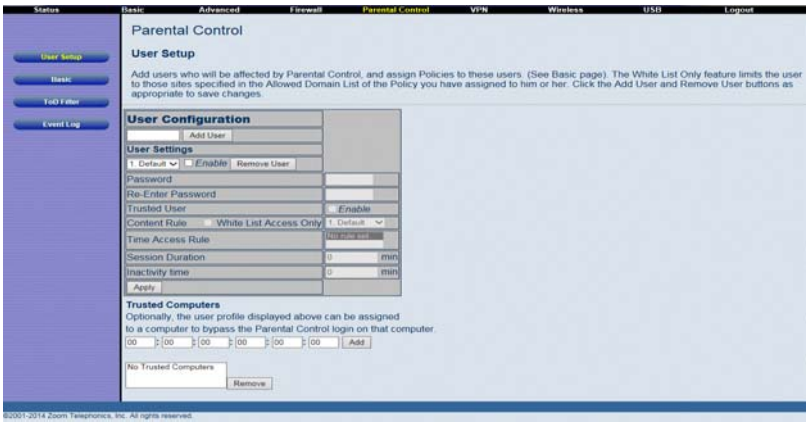

Figure 29 User Setup

Add users who will be affected by Parental Control, and assign Policies to these users. (See Basic page). The White List Only feature limits the user to those sites specified in the Allowed Domain List of the Policy you have assigned to him or her. Click the Add User and Remove User buttons as appropriate to save changes.

5.5.2 Basic

Choose **Parental Control > Basic** to display the following page.

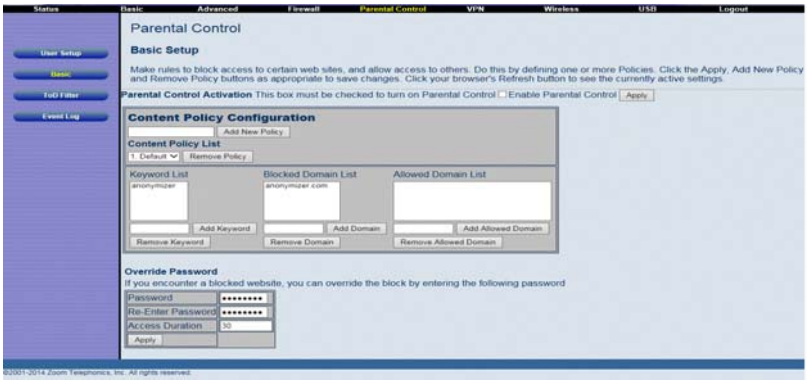

Figure 30 Basic configuration

Make rules to block access to certain web sites, and allow access to others. Do this by defining one or more Policies. Click the Apply, Add New Policy and Remove Policy buttons as appropriate to save changes. Click your browser's Refresh button to see the currently active settings.

5.5.3 ToD Filter

Choose **Parental Control > ToD Filter** and the following page will be shown.

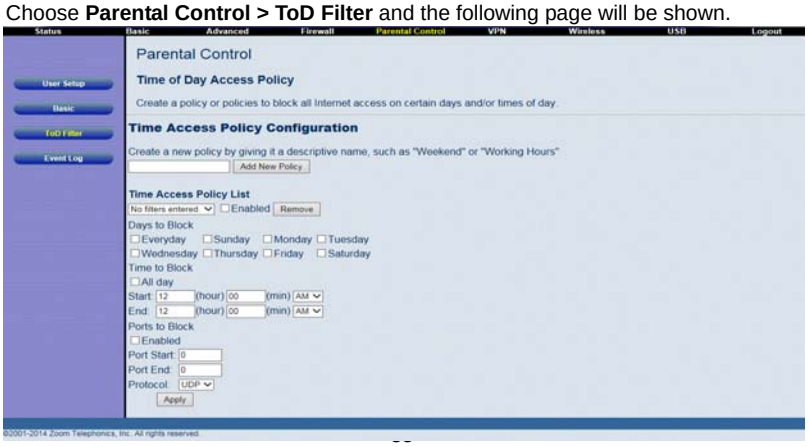

Figure 31 ToD Filter configuration

Create a policy or policies to block all Internet access on certain days and/or times of day.

5.5.4 Event Log

Choose **Parental Control > Event Log** and the page will be shown as below.

Figure 32 Event Log information

This page displays the Parental Control event log.

5.6 VPN

Choose **VPN** and the submenus of **VPN** are shown as below.

Figure 33 Submenus of **VPN**

5.6.1 Basic

Choose **VPN > Basic** to display the following page.

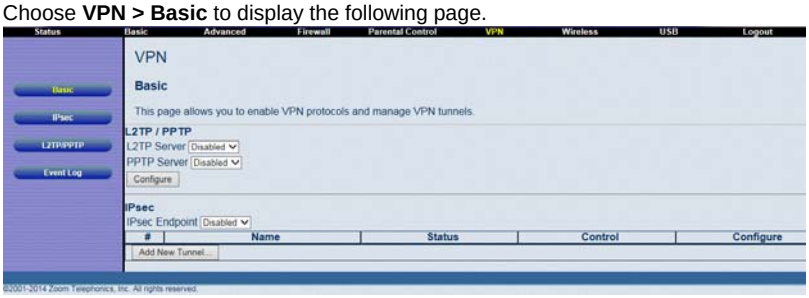

Figure 34 Basic settings

This page will show the status of configured tunnels .To start the process of manually adding a new tunnel , select the “Add New Tunnel” button.

5.6.2 IPsec

Choose **VPN > IPsec** to display the following page.

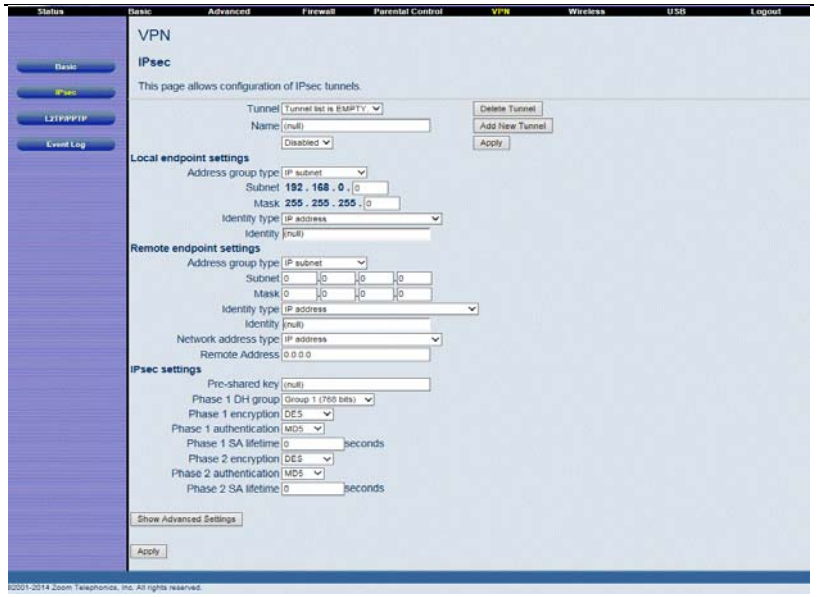

Figure 35 IPsec

In this page, you are allowed to configure all aspects of the IPSec tunnel.

5.6.3 L2TP/PPTP

Choose **VPN > L2TP/PPTP** to display the page below.

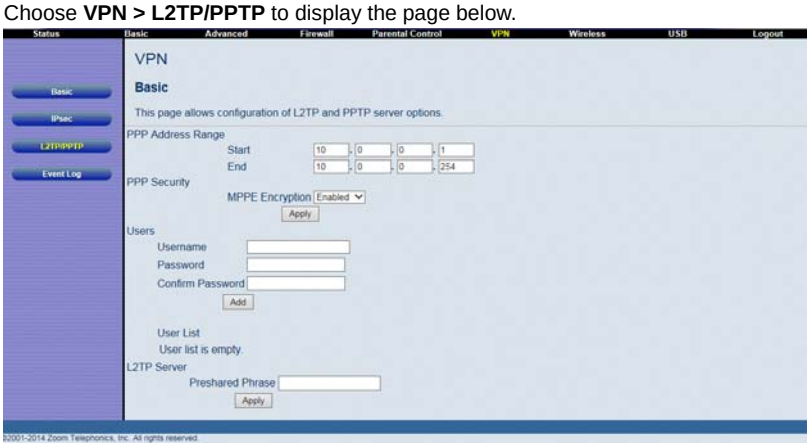

Figure 36 L2TP/PPTP setting

This page allows configuration of L2TP and PPTP server options.

5.6.4 Event Log

Choose **VPN > Event Log** to display the following page.

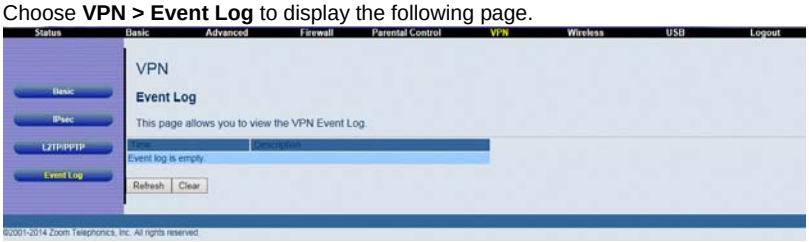

Figure 37 Event Log information

This page allows you to view the VPN Event Log.

5.7 Wireless

Choose **Wireless** and the submenus of **Wireless** are shown as below.

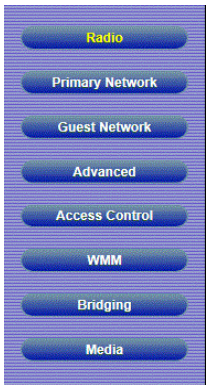

Figure 38 The submenus of Wireless

5.7.1 Radio

Choose **Wireless > Radio** to display the following page.

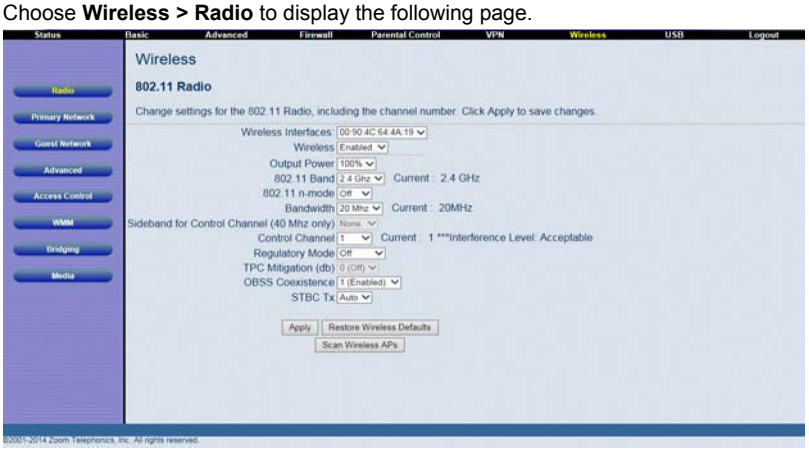

Figure 39 Radio setting

This page allows configuration of the physical parameters of your wireless network. The MAC address of the wireless interface is displayed at the top of the page.

Wireless:

Allows the wireless interface to be enabled and disabled.

Output Power:

Control the range of the AP by adjusting the radio output power.

802.11 Band:

Select whether the radio operates in the 2.4 GHz or 5 GHz band. There may be less interference from other wireless networks and household devices in the 5 GHz band, but 802.11b/g devices will not be able to connect.

802.11 n-mode:

Switch this to Off to force the AP to operate in 802.11g mode.

802.11 N Support Required:

If the 802.11 N support required field is set to “on”, then only .n capable stations are allowed to associate with the CM. If it’s set to “off” then b/g/n are all allowed.

Bandwidth:

802.11b/g channels are only 20 MHz wide, but 802.11n channels may be 40 MHz wide. There are some backward compatibility issues with 40 MHz channels though. These issues are more likely to be encountered in the 2.4 GHz band where legacy (802.11b/g) devices may be operating using 20 MHz channels.

Sideband for Control Channel (40 MHz only):

Whether the 20 MHz control channel uses the upper or lower half of the 40 MHz channel. Changes to this setting may change the control channel setting. For example (in the 2.4 GHz band), if the upper 20 MHz is selected as the sideband for the control channel, then the lowest control channel available would be channel 5 to allow the lower 20 MHz for data.

Regulatory Mode:

Selects either 802.11d or 802.11h modes of operation. These are amendments to the 802.11 specifications for solving interference issues with other transmission systems such as satellite or radar, and also transmission requirements in different parts of the world.

TPC Mitigation (dB):

Transmit Power Control mitigation factor in dB. Transmit Power Control is used to automatically reduce the transmission power when other networks are within range. This setting is only used when the Regulatory Mode is set to 802.11h.

OBSS Coexistence:

Enable/Disable Overlapping BSS Coexisistence. OBSS coexistence refers to the ability of the AP to support 20 MHz devices within 40 MHz channels. It also allows the AP to better deal with nearby 20 MHz devices that are interfering with part of its 40 MHz channel.

STBC Tx:

STBC :Space Time Block Code. Switch to on will obtain the full antenna gain.

Scan Wireless AP's:

Force the Modems Access Point to scan for other AP's within receive range.

Apply:

When any of the above settings are changed, the Apply button must be clicked in order to activate them.

5.7.2 Primary Network

Choose **Wireless > Primary Network** to display the following page.

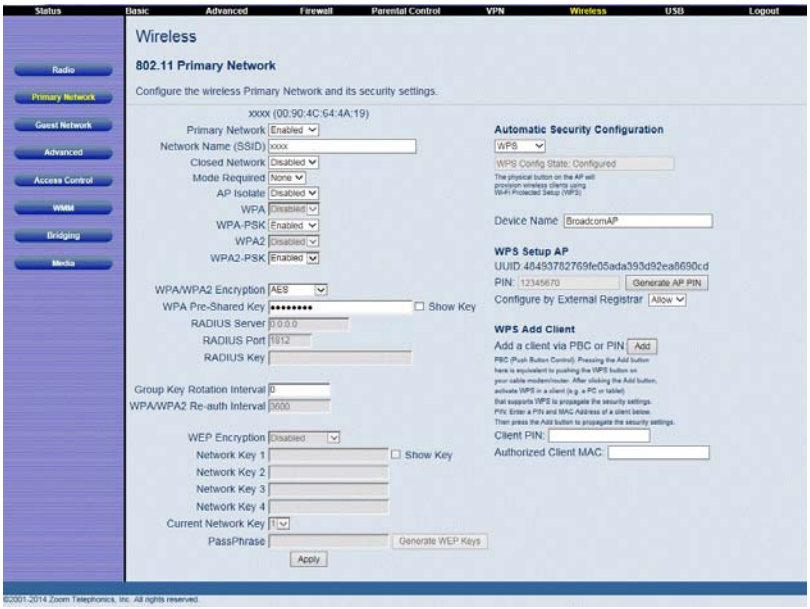

Figure 40 Primary Network configuration

This page allow you to configure the Primary Wireless Network.

Primary Network:

Enable or Disable the primary network. Guest networks may still be operational when the primary network is disabled.

Network Name (SSID):

Sets the Network Name (also known as SSID) of the primary network. This is a 1-32 ASCII character string.

Closed Network:

The Network Name is not broadcast by the AP in a Closed Network. Therefore, only clients who already know the network name will be able to connect.

WPA:

Wi-Fi Protected Access is a slightly older and less secure algorithm for securing a wireless network. This is the Enterprise variant that requires configuration of a RADIUS server.

WPA-PSK:

The Pre-Shared Key mode of the WPA algorithm which does not require use of a RADIUS server. This is also known as WPA Personal. WPA and WPA-PSK cannot be used at the same time.

WPA2:

An advanced form of WPA that is more secure. This is the Enterprise mode of WPA2 which requires the use of a RADIUS server. WPA2 and WPA may be used at the same time to provide backward compatibility with devices that do not support WPA2.

WPA2-PSK:

The Pre-Shared Key mode of WPA2, also known as WPA2 Personal. WPA2 and WPA2-PSK cannot be used at the same time. WPA2-PSK and WPA-PSK may be used at the same time to provide backward compatibility with devices that do not support WPA2.

WPA/WPA2 Encryption:

When using any of the WPA authentication schemes, AES, or TKIP + AES encryption modes can be set. AES provides the strongest encryption, while TKIP provides strong encryption with improved backward compatibility. The TKIP + AES mode allows both TKIP and AES-capable clients to connect.

WPA Pre-Shared Key:

Sets the WPA Pre-Shared Key (PSK). This is an 8-63 ASCII character string, or a 64-digit hex number. Enabled when the Network Authentication method is WPA-PSK or WPA2-PSK.

RADIUS Server:

Sets the IP address of the RADIUS server to use for client authentication. The RADIUS server may be on either the public network (WAN) or private network (LAN). This is only for WPA or WPA2 (Enterprise) modes.

RADIUS Port:

Sets the UDP port number of the RADIUS server. The default is 1812.

RADIUS Key:

Sets the shared secret for the RADIUS connection. The key is a 0 to 255 character ASCII string.

Group Key Rotation Interval:

The rotation interval in seconds indicating how often transmission keys should be rotated. Set to zero to disable periodic rekeying.

WPA/WPA2 Re-auth Interval:

This value indicates how often a station using Enterprise security needs to contact the RADIUS server.

WEP Encryption:

Sets the WEP encryption mode. Both 64-bit and 128-bit WEP encryption modes are supported. When running Shared Key or 802.1x authentication, WEP encryption must be enabled. WEP encryption cannot be used at the same time as WPA or WPA2.

Network Key 1 thru Network Key 4:

When WEP encryption is enabled, sets the static WEP keys. Enter 5 ASCII characters or 10 hexadecimal digits for a 64-bit key. Enter 13 ASCII characters or 26 hexadecimal digits for a 128-bit key.

Current Network Key:

When WEP encryption is enabled, selects the encryption (transmit) key.

PassPhrase:

Sets the text to use for WEP key generation.

Generate WEP Keys:

When WEP encryption is enabled, this action button converts the passphrase entered to a set of WEP keys. Remember to click the Apply button to save the keys.

Automatic Security Configuration

Wi-Fi Protected Setup (WPS);

WPS is the standard method to achieve the same goal as Broadcom's SES. The protocol is described in a specification issued by the Wi-Fi Alliance.

Device Name:

The name of the device that will advertised to wireless stations.

WPS Setup AP:

Set the PIN and click the 'Configure' button in this section when using an External Registrar.

WPS Add Client:

Add a new wireless client using the Internal Registrar. Choose to add either by push-button or PIN method and then click the 'Add' button.

5.7.3 Guest Network

Choose **Wireless > Guest Network** to display the following page.

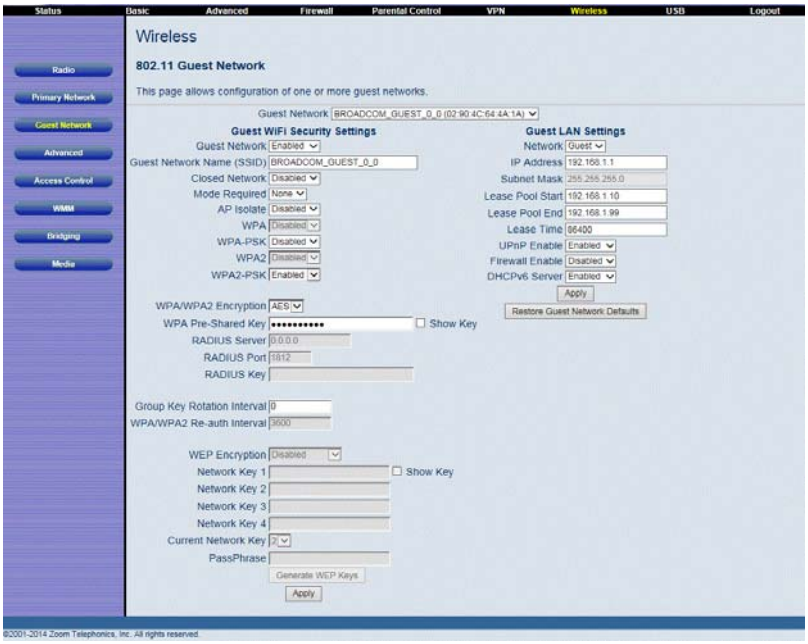

Figure 41 Guest Network configuration

The page allows you to configure a secondary guest network on the wireless interface. This network is isolated from the LAN. Any clients that associate with the guest network SSID will be isolated from the private LAN and can only communicate with WAN hosts. Most of the configuration points on the guest network page are identical to those on the Primary Network page. A few extras are explained below.

DHCP Server:

Enables the DHCP server to gives out leases to guest network clients from the specified lease pool. If the DHCP server is disabled, guest network STAs need to be assigned static IP addresses.

IP Address:

This specifies the gateway IP relayed to guest clients in DHCP lease offers.

Subnet Mask:

This specifies the subnet mask for the guest network.

Lease Pool Start:

This specifies the starting IP address for the guest network lease pool.

Lease Pool End:

This specifies the ending IP address for the guest network lease pool.

Lease Time:

This specifies the lease time for the guest network lease pool, once the CMRG completes WAN provisioning.

5.7.4 Advanced

Choose **Wireless > Advanced** to display the following page.

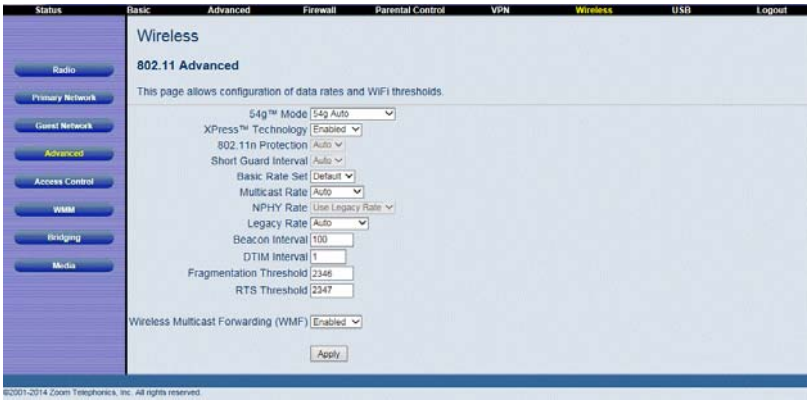

Figure 42 Advanced setting

This page allows you to configure advanced wireless settings.

54g™ Mode:

Sets the network mode. Choices are 54g Auto, 54g Performance, 54g LRS, and 802.11b Only. 54g Auto accepts 54g, 802.11g, and 802.11b clients, but optimizes performance based on the type of clients connected. 54g Performance accepts only 54g™ clients and provides the highest throughout; nearby 802.11b networks may have degraded performance. 54g LRS interoperates with the widest variety of 54g™, 802.11g, and 802.11b clients. 80211b.accepts only 802.11b clients.

54g™ Protection:

In Auto mode the AP will use RTS/CTS protection to improve 802.11g performance in mixed 802.11g + 802.11b networks. Turn protection Off to maximize 802.11g throughput under most conditions.

Xpress Technology:

Enable Broadcom proprietary method of block frame acknowledgement for 802.11g frames. This feature may improve throughput, but may cause problems.

Afterburner Technology

This feature removes the need for the acknowledgement of data frames. It may improve throughput, but may cause problems.

802.11n Protection:

Similar to 54g protection except it applies to 802.11n devices.

Basic Rate Set:

Determines which rates are advertised as “basic” rates. Default uses the driver defaults. Sets all available rates as basic rates.

Multicast Rate:

This is the rate at which you send out multicast packets to stations. Multicast packets are not acknowledged.

NPHY Rate:

Choose 802.11n rate to be applied to all unicast packets.

Legacy Rate:

"N" mode must be off on the "radio" webpage for this control to be active. When active the user can force the rate in which the AP will operate.

Beacon Interval:

Sets the beacon interval in milliseconds for the AP. The default is 100, which is fine for nearly all applications.

DTIM Interval:

Sets the wakeup interval for clients in power-save mode. When a client is running in power save mode, lower values provide higher performance but result in decreased client battery life, while higher values provide lower performance but result in increased client battery life.

Fragmentation Threshold:

Sets the fragmentation threshold. Packets exceeding this threshold will be fragmented into packets no larger than the threshold before packet transmission.

RTS Threshold:

Sets the RTS threshold. Packets exceeding this threshold will cause the AP to perform an RTS/CTS exchange to reserve the wireless medium before packet transmission.

5.7.5 Access Control

Choose **Wireless > Access Control** to display the following page.

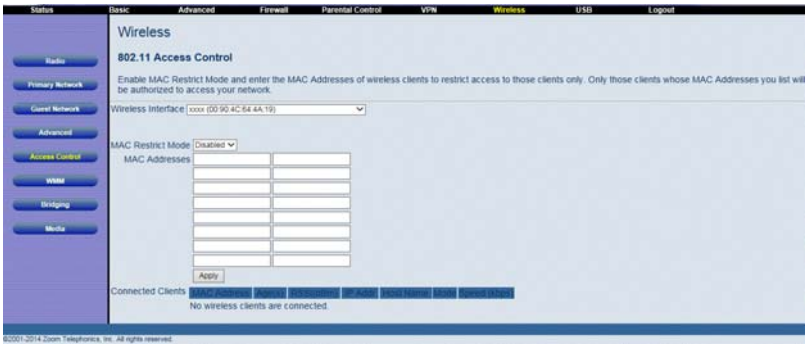

Figure 43 Access Control setting

This page allows you to control which wireless clients can access your wireless network. It also provides information about wireless clients connected to your access point.

MAC Restrict Mode:

Selects whether wireless clients with the specified MAC address are allowed or denied wireless access. To allow all clients, select Disabled.

MAC Addresses:

A list of wireless client MAC addresses to allow or deny based on the Restrict Mode setting. Valid input MAC address formats are XX:XX:XX:XX:XX:XX and XX-XX-XX-XX-XX-XX.

Connected Clients:

A list of connected wireless clients. When a client connects (associates) to the network, it is added to the list; when a client leaves (disassociates) from the network, it is removed from the list. For each client, the age (in seconds), estimated average receive signal strength (in dBm), IP address, and host name are presented. The age is the amount of time elapsed since data was transmitted to or received from the client.

5.7.6 WMM

Choose **Wireless > WMM** to display the following page.

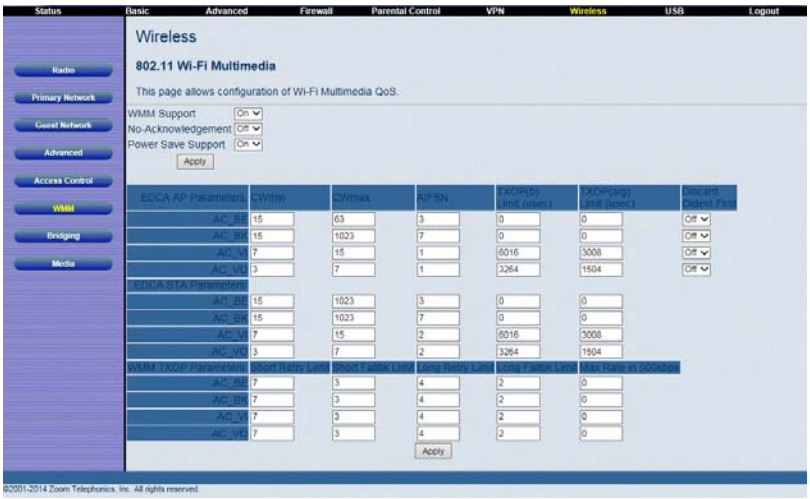

Figure 44 WMM configuration

This page allows you to configure WiFi Multi-Media (WMM). WMM is an implementation of Quality of Service (Qos) which is defined by the IEEE standard 802.11e.

WMM Support:

Sets WMM support. Choices are Auto, On, or Off. If enabled (Auto or On), the WME Information Element is included in beacon frame.

No-Acknowledgement:

Sets No-Acknowledgement support. Choices are On or Off. When enabled, acknowledgments for data are not transmitted.

Power Save Support:

Sets Power Save support. Choices are On or Off. When Power Save is enabled, the AP queues packets for STAs that are in power-save mode. Queued packets are transmitted when the STA notifies AP that it has left power-save mode.

EDCA AP Parameters:

Specifies the transmit parameters for traffic transmitted from the AP to the STA for the four Access Categories: Best Effort (AC_BE), Background (AC_BK), Video (AC_VI), and Voice (AC_VO). Transmit parameters include Contention Window (CWmin and CWmax), Arbitration Inter Frame Spacing Number (AIFSN), and Transmit Opportunity Limit (TXOP Limit).

There are also two AP-specific settings: Admission Control and Discard Oldest First. Admission control specifies if admission control is enforced for the Access Categories. Discard Oldest First specifies the discard policy for the queues. On discards the oldest first; Off discards the newest first.

EDCA STA Parameters:

Specifies the transmit parameters for traffic transmitted from the STA to the AP for the four Access Categories: Best Effort (AC_BE), Background (AC_BK), Video (AC_VI), and Voice (AC_VO). Transmit parameters include Contention Window (CWmin and CWmax), Arbitration Inter Frame Spacing Number (AIFSN), and Transmit Opportunity Limit (TXOP Limit).

5.7.7 Bridging

Choose **Wireless > Bridging** to display the following page.

Figure 45 Bridging setting

This page allows you to configure wireless bridging, which is also known as Wireless Distribution System (WDS). Bridging allows you connect multiple wireless access points together to form a single network using wireless point-to-point links.

Wireless Bridging:

This setting enables or disables wireless bridging.

Remote Bridges:

Table of remote bridge MAC addresses authorized to establish a wireless bridge. Up to 4 remote bridges may be connected. Typically, you will also have to enter your AP's MAC address (see section 0) on the remote bridge, too.

5.7.8 Media

Choose **Wireless > Media** and the follow page will be shown.

Figure 46 Media setting

This page allows configuration of Wireless Media features.

5.8 USB

Choose **USB** and the submenus of **USB** are shown as below.

Figure 47 The Submenus of USB

5.8.1 USB Basic

Choose **USB > USB Basic** to display the following page.

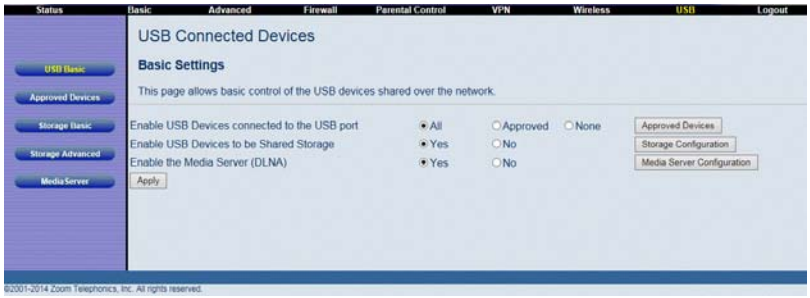

Figure 48 USB Basic setting

This page allows you to configure Linux based servers. The buttons on the right side of the page are short cuts to the buttons on the left side frame.

5.8.2 Approved Devices

Choose **USB > Approved Devices** to display the following page.

Figure 49 Approved Devices setting

This page allows you to choose if any USB storage device plugged into the modem can be used or only approved devices. If approved device is selected then each device must be manually approved on this page. USB storage devices can be safely removed after selecting the Safely Remove Device button. The user will be asked which device they want to remove.

5.8.3 Storage Basic

Choose **USB > Storage Basic** to display the following page.

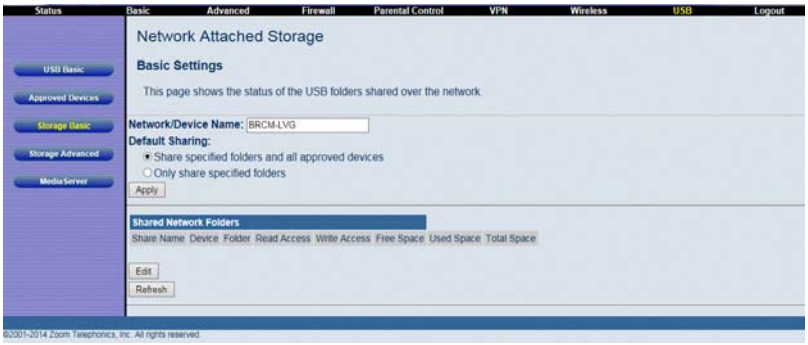

Figure 50 Storage Basic setting

This page allows you to configure the device name and what folders should be shared.

5.8.4 Storage Advanced

Choose **USB > Storage Advanced** to display the following page.

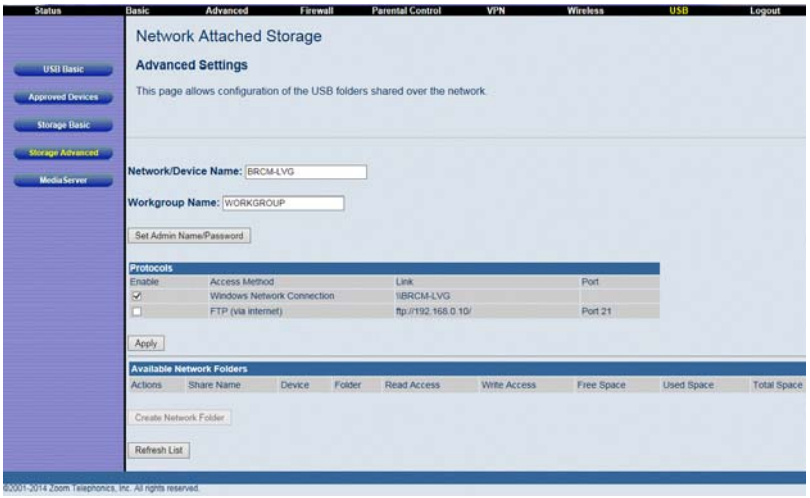

Figure 51 Storage Advanced setting

This page allows you to configure the device name. Additionally the workgroup name can is configured here. The Windows Network and FTP support can be enabled or disabled on this page. The IP address displayed in the link field is the Linux IP stack address that should be used for the FTP server address in the FTP clients.

5.8.5 Media Server

Choose **USB > Media Server** to display the following page.

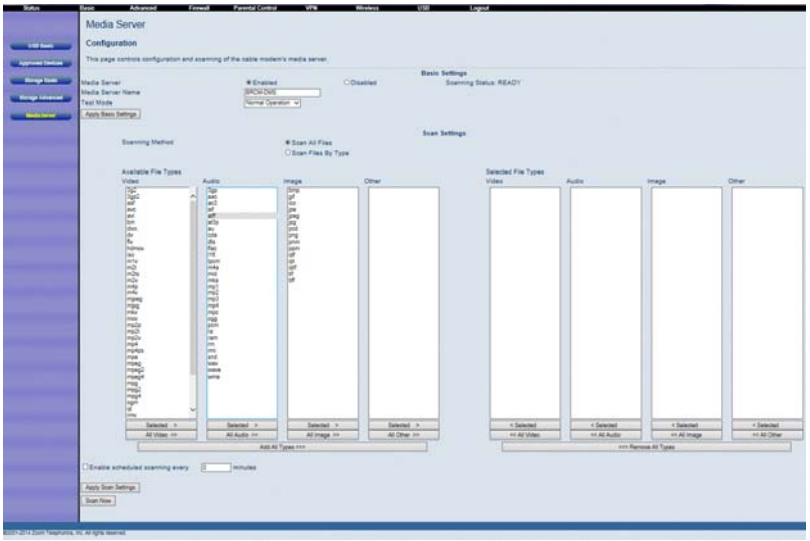

Figure 52 Media Server setting

This page allows you to configure the DLNA media server. The media server name and the file names that will be scanned on the USB storage devices are configured using this page. If desired the media Server can scan the device periodically to check for new files.

5.9 Logout

Choose **Logout** to logout Account and the following page will be shown after logout.

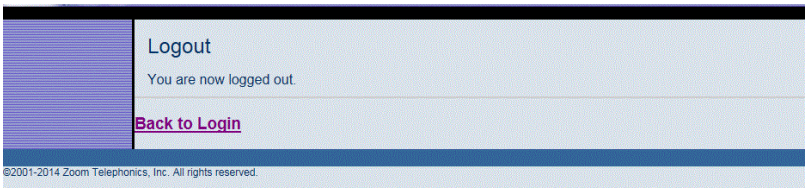

Figure 53 The logout page

6 Q&A

(1) **Q**: Why all the indicators are off?

A: Check the following:

- The connection between the power adaptor and the power socket.
- The status of the power switch.

(2) **Q**: Why the **Ethernet** indicator is off?

A: Check the following:

- The connection between the Cable Modem and your computer, hub, or switch.
- The running status of your PC, hub, or switch.

(3) **Q**: Why the **ONLINE** indicator is off?

A: Check CM DS/US LED is on. Check the connection between the Cable Line and the wall HFC.

Apply customer :

Name : Zoom Telephonics Inc
Address: 207 South Street, Boston Massachusetts 02111 USA
Contact Person: Paul Prohodski
Title: Director of Quality Assurance and Technical Services
Telephone: 617-423-1072 Ext 3100
Fax: 617-423-1075

For applicable power supplies :

1, EU : S24B13-120A200-Y4
Brand : Shenzhen Gongjin Electronics Co., Ltd
2, US: S24B12-120A200-Y4
Brand : Shenzhen Gongjin Electronics Co., Ltd

FCC statement

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

"FCC RF Radiation Exposure Statement Caution: To maintain compliance with the FCC's RF exposure guidelines, place the product at least 20cm from nearby persons."

keep 20cm away warning :

FCC, IC and CE Radiation Exposure Statement for Mobile Devices

This equipment complies with FCC, IC and CE radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 7-7/8" (200 mm) between the radiator and your body. The transmitt er must not be collocated or operating in conjunction with any other antenna or transmitter.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inf érieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonn ée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autoris é e aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Déclaration FCC, IC et CE d'exposition aux rayonnements pour les appareils mobiles

Cet équipement est conforme aux limites FCC, IC et CE d'exposition aux rayonnements stipulées pour un environnement non contr?lé. Il doit être installé et utilisé en laissant une distance minimale de 7-7/8" (200 mm) entre le radiateur et votre corps. L'émett eur ne doit pas être place au même emplacement que celui d'une autre antenne ou d'un autre émett eur, et ne doit pas fonctionner en même temps que de tels dispositifs.