User's Manual

HAWKING TECHNOLOGY

HWREG1

Hi-Gain Wireless-G Range Extender

website | www.hawkingtech.com
e-mail | techsupport@hawkingtech.com

Copyright © 2006 Hawking Technologies, Inc. All Rights Reserved.

Federal Communication Commission 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 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 of the following measures:

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

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

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.

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.

Table of Contents

Chapter 1 Introduction 1
1.1 Package Contents 2
1.2 Features 2
1.3 Specifications 2
1.4 Physical Description 3
Chapter 2 Wireless Range Extender Connection 5
Chapter 3 Wireless Range Extender Configuration 6
3.1 Getting Started 6
3.2 Configuring the Range Extender 11
3.2.1 Status and Information 12
3.2.2 Basic Settings 13
3.2.3 Security 18
3.2.4 MAC Address Filtering 23
3.2.5 Advanced Setting 25
3.2.6 System Utility 27
3.2.7 Configuration Tool 30
3.2.8 Firmware Upgrade 31
3.2.9 Reset 31
Chapter 4 Troubleshooting 33

Chapter 1 Introduction

Congratulations on purchasing your Hi-Gain Wireless-G Range Extender. The HWREG1 is the simplest way to repeat your wireless network signal for increasing the range of your network. The advanced features in the second generation Range Extender from Hawking Technologies will ensure a significant increase in your wireless operating range as well as the easiest installation possible.

The Hi-Gain Wireless-G Range Extender features support for the latest in wireless security. WEP, WPA, WPA2 and Radius are all supported by the Range Extender. The new setup wizard and setup features allow you to simply scan for a wireless network to extend, select it and you are ready to go.

Whether your application is to eliminate a wireless dead spot within your home or extend your wireless connection to another room or building, the HWREG1 can easily double the effective range of your current network.

For more wireless range and distance, upgrading to Hawking's array of Hi-Gain Wi-Fi Range Extending Antennas is possible by removing the antenna attached to the HWREG1 and replacing it.

1.1 Package Contents

The Range Extender includes the following items:

- One Hi-GainWireless-G Range Extender
- One Power Adapter
- One Quick Installation Guide
- One CD with Setup Wizard and Users Manual

1.2 Features

- Complies with the IEEE 802.11b/g (DSSS) 2.4GHz specification.
- High data rate 54Mbps network speed.
- Seamlessly integrate wireless and wired Ethernet LAN networks.
- Auto rate fallback in case of obstacles or interferences.
- Provide 64/128-bit WEP, WPA and WPA2 Data Encryption function to protect wireless data transmissions.
- Built-in DHCP server supports auto IP addresses assignment.
- Supports Web-based configuration.

1.3 Specifications

- Standards: IEEE 802.11b/g (Wireless), IEEE 802.3 (Wired)
- Data Rate: 54/48/36/24/18/12/11/9/6/5.5/2/1Mbps auto fallback
- Security: 64/128-bit WEP and WPA Data Encryption
- Frequency Band: 2.400~2.4835GHz (Industrial Scientific Medical Band)
- Modulation: CCK@11/5.5Mbps, DQPSK@2Mbps and DBPSK@1Mbps
- Radio Technology: Direct Sequence Spread Spectrum (DSSS)
- Antenna: External detachable dipole antenna (with RP-SMA connector)
- Connectors: 10/100Mbps RJ-45 x 1
- Power: 12VDC, 0.5A
- Transmit Power: 15dBm (Typical)
- LEDs: Power, LAN Link/Activity, Wireless Activity
- Dimension: 30(H) x 127(W) x 96(D) mm
- Temperature:

  Operating: 32~131°F (0~55°C)

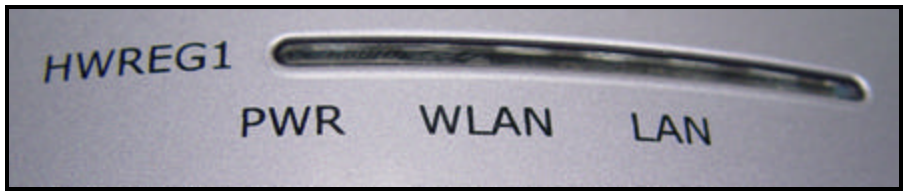
Storage: -4~158℉(-20~70°C)

- Humidity: 10-90% (Noncondensing)
- Certification: FCC, CE

1.4 Physical Description

Front Panel

On the Range Extender's front panel there are LED lights that inform you of the Range Extender's current status. Below is an explanation of each LED.



LED	Color	Status	Description
PWR	Green	Lit	Power is supplied.
		Off	No Power.
WLAN	Green	Flash	Antenna is transmitting or receiving data.
		Off	Antenna is not transmitting or receiving data.
LAN Link/Activity	Green	On	A valid link is established.
		Flash	It is transmitting or receiving data.
		Off	No link is established.

Back Panel

Range Extender's connection ports are located on the back panel. Below is the description of each connection port.

- Antenna Connector (ANT)
  This round connection is a standard Reverse SMA antenna connector. The antenna included in your packaging screws on here. Upgradeable to Hi-Gain antennas.

- DC Adapter Port
  Insert the power jack of the power adapter into this port.

- LAN Port
  The Range Extender's LAN port is the connector port for connecting the HWREG1 to your local network or computer during the setup procedure. (Uses Included Ethernet Cable)

- Reset
  The Reset button allows you to do one of two things.

  1) If problems occur with your Range Extender, press the reset button with a pencil tip (for less than 4 seconds) and the Range Extender will re-boot itself, keeping your original configurations.

  2) If problems persist or you experience critical issues or have forgotten your password, press the reset button for longer than 4 seconds and the Range Extender will reset itself to the factory default settings (warning: your original configurations will be replaced with the factory default settings).

Chapter 2 Wireless Range Extender Connection

1. **Locate an optimum location for the Wireless Range Extender.**
   The best location for your Range Extender is usually at the center of your wireless network, with line of sight to all of your local computers. However, depending on the application, you may place your Range Extender at any location that is between your original wireless router or access point and your wireless trouble spot. Do not place the Range Extender in your desired location yet. You must first connect it to your network for configuration.

2. **Connect the Wireless Range Extender to your router, hub or switch.**
   Connect one end of standard Ethernet cable to the Range Extender's LAN Port and connect the other end of the cable to a switch, a router or a hub. The Range Extender will then be connected to your existing Network.

3. **Connect the DC Power Adapter to the Wireless Range Extender's Power Socket.**
   Only use the power adapter supplied with the Range Extender. Using a different adapter may damage the product.

The Hardware Installation is complete.

Chapter 3 Wireless Range Extender Configuration

3.1 Getting Started

This Range Extender provides two options for installation: 1)a Web-Based configuration tool for basic and advanced configurations via a web browser or 2) basic configurations using a software CD based Setup Wizard. Follow the instructions below to get started with the Web-Based configuration. (The Quick Installation Guide covers how to install your product via the Setup Wizard)

From Wired Computer

1. Make sure your wired computer is in the same subnet with the Range Extender. The default IP Address and Sub Mask of the Range Extender is:
   Default IP Address: 192.168.1.235
   Default Subnet: 255.255.255.0

   Configure your PC to be in the same subnet with the Range Extender.
   1a) Windows 95/98/Me
   1. Click the *Start* button and select *Settings*, then click *Control Panel*. The *Control Panel* window will appear.
   2. Double-click *Network* icon. The *Network* window will appear.
   3. Check your list of *Network Components*. If TCP/IP is not installed, click the *Add* button to install it now. If TCP/IP is installed, go to **step 6**.
   4. In the *Network Component Type* dialog box, select *Protocol* and click *Add* button.
   5. In the *Select Network Protocol* dialog box, select *Microsoft and TCP/IP* and then click the *OK* button to start installing the TCP/IP protocol. You may need your Windows CD to complete the installation.
   6. After installing TCP/IP, go back to the *Network* dialog box. Select *TCP/IP* from the list of *Network Components* and then click the *Properties* button.
   7. Check each of the tabs and verify the following settings:
      - **Bindings**: Check *Client for Microsoft Networks* and *File and printer sharing for Microsoft Networks*.
      - **Gateway**: All fields are blank.

- **DNS Configuration**: Select *Disable DNS.*
- **WINS Configuration**: Select *Disable WINS Resolution.*

- **IP Address**: Select *Specify an IP Address.* Specify the IP Address and Subnet Mask as following example.
  - ✓ IP Address: 192.168.1.235 (any IP address within 192.168.1.2~192.168.1.234 is available, **do not setup 192.1681.1 or 192.168.1.235**)
  - ✓ Subnet Mask: 255.255.255.0

8. Reboot the PC. Your PC will now have the IP Address you specified.

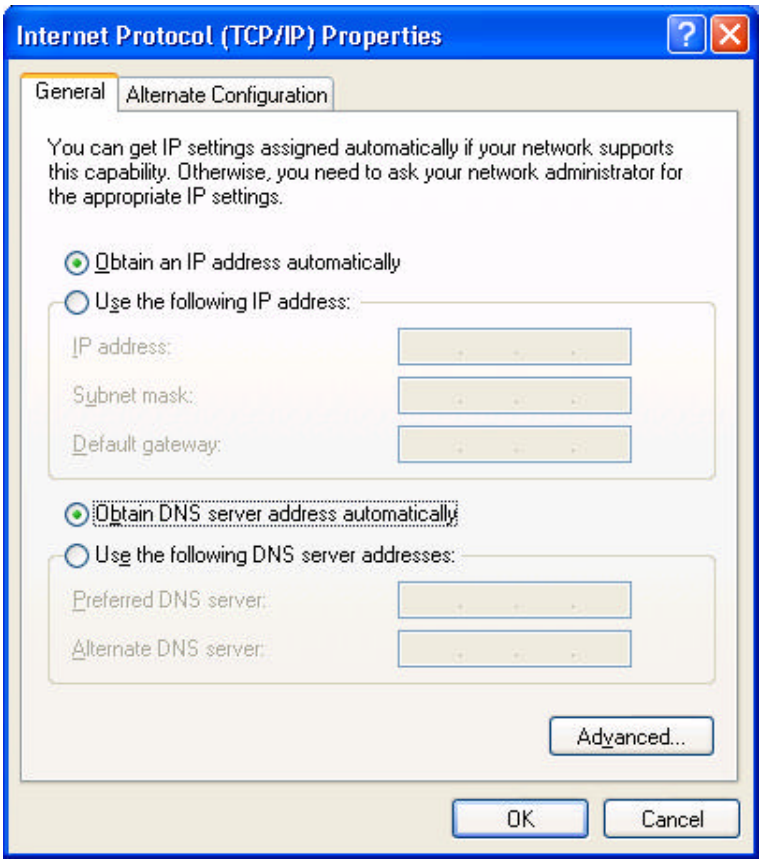
1b) Windows XP

1: Click the *Start* button and select *Settings*, then click *Network Connections.* The *Network Connections* window will appear.

2: Double-click *Local Area Connection* icon. The *Local Area Connection* window will appear.

3: Check your list of Network Components. You should see *Internet Protocol [TCP/IP]* on your list. Select it and click the *Properties* button.

4: In the Internet Protocol (TCP/IP) Properties window, select *Obtain an IP address automatically* and *Obtain DNS server address a utomatically* as shown on the following screen.



5: Click *OK* to confirm the setting. Your PC will now obtain an IP address automatically from your Broadband Router's DHCP server.

Note: Please make sure that the Broadband router's DHCP server is the only DHCP server available on your LAN.

Once you've configured your PC to obtain an IP address automatically, please proceed to Step 3.

1c) Windows 2000

1. Click the *Start* button and select *Settings*, then click *Control Panel*. The *Control Panel* window will appear.
2. Double-click *Network and Dial-up Connections* icon. In the *Network and Dial-up Connection* window, double-click *Local Area Connection* icon. The *Local Area Connection* window will appear.
3. In the *Local Area Connection* window, click the *Properties* button.
4. Check your list of *Network Components*. You should see *Internet Protocol [TCP/IP]* on your list. Select it and click the *Properties* button.
5. In the *Internet Protocol (TCP/IP) Properties* window, select *Use the following IP address* and specify the IP Address and Subnet mask as following.

- ✓ IP Address: 192.168.1.3 (any IP address within 192.168.1.2~192.168.1.234 is available, **do not setup 192.168.1.1 or 192.168.1.235**)
- ✓ Subnet Mask: 255.255.255.0

6. Click *OK* to confirm the setting. Your PC will now have the IP Address you specified.

1d) Windows NT

1. Click the *Start* button and select *Settings*, then click *Control Panel*. The *Control Panel* window will appear.
2. Double-click *Network* icon. The *Network* window will appear. Select the *Protocol* tab from the *Network* window.
3. Check if the *TCP/IP Protocol* is on your list of *Network Protocols*. If *TCP/IP* is not installed, click the *Add* button to install it now. If *TCP/IP* is installed, go to **step 5**.
4. In the Select *Network Protocol* window, select the *TCP/IP Protocol* and click the *Ok* button to start installing the *TCP/IP protocol*. You may need your Windows CD to complete the installation.
5. After you install *TCP/IP*, go back to the *Network* window. Select *TCP/IP* from the list of *Network Protocols* and then click the *Properties* button.
6. Check each of the tabs and verify the following settings:

   - **IP Address:** Select *Specify an IP address.* Specify the IP Address and Subnet Mask as following example.
     - ✓ IP Address: 192.168.1.3 (any IP address within 192.168.1.2~192.168.1.235 is available, **do not setup 192.168.1.1 or 192.168.1.235**)
     - ✓ Subnet Mask: 255.255.255.0
   - **DNS:** Let all fields are blank.
   - **WINS:** Let all fields are blank.
   - **Routing:** Let all fields are blank.

7. Click *OK* to confirm the setting. Your PC will now have the IP Address you specified.

2. Enter http://**192.168.1.235** from Web Browser to get into the Range Extender's configuration interface.
3. A screen will appear and request for a user name and password. The default user name and password is as follows.
   User Name: Admin
   Password: 1234
   Enter the default user name and password, then press **OK** to continue.

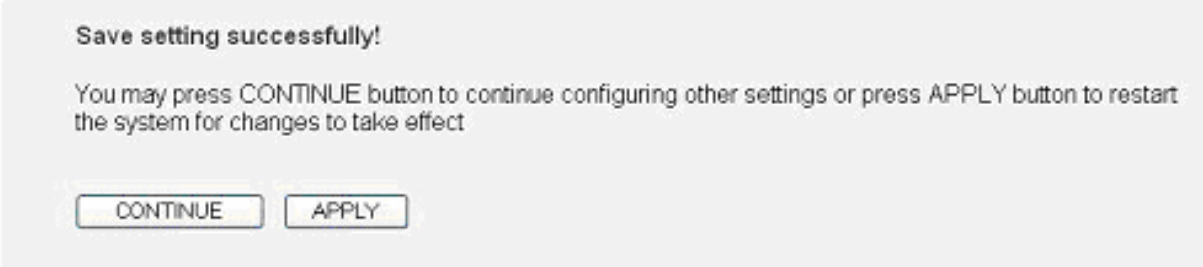
4. You can now start to configure the Range Extender.

From a Wireless Computer

1. Make sure your wireless computer is in the same subnet with the Range Extender. Please refer to the **step 1** above for configuring the IP Address and Sub Mask of the wireless computer.

2. Connect to the Range Extender.
   The Range Extender's default SSID is "**HawkingExtender**" and the WEP Encryption function is disabled. Make sure your wireless computer is using the same E SSID as the Range Extender and associate your wireless computer to the Range Extender.
3. Enter **192.168.1.235** from Web Browser to get into the Range Extender's configuration interface.
4. Enter the user name and password and then press **OK** button and you are available to configure the Range Extender now.

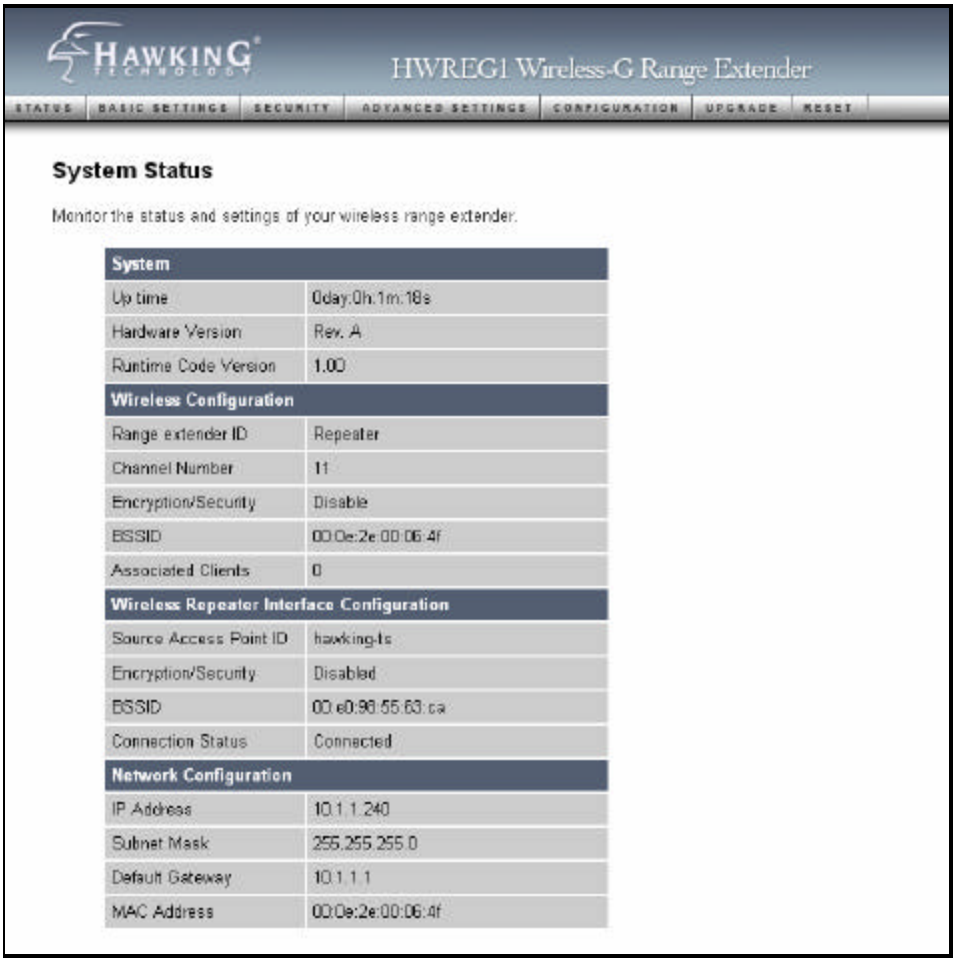
3.2 Configuring the Range Extender



When making changes to the interface you must click APPLY to register your changes. A pop up page will appear asking whether or not you wish to continue with your configuration or stop and apply all new settings. This feature allows you to continue adjusting your settings and configurations without having to apply and reboot every single time something is changed. Once you have made all your changes click APPLY and the system will reboot. If you're not finished with your configurations click CONTINUE to continue adjusting your settings.

3.2.1 Status and Information

On this screen, you can see the general information of the Range Extender including Alias Name, Firmware Version, ESSID, Channel Number, Status, IP Address, MAC Address, etc.



3.2.2 Basic Settings

The Basic Settings page lets you configure your Range Extender to extend a wireless network.

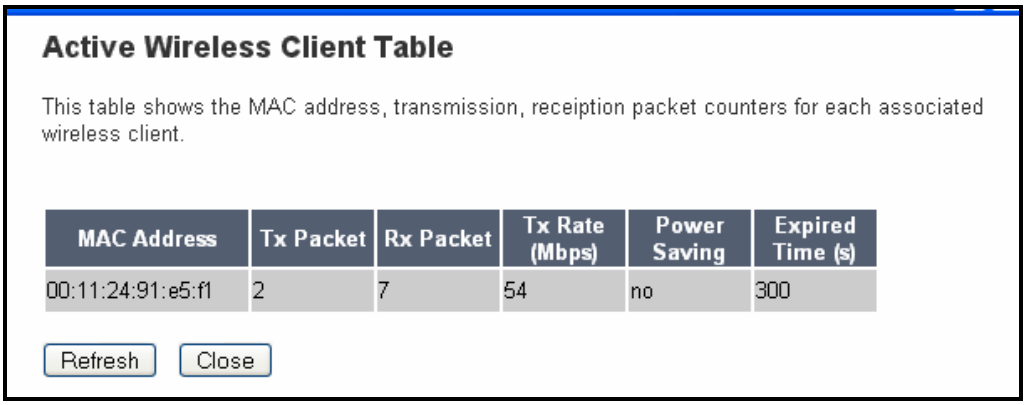
Parameter	Description
Range Extender ID	The Range Extender ID is the ESSID (up to 31 printable ASCII characters) of your Range Extender. It is the unique name identified in a WLAN. The ID prevents the unintentional merging of two co-located WLANs. Please make sure that the ESSID of all computers in the same WLAN network are the same. The default ESSID is "**HawkingExtender**". You may choose any ID here to identify your Extender's wireless connection.
Band	Allows you to select a specific network for wireless operation from the Range Extender. 802.11b only (11Mbps) or 802.11g only (54Mbps) or

	both. Both is recommended.
Source AP ID	Allows you to manually input the SSID of the network you wish to repeat or extend. The channel number selected must match the channel of the network you are extending. Selecting SCAN is an alternative configuration method that allows you to scan for nearby wireless networks, select the network you wish to extend and the settings will automatically be applied.
Associated Clients	Click "Show Active Clients" button and the "Active Wireless Client Table" will pop up. You can see the status of all active wireless computers that are connected to the Range Extender.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Range Extender.

Active Wireless Client Table

"Active Wireless Client Table" records the status of all active wireless computers that are connecting to the Range Extender. You can lookup the MAC Address, Number of Transmitted Packets, Number of Received Packets and Encryption Status of each active wireless client in this table.

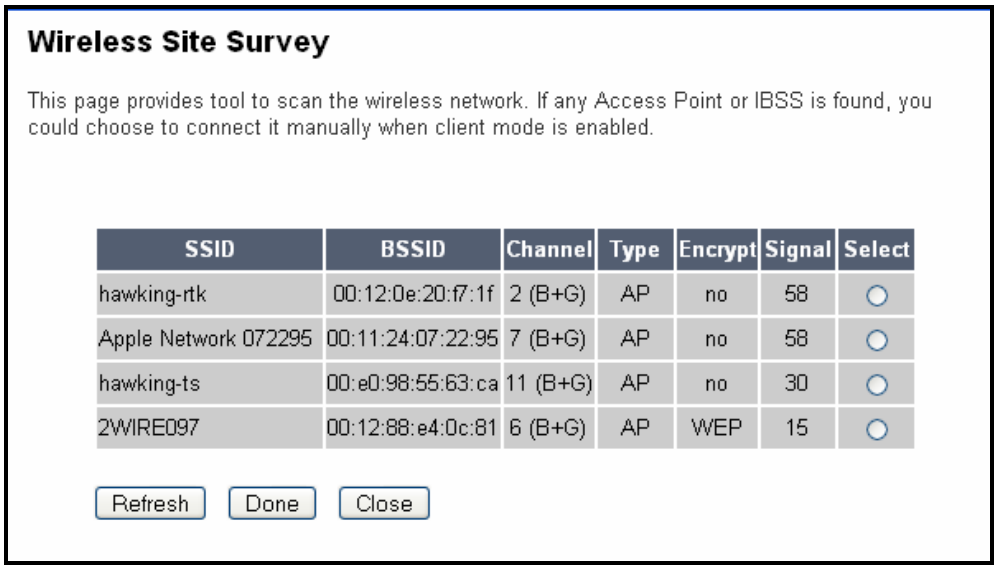


Parameter	Description

MAC Address	MAC address of this active wireless computer.
Tx Packet	The number of transmitted packets that are sent out from this active wireless computer.
Rx Packet	The number of received packets that are received by this active wireless computer.
TX Rate	The transmission rate in Mbps.
Power Saving	Shows if the wireless client is in Power Saving mode.
Expired Time	The time in second before dissociation. If the wireless keeps idle long than the expired time, this Range Extender will dissociate it. The wireless client computer has to associate again when it become active.
Refresh	Refresh the "Active Wireless Client Table".
Close	Refresh the "Active Wireless Client Table".

Wireless Site Survey

The Wireless Site Survey displays all wireless networks within the range of your Wireless Range Extender. It provides detailed information on each detected network, including: Encryption, Network Data Rate, Device Mac Address, Channel Number, Signal Strength and Device Mode/Type.



Set Wireless Security

"Security" lets you setup the wireless security for the data transmission between the Range Extender, the Source Access Point and the wireless computers connecting to the Range Extender. Encryption settings include "WEP 64bits", "WEP 128bits", "WPA (TKIP)", "WPA2 (AES)" encryption methods.

Parameter	Description

Encryption	You can select "Disable","WEP 64bits", "WEP 128bits", "WPA (TKIP)" or "WPA2 (AES)" encryption methods.
Key Format	This is only used when you select "WEP 64bits" or "WEP 128bits" encryption method. You may select to select ASCII Characters (alphanumeric format) or Hexadecimal Digits (in the "A-F", "a-f" and "0-9" range) to be the WEP Key. For example: ASCII Characters: guest Hexadecimal Digits: 12345abcde
WEP Key	This is only used when you select "WEP 64bits" or "WEP 128bits" encryption method. The WEP key is used to encrypt data transmitted between the bridged Range Extenders. Fill the text box by following the rules below. 64-bit WEP: input 10-digit Hex values (in the "A-F", "a-f" and "0-9" range) or 5-digit ASCII character as the encryption keys. 128-bit WEP: input 26-digit Hex values (in the "A-F", "a-f" and "0-9" range) or 10-digit ASCII characters as the encryption keys.
Pre-shared Key Format	You may select to select Passphrase (alphanumeric format) or Hexadecimal Digits (in the "A-F", "a-f" and "0-9" range) to be the Pre-shared Key. For example: Passphrase: iamguest Hexadecimal Digits: 12345abcde
Pre-shared Key	The Pre-shared key is used to authenticate and encrypt data transmitted between the bridged Range Extenders. Fill the text box by following the rules below. Hex WEP: input 64-digit Hex values (in the "A-F", "a-f" and "0-9" range) or at least 8 character pass phrase as the pre-shared keys.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Range Extender.

3.2.3 Security

This Range Extender provides complete wireless LAN security functions, include WEP, IEEE 802.11x, IEEE 802.11x with WEP, WPA with pre-shared key and WPA with RADIUS. With these security functions, you can prevent your wireless LAN from illegal access. Please make sure your wireless computers use the same security function.
Note: This Range Extender can act as computer and AP at the same time. The security settings apply the same configuration to AP function and computer function.

WEP only

When you select 64-bit or128-bit WEP key, you have to enter WEP keys to encrypt data. You can generate the key by yourself and enter it. You can enter four WEP keys and select one of them as default key. Then the Range Extender can receive any packets encrypted by one of the four keys.

Parameter	Description
Key Length	You can select the 64 or 128-bit key to encrypt transmitted data. Larger

	WEP key length will provide higher level of security, but the throughput will be lower.
Key Format	You may select to select ASCII Characters (alphanumeric format) or Hexadecimal Digits (in the "A-F", "a-f" and "0-9" range) to be the WEP Key. For example: ASCII Characters: guest Hexadecimal Digits: 12345abcde
Default Tx Key	Select one of the four keys to encrypt your data. Only the key you select it in the "Default key" will take effect.
Key 1 - Key 4	The WEP keys are used to encrypt data transmitted in the wireless network. Fill the text box by following the rules below. 64-bit WEP: input 10-digit Hex values (in the "A-F", "a-f" and "0-9" range) or 5-digit ASCII character as the encryption keys . 128-bit WEP: input 26-digit Hex values (in the "A-F", "a-f" and "0-9" range) or 10-digit ASCII characters as the encryption keys.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Range Extender.

802.1x only

IEEE 802.1x is an authentication protocol. Every user must use a valid account to login to this Range Extender before accessing the wireless LAN. The authentication is processed by a RADIUS server. This mode only authenticates user by IEEE 802.1x, but it does not encryption the data during communication.

Parameter	Description
RADIUS Server IP address	The IP address of external RADIUS server.
RADIUS Server Port	The service port of the external RADIUS server.
RADIUS Server Password	The password used by external RADIUS server.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Range Extender.

802.1x WEP static key

IEEE 802.1x is an authentication protocol. Every user must use a valid account to login to this Range Extender before accessing the wireless LAN. The authentication is processed by a RADIUS server. This mode also uses WEP to encrypt the data during communication.

For the WEP settings, please refer to section "WEP only". For the 802.1x settings, please refer to section "802.1x only".

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Range Extender.

WPA pre-shared key

Wi-Fi Protected Access (WPA) is an advanced security standard. You can use a pre-shared key to authenticate wireless computers and encrypt data during communication. It uses TKIP or CCMP(AES) to change the encryption key frequently. So the encryption key is not easy to be broken by hackers. This can greatly improve your wireless security.

Parameter	Description
WPA(TKIP)	TKIP can change the encryption key frequently to enhance the wireless LAN security.
WPA2(AES)	This use CCMP protocol to change encryption key frequently. AES can provide high level encryption to enhance the wireless LAN security.
WPA2 Mixed	This will use TKIP or AES based on the other communication peer automatically.
Pre-shared Key Format	You may select to select Passphrase (alphanumeric format) or Hexadecimal Digits (in the "A-F", "a-f" and "0-9" range) to be the Pre-shared Key. For example: Passphrase: iamguest Hexadecimal Digits: 12345abcde
Pre-shared Key	The Pre-shared key is used to authenticate and encrypt data transmitted in the wireless network. Fill the text box by following the rules below. Hex: input 64-digit Hex values (in the "A-F", "a-f" and "0-9" range) or at

least 8 character pass phrase as the pre-shared keys.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Range Extender.

WPA RADIUS

Wi-Fi Protected Access (WPA) is an advanced security standard. You can use an external RADIUS server to authenticate wireless computers and provide the session key to encrypt data during communication. It uses TKIP or CCMP(AES) to change the encryption key frequently. This greatly improves your wireless security.

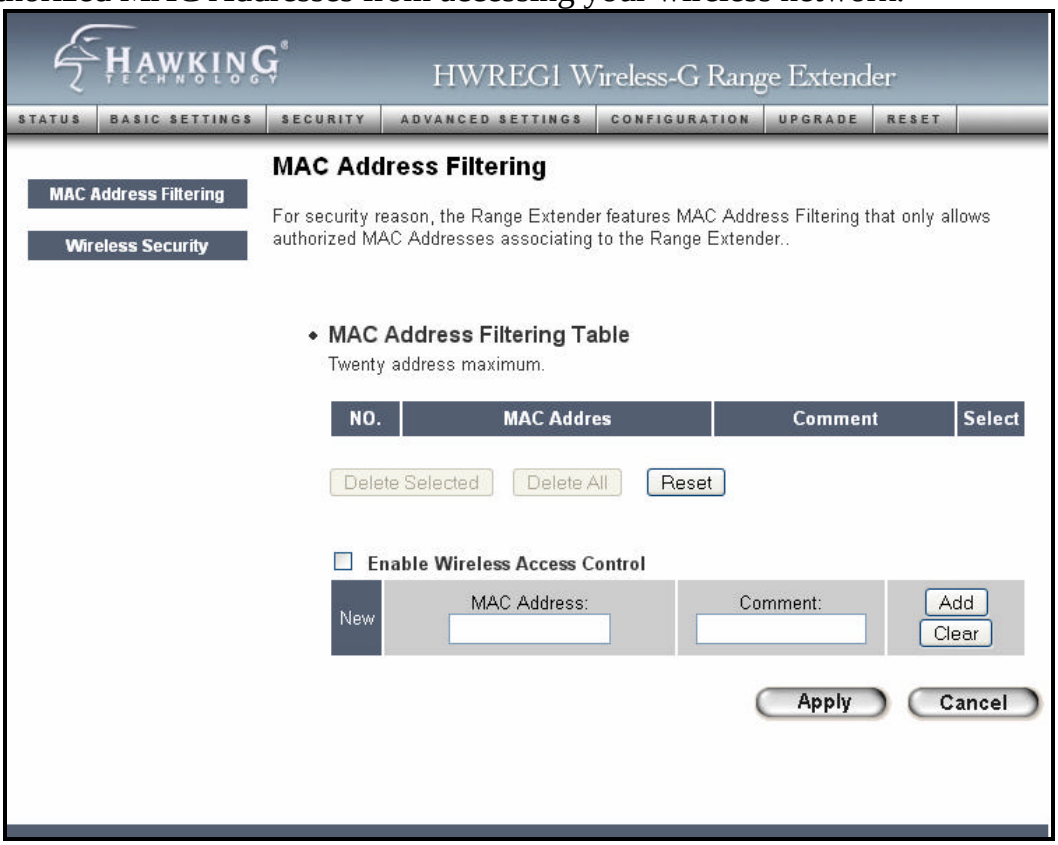
Parameter	Description
WPA(TKIP)	TKIP can change the encryption key frequently to enhance the wireless LAN security.
WPA2(AES)	This use CCMP protocol to change encryption key frequently. AES can provide high level encryption to enhance the wireless LAN security.

WPA2 Mixed	This will use TKIP or AES based on the other communication peer automatically.
RADIUS Server IP address	The IP address of external RADIUS server.
RADIUS Server Port	The service port of the external RADIUS server.
RADIUS Server Password	The password used by external RADIUS server.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Range Extender.

3.2.4 MAC Address Filtering

This Range Extender provides MAC Address Filtering, which prevents the unauthorized MAC Addresses from accessing your wireless network.



Parameter	Description

Enable Wireless Access Control	Enable or disable the MAC Address Filtering function.
MAC Address Filtering Table	This table records the MAC addresses of wireless computers you want to allow to access your network. The "Comment" field is the description of the wireless computer associated with the "MAC Address" and is helpful for you to recognize the wireless computer.
Add MAC address into the table	In the bottom "New" area, fill in the "MAC Address" and "Comment" of the wireless computer to be added and then click "Add". Then this wireless computer will be added into the "MAC Address Filtering Table" above. If you find any typo before adding it and want to retype again. Just click "Clear" and both "MAC Address" and "Comment" fields will be cleared.
Remove MAC address from the table	If you want to remove some MAC address from the "MAC Address Filtering Table", select the MAC addresses you want to remove in the table and then click "Delete Selected". If you want remove all MAC addresses from the table, just click "Delete All" button.
Reset	Click "Reset" will clear your current selections.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Range Extender.

3.2.5 Advanced Setting

You can set advanced parameters of this Range Extender. The parameters include Authentication Type, Fragment Threshold, RTS Threshold, Beacon Interval, Tx Operation Rate, Tx Basic Rate, Preamble Type, Broadcast ESSID. You should not change these parameters unless you know what effect the changes will have on the Range Extender.

Parameter	Description
Authentication Type	There are two authentication types: "Open System" and "Shared Key". When you select "Open System", wireless computers can associate with this Range Extender without WEP encryption. When you select "Shared Key", you should also setup WEP key in the "Encryption" page and wireless computers should use WEP encryption in the authentication phase to associate with this Range Extender. If you select "Auto", the

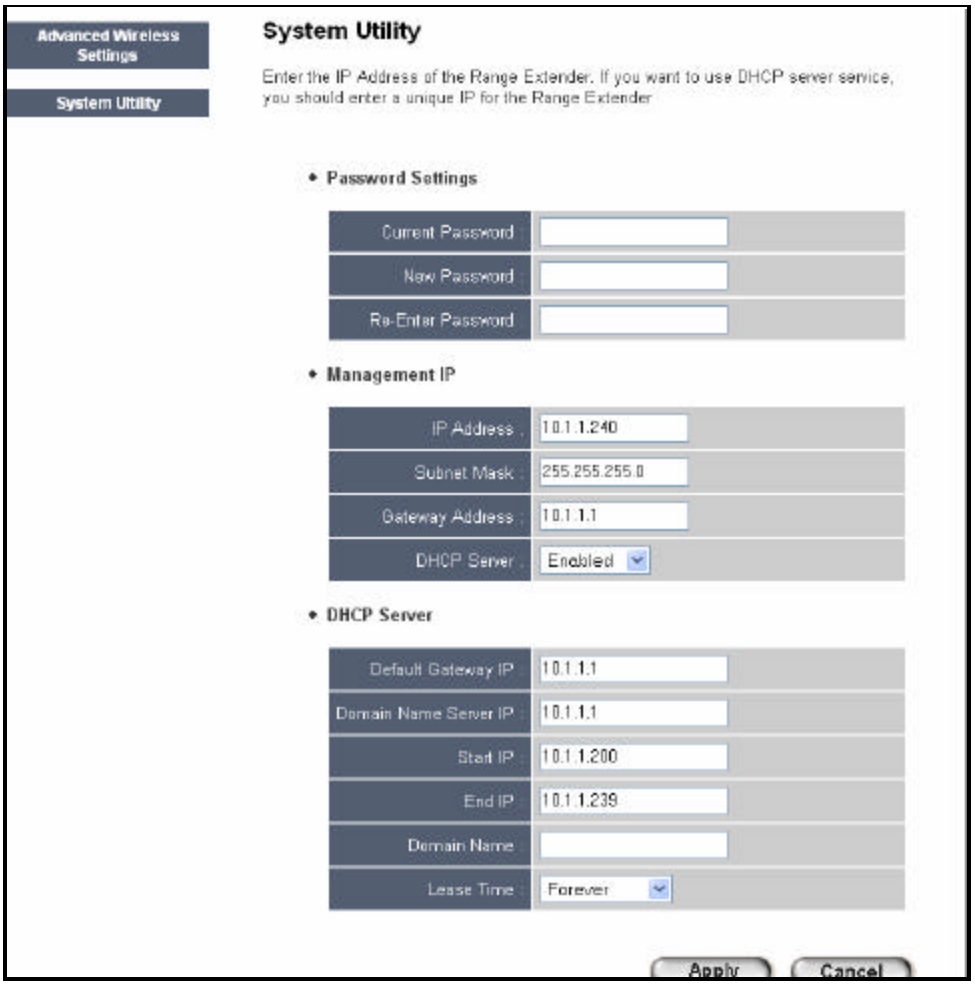
	wireless client can associate with this Range Extender by using any one of these two authentication types.
Fragment Threshold	"Fragment Threshold" specifies the maximum size of packet during the fragmentation of data to be transmitted. If you set this value too low, it will result in bad performance.
RTS Threshold	When the packet size is smaller than the RTS threshold, the Range Extender will not use the RTS/CTS mechanism to send this packet.
Beacon Interval	The interval of time that this Range Extender broadcast a beacon. Beacon is used to synchronize the wireless network.
Data Rate	The "Data Rate " is the rate this Range Extender uses to transmit data packets. The Range Extender will use the highest possible selected transmission rate to transmit the data packets.
Preamble Type	Preamble type defines the length of CRC block in the frames during the wireless communication. "Short Preamble" is suitable for high traffic wireless network. "Long Preamble" can provide more reliable communication.
Broadcast ESSID	If you enable "Broadcast ESSID", every wireless computer located within the coverage of this Range Extender can discover this Range Extender easily. If you are building a public wireless network, enabling this feature is recommended. Disabling "Broadcast ESSID" can provide better security.
IAPP	If you enable "IAPP", the Range Extender will automatically broadcast information of associated wireless computers to its neighbors. This will help wireless computer roaming smoothly between Range Extenders. If you have more than one Range Extenders in your wireless LAN and wireless computers have roaming requirements, enabling this feature is recommended. Disabling "IAPP" can provide better security.
802.11g Protection	This is also called CTS Protection. It is recommended to enable the protection mechanism. This mechanism can decrease the rate of data collision between 802.11b and 802.11g wireless computers. When the

protection mode is enabled, the throughput of the AP will be a little lower due to many of frame traffic should be transmitted.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Range Extender.

3.2.6 System Utility

From here, you can define the Range Extender's IP Address and Login Password and enable the Range Extender to be a DHCP Server.



Parameter	Description
Current Password	Enter the current password (up to 15-digit alphanumeric string) of the

	Range Extender. The default password for the Range Extender is **1234**. Note that the password is case-sensitive.
New Password	Enter the password (up to 15-digit alphanumeric string) you want to login to the Range Extender. Note that the password is case-sensitive.
Re-Enter Password	Reconfirm the password (up to 15-digit alphanumeric string) you want to login to the Range Extender. Note that the password is case-sensitive.
IP Address	Designate the Range Extender's IP Address. This IP Address should be unique in your network. The default IP Address is **192.168.2.1**.
Subnet Mask	Specify a Subnet Mask for your LAN segment. The Subnet Mask of the Range Extender is fixed and the value is **255.255.255.0**.
Gateway Address	The IP address of the default gateway of the subnet that this Range Extender resides in. It allows this Range Extender be accessed by PC from deferent subnet to do configuration.
DHCP Server	Enable or disable the DHCP Server.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Range Extender.

DHCP Server Setting

DHCP Server will automatically give your LAN client an IP address. If the DHCP is not enabled then you'll have to manually set your LAN client's IP address.

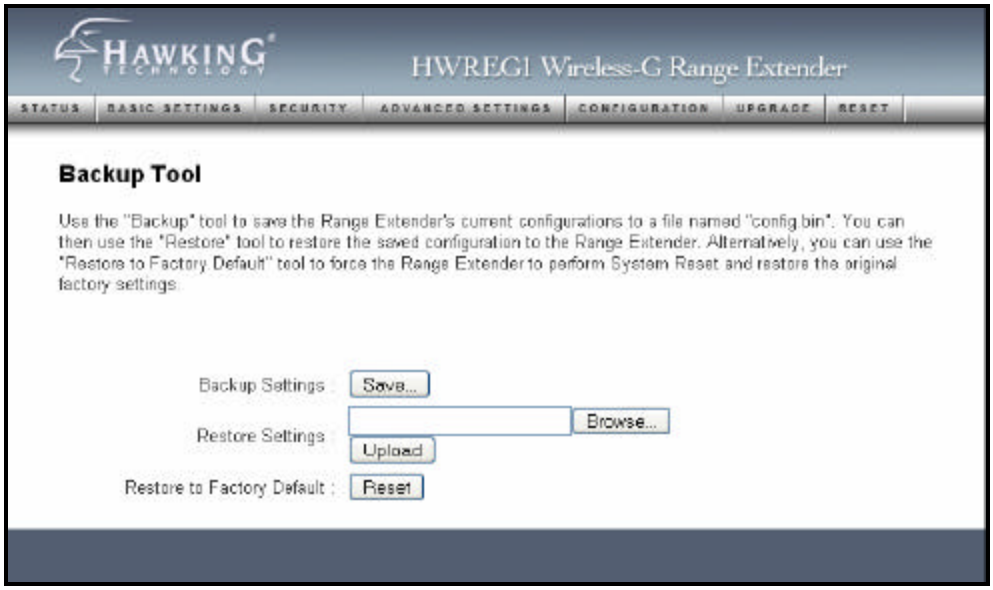
Parameter	Description
Default Gateway IP	Specify the gateway IP in your network. This IP address should be different from the Management IP.

Domain Name Server IP	This is the ISP's DNS server IP address that they gave you; or you can specify your own preferred DNS server IP address.
Start IP/End IP	You can designate a particular IP address range for your DHCP server to issue IP addresses to your LAN Clients. By default the IP range is from: Start IP **192.168.2.100** to End IP **192.168.2.200**.
Domain Name	You can specify the Domain Name for your Range Extender.
Lease Time	The DHCP Server when enabled will temporarily give your LAN client an IP address. In the Lease Time setting you can specify the time period that the DHCP Server lends an IP address to your LAN clients. The DHCP Server will change your LAN client's IP address when this time threshold period is reached.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Range Extender.

3.2.7 Configuration Tool

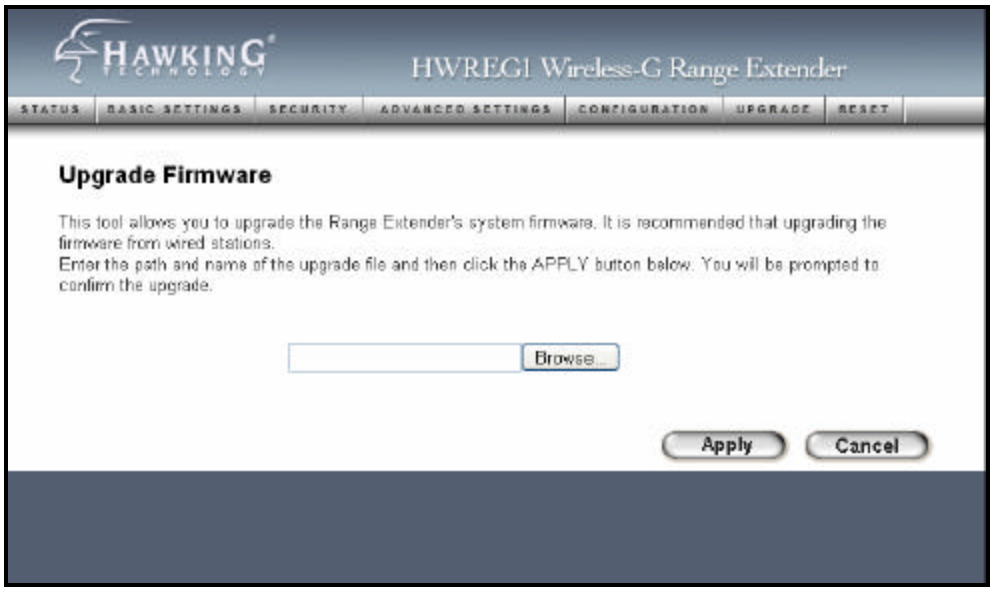
The Configuration Tools screen allows you to save (**Backup**) the Range Extender's current configuration setting. Saving the configuration settings provides an added protection and convenience should problems occur with the Range Extender and you have to reset to factory default. When you save the configuration setting (Backup) you can re-load the saved configuration into the Range Extender through the **Restore** selection. If extreme problems occur you can use the **Restore to Factory Default** selection, this will set all configurations to its original default settings (e.g. when you first purchased the Range Extender).



Parameter	Description
Configuration Tools	Use the "**Backup**" tool to save the Range Extender's current configuration to a file named "config.bin" on your PC. You can then use the "**Restore**" tool to upload and restore the saved configuration to the Range Extender. Alternatively, you can use the "**Restore to Factory Default**" tool to force the Range Extender to perform a power reset and restore the original factory settings.

3.2.8 Firmware Upgrade

This page allows you to upgrade the Range Extender's firmware.

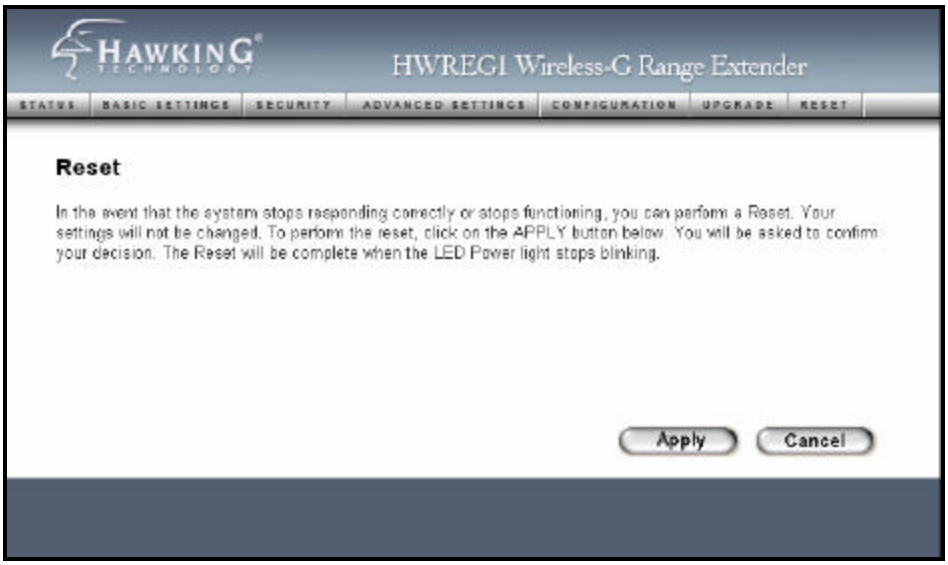


Parameter	Description
Firmware Upgrade	This tool allows you to upgrade the Range Extender's system firmware. To upgrade the firmware of your Range Extender, you need to download the firmware file to your local hard disk, and enter that file name and path in the appropriate field on this page. You can also use the **Browse** button to find the firmware file on your PC. Please reset the Range Extender when the upgrade process is complete.

Once you've selected the new firmware file, click **Apply** button at the bottom of the screen to start the upgrade process. (You may have to wait a few minutes for the upgrade to complete). Once the upgrade is complete you can start using the Range Extender.

3.2.9 Reset

You can reset the Range Extender's system should any problem exist. The reset function essentially Re-boots your Range Extender's system.



Parameter	Description
Reset	In the event that the system stops responding correctly or in some way stops functioning, you can perform a reset. **Your settings will not be changed**. To perform the reset, click on the **Apply** button. You will be asked to confirm your decision. Once the reset process is complete you may start using the Range Extender again.

Chapter 4 Troubleshooting

This chapter provides solutions to problems usually encountered during the installation and operation of the Range Extender.

1. How to manually find your PC's IP and MAC Address?

1) In Windows, open the Command Prompt program
2) Type **Ipconfig /all** and **Enter**
   - Your PC's IP address is the one entitled **IP address**
   - Your PC's MAC Address is the one entitled **Physical Address**

2. What is ESSID?

An Infrastructure configuration could also support roaming capability for mobile workers. More than one BSS can be configured as an Extended Service Set (ESS). Users within an ESS could roam freely between BSSs while maintaining a continuous connection to the wireless network computers and the Wireless Range Extenders.

3. Can data be intercepted while transmitting through the air?

WLAN features two-fold protection in security. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent scrambling security feature. On the software side, the WLAN series offers the encryption function (WEP, WPA, WPA2) to enhance security and access control.

4. What is WEP?

WEP stands for Wired Equivalent Privacy, a data privacy mechanism based on a 64(40)-bit shared key algorithm.

5. What is WPA?

WPA is an acronym for Wi-Fi Protected Access. It is a security protocol for 802.11 wireless networks. WPA can provide data protection with the use of encryption and the use of access controls and user authentication.

6. What is WPA2?

In addition to WPA, WPA2 provides a stronger encryption mechanism through

Advanced Encryption Standard (AES).

7. What is a MAC Address?

The Media Access Control (MAC) address is a unique number assigned by the manufacture r to any Ethernet networking device, such as a network adapter, that allows the network to identify it at the hardware level. For all practical purposes, this number is usually permanent. Unlike IP addresses, which can change every time a computer logs on to the network, the MAC address of a device stays the same, making it a valuable identifier for the network.