

300N Wireless Range Extender

User Manual

Version: 1.0

(May, 2014)

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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 limits 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.

The equipment version marketed in US is restricted to usage of the channels 1-11 only.

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 Introduction and safety information

Thank you for purchasing this mini 802.11b/g/n wireless range extender!
The ultra-compact design with power built-in allows you to install this repeater everywhere, and still providing excellent network performance to extend the Wi-Fi signal and wireless coverage.

Other features of this wireless repeater including:

- Extend the wireless signal inside your home or office.
- Ultra-compact design while maintaining excellent network performance.
- LED signal indicator to easily realize the best location placement to extend WiFi signal and secure better wireless performance.
- This device can support Repeater, AP and client modes.
- WPS (Wi-Fi Protected Setup) hardware button for easy installation and secure wireless security.

1-2 Safety Information

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

1. This wireless repeater is designed for indoor use only. DO NOT expose this device to direct sun light, rain, or snow.
2. DO NOT put this at or near hot or humid places, like kitchen or bathroom. Also, do not left this Wireless repeater in the car in summer.
3. Do not allow kids to put any small parts of this wireless repeater in their mouth, and it could cause serious injury or could be fatal. If they throw this wireless repeater, it will be damaged. PLEASE KEEP THIS WIRELESS REPEATER OUT THE REACH OF CHILDREN!
4. This Wireless repeater will become hot when being used for long time (*This is normal and is not a malfunction*). DO NOT put the Wireless repeater on a paper, cloth, or other flammable objects after the Wireless repeater has been used for a long time.
5. There's no user-serviceable part inside the Wireless repeater. If you found that the Wireless repeater is not working properly, please contact your dealer of purchase and ask for help. DO NOT disassemble the Wireless repeater by yourself, warranty will be void.
6. If the Wireless repeater falls into water, DO NOT USE IT AGAIN BEFORE YOU SEND THE CARD TO THE DEALER OF PURCHASE FOR INSPECTION.

1-3 System Requirements

- Wireless network card which is compatible with 802.11b/g/n wireless network standard.
- Windows 2000, 2003, XP, Vista, 7 or Windows 8/8.1 operating system
- CD-ROM drive
- At least 100MB of available disk space

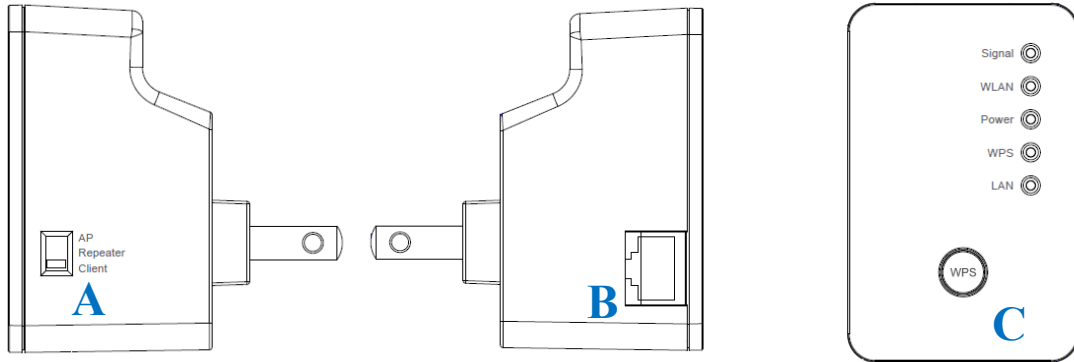
1-4 Package Contents

Before you start to use this Range Extender, please check if there's anything missing in the package, and contact your dealer of purchase to claim for missing items:

- Range Extender (1 set)
- Quick Installation Guide (1 set)
- User Manual CDROM (1 disc)

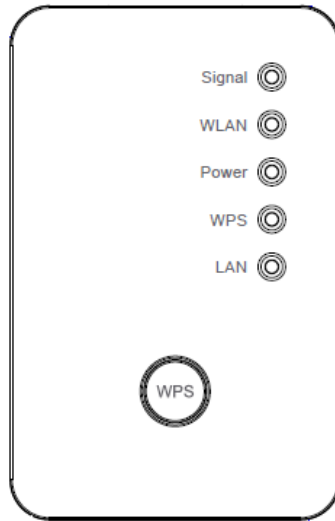
1-5 Familiar with your new wireless repeater

Interface Descriptions



Item	Item Name	Description
A	Mode switch	You can switch the operation mode by this switch, this Range Extender supports 3 modes, include AP mode, Repeater mode and Client mode.
B	LAN port	One 10/100Mbps Ethernet LAN Port with Auto-MDI/MDI-X. Connecting to computer, switch or other device for network.
C	WPS / Reset button	This button support 2 functions: <ol style="list-style-type: none"> 1. One click to start WPS function (Both 2.4Ghz and 5Ghz) 2. Hold the button 10 seconds to reset all the values to the factory default.

LED Definitions



LED	Color	LED Status	Description
Signal Status	Green	Steady ON	1. Good signal (RSSI 100%~50%)
		Blinking	1. Poor signal 2. Slow blinking (RSSI <50%~25%) 3. Quick blinking (RSSI <25%)
		Off	1. No signal
WLAN Status	Green	Blinking	Wireless function is active (transferring or receiving data)
		Off	Wireless network is switched off
Power On/Off Status	Green	Steady ON	1. Power is turned on and system is boot up.
		Slow Blinking	1. System is booting up. 2. Ready for “ Reset to factory default ”, power LED is blinking.
		Off	1. Power is turned off.
WPS Status	Green	Steady ON	1. When WPS connection is successful, turn on for 5 minutes.
		Blinking	1. WPS is in progress, blinking for 2 minutes (waiting for WPS connection)
		Quick blinking	1. WPS error, blinking
LAN	Green	Steady ON	1. LAN port is connected.

Status	Blinking	1. LAN port is active (transferring or receiving data).
	Off	1. LAN port is not connected/ or LED off mode

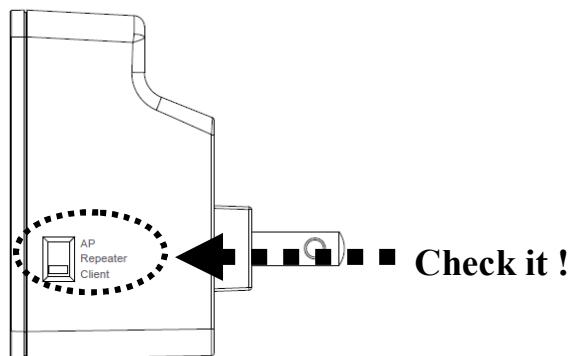
CHAPTER II: Setup your Range Extender

Thank you for choose this Range Extender!

It can extend your wireless signal and coverage and help you to solve wireless dead zone problem. This chapter will show you how to quickly install this device by using quick setup and web UI.

2-1 First time setup your Range Extender

For the first time setup, before insert it to your AC plug, please set the mode you want to use, you can see a slide switch on the repeater's right side as below:



This Range Extender supports AP, Repeater and Client modes, the default value is setting on the “Repeater mode”, you can also switch it to another mode while you’re using this Range Extender

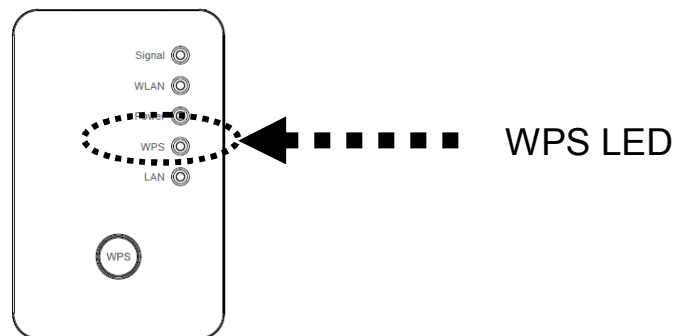
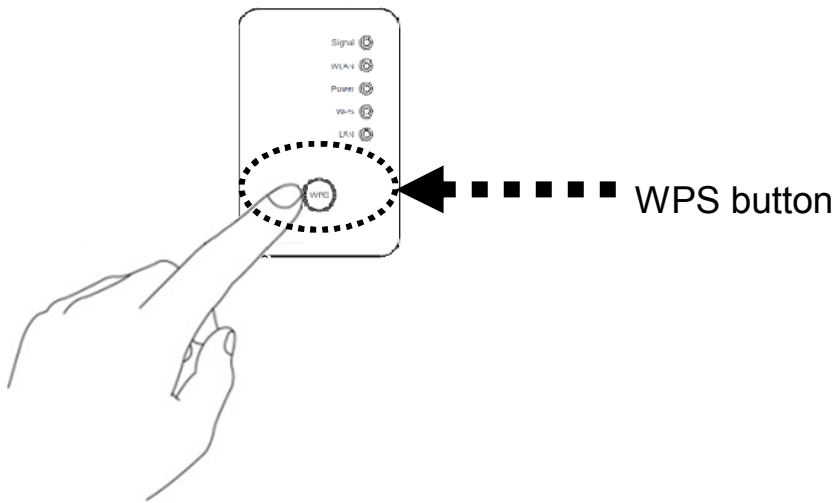
Then please follow the instructions on the below chapters to setup this Range Extender:

2-1-1 Repeater mode setup

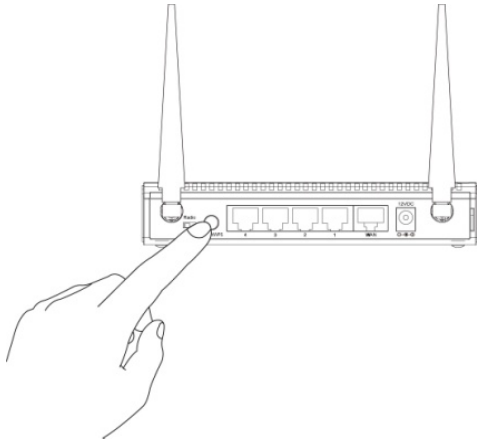
Before you setup this Range Extender, please make sure the mode switch set to “Repeater” side, to setup the repeater mode, you have 2 way to make it, one is by WPS button, another is by the Web browser.

2-1-1a Setup by WPS button

- (1) Please move this Range Extender to near the Wireless Router you want to connect, and insert it to the power outlet.
- (2) Press one click on **WPS button**, ‘WPS’ LED will start flashing.



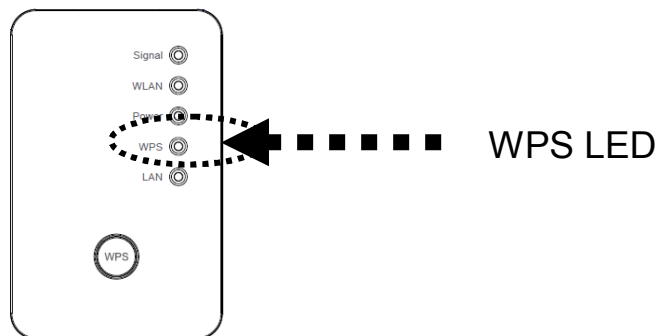
- (3) Then press **WPS button** on the wireless router you wish to connect within 2 minutes.



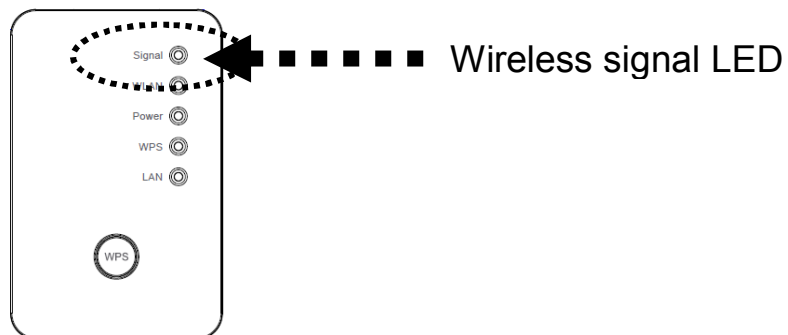
NOTE:

This WPS button position on wireless router is for example, different device may have different WPS button position.

- (4) If WPS connection is successfully established, '**WPS**' LED will light for 5 minutes; if '**WPS**' LED flashes fast, there's something error, please wait for 2 minutes until '**WPS**' LED off, and try from step(1) again.



When connection is created, the Wireless signal LED will turn on.



- (5) Please move this Range Extender to the place you wish to use (a better place will be the center of your house) and insert this Range Extender into power outlet on

the wall, the wireless connection will be established automatically.

You can check “Wireless signal LED” status to understand signal reception level.

Steady light: Excellent, Flash: Good, Fast flash: poor.

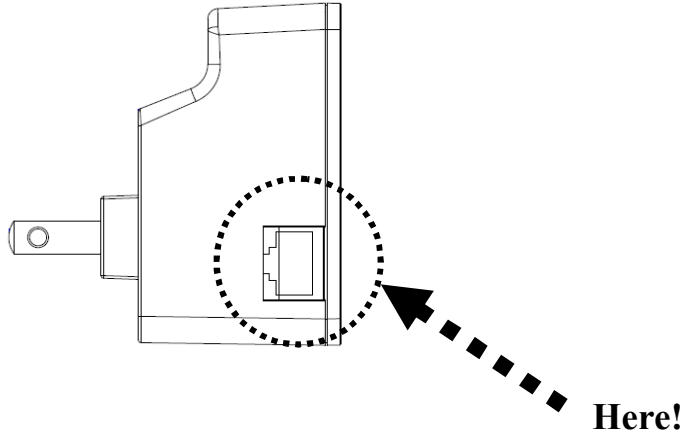
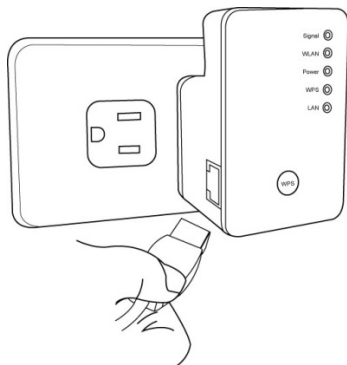
NOTE:

If the Signal LED is off, it means this place is out of the wireless signal of your wireless router, please move this repeater closer to wireless router until repeater device can receive signal from wireless router and extend its signal.

2-1-1b Setup by Web browser

Before you can connect to the repeater and start configuration procedures, your computer must be able to get an IP address automatically (use dynamic IP address). If it's set to use static IP address, or you're unsure, please refer to '[Chapter X: Appendix, 5-1 Configuring TCP/IP on PC](#)' to set your computer to use dynamic IP address.

(1) Use Ethernet cable to connect your computer's Ethernet port and Ranger Extender's Ethernet port.



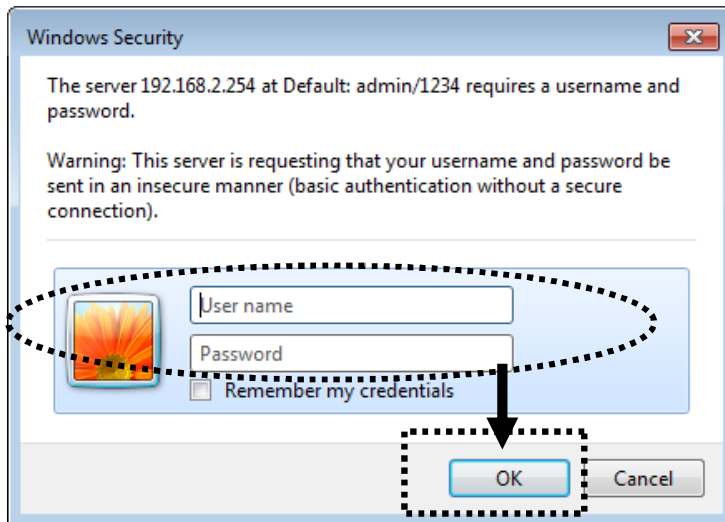
(2) Open the Web Browser on your PC, it will direct to the Web UI page, or you can input the default IP address <http://repeaterxxxx> in the address bar.

NOTE:

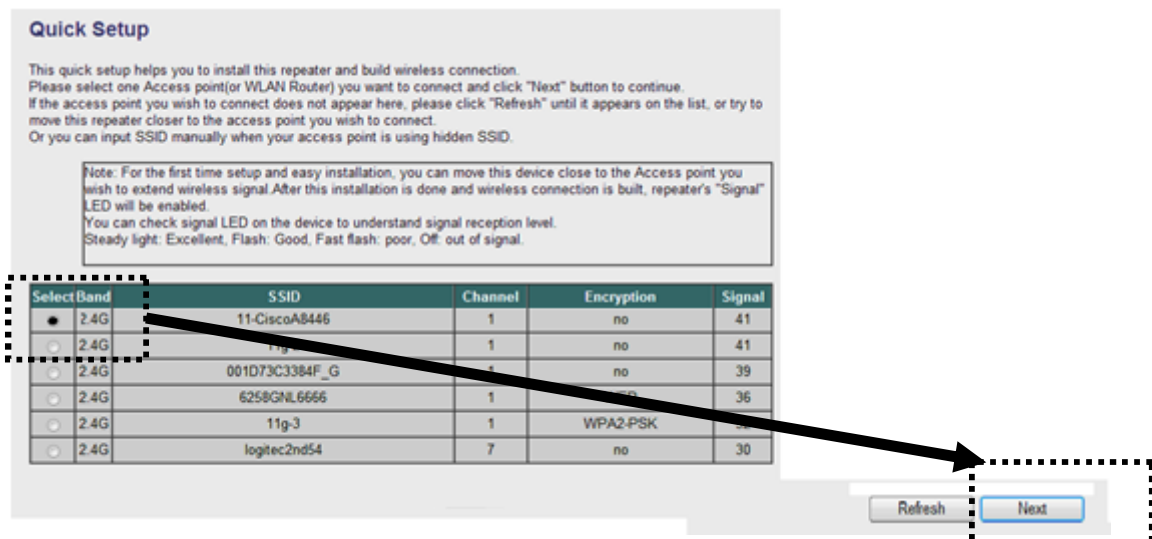
this default SSID 'repeaterxxxx' is for example, different device may have different last 4 digits.

The xxxx is the last 4 digits of the MAC number of your Range Extender, Each device has different MAC number, please find it on your device label.) You can also input default IP 'http://192.168.2.254 instead of repeaterxxxx if your PC is not Windows OS.

(3) Wireless repeater will prompt you to input username and password. Default username is 'admin' and password is '1234'. Click 'OK' button to continue.



(4) All wireless routers nearby will be displayed on the list. Select one wireless router you want to connect and click 'Next' button to continue. If the wireless router you wish to connect does not appear here, please click 'Refresh' until it appears on the list, or try to move wireless repeater closer to the wireless router you wish to connect.



If you want to connect to a hidden wireless router, you can select to input SSID manually.

Setup repeater manually

SSID :

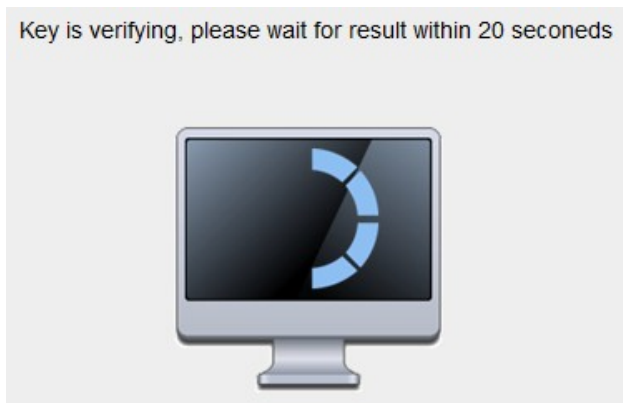
(5) You'll be prompted to input wireless router's wireless security key, input it in 'KEY' field and click 'Next' to continue.

Security

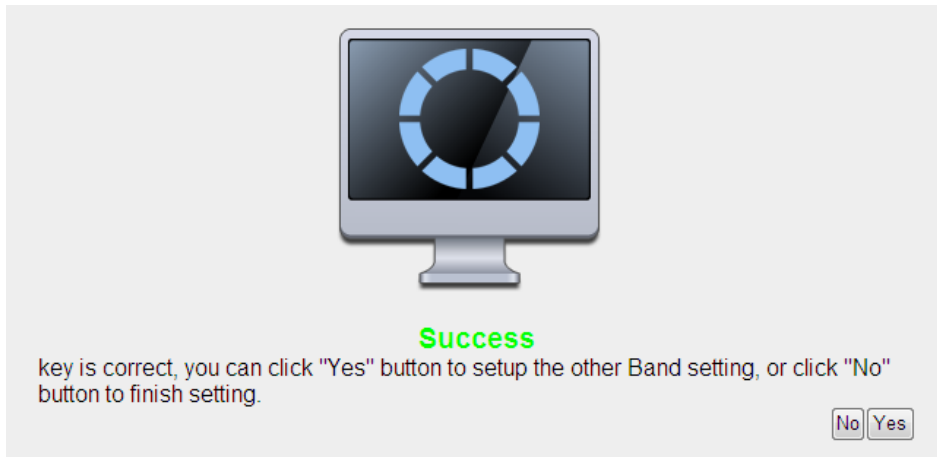
Please input wireless security key of your connected Access Point.

KEY :

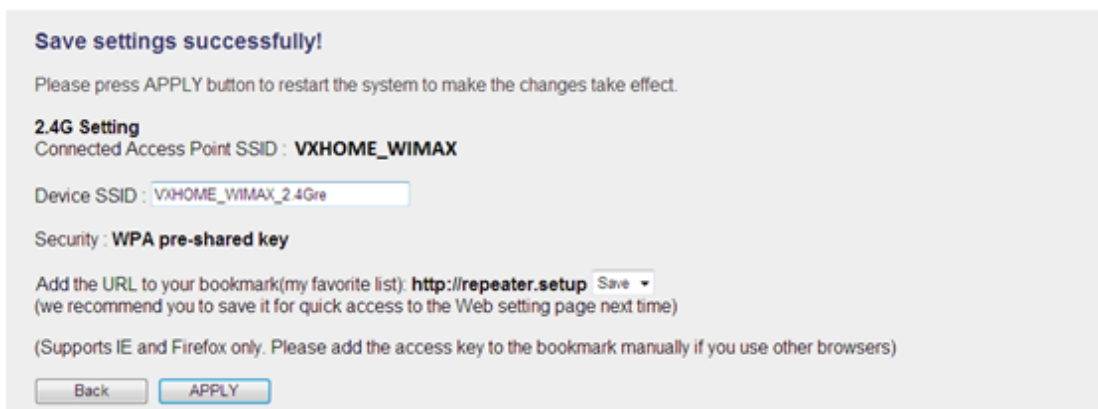
(6) It will start to verify the wireless key with your associated wireless router and show you result within 20 seconds. Please follow the instruction to continue setup.



(7) When key is correct, this Range Extender will display the information for you, you can press "Yes" button to setup another band, or press "No" to the bridge setup



(8)After settings successfully, you can set your own SSID to your extend wireless (Default SSID will be XXX_YGre (XXX is the SSID of the wireless router you connected, Y is the wireless band), please press “APPLY” to end the setting or press “Back” to return the setup page.



NOTE:

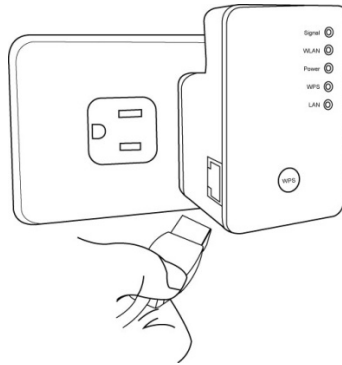
We recommend you to copy your ‘firmware URL’ (for example: <http://repeater.setup>) to you

(9)The Range Extender will reboot to make your setting effect, after restart, you can move this Range Extender to the place you wish to use (a better place will be the center of your house) and insert this Range Extender into power outlet on the wall, the wireless connection will be established automatically.

2-1-2 AP mode setup

Before you setup this Range Extender, please make sure the mode switch set to “AP”

side, and please make sure your Wired / Wireless Router you want to connect with this Range Extender support DHCP service



- (1) Connect the Range Extender and your PC with an Ethernet cable.
- (2) Open the Web browser from your PC, it will direct to the website for setup

Quick Setup

This quick setup helps you build wireless connection. You can change default device SSID.

Device SSID(2.4GHz): default

Next

- (3) Setup your SSID for this Range Extender (you can also enable / disable Wireless signal in this page), then press “Next” to continue.
- (4) Please setup the encryption to your wireless

2.4G Security

Please input wireless security key of your connected Access Point

Encryption : Disable

Hidden SSID : NO

Back Next

2.4G Security

Please input wireless security key of your connected Access Point

Encryption :	WEP
Key Length :	64-bit
Key Format :	Hex (10 characters)
Default Tx Key :	Key 1
KEY :	*****
Hidden SSID :	NO

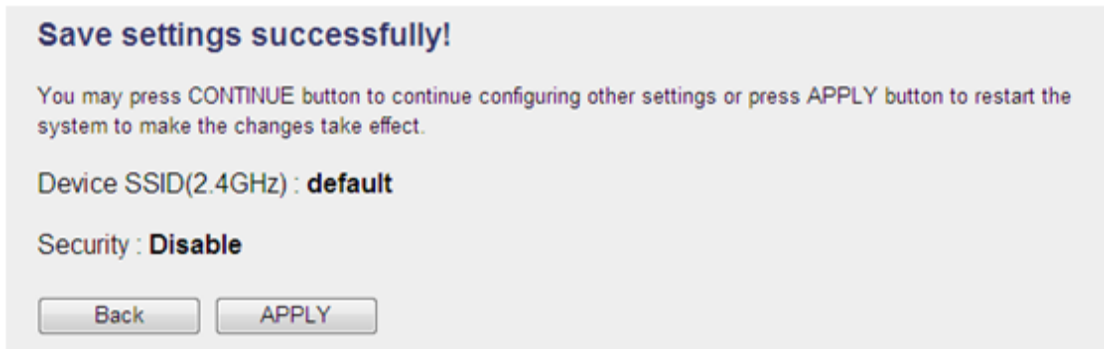
2.4G Security

Please input wireless security key of your connected Access Point

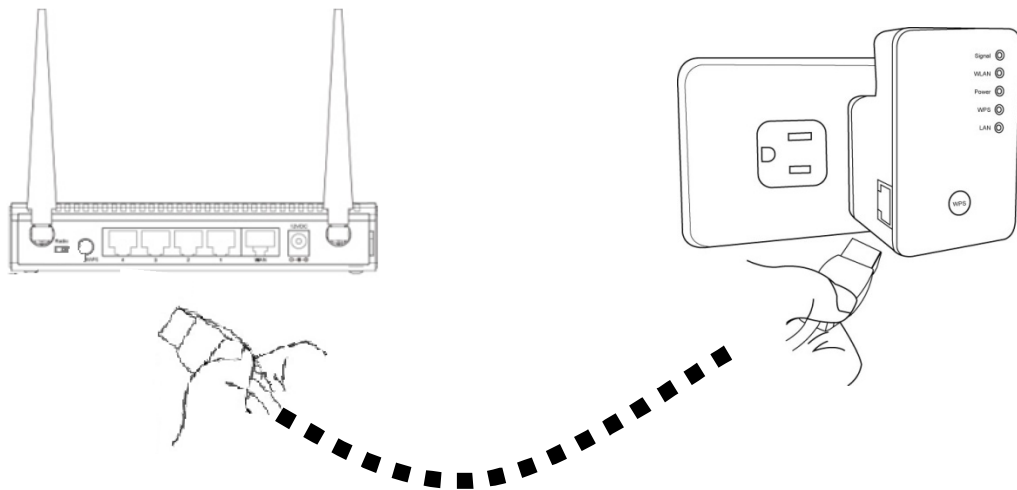
Encryption :	WPA pre-shared key
WPA Unicast Cipher Suite :	<input checked="" type="radio"/> WPA(TKIP) <input type="radio"/> WPA2(AES)
Pre-shared Key Format :	Passphrase
KEY :	
Hidden SSID :	NO

NOTE:
 This Range Extender supports 2 kinds of the encryption, one is WEP, another is WPA, please select one to setup (We recommend you to setup it to keep your security for wireless connection)

- (5) Setup success! You will see the setup information shown on this page. Press “APPLY” to finish the setup, press “Back” to return the setup page. Then the Range Extender will need several seconds to restart.



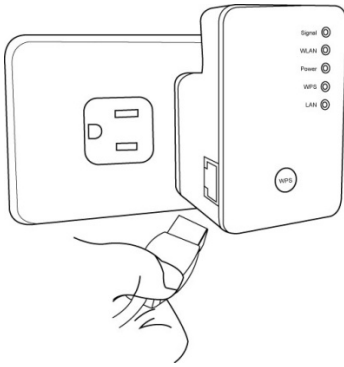
- (6) Connect your Range Extender to the LAN port on your Wired or Wireless router with an Ethernet cable; start to enjoy your wireless connection!



2-1-3 Client mode setup

Before you setup this Range Extender, please make sure the mode switch set to "Client" side, and please make sure your Wireless Router you want to connect with this Range Extender support DHCP service for Wireless.

- (1) Connect the Range Extender and your PC with an Ethernet cable.



(2) Open the Web browser from your PC, it will direct to the website for site survey.

Quick Setup

This quick setup helps you to install this repeater and build wireless connection.
 Please select one Access point(or WLAN Router) you want to connect and click "Next" button to continue.
 If the access point you wish to connect does not appear here, please click "Refresh" until it appears on the list, or try to move this repeater closer to the access point you wish to connect.
 Or you can input SSID manually when your access point is using hidden SSID.

Note: For the first time setup and easy installation, you can move this device close to the Access point you wish to extend wireless signal. After this installation is done and wireless connection is built, repeater's "Signal" LED will be enabled.
 You can check signal LED on the device to understand signal reception level.
 Steady light: Excellent, Flash: Good, Fast flash: poor, Off: out of signal.

Select	Band	SSID	Channel	Encryption	Signal
<input type="radio"/>	2.4G	Matt	1	WPA2PSK	100
<input type="radio"/>	2.4G	78-2.4G	1	NONE	29
<input type="radio"/>	2.4G	MEDIA 64C05 05	6	NONE	5
<input type="radio"/>	2.4G	OOO-XXX-2.4G	6	WPA2PSK	91
<input type="radio"/>	2.4G	ASUS	6	NONE	81
<input type="radio"/>	2.4G	IBM_68U	6	WPA2PSK	100
<input type="radio"/>	2.4G	AP24G	6	WPA2PSK	0
<input type="radio"/>	2.4G	atarm-8fa61c-g	7	WPA2PSK	60
<input type="radio"/>	2.4G	2.4G testing	13	NONE	96

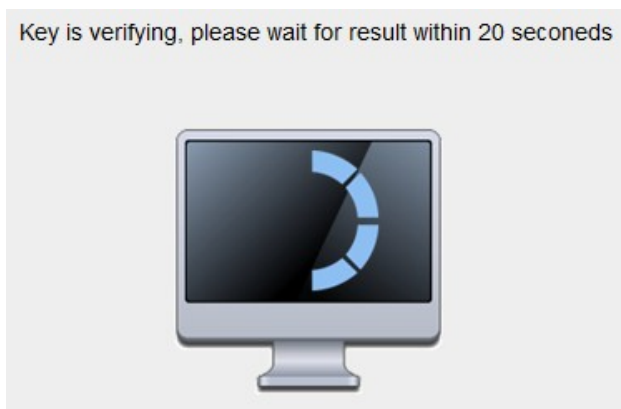
(3) Select the wireless station you want to connect, and input the security key to it.

Security

Please input wireless security key of your connected Access Point.

KEY :

- (4) It will start to verify the wireless key with your associated wireless router and show you result within 20 seconds. Please follow the instruction to continue setup.



- (5) When key is correct, this Range Extender will display the information for you

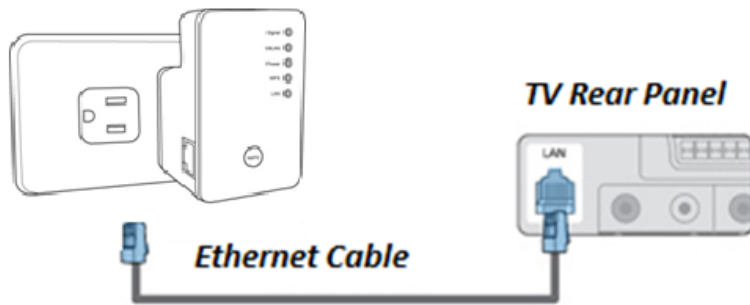
Save settings successfully!

You may press **CONTINUE** button to continue configuring other settings or press **APPLY** button to restart the system to make the changes take effect.

Device SSID(2.4GHz) : VXHOME_WIMAX

Security : **WPA2-shared key**

- (6) System will restart to make your settings work
- (7) Remove the Ethernet cable from the Range Extender, and connect the Range Extender with the device you want to connect (Ex: Smart TV) with an Ethernet cable, then your device will have the ability of wireless connection! Then you can enjoy the networking



2-2 Advanced setup

After you connect to the repeater from wireless, Please open the browser, and input the URL as you copied in the quick setup (default: <http://repeater.setup>)

2-2-1 WPS Setting

You can enable or disable WPS function, and also start WPS with software PBC (Push Button Communication) or PIN method in this page

WPS(Wi-Fi Protected Setup) Settings

This page allows you to change the setting for WPS(Wi-Fi Protected Setup).WPS can help your wireless client automatically connect to the Access Point.

WPS Setting:		<input checked="" type="radio"/> Enable WPS	<input type="radio"/> Disable WPS
• 2.4G Wi-Fi Protected Setup Information			
WPS Status:	Unconfigured		
Self PinCode:	0		
SSID:	AirLink2200ac		
Authentication Mode:	Disable		
Passphrase Key:			
• Device Configure			
(Device is as a AP/router) Config Mode:	Registrar ▼		
Configure via Push Button:	Start PBC		
Input client PIN code :	<input type="text"/>	Start PIN	

APPLY	CANCEL
-------	--------

2-2-2 Advance Settings

- A. WLAN Settings: Setup extended SSID, Encryption and channel to 2.4G connection manually, you can also disable the 2.4G radio in this page.

Security
Please set your Device.

Wireless Radio :	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Device SSID :	VXHOME_WIMAX_2.4
Encryption :	WPA pre-shared key ▼
WPA Unicast Cipher Suite :	<input type="radio"/> WPA(TKIP) <input checked="" type="radio"/> WPA2(AES)
Pre-shared Key Format :	Passphrase ▼
KEY :	wxyz6789
Channel :	11 ▼

APPLY CANCEL

- B. MAC address filtering: It's a security settings for access control, you can deny the user with specified MAC in the list, please follow the ways the setup the MAC address filtering:
- Enable the option "Enable Wireless Access Control"
 - Fill in the MAC address (10 characters) and comments (not necessary) in the slot on the bottom of this page.
 - Press "Add" button to increase the MAC address to the table.
 - Press "Apply" button to make it effect.
 - In the MAC address table, you can select one or select all to delete in the list

MAC Address Filtering

For security reason, the device support MAC Address Filtering allows authorized MAC Addresses associating to the device.

- MAC Address Filtering Table**
 It allows to entry 20 sets address only.

NO.	MAC Address	Comment	Select
1	60:eb:69:ab:18:76		<input type="checkbox"/>

Enable Wireless Access Control

New	MAC Address:	Comment:	Add	Clear
	<input type="text"/>	<input type="text"/>	<input type="button" value="Add"/>	<input type="button" value="Clear"/>

C. Admin Utility

System Utility

You can change the default password & device IP address form this setting page. If you want to use DHCP server service, you should enter a unique IP for the Device.

- Password Settings**

Current Password :	<input type="text"/>
New Password :	<input type="text"/>
Re-Enter Password :	<input type="text"/>
- Management IP**

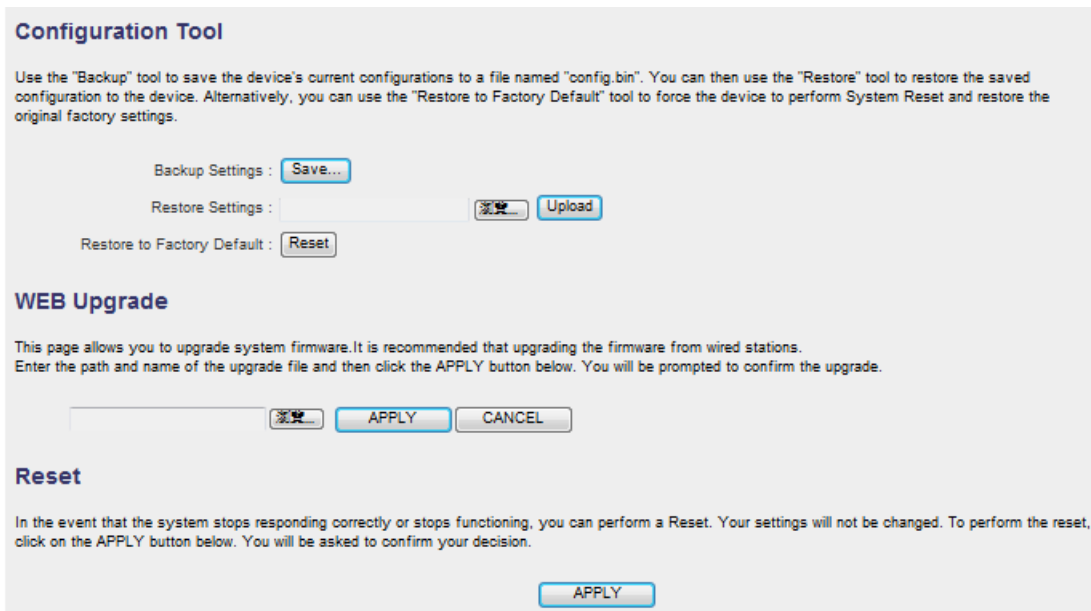
Obtain an IP address automatically :
 Use the following IP address :

IP Address :	<input type="text" value="192.168.2.254"/>
Subnet Mask :	<input type="text" value="255.255.255.0"/>
Gateway Address :	<input type="text"/>
- DHCP Server**

DHCP Server :	Disabled ▾
Default Gateway IP :	<input type="text" value="192.168.2.254"/>
Domain Name Server IP :	<input type="text" value="192.168.2.254"/>
Start IP :	<input type="text" value="192.168.2.100"/>
End IP :	<input type="text" value="192.168.2.200"/>
Domain Name :	<input type="text" value="setup"/>
Lease Time :	Forever ▾

- a. Password settings: Change the default password to login the repeater.
- b. Management IP: The IP address to login the repeater, You can select “Obtain the IP address automatically” (default value) or set the IP address manually by select “Use the following IP address”
- c. DHCP Server: Setup the DHCP server manually, it’s disable in the default, if you want to setup this function, you select “Use the following IP address” in the Management IP option.

D. Configuration :



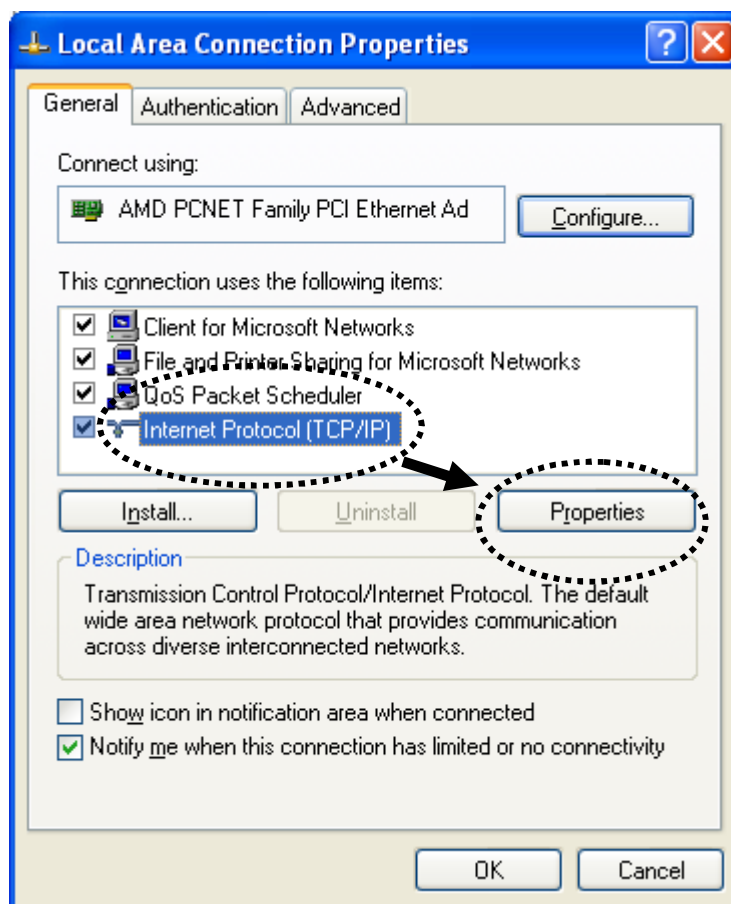
- a. Configuration Tool: to save (download) , upload or reset all the settings to factory default value here.
- b. WEB Upgrade: to use the “Browse” button to select the firmware file, then press “APPLY” button, you can start to update the firmware to this repeater, while you update the firmware, please do not turn off the power of the repeater.
- c. Reset: Reset this repeater without change any settings.

Chapter X: Appendix

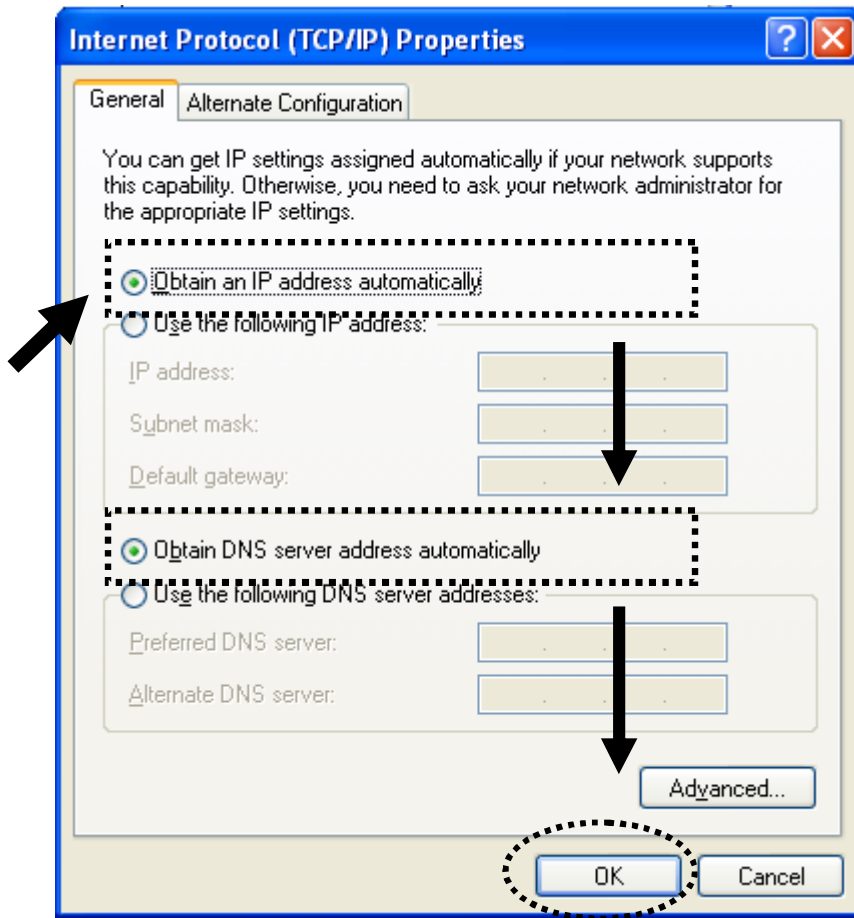
5-1 Configuring TCP/IP on PC

5-1-1 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*, then double-click *Local Area Connection, Local Area Connection Status* window will appear, and then click 'Properties'

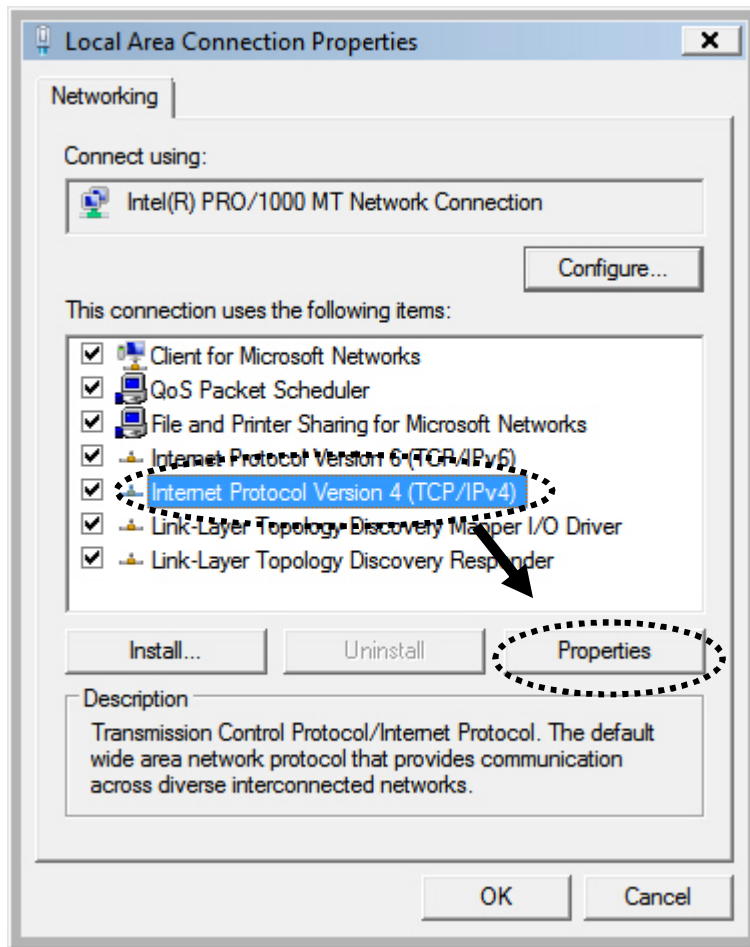


2. Select 'Obtain an IP address automatically' and 'Obtain DNS server address automatically', then click 'OK'.

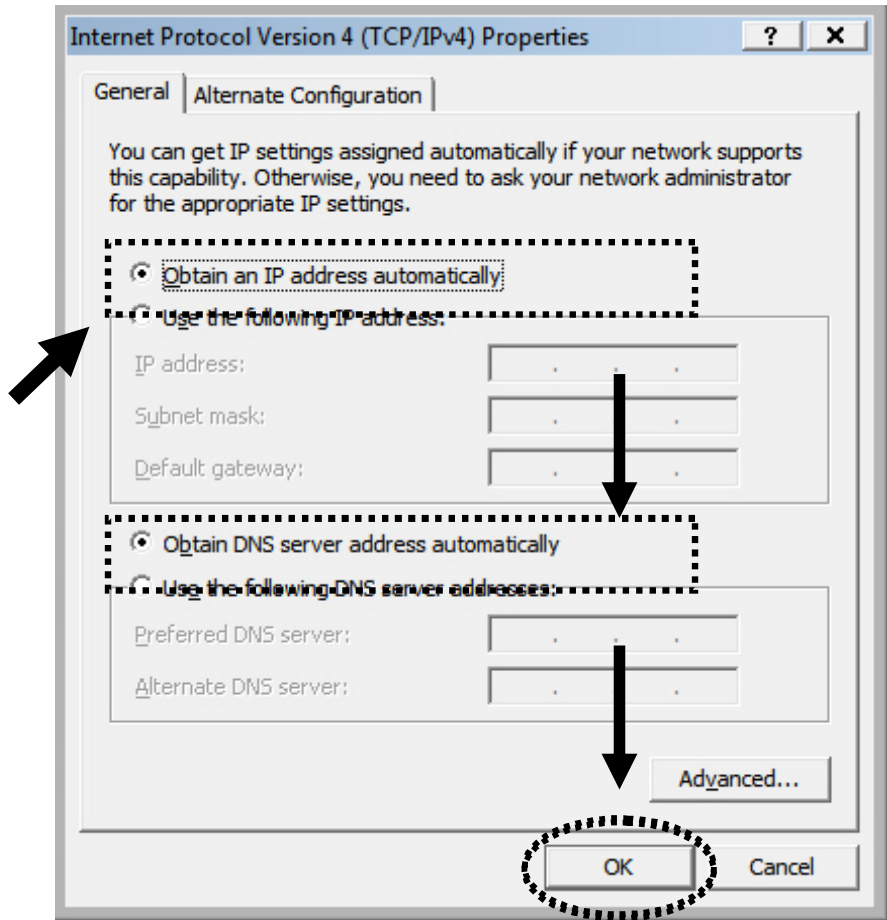


5-1-2 Windows Vista/Windows 7 IP address setup:

1. Click 'Start' button (it should be located at lower-left corner of your computer), then click control panel. Click **View Network Status and Tasks**, and then click **Manage Network Connections**. 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'.



5-2 Specification

SoC + RF: Realtek RTL8196EU + RTL8192ER

Flash: 2MB

DDR2 RAM: 16MB (Embedded with the SoC)

LAN Port: 10/100M UTP Port x 1

Power: 3VDC, 1.2A Switching Power Module Inside

Temperature: 32~104°F (0 ~ 40°C)

Humidity: 10-90% (NonCondensing)

5-3 Glossary

1. What is the IEEE 802.11g standard?

802.11g is the new IEEE standard for high-speed wireless LAN communications that provides for up to 54 Mbps data rate in the 2.4 GHz band.

802.11g is quickly becoming the next mainstream wireless LAN technology for the home, office and public networks.

802.11g defines the use of the same OFDM modulation technique specified in IEEE 802.11a for the 5 GHz frequency band and applies it in the same 2.4 GHz frequency band as IEEE 802.11b. The 802.11g standard requires backward compatibility with 802.11b.

The standard specifically calls for:

- A. A new physical layer for the 802.11 Medium Access Control (MAC) in the 2.4 GHz frequency band, known as the extended rate PHY (ERP). The ERP adds OFDM as a mandatory new coding scheme for 6, 12 and 24 Mbps (mandatory speeds), and 18, 36, 48 and 54 Mbps (optional speeds). The ERP includes the modulation schemes found in 802.11b including CCK for 11 and 5.5 Mbps and Barker code modulation for 2 and 1 Mbps.
- B. A protection mechanism called RTS/CTS that governs how 802.11g devices and 802.11b devices interoperate.

2. What is the IEEE 802.11b standard?

The IEEE 802.11b Wireless LAN standard subcommittee, which formulates the standard for the industry. The objective is to enable wireless LAN hardware from different manufactures to communicate.

3. What does IEEE 802.11 feature support?

The product supports the following IEEE 802.11 functions:

- CSMA/CA plus Acknowledge Protocol
- Multi-Channel Roaming
- Automatic Rate Selection
- RTS/CTS Feature
- Fragmentation
- Power Management

4. What is Ad-hoc?

An Ad-hoc integrated wireless LAN is a group of computers, each has a Wireless LAN card, Connected as an independent wireless LAN. Ad hoc wireless LAN is applicable at a departmental scale for a branch or SOHO operation.

5. What is Infrastructure?

An integrated wireless and wireless and wired LAN is called an Infrastructure configuration. Infrastructure is applicable to enterprise scale for wireless access to central database, or wireless application for mobile workers.

6. What is BSS ID?

A specific Ad hoc LAN is called a Basic Service Set (BSS). Computers in a BSS must be configured with the same BSS ID.

7. What is WEP?

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 40 bit shared key algorithm, as described in the IEEE 802.11 standard.

8. What is TKIP?

TKIP is a quick-fix method to quickly overcome the inherent weaknesses in WEP security, especially the reuse of encryption keys. TKIP is involved in the IEEE 802.11i WLAN security standard, and the specification might be officially released by early 2003.

9. What is AES?

AES (Advanced Encryption Standard), a chip-based security, has been developed to ensure the highest degree of security and authenticity for digital information, wherever and however communicated or stored, while making more efficient use of hardware and/or software than previous encryption standards. It is also included in IEEE 802.11i standard. Compare with AES, TKIP is a temporary protocol for replacing WEP security until manufacturers implement AES at the hardware level.

10. Can Wireless products support printer sharing?

Wireless products perform the same function as LAN products. Therefore, Wireless products can work with Netware, Windows 2000, or other LAN operating systems to support printer or file sharing.

11. Would the information be intercepted while transmitting on air?

WLAN features two-fold protection in security. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent security feature of scrambling. On the software side, WLAN series offer the encryption function (WEP) to enhance security and Access Control. Users can set it up depending upon their needs.

12. What is DSSS? What is FHSS? And what are their differences?

Frequency-hopping spread-spectrum (FHSS) uses a narrowband carrier that changes frequency in a pattern that is known to both transmitter and receiver. Properly synchronized, the net effect is to maintain a single logical channel. To

an unintended receiver, FHSS appears to be short-duration impulse noise. Direct-sequence spread-spectrum (DSSS) generates a redundant bit pattern for each bit to be transmitted. This bit pattern is called a chip (or chipping code). The longer the chip is, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without-the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

13. What is Spread Spectrum?

Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communication systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread –spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

14. What is WPS?

WPS stands for Wi-Fi Protected Setup. It provides a simple way to establish unencrypted or encrypted connections between wireless clients and access point automatically. User can press a software or hardware button to activate WPS function, and WPS-compatible wireless clients and access point will establish connection by themselves. There are two types of WPS: PBC (Push-Button Configuration) and PIN code.