HitronTechnologies

USER'S GUIDE

CGN2 RESIDENTIAL CABLE MODEM

VERSION 2.0 - FEBRUARY 2012

ABOUT THIS USER'S GUIDE

INTENDED AUDIENCE

This manual is intended for people who want to configure the CGN2's features via its Graphical User Interface (GUI).

HOW TO USE THIS USER'S GUIDE

This manual contains information on each the CGN2's GUI screens, and describes how to use its various features.

- Use the Introduction (page 12) to see an overview of the topics covered in this manual.
- Use the Table of Contents (page 7), List of Figures (page 10) and List of Tables (page 11) to quickly find information about a particular GUI screen or topic.
- Use the Index (page 110) to find information on a specific keyword.
- Use the rest of this User's Guide to see in-depth descriptions of the CGN2's features.

RELATED DOCUMENTATION

- **Quick Installation Guide**: see this for information on getting your CGN2 up and running right away. It includes information on system requirements, package contents, the installation procedure, and basic troubleshooting tips.
- **Online Help**: each screen in the CGN2's Graphical User Interface (GUI) contains a **Help** button. Click this button to see additional information about configuring the screen.

DOCUMENT CONVENTIONS

This User's Guide uses various typographic conventions and styles to indicate content type:

- Bulleted paragraphs are used to list items, and to indicate options.

1. Numbered paragraphs indicate procedural steps.

NOTE: Notes provide additional information on a subject.

Warnings provide information about actions that could harm you or your device.

Product labels, field labels, field choices, etc. are in **bold** type. For example:

> Select **UDP** to use the User Datagram Protocol.

A mouse click in the Graphical User Interface (GUI) is denoted by a right angle bracket (>). For example:

> Click **Settings** > **Advanced Settings**.

means that you should click **Settings** in the GUI, then **Advanced settings**.

A key stroke is denoted by square brackets and uppercase text. For example:

> Press [ENTER] to continue.

CUSTOMER SUPPORT

For technical assistance or other customer support issues, please consult your Hitron representative.

DEFAULT CREDENTIALS

The CGN2's default login credentials are as follows. For more information, see Logging into the CGN2 on page 23.

Table 1: Default Credentials

Username	cusadmin
Password	password

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COMPLIANCES

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.

IEEE 802.11b or 802.11g operation of this product in the U.S.A is firmware-limited to channels 1 through 11.

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 - The cable distribution system should be grounded (earthed) in accordance with ANSI/NFPA 70, the National Electrical Code (NEC), in particular Section 820.93, Grounding of Outer Conductive Shield of a Coaxial Cable.
107 SMCD3G3-CCR 4-Port Gateway Administrator Manual

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1 INTRODUCTION

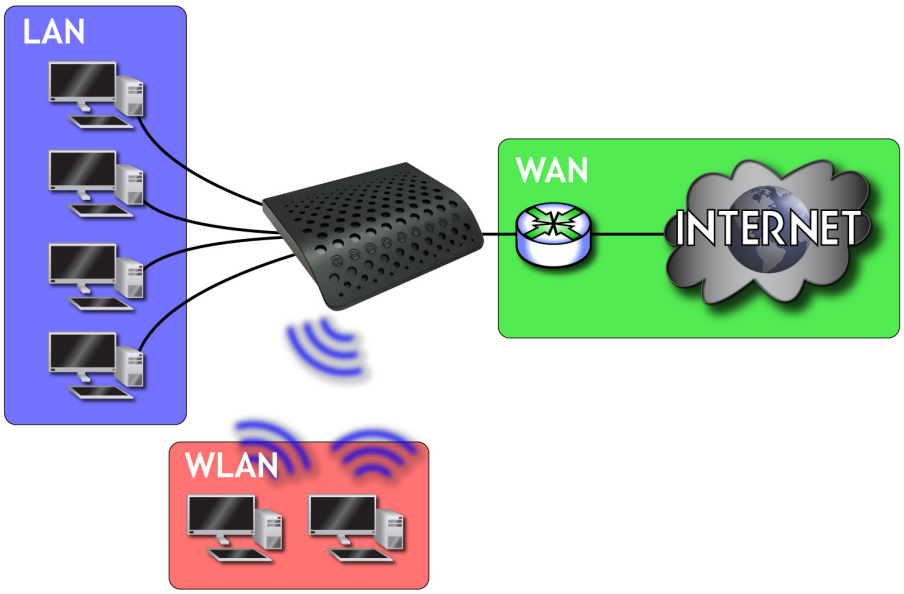
This chapter introduces the CGN2 and its GUI (Graphical User Interface). It contains the following sections:

1.1 CGN2 OVERVIEW

Your CGN2 is a NAT-capable cable modem and wireless access point that allows you to connect your computers, wireless devices, and other network devices to one another, and to the Internet via the cable connection.

Computers with a wired connection to the CGN2 are on the Local Area Network (LAN), computers with a wireless connection to the CGN2 are on the Wireless Local Area Network (WLAN) and the CGN2 connects to the service provider over the Wide Area Network (WAN).

Figure 1: Application Overview



1.1.1 KEY FEATURES

The CGN2 provides:

- Internet connection to cable modem service via **CABLE** port (F-type RF connector)
- Local Area Network connection via four 10/100/1000 Mbps (megabits per second) Ethernet ports
- Dynamic Host Configuration Protocol (DHCP) for devices on the LAN
- LAN troubleshooting tools (Ping and Traceroute)
- IEEE 802.11b/g/n wireless MIMO (Multiple-In, Multiple-Out) networking, allowing speeds of up to 300Mbps
- Wireless security: WEP, WPA-PSK and WPA2-PSK encryption, Wifi Protected Setup (WPS) push-button and PIN configuration, MAC filtering,
- Wired security: stateful inspection firewall with intrusion detection system, IP and MAC filtering, port forwarding and port triggering, De-Militarized Zone (DMZ) and event logging
- Parental control: scheduled website blocking and access logs

- Settings backup and restore
- Secure configuration interface, accessible by Web browser

1.2 HARDWARE CONNECTIONS

This section describes the CGN2's physical ports and buttons.

Figure 2: Hardware Connections

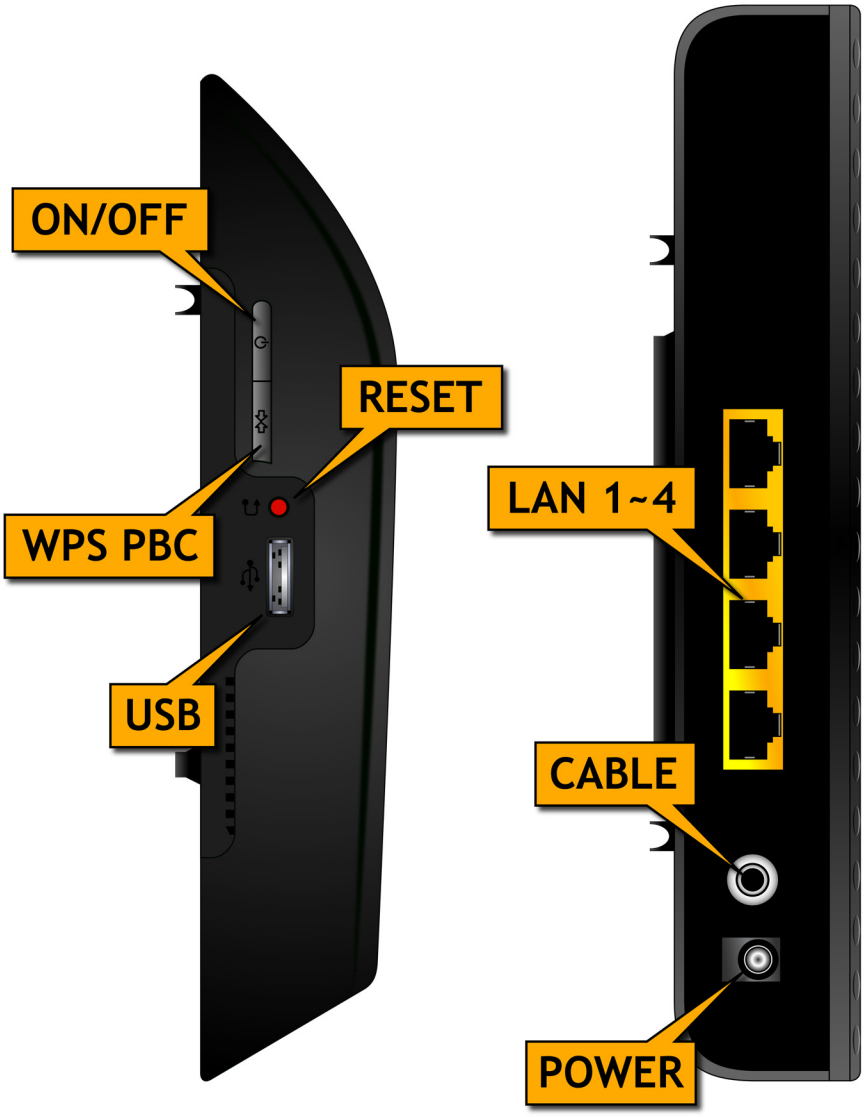


Table 2: Hardware Connections

ON/OFF	Use this button to turn your CGN2 on or off. • To turn the CGN2 on, press and hold the **ON/OFF** button for less than 1 second. • To turn the CGN2 off, press and hold the **ON/OFF** button for longer than 4 seconds.
WPS PBC	Press this button to begin the WiFi Protected Setup (WPS) Push-Button Configuration (PBC) procedure. Press the PBC button on your wireless clients in the coverage area within two minutes to enable them to join the wireless network. See WPS on page 85 for more information.
Reset	Use this button to reboot or reset your CGN2. • Press the button and hold it for less than five seconds to reboot the CGN2. The CGN2 restarts, using your existing settings. • Press the button and hold it for more than five seconds to delete all user-configured settings and restart the CGN2 using its factory default settings. See Resetting the CGN2 on page 25 for more information on resetting the CGN2. NOTE: Unless you previously backed-up the CGN2's configuration settings prior to resetting the CGN2, the settings cannot be recovered.

Table 2: Hardware Connections

USB	The CGN2 provides one USB 2.0 host port, allowing you to plug in a USB flash disk for mounting and sharing through the LAN interfaces via the Samba protocol (network neighborhood). The CGN2 supports the following Windows file systems: • FAT16 • FAT32 • NTFS **USB devices must not drain more than 500mA from the USB port. USB devices requiring more than 500mA should be provided with their own power source(s).**
LAN1	Use these ports to connect your computers and other network devices, using Category 5 or 6 Ethernet cables with RJ45 connectors.
LAN2	
LAN3	
LAN4	

Table 2: Hardware Connections

CABLE	Use this to connect to the Internet via an F-type RF cable.
POWER	Use this to connect to the 12v/2A power adapter that came with your CGN2. **NEVER use another power adapter with your CGN2. Doing so could harm your CGN2.** Figure 3: Power Adaptor 

1.3 LEDS

This section describes the CGN2's LEDs (lights).

Figure 4: LEDs

Table 3: LEDs

LED	STATUS	**DESCRIPTION**
WIRELESS 	Off	The wireless network is not enabled.
	Green, steady	The wireless network is enabled, and no data is being transmitted or received over the wireless network.
	Green, blinking	The wireless network is enabled, and data is being transmitted or received over the wireless network.
	Bi-color	Wi-Fi Protected Setup (WPS) is in operation.

Table 3: LEDs

LAN 1~4 	Off	No device is connected to the relevant **LAN** port.
	Green, blinking	A device is connected to the relevant **LAN** port via a Fast Ethernet (100Mbps) link, and is transmitting or receiving data.
	Green, steady	A device is connected to the relevant **LAN** port via a Fast Ethernet (100Mbps) link, but is not transmitting or receiving data.
	Blue, blinking	A device is connected to the relevant **LAN** port via a Gigabit Ethernet (1000Mbps) link, and is transmitting or receiving data.
	Blue, steady	A device is connected to the relevant **LAN** port via a Gigabit Ethernet (1000Mbps) link, but is not transmitting or receiving data.
Status 	Blinking	The CGN2's cable modem is registering with the service provider's CMTS.
	On	The CGN2's cable modem has successfully registered with the service provider and is ready for data transfer.
US 	Green, blinking	The CGN2 is searching for an upstream frequency on the **CABLE** connection.
	Green, steady	The CGN2 has successfully located and locked onto an upstream frequency on the **CABLE** connection.
	Blue	The CGN2 is engaged in channel bonding on the upstream connection.
	Off	There is no upstream activity on the **CABLE** connection.
DS 	Green, blinking	The CGN2 is searching for a downstream frequency on the **CABLE** connection.
	Green, steady	The CGN2 has successfully located and locked onto a downstream frequency on the **CABLE** connection.
	Blue	The CGN2 is engaged in channel bonding on the downstream connection.
	Off	There is no downstream activity on the **CABLE** connection.
Power 	On	The CGN2 is receiving power.
	Off	The CGN2 is not receiving power.

When you turn on the CGN2, the LEDs light up in the following order:

- **Power**
- **US**
- **DS**
- **Status**
- The **ETH 1~4** LEDs light up as soon as there is activity on the relevant port, and the **WIRELESS** LED lights up once the wireless network is ready.

1.4 IP ADDRESS SETUP

Before you log into the CGN2's GUI, your computer's IP address must be in the same subnet as the CGN2. This allows your computer to communicate with the CGN2.

NOTE: See IP Addresses and Subnets on page 27 for background information.

The CGN2 has a built-in DHCP server that, when active, assigns IP addresses to computers on the LAN. When the DHCP server is active, you can get an IP address automatically. The DHCP server is active by default.

If your computer is configured to get an IP address automatically, or if you are not sure, try to log in to the CGN2 (see Logging into the CGN2 on page 23).

- If the login screen displays, your computer is already configured correctly.
- If the login screen does not display, either the CGN2's DHCP server is not active or your computer is not configured correctly. Follow the procedure in Manual IP Address Setup on page 22 and set your computer to get an IP address automatically. Try to log in again. If you cannot log in, follow the manual IP address setup procedure again, and set a specific IP address as shown. Try to log in again.

NOTE: If you still cannot see the login screen, your CGN2's IP settings may have been changed from their defaults. If you do not know the CGN2's new address, you should return it to its factory defaults. See Resetting the CGN2 on page 25. Bear in mind that ALL user-configured settings are lost.

1.4.1 MANUAL IP ADDRESS SETUP

By default, your CGN2's local IP address is **192.168.0.1**. If your CGN2 is using the default IP address, you should set your computer's IP address to be between **192.168.0.2** and **192.168.0.254**.

NOTE: If your CGN2 DHCP server is active, set your computer to get an IP address automatically in step 5. The CGN2 assigns an IP address to your computer. The DHCP server is active by default.

Take the following steps to manually set up your computer's IP address to connect to the CGN2:

NOTE: This example uses Windows XP; the procedure for your operating system may be different.

1. Click **Start**, then click **Control Panel**.
2. In the window that displays, double-click **Network Connections**.
3. Right-click your network connection (usually **Local Area Connection**) and click **Properties**.
4. In the **General** tab's **This connection uses the following items** list, scroll down and select **Internet Protocol (TCP/IP)**. Click **Properties**.
5. You can get an IP address automatically, or specify one manually:
   - If your CGN2's DHCP server is active, select **Get an IP address automatically**.
   - If your CGN2's DHCP server is active, select **Use the following IP address**. In the **IP address** field, enter a value between **192.168.0.2** and **192.168.0.254** (default). In the **Subnet mask** field, enter **255.255.255.0** (default).

NOTE: If your CGN2 is not using the default IP address, enter an IP address and subnet mask that places your computer in the same subnet as the CGN2.

6. Click **OK**. The **Internet Protocol (TCP/IP)** window closes. In the **Local Area Connection Properties** window, click **OK**.

Your computer now obtains an IP address from the CGN2, or uses the IP address that you specified, and can communicate with the CGN2.

1.5 LOGGING INTO THE CGN2

Take the following steps to log into the CGN2's GUI.

NOTE: You can log into the CGN2's GUI via the wireless interface. However, it is strongly recommended that you configure the CGN2 via a wired connection on the LAN.

1. Open a browser window.
2. Enter the CGN2's IP address (default **192.168.0.1**) in the URL bar. The **Login** screen displays.

Figure 5: Login

3. Enter the **Username** and **Password**. The default login username is **cusadmin**, and the default password is **password**.

NOTE: The Username and Password are case-sensitive; "password" is not the same as "Password".

4. Click **Login**. The **System Info** screen displays (see The System Info Screen on page 33).

1.6 GUI OVERVIEW

This section describes the CGN2's GUI.

Figure 6: GUI Overview

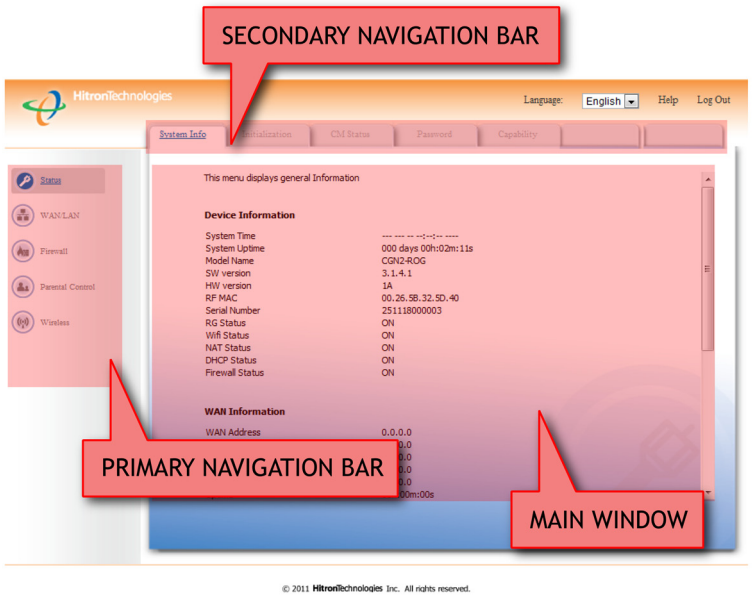


Table 4: GUI Overview

Primary Navigation Bar	Use this section to move from one part of the GUI to another.
Secondary Navigation Bar	Use this section to move from one related screen to another.
Main Window	Use this section to read information about your CGN2's configuration, and make configuration changes.

Each item in the **Primary Navigation Bar** has its own chapter in this User's Guide; items in the **Secondary Navigation Bar** have their own section within a chapter.

1.7 RESETTING THE CGN2

When you reset the CGN2 to its factory defaults, all user-configured settings are lost, and the CGN2 is returned to its initial configuration state.

There are two ways to reset the CGN2:

- Press the **RESET** button on the CGN2, and hold it in for ten seconds or longer.
- Click **WAN/LAN** > **Backup**. In the screen that displays, click the **Factory Reset** button.

The CGN2 turns off and on again, using its factory default settings.

NOTE: Depending on your CGN2's previous configuration, you may need to re-configure your computer's IP settings; see IP Address Setup on page 21.

2 STATUS

This chapter describes the screens that display when you click **Status** in the toolbar. It contains the following sections:

2.1 CABLE OVERVIEW

This section describes some of the concepts related to the **Cable** screens.

2.1.1 DOCSIS

The Data Over Cable Service Interface Specification (DOCSIS) is a telecommunications standard that defines the provision of data services) Internet access) over a traditional cable TV (CATV) network.

Your CGN2 supports DOCSIS version 3.0.

2.1.2 IP ADDRESSES AND SUBNETS

Every computer on the Internet must have a unique Internet Protocol (IP) address. The IP address works much like a street address, in that it identifies a specific location to which information is transmitted. No two computers on a network can have the same IP address.

2.1.2.1 IP ADDRESS FORMAT

IP addresses consist of four octets (8-bit numerical values) and are usually represented in decimal notation, for example **192.168.1.1**. In decimal notation, this means that each octet has a minimum value of 0 and a maximum value of 255.

An IP address carries two basic pieces of information: the “network number” (the address of the network as a whole, analogous to a street name) and the “host ID” (analogous to a house number) which identifies the specific computer (or other network device).

2.1.2.2 IP ADDRESS ASSIGNMENT

IP addresses can come from three places:

- The Internet Assigned Numbers Agency (IANA)
- Your Internet Service Provider
- You (or your network devices)

IANA is responsible for IP address allocation on a global scale, and your ISP assigns IP addresses to its customers. You should never attempt to define your own IP addresses on a public network, but you are free to do so on a private network.

In the case of the CGN2:

- The public network (Wide Area Network or WAN) is the link between the cable connector and your Internet Service Provider. Your CGN2’s IP address on this network is assigned by your service provider.

- The private network (in routing mode - see Routing Mode on page 31) is your Local Area Network (LAN) and Wireless Local Area Network (WLAN), if enabled. You are free to assign IP addresses to computers on the LAN and WLAN manually, or to allow the CGN2 to assign them automatically via DHCP (Dynamic Host Configuration Protocol). IANA has reserved the following blocks of IP addresses to be used for private networks only:

Table 5: Private IP Address Ranges

FROM...	...TO
10.0.0.0	10.255.255.255
172.16.0.0	172.31.255.255
192.168.0.0	192.168.255.255

If you assign addresses manually, they must be within the CGN2's LAN subnet.

2.1.2.3 SUBNETS

A subnet (short for sub-network) is, as the name suggests, a separate section of a network, distinct from the main network of which it is a part. A subnet may contain all of the computers at one corporate local office, for example, while the main network includes several offices.

In order to define the extent of a subnet, and to differentiate it from the main network, a subnet mask is used. This "masks" the part of the IP address that refers to the main network, leaving the part of the IP address that refers to the sub-network.

Each subnet mask has 32 bits (binary digits), as does each IP address:

- A binary value of **1** in the subnet mask indicates that the corresponding bit in the IP address is part of the main network.
- A binary value of **0** in the subnet mask indicates that the corresponding bit in the IP address is part of the sub-network.

For example, the following table shows the IP address of a computer (**192.168.1.1**) expressed in decimal and binary (each cell in the table indicates one octet):

Table 6: IP Address: Decimal and Binary

192	168	0	1
11000000	10101000	00000000	00000001

The following table shows a subnet mask that "masks" the first twenty-four bits of the IP address, in both its decimal and binary notation.

Table 7: Subnet Mask: Decimal and Binary

255	255	255	0
11111111	11111111	11111111	00000000

This shows that in this subnet, the first three octets (**192.168.1**, in the example IP address) define the main network, and the final octet (**1**, in the example IP address) defines the computer's address on the subnet.

The decimal and binary notations give us the two common ways to write a subnet mask:

- Decimal: the subnet mask is written in the same fashion as the IP address: **255.255.255.0**, for example.
- Binary: the subnet mask is indicated after the IP address (preceded by a forward slash), specifying the number of binary digits that it masks. The subnet mask **255.255.255.0** masks the first twenty-four bits of the IP address, so it would be written as follows: 192.168.1.1**/24**.

2.1.3 DHCP

The Dynamic Host Configuration Protocol, or DHCP, defines the process by which IP addresses can be assigned to computers and other networking devices automatically, from another device on the network. This device is known as a DHCP server, and provides addresses to all the DHCP client devices.

In order to receive an IP address via DHCP, a computer must first request one from the DHCP server (this is a broadcast request, meaning that it is sent out to the whole network, rather than just one IP address). The DHCP server hears the requests, and responds by assigning an IP address to the computer that requested it.

If a computer is not configured to request an IP address via DHCP, you must configure an IP address manually if you want to access other computers and devices on the network. See IP Address Setup on page 21 for more information.

By default, the CGN2 is a DHCP client on the WAN (the CATV connection). It broadcasts an IP address over the cable network, and receives one from the service provider. By default, the CGN2 is a DHCP server on the LAN; it provides IP addresses to computers on the LAN which request them.

2.1.4 DHCP LEASE

"DHCP lease" refers to the length of time for which a DHCP server allows a DHCP client to use an IP address. Usually, a DHCP client will request a DHCP lease renewal before the lease time is up, and can continue to use the IP address for an additional period. However, if the client does not request a renewal, the DHCP server stops allowing the client to use the IP address.

This is done to prevent IP addresses from being used up by computers that no longer require them, since the pool of available IP addresses is finite.

2.1.5 MAC ADDRESSES

Every network device possesses a Media Access Control (MAC) address. This is a unique alphanumeric code, given to the device at the factory, which in most cases cannot be changed (although some devices are capable of "MAC spoofing", where they impersonate another device's MAC address).

MAC addresses are the most reliable way of identifying network devices, since IP addresses tend to change over time (whether manually altered, or updated via DHCP).

Each MAC address displays as six groups of two hexadecimal digits separated by colons (or, occasionally, dashes) for example **00:AA:FF:1A:B5:74**.

NOTE: Each group of two hexadecimal digits is known as an "octet", since it represents eight bits.

Bear in mind that a MAC address does not precisely represent a computer on your network (or elsewhere), it represents a network device, which may be part of a computer (or other device). For example, if a single computer has an Ethernet card (to connect to your CGN2 via one of the **LAN** ports) and also has a wireless card (to connect to your CGN2 over the wireless interface) the MAC addresses of the two cards will be different. In the case of the CGN2, each internal module (cable modem module, Ethernet module, wireless module, etc.) possesses its own MAC address.

2.1.6 ROUTING MODE

When your CGN2 is in routing mode, it acts as a gateway for computers on the LAN to access the Internet. The service provider assigns an IP address to the CGN2 on the WAN, and all traffic for LAN computers is sent to that IP address. The CGN2 assigns private IP addresses to LAN computers (when DHCP is active), and transmits the relevant traffic to each private IP address.

NOTE: When DHCP is not active on the CGN2 in routing mode, each computer on the LAN must be assigned an IP address in the CGN2's subnet manually.

When the CGN2 is not in routing mode, the service provider assigns an IP address to each computer connected to the CGN2 directly. The CGN2 does not perform any routing operations, and traffic flows between the computers and the service provider.

Routing mode is not user-configurable; it is specified by the service provider in the CGN2's configuration file.

2.1.7 CONFIGURATION FILES

The CGN2's configuration (or config) file is a document that the CGN2 obtains automatically over the Internet from the service provider's server, which specifies the settings that the CGN2 should use. It contains a variety of settings that are not present in the user-configurable Graphical User Interface (GUI) and can be specified only by the service provider.

2.1.8 DOWNSTREAM AND UPSTREAM TRANSMISSIONS

The terms "downstream" and "upstream" refer to data traffic flows, and indicate the direction in which the traffic is traveling. "Downstream" refers to traffic from the service provider to the CGN2, and "upstream" refers to traffic from the CGN2 to the service provider.

2.1.9 CABLE FREQUENCIES

Just like radio transmissions, data transmissions over the cable network must exist on different frequencies in order to avoid interference between signals.

The data traffic band is separate from the TV band, and each data channel is separate from other data channels.

2.1.10 MODULATION

Transmissions over the cable network are based on a strong, high frequency periodic waveform known as the “carrier wave.” This carrier wave is so called because it “carries” the data signal. The data signal itself is defined by variations in the carrier wave. The process of varying the carrier wave (in order to carry data signal information) is known as “modulation.” The data signal is thus known as the “modulating signal.”

Cable transmissions use a variety of methods to perform modulation (and the “decoding” of the received signal, or “demodulation”). The modulation methods defined in DOCSIS 3 are as follows:

- **QPSK**: Quadrature Phase-Shift Keying
- **QAM**: Quadrature Amplitude Modulation
- **QAM TCM**: Trellis modulated Quadrature Amplitude Modulation

In many cases, a number precedes the modulation type (for example **16 QAM**). This number refers to the complexity of modulation. The higher the number, the more data can be encoded in each symbol.

NOTE: In modulated signals, each distinct modulated character (for example, each audible tone produced by a modem for transmission over telephone lines) is known as a symbol.

Since more information can be represented by a single character, a higher number indicates a higher data transfer rate.

2.1.11 TDMA, FDMA AND SCDMA

Time Division Multiple Access (TDMA), Frequency Division Multiple Access (FDMA) and Synchronous Code Division Multiple Access (SCDMA) are channel access methods that allow multiple users to share the same frequency channel.

- TDMA allows multiple users to share the same frequency channel by splitting transmissions by time. Each user is allocated a number of time slots, and transmits during those time slots.
- FDMA allows multiple users to share the same frequency channel by assigning a frequency band within the existing channel to each user.

- SCDMA allows multiple users to share the same frequency channel by assigning a unique orthogonal code to each user.

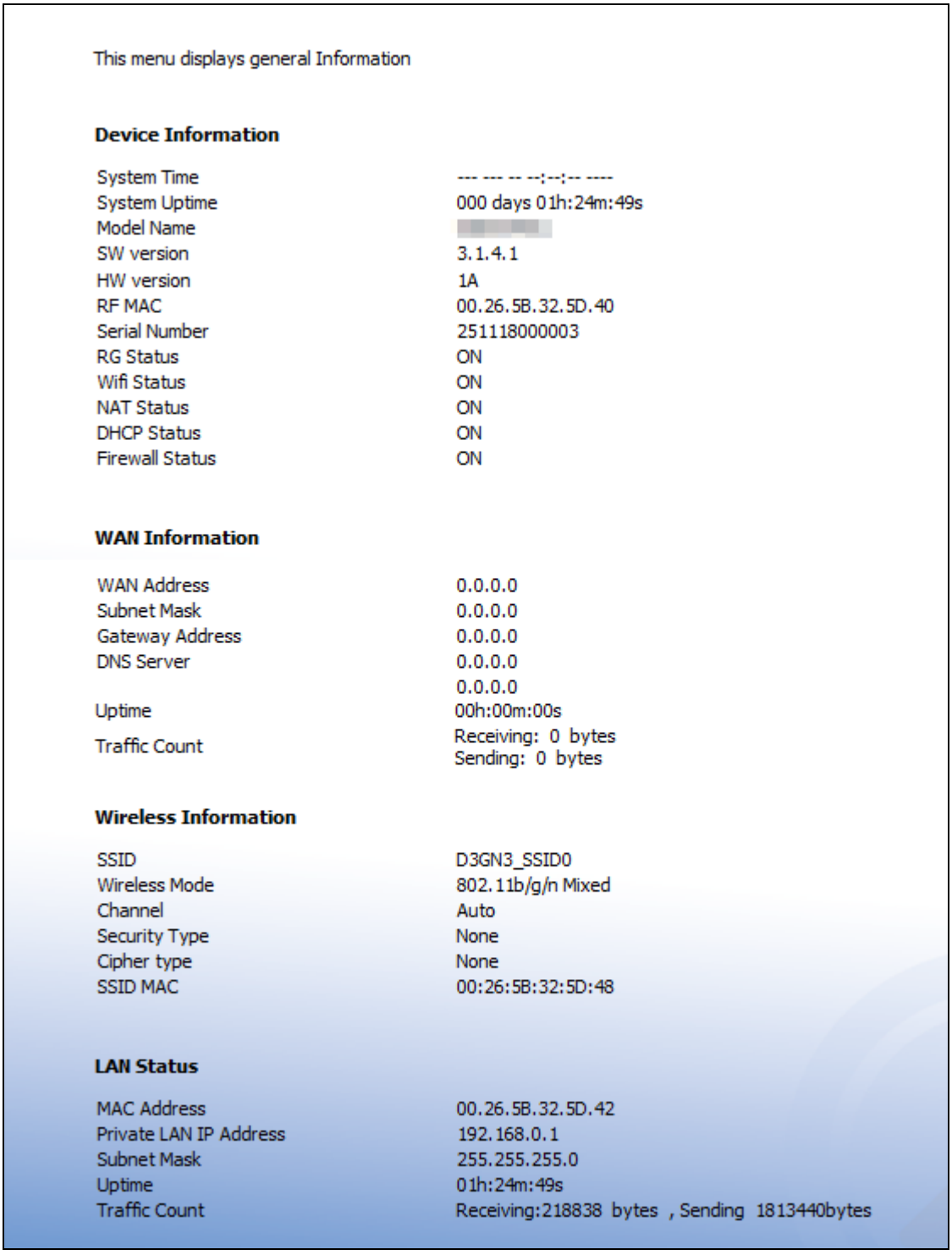
2.2 THE SYSTEM INFO SCREEN

Use this screen to see general information about your CGN2's hardware, its software, and its connection to the Internet.

NOTE: Most of the information that displays in this screen is for troubleshooting purposes only. However, you may need to use the MAC Address information when setting up your network.

Click **Status** > **System Info**. The following screen displays.

Figure 7: The Status > System Info Screen



This menu displays general Information

Device Information

System Time	--- --- -- --:--:-- ----
System Uptime	000 days 01h:24m:49s
Model Name	
SW version	3.1.4.1
HW version	1A
RF MAC	00.26.5B.32.5D.40
Serial Number	251118000003
RG Status	ON
Wifi Status	ON
NAT Status	ON
DHCP Status	ON
Firewall Status	ON

WAN Information

WAN Address	0.0.0.0
Subnet Mask	0.0.0.0
Gateway Address	0.0.0.0
DNS Server	0.0.0.0
	0.0.0.0
Uptime	00h:00m:00s
Traffic Count	Receiving: 0 bytes Sending: 0 bytes

Wireless Information

SSID	D3GN3_SSID0
Wireless Mode	802.11b/g/n Mixed
Channel	Auto
Security Type	None
Cipher type	None
SSID MAC	00:26:5B:32:5D:48

LAN Status

MAC Address	00.26.5B.32.5D.42
Private LAN IP Address	192.168.0.1
Subnet Mask	255.255.255.0
Uptime	01h:24m:49s
Traffic Count	Receiving:218838 bytes , Sending 1813440bytes

The following table describes the labels in this screen.

Table 8: The Status > System Info Screen

Device Information	
System Time	This displays the current date and time.
System Uptime	This displays the number of days, hours, minutes and seconds since the CGN2 was last switched on or rebooted.
Model Name	This displays the device's model name.
SW Version	This displays the version number of the software that controls the CGN2.
HW Version	This displays the version number of the CGN2's physical hardware.
RF MAC	This displays the Media Access Control (MAC) address of the CGN2's RF module. This is the module that connects to the Internet through the **CATV** connection.
Serial Number	This displays a number that uniquely identifies the device.
RG Status	This displays whether or not the CGN2 is in Residential Gateway (RG) mode. When the CGN2 is in Residential Gateway mode, **ON** displays. When the CGN2 is not in Residential Gateway mode, **OFF** displays.
Wifi Status	This displays whether or not the CGN2's wireless network is active. When the CGN2's wireless network is active, **ON** displays. When the CGN2's wireless network is not active, **OFF** displays.
NAT Status	This displays whether or not the CGN2's Network Address Translation (NAT) feature is active. When NAT is active, **ON** displays. When NAT is not active, **OFF** displays.
DHCP Status	This displays whether or not the CGN2's DHCP server is active. When the DHCP server is active, **ON** displays. When the DHCP server is not active, **OFF** displays.
Firewall Status	This displays whether or not the CGN2's firewall is active. When the firewall is active, **ON** displays. When the firewall is not active, **OFF** displays.

Table 8: The Status > System Info Screen (continued)

WAN Information	
WAN Address	This field displays the CGN2's IP address on the WAN (Wide Area Network) interface.
Subnet Mask	This field displays the CGN2's WAN subnet mask.
Gateway Address	This field displays the address of the device on the WAN to which the CGN2 is connected.
DNS Server	This field displays the Domain Name Servers that the CGN2 uses to resolve domain names into IP addresses.
Uptime	This displays the number of hours, minutes and seconds that the CGN2 has been connected to another device over the WAN interface.
Traffic Count	This displays the number of bytes received and sent on the WAN interface.
Wireless Information	
SSID	This displays the wireless network's Service Set Identifier. This is the name of the wireless network, to which wireless clients connect.
Wireless Mode	This displays the type of wireless network that the CGN2 is using.
Channel	This displays the wireless channel on which the CGN2 is transmitting and receiving.
Security Type	This displays the type of security the CGN2's wireless network is currently using.
Cipher type	This displays the type of encryption that the wireless network's security is using: • **TKIP** displays if it is using the Temporal Key Integrity Protocol. • **AES** displays if it is using the Advanced Encryption Standard. • **TKIP and AES** displays if it allows clients using either encryption type to connect to the CGN2.
SSID MAC	This displays the Media Access Control (MAC) address of the wireless module, to which wireless clients connect.
LAN Status	
MAC Address	This displays the Media Access Control (MAC) address of the CGN2's Ethernet module. This is the module to which you connect through the **LAN** ports.

Table 8: The Status > System Info Screen (continued)

Private LAN IP Address	This displays the IP address of the CGN2's Ethernet module. This is the IP address you use to connect with the CGN2's admin interface via the **LAN** ports.
Subnet Mask	This displays the CGN2's LAN subnet mask.
Uptime	This displays the number of hours, minutes and seconds that the CGN2 has been connected to another device over the LAN interface.
Traffic Count	This displays the number of bytes received and sent on the LAN interface.

2.3 THE INITIALIZATION SCREEN

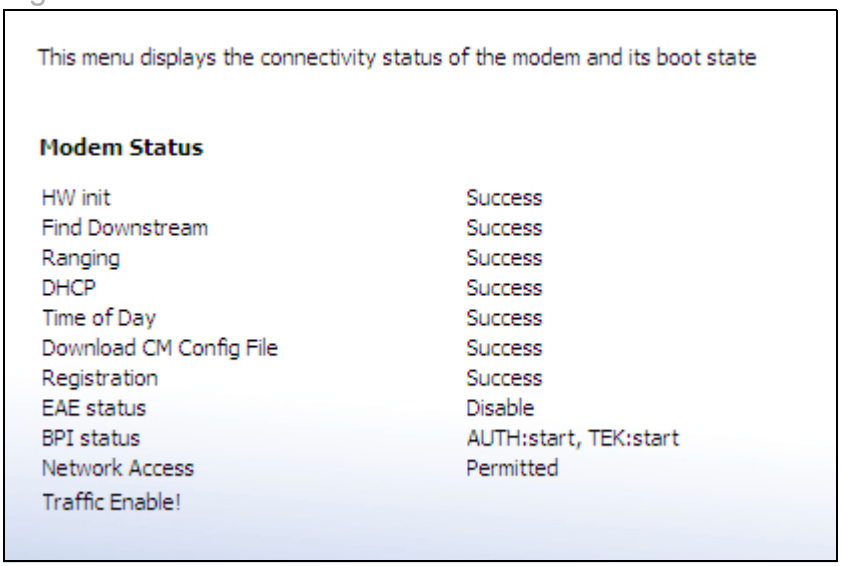
This screen displays the steps successfully taken to connect to the Internet over the **CABLE** connection.

Use this screen for troubleshooting purposes to ensure that the CGN2 has successfully connected to the Internet; if an error has occurred you can identify the stage at which the failure occurred.

NOTE: This screen displays when you first log in to the CGN2.

Click **Status** > **Initialization**. The following screen displays.

Figure 8: The Status > Initialization Screen



For each step:

- **Process** displays when the CGN2 is attempting to complete a connection step.
- **Success** displays when the CGN2 has completed a connection step.

2.4 THE CM STATUS SCREEN

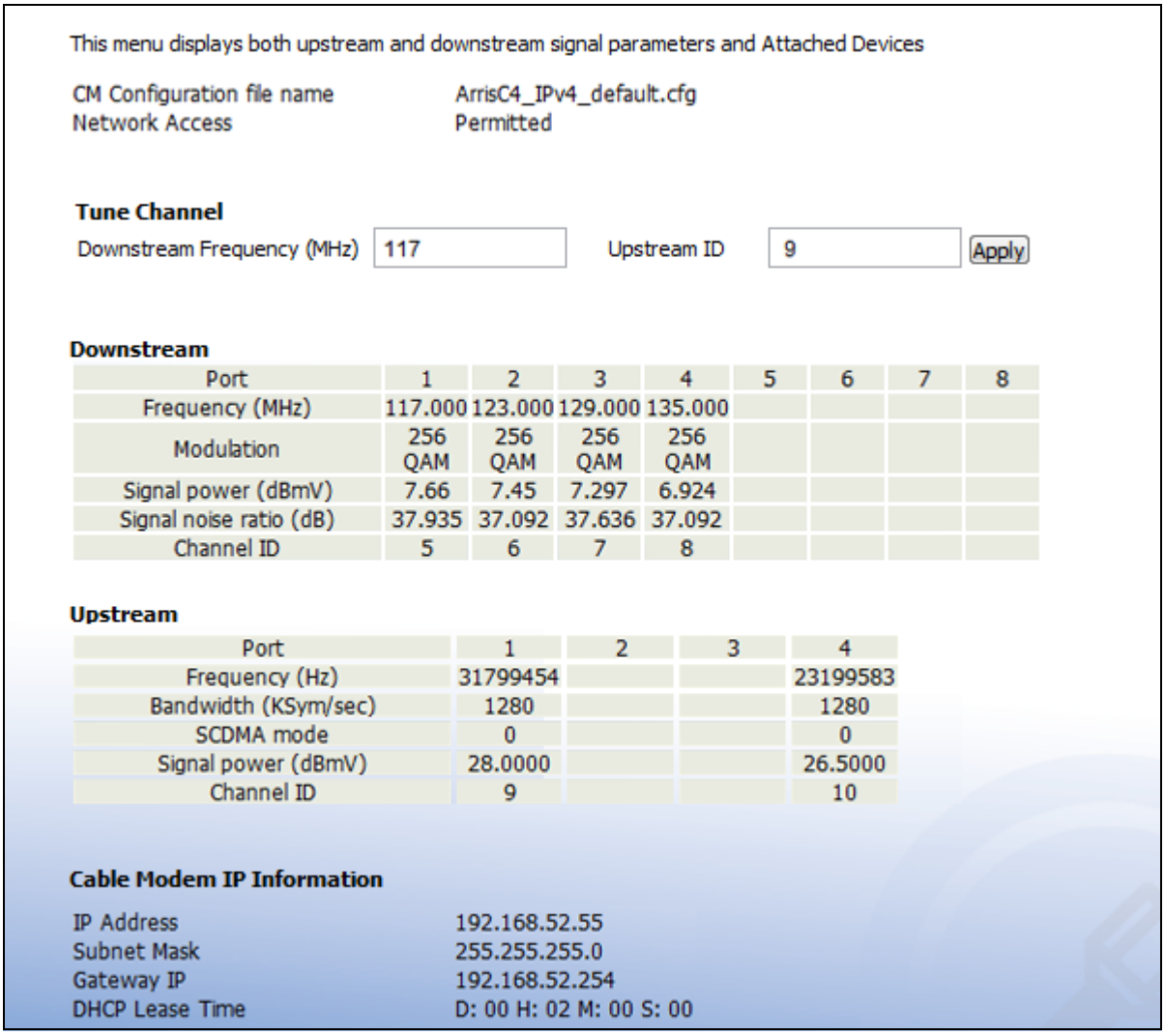
Use this screen to discover information about:

- The nature of the upstream and downstream connection between the CGN2 and the device to which it is connected through the **CABLE** interface.
- IP details of the CGN2's WAN connection.

You can also configure the CGN2's downstream center frequency.

Click **Status** > **CM Status**. The following screen displays.

Figure 9: The Status > CM Status Screen



The following table describes the labels in this screen.

Table 9: The Status > CM Status Screen

CM Configuration File Name	This displays the name of the configuration file that the CGN2 downloaded from your service provider. This file provides the CGN2 with the service parameter data that it needs to perform its functions correctly.
Network Access	This displays whether or not your service provider allows you to access the Internet over the **CABLE** connection. ▸ **Permitted** displays if you can access the Internet. ▸ **Denied** displays if you cannot access the Internet.
Tune Channel	

Table 9: The Status > CM Status Screen (continued)

Downstream Frequency	This displays the center frequency in Megahertz (MHz) at which the CGN2 connects over the **CABLE** interface. If you want the CGN2 to use a different center frequency, enter it in the field and click **Apply**. NOTE: Do not change the frequency unless you have a good reason to do so.
Upstream ID	This displays the ID number of the channel on which the upstream signal is to be transmitted. When an upstram connection cannot be made on the specified channel, the CGN2 attempts to connect on the next channel. If you want the CGN2 to attempt to connect on a different channel, enter it in the field and click **Apply**. NOTE: Do not change the channel unless you have a good reason to do so.
Downstream NOTE: The downstream signal is the signal transmitted to the CGN2.	
Frequency (MHz)	This displays the actual frequency in Megahertz (MHz) of each downstream data channel to which the CGN2 is connected.
Modulation	This displays the type of modulation that each downstream channel uses.
Signal Power (dBmV)	This displays the power of the signal of each downstream data channel to which the CGN2 is connected, in dBmV (decibels above/below 1 millivolt).
Signal Noise Ratio (dB)	This displays the Signal to Noise Ratio (SNR) of each downstream data channel to which the CGN2 is connected, in dB (decibels).
Upstream NOTE: The upstream signal is the signal transmitted from the CGN2.	
Frequency (Hz)	This displays the frequency in Herz (Hz) of each upstream data channel to which the CGN2 is connected.
Bandwidth (KSym/ sec)	This displays the bandwidth of each upstream data channel to which the CGN2 is connected (in thousands of symbols per second).

Table 9: The Status > CM Status Screen (continued)

SCDMA Mode	This displays the Synchronous Code Division Multiple Access (SCDMA) mode of each channel on which the upstream signal is transmitted.
Signal Power (dBmV)	This displays the transmitted power of the signal of each upstream data channel to which the CGN2 is connected, in dBmV (decibels above/below 1 millivolt).
Channel ID	This displays the ID number of each channel on which the upstream signal is transmitted.
Cable Modem IP Information	
IP Address	This displays the CGN2's WAN IP address. This IP address is automatically assigned to the CGN2
Subnet Mask	This displays the CGN2's WAN subnet mask.
Gateway IP	This displays the IP address of the device to which the CGN2 is connected over the **CABLE** interface.
DHCP Lease Time	This displays the time that elapses before your device's IP address lease expires, and a new IP address is assigned to it by the DHCP server.

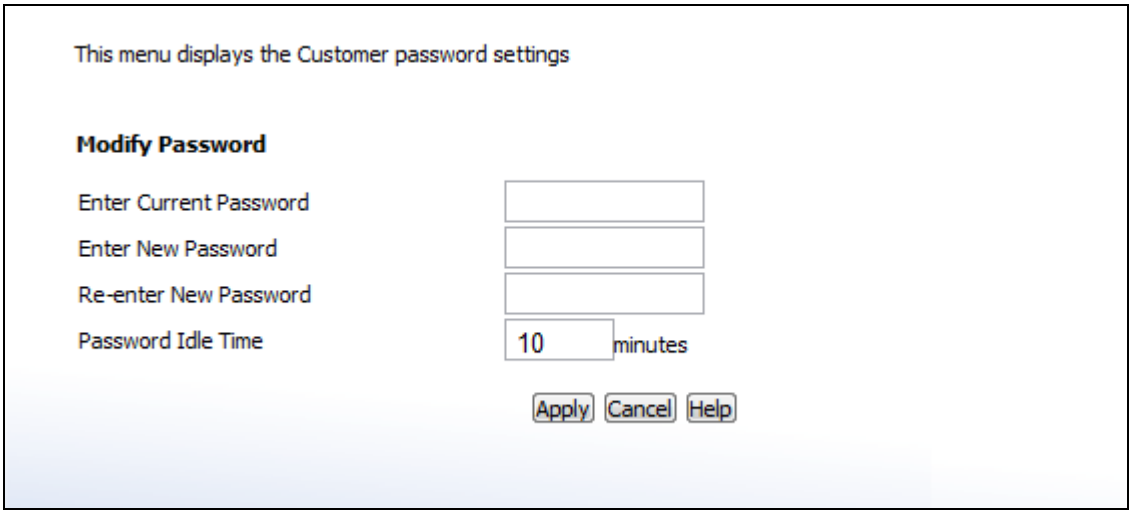
2.5 THE PASSWORD SCREEN

Use this screen to change the password with which you log in to the CGN2.

NOTE: If you forget your password, you will need to reset the CGN2 to its factory defaults.

Click **Status** > **Password**. The following screen displays.

Figure 10: The Status > Password Screen



The following table describes the labels in this screen.

Table 10: The Status > Password Screen

Enter Current Password	Enter the password with which you currently log into the CGN2
Enter New Password	Enter and re-enter the password you want to use to log into the CGN2.
Re-enter New Password	
Password Idle Time	Enter the number of minutes of inactivity after which you should be automatically logged out of the CGN2. Once this period elapses, you will need to log in again.
Apply	Click this to save your changes to the fields in this screen.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

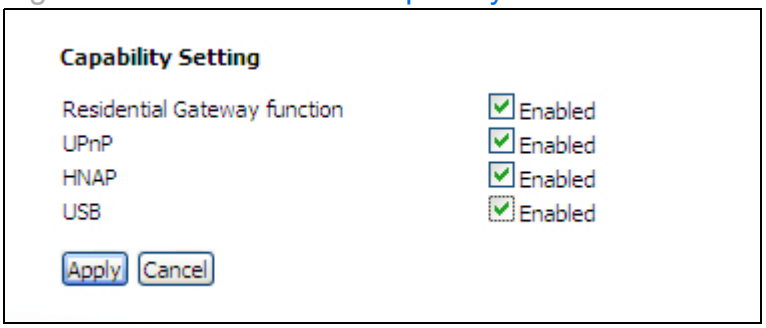
2.6 THE CAPABILITY SCREEN

Use this screen to enable or disable the CGN2's residential gateway and Universal Plug n Play (UPnP) functions.

Disabling the residential gateway feature sets the unit to use bridge mode only. Use this mode when your network is already using another router.

Click **Status** > **Capability**. The following screen displays.

Figure 11: The Status > Capability Screen



The following table describes the labels in this screen.

Table 11: The Status > Capability Screen

Residential Gateway function	Select the checkbox to enable the CGN2's residential gateway features, or deselect the checkbox to disable them.
UPnP	Select the checkbox to enable the CGN2's Universal Plug n Play features, or deselect the checkbox to disable them.
HNAP	Select the checkbox to enable the CGN2's Home Network Administration Protocol features, or deselect the checkbox to disable them.
USB	Select the checkbox to enable the CGN2's USB media sharing capability, or deselect the checkbox to disable them. NOTE: This option is available to logged-in **MSO** users only. When you select this checkbox and apply your changes, the CGN2 reboots. Once it has successfully rebooted, the **WAN/LAN** > **Shared Media** screen displays in the **cusadmin** user interface.
Apply	Click this to save your changes to the fields in this screen.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

3 WAN/LAN

This chapter describes the screens that display when you click **WAN/LAN** in the toolbar. It contains the following sections:

3.1 WAN/LAN OVERVIEW

This section describes some of the concepts related to the **WAN/LAN** screens.

3.1.1 WAN AND LAN

A Local Area Network (LAN) is a network of computers and other devices that usually occupies a small physical area (a single building, for example). Your CGN2's LAN consists of all the computers and other networking devices connected to the **LAN 1~4** ports. This is your private network (in routing mode - see Routing Mode on page 31).

The LAN is a separate network from the Wide Area Network (WAN). In the case of the CGN2, the WAN refers to all computers and other devices available on the cable connection.

By default, computers on the WAN cannot identify individual computers on the LAN; they can see only the CGN2. The CGN2 handles routing to and from individual computers on the LAN.

3.1.2 LAN IP ADDRESSES AND SUBNETS

IP addresses on the LAN are controlled either by the CGN2's built-in DHCP server (see DHCP on page 29), or by you (when you manually assign IP addresses to your computers).

For more information about IP addresses and subnets in general, see IP Addresses and Subnets on page 27.

3.1.3 DNS AND DOMAIN SUFFIX

A domain is a location on a network, for instance **example.com**. On the Internet, domain names are mapped to the IP addresses to which they should refer by the Domain Name System. This allows you to enter "www.example.com" into your browser and reach the correct place on the Internet even if the IP address of the website's server has changed.

Similarly, the CGN2 allows you to define a **Domain Suffix** to the LAN. When you enter the domain suffix into your browser, you can reach the CGN2 no matter what IP address it has on the LAN.

3.1.4 DEBUGGING (PING AND TRACEROUTE)

The CGN2 provides a couple of tools to allow you to perform network diagnostics on the LAN:

- Ping: this tool allows you to enter an IP address and see if a computer (or other network device) responds with that address on the network. The name comes from the pulse that submarine SONAR emits when scanning for underwater objects, since the process is rather similar. You can use this tool to see if an IP address is in use, or to discover if a device (whose IP address you know) is working properly.
- Traceroute: this tool allows you to see the route taken by data packets to get from the CGN2 to the destination you specify. You can use this tool to solve routing problems, or identify firewalls that may be blocking your access to a computer or service.

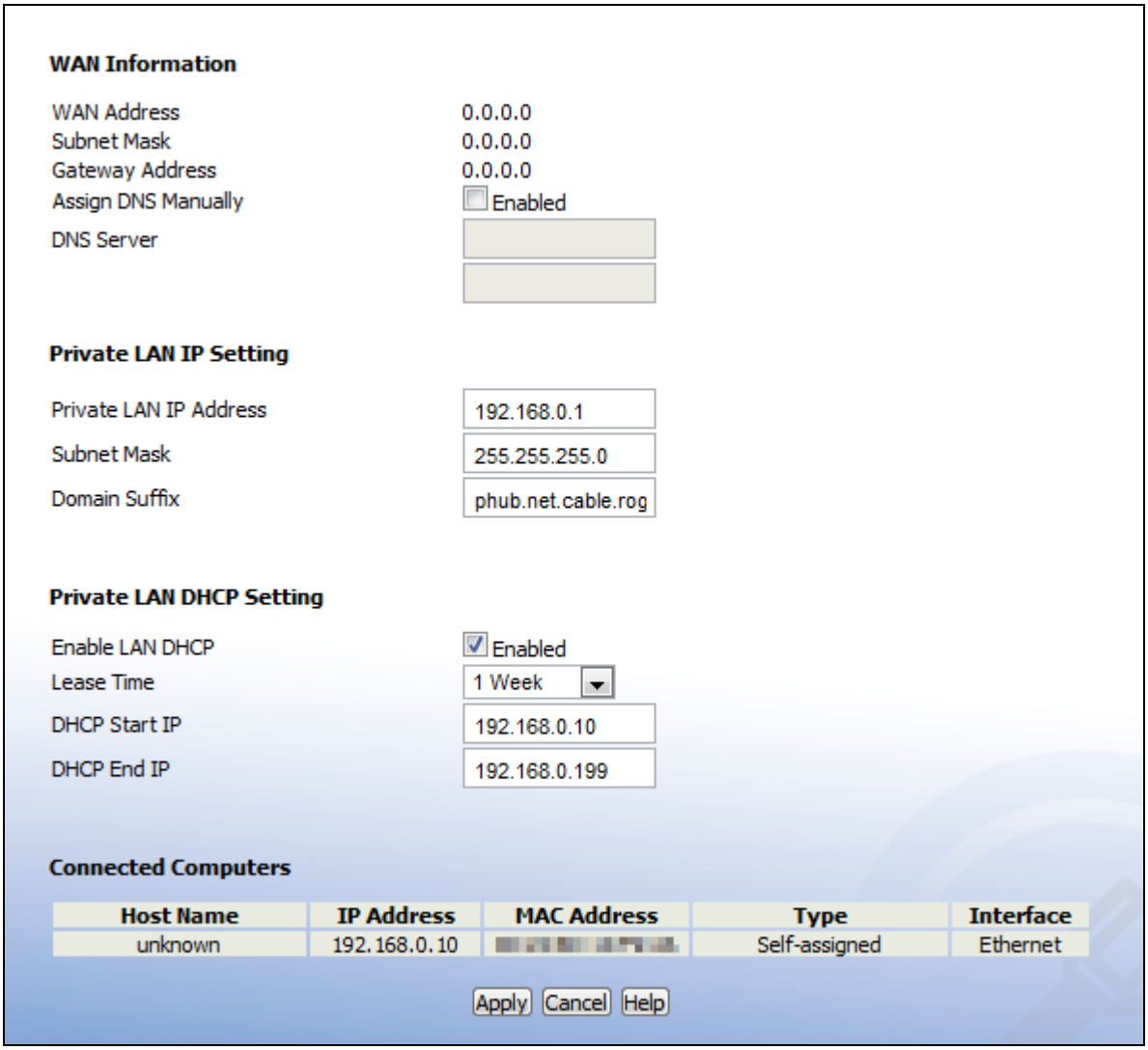
3.2 THE IP SCREEN

Use this screen to:

- View information about the CGN2's connection to the WAN
- Enable or disable manual DNS assignment
- Define DNS servers for manual DNS assignment
- Configure the CGN2's LAN IP address, subnet mask and domain suffix
- Configure the CGN2's internal DHCP server
- Define how the CGN2 assigns IP addresses on the LAN
- See information about the network devices connected to the CGN2 on the LAN.

Click **WAN/LAN** > **IP**. The following screen displays.

Figure 12: The WAN/LAN > IP Screen



The following table describes the labels in this screen.

Table 12: The WAN/LAN > IP Screen

WAN Information	
WAN Address	This field displays the CGN2's IP address on the WAN (Wide Area Network) interface.
Subnet Mask	This field displays the CGN2's WAN subnet mask.
Gateway Address	This field displays the address of the device on the WAN to which the CGN2 is connected.

Table 12: The WAN/LAN > IP Screen (continued)

Assign DNS Manually	▲ Select the checkbox to enable manual DNS server assignment, and enter the DNS servers that you want to use in the **DNS Server** fields below. ▲ Deselect the checkbox to disable manual DNS server assignment. The CGN2 uses the DNS servers assigned automatically when it receives an IP address over the WAN. It is strongly recommended that you do not enable manual DNS server assignment unless you have good reason to do so.
DNS Server	These fields display the Domain Name Servers that the CGN2 uses to resolve domain names into IP addresses. If you selected the **Assign DNS Manually** checkbox, enter the DNS servers that you want to use in these fields.
Private LAN IP Setting	
IP Address	Use this field to define the IP address of the CGN2 on the LAN.
Subnet Mask	Use this field to define the LAN subnet. Use dotted decimal notation (for example, **255.255.255.0**).
Domain Suffix	Use this field to define the domain that you can enter into a Web browser (instead of an IP address) to reach the CGN2 on the LAN. It is suggested that you make a note of your device's **Domain Suffix** in case you ever need to access the CGN2's GUI without knowledge of its IP address.
Private LAN DHCP Setting	
Enable LAN DHCP	Select this if you want the CGN2 to provide IP addresses to network devices on the LAN automatically. Deselect this if you already have a DHCP server on your LAN, or if you wish to assign IP addresses to your computers and other network devices manually.
Lease Time	Use this field to define the time after which the CGN2 renews the IP addresses of all the network devices connected to the CGN2 on the LAN (when DHCP is enabled).
DHCP Start IP	Use this field to specify the IP address at which the CGN2 begins assigning IP addresses to devices on the LAN (when DHCP is enabled).

Table 12: The WAN/LAN > IP Screen (continued)

DHCP End IP	Use this field to specify the IP address at which the CGN2 stops assigning IP addresses to devices on the LAN (when DHCP is enabled). NOTE: Devices requesting IP addresses once the DHCP pool is exhausted are not assigned an IP address.
Connected Computers	
Host Name	This displays the name of each network device connected on the LAN.
IP Address	This displays the IP address of each network device connected on the LAN.
MAC Address	This displays the Media Access Control (MAC) address of each network device connected on the LAN.
Type	This displays whether the device's IP address was assigned by DHCP (**DHCP-IP**), or **self-assigned**.
Interface	This displays whether the device is connected on the LAN (**Ethernet**) or the WLAN (**Wireless(x)**, where **x** denotes the wireless mode; **b**, **g** or **n**).
Apply	Click this to save your changes to the fields in this screen.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

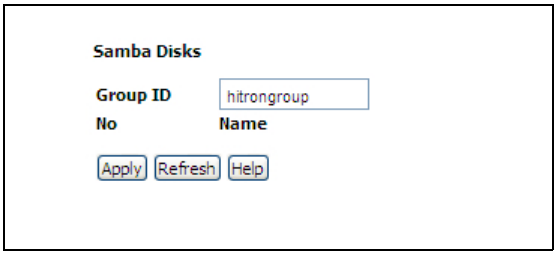
3.3 THE SHARED MEDIA SCREEN

Use this screen to manage and share data stored on devices connected to the CGN2's **USB** port. The CGN2 provides one USB 2.0 host port, allowing you to plug in a USB flash disk for mounting and sharing through the LAN interfaces via the Samba protocol (network neighborhood).

NOTE: This screen is not available unless a logged-in MSO admin user previously enabled the **USB** option in the **Status** > **Capability** screen; see The Capability Screen on page 42 for more information.

Click **WAN/LAN** > **Shared Media**. The following screen displays.

Figure 13: The WAN/LAN > Shared Media Screen



The following table describes the labels in this screen.

Table 13: The WAN/LAN > Shared Media Screen

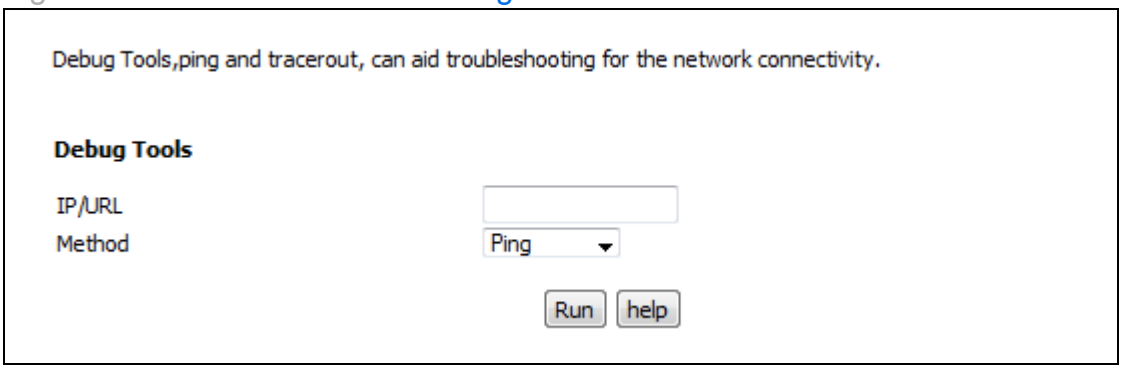
Group ID	Specify the name of the Network Neighborhood workgroup whose users may access the shared media on the USB device.
No.	This field displays the index number of the connected USB device. When no USB device is connected, no number displays in this column.
Name	This field displays the identifying name of the connected USB device. ▸ When no USB device is connected, no name displays in this column. ▸ When a USB device is connected, click its **Name** to view the files on the device. These files are shared with the relevant user group (defined in the **Group ID** field).
Apply	Click this to save your changes to the fields in this screen.
Refresh	Click this to reload the information in this screen. Do this if you connect or disconnect a device from the **USB** port and the information in this screen does not update automatically.
Help	Click this to see information about the fields in this screen.

3.4 THE DEBUG SCREEN

Use this screen to perform ping and traceroute tests on IP addresses or URLs.

Click **WAN/LAN** > **Debug**. The following screen displays.

Figure 14: The WAN/LAN > Debug Screen



The following table describes the labels in this screen.

Table 14: The WAN/LAN > Debug Screen

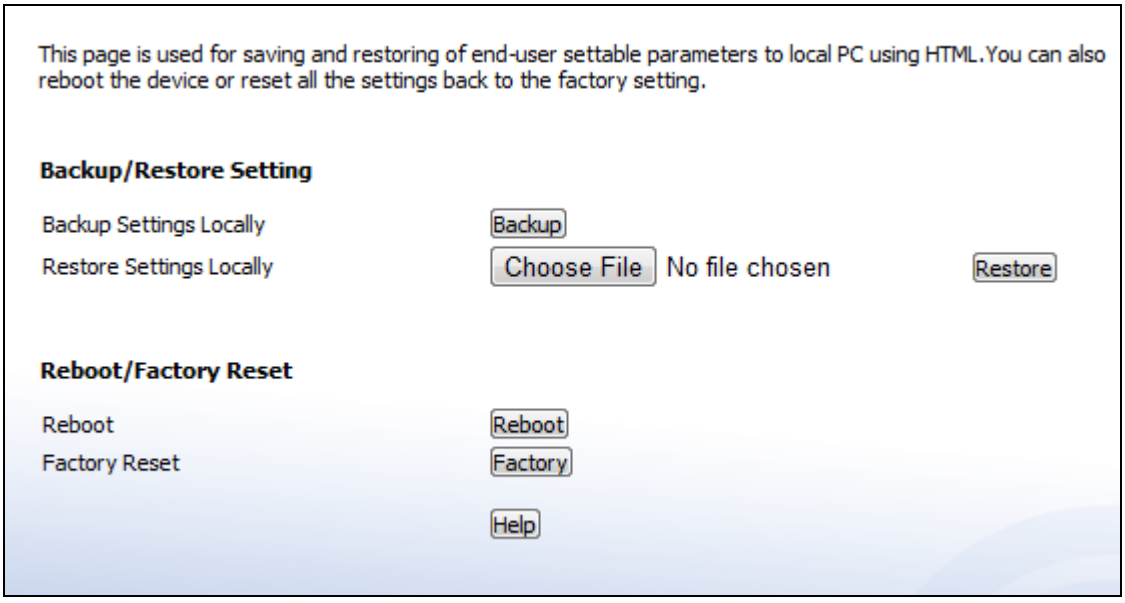
IP/URL	Enter the IP address or URL that you want to test.
Method	Select the type of test that you want to run on the **IP/URL** that you specified.
Run	Click this to perform the test.
Help	Click this to see information about the fields in this screen.

3.5 THE BACKUP SCREEN

Use this screen to back up your CGN2's settings to your computer, to load settings from a backup you created earlier, to reboot your CGN2, or to return it to its factory default settings.

Click **WAN/LAN** > **Backup**. The following screen displays.

Figure 15: The WAN/LAN > Backup Screen



The following table describes the labels in this screen.

Table 15: The LAN > Backup Screen

Backup/Restore Setting	
Backup Settings Locally	Click this to create a backup of all your CGN2's settings on your computer.
Restore Settings Locally	Use these fields to return your CGN2's settings to those specified in a backup that you created earlier. Click **Choose File** to select a backup, then click **Restore** to return your CGN2's settings to those specified in the backup.
Reboot/Factory Reset	
Reboot	Click **Reboot** to restart your CGN2.
Factory Reset	Click **Factory** to return your CGN2 to its factory default settings. NOTE: When you do this, all your user-configured settings are lost, and cannot be retrieved.
Help	Click this to see information about the fields in this screen.

4 FIREWALL

This chapter describes the screens that display when you click **Firewall** in the toolbar. It contains the following sections:

4.1 FIREWALL OVERVIEW

This section describes some of the concepts related to the **Firewall** screens.

4.1.1 FIREWALL

The term “firewall” comes from a construction technique designed to prevent the spread of fire from one room to another. Similarly, your CGN2’s firewall prevents intrusion attempts and other undesirable activity originating from the WAN, keeping the computers on your LAN safe. You can also use filtering techniques to specify the computers and other devices you want to allow on the LAN, and prevent certain traffic from going from the LAN to the WAN.

4.1.2 INTRUSION DETECTION SYSTEM

An intrusion detection system monitors network activity, looking for policy violations, and malicious or suspicious activity. The CGN2's intrusion detection system logs all such activity to the **Firewall** > **Local Logs** screen.

4.1.3 PING

The CGN2 allows you to use the ping utility on the LAN (in the **WAN/LAN** > **Debug** screen) and also on the WAN (in the **Firewall** > **Firewall Options** screen). For more information, see Debugging (Ping and Traceroute) on page 46.

4.1.4 MAC FILTERING

Every networking device has a unique Media Access Control (MAC) address that identifies it on the network. When you enable MAC address filtering on the CGN2's firewall, you can set up a list of MAC addresses, and then specify whether you want to:

- Deny the devices on the list access to the CGN2 and the network (in which case all other devices can access the network)

or

- Allow the devices on the list to access the network (in which case no other devices can access the network)

4.1.5 IP FILTERING

IP filtering allows you to prevent computers on the LAN from sending certain types of data to the WAN. You can use this to prevent unwanted outgoing communications. Specify the IP address of the computer on the LAN from which you want to prevent communications, and specify the port range of the communications you want to prevent. The CGN2 discards outgoing data packets that match the criteria you specified.

4.1.6 PORT FORWARDING

Port forwarding allows a computer on your LAN to receive specific communications from the WAN. Typically, this is used to allow certain applications (such as gaming) through the firewall, for a specific computer on the LAN. Port forwarding is also commonly used for running a public HTTP server from a private network.

You can set up a port forwarding rule for each application for which you want to open ports in the firewall. When the CGN2 receives incoming traffic from the WAN with a destination port that matches a port forwarding rule, it forwards the traffic to the LAN IP address and port number specified in the port forwarding rule.

NOTE: For information on the ports you need to open for a particular application, consult that application's documentation.

4.1.7 PORT TRIGGERING

Port triggering is a means of automating port forwarding. The CGN2 scans outgoing traffic (from the LAN to the WAN) to see if any of the traffic's destination ports match those specified in the port triggering rules you configure. If any of the ports match, the CGN2 automatically opens the incoming ports specified in the rule, in anticipation of incoming traffic.

4.1.8 DMZ

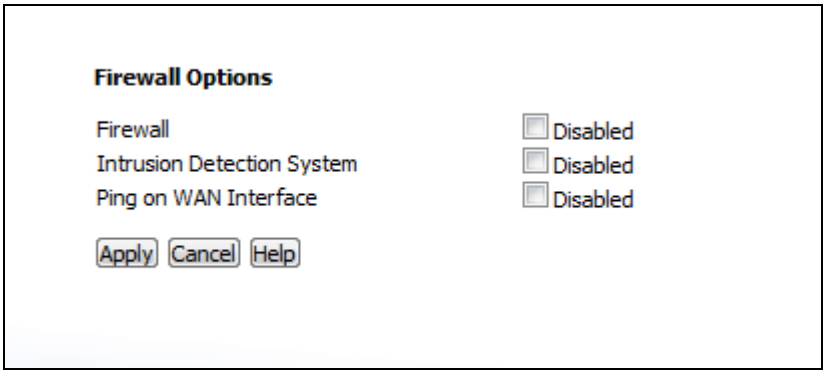
In networking, the De-Militarized Zone (DMZ) is a part of your LAN that has been isolated from the rest of the LAN, and opened up to the WAN. The term comes from the military designation for a piece of territory, usually located between two opposing forces, that is isolated from both and occupied by neither.

4.2 THE FIREWALL OPTIONS SCREEN

Use this screen to turn firewall features on or off. You can enable or disable the CGN2's intrusion detection system, and allow or prevent responses to ICMP requests from the WAN.

Click **Firewall** > **Firewall Options**. The following screen displays.

Figure 16: The Firewall > Firewall Options Screen



The following table describes the labels in this screen.

Table 16: The Firewall > Firewall Options Screen

Firewall	▸ Select this to turn the firewall on. ▸ Deselect this to turn the firewall off. NOTE: It is strongly recommended that you enable the CGN2's firewall unless LAN protection is provided by another device or software.
Intrusion Detection System	▸ Select this to turn the intrusion detection system off. ▸ Deselect this to turn the intrusion detection system on.
Ping on WAN Interface	▸ Select this to prevent responses to ICMP requests originating from the WAN. ▸ Select this to allow responses to ICMP requests originating from the WAN.
Apply	Click this to save your changes to the fields in this screen.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

4.3 THE FILTER SETTING SCREEN

Use this screen to configure Media Access Control (MAC) address filtering on the LAN, and to configure IP filtering.

NOTE: To configure MAC address filtering on the wireless network, see The Access Control Screen on page 93.

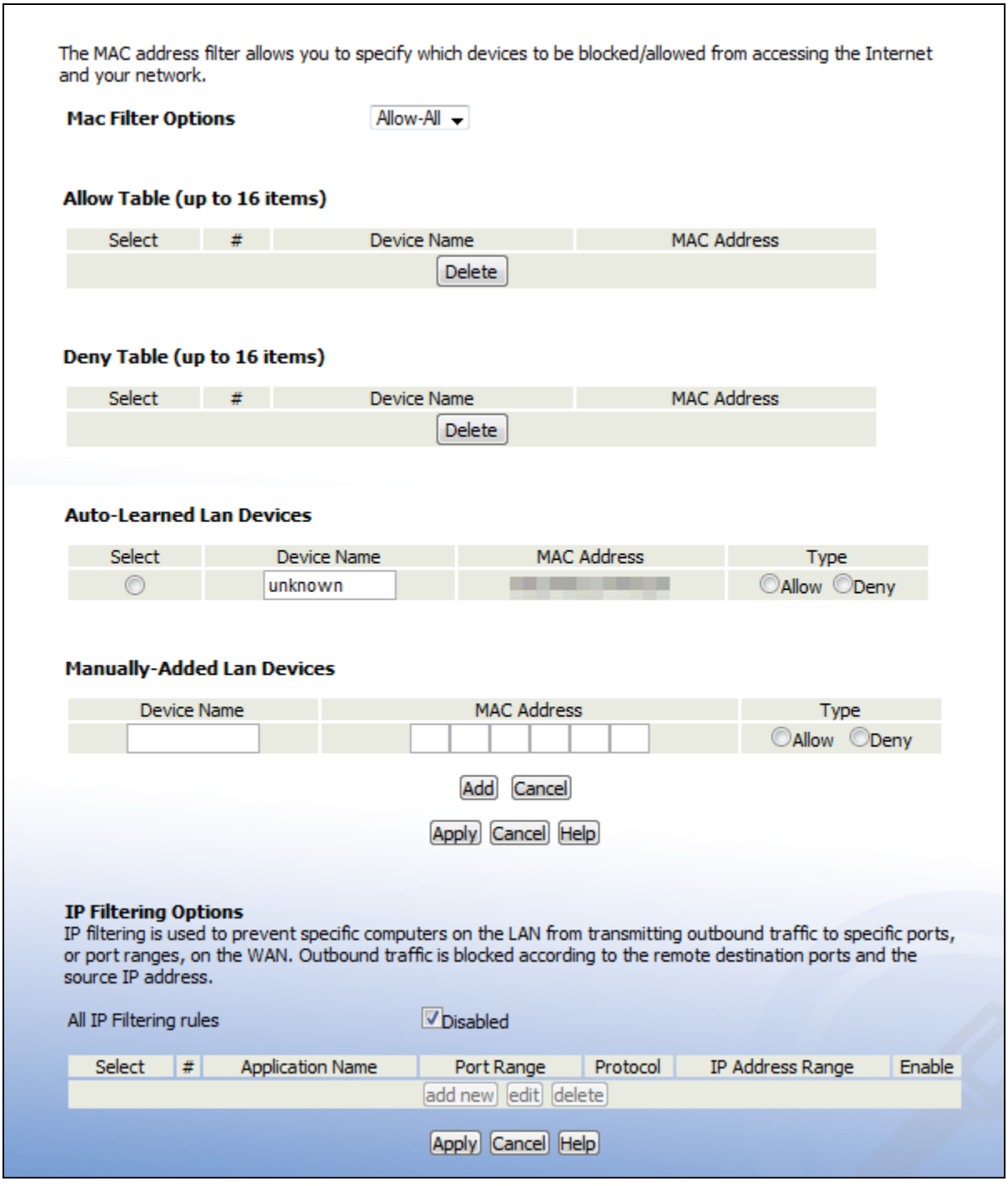
You can set the CGN2 to allow only certain devices to access the CGN2 and the network, or to deny certain devices access.

NOTE: To see a list of all the computers connected to the CGN2 on the LAN, click the **Connected Computers** button in the **Firewall** > **IP Filtering**, **Forwarding**, **Port Triggering** or **Firewall Options** screens.

You can turn IP filtering on or off, and configure new and existing IP filtering rules.

Click **Firewall** > **Filter Setting**. The following screen displays.

Figure 17: The Firewall > Filter Setting Screen



The following table describes the labels in this screen.

Table 17: The Firewall > Filter Setting Screen

MAC Filter Options	
MAC Filter Options	Use this field to control whether the CGN2 performs MAC filtering. • Select **Allow-All** to turn MAC filtering off. All devices may access the CGN2 and the network. • Select **Allow** to permit only devices with the MAC addresses you set up in the **Allow Table** to access the CGN2 and the network. All other devices are denied access. • Select **Deny** to permit all devices except those with the MAC addresses you set up in the **Deny Table** to access the CGN2 and the network. The specified devices are denied access.
Allow Table (up to 16 Items)	
#	This displays the index number assigned to the permitted device.
Device Name	This displays the name you gave to the permitted device.
MAC Address	This displays the MAC address of the permitted device.
Delete	Select a permitted device's radio button ( ) and click this to remove the device from the list. The device may no longer access the CGN2 and the network. NOTE: Make sure you do not delete your management computer from the list; if you do so, you will need to log back in from another computer, or reset the CGN2.
Deny Table (up to 16 Items)	
#	This displays the index number assigned to the denied device.
Device Name	This displays the name you gave to the denied device.
MAC Address	This displays the MAC address of the denied device.
Delete	Select a denied device's radio button ( ) and click this to remove the device from the list. The device may now access the CGN2 and the network.
Auto-Learned LAN Devices	

Table 17: The Firewall > Filter Setting Screen (continued)

Device Name	This displays the name of each network device that has connected to the CGN2 on the LAN. To change the name assigned to a device, edit it in the relevant field.
MAC Address	This displays the MAC address of each network device that has connected to the CGN2 on the LAN.
Type	Use this field to specify the list to which you want to add the device. ▸ Select **Allow** to add the device to the **Allow Table**. ▸ Select **Deny** to add the device to the **Deny Table**.
Manually-Added LAN Devices	
Device Name	Enter the name to associate with a network device that you want to permit or deny access to the CGN2 and the network. NOTE: This name is arbitrary, and does not affect functionality in any way.
MAC Address	Specify the MAC address of the network device that you want to permit or deny access to the CGN2 and the network.
Type	Use this field to specify the list to which you want to add the device. ▸ Select **Allow** to add the device to the **Allow Table**. ▸ Select **Deny** to add the device to the **Deny Table**.
Add	Click this to add the device to the list you specified.
Cancel	Click this to clear the **Manually-Added LAN Devices** fields.
Apply	Click this to save your changes to the fields in the **Mac Filter** tables.
Cancel	Click this to return the fields in the **Mac Filter** tables to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.
IP Filtering Options	

Table 17: The Firewall > Filter Setting Screen (continued)

All IP Filtering Rules	Use this to turn IP filtering on or off. • Deselect the checkbox to enable IP filtering. • Select the checkbox to disable IP filtering (default). NOTE: You can add, edit or delete IP filtering rules only when this checkbox is deselected.
Select	Select an IP filtering rule's radio button ( ) before clicking **Edit** or **Delete**.
#	This displays the arbitrary identification number assigned to the IP filtering rule.
Application Name	This displays the arbitrary name you assigned to the rule when you create it.
Port Range	This displays the start and end values of the ports to which communications from the specified IP addresses is not permitted.
Protocol	This displays the type of communications that are not permitted: • **TCP** displays if communications via the Transmission Control Protocol are not permitted. • **UDP** displays if communications via the User Datagram Protocol are not permitted. • **TCP/UDP** displays if communications via the Transmission Control Protocol and the User Datagram Protocol are not permitted.
IP Address Range	This displays the start and end IP address from which communications to the specified ports are not permitted.
Enable	Use this field to turn each IP filtering rule on or off. • Select this checkbox to enable the IP filtering rule. • Deselect this checkbox to disable the IP filtering rule.
Add New	Click this to define a new IP filtering rule. See Adding or Editing an IP Filtering Rule on page 63 for information on the screen that displays.
Edit	Select an IP filtering rule's radio button ( ) and click this to make changes to the rule. See Adding or Editing an IP Filtering Rule on page 63 for information on the screen that displays.

Table 17: The Firewall > Filter Setting Screen (continued)

Delete	Select an IP filtering rule's radio button ( ) and click this to remove the rule. The deleted rule's information cannot be retrieved.
Apply	Click this to save your changes to the fields in the **IP Filtering Options** section.
Cancel	Click this to return the fields in the **IP Filtering Options** section to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

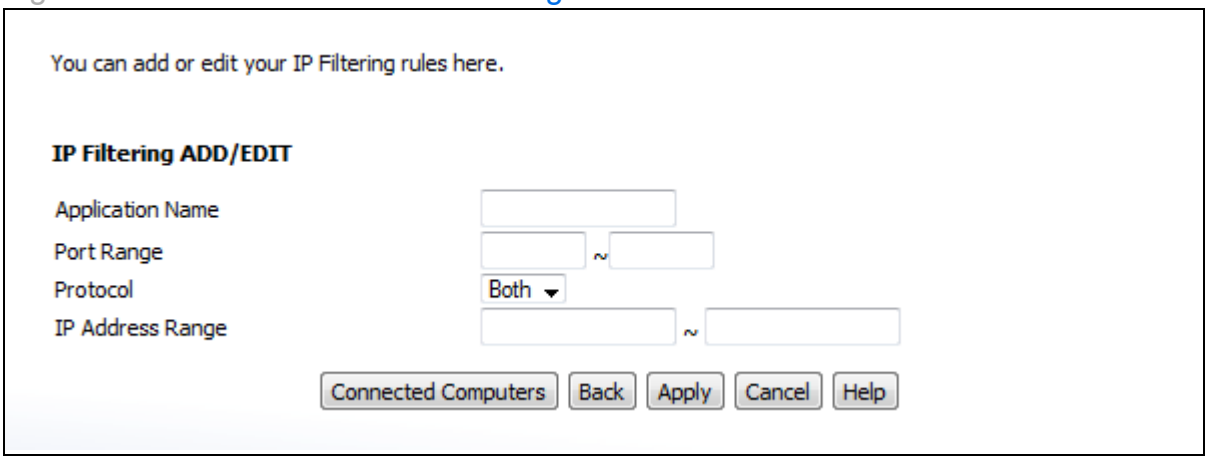
4.3.1 ADDING OR EDITING AN IP FILTERING RULE

- To add a new IP filtering rule, click **Add** in the **Firewall** > **Filter Setting** screen's **IP Filtering Options** section.
- To edit an existing IP filtering rule, select the rule's radio button ( ) in the **Firewall** > **Filter Setting** screen's **IP Filtering Options** section and click the **Edit** button.

NOTE: Ensure that the **Disabled** checkbox is deselected in order to add or edit IP filtering rules.

The following screen displays.

Figure 18: The Firewall > Filter Settings > Add/Edit Screen



The following table describes the labels in this screen.

Table 18: The Firewall > Filter Settings > Add/Edit Screen

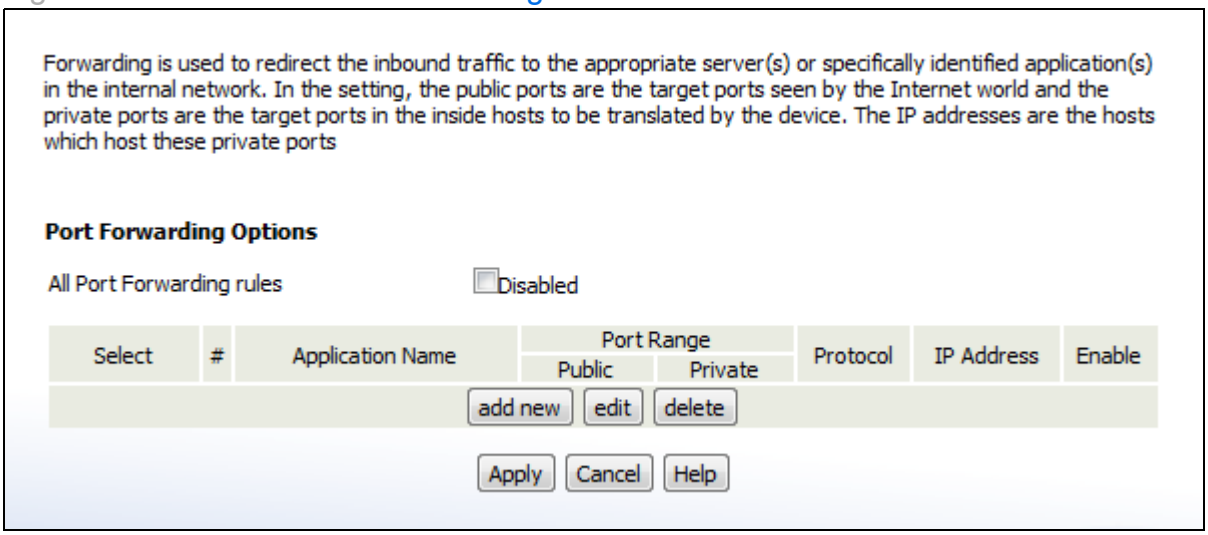
Application Name	Enter a name for the application that you want to block. NOTE: This name is arbitrary, and does not affect functionality in any way.
Port Range	Use these fields to specify the target port range to which communication should be blocked. Enter the start port number in the first field, and the end port number in the second field. To specify only a single port, enter its number in both fields.
Protocol	Use this field to specify whether the CGN2 should block communication via: ▸ Transmission Control Protocol (**TCP**) ▸ User Datagram Protocol (**UDP**) ▸ **Both** TCP and UDP. NOTE: If in doubt, leave this field at its default (**Both**).
IP Address Range	Use these fields to specify the range of local computers' IP addresses from which communications should be blocked. Enter the start IP address in the first field, and the end IP address in the second. To specify only a single IP address, enter it in both fields.
Connected Computers	Click this to see a list of the computers currently connected to the CGN2 on the LAN.
Back	Click this to return to the **Firewall** > **Filter Settings** screen without saving your changes to the IP filtering rule.
Apply	Click this to save your changes to the fields in this screen.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

4.4 THE FORWARDING SCREEN

Use this screen to configure port forwarding between computers on the WAN and computers on the LAN. You can turn port forwarding on or off and configure new and existing port forwarding rules.

Click **Firewall** > **Forwarding**. The following screen displays.

Figure 19: The Firewall > Forwarding Screen



The following table describes the labels in this screen.

Table 19: The Firewall > Forwarding Screen

All Port Forwarding Rules	Use this field to turn port forwarding on or off. ▸ Select the checkbox to enable port forwarding. ▸ Deselect the checkbox to disable port forwarding.
Select	Select a port forwarding rule's radio button ( ) before clicking **Edit** or **Delete**.
#	This displays the arbitrary identification number assigned to the port forwarding rule.
Application Name	This displays the arbitrary name you assigned to the rule when you created it.

Table 19: The Firewall > Forwarding Screen (continued)

Port Range	These fields display the ports to which the rule applies: • The **Public** field displays the incoming port range. These are the ports on which the CGN2 received traffic from the originating host on the WAN. • The **Private** field displays the port range to which the CGN2 forwards traffic to the device on the LAN.
Protocol	This field displays the protocol or protocols to which this rule applies: • Transmission Control Protocol (**TCP**) • User Datagram Protocol (**UDP**) • Transmission Control Protocol and User Datagram Protocol (**TCP/UDP**) • Generic Routing Encapsulation (**GRE**) • Encapsulating Security Protocol (**ESP**)
IP Address	This displays the IP address of the computer on the LAN to which traffic conforming to the **Public Port Range** and **Protocol** conditions is forwarded.
Enable	Use this field to turn each port forwarding rule on or off. • Select this checkbox to enable the port forwarding rule. • Deselect this checkbox to disable the port forwarding rule.
Add New	Click this to define a new port forwarding rule. See Adding or Editing a Port Forwarding Rule on page 67 for information on the screen that displays.
Edit	Select a port forwarding rule's radio button ( ) and click this to make changes to the rule. See Adding or Editing a Port Forwarding Rule on page 67 for information on the screen that displays.
Delete	Select a port forwarding rule's radio button ( ) and click this to remove the rule. The deleted rule's information cannot be retrieved.
Apply	Click this to save your changes to the fields in this screen.

Table 19: The Firewall > Forwarding Screen (continued)

Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

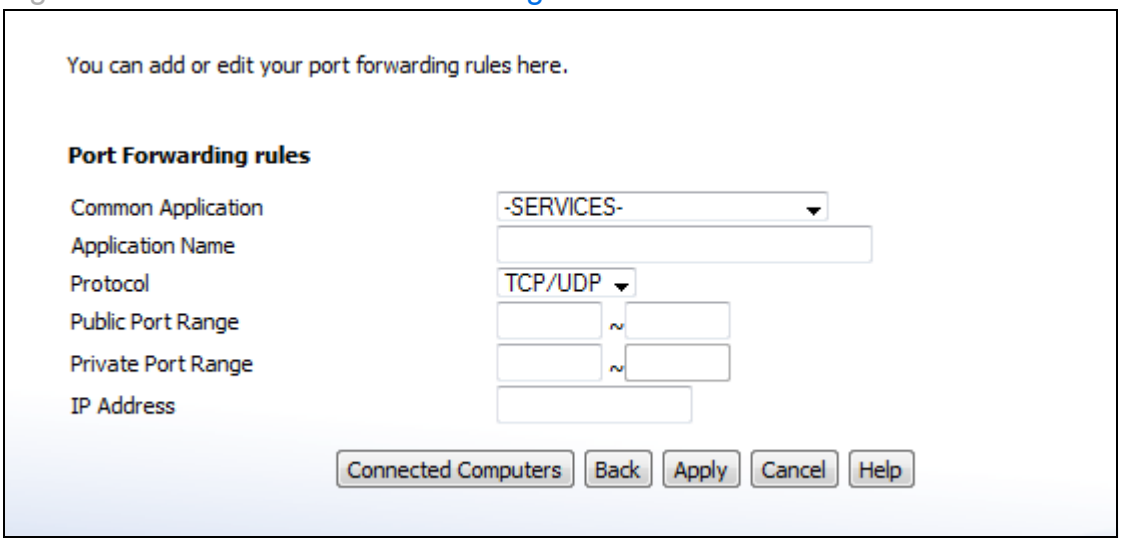
4.4.1 ADDING OR EDITING A PORT FORWARDING RULE

- To add a new port forwarding rule, click **Add** in the **Firewall** > **Forwarding** screen.
- To edit an existing port forwarding rule, select the rule's radio button ( ) in the **Firewall** > **Forwarding** screen and click the **Edit** button.

NOTE: Ensure that the **Disabled** checkbox is disabled in order to add or edit port forwarding rules.

The following screen displays.

Figure 20: The Firewall > Forwarding > Add/Edit Screen



The following table describes the labels in this screen.

Table 20: The Firewall > Forwarding > Add/Edit Screen

Application Name	Enter a name for the application for which you want to create the rule. NOTE: This name is arbitrary, and does not affect functionality in any way.
Public Port Range	Use these fields to specify the incoming port range. These are the ports on which the CGN2 received traffic from the originating host on the WAN. Enter the start port number in the first field, and the end port number in the second field. To specify only a single port, enter its number in both fields.
Private Port Range	Use these fields to specify the ports to which the received traffic should be forwarded. Enter the start port number in the first field. The number of ports must match that specified in the **Public Port Range**, so the CGN2 completes the second field automatically.
Protocol	Use this field to specify whether the CGN2 should forward traffic via: ▲ Transmission Control Protocol (**TCP**) ▲ User Datagram Protocol (**UDP**) ▲ Transmission Control Protocol and User Datagram Protocol (**TCP/UDP**) ▲ Generic Routing Encapsulation (**GRE**) ▲ Encapsulating Security Protocol (**ESP**) NOTE: If in doubt, leave this field at its default (**TCP/UDP**).
IP Address	Use this field to enter the IP address of the computer on the LAN to which you want to forward the traffic.
Connected Computers	Click this to see a list of the computers currently connected to the CGN2 on the LAN.
Back	Click this to return to the **Firewall** > **Forwarding** screen without saving your changes to the port forwarding rule.

Table 20: The Firewall > Forwarding > Add/Edit Screen

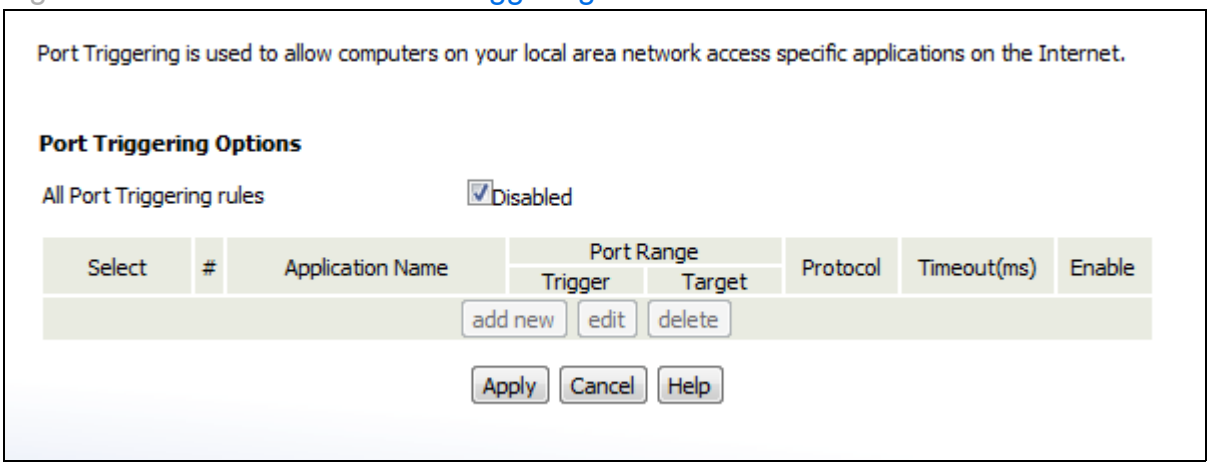
Apply	Click this to save your changes to the fields in this screen.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

4.5 THE PORT TRIGGERING SCREEN

Use this screen to configure port triggering. You can turn port triggering on or off and configure new and existing port triggering rules.

Click **Firewall** > **Port Triggering**. The following screen displays.

Figure 21: The Firewall > Port Triggering Screen



The following table describes the labels in this screen.

Table 21: The Firewall > Port Triggering Screen

All Port Triggering Rules	Use this field to turn port triggering on or off. ▸ Select the checkbox to enable port triggering. ▸ Deselect the checkbox to disable port triggering.
Select	Select a port triggering rule's radio button ( ) before clicking **Edit** or **Delete**.
#	This displays the arbitrary identification number assigned to the port triggering rule.

Table 21: The Firewall > Port Triggering Screen

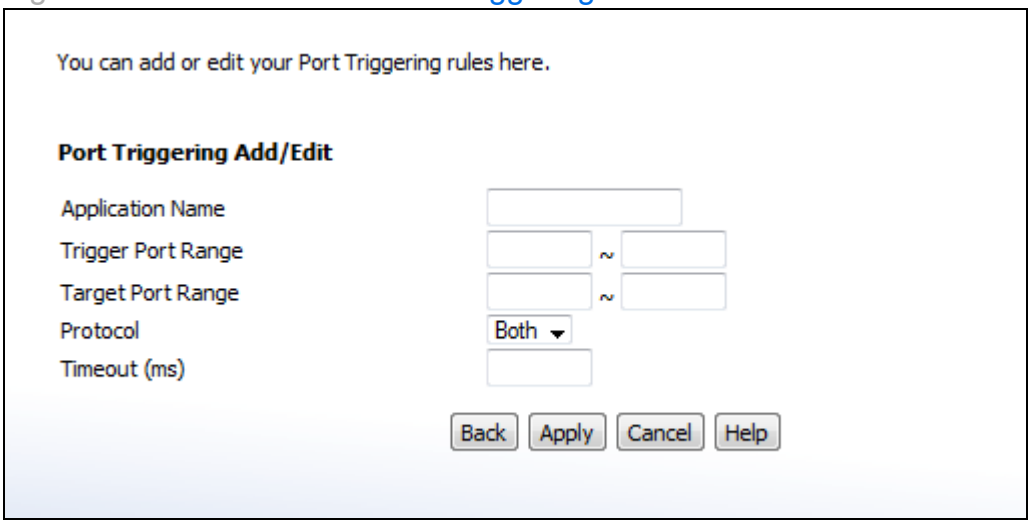
Application Name	This displays the arbitrary name you assigned to the rule when you created it.
Port Range	These fields display the ports to which the rule applies: • The **Trigger** field displays the range of outgoing ports. When the CGN2 detects activity (outgoing traffic) on these ports from computers on the LAN, it automatically opens the **Target** ports. • The **Target** field displays the range of triggered ports. These ports are opened automatically when the CGN2 detects activity on the **Trigger** ports from computers on the LAN.
Protocol	This displays the protocol of the port triggering rule.
Timeout (ms)	This displays the time (in milliseconds) after the CGN2 opens the **Target** ports that it should close them.
Enable	Use this field to turn each port triggering rule on or off. • Select this checkbox to enable the port triggering rule. • Deselect this checkbox to disable the port triggering rule.
Add New	Click this to define a new port triggering rule. See Adding or Editing a Port Triggering Rule on page 71 for information on the screen that displays.
Edit	Select a port triggering rule's radio button ( ) and click this to make changes to the rule. See Adding or Editing a Port Triggering Rule on page 71 for information on the screen that displays.
Delete	Select a port triggering rule's radio button ( ) and click this to remove the rule. The deleted rule's information cannot be retrieved.
Apply	Click this to save your changes to the fields in this screen.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

4.5.1 ADDING OR EDITING A PORT TRIGGERING RULE

- To add a new port triggering rule, click **Add** in the **Firewall** > **Port Triggering** screen.
- To edit an existing port triggering rule, select the rule's radio button ( ) in the **Firewall** > **Port Triggering** screen and click the **Edit** button.

The following screen displays.

Figure 22: The Firewall > Port Triggering > Add/Edit Screen



The following table describes the labels in this screen.

Table 22: The Firewall > Port Triggering > Add/Edit Screen

Application Name	Enter a name for the application for which you want to create the rule. NOTE: This name is arbitrary, and does not affect functionality in any way.
Trigger Port Range	Use these fields to specify the trigger ports. When the CGN2 detects activity on any of these ports originating from a computer on the LAN, it automatically opens the **Target** ports in expectation of incoming traffic. Enter the start port number in the first field, and the end port number in the second field. To specify only a single port, enter its number in both fields.

Table 22: The Firewall > Port Triggering > Add/Edit Screen

Target Port Range	Use these fields to specify the target ports. The CGN2 opens these ports in expectation of incoming traffic whenever it detects activity on any of the **Trigger** ports. The incoming traffic is forwarded to these ports on the computer connected to the LAN. Enter the start port number in the first field, and the end port number in the second field. To specify only a single port, enter its number in both fields.
Protocol	Use this field to specify whether the CGN2 should activate this trigger when it detects activity via: ▸ Transmission Control Protocol (**TCP**) ▸ User Datagram Protocol (**UDP**) ▸ Transmission Control Protocol and User Datagram Protocol (**Both**) NOTE: If in doubt, leave this field at its default (**Both**).
Timeout (ms)	Enter the time (in milliseconds) after the CGN2 opens the **Target** ports that it should close them.
Connected Computers	Click this to see a list of the computers currently connected to the CGN2 on the LAN.
Back	Click this to return to the **Firewall** > **Forwarding** screen without saving your changes to the port forwarding rule.
Apply	Click this to save your changes to the fields in this screen.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

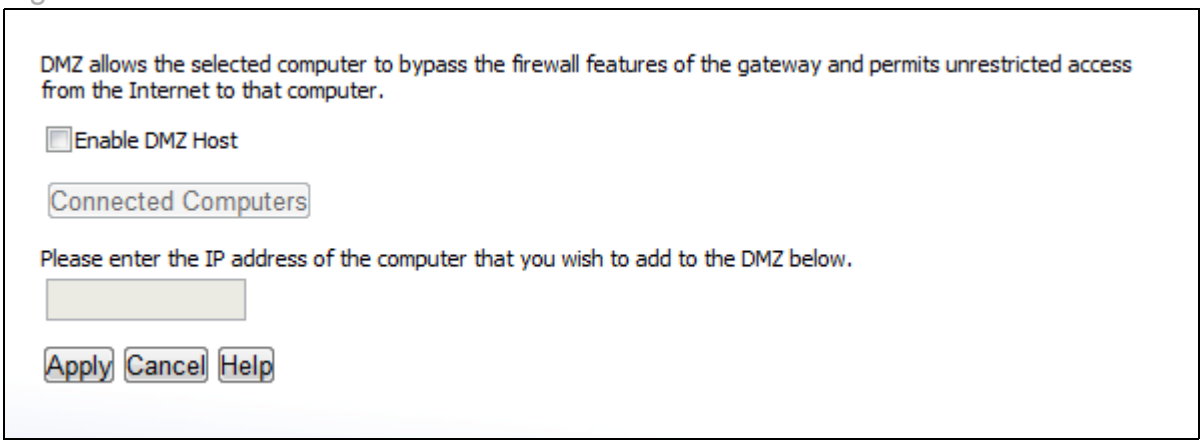
4.6 THE DMZ SCREEN

Use this screen to configure your network's Demilitarized Zone (DMZ).

NOTE: Only one device can be on the DMZ at a time.

Click **Firewall** > **DMZ**. The following screen displays.

Figure 23: The Firewall > DMZ Screen



The following table describes the labels in this screen.

Table 23: The Firewall > DMZ Screen

Enable DMZ Host	Use this field to turn the DMZ on or off. ▸ Select the checkbox to enable the DMZ. ▸ Deselect the checkbox to disable the DMZ. Computers that were previously in the DMZ are now on the LAN.
Connected Computers	Click this to see a list of the computers currently connected to the CGN2 on the LAN. To add a connected computer to the DMZ, click its **Add** button and click **Apply** in the screen that displays.
[...] IP Address [...]	Enter the IP address of the computer that you want to add to the DMZ.
Apply	Click this to save your changes to the fields in this screen.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

5 PARENTAL CONTROL

This chapter describes the screens that display when you click **Parent Control** in the toolbar. It contains the following sections:

5.1 PARENTAL CONTROL OVERVIEW

This section describes some of the concepts related to the **Parental Control** screens.

5.1.1 WEBSITE BLOCKING

The **Parental Control** screens allow you to block access from computers on the LAN to certain websites, or websites whose URLs (website addresses) contain the keywords you specify.

You can also specify “trusted” computers, which should be exempted from website blocking, and you can schedule website blocking so that it is only in effect at certain times (evenings and weekends, for example).

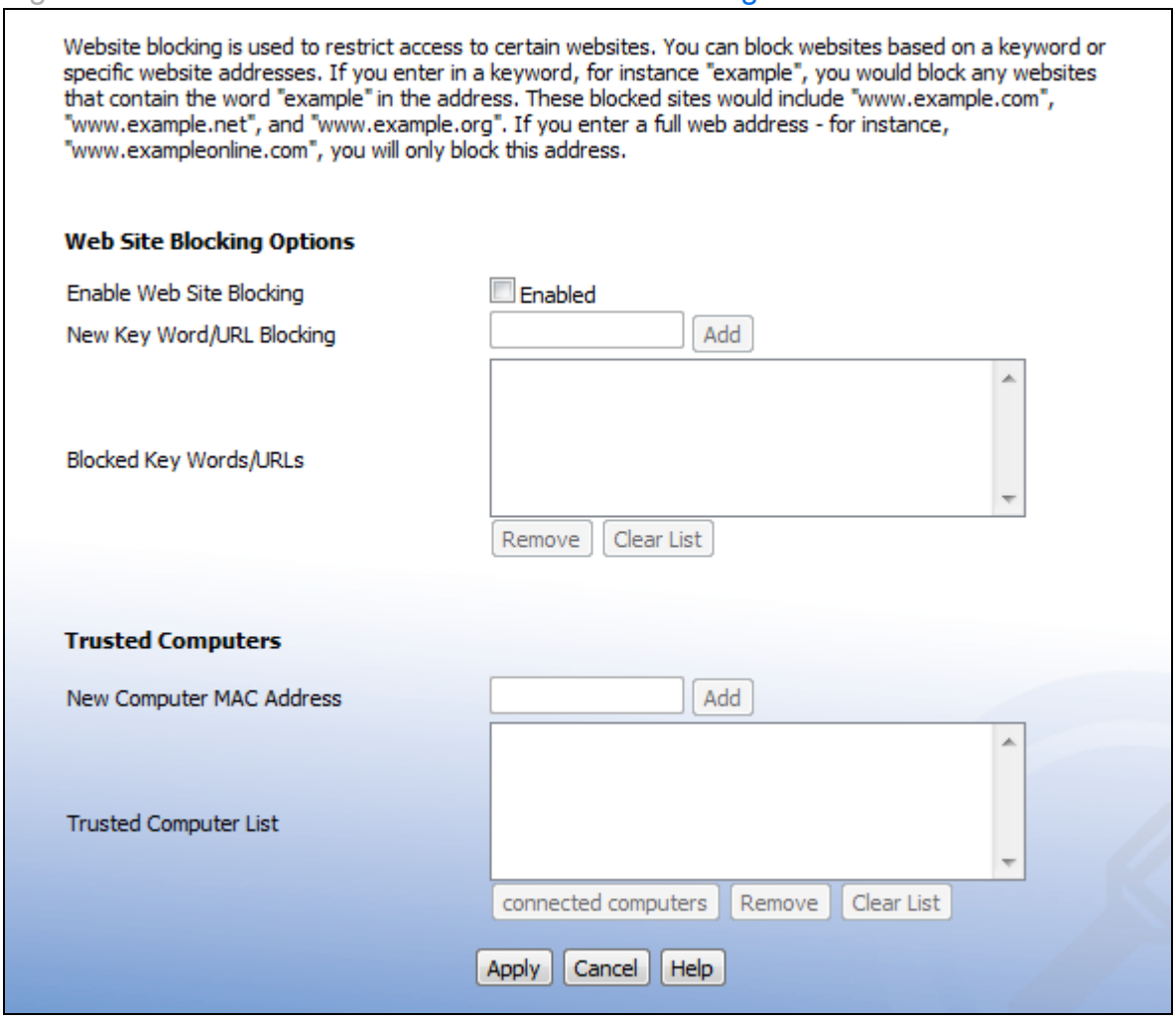
5.2 THE WEBSITE BLOCKING SCREEN

Use this screen to block access from the LAN to certain websites. You can also specify trusted computers, which are not subject to the blocking filter.

NOTE: To apply the blocking filter only at certain times, use the **Parental Control** > **Scheduling** screen.

Click **Parental Control** > **Web Site Blocking**. The following screen displays.

Figure 24: The Parental Control > Web Site Blocking Screen



The following table describes the labels in this screen.

Table 24: The Parental Control > Web Site Blocking Screen

Web Site Blocking Options	
Enable Web Site Blocking	Use this field to turn web site blocking on or off. • Select the checkbox to enable web site blocking. • Deselect the checkbox to disable web site blocking.
New Key Word/URL Blocking	Use these fields to configure the websites to which users on the LAN are denied access: • Enter a URL (for example, “www.example.com”) to block access to that website only. • Enter a keyword (for example, “example”) to block access to all websites that contain the keyword in their URL (for example, “www.example.com”, “www.example.org”, “www.someotherwebsite.com/example” and so forth). Click **Add** to add the URL or keyword to the **Blocked Key Words/URLs** list.
Blocked Key Words/ URLs	This displays the list of websites and keywords to which users on the LAN are denied access. • Select a URL or keyword and click **Remove** to delete it from the list. • Click **Clear List** to delete all the URLs and keywords from the list.
Trusted Computers	
New Computer MAC Address	Enter a computer’s Media Access Control (MAC) address and click **Add** to include it in the trusted computer list.
Trusted Computer List	This displays a list of the computers which are exempt from the website blocking filter, identified by their MAC addresses.
Connected Computers	Click this to see a list of the computers that are currently connected to the CGN2. To add a computer to the **New Computer MAC Address** field, select its **Add** checkbox and click **Apply** in the screen that displays.
Remove	Select a computer’s MAC address from the **Connected Computers** list and click this to delete it from the list.

Table 24: The Parental Control > Web Site Blocking Screen (continued)

Clear List	Click this to delete all the computers' MAC addresses from the list.
Apply	Click this to save your changes to the fields in this screen.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

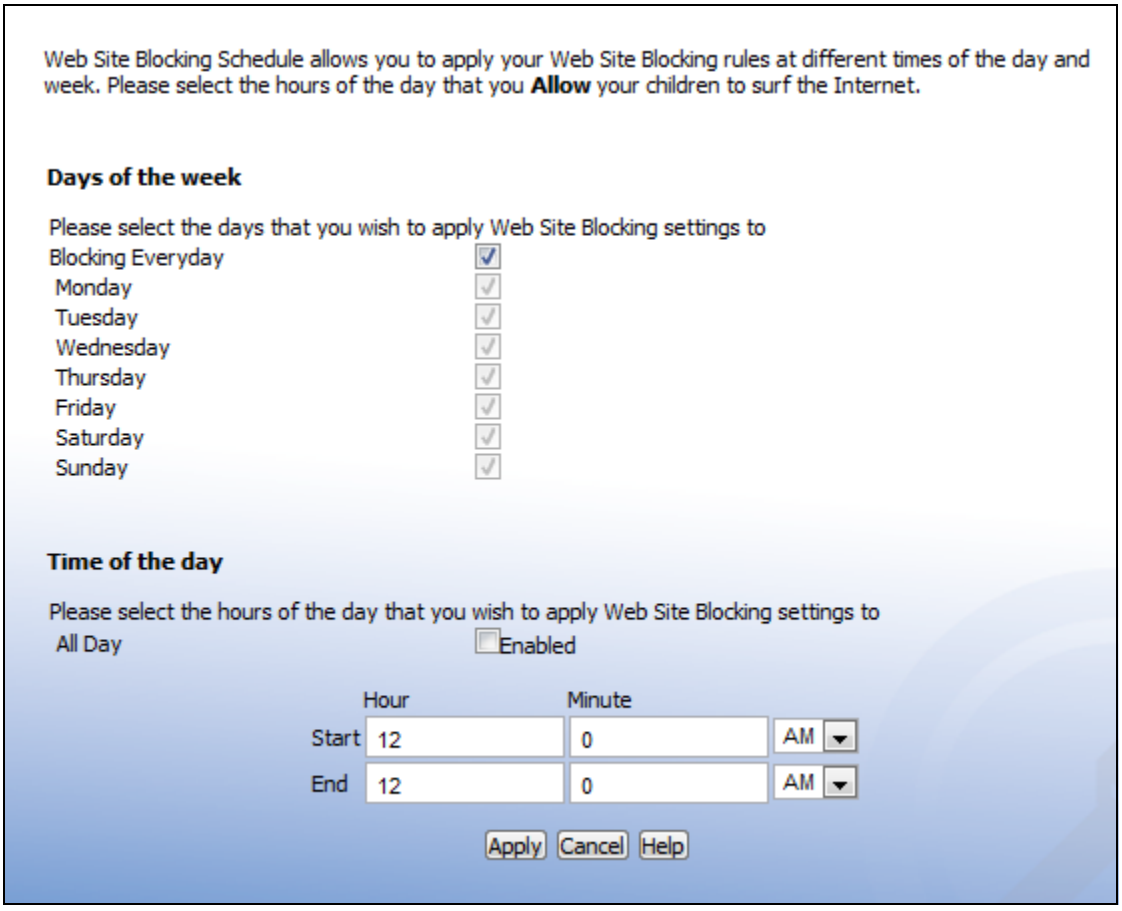
5.3 THE SCHEDULING SCREEN

Use this screen to control when the website blocking filter should be in effect.

NOTE: To configure the website blocking filter, use the **Parent Control** > **Web Site Blocking** screen.

Click **Parent Control** > **Scheduling**. The following screen displays.

Figure 25: The Parental Control > Scheduling Screen



The following table describes the labels in this screen.

Table 25: The Parental Control > Scheduling Screen

Days of the Week	Select the days of the week on which you want the website blocking filter to be in effect.
Time of Day	Use these fields to control the time that the website blocking filter should be in effect: • Select **All Day** to apply the website blocking filter at all times. • To apply the website blocking filter only at certain times of day, deselect **All Day**. Use the **Start** fields to define the time that the filter should come into effect, and use the **End** fields to define the time that the filter should cease being in effect.
Apply	Click this to save your changes to the fields in this screen.

Table 25: The Parental Control > Scheduling Screen (continued)

Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

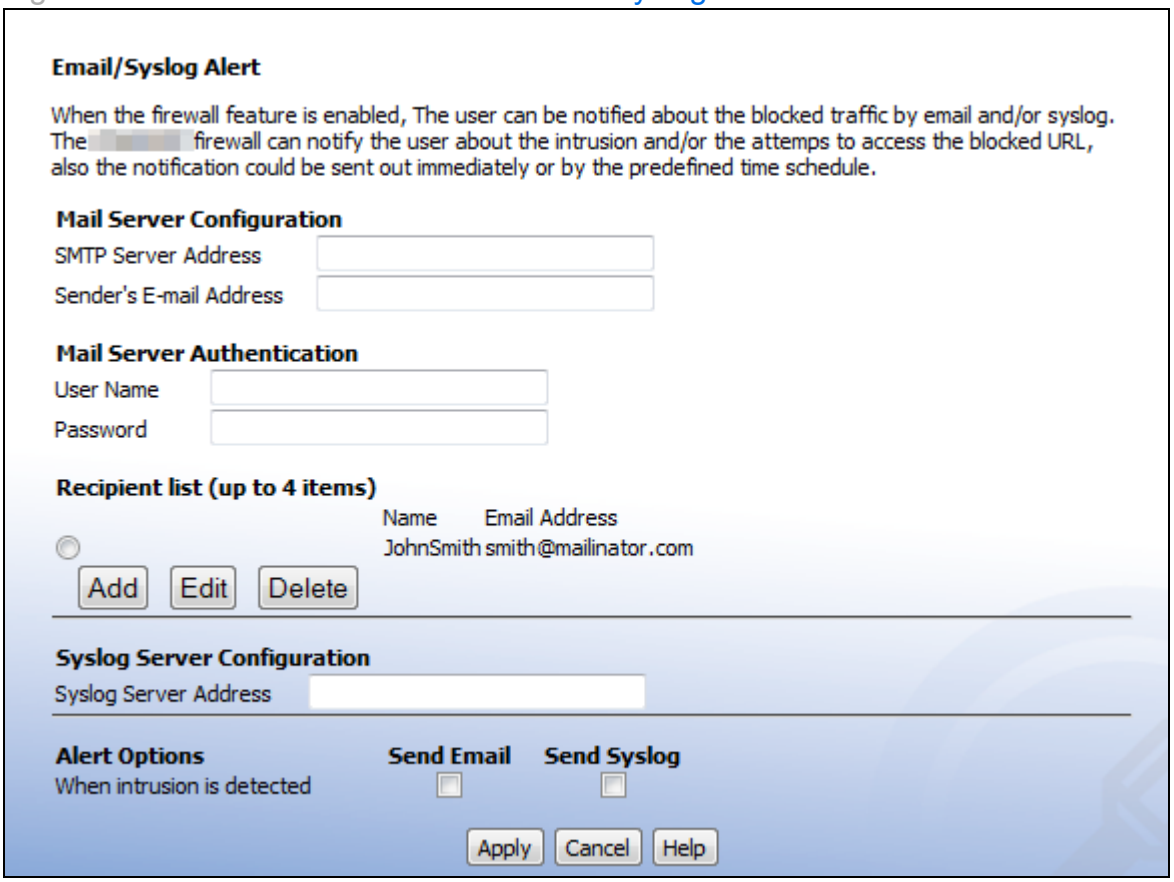
5.4 THE EMAIL / SYSLOG ALERT SCREEN

Use this screen to forward information to a target email address or system log each time the firewall alert is triggered, and to define the time at which emails should be sent and/or log entries created.

The firewall must be enabled for alerts to be triggered.

Click **Parent Control** > **Email/Syslog Alert**. The following screen displays.

Figure 26: The Parental Control > Email / Syslog Alert Screen



The following table describes the labels in this screen.

Table 26: The Parental Control > Email / Syslog Alert Screen

Mail Server Configuration	Use this section to define the location of the transmitting email server, and the email address from which admin emails appear to originate.
SMTP Server Address	Enter the address of the email server from which admin emails should be sent.
Sender's Email Address	Enter the email address from which admin emails should appear to originate.
Mail Server Authentication	Use this section to enter the user credentials for the defined email server.
User Name	Enter the user name for your account on the defined email server.
Password	Enter the password associated with the above user name.

Table 26: The Parental Control > Email / Syslog Alert Screen (continued)

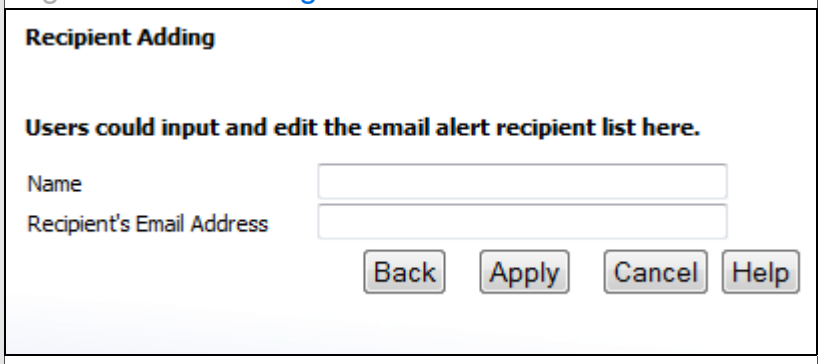
Recipient List (up to 4 items)	Use this section to define up to four target email address to which admin emails will be sent. • To enter a new target email address, click **Add**. Enter the target email address's **Name** and **Recipient's Address** in the fields that display, then click **Apply** to save your changes. Alternatively, click **Cancel** to return to the previous screen without saving your changes. Figure 27: Add Target Email Address  • To make changes to an existing target email address, select its radio button and click **Edit**. The screen that displays is the same as the **Add Target Email Address** screen. • To remove an email address, select its radio button and click **Delete**. The email address is removed from the list.
Syslog Server Configuration	Use this section to define the server on which the system log is stored.
Syslog Server Address	Enter the address of the server on which the system log is stored.
Alert Options	Use this section to define the actions to be taken when an intrusion event is detected.
When Intrusion is Detected	• Select **Send Email** to send an email to the list when an intrusion event is detected. • Select **Send Syslog** to send an entry to the system log when an intrusion event is detected.
Apply	Click this to save your changes to the fields in this screen.

Table 26: The Parental Control > Email / Syslog Alert Screen (continued)

Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

6 WIRELESS

This chapter describes the screens that display when you click **Wireless** in the toolbar. It contains the following sections:

6.1 WIRELESS OVERVIEW

This section describes some of the concepts related to the **Wireless** screens.

6.1.1 WIRELESS NETWORKING BASICS

Your CGN2's wireless network is part of the Local Area Network (LAN), known as the Wireless LAN (WLAN). The WLAN is a network of radio links between the CGN2 and the other computers and devices that connect to it.

6.1.2 ARCHITECTURE

The wireless network consists of two types of device: access points (APs) and clients.

- The access point controls the network, providing a wireless connection to each client.

- The wireless clients connect to the access point in order to receive a wireless connection to the WAN and the wired LAN.

The CGN2 is the access point, and the computers you connect to the CGN2 are the wireless clients.

6.1.3 WIRELESS STANDARDS

The way in which wireless devices communicate with one another is standardized by the Institute of Electrical and Electronics Engineers (IEEE). The IEEE standards pertaining to wireless LANs are identified by their 802.11 designation. There are a variety of WLAN standards, but the CGN2 supports the following (in order of adoption - old to new - and data transfer speeds - low to high):

- IEEE 802.11b
- IEEE 802.11g
- IEEE 802.11n

6.1.4 SERVICE SETS AND SSIDS

Each wireless network, including all the devices that comprise it, is known as a Service Set.

NOTE: Depending on its capabilities and configuration, a single wireless access point may control multiple Service Sets; this is often done to provide different service or security levels to different clients.

Each Service Set is identified by a Service Set IDentifier (SSID). This is the name of the network. Wireless clients must know the SSID in order to be able to connect to the AP. You can configure the CGN2 to broadcast the SSID (in which case, any client who scans the airwaves can discover the SSID), or to “hide” the SSID (in which case it is not broadcast, and only users who already know the SSID can connect).

6.1.5 WIRELESS SECURITY

Radio is inherently an insecure medium, since it can be intercepted by anybody in the coverage area with a radio receiver. Therefore, a variety of techniques exist to control authentication (identifying who should be allowed to join the network) and encryption (signal scrambling so that only authenticated users can decode the transmitted data). The sophistication of each security method varies, as does its effectiveness. The CGN2 supports the following wireless security protocols (in order of effectiveness):

- **WEP** (the Wired Equivalency Protocol): this protocol uses a series of "keys" or data strings to authenticate the wireless client with the AP, and to encrypt data sent over the wireless link. WEP is a deprecated protocol, and should only be used when it is the only security standard supported by the wireless clients. WEP provides only a nominal level of security, since widely-available software exists that can break it in a matter of minutes.
- **WPA-PSK** (WiFi Protected Access - Pre-Shared Key): WPA was created to solve the inadequacies of WEP. There are two types of WPA: the "enterprise" version (known simply as WPA) requires the use of a central authentication database server, whereas the "personal" version (supported by the CGN2) allows users to authenticate using a "pre-shared key" or password instead. While WPA provides good security, it is still vulnerable to "brute force" password-guessing attempts (in which an attacker simply barrages the AP with join requests using different passwords), so for optimal security it is advised that you use a random password of thirteen characters or more, containing no "dictionary" words.
- **WPA2-PSK**: WPA2 is an improvement on WPA. The primary difference is that WPA uses the Temporal Key Integrity Protocol (TKIP) encryption standard (which has been shown to have certain possible weaknesses), whereas WPA2 uses the stronger Advanced Encryption Standard (AES) in the Counter mode with Cipher block chaining Message authentication code Protocol (CCMP), which has received the US government's seal of approval for communications up to the Top Secret security level. Since WPA2-PSK uses the same pre-shared key mechanism as WPA-PSK, the same caveat against using insecure or simple passwords applies.

6.1.5.1 WPS

WiFi-Protected Setup (WPS) is a standardized method of allowing wireless devices to quickly and easily join wireless networks, while maintaining a good level of security. The CGN2 provides two methods of WPS authentication:

- **Push-Button Configuration (PBC)**: when the user presses the **PBC** button on the AP (either a physical button, or a virtual button in the GUI), any user of a wireless client that supports WPS can press the corresponding **PBC** button on the client within two minutes to join the network.
- **Personal Identification Number (PIN) Configuration**: all WPS-capable devices possess a PIN (usually to be found printed on a sticker on the device's housing). When you configure another device to use the same PIN, the two devices authenticate with one another.

Once authenticated, devices that have joined a network via WPS use the WPA2 security standard.

6.1.6 WMM

WiFi MultiMedia (WMM) is a Quality of Service (QoS) enhancement that allows prioritization of certain types of data over the wireless network. WMM provides four data type classifications (in priority order; highest to lowest):

- Voice
- Video
- Best effort
- Background

If you wish to improve the performance of voice and video (at the expense of other, less time-sensitive applications such as Internet browsing and FTP transfers), you can enable WMM. You can also edit the WMM QoS parameters, but are disadvised to do so unless you have an extremely good reason to make the changes.

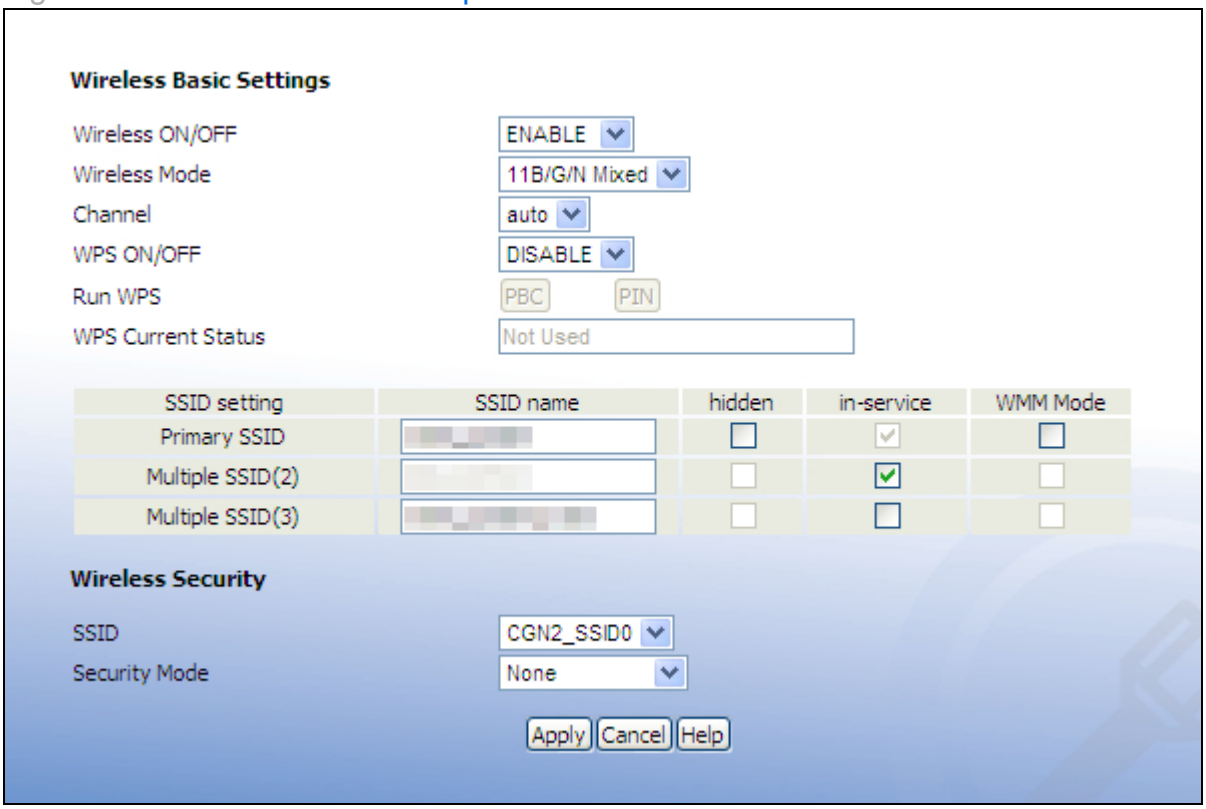
6.2 THE SETUP SCREEN

Use this screen to configure your CGN2's basic wireless settings. You can turn the wireless module on or off, select the wireless mode and channel, run WPS and configure the wireless network's SSID. You can also configure authentication and encryption on your wireless network.

NOTE: It is strongly recommended that you set up security on your network; otherwise, anyone in the radio coverage area can access your network.

Click **Wireless** > **Setup**. The following screen displays.

Figure 28: The Wireless > Setup Screen



The following table describes the labels in this screen.

Table 27: The Wireless > Setup Screen

Wireless Basic Settings	
Wireless ON/OFF	Use this field to turn the wireless network on or off. ▸ Select **ENABLE** to turn the wireless network on. ▸ Deselect **DISABLE** to turn the wireless network off.

Table 27: The Wireless > Setup Screen (continued)

Wireless Mode	Select the type of wireless network that you want to use: • **11B/G Mixed**: use IEEE 802.11b and 802.11n • **11B Only**: use IEEE 802.11b • **11G Only**: use IEEE 802.11g • **11N Only**: use IEEE 802.11n • **11G/N Mixed**: use IEEE 802.11g and 802.11N • **11B/G/N Mixed**: use IEEE 802.11b, 802.11g and 802.11N NOTE: Only wireless clients that support the network protocol you select can connect to the wireless network. If in doubt, use **11B/G/N** (default).
Channel	Select the wireless channel that you want to use, or select **Auto** to have the CGN2 select the optimum channel to use. NOTE: Use the **Auto** setting unless you have a specific reason to do otherwise.
WPS ON/OFF	Use this field to turn Wifi Protected Setup (WPS) on or off. • Select **ENABLE** to turn WPS on. • Deselect **DISABLE** to turn WPS off.

Table 27: The Wireless > Setup Screen (continued)

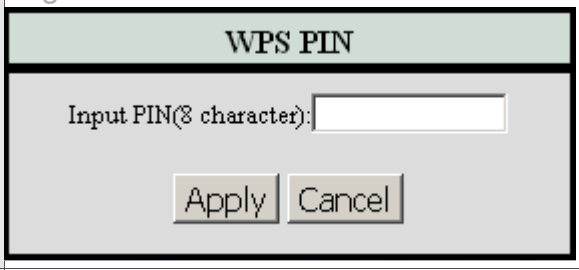
Run WPS	Use these buttons to run Wifi Protected Setup (WPS): • Click the **PBC** button to begin the Push-Button Configuration process. You must then press the PBC button on your client wireless devices within two minutes in order to register them on your wireless network. • Click the **PIN** button to begin the PIN configuration process. In the screen that displays, enter the WPS PIN that you want to use for the CGN2, or the WPS PIN of the client device you want to add to the network. Figure 29: WPS PIN 
WPS Current Status	This displays whether or not the CGN2 is using Wifi Protected Setup.
SSID Setting	This displays an entry for each of the CGN2's SSIDs. NOTE: You may have additional BSSIDs, depending on your contract with your service provider.
SSID Name	Enter the name that you want to use for your wireless network. This is the name that identifies your network, and to which wireless clients connect. NOTE: It is suggested that you change the SSID from its default, for security reasons.

Table 27: The Wireless > Setup Screen (continued)

Hidden	Use this field to make your network visible or invisible to other wireless devices. • Select the checkbox if you do not want the CGN2 to broadcast the network name (SSID) to all wireless devices in the coverage area. Anyone who wants to connect to the network must know the SSID. • Deselect the checkbox if you want your network name (SSID) to be public. Anyone with a wireless device in the coverage area can discover the SSID, and attempt to connect to the network.
In Service	This field controls whether or not the SSID is in operation. NOTE: This field is user-configurable for the **Primary SSID** only.
WMM Mode	Select the checkbox if you want to apply Wifi MultiMedia (WMM) Quality of Service (QoS) settings to this SSID.
Wireless Security	
SSID	Select the SSID for which you want to configure security.
Security Mode	Select the type of security that you want to use. • Select **None** to use no security. Anyone in the coverage area can enter your network. • Select **WEP** to use the Wired Equivalent Privacy security protocol. • Select **WPA-Personal** to use the WiFi Protected Access (Personal) security protocol. NOTE: Due to inherent security vulnerabilities, it is suggested that you use **WEP** only if it is the only security protocol your wireless clients support. Under almost all circumstances, you should use **WPA-Personal**.
WEP Settings NOTE: These fields are only configurable when you select **WEP** from the **Security Mode** list.	

Table 27: The Wireless > Setup Screen (continued)

WEP Key Length	Use this field to specify the length of the security key used to allow wireless devices to join the network. The longer the key, the more secure it is. ▸ Select **64-bit** to use a ten-digit security key. ▸ Select **128-bit** to use a twenty-six-digit security key.
WEP Key 1~4	Use these fields to define the security keys that all wireless devices on the network must use to join the network. The CGN2 supports up to four WEP keys, of which you can select one as the default. You should input the same four keys, in the same order, in your network's wireless clients. Your CGN2 and your wireless clients can use different default keys, as long as all four keys are present and in the same order. If your wireless client supports only a single WEP key, use the CGN2's default key. Enter the keys in hexadecimal format (using the digits **0~9** and the letters **A~F**).
Default WEP Key	Select the number of the security key that you want the CGN2 to use as its default authentication key for transmissions.
Authentication	Select the authentication mode that you want to use: ▸ Select **Open System** to allow wireless clients to authenticate (identify themselves) to the CGN2 before presenting their security credentials (WEP keys). ▸ Select **Shared Key** to use the WEP key in the authentication process. When a client wants to associate, the CGN2 sends an unencrypted challenge message. The client must use the WEP key to encrypt the challenge message and return it to the CGN2, which then decrypts the message and compares the result with its original message. **Open System** authentication is the more secure of the two authentication types, since while the **Shared Key** system appears more robust, it is possible to derive secure data by capturing the challenge messages. ▸ Select **Automatic** to have the CGN2 choose the authentication method.

Table 27: The Wireless > Setup Screen (continued)

WPA_Personal NOTE: These fields display only when you select **WPA-Personal** from the **Security Mode** list.	
WPA Mode	Select the type of WPA security that you want to use: • Select **WPA-PSK** to use Wifi Protected Access (Pre-Shared Key) mode • Select **WPA2-PSK** to use Wifi Protected Access 2 (Pre-Shared Key) mode • Select **Auto (WPA-PSK or WPA2-PSK)** to allow clients operating in either mode to connect to the CGN2.
Cipher Type	Select the type of encryption that you want to use: • Select **TKIP** to use the Temporal Key Integrity Protocol. • Select **AES** to use the Advanced Encryption Standard. • Select **TKIP and AES** to allow clients using either encryption type to connect to the CGN2.
Group Key Update Interval	Enter the frequency (in seconds) with which you want the CGN2 to create new pre-shared keys, and issue them to the wireless client.
Pre-Shared Key	Enter the pre-shared key that you want to use for your wireless network. You will need to enter this key into your wireless clients in order to allow them to connect to the network.
Pre-Authentication	Use this field to allow pre-authentication (**Enable**) in WPA2, or deny pre-authentication requests (**Disable**). In preauthentication, a WPA2 wireless client can perform authentication with other wireless access points in its range when it is still connected to its current wireless access point. This allows mobile wireless clients to connect to new access points more quickly, permitting more efficient roaming.
Apply	Click this to save your changes to the fields in this screen.

Table 27: The Wireless > Setup Screen (continued)

Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

6.3 THE ACCESS CONTROL SCREEN

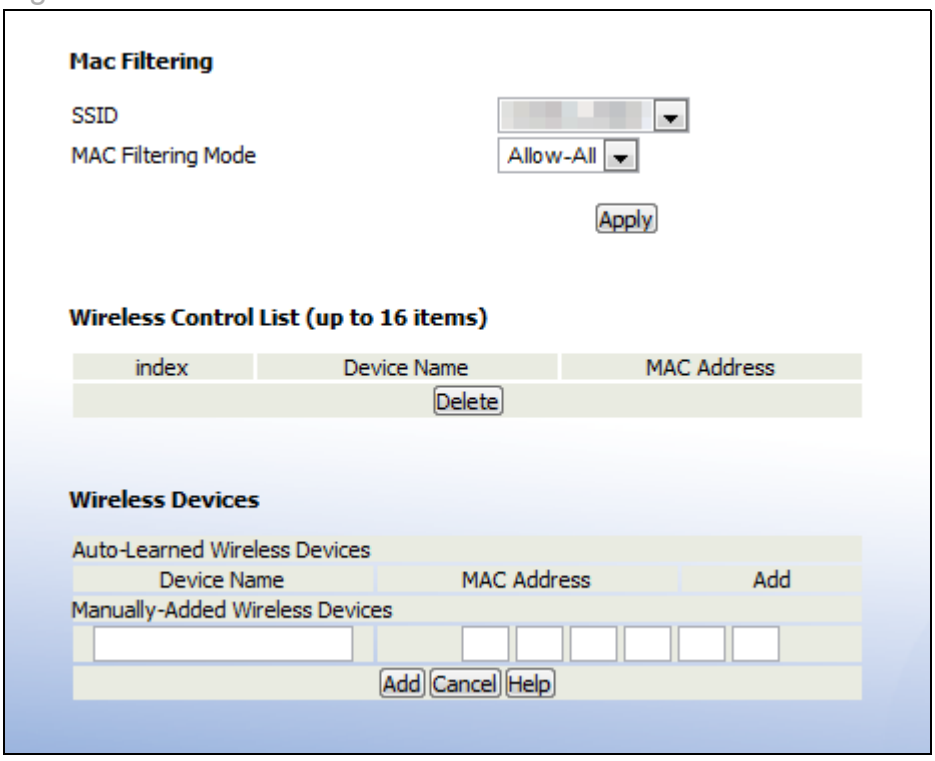
Use this screen to configure Media Access Control (MAC) address filtering on the wireless network.

NOTE: To configure MAC address filtering on the wired LAN, see The Filter Setting Screen on page 57.

You can set the CGN2 to allow only certain devices to access the CGN2 and the network wirelessly, or to deny certain devices access.

Click **Wireless** > **Access Control**. The following screen displays.

Figure 30: The Wireless > Access Control Screen



The following table describes the labels in this screen.

Table 28: The Wireless > Access Control Screen

MAC Filtering	
SSID	Select the SSID for which you want to configure wireless access control. NOTE: At the time of writing, the CGN2 supports a single SSID.
MAC Filtering Mode	Use this field to control whether the CGN2 performs MAC filtering on the wireless network. • Select **Allow-All** to turn MAC filtering off. All devices may access the CGN2 and the network wirelessly. • Select **Allow** to permit only devices with the MAC addresses you set up in the **Wireless Control List** to access the CGN2 and the network wirelessly. All other devices are denied access. • Select **Deny** to permit all devices except those with the MAC addresses you set up in the **Wireless Control List** to access the CGN2 and the network wirelessly. The specified devices are denied access.
Apply	Click this to save your changes in the MAC filtering section.
Wireless Control List (up to 16 Items)	
# Index	This displays the index number assigned to the permitted or denied wireless device.
Device Name	This displays the name you gave to the permitted or denied wireless device.
MAC Address	This displays the MAC address of the permitted or denied wireless device.
Delete	Select a permitted or denied wireless device's radio button ( ) and click this to remove the device from the list. The device may no longer access the CGN2 and the network.
Wireless Devices	
Auto-Learned Wireless Devices	
Device Name	This displays the name of each network device that has connected to the CGN2 on the wireless network.

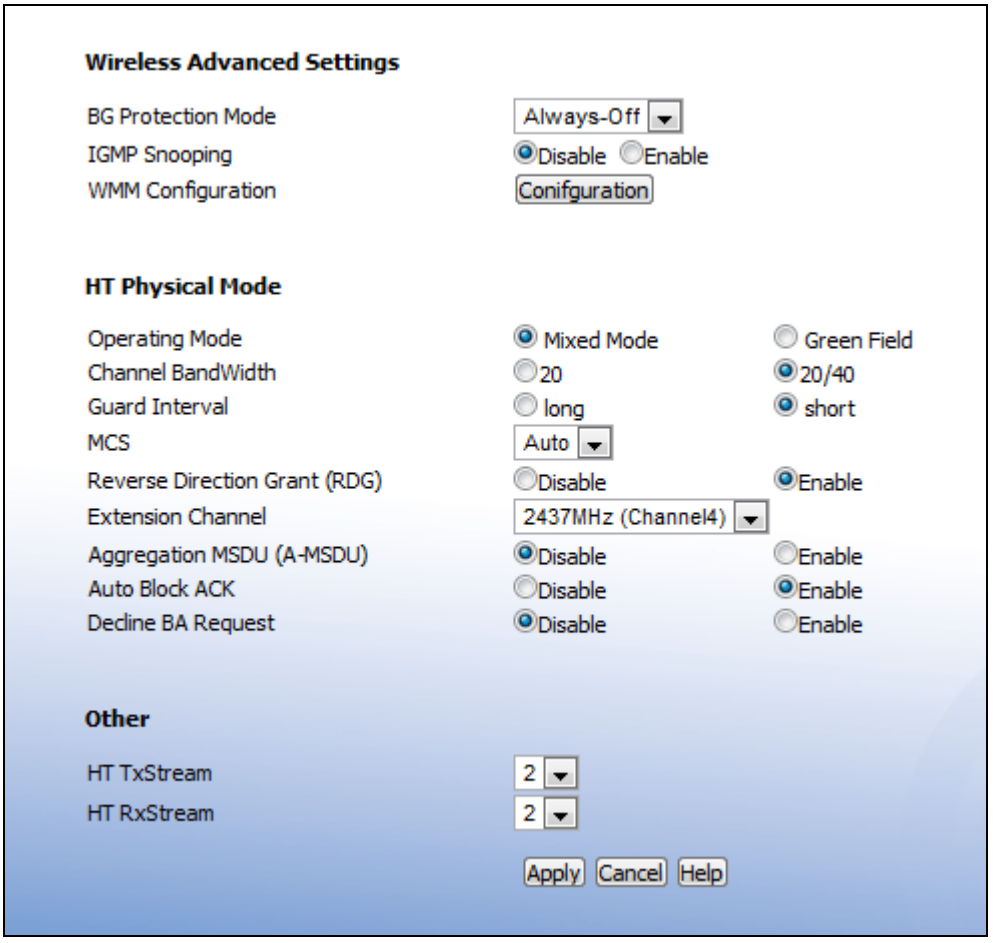
Table 28: The Wireless > Access Control Screen (continued)

MAC Address	This displays the MAC address of each network device that has connected to the CGN2 on the wireless network.
Add	Select a device's checkbox and click **Add** to add the device to the **Wireless Control List**.
Manually-Added Wireless Devices	
Device Name	Enter the name to associate with a network device that you want to permit or deny access to the CGN2 and the network wirelessly. NOTE: This name is arbitrary, and does not affect functionality in any way.
MAC Address	Specify the MAC address of the network device that you want to permit or deny access to the CGN2 and the network wirelessly.
Add	Click this to add any **Manually-Added Wireless Devices**, and **Auto-Learned Wireless Devices** with their Add boxes checked, to the **Wireless Control List**.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

6.4 THE ADVANCED SCREEN

Click **Wireless** > **Advanced**. The following screen displays.

Figure 31: The Wireless > Advanced Screen



The following table describes the labels in this screen.

Table 29: The Wireless > Advanced Screen

Wireless Advanced Settings	
BG Protection Mode	Use this field to configure IEEE 802.11b/g protection. Both 802.11b and 802.11g wireless communications occur at the same radio frequencies. When the CGN2 is wirelessly connected to 802.11b clients and 802.11g clients simultaneously, the performance of the link to 802.11g clients can deteriorate due to the presence of the 802.11b clients. Because 802.11b and 802.11g use different modulation techniques, 802.11b clients do not understand 802.11g's Request To Send (RTS) and Clear To Send (CTS) messages, which ensure that each wireless device transmits only when other devices are not transmitting. When B/G protection is active, the CGN2 prevents 802.11b clients transmitting over 802.11g transmissions by first transmitting an announcement (known as a CTS-to-Self) to 802.11b clients, stating that it intends to transmit to 802.11g clients. ▸ Select **Auto** to have the CGN2 control whether B/G protection is active or not. ▸ Select **Always-on** to use B/G protection at all times. ▸ Select **Always-off** to never use B/G protection.

Table 29: The Wireless > Advanced Screen (continued)

IGMP Snooping	Use this field to turn Internet Group Management Protocol (IGMP) snooping on or off. IGMP is used to manage multicast groups. In multicast groups, data is transmitted to numerous IP addresses simultaneously. This is the most efficient method of providing the same data to many different recipients at the same time, since each data packet needs to be sent only once. Multicast groups are often used for Internet TV and real-time streaming applications such as online gaming. IGMP snooping allows the CGN2 to "snoop" or listen in on IGMP traffic, and to determine which computers on the LAN belong to which IGMP groups. By keeping lists of which computers belong to IGMP groups, the CGN2 can send the IGMP data to only those computers that have requested it, and can refrain from sending unsolicited multicast data. This can improve your connection to wireless clients. • Select **Disable** to turn IGMP snooping off. • Select **Enable** to turn IGMP snooping on.
WMM Configuration	Click this to set up your Wifi Multimedia (WMM) Quality of Service (QoS) settings. See Configuring WMM Parameters on page 103 for information on the screen that displays. NOTE: Turn WMM on and off in the **Wireless** > **Basic Settings** screen.
HT Physical Mode	

Table 29: The Wireless > Advanced Screen (continued)

Operating Mode	Use this field to configure how the CGN2 transmits in IEEE 802.11n mode. **Mixed mode**, on the other hand, allows 802.11a/b/g stations to tell when 802.11n transmissions are occurring, by transmitting RTS, CTS and CTS-to-Self messages in a format the legacy stations can understand. You should select this option if you have 802.11a/b/g stations in your networks, or if there are other 802.11a/b/g networks in your area. **Green Field**, also known is High Throughput (HT) mode, assumes that there are no existing IEE 802.11a/b/g stations using the same radio channel. In greenfield mode, the 802.11a/b/g stations are unable to tell when 802.11n transmissions are occurring. You should select this mode only if there are no 802.11a/b/g stations in your network (or other networks in your location). Otherwise these stations' wireless transmissions will interfere with your 802.11n transmissions. When no 802.11a/b/g stations are present, greenfield mode allows greater wireless network speeds, because the legacy messages (RTS, CTS and CTS-to-Self) do not need to be sent.
Channel Bandwidth	This field allows you to configure the width of the radio channel the CGN2 uses to communicate with its wireless clients (IEEE 802.11n only). Using the full 40MHz bandwidth can double your data speed. - Select **20** to only use a 20 megahertz band. - Select **20/40** to use a 40 megahertz band when possible, and a 20 megahertz band when a 40Mhz band is unavailable.

Table 29: The Wireless > Advanced Screen (continued)

Guard Interval	In 802.11n networks, the guard interval is the amount of time that elapses between the transmission of symbols. This is to prevent Inter-Symbol Interference, or ISI, caused by echoes. NOTE: In modulated signals, each distinct modulated character (for example, each audible tone produced by a modem for transmission over telephone lines) is known as a symbol. - Select **Long** to use a long guard interval of 800 nanoseconds. - Select **Short** to use a short guard interval of 400 nanoseconds.
MCS	Use this field to configure the Modulation and Coding Scheme (MCS) that the CGN2 uses for IEEE 802.11n transmissions. The 802.11n protocol specifies 77 Modulation and Coding Schemes. Each MCS refers to a combination of a modulation technique, a coding rate, a guard interval, and a certain number of spatial streams. The CGN2 supports MCS 0~15, and 32. Select the MCS that you wish to use for 802.11n transmissions. If unsure, select **Auto** (default).

Table 29: The Wireless > Advanced Screen (continued)

Reverse Direction Grant (RDG)	Use this field to configure Reverse Direction Grant in IEEE 802.11n transmissions. Each data transfer requires that the wireless station initiating the transfer acquires permission from the access point to perform the transfer. This is known as a transmission opportunity, or TXOP. Each TXOP is time-limited; the initiating station may transmit for only a certain length of time, and then must cease. Normally, if the receiving station wishes to return data to the initiating station, it must also acquire its own TXOP. However, when you enable Reverse Direction Grants, a wireless station that has already obtained a TXOP may issue a Reverse Direction Grant to the receiving station. This allows the receiving station to transmit data back to the initiating station for the remaining time specified in the original TXOP. It does not need to acquire its own TXOP. • Select **Disable** to disallow Reverse Direction Grants. • Select **Enable** to allow Reverse Direction Grants.
Extension Channel	This field displays the secondary wireless radio channel that the CGN2 uses for channel bonding (combining two channels for faster data transfer) in IEEE 802.11n transmissions. NOTE: At the time of writing, you cannot select the **Extension channel**. It is selected automatically by the CGN2.
Aggregation MSDU (A-MSDU)	Use this field to control whether the CGN2 supports Aggregation MSDUs (A-MSDUs) in IEEE 802.11n transmissions. Each A-MSDU consists of multiple MSDUs, added together (aggregated) to create one large packet. This reduces the overhead associated with transmission, but can result in a reduced data rate if your network suffers from a high error rate since each lost A-MSDU will require retransmission. • Select **Disable** to not use A-MSDUs. • Select **Enable** to use A-MSDUs.

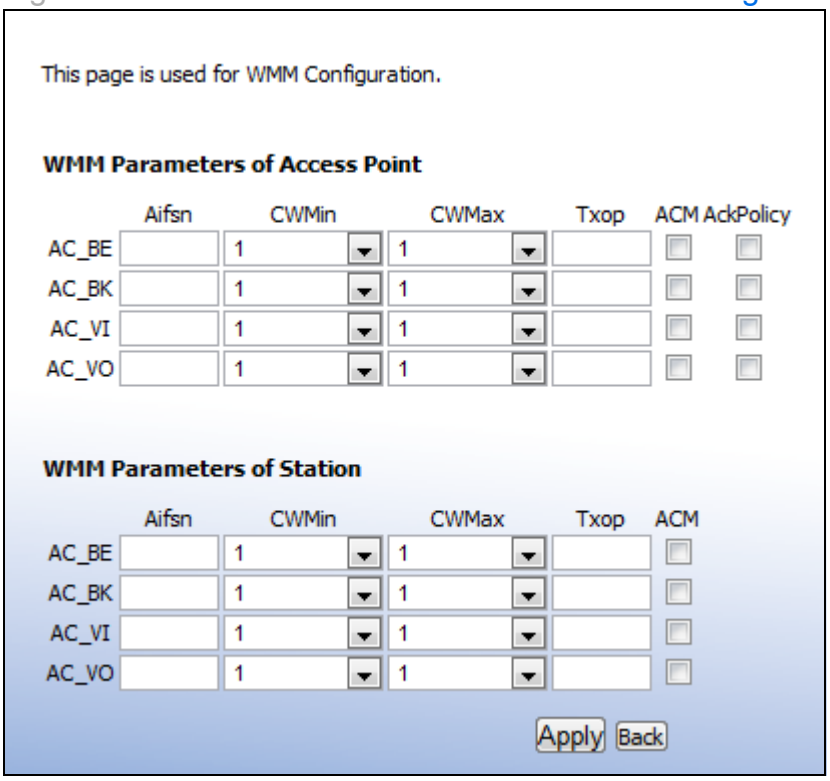
Table 29: The Wireless > Advanced Screen (continued)

Auto Block ACK	Use this field to control how the CGN2 sends acknowledgement (ACK) requests in IEEE 802.11n transmissions. Normally, an ACK request is sent after every data or management frame in order to ensure that it has been received correctly. However, when you enable **Auto Block ACK** the CGN2 sends a burst of multiple frames together, and follows it with a single, block ACK request. ▸ Select **Disable** to not use block ACKs. ▸ Select **Enable** to use block ACKs. NOTE: Block ACK can increase your network's speed, as fewer ACK messages are sent. However, you should not use it if your network is prone to interference, since if the transmitting station needs to retransmit information, the required retransmission will be much longer.
Decline BA Request	Use this field to control how the CGN2 receives acknowledgement (ACK) requests in IEEE 802.11n transmissions. Select **Disable** to accept block ACK requests. The transmitting device may then send multiple data frames together, followed by the block ACK request. Select **Enable** to decline block ACK requests. The transmitting device must then follow each data frame with an ACK request in the traditional manner.
Other	
HT TxStream	Select the number of 802.11n radio transmitting channels (**1** or **2**) for High Throughput (HT) transmission.
HT RxStream	Select the number of 802.11n radio receiving channels (**1** or **2**) for High Throughput (HT) transmission.
Apply	Click this to save your changes to the fields in this screen.
Cancel	Click this to return the fields in this screen to their last-saved values without saving your changes.
Help	Click this to see information about the fields in this screen.

6.4.1 CONFIGURING WMM PARAMETERS

To set up your CGN2's Wifi MultiMedia (WMM) Quality of Service (QoS) settings, click the **Configuration** button in the **Wireless** > **Advanced** screen. The following screen displays.

Figure 32: The Wireless > Advanced > WMM Configuration Screen



NOTE: It is strongly recommended that you do not change the default values in this screen unless you have a good reason to do so.

The following table describes the labels in this screen.

Table 30: The Wireless > Advanced > WMM Configuration Screen

WMM Parameters of Access Point NOTE: This section controls the parameters of data transmitted from the CGN2 to the wireless clients.	
AC_BE	This row controls the Best Effort (BE) Access Category (AC)

Table 30: The Wireless > Advanced > WMM Configuration Screen

AC_BK	This row controls the Background (BK) Access Category (AC)
AC_VI	This row controls the Video (VI) Access Category (AC)
AC_VO	This row controls the Voice (VO) Access Category (AC)
AIFSN	This column controls the Arbitration Inter-Frame Space Number for each Access Category. WMM gives the highest priority to the AC with the lowest AIFSN.
CWMin	This column controls the Contention Window Minimum for each Access Category. A smaller **CWMin** value increases priority for data of the relevant type. The contention window system is a mechanism for providing priority to important data on the wireless network. When a data collision occurs, each frame is assigned a random time to wait before attempting transmission again. This random time value is between zero and the data's **CWMin** value. If a collision occurs again, the time value is doubled, and transmission is attempted again. This continues until the time value reaches the **CWMax** value.
CWMax	This column controls the Contention Window Maximum for each Access Category. A smaller CWMin value decreases the access delay for data of the relevant type, but can result in more data collisions.
TXOP	This field defines the Transmission Opportunity (TXOP) length for each Access Category. This is the length of time during which the wireless device may to transmit over the wireless network, once it receives a transmission opportunity.
ACM	This field specifies whether Admission Control is Mandatory (ACM) for each Access Category. Select the checkbox to have the CGN2 control ACM.

Table 30: The Wireless > Advanced > WMM Configuration Screen

AckPolicy	WMM defines two ACK policies: NormalAck and NoAck. • **NormalAck**: the recipient of a transmission acknowledges each received packet. • **NoAck**: the recipient of a transmission does not acknowledge received packets. This can improve data throughput in situations where signal quality is excellent, but in other situations can cause a significant increase in lost packets. Select the checkbox to use the NoAck policy.
WMM Parameters of Station NOTE: This section controls the parameters of data transmitted from the wireless clients to the CGN2.	
AC_BE	This row controls the Best Effort (BE) Access Category (AC)
AC_BK	This row controls the Background (BK) Access Category (AC)
AC_VI	This row controls the Video (VI) Access Category (AC)
AC_VO	This row controls the Voice (VO) Access Category (AC)
AIFSN	This column controls the Arbitration Inter-Frame Space Number for each Access Category. WMM gives the highest priority to the AC with the lowest AIFSN.
CWMin	This column controls the Contention Window Minimum for each Access Category. A smaller **CWMin** value increases priority for data of the relevant type. The contention window system is a mechanism for providing priority to important data on the wireless network. When a data collision occurs, each frame is assigned a random time to wait before attempting transmission again. This random time value is between zero and the data's **CWMin** value. If a collision occurs again, the time value is doubled, and transmission is attempted again. This continues until the time value reaches the **CWMax** value.
CWMax	This column controls the Contention Window Maximum for each Access Category. A smaller CWMin value decreases the access delay for data of the relevant type, but can result in more data collisions.

Table 30: The Wireless > Advanced > WMM Configuration Screen

TXOP	This field defines the Transmission Opportunity (TXOP) length for each Access Category. This is the length of time during which the wireless device may to transmit over the wireless network, once it receives a transmission opportunity.
ACM	This field specifies whether Admission Control is Mandatory (ACM) for each Access Category. Select the checkbox to have the wireless client control ACM.

7 TROUBLESHOOTING

Use this section to solve common problems with the CGN2 and your network.

Problem: None of the LEDs Turn On

The CGN2 is not receiving power, or there is a fault with the device.

1. Ensure that you are using the correct power adaptor.

Using a power adaptor other than the one that came with your CGN2 can damage the CGN2.

2. Ensure that the power adaptor is connected to the CGN2 and the wall socket (or other power source) correctly.
3. Ensure that the power source is functioning correctly. Replace any broken fuses or reset any tripped circuit breakers.
4. Disconnect and re-connect the power adaptor to the power source and the CGN2.
5. If none of the above steps solve the problem, consult your vendor.

Problem: One of the LEDs does not Display as Expected

1. Ensure that you understand the LED's normal behavior (see LEDs on page 18).
2. Ensure that the CGN2's hardware is connected correctly; see the Quick Installation Guide.
3. Disconnect and re-connect the power adaptor to the CGN2.

4 If none of the above steps solve the problem, consult your vendor.

Problem: I Forgot the CGN2's IP Address

1 The CGN2's default LAN IP address is **192.168.0.1**.

2 You can locate the CGN2's GUI by entering the LAN domain suffix into your browser's address bar (on a computer connected to the LAN). The default LAN domain suffix is displayed in the **WAN/LAN** > **IP** screen's **Domain Suffix** field. See The IP Screen on page 47 for more information.

3 Depending on your operating system and your network, you may be able to find the CGN2's IP address by looking up your computer's default gateway. To do this on (most) Windows machines, click **Start** > **Run**, enter "cmd", and then enter "ipconfig". Get the IP address of the **Default Gateway**, and enter it in your browser's address bar.

4 If you still cannot access the CGN2, you need to reset the CGN2. See Resetting the CGN2 on page 25. All user-configured data is lost, and the CGN2 is returned to its default settings. If you previously backed-up a more recent version your CGN2's settings, you can now upload them to the CGN2; see The Backup Screen on page 52.

Problem: I Forgot the CGN2's Admin Username or Password

1 The default username is **cusadmin**, and the default password is **password**.

2 If the default username and password do not work, you need to reset the CGN2. See Resetting the CGN2 on page 25. All user-configured data is lost, and the CGN2 is returned to its default settings. If you previously backed-up a more recent version your CGN2's settings, you can now upload them to the CGN2; see The Backup Screen on page 52.

Problem: I Cannot Access the CGN2 or the Internet

1 Ensure that you are using the correct IP address for the CGN2.

2 Check your network's hardware connections, and that the CGN2's LEDs display correctly (see LEDs on page 18).

3 Make sure that your computer is on the same subnet as the CGN2; see IP Address Setup on page 21.

4 If you are attempting to connect over the wireless network, there may be a problem with the wireless connection. Connect via a **LAN** port instead.

5 If the above steps do not work, you need to reset the CGN2. See Resetting the CGN2 on page 25. All user-configured data is lost, and the CGN2 is returned to its default settings. If you previously backed-up a more recent version your CGN2's settings, you can now upload them to the CGN2; see The Backup Screen on page 52.

6 If the problem persists, contact your vendor.

Problem: I Cannot Access the Internet and the DS and US LEDs Keep Blinking

Your service provider may have disabled your Internet access; check the **Cable** > **System Info** screen's Network Access field (see The System Info Screen on page 33).

Problem: I Cannot Connect My Wireless Device

1 Ensure that your wireless client device is functioning properly, and is configured correctly. See the wireless client's documentation if unsure.

2 Ensure that the wireless client is within the CGN2's radio coverage area. Bear in mind that physical obstructions (walls, floors, trees, etc.) and electrical interference (other radio transmitters, microwave ovens, etc) reduce your CGN2's signal quality and coverage area.

3 Ensure that the CGN2 and the wireless client are set to use the same wireless mode and SSID (see The Setup Screen on page 86) and security settings (see The Access Control Screen on page 93).

4 Re-enter any security credentials (WEP keys, WPA(2)-PSK password, or WPS PIN).

5 If you are using WPS's PBC (push-button configuration) feature, ensure that you are pressing the button on the CGN2 and the button on the wireless client within 2 minutes of one another.

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