

SR804n Cable Modem User Manual

VER: 1.0

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1 Safety Introductions

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

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

2 Overview

The SR804N is targeted towards DOCSIS/EuroDOCSIS3.0 cable modem, eMTA and gateway. With eight downstream channels and four upstream channels, it supports up to 400Mbps/160Mbps. The SR804N incorporates a variety of industry standard peripheral interfaces including dual IEEE802.3 10/100/1000Mbps interface, one with integrated GPHY, and dual USB2.0 interfaces(Host and Host/Device) with integrated PHYs. The SR804N supports WLAN access. It complies with IEEE 802.11,802.11b/g and 802.11n specifications, WEP, WPA, and WPA2 security specifications. The WLAN of the SR804N supports 2T2R.

2.1 Application

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

2.2 Features

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

- Remote update
- System statistics and monitoring

2.3 Standards Compatibility and Compliance

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

3 Hardware Description and Hardware Installation

3.1 Hardware Description

3.1.1 Front Panel

The following table describes the indicators on the front panel.

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

3.1.2 Rear Panel

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

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

Warning:

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

Ne pas appuyer sur le bouton de réinitialisation, sauf si vous voulez effacer les réglages actuels. Le bouton de réinitialisation est dans un petit trou circulaire sur le panneau arrière. Si vous souhaitez restaurer les paramètres par défaut, se il vous plaît appuyez sur le bouton de réinitialisation doucement pendant 1 seconde avec une fine aiguille insérée dans le trou, puis relâchez le bouton. Le système redémarre et revient aux valeurs par défaut.

3.2 Hardware Installation

3.2.1 Connecting the Device

Please follow the steps below to connect the device.

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

- Step2** Connect the **Eth** port of the CMRG to the network card of the PC via an Ethernet cable.
- Step3** Plug one end of the power adapter to the wall outlet and connect the other end to the **Power** port of the CMRG.

4 PC Network Configuration and Login

4.1 PC Network Configuration

Each network interface on the PC should either be configured with a statically defined IP address and DNS address, or be instructed to automatically obtain an IP address using the network DHCP server. SR804N provides a DHCP server on its LAN and it is recommended to configure your LAN to automatically obtain its IP address and DNS server IP address.

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

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

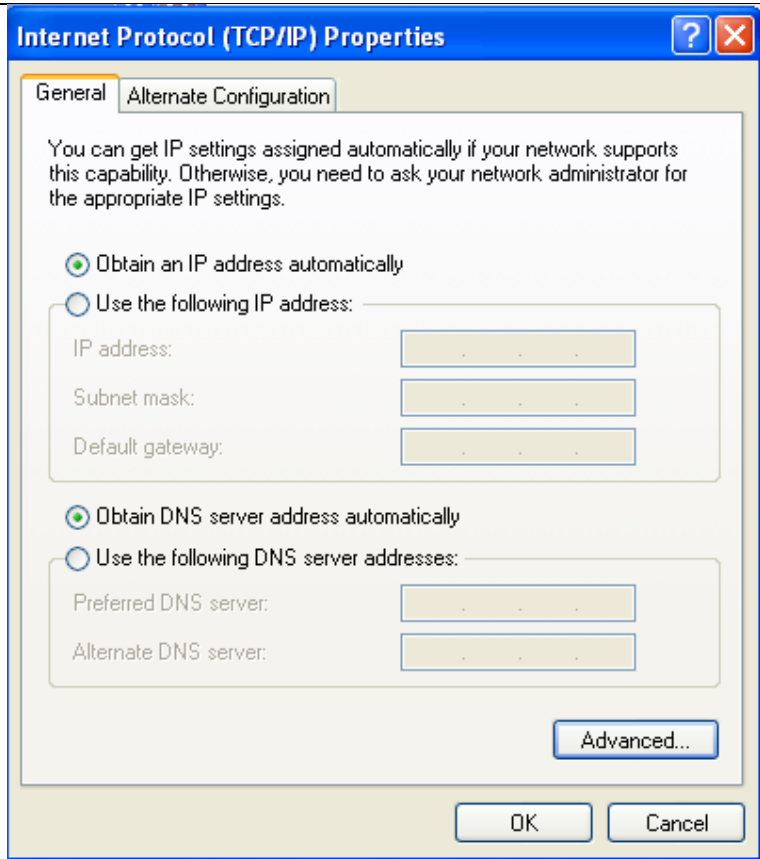


Figure 1 IP and DNS configuration

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

- Step1** Choose **Start > Control Panel > Network Connections**.
- Step2** Right-click the Ethernet connection icon and choose **Properties**.
- Step3** On the **General** tab, select the **Internet Protocol (TCP/IP)** component and click **Properties**.
- Step4** The **Internet Protocol (TCP/IP) Properties** window appears.
- Step5** Select the **Obtain an IP address automatically** radio button.

- Step6** Select the **Obtain DNS server address automatically** radio button.
- Step7** Click **OK** to save the settings.

4.2 Logging In to the SR804N Cable Modem

To log in to the SR804Ncable modem, do as follows:

- Step1** Open a Web browser on your computer.
- Step2** Enter **http://192.168.100.1** (the default IP address of the SR804Ncable modem) in the address bar. The login page appears.
- Step3** Enter the user name and the password. The default Username is **admin** and the Password is **admin**.
- Step4** Click **OK** to log in to the Web page. Otherwise, please click **Cancel** to exit the login page.



Figure 2 Login page

After logging in to the SR804N cable modem, you can query, configure, and modify all the settings, and diagnose the system.

5 Web-Based Management

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

5.1 Status

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



Figure 3 Submenus of Status

5.1.1 Software

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

Status	Basic	Advanced	Firewall	Parental Control	VPN	Wireless	TDS9	USB
--------	-------	----------	----------	------------------	-----	----------	------	-----

- Software
- Connection
- Security
- Diagnostics
- Event Log

Status

Software

This page displays information on the current system software.

Information	
Standard Specification Compliant	DOCSIS 3.0
Hardware Version	V1.0
Software Version	CM11.2U23W-4.TW-RA3B010-V1.EN
Cable Modem MAC Address	bc:96:80:35:4f:b9
Cable Modem Serial Number	354fb9
CM certificate	Installed

Status	
System Up Time	0 days 00h:10m:42s
Network Access	Allowed
Cable Modem IP Address	10.50.1.6

Figure 4 Software page

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

5.1.2 Connection

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

SmartRG

Software
Connection
 Security
 Diagnostics
 Event Log

Status

Connection

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

Router Provisioning Mode:

Startup Procedure

Procedure	Status	Comment
Acquire Downstream Channel	S29000000 Hz	Locked
Connectivity State	OK	Operational
Boot State	OK	Operational
Configuration File	OK	Oss7.cfg
Security	Disabled	Disabled

Downstream Bonded Channels

Channel	Lock Status	Modulation	Channel ID	Frequency	Power	SNR	Correctables	Uncorrectables
1	Locked	QAM256	19	529000000 Hz	-12.3 dBmV	42.5 dB	27	0
2	Locked	QAM256	17	517000000 Hz	-14.0 dBmV	40.3 dB	41	0
3	Locked	QAM256	18	523000000 Hz	-13.5 dBmV	40.9 dB	37	0
4	Locked	QAM256	20	535000000 Hz	-11.7 dBmV	43.2 dB	19	0
5	Locked	QAM256	21	585000000 Hz	-11.9 dBmV	43.1 dB	20	0
6	Locked	QAM256	22	591000000 Hz	-12.1 dBmV	43.2 dB	25	0
7	Locked	QAM256	23	597000000 Hz	-12.0 dBmV	42.5 dB	20	0
8	Locked	QAM256	24	603000000 Hz	-12.8 dBmV	41.4 dB	26	0

Total Correctables **Total Uncorrectables**

215 0

Upstream Bonded Channels

Channel	Lock Status	US Channel Type	Channel ID	Symbol Rate	Frequency	Power
1	Locked	ATDMA	1	2560 Ksym/sec	14600000 Hz	55.8 dBmV
2	Not Locked	Unknown	0	0 Ksym/sec	0 Hz	0.0 dBmV
3	Not Locked	Unknown	0	0 Ksym/sec	0 Hz	0.0 dBmV
4	Not Locked	Unknown	0	0 Ksym/sec	0 Hz	0.0 dBmV

CM IP Address **Duration** **Expires**

10.50.1.6 D: 07 H: 00 M: 00 S: 00 Wed Oct 29 15:19:54 2014

DownStream Freq

Current System Time: Wed Oct 22 15:29:50 2014

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Figure 5 Connection information

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

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

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

5.1.3 Security

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

The screenshot shows the SmartRG web interface. At the top, there is a navigation bar with tabs: Status, Basic, Advanced, Firewall, Parental Control, VPN, Wireless, TRRS, and USB. The 'Status' tab is selected. On the left side, there is a sidebar with a 'SmartRG' logo and a list of menu items: Software, Connection, Security, Diagnostics, and Event Log. The 'Security' menu item is highlighted. The main content area is titled 'Status Security' and contains the following text: 'This page allows configuration of administration access privileges and the ability to restore factory defaults to the system.' Below this text are four input fields: 'Password Change User ID', 'New Password', 'Re-Enter New Password', and 'Current User ID Password'. At the bottom of the form, there is a 'Restore Factory Defaults' section with two radio buttons: 'Yes' and 'No' (which is selected). An 'Apply' button is located at the bottom center of the form.

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Figure 6 Security configuration

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

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

5.1.4 Diagnostics

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

Status

Diagnostics

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

Utility:

Ping Test Parameters

Target:

Ping Size: bytes

No. of Pings:

Ping Interval: ms

Results
Waiting for input...

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Figure 7 Diagnostic information

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

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

5.1.5 Event Log

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

Status

SNMP Event Log

This page displays the contents of the SNMP event log.

Time	Name	Description

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Figure 8 Event Log information

This page displays the contents of the SNMP event log.

5.2 Basic

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




Figure 9 Submenus of basic

5.2.1 Setup

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

Status	Basic	Advanced	Firewall	Parental Control	VPN	Wireless	Tools	USB
--------	-------	----------	----------	------------------	-----	----------	-------	-----



Basic Setup

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

Network Configuration

LAN

IPv6 Address: Unspecified
 IPv6 Prefix: ::
 IPv4 Address:
 MAC Address: bc:96:80:35:4f:bd

Interface Prefix
None Specified

WAN

IPv6 Address: fe80:be96:80ff:fe35:4fbb:64
 IPv4 Address: fe80:be96:80ff:fe35:4fbb:64
 MAC Address: bc:96:80:35:4f:bb
 Duration: D: 25061 H: 15 M: 22 S: 40
 Expires: Wed Oct 22 15:33:25 2014
 IPv6 DNS Servers: None

WAN Connection Type:

IPv4 MTU Size: (256-1500 octets, 0 = use default)

Spoofed MAC Address:

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Figure 10 Setup configuration

Enter the information from the Required Information section as indicated:

- 1.If your ISP uses DHCP, select "DHCP" for the WAN Connection Type, and enter Host Name and Domain name if required. OR
If your ISP uses static IP addressing, select "Static IP" for the WAN Connection Type, and enter the information provided by your ISP for Static IP Address, Static IP Mask, Default Gateway, Primary DNS, and Secondary DNS.
- 2.Enter a unicast MAC address in the Spoofed MAC Address field. Your ISP may require this to be your PC's MAC address. If not, you can simply supply the WAN side MAC address of the router as your CPE and leave the spoofed MAC address entry set to all 0's, since there will be no spoofing required.
- 3.Select the Apply button. This will reset the CMRG.

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

- 1.Power up the CMRG and wait for it to register with the CMTS and obtain an Internet-routable IP address
- 2.Get an IP lease from the internal DHCP server for each PC attached to the CMRG.

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

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

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



Figure 11 Reload page

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

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

5.2.2 DHCP

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

Basic

DHCP

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

DHCP Server Yes No

Starting Local Address

Number of CPEs

Lease Time

DHCP Clients

Mac Address	IP Address	Start Time	Lease Time	Expires	State
001010dead507	192.168.0.010	255.255.255.000	0:00:01:01	M:00 S:00	Wed Oct 22 15:36:00 2014

Current System Time: Wed Oct 22 15:35:22 2014

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Figure 12 DHCP configuration

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

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

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

5.2.3 DHCPv6

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

Basic

DhcpV6

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

System Delegated Prefix

User defined prefix

Server Settings

LAN Delegated Prefix will be derived from System Delegated Prefix and Start Address will have the same prefix as the LAN Delegated Prefix.

Enabled

LAN Delegated Prefix

Start Address

Number of addresses

Valid Lifetime

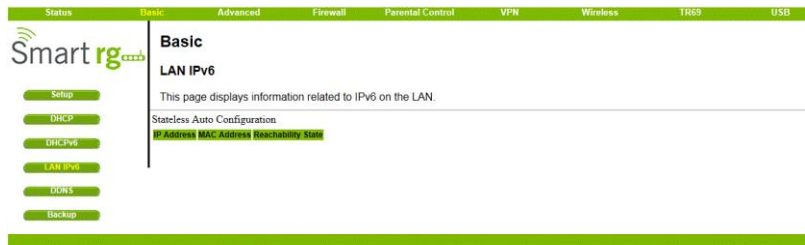
Enable Rapid Commit

Figure 13 DHCPv6 configuration

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

5.2.4 LAN IPv6

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



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Figure 14 LAN IPv6 information

This page displays information related to IPv6 on the LAN.

5.2.5 DDNS

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

Status	Basic	Advanced	Firewall	Parental Control	VPN	Wireless	TDS	USB
								
<ul style="list-style-type: none"> Setup DDNS DDNS Pkt LAN IP DDNS Backup 		<p>Basic</p> <p>DDNS</p> <p>This page allows setup of Dynamic DNS service.</p> <p>DDNS Service: Disabled <input type="button" value="v"/></p> <p>User Name: <input type="text"/></p> <p>Password: <input type="password"/></p> <p>Host Name: <input type="text"/></p> <p>IP Address: fe80::3e96:80ff:fe35:4fb6/64</p> <p>Status: <i>DDNS service is not enabled.</i></p> <p style="text-align: center;"><input type="button" value="Apply"/></p>						

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Figure 15 DDNS setup

This page is used to configure DDNS. Dynamic DNS (DDNS) allows a dynamic IP address to be aliased to a static, pre-defined host name so that the host can be easily contacted by other hosts on the internet even if its IP address changes. The CMRG supports a dynamic DNS client compatible with the Dynamic DNS service (<http://www.dyndns.com/>).

To activate the DDNS client:

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

5.2.6 Backup

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



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Figure 16 Backup

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

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

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

5.3 Advanced

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




Figure 17 Submenus of advanced

5.3.1 Options

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

Status	Basic	Advanced	Firewall	Parental Control	VPN	Wireless	TR069	USB
--------	-------	----------	----------	------------------	-----	----------	-------	-----



- [Options](#)
- [IP Filtering](#)
- [MAC Filtering](#)
- [Port Filtering](#)
- [Forwarding](#)
- [Port Triggers](#)
- [DMZ Host](#)
- [ISP Setup](#)

Advanced

Options

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

WAN Blocking	<input checked="" type="checkbox"/>	Enable
Ipssec PassThrough	<input type="checkbox"/>	Enable
PPTP PassThrough	<input type="checkbox"/>	Enable
Remote Config Management	<input type="checkbox"/>	Enable
Multicast Enable	<input checked="" type="checkbox"/>	Enable
UPnP Enable	<input checked="" type="checkbox"/>	Enable
Primary Network Bridged	<input type="checkbox"/>	Enable
NAT ALG Status		
RSVP	<input checked="" type="checkbox"/>	Enable
FTP	<input checked="" type="checkbox"/>	Enable
TFTP	<input checked="" type="checkbox"/>	Enable
KerbS8S	<input checked="" type="checkbox"/>	Enable
NetBios	<input checked="" type="checkbox"/>	Enable
IKE	<input checked="" type="checkbox"/>	Enable
RTSP	<input checked="" type="checkbox"/>	Enable
Kerb1293	<input checked="" type="checkbox"/>	Enable
H225	<input checked="" type="checkbox"/>	Enable
PPTP	<input checked="" type="checkbox"/>	Enable
MSN	<input checked="" type="checkbox"/>	Enable
SIP	<input checked="" type="checkbox"/>	Enable
ICQ	<input checked="" type="checkbox"/>	Enable
IRC666x	<input checked="" type="checkbox"/>	Enable
ICQTalk	<input checked="" type="checkbox"/>	Enable
Net2Phone	<input checked="" type="checkbox"/>	Enable
IRC7000	<input checked="" type="checkbox"/>	Enable
IRC8000	<input checked="" type="checkbox"/>	Enable

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

Addresses entered: 0/32

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Figure 18 Advanced options

This page allows you to configure the accessible features.

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

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

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

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

“Multicast Enable” allows multicast specific traffic (denoted by a multicast specific address) to be passed to and from the PC’s on the private network behind the CMRG. “UPnP Enable” enables the UPnP agent in the CMRG. If you are running a CPE application that requires UPnP, check this box.

5.3.2 IP Filtering

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

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Options

IP Filtering

MAC Filtering

Port Filtering

Forwarding

Port Triggers

DMZ Host

ISP Setup

Advanced

IP Filtering

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

IP Filtering		
Start Address	End Address	Enabled
192.168.0,0	192.168.0,0	<input type="checkbox"/>
192.168.0,0	192.168.0,0	<input type="checkbox"/>
192.168.0,0	192.168.0,0	<input type="checkbox"/>
192.168.0,0	192.168.0,0	<input type="checkbox"/>
192.168.0,0	192.168.0,0	<input type="checkbox"/>
192.168.0,0	192.168.0,0	<input type="checkbox"/>
192.168.0,0	192.168.0,0	<input type="checkbox"/>
192.168.0,0	192.168.0,0	<input type="checkbox"/>
192.168.0,0	192.168.0,0	<input type="checkbox"/>
192.168.0,0	192.168.0,0	<input type="checkbox"/>

Apply

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Figure 19 IP Filtering configuration

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

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

5.3.3 MAC Filtering

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



Advanced

MAC Filtering

This page allows configuration of MAC address filters in order to block internet traffic to specific network devices on the LAN. This feature only applies to IPv4 traffic.

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

Addresses entered: 0/20

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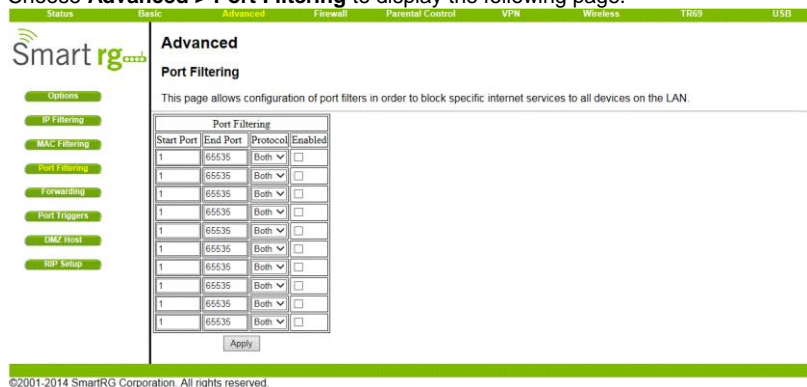
Figure 20 MAC filtering configuration

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

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

5.3.4 Port Filtering

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



Advanced

Port Filtering

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

Start Port	End Port	Protocol	Enabled
1	65535	Both	<input type="checkbox"/>
1	65535	Both	<input type="checkbox"/>
1	65535	Both	<input type="checkbox"/>
1	65535	Both	<input type="checkbox"/>
1	65535	Both	<input type="checkbox"/>
1	65535	Both	<input type="checkbox"/>
1	65535	Both	<input type="checkbox"/>
1	65535	Both	<input type="checkbox"/>
1	65535	Both	<input type="checkbox"/>
1	65535	Both	<input type="checkbox"/>

Apply

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Figure 21 Port Filtering configuration

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

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

5.3.5 Forwarding

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

Application	Port
HTTP	80
FTP	21
TFTP	69
SMTP	25
POP3	110
NNTP	119
Time	23
IRC	194
SMB	139
Finger	79
Gopher	70
Whisk	43
Radius	180
LDAP	389
UDP	888

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Figure 22 Forwarding

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

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

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

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

5.3.6 Port Triggers

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

Advanced
Port Triggers

This page allows configuration of dynamic triggers to specific devices on the LAN. This allows for special applications that require specific numbers with bi-directional traffic to function properly. Applications such as video conferencing, voice, gaming, and some messaging prc features may require these special settings.

Create

Trigger		Target		Status	Description	Enabled	Remove All
Start Port	End Port	Start Port	End Port				

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Figure 23 Port Triggers

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

5.3.7 DMZ Host

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

Advanced

DMZ Host

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

DMZ Address

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Figure 24 DMZ Host setup

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

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

5.3.8 RIP Setup

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

Advanced

Routing Information Protocol Setup

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

RIP Authentication Enable

RIP Authentication Key

RIP Authentication Key ID

RIP Reporting Interval seconds

RIP Destination IP Address

RIP Destination IP Subnet Mask

Figure 25 RIP Setup

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

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

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

To enable the CMRG to perform RIP, do the following (this example uses BCMV2 as the RIP Authentication Key and 1 as the Key ID):

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

To enable the CMTS for IPv2 with MD-5 authentication (Cisco uBR example shown below):

- 1.) The following steps go through configuring IPv2 for a Cisco CMTS. The network number used in this configuration will vary from network to network so use the network number that matches your set-up.

```
7223#configure terminal
7223(config)#key chain ubr
7223(config-keychain)#key 1
```



```
7223(config-keychain-key)#key-str BRCMV2
7223(config-keychain-key)#exit
7223(config-keychain)#exit
7223(config)#router rip
7223(config-router)#ver 2
7223(config-router)#no validate-update
7223(config-router)#passive-interface cable 2/0
7223(config-router)#network 10.0.0.0
7223(config-router)#exit
7223(config)#inter cable 2/0
7223(config-if)#ip rip receive ver 2
7223(config-if)#ip rip authentication mode md5
7223(config-if)#ip rip authentication key-chain ubr
7223(config-if)#exit
7223(config)#exit
```

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

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

```
7223#debug ip rip
```

RIP protocol debugging is on

```
7223#term mon
```

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

```
00:28:41: RIP: received packet with MD5 authentication
```

```
00:28:41: RIP: received v2 update from 10.24.81.148 on Cable2/0
```

```
00:28:41:      10.24.81.0/24 via 10.24.81.148 in 1 hops
```

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

```
7223#sh ip route
```

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 10.24.95.17 to network 0.0.0.0

10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks

C 10.24.80.0/24 is directly connected, Cable2/0

C 10.24.81.0/24 is directly connected, Cable2/0

C 10.24.95.16/28 is directly connected, FastEthernet0/0

S* 0.0.0.0/0 [1/0] via 10.24.95.17

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

5.4 Firewall

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



Figure 26 submenus of Firewall

5.4.1 Basic

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

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

The screenshot shows the 'Firewall Basic' configuration page. On the left, there are navigation tabs: 'Basic' (selected), 'Local Log', and 'Remote Log'. The main content area is titled 'Firewall Basic' and contains the following settings:

- IPv4 Firewall Protection: (dropdown menu)
- IPv6 Firewall Protection: On (checkbox)
- Block Fragmented IP Packets: Enable (checkbox)
- Port Scan Detection: Enable (checkbox)
- IP Flood Detection: Enable (checkbox)

Below these settings is an 'Apply' button. To the right, there is a box titled 'Allowed Services' containing the text 'No Ports Restricted'.

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Figure 27 Basic configuration

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

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

5.4.2 Local Log

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

The screenshot shows the 'Firewall Local Log' configuration page. On the left, there are navigation tabs: 'Basic', 'Local Log' (selected), and 'Remote Log'. The main content area is titled 'Firewall Local Log' and contains the following settings:

- Contact Email Address:
- SMTP Server Name:
- SMTP Username:
- SMTP Password:
- E-mail Alerts: Enable (checkbox)

Below these settings is an 'Apply' button.

Figure 28 Local Log

The Local Log can send firewall attack reports out in two different ways. Individual emails can be sent out automatically, each time the firewall is under attack, and also a local log is stored within the modem and displayed in table form on the Local Log page.

To enable the automatic email alerts, enter your email address in the space provided, enter that email account's associated SMTP (Outgoing) mail server address and authentication credentials if required (provided by your ISP), check the "enable" box and click the Apply button. Individual emails will now be sent to the specified address each time an attack is detected. Each attack is also logged in the table on the Event Log page. If desired, a summary of the Event Log Table can be sent to the specified contact email address by clicking on the Email Log button. Clicking on the Clear Log button can also clear the table.

5.4.3 Remote Log

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

The screenshot shows the SmartRG modem web interface. At the top, there is a navigation bar with tabs: Status, Basic, Advanced, Firewall, Parental Control, VPN, Wireless, TR069, and USB. The 'Firewall' tab is selected. On the left side, there are three buttons: Home, Local Log, and Remote Log. The 'Remote Log' button is highlighted. The main content area is titled 'Firewall Remote Log'. Below the title, there is a description: 'This page allows optional configuration of events to be sent to a local SysLog server.' Underneath, there is a section 'Send selected events' with four checkboxes: 'Permitted Connections', 'Blocked Connections', 'Known Internet Attacks', and 'Product Configuration Events'. Below these checkboxes is a text input field for the SysLog server address, which contains '192.168.0.' followed by a small square icon. At the bottom of this section is an 'Apply' button. At the very bottom of the page, there is a copyright notice: '©2001-2014 SmartRG Corporation. All rights reserved.'

Figure 29 Remote Log

The Remote Log can send firewall attack reports out to a standard SysLog server so many instances can be logged over a long period of time. Individual attack or configuration items can be selected that will be sent to the SysLog server such that only the items of interest can be monitored. Permitted connections, blocked

connections, known Internet attack types, and CMRG configuration events can be logged. The SysLog server must be on the same network as the Private LAN behind the CMRG (typically 192.168.0.x). To activate the SysLog monitoring feature, check all desired event types to monitor and enter the last byte of the IP address of the SysLog server. Normally, the IP address of this SysLog server would be hard-coded so that the address will not change and always agrees with the entry on this page.

5.5 Parental Control

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



Figure 30 Submenus of Parental Control

5.5.1 User Setup

Choose **Parental Control > User Setup** to display the following page.

The screenshot shows the SmartRG web interface. At the top, there is a navigation bar with tabs: Status, Basic, Advanced, Firewall, Parental Control, VPN, Wireless, TRIP, and USB. The "Parental Control" tab is selected. On the left side, there is a sidebar with four green buttons: "User Setup", "Basic", "ToD Filter", and "Local Log". The "User Setup" button is highlighted. The main content area is titled "Parental Control" and "User Setup". Below the title, there is a description: "This page allows configuration of users. 'White List Only' feature limits the user to visit only the sites, specified in the Allowed Domain List of his/her content rule." Below this is a "User Configuration" form with the following fields:

User Configuration	
Add User	
User Settings	
1 Default	Enable Remove User
Password	
Re-Enter Password	
Trusted User	Enable
Content Rule	White List Access Only 1 Default
Time Access Rule	Dynamic
Session Duration	0 min
Inactivity time	0 min
Apply	
Trusted Computers	
Optionally, the user profile displayed above can be assigned to a computer to bypass the Parental Control login on that computer.	
00:00:00:00:00:00:00:00 Add	
No Trusted Computers	
Remove	

Figure 31 User Setup

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

5.5.2 Basic

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

Parental Control

Basic Setup

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

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

Content Policy Configuration

Content Policy List

1. Default

Keyword List	Blocked Domain List	Allowed Domain List
anonymizer	anonymizer.com	
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="button" value="Add Keyword"/>	<input type="button" value="Add Domain"/>	<input type="button" value="Add Allowed Domain"/>
<input type="button" value="Remove Keyword"/>	<input type="button" value="Remove Domain"/>	<input type="button" value="Remove Allowed Domain"/>

Override Password

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

Password	*****
Re-Enter Password	*****
Access Duration	30
<input type="button" value="Apply"/>	

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Figure 32 Basic setup

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

5.5.3 ToD Filter

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

The screenshot shows the SmartRG web interface for configuring the ToD Filter. The top navigation bar includes tabs for Status, Basic, Advanced, Firewall, Parental Control, VPN, Wireless, TR069, and USB. The left sidebar has buttons for User Setup, Basic, ToD Filter, and Local Log. The main content area is titled 'Parental Control' and 'Time of Day Access Policy'. It contains the following elements:

- Time of Day Access Policy:** A description stating that this page allows configuration of time access policies to block all internet traffic based on time of day settings.
- Time Access Policy Configuration:** A section for creating a new policy with a descriptive name, such as "Weekend" or "Working Hours". It includes an "Add New Policy" button.
- Time Access Policy List:** A section showing the current policy list. It includes a dropdown for "No filters entered", an "Enabled" checkbox, and a "Remove" button.
- Days to Block:** A section with checkboxes for "Everyday", "Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday", and "Saturday".
- Time to Block:** A section with an "All day" checkbox and two time selection fields: "Start: 12 (hour) 00 (min) AM" and "End: 12 (hour) 00 (min) AM".
- Ports to Block:** A section with an "Enabled" checkbox, "Port Start" and "Port End" input fields, and a "Protocol" dropdown menu set to "UDP". An "Apply" button is located at the bottom of this section.

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Figure 33 ToD Filter configuration

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

5.5.4 Local Log

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

The screenshot shows the SmartRG web interface for the Local Log configuration. The top navigation bar includes tabs for Status, Basic, Advanced, Firewall, Parental Control, VPN, Wireless, TR069, and USB. The left sidebar has buttons for User Setup, Basic, ToD Filter, and Local Log. The main content area is titled 'Parental Control' and 'Event Log'. It contains the following elements:

- Event Log:** A description stating that this page displays Parental Control event log reporting.
- Log Links:** A row of links: "Last Occurrence", "Admin", "Target", "User", and "Source".
- Clear Log:** A button to clear the event log.

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Figure 34 Local Log information

This page displays the Parental Control event log.

5.6 VPN

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



Figure 35 Submenus of VPN

5.6.1 Basic

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

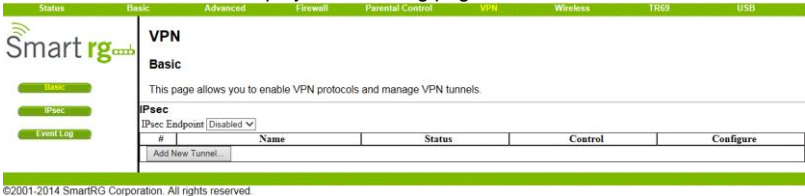


Figure 36 Basic settings

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

5.6.2 IPsec

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

Status	Basic	Advanced	Firewall	Parental Control	VPN	Wireless	TR69	USB
--------	-------	----------	----------	------------------	-----	----------	------	-----

Smart **rg** corp

Basic
IPsec
Event Log

VPN

IPsec

This page allows configuration of IPsec tunnels.

Tunnel: Tunnel list to EMPTY.

Name: (null)

Local endpoint settings

Address group type: IP subnet
 Subnet: 192.168.0.0
 Mask: 255.255.255.0
 Identity type: IP address
 Identity: (null)

Remote endpoint settings

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

IPsec settings

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

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Figure 37 IPsec

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

5.6.3 Event Log

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

Status	Basic	Advanced	Firewall	Parental Control	VPN	Wireless	TR69	USB
--------	-------	----------	----------	------------------	-----	----------	------	-----

Smart **rg** corp

Basic
IPsec
Event Log

VPN

Event Log

This page allows you to view the VPN Event Log.

Event log is empty.

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Figure 38 Event Log information

This page allows you to view the VPN Event Log.

5.7 Wireless

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



Figure 39 Submenus of Wireless

5.7.1 Radio

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

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Figure 40 Radio setting

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

Wireless:

Allows the wireless interface to be enabled and disabled.

Country:

Restricts the channel set based on the selected country's regulatory requirements.

Output Power:

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

802.11 Band:

Select the radio operates in the 2.4 GHz band.

802.11 n-mode:

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

802.11 N Support Required:

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

Bandwidth:

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

Sideband for Control Channel (40 MHz only):

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

Control Channel:

Selects the control channel for AP operation. The list of available channels depends on the selected country as presented in

Table 1. Next to the drop-down list box, the current channel number is displayed.

Table 1. Allowed Channels by Country:

Country	First Channel	Last Channel
USA	1	11
Worldwide, China, Europe	1	13
Japan, Thailand, All Channels	1	14
Israel	5	7
Jordan	10	13

Regulatory Mode:

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

TPC Mitigation (dB):

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

OBSS Coexistence:

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

STBC Tx:

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

Scan Wireless AP's:

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


Apply:

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

5.7.2 Primary Network

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

Status	Basic	Advanced	Firewall	Parental Control	VPN	Wireless	TDS9	USB
--------	-------	----------	----------	------------------	-----	----------	------	-----



Wireless

802.11 Primary Network

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

xxxx (00:90:4C:64:4A:19)

Primary Network Enabled

Network Name (SSID)

Closed Network Disabled

Mode Required

AP Isolate Disabled

WPA Disabled

WPA-PSK Enabled

WPA2 Disabled

WPA2-PSK Enabled

WPA/WPA2 Encryption

WPA Pre-Shared Key Show Key

RADIUS Server

RADIUS Port

RADIUS Key

Group Key Rotation Interval

WPA/WPA2 Re-auth Interval

WEP Encryption Disabled

Network Key 1

Network Key 2

Network Key 3

Network Key 4

Current Network Key

PassPhrase

Automatic Security Configuration

[WPS]

WPS Config State: Configured

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

Device Name

WPS Setup AP

UUID:484937827696e05ada393492ea8690cd

PIN: 12345670

Configure by External Registrar

WPS Add Client

Add a client:

Client PIN:

Authorized Client MAC:

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Figure 41 Primary Network configuration

This page allow you to configure the Primary Wireless Network.

Primary Network:

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

Network Name (SSID):

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

Closed Network:

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

WPA:

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

WPA-PSK:

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

WPA2:

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

WPA2-PSK:

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

WPA/WPA2 Encryption:

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

WPA Pre-Shared Key:

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

RADIUS Server:

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

RADIUS Port:

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

RADIUS Key:

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

Group Key Rotation Interval:

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

WPA/WPA2 Re-auth Interval:

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

WEP Encryption:

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

Network Key 1 thru Network Key 4:

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

Current Network Key:

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

PassPhrase:

Sets the text to use for WEP key generation.

Generate WEP Keys:

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

Automatic Security Configuration

Wi-Fi Protected Setup (WPS);

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

Device Name:

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

WPS Setup AP:

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


WPS Add Client:

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

5.7.3 Guest Network

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

Status	Basic	Advanced	Firewall	Parental Control	VPN	Wireless	TR69	USD
--------	-------	----------	----------	------------------	-----	----------	------	-----



Wireless

802.11 Guest Network

This page allows configuration of a guest network.

Guest Network: hello world (02:90:4C:64:4A:1A)

Guest WiFi Security Settings	Guest LAN Settings
Guest Network: Enabled	Network: Guest
Guest Network Name (SSID): hello world	IP Address: 192.168.1.1
Closed Network: Disabled	Subnet Mask: 255.255.255.0
Mode Required: None	Lease Pool Start: 192.168.1.10
AP Isolate: Disabled	Lease Pool End: 192.168.1.99
WPA: Disabled	Lease Time: 86400
WPA-PSK: Disabled	UPnP: Enabled
WPA2: Disabled	Firewall: Disabled
WPA2-PSK: Enabled	DHCPv6 Server: Enabled
<input type="button" value="Apply"/>	
<input type="button" value="Restore Guest Network Defaults"/>	

WPA WPA2 Encryption: AES

WPA Pre-Shared Key: ***** Show Key

RADIUS Server: 0.0.0.0

RADIUS Port: 1812

RADIUS Key:

Group Key Rotation Interval: 0

WPA WPA2 Re-auth Interval: 3600

WEP Encryption: Disabled

Network Key 1:

Network Key 2:

Network Key 3:

Network Key 4:

Current Network Key:

PassPhrase:

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Figure 42 Guest Network configuration

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

DHCP Server:

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

IP Address:

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

Subnet Mask:

This specifies the subnet mask for the guest network.

Lease Pool Start:

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

Lease Pool End:

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

Lease Time:

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

5.7.4 Advanced

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

The screenshot displays the 'Advanced' settings for the wireless network. The '802.11 Advanced' section is active, showing various configuration options. The '54g™ Mode' is set to '54g Auto'. Other settings include 'XPress™ Technology' (Enabled), '802.11n Protection' (Auto), 'Short Guard Interval' (Auto), 'Basic Rate Set' (Default), 'Multicast Rate' (Auto), 'NPHY Rate' (Use Legacy Rate), 'Legacy Rate' (Auto), 'Beacon Interval' (100), 'DTIM Interval' (1), 'Fragmentation Threshold' (2346), and 'RTS Threshold' (2347). At the bottom, 'Wireless Multicast Forwarding (WMM)' is set to 'Enabled' and 'Hotspot 2.0 Passpoint' is set to 'Disabled'. An 'Apply' button is located at the bottom right of the settings area.

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Figure 43 Advanced setting

This page allows you to configure advanced wireless settings.

54g™ Mode:

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

54g™ Protection:

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

Xpress Technology:

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

Afterburner Technology

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

802.11n Protection:

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

Basic Rate Set:

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

Multicast Rate:

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

NPHY Rate:

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

Legacy Rate:

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

Beacon Interval:

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

DTIM Interval:

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

Fragmentation Threshold:

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

RTS Threshold:

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

5.7.5 Access Control

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

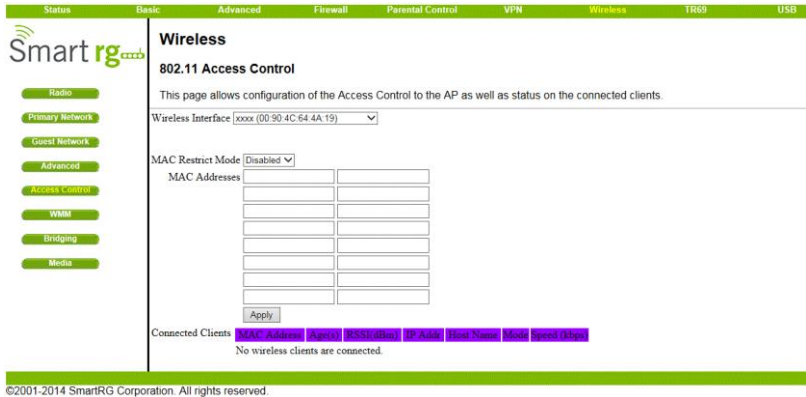


Figure 44 Access Control setting

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

MAC Restrict Mode:

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

MAC Addresses:

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

Connected Clients:

A list of connected wireless clients. When a client connects (associates) to the network, it is added to the list; when a client leaves (disassociates) from the network, it is removed from the list. For each client, the age (in seconds), estimated average

receive signal strength (in dBm), IP address, and host name are presented. The age is the amount of time elapsed since data was transmitted to or received from the client.

5.7.6 WMM

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

The screenshot shows the configuration page for 802.11 Wi-Fi Multimedia. The page title is "Wireless" and "802.11 Wi-Fi Multimedia". Below the title, there is a description: "This page allows configuration of the Wi-Fi Multimedia QoS." The settings are as follows:

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

There are three tables of parameters:

EDCA AP Parameters	CS/Queue	TS/Queue	AP/Queue	TSNPIF Queue (bytes)	TSNPIF Queue (frames)	Default Queue Prio
AC_BK	15	63	3	0	0	Off
AC_BE	15	1023	7	0	0	Off
AC_BI	7	15	1	6016	3008	Off
AC_VI	3	7	1	3264	1504	Off

EDCA STA Parameters	CS/Queue	TS/Queue	AP/Queue	TSNPIF Queue (bytes)	TSNPIF Queue (frames)
AC_BK	15	1023	3	0	0
AC_BE	15	1023	7	0	0
AC_BI	7	15	2	6016	3008
AC_VI	3	7	2	3264	1504

WMM TSNP Parameters	TSNPIF Queue (bytes)	TSNPIF Queue (frames)	TSNPIF Queue (bytes)	TSNPIF Queue (frames)
AC_BK	7	3	4	0
AC_BE	7	3	4	2
AC_BI	7	3	4	2
AC_VI	7	3	4	2
AC_VO	7	3	4	2

Figure 45 WMM configuration

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

WMM Support:

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

No-Acknowledgement:

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

Power Save Support:

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

EDCA AP Parameters:

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

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

EDCA STA Parameters:

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

5.7.7 Bridging

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

The screenshot shows the SmartRG web interface. At the top, there is a navigation bar with tabs: Status, Basic, Advanced, Firewall, Parental Control, VPN, Wireless, TR069, and USB. The 'Wireless' tab is selected. On the left side, there is a vertical menu with buttons for: Radio, Primary Network, Guest Network, Advanced, Access Control, WMM, Bridging, and Media. The 'Bridging' button is highlighted. The main content area is titled 'Wireless' and '802.11 Bridging'. Below the title, it says 'This page allows configuration of WDS features.' There is a 'Wireless Bridging' dropdown menu currently set to 'Disabled'. Below that is a 'Remote Bridges' section with three empty text input fields and an 'Apply' button.

Figure 46 Bridging setting

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

Wireless Bridging:

This setting enables or disables wireless bridging.

Remote Bridges:

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

5.7.8 Media

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

The screenshot shows the SmartRG web interface with the 'Wireless' tab selected. The left sidebar contains navigation options: Radio, Primary Network, Guest Network, Advanced, Access Control, WMM, Bridging, and Media. The main content area is titled 'Wireless' and '802.11 Media'. Below the title, it states 'This page allows configuration of Wireless Media features.' The settings are as follows:

- Wireless Interface: (00:90:4C:64:4A:19)
- Band Steering: Disabled
- Airtime Fairness: Disabled
- Traffic Scheduler: Disabled
- Exhausted Buffer Order Scheduling (EBOS): Disabled

An 'Apply' button is located at the bottom of the settings list.

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Figure 47 Media setting

This page allows configuration of Wireless Media features.

5.8 TR69

Choose **TR69** and the submenus of **TR69** are shown as below.

TR-069 client

Figure 48 Submenus of TR69

5.8.1 TR-069 client

Choose **TR69** > **TR-069 client** to display the following page.



TR69

TR-069 client - Configuration

WAN Management Protocol (TR-069) allows a Auto-Configuration Server (ACS) to perform auto-configuration, provision, collection, and diagnostics to this device. Select the desired values and click 'Apply/Save' to configure the TR-069 client options.

Periodic Inform: Enable Disable

Inform Interval:

ACS URL:

ACS User Name:

ACS Password:

Connection Request User Name:

Connection Request Password:

Connection Request URL:

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Figure 49 TR-069 client configuration

WAN Management Protocol (TR-069) allows a Auto-Configuration Server (ACS) to perform auto-configuration, provision, collection, and diagnostics to this device. Select the desired values and click 'Apply/Save' to configure the TR-069 client options.

5.9 USB

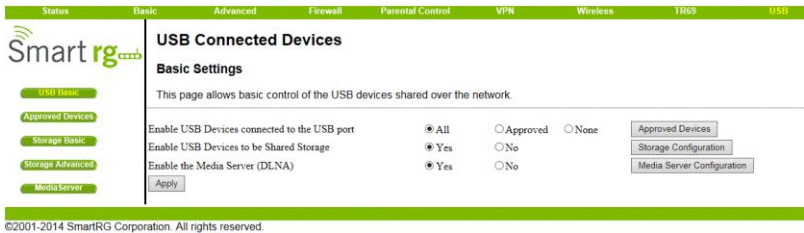
Choose **USB** and the submenus of **USB** are shown as below.



Figure 50 Submenus of USB

5.9.1 USB Basic

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



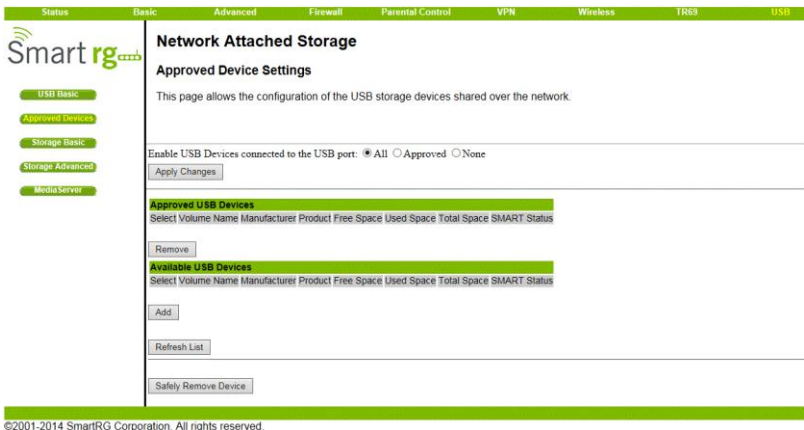
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Figure 51 USB Basic setting

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

5.9.2 Approved Devices

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



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Figure 52 Approved Devices setting

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

5.9.3 Storage Basic

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

The screenshot shows the 'Network Attached Storage' configuration page. At the top, there is a navigation bar with tabs: Status, Basic, Advanced, Firewall, Parental Control, VPN, Wireless, TR069, and USB. On the left, a sidebar contains menu items: USB Basic (highlighted), Approved Devices, Storage Basic, Storage Advanced, and Media Server. The main content area is titled 'Network Attached Storage' and 'Basic Settings'. It includes a description: 'This page shows the status of the USB folders shared over the network.' Below this, there is a 'Network/Device Name' field with the value 'BRCM-LVG'. The 'Default Sharing' section has two radio buttons: 'Share specified folders and all approved devices' (selected) and 'Only share specified folders'. An 'Apply' button is located below the radio buttons. A section titled 'Shared Network Folders' contains a table with columns: Share Name, Device, Folder, Read Access, Write Access, Free Space, Used Space, and Total Space. Below the table are 'Edit' and 'Refresh' buttons. At the bottom left, there is a copyright notice: '©2001-2014 SmartRG Corporation. All rights reserved.'

Figure 53 Storage Basic setting

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

5.9.4 Storage Advanced

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

SmartRG

Status Basic **Advanced** Firewall Parental Control VPN Wireless TRRS USB

USB Basic
Approved Devices
Storage Basic
Storage Advanced
Media Server

Network Attached Storage

Advanced Settings

This page allows configuration of the USB folders shared over the network.

Network/Device Name:

Workgroup Name:

Enable	Access Method	Link	Port
<input checked="" type="checkbox"/>	Windows Network Connection	\\BRCM-LVG	
<input type="checkbox"/>	FTP (via internet)	ftp://192.168.0.10/	Port 21

Available Network Folders								
Actions	Share Name	Device	Folder	Read Access	Write Access	Free Space	Used Space	Total Space
<input type="button" value="Create Network Folder"/>								
<input type="button" value="Refresh List"/>								

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Figure 54 Storage Advanced setting

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

5.9.5 Media Server

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

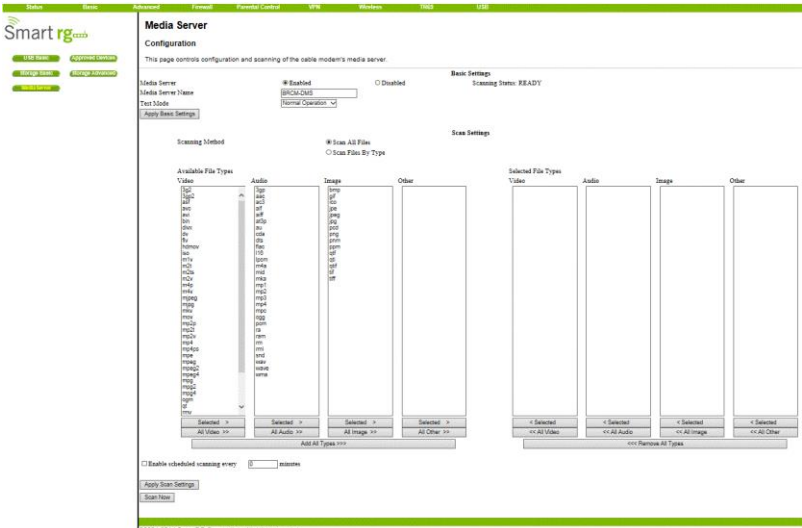


Figure 55 Media Server setting

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

6 Q&A

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

A: Check the following:

The connection between the power adaptor and the power socket.

The status of the power switch.

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

A: Check the following:

The connection between the Cable Modem and your computer, hub, or switch.

The running status of your PC, hub, or switch.

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

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

FCC Statement

This 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.

The grantee is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

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

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

IC Statement

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

CAN ICES-3(B)/NMB-3(B)

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) il ne doit pas produire de brouillage et
- (2) l'utilisateur du dispositif doit être prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ou émetteur. Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.