Cable Modem/Router with Wireless-N

USER MANUAL

zoom

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Safety Issues & Warnings

SAFETY

This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines of this and of the computer manufacture must therefore be allowed at all times to ensure the safe use of the equipment.

WARNING: Risk of electric shock. Do **NOT** expose to water or moisture.

- The cable modem is a high-performance communications device designed for home and office environments.
- Do **NOT** use the cable modem outdoors. Keep the cable modem in an environment that is between 0°C and 40°C (between 32°F and 104°F).
- To avoid overheating the cable modem, do **NOT** place any object on top of the cable modem.
- Do **NOT** place the cable modem in a confined space.
- Do **NOT** restrict the flow of air around the cable modem.
- The manufacturer assumes no liabilities for damage caused by any improper use of the cable modem.
- Make sure the voltages and frequency of the power outlet matches the electrical rating labels on the power cube.

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Overview

This User Manual provides instructions for connecting and configuring your Cable Modem/Router with Wireless-N and setting up wireless and wired local area networks. It also includes details about security, firewalls, VPNs (Virtual Private Networks) and administrative tasks.

If you have used the Quick Start flyer to set up your cable modem/router, establish an Internet connection, and set up your local area network, you may choose to reference this User Manual for advanced topics or to make changes to the settings you previously configured. If you haven't successfully set up your cable modem/router using the Quick Start, start with this manual's **Chapter 1: Installing the Cable Modem/Router with Wireless-N**.

You can find Tips for setting up computers and other devices on a wireless network in **Appendix A: Tips for setting up computers and other devices on a wireless network**. This appendix supplements chapter 1.

If you want to make changes to the default WPA-PSK/WPA2-PSK security settings, please refer to **Chapter 2: Setting Wireless Security**.

If you are like most users, you don't need to read other chapters in this manual. You do want to read other chapters if you are a network administrator or if you are using the Cable Modem/Router with Wireless-N for gaming or something else that requires special settings.

You can skip to specific sections of this User Manual based on your intended use of the Cable Modem/Router with Wireless-N. Each of the menu options in your Configuration Manager is covered as a separate chapter in the remaining portion of the User Manual. Refer to the chart on the next page to go to a specific menu option.

Chapter	Menu Options	Go to this section if you want to…	See Page
3	**Status**	troubleshoot problems with the cable modem/router	25
4	**Basic**	make some modifications for more advanced uses	33
5	**Advanced**	make use of advanced router features supported by the cable modem/router	40
6	**Firewall**	configure the firewall application to protect the private LAN from attacks from the WAN interface	54
7	**Parental Control**	configure access policies or rules to specific network devices based on the time of day and Internet contents	62
8	**Wireless**	configure and use the wireless features supported by the cable modem/router	70
9	**VPN**	enable the VPN protocol and configure IPSec tunnels, L2TP and PPTP server options	88

Gaming

If you are using your router for gaming, you may need to make changes to the router's firewall setting for the game to work. This is done by setting up a **DMZ** or using **port triggering** so that the cable modem/router's firewall won't block the other players from your system during your gaming. The main difference between the methods is the amount of access someone has to your system.

A DMZ allows access on all ports of the computer. Because of this, DMZ's are less secure and should be used with caution on your computer. However DMZ's work well with gaming stations since security is not as much of an issue for gaming stations as it is for computers.

Port triggering works by sensing when data is sent out on a predetermined outgoing port and then automatically opening up the corresponding incoming port(s). It will automatically forward the traffic on the incoming port to the computer that accessed the outgoing port. If your game uses one port to send outgoing data and a different port (or ports) for incoming data, you may want to use port triggering. You do not need to know the IP address of your gaming station to set up port triggering.

Once you've decided what type of security to use for gaming, you can set up that security using the appropriate section of this manual:

- **DMZ:** For instructions on how to set up a DMZ, please refer to page 50.
- **Port Triggering:** For instructions on how to set up port triggering, please refer to page 48.

Setting up wireless security for the iPhone®, iPod touch®, and other wireless devices

Appendix A discusses how to set up wireless security for the iPhone, iPod touch, iPad™ and other tablets, and other devices.

1

Installing the Cable Modem/Router with Wireless-N

This chapter provides basic instructions for connecting the hardware and configuring the Cable Modem/Router with Wireless-N using the Zoom Configuration Manager. This chapter is almost identical to the printed Quick Start.

Package Contents

Your package contains the following items:

- Cable modem/router
- Power cord
- Ethernet RJ-45 cable
- Quick Start flyer
- CD with User Manual

System Requirements

- You need to connect the cable modem/router to a cable modem service that uses any of the popular DOCSIS standards – 3.0, 2.0, or 1.1. If you need to get cable modem service, please speak with your cable service provider.
- To use this User Manual, you need a computer, an iPad or another tablet, or a game console.

If your cable service provider provided a cable modem starter kit, please continue below. If you don't have or choose not to use the cable modem starter kit from your service provider, go to **How to connect to a computer if you don't have or choose not to use a cable modem starter kit** below.

If your cable service provider provided a cable modem starter kit
Some cable service providers supply a cable modem starter kit that can be useful when you install your cable modem. The kit may include a coaxial cable for connecting between a wall jack and your cable modem. (These are also available at most electronics retailers.) The kit will include instructions, and may also include a CD with software. If you receive a kit like this, we recommend that you read

the kit's instructions and use them to install your Zoom cable modem/router. This cable modem/router is DOCSIS 3.0 certified by CableLabs, and connects like a normal cable modem.

You may be asked by your cable service provider to provide the **serial number** and **Cable MAC** address, which are printed on the label on the bottom of the modem. Your cable service provider may also ask for your cable modem's model name and number, which is **Zoom 5350**. You will need to plug in the cable modem/router's power cord, connect to cable modem service using a coaxial cable, and then connect to a computer using either the included Ethernet cable or the wireless feature (see **Using the Cable Modem/Router to Make a Wireless Connection**).

Note: Please refer to the **Hardware Connection** section if you would like to see a diagram of the back of the cable modem/router and a description of the connections.

After you have installed your Zoom cable modem/router and it has synchronized itself with the cable network, your cable modem/router can connect your computer to the Internet.

Note: Allow 5 to 30 minutes to power up the first time because the cable modem/router must locate and connect to the appropriate channels for communication. You'll see the **DS**, **US**, and/or **Online** modem lights flashing until the **Online** light stays steady green to signal success.

Now open your browser and go to a familiar Web site to check that the cable modem/router is working.

- If you want to connect the modem/router wirelessly to one or more devices, see **Connecting the Cable Modem/Router Wirelessly to Some Device**.
- If you want to connect additional computers/devices using the modem/router's Ethernet/LAN ports, please see **Read This Only if You Are Connecting Additional Computers and/or Other Devices to the Cable Modem/Router's Ethernet ports**.
- If you want to configure advanced options, please refer to the **Table of Contents** at the beginning of this User Manual to select a specific topic.
- If you want to set up a wireless network, please refer to **Appendix A: Setting Up Your Wireless Network**. (Most newer **Windows 7, Vista, and XP computers with built-in wireless networking** capabilities do not require the installation of a wireless component. If this is the case, you should set up that computer's wireless connection if it isn't already configured using the Windows 7, Vista, or XP connect utility. See **Appendix A** for instructions.)

How to connect to a computer if you don't have or choose not to use a cable modem starter kit

Note: You may be asked by your cable service provider to provide the **serial number** and **Cable MAC** address, which are printed on the label at the bottom of the modem/router. Your cable service provider may also ask for your cable modem's model name and number, which is **Zoom 5350**.

1 Be sure your computer is on and the cable modem/router is unplugged.
Note: Please refer to the **Hardware Connection** section if you would like to see a diagram of the back of the cable modem and a description of the connections as you read the following steps.

2 Connect one end of the coaxial cable to the cable outlet or splitter. Connect the other end of the coaxial cable to the **Cable** connector on the rear panel of the cable modem. Hand-tighten the connectors to avoid damaging them.

- ➢ You can connect a coaxial cable between an open cable service wall jack and the cable modem. (If no wall jack is available, you can use a coaxial T connector or splitter.)
- ➢ Alternatively, there may already be a coaxial cable that is connected to service and that has an open end for connecting to the cable modem/router.

3 Plug the power cord into the **AC IN** connector on the rear panel of the cable modem/router and into the electrical outlet. This turns the cable modem/router on. Check if the **Power** LED lights up.

4 For initial setup we recommend that you connect the provided Ethernet cable to any **Gigabit Ethernet** port (GE / LAN 1, 2, 3, or 4) on the rear panel of the cable modem/router and connect the other end to the Ethernet port on your computer. If you want to connect your computer wirelessly instead, see **Connecting the Cable Modem/Router Wirelessly to Some Device**.

Note: Allow 5 to 30 minutes to power up the first time because the cable modem must locate and connect to the appropriate channels for communication. You'll see the **DS**, **US**, and/or **Online** modem lights flashing until the **Online** light stays steady green to signal success.

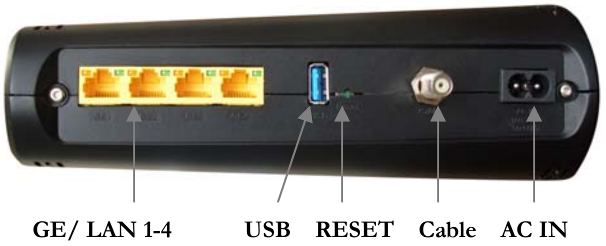
Now open your browser and go to a familiar Web site to check that the cable modem/router is working.

- ❖ If you want to connect the modem/router wirelessly to some device, see **Connecting the Cable Modem/Router Wirelessly to Some Device**.
- ❖ If you want to connect additional computers/devices using the modem/router's Ethernet/LAN ports, please see **Read This Only if You Are Connecting Additional Computers and/or Other Devices to the Cable Modem/Router's Ethernet ports**.
- ❖ If you want to configure advanced options, please refer to the **Table of Contents** at the beginning of this User Manual to select a specific topic.
- ❖ If you want to set up a wireless network, please refer to **Appendix A: Setting Up Your Wireless Network**. (Most newer **Windows 7, Vista, and XP computers with built-in wireless networking** capabilities do not require the installation of a wireless component. If this is the case, you should set up that computer's wireless connection if it isn't already configured using the Windows 7, Vista, or XP connect utility. See **Appendix A** for instructions.)

Please note the following:

- Do not block the modem/router vents in any way.
- Do not use the modem where it's very hot or very cold.
- Place the cable modem/router in a vertical orientation (using the "feet" at the bottom of the unit to create a stable placement). The Power LED on the front panel should be at the top of the unit.

Hardware Connection



Port	Description
GE 1-4 (Gigabit Ethernet 1-4 also known as LAN 1-4)	Four 10/100/1000 auto-sensing RJ-45 ports. Connect devices on your LAN (Local Area Network) such as a computer, hub or switch to these ports.
USB	The USB port is for manufacturer's use only.
RESET	Use this button in the unlikely event that you want to restore the default factory settings. This button is recessed to prevent accidental resets of your cable modem/router.
Cable	Connect your coaxial cable line to this port.
AC IN	Connect the supplied power cord to this port.

Connecting the Cable Modem/Router Wirelessly to Some Device

Your cable modem/router has wireless-N for WiFi® compatible connection to your computer and/or other devices. The cable modem/router comes set up by default with WPA/WPA2 security, and this can be changed if you like.

For those computer(s) and/or device(s) that support WPS, see **Using WPS to set up your wireless network**. For those computer(s) and/or device(s) that do support WPA/WPA2 but that don't support WPS, enter the default SSID and Pre-Shared Key below in the wireless network portion of the device's configuration menus. (If you want setup tips for computers and other wireless-enabled devices, go to **Appendix A: Tips for setting up computers and other devices on a wireless network**.)

Note: Typically, tablets like the iPad and e-readers don't support WPS but do support WPA/WPA2.

Default Wireless Security Settings

The **default SSID** is: ZOOM

The **default Pre-Shared Key** is: zoom#### where #### represents the last 4 characters of the **Cable MAC address** of the unit, which can be found on the label on the bottom of the cable modem/router.

Note: If you want to change the default SSID and Pre-Shared Key, please refer to page 15 for instructions.

In the unlikely event that one or more of your devices only supports WEP security, please refer to page 18 for instructions on how to configure WEP security.

Using WPS to set up your wireless network

If all the WiFi compatible wireless devices on your network support WPS:

1 Press the **WPS** LED pushbutton on the front panel of the router for 5 seconds. The WPS LED should blink green.

2 Within 2 minutes (before the WPS LED light turns off), press the WPS button on the device that you're linking wirelessly to the modem/router. The button may be a physical pushbutton on the device or a button on a page of the device's wireless network configuration menus.

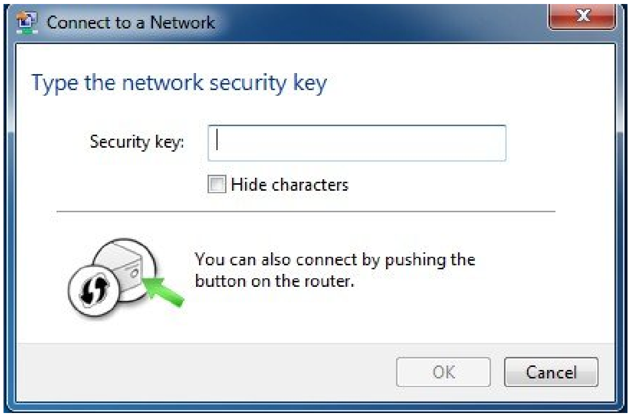
Note: Windows 7 SP1 (Service Pack 1) or the latest updates, or Windows Vista SP2 (Service Pack 2) users can use **WPS** for easy configuration.

a Open **Connect to a Network** by right-clicking the network icon in the notification area of the Windows taskbar.

b A list of available networks is displayed.

c Click **ZOOM** (or the SSID you changed the default to), and then click **Connect**.

d You may see a screen with a text box for the Security key. If WPS configuration is supported, you may see a message such as *You can also connect by pushing the button on the router.*



Connect to a Network

Type the network security key

Security key:

□ Hide characters

You can also connect by pushing the button on the router.

Press the Wi-Fi Protected Setup (WPS) button on the router for 5 seconds. (You do not need to type a security key or passphrase in the Security key text box on your Windows machine). The cable modem/router will automatically set up the computer to connect to the network and apply the network's security settings. Then click **OK** on the **Connect to a Network** dialog box.

3 **Congratulations!** You should now have a secure connection between your cable modem/router and a device. Now is a good time to check that your device's Internet connection is working. Open your browser and go to a familiar Web site. If you are able to connect, continue with the next step below.
If you are not able to connect to the Internet, please see **AppendixB: Troubleshooting Tips**.

4 If you have other devices whose WPS security you need to set, repeat steps 1 through 3 for each device. When they are all set, go to step 5.

5 Your basic setup for local wireless devices is complete.

Note: If you want to change the default SSID and Pre-Shared Key, please refer to page 15 for instructions.

Read This Only if You Are Connecting Additional Computers and/or Other Devices to the Cable Modem/Router's Ethernet/LAN ports

You can plug up to four computers, game consoles, or other Ethernet-capable devices into the cable modem/router's LAN ports. For information about your specific device, please refer to the documentation that came with that device. Follow the instructions below for each computer or other device.

1 If you connected the cable modem/router to a computer using a wired connection when setting up the cable modem/router, unplug the computer now if you don't want it to stay connected to the cable modem/router.

2 To connect a computer or other Ethernet-capable device, plug one end of an Ethernet cable into an available Ethernet (GE 1, 2, 3, or 4) port on the cable modem/router and plug the other end of the Ethernet cable into the Ethernet port of the additional device you want to connect to the

cable modem/router. (If you are connecting a hub or a switch, this is typically called an Uplink or Expansion port.) **If you are connecting a computer or game station, go to step 5 of this section.**

3 If you are connecting a network device such as a switching hub, use the instructions that came with that device. Then reboot any computer that is part of your network. For example, if you connected a switching hub, reboot any computer that will be connected to that switching hub.

4 If you are connecting a HomePlug adapter pair with one adapter plugged into the cable modem/router and an AC outlet, and the other adapter plugged into a computer or game station and an AC outlet, make those connections and then go to step 5.

5 Verify that your Internet connection is working. Open a Web browser on each computer that's using your network and try to connect to a familiar Web address.

Note: If at any time you need to make changes to the cable modem/router's configuration, open a web browser from any PC on your cable modem/router's network and type **http://192.168.0.1** to open the Zoom Configuration Manager. Alternately, you can connect a computer directly to the cable modem/router, open its browser, and then type **http://192.168.0.1**.

6 **Congratulations!** You have connected an additional device to the Internet. You can connect up to 4 Ethernet-capable devices to the cable modem/router, following the instructions above for each device and starting at step 2 of this section.

- ❖ If you want to set up a wireless network, please refer to **Appendix A: Setting Up Your Wireless Network**. (Most newer **Windows 7, Vista, and XP computers with built-in wireless networking** capabilities do not require the installation of a wireless component. If this is the case, you should set up that computer's wireless connection if it isn't already configured using the Windows 7, Vista, or XP connect utility. See **Appendix A** for instructions.)
- ❖ If you want to configure advanced options, continue with the section **Logging in to the Zoom Configuration Manager**. Then refer to the **Table of Contents** at the beginning of this User Manual for instructions for the feature(s) you want to configure.

Logging in to the Zoom Configuration Manager

Step 1: Connecting the Router to a Computer

1 Connect the router to a computer following the instructions under **How to connect to a computer if you don't have or choose not to use a cable modem starter kit**. Then continue to **Step 2** below.

Step 2: Establishing Communication

1 Open your Web browser, enter **http://192.168.0.1** in the address bar, and press the **Enter** key to open the Cable Modem/Router configuration software.

2 In the **Enter Network Password** dialog box, type the following User Name and Password in lower case, then click **OK**.

User Name: **admin**
Password: **admin**

3 The **Status** page should appear. If the **Status** page doesn't appear, please see **Appendix B: Troubleshooting Tips**.

From the Zoom Configuration Manager, you can configure advanced features and make changes to the default wireless security options including the SSID and Pre-Shared Key.

- ❖ If you want to change the default SSID or Pre-Shared Key, go to **Changing the Pre-Shared Key and SSID from the default settings**.
- ❖ If you need instructions for setting up a wireless network, please refer to **Appendix A: Setting Up Your Wireless Network**. (Most newer **Windows 7, Vista, and XP computers with built-in wireless networking** capabilities do not require the installation of a wireless component. If this is the case, you should set up that computer's wireless connection if it isn't already configured using the Windows 7, Vista, or XP connect utility. See **Appendix A** for instructions.)
- ❖ Otherwise, refer to the **Table of Contents** to select a specific topic for advanced options.

2

Setting Wireless Security

Your cable modem/router comes from the factory with, security turned on by default. If you want to use another security mode instead of the default security mode of WPA-PSK/WPA2-PSK *, or if you want to change the Pre-Shared Key, this chapter explains how.*

There are two basic wireless security modes, WPA and WEP. There are two versions of WPA: WPA and WPA2. When configured as part of a typical home or small office network, WPA and WPA2 require a Pre-Shared Key, or PSK. These modes are typically called WPA-PSK and WPA2-PSK, respectively, though sometimes they're just called WPA and WPA2. You can enable either WPA-PSK or WPA2-PSK alone, or you can enable both WPA-PSK and WPA2-PSK together. By default, your cable modem/router has both WPA-PSK and WPA2-PSK enabled. You will only need to change the security mode if you know that you have a device you are connecting to your wireless network that only supports WEP. (Go to **Setting Up Security Using WEP**.) In the unlikely event that you want an unsecured network, this is discussed late in this chapter in **Disabling Security**.

Note: If you have a Radius Server (very unlikely for a home network), select the WPA/WPA2 options without PSK. All instances of WPA and/or WPA2 that follow refer to WPA-PSK and/or WPA2-PSK unless noted otherwise.

You can check to see if all other clients that you plan to put on the network support WPA or WPA2. You can do this by checking the manual that came with each device or by checking the configuration software for the installed device. Look under **Security** or **Encryption** or **Setup** or **Advanced Features**. **Appendix A** discusses how to check the configuration software for various wireless devices.

If all of the devices you want to connect to your wireless network support WPA or WPA2 you may want to change the Pre-Shared Key and/or change the Network Name (SSID. In that case, go below to **Changing the Pre-Shared Key and SSID from the default settings**. For instructions on configuring WPA/WPA2 Security with your devices, go to **WPA/WPA2 Security**.

If any of the devices you want to connect to your wireless network do not support WPA or WPA2, go to **Setting Up Security Using WEP**.

If you need to set up an unsecured network, see **Disabling Security**.

Changing the Pre-Shared Key and SSID from the default settings

In the default security setting, both WPA-PSK and WPA2-PSK are enabled. The default SSID is **ZOOM** and Pre-Shared Key is **zoom####** where **####** represents the last 4 characters of the Cable MAC address of the unit, which can be found on the label on the bottom of the cable modem/router. If you want to change the SSID and/or the Pre-Shared Key, go to **WPA/WPA2 Security**.

WPA/WPA2 Security

WPA and WPA2 use a **passphrase** or **PSK** that you choose and enter on the Cable Modem/Router and other wireless devices on the network (clients) to set up security. To use WPA/WPA2, **all** of the wireless devices on your network must support either encryption method. If you know that all your devices support the more secure WPA2 you can enable WPA2 only instead of both WPA and WPA2.

1 Open the Zoom Configuration Manager by typing the following in your Web browser's address bar: **http://192.168.0.1**

2 In the **Enter Network Password** dialog box, type the following User Name and Password in lower case, then click **OK**..

User Name: **admin**

Password: **admin**

(The User Name and Password entered here are not the same as the User Name and Password that your Internet service provider may have given you.)

3 Click **Wireless** on the top menu.

4 Then click **Primary Network** on the left-side menu and in the text box labeled **Network Name (SSID)**, type an SSID of your choice. The SSID needs to be at least one character long, and it's probably best to pick a name that you'll recognize as yours.

5 Start by setting all the following drop-down menus to Disable: WPA, WPA-PSK, WPA2, and WPA2-PSK.

6 Then select Enable for the mode(s) you choose for setting wireless security.

Note: To use WPA2 /WPA, **all** of the wireless devices on your network must support either encryption method. In this case, enable:

- WPA-PSK and WPA2-PSK (if you want to use a Pre-Shared Key)

  or

- WPA and WPA2 (use this only if your network uses a Radius Server. This is very uncommon for a home network)

If you know that all your devices support the more secure WPA2 you can enable WPA2 only (or WPA2-PSK if you want to use a Pre-Shared Key) instead of WPA and WPA2.

7 In the **WPA Pre-Shared Key** text box (only if you selected an option requiring a Pre-Shared Key), enter a passphrase of your choice (a minimum of 8 characters). Write down this passphrase and put it where you can find it – on the bottom of the Cable Modem/Router case, for instance.

8 Click **Apply**.

9 Now you need to set up each of your wireless devices with the SSID and passphrase.

a First, make sure that the device's wireless capability is switched on. (Many notebooks have a switch for wireless, for instance.)

b Next go to the device's area for configuring a wireless network connection. (If you need them, tips for finding this area are in **Appendix A**.)

- For a Windows computer, click the **Wireless Networking** icon at the lower right corner of the screen.
- For another device such as an iPhone or iPad, you may have to click on something like Settings and then WiFi. Skip (c) and continue with (d) below.

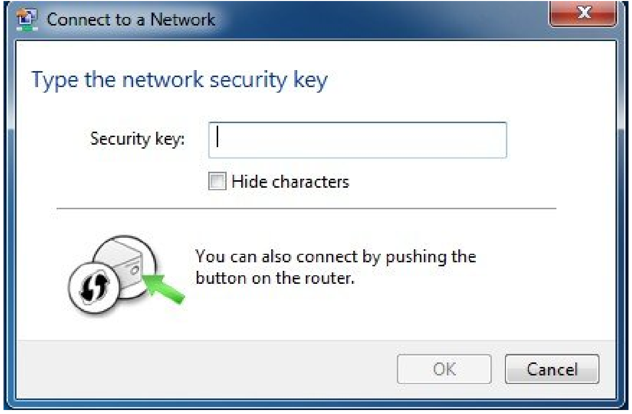
c Select the **Site Survey** or **Scan** option to see a list of the access points in your area. That list should include the SSID **ZOOM** or the SSID you created.

d Select **ZOOM** (or the SSID you created).

Note: If any of your devices support **WPS**, you can configure WPS for those devices. Press the WPS LED pushbutton on the front panel of the router for 5 seconds. The WPS LED should blink green. Within 2 minutes (before the WPS LED light turns off), press the WPS button on the device that you're linking wirelessly to the modem/router. The button may be a physical pushbutton on the device or a button on a page of the device's wireless network configuration menus. Skip (e) and (f).

Windows 7 (SP1) Service Pack 1 or the latest updates, or Windows Vista SP2 users, you can use **WPS** for easy configuration. Click **Connect**. Then press the

Wi‑Fi Protected Setup (WPS) button on the router for 5 seconds.



Connect to a Network

Type the network security key

Security key:

□ Hide characters

You can also connect by pushing the button on the router.

(You do not need to type a security key or passphrase in the Security Key text box on your Windows machine). The cable modem/router will automatically set up the computer to connect to the network and apply the network's security settings. Then click **OK** on the **Connect to a Network** dialog box. Skip (e) and (f).

e Enter the Pre-Shared Key that you just wrote down in Step 7.

f Save your settings.

That's it! Your security setup is now complete!

Setting Up Security Using WEP

If **any** of your network devices DO NOT support WPA or WPA2, you can use WEP to configure network security. WEP can be configured two ways: 64-bit and 128-bit. 128-bit WEP provides more security than 64-bit.

1 Open the Zoom Configuration Manager by typing the following in your Web browser's address bar: **http://192.168.0.1**

2 In the **Enter Network Password** dialog box, type the following User Name and Password in lower case, then click **OK**..

User Name: **admin**

Password: **admin**

(The User Name and Password entered here are not the same as the User Name and Password that your Internet service provider may have given you.)

3 Click **Wireless** on the top menu.

4 Then click **Primary Network** on the left-side menu.

5 From the **WEP Encryption** drop-down menu, select **WEP-64 bit** (**or WEP-128** bit for more security).

6 For **Network Key 1**, you can either enter your own WEP Key or you can have WEP Keys generated.

If you are entering a network key of your choice, enter 13 ASCII characters or 26 hexadecimal digits for 128-bit encryption keys. Enter 5 ASCII characters or 10 hexadecimal digits for 64-bit encryption keys.

Otherwise, type something into the text box and click on **Generate WEP Keys** and WEP Keys will automatically be generated for you.

Caution! Do not click **Apply** until you have entered WEP Keys.

7 Click **Apply**.

Every wireless network client needs to be set individually. Open the wireless configuration software that came with the device, which should be running on the computer where the device is installed. (Tips for finding the wireless configuration section of your device can be found in **Appendix A**.) Find the configuration menu for security, choose **WEP**, and enter the **Network Key**, exactly as you entered it or exactly as it was generated for you on the Cable Modem/Router **Wireless** page.

Your security setup configuration is now complete!

Disabling Security

If for some reason you need to set up an unsecured network, you will need to disable the default security that is currently set up for your cable modem/router. Follow the instructions below.

1 Open the Zoom Configuration Manager by typing the following in your Web browser's address bar: **http://192.168.0.1**

2 In the **Enter Network Password** dialog box, type the following User Name and Password in lower case, then click **OK**..

User Name: **admin**

Password: **admin**

(The User Name and Password entered here are not the same as the User Name and Password that your Internet service provider may have given you.)

3 Click **Wireless** on the top menu.

4 Then click **Primary Network** on the left-side menu and in the text box labeled **Network Name (SSID)**, type an SSID of your choice. The SSID needs to be at least one character long, and it's probably best to pick a name that you'll recognize as yours.

5 Set all the following drop-down menus to Disable: WPA, WPA-PSK, WPA2, and WPA2-PSK.

6 Click **Apply**.

7 Now you need to set up each of your wireless devices with the SSID.

a First, make sure that the device's wireless capability is switched on. (Many notebooks have a switch for wireless, for instance.)

b Next go to the device's area for configuring a wireless network connection. (If you need them, tips for finding this area are in **Appendix A**.)

- For a Windows computer, click the **Wireless Networking** icon at the lower right corner of the screen.
- For another device such as an iPhone or iPad, you may have to click on something like Settings and then WiFi. Skip (c) and continue with (d) below.

c Select the **Site Survey** or **Scan** option to see a list of the access points in your area. That list should include the SSID **ZOOM** or the SSID you created.

d Select **ZOOM** (or the SSID you created).

That's it! You have now disabled security.

If you are like most users, you don't need to read further in this manual. You do want to read further if you are a network administrator or if you are using the Cable Modem/Router with Wireless-N for gaming or something else that requires special settings.

You can skip to specific sections of this User Manual based on your intended use of the Cable Modem/Router with Wireless-N. Each of the menu options in your Configuration Manager is covered as a separate chapter in the remaining portion of the User Manual. Refer to the chart on the next page to go to a specific menu option.

Chapter	Menu Options	Go to this section if you want to…	See Page
3	**Status**	monitor or troubleshoot problems with the cable modem/router	25
4	**Basic**	make some modifications for more advanced uses	33
5	**Advanced**	make use of advanced router features supported by the cable modem/router	40
6	**Firewall**	configure the firewall application to protect the private LAN from attacks from the WAN interface	54
7	**Parental Control**	configure access policies or rules to specific network devices based on the time of day and Internet contents	62
8	**Wireless**	configure and use the wireless features supported by the cable modem/router	70
9	**VPN**	enable the VPN protocol and configure IPSec tunnels, L2TP and PPTP server options	88

Accessing the Cable Modem/Router's Configuration Manager

From your Web browser, you will log in to the interface to define system parameters, change password settings, view status windows to monitor network conditions, and control the cable modem/router and its ports.

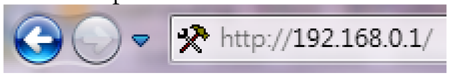
To access the cable modem/router's Configuration Manager, use the following procedure:

1 Launch a Web browser.

Note: Your computer does not have to be online to configure your cable modem/router.

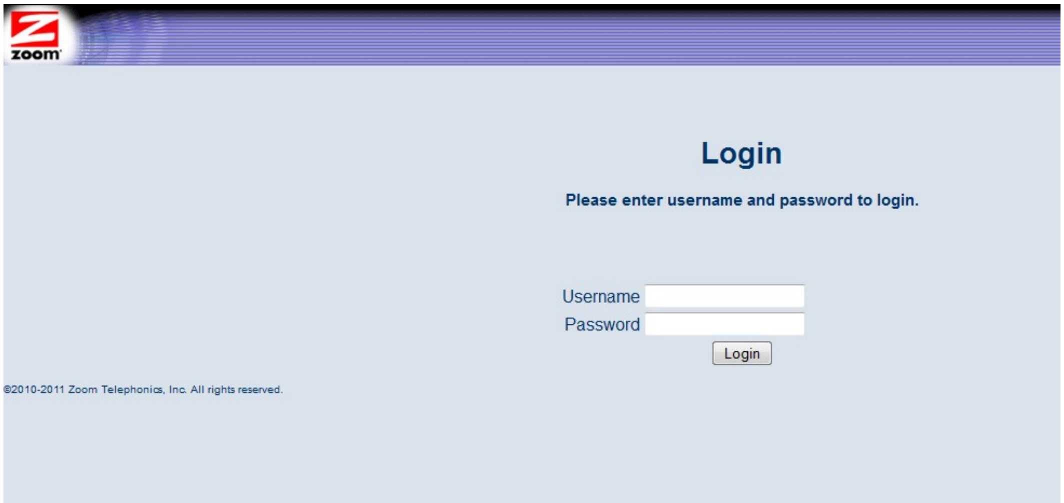
2 In the browser address bar, type **http://192.168.0.1** and press the **Enter** key.

For example:



http://192.168.0.1/

The Login screen appears (see Figure 1)



Login

Please enter username and password to login.

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Figure 1. Login Screen

3 In the Login screen, enter:

default username: **admin**

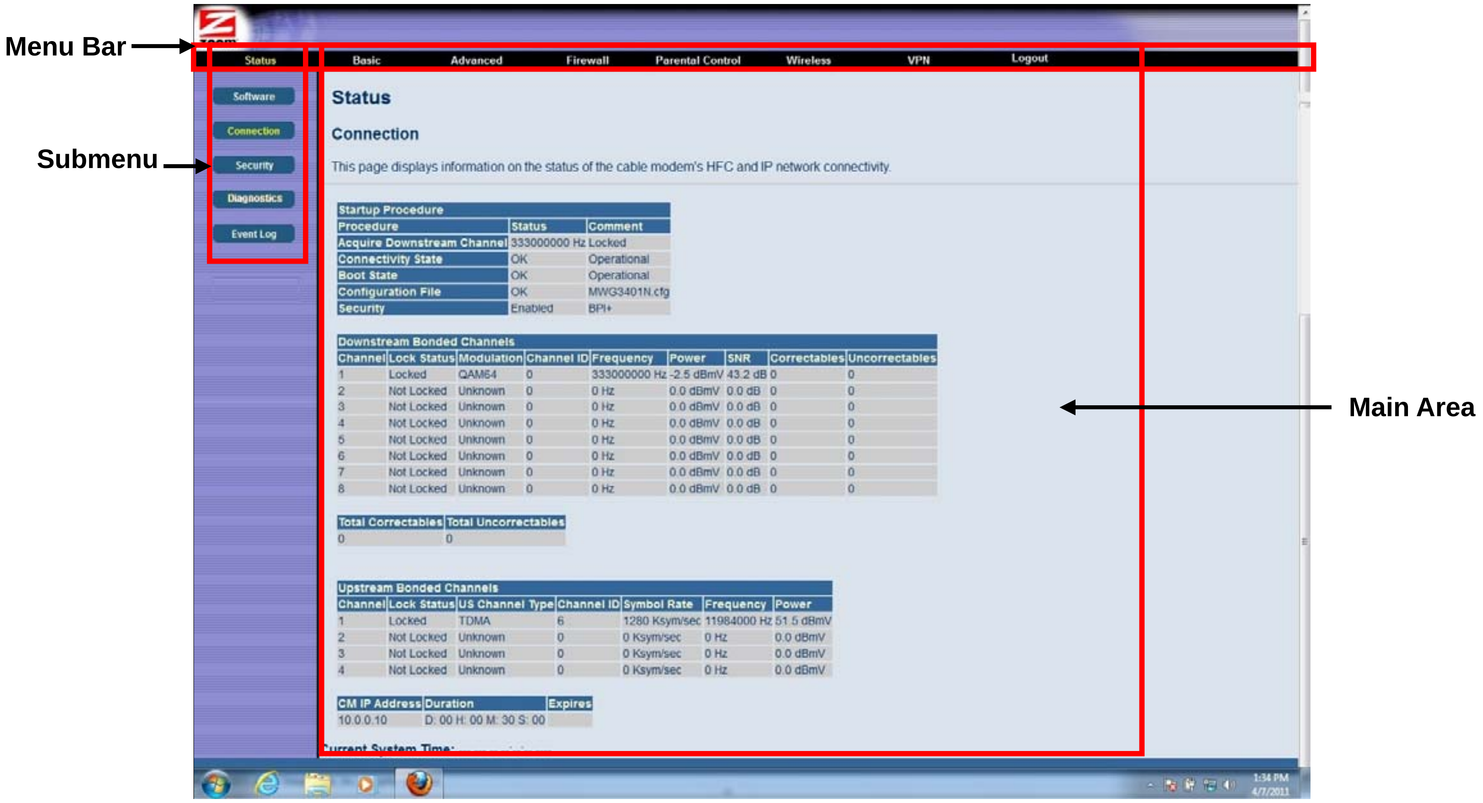
default password: **admin**

Both the username and password are case sensitive. After you log in to the Zoom Configuration Manager interface, you can change the default password on the **Status - Security** page.

4 Click the Login button to access the cable modem/router. The **Status** page appears, showing connection status information about your cable modem/router.

Understanding the Configuration Manager Interface Screens

The top of the management interface contains a menu bar you use to select menus for configuring the cable modem/router. When you click a menu item, information and any configuration settings associated with the menu appear in the main area of the interface (see Figure 2). If the displayed information exceeds what can be shown in the main area, scroll bars appear to the right of the main area so you can scroll up and down through the information.



Status

Connection

This page displays information on the status of the cable modem's HFC and IP network connectivity.

Startup Procedure		
Procedure	Status	Comment
Acquire Downstream Channel	333000000 Hz	Locked
Connectivity State	OK	Operational
Boot State	OK	Operational
Configuration File	OK	MWG3401N.cfg
Security	Enabled	BPI+

Downstream Bonded Channels								
Channel	Lock Status	Modulation	Channel ID	Frequency	Power	SNR	Correctables	Uncorrectables
1	Locked	QAM64	0	333000000 Hz	-2.5 dBmV	43.2 dB	0	0
2	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
3	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
4	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
5	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
6	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
7	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
8	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0

Total Correctables	Total Uncorrectables
0	0

Upstream Bonded Channels						
Channel	Lock Status	US Channel Type	Channel ID	Symbol Rate	Frequency	Power
1	Locked	TDMA	6	1280 Ksym/sec	11984000 Hz	51.5 dBmV
2	Not Locked	Unknown	0	0 Ksym/sec	0 Hz	0.0 dBmV
3	Not Locked	Unknown	0	0 Ksym/sec	0 Hz	0.0 dBmV
4	Not Locked	Unknown	0	0 Ksym/sec	0 Hz	0.0 dBmV

CM IP Address	Duration	Expires
10.0.0.10	D: 00 H: 00 M: 30 S: 00	

Current System Time:

Figure 2. Main Areas on the Configuration Manager Interface

Every menu has submenus associated with it. If you click a menu item, the submenus appear on the left frame of the Configuration Manager. For example, if you click the **Status** menu item, the submenu **Software**, **Connection**, **Security** and **Diagnostics** appear on the left column (see Figure 3).

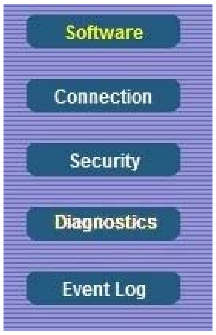


Figure 3. Example of Status Submenu

The right-most item on the menu bar is the logout option. Click it to log out from the Configuration Manager interface.

Configuration Manager Interface Menus

Table 1 describes the menus in the Configuration Manager interface.

Table 1. Configuration Manager Interface Menus

Menu Options	Go to this section if you want to…	See Page
Status	monitor or troubleshoot problems with the cable modem/router	25
Basic	make some modifications for more advanced uses	33
Advanced	make use of advanced modem/router features supported by the cable modem/router	40
Firewall	configure the firewall application to protect the private LAN from attacks from the WAN interface	54
Parental Control	configure access policies or rules to specific network devices based on the time of day and Internet contents	62
Wireless	configure and use the wireless features supported by the cable modem/router	70
VPN	enable the VPN protocol and configure IPSec tunnels, L2TP and PPTP server options	88

3

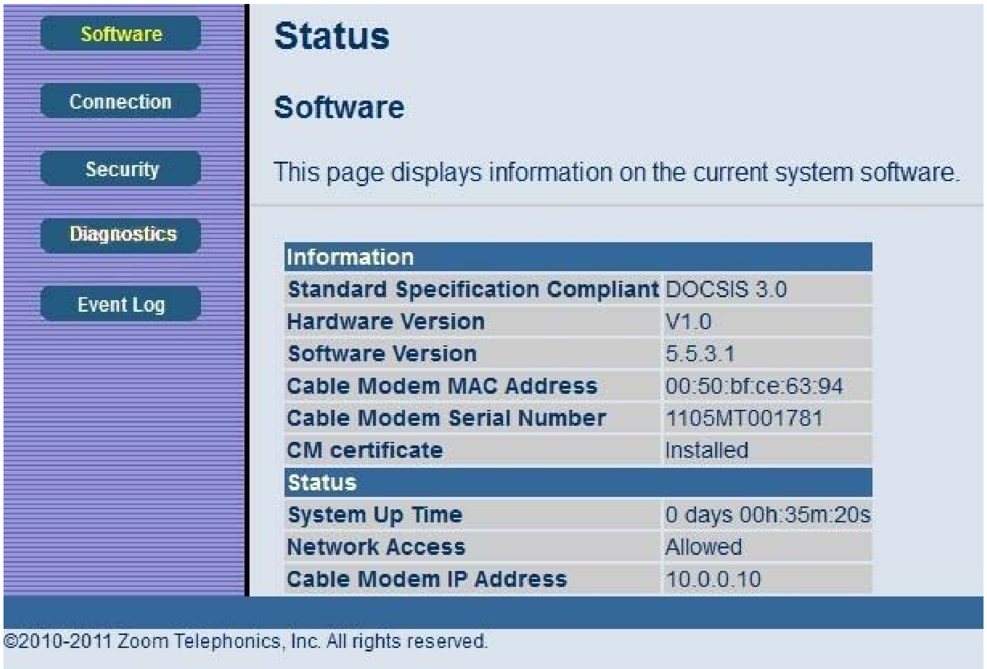
Status Menu Options

The Status Menu lets you:

- View the status and connection information of the cable modem/router
- Change the administrator password
- Use diagnostic tools for troubleshooting

Software

The Software page is a read-only screen that shows the cable modem/router's current system software version. This page appears when you first log in to the Configuration Manager interface. You can also display it by clicking **Status** in the menu bar and then click the **Software** submenu. Figure 4 shows an example of the menu and Table 2 describes the items you can select.



Status

Software

This page displays information on the current system software.

Information	
Standard Specification Compliant	DOCSIS 3.0
Hardware Version	V1.0
Software Version	5.5.3.1
Cable Modem MAC Address	00:50:bf:ce:63:94
Cable Modem Serial Number	1105MT001781
CM certificate	Installed
Status	
System Up Time	0 days 00h:35m:20s
Network Access	Allowed
Cable Modem IP Address	10.0.0.10

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Figure 4. Software Menu

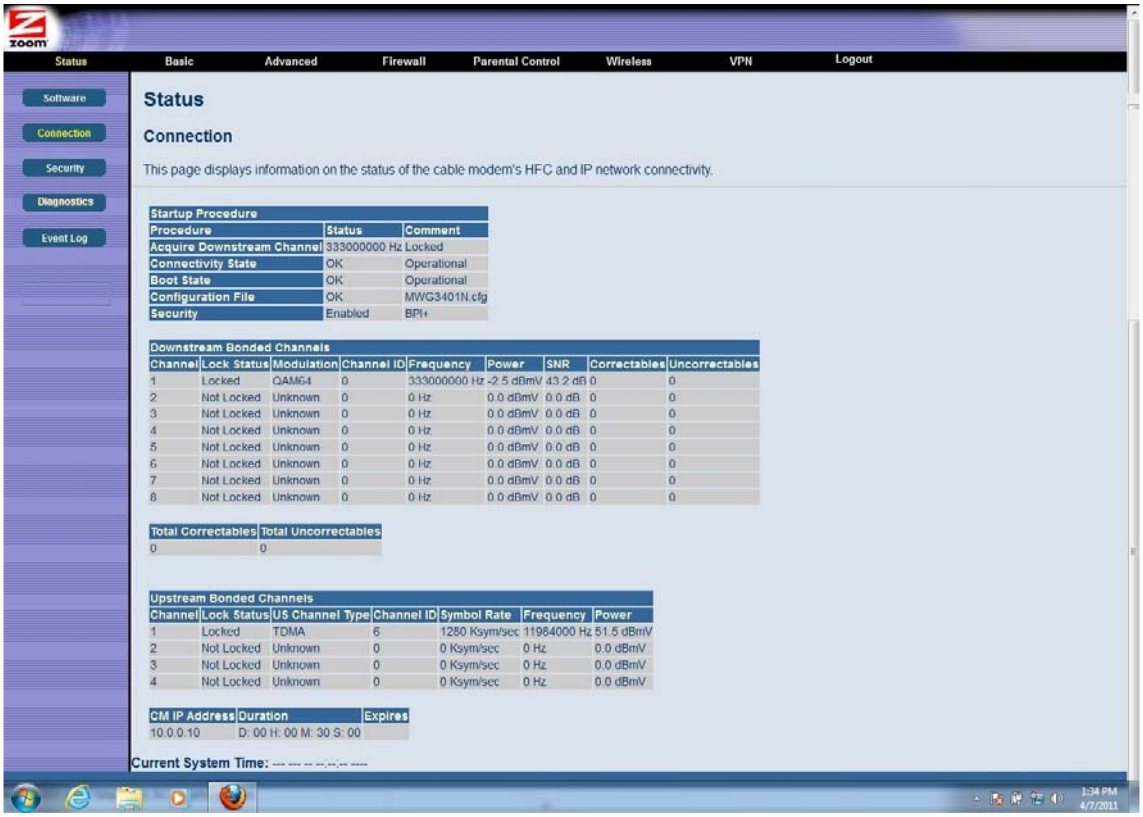
Table 2. Software Menu Option

Option	Description
Information	Shows the information on the current system software.
Status	Shows the system up time, network accessibility, and IP address of the Cable modem/router.

Connection

The Connection page is a read-only screen that shows the status of steps in your cable modem/router registration process. It also shows your cable modem/router's upstream and downstream channel status.

To access the Connection page, click **Status** in the menu bar and then click the **Connection** submenu. Figure 5 shows an example of the menu.



Status

Connection

This page displays information on the status of the cable modem's HFC and IP network connectivity.

Startup Procedure		
Procedure	Status	Comment
Acquire Downstream Channel	333000000 Hz	Locked
Connectivity State	OK	Operational
Boot State	OK	Operational
Configuration File	OK	MWG3401N.cfg
Security	Enabled	BPI+

Downstream Bonded Channels								
Channel	Lock Status	Modulation	Channel ID	Frequency	Power	SNR	Correctables	Uncorrectables
1	Locked	QAM64	0	333000000 Hz	-2.5 dBmV	43.2 dB	0	0
2	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
3	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
4	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
5	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
6	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
7	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0
8	Not Locked	Unknown	0	0 Hz	0.0 dBmV	0.0 dB	0	0

Total Correctables	Total Uncorrectables
0	0

Upstream Bonded Channels						
Channel	Lock Status	US Channel Type	Channel ID	Symbol Rate	Frequency	Power
1	Locked	TDMA	6	1280 Ksym/sec	11984000 Hz	51.5 dBmV
2	Not Locked	Unknown	0	0 Ksym/sec	0 Hz	0.0 dBmV
3	Not Locked	Unknown	0	0 Ksym/sec	0 Hz	0.0 dBmV
4	Not Locked	Unknown	0	0 Ksym/sec	0 Hz	0.0 dBmV

CM IP Address	Duration	Expires
10.0.0.10	D: 00 H: 00 M: 30 S: 00	

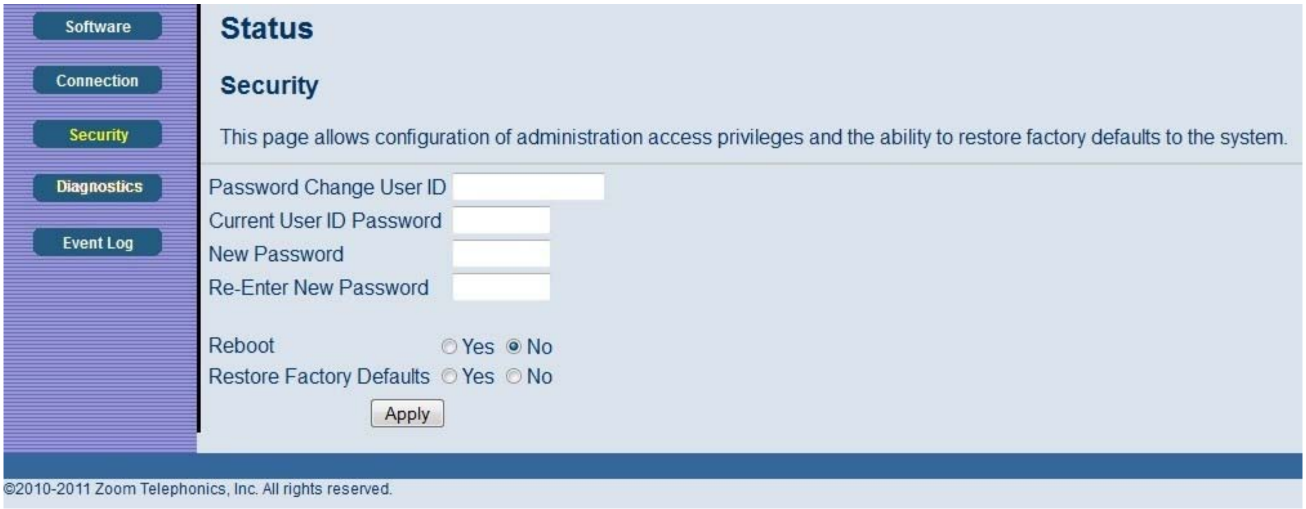
Current System Time: --- --- -- --:--:-- ----

Figure 5. Example of Connection Page

Security

The Security page allows you to configure access privileges and restore the cable modem/router to its factory defaults.

To access the Security page, click **Status** in the menu bar and then click the **Security** submenu. Figure 6 shows an example of the menu and Table 3 describes the items you can select.



Status

Security

This page allows configuration of administration access privileges and the ability to restore factory defaults to the system.

Password Change User ID

Current User ID Password

New Password

Re-Enter New Password

Reboot ○ Yes ● No

Restore Factory Defaults ○ Yes ○ No

Apply

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Figure 6. Example of Security Page

To restore the cable modem/router to factory defaults:

1 In the Security submenu, select the **Yes** button next to **Restore Factory Defaults**.

2 Click **Apply**.

3 Click **OK** to reboot the cable modem/router. The reboot is complete when the POWER LED stops blinking.

4 If the Login screen doesn't reappear, click the **Refresh** link to log back in to the Configuration Manager.

Table 3. Security Menu Option

Option	Description
Password Change User ID	Enter the new ID for the administrator.
New Password	Enter the new security password.
Re-Enter New password	Re-enter (confirm) the new security password.
Current User ID Password	Enter the current ID of the administrator.
Restore Factory Defaults	Allows you to reset to factory default settings.

Note: You DO NOT have to restore factory defaults to change the password.

Diagnostics

Note: Some versions may not support this feature.

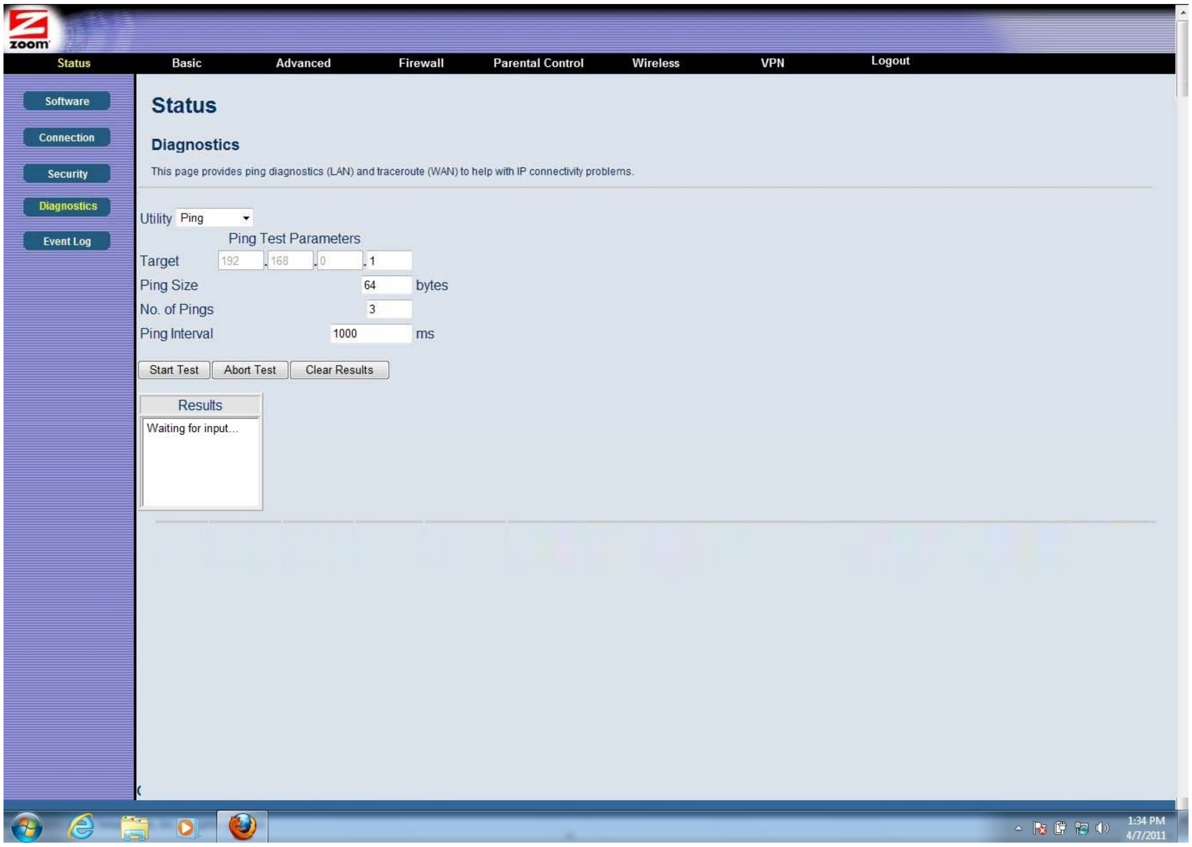
The Diagnostics page allows you to troubleshoot connectivity problems. Two utilities are provided for troubleshooting network connectivity: Ping and Traceroute.

Ping allows you to check connectivity between the cable modem/router and devices on the LAN while Traceroute allows you to map the network path from the cable modem/router to a public host.

Selecting Traceroute from the drop-down Utility list will present alternate controls for the Traceroute utility.

To access the Diagnostics page, click **Status** in the menu bar and then click the **Diagnostics** submenu. Figure 7 and Figure 8 show the examples of the menu and

Table 4 describes the items you can select.



Status

Diagnostics

This page provides ping diagnostics (LAN) and traceroute (WAN) to help with IP connectivity problems.

Utility: Ping

Ping Test Parameters

Target: 192 . 168 . 0 . 1

Ping Size: 64 bytes

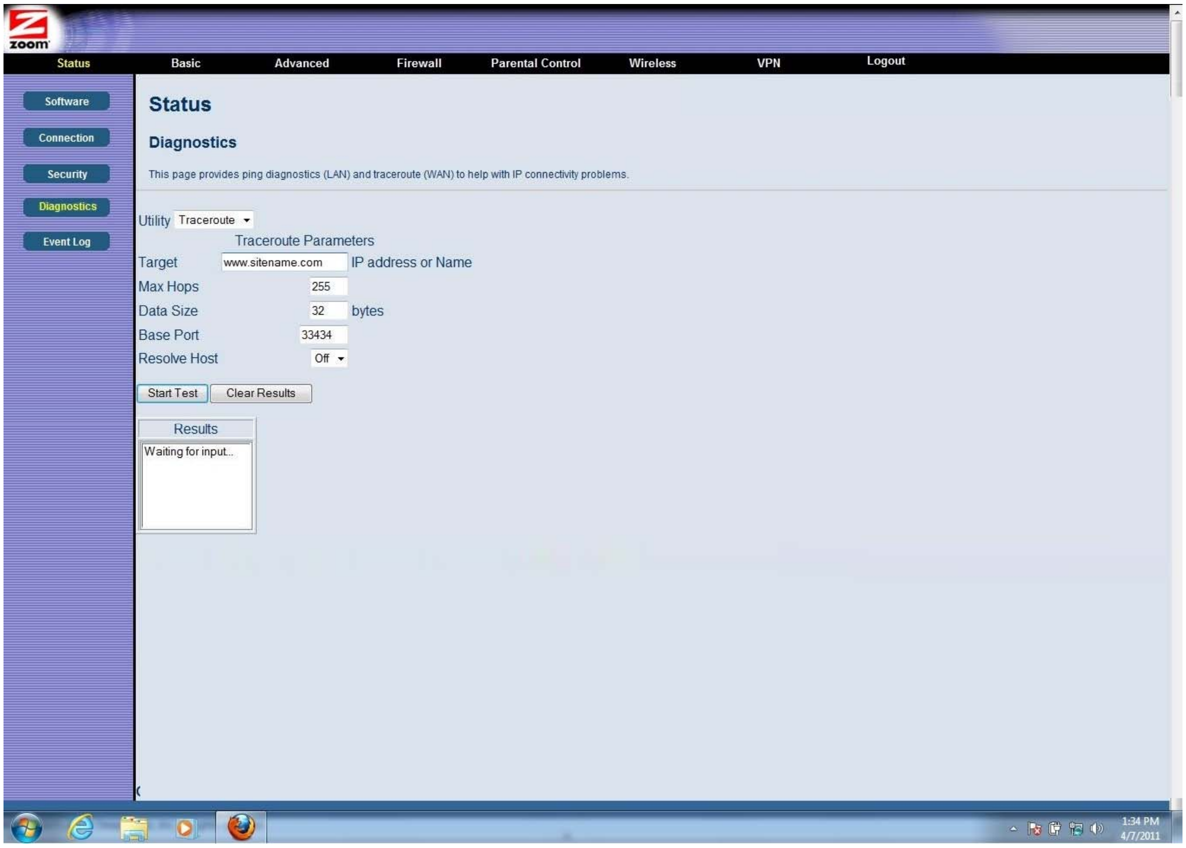
No. of Pings: 3

Ping Interval: 1000 ms

Results

Waiting for input...

Figure 7. Example of Diagnostics - Ping Page



Status

Diagnostics

This page provides ping diagnostics (LAN) and traceroute (WAN) to help with IP connectivity problems.

Utility: Traceroute

Traceroute Parameters

Target: www.sitename.com IP address or Name

Max Hops: 255

Data Size: 32 bytes

Base Port: 33434

Resolve Host: Off

Results

Waiting for input...

Figure 8. Example of Diagnostics - Traceroute Page

To run either utility:

1. Select the utility from the Utility drop-down list.
2. Make any changes to the default parameters.
3. Select **Start Test** to begin. The window will automatically be refreshed as the results are displayed in the Results table.

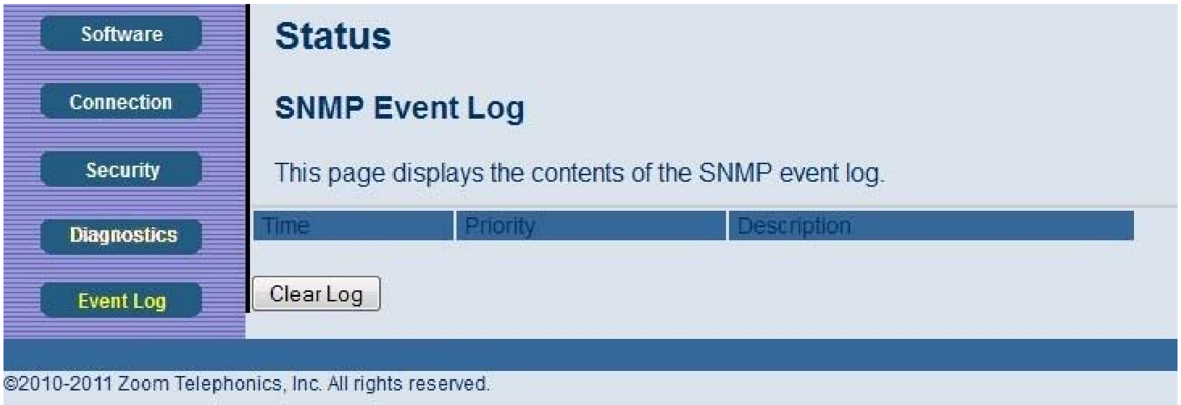
Table 4. Diagnostics Menu Option

Option	Description
Utility	Select the utility for troubleshooting.
Parameters	Enter the required parameters to perform diagnostics.
Start Test	Click this button to begin diagnostic after making any changes to the default parameters.
Abort Test	Click this button to abort Ping diagnostics.
Clear Results	Click this button to clear the results table.

Event Log

The Event Log page shows the SNMP event log.

To access the Event Log page, click **Status** in the menu bar and then click the **Event Log** submenu. Figure 9 shows an example of the menu and Table 5 describes the items you can select.



Status

SNMP Event Log

This page displays the contents of the SNMP event log.

Time	Priority	Description

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Figure 9. Event Log Page

Table 5. Event Log Menu Option

Option	Description
Time	Shows the local time of a log event.
Priority	Shows the priority level of an event.
Description	Shows detailed information of an SNMP event.

4

Basic Menu Options

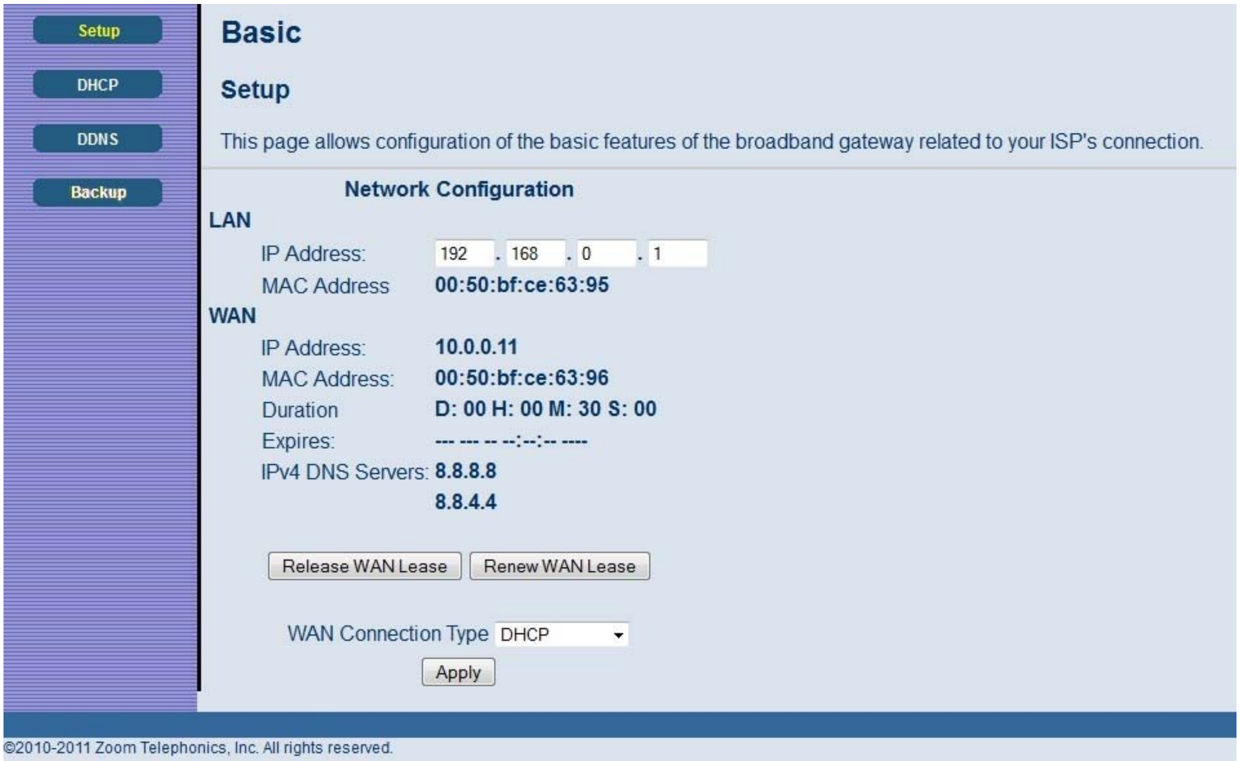
The Basic Menu lets you:

- Configure the basic settings of your cable modem/router
- Configure DHCP server for the LAN
- Configure DDNS service
- Backup and restore of configuration settings

Setup

The Setup page allows you to configure the basic features of the cable modem/router related to your ISP's connection.

To access the Setup page, click **Basic** in the menu bar and then click the **Setup** submenu. Figure 10 shows an example of the menu and Table 6 describes the items you can select.



Basic

Setup

This page allows configuration of the basic features of the broadband gateway related to your ISP's connection.

Network Configuration

LAN

IP Address: 192 . 168 . 0 . 1

MAC Address 00:50:bf:ce:63:95

WAN

IP Address: 10.0.0.11

MAC Address: 00:50:bf:ce:63:96

Duration D: 00 H: 00 M: 30 S: 00

Expires: --- --- -- --:--:-- ----

IPv4 DNS Servers: 8.8.8.8
8.8.4.4

WAN Connection Type DHCP

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Figure 10. Example of Setup Page

Table 6. Setup Menu Option

Option	Description
LAN IP Address	Set the base LAN IP for your private network. By default this is 192.168.0.1 There is normally no need to change this.
WAN Connection Type	Select how your cable modem/router obtains an IP address. The options are via DHCP or manual configuration of a static IP address. Unless you have arranged for a static IP address from your service provider, you should leave this setting at its default, DHCP.

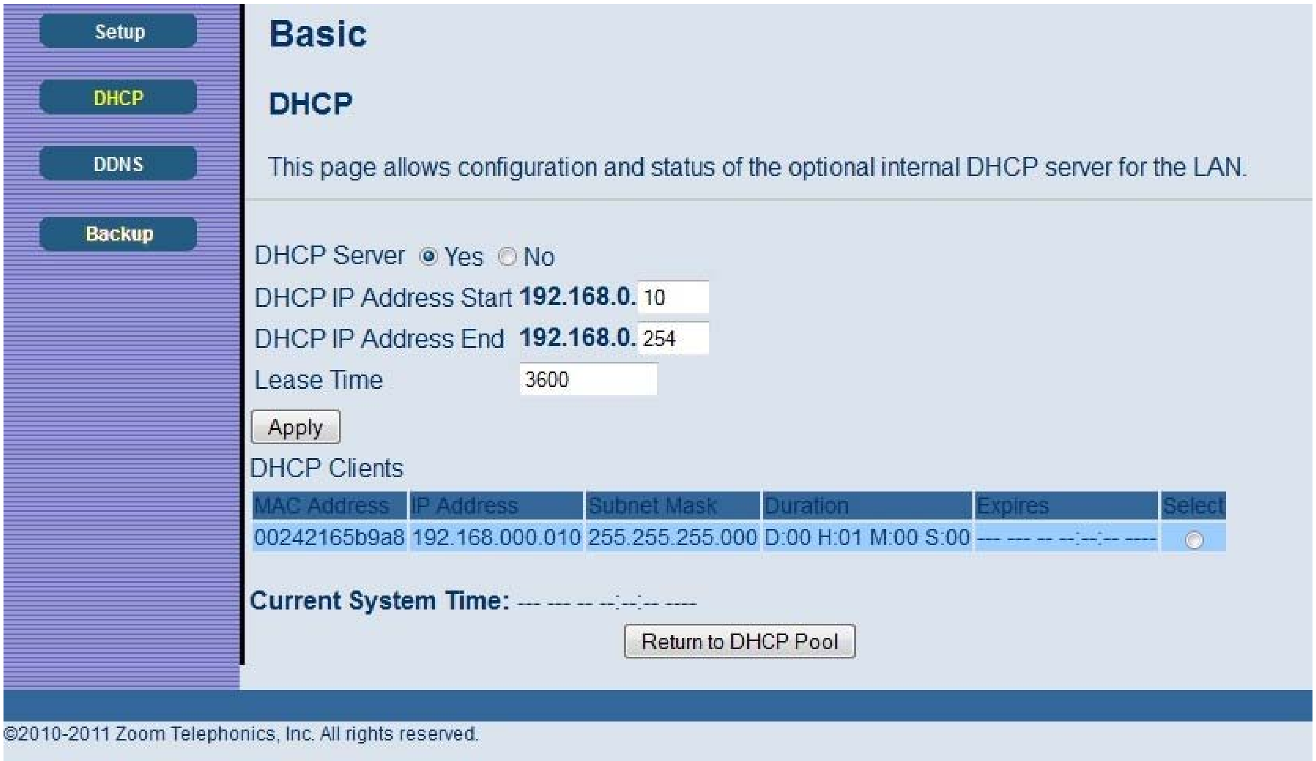
DHCP

The DHCP page allows you to configure your cable modem/router's DHCP server.

To access the **DHCP** page:

1. Click **Basic** in the menu bar.
2. Then click the **DHCP** submenu.

Figure 11 shows an example of the menu and Table 7 describes the items you can select.



Basic

DHCP

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

DHCP Server ● Yes ○ No

DHCP IP Address Start **192.168.0.** 10

DHCP IP Address End **192.168.0.** 254

Lease Time 3600

DHCP Clients

MAC Address	IP Address	Subnet Mask	Duration	Expires	Select
00242165b9a8	192.168.000.010	255.255.255.000	D:00 H:01 M:00 S:00	--- --- -- --:--:-- ----	○

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

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Figure 11. Example of DHCP Page

In the unusual event that you have a separate DHCP server on your LAN, you can disable the cable modem/router's DHCP server by selecting the No radio button. If you do this, make sure the IP address assigned to the cable modem/router is on the same subnet as that of the external DHCP server, or you won't be able to access the cable modem/router from the LAN. The base LAN IP address of the cable modem/router can be set from the Basic Setup page.

Note that the cable modem/router will only operate on a class C subnet, with subnet mask 255.255.255.0

You may also want to disable the DHCP server if you have assigned static IP addresses to all devices on your network.

Table 7. DHCP Menu Options

Option	Description
DHCP Server	Select Yes to use internal DHCP server of the cable modem/router, or select No to disable it.
Starting Local Address	Configure the starting IP address for IP leases available to devices on the LAN.
Number of CPEs	Configure the number of PCs supported on the LAN.
Lease Time	Configure the time a lease will last before it must be renewed. Default is 3600 seconds , or 1 hour.

DDNS

The DDNS page allows you to make use of a DDNS server. 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. This means you can host a server on your LAN that can be accessed from anywhere on the Internet.

Caution: Some service providers may consider connection of such a server to be a breach of your service agreement.

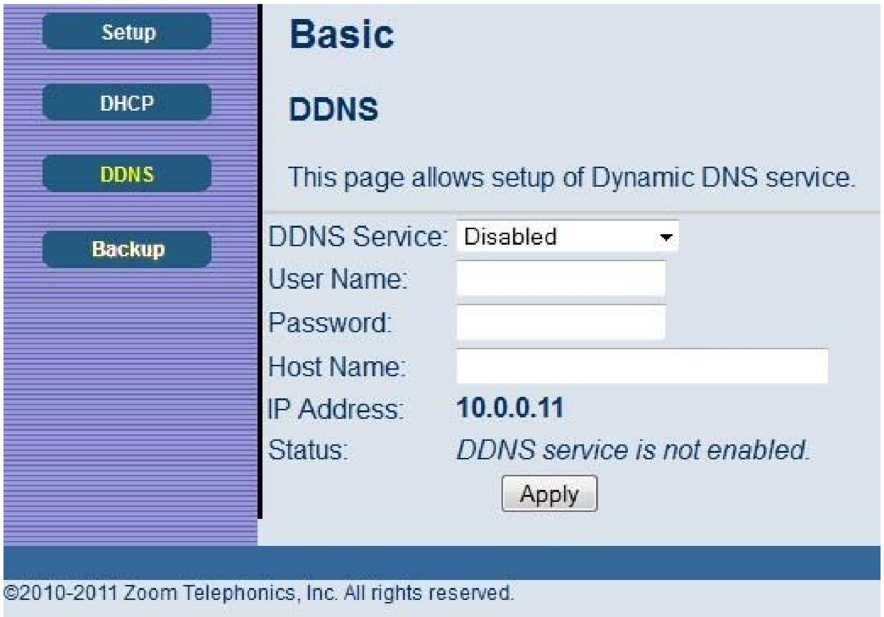
The cable modem/router supports a dynamic DNS client compatible with the Dynamic DNS service (http://www.dyndns.com/). You must sign up with this service if you want to use it.

To access the **DDNS** page:

1 Click **Basic** in the menu bar.

2 Then click the **DDNS** submenu.

Figure 12 shows an example of the menu and Table 8 describes the items you can select.



Basic

DDNS

This page allows setup of Dynamic DNS service.

DDNS Service: Disabled

User Name:

Password:

Host Name:

IP Address: 10.0.0.11

Status: *DDNS service is not enabled.*

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Figure 12. Example of DDNS Page

To activate the DDNS client:

1 Go to the DynDNS website and create an account for the **Dynamic DNS** service.

2 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.

3 You will also be asked for your host's current **IP address**. This is the WAN IP address that has been assigned to your cable modem/router during provisioning. (See WAN IP Address on the Basic / Setup web page.)

4 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**.

5 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.

Table 8. DDNS Menu Option

Option	Description
DDNS Service	Select the type of service that you are registered for from your DDNS service provider.
User Name	Enter your DDNS account username subscribed to the service provider.
Password	Enter the password of the account.
Host Name	Enter the host name of your service host.
IP Address	Shows the current WAN side public IP address.
Status	Shows the status of DDNS service.

Backup

Note: Some versions may not support this feature.

The Backup page allows you to save the current cable modem/router 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.

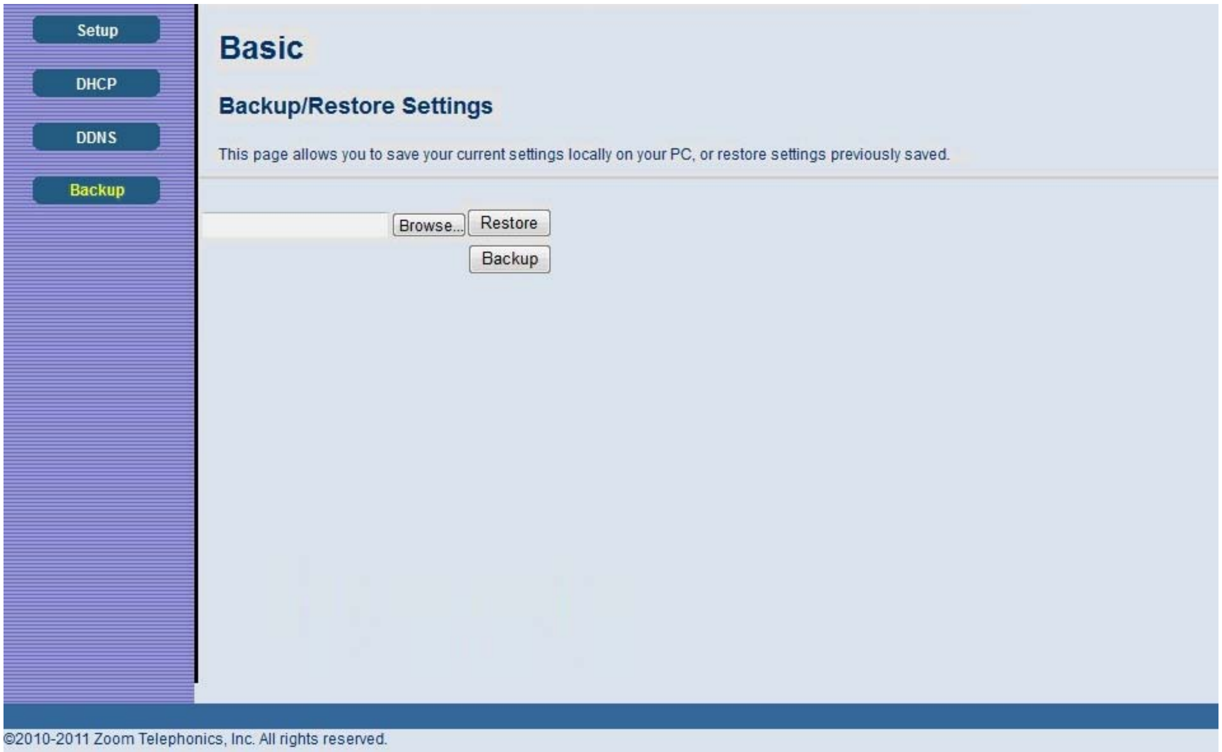
To restore a previous configuration:
Click **Browse** and use the navigation window to locate the file. (Usually cable modem/router Settings.bin, unless you rename it before saving.) Once the file has been located, click **Restore** to restore the settings.
Note: Once the settings are restored, the device will reboot.

To access the **Backup** page:

1 Click **Basic** in the menu bar.

2 Then click the **Backup** submenu.

Figure 13 shows an example of the menu.



Basic

Backup/Restore Settings

This page allows you to save your current settings locally on your PC, or restore settings previously saved.

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Figure 13. Example of Backup Page

5

Advanced Menu Options

The Advanced Menu lets you:

- Enable advanced features of the cable modem/router
- Configure LAN IP address, MAC address, and port number filtering
- Configure WAN to LAN port forwarding and triggers
- Configure DMZ hosting
- Configure RIP parameters

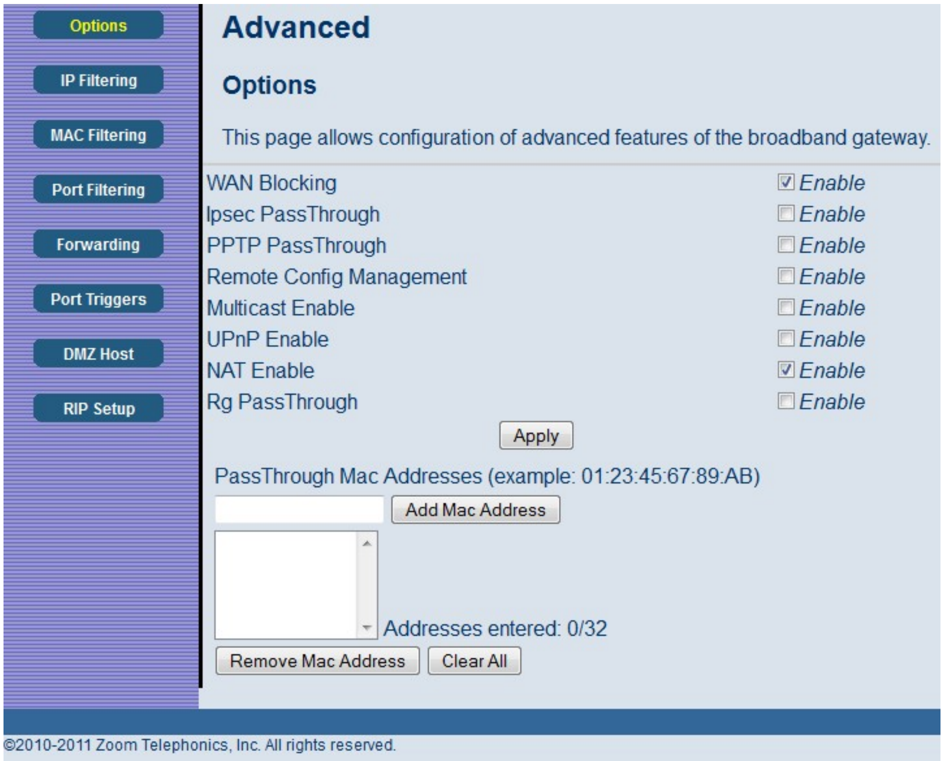
Options

The Options page allows you to configure the cable modem/router to operate in different modes that adjust how the device routes IP traffic.

To access the **Options** page:

1. Log in to the **Configuration Manager** (see page 13 for instructions).
2. Click **Advanced** in the menu bar.
3. Then click the **Options** submenu.

Figure 14 shows an example of the menu and Table 9 describes the items you can select.



Advanced

Options

This page allows configuration of advanced features of the broadband gateway.

WAN Blocking	☑ *Enable*
Ipsec PassThrough	□ *Enable*
PPTP PassThrough	□ *Enable*
Remote Config Management	□ *Enable*
Multicast Enable	□ *Enable*
UPnP Enable	□ *Enable*
NAT Enable	☑ *Enable*
Rg PassThrough	□ *Enable*

PassThrough Mac Addresses (example: 01:23:45:67:89:AB)

Addresses entered: 0/32

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Figure 14. Example of Options Page

To enable a feature:

1 Click the appropriate check box (a check mark will appear).

2 When you are done with your selections, click on the **Apply** button.

Table 9. Options Menu Option

Option	Description
WAN Blocking	Prevents the cable modem/router or the PCs behind it from being visible to the WAN (i.e. from the Internet). For instance, pings to the cable modem/router's WAN IP address or to the devices behind it are not returned. This makes it more difficult for hackers to attack your PCs and other devices on your network.
IPSec/PPTP PassThrough	Enable to support VPN devices or software on your network.
Remote Configuration Management	Allows the cable modem/router to be remotely administered at port 8080. When enabled, navigate to http://CMIPAddress:8080/ to administer the cable modem/router remotely). You can find your CM: WAN IP address on the **Basic Setup** page.
Multicast Enable	Allows multicast specific traffic (denoted by a multicast specific address) to be passed to and from the PCs on the private network behind the cable modem/router.
UPnP Enable	Select Enable to enable the UPnP agent in the cable modem/router. If you are running an application that requires UPnP, check this box.
RgPassThrough	Allows PCs behind the cable modem/router to bypass the cable modem/router DHCP server and NAT functions. PCs or other IP devices can be added to the passthrough table by entering the MAC addresses of the devices into the passthrough table.

IP Filtering

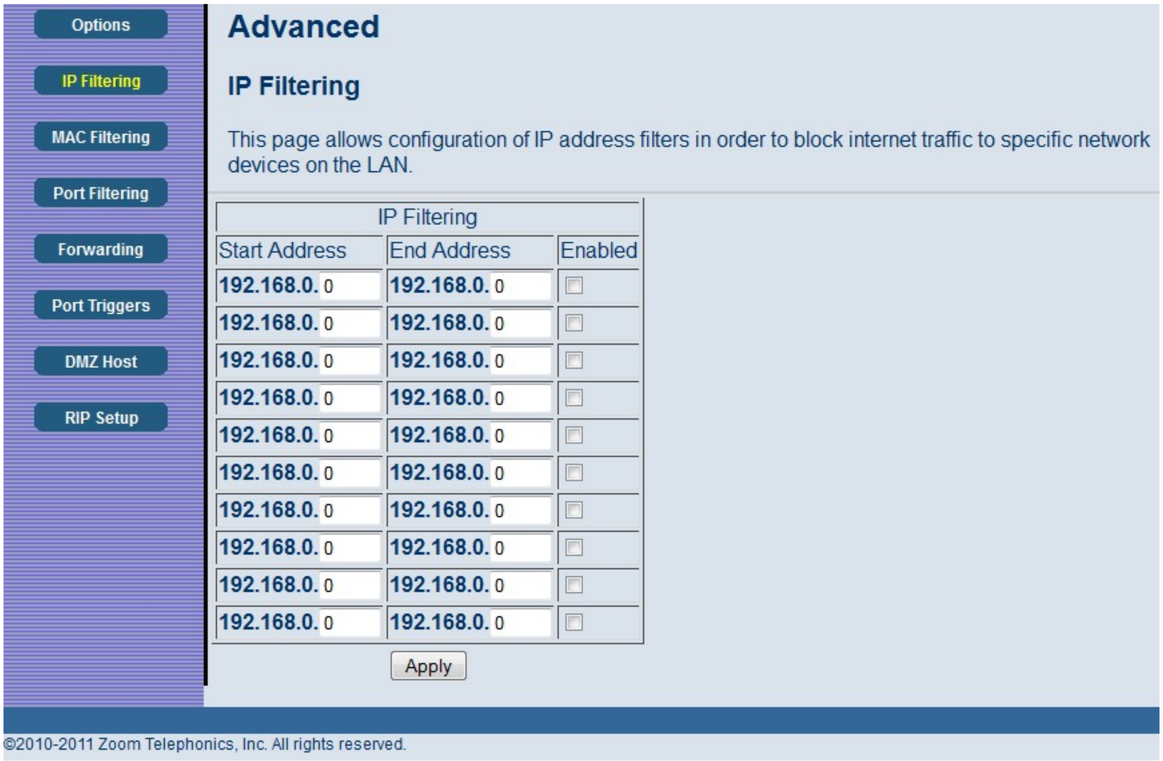
The IP Filtering page allows you to configure IP address filters in order to block Internet traffic to specific network device on your LAN. By entering starting and ending IP address ranges, you can configure which local PCs are denied access to the WAN.

To access the **IP Filtering** page:

1 Click **Advanced** in the menu bar.

2 Then click the **IP Filtering** submenu.

Figure 15 shows an example of the menu and Table 10 describes the items you can select.



Advanced

IP Filtering

This page allows configuration of IP address filters in order to block internet traffic to specific network devices on the LAN.

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	□

Figure 15. Example of IP Filtering Page

To activate the IP address filter:

1 Enter the last byte (the numbers after the last period) of the IP address in **Start Address** and **End Address**.

2 Check the **Enable** box to the right of the entry to store settings.

3 Click the **Apply** button to activate the filter rules.

Table 10. IP Filtering Menu Option

Option	Description
Start/End Address	Enter the last byte of the IP address. The upper bytes of the IP address are set automatically from the cable modem/router IP address.
Enable	To activate the IP address filter, you must also check the **Enable** box and click **Apply**. You can disable this filter while retaining the addresses you entered for later use.

MAC Filtering

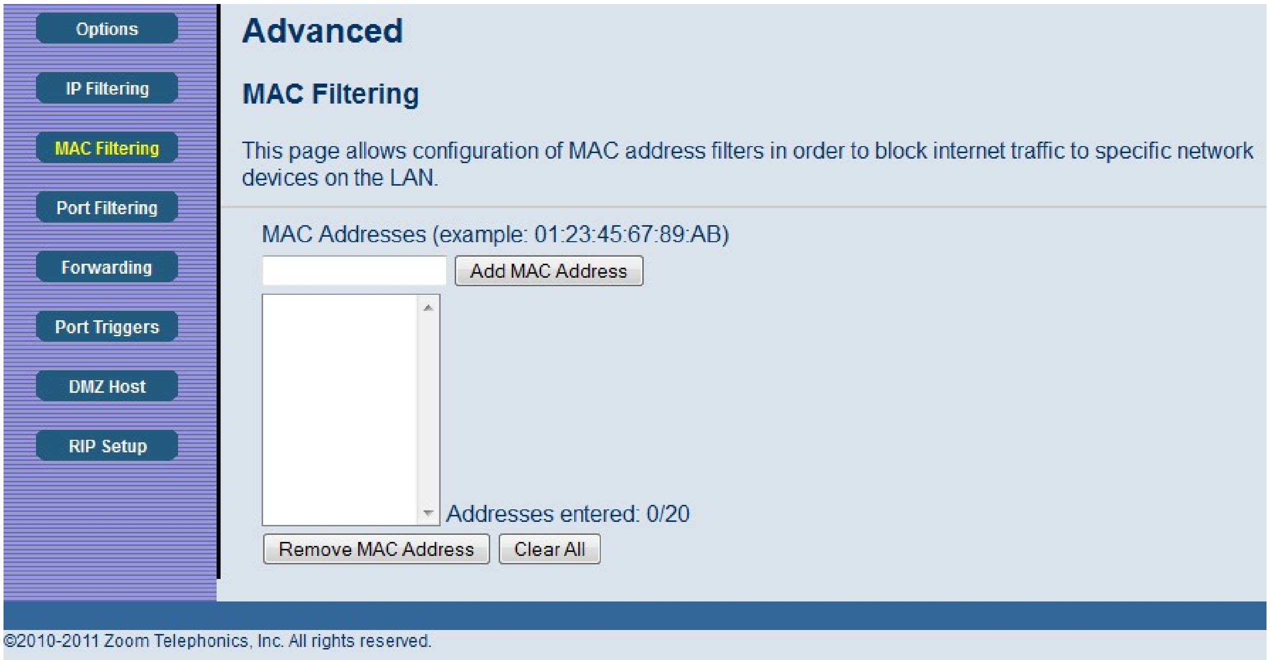
The MAC Filtering page allows you to configure MAC address filters in order to block Internet traffic to specific network devices on your LAN.

To access the **MAC Filtering** page:

1 Click **Advanced** in the menu bar.

2 Then click the **MAC Filtering** submenu.

Figure 16 shows an example of the menu and Table 11 describes the items you can select.



Advanced

MAC Filtering

This page allows configuration of MAC address filters in order to block internet traffic to specific network devices on the LAN.

MAC Addresses (example: 01:23:45:67:89:AB)

Addresses entered: 0/20

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Figure 16. Example of MAC Filtering Page

Table 11. MAC Filtering Menu Option

Option	**Description**
MAC Address	PCs and other devices can be added to the MAC filter table by entering their MAC addresses into the **Add MAC Address** box, and clicking the **Add MAC Address** button. Internet traffic to and from each listed Address will be blocked.

Port Filtering

The Port Filtering page allows you to configure port filters in order to block Internet traffic to specific ports on all devices on your LAN.

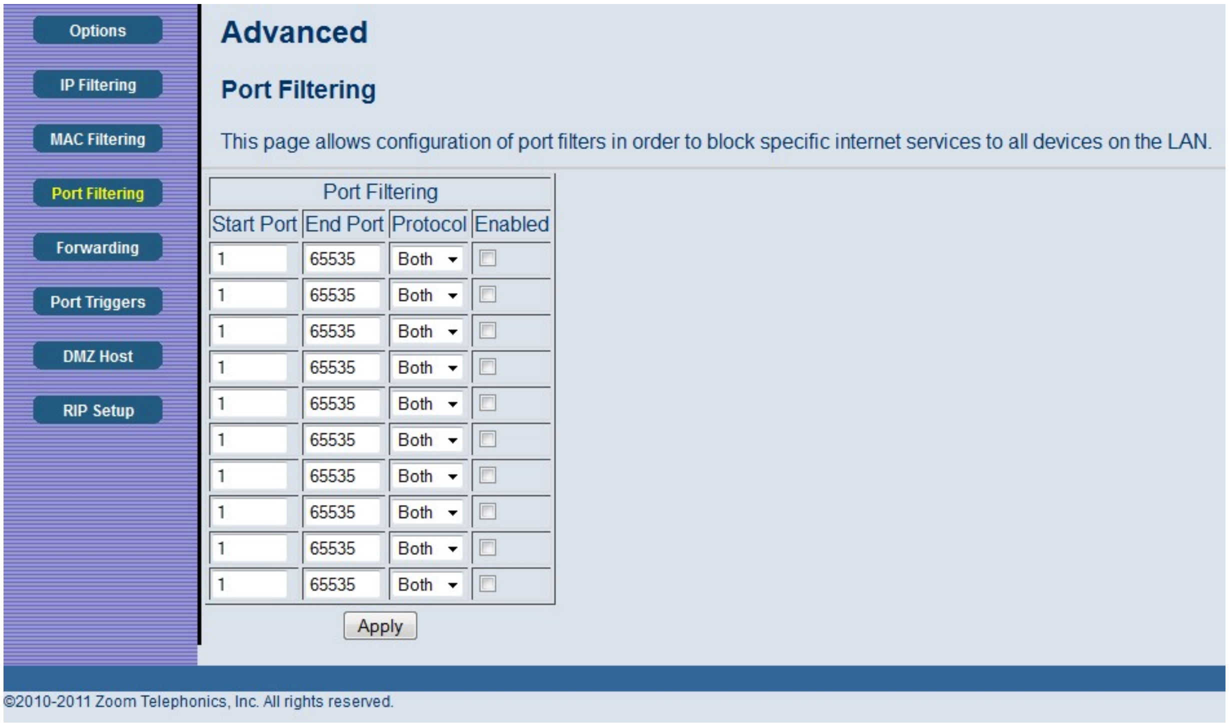
Similarly, you can prevent PCs from sending outgoing TCP/UDP traffic to the Internet from specific IP port numbers. This can be configured using the Port Filtering page.

To access the **Port Filtering** page:

1 Click **Advanced** in the menu bar.

2 Then click the **Port Filtering** submenu.

Figure 17 shows an example of the menu and Table 12 describes the items you can select.



Advanced

Port Filtering

This page allows configuration of port filters in order to block specific internet services to all devices on the LAN.

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	□

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Figure 17. Example of Port Filtering Page

For example, if you would like to block all PCs on the private LAN from accessing HTTP sites (or "web surfing"):

1 Set the Start Port to **80**, the End Port to **80**.

2 Set the protocol to **TCP**.

3 Check the **Enable** box to the right of the entry to store settings.

4 Click **Apply** button to activate the filter rules.

Table 12. Port Filtering Menu Option

Option	Description
Start/End Port	Enters the start and end port of the port filter range
Protocol	Filter either both TCP and UDP traffic or just UDP or just TCP.

Forwarding

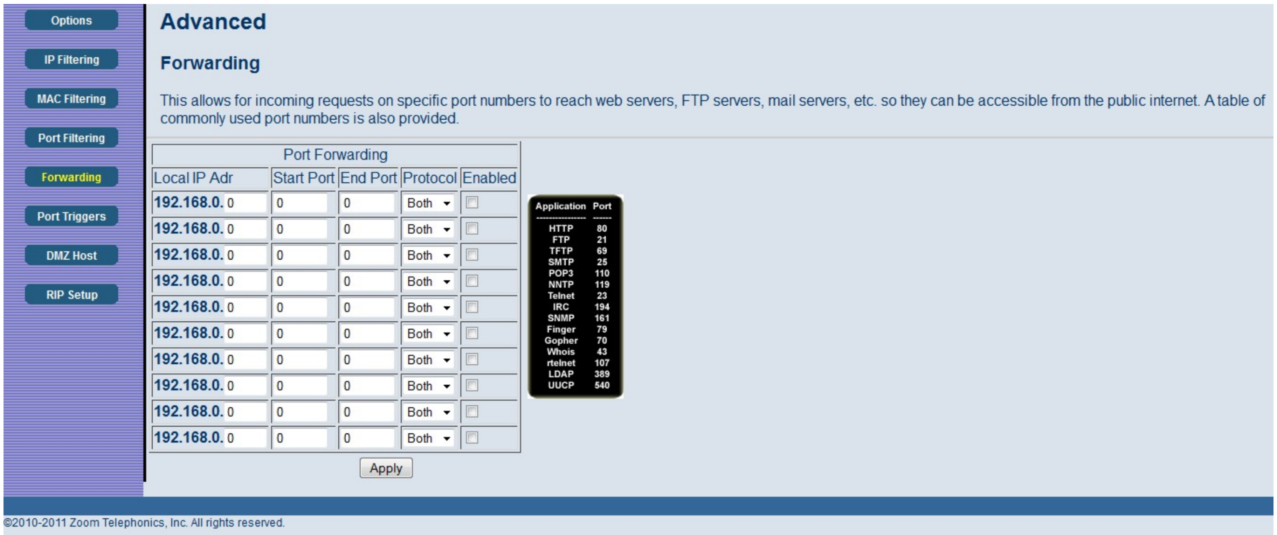
The Forwarding page allows you to run a publicly accessible server from your LAN by specifying the mapping of TCP/UDP ports to a local PC. It allows incoming requests to specific port numbers to reach a web server, FTP server, mail server, etc.

To access the **Forwarding** page,

1 Click **Advanced** in the menu bar.

2 Then click the **Forwarding** submenu.

Figure 18 shows an example of the menu and Table 13 describes the items you can select.



Advanced

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.

Port Forwarding

Local IP Adr	Start Port	End Port	Protocol	Enabled
192.168.0. 0	0	0	Both	□
192.168.0. 0	0	0	Both	□
192.168.0. 0	0	0	Both	□
192.168.0. 0	0	0	Both	□
192.168.0. 0	0	0	Both	□
192.168.0. 0	0	0	Both	□
192.168.0. 0	0	0	Both	□
192.168.0. 0	0	0	Both	□
192.168.0. 0	0	0	Both	□
192.168.0. 0	0	0	Both	□

Application	Port
HTTP	80
FTP	21
TFTP	69
SMTP	25
POP3	110
NNTP	119
Telnet	23
IRC	194
SNMP	161
Finger	79
Gopher	70
Whois	43
rtelnet	107
LDAP	389
UUCP	540

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Figure 18. Example of Forwarding Page

To activate the port forwarding:

1. Enter the port range of the Internet traffic that you want to forward, and the IP address of the server to which you want to forward that traffic.
2. Select the protocol(s) to be forwarded.
3. Check the **Enable** box to the right of the entry to store settings.
4. Click the **Apply** button to activate the forwarding rules.

Table 13. Forwarding Menu Option

Option	Description
Local IP Address	Enter the IP address to which forwarded traffic should be sent.
Start/End Port	Enter the range of port numbers (start and end port) to forward. If only a single port is desired, enter the same port number in the **Start** and **End** locations.
Protocol	Select the protocol(s) to be forwarded.

Note: You may need to assign static IP addresses to devices on your LAN to insure that the port forwarding you have set up will always apply to them.

Port Triggers

The Port Triggers page 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.

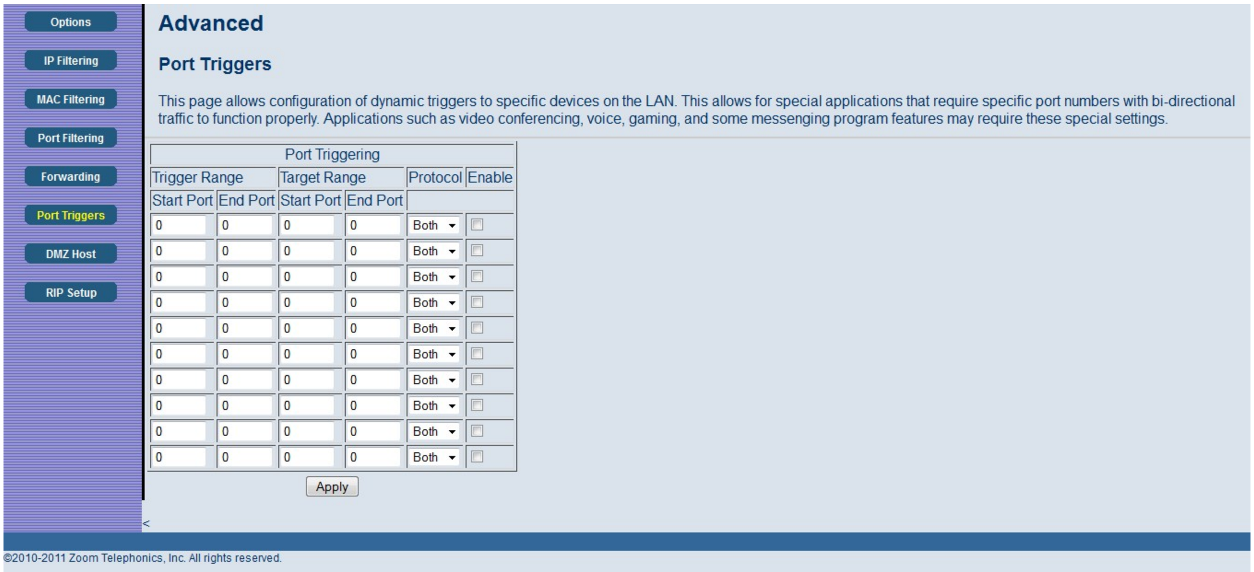
Port Triggers are similar to Port Forwarding except that they are not static ports held open all the time. With the port triggering function, the cable modem/router detects outgoing data on a specific IP port number and opens corresponding target ports for incoming data. If no outgoing traffic is detected on the Trigger Range ports for 10 minutes, the Target Range ports will close.

To access the **Port Triggers** page:

1 Click **Advanced** in the menu bar.

2 Then click the **Port Triggers** submenu.

Figure 19 shows an example of the menu and Table 14 describes the items you can select.



Advanced

Port Triggers

This page allows configuration of 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 messenging program features may require these special settings.

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	☐

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Figure 19. Example of port Triggers Page

To activate a port trigger

1 Enter the trigger and target ports range for the Internet traffic to forward to.

2 Select the forwarding protocol(s).

3 Check the **Enable** box to the right of the entry to store settings.

4 Click the **Apply** button to activate the forwarding rules.

Table 14. Port Triggers Menu Option

Option	Description
Trigger Range **(Start / End Port)**	Enter the trigger range (starting and ending ports) of the application for which you want to enable port triggering. The application will send data from these ports.
Target Range **(Start / End Port)**	Enter the target range (starting and ending ports) to open for the same application. The application will receive data on these ports.
Protocol	Select the protocol for this rule.

DMZ Host

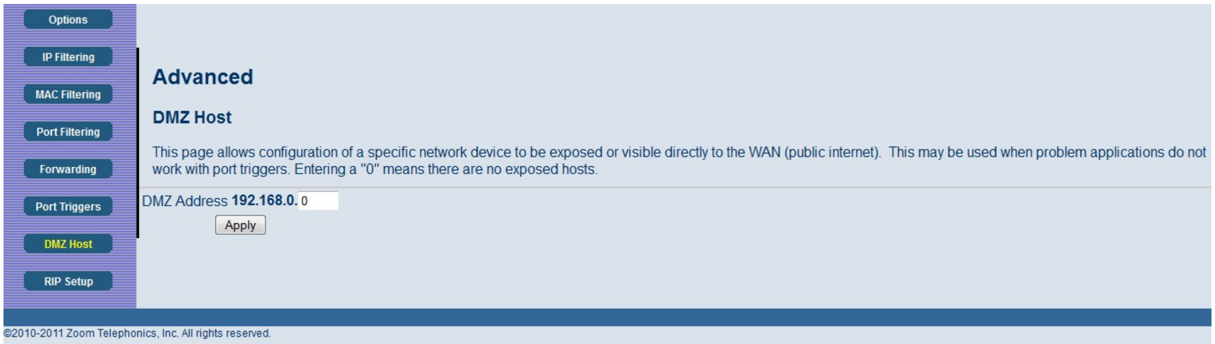
The DMZ (De-militarized Zone) Host page allows you to configure a network device (e.g. a PC) to be exposed or visible directly to the Internet. This may be used if an application doesn't work with port triggers. If you have an application that won't run properly behind the NAT firewall, you can configure it for unrestricted two-way Internet access by defining it as a virtual DMZ host. Adding a client to the DMZ may expose your local network to various security risks because the client is not protected, so use this option as a last resort.

To access the **DMZ Host** page:

1 Click **Advanced** in the menu bar.

2 Then click the **DMZ Host** submenu.

Figure 20 shows an example of the menu.



Advanced

DMZ Host

This page allows configuration of a specific network device to be exposed or visible directly to the WAN (public internet). This may be used when problem applications do not work with port triggers. Entering a "0" means there are no exposed hosts.

DMZ Address 192.168.0. 0

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Figure 20. Example of DMZ Host Page

To configure DMZ settings:

1 Enter the last byte of the LAN IP address of the PC or other device on your network that you want to configure as a DMZ host.

2 Click **Apply**.

Note: 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.

Note: You may need to assign your DMZ host a static IP address on your LAN to insure that it will always be at that address.

RIP Setup

The RIP Setup page allows you to configure RIP (Router Information Protocol) parameters. RIP automatically identifies and uses the best known and quickest route to any given destination address to help reduce network congestion and delays.

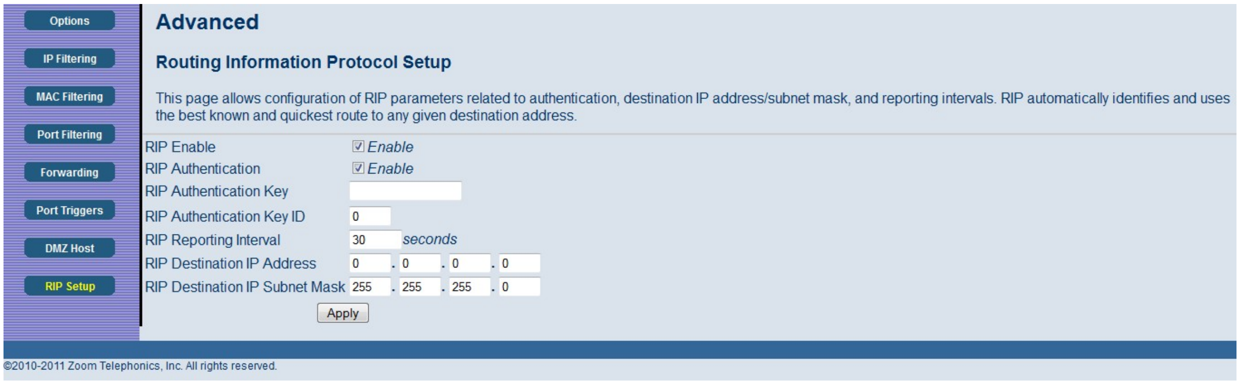
RIP is a protocol that requires negotiation from both sides of the network (e.g. both the cable modem/router and your service provider's CMTS (Cable Modem Termination System)). Your service provider will normally set this up based on their knowledge of their CMTS settings.

To access the **RIP Setup** page:

1 Click **Advanced** in the menu bar.

2 Then click the **RIP Setup** submenu.

Figure 21 shows an example of the menu and Table 15 describes the items you can select.



Advanced

Routing Information Protocol Setup

This page allows configuration of RIP parameters related to authentication, destination IP address/subnet mask, and reporting intervals. RIP automatically identifies and uses the best known and quickest route to any given destination address.

RIP Enable	☑ *Enable*
RIP Authentication	☑ *Enable*
RIP Authentication Key	
RIP Authentication Key ID	0
RIP Reporting Interval	30 *seconds*
RIP Destination IP Address	0 . 0 . 0 . 0
RIP Destination IP Subnet Mask	255 . 255 . 255 . 0

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Figure 21. Example of RIP Setup Page

Note: RIP messages will only be sent when the cable modem/router is configured for Static IP Addressing (see the **Basic – Setup** page).

It is unlikely that your cable Internet service supports this mode. If they do, and you want to enable RIP, you will need to ask for the CMTS's key name and number. You may need additional information.

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

- To turn on RIP MD5 Authentication, and check the **Enable** box.
- To specify a RIP MD5 Authentication Key String, type **BRCMV2** for this example.
  key name = a string value to match CMTS key name value
- To specify a RIP MD5 Auth Key ID, type **1**.
  key number = a number to match the CMTS key number value
- To change the RIP announcement interval, enter a number in seconds.
  reporting interval by default = 30 seconds
- To specify a RIP unicast destination IP address, enter the IP address and subnet mask.

Table 15. RIP Setup Menu Option

Option	Description
RIP Authentication	Check this box to enable RIP authentication for routing protocols
RIP Authentication Key	Enter the set of keys for your interface.
RIP Authentication Key ID	Enter the ID to identify the key used to create the authentication data.
RIP Reporting Interval	Enter the interval at which to update routing table.
RIP Destination IP Address	Enter the destination IP address for RIP.
RIP Destination IP Subnet Mask	Enter the subnet mask for the destination IP address.

6

Firewall Menu Options

The Firewall Menu lets you:

- Configure web contents filter
- View the local and remote logs

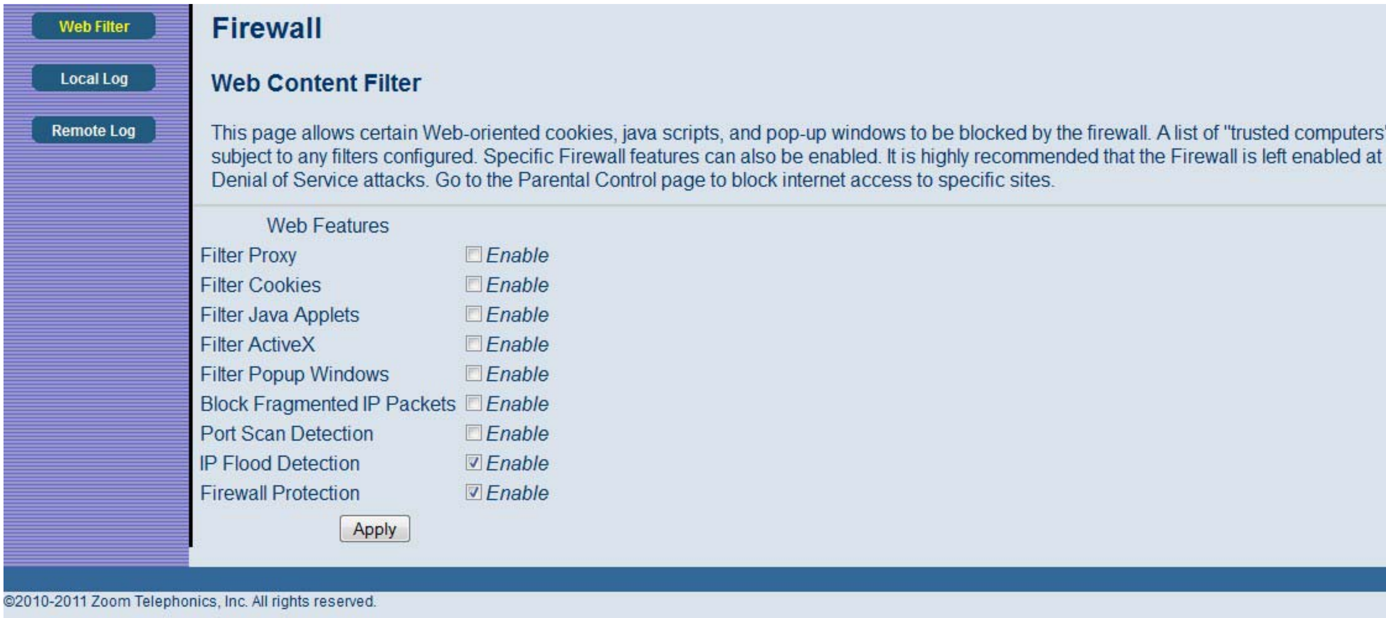
Web Filter

The Web Filter page allows you to block or exclusively permit different types of data through the cable modem/router from the WAN to the LAN.

To access the **Web Filter** page:

1. Click **Firewall** in the menu bar.
2. Then click the **Web Filter** submenu.

Figure 22 shows an example of the menu and Table 16 describes the items you can select.



Firewall

Web Content Filter

This page allows certain Web-oriented cookies, java scripts, and pop-up windows to be blocked by the firewall. A list of "trusted computers' subject to any filters configured. Specific Firewall features can also be enabled. It is highly recommended that the Firewall is left enabled at Denial of Service attacks. Go to the Parental Control page to block internet access to specific sites.

Web Features

Filter Proxy □ *Enable*
Filter Cookies □ *Enable*
Filter Java Applets □ *Enable*
Filter ActiveX □ *Enable*
Filter Popup Windows □ *Enable*
Block Fragmented IP Packets □ *Enable*
Port Scan Detection □ *Enable*
IP Flood Detection ☑ *Enable*
Firewall Protection ☑ *Enable*

Apply

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Figure 22. Example of Web Filter Page

To enable web content filter:

1 Click the appropriate check box. A check-mark will appear.

2 When you are done with your selections, click on the **Apply** button.

Table 16. Web Filter Menu Option

Option	**Description**
Filter Proxy	Check this box to filter proxies.
Filter cookies	Check this box to filter cookies.
Filter Java	Check this box to filter Javas.
Applets	Check this box to filter Applets.
Filter ActiveX	Check this box to filter ActiveX.
Filter Popup Windows	Check this box to filter popup windows.
Port Scan Detection	Detects and blocks port scan activity originating on both the LAN and WAN.

Block Fragmented IP packets	Prevents all fragmented IP packets from passing through the firewall.
IP Flood Detection	Detects and blocks packet floods originating on both the LAN and WAN.
Firewall Protection	Turns on the Stateful Packet Inspection (SPI) firewall features.

Note: Java applets, ActiveX controls, and popup windows function filtering will fail if the web pages are sent in uncompressed format to the web browser.

Local Log

The Local Log page allows you to configure firewall event log reporting via email alerts. Individual emails can be sent out automatically each time the firewall is under attack. A local log is also stored within the modem and displayed within this page.

To access the **Local Log** page:

1 Click **Firewall** in the menu bar.

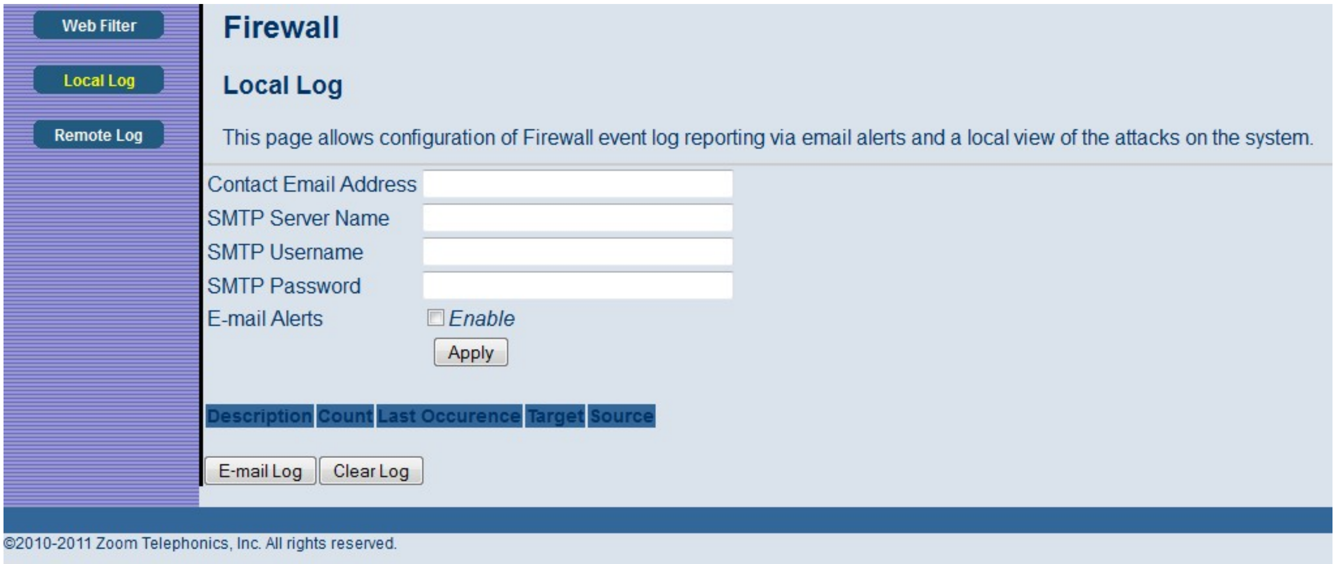
2 Then click the **Local Log** submenu.

Figure 23 shows an example of the menu and Table 17 describes the items you can select.

To enable the automatic email alerts:

1 Configure the email address you want to send alerts to. You also need to configure the email account you will send from (this may be the same account). This includes the SMTP (outgoing)/ mail server address, together with username and password. You may need to contact your service provider to find the information.

2 Check the **Enable** box and click the Apply button.



Firewall

Local Log

This page allows configuration of Firewall event log reporting via email alerts and a local view of the attacks on the system.

Contact Email Address

SMTP Server Name

SMTP Username

SMTP Password

E-mail Alerts ☐ *Enable*

Description	Count	Last Occurence	Target	Source

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Figure 23. Example of Remote Log Page

Table 17. Local Log Menu Option

Option	Description
Contact Email Address	Enter the email address where you want to receive the alert email.
SMTP Server Name	Enter the SMTP (Outgoing) mail server address of the email account you will send from.
SMTP Username	Enter the username of the email account you will send from.
SMTP Password	Enter the password of the email account you will send from.
E-mail Alerts	Check to enable sending alert email, when an attack is detected.

Remote Log

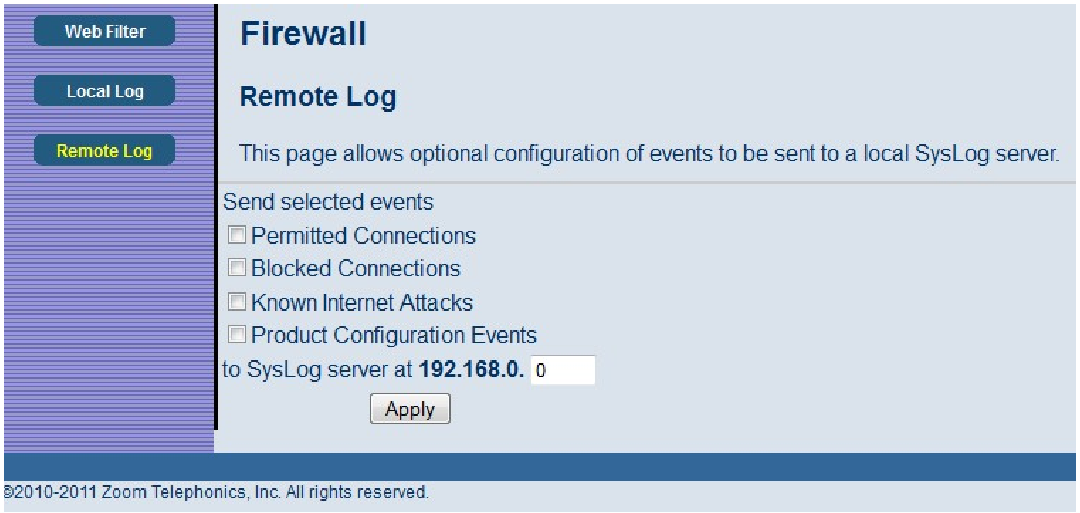
The Remote Log page allows you to send firewall attack reports to a standard SysLog server. It is useful to log volumes of instances over a long period of time. Individual attack or configuration items can be selected that will be sent to the SysLog server so that only the items of interest can be monitored. Permitted connections, blocked connections, known Internet attack types, and cable modem/router configuration events can also be logged. The SysLog server must be on the same subnet as the Private LAN behind the cable modem/router (typically 192.168.0.x).

To access the **Remote Log** page:

1 Click **Firewall** in the menu bar.

2 Then click the **Remote Log** submenu.

Figure 24 shows an example of the menu and Table 18 describes the items you can select.



Firewall

Remote Log

This page allows optional configuration of events to be sent to a local SysLog server.

Send selected events

□ Permitted Connections

□ Blocked Connections

□ Known Internet Attacks

□ Product Configuration Events

to SysLog server at **192.168.0.** 0

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Figure 24. Example of Remote Log Page

Below is a complete list of the capable SysLog server attack/notification types and their format. The generic format of sysLog messages for traffic or administration-related events is:

MMM DD HH:MM:SS YYYY SYSLOG[0]: [Host HostIP] Protocol SourceIP,SourcePort --> DestIP,DestPort EventText

Table 18. SysLog Server Event Format

Parameter	Description
MMM	The three-letter abbreviation for the month (e.g., JUN, JUL AUG, etc.)
DD	The two-digit day of the month (e.g., 01, 02, 03, etc.)
HH:MM:SS	The time displayed as two-digit values for the hour, minute, and second, respectively.
YYYY	The four-digit year.
HostIP	The IP address of cable modem/router sending the SysLog event. This is the LAN IP Address on the Basic - Setup page.
Protocol	Can be one of the following: "TCP", "UDP", "ICMP", "IGMP" or "OTHER". In the case of "OTHER" the protocol type is displayed in parentheses (). For ICMP packets, the ICMP type is displayed in parentheses.
SourceIP	The IP address of the originator of the session/packet.
SourcePort	The source port at the originator.
DestIP	The IP address of the recipient of the session/packet.
DestPort	The destination port at the recipient.
EventText	A textual description of the event.

The format of SysLog messages for informational events is simplified:

MMM DD HH:MM:SS YYYY SYSLOG[0]: [Host HostIP] EventText

The table below lists all events that can be sent to the SysLog server.

Table 19. SysLog Server Event and Meaning

Event Text	Meaning
ALLOW: Inbound access request	An inbound request was made, and accepted, from a public network client to use a service hosted on the firewall or a client behind the firewall.
ALLOW: Outbound access request	An outbound request was made, and accepted, from a public client to use a service hosted on a public network server.
DENY: Inbound or outbound access request	A request to traverse the firewall by a public or private client violated the security policy, and was blocked.
DENY: Firewall interface access request	A request was made to the public or private firewall interface by a public or private client that violated the security policy, and was blocked.
FAILURE: User interface login (Invalid username or password)	An attempt was made to login to the user interface, and access was denied because the username and/or password was incorrect.
SUCCESS: User interface login	An attempt was made to login to the user interface, and access was allowed.
ALLOW: User interface access [request]	An HTTP GET or POST request was made by an authenticated user to the user interface.
DENY: Inbound or outbound [internet attack name] attack	A known internet attack was detected attempting to traverse the firewall, and was blocked. Examples of known internet attacks are Ping Of Death, Teardrop, WinNuke, XmasTree, SYN Flood, etc.
DENY: Firewall interface [internet attack name] attack	A known internet attack directed at the firewall itself was detected and blocked. Examples of known internet attacks are Ping Of Death, Teardrop, WinNuke, XmasTree, SYN Flood, etc.
Firewall Up	The public interface (WAN) connection is up, and the firewall has begun to police traffic, or the firewall was previously disabled, and the user has enabled it through the user interface.
Remote config management enabled [port#]	Remote configuration management (via HTTP through the specified port # on the public interface) has been enabled via the user interface.
Remote config management disabled	Remote configuration management has been disabled via the user interface.

Time Of Day established	The system established the current system time via the DOCSIS cable modem registration process. The system time is used by the firewall to timestamp events.
Public Network Interface up (IP address x.x.x.x)	The firewall successfully obtained an IP address for the public network (WAN) interface via DHCP. This process takes place after the cable modem registration process successfully completes.

7

Parental Control Menu Options

The Parental Control Menu lets you:

- Configure the rules for Internet access based on user or time period
- Configure the rules to block certain Internet contents and certain web sites
- View the event logs related to parental control

To set up Parental Control, you first set up Policies in the **Basic Setup** Menu. Next, you assign a user name and password for each user on your network. Finally you apply the Policies to individual users in the **User Setup** Menu. When you enable Parental Control, each user must log on to view Internet content. The content a user may access will be defined by the policy that you assigned to that user. A user profile may optionally be applied to a specific computer, so that no login is required for users of that computer.

Basic

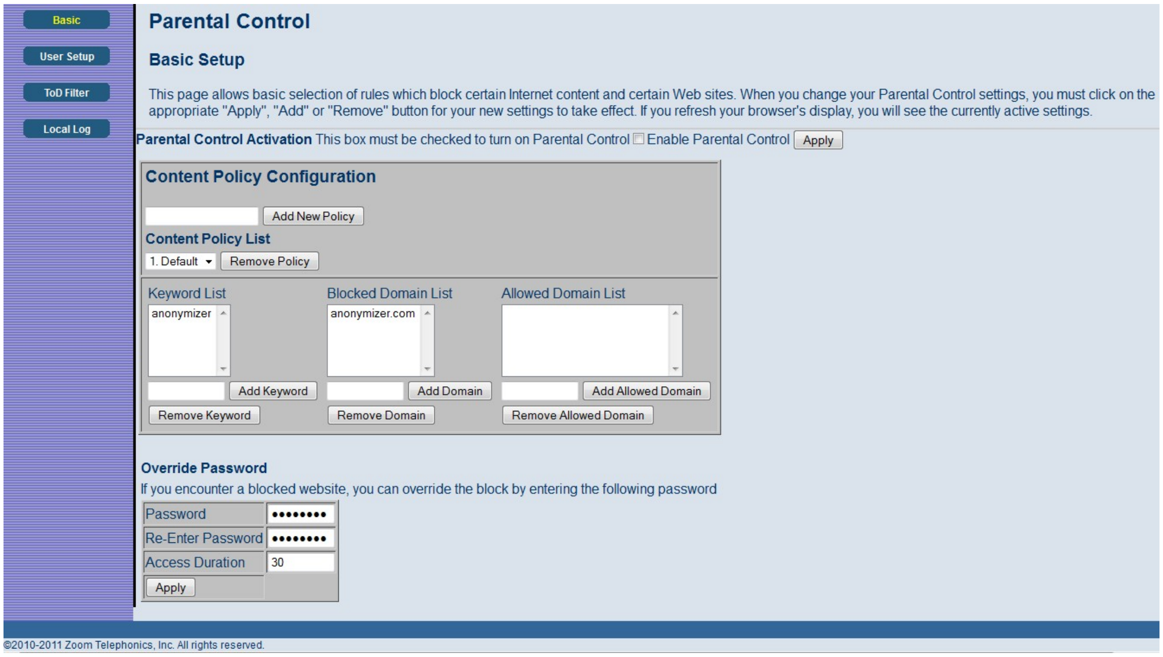
This Basic Setup page allows you to configure rules which block certain Internet content and certain Web sites. An override password and access duration timer allow user override of the content filter settings. When entered, these allow a user Internet access without the constraint of the rules entered until the timer expires.

To access the Basic page:

1. Click **Parental Control** in the menu bar.
2. Then click the **Basic** submenu.

Figure 25 shows an example of the menu and Table 20 describes the items you can select.

Note: Always remember to click the **Apply** button to complete changes on this page.



Parental Control

Basic Setup

This page 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. If you refresh your browser's display, you will see the currently active settings.

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

Content Policy Configuration

Content Policy List

1. Default

Keyword List	Blocked Domain List	Allowed Domain List
anonymizer	anonymizer.com	

Override Password

If you encounter a blocked website, you can override the block by entering the following password

Password	••••••••
Re-Enter Password	••••••••
Access Duration	30

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Figure 25. Example of Basic Page

Table 20. Basic Setup Menu Option

Option	Description
Enable Parental Control	Check the box to enable Parental Control.
Content Policy Configuration	Enter a name for a content policy, and click **Add New Policy**.
Keyword List	Enter a keyword in the field at the bottom of the keyword list, and click **Add Keyword**. The keyword is associated with the respective entries in the **Blocked** and **Allowed Domain Lists**. See the **User Setup** page for more details.
Content Policy List	Pull-down list that shows Policy Names that you have created. Select the policy you want to define or edit.
Blocked Domain List	Type the domain name and add this domain to be blocked item and tied to a particular rule name. Blocked Domain feature can be time constrained to certain parts of the day or night via the settings from the Parental Control - ToD Filter page.
Allowed Domain List	Type the domain name and add this domain to be exclusively passed item and tied to a particular rule name. Allowed Domain feature can be time constrained to certain parts of the day or night via the settings from the T Parental Control - ToD Filter page.
Override Password	Enter the password and access duration timer for user override of the content filter settings.

User Setup

The User Setup page is the master page to which each individual “user” is linked to a specified time access rule, content filtering rule, and login password.

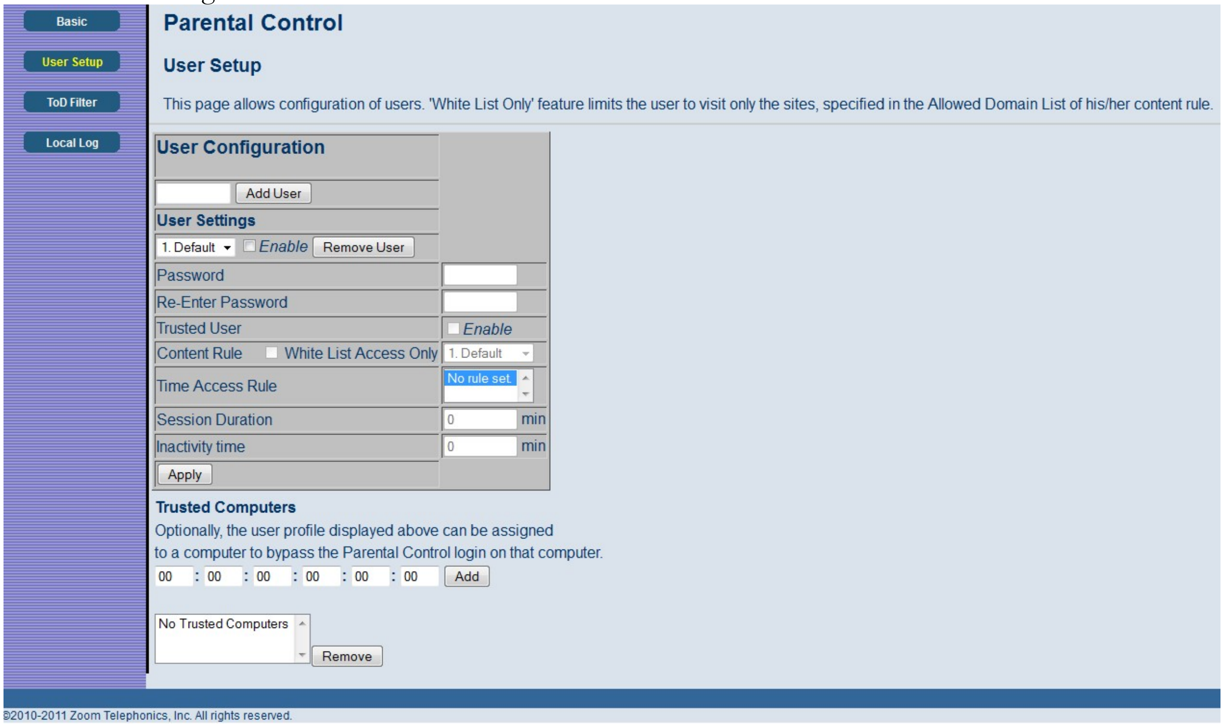
To access the **User Setup** page:

1 Click **Parental Control** in the menu bar.

2 Then click the **User Setup** submenu.

Figure 26 shows an example of the menu and Table 21 describes the items you can select.

Note: Always remember to click on the appropriate **Apply**, **Add** or **Remote** button to store and activate the settings.



Parental Control

User Setup

This page allows configuration of users. 'White List Only' feature limits the user to visit only the sites, specified in the Allowed Domain List of his/her content rule.

User Configuration

Add User

User Settings

1. Default □ Enable Remove User

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

Apply

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 Add

No Trusted Computers Remove

Figure 26. Example of User Setup Page

Table 21. User Setup Menu Option

Option	Description
User Configuration	Enter a user name (e.g. Mom, Dad, Bro, Sis) and click **Add User**.
Users Settings	Select a user from the drop-down list. Click the checkbox to enable parental control for this user.
Password	Enter the password for this user.
Re-Enter Password	Re-enter (confirm) the password for this user.
Trusted User	Select Enable to grant this user access to all Internet content regardless of any policy or time settings.
Content Rule	Select the content policy for this. The content policy is defined in the Parental Control - Basic page.
White List Only	Click this checkbox to limit the user to visit only the sites specified in the Allowed Domain List (see Parental Control - Basic page) of his/her content policy.
Time Access Rule	Select the access time rule for this user. The content policy is defined in Parental Control - ToD Filter page.
Session Duration	Enter the session duration time to limit this user's Internet access time.
Inactivity Time	Configure the inactivity timeout for this user to re-login. If there is no Internet activity for the specified amount of time (in minutes), the user must login again to continue using the Internet.

When all above information has been entered, click the **Apply** button to activate these settings. Repeat for each user.

Trusted Computers	Enter the MAC address of a computer or other device to bypass the login requirement. This computer or device will always have access as defined by the User profile above.

When the above information has been entered, click the **Apply** button to activate these settings. Repeat for each user.

ToD Filter (Time of Day Filter)

The ToD page allows you to configure the Internet access policies according the time of day settings. This page is tied to the **Parental Control - User Setup** page. You can define up to 30 time access policies. You can define policies that block all public Internet traffic for entire days or for specific time periods within each day. You can combine these policies in any way you want.

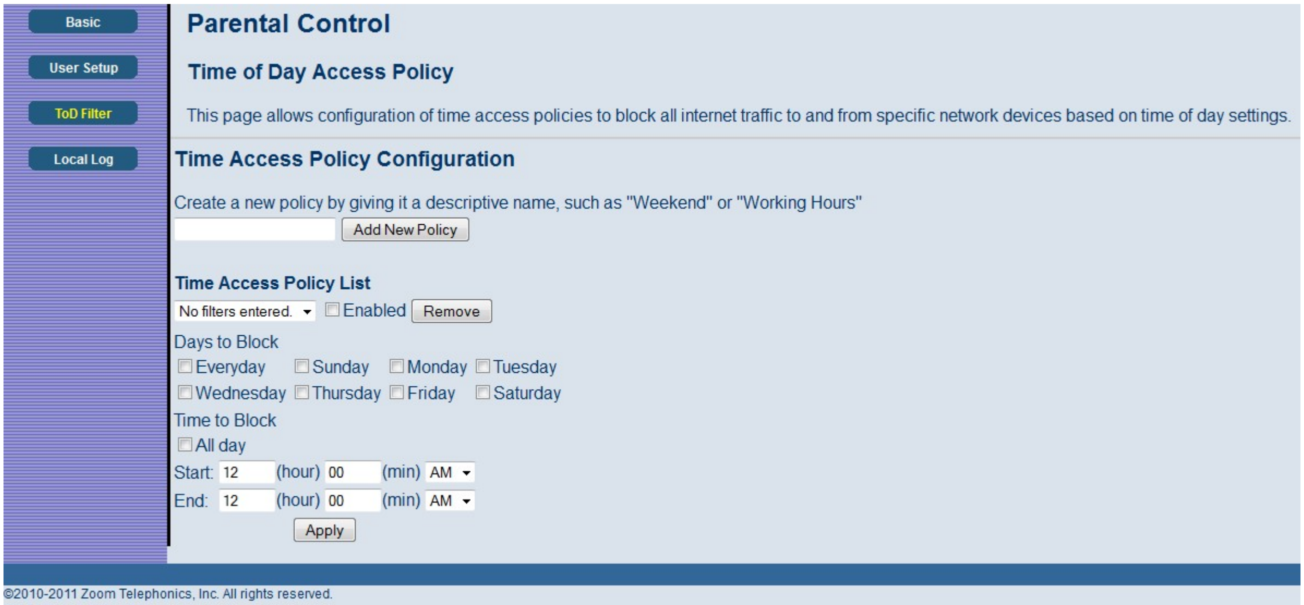
To access the **ToD Filter** page:

1 Click **Parental Control** in the menu bar.

2 Then click the **ToD Filter** submenu.

Figure 27 shows an example of the menu and Table 22 describes the items you can select.

Note: Always remember to click on the appropriate **Apply**, **Add** or **Remote** button to store and activate the settings.



Parental Control

Time of Day Access Policy

This page allows configuration of time access policies to block all internet traffic to and from specific network devices based on time of day settings.

Time Access Policy Configuration

Create a new policy by giving it a descriptive name, such as "Weekend" or "Working Hours"

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 ▾

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Figure 27. Example of ToD Filter Page

Table 22. ToD Filter Menu Option

Option	Description
Time Access Policy Configuration	Enter a name for the time access policy and click **Add New Policy**.
Time Access Policy List	Select a policy from the drop-down list. Click the Enable checkbox to enable this rule.
Days to Block	Click the checkboxes of the days that this rule applies to.
Time to Block	Click the checkbox **All Day** to define this policy to block Internet access for the entire day of each day selected – or enter the start and stop times of the periods you want to block access. **Note:** If you want to allow access for only a part of the day, you may need to create and apply two time policies. See example below.

Example of Time to Block – create and apply two time policies to allow access
Mon – Fri 7:00pm – 9:00pm:

Time Policy Name	Days to Block	Time to Block
Weekday I	Mon – Fri	12:00am – 7:00pm
Weekday II	Mon – Fri	9:00pm – 12:00am

Select both Weekday I and Weekday II at User/Time Access Rule.

Local Log

The Local Log page shows you the events related to the settings of Parental Control. This table is a running list of the last 30 Parental Control access violations that include the following items on Internet traffic:

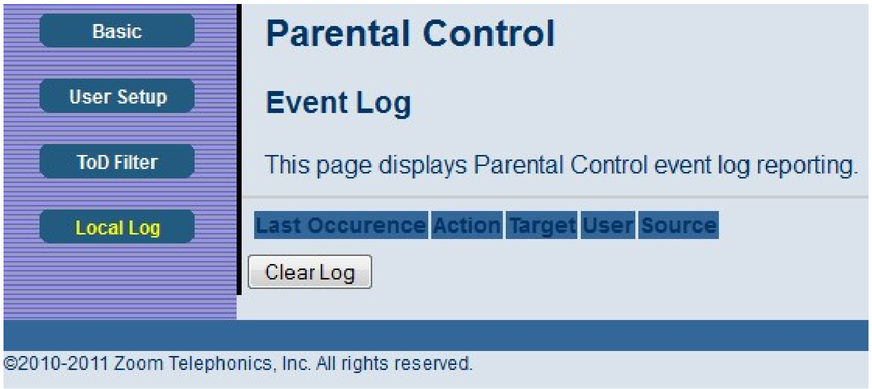
- If the user's internet access is blocked. (time filter)
- If a blocked keyword is detected in the URL.
- If a blocked domain is detected in the URL.
- If the online lookup service detects that the URL falls in a category that is blocked.

To access the **Local Log** page:

1 Click **Parental Control** in the menu bar.

2 Then click the **Local Log** submenu.

Figure 28 shows an example of the menu.



Parental Control

Event Log

This page displays Parental Control event log reporting.

Last Occurence	Action	Target	User	Source

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Figure 28. Example of Local Log Page

8

Wireless Menu Options

The Wireless Menu lets you:

- Configure cable modem/router to serve as a wireless access point (AP)
- Configure essential and advanced settings of wireless network
- Configure guest network for temporary visitors
- Configure WMM QoS

Note: Your cable modem/router has been preconfigured to support wireless connections without any further configuration. Please see page 10 for details.
Most users will not need to read this chapter.

Radio

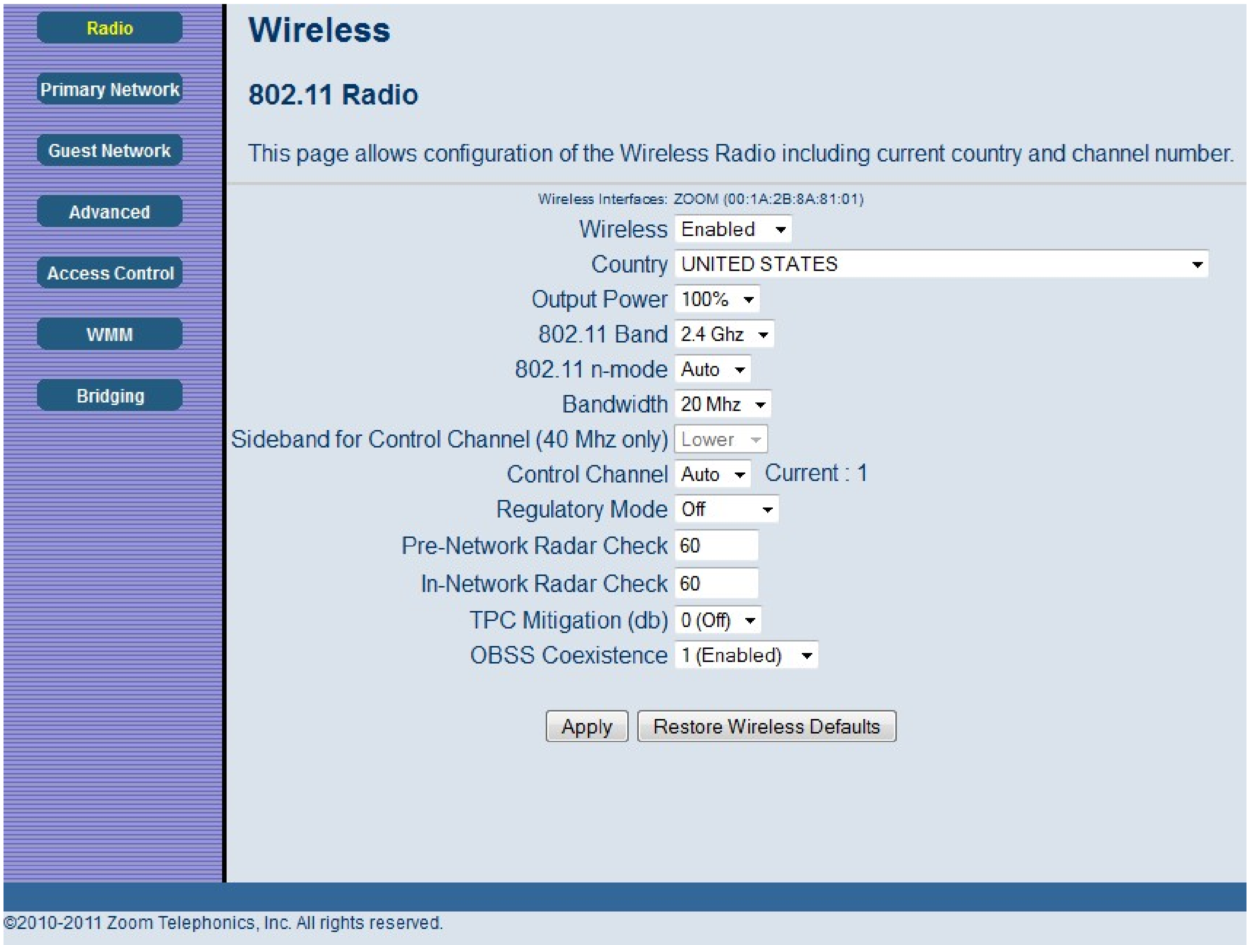
The Radio page allows you to modify wireless settings.

To access the **Radio** page:

1 Click **Wireless** in the menu bar.

2 Then click the **Radio** submenu.

Figure 29 shows an example of the menu and Table 23 describes the items you can select.



Wireless

802.11 Radio

This page allows configuration of the Wireless Radio including current country and channel number.

Wireless Interfaces: ZOOM (00:1A:2B:8A:81:01)

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	Auto Current : 1
Regulatory Mode	Off
Pre-Network Radar Check	60
In-Network Radar Check	60
TPC Mitigation (db)	0 (Off)
OBSS Coexistence	1 (Enabled)

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Figure 29. Example of Radio Page

Table 23. Radio Menu Option

Option	Description
Wireless	Select Enable to enable the wireless function.
Country	Your device is configured for operation in the U.S. only.
Output Power	Set the strength of the wireless signal that the cable modem/router transmits.
802.11 Band	Your device supports 2.4 GHz only.
802.11n-mode	In **Auto** mode, your cable modem/router will automatically adjust to avoid interference with neighboring devices.
Bandwidth	Specify radio frequency bandwidth, either 20MHz single, or 40MHz (dual channel), that the cable modem/router will use if 802.11n mode is configured as Automatic and the Control Channel is configured as Automatic.
Sideband for Control Channel (40 MHz only)	You may select Sideband and the secondary extension channels if your cable modem/router is operating at 40 MHz bandwidth and the 802.11n-mode is configured as **Auto**.
Control Channel	Select the channel for AP operation next to the drop-down list box. The current channel number is displayed. The list of detailed control channel and extension channels are shown in the Table below.

Table 24. Country Extension Channel List

Control Channel	Sideband for Control Channel	Extension Channel
US Channel 1-7	Lower	Channel Number + 4
US Channel 5-11	Upper	Channel Number - 4

Example 1: If your control channel is set to 1, the extension channel will be transmitted on channel 5. The total bandwidth of the signals on channel 1 and 5 equals 40 MHz.

Example 2: If your control channel is set to 11, the extension channel will be transmitted on channel 7. The total bandwidth of the signals on channel 11 and 7 equals 40 MHz.

Primary Network

The Primary Network page allows you to configure the primary wireless network and its security settings. Strong security is the best way to prevent unauthorized wireless network access. This page provides Automatic Security Configuration to simplify the configuration process.

- Broadcom's SecureEasySetup (SES) technology dramatically simplifies installation by automating the processes of configuring new wireless networks and adding devices to existing networks.

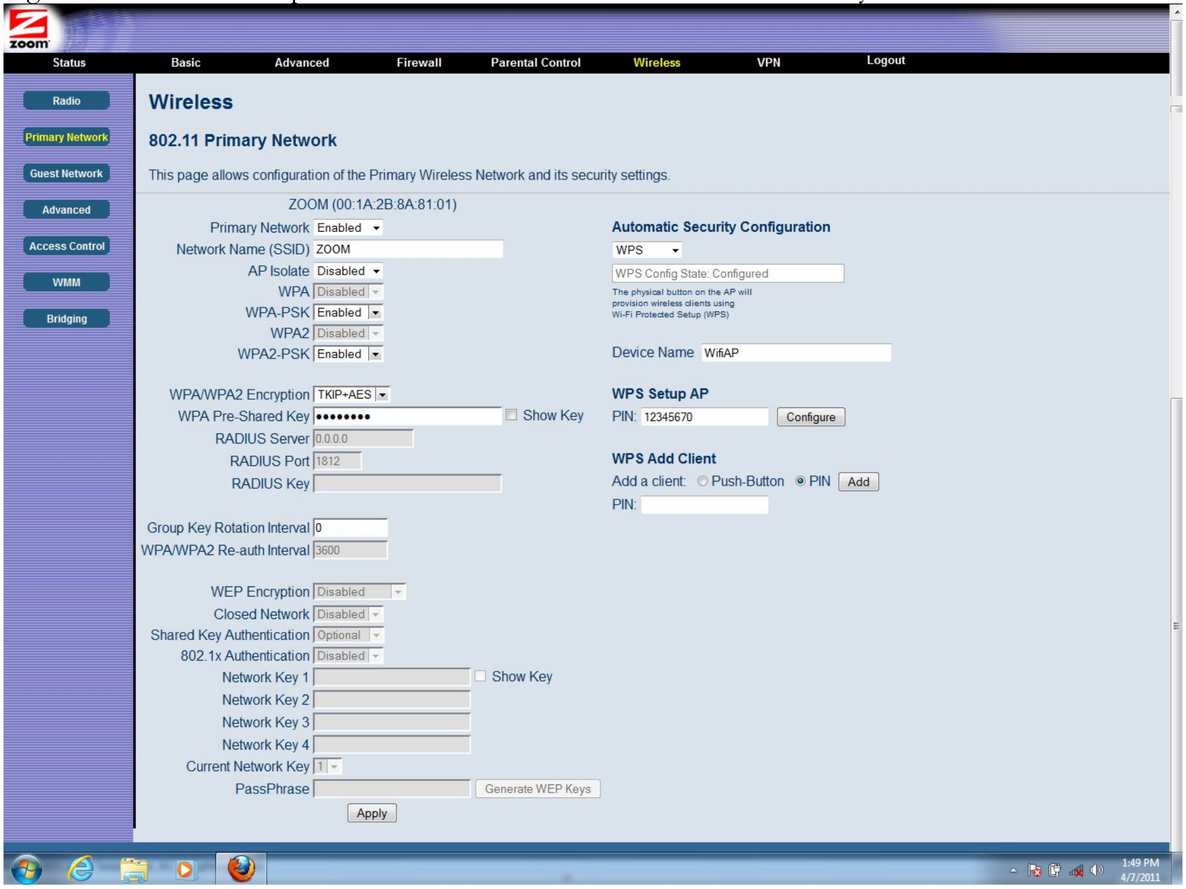
- SES establishes a private connection between the devices and automatically configures the network's SSID and WPA-Personal security settings. It configures a new network only on each new device that is authorized to join the network.

To access the **Primary Network** page:

1 Click **Wireless** in the menu bar.

2 Then click the **Primary Network** submenu.

Figure 30 shows an example of the menu and Table 25 describes the items you can select.



Wireless

802.11 Primary Network

This page allows configuration of the Primary Wireless Network and its security settings.

ZOOM (00:1A:2B:8A:81:01)

Primary Network	Enabled
Network Name (SSID)	ZOOM
AP Isolate	Disabled
WPA	Disabled
WPA-PSK	Enabled
WPA2	Disabled
WPA2-PSK	Enabled
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
WEP Encryption	Disabled
Closed Network	Disabled
Shared Key Authentication	Optional
802.1x Authentication	Disabled
Network Key 1	□ Show Key
Network Key 2	
Network Key 3	
Network Key 4	
Current Network Key	1
PassPhrase	

Automatic Security Configuration

WPS

WPS Config State: Configured

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

Device Name WifiAP

WPS Setup AP

PIN: 12345670

WPS Add Client

Add a client: ○ Push-Button ● PIN

PIN:

Figure 30. Example of Primary Network Page

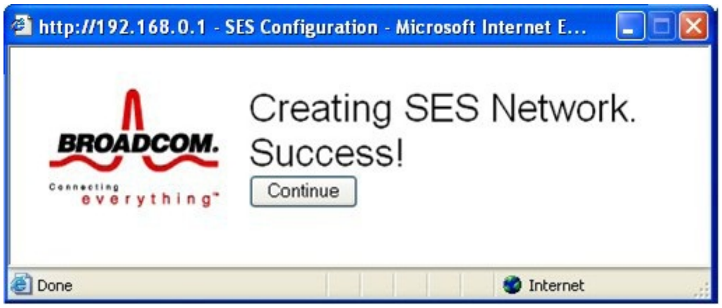
Table 25. Primary Network Menu Option

Option	Description
Primary Network	Select Enable to enable primary wireless network.
Network Name (SSID)	Set the Network Name (also known as SSID) of the wireless network. This is a 1-32 ASCII character string.
Closed Network	Select Enable to suppress broadcast of the SSID.
WPA	WiFi Protected Access (WPA) offers stronger encryption than WEP. Enable WPA alone if you have a RADIUS server – otherwise WPA-PSK.
WPA-PSK	Offers stronger encryption than WEP. When enabled, you must also enter a Pre-Shared Key.
WPA2	Offers state-of-the-art security. Enable WPA2 alone only if you have a RADIUS server; otherwise use WPA2-PSK.
WPA2-PSK	Offers state-of-the-art security. When enabled, you must also enter a Pre-Shared Key below.
WPA/WPA2 Encryption	Select Enable to use WPA/WPA2 encryption.
WPA Pre-Shared Key	Enter a 8-63 ASCII character string if you have enabled WPA-PSK or WPA2-PSK.
RADIUS Server	If you're using a RADIUS server, enter it's IP address here. The RADIUS server may be on either public network (WAN) or private network (LAN).
RADIUS Port (Relevant only when the RADIUS server is enabled)	Enter the UDP port number of the RADIUS server. The default port is 1812.
RADIUS Key (Relevant only when the RADIUS server is enabled)	Enter the RADIUS Key.
Group Key Rotation Interval (Relevant only when the RADIUS server is enabled)	When enabled, the cable modem/router generates the best possible random group key and updates all key-management capable clients periodically. Set to zero to disable periodic rekeying.
WPA/WPA2 Re-auth Interval	Interval (in seconds) at which the cable modem/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 an AP and all stations in a WLAN on a periodic basis.
WEP Encryption	WEP Encryption can be set to WEP 128-bit, 64-bit, or Disable. Both the wireless clients and the cable modem/router must use the same WEP key.
Shared Key Authentication	Select Enable to enable. Shared Key authentication is only available when WEP is enabled.

802.1x Authentication (only available when WEP is enabled)	Select Enable to enable 802.1x authentication.
Network Key 1-4	You can pre-define up to 4 keys for 64-bit or 128-bit WEP. 64-bit keys require 10 hexadecimal digits and 128-bit key require 26 hexadecimal digits.
Current Network Key	Select one of the four pre-defined keys as the current network key.
PassPhase	Enter a word or group of printable characters and click Generate WEP keys to generate WEP encryption key. These characters are case sensitive.
Generate WEP Keys	Click to generate 4 WEP keys automatically.
Automatic Security Configuration	Select the mode of push button. • SES: SES (Secure Easy Setup) is a technology developed by Broadcom. SES lets you configure the SSID and encryption keys on both the cable modem/router and the client with the press of a button. • WPS: WPS (WiFi Protected Setup) is a protocol to simplify the process of configuring security on wireless networks.
Device Name	Enter a name to identify this cable modem/router in WPS network.
WPS Setup AP PIN	PIN (Personal Identification Number) is the number of your PC or game machine. When a WPS-supported device tries to connect to this cable modem/router, you have to enter its PIN into the WPS Setup AP's PIN field, then click **Configure**.
WPS Add Client	Select WPS mode to be deployed.
Push-Button	In Push-Button mode, then user only needs to push the WPS button on the cable modem/router. Then, within 2 minutes, activate WPS on your client device(s).
PIN	For devices that require a PIN, enter the PIN in the WPS Add Client PIN's field, and then click **Add**.

Create SES Network

This action button generates a new SES network, applies the configuration to the wireless interface, and stores the settings to non-volatile memory. It enables WPA-PSK authentication and generates a unique Network Name (SSID) and random, 16-character Pre-Shared Key (PSK). The pop-up window shown below informs the user a SES network has been successfully created.


http://192.168.0.1 - SES Configuration - Microsoft Internet E...
BROADCOM.
Connecting everything
Continue
Done
Internet

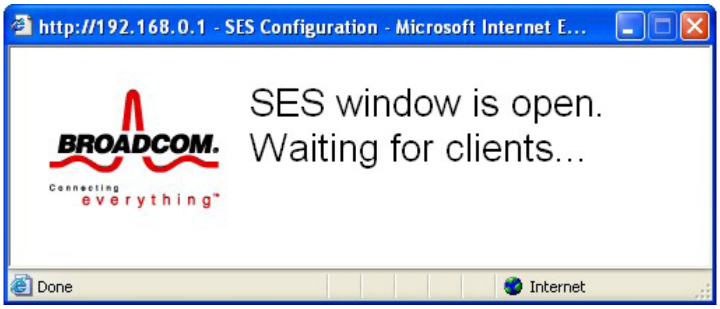
Creating SES Network.
Success!

Figure 31. SES Configuration Window - Success!

Open SES Window

This button opens a window that allows a SES client to connect. The window remains open for 2 minutes. Only 1 SES client may connect during an Open Window period. If you have more than 1 client to connect to your SES, you must open the window multiple times.

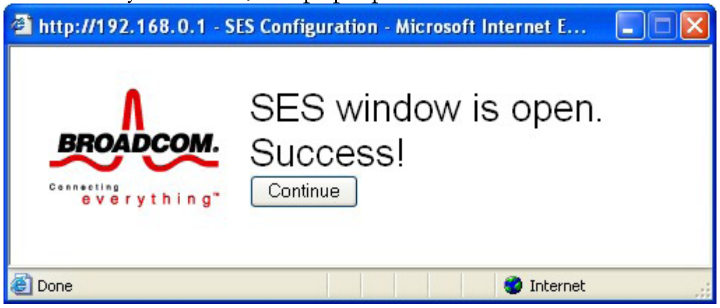
When the SES window is open, the pop-up window below indicates the cable modem/router is waiting for a SES client.


http://192.168.0.1 - SES Configuration - Microsoft Internet E...
BROADCOM.
Connecting everything
Done
Internet

SES window is open.
Waiting for clients...

Figure 32. SES Configuration Window - Waiting!

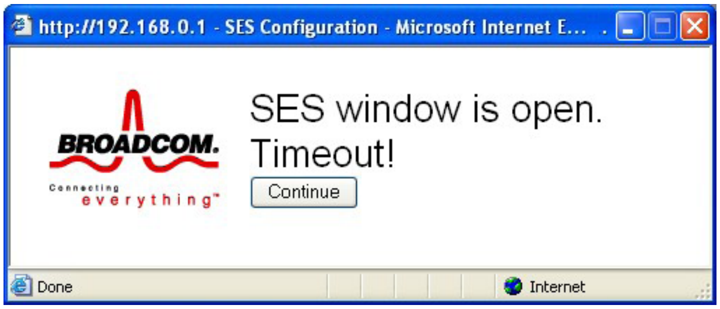
Once a SES client successfully connects, the pop-up window indicates success as shown below.


http://192.168.0.1 - SES Configuration - Microsoft Internet E...
BROADCOM.
Connecting everything
Continue
Done
Internet

SES window is open.
Success!

Figure 33. SES Configuration Window - Success!

If a SES client does not connect during the 2-minute open window period, the pop-up window indicates a timeout error as shown below.

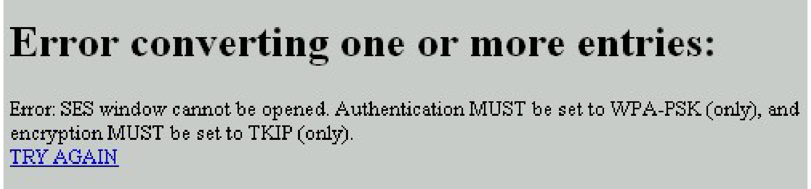


http://192.168.0.1 - SES Configuration - Microsoft Internet E...

SES window is open.
Timeout!

Figure 34. SES Configuration Window - Timeout!

Finally, if the current security configuration does not meet the SES requirements of WPA-PSK authentication with TKIP, the window will not open and the error message shown below will be displayed.



Error converting one or more entries:

Error: SES window cannot be opened. Authentication MUST be set to WPA-PSK (only), and encryption MUST be set to TKIP (only).
TRY AGAIN

Figure 35. Authentication Error Message

Guest Network
The Guest Network page allows you to configure a guest network. A guest network is a small section of an organization's computer network designed for use by temporary visitors. This guest network often provides full Internet connectivity, but it also strictly limits access to any internal (intranet) Web sites or files.
Traditionally, you needed to use different APs to configure different Basic Service Sets (BSSs). Your cable modem/router supports Multiple SSID which allows you to use the same access point to provide several BSSs simultaneously. You can then assign various privileges to different SSIDs and associated networks.

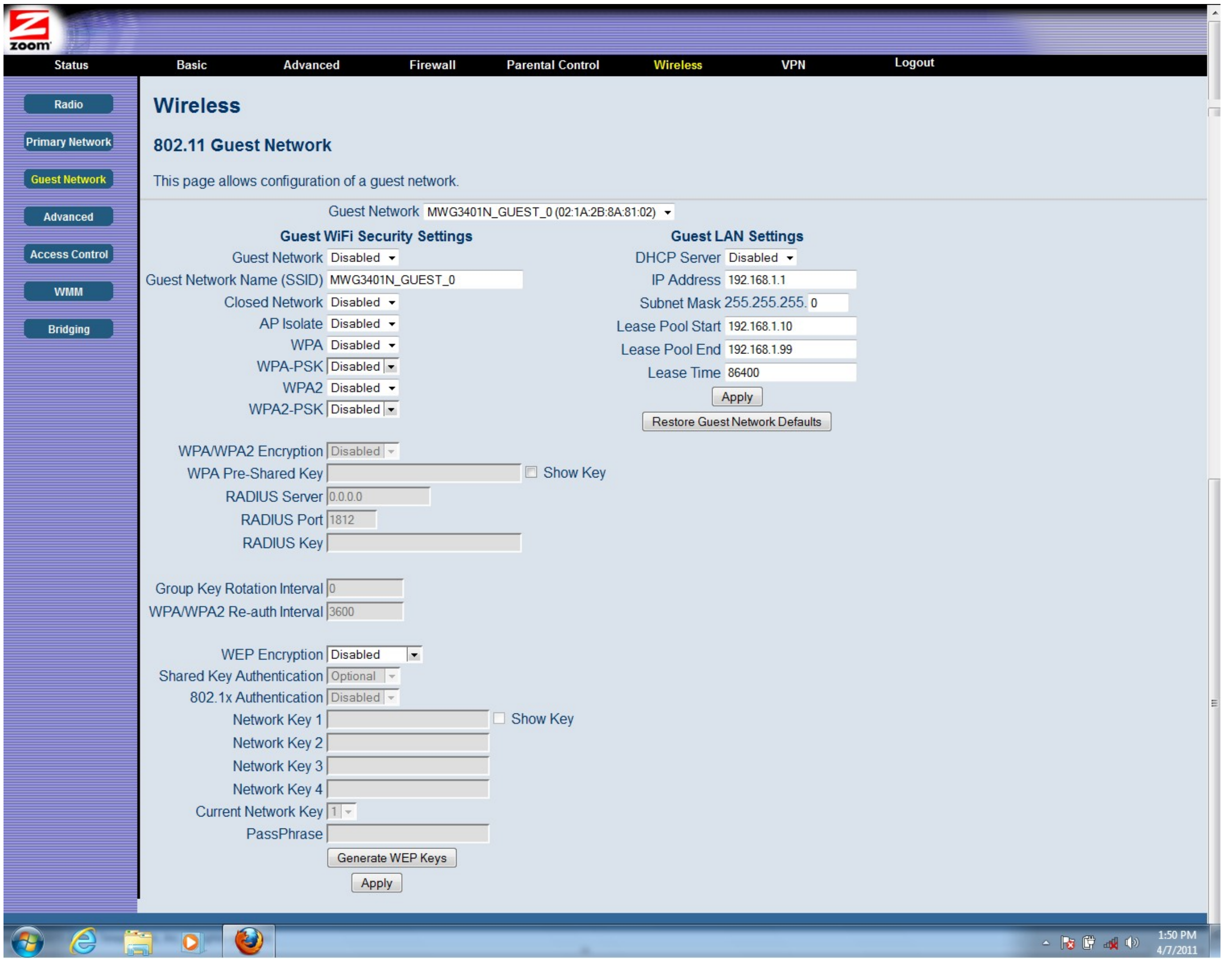
- Up to four BSSs are allowed on one cable modem/router simultaneously, one for Admin access and three for Guest Networks.
- If you are using WEP, you must use different WEP keys for different BSSs.
- You should use different PSKs for different BSSs if you are using WPA/WPA2.

To access the **Guest Network** page:

1 Click **Wireless** in the menu bar.

2 Then click the **Guest Network** submenu.

Figure 36 shows an example of the menu and Table 26 describes the items you can select.



Wireless

802.11 Guest Network

This page allows configuration of a guest network.

Guest Network MWG3401N_GUEST_0 (02:1A:2B:8A:81:02)

Guest WiFi Security Settings

Guest Network Disabled
Guest Network Name (SSID) MWG3401N_GUEST_0
Closed Network Disabled
AP Isolate Disabled
WPA Disabled
WPA-PSK Disabled
WPA2 Disabled
WPA2-PSK Disabled

WPA/WPA2 Encryption Disabled
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

WEP Encryption Disabled
Shared Key Authentication Optional
802.1x Authentication Disabled
Network Key 1 □ Show Key
Network Key 2
Network Key 3
Network Key 4
Current Network Key 1
PassPhrase

Guest LAN Settings

DHCP Server Disabled
IP Address 192.168.1.1
Subnet Mask 255.255.255. 0
Lease Pool Start 192.168.1.10
Lease Pool End 192.168.1.99
Lease Time 86400

Figure 36. Example of Guest Network Page

Table 26. Guest Network Menu Option

Option	Description
Guest Network	Select Enable to enable guest network.
Guest Network Name (SSID)	Enter a name for the guest network.
Closed Network	Select Enable to supress broadcast of the SSID.
WPA	WiFi Protected Access (WPA) offers stronger encryption than WEP. Enable WPA alone if you have a RADIUS server – otherwise WPA-PSK.
WPA-PSK	Offers stronger encryption than WEP. When enabled, you must also enter a Pre-Shared Key.
WPA2	Offers state-of-the-art security. Enable WPA2 alone only if you have a RADIUS server; otherwise use WPA2-PSK.
WPA2-PSK	Offers state-of-the-art security. When enabled, you must also enter a Pre-Shared Key below.
WPA/WPA2 Encryption	Select Enable to use WPA/WPA2 encryption.
WPA Pre-Shared Key	Enter a 8-63 ASCII character string if you have enabled WPA-PSK or WPA2-PSK.
RADIUS Server	If you're using a RADIUS server, enter it's IP address here. The RADIUS server may be on either public network (WAN) or private network (LAN).
RADIUS Port (Relevant only when the RADIUS server is enabled)	Enter the UDP port number of the RADIUS server. The default port is 1812.
RADIUS Key (Relevant only when the RADIUS server is enabled)	Enter the RADIUS Key.
Group Key Rotation Interval (Relevant only when the RADIUS server is enabled)	When enabled, the cable modem/router generates the best possible random group key and updates all key-management capable clients periodically. Set to zero to disable periodic rekeying.
WPA/WPA2 Re-auth Interval	Interval (in seconds) at which the cable modem/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 an AP and all stations in a WLAN on a periodic basis.
WEP Encryption	WEP Encryption can be set to WEP 128-bit, 64-bit, or Disable. Both the wireless clients and the cable modem/router must use the same WEP key.
Shared Key Authentication	Select Enable to enable. Shared Key authentication is only available when WEP is enabled.

802.1x Authentication (only available when WEP is enabled)	Select Enable to enable 802.1x authentication.
Network Key 1-4	You can pre-define up to 4 keys for 64-bit or 128-bit WEP. 64-bit keys require 10 hexadecimal digits and 128-bit key require 26 hexadecimal digits.
Current Network Key	Select one of the four pre-defined keys as the current network key.
PassPhase	Enter a word or group of printable characters and click Generate WEP keys to generate WEP encryption key. These characters are case sensitive.
Generate WEP Keys	Click to generate 4 WEP keys automatically.
DHCP Server	Select Enable to deploy DHCP server for this guest SSID.
IP Address	Enter the IP address to be the default cable modem/router address for clients connected this guest network.
Subnet Mask	Enter the subnet mask for this guest network.
Lease Pool Start	Enter the start IP address of this DHCP address pool.
Lease Pool End	Enter the end IP address of this DHCP address pool.
Lease Time	Enter the leased time for DHCP clients. DHCP clients will resend DHCP request before expiration. Maximum value is 86400 seconds.

Advanced

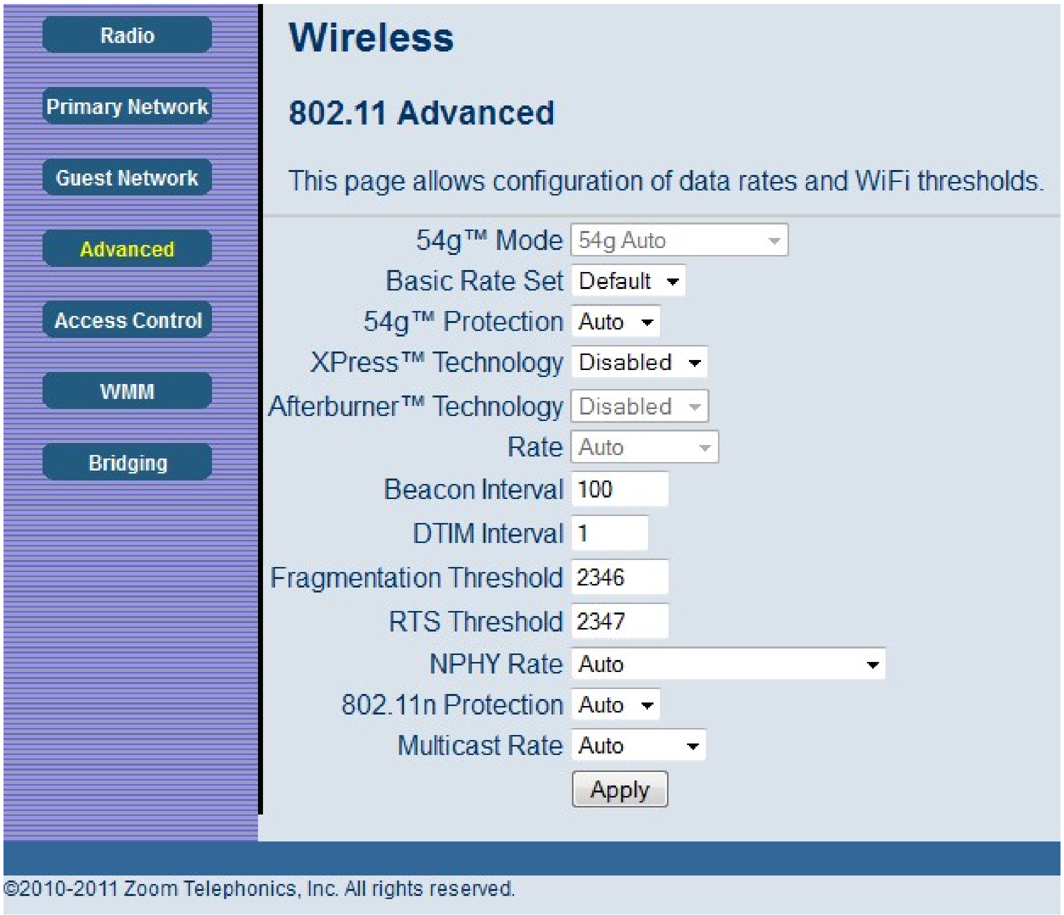
The Advanced page allows you to configure advanced wireless settings. Most users will have no need to change these settings.

To access the **Advanced** page:

1 Click **Wireless** in the menu bar.

2 Then click the **Advanced** submenu.

Figure 37 shows an example of the menu and Table 27 describes the items you can select.



Wireless

802.11 Advanced

This page allows configuration of data rates and WiFi thresholds.

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

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Figure 37. Example of Advanced Page

Table 27. Advanced Menu Option

Option	Description
54g™ Mode	Auto by default.
Basic Rate Set	Select the wireless transmission rate to a particular speed or leave it as default (Auto) to allow the AP adjusts speed automatically.
54g™ Protection	In Auto mode (Protection ON), the device will use RTS/CTS control to improve 802.11g performance in mixed networks. Turning protection OFF will maximize 802.11g throughput under most conditions.
XPress™ Technology	When Xpress is turned on, aggregate throughput can improve significantly.
Afterburner™ Technology	Afterburner technology is an enhancement for the 54g™ platform, Broadcom's maximum performance implementation of the IEEE 802.11g standard.
Rate	Forces the transmission rate for the cable modem/router to a particular speed. Auto will provide the best performance in nearly all situations.
Beacon Interval	A beacon is a packet broadcast by the router to synchronize the wireless network. The default interval is 100 ms.
DTIM Interval	Interval of the Delivery Traffic Indication Message (DTIM). A DTIM field is a countdown field informing clients of the next window for listening to broadcast and multicast messages. When the router has buffered broadcast or multicast for associated clients, it sends the next DTIM with a DTIM Interval value. Its clients hear the beacons and awaken to receive the broadcast and multicast message. The default value is 1.
Fragmentation Threshold	This value specifies the maximum size for a packet before data is fragmented into multiple packets. If you experience a high packet error rate, you may slightly increase the fragmentation threshold. Setting the fragmentation threshold too low may result in poor network performance. Only minor reduction of the default value is recommended. In most cases, it should remain at its default value of 2346.
RTS Threshold	Using this setting can regulate your wireless network if you experience any inconsistent data flow. Make only minor adjustments to the default value of 2347.
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	The 802.11g standards provide a protection method so 802.11g and 802.11b devices can co-exist in the same network without “speaking” at the same time. Do not disable 802.11n protection if

	there is a possibility that 802.11b or 802.11g devices will use your wireless network. In **Auto** mode, the wireless devices use RTS/CTS to improve 802.11n performance in mixed 802.11g/802.11b networks. Turn protection off to maximize 802.11n throughput under most conditions.
Multicast Rate	Specify the rate at which multicast packets are transmitted and received on your wireless network. Multicast packets are used to send a single message to a set of recipients in a defined group. Teleconferencing, videoconferencing and group email are some examples of multicast applications. Specifying a high multicast rate may improve performance of multicast features. The rates are in Mbps. You can select **Automatic**, **1**, **2**, **5.5**, **6**, **9**, **11**, **12**, **18**, **24**, **36**, **48** and **54**.

Access Control

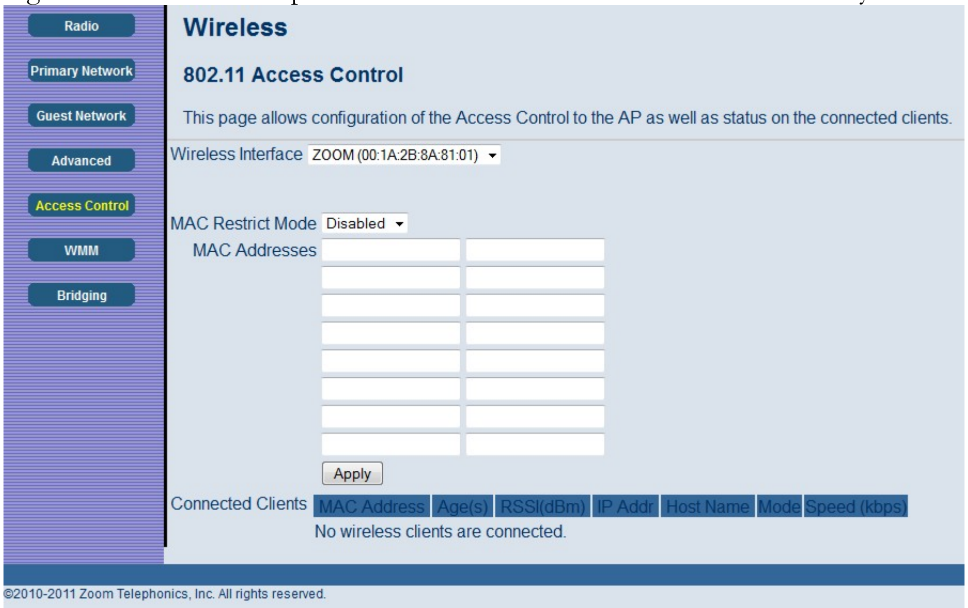
This page allows you to control which wireless clients can access your wireless network. It also provides information about wireless clients connected to your access point.

To access the **Access Control** page:

1 Click **Wireless** in the menu bar.

2 Then click the **Access Control** submenu.

Figure 38 shows an example of the menu and Table 28 describes the items you can select.



Wireless

802.11 Access Control

This page allows configuration of the Access Control to the AP as well as status on the connected clients.

Wireless Interface: ZOOM (00:1A:2B:8A:81:01)

MAC Restrict Mode: Disabled

MAC Addresses

Connected Clients

MAC Address	Age(s)	RSSI(dBm)	IP Addr	Host Name	Mode	Speed (kbps)

No wireless clients are connected.

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Figure 38. Example of Access Control Page

Table 28. Access Control Menu Option

Option	Description
Wireless Interface	Select the wireless interface to configure the access control list.
MAC Restrict Mode	Select whether wireless clients with the specified MAC address are allowed or denied wireless access. To allow all clients, select Disabled.
MAC Addresses	Shows the list of wireless client MAC addresses to allow or deny based on the Restrict Mode setting. Valid MAC address formats are XX:XX:XX:XX:XX:XX and XX-XX-XX-XX-XX-XX.
Connected Clients	Shows the 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.

WMM (WiFi Multimedia)

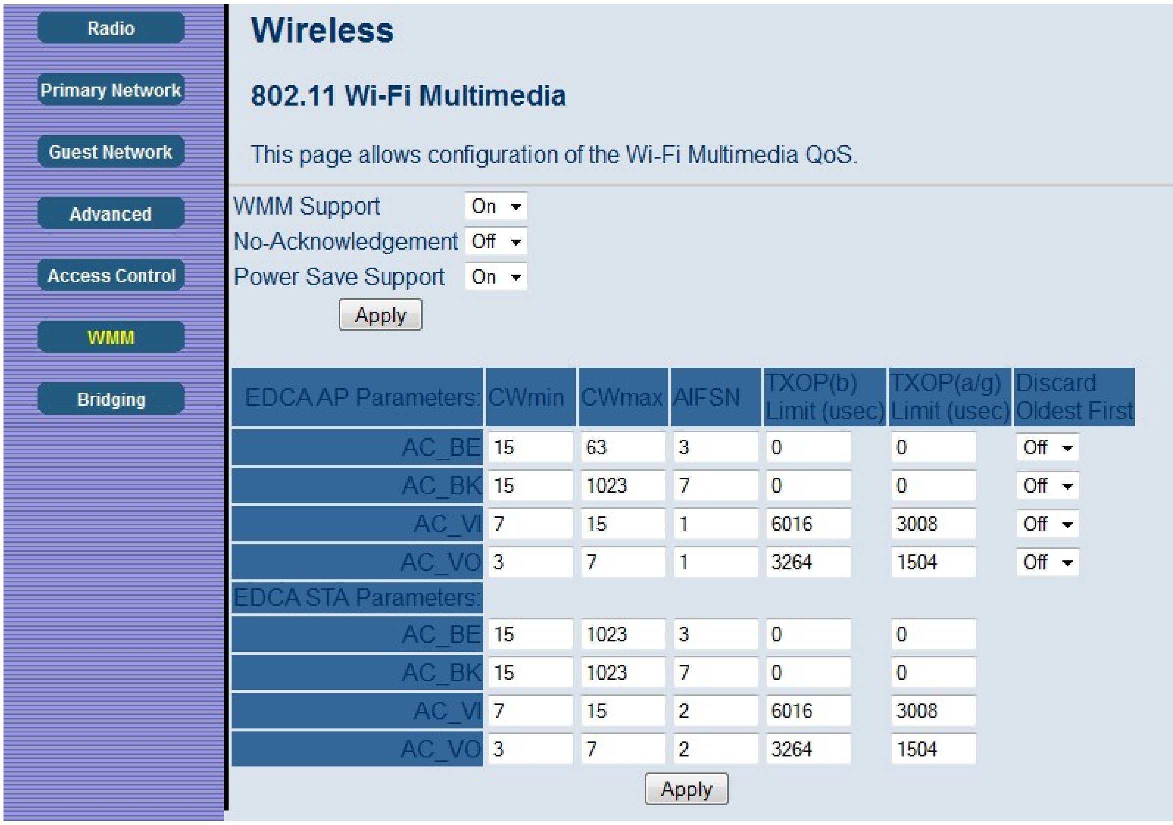
The WMM page allows you to configure WMM (WiFi Multimedia) feature. WMM is a subset of the 802.11e wireless LAN (WLAN) specification that enhances quality of service (QoS) on a network by prioritizing data packets according to their categories.
WMM enhances QoS at the wireless driver level. It provides a mechanism to prioritize wireless data traffic to and from the associated (WMM capable) stations.

If you enable the WMM feature, you may need to decide whether or not to broadcast cable modem/router's network name. Broadcasting allows you to easily recognize your wireless network in the list of available networks. Once you have configured your wireless clients, it is recommended that you disable the broadcasting feature.

To access the **WMM** page:

1 Click **Wireless** in the menu bar.
2 Then click the **WMM** submenu.

Figure 39 shows an example of the menu and Table 29 describes the items you can select.



Wireless

802.11 Wi-Fi Multimedia

This page allows configuration of the Wi-Fi Multimedia QoS.

WMM Support On
No-Acknowledgement Off
Power Save Support On

Apply

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	

Apply

Figure 39. Example of WMM Page

Table 29. WMM Menu Option

Option	Description
WMM Support	Select On to include the WME Information Element in beacon frame.
No-Acknowledgement	Select On to not transmit acknowledgments for data.
Power Save Support	Select On to allow the AP (cable modem/router) queuing packets for stations/clients in power-save mode. Queued packets are transmitted when the station/client notifies AP that it has left power-save mode.
EDCA AP Parameters	Enter the transmit parameters for traffic transmitted from the AP to the STA (station) for the four Access Categories (AC): 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: Specify if admission control is enforced for the Access Categories. • Discard Oldest First. Specify the discard policy for the queues. **On** discards the oldest first and **Off** discards the newest first.
EDCA STA Parameters	Specifies the transmit parameters for traffic transmitted from the STA (station) to the AP for the four Access Categories (AC): 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).

Bridging

The Bridging page allows you to configure WDS (Wireless Distribution System) feature.

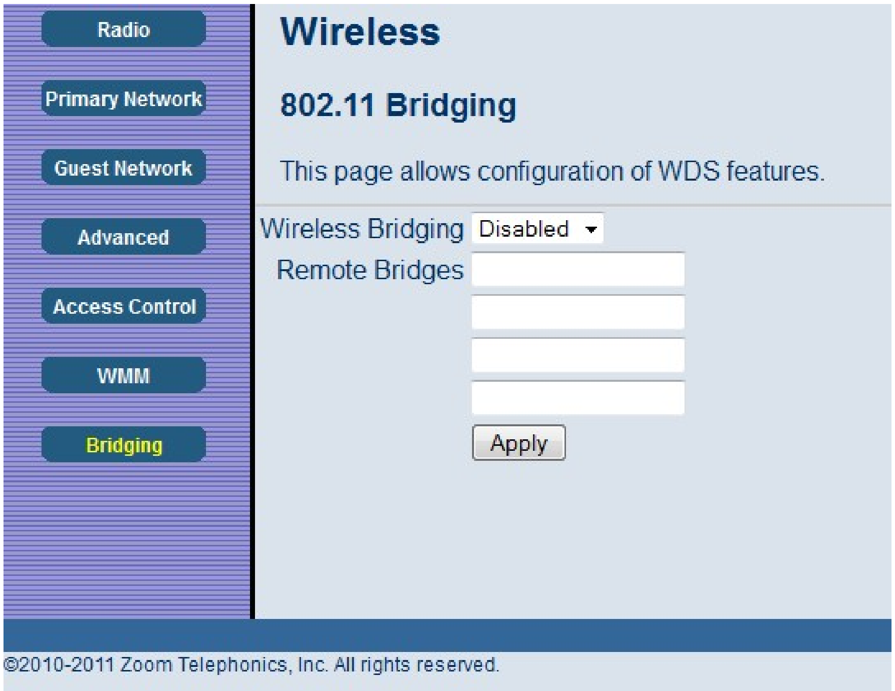
Only those bridges listed in the Remote Bridges table will be granted access. APs must operate in the same channel to be bridged together.

To access the **Bridging** page:

1 Click **Wireless** in the menu bar.

2 Then click the **Bridging** submenu.

Figure 40 shows an example of the menu and Table 30 describes the items you can select.



Wireless

802.11 Bridging

This page allows configuration of WDS features.

Wireless Bridging: Disabled

Remote Bridges

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Figure 40. Example of Bridging Page

Table 30. Bridging Menu Option

Option	Description
Wireless Bridging	Select to enable or disable 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 on the remote bridge.

9

VPN (Virtual Private Network) Menu Options

The VPN Menu lets you:

- Configure a VPN tunnel
- View VPN event logs

Basic Setting

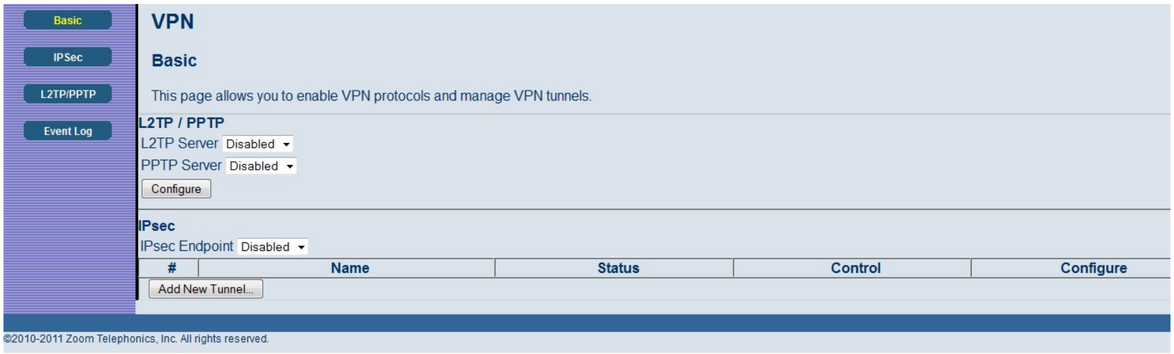
This page allows you to enable VPN protocols and manage VPN tunnels. A virtual private network (VPN) is a computer network in which some of the links between nodes are carried by open connections or virtual circuits within some larger network (e.g., the Internet) as opposed to by physical wires, as in a traditional private network. A VPN can be used to separate the traffic of different user communities over an underlying network with strong security features.

To access the **Basic** page:

1 Click **VPN** in the menu bar.

2 Then click the **Basic** submenu.

Figure 41 shows an example of the menu and Table 31 describes the items you can select.



VPN

Basic

This page allows you to enable VPN protocols and manage VPN tunnels.

L2TP / PPTP

L2TP Server: Disabled

PPTP Server: Disabled

IPsec

IPsec Endpoint: Disabled

#	Name	Status	Control	Configure

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Figure 41. Example of Basic Page

Table 31. Basic Menu Option

Option	Description
L2TP Server	Select Enable to enable L2TP (Layer 2 Tunneling Protocol) server.
PPTP Server	Select Enable to enable PPTP (Point-to-Point Tunneling Protocol) server.
IPSec Endpoint	Select Enable to enable IPSec endpoint.

IPSec

The IPSec page allows you to configure IPSec tunnel and endpoint settings. A VPN tunnel is usually established in two phases. Each phase establishes a security association (SA), a contract indicating what security parameters cable modem/router and the remote IPSec cable modem/router will use.

- The **first phase** establishes an Internet Key Exchange (IKE) SA between the cable modem/router and the remote IPSec cable modem/router.
- The **second phase** uses the IKE SA to securely establish an IPSec SA through which the cable modem/router and remote IPSec cable modem/router can send data between computers on the local network and remote network.

Before IPSec VPN configuration, try to familiarize yourself with terms like IPSec Algorithms, Authentication Header and ESP protocol.

IPSec Algorithms

The ESP and AH protocols are necessary to create a Security Association (SA), the foundation of an IPSec VPN. An SA is built from the authentication provided by the AH and ESP protocols. The primary function of key management is to establish and maintain the SA between systems. Once the SA is established, the transport of data may commence.

AH (Authentication Header) Protocol

The AH protocol (RFC 2402) was designed for integrity, authentication, sequence integrity (replay resistance), and non-repudiation but not for confidentiality, for which the ESP was designed.
In applications where confidentiality is not required or not sanctioned by government encryption restrictions, an AH can be employed to ensure integrity. This type of implementation does not protect the information from dissemination but will allow for verification of the integrity of the information and authentication of the originator.

ESP (Encapsulating Security Payload) Protocol

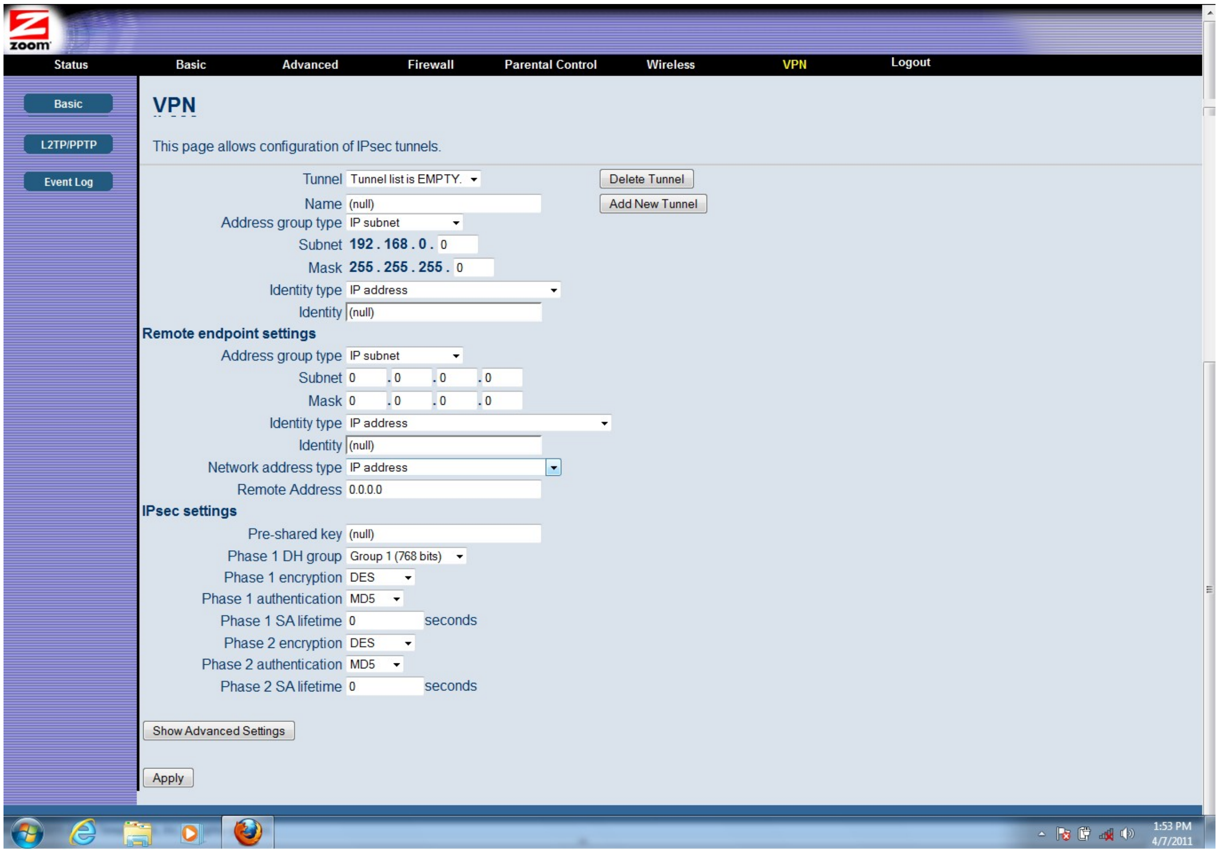
The ESP protocol (RFC 2406) provides encryption as well as the services offered by AH. ESP authenticating properties are limited compared to the AH due to the non-inclusion of the IP header information during the authentication process. However, ESP is sufficient if only the upper layer protocols need to be authenticated. An added feature of the ESP is payload padding, which further protects communications by concealing the size of the packet being transmitted.

To access the **IPSec** page:

1 Click **VPN** in the menu bar.

2 Then click the **IPSec** submenu.

Figure 42 shows an example of the menu and Table 32 describes the items you can select.



VPN

This page allows configuration of IPsec tunnels.

Tunnel: Tunnel list is EMPTY.
Name: (null)
Address group type: IP subnet
Subnet: 192 . 168 . 0 . 0
Mask: 255 . 255 . 255 . 0
Identity type: IP address
Identity: (null)

Remote endpoint settings

Address group type: IP subnet
Subnet: 0 . 0 . 0 . 0
Mask: 0 . 0 . 0 . 0
Identity type: IP address
Identity: (null)
Network address type: IP address
Remote Address: 0.0.0.0

IPsec settings

Pre-shared key: (null)
Phase 1 DH group: Group 1 (768 bits)
Phase 1 encryption: DES
Phase 1 authentication: MD5
Phase 1 SA lifetime: 0 seconds
Phase 2 encryption: DES
Phase 2 authentication: MD5
Phase 2 SA lifetime: 0 seconds

Figure 42. Example of IPSec Page

Table 32. IPSec Menu Option

Option	Description
Tunnel	This is a pull-down list of VPN Names defined below. Select the specific VPN tunnel to configure.
Name	Enter a VPN name and click **Add New Tunnel**.
Local Endpoint Settings	Configure the local network located at your cable modem/router's AN side.
Address Group Type	Define the local address type. Select IP Subnet to protect the whole subnet; select Single IP address to protect a single PC or device; select IP address range to protect several PCs, or devices.
Subnet	Enter the subnet scale for address group.
Mask	Enter the subnet mask for address group.
Identity Type	Select the type to identify the cable modem/router. The choices are:WAN IP address, LAN IP address, FQDN (Fully Qualified Domain Name) or Email address.
Identity	Enter the value corresponding to the selected identity type.
Remote Endpoint Settings	Record the parameters of the network on which the peer VPN is located.
Address Group Type	Define the local address type. Select IP Subnet to protect the whole subnet; select Single IP address to protect a single PC; select IP address range to protect several PCs.
Subnet	Enter the subnet for address group.
Mask	Enter the subnet mask for address group.
Identity Type	Select the type to identify the cable modem/router. The choices are WAN IP address, IP address, FQDN or Email address.
Identity	Enter the value corresponding to the selected identity type.
Network Address Type	Enter the IP address or domain name of the peer VPN cable modem/router. You can select IP address, which is typically suitable for static public IP addresses or FQDN, which is typically suitable for dynamic public IP address.
Remote Address	Enter IP address according to the **Network Address Type**.
IPSec Settings	Configure the IPSec protocol related parameters.
Pre-Shared Key	Enter a key (Pre-Shared key) for authentication.

Phase 1DH Group	Select the Diffie-Hellman key group (DHx) you want to use for encryption keys. DH1: uses a 768-bit random number DH2: uses a 1024-bit random number DH5: uses a 1536-bit random number.
Phase 1 Encryption	Select the key size and encryption algorithm to use for data communications. DES: a 56-bit key with the DES encryption algorithm 3DES: a 168-bit key with the DES encryption algorithm. Both the cable modem/router and the remote IPSec router must use the same algorithms and key, which can be used to encrypt and decrypt the message or to generate and verify a message authentication code. Longer keys require more processing power, resulting in increased latency and decreased throughput. AES: AES (Advanced Encryption Standard) is a newer method of data encryption that also uses a secret key. This implementation of AES applies a 128-bit key to 128-bit blocks of data. AES is faster than 3DES. Here you have the choice of AES-128, AES-192 and AES-256.
Phase 1 Authentication	Select the hash algorithm used to authenticate packet data in the IKE SA. SHA1: generally considered stronger than MD5, but it is also slower. MD5 (Message Digest 5): produces a 128-bit digest to authenticate packet data. SHA1 (Secure Hash Algorithm): produces a 160-bit digest to authenticate packet data.
Phase 1 SA Lifetime	In this field define the length of time before an IKE SA automatically renegotiates. This value may range from 120 to 86400 seconds. A short SA lifetime increases security by forcing the two VPN cable modem/router's to update the encryption and authentication keys. However, every time the VPN tunnel renegotiates, all users accessing remote resources are temporarily disconnected.

Phase 2 Encryption	Select the key size and encryption algorithm to use for data communications. Null: No data encryption in IPSec SA. Not recommended. DES: a 56-bit key with the DES encryption algorithm 3DES: a 168-bit key with the DES encryption algorithm. Both the cable modem/router and the remote IPSec router must use the same algorithms and key , which can be used to encrypt and decrypt the message or to generate and verify a message authentication code. Longer keys require more processing power, resulting in increased latency and decreased throughput. AES: Advanced Encryption Standard is a newer method of data encryption that also uses a secret key. This implementation of AES applies a 128-bit key to 128-bit blocks of data. AES is faster than 3DES. Here you have the choice of AES-128, AES-192 and AES-256.
Phase 2 Authentication	Select the hash algorithm used to authenticate packet data in the IKE SA. SHA1 is generally considered stronger than MD5, but it is also slower.
Phase 2 SA Lifetime	In this field define the length of time before an IPSec SA automatically renegotiates. This value may range from 120 to 86400 seconds.
Key Management	Select to use IKE (ISAKMP) or manual key configuration in order to set up a VPN.
IKE Negotiation Mode	Select how Security Association (SA) will be established for each connection through IKE negotiations. Main Mode: ensures the highest level of security when the communicating parties are negotiating authentication (phase 1). Aggressive Mode: quicker than Main Mode because it eliminates several steps when the communicating parties are negotiating authentication (phase 1).
Perfect Forward Secrecy (PFS)	Perfect Forward Secret (PFS) is disabled by default in phase 2 IPSec SA setup. This allows faster IPSec setup, but is not as secure. You can select DH1, DH2 or DH5 to enable PFS.
Phase 2 DH Group	Select DHx after enabling PFS.
Replay Detection	Select Enable to enable replay detection. As VPN setup is processing intensive, the system is vulnerable to Denial of Service (DOS) attacks. The IPSec receiver can detect and reject old or duplicate packets to protect against replay attacks.

NetBIOS Broadcast Forwarding	Select Enable to send NetBIOS (Network Basic Input/Output System) packets through the VPN connection. NetBIOS packets are TCP or UDP packets that enable a computer to find other computers. It may sometimes be necessary to allow NetBIOS packets to pass through VPN tunnels in order to allow local computers to find computers on the remote network and vice versa.
Dead Peer Detection	Select Enable to force the cable modem/router to periodically detect if the remote IPSec cable modem/router is available or not.
Manual Encryption Key	If Manual mode is selected in the Key Management field, enter a 16 hexadecimal digits manual encryption key for encryption.
Manual Authentication Key	Enter a 32 hexadecimal digit unique authentication key to be used by IPSec.
Inbound SPI	Enter a unique SPI (Security Parameter Index) for inbound SPI.
Outbound SPI	Enter a unique SPI (Security Parameter Index) for outbound SPI.

L2TP/PPTP

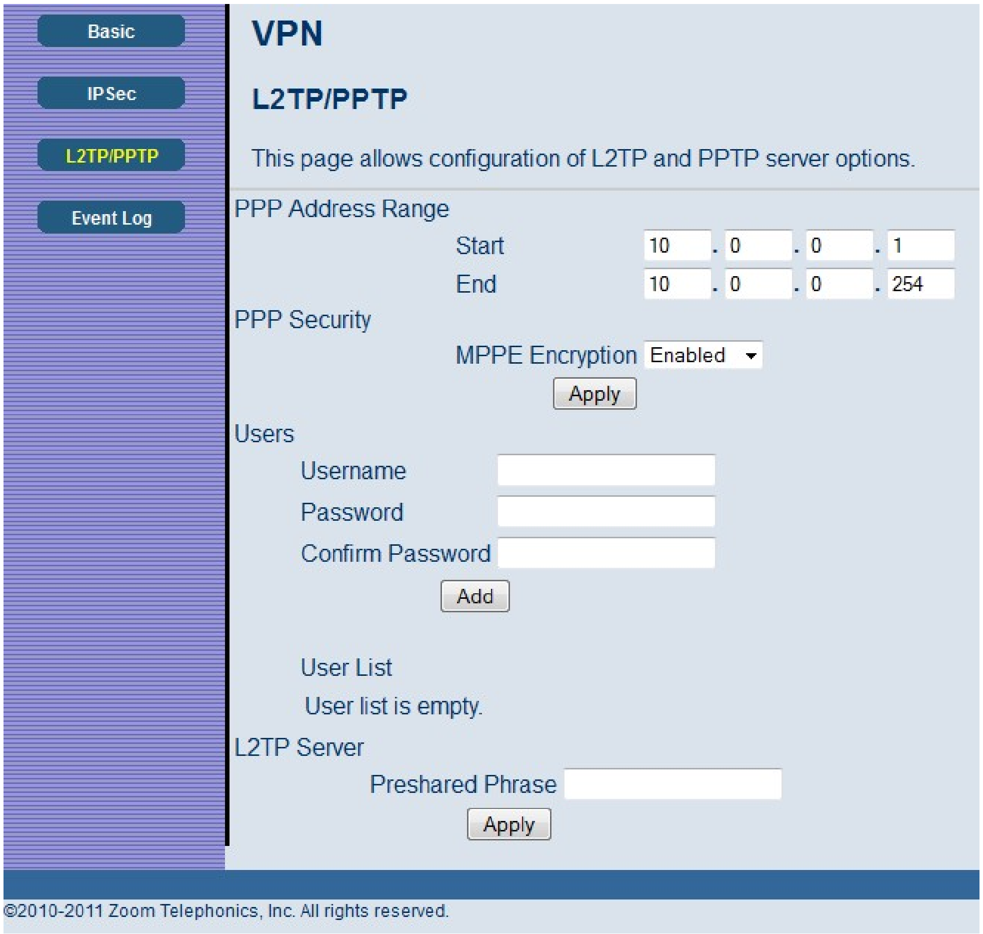
The L2TP/PPTP page allows you to configure server and security settings. The L2TP (Layer 2 Tunneling Protocol) and PPTP (Point-to-Point Tunneling Protocol) both allow PPP frames to be tunneled through the network. PPTP is a Microsoft proprietary protocol, which is very similar to L2TP.

To access the **L2TP/PPTP** page:

1 Click **VPN** in the menu bar.

2 Then click the **L2TP/PPTP** submenu.

Figure 43 shows an example of the menu and Table 33 describes the items you can select.



VPN

L2TP/PPTP

This page allows configuration of L2TP and PPTP server options.

PPP Address Range

Start 10 . 0 . 0 . 1

End 10 . 0 . 0 . 254

PPP Security

MPPE Encryption Enabled

Users

Username

Password

Confirm Password

User List

User list is empty.

L2TP Server

Preshared Phrase

Figure 43. Example of L2TP/PPTP Page

Table 33. L2TP/PPTP Menu Option

Option	Description
PPP Address Range (Start/End)	Configure the dedicated IP address pool for L2TP/PPTP. The LAN IP subnet at one end of the VPN tunnel must be different from the LAN IP subnet at the other end of the VPN tunnel. For example, if one side's LAN subnet is 192.168.**0**.x, then the other side should be 192.168.**1**.x (where the subnet mask in this example is 255.255.255.0).
PPP Security (MPPE Encryption)	Select Enable to enable MPPE (Microsoft Point-to-Point Encryption). MPPE is used to enhance the confidentiality of PPP-encapsulated packets. It uses the RSA RC4 encryption algorithm.
Username	Enter the user name for the L2TP or PPTP tunneling.
Password	Enter the password for the L2TP or PPTP tunneling.
Confirm Password	Re-enter to confirm the password.
User List	Show the existing user list.
L2TP Server (Preshared Phrase)	Enter a key (Pre-Shared key) for authentication. This key is used by IPSec to validate the computer as a trusted machine.

Event Log

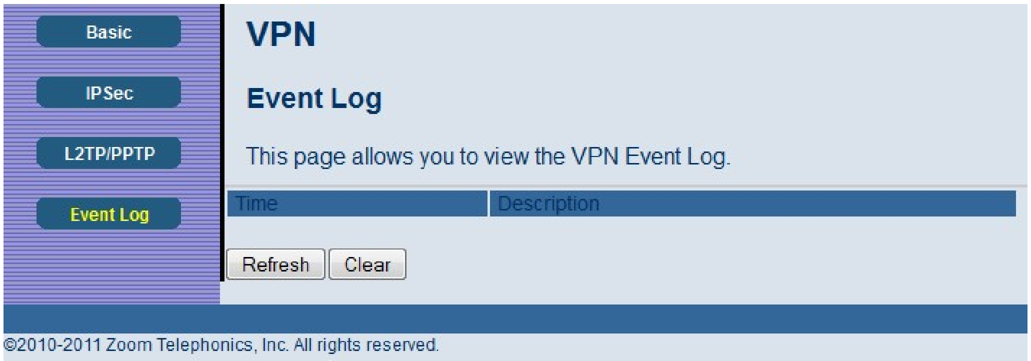
The Event Log page shows the VPN event log.

To access the **Event Log** page:

1 Click **VPN** in the menu bar.

2 Then click the **Event Log** submenu.

Figure 44 shows an example of the menu and Table 34 describes the items you can select.



VPN

Event Log

This page allows you to view the VPN Event Log.

Time	Description

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Figure 44. Example of Event Log Page

Table 34. Event Log Menu Option

Option	**Description**
Time	Shows the local time mapping to a certain log event.
Description	Shows detailed information of a VPN event log.

Appendix A: Tips for setting up computers and other devices on a wireless network

This appendix provides tips for wireless setup up computers and/or other devices that have built-in wireless capabilities and/or a wireless adapter. This information supplements information in chapters 1 and 2.

Note that for **each** computer or other device added to your wireless network, you will need to take appropriate steps for setting up that computer or other device. To do that, select one of the possibilities for that computer or other device below:

- Most newer **Windows 7, Vista, and XP computers have built-in wireless networking** capabilities and do not require the installation of a wireless adapter. If this is the case, you set up that computer's wireless connection using the Windows 7, Vista, or XP connect utility. See the sections below on connecting **Windows 7** (page 98), **Vista** (page 98), or **XP** (page 100) computers with built-in wireless capabilities.
- Some **computers** may have **built-in wireless networking** capabilities, but do not use the Windows 7, Vista, or XP utility to configure their device. These computers are covered on page 101 under **Connecting Some Wireless-enabled Computers or other Devices (including the iPhone or other cellular phones and the iPod Touch) to the Cable Modem/Router.**
- If you have a **non-computer wireless device like an iPhone or other cellular phone, an iPod Touch, or an iPad or other tablet computer**, see the instructions on page 101 for **Connecting a Wireless-enabled Computer or Device to the Cable Modem/Router**.
- Some **computers** may need a **wireless network adapter installed**. This can be a USB adapter, PC Card adapter, or PCI adapter. When you install the adapter, make sure that it is set to **infrastructure** or **access point** mode (NOT **ad-hoc** or **peer-to-peer** mode). If you need help installing your wireless adapter or setting its mode, refer to the documentation that came with it. After you install the adapter, see the instructions on page 101 for **Connecting a Computer with a wireless adapter to the Cable Modem/Router**.

Connecting a Windows 7 Computer with Built-in Wireless Capabilities

1 From the notification area of the Windows taskbar, click on the wireless symbol.

2 In the wireless network options box, highlight **ZOOM** (or the SSID you changed it to) and click **Connect**. (The cable/modem router comes set up with default security. The default security mode is WPA-PSK/WPA2-PSK. If you have disabled security (described in the section **Disabling Security**), you do not need to enter the Pre-Shared Key; skip the next bullet point.)

   - Enter the default Pre-Shared Key which is **zoom####** where **####** represents the last

4 characters of the Cable MAC address of the unit, which can be found on the label on the bottom of the cable modem/router or enter the Pre-Shared Key you previously created. In the unlikely event that you set up WEP security, enter the WEP Key.

- Click **Connect**.

If you have difficulty connecting, make sure you have entered the correct Pre-Shared Key or WEP Key. Then perform a power cycle on your computer and the Cable Modem/Router as described in **Appendix B: Troubleshooting Tips**.

3 In the **Successfully connected to [desired network]** dialog box, you have three options. You can:

- Select **Save the network** and **Start this connection automatically** if you always want to connect to the same network. Then click **Close**. The next time you start your computer you will automatically connect to the selected network.
- Select **Save the network** and clear the **Start this connection automatically** check box if you don't want to automatically connect to this network every time you start your computer but you will want to connect in the future. Click **Close** to display the **Select a location . . .** dialog box where you choose a location.

  If the **User Account Control** dialog box appears, click **Continue**.
- Click **Close** to complete the connection procedure. Select this option if you are connecting to this network only one time.

To disconnect from the current network:

1 Right-click the wireless network icon in the notification area of the Windows taskbar.

2 Right-click **ZOOM** and select **Disconnect**.

Connecting a Windows Vista Computer with Built-in Wireless Capabilities

1 From the **Start** menu select **Connect to**.

2 In the **Connect to a network** dialog box, highlight **ZOOM** (or the SSID you changed it to) and click **Connect**. (The cable/modem router comes set up with default security. The default security mode is WPA-PSK/WPA2-PSK. In the unlikely event that you have disabled security (described in the section **Disabling Security**), you do not need to enter the Pre-Shared Key; so you should skip step 3 and proceed to step 4.)

3 Enter the default **Pre-Shared Key** which is zoom#### where #### represents the last 4 characters of the Cable MAC address of the unit, which can be found on the label on the bottom of the cable modem/router or enter the Pre-Shared Key you created if you changed it from the default. In the unlikely event that you set up WEP security, enter the WEP Key.

4 Click **Connect**.

If you have difficulty connecting, make sure you have entered the correct Pre-Shared Key or WEP Key. Then perform a power cycle on your computer and the Cable Modem/Router as described in **Appendix B: Troubleshooting Tips**.

5 In the **Successfully connected to [desired network]** dialog box, you have three options. You can:

- Select **Save the network** and **Start this connection automatically** if you always want to connect to the same network. Then click **Close**. The next time you start your computer you will automatically connect to the selected network.
- Select **Save the network** and clear the **Start this connection automatically** check box if you don't want to automatically connect to this network every time you start your computer but you will want to connect in the future. Click **Close** to display the **Select a location . . .** dialog box where you choose a location. Windows Vista automatically applies the correct network security settings.

  If the **User Account Control** dialog box appears, click **Continue**.
- Click **Close** to complete the connection procedure. Select this option if you are connecting to this network only one time.

To disconnect from the current network:

1 From the **Start** menu, select **Connect to**.

2 In the **Disconnect or Connect to another network** dialog box, select the current network and click **Disconnect**.

3 In the **Are You Sure?** message box, click **Disconnect** again.

4 In the next dialog box, you can connect to another network or click **Close** to complete the disconnect procedure.

Connecting a Windows XP Computer with Built-in Wireless Capabilities

1 On your Windows desktop, click the **Start** button then click **Settings→Control Panel**.

2 **Double-click** the **Network Connections** icon.

3 **Right-click** the **Wireless Network Connection** icon, then select **Properties**.

4 On the **Wireless Network Connection Properties** dialog box, select the **Wireless Networks** tab. Windows will automatically scan for available wireless networks in your area. Any compatible networks within range will appear in the **Available networks** list. It should find the wireless network of the Cable Modem/Router—named **ZOOM** (or the SSID you changed it to). (The scan is done automatically because the **Use Windows to configure my wireless network settings** check box is selected by default).

5 Select **ZOOM** (or the SSID you changed it to) from the **Available networks** list, then click the **Configure** button to add it to the **Preferred networks** list. The notebook will try to connect to the Internet using the wireless networks listed here, in the order in which they appear. (If you already have networks listed here, we recommend you either remove them or use the **Move up** button to move **ZOOM** (or the SSID you changed it to) to the top of the list.) The cable/modem router comes set up with default security. The default security mode is WPA-PSK/WPA2-PSK. In the unlikely event that you have disabled security (described in the section Disabling Security), you do not need to enter the Pre-Shared Key; so you can skip step 6 and proceed to step 7.

6 When asked for a Passphrase, enter the default **Pre-Shared Key** (which is **zoom####** where **####** represents the last 4 characters of the Cable MAC address of the unit, which can be found on the label on the bottom of the cable modem/router) or enter the Pre-Shared Key you created if you changed it from the default. In the unlikely event that you set up WEP security, enter the WEP Key.

7 Click **OK**.

8 Test your wireless connection. From the computer or notebook that you set up, open your Web browser (for instance, Internet Explorer or Firefox) and try to connect to a familiar Web address.

If you connect successfully, your notebook's wireless capability is configured and you are ready to browse the Web!

To disconnect from the current network:

1 On your Windows desktop, click the **Start** button then click **Settings→Control Panel**.

2 **Double-click** the **Network Connections** icon.

3 **Right-click** the **Wireless Network Connection** icon, then select **View Available Wireless Networks** and click **ZOOM**. Click **Disconnect** in the wireless connection window.

4 Close the window by clicking on the X at the top of the window.

Connecting Some Wireless-enabled Computers or other Devices (including the iPhone or other cellular phones and the iPod Touch) to the Cable Modem/Router

1 Go to the wireless-enabled computer or device that you want to add to the network. The computer should have software that will let it perform a **site search** to scan for available wireless networks in your area. You may have to click on something like **Settings** and then **WiFi**. When the **SSID** (Service Set Identifier) of your Cable Modem/Router wireless network appears in the list—the default SSID is **ZOOM**—select it (or the SSID you created) as the network you want to use to connect to the Internet. (The default security mode is WPA-PSK/WPA2-PSK. In the

unlikely event that you have disabled security (described in the section **Disabling Security**), you do not need to enter the Pre-Shared Key; so you should skip step 2 and proceed to step 3.)

> Tip!
> If you need help, refer to the documentation that came with your wireless device.

There are several site scan issues you should be aware of:

- ➢ More than one wireless network may appear in the list. These are other wireless networks that are within range of your network. Your neighbors, for instance, may be within range of your network. Each wireless network has a channel associated with it. We recommend there be at least a five-channel difference between your network and those of your neighbors. Having less than a five-channel difference may result in interference with your connection. By default, the Cable Modem/Router uses channel 10. If you need to change this channel, you must do so using the **Wireless Setup** page of the **Zoom Configuration Manager**. For instructions on how to log in to the **Zoom Configuration Manager**, see page 13. Then see **Chapter 8** for instructions on how to access the Wireless Setup page to change the channel.

2 When asked for a Passphrase, enter the default **Pre-Shared Key** (which is **zoom####** where #### represents the last 4 characters of the Cable MAC address of the unit, which can be found on the label on the bottom of the cable modem/router) or enter the Pre-Shared Key you created if you changed it from the default. In the unlikely event that you set up WEP security, enter the WEP Key.

3 Test your wireless connections. From each computer or device that you set up, open your Web browser (for instance, Internet Explorer, Firefox, or Chrome) and try to connect to a familiar Web address.

If you connect successfully, you are ready to browse the Web!

To disconnect from the current network:

1 On your wireless device or computer, find the wireless network connection option (similar to the process of adding your device or computer to the network).

2 Click or highlight **ZOOM** (or the SSID you changed it to).

3 Select or click on **Disconnect** or similarly-named button.

Connecting a Computer with a Wireless adapter to the Cable Modem/Router

1 Go to the computer that is set up with a wireless adapter that you want to add to the network. The computer should have software that will let it perform a **site search** to scan for available

wireless networks in your area. When the **SSID** (Service Set Identifier) of your Cable Modem/Router wireless network appears in the list—the default SSID is **ZOOM**—select it (or the SSID you created) as the network you want to use to connect to the Internet. (The default security mode is WPA-PSK/WPA2-PSK. If you have disabled security (described in the section **Disabling Security**), you do not need to enter the Pre-Shared Key; skip step 2 and proceed to step 3.)

> Tip!
> For most wireless adapters, you will use its wireless configuration manager software and click a **Scan** button or select a **Site Scan**, **Scan Networks**, or other similarly named tab to do a site search. If you need help, refer to the documentation that came with your wireless adapter.

There are several site scan issues you should be aware of:

- **Windows 7, XP, and Vista users:** If you installed a wireless adapter on a Windows 7, XP, or Vista computer, Windows may try to automatically configure the adapter (rather than let you use the software provided with the wireless adapter). You will know this is happening because you will be prompted with a message about one or more wireless networks being available. You will also be able to click a link to open the **Wireless Network Connection Properties** dialog box. If this happens, click the link, clear the **Use Windows to configure my wireless network settings** check box, and then click **OK**. You can then use the software provided with your wireless adapter without interruption from Windows.
- More than one wireless network may appear in the list. These are other wireless networks that are within range of your network. Your neighbors, for instance, may be within range of your network. Each wireless network has a channel associated with it. We recommend there be at least a five-channel difference between your network and those of your neighbors. Having less than a five-channel difference may result in interference with your connection. By default, the Cable Modem/Router uses channel 10. If you need to change this channel, you must do so using the **Wireless Setup** page of the **Zoom Configuration Manager**. For instructions on how to log in to the **Zoom Configuration Manager**, see page 13. Then see **Chapter 8** for instructions on how to access the Wireless Setup page to change the channel.

2 When asked for a Passphrase, enter the default **Pre-Shared Key** (which is **zoom####** where **####** represents the last 4 characters of the Cable MAC address of the unit, which can be found on the label on the bottom of the cable modem/router) or enter the Pre-Shared Key you created if you changed it from the default. If you set up WEP security, enter the WEP Key.

3 Test your wireless connections. From each desktop or notebook computer that you set up, open your Web browser (for instance, Internet Explorer or Firefox) and try to connect to a familiar Web address.

If you connect successfully, you are ready to browse the Web!

To disconnect from the current network:

1 On your computer that has a wireless adapter, find the wireless network connection option (similar to the process of adding your computer to the network).

2 Click or highlight **ZOOM** (or the SSID you changed it to).

3 Select or click on **Disconnect** or similarly-named button.

Appendix B: Troubleshooting Tips

Problem: **I cannot access my Internet service or send or receive email.**

Solution: The following front panel lights on the cable modem/router – **ONLINE**, **US** (upstream), **DS** (downstream), and **POWER –** must be solidly lit before your modem will let you connect to the Internet. If they are not:

- Check all modem connections (power, Ethernet, and cable modem line).
- Unplug your cable modem/router and then plug it back in.
- Restart your computer.
- Check to see that your cable TV is working.
- Check with your cable service provider to make sure that high speed access is available and running.
- In rare instances, the cable signal may be weak or noisy. If this is the case, call your cable service provider.
- If you are using your PC's Ethernet port, check that this port is functioning correctly. If you are using wireless, check that your wireless connection is functioning correctly. Refer to its documentation if necessary.
- Check that your Web browser is configured correctly. It should be set to use a network connection; this might be called a LAN (Local Area Network) or broadband connection.
- Check that your computer's network settings are configured correctly. A Windows computer should have a local area connection that should normally be Internet Protocol version 4, Internet Protocol version 6, or TCP/IP; not AOL, Dial-up, or Adapter. A Macintosh computer should be configured for Built-in Ethernet, and TCP/IP should be set to Using DHCP.

Appendix C: If You Need Help

We encourage you to register your product and to notice the many support options available from Zoom. Please go to **www.zoomtel.com/techsupport**. From here you can **register your router** and/or **contact our technical support experts** and/or use our intelligent database **SmartFacts**tm and/or get **warranty** information.

US:	(617) 753-0963
UK: London:	+44 2033180660
UK: Manchester:	+44 1618840074

Appendix D: Compliance

FCC Interference Statement

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 radio interference in a commercial environment. This equipment can generate, use and radiate radio frequency energy and, if not installed and used in accordance with the instructions in this manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures are necessary to correct the interference. 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 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.

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

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device is going to be operated in 5.15~5.25GHz frequency range, it is restricted in indoor environment only.

IMPORTANT NOTE:

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

Note to CATV System Installer - This reminder is provided to call the CATV systems installer's attention to Section 820-93 of the National Electric Code which provide guideline for proper grounding and, in particular, specify that the Coaxial cable shield shall be connected to the grounding system of the building, as close to the point of cable entry as practical.