HAWKING TECHNOLOGY

HWREN2

Hi-Gain™ Wireless 300N Range Extender Pro

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

USER'S MANUAL ▶▶

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Federal Communication Commission Interference Statement

FCC Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of 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:

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

FCC Caution

This equipment must be installed and operated in accordance with provided instructions and a minimum 20 cm spacing must be provided between computer mounted antenna and person’s body (excluding extremities of hands, wrist and feet) during wireless modes of operation.

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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

Federal Communication Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

R&TTE Compliance Statement

This equipment complies with all the requirements of DIRECTIVE 1999/5/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of March 9, 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE).

The R&TTE Directive repeals and replaces in the directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) As of April 8, 2000.

Safety

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

EU Countries Intended for Use

The ETSI version of this device is intended for home and office use in Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

The ETSI version of this device is also authorized for use in EFTA member states: Iceland, Liechtenstein, Norway, and Switzerland.

EU Countries Not intended for use

None.

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Chapter I: Product Information

1-1 Product Introduction

Thank you for purchasing the Hawking HWREN2 Hi-Gain™ Wireless 300N Range Extender Pro!

Easy installation procedures allow any computer user to setup a network in very short time - within minutes, even inexperienced users. Just follow the instructions given in this user manual, you can complete the setup procedure and unleash the power of this range extender all by yourself!

Other features of the HWREN2 Hi-Gain™ Wireless 300N Range Extender Pro includes:

- Compatibility with IEEE 802.11b/g/Draft-N wireless network standard - works with other 802.11b/g/Draft-N wireless devices.
- High speed wireless network, three times faster than conventional 802.11g wireless network (up to 300Mbps).
- Supports DHCP server function.
- Supports 64/128-bit WEP, WPA, and WPA2 wireless data encryption.
- Supports MAC address filtering (Only allow specific wireless device of your choice to connect to this range extender).
- Supports WPS (Wi-Fi Protected Setup), simplifies wireless client setup procedures. Even inexperienced users can setup wireless network without a network technician's help!
- Easy to use web-based GUI (Graphical User Interface) for network configuration and management purposes.

1-2 Safety Information

In order to keep the safety of users and your properties, please follow the following safety instructions:

1. This range extender is designed for indoor use only; DO NOT place this range extender outdoors.

2. DO NOT put this range extender near hot or humid places, like a kitchen or bathroom. Also, do not leave this range extender in the car.

3. DO NOT pull any connected cable with force; disconnect it from the range extender first.

4. If you want to place this range extender at high places or hang on the wall, please make sure the range extender is firmly secured. Falling from high places would damage the range extender and its accessories, and void the warranty.

5. Accessories of this range extender, like the antenna and power supply, are dangerous to small children under 3 years old. They may put the small parts in their nose or mouth and it could cause serious damage to them. KEEP THIS RANGE EXTENDER OUT THE REACH OF CHILDREN!

6. The range extender will become hot when being used for a long time (***This is normal and is not a malfunction)*.** DO NOT put this range extender on paper, cloth, or other flammable materials.

7. There's no user-serviceable part inside the range extender. If you found that the range extender is not working properly, please contact your dealer of purchase and ask for help. DO NOT disassemble the range extender, or the warranty will be void.

8. If the range extender falls into water when it's powered, DO NOT use your hand to pick it up. Switch the electrical power off before you do anything, or contact an experienced electrical technician for help.

9. If you smell something strange or even see some smoke coming out from the range extender or power supply, remove the power supply or switch the electrical power off immediately, and call dealer of purchase for help.

1-3 System Requirements

- Computer or network device(s) with wired or wireless network interface card.
- Web browser (*Microsoft Internet Explorer 4.0 or above, Netscape Navigator 4.7 or above, Opera web browser, Mozilla Firefox web browser or Safari web browser).*
- An available AC power socket (100 – 240 V, 50/60Hz)

1-4 Package Contents

Before you starting to use this range extender, please check if there is anything missing in the package. Contact your place of purchase to claim missing items:

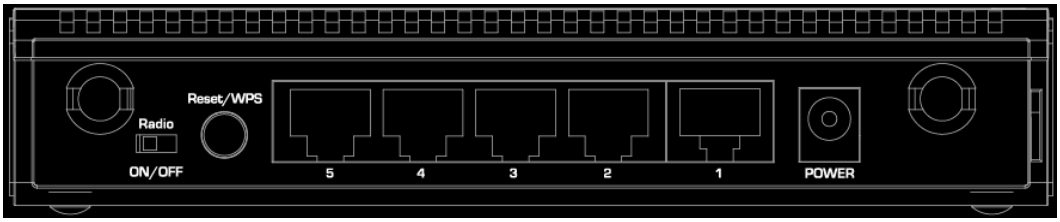
1x - 300N Range Extender Pro
2x - 3dBi Dipole Antenna
1x - Quick Installation Guide
1x - A/C power adapter
1x - Ethernet cord
1x - Setup CD

1-5 Product Overview

Front Panel

LED Name (Left to Right)	Light Status	Description
PWR	On	Device is turned on
	Off	Device is turned off
LAN 1-4	On	LAN port is connected
	Off	LAN port is not connected
	Flashing	LAN activity (transferring or receiving data)
WLAN	On	WLAN port is connected
	Off	WLAN port is not connected
	Flashing	Wireless activity (transferring or receiving data)

Back Panel



Item Name	Description
Antenna	Two SMA antenna connectors for the 3dBi detachable antenna enclosed with the product.
Power (12V/1A)	Power connector, connects to A/C power adapter.
Network	Local Area Network (LAN) port
Reset/WPS	Reset the router to factory default settings (clear all settings) or start WPS function. Press this button and hold for 15 seconds to restore all settings to factory defaults, power off/on. Press this button for less than

	5 seconds to start WPS function.

Chapter II: Quick Setup and Basic Settings

2-1 Installing the HWREN2

Complete the following instructions to build the network connection between your new wireless range extender and your computers or network devices:

1. Connect the range extender to your computer (source) through the LAN port of the range extender by Ethernet cable or connect to it wirelessly.

2. Connect the A/C power adapter to the wall socket, and then connect it to the ‘Power’ socket of the range extender.

3. Please check all LEDs on the front panel. LAN LEDs should be on if the range extender is correctly connected to the router. If it is not on, or any LED you expect is not on, please recheck the cabling, or jump to ***‘6-2 Troubleshooting’*** for possible reasons and solutions.

2-2 Connecting to the Range Extender by Web Browser

After your HWREN2 Hi-Gain™ Wireless 300N Range Extender Pro has been connected and powered the next step is to access the Web Menu for initial configuration. To do this, your computer must be able to get an IP address automatically (use dynamic IP address setting).

Try to access: http://192.168.1.240

If the Web Menu appears you can skip the next steps and go to step 2-3. You will need to enter the following default login and password to access the 'Quick Setup' menu:

Login: admin
Password: 1234

If it's set to use a static IP address or you are unsure, please follow the following instructions to configure your computer to use a dynamic IP address:

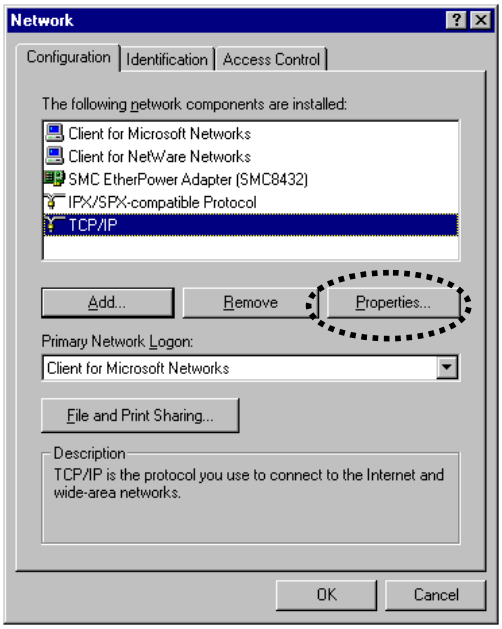
Note: Please be sure to set your network IP addresses back to default after you have finished configuration.

If the operating system of your computer is….

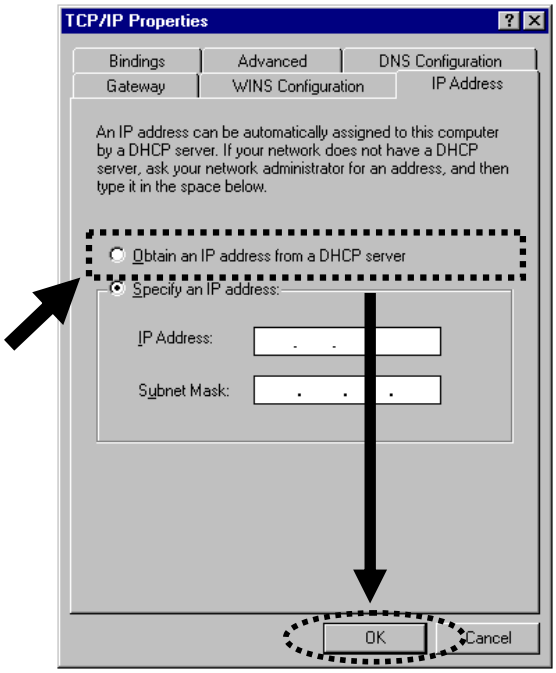
Windows 95/98/Me - please go to section 2-2-1
Windows 2000 - please go to section 2-2-2
Windows XP - please go to section 2-2-3
Windows Vista/7 - please go to section 2-2-4
Mac OS X - please go to section 2-2-5

2-2-1 Windows 95/98/Me IP Address Setup:

1. Click ‘Start’ button (it should be located at lower-left corner of your computer), then click control panel. Double-click ***Network*** icon, and ***Network*** window will appear. Select ‘TCP/IP’, then click ‘Properties’.

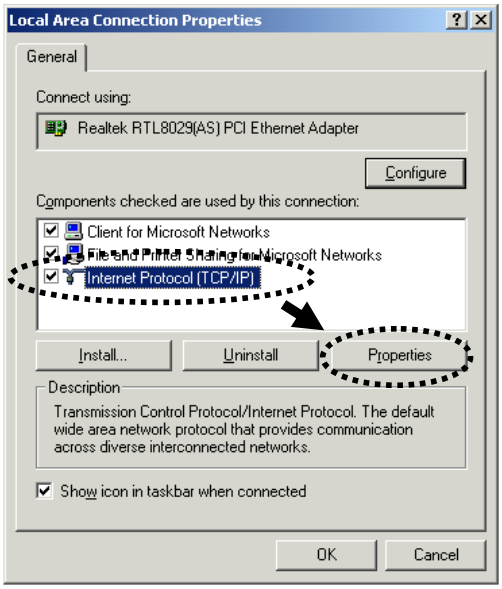


2. Select ‘Obtain an IP address from a DHCP server’ and then click ‘OK’.

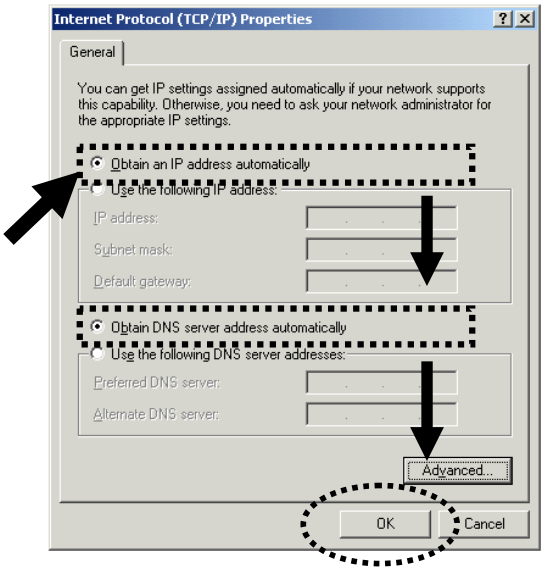


2-2-2 Windows 2000 IP Address Setup

1. Click ‘Start’ button (it should be located at lower-left corner of your computer), then click control panel. Double-click ***Network and Dial-up Connections*** icon; click ***Local Area Connection,*** and ***Local Area Connection Properties*** window will appear. Select ‘Internet Protocol (TCP/IP)’ and then click ‘Properties’

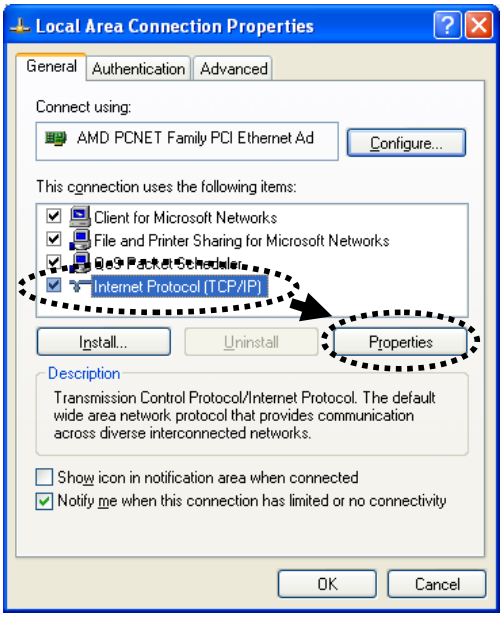


2. Select ‘Obtain an IP address automatically’ and ‘Obtain DNS server address automatically’, then click ‘OK’.

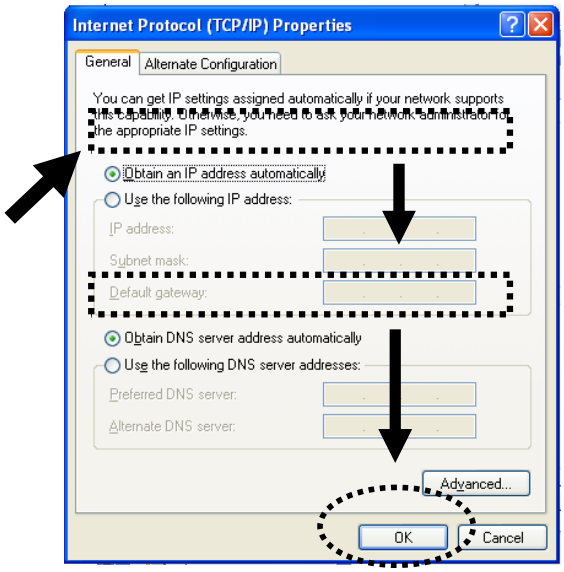


2-2-3 Windows XP IP Address Setup

1. Click ‘Start’ button (it should be located at lower-left corner of your computer), then click control panel. Double-click ***Network and Internet Connections*** icon, click ***Network Connections,*** and then double-click ***Local Area Connection, Local Area Connection Status*** window will appear, and then click ‘Properties’

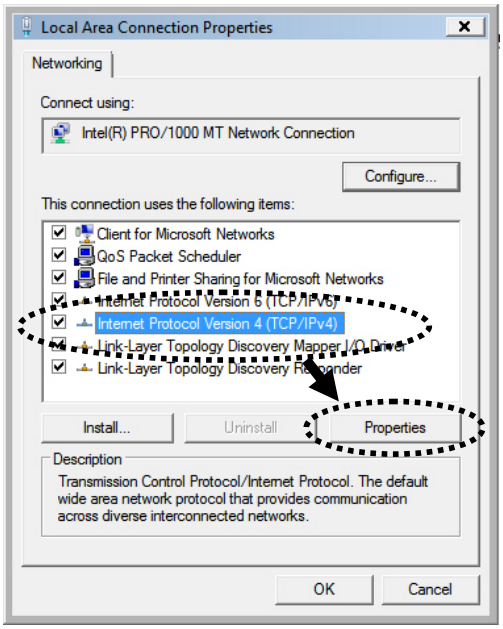


2. Select ‘Obtain an IP address automatically’ and ‘Obtain DNS server address automatically’, then click ‘OK’.

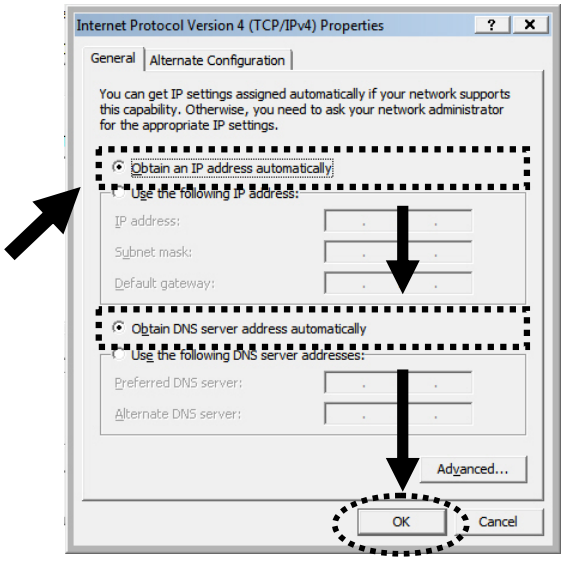

Internet Protocol (TCP/IP) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports
the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

2-2-4 Windows Vista/7 IP Address Setup

1. Click ‘Start’ button (it should be located at lower-left corner of your computer), then click control panel. Under ***Network and Internet,*** Click ***View Network Status and Tasks***, then click ***Manage Network Connections/Change Adapter Settings*** on the right hand column. Right-click ***Local Area Network, then select ‘Properties’. Local Area Connection Properties*** window will appear, select ‘Internet Protocol Version 4 (TCP / IPv4)’, and then click ‘Properties’



2. Select ‘Obtain an IP address automatically’ and ‘Obtain DNS server address automatically’, then click ‘OK’.


Internet Protocol Version 4 (TCP/IPv4) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

2-2-5 Mac OS X IP Address Setup

Go to your system preferences, go to network. Select your network connection. Make sure ‘Configure’ is set to ‘Using DHCP’.

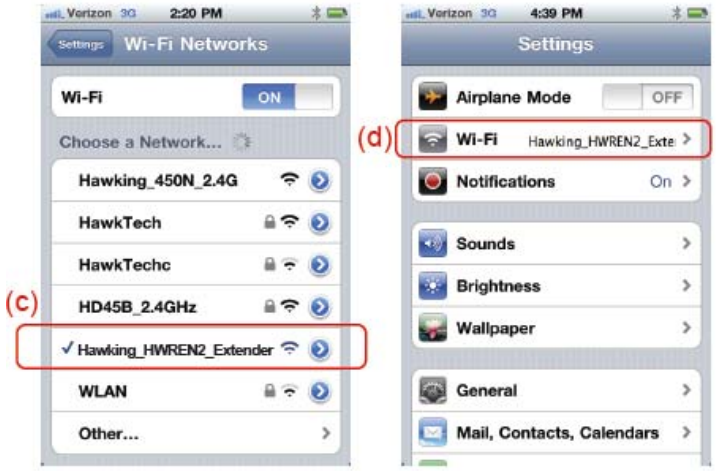
2-2-6 Tablet/Smartphone Setup

iOS (iPhone or iPad)

Go to your settings on your tablet or smart phone

First, make sure JavaScript is On: Go to Settings icon Select (a) Safari > make sure (b) JavaScript is ON.

back to Home Screen > Select Settings > In Wi-Fi Networks, select (c) “Hawking_HWREN2_Extender” > (d) Make sure your Wi-Fi is connected to Hawking_HWREN2_Extender

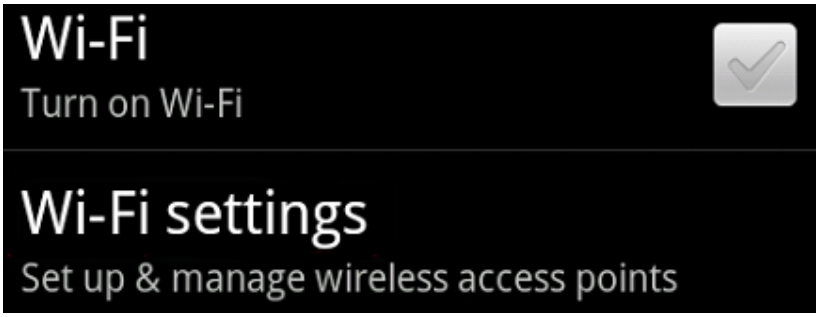


Android (Android 2.1 +)

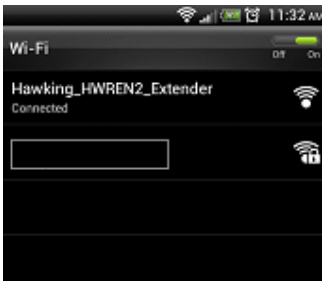
Go to Settings

Go to Wireless & Networks

Check “Turn on Wi-Fi” and then click on Wi-Fi settings

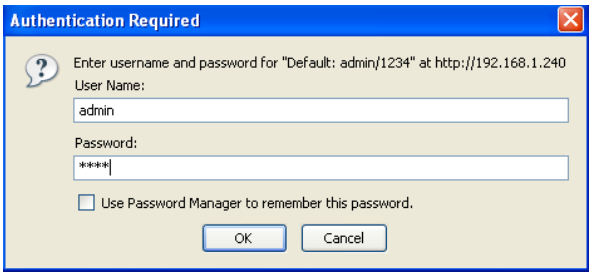


Look for Hawking_HWREN2_Extender, then select to connect

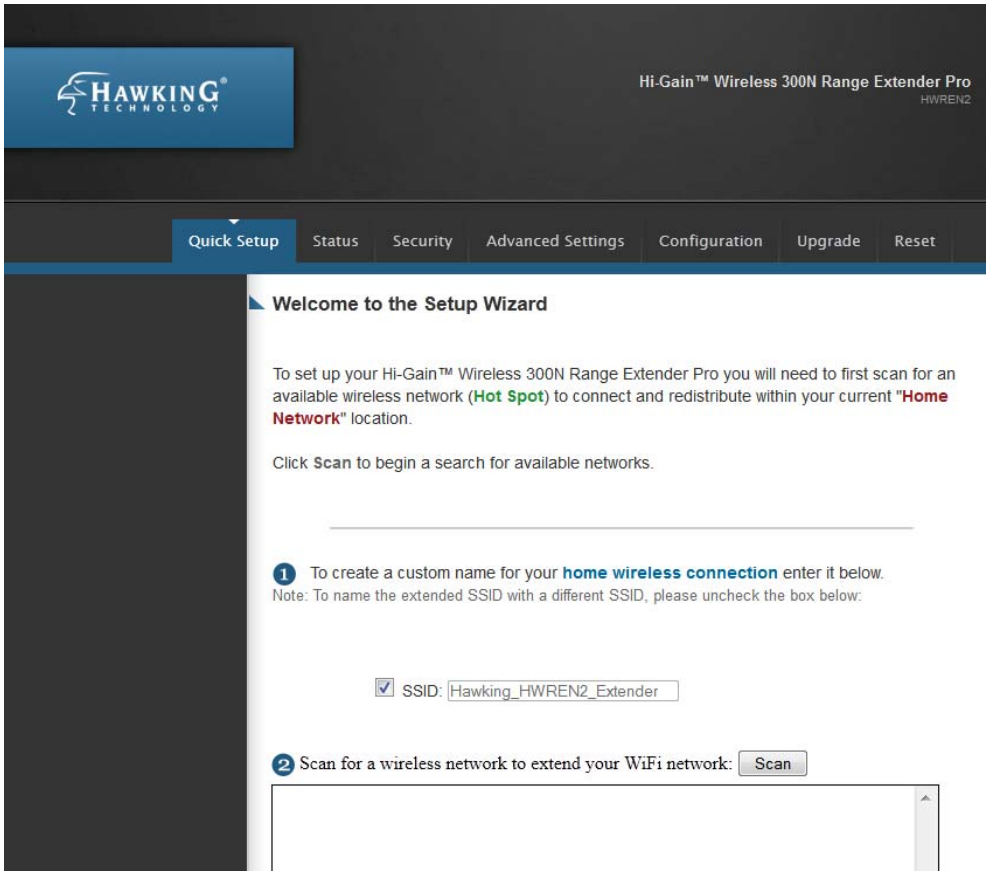


2-2-7 Connecting to Web Management Interface

All functions and settings of this range extender can be configured via web management interface. Please start your web browser, and input ‘192.168.1.240’ in address bar, then press the ‘Enter’ key. The following message should be shown:



Please input user name and password in the fields respectively, default user name is ‘admin’, and default password is ‘1234’, then press the ‘OK’ button, and you will see the web management interface of this range extender:



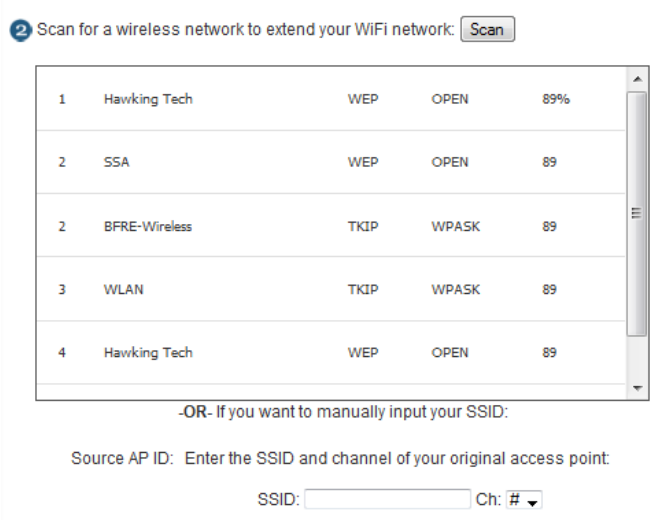
NOTE: If you can’t see the web management interface, and you are being prompted to input the user name and password again, it means you didn’t input the username and password correctly. Retype the user name and password again. If you’re certain about the username and password you typed are correct, please go to ‘6-2 Troubleshooting’ to perform a factory reset.

2-3 Quick Setup

After you have connected to the range extender by web browser, the first thing you see is ‘Quick Setup’ page. This is where you will setup and connect to your wireless networks.

Step 1) This will prompt you to create a custom name. By default, the range extender will be the same SSID as your original wireless network. If you wish to change it, please uncheck and manually input a custom name. Otherwise, leave checked.

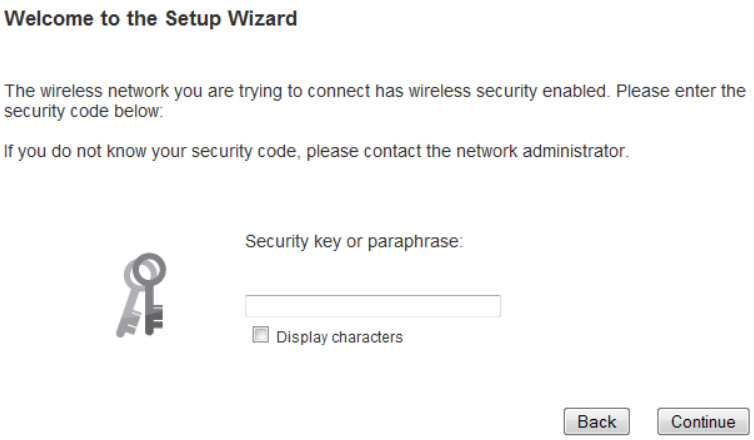
Step 2) Please select your wireless network from the list below by selecting the network with your mouse. If your wireless network does not appear, please click ‘Scan’ so our HWREN2 can rescan the wireless networks. You can also manually input your SSID and channel if you know them.



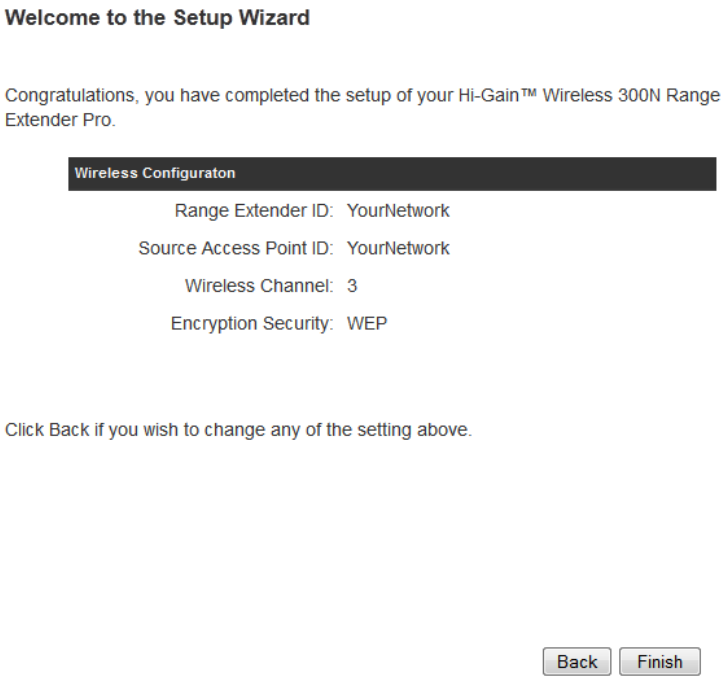
Step 3) After you select your network, press ‘Connect’ to proceed to the next step.

Step 4) If your wireless network requires a password, the next page should prompt you to enter your wireless key. This key should be the exact same key as your wireless access point or wireless router. Please contact your network administrator if you do not know the security code.

Click ‘Continue’ to proceed to the next step or ‘Back’ if you wish to make some changes.

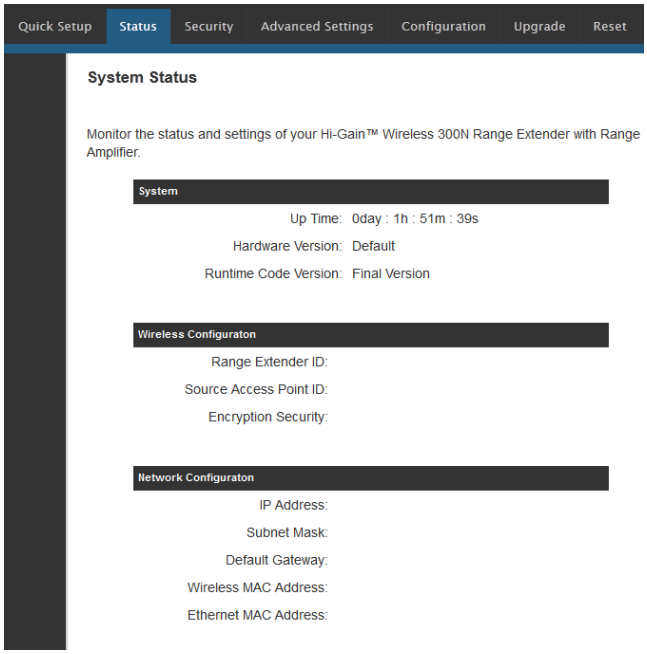


Step 5) Final summary page. If everything seems to be in order, please click ‘Finish’ Your device should automatically reboot and restart after 30 seconds. If you need to make changes, please click ‘Back’



2-4 Status

The Status page will give you a quick run through of the basic settings on the HWREN2 Hi-Gain™ Wireless 300N Range Extender Pro.



System

Up Time	*How long the device has been running.*
Hardware Version	*Current Version of the hardware.*
Runtime Code Version	*Current Version of the firmware.*

Wireless Configuration

Range Extender ID	*The HWREN2's wireless name (SSID)*
Source Access Point ID	*SSID of the connected access point/wireless router*
Encryption Security	*The type of wireless security being used.*

Network Configuration

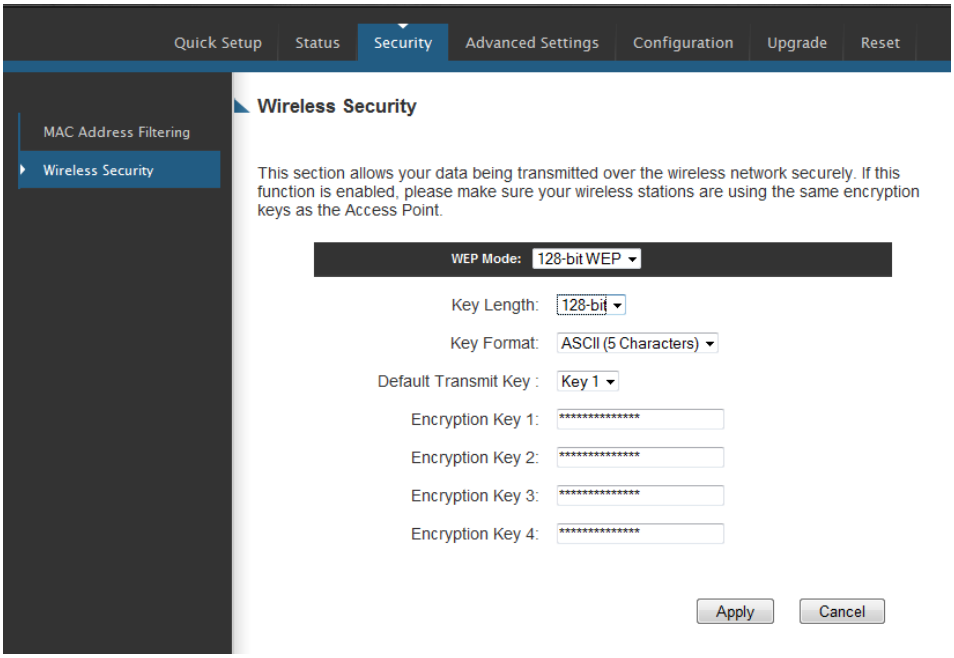
IP Address	*IP address of the HWREN2*
Subnet Mask	*Subnet Mask of the HWREN2*
Default Gateway	*Gateway address of the HWREN2*
Wireless MAC Address	*MAC address of the wireless adapter in the HWREN2*
Ethernet MAC Address	*MAC address of the Ethernet port of the HWREN2*

2-5 Wireless Security

This wireless range extender provides many types of wireless security (wireless data encryption). When you use data encryption, data transferred by radio signals in the air will become unreadable for those people who don't know the correct encryption key (encryption password).

> **Note: All security settings for the Range Extender must be identical to the original root Access Point's/Wireless Router's security settings. If you do not know, refer to the router's manual or contact your network admin for this information.**

1. Click the 'Security' tab and on the left hand column, click the 'Wireless Security' sub-tab in the web management interface.



There are three types of security levels you can select: Disable (no security - data encryption disabled), WEP, WPA Pre-shared Key. Please refer to the following sections for detailed instructions.

Please remember it’s very important to set wireless security settings properly! Without a proper setting, hackers and intruders may gain access to your local network and cause serious problems in your network.

There are several things you can do to improve wireless security:

1. Always enable data encryption. Only disable it when you want to open your wireless range extender to the public.

2. Never use simple words as encryption password. Using random combinations of symbols, numbers, and alphabets will greatly improve security.

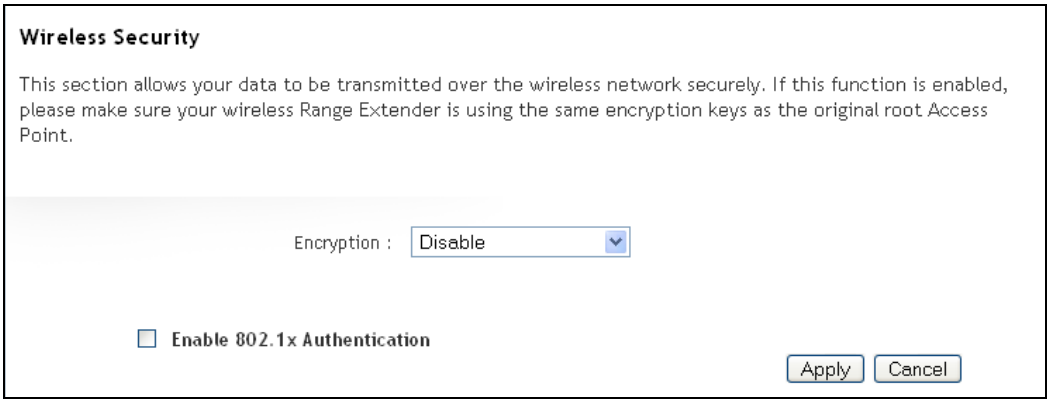
3. Use WPA when possible - it's much safer than WEP.

4. Change encryption password after you’ve used it for too long time.

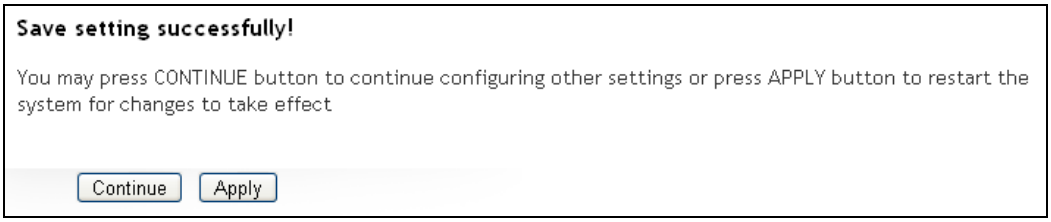
2-5-1 Disable Security

Note: The wireless security must match whatever network you are trying to extend. Otherwise, the device will not function.

When you select ‘Disable’, wireless encryption for the network is disabled.



After you finish with setting, click ‘Apply’, and the following message will be displayed:



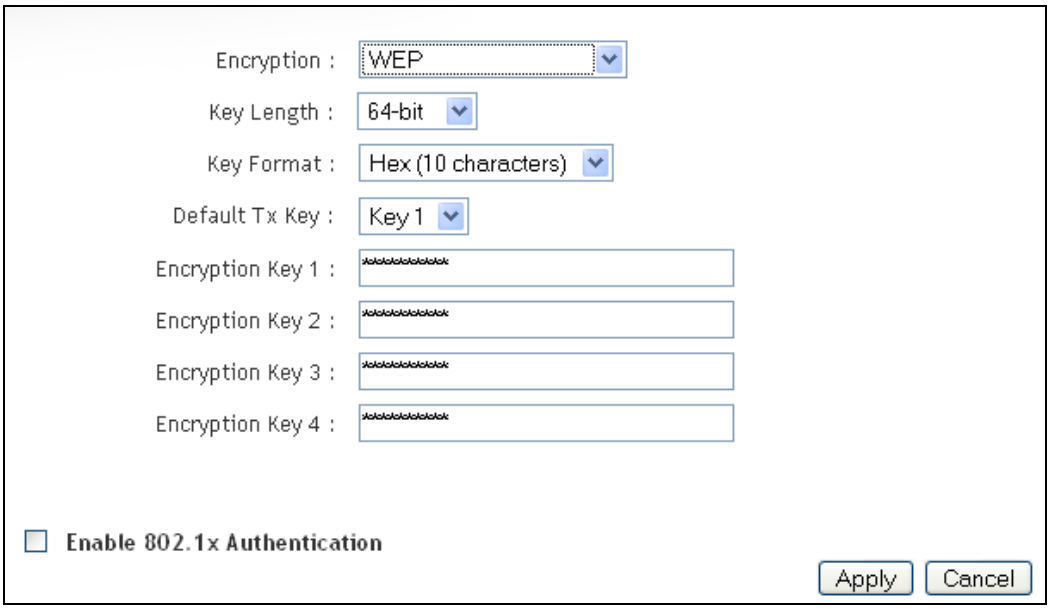
When you see this message, the settings you made are successfully saved. You can click the ‘Continue’ button to return to the previous page and modify other settings, or click the ‘Apply’ button to restart the wireless range extender. The changes will take effect after about 30 seconds.

2-5-2 WEP

WEP (Wired Equivalent Privacy) is a common encryption mode. It is safe enough for home and personal use but if you need higher level of security, please consider using WPA encryption (see next Section).

However, some wireless clients don't support WPA, but only support WEP, so WEP is still a good choice for you if you have such a client in your network environment.

When you select 'WEP' as encryption type, the following page will be displayed:

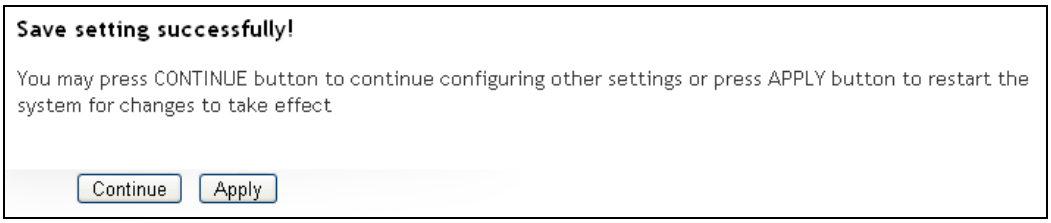


Here are descriptions of every setup item:

Key Length	*There are two types of WEP key length: 64-bit and 128-bit. Using 128-bit is safer than 64-bit, but will reduce some data transfer performance.*
Key Format	*There are two types of key format: ASCII and Hex. When you select a key format, the number of characters of key will be displayed. For example, if you select 64-bit'as key length, and Hex as key format, you'll see the message at the right of 'Key*

	Format' is Hex (10 characters), which means the length of WEP key is 10 characters.
Default Tx Key	*You can set up to four sets of WEP key, and you can decide which key is being used by default here.* ***If you don't know which one you should use, select "Key 1".***
Encryption Key 1 to 4	*Input WEP key characters here, the number of characters must be the same as the number displayed at "Key Format" field. You can use any alphanumerical characters (0-9, a-z, and A-Z) if you select 'ASCII' key format, and if you select "Hex" as key format, you can use characters 0-9, a-f, and A-F. You must enter at least one encryption key here, and if you entered multiple WEP keys, they should not be same with each other.*
Enable 802.1x Authentication	*Check this box to enable 802.1x user authentication.*

After you finish with setting, click 'Apply', and the following message will be displayed:

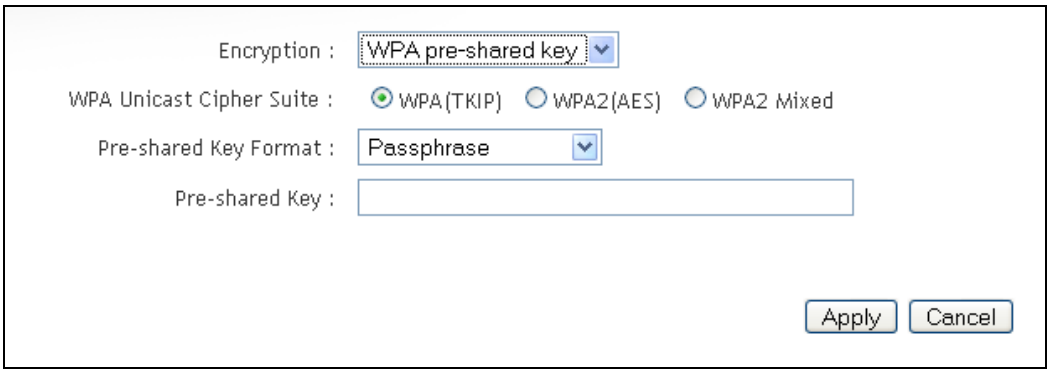


When you see this message, the settings you made are successfully saved. You can click the 'Continue' button to return to the previous page and modify other settings, or click the 'Apply' button to restart the wireless range extender. The changes will take effect after about 30 seconds.

2-5-3 WPA Pre-shared Key

WPA Pre-shared key is currently the safest encryption method. It is recommended to use this encryption method to ensure the safety of your data.

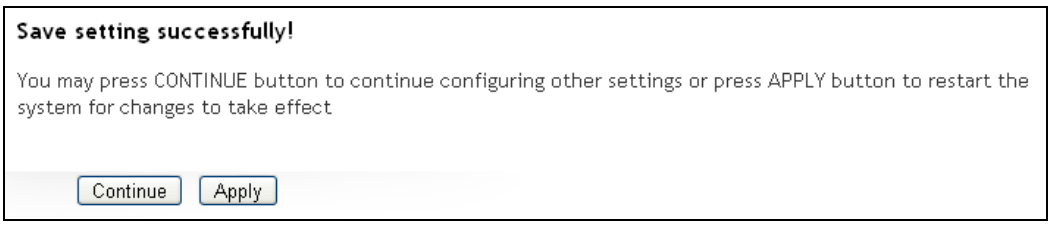
When you select 'WPA pre-shared key' as encryption type, the following messages will be displayed:



Here are descriptions of every setup item:

WPA Unicast Cipher Suite	*Available options are: WPA (TKIP), WPA2 (AES), and WPA2 Mixed. You can select one of them, but you have to make sure your wireless client supports the cipher you selected.*
Pre-shared Key Format	*Please select the format of pre-shared key here, available options are "Passphrase" (8 to 63 alphanumerical characters) and "Hex" (64 hexadecimal characters – 0 to 9 and a to f).*
Pre-shared Key	*Please input pre-shared key according to the key format you selected here. For security reasons, don't use simple words).*

After you finish with setting, click 'Apply', and the following message will be displayed:



When you see this message, the settings you made are successfully saved. You can click the ‘Continue’ button to return to the previous page and modify other settings, or click the ‘Apply’ button to restart the wireless range extender. The changes will take effect after about 30 seconds.

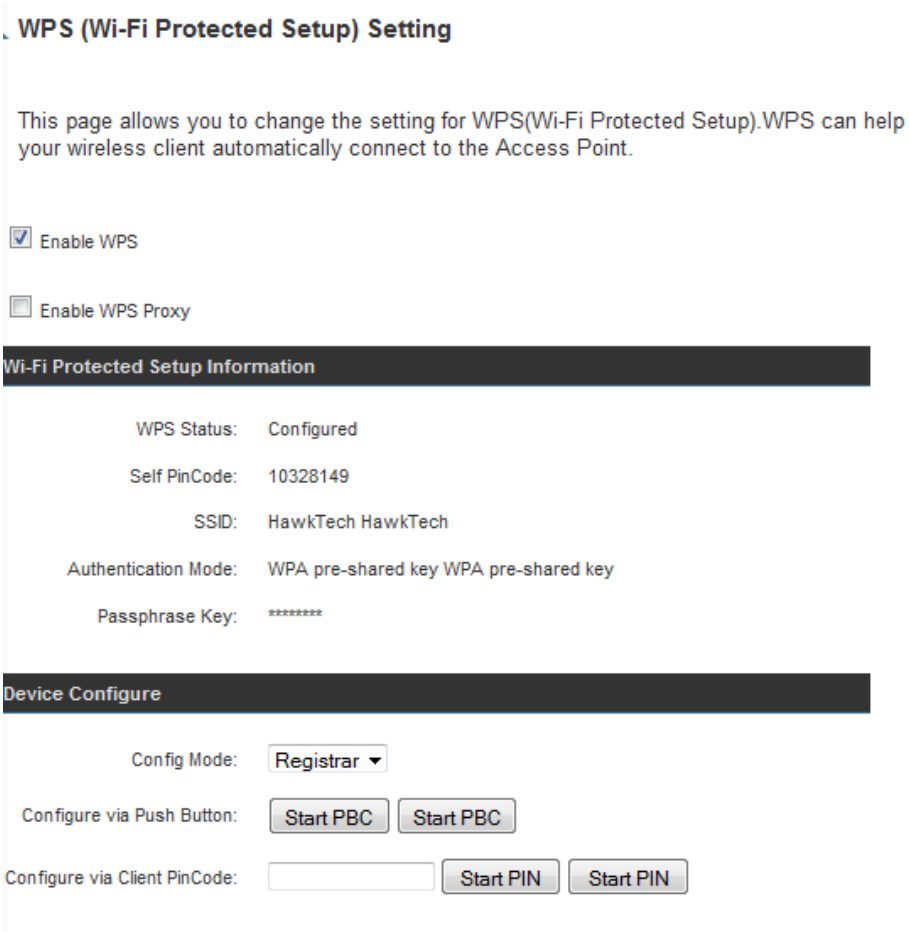
2-6 WPS Setting

Wi-Fi Protected Setup (WPS) is the simplest way to build a connection between wireless network clients and this extender. You don’t have to select encryption mode and input a long encryption passphrase every time when you need to setup a wireless client, you only have to press a button on wireless client and this extender, and the WPS will do the setup for you.

This range supports two types of WPS: Push-Button Configuration (PBC), and PIN code. If you want to use PBC, you have to switch this range extender to WPS mode and push a specific button on the wireless client to start WPS mode. You can push Reset/WPS button of this range extender or click ‘Start PBC’ button in the web configuration interface to do this; if you want to use PIN code, you have to provide the PIN code of the wireless client you wish to connect to this extender and then switch the wireless client to WPS mode. The detailed instructions are listed below:

Note: WPS function of this range extender will not work for those wireless clients that do not support WPS.

To use WPS function to set encrypted connection between this extender and WPS-enabled wireless client by WPS, click ‘WPS Setting’ on the left of web management menu, and the following information will be displayed:



Enable WPS	*Check this box to enable or disable WPS function*
Wi-Fi Protected Setup Information	*WPS Status: Displays WPS status. If data encryption settings of this extender has never been set, an 'unConfigured' message will be displayed here. If the data encryption settings have been set before, a 'Configured' message will be displayed here.* *Self PinCode: This is the WPS PIN code of this extender. This code is useful when you need to build wireless connection by WPS with other WPS-enabled wireless devices.* *SSID: Displays the SSID (ESSID) of this extender.* *Authentication Mode: The wireless security*

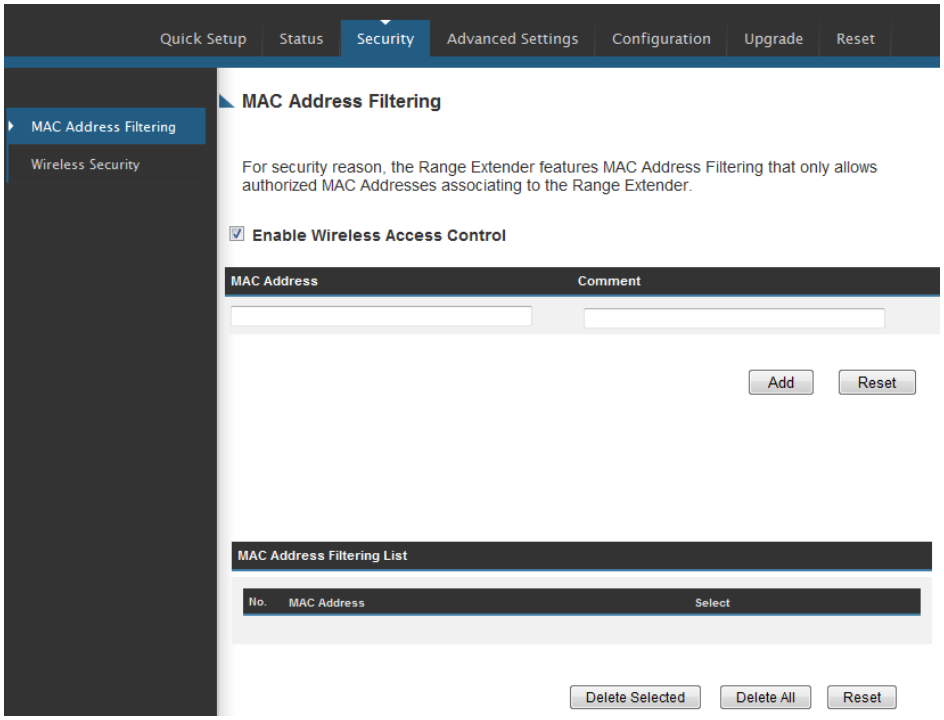
	authentication mode of this extender will be displayed here. If you don't enable security function of the range extender before WPS is activated, the extender will auto set the security to WPA (AES) and generate a set of passphrase keys for WPS connection. *Passphrase Key: Displays the WPA passphrase here, all characters will be replaced by asterisk for security reasons. If encryption is not set on this extender, nothing will be displayed here.*
Config Mode	*There are 'Registrar' and 'Enrollee' modes for the WPS connection. When 'Registrar' is enabled, the wireless clients will follow the extender's wireless settings for WPS connection. When 'Enrolle' mode is enabled, the extender will follow the wireless settings of wireless client for WPS connection.*
Start PBC	*Click 'Start PBC' to start Push-Button style WPS setup procedure. This range extender will wait for WPS requests from wireless clients for 2 minutes. The 'WLAN' LED on the range extender will be steady on for 2 minutes when this extender is waiting for incoming WPS request.*
Start PIN	*Please input the PIN code of the wireless client you via client wish to connect, and click 'Start PIN' button. The 'WLAN' LED on the extender will be steady on when this extender is waiting for incoming WPS request.*

NOTE: When you're using PBC type WPS setup, you must press 'PBC' button (hardware or software) of wireless client within 120 seconds; if you didn't press PBC button of wireless client within this time period, please press 'PBC' button (hardware or software) of this extender again.

2-7 MAC Address Filtering

Another security measure you can use to keep hackers and intruders away is ‘MAC Address filtering’. You can pre-define a so-called ‘white-list’, which contains MAC addresses of the wireless clients you trust. All other wireless clients with a MAC address that are not in your list will be denied by this wireless range extender.

To setup MAC filtering, click ‘MAC Address Filtering’ on left hand column under the ‘Security’ tab in the web management interface and the following page will be displayed:

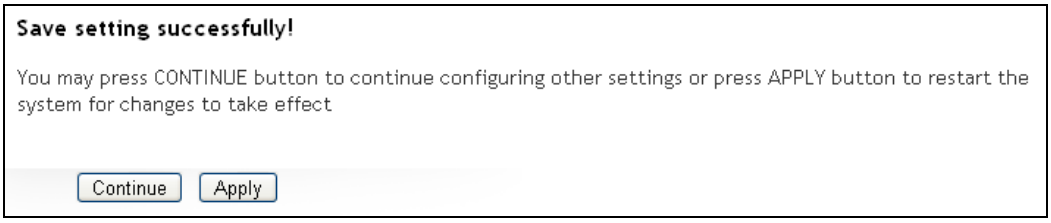


This page contains two parts of MAC filtering information. All allowed MAC addresses will be listed in upper part, and you can add new MAC addresses by components in lower part.

Enable Wireless Access Control	*Check this box to enable MAC address restriction. If unchecked, no restriction will be enforced (any wireless client with proper encryption setting will be able to connect to this wireless range extender).*
MAC address	*Input MAC address allowed using this wireless*

	range extender here. You don't have to add colon (:) or hyphen (-) by yourself, just input 0 to 9 and a to f here, like 112233445566 or aabbccddeeff.
Comment	*You can input any text here as the comment of this MAC address, like 'ROOM 2A Computer' or anything. You can input up to 16 alphanumerical characters here. This is optional and you can leave it blank. However, it's recommended to use this field to write a comment for every MAC address as a memory aid.*
Add	*When you finish inputting MAC address and (optional) Comment, click this button to add the MAC address to the list.*
Reset	*Remove all characters in 'MAC address' and 'Comments' field.*
Select	*Check this box to select one or more MAC addresses to delete.*
Delete Selected	*Click this button to delete all selected MAC addresses.*
Delete All	*Delete all MAC address entries.*
Reset	*Uncheck all selected MAC address entries.*

After you finish with setting, click 'Apply', and the following message will be displayed:



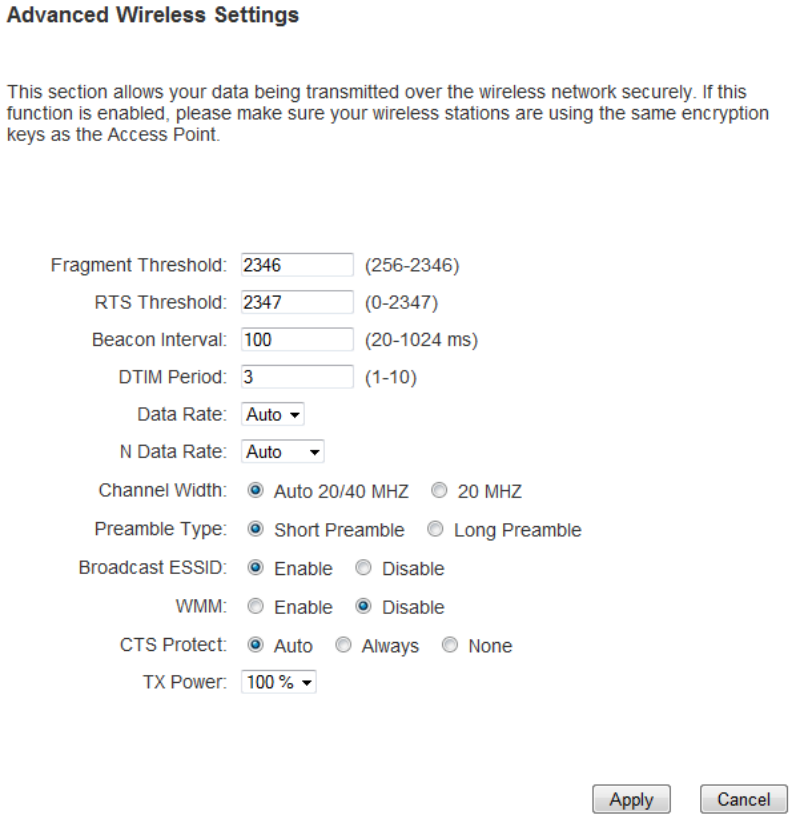
When you see this message, the settings you made are successfully saved. You can click the 'Continue' button to return to the previous page and modify other settings, or click the 'Apply' button to restart the wireless range extender. The changes will take effect after about 30 seconds.

Chapter III: Advanced Settings

3-1 Advanced Wireless Settings

This wireless range extender has many advanced wireless features. Please note that all settings listed here are for experienced users only, if you're not sure about the meaning and function of these settings, do not modify them, or the wireless performance will be reduced.

You can click 'Advanced Setting' tab at the top of web interface to enter advanced settings menu, and the following message will be displayed:

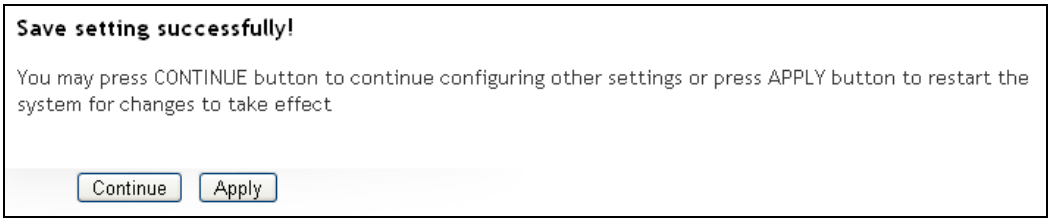


Fragment Threshold	*Set the Fragment threshold of wireless radio.* ***Do not modify default value if you don't know what it is, default value is 2346***
RTS Threshold	*Set the RTS threshold of wireless radio.* ***Do not modify default value if you don't know what it is,***

	default value is 2347
Beacon Interval	*Set the beacon interval of wireless radio.* ***Do not modify default value if you don't know what it is, default value is 100***
DTIM Period	*Set the DTIM period of wireless radio.* ***Do not modify default value if you don't know what it is, default value is 3***
Data Rate	*Set the wireless data transfer rate to a certain value. Since most of wireless devices will negotiate with each other and pick a proper data transfer rate automatically,* ***it's not necessary to change this value unless you know what will happen after modification.***
N Data Rate	*Set the data rate of 802.11 Draft-N clients, available options are MCS 0 to MCS 15, it's safe to set this option to 'Auto' and* ***it's not necessary to change this value unless you know what will happen after modification.***
Channel Width	*Select wireless channel width (bandwidth taken by wireless signals of this range extender). It's suggested to select 'Auto 20/40MHz'. Do not change to '20 MHz' unless you know what it is.*
Preamble Type	*Set the type of preamble of wireless radio,* ***Do not modify default value if you don't know what it is, default setting is 'Short Preamble'.***
Broadcast ESSID	*Decide if the wireless range extender will broadcast its own ESSID or not. You can hide the ESSID of your wireless range extender (set the option to 'Disable'), so only people those who know the ESSID of your wireless range extender can get connected.*
WMM	*WMM (Wi-Fi Multimedia) technology, which can improve the performance of certain network applications, like audio/video streaming, network telephony (VoIP), and others. When you enable WMM function, the range extender will define the priority of different kinds of data, to give higher priority to applications which require instant*

	responding. Therefore you can improve the performance of such network applications.
CTS Protect	*Enabling this setting will reduce the chance of radio signal collisions between 802.11b and 802.11g wireless range extenders. It's recommended to set this option to 'Auto'.*
TX Power	*You can set the output power of wireless radio. Unless you're using this wireless range extender in a really big space, you may not have to set output power to 100%.* ***This will enhance security (malicious / unknown users in distance will not be able to reach your wireless range extender).***

After you finish with setting, click 'Apply', and the following message will be displayed:



When you see this message, the settings you made are successfully saved. You can click the 'Continue' button to return to the previous page and modify other settings, or click the 'Apply' button to restart the wireless range extender. The changes will take effect after about 30 seconds.

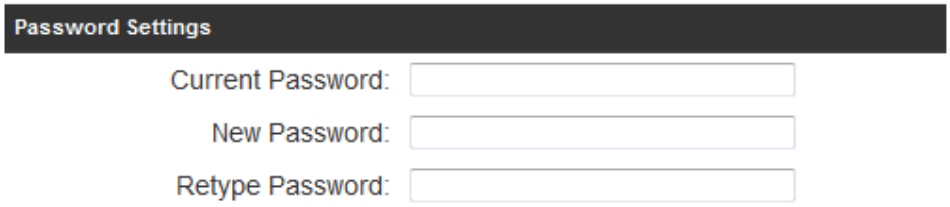
3-2 System Utilities

This range extender provides some control functions including password, IP address management, and DHCP server function. Click ‘Advanced Settings’ tab and then click ‘System Utility’ sub-tab beneath it in the web management interface to access these functions. Below are detailed descriptions of every control function.

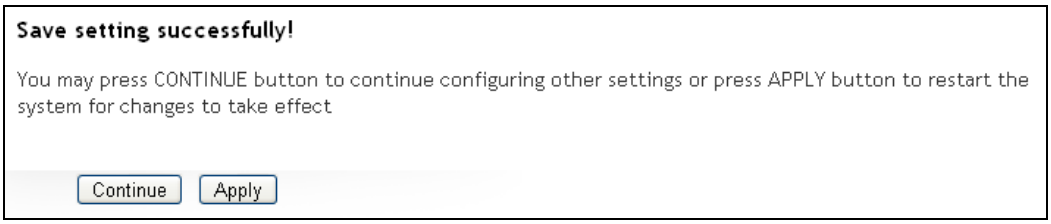
3-2-1 Change Password

You can change the password used to enter the web configuration menu of this wireless range extender.

Click ‘System Utility’ on the left column, and the following message will be displayed:



Input current password in ‘Current Password’ field, then input new password in both ‘New Password’ and ‘Re-Enter Password’ fields. After you finish, please go to the bottom of this page and click ‘Apply’, and the following message will be displayed:



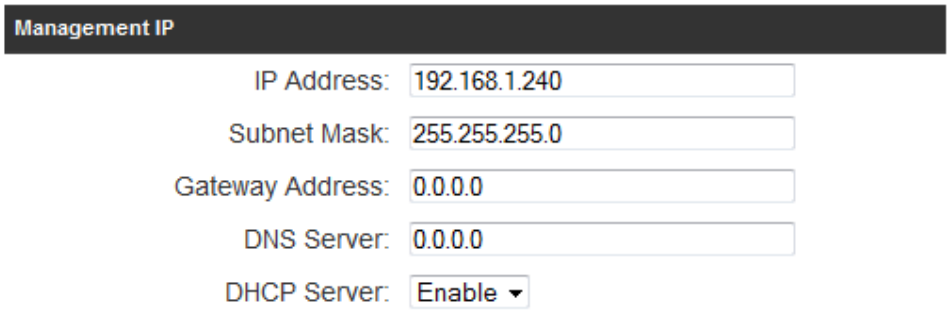
When you see this message, the settings you made are successfully saved. You can click the ‘Continue’ button to return to the previous page and modify other settings, or click the ‘Apply’ button to restart the wireless range extender. The changes will take effect after about 30 seconds.

3-2-2 IP Address of the Wireless Range extender

You can change the IP address of this wireless range extender so it can become a part of your local network. Please remember this address or you will not be able to connect to the configuration menu of this wireless range extender.

Default IP address: 192.168.1.240 / Subnet Mask: 255.255.255.0.
You can press and hold ‘Reset’ button 15 seconds, then power off/on to change the IP address back to default value if you forget the IP address you set.

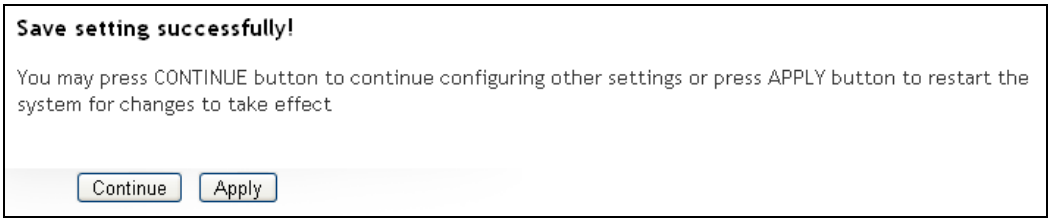
To change IP address, please click ‘System Utility’ sub-tab, and the following message will be displayed:



Please input IP address and Subnet Mask in corresponding field, and you can input the IP address of gateway in the ‘Gateway Address’ field, if you need to manage this wireless range extender from another network (like the Internet).

If you want to activate the DHCP server function of this wireless range extender, select ‘Enabled’ in ‘DHCP Server’ option. Please go to section 3-2-3 for DHCP settings. If you don’t want to use DHCP server function of this wireless range extender, or there’s another DHCP server on the network, please select ‘Disable’. The default mode for the DHCP server is ‘Disable’.

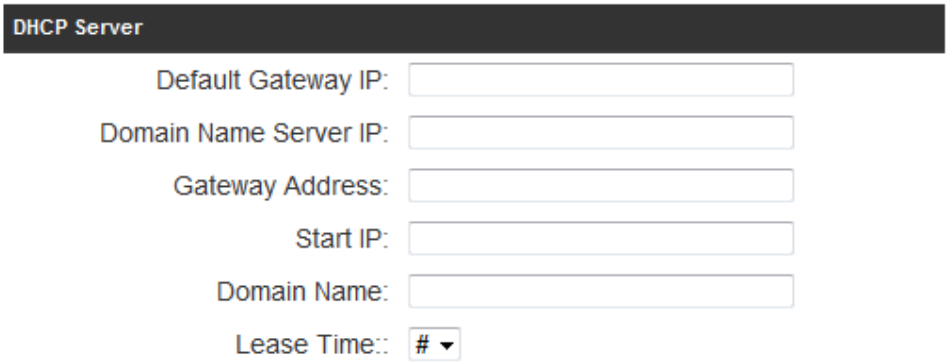
After you finish, please go to the bottom of this page and click ‘Apply’, and the following message will be displayed:



When you see this message, the settings you made are successfully saved. You can click the ‘Continue’ button to return to the previous page and modify other settings, or click the ‘Apply’ button to restart the wireless range extender. The changes will take effect after about 30 seconds.

3-2-3 DHCP Server

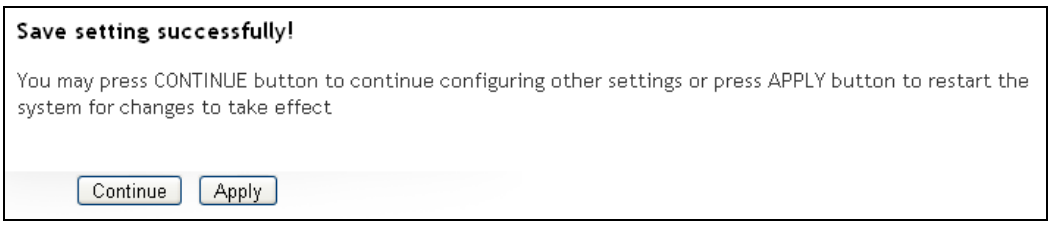
This wireless range extender is capable of acting as a DHCP server for your network, but it's disabled by default. If you want to activate this function, please click 'System Utility' sub-tab and the following message will be displayed:



NOTE: Please remember to select 'Enable' in 'DHCP Server' option as described in Section 3-2-2 or all DHCP-related fields will be grayed out, and you will not be able to input any DHCP parameter.

Default Gateway IP	*Please input the IP address of default gateway of your network here.*
Domain Name Server IP	*Please input the IP address of domain name server (DNS) here.*
Start IP	*Please input the start IP address of the IP range.*
End IP	*Please input the end IP address of the IP range.*
Domain Name	*If you wish, you can also optionally input the domain name for your network. This is optional.*
Lease Time	*Please choose a lease time (the duration that every computer can keep a specific IP address) of every IP address assigned by this range extender from dropdown menu.*

After you finish, please go to the bottom of this page and click 'Apply', and the following message will be displayed:



When you see this message, the settings you made are successfully saved. You can click the ‘Continue’ button to return to the previous page and modify other settings, or click the ‘Apply’ button to restart the wireless range extender. The changes will take effect after about 30 seconds.

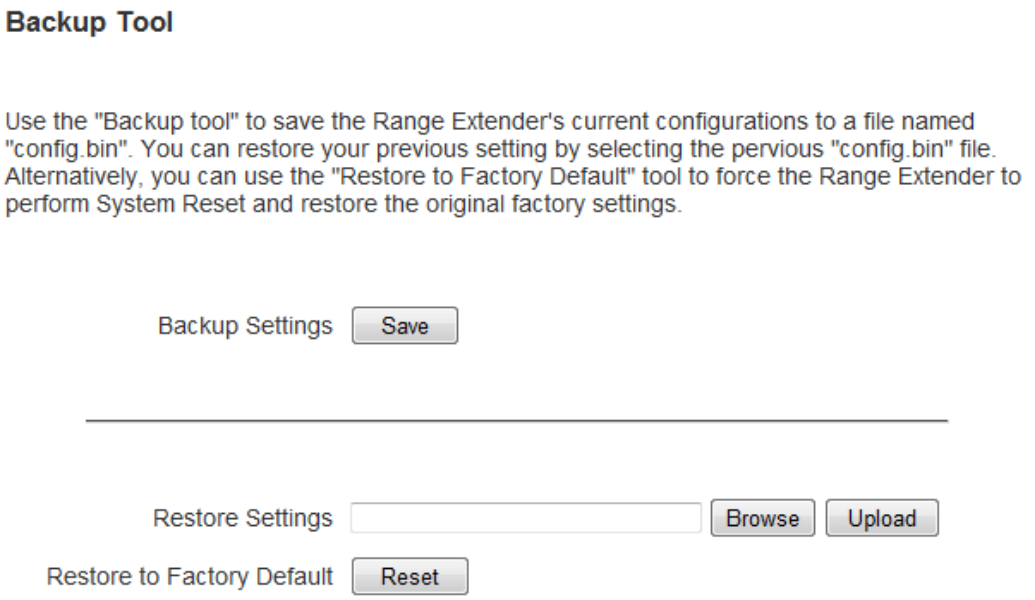
Chapter IV: Advanced Configuration

4-1 Configuration Backup and Restore

You can backup all configurations of this range extender to a file, so you can make several copies of range extender configuration for security reasons.

To backup or restore range extender configuration, please follow the following instructions:

Click the ‘Configuration’ tab in the web management interface, and the following message will be displayed on your web browser:



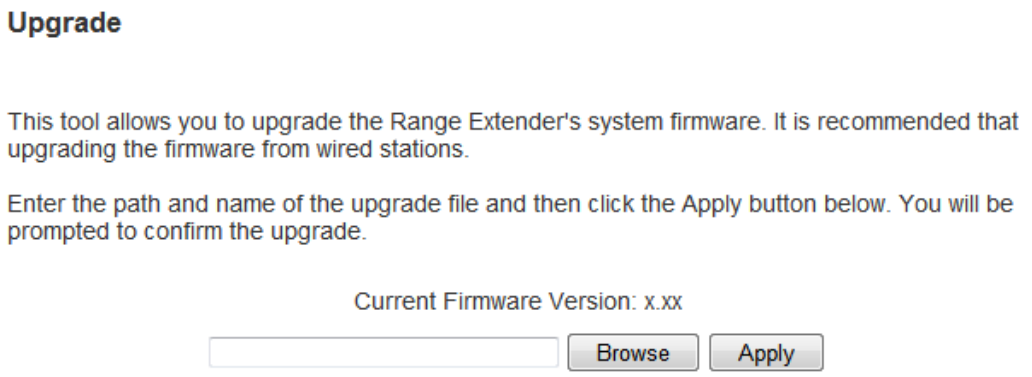
Backup Settings	*Press “Save” button, and you’ll be prompted to download the configuration as a file, default filename is “config.bin”, you can save it as another filename for different versions, and keep it in a safe place.*
Restore Settings	*Press “Browse” to pick a previously-saved configuration file from your computer, and then click “Upload” to transfer the configuration file to*

	range extender. After the configuration is uploaded, the range extender's configuration will be replaced by the file you just uploaded.
Restore to Factory Default	*Click this button to remove all settings you made, and restore the configuration of this range extender back to factory default settings.*

4-2 Firmware Upgrade

If there is new firmware available for your wireless range extender, you can upload the firmware to the range extender to change the firmware to the updated version to get extra functions or fix problems.

To perform firmware upgrade, click ‘Upgrade’ tab on the top-right of web management interface, and the following message will be displayed:



Download the latest firmware file from our website (http://www.hawkingtech.com/) and save it to a location on your computer. Click the ‘Browse’ button. You will be prompted to provide the filename of a firmware upgrade file. Browse to the file you downloaded and use it to upgrade your range extender.

After a firmware upgrade file is selected, click ‘Apply’ button, and the range extender will start firmware upgrade procedure automatically. The procedure may take several minutes.

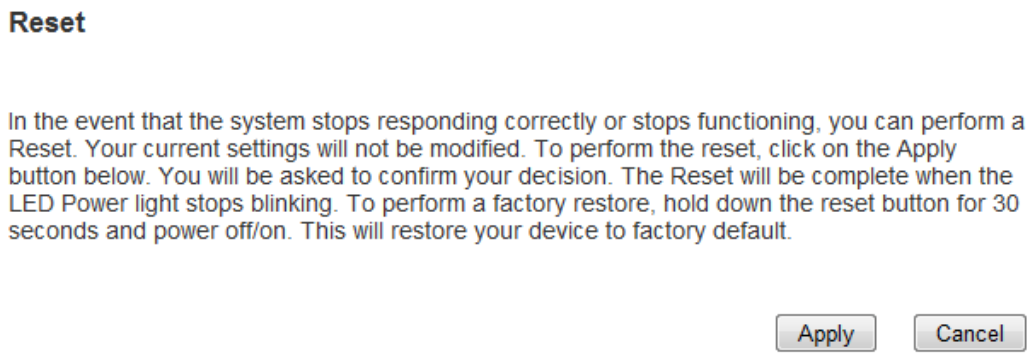
NOTE: Never interrupt the upgrade procedure by closing the web browser or physically disconnecting your computer from the range extender. If the firmware you uploaded is corrupt, the firmware upgrade will fail, and you may have to return this range extender. (Warranty is void if you interrupt the upgrade procedure).

4-3 System Reset

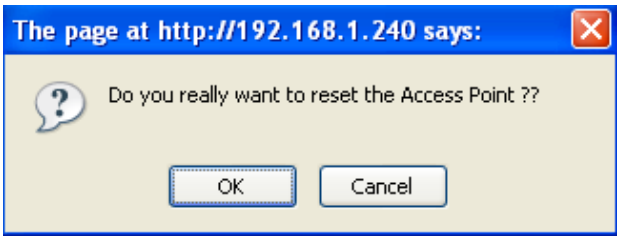
When you think the range extender is not working properly, you can use this function to restart the range extender; this may help to solve certain problems.

This function is useful when the range extender is far from you or unreachable. However, if the range extender is not responding, you may have to switch it off by unplugging the power plug and plugging it back again after 10 seconds.

To reset your range extender, please click ‘Reset’ tab in the web management interface, and the following message will be displayed:



Please click ‘Apply’, and a popup message will ask you again, to make sure you really want to reset the range extender:



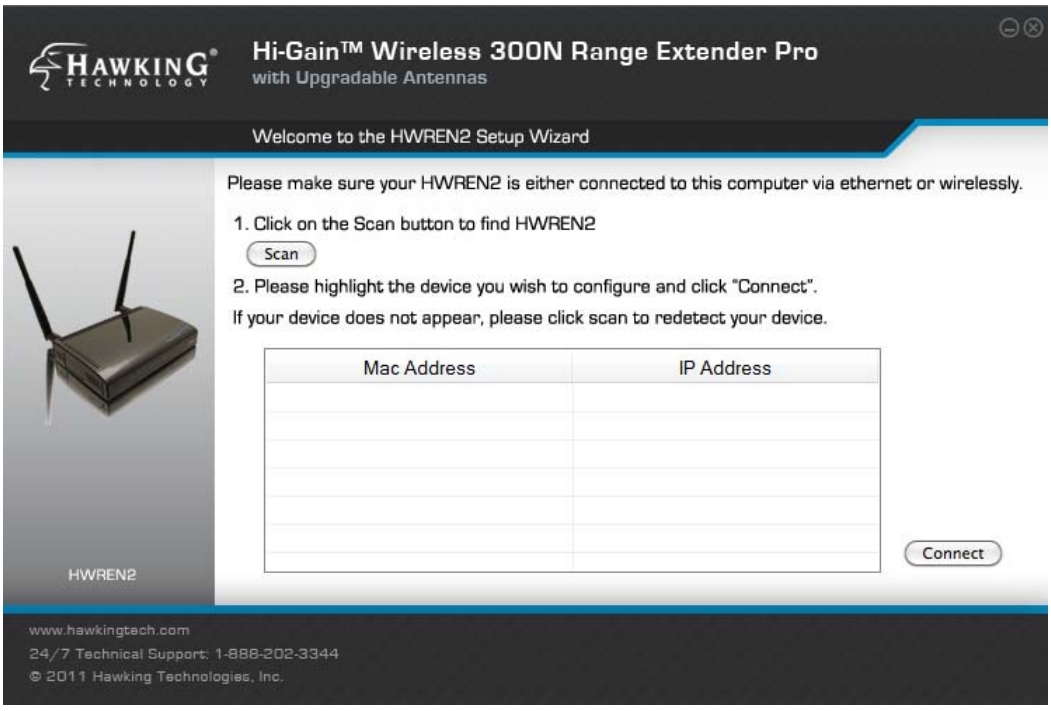
Click ‘OK’ to reset the range extender, or click ‘Cancel’ to abort. Please remember all connections between wireless client and this range extender will be disconnected.

Chapter V Setup Wizard

The HWREN2's Setup Wizard is used to help troubleshoot a connection or for easy access to the basic configuration settings of the HWREN2. This Utility may often be used in conjunction with support calls from our support department or by the user when on site for quick configuration purposes.

To run the support utility, insert the CD into your computer's CD rom and click on 'Setup Wizard'. Note: this utility only supports Windows operating systems. If your computer prompts you, please allow the program through your firewall.

The following window should appear. If no devices appear automatically, please click on 'Scan'.



You should see your device listed under Mac Address. Each HWREN2 on the network will have a unique Mac Address. This number should correspond to the numbers/letters listed on the bottom of your device. Please select the unit that you wish to configure. Next to the Mac Address, there will be an IP address that is assigned to that particular HWREN2. Highlight the unit and click 'Connect'. A web browser will open and take you into the setup page of the device. (Refer to earlier sections on this manual.)

If the device does not appear, you may have to reset the unit. Press and hold the reset button for 15 seconds, power off/on. Then reconnect and start from section 2-1.

Chapter VI: Appendix

6-1 Hardware Specification

CPU + Wireless Chipsets：Realtek RTL8196C+RTL8192CE

Flash: 2MB

SDRAM: 16MB

LAN Ports: 10/100M UTP Port x 5

Antenna: 2x 3dBi Dipole antennas

Power: 12VDC, 1A Switching Power Adapter

Output Power spec:

11n (40MHz)@MCS15: 23+/-1.5dBm
11n (20MHz)@MCS15: 23+/-1.5dBm
11g@54Mbps: 23+/-1.5dBm
11b@11Mbps: 26+/-1.5dBm

Receive Sensitivity spec:

11n (40MHz)@MCS15: -69+/-2dBm
11n (20MHz)@MCS15: -73+/-2dBm
11g@54Mbps: -78+/-2dBm
11b@11Mbps: -89+/-2dBm

Temperature: 32~104°F (0 ~ 40°C)

Humidity: 10-90% (NonCondensing)

Certification: FCC, CE

6-2 Troubleshooting

If you found the range extender is working improperly or stops responding to you, don't panic! Before you contact your dealer of purchase for help, please read this troubleshooting first. Some problems can be solved by yourself within very short time!

Scenario	Solution
Range extender disconnects after a period of time.	a. Check the wireless channel on your router. Make sure it is set to a static channel. Some routers use an AUTO channel function in which the channel changes itself periodically. If so, our range extender cannot update these changes and that may explain your disconnects.
Range extender is not responding to me when I want to access it by web browser	b. Please check the connection of power cord and network cable of this range extender. All cords and cables should be correctly and firmly inserted to the range extender. c. If all LEDs on this range extender are out, please check the status of A/C power adapter, and make sure it's correctly powered. d. You must use the same IP address section which range extender uses. e. Are you using MAC or IP address filter? Try to connect the range extender by another computer and see if it works; if not, please perform a hard reset (pressing 'reset' button for 15 seconds, power off/on). f. Set your computer to obtain an IP address automatically (DHCP), and see if your computer can get an IP address. g. If you did a firmware upgrade and this happens, contact your dealer of purchase for help. h. If all above solutions don't work, contact Hawking Technologies for help.

Can’t get connected to wireless range extender	a. If encryption is enabled, please re-check WEP or WPA passphrase settings on your wireless client. b. Try to move closer to wireless range extender. c. Unplug the power plug of range extender, and plug it back again after 10 seconds. d. If all LEDs on this range extender are out, please check the status of A/C power adapter, and make sure it’s correctly powered.
I can’t locate my range extender by my wireless client	a. ‘Broadcast ESSID’ set to off? b. Is Antenna properly installed and secured? c. Are you too far from your range extender? Try to get closer. d. Please remember that you have to input ESSID on your wireless client manually, if ESSID broadcast is disabled.
File download is very slow or breaks frequently	a. Try to reset the range extender and see if it’s better after that. b. Try to know what computers do on your local network. If someone’s transferring big files, other people will think Internet is really slow. c. Change the wireless channel on your router and reconfigure our device to match this. Sometimes interference can cause slowness.
I can’t log onto web management interface: password is wrong	a. Make sure you’re connecting to the correct IP address of the range extender! b. Password is case-sensitive. Make sure the ‘Caps Lock’ light is not illuminated. c. If you really forget the password, do a hard reset.
Range extender is very hot	a. If you smell something wrong or see the smoke coming out from range extender or A/C power adapter, please disconnect the range extender and A/C power adapter from utility power (make sure it’s safe before

	you’re doing this!), and call Hawking Technologies for help.

6-3 Glossary

Default Gateway (Range extender): Every non-range extender IP device needs to configure a default gateway's IP address. When the device sends out an IP packet, if the destination is not on the same network, the device has to send the packet to its default gateway, which will then send it out towards the destination.

DHCP: Dynamic Host Configuration Protocol. This protocol automatically gives every computer on your home network an IP address.

DNS Server IP Address: DNS stands for Domain Name System, which allows Internet servers to have a domain name (such as www.Broadbandrange extender.com) and one or more IP addresses (such as 192.34.45.8). A DNS server keeps a database of Internet servers and their respective domain names and IP addresses, so that when a domain name is requested (as in typing "Broadbandrange extender.com" into your Internet browser), the user is sent to the proper IP address. The DNS server IP address used by the computers on your home network is the location of the DNS server your ISP has assigned to you.

DSL Modem: DSL stands for Digital Subscriber Line. A DSL modem uses your existing phone lines to transmit data at high speeds.

Ethernet: A standard for computer networks. Ethernet networks are connected by special cables and hubs, and move data around at up to 10/100 million bits per second (Mbps).

Idle Timeout: Idle Timeout is designed so that after there is no traffic to the Internet for a pre-configured amount of time, the connection will automatically be disconnected.

IP Address and Network (Subnet) Mask: IP stands for Internet Protocol. An IP address consists of a series of four numbers separated by periods, that identifies a single, unique Internet computer host in an IP network. Example: 192.168.2.1. It consists of 2 portions: the IP network address, and the host identifier.

The IP address is a 32-bit binary pattern, which can be represented as four cascaded decimal numbers separated by ".": aaa.aaa.aaa.aaa, where each

“aaa” can be anything from 000 to 255, or as four cascaded binary numbers separated by “.”: bbbbbbbb.bbbbbbbb.bbbbbbbb.bbbbbbbb, where each “b” can either be 0 or 1.
A network mask is also a 32-bit binary pattern, and consists of consecutive leading
1’s followed by consecutive trailing 0’s, such as 11111111.11111111.11111111.00000000. Therefore sometimes a network mask can also be described simply as “x” number of leading 1’s.
When both are represented side by side in their binary forms, all bits in the IP address that correspond to 1’s in the network mask become part of the IP network address, and the remaining bits correspond to the host ID.

For example, if the IP address for a device is, in its binary form, 11011001.10110000.10010000.00000111, and if its network mask is, 11111111.11111111.11110000.00000000
It means the device’s network address is 11011001.10110000.10010000.00000000, and its host ID is, 00000000.00000000.00000000.00000111. This is a convenient and efficient method for range extenders to route IP packets to their destination.

ISP Gateway Address: (see ISP for definition). The ISP Gateway Address is an IP address for the Internet range extender located at the ISP's office.

ISP: Internet Service Provider. An ISP is a business that provides connectivity to the Internet for individuals and other businesses or organizations.

LAN: Local Area Network. A LAN is a group of computers and devices connected together in a relatively small area (such as a house or an office). Your home network is considered a LAN.

MAC Address: MAC stands for Media Access Control. A MAC address is the hardware address of a device connected to a network. The MAC address is a unique identifier for a device with an Ethernet interface. It is comprised of two parts: 3 bytes of data that corresponds to the Manufacturer ID (unique for each manufacturer), plus 3 bytes that are often used as the product’s serial number.

NAT: Network Address Translation. This process allows all of the computers on your home network to use one IP address. Using the broadband range extender's NAT capability, you can access the Internet from any computer on your home network without having to purchase more IP addresses from your ISP.

Port: Network Clients (LAN PC) uses port numbers to distinguish one network application/protocol over another. Below is a list of common applications and protocol/port numbers:

Application	Protocol	Port Number
Telnet	TCP	23
FTP	TCP	21
SMTP	TCP	25
POP3	TCP	110
H.323	TCP	1720
SNMP	UCP	161
SNMP Trap	UDP	162
HTTP	TCP	80
PPTP	TCP	1723
PC Anywhere	TCP	5631
PC Anywhere	UDP	5632

PPPoE: Point-to-Point Protocol over Ethernet. Point-to-Point Protocol is a secure data transmission method originally created for dial-up connections; PPPoE is for Ethernet connections. PPPoE relies on two widely accepted standards, Ethernet and the Point-to-Point Protocol. It is a communications protocol for transmitting information over Ethernet between different manufacturers

Protocol: A protocol is a set of rules for interaction agreed upon between multiple parties so that when they interface with each other based on such a protocol, the interpretation of their behavior is well defined and can be made objectively, without confusion or misunderstanding.

Range extender: A range extender is an intelligent network device that forwards packets between different networks based on network layer address information such as IP addresses.

Subnet Mask: A subnet mask, which may be a part of the TCP/IP information provided by your ISP, is a set of four numbers (e.g. 255.255.255.0) configured like an IP address. It is used to create IP address numbers used only within a particular network (as opposed to valid IP address numbers recognized by the Internet, which must be assigned by InterNIC).

TCP/IP, UDP: Transmission Control Protocol/Internet Protocol (TCP/IP) and Unreliable Datagram Protocol (UDP). TCP/IP is the standard protocol for data transmission over the Internet. Both TCP and UDP are transport layer protocol. TCP performs proper error detection and error recovery, and thus is reliable. UDP on the other hand is not reliable. They both run on top of the IP (Internet Protocol), a network layer protocol.

Universal Repeater: Another name for range extender.

WAN: Wide Area Network. A network that connects computers located in geographically separate areas (e.g. different buildings, cities, countries). The Internet is a wide area network.

Web-based management Graphical User Interface (GUI): Many devices support a graphical user interface that is based on the web browser. This means the user can use the familiar Netscape or Microsoft Internet Explorer to Control/configure or monitor the device being managed.