LevelOne

User Manual

WRE-8011E

AC1200 Wireless Range Extender

V1.0_20161125

Table of Contents

1 Introduction

Congratulations on becoming the owner of the Portable Repeater. You will now be able to access the Internet using your high-speed xDSL/Cable modem connection.

This User Guide will show you how to connect your Portable Repeater, and how to customize its configuration to get the most out of your new product.

Features

The list below contains the main features of the device and may be useful to users with knowledge of networking protocols. If you are not an experienced user, the chapters throughout this guide will provide you with enough information to get the most out of your device.

Features include:

- 10/100Base-T Ethernet router to provide Internet connectivity to all computers on your LAN
- User-friendly configuration program accessed via a web browser

The Portable Repeater has the internal Ethernet switch allows for a direct connection to a 10/100BASE-T Ethernet network via an RJ-45 interface, with LAN connectivity for both the Portable Repeater and a co-located PC or other Ethernet-based device.

Device Requirements

In order to use the Portable Repeater, you must have the following:

- One RJ-45 Broadband Internet connection via cable modem or xDSL modem
- Instructions from your ISP on what type of Internet access you will be using, and the addresses needed to set up access
- One or more computers each containing an Ethernet card (10Base-T/100Base-T network interface card (NIC))
- TCP/IP protocol for each PC
- For system configuration using the supplied
  a. web-based program: a web browser such as Internet Explorer v4 or later, or Netscape v4 or later. Note that version 4 of each browser is the minimum version requirement – for optimum display quality, use Internet Explorer v5, or Netscape v6.1

Note

You do not need to use a hub or switch in order to connect more than one Ethernet PC to your device. Instead, you can connect up to four Ethernet PCs directly to your device using the ports labeled Ethernet on the rear panel.

Using this Document

Notational conventions

- Acronyms are defined the first time they appear in the text and also in the glossary.
- For brevity, the Portable Repeater is referred to as “the device”.
- The term *LAN* refers to a group of Ethernet-connected computers at one site.

Typographical conventions

- *Italic* text is used for items you select from menus and drop-down lists and the names of displayed web pages.
- **Bold** text is used for text strings that you type when prompted by the program, and to emphasize important points.

Special messages

This document uses the following icons to draw your attention to specific instructions or explanations.

Note

Provides clarifying or non-essential information on the current topic.

Definition

Explains terms or acronyms that may be unfamiliar to many readers. These terms are also included in the Glossary.

⚠ **WARNING**

Provides messages of high importance, including messages relating to personal safety or system integrity.

Getting Support

Supplied by:
Helpdesk Number:
Website:

2 Getting to know the device

Computer / System requirements

- Windows 98SE, Windows Me, Windows 2000, Windows XP, Windows Vista, Windows 7, Windows 8, Windows 8.1 and Windows 10.

Package Contents

1. WRE-8011E
2. Quick Installation Guide
3. Ethernet Cable (RJ-45)

LED meanings & activations

Top Side

The Top Side contains lights called Light Emitting Diodes (LEDs) that indicate the status of the unit.

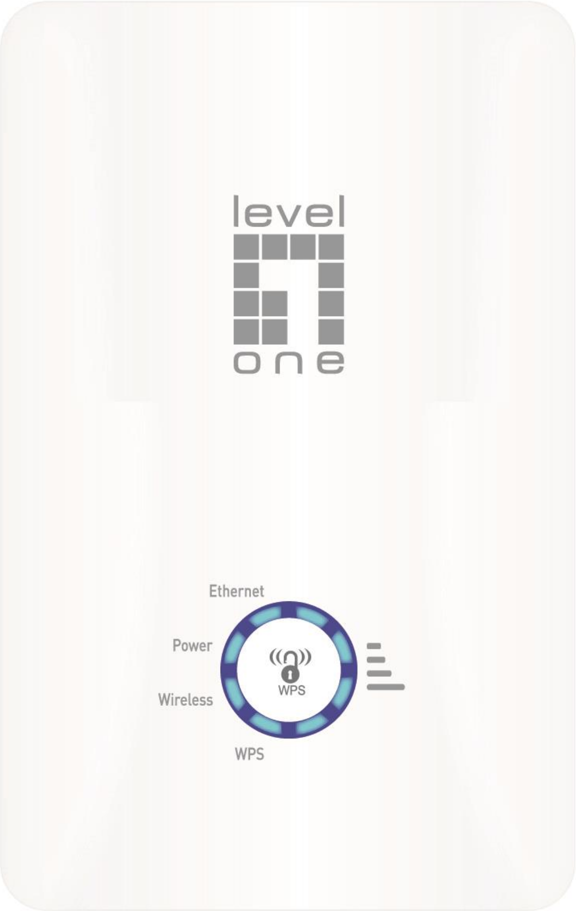
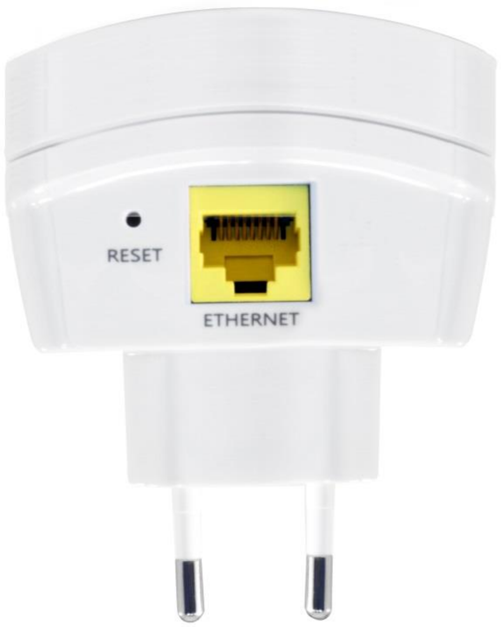


Figure 1: *Top Side and LEDs*

Label	Color	Function
Wifi Signal	Green	On Wireless Signal Strength Off: No WLAN link
Wireless	Green	On: WLAN link established and active Blink: Valid Wireless packet being transferred
WPS	Green	Off: WPS link isn’t established and active Blink: Valid WPS packet being transferred
Ethernet	Green	On: LAN link established and active Off: No LAN link Blink: Valid Ethernet packet being transferred

Rear and Left Panel and bottom Side

The rear and right panel and bottom side contains a *Restore Defaults* button, the ports for the unit's data and power connections.



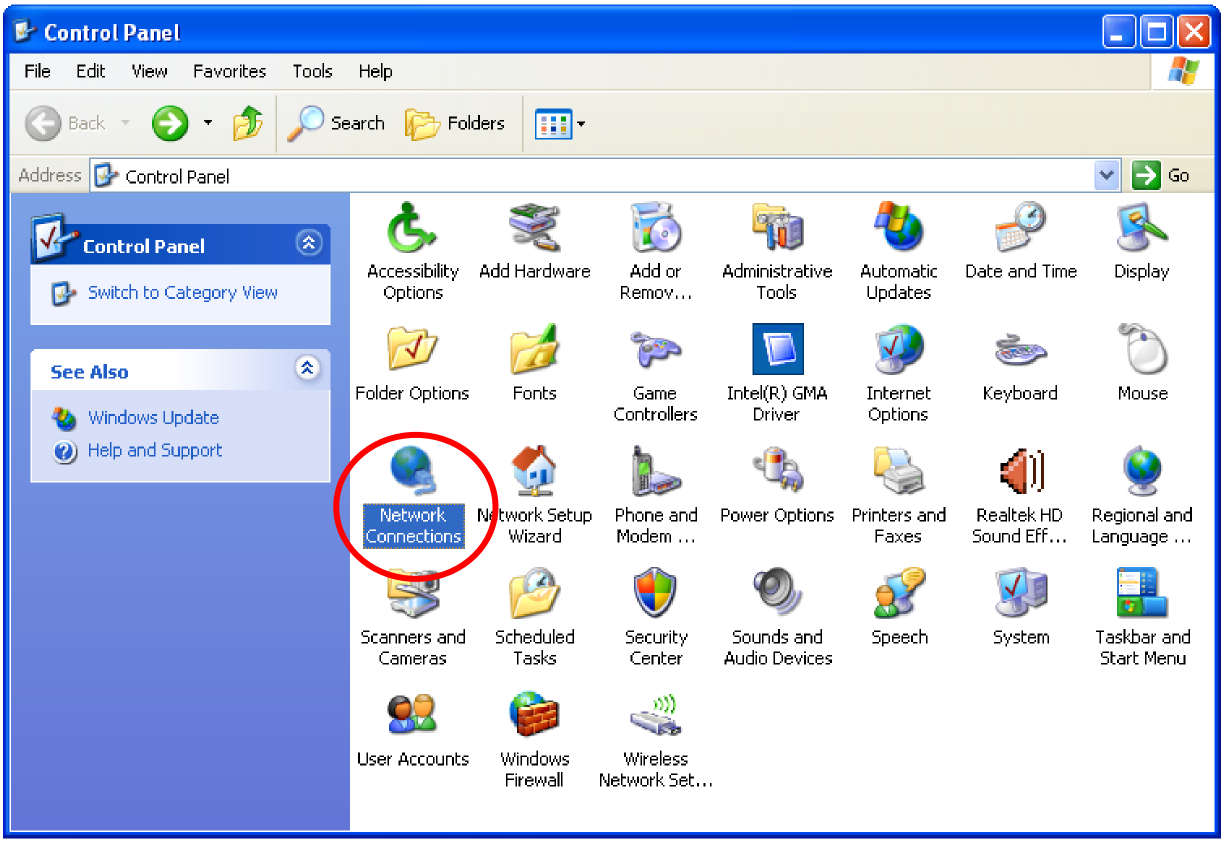
Label	Function
Ethernet	Connects the device via LAN Ethernet to a PC
WPS / RESET	WPS Press this button for 3 full seconds and the WPS LED will flash to start WPS. Now go to the wireless adapter or device and press its WPS button. Make sure to press the button within 120 seconds (2 minutes) after pressing the router's WPS button. RESET Reset button. **RESET** the WRE-8011E to its default settings. Press this button for at least 10 full seconds to **RESET** device to its default settings.

3 Computer configurations under different OS, to obtain IP address automatically

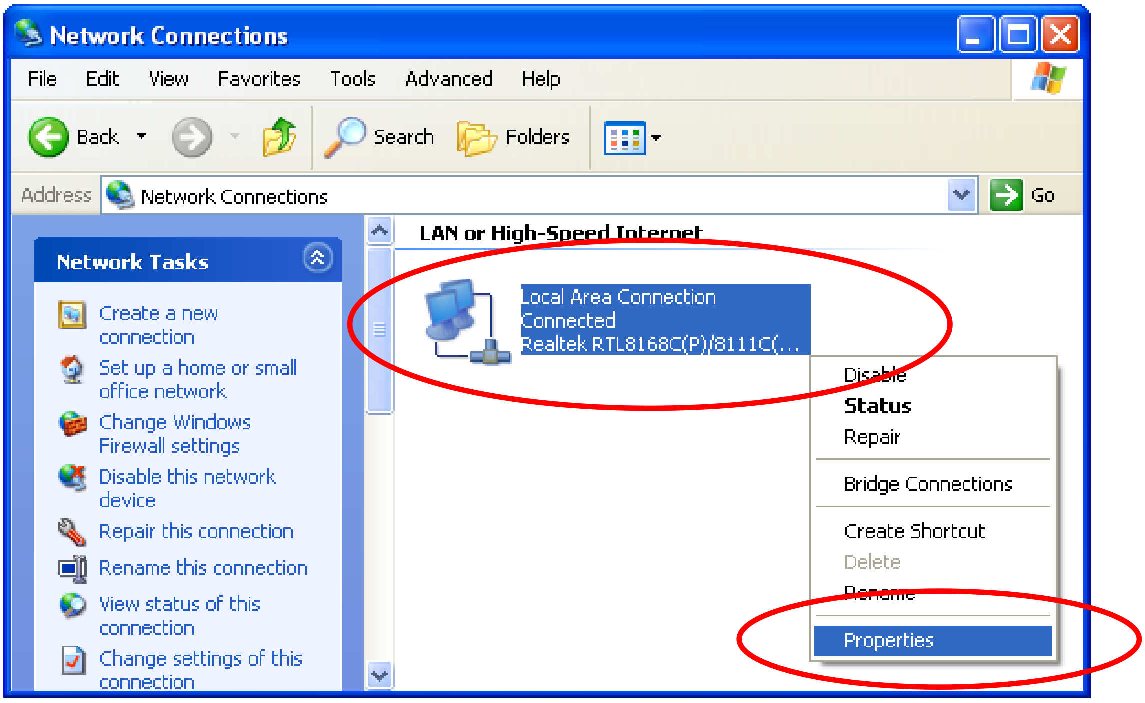
Before starting the WRE-8011E configuration, please kindly configure the PC computer as below, to have automatic IP address / DNS Server.

For Windows 98SE / ME / 2000 / XP

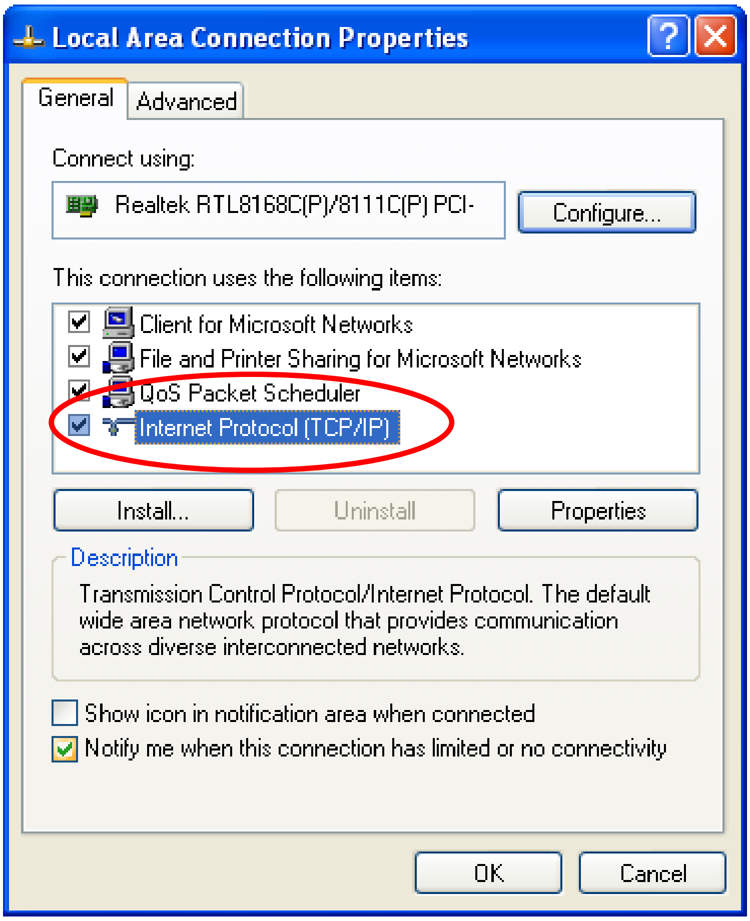
1. Click on "**Start**" -> "**Control Panel**" **(in Classic View)**. In the Control Panel, double click on "**Network Connections**" to continue.



2. Single RIGHT click on "**Local Area connection**", then click "**Properties**".


Network Connections
File Edit View Favorites Tools Advanced Help
Back
Search
Folders
Address Network Connections
Go
Network Tasks
Create a new connection
Set up a home or small office network
Change Windows Firewall settings
Disable this network device
Repair this connection
Rename this connection
View status of this connection
Change settings of this connection
LAN or High-Speed Internet
Local Area Connection
Connected
Realtek RTL8168C(P)/8111C(...
Disable
Status
Repair
Bridge Connections
Create Shortcut
Delete
Rename
Properties

3. Double click on "**Internet Protocol (TCP/IP)**".



Connect using:

Realtek RTL8168C(P)/8111C(P) PCI-

This connection uses the following items:

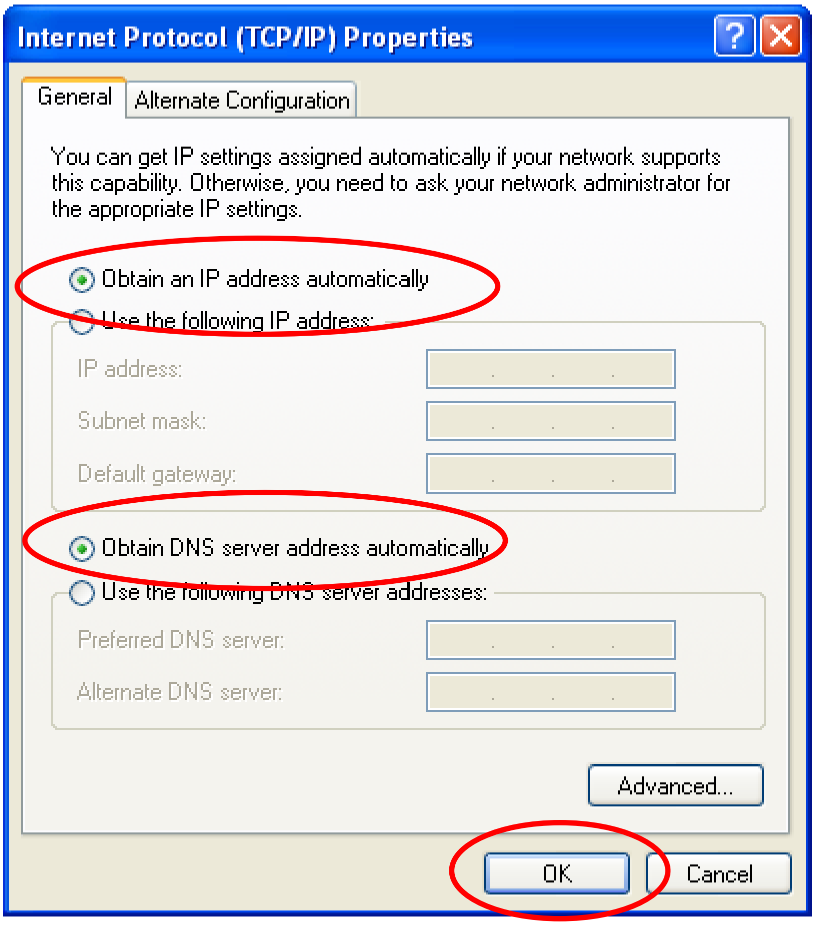
☑ Client for Microsoft Networks
☑ File and Printer Sharing for Microsoft Networks
☑ QoS Packet Scheduler
☑ Internet Protocol (TCP/IP)

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

□ Show icon in notification area when connected
☑ Notify me when this connection has limited or no connectivity

4. Check "**Obtain an IP address automatically**" and "**Obtain DNS server address automatically**" then click on "**OK**" to continue.



Internet Protocol (TCP/IP) Properties

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:

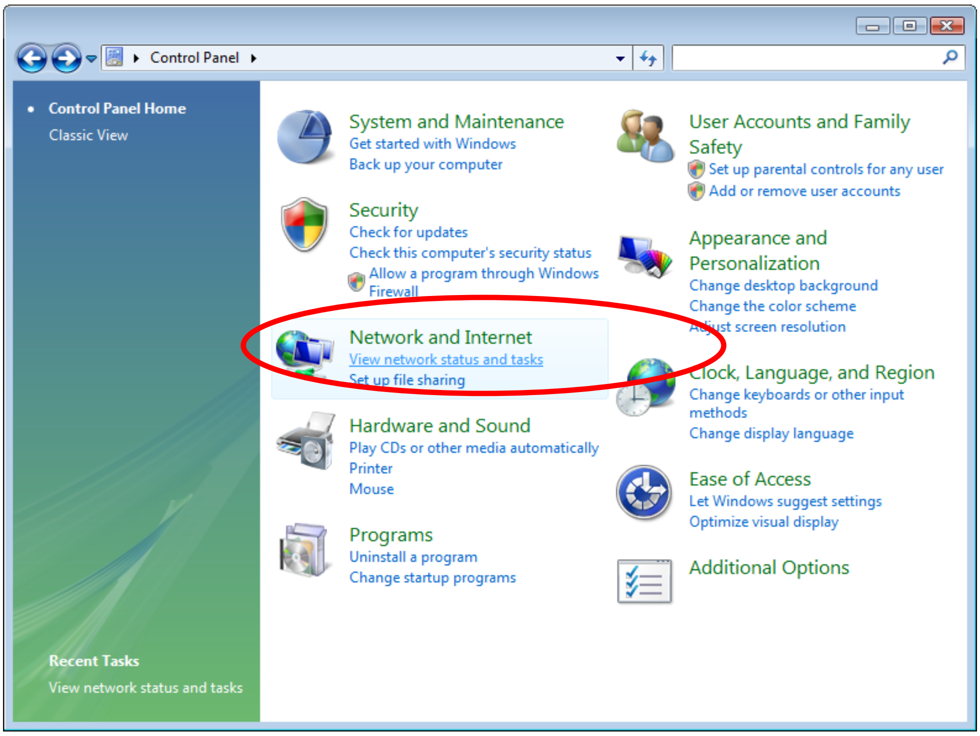
Preferred DNS server: . . .

Alternate DNS server: . . .

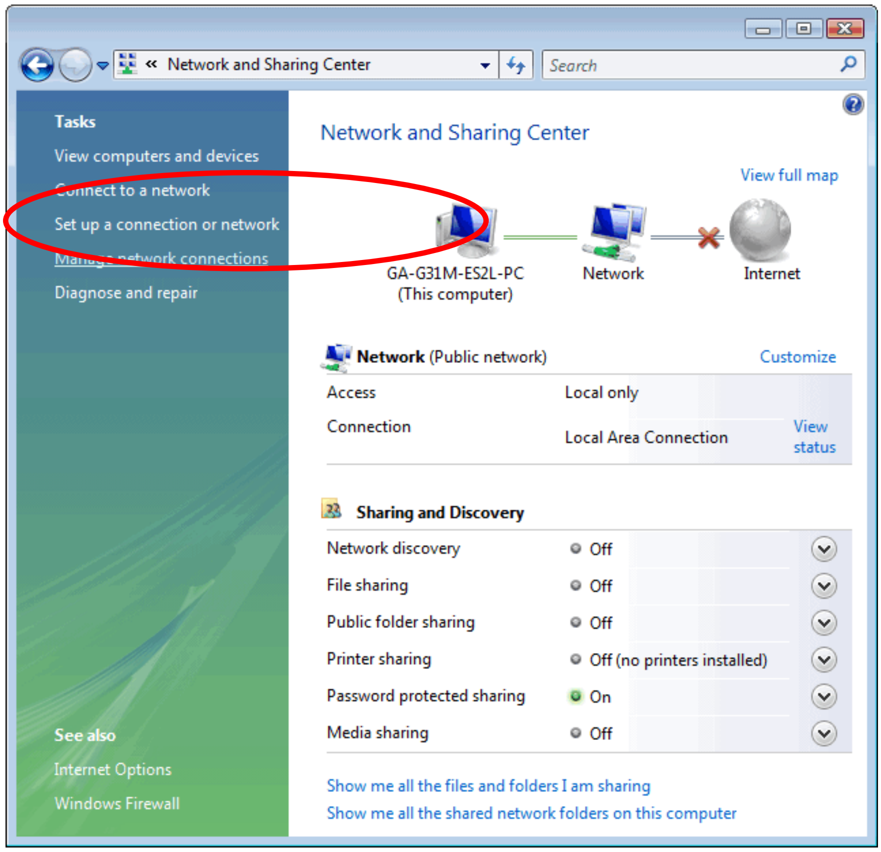
5. Click "**Show icon in notification area when connected**" (see screen image in 3. above) then Click on "**OK**" to complete the setup procedures.

For Windows Vista-32/64

1. Click on “**Start**” -> “**Control Panel**” -> “**View network status and tasks**”.


Control Panel
Control Panel Home
Classic View
Recent Tasks
View network status and tasks
System and Maintenance
Get started with Windows
Back up your computer
Security
Check for updates
Check this computer's security status
Allow a program through Windows Firewall
Network and Internet
View network status and tasks
Set up file sharing
Hardware and Sound
Play CDs or other media automatically
Printer
Mouse
Programs
Uninstall a program
Change startup programs
User Accounts and Family Safety
Set up parental controls for any user
Add or remove user accounts
Appearance and Personalization
Change desktop background
Change the color scheme
Adjust screen resolution
Clock, Language, and Region
Change keyboards or other input methods
Change display language
Ease of Access
Let Windows suggest settings
Optimize visual display
Additional Options

2. In the Manage network connections, click on “**Manage network connections**” to continue.


Network and Sharing Center
Search
Tasks
View computers and devices
Connect to a network
Set up a connection or network
Manage network connections
Diagnose and repair
See also
Internet Options
Windows Firewall
View full map
GA-G31M-ES2L-PC
(This computer)
Network
Internet
Customize
View status
Show me all the files and folders I am sharing
Show me all the shared network folders on this computer

Network and Sharing Center

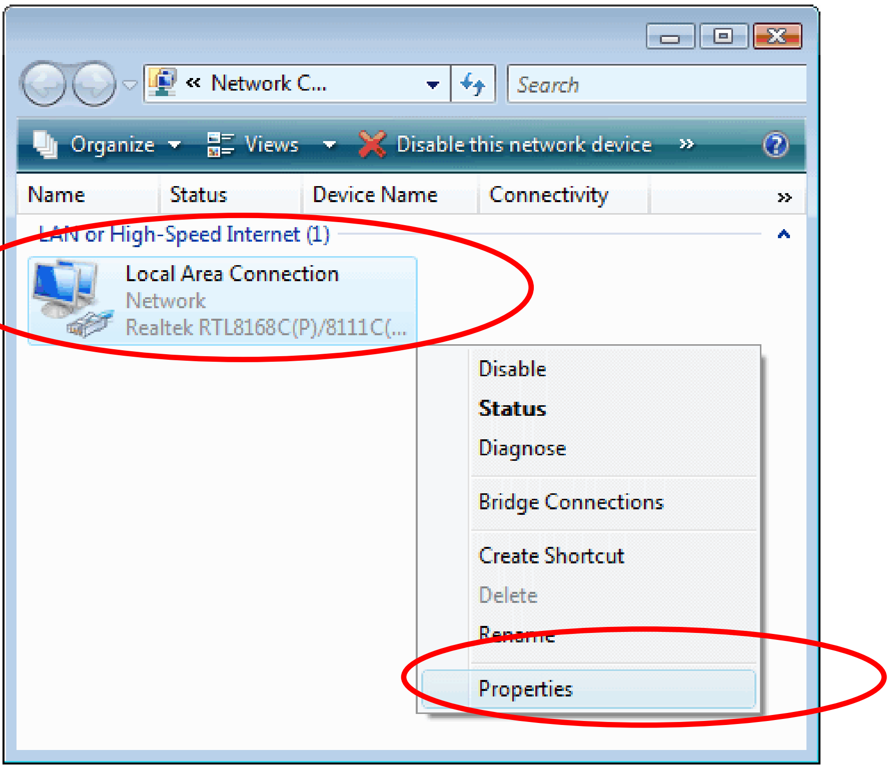
Network (Public network)

Access	Local only
Connection	Local Area Connection

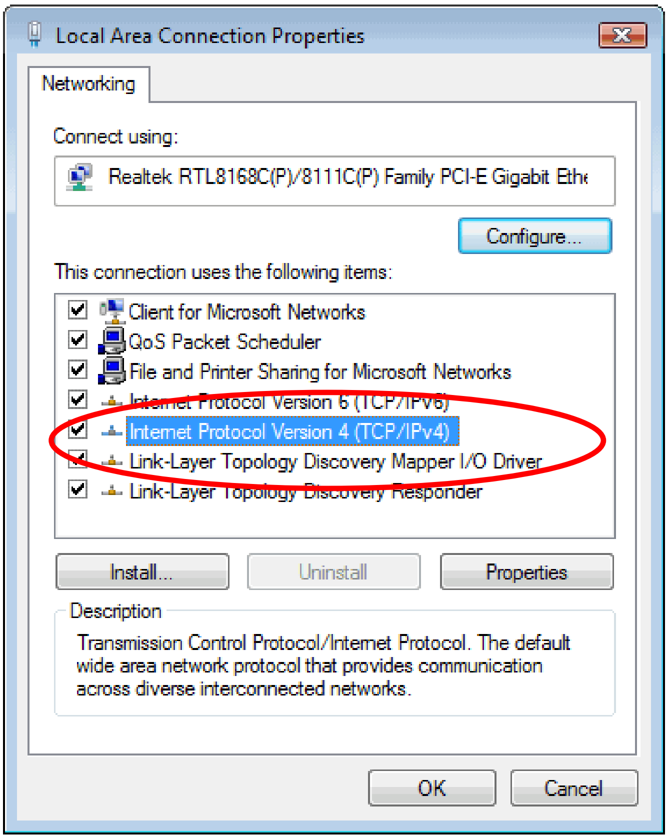
Sharing and Discovery

Network discovery	○ Off
File sharing	○ Off
Public folder sharing	○ Off
Printer sharing	○ Off (no printers installed)
Password protected sharing	● On
Media sharing	○ Off

3. Single RIGHT click on "**Local Area connection**", then click "**Properties**".



4. The screen will display the information "**User Account Control**" and click "**Continue**" to continue.
5. Double click on "**Internet Protocol Version 4 (TCP/IPv4)**".



Connect using:

Realtek RTL8168C(P)/8111C(P) Family PCI-E Gigabit Ethe

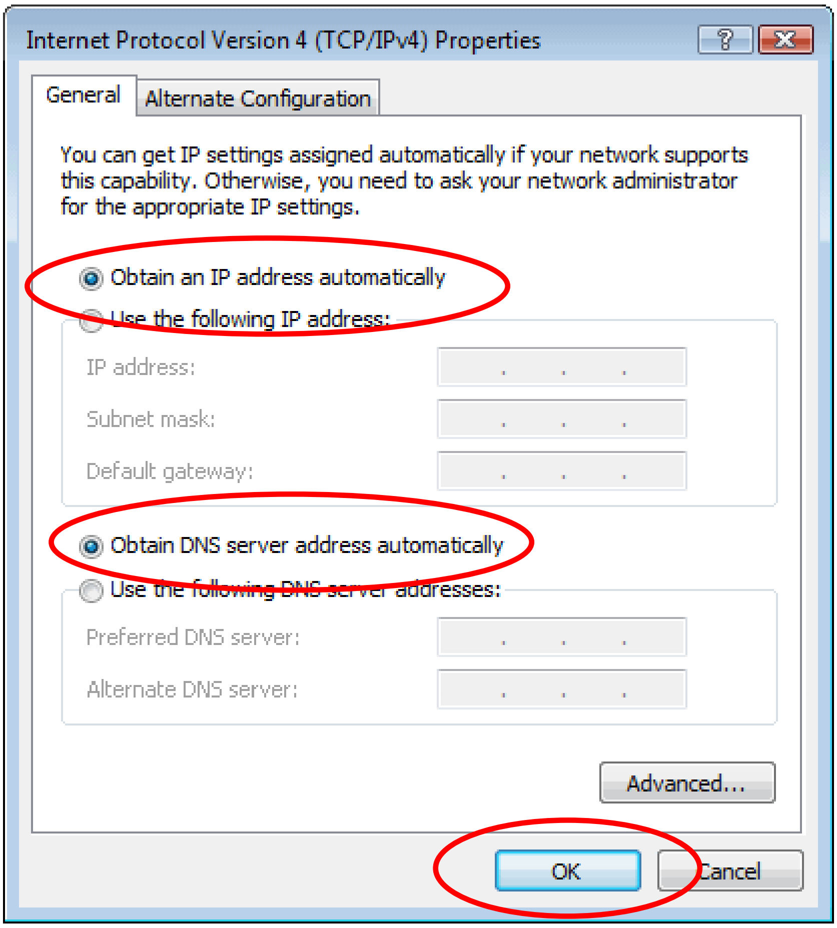
This connection uses the following items:

- ☑ Client for Microsoft Networks
- ☑ QoS Packet Scheduler
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- ☑ Link-Layer Topology Discovery Mapper I/O Driver
- ☑ Link-Layer Topology Discovery Responder

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

6. Check "**Obtain an IP address automatically**" and "**Obtain DNS server address automatically**" then click on "**OK**" to continue.



Internet Protocol Version 4 (TCP/IPv4) Properties

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

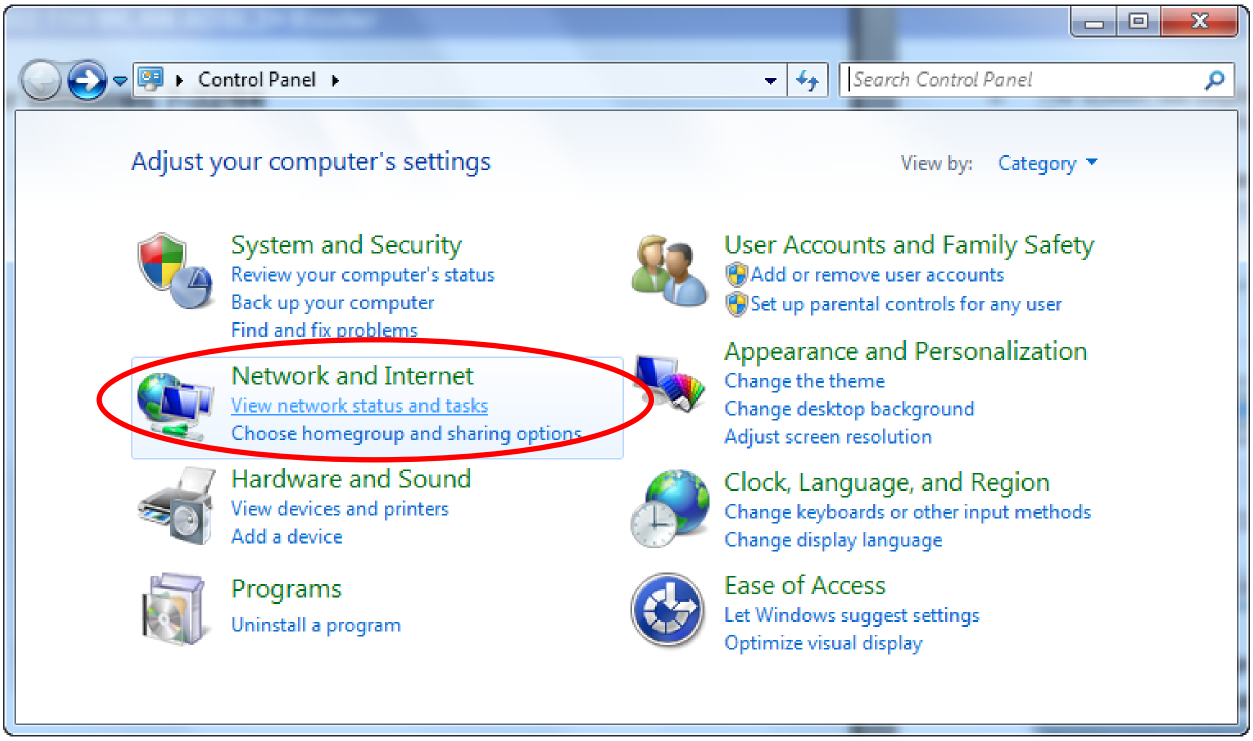
○ Use the following DNS server addresses:

Preferred DNS server: . . .

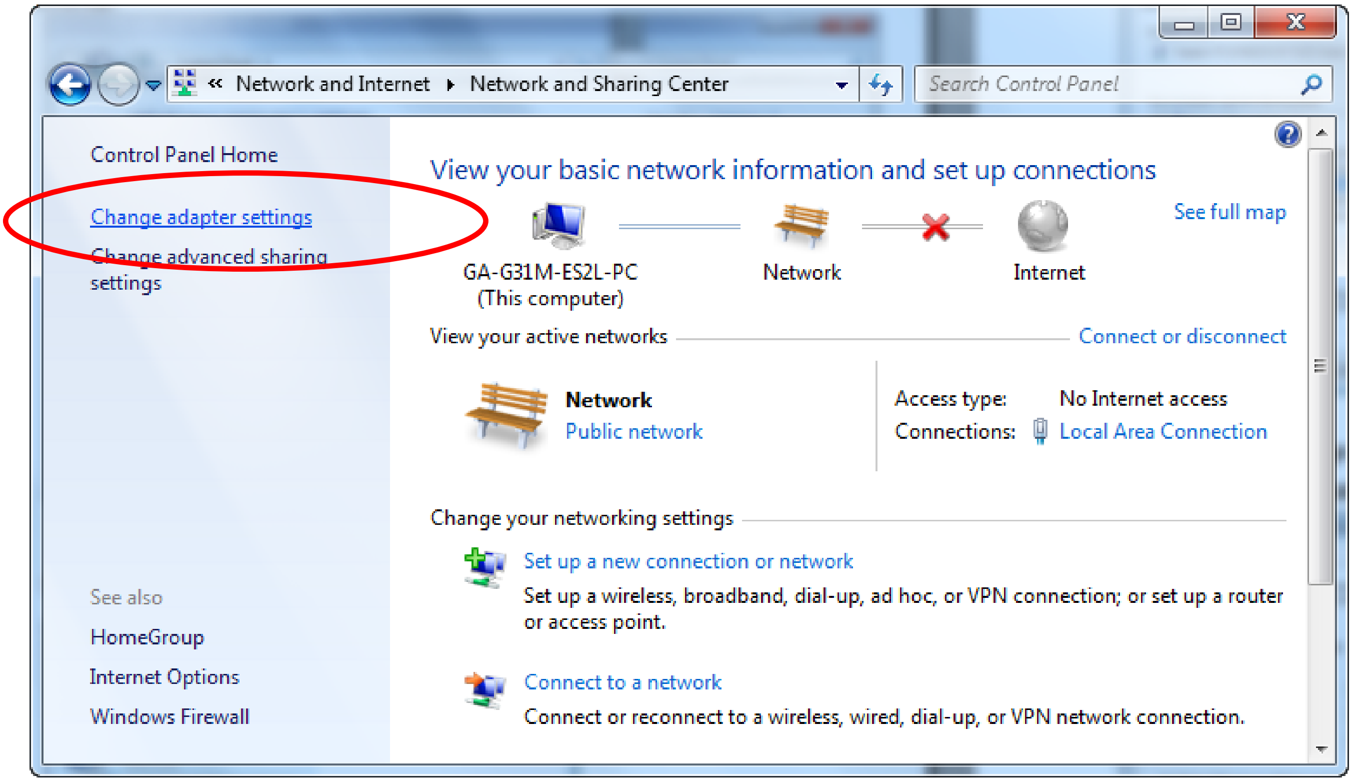
Alternate DNS server: . . .

For Windows 7-32/64

7. Click on “**Start**” -> “**Control Panel**” **(in Category View)** -> “**View network status and tasks**”.


Control Panel
Search Control Panel
Adjust your computer's settings
View by: Category
System and Security
Review your computer's status
Back up your computer
Find and fix problems
Network and Internet
View network status and tasks
Choose homegroup and sharing options
Hardware and Sound
View devices and printers
Add a device
Programs
Uninstall a program
User Accounts and Family Safety
Add or remove user accounts
Set up parental controls for any user
Appearance and Personalization
Change the theme
Change desktop background
Adjust screen resolution
Clock, Language, and Region
Change keyboards or other input methods
Change display language
Ease of Access
Let Windows suggest settings
Optimize visual display

8. In the Control Panel Home, click on “**Change adapter settings**” to continue.


« Network and Internet ▸ Network and Sharing Center
Search Control Panel
Control Panel Home
Change adapter settings
Change advanced sharing settings
See also
HomeGroup
Internet Options
Windows Firewall
View your basic network information and set up connections
See full map
GA-G31M-ES2L-PC
(This computer)
Network
Internet
View your active networks
Connect or disconnect
Network
Public network
Change your networking settings
Set up a new connection or network
Connect to a network

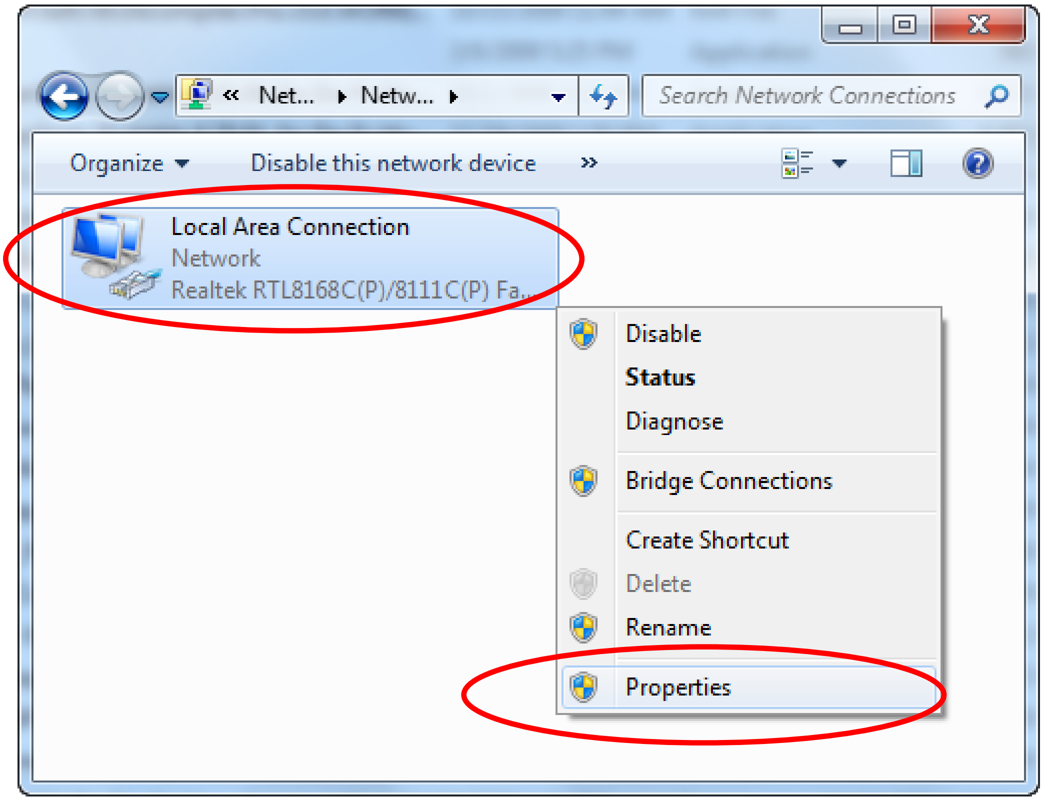
Access type: No Internet access

Connections: Local Area Connection

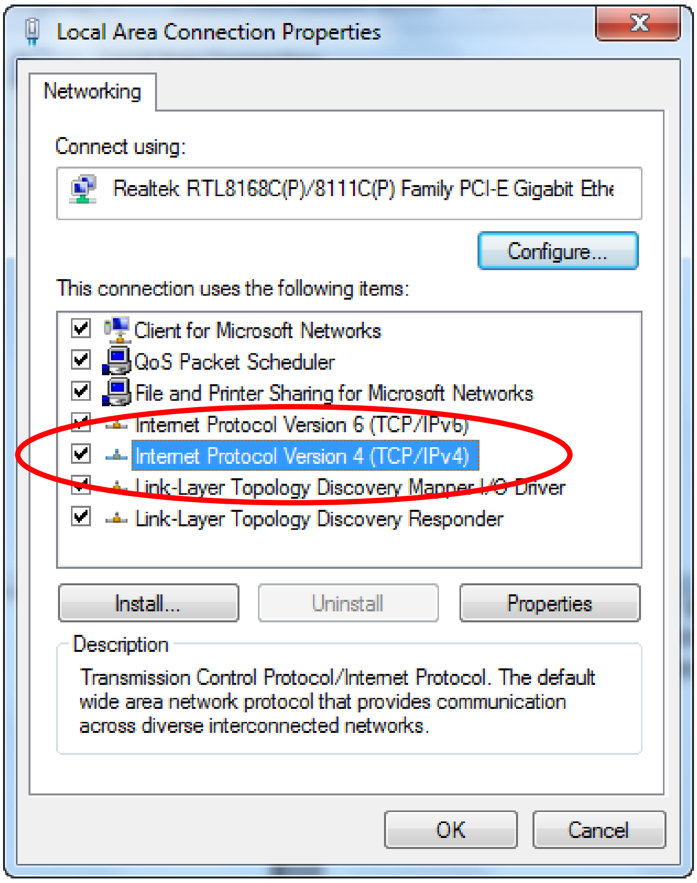
Set up a wireless, broadband, dial-up, ad hoc, or VPN connection; or set up a router or access point.

Connect or reconnect to a wireless, wired, dial-up, or VPN network connection.

9. Single RIGHT click on “**Local Area Connection**”, then click “**Properties**”.



10. Double click on "**Internet Protocol Version 4 (TCP/IPv4)**".



Local Area Connection Properties

Networking

Connect using:

Realtek RTL8168C(P)/8111C(P) Family PCI-E Gigabit Ethe

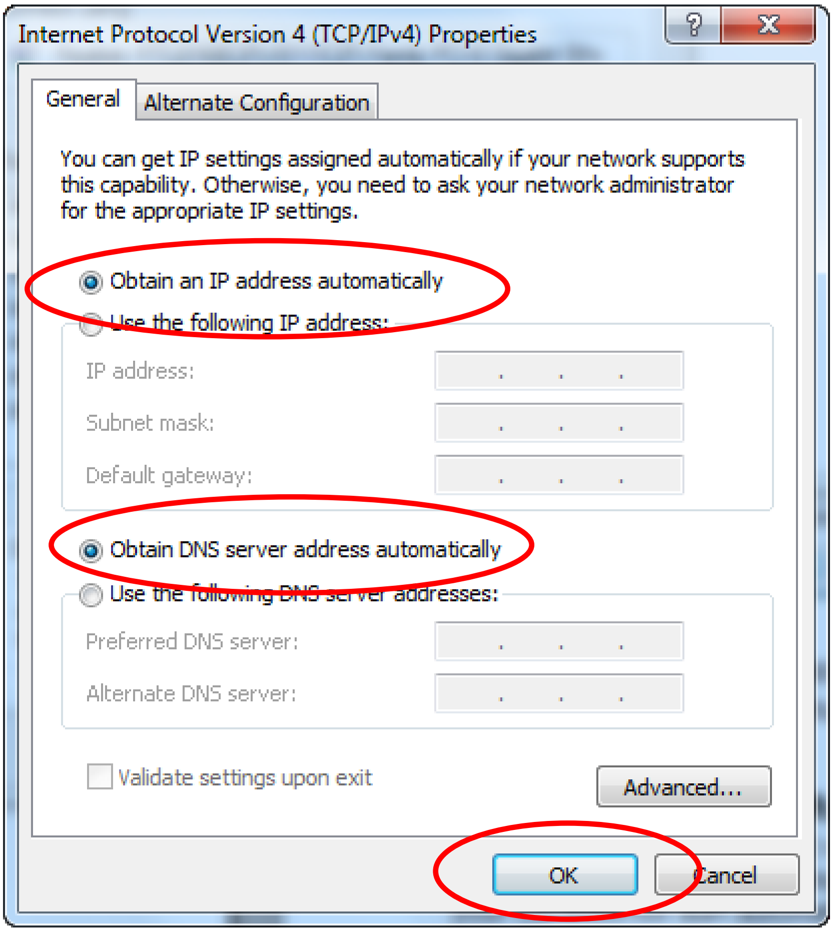
This connection uses the following items:

- ☑ Client for Microsoft Networks
- ☑ QoS Packet Scheduler
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- ☑ Link-Layer Topology Discovery Mapper I/O Driver
- ☑ Link-Layer Topology Discovery Responder

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

11. Check "**Obtain an IP address automatically**" and "**Obtain DNS server address automatically**" then click on "**OK**" to continue.



Internet Protocol Version 4 (TCP/IPv4) Properties

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:

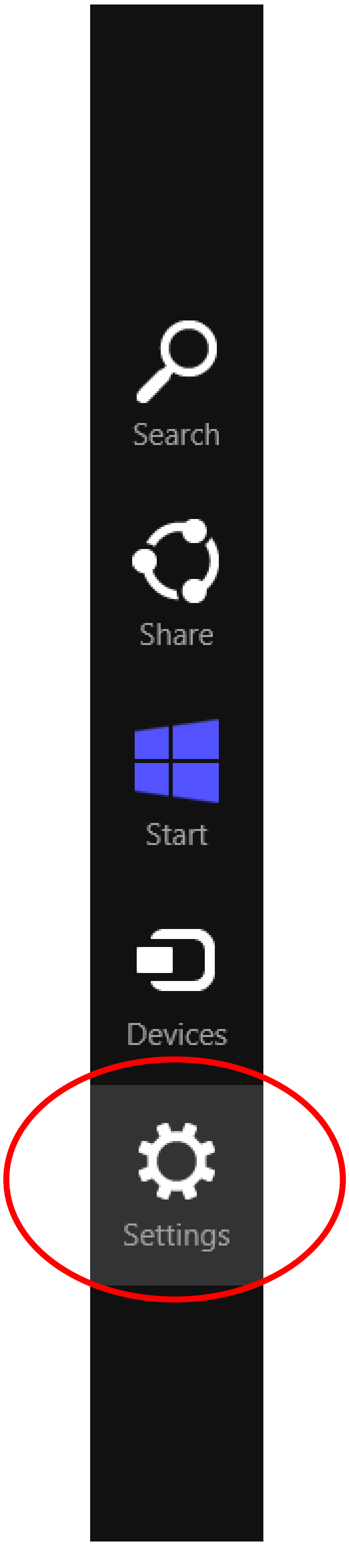
Preferred DNS server: . . .

Alternate DNS server: . . .

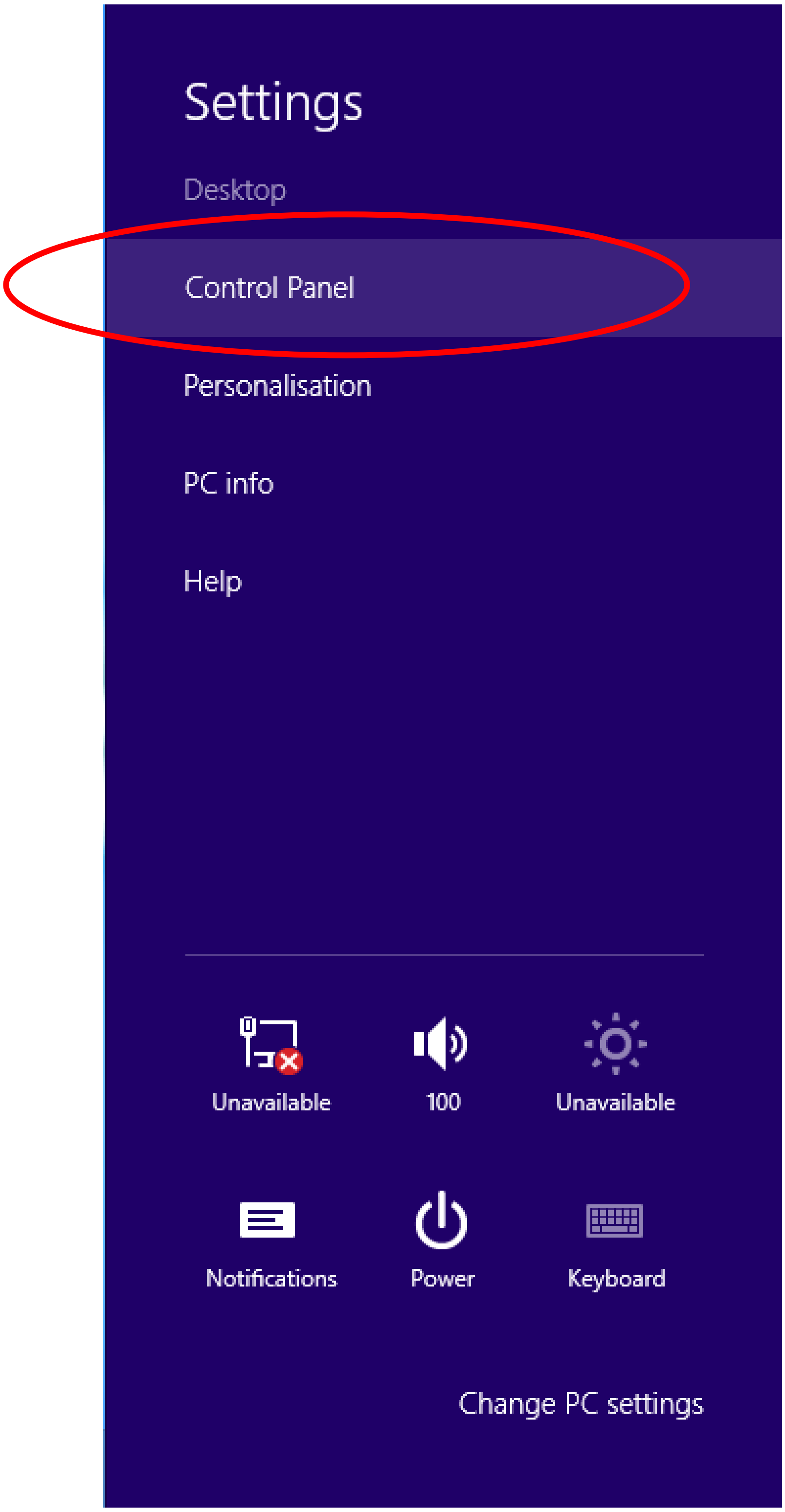
□ Validate settings upon exit

For Windows 8/8.1-32/64

1. Move the mouse or tap to the upper right corner and click on “**Settings**”.



2. Click on “**Control Panel**”.



Settings

Desktop

Control Panel

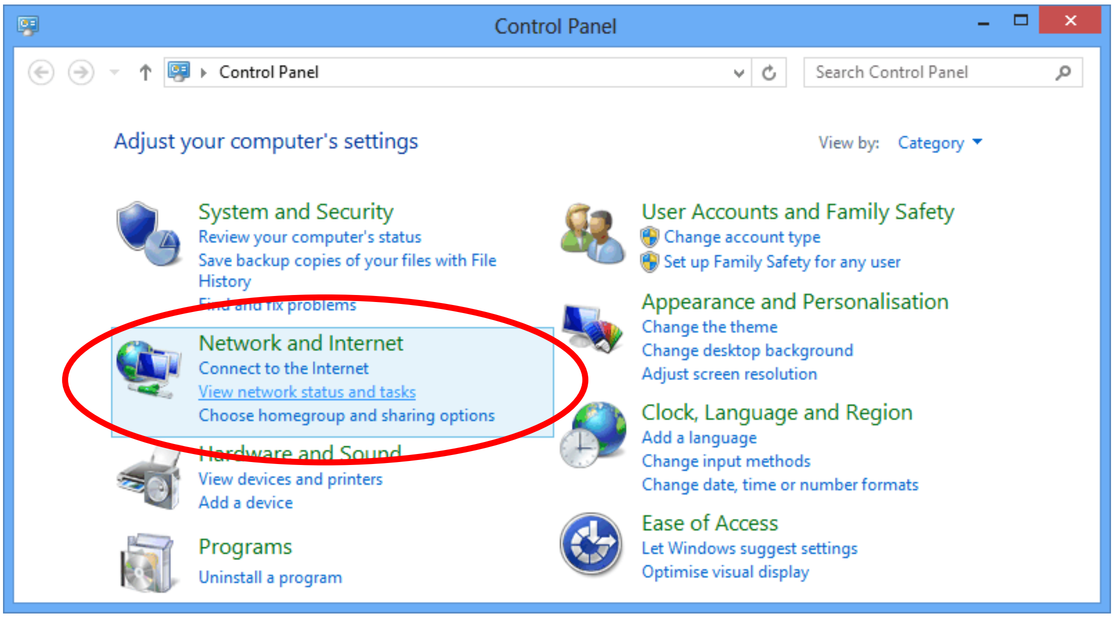
Personalisation

PC info

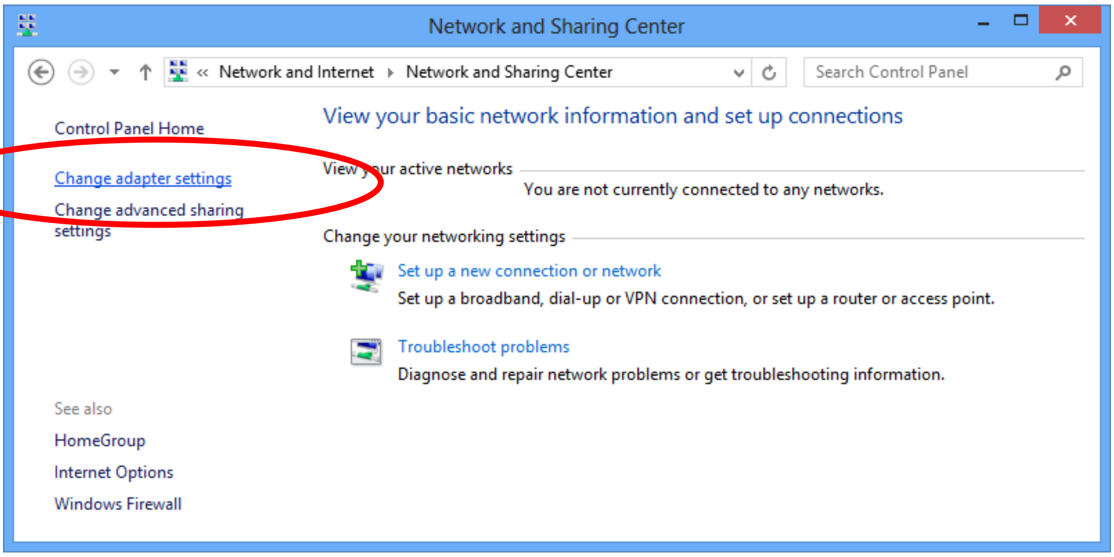
Help

Change PC settings

3. Click on “**View network status and tasks**”.


Control Panel
Control Panel
Search Control Panel
Adjust your computer's settings
View by: Category
System and Security
Review your computer's status
Save backup copies of your files with File History
Find and fix problems
Network and Internet
Connect to the Internet
View network status and tasks
Choose homegroup and sharing options
Hardware and Sound
View devices and printers
Add a device
Programs
Uninstall a program
User Accounts and Family Safety
Change account type
Set up Family Safety for any user
Appearance and Personalisation
Change the theme
Change desktop background
Adjust screen resolution
Clock, Language and Region
Add a language
Change input methods
Change date, time or number formats
Ease of Access
Let Windows suggest settings
Optimise visual display

4. In the Control Panel Home, click on “**Change adapter settings**” to continue.

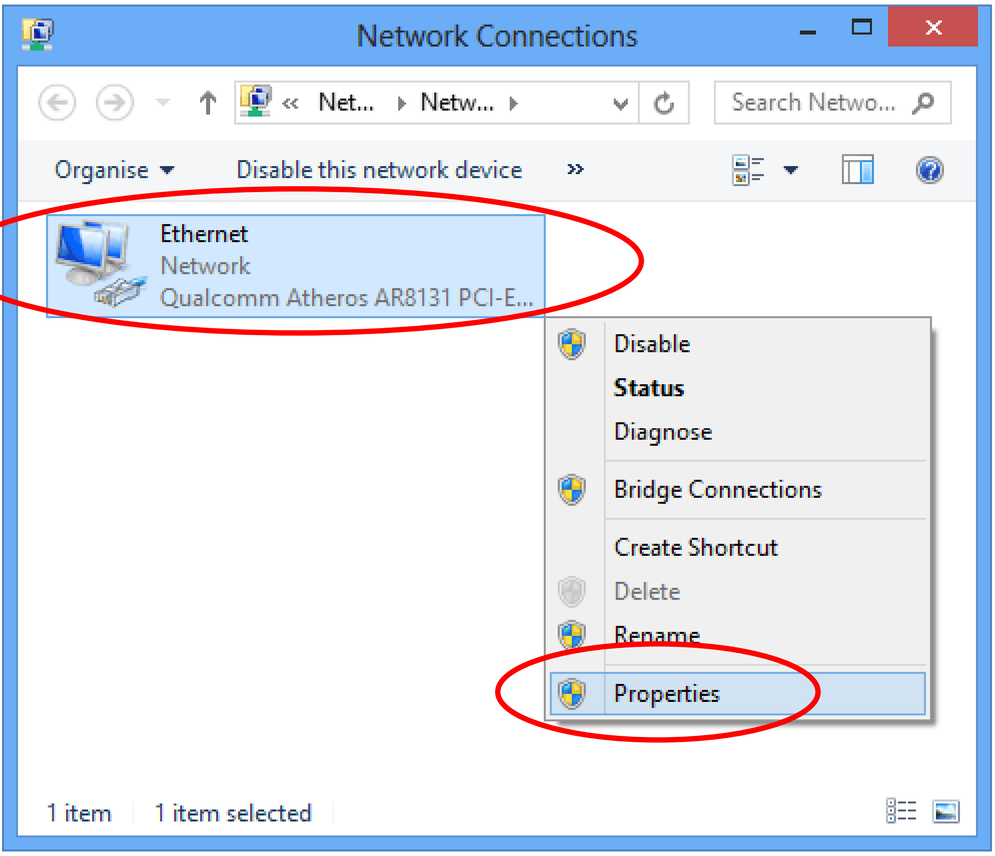

Network and Sharing Center
« Network and Internet › Network and Sharing Center
Search Control Panel
Control Panel Home
Change adapter settings
Change advanced sharing settings
See also
HomeGroup
Internet Options
Windows Firewall
View your basic network information and set up connections
View your active networks
Change your networking settings
Set up a new connection or network
Troubleshoot problems

You are not currently connected to any networks.

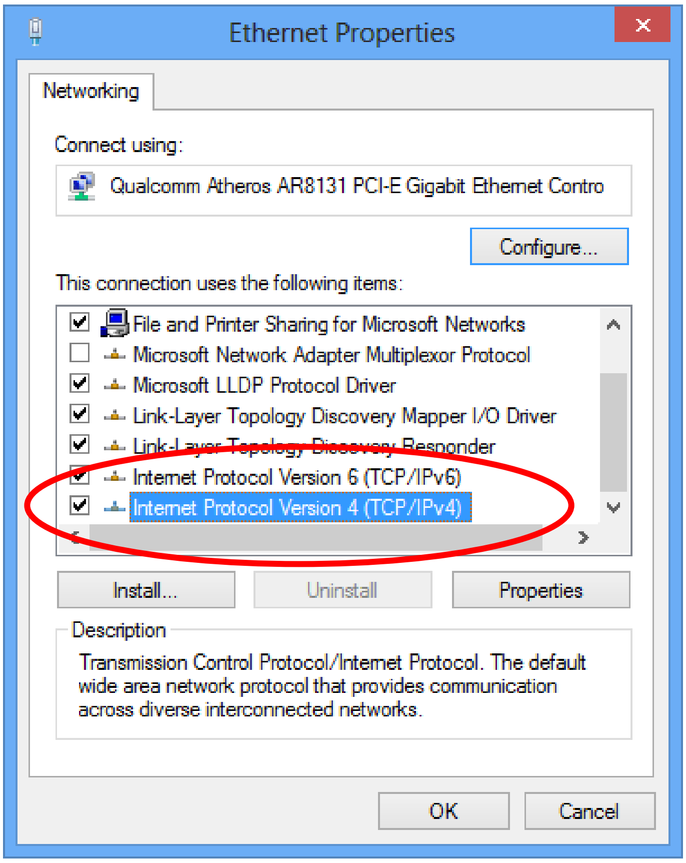
Set up a broadband, dial-up or VPN connection, or set up a router or access point.

Diagnose and repair network problems or get troubleshooting information.

5. Single RIGHT click on “**Ethernet**", then click "**Properties**".



6. Double click on "**Internet Protocol Version 4 (TCP/IPv4)**".



Connect using:

Qualcomm Atheros AR8131 PCI-E Gigabit Ethernet Contro

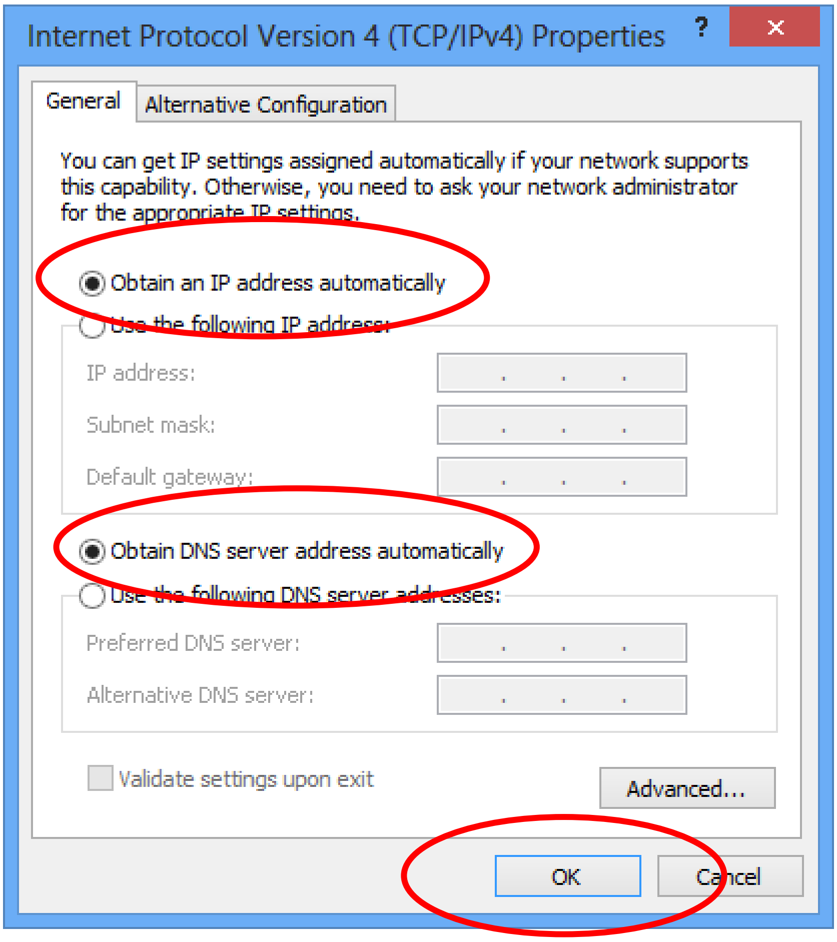
This connection uses the following items:

- ☑ File and Printer Sharing for Microsoft Networks
- ☐ Microsoft Network Adapter Multiplexor Protocol
- ☑ Microsoft LLDP Protocol Driver
- ☑ Link-Layer Topology Discovery Mapper I/O Driver
- ☑ Link-Layer Topology Discovery Responder
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Internet Protocol Version 4 (TCP/IPv4)

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

7. Check "**Obtain an IP address automatically**" and “**Obtain DNS server address automatically**” then click on "**OK**" to continue.



Internet Protocol Version 4 (TCP/IPv4) Properties

General | Alternative 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:

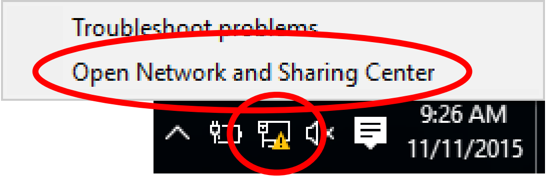
Preferred DNS server: . . .

Alternative DNS server: . . .

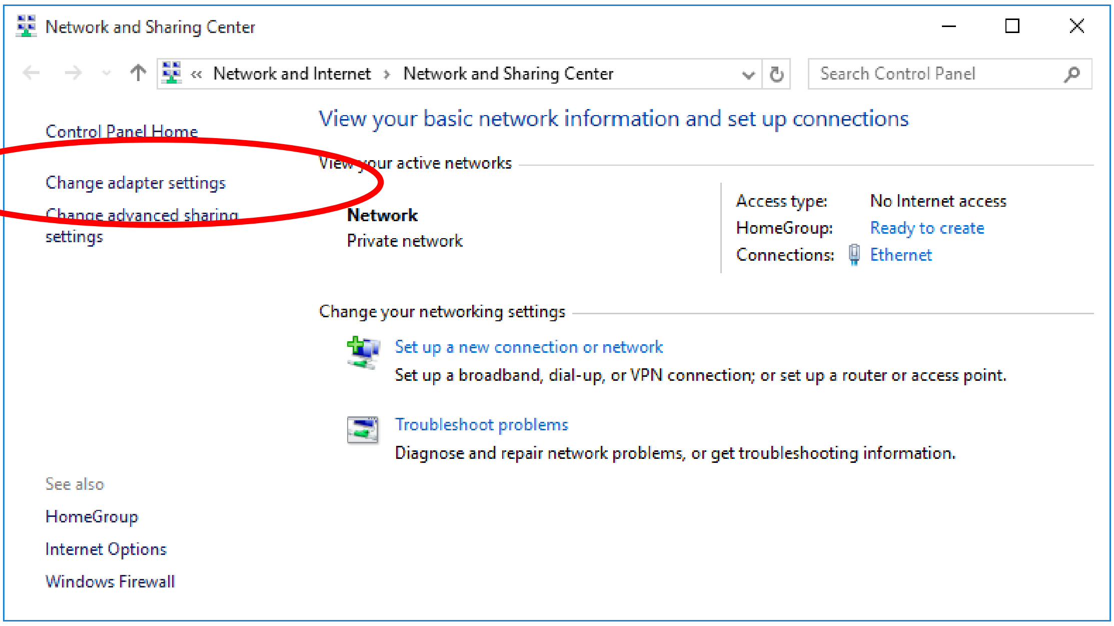
□ Validate settings upon exit

For Windows 10-32/64

1. Right click on ***Network*** icon , then click "***Open Network and Sharing Center***".



2. In the Control Panel Home, click on "**Change adapter settings**" to continue.



Network and Sharing Center

« Network and Internet › Network and Sharing Center

Search Control Panel

Control Panel Home

Change adapter settings

Change advanced sharing settings

View your basic network information and set up connections

View your active networks

Network
Private network

Access type: No Internet access
HomeGroup: Ready to create
Connections: Ethernet

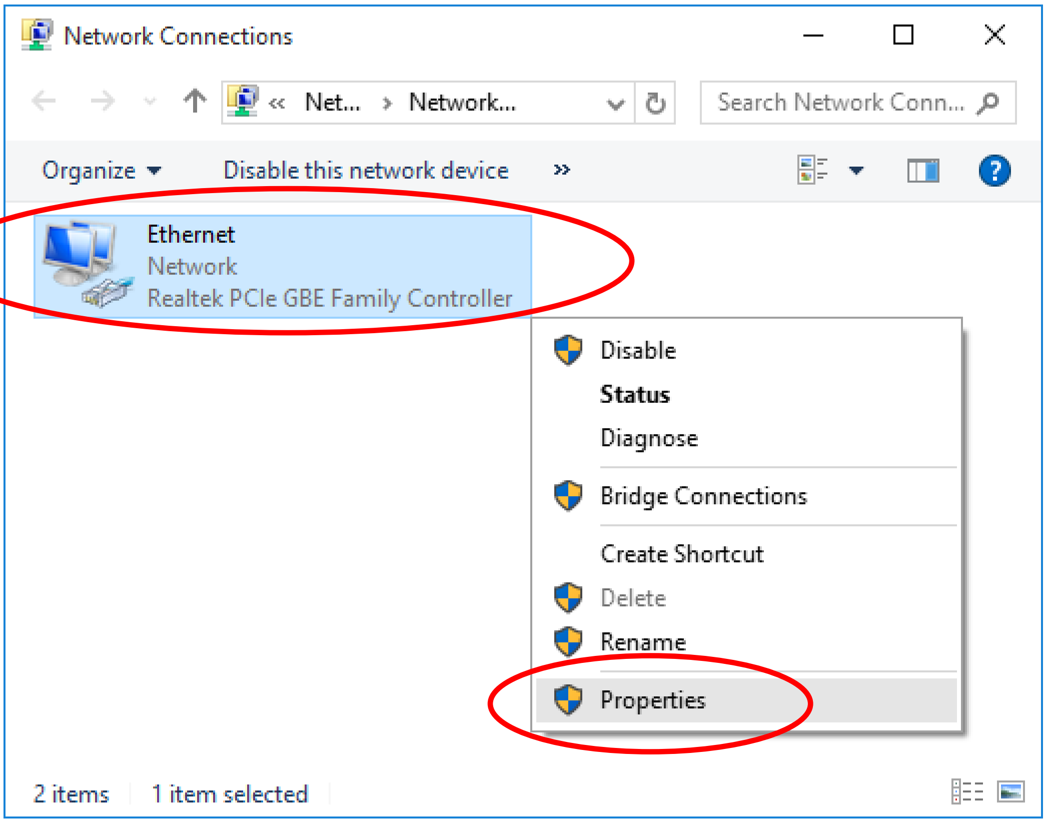
Change your networking settings

Set up a new connection or network
Set up a broadband, dial-up, or VPN connection; or set up a router or access point.

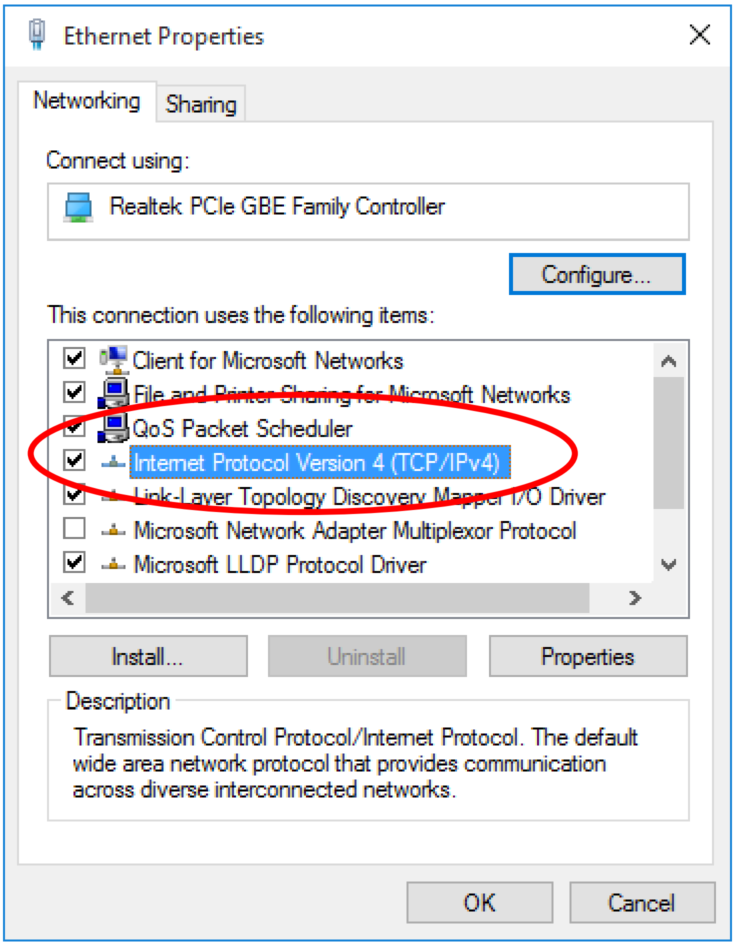
Troubleshoot problems
Diagnose and repair network problems, or get troubleshooting information.

See also
HomeGroup
Internet Options
Windows Firewall

3. Single RIGHT click on “**Ethernet**", then click "**Properties**".



4. Double click on "**Internet Protocol Version 4 (TCP/IPv4)**".



Ethernet Properties

Connect using:

Realtek PCIe GBE Family Controller

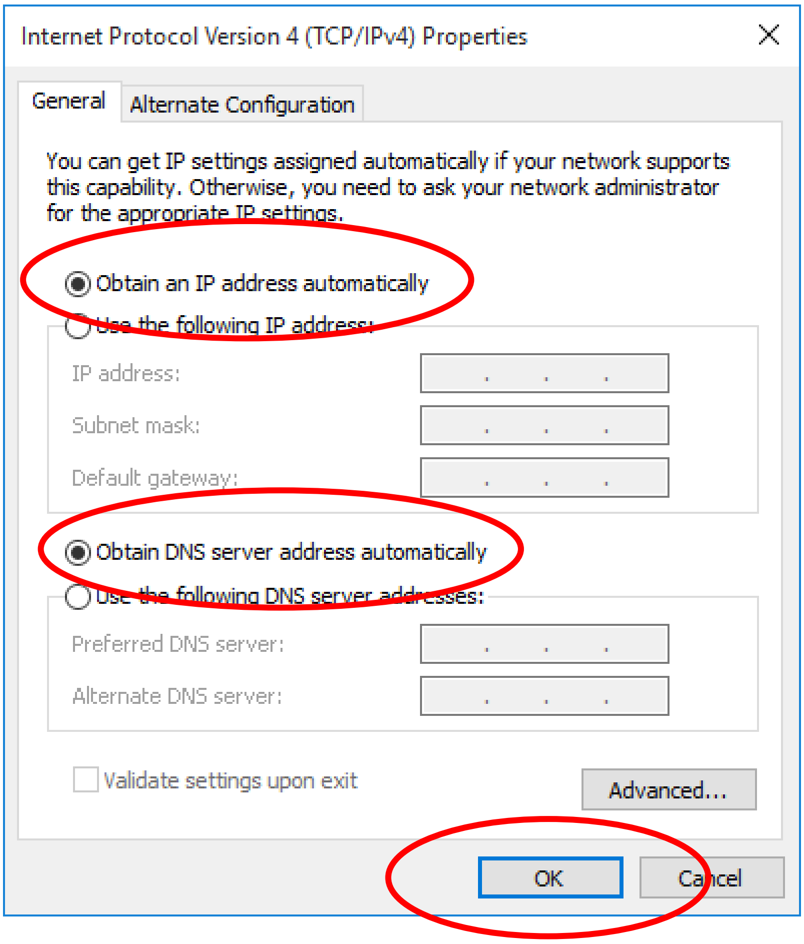
This connection uses the following items:

☑ Client for Microsoft Networks
☑ File and Printer Sharing for Microsoft Networks
☑ QoS Packet Scheduler
☑ Internet Protocol Version 4 (TCP/IPv4)
☑ Link-Layer Topology Discovery Mapper I/O Driver
□ Microsoft Network Adapter Multiplexor Protocol
☑ Microsoft LLDP Protocol Driver

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

5. Check "**Obtain an IP address automatically**" and “**Obtain DNS server address automatically**” then click on "**OK**" to continue.



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: . . .

□ Validate settings upon exit

4 Connecting your device

This chapter provides basic instructions for connecting the Portable Repeater to a computer or LAN and to the Internet.

In addition to configuring the device, you need to configure the Internet properties of your computer(s). For more details, see the following sections:

- *Configuring Ethernet PCs*

This chapter assumes that you have already established a DSL/Cable service with your Internet service provider (ISP). These instructions provide a basic configuration that should be compatible with your home or small office network setup. Refer to the subsequent chapters for additional configuration instructions.

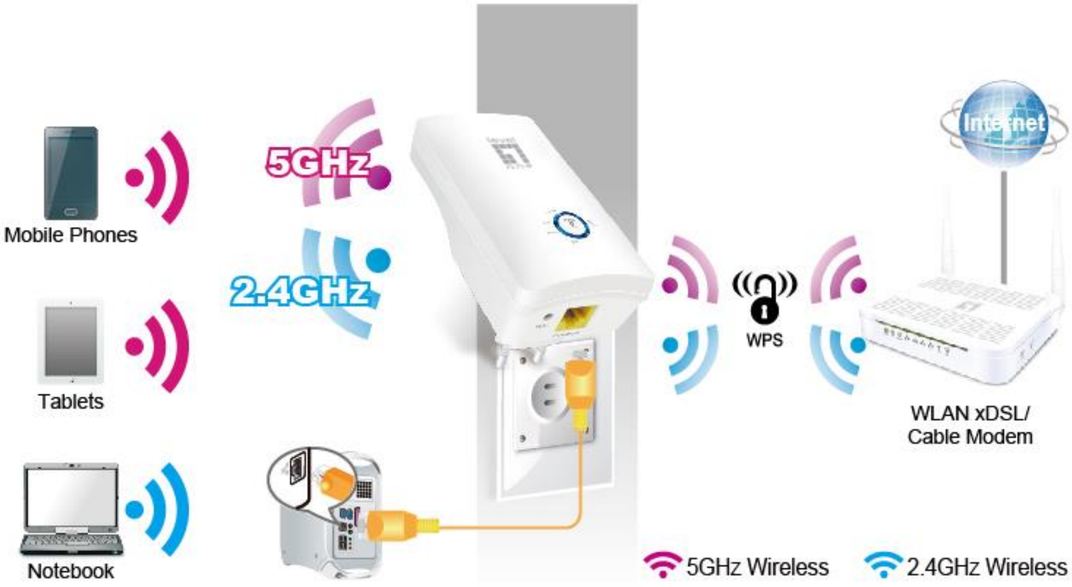
Connecting the Hardware

This section describes how to connect the device to the wall phone port, the power outlet and your computer(s) or network.

WARNING

Before you begin, turn the power off for all devices. *These include your computer(s), your LAN hub/switch (if applicable), and the Portable Repeater.*

The diagram below illustrates the hardware connections. The layout of the ports on your device may vary from the layout shown. Refer to the steps that follow for specific instructions.



Step 1. Connect the Ethernet cable to LAN Port

Connect the supplied RJ45 Ethernet cable from your PC's Ethernet port to any of the WRE-8011E LAN Port.

Step 2. Connect the WRE-8011E to your wall-mounted power outlet

WPS Pairing between WRE-8011E and Wireless xDSL/Cable Modem

This section describes how to do WPS Pairing between WRE-8011E and Wireless xDSL/Cable.

The diagram below illustrates the hardware connections. The layout of the ports on your device may vary from the layout shown. Refer to the steps that follow for specific instructions.

Wireless xDSL/Cable Modem
WPS
WPS

Step 1. Press WPS button on Wireless xDSL/Cable Modem.

Step 2. Press WPS button on WRE-8011E for 3 seconds and release WPS button. Now the WPS LED is blinking and the WRE-8011E is donig WPS Pairing with Wireless xDSL/Cable Modem.

Make sure to press the button within 120 seconds (2 minutes) after pressing the Wireless xDSL/Cable Modem's WPS button.

Step 3. Once the WRE-8011E finished doing WPS Pairing with Wireless xDSL/Cable Modem, the Wifi Signal Strength LED is ON. The status of Wifi signal strength LED varies depending on the Wifi signal strength between WRE-8011E and Wireless xDSL/Cable Modem.

Step 4. Check if the Wifi Signal Strength LED of WRE-8011E is ON, the WRE-8011E is connected and suitable for Internet Connections.

Step 5. Check if the Wifi Signal Strength is OFF, the WRE-8011E isn’t connected and suitable for Internet Connections. Please repeat steps of WPS Pairing or follow next step to have it connected and suitable for Internet Connections.

5 Advanced Configuration

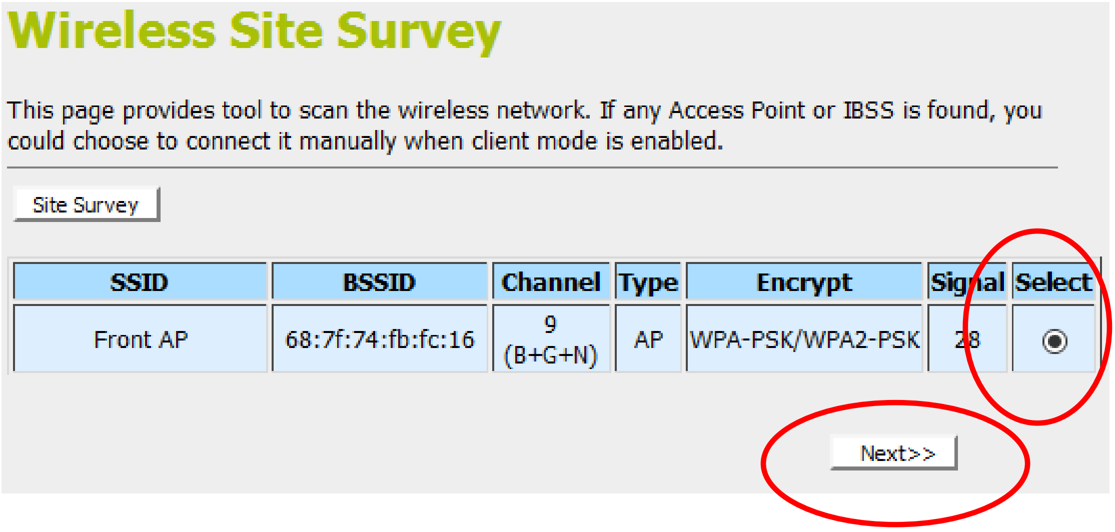
Advanced Configuration

1. From any of the LAN computers connected to , launch your web browser, type the following URL in the web address (or location) box, and press [Enter] on your keyboard:

http://repeater.nw

Repeater Mode (Extend your Wireless Network)

2. Check on "**Select**" ratio of SSID of the front AP and click on "**Next>>**" button.

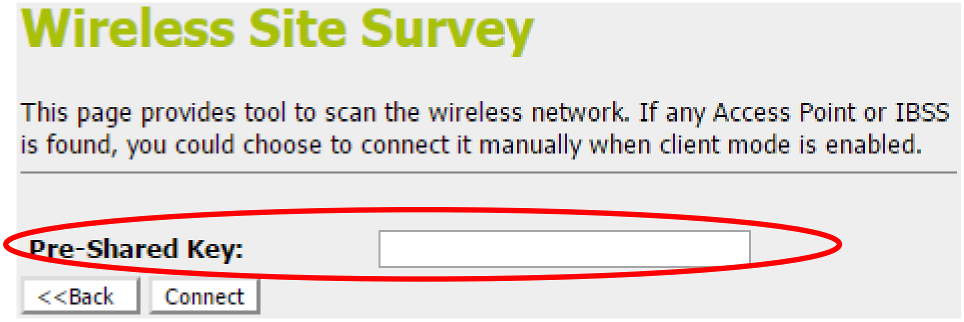


Wireless Site Survey

This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.

SSID	BSSID	Channel	Type	Encrypt	Signal	Select
Front AP	68:7f:74:fb:fc:16	9 (B+G+N)	AP	WPA-PSK/WPA2-PSK	28	●

3. Enter Wifi password of the front AP and then click on "**Connect**" button.

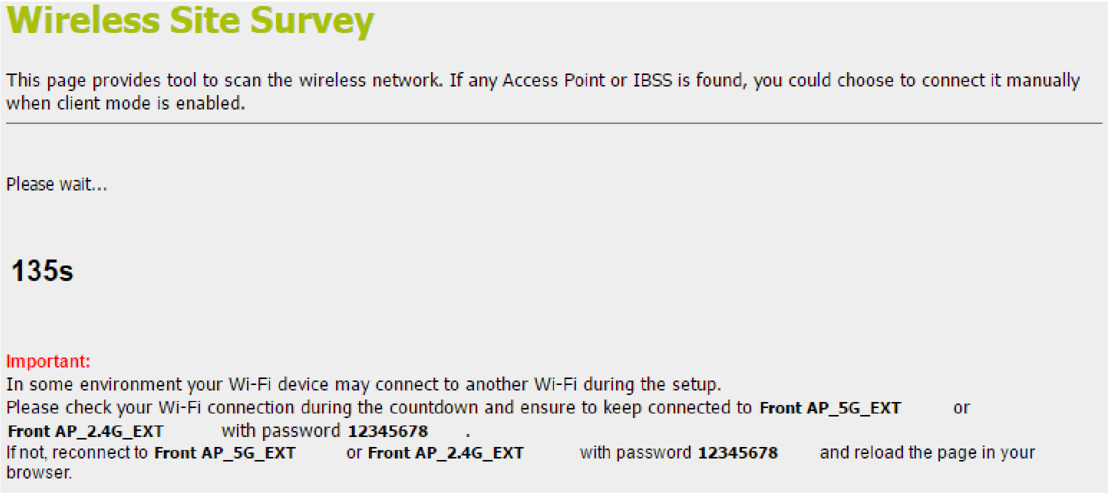


Wireless Site Survey

This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.

Pre-Shared Key:

4. Please wait... 140 s



Wireless Site Survey

This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.

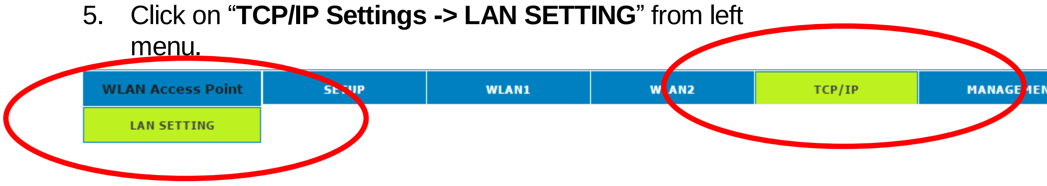
Please wait...

135s

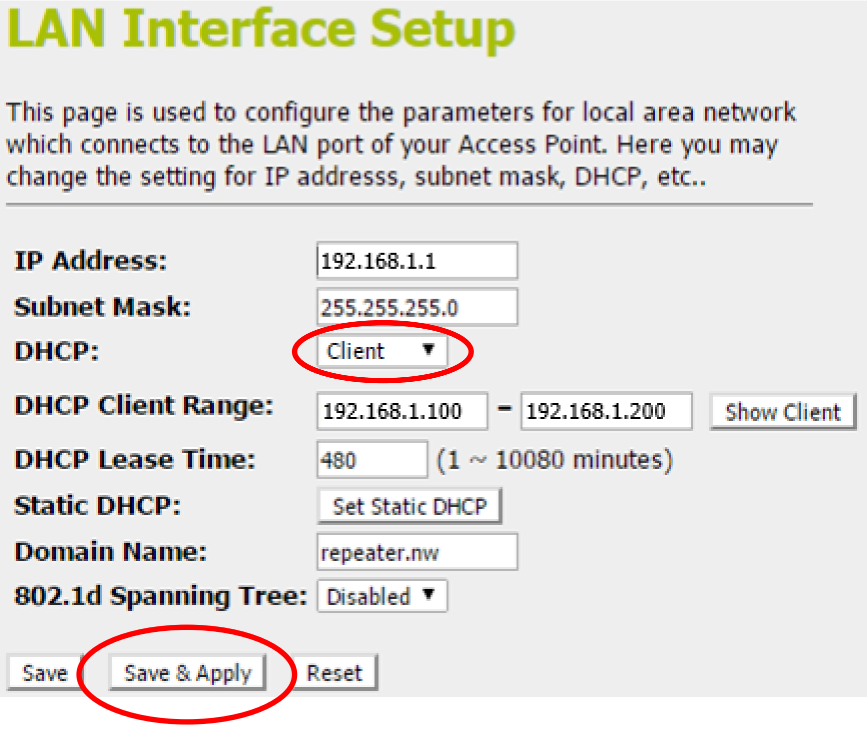
Important:
In some environment your Wi-Fi device may connect to another Wi-Fi during the setup.
Please check your Wi-Fi connection during the countdown and ensure to keep connected to **Front AP_5G_EXT** or **Front AP_2.4G_EXT** with password **12345678** .
If not, reconnect to **Front AP_5G_EXT** or **Front AP_2.4G_EXT** with password **12345678** and reload the page in your browser.

AP Mode (Extend your Wired Network to allow wireless devices to connect your wired network using Wi-Fi)

5. Click on "**TCP/IP Settings -> LAN SETTING**" from left menu.



6. Select on "**Client**" from DHCP drop-down list.
7. Click on "**Save & Apply**" button.

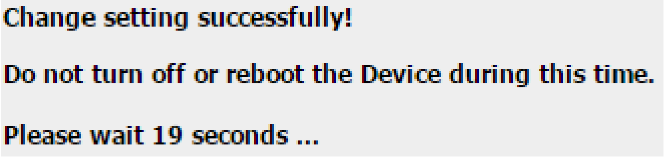


LAN Interface Setup

This page is used to configure the parameters for local area network which connects to the LAN port of your Access Point. Here you may change the setting for IP addresss, subnet mask, DHCP, etc..

IP Address:	192.168.1.1
Subnet Mask:	255.255.255.0
DHCP:	Client ▼
DHCP Client Range:	192.168.1.100 - 192.168.1.200 Show Client
DHCP Lease Time:	480 (1 ~ 10080 minutes)
Static DHCP:	Set Static DHCP
Domain Name:	repeater.nw
802.1d Spanning Tree:	Disabled ▼

8. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



Change setting successfully!

Do not turn off or reboot the Device during this time.

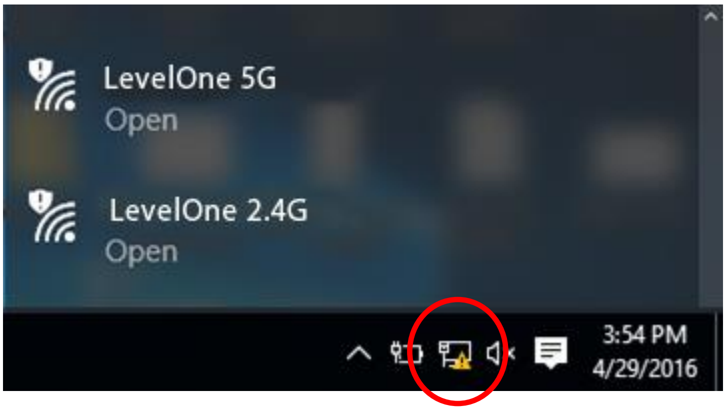
Please wait 19 seconds ...

9. Please disconnect the Ethernet Cable from PC and connect it to the LAN port of xDSL/Cable Modem.
10. Please wait for 2 minutes.
11. Now, the WRE-8011E has been configured completed, and suitable for Wireless and Internet Connections.

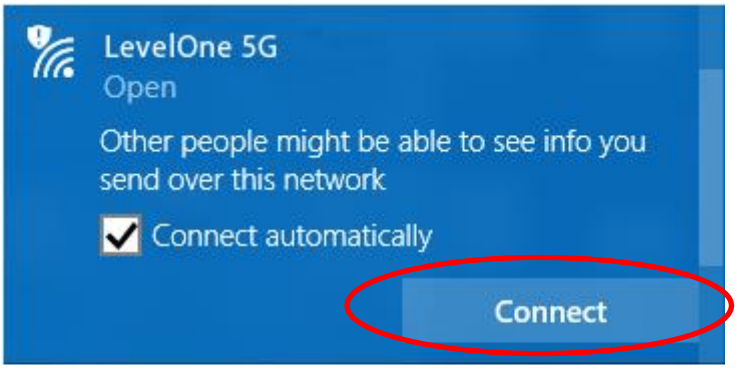
Wireless Connection

For easy installation it is saved to keep the settings. You can later change the wireless settings via the wireless configuration menu.

1. Double click on the network icon on your computer and search for the wireless network that you enter **SSID** name.
2. Click on the wireless network that you enter SSID name (the default settings, Wireless Network = Enable, Default Channel = Auto, SSID = **LevelOne 5G** for 5GHz and **LevelOne 2.4G** for 2.4GHz) to connect.

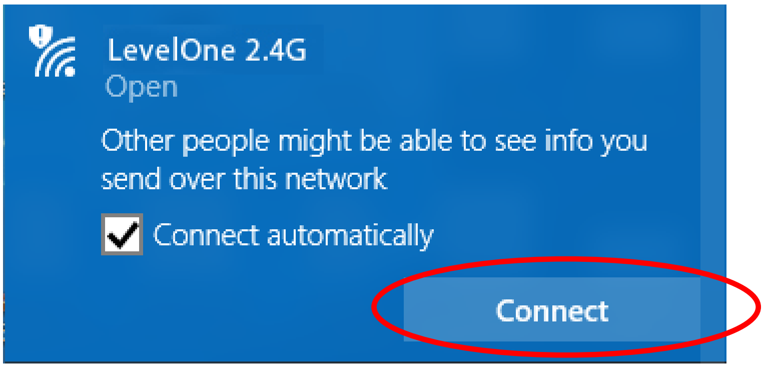


3. If the wireless network isn’t encrypted, click on "**Connect** " to connect.



Other people might be able to see info you send over this network

☑ Connect automatically

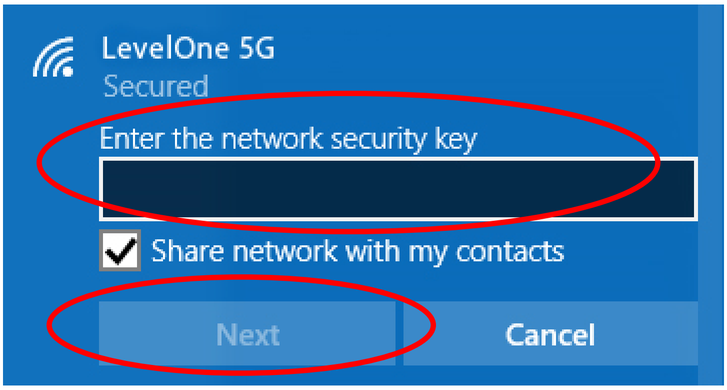


LevelOne 2.4G
Open

Other people might be able to see info you send over this network

☑ Connect automatically

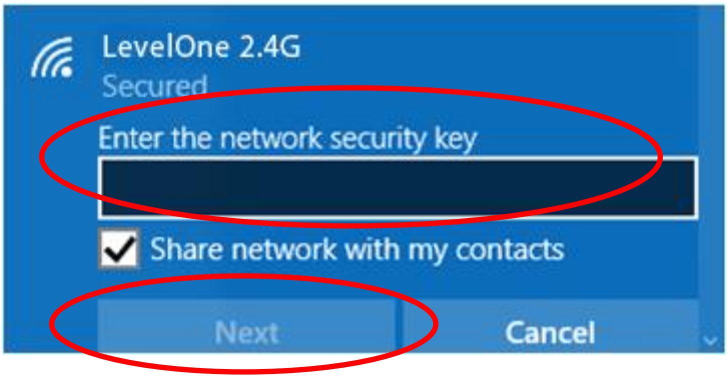
4. If the wireless network is encrypted, enter your own wireless password at least 8 characters for example 12345678 in the **key** field / **Network key** field / **Confirm Network key** field **(the default settings Security Mode = None)**. You can later change this network key via the wireless configuration menu.
5. Click on "**Next**".



LevelOne 5G
Secured

Enter the network security key

☑ Share network with my contacts



LevelOne 2.4G
Secured

Enter the network security key

☑ Share network with my contacts

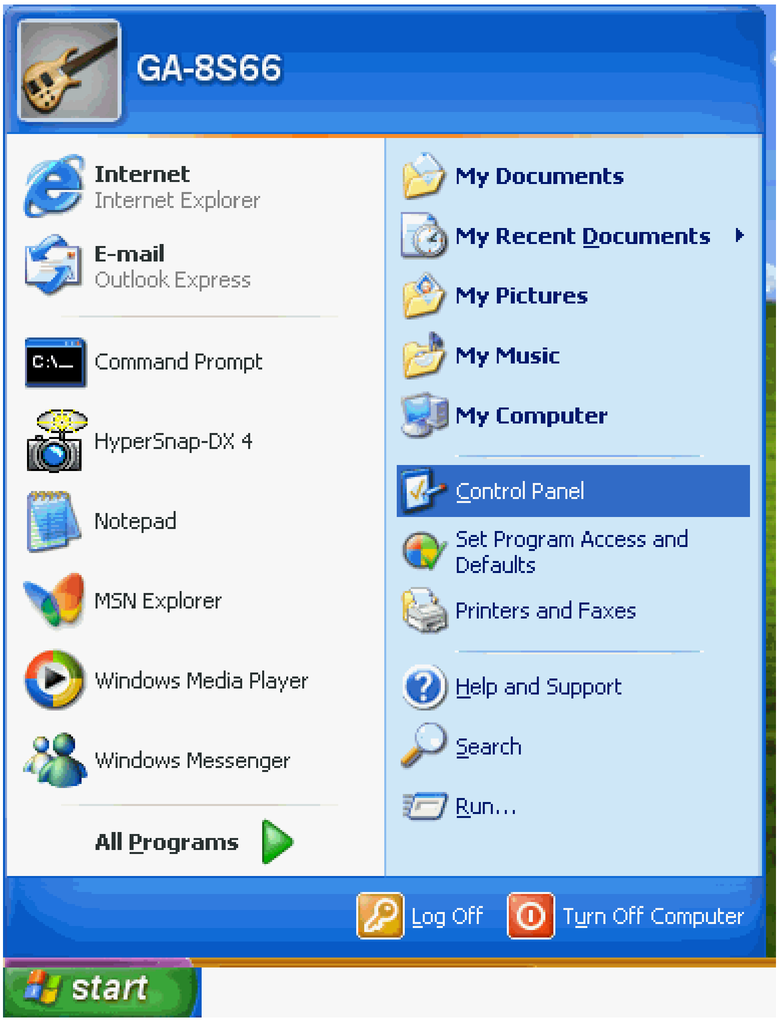
6. Now you are ready to use the Wireless Network to Internet or intranet.

6 What the Internet/WAN access of your own Network now is

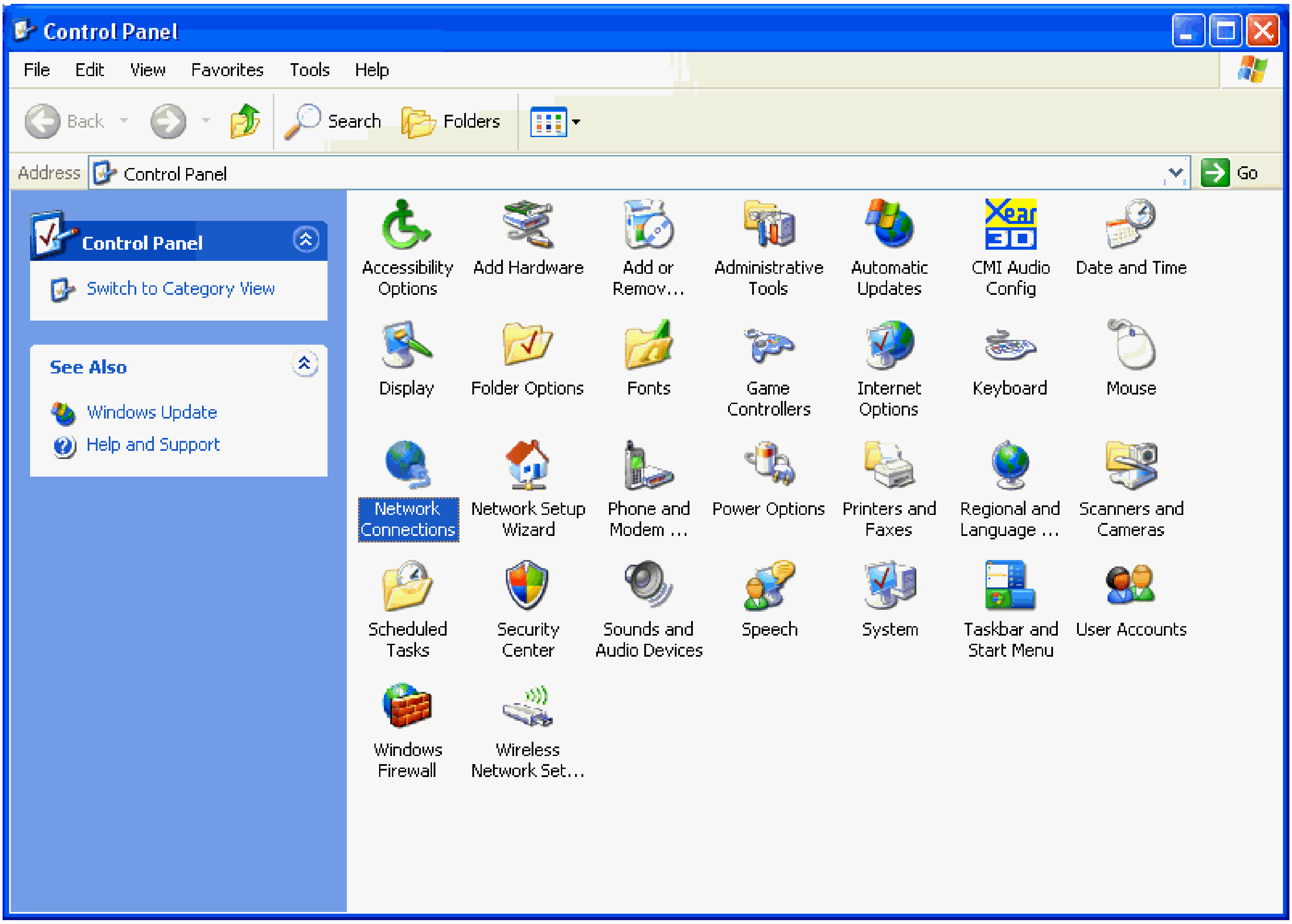
Now you could check what the Internet/WAN access of your network is to know how to configure the WAN port of Portable Repeater.

Please follow steps below to check what the Internet/WAN access if your own Network is DHCP Client, Static IP or PPPoE Client.

1. Click Start -> Control Panel



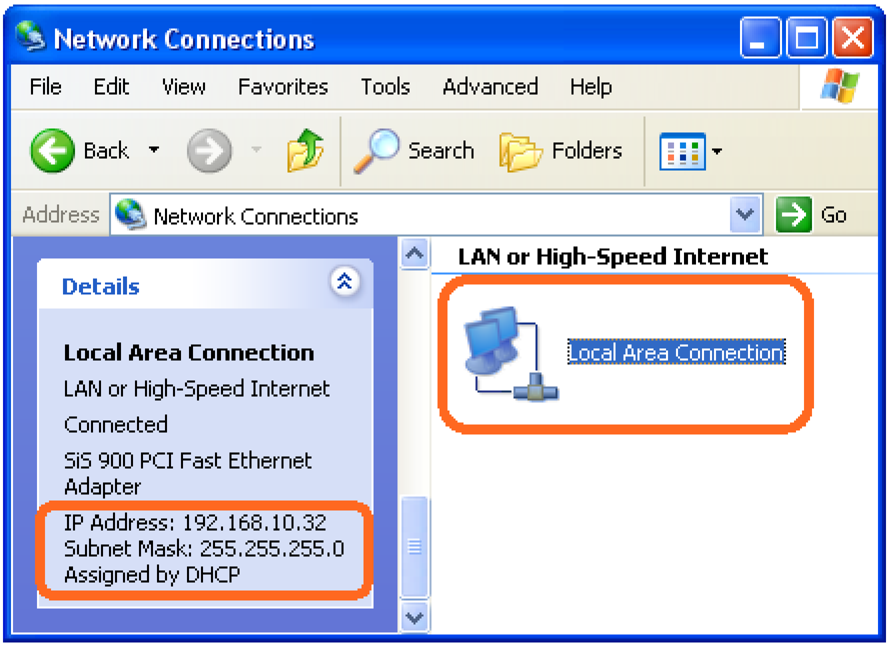
2. Double click *Network Connections*



Internet/WAN access is the DHCP client

If you cannot see any **Broadband Adapter** in the **Network Connections**, your Internet/WAN access is **DHCP Client** or **Static IP**.

3. Click **Local Area Connection** in **LAN or High-Speed Internet** and you could see string **Assigned by DHCP** in Details.

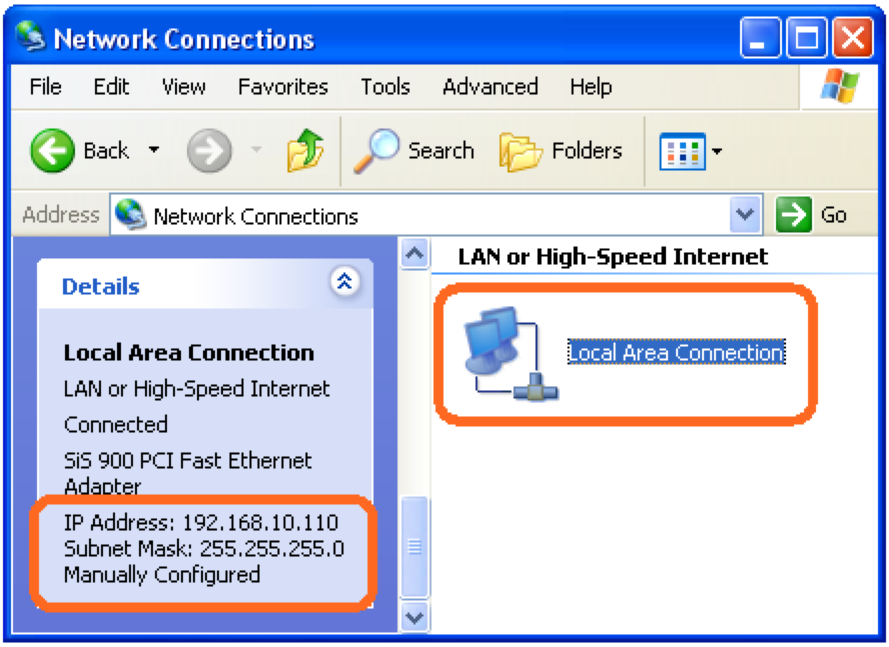


Local Area Connection
LAN or High-Speed Internet
Connected
SiS 900 PCI Fast Ethernet Adapter
IP Address: 192.168.10.32
Subnet Mask: 255.255.255.0
Assigned by DHCP

Internet/WAN access is the Static IP

If you cannot see any **Broadband Adapter** in the **Network Connections**, your Internet/WAN access is **DHCP Client** or **Static IP**.

4. Click **Local Area Connection** in **LAN or High-Speed Internet** and you could see string **Manually Configured** in Details.



Local Area Connection
LAN or High-Speed Internet
Connected
SiS 900 PCI Fast Ethernet Adapter
IP Address: 192.168.10.110
Subnet Mask: 255.255.255.0
Manually Configured

5. Right click **Local Area Connection** and click **Properties** and then you could get the IP settings in detail and write down the IP settings as follow:

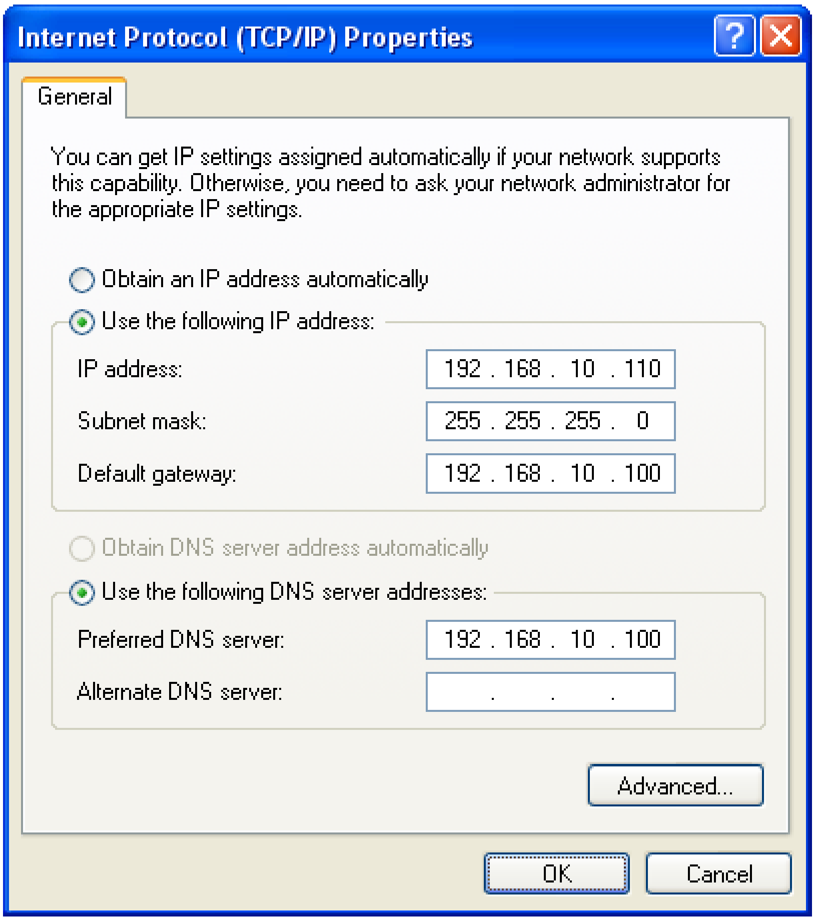
IP Address: 192.168.10.110

Subnet mask: 255.255.255.0

Default gateway: 192.168.10.100

Preferred DNS server: 192.168.10.100

Alternate DNS Server: If you have it, please also write it down.



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: 192 . 168 . 10 . 110

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 10 . 100

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server: 192 . 168 . 10 . 100

Alternate DNS server: . . .

Internet/WAN access is the PPPoE client

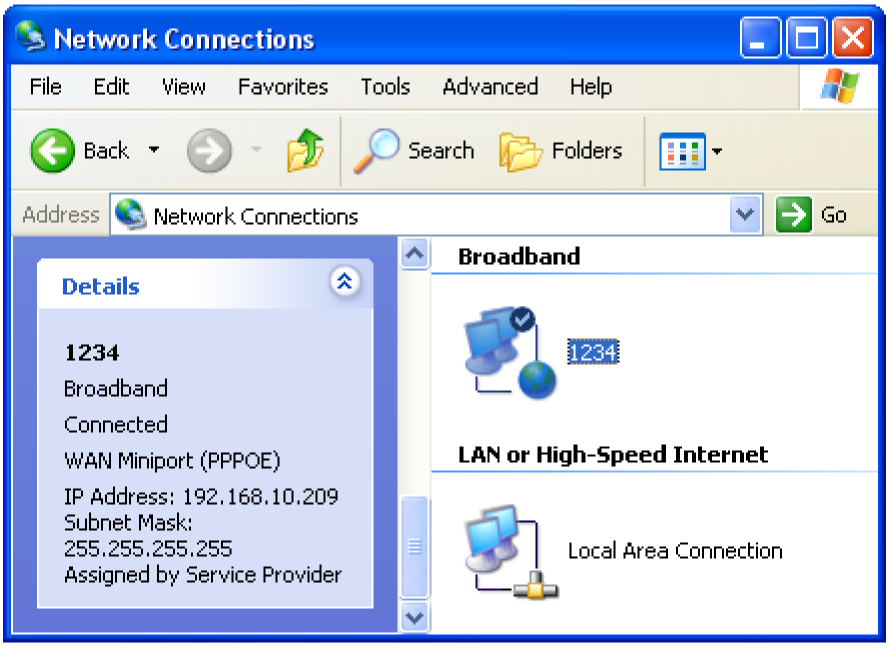
If you can see any **Broadband Adapter** in the **Network Connections**, your Internet/WAN access is **PPPoE Client**.

6. Click **Broadband Adapter** in **Broadband** and you could see string **Assigned by Service Provider** in Details.

For PPPoE configuration on Portable Repeater, you'll need following information that you could get from your Telecom, or by your Internet Service Provider.

Username of PPPoE: 1234 for example

Password of PPPoE: 1234 for example



Network Connections
File Edit View Favorites Tools Advanced Help
Back Search Folders
Address Network Connections Go
Details
Broadband
1234
LAN or High-Speed Internet
Local Area Connection

1234
Broadband
Connected
WAN Miniport (PPPOE)
IP Address: 192.168.10.209
Subnet Mask:
255.255.255.255
Assigned by Service Provider

7 Getting Started with the Web pages

The Portable Repeater includes a series of Web pages that provide an interface to the software installed on the device. It enables you to configure the device settings to meet the needs of your network. You can access it through your web browser from any PC connected to the device via the LAN ports.

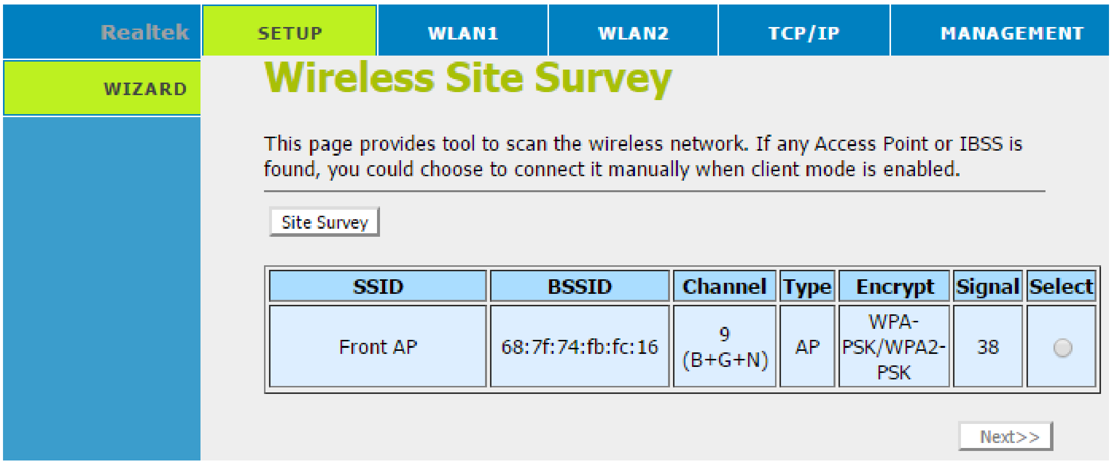
Accessing the Web pages

To access the Web pages, you need the following:

- A PC or laptop connected to the LAN port on the device.
- A web browser installed on the PC. The minimum browser version requirement is Internet Explorer v4 or Netscape v4. For the best display quality, use latest version of Internet Explorer, Netscape or Mozilla Fire fox. From any of the LAN computers, launch your web browser, type the following URL in the web address (or location) box, and press [Enter] on your keyboard:

  http://repeater.nw

  The Quick Setup homepage for the web pages is displayed:



Wireless Site Survey

This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.

SSID	BSSID	Channel	Type	Encrypt	Signal	Select
Front AP	68:7f:74:fb:fc:16	9 (B+G+N)	AP	WPA-PSK/WPA2-PSK	38	○

Figure 2: Homepage

1. You are now ready to configure your device.

This is the first page displayed each time you log in to the Web pages.

Note

If you receive an error message or the Welcome page is not displayed, see Troubleshooting Suggestions.

Testing your Setup

Once you have connected your hardware and configured your PCs, any computer on your LAN should be able to use the DSL /Cable connection to access the Internet.

To test the connection, turn on the device, wait for 30 seconds and then verify that the LEDs are illuminated as follows:

Table 1. LED Indicators

Label	Color	Function
POWER	green	On: device is powered on Off: device is powered off
WLAN	green	On: WLAN link established and active Blink: Valid Wireless packet being transferred
LAN	green	On: LAN link established and active Off: No LAN link Blink: Valid Ethernet packet being transferred

If the LEDs illuminate as expected, test your Internet connection from a LAN computer. To do this, open your web browser, and type the URL of any external website (such as http://www.yahoo.com). The LED labeled *WAN* should blink rapidly and then appear solid as the device connects to the site.

If the LEDs do not illuminate as expected, you may need to configure your Internet access settings using the information provided by your ISP. For details, see *Internet Access*. If the LEDs still do not illuminate as expected or the web page is not displayed, see *Troubleshooting Suggestions* or contact your ISP for assistance.

Default device settings

In addition to handling the xDSL / Cable modem connection to your ISP, the Portable Repeater can provide a variety of services to your network. The device is preconfigured with default settings for use with a typical home or small office network.

The table below lists some of the most important default settings; these and other features are described fully in the subsequent chapters. If you are familiar with network configuration, review these settings to verify that they meet the needs of your network. Follow the instructions to change them if necessary. If you are unfamiliar with these settings, try using the device without modification, or contact your ISP for assistance.

WARNING

We strongly recommend that you contact your ISP prior to changing the default configuration.

Option	Default Setting	Explanation/Instructions
WAN Port IP Address	DHCP Client	This is the temporary public IP address of the WAN port on the device. It is an unnumbered interface that is replaced as soon as your ISP assigns a 'real' IP address. See *Network Settings -> WAN Interface*.
LAN Port IP Address	Assigned static IP address: 192.168.1.1 Subnet mask: 255.255.255.0	This is the IP address of the LAN port on the device. The LAN port connects the device to your Ethernet network. Typically, you will not need to change this address. See *Network Settings -> LAN Interface*.
DHCP (Dynamic Host Configuration Protocol)	DHCP server enabled with the following pool of addresses: 192.168.1.100 through 192.168.1.200	The Portable Repeater maintains a pool of private IP addresses for dynamic assignment to your LAN computers. To use this service, you must have set up your computers to accept IP information dynamically, as described in *Configuring Ethernet PCs*.

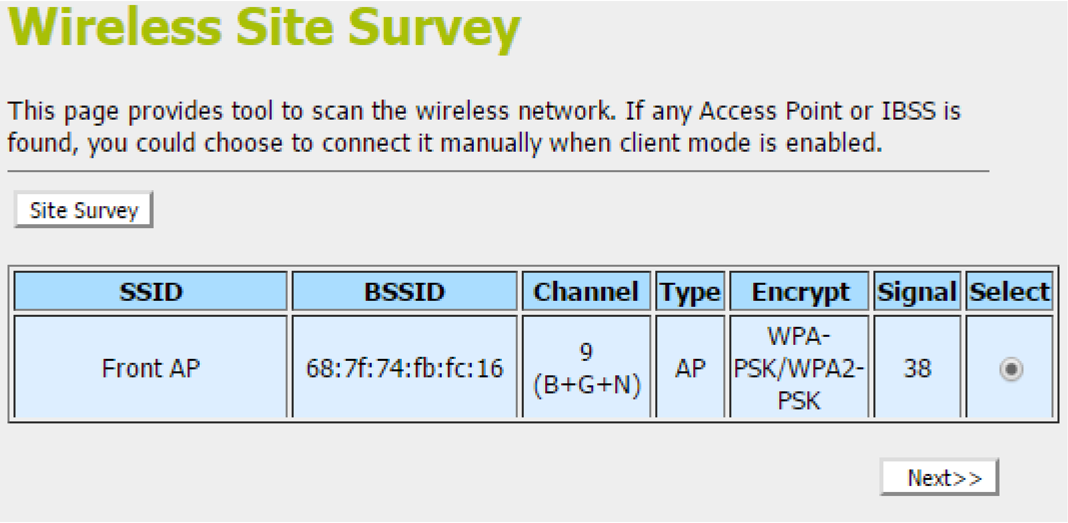
8 Quick Setup

The *Quick Setup* page displays useful information about the setup of your device, including:

- details of the device’s Internet access settings
- details of the device’s VoIP settings
- details of the device’s Wireless settings

To display this page:

From the head menu, click on *Setup*. The following page is displayed:



Wireless Site Survey

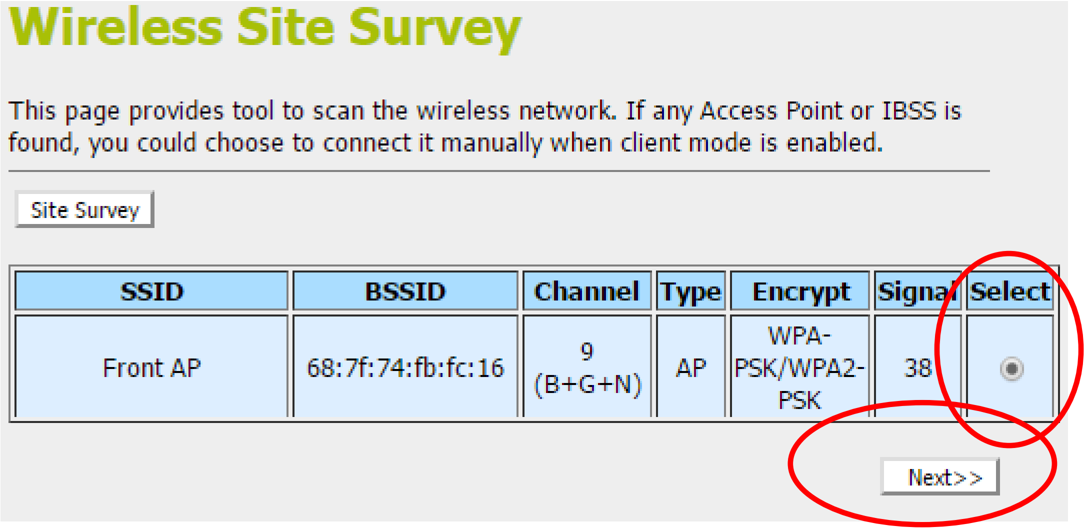
This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.

SSID	BSSID	Channel	Type	Encrypt	Signal	Select
Front AP	68:7f:74:fb:fc:16	9 (B+G+N)	AP	WPA-PSK/WPA2-PSK	38	●

Figure 3: Quick Setup page

Repeater Mode (Extend your Wireless Network)

1. Check on “**Select**” ratio of SSID of the front AP and click on “**Next>>**” button.

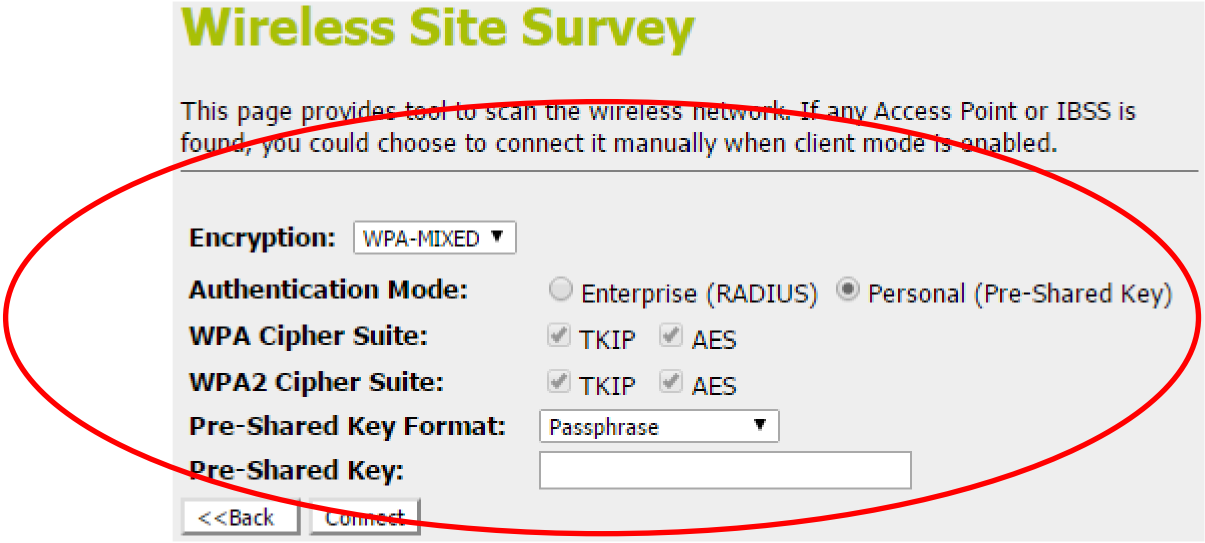


Wireless Site Survey

This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.

SSID	BSSID	Channel	Type	Encrypt	Signal	Select
Front AP	68:7f:74:fb:fc:16	9 (B+G+N)	AP	WPA-PSK/WPA2-PSK	38	●

2. Configure related parameters and then click on “**Connect**” button.

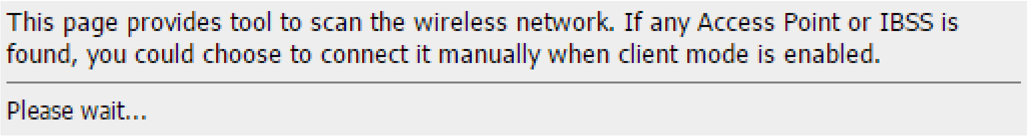


Wireless Site Survey

This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.

Encryption:	WPA-MIXED ▾
Authentication Mode:	○ Enterprise (RADIUS) ● Personal (Pre-Shared Key)
WPA Cipher Suite:	☑ TKIP ☑ AES
WPA2 Cipher Suite:	☑ TKIP ☑ AES
Pre-Shared Key Format:	Passphrase ▾
Pre-Shared Key:	

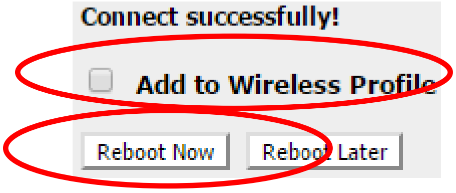
3. Please wait....



This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.

Please wait...

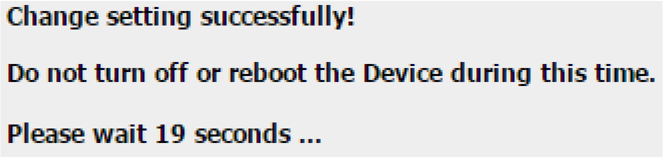
4. Click on “**Reboot Now**” button.



Connect successfully!

□ Add to Wireless Profile

5. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



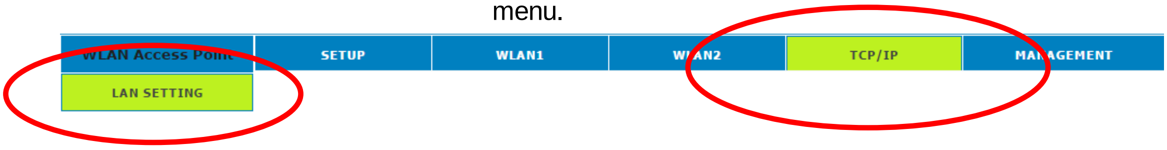
Change setting successfully!

Do not turn off or reboot the Device during this time.

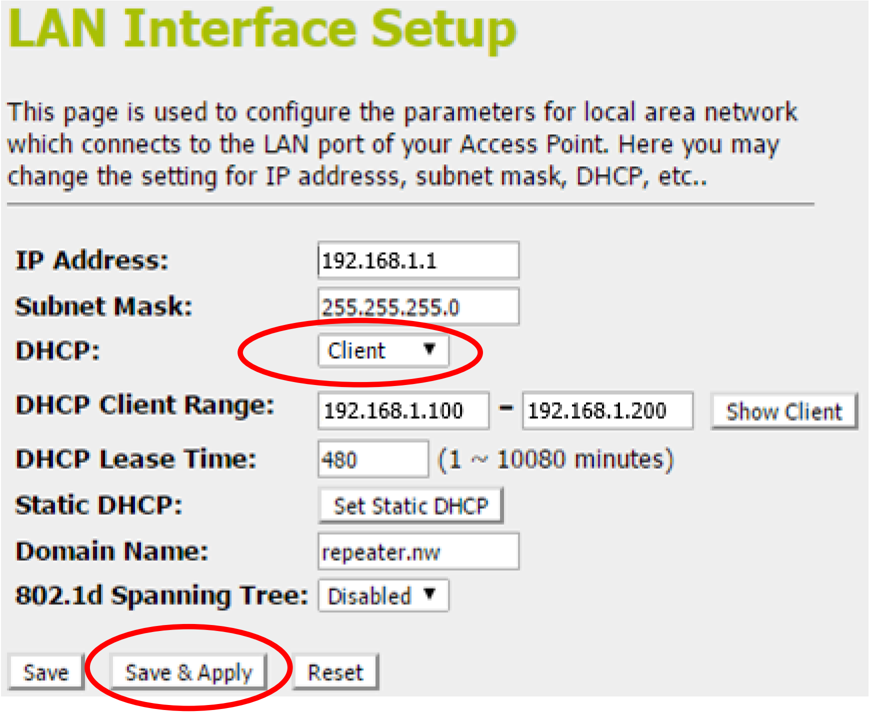
Please wait 19 seconds ...

AP Mode (Extend your Wired Network to allow wireless devices to connect your wired network using Wi-Fi)

6. Click on “**TCP/IP Settings -> LAN SETTING**” from left menu.



7. Select on “**Client**” from DHCP drop-down list.
8. Click on “**Save & Apply**” button.

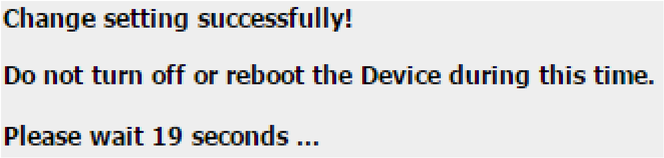


LAN Interface Setup

This page is used to configure the parameters for local area network which connects to the LAN port of your Access Point. Here you may change the setting for IP addresss, subnet mask, DHCP, etc..

IP Address:	192.168.1.1
Subnet Mask:	255.255.255.0
DHCP:	Client ▼
DHCP Client Range:	192.168.1.100 - 192.168.1.200 Show Client
DHCP Lease Time:	480 (1 ~ 10080 minutes)
Static DHCP:	Set Static DHCP
Domain Name:	repeater.nw
802.1d Spanning Tree:	Disabled ▼

9. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

10. Please disconnect the Ethernet Cable from PC and connect it to the LAN port of xDSL/Cable Modem.

11. Now, the WRE-8011E has been configured completed, and suitable for Wireless and Internet Connections.

9 LAN Interface

This chapter is to configure the parameters for local area network which connects to the LAN port of your Access Point. Here you may change the setting for IP address, subnet mask, DHCP, etc...

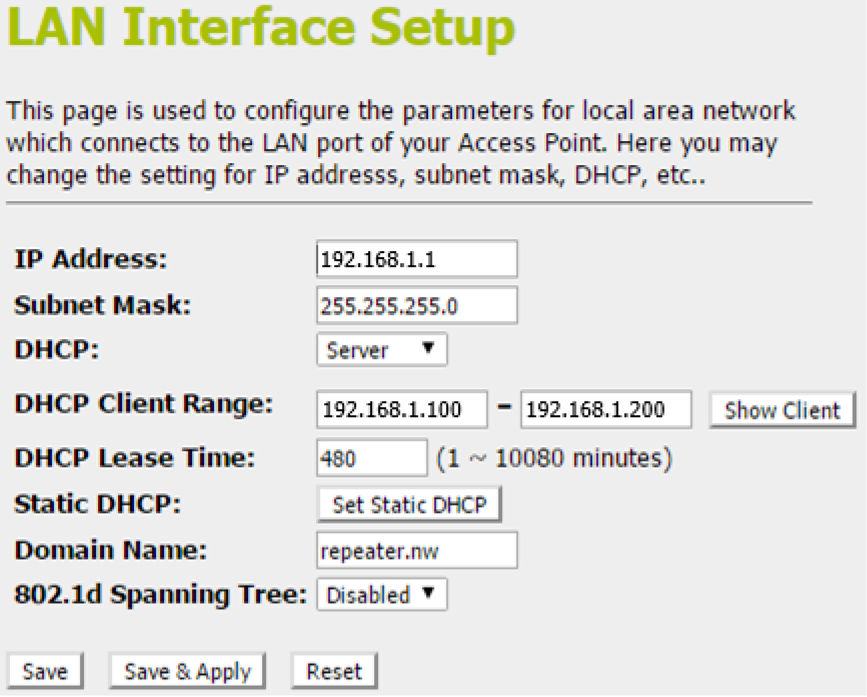
Note

You should only change the addressing details if your ISP asks you to, or if you are familiar with network configuration. In most cases, you will not need to make any changes to this configuration.

LAN Interface Setup

To check the configuration of LAN Interface:

1. From the *left-hand* menu, click on *TCP/IP Settings -> LAN SETTING*. The following page is displayed:



LAN Interface Setup

This page is used to configure the parameters for local area network which connects to the LAN port of your Access Point. Here you may change the setting for IP addresss, subnet mask, DHCP, etc..

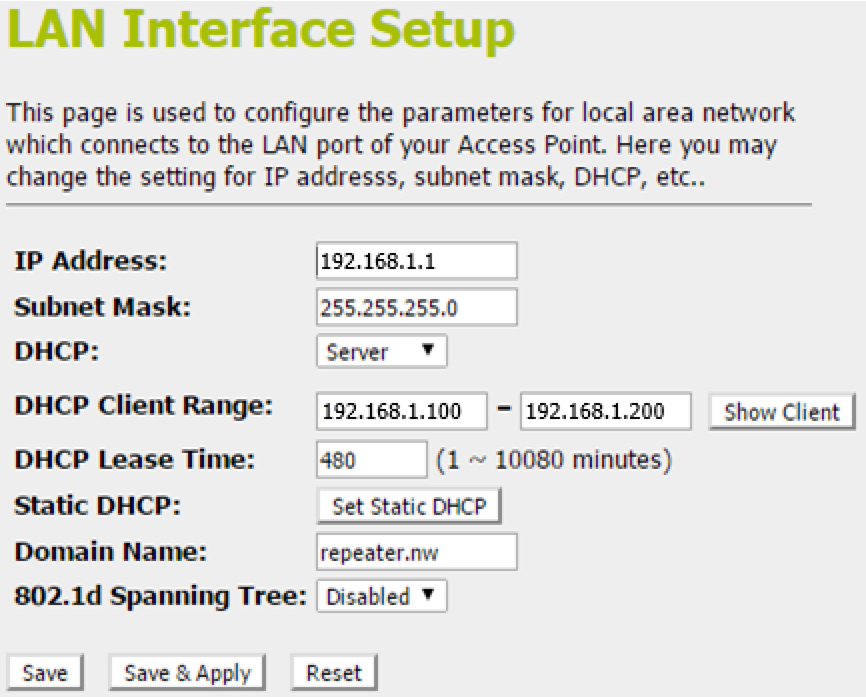
IP Address:	192.168.1.1
Subnet Mask:	255.255.255.0
DHCP:	Server ▼
DHCP Client Range:	192.168.1.100 - 192.168.1.200 [Show Client]
DHCP Lease Time:	480 (1 ~ 10080 minutes)
Static DHCP:	[Set Static DHCP]
Domain Name:	repeater.nw
802.1d Spanning Tree:	Disabled ▼

Field	Description
IP Address	**The IP address of your router on the local area network. Your local area network settings are based on the address assigned here.**
Subnet Mask	**The subnet mask of your router on the local area network.**
DHCP Mode	**Once your router is properly configured and DHCP Server is enabled, the DHCP Server will manage the IP addresses and other network configuration information for computers and other devices connected to your Local Area Network. There is no need for you to do this yourself.** **The computers (and other devices) connected to your LAN also need to have their TCP/IP configuration set to "DHCP" or "Obtain an IP address automatically".**
IP Pool Range	**These two IP values (from and to) define a range of IP addresses that the DHCP Server uses when assigning addresses to computers and devices on your Local Area Network. Any addresses that are outside of this range are not managed by the DHCP Server; these could, therefore, be used for manually configured devices or devices that cannot use DHCP to obtain network address details automatically.** **Your router, by default, has a static IP address of 192.168.0.1. This means that addresses 192.168.0.2 to 192.168.0.254 can be made available for allocation by the DHCP Server.**
Max Lease Time	**The amount of time that a computer may have an IP address before it is required to renew the lease. The lease functions just as a lease on an apartment would. The initial lease designates the amount of time before the lease expires. If the tenant wishes to retain the address when the lease is expired then a new lease is established. If the lease expires and the address is no longer needed then another tenant may use the address.**
Domain Name	**Domain name for the dhcp server scope.**
IP Address	**The IP address to be configured for your computer or device on the local area network.For example, 192.168.0.2.**
Mac Address	**The mac address of your computer or device on the local area network.**

Changing the LAN IP address and subnet mask

To Change the configuration of LAN Interface:

1. From the *left-hand* menu, click on *TCP/IP Settings -> LAN Interface*. The following page is displayed:

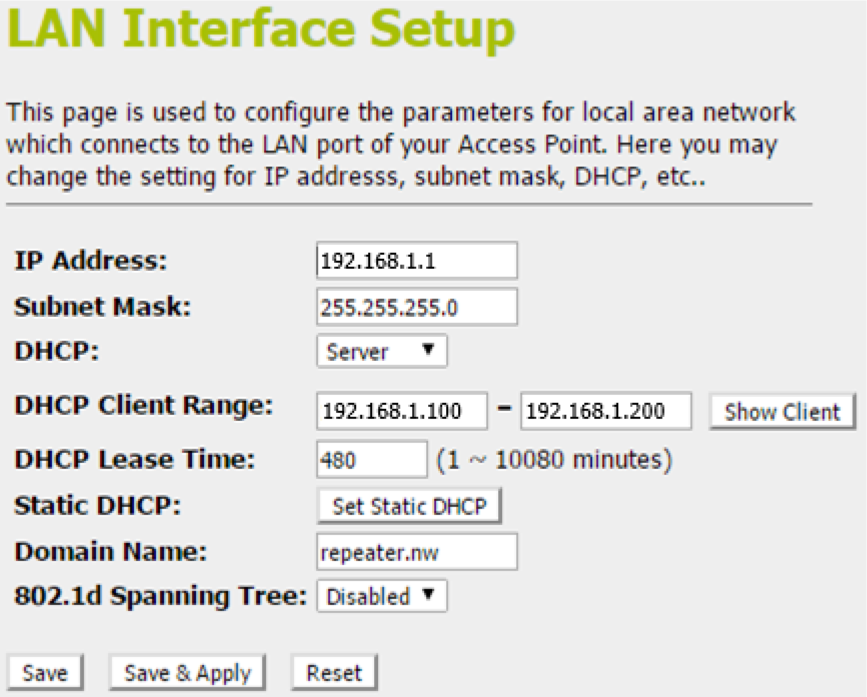


LAN Interface Setup

This page is used to configure the parameters for local area network which connects to the LAN port of your Access Point. Here you may change the setting for IP addresss, subnet mask, DHCP, etc..

IP Address:	192.168.1.1
Subnet Mask:	255.255.255.0
DHCP:	Server ▼
DHCP Client Range:	192.168.1.100 - 192.168.1.200 Show Client
DHCP Lease Time:	480 (1 ~ 10080 minutes)
Static DHCP:	Set Static DHCP
Domain Name:	repeater.nw
802.1d Spanning Tree:	Disabled ▼

2. Change the *IP Address and Subnet Mask and DHCP Client Range*.
3. Click *Save & Apply*.

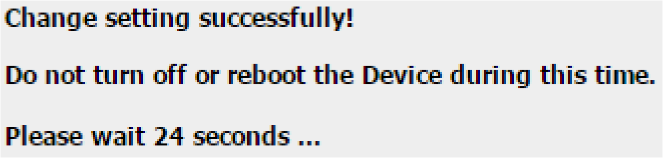


LAN Interface Setup

This page is used to configure the parameters for local area network which connects to the LAN port of your Access Point. Here you may change the setting for IP addresss, subnet mask, DHCP, etc..

IP Address:	192.168.1.1
Subnet Mask:	255.255.255.0
DHCP:	Server ▼
DHCP Client Range:	192.168.1.100 - 192.168.1.200 Show Client
DHCP Lease Time:	480 (1 ~ 10080 minutes)
Static DHCP:	Set Static DHCP
Domain Name:	repeater.nw
802.1d Spanning Tree:	Disabled ▼

4. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 15 seconds ....



Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 24 seconds ...

You may also need to renew your DHCP lease:

Windows 95/98

a. Select **Run...** from the **Start** menu.

b. Enter **winipcfg** and click **OK**.

c. Select your ethernet adaptor from the pull-down menu

d. Click **Release All** and then **Renew All**.

e. **Exit** the winipcfg dialog.

Windows NT/Windows 2000/Windows XP

a. Bring up a command window.

b. Type **ipconfig /release** in the command window.

c. Type **ipconfig /renew**.

d. Type **exit** to close the command window.

Linux

a. Bring up a shell.

b. Type **pump -r** to release the lease.

c. Type **pump** to renew the lease.

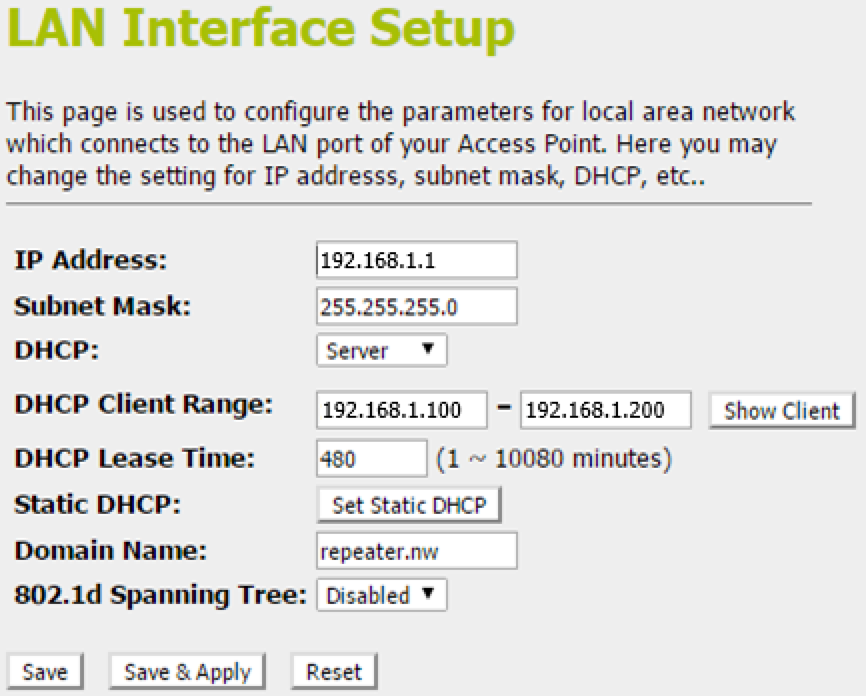
Note

If you change the LAN IP address of the device while connected through your Web browser, you will be disconnected. You must open a new connection by entering your new LAN IP address as the URL.

DHCP Static IP Configuration

If you need to assign static ip for your computer or device on the local area network, configure static ip with the mac address.:

1. From the *left-hand* menu, click on *TCP/IP Settings -> LAN Interface*. The following page is displayed:
2. Click *Set Static DHCP*



LAN Interface Setup

This page is used to configure the parameters for local area network which connects to the LAN port of your Access Point. Here you may change the setting for IP addresss, subnet mask, DHCP, etc..

IP Address: 192.168.1.1

Subnet Mask: 255.255.255.0

DHCP: Server

DHCP Client Range: 192.168.1.100 - 192.168.1.200

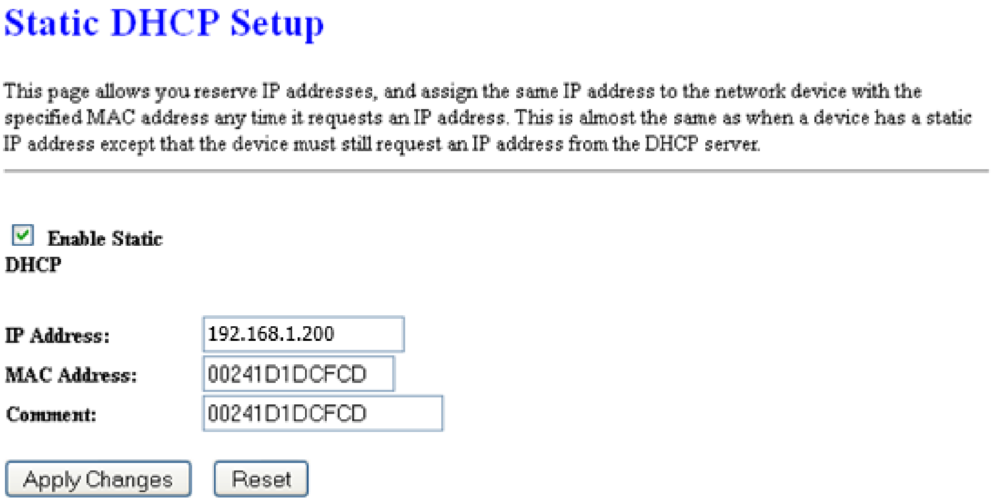
DHCP Lease Time: 480 (1 ~ 10080 minutes)

Static DHCP:

Domain Name: repeater.nw

802.1d Spanning Tree: Disabled

3. Enable *Static DHCP*.
4. Enter the *IP Address*.
5. Enter the *Mac Address*.
6. Click *Add*.



Static DHCP Setup

This page allows you reserve IP addresses, and assign the same IP address to the network device with the specified MAC address any time it requests an IP address. This is almost the same as when a device has a static IP address except that the device must still request an IP address from the DHCP server.

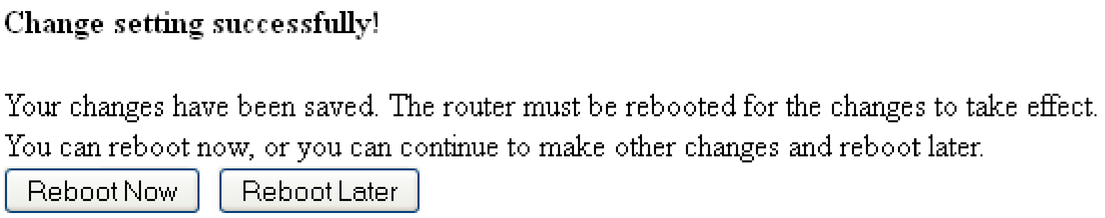
☑ Enable Static DHCP

IP Address: 192.168.1.200

MAC Address: 00241D1DCFCD

Comment: 00241D1DCFCD

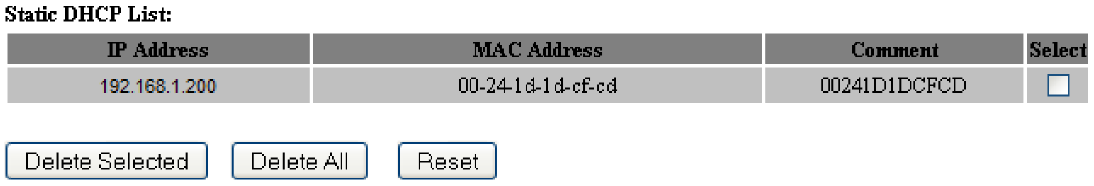
7. Click *Reboot Now*.



Change setting successfully!

Your changes have been saved. The router must be rebooted for the changes to take effect. You can reboot now, or you can continue to make other changes and reboot later.

8. The DHCP Static IP Configuration that you created has been added in the *DHCP Static IP Table*.



Static DHCP List:

IP Address	MAC Address	Comment	Select
192.168.1.200	00-24-1d-1d-cf-cd	00241D1DCFCD	□

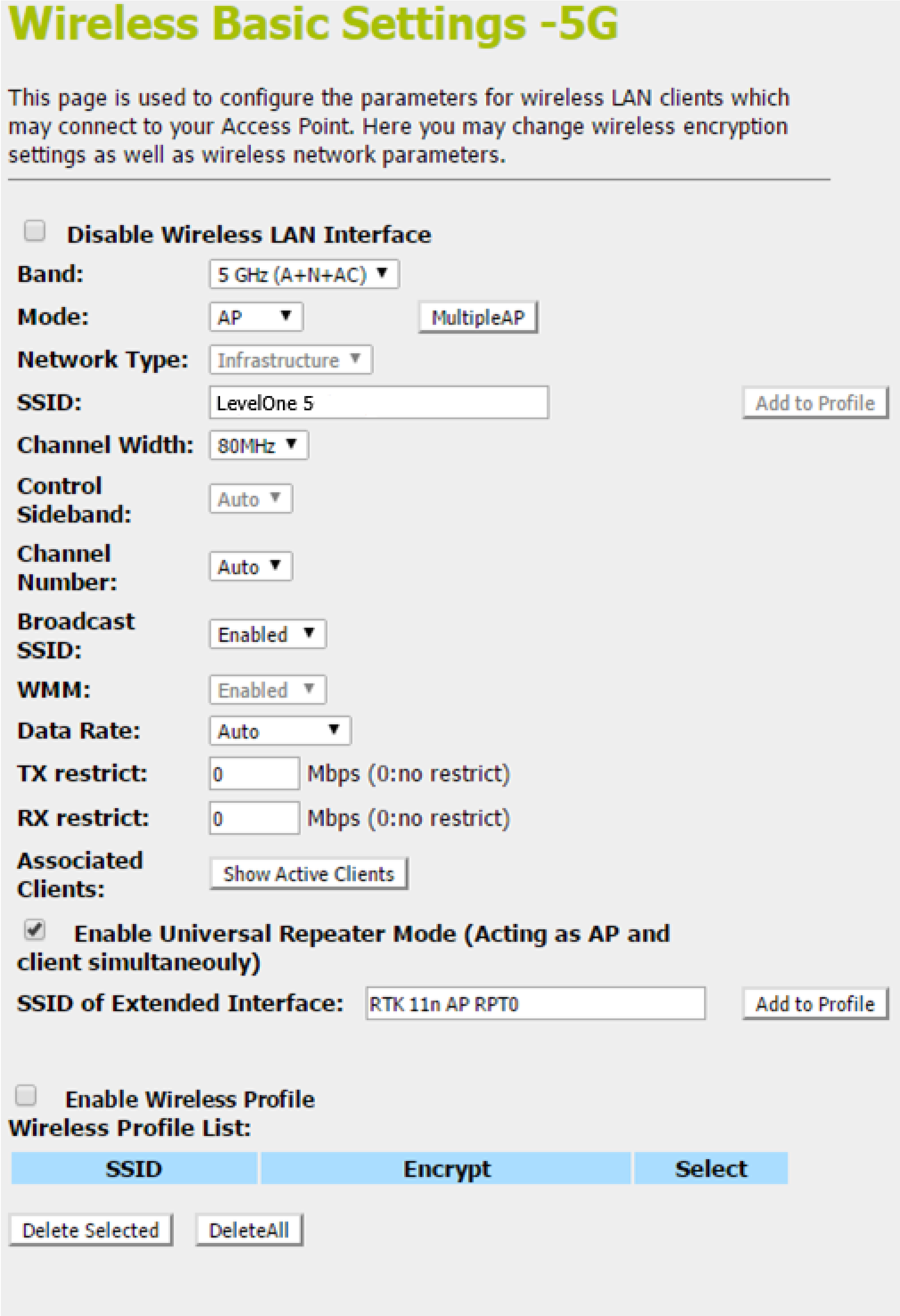
10 Wireless Network - 5GHz

This chapter assumes that you have already set up your Wireless PCs and installed a compatible Wireless card on your device. See *Configuring Wireless PCs*.

Wireless Basics

The *Wireless Network* page allows you to configure the Wireless features of your device. To access the *Wireless Basics* page:

From the *Wireless* menu, click on WLAN1 -> *BASIC SETTING*. The following page is displayed:



Wireless Basic Settings -5G

This page is used to configure the parameters for wireless LAN clients which may connect to your Access Point. Here you may change wireless encryption settings as well as wireless network parameters.

☐ **Disable Wireless LAN Interface**

Band:	5 GHz (A+N+AC) ▼		
Mode:	AP ▼	MultipleAP	
Network Type:	Infrastructure ▼		
SSID:	LevelOne 5		Add to Profile
Channel Width:	80MHz ▼		
Control Sideband:	Auto ▼		
Channel Number:	Auto ▼		
Broadcast SSID:	Enabled ▼		
WMM:	Enabled ▼		
Data Rate:	Auto ▼		
TX restrict:	0	Mbps (0:no restrict)	
RX restrict:	0	Mbps (0:no restrict)	
Associated Clients:	Show Active Clients		

☑ **Enable Universal Repeater Mode (Acting as AP and client simultaneouly)**

SSID of Extended Interface: RTK 11n AP RPT0 Add to Profile

☐ **Enable Wireless Profile**

Wireless Profile List:

SSID	Encrypt	Select

Delete Selected DeleteAll

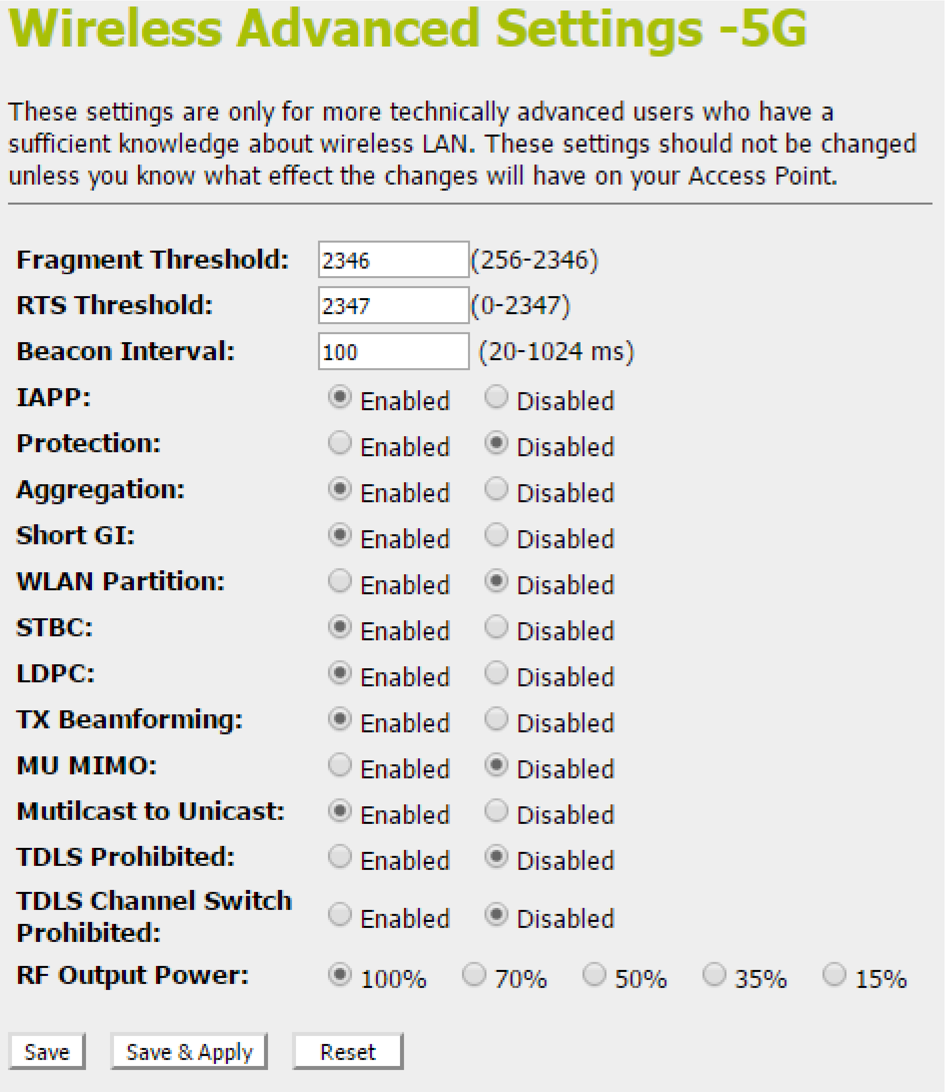
Figure 4: Wireless Network page

Field	Description
Disable Wireless LAN Interface	**Enable/Disable the Wireless LAN Interface.** **Default: Disable**
Band	**Specify the WLAN Mode to 802.11b/g Mixed mode, 802.11b mode or 802.11g mode**
Mode	**Configure the Wireless LAN Interface to AP, Client, WDS, AP + WDS, MESH or AP + MESH mode**
Network Type	**Configure the Network Type to Infrastructure or Ad hoc.**
SSID	**Specify the network name.** **Each Wireless LAN network uses a unique Network Name to identify the network. This name is called the Service Set Identifier (SSID). When you set up your wireless adapter, you specify the SSID. If you want to connect to an existing network, you must use the name for that network. If you are setting up your own network you can make up your own name and use it on each computer. The name can be up to 20 characters long and contain letters and numbers.**
Channel Width	**Choose a Channel Width from the pull-down menu.**
Control Sideband	**Choose a Control Sideband from the pull-down menu.**
Channel Number	**Choose a Channel Number from the pull-down menu.**
Broadcast SSID	**Broadcast or Hide SSID to your Network.** **Default: Enabled**
WMM	**Enable/disable the Wi-Fi Multimedia (WMM) support.**
Data Rate	**Select the Data Rate from the drop-down list**
Associated Clients	**Show Active Wireless Client Table** **This table shows the MAC address, transmission, receiption packet counters and encrypted status for each associated wireless client.**
Enable Mac Clone (Single Ethernet Client)	**Enable Mac Clone (Single Ethernet Client)**
Enable Universal Repeater Mode	**Acting as AP and client simultaneously**
SSID of Extended Interface	**When mode is set to “AP” and URM (Universal Repeater Mode) is enabled, user should input SSID of another AP in the field of “SSID of Extended Interface”. Please note, the channel number should be set to the one, used by another AP because 8186 will share the same channel between AP and URM interface (called as extended interface hereafter).**

Advanced Settings

These settings are only for more technically advanced users who have a sufficient knowledge about wireless LAN. These settings should not be changed unless you know what effect the changes will have on your Access Point. To access the *Wireless Network Advanced Settings* page:

From the left-hand *Wireless* menu, click on *WLAN1 -> Advanced Settings*. The following page is displayed:



Wireless Advanced Settings -5G

These settings are only for more technically advanced users who have a sufficient knowledge about wireless LAN. These settings should not be changed unless you know what effect the changes will have on your Access Point.

Fragment Threshold:	2346 (256-2346)				
RTS Threshold:	2347 (0-2347)				
Beacon Interval:	100 (20-1024 ms)				
IAPP:	● Enabled	○ Disabled			
Protection:	○ Enabled	● Disabled			
Aggregation:	● Enabled	○ Disabled			
Short GI:	● Enabled	○ Disabled			
WLAN Partition:	○ Enabled	● Disabled			
STBC:	● Enabled	○ Disabled			
LDPC:	● Enabled	○ Disabled			
TX Beamforming:	● Enabled	○ Disabled			
MU MIMO:	○ Enabled	● Disabled			
Mutilcast to Unicast:	● Enabled	○ Disabled			
TDLS Prohibited:	○ Enabled	● Disabled			
TDLS Channel Switch Prohibited:	○ Enabled	● Disabled			
RF Output Power:	● 100%	○ 70%	○ 50%	○ 35%	○ 15%

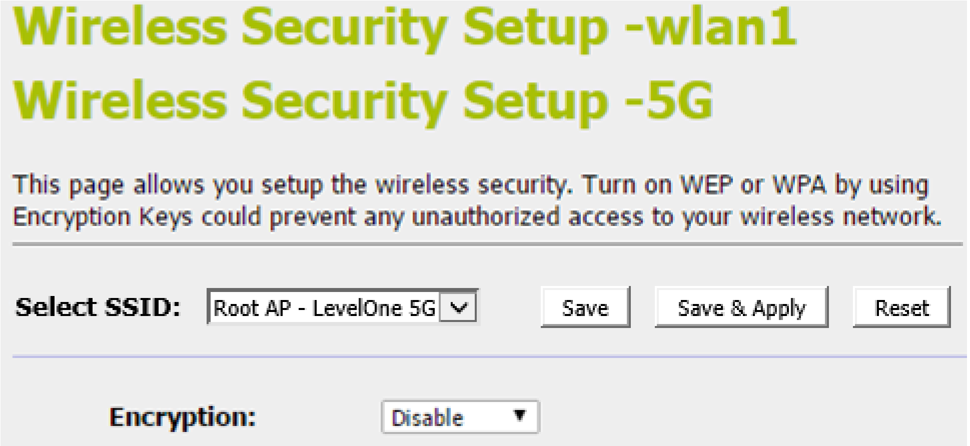
Field	Description
Fragment Threshold	**When transmitting a packet over a network medium, sometimes the packet is broken into several segments, if the size of packet exceeds that allowed by the network medium.** **The Fragmentation Threshold defines the number of bytes used for the fragmentation boundary for directed messages.**
RTS Threshold	**RTS stands for “Request to Send”. This parameter controls what size data packet the low level RF protocol issues to an RTS packet. The default is 2347.**

Beacon Interval	**Choosing beacon period for improved response time for wireless http clients.**
Preamble Type	**Specify the Preamble type is short preamble or long preamble**
IAPP	**Disable or Enable IAPP**
Protection	**A protection mechanism prevents collisions among 802.11g nodes.**
Aggregation	**Disable or Enable Aggregation**
Short GI	**Disable or Enable Short GI**
WLAN Partition	**Disable or Enable WLAN Partition**
STBC	**Disable or Enable STBC**
20/40MHz Coexist	**Disable or Enable 20/40MHz Coexist**
RF Output Power	**TX Power measurement.**

Security

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network. To access the *Wireless Network Security* page:

From the left-hand *Wireless* menu, click on *WLAN1 -> Security*. The following page is displayed:



Wireless Security Setup -wlan1

Wireless Security Setup -5G

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.

Select SSID: Root AP - LevelOne 5G

Encryption: Disable

Field	Description
Select SSID	**Select the SSID**
Encryption	**Configure the Encryption to Disable, WEP, WPA , WPA2 or WPA-Mixed**
Use 802.1x Authentication	**Use 802.1x Authentication by WEP 64bits or WEP 128bits**
Authentication	**Configure the Authentication Mode to Open System, Shared Key or Auto**
Key Length	**Select the Key Length 64-bit or 128-bit**
Key Format	**Select the Key Format ASCII (5 characters), Hex (10 characters), ASCII (13 characters) or Hex (26 characters)**
Encryption Key	**Enter the Encryption Key**
WPA Authentication Mode	**Configure the WPA Authentication Mode to Enterprise (RADIUS) or Personal (Pre-Shared Key)**
WPA Cipher Suite	**Configure the WPA Cipher Suite to AES**

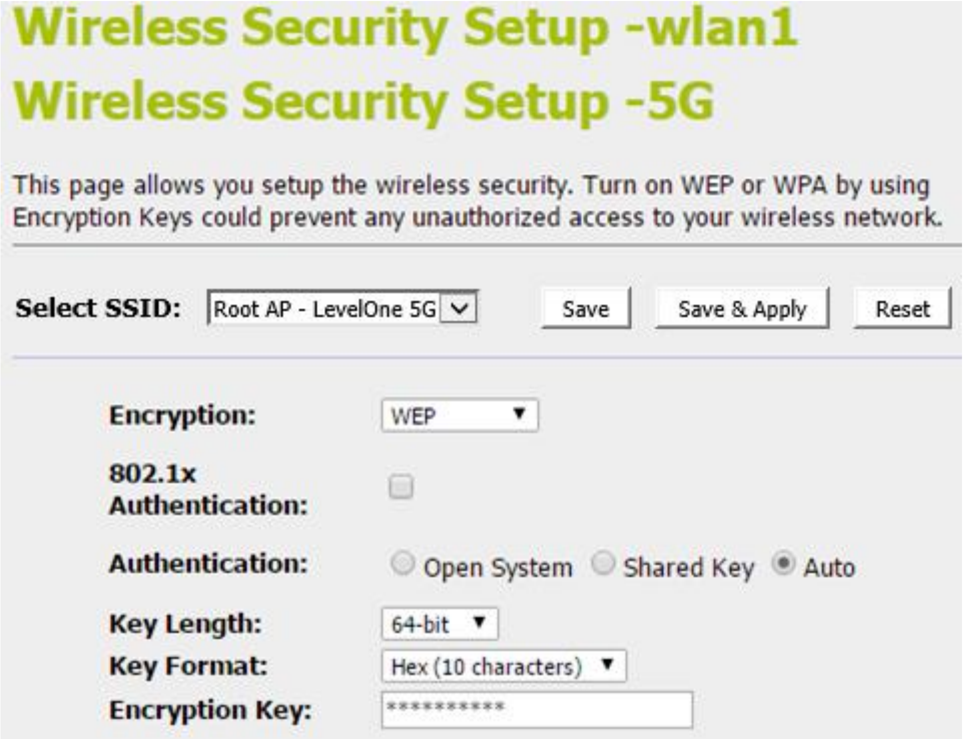
Field	Description
WPA2 Cipher Suite	**Configure the WPA2 Cipher Suite to AES**
Pre-Shared Key	**Configure the Pre-Shared Key Format to Passphrase or HEX (64**

Format	characters)
Pre-Shared Key	Type the Pre-Shared Key
Enable Pre-Authentication	According to some of the preferred embodiments, a method for proactively establishing a security association between a mobile node in a visiting network and an authentication agent in another network to which the mobile node can move includes: negotiating pre-authentication using a flag in a message header that indicates whether the communication is for establishing a pre-authentication security association; and one of the mobile node and the authentication agent initiating pre-authentication by transmitting a message with the flag set in its message header, and the other of the mobile node and the authentication agent responding with the flag set in its message header only if it supports the pre-authentication. Enable/disable pre-authentication support. Default: disable.
Authentication RADIUS Server	Port: Type the port number of RADIUS Server IP address: Type the IP address of RADIUS Server Password: Type the Password of RADIUS Server

WEP + Encryption Key

WEP aims to provide security by encrypting data over radio waves so that it is protected as it is transmitted from one end point to another. However, it has been found that WEP is not as secure as once believed.

1. From the *Encryption* drop-down list, select *WEP* setting.
2. From the *Key Length* drop-down list, select *64-bit* or *128-bit* setting.
3. From the *Key Format* drop-down list, select *ASCII (5 characters), Hex (10 characters), ASCII (13 characters)* or *Hex (26 characters)* setting.
4. Enter the *Encryption Key* value depending on selected ASCII or Hexadecimal.
5. Click *Save & Apply* button.



Wireless Security Setup -wlan1

Wireless Security Setup -5G

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.

Select SSID: Root AP - LevelOne 5G

Encryption: WEP

802.1x Authentication: □

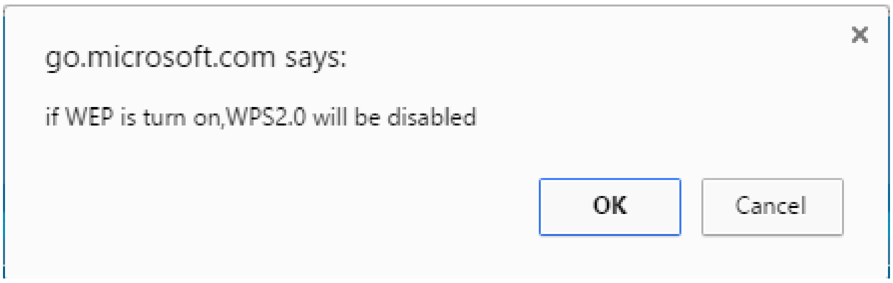
Authentication: ○ Open System ○ Shared Key ● Auto

Key Length: 64-bit

Key Format: Hex (10 characters)

Encryption Key: **********

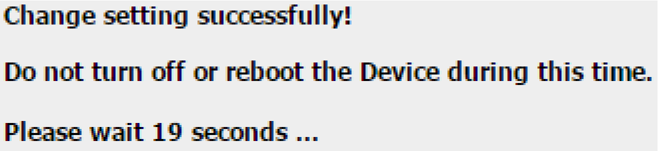
6. Click *OK* button.



go.microsoft.com says:

if WEP is turn on,WPS2.0 will be disabled

7. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



Change setting successfully!

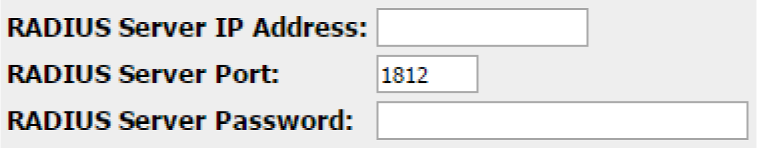
Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

WEP + Use 802.1x Authentication

WEP aims to provide security by encrypting data over radio waves so that it is protected as it is transmitted from one end point to another. However, it has been found that WEP is not as secure as once believed.

1. From the *Encryption* drop-down list, select *WEP* setting.
2. Check the option of *Use 802.1x Authentication.*
3. Click on the ratio of *WEP 64bits* or *WEP 128bits*.
4. Enter the *Port*, *IP Address* and *Password* of RADIUS Server:

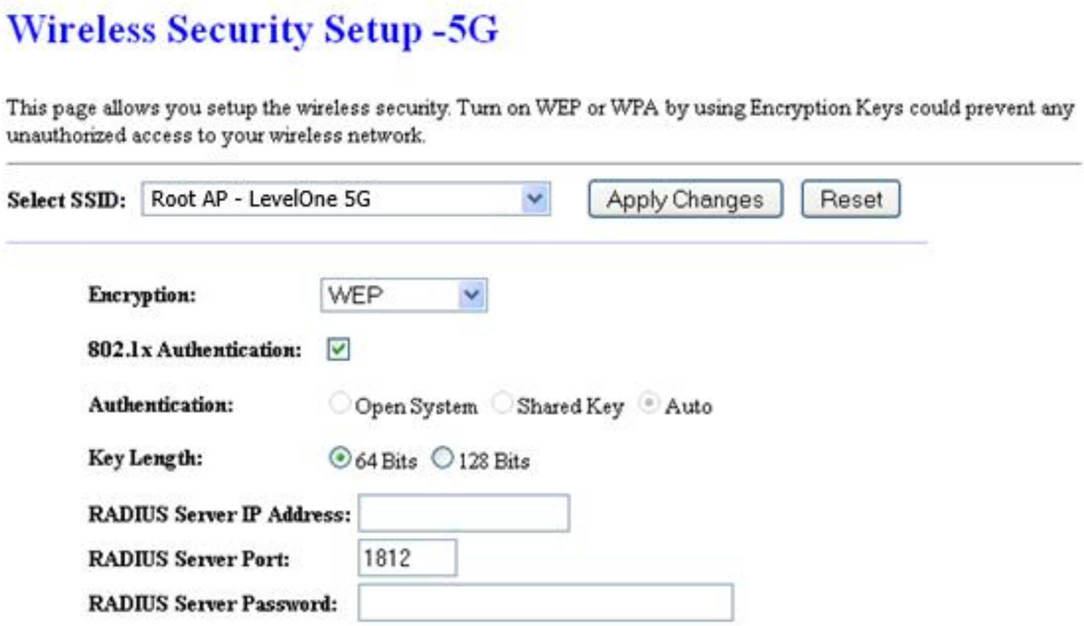


RADIUS Server IP Address:

RADIUS Server Port: 1812

RADIUS Server Password:

5. Click *Save & Apply* button.



Wireless Security Setup -5G

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.

Select SSID: Root AP - LevelOne 5G

Encryption: WEP

802.1x Authentication: ☑

Authentication: ○ Open System ○ Shared Key ● Auto

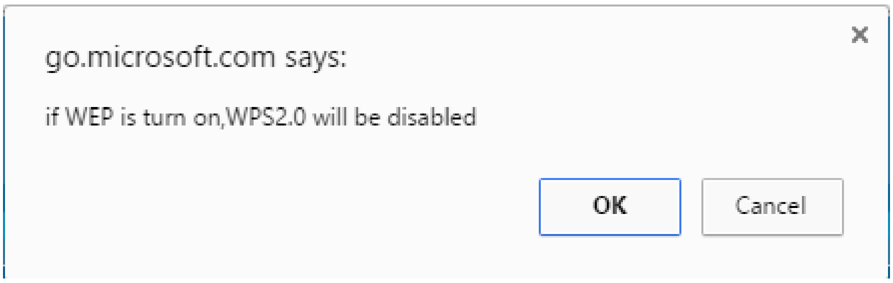
Key Length: ● 64 Bits ○ 128 Bits

RADIUS Server IP Address:

RADIUS Server Port: 1812

RADIUS Server Password:

6. Click *OK* button.



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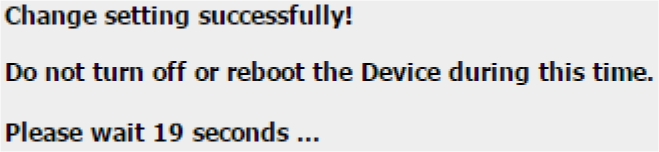


Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

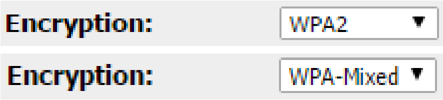
WPA2/WPA Mixed + Personal (Pre-Shared Key)

Wi-Fi Protected Access (WPA and WPA2) is a class of systems to secure wireless (Wi-Fi)

computer networks. WPA is designed to work with all wireless network interface cards, but not necessarily with first generation wireless access points. WPA2 implements the full standard, but will not work with some older network cards. Both provide good security, with two significant issues:

- Either WPA or WPA2 must be enabled and chosen in preference to WEP. WEP is usually presented as the first security choice in most installation instructions.
- In the "Personal" mode, the most likely choice for homes and small offices, a pass phrase is required that, for full security, must be longer than the typical 6 to 8 character passwords users are taught to employ.

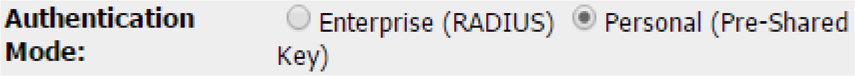
1. From the *Encryption* drop-down list, select *WPA2* or *WPA Mixed* setting.



Encryption: WPA2 ▼

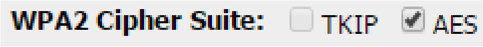
Encryption: WPA-Mixed ▼

2. Click on the ratio of *Personal (Pre-Shared Key)*.



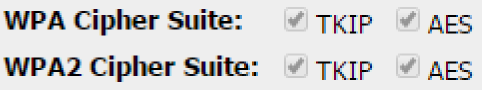
Authentication Mode: ○ Enterprise (RADIUS) ● Personal (Pre-Shared Key)

3. Check the option of *AES* in *WPA2 Cipher Suite* if your Encryption is *WPA2*:



WPA2 Cipher Suite: □ TKIP ☑ AES

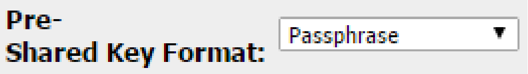
4. Check the option of *TKIP* and/or *AES* in *WPA/WPA2 Cipher Suite* if your Encryption is *WPA Mixed*:



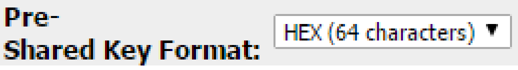
WPA Cipher Suite: ☑ TKIP ☑ AES

WPA2 Cipher Suite: ☑ TKIP ☑ AES

5. From the *Pre-Shared Key Format* drop-down list, select *Passphrase* or *Hex (64 characters)* setting.

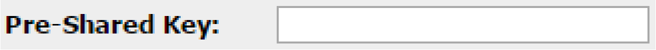


Pre-Shared Key Format: Passphrase



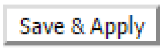
Pre-Shared Key Format: HEX (64 characters)

6. Enter the *Pre-Shared Key* depending on selected *Passphrase* or *Hex (64 characters)*.

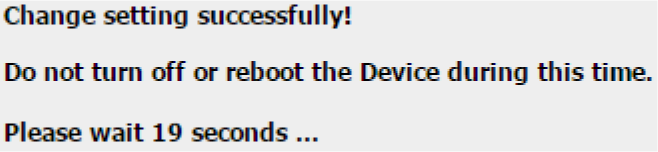


Pre-Shared Key:

7. Click on *Save & Apply* button to confirm and return.



8. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

WPA2/WPA Mixed + Enterprise (RADIUS)

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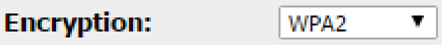
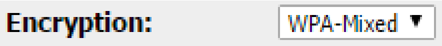
- Either WPA or WPA2 must be enabled and chosen in preference to WEP. WEP is usually presented as the first security choice in most installation instructions.
- In the "Personal" mode, the most likely choice for homes and small offices, a pass phrase is required that, for full security, must be longer than the typical 6 to 8 character passwords users are taught to employ.

1. From the *Encryption* drop-down list, select *WPA2* or *WPA Mixed* setting.

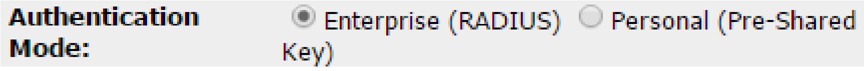


Encryption: WPA2



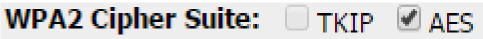
Encryption: WPA-Mixed

2. Click on the ratio of *Enterprise (RADIUS)*.



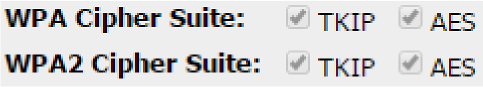
Authentication Mode: ● Enterprise (RADIUS) ○ Personal (Pre-Shared Key)

3. Check the option of *AES* in *WPA2 Cipher Suite* if your Encryption is *WPA2*:



WPA2 Cipher Suite: □ TKIP ☑ AES

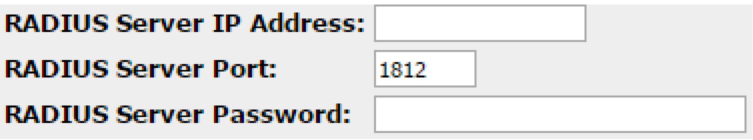
4. Check the option of *TKIP* and/or *AES* in *WPA/WPA2 Cipher Suite* if your Encryption is *WPA Mixed*:



WPA Cipher Suite: ☑ TKIP ☑ AES

WPA2 Cipher Suite: ☑ TKIP ☑ AES

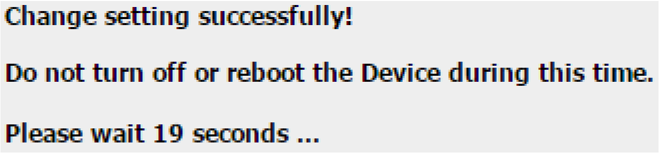
5. Enter the *Port*, *IP Address* and *Password* of RADIUS Server:



RADIUS Server IP Address:	
RADIUS Server Port:	1812
RADIUS Server Password:	

6. Click on *Save & Apply* button to confirm and return.

7. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

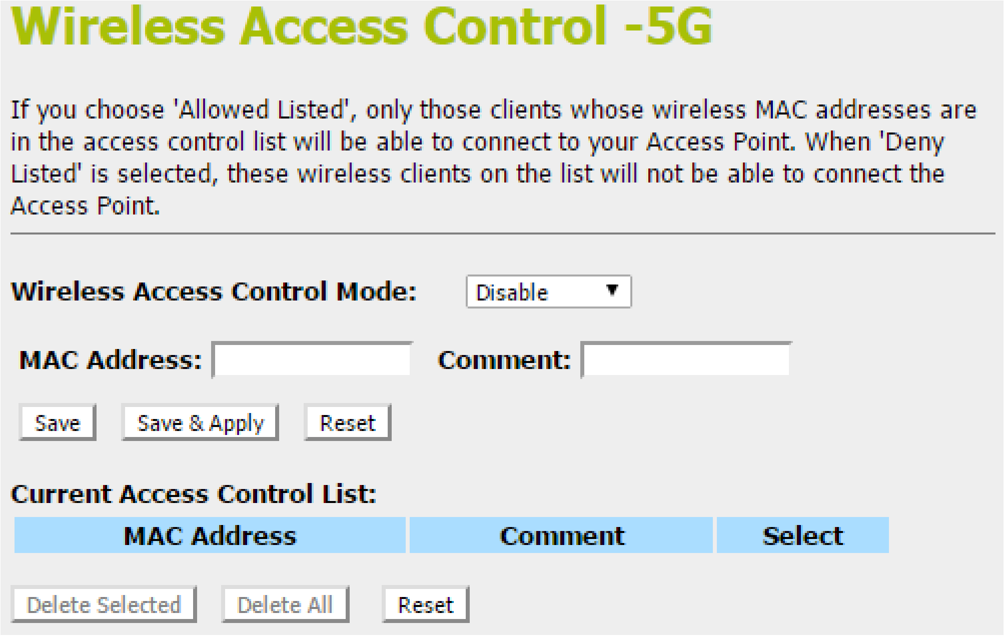
Wireless Access Control Mode

For security reason, using MAC ACL's (MAC Address Access List) creates another level of difficulty to hacking a network. A MAC ACL is created and distributed to AP so that only authorized NIC's can connect to the network. While MAC address spoofing is a proven means to hacking a network this can be used in conjunction with additional security measures to increase the level of complexity of the network security decreasing the chance of a breach.

MAC addresses can be add/delete/edit from the ACL list depending on the MAC Access Policy.

If you choose 'Allowed Listed', only those clients whose wireless MAC addresses are in the access control list will be able to connect to your Access Point. When 'Deny Listed' is selected, these wireless clients on the list will not be able to connect the Access Point. To access the *Wireless Network Access Control* page:

From the left-hand *Wireless* menu, click on *WLAN1 -> Access Control*. The following page is displayed:



Wireless Access Control -5G

If you choose 'Allowed Listed', only those clients whose wireless MAC addresses are in the access control list will be able to connect to your Access Point. When 'Deny Listed' is selected, these wireless clients on the list will not be able to connect the Access Point.

Wireless Access Control Mode: Disable

MAC Address: Comment:

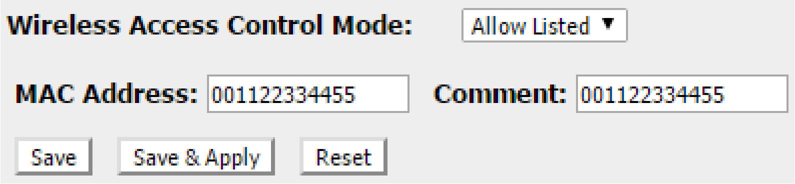
Current Access Control List:

MAC Address	Comment	Select

Allow Listed

If you choose 'Allowed Listed', only those clients whose wireless MAC addresses are in the access control list will be able to connect to your Access Point.

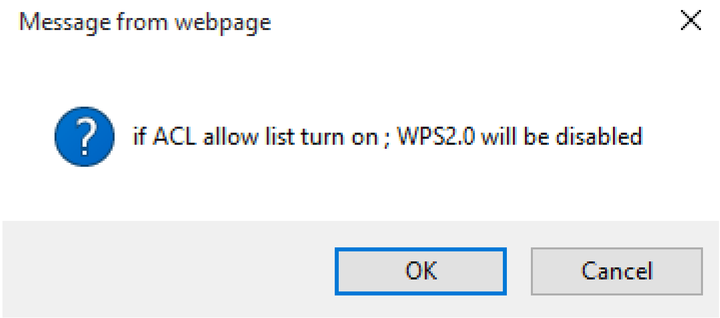
1. From the Wireless Access Control Mode drop-down list, select Allowed Listed setting.
2. Enter the *MAC Address*.
3. Enter the *Comment*.
4. Click *Save & Apply* button.



Wireless Access Control Mode: Allow Listed ▼

MAC Address: 001122334455 **Comment:** 001122334455

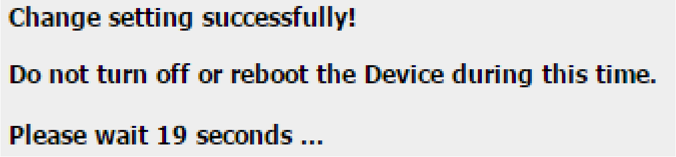
5. Click *OK* button.



Message from webpage

if ACL allow list turn on ; WPS2.0 will be disabled

6. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...

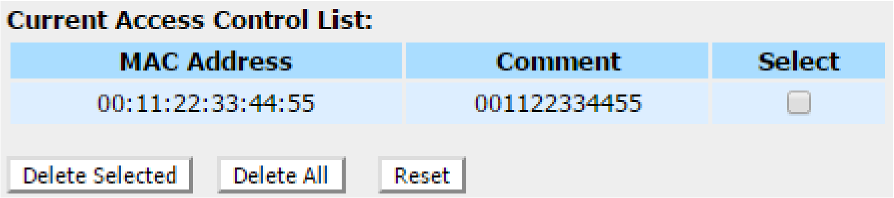


Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

7. The MAC Address that you created has been added in the *Current Access Control List*.



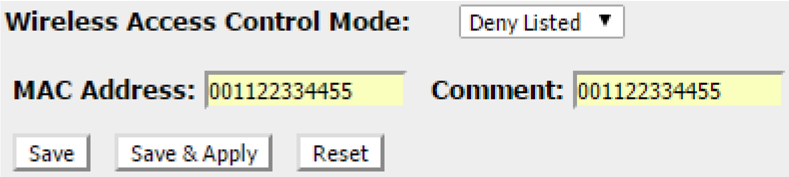
Current Access Control List:

MAC Address	Comment	Select
00:11:22:33:44:55	001122334455	□

Deny Listed

When 'Deny Listed' is selected, these wireless clients on the list will not be able to connect the Access Point.

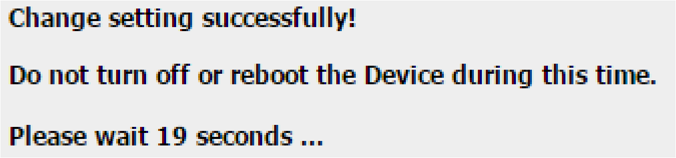
1. From the Wireless Access Control Mode drop-down list, select *Deny Listed* setting.
2. Enter the *MAC Address*.
3. Enter the *Comment*.
4. Click *Save & Apply* button.



Wireless Access Control Mode: Deny Listed

MAC Address: 001122334455 Comment: 001122334455

5. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



Change setting successfully!

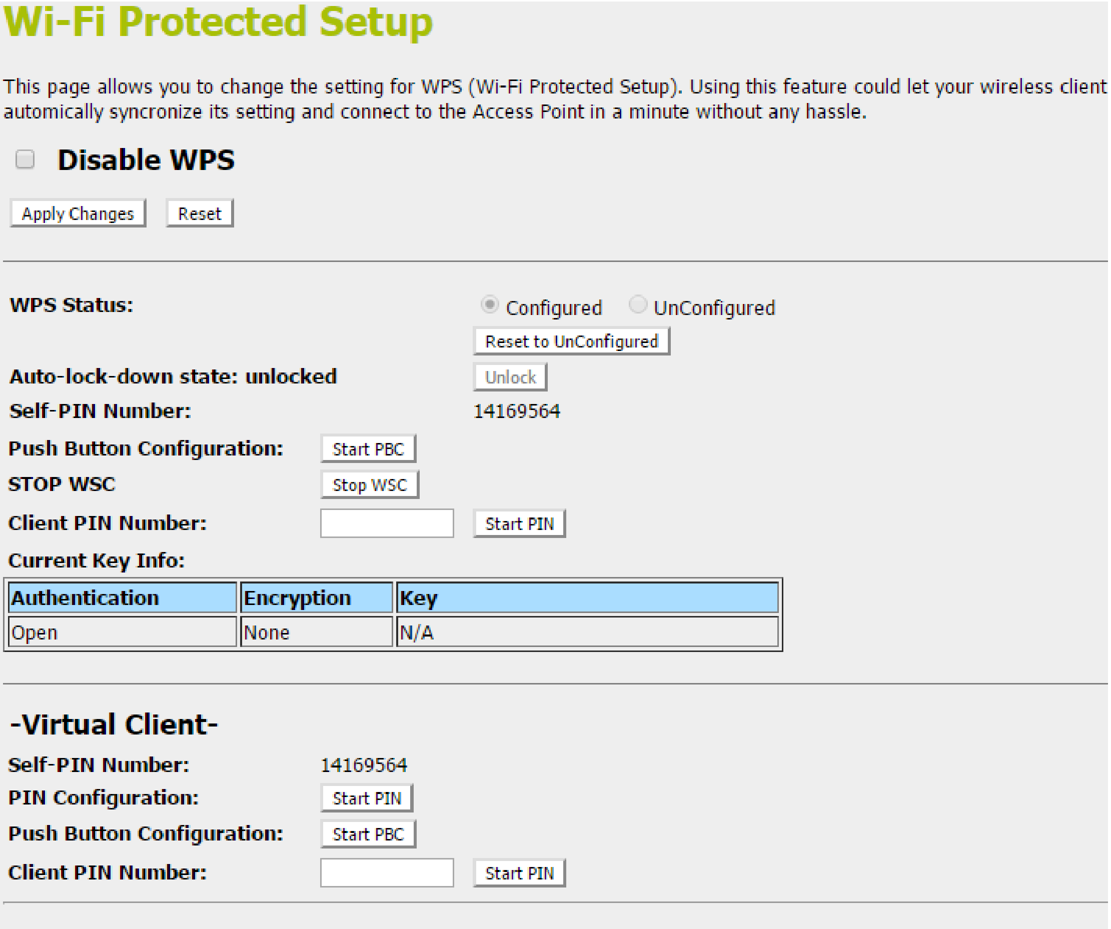
Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

WPS

This page allows you to change the setting for WPS (Wi-Fi Protected Setup). Using this feature could let your wireless client automatically syncronize its setting and connect to the Access Point in a minute without any hassle. To access the *Wireless Network WPS* page:

From the left-hand *Wireless* menu, click on *WLAN1 -> WPS*. The following page is displayed:



Wi-Fi Protected Setup

This page allows you to change the setting for WPS (Wi-Fi Protected Setup). Using this feature could let your wireless client automically syncronize its setting and connect to the Access Point in a minute without any hassle.

□ **Disable WPS**

WPS Status: ● Configured ○ UnConfigured

Auto-lock-down state: unlocked

Self-PIN Number: 14169564

Push Button Configuration:

STOP WSC

Client PIN Number:

Current Key Info:

Authentication	Encryption	Key
Open	None	N/A

-Virtual Client-

Self-PIN Number: 14169564

PIN Configuration:

Push Button Configuration:

Client PIN Number:

Field	Description
Disable WPS	**Checking this box and clicking “Save & Apply” will disable Wi-Fi Protected Setup. WPS is turned on by default.**
Self-PIN Number	**“Self-PIN Number” is AP’s PIN. Whenever users want to change AP’s PIN, they could click “Regenerate PIN” and then click “ Save & Apply”. Moreover, if users want to make their own PIN, they could enter four digit PIN without checksum and then click “ Save & Apply”. However, this would not be recommended since the registrar side needs to be supported with four digit PIN.**

Field	Description
Push Button Configuration	**Clicking this button will invoke the PBC method of WPS. It is only used when AP acts as a registrar.**
Save & Apply	**Whenever users want to enable/disable WPS or change AP's PIN, they need to apply this button to commit changes.**
Reset	**It restores the original values of "Self-PIN Number" and "Client PIN Number".**
Client PIN Number	**It is only used when users want their station to join AP's network. The length of PIN is limited to four or eight numeric digits. If users enter eight digit PIN with checksum error, there will be a warning message popping up.** **If users insist on this PIN, AP will take it.**

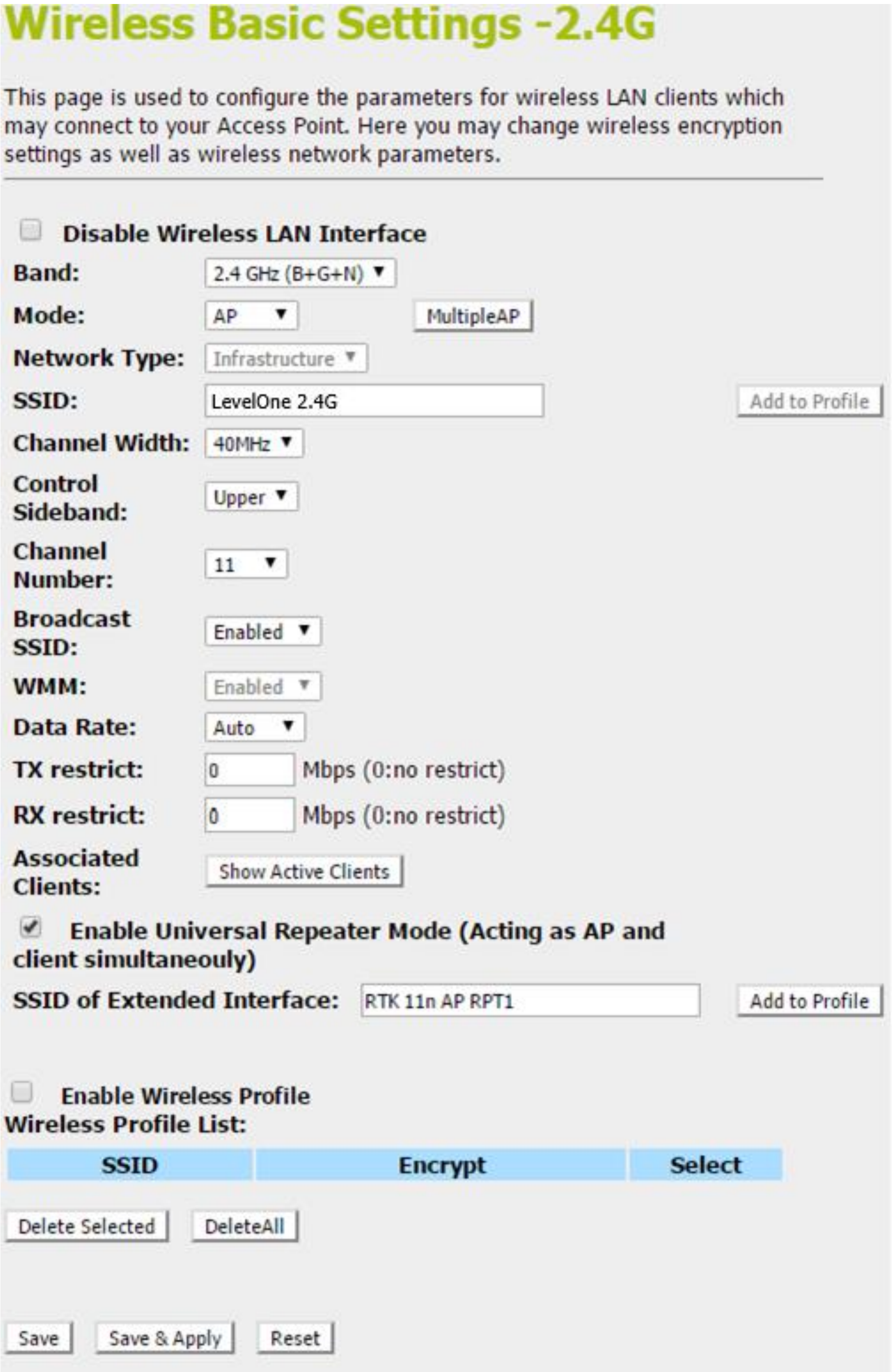
11 Wireless Network – 2.4GHz

This chapter assumes that you have already set up your Wireless PCs and installed a compatible Wireless card on your device. See *Configuring Wireless PCs*.

Wireless Basics

The *Wireless Network* page allows you to configure the Wireless features of your device. To access the *Wireless Basics* page:

From the *Wireless* menu, click on WLAN2 -> *BASIC SETTING*. The following page is displayed:



Wireless Basic Settings -2.4G

This page is used to configure the parameters for wireless LAN clients which may connect to your Access Point. Here you may change wireless encryption settings as well as wireless network parameters.

☐ Disable Wireless LAN Interface

Band: 2.4 GHz (B+G+N) ▼

Mode: AP ▼ MultipleAP

Network Type: Infrastructure ▼

SSID: LevelOne 2.4G Add to Profile

Channel Width: 40MHz ▼

Control Sideband: Upper ▼

Channel Number: 11 ▼

Broadcast SSID: Enabled ▼

WMM: Enabled ▼

Data Rate: Auto ▼

TX restrict: 0 Mbps (0:no restrict)

RX restrict: 0 Mbps (0:no restrict)

Associated Clients: Show Active Clients

☑ Enable Universal Repeater Mode (Acting as AP and client simultaneouly)

SSID of Extended Interface: RTK 11n AP RPT1 Add to Profile

☐ Enable Wireless Profile

Wireless Profile List:

SSID	Encrypt	Select

Delete Selected DeleteAll

Save Save & Apply Reset

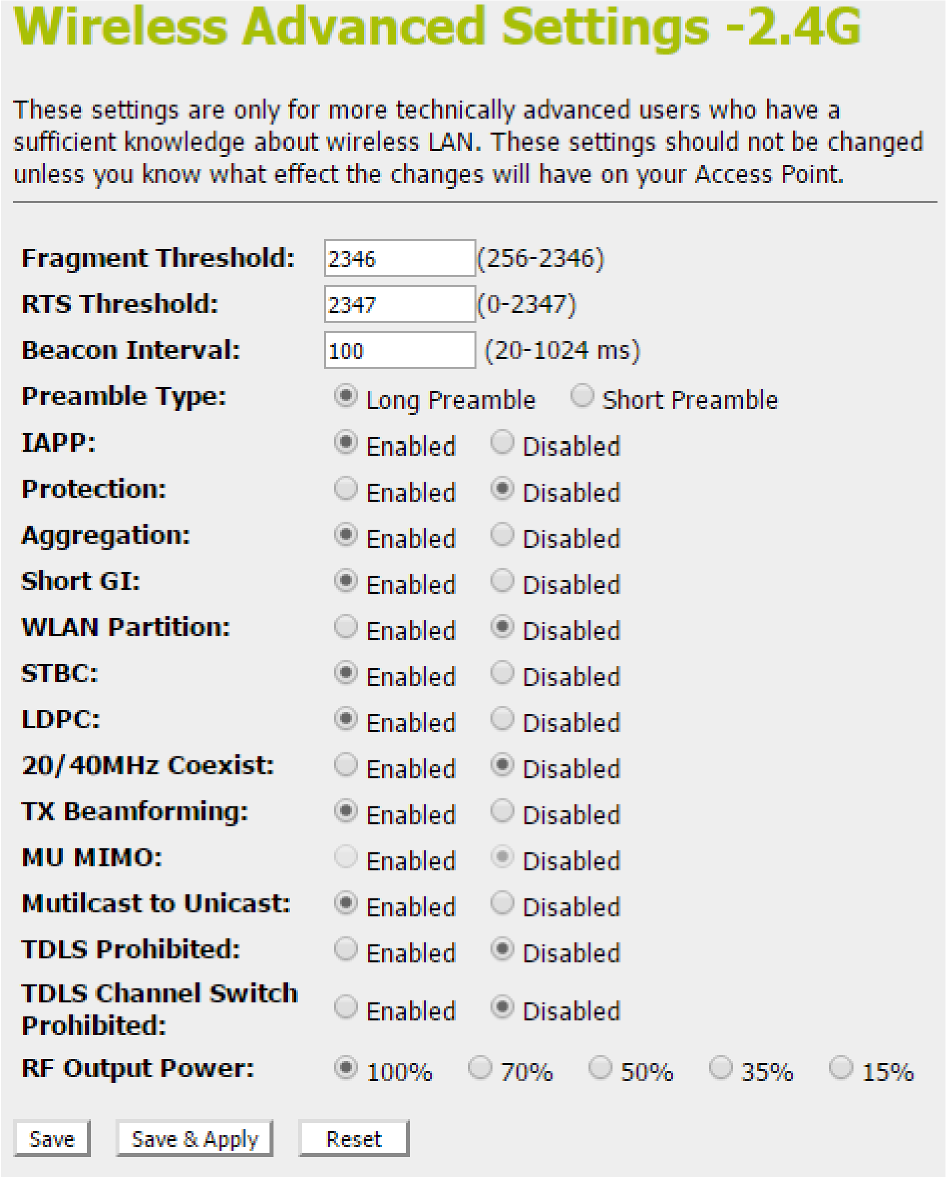
Figure 5: Wireless Network page

Field	Description
Disable Wireless LAN Interface	**Enable/Disable the Wireless LAN Interface.** **Default: Disable**
Band	**Specify the WLAN Mode to 802.11b/g Mixed mode, 802.11b mode or 802.11g mode**
Mode	**Configure the Wireless LAN Interface to AP, Client, WDS, AP + WDS, MESH or AP + MESH mode**
Network Type	**Configure the Network Type to Infrastructure or Ad hoc.**
SSID	**Specify the network name.** **Each Wireless LAN network uses a unique Network Name to identify the network. This name is called the Service Set Identifier (SSID). When you set up your wireless adapter, you specify the SSID. If you want to connect to an existing network, you must use the name for that network. If you are setting up your own network you can make up your own name and use it on each computer. The name can be up to 20 characters long and contain letters and numbers.**
Channel Width	**Choose a Channel Width from the pull-down menu.**
Control Sideband	**Choose a Control Sideband from the pull-down menu.**
Channel Number	**Choose a Channel Number from the pull-down menu.**
Broadcast SSID	**Broadcast or Hide SSID to your Network.** **Default: Enabled**
WMM	**Enable/disable the Wi-Fi Multimedia (WMM) support.**
Data Rate	**Select the Data Rate from the drop-down list**
Associated Clients	**Show Active Wireless Client Table** **This table shows the MAC address, transmission, receiption packet counters and encrypted status for each associated wireless client.**
Enable Mac Clone (Single Ethernet Client)	**Enable Mac Clone (Single Ethernet Client)**
Enable Universal Repeater Mode	**Acting as AP and client simultaneously**
SSID of Extended Interface	**When mode is set to “AP” and URM (Universal Repeater Mode) is enabled, user should input SSID of another AP in the field of “SSID of Extended Interface”. Please note, the channel number should be set to the one, used by another AP because 8186 will share the same channel between AP and URM interface (called as extended interface hereafter).**

Advanced Settings

These settings are only for more technically advanced users who have a sufficient knowledge about wireless LAN. These settings should not be changed unless you know what effect the changes will have on your Access Point. To access the *Wireless Network Advanced Settings* page:

From the left-hand *Wireless* menu, click on *WLAN2 -> ADVANCED*. The following page is displayed:



Wireless Advanced Settings -2.4G

These settings are only for more technically advanced users who have a sufficient knowledge about wireless LAN. These settings should not be changed unless you know what effect the changes will have on your Access Point.

Fragment Threshold:	2346 (256-2346)
RTS Threshold:	2347 (0-2347)
Beacon Interval:	100 (20-1024 ms)
Preamble Type:	● Long Preamble ○ Short Preamble
IAPP:	● Enabled ○ Disabled
Protection:	○ Enabled ● Disabled
Aggregation:	● Enabled ○ Disabled
Short GI:	● Enabled ○ Disabled
WLAN Partition:	○ Enabled ● Disabled
STBC:	● Enabled ○ Disabled
LDPC:	● Enabled ○ Disabled
20/40MHz Coexist:	○ Enabled ● Disabled
TX Beamforming:	● Enabled ○ Disabled
MU MIMO:	○ Enabled ● Disabled
Mutilcast to Unicast:	● Enabled ○ Disabled
TDLS Prohibited:	○ Enabled ● Disabled
TDLS Channel Switch Prohibited:	○ Enabled ● Disabled
RF Output Power:	● 100% ○ 70% ○ 50% ○ 35% ○ 15%

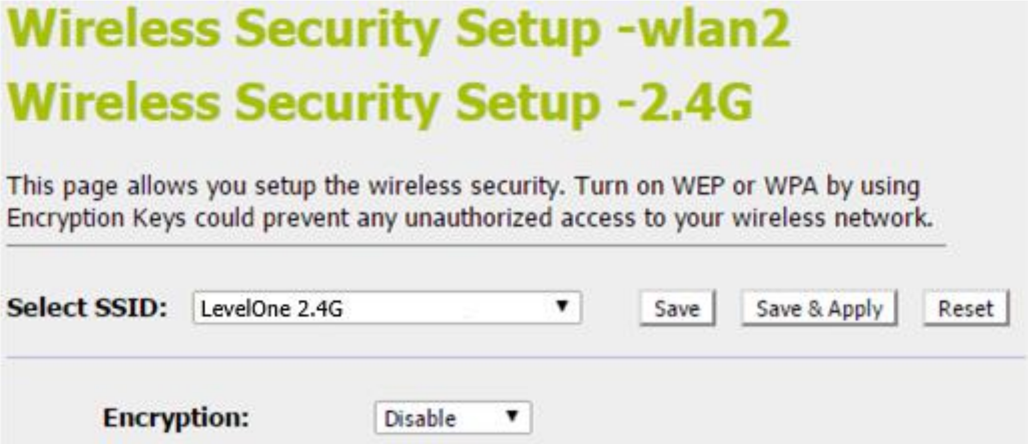
Field	Description
Fragment Threshold	**When transmitting a packet over a network medium, sometimes the packet is broken into several segments, if the size of packet exceeds that allowed by the network medium.** **The Fragmentation Threshold defines the number of bytes used for the fragmentation boundary for directed messages.**
RTS Threshold	**RTS stands for "Request to Send". This parameter controls what size data packet the low level RF protocol issues to an RTS packet. The**

	default is 2347.
Beacon Interval	Choosing beacon period for improved response time for wireless http clients.
Preamble Type	Specify the Preamble type is short preamble or long preamble
IAPP	Disable or Enable IAPP
Protection	A protection mechanism prevents collisions among 802.11g nodes.
Aggregation	Disable or Enable Aggregation
Short GI	Disable or Enable Short GI
WLAN Partition	Disable or Enable WLAN Partition
STBC	Disable or Enable STBC
20/40MHz Coexist	Disable or Enable 20/40MHz Coexist
RF Output Power	TX Power measurement.

Security

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network. To access the *Wireless Network Security* page:

From the left-hand *Wireless* menu, click on *WLAN2 -> Security*. The following page is displayed:



Wireless Security Setup -wlan2

Wireless Security Setup -2.4G

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.

Select SSID: LevelOne 2.4G

Encryption: Disable

Field	Description
Select SSID	**Select the SSID**
Encryption	**Configure the Encryption to Disable, WEP, WPA , WPA2 or WPA-Mixed**
Use 802.1x Authentication	**Use 802.1x Authentication by WEP 64bits or WEP 128bits**
Authentication	**Configure the Authentication Mode to Open System, Shared Key or Auto**
Key Length	**Select the Key Length 64-bit or 128-bit**
Key Format	**Select the Key Format ASCII (5 characters), Hex (10 characters), ASCII (13 characters) or Hex (26 characters)**
Encryption Key	**Enter the Encryption Key**
WPA Authentication Mode	**Configure the WPA Authentication Mode to Enterprise (RADIUS) or Personal (Pre-Shared Key)**
WPA Cipher Suite	**Configure the WPA Cipher Suite to AES**

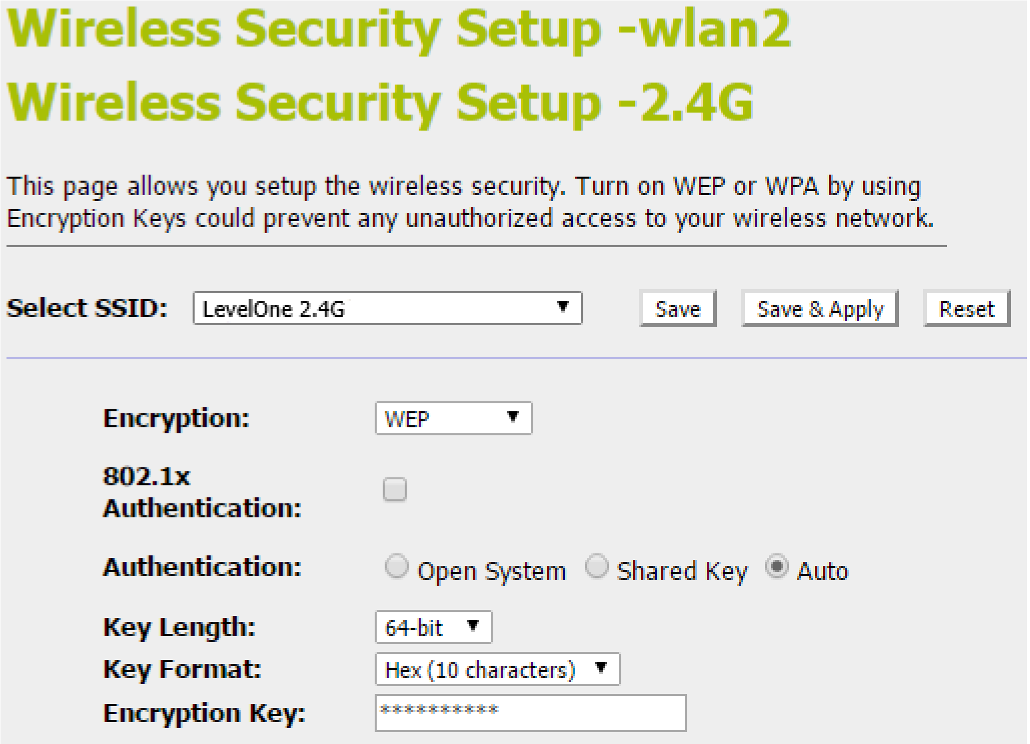
Field	Description
WPA2 Cipher Suite	**Configure the WPA2 Cipher Suite to AES**
Pre-Shared Key	**Configure the Pre-Shared Key Format to Passphrase or HEX (64**

Format	characters)
Pre-Shared Key	Type the Pre-Shared Key
Enable Pre-Authentication	According to some of the preferred embodiments, a method for proactively establishing a security association between a mobile node in a visiting network and an authentication agent in another network to which the mobile node can move includes: negotiating pre-authentication using a flag in a message header that indicates whether the communication is for establishing a pre-authentication security association; and one of the mobile node and the authentication agent initiating pre-authentication by transmitting a message with the flag set in its message header, and the other of the mobile node and the authentication agent responding with the flag set in its message header only if it supports the pre-authentication. Enable/disable pre-authentication support. Default: disable.
Authentication RADIUS Server	Port: Type the port number of RADIUS Server IP address: Type the IP address of RADIUS Server Password: Type the Password of RADIUS Server

WEP + Encryption Key

WEP aims to provide security by encrypting data over radio waves so that it is protected as it is transmitted from one end point to another. However, it has been found that WEP is not as secure as once believed.

1. From the *Encryption* drop-down list, select *WEP* setting.
2. From the *Key Length* drop-down list, select *64-bit* or *128-bit* setting.
3. From the *Key Format* drop-down list, select *ASCII (5 characters), Hex (10 characters), ASCII (13 characters)* or *Hex (26 characters)* setting.
4. Enter the *Encryption Key* value depending on selected ASCII or Hexadecimal.
5. Click *Save & Apply* button.



Wireless Security Setup -wlan2

Wireless Security Setup -2.4G

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.

Select SSID: LevelOne 2.4G

Encryption: WEP

802.1x Authentication: □

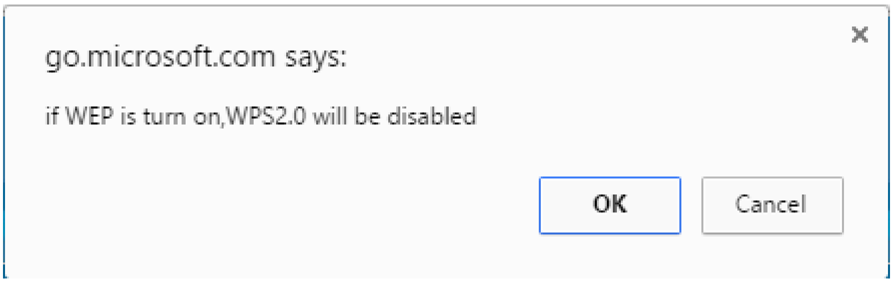
Authentication: ○ Open System ○ Shared Key ● Auto

Key Length: 64-bit

Key Format: Hex (10 characters)

Encryption Key: **********

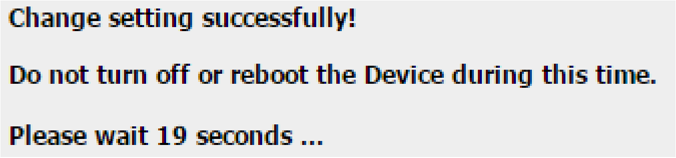
6. Click *OK* button.



go.microsoft.com says:

if WEP is turn on,WPS2.0 will be disabled

7. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



Change setting successfully!

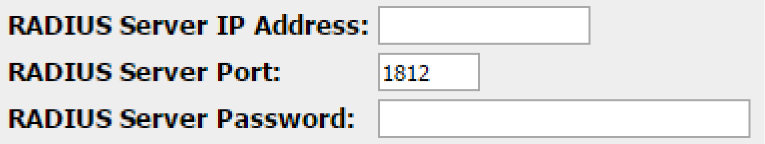
Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

WEP + Use 802.1x Authentication

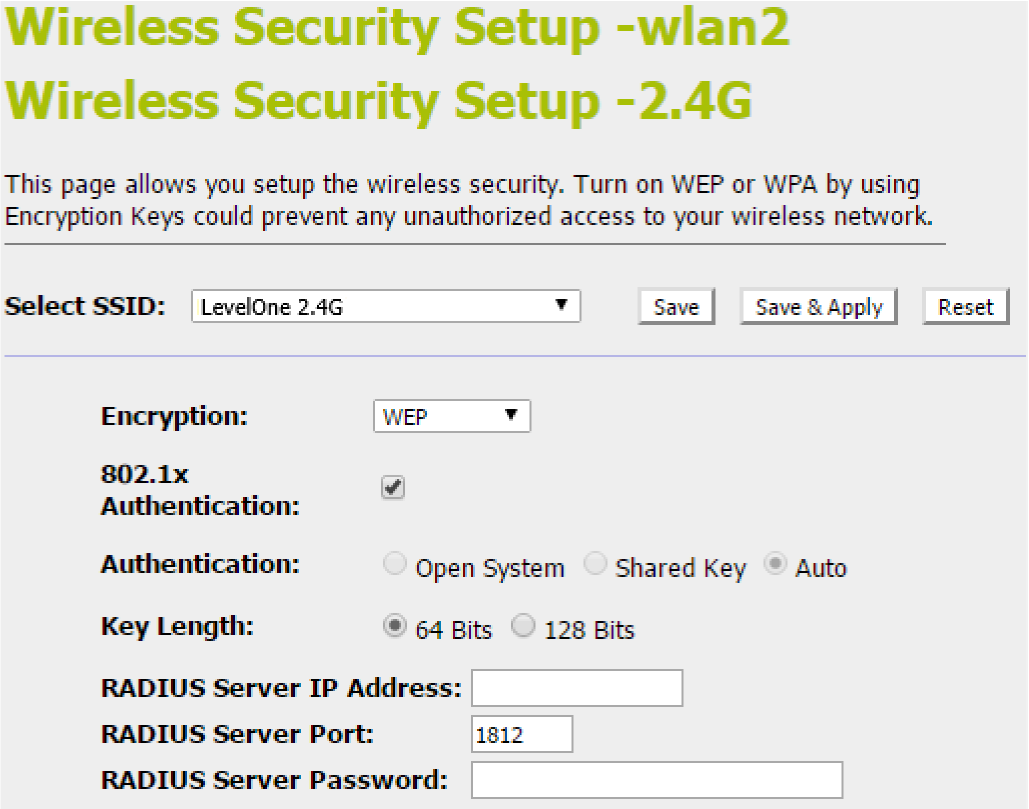
WEP aims to provide security by encrypting data over radio waves so that it is protected as it is transmitted from one end point to another. However, it has been found that WEP is not as secure as once believed.

1. From the *Encryption* drop-down list, select *WEP* setting.
2. Check the option of *Use 802.1x Authentication.*
3. Click on the ratio of *WEP 64bits* or *WEP 128bits*.
4. Enter the *Port*, *IP Address* and *Password* of RADIUS Server:



RADIUS Server IP Address:	
RADIUS Server Port:	1812
RADIUS Server Password:	

5. Click *Save & Apply* button.



Wireless Security Setup -wlan2

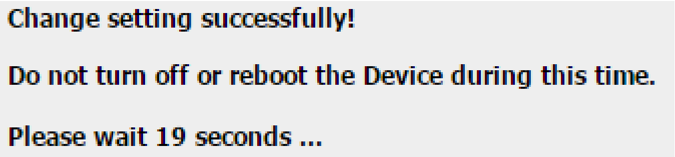
Wireless Security Setup -2.4G

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.

Select SSID: LevelOne 2.4G ▼

Encryption:	WEP ▼
802.1x Authentication:	☑
Authentication:	○ Open System ○ Shared Key ● Auto
Key Length:	● 64 Bits ○ 128 Bits
RADIUS Server IP Address:	
RADIUS Server Port:	1812
RADIUS Server Password:	

6. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

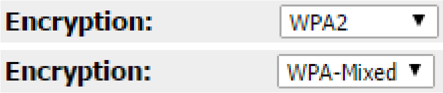
WPA2/WPA Mixed + Personal (Pre-Shared Key)

Wi-Fi Protected Access (WPA and WPA2) is a class of systems to secure wireless (Wi-Fi)

computer networks. WPA is designed to work with all wireless network interface cards, but not necessarily with first generation wireless access points. WPA2 implements the full standard, but will not work with some older network cards. Both provide good security, with two significant issues:

- Either WPA or WPA2 must be enabled and chosen in preference to WEP. WEP is usually presented as the first security choice in most installation instructions.
- In the "Personal" mode, the most likely choice for homes and small offices, a pass phrase is required that, for full security, must be longer than the typical 6 to 8 character passwords users are taught to employ.

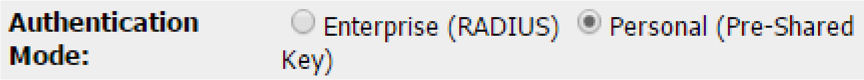
1. From the *Encryption* drop-down list, select *WPA2* or *WPA Mixed* setting.



Encryption: WPA2 ▼

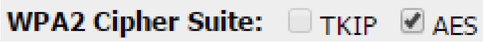
Encryption: WPA-Mixed ▼

2. Click on the ratio of *Personal (Pre-Shared Key)*.



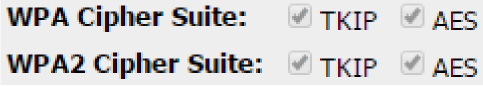
Authentication Mode: ○ Enterprise (RADIUS) ● Personal (Pre-Shared Key)

3. Check the option of *AES* in *WPA2 Cipher Suite* if your Encryption is *WPA2*:



WPA2 Cipher Suite: □ TKIP ☑ AES

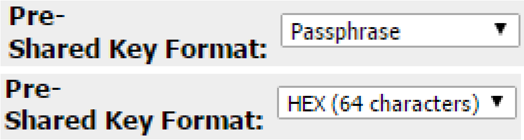
4. Check the option of *TKIP* and/or *AES* in *WPA/WPA2 Cipher Suite* if your Encryption is *WPA Mixed*:



WPA Cipher Suite: ☑ TKIP ☑ AES

WPA2 Cipher Suite: ☑ TKIP ☑ AES

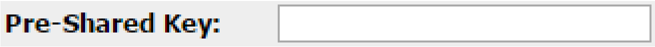
5. From the *Pre-Shared Key Format* drop-down list, select *Passphrase* or *Hex (64 characters)* setting.



Pre-Shared Key Format: Passphrase ▼

Pre-Shared Key Format: HEX (64 characters) ▼

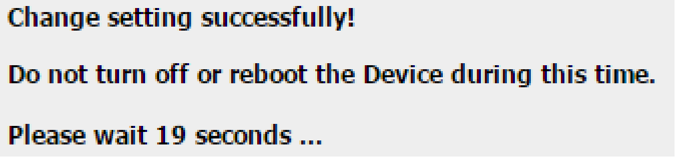
6. Enter the *Pre-Shared Key* depending on selected *Passphrase* or *Hex (64 characters)*.



Pre-Shared Key:

7. Click on *Save & Apply* button to confirm and return.

8. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



Change setting successfully!

Do not turn off or reboot the Device during this time.

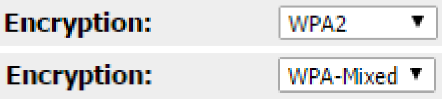
Please wait 19 seconds ...

WPA2/WPA Mixed + Enterprise (RADIUS)

Wi-Fi Protected Access (WPA and WPA2) is a class of systems to secure wireless (Wi-Fi) computer networks. WPA is designed to work with all wireless network interface cards, but not necessarily with first generation wireless access points. WPA2 implements the full standard, but will not work with some older network cards. Both provide good security, with two significant issues:

- Either WPA or WPA2 must be enabled and chosen in preference to WEP. WEP is usually presented as the first security choice in most installation instructions.
- In the "Personal" mode, the most likely choice for homes and small offices, a pass phrase is required that, for full security, must be longer than the typical 6 to 8 character passwords users are taught to employ.

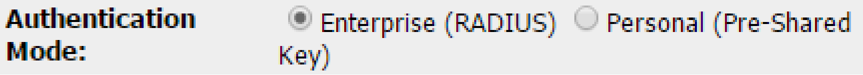
1. From the *Encryption* drop-down list, select *WPA2* or *WPA Mixed* setting.



Encryption: WPA2 ▼

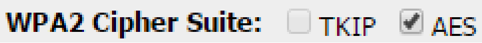
Encryption: WPA-Mixed ▼

2. Click on the ratio of *Enterprise (RADIUS)*.



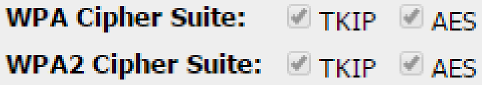
Authentication Mode: ● Enterprise (RADIUS) ○ Personal (Pre-Shared Key)

3. Check the option of *AES* in *WPA2 Cipher Suite* if your Encryption is *WPA2*:



WPA2 Cipher Suite: □ TKIP ☑ AES

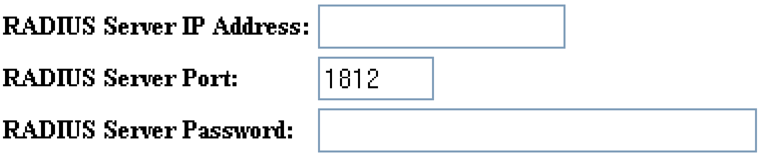
4. Check the option of *TKIP* and/or *AES* in *WPA/WPA2 Cipher Suite* if your Encryption is *WPA Mixed*:



WPA Cipher Suite: ☑ TKIP ☑ AES

WPA2 Cipher Suite: ☑ TKIP ☑ AES

5. Enter the *Port*, *IP Address* and *Password* of RADIUS Server:

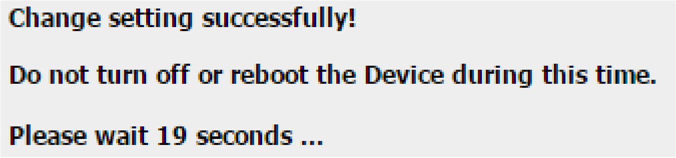


RADIUS Server IP Address:

RADIUS Server Port: 1812

RADIUS Server Password:

6. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

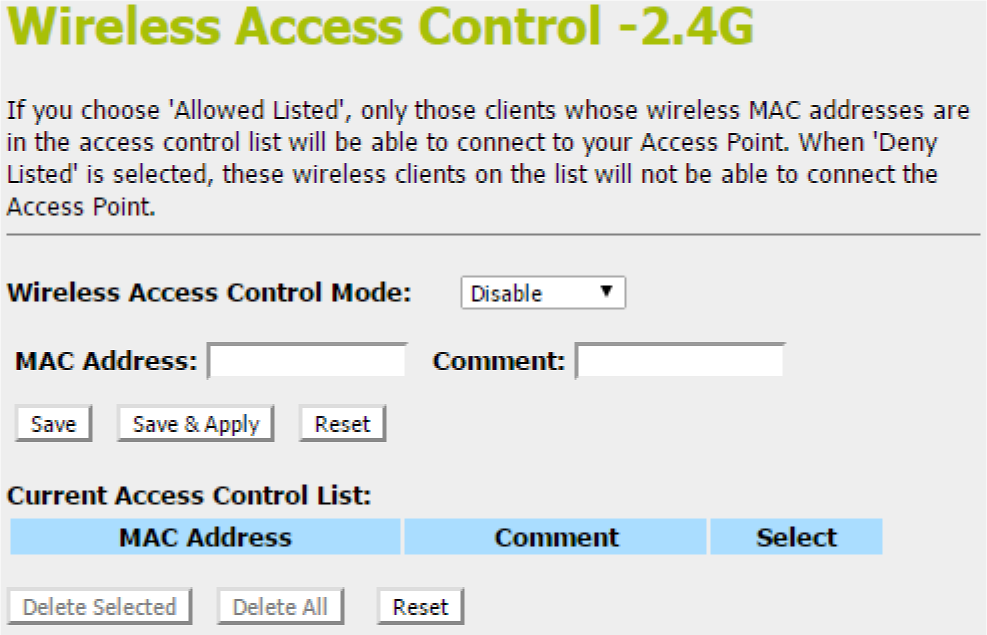
Wireless Access Control Mode

For security reason, using MAC ACL's (MAC Address Access List) creates another level of difficulty to hacking a network. A MAC ACL is created and distributed to AP so that only authorized NIC's can connect to the network. While MAC address spoofing is a proven means to hacking a network this can be used in conjunction with additional security measures to increase the level of complexity of the network security decreasing the chance of a breach.

MAC addresses can be add/delete/edit from the ACL list depending on the MAC Access Policy.

If you choose 'Allowed Listed', only those clients whose wireless MAC addresses are in the access control list will be able to connect to your Access Point. When 'Deny Listed' is selected, these wireless clients on the list will not be able to connect the Access Point. To access the *Wireless Network Access Control* page:

From the left-hand *Wireless* menu, click on *WLAN2 -> Access Control*. The following page is displayed:



Wireless Access Control -2.4G

If you choose 'Allowed Listed', only those clients whose wireless MAC addresses are in the access control list will be able to connect to your Access Point. When 'Deny Listed' is selected, these wireless clients on the list will not be able to connect the Access Point.

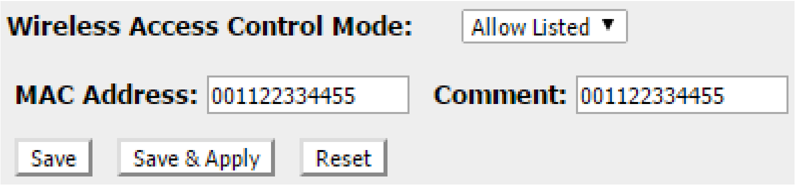
Wireless Access Control Mode: Disable

MAC Address	Comment	Select

Allow Listed

If you choose 'Allowed Listed', only those clients whose wireless MAC addresses are in the access control list will be able to connect to your Access Point.

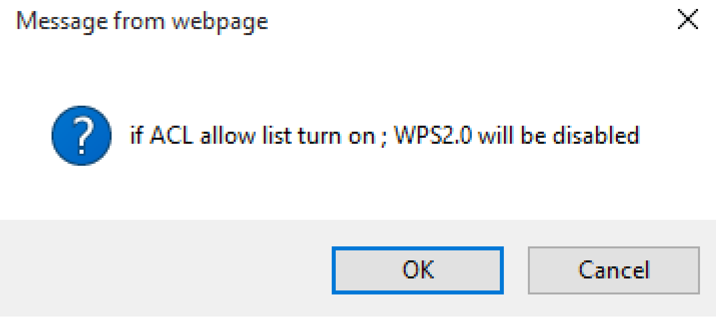
1. From the Wireless Access Control Mode drop-down list, select Allowed Listed setting.
2. Enter the *MAC Address*.
3. Enter the *Comment*.
4. Click *Save & Apply* button.



Wireless Access Control Mode: Allow Listed ▼

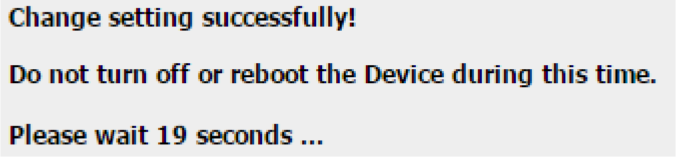
MAC Address: 001122334455 Comment: 001122334455

5. Click *OK* button.



if ACL allow list turn on ; WPS2.0 will be disabled

6. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...

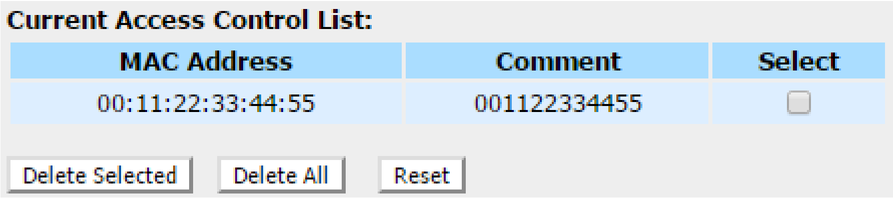


Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

7. The MAC Address that you created has been added in the *Current Access Control List*.



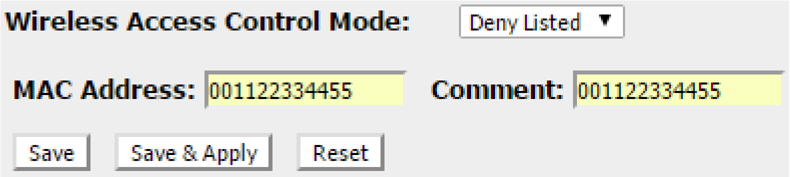
Current Access Control List:

MAC Address	Comment	Select
00:11:22:33:44:55	001122334455	□

Deny Listed

When 'Deny Listed' is selected, these wireless clients on the list will not be able to connect the Access Point.

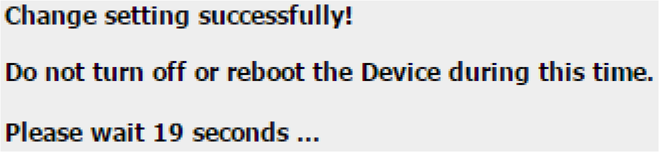
1. From the Wireless Access Control Mode drop-down list, select *Deny Listed* setting.
2. Enter the *MAC Address*.
3. Enter the *Comment*.
4. Click *Save & Apply* button.



Wireless Access Control Mode: Deny Listed

MAC Address: 001122334455 Comment: 001122334455

5. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 20 seconds ...



Change setting successfully!

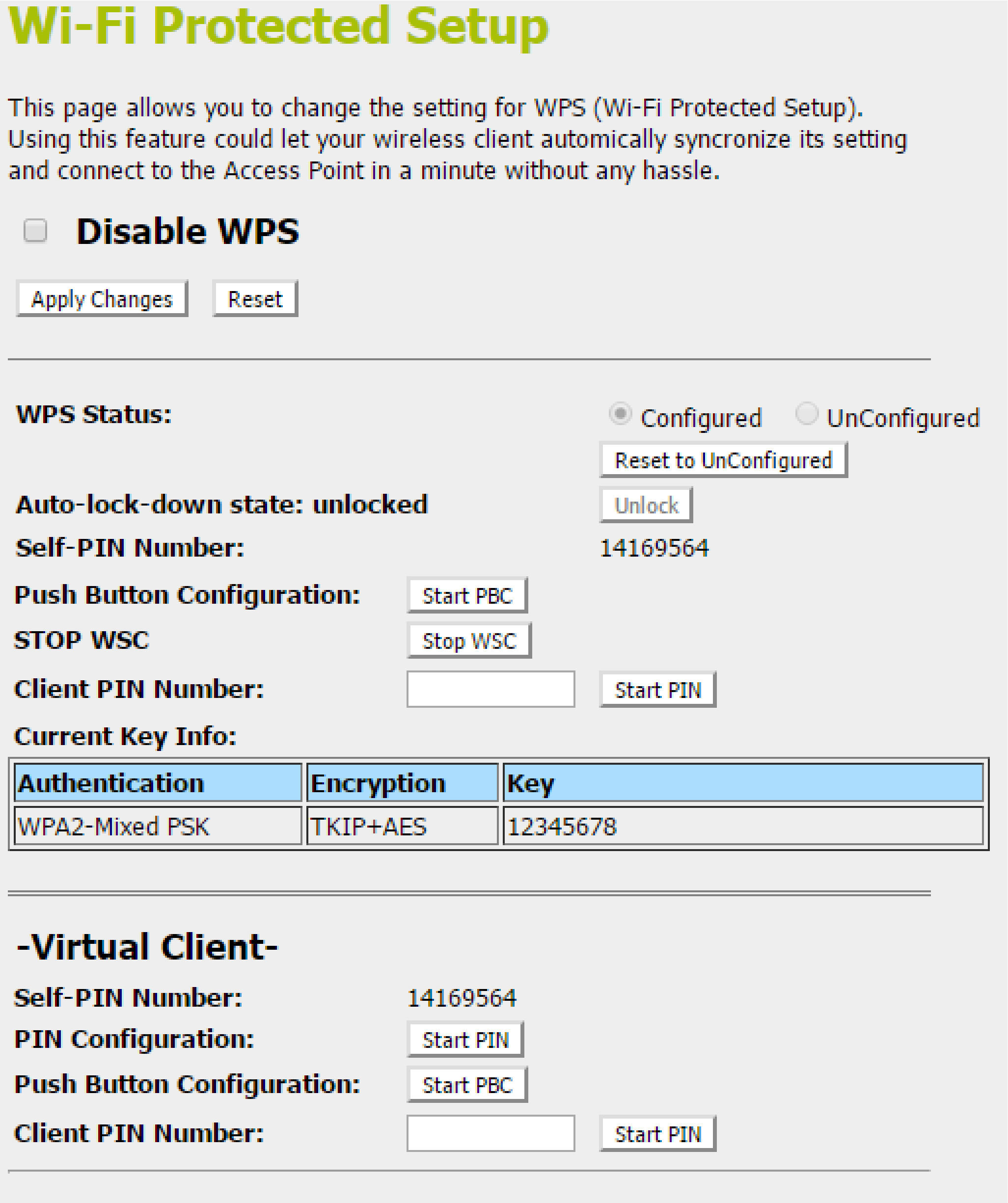
Do not turn off or reboot the Device during this time.

Please wait 19 seconds ...

WPS

This page allows you to change the setting for WPS (Wi-Fi Protected Setup). Using this feature could let your wireless client automatically syncronize its setting and connect to the Access Point in a minute without any hassle. To access the *Wireless Network WPS* page:

From the left-hand *Wireless* menu, click on *WLAN2 -> WPS*. The following page is displayed:



Wi-Fi Protected Setup

This page allows you to change the setting for WPS (Wi-Fi Protected Setup). Using this feature could let your wireless client automically syncronize its setting and connect to the Access Point in a minute without any hassle.

□ **Disable WPS**

WPS Status: ● Configured ○ UnConfigured

Auto-lock-down state: unlocked

Self-PIN Number: 14169564

Push Button Configuration:

STOP WSC

Client PIN Number:

Current Key Info:

Authentication	Encryption	Key
WPA2-Mixed PSK	TKIP+AES	12345678

-Virtual Client-

Self-PIN Number: 14169564

PIN Configuration:

Push Button Configuration:

Client PIN Number:

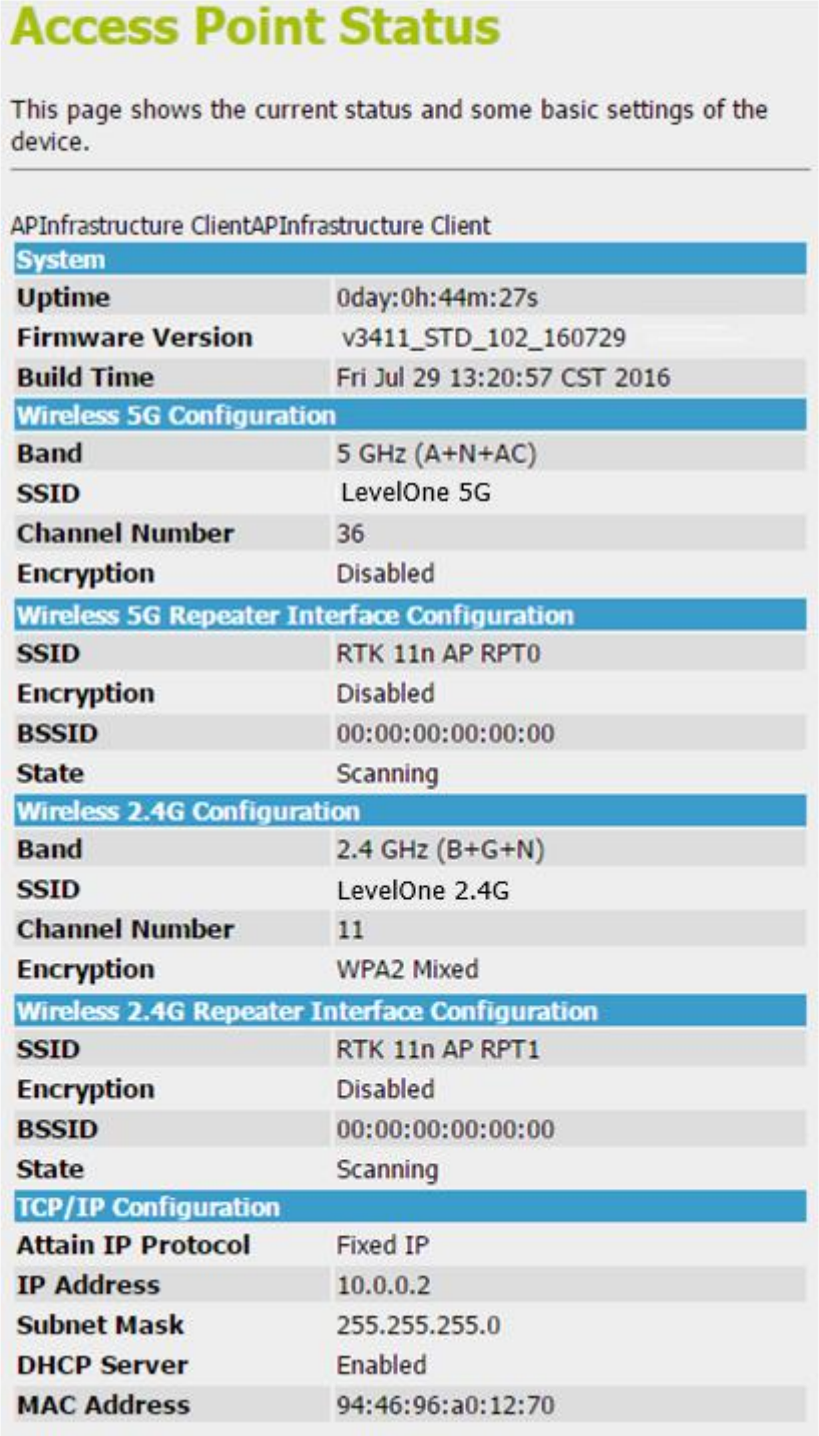
Field	Description
Disable WPS	**Checking this box and clicking “Save & Apply” will disable Wi-Fi Protected Setup. WPS is turned on by default.**
Self-PIN Number	**“Self-PIN Number” is AP’s PIN. Whenever users want to change AP’s PIN, they could click “Regenerate PIN” and then click “ Save & Apply”. Moreover, if users want to make their own PIN, they could enter four digit PIN without checksum and then click “ Save & Apply”. However, this would not be recommended since the registrar side needs to be supported with four digit PIN.**

Field	Description
Push Button Configuration	**Clicking this button will invoke the PBC method of WPS. It is only used when AP acts as a registrar.**
Save & Apply	**Whenever users want to enable/disable WPS or change AP’s PIN, they need to apply this button to commit changes.**
Reset	**It restores the original values of “Self-PIN Number” and “Client PIN Number”.**
Client PIN Number	**It is only used when users want their station to join AP’s network. The length of PIN is limited to four or eight numeric digits. If users enter eight digit PIN with checksum error, there will be a warning message popping up.** **If users insist on this PIN, AP will take it.**

12 Status

This page displays the current information for the device. It will display the LAN, WAN, and system firmware information.

1. From the *Management -> Status* menu. The following page is displayed:



Access Point Status

This page shows the current status and some basic settings of the device.

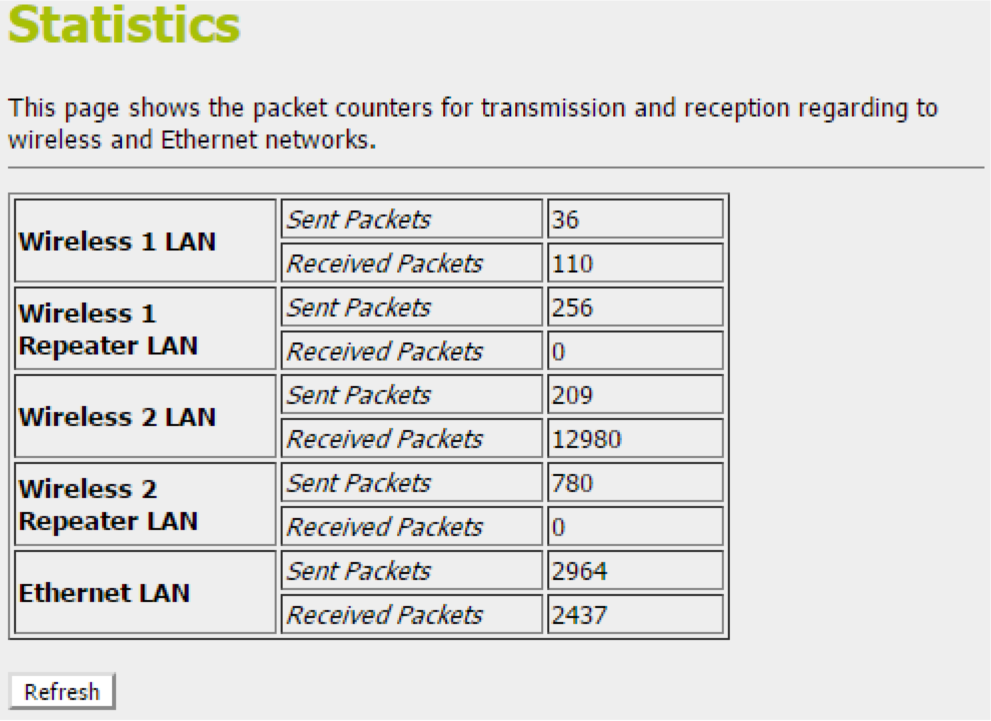
APInfrastructure ClientAPInfrastructure Client

System	
Uptime	0day:0h:44m:27s
Firmware Version	v3411_STD_102_160729
Build Time	Fri Jul 29 13:20:57 CST 2016
Wireless 5G Configuration	
Band	5 GHz (A+N+AC)
SSID	LevelOne 5G
Channel Number	36
Encryption	Disabled
Wireless 5G Repeater Interface Configuration	
SSID	RTK 11n AP RPT0
Encryption	Disabled
BSSID	00:00:00:00:00:00
State	Scanning
Wireless 2.4G Configuration	
Band	2.4 GHz (B+G+N)
SSID	LevelOne 2.4G
Channel Number	11
Encryption	WPA2 Mixed
Wireless 2.4G Repeater Interface Configuration	
SSID	RTK 11n AP RPT1
Encryption	Disabled
BSSID	00:00:00:00:00:00
State	Scanning
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	10.0.0.2
Subnet Mask	255.255.255.0
DHCP Server	Enabled
MAC Address	94:46:96:a0:12:70

13 Statistics

This page shows the packet statistics for transmission and reception regarding to network interface.

1. From the *Management -> Statistics* menu. The following page is displayed:



Statistics

This page shows the packet counters for transmission and reception regarding to wireless and Ethernet networks.

Wireless 1 LAN	*Sent Packets*	36
	Received Packets	110
Wireless 1 Repeater LAN	*Sent Packets*	256
	Received Packets	0
Wireless 2 LAN	*Sent Packets*	209
	Received Packets	12980
Wireless 2 Repeater LAN	*Sent Packets*	780
	Received Packets	0
Ethernet LAN	*Sent Packets*	2964
	Received Packets	2437

14 Firmware Upgrade

About firmware versions

Firmware is a software program. It is stored as read-only memory on your device.

Your device can check whether there are later firmware versions available. If there is a later version, you can download it via the Internet and install it on your device.

Note

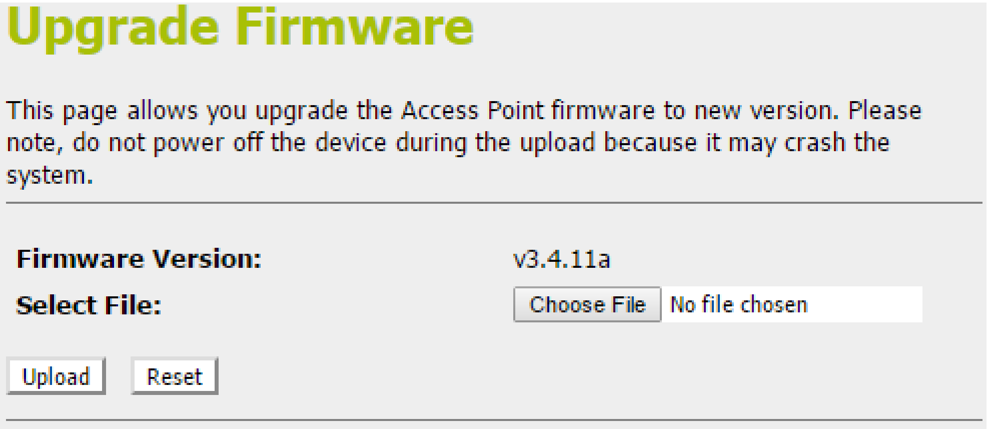
If there is a firmware update available you are strongly advised to install it on your device to ensure that you take full advantage of any new feature developments.

Manually updating firmware

You can manually download the latest firmware version from provider's website to your PC's file directory.

Once you have downloaded the latest firmware version to your PC, you can manually select and install it as follows:

1. From the *MANAGEMENT -> Firmware Upgrade* menu. The following page is displayed:
2. Click on the *Browse…* button.
3. Once you have selected the file to be installed, click *Open*. The file's directory path is displayed in the *New Firmware Image:* text box.
4. Click *Upload*.



Upgrade Firmware

This page allows you upgrade the Access Point firmware to new version. Please note, do not power off the device during the upload because it may crash the system.

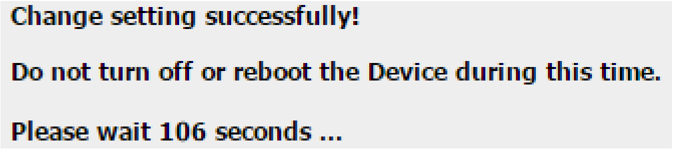
Firmware Version:	v3.4.11a
Select File:	Choose File No file chosen

Figure 6: Manual Update Installation section

(Note that if you are using certain browsers (such as *Opera 7*) the *Browse* button is labeled *Choose*.)

Use the *Choose file* box to navigate to the relevant directory where the firmware version is saved.

5. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 105 seconds ...



Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 106 seconds ...

15 Backup/Restore Settings

This page allows you save current settings to a file or reload the settings from the file which was saved previously.

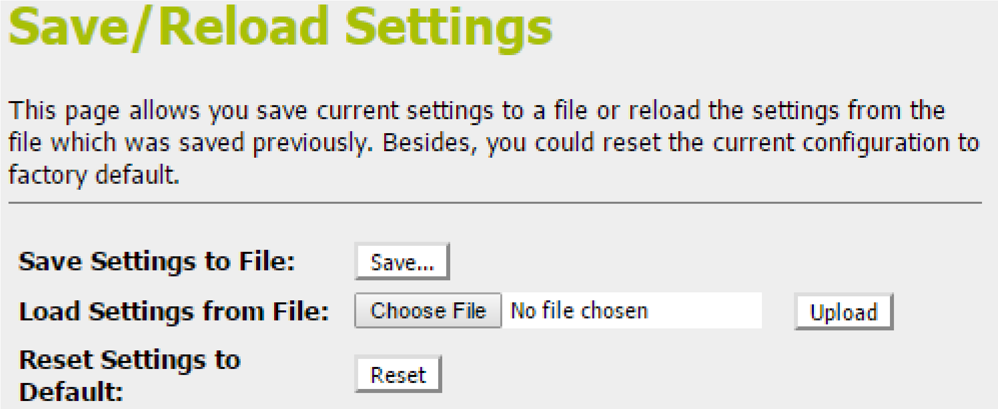
Besides, you could reset the current configuration to factory default.

If you do make changes to the default configuration but then wish to revert back to the original factory configuration, you can do so by resetting the device to factory defaults.

Save Settings to File

It allows you save current settings to a file.

1. From the *MANAGEMENT -> Save/Reload Settings* menu. The following page is displayed:



Save/Reload Settings

This page allows you save current settings to a file or reload the settings from the file which was saved previously. Besides, you could reset the current configuration to factory default.

Save Settings to File: Save...

Load Settings from File: Choose File No file chosen Upload

Reset Settings to Default: Reset

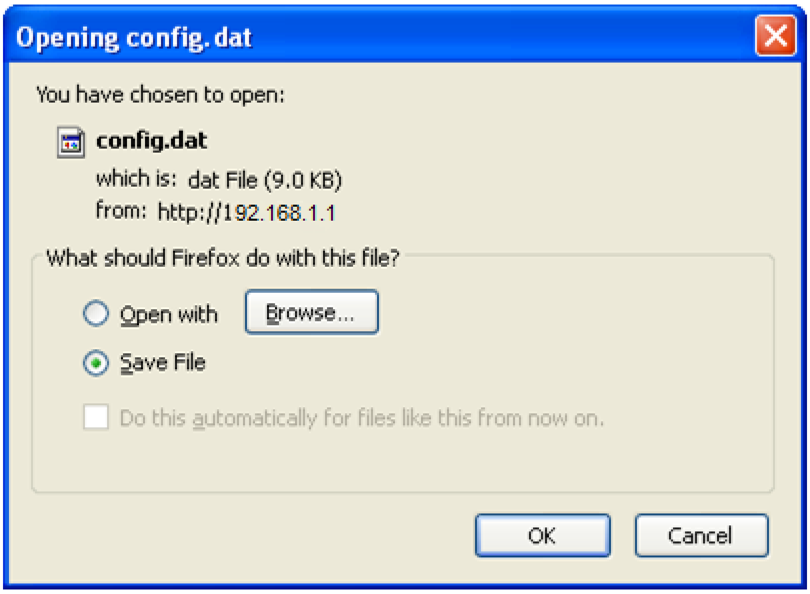
Figure 7: Reset to Defaults page

Option	Description
Save Settings to File	**Save the Settings to a File**
Load Settings from File	**Load Settings from a File**

2. Click on *Save…*.

Save Settings to File: Save...

3. If you are happy with this, click *Save* and then browse to where the file to be saved. Or click *Cancel* to cancel it.



Opening config.dat

You have chosen to open:

config.dat

which is: dat File (9.0 KB)

from: http://192.168.1.1

What should Firefox do with this file?

○ Open with

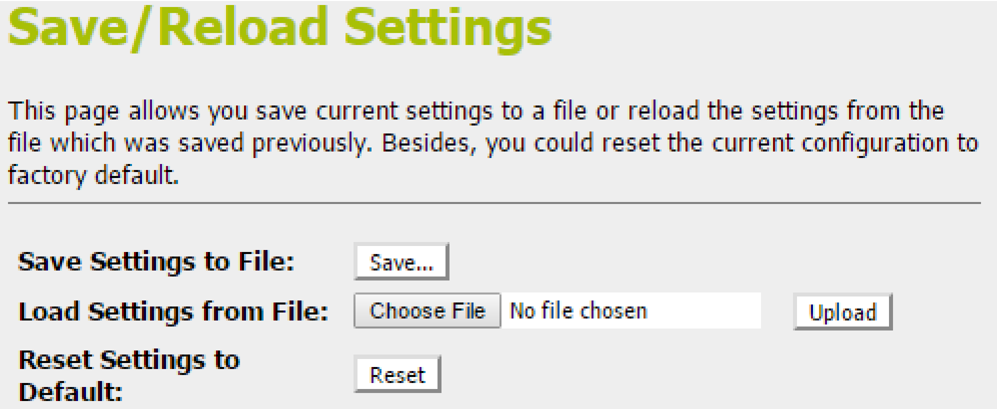
● Save File

□ Do this automatically for files like this from now on.

Load Settings from File

It allows you to reload the settings from the file which was saved previously.

4. From the *MANAGEMENT -> Backup/Restore* menu. The following page is displayed:



Save/Reload Settings

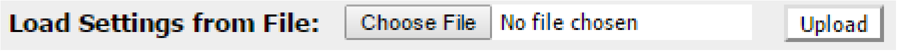
This page allows you save current settings to a file or reload the settings from the file which was saved previously. Besides, you could reset the current configuration to factory default.

Save Settings to File:

Load Settings from File: No file chosen

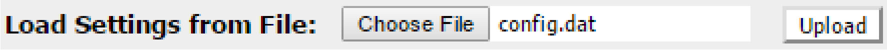
Reset Settings to Default:

5. Click on *Choose File* to browse to where the config.img is.



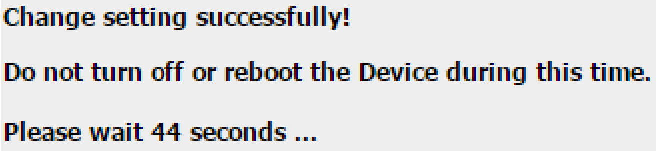
Load Settings from File: No file chosen

6. If you are happy with this, click *Upload* to start to load settings from file.



Load Settings from File: config.dat

7. Change setting successfully! Do not turn off or reboot the Device during this time. Please wait 45 seconds ...



Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 44 seconds ...

Resetting to Defaults

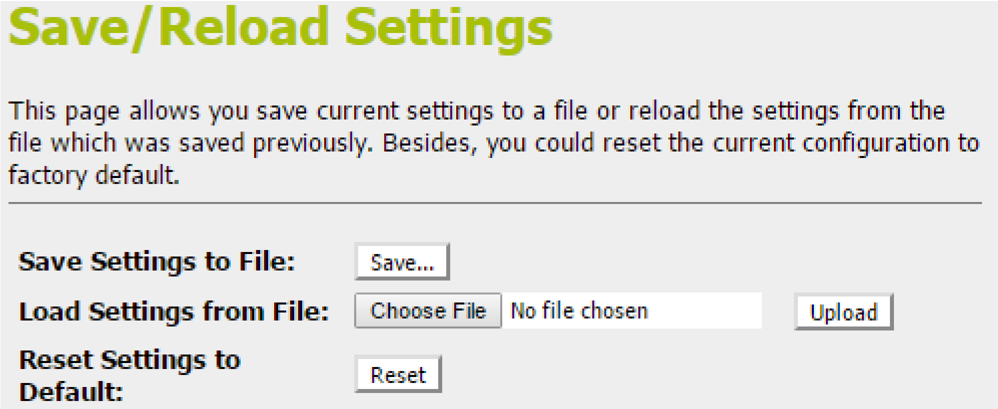
If you do make changes to the default configuration but then wish to revert back to the original factory configuration, you can do so by resetting the device to factory defaults.

Note

> *If you reset your device to factory defaults, all previous configuration changes that you have made are overwritten by the factory default configuration.*

Software Reset:

1. From the left-hand *Management* menu, click on *Reset factory default*. The following page is displayed:



Save/Reload Settings

This page allows you save current settings to a file or reload the settings from the file which was saved previously. Besides, you could reset the current configuration to factory default.

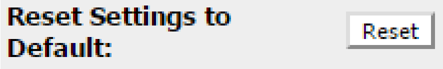
Save Settings to File:

Load Settings from File: No file chosen

Reset Settings to Default:

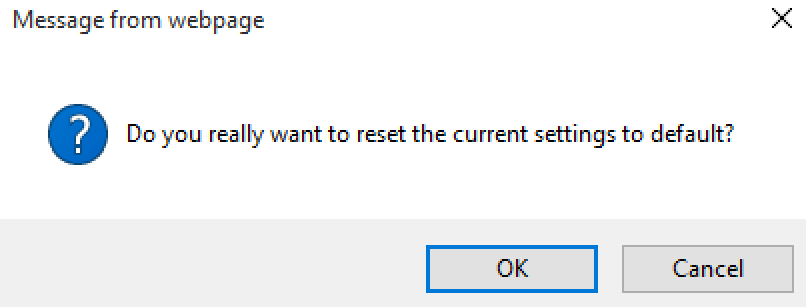
Figure 8: Reset to Defaults page

2. Click on *Reset*



Reset Settings to Default:

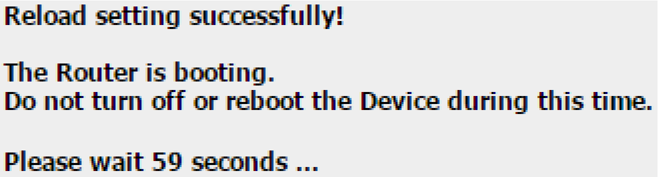
3. This page reminds you that resetting to factory defaults cannot be undone – any changes that you have made to the basic settings will be replaced. If you are happy with this, click *OK*. Or click *Cancel* to cancel it.



Message from webpage

Do you really want to reset the current settings to default?

4. Reload setting successfully! The Router is booting. Do not turn off or reboot the Device during this time. Please wait 60 seconds ...



Reload setting successfully!

The Router is booting.
Do not turn off or reboot the Device during this time.

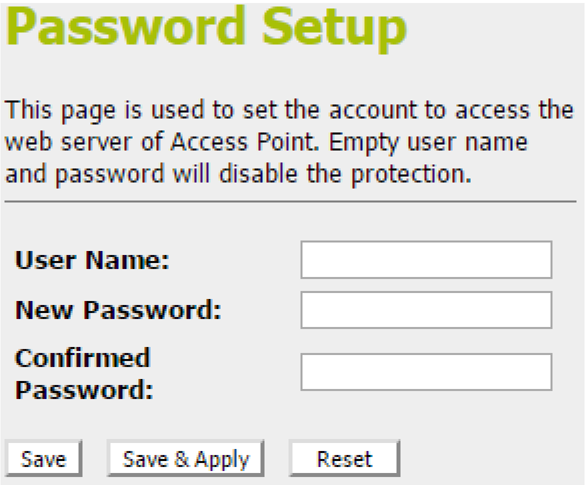
Please wait 59 seconds ...

16 Password

This page is used to set the account to access the web server of Access Point. Empty user name and password will disable the protection.

To change the default password:

1. From the left *Management* menu, click on *Password*. The following page is displayed:



Password Setup

This page is used to set the account to access the web server of Access Point. Empty user name and password will disable the protection.

User Name:	
New Password:	
Confirmed Password:	

Figure 9: Currently Defined Administration Password: Setup page

A Configuring your Computers

This appendix provides instructions for configuring the Internet settings on your computers to work with the Portable Repeater.

Configuring Ethernet PCs

Before you begin

By default, the Portable Repeater automatically assigns the required Internet settings to your PCs. You need to configure the PCs to accept this information when it is assigned.

Note

In some cases, you may want to assign Internet information manually to some or all of your computers rather than allow the Portable Repeater to do so. See *Assigning static Internet information to your PCs* for instructions.

- If you have connected your LAN PCs via Ethernet to the Portable Repeater, follow the instructions that correspond to the operating system installed on your PC:
  - Windows® XP PCs
  - Windows 2000 PCs
  - Windows Me PCs
  - Windows 95, 98 PCs
  - Windows NT 4.0 workstations

Windows® XP PCs

1. In the Windows task bar, click the *Start* button, and then click *Control Panel*.
2. Double-click the Network Connections icon.
3. In the *LAN or High-Speed Internet* window, right-click on the icon corresponding to your network interface card (NIC) and select *Properties*. (Often, this icon is labeled *Local Area Connection*).

   The *Local Area Connection* dialog box is displayed with a list of currently installed network items.
4. Ensure that the check box to the left of the item labeled *Internet Protocol TCP/IP* is checked and click *Properties*.
5. In the *Internet Protocol (TCP/IP) Properties* dialog box, click the radio button labeled *Obtain an IP address automatically*. Also click the radio button labeled *Obtain DNS server address automatically*.
6. Click *OK* twice to confirm your changes, and then close the Control Panel.

Windows 2000 PCs

First, check for the IP protocol and, if necessary, install it:

1. In the Windows task bar, click the *Start* button, point to *Settings*, and then click *Control Panel*.
2. Double-click the Network and Dial-up Connections icon.

3. In the *Network and Dial-up Connections* window, right-click the Local Area Connection icon, and then select *Properties*.

   The *Local Area Connection Properties* dialog box is displayed with a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled. Skip to step 10.

4. If Internet Protocol (TCP/IP) does not display as an installed component, click *Install…*
5. In the *Select Network Component* Type dialog box, select *Protocol*, and then click *Add…*
6. Select *Internet Protocol (TCP/IP)* in the Network Protocols list, and then click *OK*.

   You may be prompted to install files from your Windows 2000 installation CD or other media. Follow the instructions to install the files.

7. If prompted, click *OK* to restart your computer with the new settings.

Next, configure the PCs to accept IP information assigned by the Portable Repeater:

8. In the *Control Panel*, double-click the Network and Dial-up Connections icon.
9. In the *Network and Dial-up Connections* window, right-click the Local Area Connection icon, and then select *Properties*.
10. In the Local Area Connection Properties dialog box, select *Internet Protocol (TCP/IP),* and then click *Properties*.
11. In the *Internet Protocol (TCP/IP) Properties* dialog box, click the radio button labeled *Obtain an IP address automatically.* Also click the radio button labeled *Obtain DNS server address automatically*.
12. Click *OK* twice to confirm and save your changes, and then close the Control Panel.

Windows Me PCs

1. In the Windows task bar, click the *Start* button, point to *Settings*, and then click *Control Panel*.
2. Double-click the Network and Dial-up Connections icon.
3. In the *Network and Dial-up Connections* window, right-click the Network icon, and then select *Properties*.

   The *Network Properties* dialog box displays with a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled. Skip to step 11.
4. If Internet Protocol (TCP/IP) does not display as an installed component, click *Add…*
5. In the *Select Network Component Type* dialog box, select *Protocol*, and then click *Add…*
6. Select *Microsoft* in the Manufacturers box.
7. Select *Internet Protocol (TCP/IP)* in the Network Protocols list, and then click *OK*.

   You may be prompted to install files from your Windows Me installation CD or other media. Follow the instructions to install the files.
8. If prompted, click *OK* to restart your computer with the new settings.

Next, configure the PCs to accept IP information assigned by the Portable Repeater:

9. In the *Control Panel*, double-click the Network and Dial-up Connections icon.
10. In *Network and Dial-up Connections window*, right-click the Network icon, and then select *Properties*.
11. In the *Network Properties* dialog box, select *TCP/IP*, and then click *Properties*.
12. In the TCP/IP Settings dialog box, click the radio button labeled **Server** *assigned IP address*. Also click the radio button labeled *Server assigned name server address*.
13. Click *OK* twice to confirm and save your changes, and then close the *Control Panel*.

Windows 95, 98 PCs

First, check for the IP protocol and, if necessary, install it:

1. In the Windows task bar, click the *Start* button, point to *Settings*, and then click *Control Panel*.
2. Double-click the Network icon.

   The *Network* dialog box displays with a list of currently installed network components. If the list includes TCP/IP, and then the protocol has already been enabled. Skip to step 9.
3. If TCP/IP does not display as an installed component, click *Add…*

   The *Select Network Component Type* dialog box displays.
4. Select *Protocol*, and then click *Add…*

   The Select Network Protocol dialog box displays.

5. Click on *Microsoft* in the Manufacturers list box, and then click *TCP/IP* in the Network Protocols list box.
6. Click *OK* to return to the Network dialog box, and then click *OK* again.

   You may be prompted to install files from your Windows 95/98 installation CD. Follow the instructions to install the files.

7. Click *OK* to restart the PC and complete the TCP/IP installation.

Next, configure the PCs to accept IP information assigned by the Portable Repeater:

8. Open the Control Panel window, and then click the Network icon.
9. Select the network component labeled TCP/IP, and then click *Properties*.

   If you have multiple TCP/IP listings, select the listing associated with your network card or adapter.

10. In the TCP/IP Properties dialog box, click the IP Address tab.
11. Click the radio button labeled *Obtain an IP address automatically*.
12. Click the DNS Configuration tab, and then click the radio button labeled *Obtain an IP address automatically*.
13. Click *OK* twice to confirm and save your changes.

    You will be prompted to restart Windows.

14. Click *Yes*.

Windows NT 4.0 workstations

First, check for the IP protocol and, if necessary, install it:

1. In the Windows NT task bar, click the *Start* button, point to *Settings*, and then click *Control Panel*.
2. In the Control Panel window, double click the Network icon.
3. In the *Network dialog* box, click the *Protocols* tab.

   The *Protocols* tab displays a list of currently installed network protocols. If the list includes TCP/IP, then the protocol has already been enabled. Skip to step 9.

4. If TCP/IP does not display as an installed component, click *Add…*
5. In the *Select Network Protocol* dialog box, select *TCP/IP*, and then click *OK*.

   You may be prompted to install files from your Windows NT installation CD or other media. Follow the instructions to install the files.

   After all files are installed, a window displays to inform you that a TCP/IP service called DHCP can be set up to dynamically assign IP information.

6. Click *Yes* to continue, and then click *OK* if prompted to restart your computer.

Next, configure the PCs to accept IP information assigned by the Portable Repeater:

7. Open the Control Panel window, and then double-click the Network icon.
8. In the *Network* dialog box, click the *Protocols* tab.
9. In the *Protocols* tab, select *TCP/IP*, and then click *Properties*.
10. In the *Microsoft TCP/IP Properties* dialog box, click the radio button labeled *Obtain an IP address from a DHCP server.*
11. Click *OK* twice to confirm and save your changes, and then close the Control Panel.

Assigning static Internet information to your PCs

If you are a typical user, you will not need to assign static Internet information to your LAN PCs because your ISP automatically assigns this information for you.

In some cases however, you may want to assign Internet information to some or all of your PCs directly (often called “statically”), rather than allowing the Portable Repeater to assign it. This option may be desirable (but not required) if:

- You have obtained one or more public IP addresses that you want to always associate with specific computers (for example, if you are using a computer as a public web server).
- You maintain different subnets on your LAN (subnets are described in Appendix B).

Before you begin, you must have the following information available:

- The IP address and subnet mask of each PC
- The IP address of the default gateway for your LAN. In most cases, this is the address assigned to the LAN port on the Portable Repeater. By default, the LAN port is assigned the IP address *192.168.1.1*. (You can change this number or another number can be assigned by your ISP. See *Addressing* for more information.)
- The IP address of your ISP’s Domain Name System (DNS) server.

On each PC to which you want to assign static information, follow the instructions relating only to checking for and/or installing the IP protocol. Once it is installed, continue to follow the instructions for displaying each of the Internet Protocol (TCP/IP) properties. Instead of enabling dynamic assignment of the IP addresses for the computer, DNS server and default gateway, click the radio buttons that enable you to enter the information manually.

Note

Your PCs must have IP addresses that place them in the same subnet as the Portable Repeater’s LAN port. If you manually assign IP information to all your LAN PCs, you can follow the instructions in Addressing to change the LAN port IP address accordingly.

B IP Addresses, Network Masks, and Subnets

IP Addresses

Note

This section refers only to IP addresses for IPv4 (version 4 of the Internet Protocol). IPv6 addresses are not covered.

This section assumes basic knowledge of binary numbers, bits, and bytes.

IP addresses, the Internet's version of telephone numbers, are used to identify individual nodes (computers or devices) on the Internet. Every IP address contains four numbers, each from 0 to 255 and separated by dots (periods), e.g. 20.56.0.211. These numbers are called, from left to right, field1, field2, field3, and field4.

This style of writing IP addresses as decimal numbers separated by dots is called *dotted decimal notation*. The IP address 20.56.0.211 is read "twenty dot fifty-six dot zero dot two-eleven."

Structure of an IP address

IP addresses have a hierarchical design similar to that of telephone numbers. For example, a 7-digit telephone number starts with a 3-digit prefix that identifies a group of thousands of telephone lines, and ends with four digits that identify one specific line in that group.

Similarly, IP addresses contain two kinds of information:

- *Network ID*
  Identifies a particular network within the Internet or intranet
- *Host ID*
  Identifies a particular computer or device on the network

The first part of every IP address contains the network ID, and the rest of the address contains the host ID. The length of the network ID depends on the network's *class* (see following section). The table below shows the structure of an IP address.

	Field1	**Field2**	**Field3**	**Field4**
Class A	Network ID	Host ID		
Class B	Network ID		Host ID	
Class C	Network ID			Host ID

Here are some examples of valid IP addresses:

Class A: 10.30.6.125 (network = 10, host = 30.6.125)
Class B: 129.88.16.49 (network = 129.88, host = 16.49)
Class C: 192.60.201.11 (network = 192.60.201, host = 11)

Network classes

The three commonly used network classes are A, B, and C. (There is also a class D but it has a special use beyond the scope of this discussion.) These classes have different uses and characteristics.

Class A networks are the Internet's largest networks, each with room for over 16 million hosts. Up to 126 of these huge networks can exist, for a total of over 2 billion hosts. Because of their huge size, these networks are used for WANs and by organizations at the infrastructure level of the Internet, such as your ISP.

Class B networks are smaller but still quite large, each able to hold over 65,000 hosts. There can be up to 16,384 class B networks in existence. A class B network might be appropriate for a large organization such as a business or government agency.

Class C networks are the smallest, only able to hold 254 hosts at most, but the total possible number of class C networks exceeds 2 million (2,097,152 to be exact). LANs connected to the Internet are usually class C networks.

Some important notes regarding IP addresses:

- The class can be determined easily from field1:

field1 = 1-126:	Class A
field1 = 128-191:	Class B
field1 = 192-223:	Class C

  (field1 values not shown are reserved for special uses)
- A host ID can have any value except all fields set to 0 or all fields set to 255, as those values are reserved for special uses.

Subnet masks

Definition
mask

A mask *looks like a regular IP address, but contains a pattern of bits that tells what parts of an IP address are the network ID and what parts are the host ID: bits set to 1 mean "this bit is part of the network ID" and bits set to 0 mean "this bit is part of the host ID."*

Subnet masks are used to define *subnets* (what you get after dividing a network into smaller pieces). A subnet's network ID is created by "borrowing" one or more bits from the host ID portion of the address. The subnet mask identifies these host ID bits.

For example, consider a class C network 192.168.1. To split this into two subnets, you would use the subnet mask:

255.255.255.128

It's easier to see what's happening if we write this in binary:

11111111. 11111111. 11111111.10000000

As with any class C address, all of the bits in field1 through field3 are part of the network ID, but note how the mask specifies that the first bit in field4 is also included. Since this extra bit has only two values (0 and 1), this means there are two subnets. Each subnet uses the remaining 7 bits in field4 for its host IDs, which range from 1 to 126 hosts (instead of the usual 0 to 255 for a class C address).

Similarly, to split a class C network into four subnets, the mask is:

255.255.255.192 or 11111111. 11111111. 11111111.11000000

The two extra bits in field4 can have four values (00, 01, 10, 11), so there are four subnets. Each subnet uses the remaining six bits in field4 for its host IDs, ranging from 1 to 62.

Note

Sometimes a subnet mask does not specify any additional network ID bits, and thus no subnets. Such a mask is called a default subnet mask*. These masks are:*

Class A:	*255.0.0.0*
Class B:	*255.255.0.0*
Class C:	*255.255.255.0*

These are called default *because they are used when a network is initially configured, at which time it has no subnets.*

C UPnP Control Point Software on Windows ME/XP

This appendix provides instructions for configuring the UPnP on your computers to work with the Portable Repeater.

UPnP is an architecture for pervasive peer-to-peer network connectivity of intelligent appliances, Wireless devices, and PCs of all form factors. It is designed to bring easy-to-use, flexible, standards-based connectivity to ad-hoc or unmanaged networks whether in the home, in a small business, public spaces, or attached to the Internet. UPnP is a distributed, open networking architecture that leverages TCP/IP and the Web technologies to enable seamless proximity networking in addition to control and data transfer among networked devices in the home, office, and public spaces.

UPnP is more than just a simple extension of the plug and play peripheral model. It is designed to support zero-configuration, "invisible" networking, and automatic discovery for a breadth of device categories from a wide range of vendors. This means a device can dynamically join a network, obtain an IP address, convey its capabilities, and learn about the presence and capabilities of other devices. DHCP and DNS servers are optional and are used only if available on the network. Finally, a device can leave a network smoothly and automatically without leaving any unwanted state behind.

UPnP Control Point Software on Windows ME

To install the control point software on Windows ME:

1. In the Control Panel, select "Add/Remove Programs".

2. In the "Add/Remove Programs Properties" dialog box, select the "Windows Setup" tab. In the "Components" list, double click on the "Communications" entry.

3. In the "Communications" dialog box, scroll down the "Components" list to display the UPnP entry. Select the entry, click "OK".

4. Click "OK" to finish the "Add/Remove Programs" dialog.

5. Reboot your system.

Once you have installed the UPnP software and you have rebooted (and your network includes the IGD system), you should be able to see the IGD controlled device on your network.

UPnP Control Point Software on Windows XP with Firewall

On Windows XP versions earlier than SP2, Firewall support is provided by the Windows XP Internet Connection Firewall. You cannot use the Windows XP Internet Connection Firewall support on a system that you intend to use as a UPnP control point. If this feature is enabled, although the control point system may display controlled devices in the list of network devices, the control point system cannot participate in UPnP communication. (This restriction also applies to controlled devices running on Windows XP systems earlier than SP2.)

On Windows XP SP2 and later, Firewall support is provided by Windows Firewall. Unlike earlier versions, Windows XP SP2 can be used on a system that you intend to use as a UPnP control point.

To turn off the Firewall capability on any version of Windows XP, follow the steps below:

1. In the Control Panel, select "Network and Internet Connections".

2. In the "Network and Internet Connections" dialog box, select "Network Connections".

3. In the "Network Connections" dialog box, right-click on the local area connection entry for your network; this will display a menu. Select the "Properties" menu entry.

4. In the "Local Area Connection Properties" dialog box, select the "Advanced" tab. Disable the Internet Connection Firewall by de-selecting the entry with the following label:

"Protect my computer and network by limiting or preventing access to the computer from the Internet".

5. Click "OK".

SSDP requirements

You must have SSDP Discovery Service enabled on your Windows XP system to use the UPnP Control point software.

SSDP Discovery Service is enabled on a default installation of Windows XP. To check if it is enabled on your system, look in Control Panel > Administrative Tools > Services).

Installation procedure

To install the Control point software on Windows XP, follow the steps below:

1. In the Control Panel, select "Add/Remove Programs".

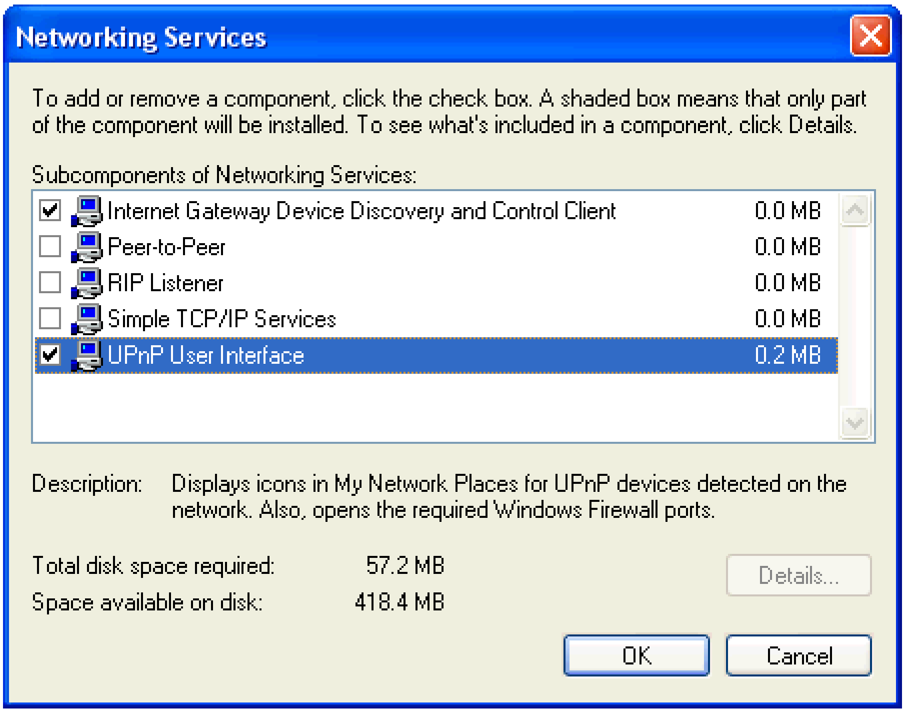
2. In the "Add or Remove Programs" dialog box, click the "Add / Remove Windows Components" button.

3. In the "Windows Component Wizard" dialog box, scroll down the list to display the "Networking Services" entry. Highlight (select) the entry, and click on the "Details" button.

4. The “Networking Services” window is displayed.

The subcomponents shown in the Networking Services window will be different depending on if you are using Windows XP, Windows XP (SP1), or Windows XP (SP2).

If you are using Windows XP SP2, the Networking Services window will display the following list of sub-components:



Networking Services

To add or remove a component, click the check box. A shaded box means that only part of the component will be installed. To see what's included in a component, click Details.

Subcomponents of Networking Services:

☑	Internet Gateway Device Discovery and Control Client	0.0 MB
□	Peer-to-Peer	0.0 MB
□	RIP Listener	0.0 MB
□	Simple TCP/IP Services	0.0 MB
☑	UPnP User Interface	0.2 MB

Description: Displays icons in My Network Places for UPnP devices detected on the network. Also, opens the required Windows Firewall ports.

Total disk space required: 57.2 MB

Space available on disk: 418.4 MB

5. Select the following entries from the “Networking Services” window and then click "OK":

If you are using **Windows XP**, select:

- "Universal Plug and Play".

If you are using **Windows XP SP1**, select:

- "Internet Gateway Device discovery and Control Client".
- "Universal Plug and Play".

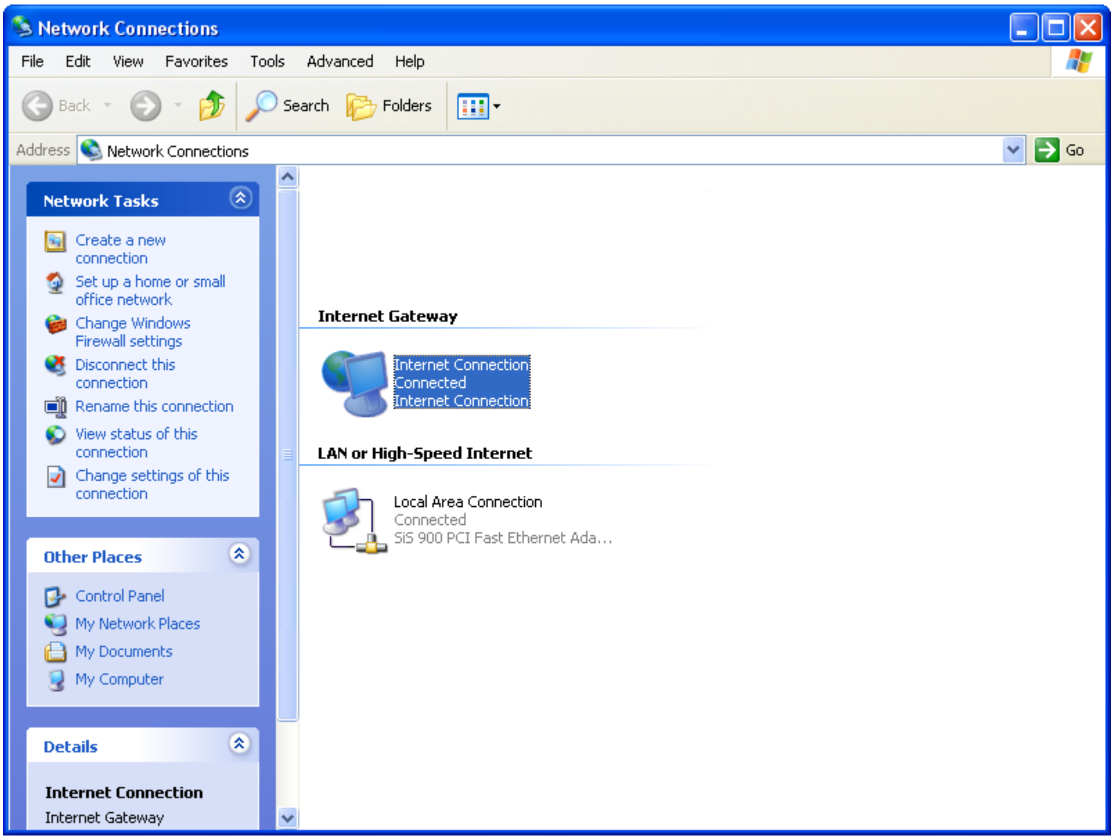
If you are using **Windows XP SP2**, select:

- "Internet Gateway Device discovery and Control Client".
- "UPnP User Interface".

6. Reboot your system.

Once you have installed the UPnP software and you have rebooted (and your network includes the IGD system), you should be able to see the IGD controlled device on your network.

For example, from the Network Connections window you should see the Internet Gateway Device:


Network Connections
File Edit View Favorites Tools Advanced Help
Back
Search
Folders
Address
Network Connections
Go
Network Tasks
Create a new connection
Set up a home or small office network
Change Windows Firewall settings
Disconnect this connection
Rename this connection
View status of this connection
Change settings of this connection
Other Places
Control Panel
My Network Places
My Documents
My Computer
Details

Internet Connection
Internet Gateway

Internet Gateway

Internet Connection
Connected
Internet Connection

LAN or High-Speed Internet

Local Area Connection
Connected
SiS 900 PCI Fast Ethernet Ada...

D Troubleshooting

This appendix suggests solutions for problems you may encounter in installing or using the Portable Repeater, and provides instructions for using several IP utilities to diagnose problems.

Contact Customer Support if these suggestions do not resolve the problem.

Troubleshooting Suggestions

Problem	Troubleshooting Suggestion
LEDs	
Power LED does not illuminate after product is turned on.	Verify that you are using the power cable provided with the device and that it is securely connected to the Portable Repeater and a wall socket/power strip.
LINK LAN LED does not illuminate after Ethernet cable is attached.	Verify that the Ethernet cable is securely connected to your LAN hub or PC and to the Portable Repeater. Make sure the PC and/or hub is turned on. Verify that your cable is sufficient for your network requirements. A 100 Mbit/sec network (10BaseTx) should use cables labeled CAT 5. A 10Mbit/sec network may tolerate lower quality cables.
Internet Access	
My PC cannot access the Internet	Use the ping utility (discussed in the following section) to check whether your PC can communicate with the device's LAN IP address (by default 192.168.1.1). If it cannot, check the Ethernet cabling. If you statically assigned a private IP address to the computer, (not a registered public address), verify the following: • Check that the gateway IP address on the computer is your public IP address (see Current Status for instructions on viewing the IP information.) If it is not, correct the address or configure the PC to receive IP information automatically. • Verify with your ISP that the DNS server specified for the PC is valid. Correct the address or configure the PC to receive this information automatically.
My LAN PCs cannot display web pages on the Internet.	Verify that the DNS server IP address specified on the PCs is correct for your ISP, as discussed in the item above. If you specified that the DNS server be assigned dynamically from a server, then verify with your ISP that the address configured on the Portable Repeater is correct, then You can use the ping utility, to test connectivity with your ISP's DNS server.
Web pages	

Problem	Troubleshooting Suggestion
I forgot/lost my user ID or password.	If you have not changed the password from the default, try using “admin” the user ID and “admin “ as password. Otherwise, you can reset the device to the default configuration by pressing the Reset Default button on the Rare panel of the device (see *Rare Panel*). Then, type the default User ID and password shown above. **WARNING:** Resetting the device removes any custom settings and returns all settings to their default values.
I cannot access the web pages from my browser.	Use the ping utility, discussed in the following section, to check whether your PC can communicate with the device’s LAN IP address (by default 192.168.1.1). If it cannot, check the Ethernet cabling. Verify that you are using Internet Explorer or Netscape Navigator v4.0 or later. Verify that the PC’s IP address is defined as being on the same subnet as the IP address assigned to the LAN port on the Portable Repeater.
My changes to the web pages are not being retained.	Be sure to use the *Confirm Changes/Apply* function after any changes.

Diagnosing Problem using IP Utilities

ping

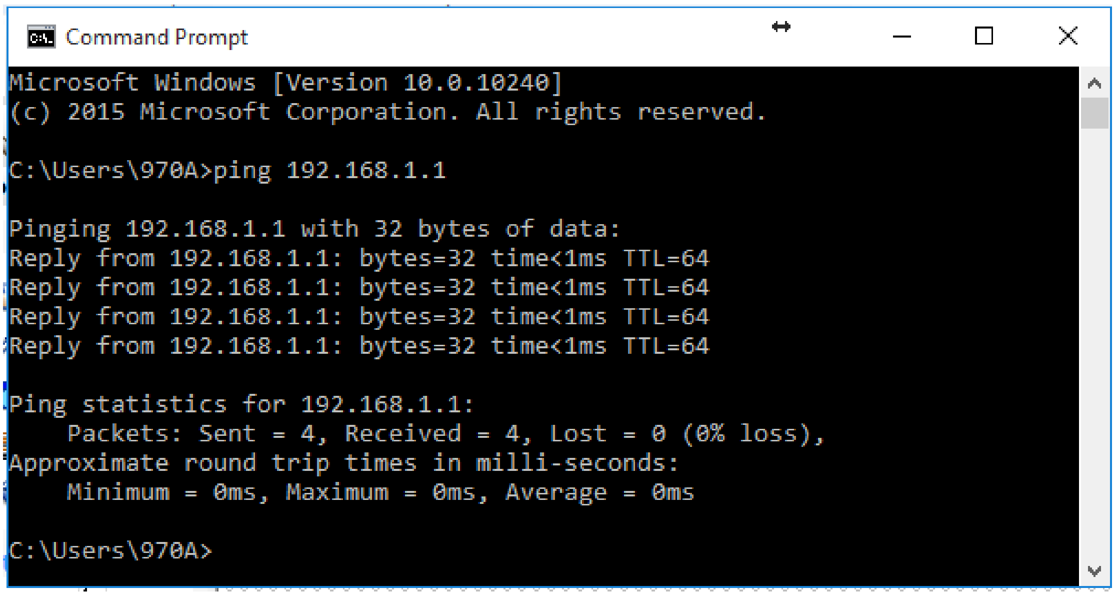
Ping is a command you can use to check whether your PC can recognize other computers on your network and the Internet. A ping command sends a message to the computer you specify. If the computer receives the message, it sends messages in reply. To use it, you must know the IP address of the computer with which you are trying to communicate.

On Windows-based computers, you can execute a ping command from the Start menu. Click the *Start* button, and then click *Run*. In the *Open* text box, type a statement such as the following:

ping 192.168.1.1

Click *OK*. You can substitute any private IP address on your LAN or a public IP address for an Internet site, if known.

If the target computer receives the message, a *Command Prompt* window is displayed:



```
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\970A>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\970A>
```

Figure 10: Using the ping Utility

If the target computer cannot be located, you will receive the message *Request timed out*.

Using the ping command, you can test whether the path to the Portable Repeater is working (using the preconfigured default LAN IP address 192.168.1.1) or another address you assigned.

You can also test whether access to the Internet is working by typing an external address, such as that for *www.yahoo.com* (216.115.108.243). If you do not know the IP address of a particular Internet location, you can use the *nslookup* command, as explained in the following section.

From most other IP-enabled operating systems, you can execute the same command at a command prompt or through a system administration utility.

nslookup

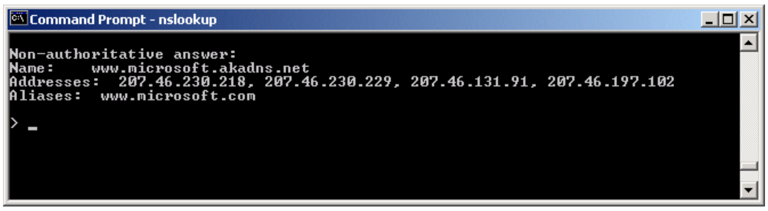
You can use the nslookup command to determine the IP address associated with an Internet site name. You specify the common name, and the nslookup command looks up the name in on your DNS server (usually located with your ISP). If that name is not an entry in your ISP's DNS table, the request is then referred to another higher-level server, and so on, until the entry is found. The server then returns the associated IP address.

On Windows-based computers, you can execute the nslookup command from the *Start* menu. Click the *Start* button, and then click *Run*. In the *Open* text box, type the following:

Nslookup

Click *OK*. A Command Prompt window displays with a bracket prompt (>). At the prompt, type the name of the Internet address that you are interested in, such as *www.microsoft.com*.

The window will display the associate IP address, if known, as shown below:



```
Non-authoritative answer:
Name:    www.microsoft.akadns.net
Addresses:  207.46.230.218, 207.46.230.229, 207.46.131.91, 207.46.197.102
Aliases:  www.microsoft.com

> _
```

Figure 11: Using the nslookup Utility

There may be several addresses associated with an Internet name. This is common for web sites that receive heavy traffic; they use multiple, redundant servers to carry the same information.

To exit from the nslookup utility, type **exit** and press **[Enter]** at the command prompt.

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Digital Data Communications GmbH

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