TP-LINK®

User Guide

TL-WA601G

108M Wireless Access Point

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FCC STATEMENT

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

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/ TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1) This device may not cause harmful interference.

2) This device must accept any interference received, including interference that may cause undesired operation.

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

FCC RF Radiation Exposure Statement

To comply with FCC RF exposure compliance requirements, this grant is applicable to only Mobile Configurations. The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

CE Mark Warning

This is a class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

National Restrictions

2400.0-2483.5 MHz

Country	Restriction	Reason/remark
Bulgaria		General authorization required for outdoor use and public service
France	Outdoor use limited to 10 mW e.i.r.p. within the band 2454-2483.5 MHz	Military Radiolocation use. Refarming of the 2.4 GHz band has been ongoing in recent years to allow current relaxed regulation. Full implementation planned 2012
Italy		If used outside of own premises, general authorization is required
Luxembourg	None	General authorization required for network and service supply(not for spectrum)
Norway	Implemented	This subsection does not apply for the geographical area within a radius of 20 km from the centre of Ny-Ålesund
Russian Federation		Only for indoor applications

Note: Please don't use the product outdoors in France.

CONTENTS

Package Contents

The following items should be found in your package:

➢ One TL-WA601G 108Mbps Wireless Access Point

➢ One AC power Adapter for TL-WA601G 108Mbps Wireless Access Point

➢ One Resource CD , including:

  ● This User Guide

  ● Other Helpful Information

☞ **Note:**

Make sure that the package contains the above items. If any of the listed items are damaged or missing, please contact with your distributor.

Chapter 1 Introduction

Thank you for choosing the TL-WA601G 108Mbps Wireless Access Point.

1.1 Product Overview

This AP provides smooth connectivity between Ethernet wired networks and radio-equipped wireless devices.

It adopts **108M Super G**™ **WLAN Transmission Technology**, which offers the highest throughput performance available on the market today, and data rates of up to 108Mbps. In dynamic 108M mode, the AP can attach IEEE 802.11b, 802.11g and 108Mbps Super G™ devices at the same time in an integrated environment.

It adopts **2x to 3x eXtended Range**™ **WLAN transmission technology** so that transmission distance is 2-3 times of traditional IEEE 802.11g and IEEE 802.11b solutions, up to 855.36m tested in China. The transmission range is extended to 4-9 times.

It is an easy, web-based setup for installation and management. Even though you may not be familiar with the AP, this guide will make configuring the AP easy. Before installing the AP, please look through this guide to get to know all the AP's functions.

1.2 Main Features

➢ Complies with IEEE802.11g, IEEE802.11b, IEEE802.3, IEEE802.3u standards

➢ Adopts 2x to 3x eXtended Range™ and 108M Super G™ wireless LAN transmission technology.

➢ Supports 108/54/48/36/24/18/12/9/6Mbps or 11/5.5/3/2/1Mbps wireless LAN data transfer rates

➢ Provides 64/128/152-bit WEP encryption security

➢ Provides WPA/WPA2 and WPA-PSK/WPA2-PSK authentication and TKIP/AES encryption security

➢ Built-in DHCP server supporting dynamic IP address distributing

➢ Supports MAC address filtering

➢ Supports multiple operating modes (Access Point, Client, Repeater, Point to Point, Point to Multi-point)

➢ Supports TCP/IP, DHCP

➢ Supports Traffic statistics

➢ Supports firmware upgrade

➢ Supports Remote and Web management

1.3 Conventions

The AP or TL-WA601G, or device mentioned in this User guide stands for TL-WA601G 108M Wireless Access Point without any explanations.

Parameters provided in the pictures are just references for setting up the product, which may differ from the actual situation.

You can set the parameters according to your demand.

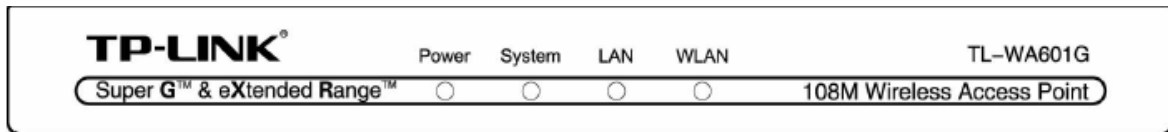# Chapter 2 Hardware Installation

2.1 The Front Panel

Figure 2-1

The LED indicators displayed on the front panel, the status of these LED indicators represent the device's working circs. For details, please refer to 2.1.1 LED Explanation

2.1.1 LED Explanation

| Name	Status	Description
Power	Off	No Power
	On	Power on
System	Off	The AP has a hardware error
	On	The AP is initialising
	Flashing	The AP is working properly
LAN	Off	There is no device linked to the corresponding port
	On	There is a device linked to the corresponding port but no activity
	Flashing	There is an active device linked to the corresponding port
WLAN	Off	The Wireless Radio function is disabled
	Flashing	The Wireless Radio function is enabled

2.2 The Back Panel
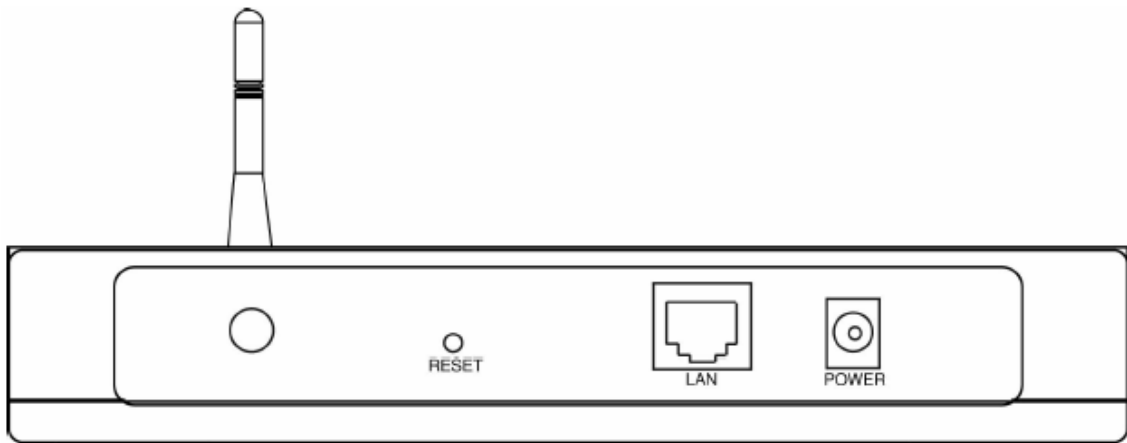
Figure 2-2

➢ Wireless antenna

➢ Factory Default Reset button

➢ There are three ways to reset the AP's factory defaults:

- Use the **Factory Defaults** function on **System Tools** -> **Factory Defaults** page in the AP's Web-based Utility.

- Use the Factory Default Reset button: Press and hold the default Reset button for 5 seconds, and then the AP reboot after the System led flash 5 times.

- Use the Factory Default Reset button: First, turn off the AP's power. Second, press and hold the default Reset button then turn on the AP's power, until the system LED lights up (about 3 seconds). Last, release the reset button and wait for the AP to reboot.

☞ **Note:**

Ensure the AP is powered on before it restarts completely.

➢ One LAN 10/100Mbps RJ45 port for connecting the AP to hub or switch

➢ AC power socket: Only use the power adapter provided with the TL-WA601G 108Mbps Wireless Access Point; Usage of a different adapter may result in product damage.

2.3 System Requirements

➢ Broadband Internet Access Service (DSL/Cable/Ethernet)

➢ One DSL/Cable Modem that has an RJ45 connector

➢ A Ethernet broadband router

➢ TCP/IP protocol must be installed on each PC

➢ Web browser, such as Microsoft Internet Explorer 5.0 or later, Netscape Navigator 6.0 or later

➢ 802.11g or 802.11b-compliant devices, such as the TL-WN510G Wireless Adapter

2.4 Installation Environment Requirements

➢ Not in direct sunlight or near a heater or heating vent

➢ Not cluttered or crowded. There should be at least 2 inches (5 cm) of clear space on all sides of the AP

➢ Well ventilated (especially if it is in a closet)

➢ Operating temperature: 0℃~40℃ (32℉~104℉)

➢ Operating Humidity: 10%~90%RH, Non-condensing

2.5 Connecting the Device

Figure 2-3 is an example of an infrastructure network incorporating the TL-WA601G. An Infrastructure network contains an access point or a wireless router. For a typical connection of the AP, please do the following:

1. You will need broadband Internet access (a Cable or DSL-subscriber line into your home or office). Consult with your Cable or DSL provider for proper installation of the modem.

2. Connect the Cable or DSL modem to a Router. Quickly install the router.

3. Locate an optimum location for the AP. The best place is usually near the center of the area in which your PC(s) will wirelessly connect. The place must accord with the Installation Environment Requirements.

4. Adjust the direction of the antenna. Normally, upright is a good direction.

5. Connect the Ethernet Broadband Router to the TL-WA601G AP. Power on the AP.

6. If you are connecting a desktop PC or laptop to your network, install the TP-LINK Wireless Adapter on the PC.
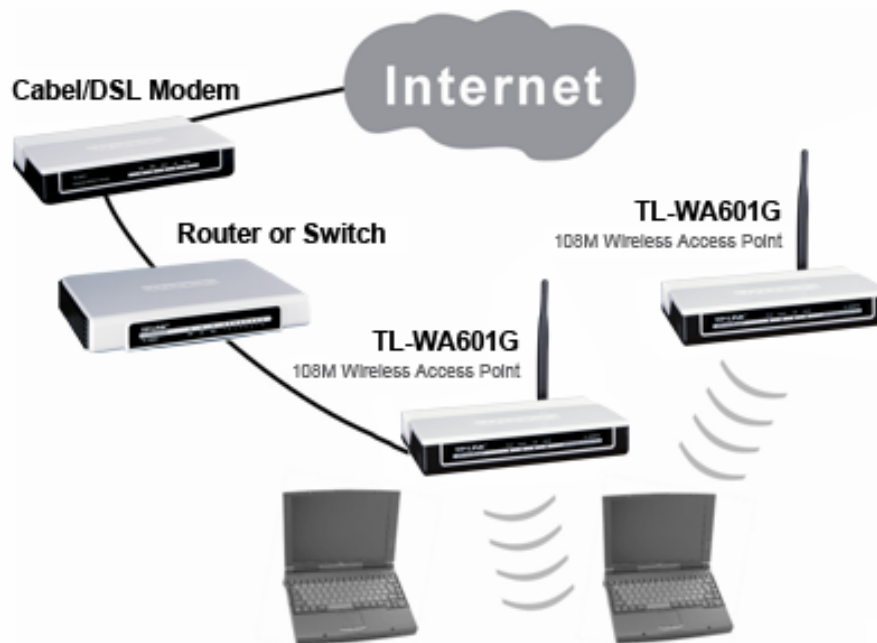

Figure 2-3 The Example of Infrastructure Network Incorporating the TL-WA601G

2.6 Configure PC

After connecting the TL-WA601G AP into your network, you should configure it. The default IP address of the TL-WA601G 108Mbps Wireless Access Point is 192.168.1.1, and the default

Subnet Mask is 255.255.255.0. These values can be seen from the LAN. They can be changed as you desire, as an example we use the default values for description in this guide.

Connect the local PCs to the LAN ports on the AP and configure the IP address manually for your PCs.

1. From the **Start** menu on your desktop, go to **Settings**, and then click on Network Connections.
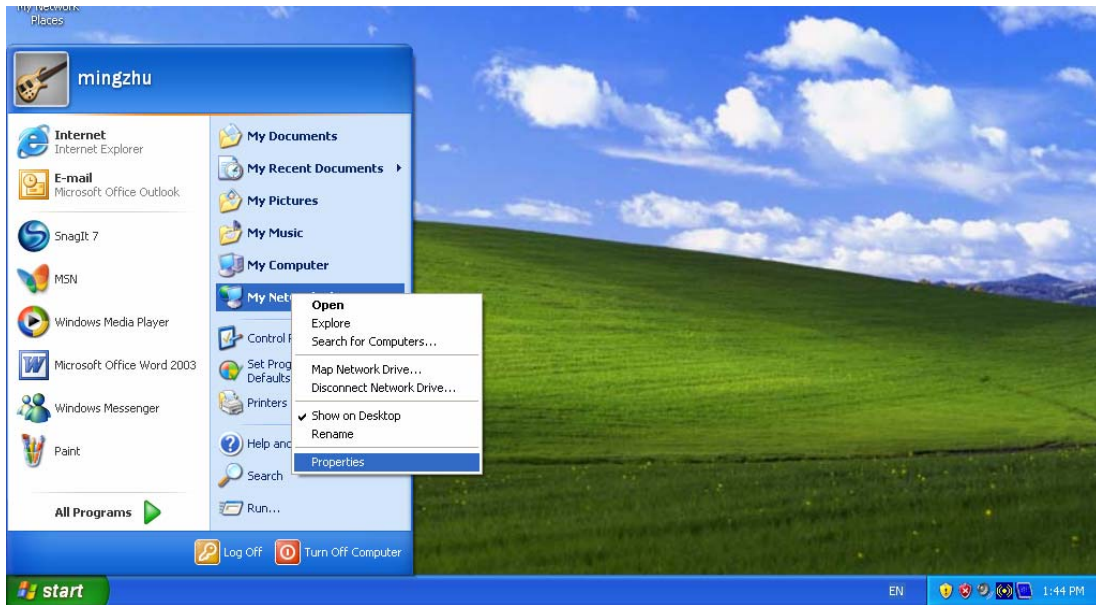

Figure 2-4

2. In the **Network Connections** window, right-click on LAN (Local Area Connection), then click Properties.
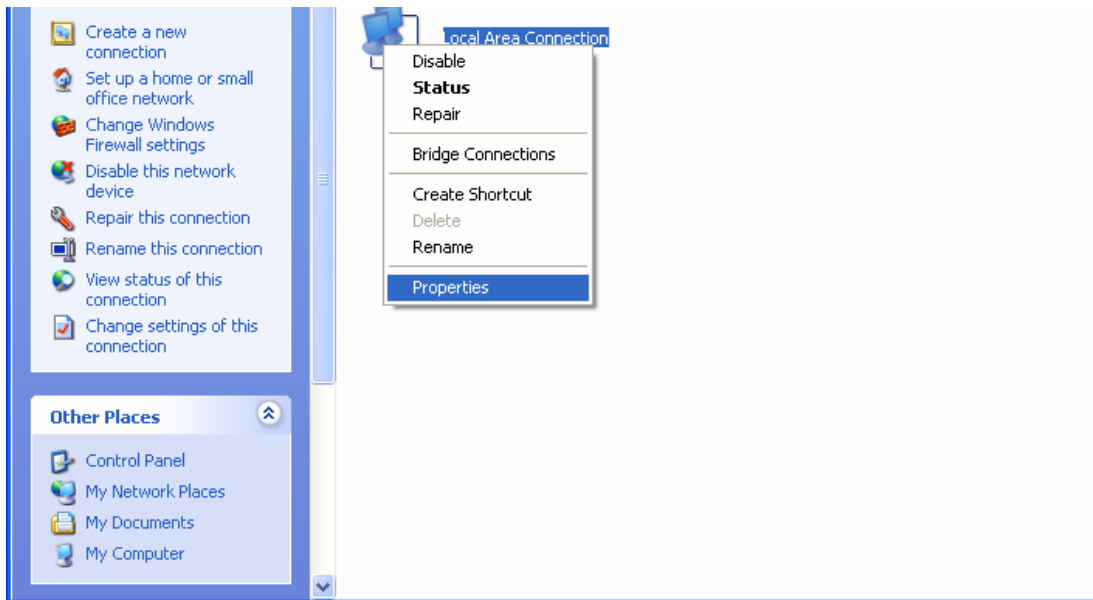

Figure 2-5

3. In the **General** tab of **Internet Protocol (TCP/IP) Properties** menu, highlight Internet Protocol (TCP/IP) under "This connection uses the following items:" by clicking on it once. Click on the Properties button.
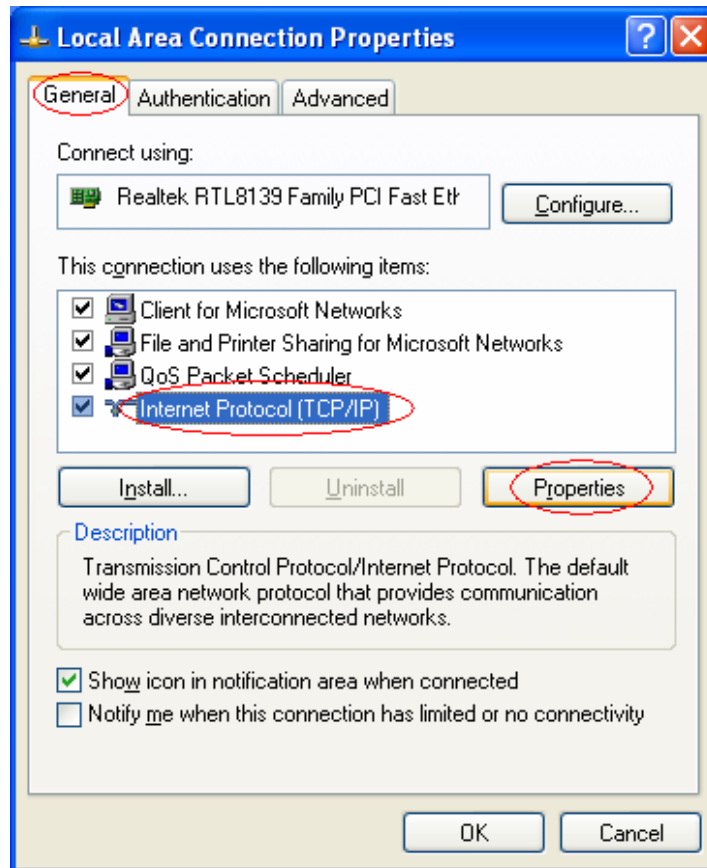
Figure 2-6
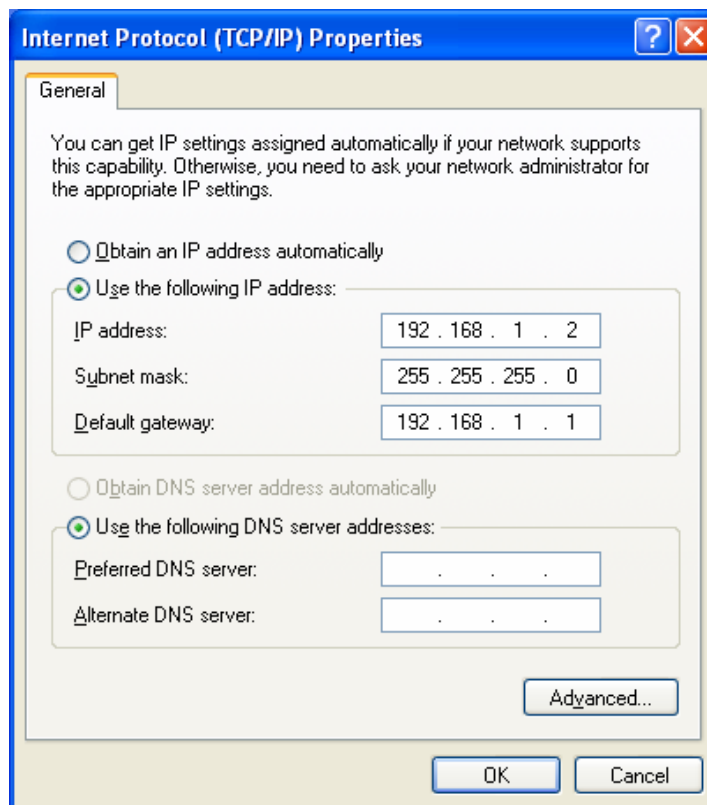
4. Configure the IP address manually. Click OK.

Figure 2-7

1)   Open TCP/IP Properties of the LAN card in your PC, enter the IP address as 192.168.1.*
(* is any value between 2 to 254, Subnet mask is 255.255.255.0, Gateway is 192.168.1.1,
DNS address is the value provided by ISP).

2)   Now, you can run the Ping command in the command prompt to verify the network
connection between your PC and the AP. The following example is in Windows XP
Operating System.

3)   Open a command prompt, From the Start menu on your desktop, select run tab, type
cmd in the field, and type *ping 192.168.1.1* on the screen that appears, and then press
Enter.

If the result displayed is similar to that shown in Figure below, the connection between your PC
and the AP has been established.

```
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
```

Figure 2-8

If the result displayed is similar to that shown in Figure below, it means that your PC has not
connected to the AP.

```
Pinging 192.168.1.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Figure 2-9

Please check it following these steps:

☞ **Note:**

If the connection between your PC and the AP is correct?

The LEDs of LAN port which you link to on the device and LEDs on your PC's adapter should be
lit.

If the TCP/IP configuration for your PC is correct?

If the AP's IP address is 192.168.1.1, your PC's IP address must be within the range of
192.168.1.2 ~ 192.168.1.254.

Chapter 3 Software Configuration

This User Guide recommends using the "Quick Installation Guide" for first-time installation. For advanced users, if you want to know more about this device and make use of its functions adequately, you need to read this chapter and configure advanced settings through the Web-based Utility.

3.1 Login

The TL-WA601G 108Mbps Wireless Access Point is easy to configure and manage With a Web-based (Internet Explorer or Netscape® Navigator) utility. The Web-based utility can be used on any Windows, Macintosh or UNIX OS with a web browser.

Connect to the AP by typing *http://192.168.1.1* in the address field of web browser.

Figure 3-1 Login to the AP

After a moment, a login window will appear similar to that shown in Figure 3-2. Enter **admin** for the User Name and Password, both in lower case letters. Then click the **OK** button or press the **Enter** key.
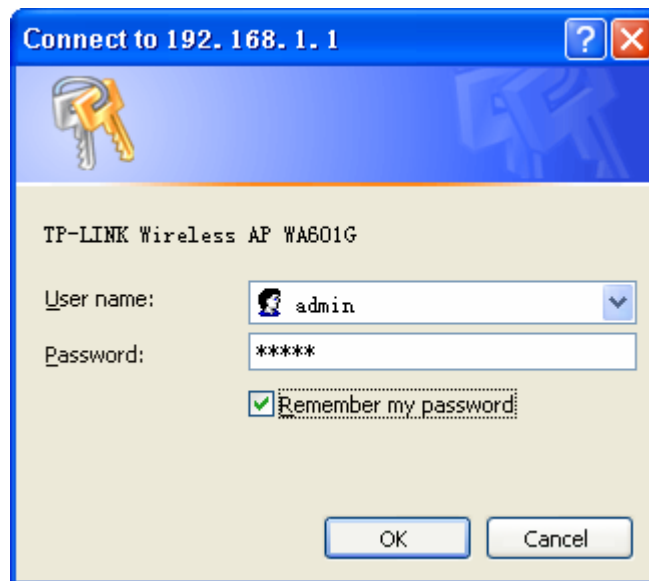

Figure 3-2 Login Windows

) **Note:**

If the above screen does not prompt, it means that your web-browser has been set to a proxy. Go to Tools menu>Internet Options>Connections>LAN Settings, in the screen that appears, cancel the Using Proxy checkbox, and click OK to finish it.

After your successful login, you can configure and manage the AP. There are six main menus on the left of the web-based utility. Submenus will be available after you click one of the main menus. The six main menus are: **Status, Network, Wireless, DHCP, Wireless Settings and System Tools.** On the right of the web-based utility, there are the detailed explanations and instructions for the corresponding page. To apply any settings you have altered on the page, please click the **Save** button.

There are the detailed explanations for each web page's key functions below.

3.2 Status

The Status page displays the AP's current status and configuration. All information is read-only.

➢ **Wired -** This field displays the current settings or information for the Network, including the **MAC address, IP address and Subnet Mask.**

➢ **Wireless -** This field displays basic information or status for wireless function, including **Operating Mode, SSID, Channel, Mode, MAC Address and IP Address.**

➢ **Traffic Statistics -** This field displays the AP's traffic statistics.

➢ **System Up Time -** The time of the AP running from it's powered on or reset.

Figure 3-3 AP Status

3.3 Network

You can configure the IP parameters of Network on this page.

Network

Type:	Static IP
IP Address:	192.168.1.1
Subnet Mask:	255.255.255.0
Gateway:	0.0.0.0
MAC Address:	00-0A-EB-86-46-2C

Save

Figure 3-4 Network

➢ **Type -** Choosing dynamic IP to get IP address from DHCP server, or choosing static IP to config IP address manually.

➢ **IP Address -** Enter the IP address of your AP in dotted-decimal notation (factory default: 192.168.1.1).

➢ **Subnet Mask -** An address code that determines the size of the network. Normally use 255.255.255.0 as the subnet mask.

➢ **Gateway -** The gateway should be in the same subnet as your IP address.

➢ **MAC Address -** the physical address of the AP, as seen from the LAN. The value can't be changed.

) **Note:**

If you change the IP Address, you must use the new IP Address to login the AP.
If the new LAN IP Address you set is not in the same subnet, the IP Address pool in the DHCP sever will not take effect, until they are re-configured.

3.4 Wireless

– Wireless
 • Basic Settings
 • Wireless Mode
 • Security Settings
 • MAC Filtering
 • Wireless Statistics
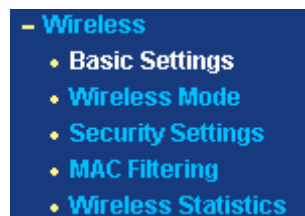
Figure 3-5 The Wireless menu

There are five submenus under the Wireless menu (shown in Figure 3-5): **Basic Settings, Wireless mode, Security Settings, MAC Filtering** and **Wireless Statistics.** Click any of them, and you will be able to configure the corresponding function. The detailed explanations for each submenu are provided below.

3.4.1 Basic Settings

The basic settings for the wireless network are set on this page, Figure 3-6:
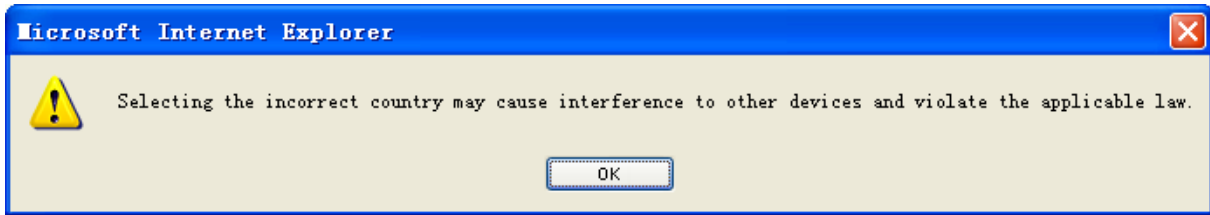

Figure 3-6 Wireless Settings

➢ **SSID -** Enter a value of up to 32 characters. The same name (SSID) must be assigned to all wireless devices in your network. The default SSID is TP-LINK_xxxxxx (xxxxxx indicates the last unique six characters of each device's MAC address), which can ensure your wireless network security. But it is recommended strongly that you change your networks name (SSID) to a different value. This value is case-sensitive. For example, *TP-LINK* is NOT the same as *tp-link*.

➢ **Channel -** This field determines which operating frequency will be used. It is not necessary to change the wireless channel unless you notice interference problems with another nearby access point.

➢ **Mode -** Select the desired wireless mode. The options are:

- **108Mbps (Dynamic) -** Super G™, 802.11g and 802.11b wireless stations can connect to the AP.

- **108Mbps (Static) -** Only Super G™ wireless stations can connect to the AP.

- **54Mbps (802.11g) -** Both 802.11g and 802.11b wireless stations can connect to the AP.

- **11Mbps (802.11b) -** Only 802.11b wireless stations can connect to the AP.

➢ **Region -** Select your region from the pull-down list. This field specifies the region where the wireless function of the AP can be used. If your country or region is not listed, please contact your local government agency for assistance.

The default region is United States. When you select your local region from the pull-down list, the dialog shown in Figure appears below. Click OK.

☞ **Note:**

Limited by local law regulations, version for North America does not have region selection option. The wireless basic settings for this version are shown below.

☞ **Note:**

To apply any settings you have altered on the page, please click the **Save** button, and wait the AP reboot automatically.

3.4.2 Wireless Mode

The wireless mode settings for the wireless network are set on this page.

Wireless Mode Settings

○ Disable Wireless

⊙ Access Point
☑ Enable SSID Broadcast

○ Client
☐ Enable WDS
⊙ SSID: `TP-LINK_BEF0E3`
○ MAC of AP:

○ Repeater
MAC of AP:

○ Universal Repeater
MAC of AP:

○ Bridge (Point to Point)
☐ With AP Mode
MAC of AP:

○ Bridge (Point to Multi-Point)
☐ With AP Mode
MAC of AP1:
MAC of AP2:
MAC of AP3:
MAC of AP4:
MAC of AP5:
MAC of AP6:

[Survey]

[Save]

Note: The current security method may be invalid after changing the wireless mode.

Figure 3-7 Wireless Mode Settings

➢ **Disable Wireless -** The wireless of this AP can be enabled or disabled to allow wireless stations access. If disabled, wireless stations will not be able to access the AP.

☞ **Note:**

AP provides five operational modes: Access Point, Client, Repeater, Bridge (point to point), Bridge (point to Multi-point).

➢ **Access Point -** Access Point mode allows wireless stations including AP clients to access.

  • **Enable SSID Broadcast -** If you select the **Enable SSID Broadcast** checkbox, the Wireless Access Point SSID will broadcast its name (SSID) on the air.

➢ **Client -** This mode allows one or more remote LANs connect with a central LAN, and thus creating an extended virtual LAN. In this way, any station of the Remote LAN can successfully communicate with any station of the central LAN, as if all of them belong to the same physical LAN. Wireless Stations can't associate with AP Clients.

  • **Enable WDS -** The AP client can connect to AP with WDS enabled or disabled. If WDS is enabled, all traffic from wired networks will be forwarded in the format of WDS frames consist of four address fields. If WDS is disabled, three address frames are used. If your AP supports WDS well, please select the option.

  • **SSID -** Enter the SSID of AP that you want to access. If you select the radio before SSID, the AP client will connect to AP according SSID.

  • **MAC of AP -** Enter the MAC address of AP that you want to access. If you select the radio before MAC of AP, the AP client will connect to AP according MAC address.

➢ **Repeater -** A wireless repeater is an AP with its own BSSID that relays data to a root AP, to which it is associated. The wireless repeater relays signal between its stations and the root AP for greater wireless range. Please input the MAC address of root AP in the field of MAC of AP.

➢ **Universal Repeater -** APs without WDS function can also be communicated with in this mode.

☞ **Note:**

If the available AP can't support with WDS, you may select Client mode without WDS or Universal Repeater mode to associate with the AP.

Here is an example of how to configure wireless repeater. Please do the following:

1. Configure the Operating Mode of the TL-WA601G Access Points.

  • Configure AP1 on LAN Segment 1 in Access Point mode.

  • Configure AP2 in Repeater mode with the MAC address of its root AP (AP1).

  • Configure AP3 in Repeater mode with the MAC address of its root AP (AP2).
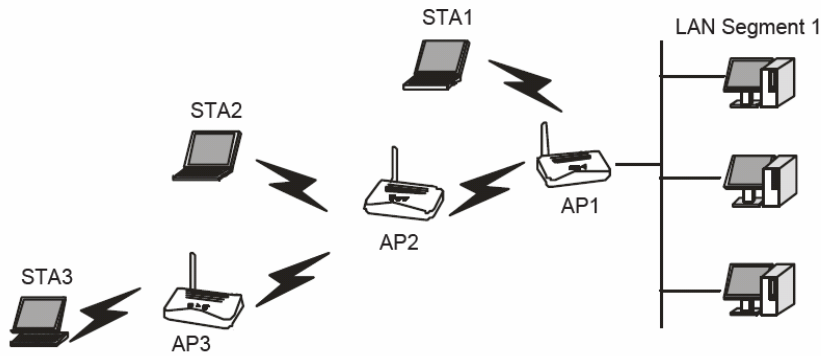
Figure 3-8 Wireless repeating

2. Verify the wireless security parameters for all access points, if any.

3. Verify connectivity across the LANs. A computer on any LAN segment should be able to connect to the Internet or share files and printers with any other PCs or servers connected to any of the three WLAN segments.

) **Note:**

You can extend this repeating by adding up to 2 additional TL-WA601Gs configured in repeater mode. However, since Repeater configurations communicate in half-duplex mode, the bandwidth decreases as you add Repeaters to the network. Also, you can extend the range of the wireless network with wireless antenna accessories.

➢ **Bridge (Point to Point) -** This mode bridges the AP and another AP also in bridge mode to connect two wired LANs. Please input the MAC address of the other AP in the field of MAC of AP.

• **With AP mode:** If you select this option, you AP will also support AP mode when it is in Bridge (Point to Point) mode.

Here is an example of how to configure Point-to-Point Bridge. Please do the following:
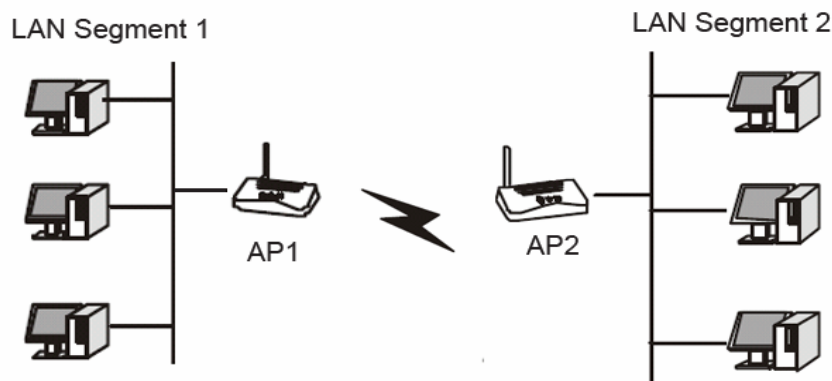

Figure 3-9 Point to Point Bridge

1. Configure the TL-WA601G (AP1) on LAN Segment 1 in Point-to-Point Bridge mode.

2. Configure the TL-WA601G (AP2) on LAN Segment 2 in Point-to-Point Bridge mode. AP1 must have AP2's MAC address in its MAC Address field and AP2 must have AP1's MAC address in its MAC Address field.

3. Configure and verify the following parameters for both access points:

- Both use the same Channel and security settings if security is in use.

- Verify connectivity across the LAN 1 and LAN 2. A computer on either LAN segment should be able to connect to the Internet or share files and printers of any other PCs or servers connected to LAN Segment 1 or LAN Segment 2.

➢ **Bridge (Point to Multi-Point) -** This mode bridges the AP and up to 6 APs also in bridge mode to connect two or more wired LANs. Please input the MAC address of other APs in the field of MAC of AP1 to MAC of AP6.

- **With AP mode:** If you select this option, you AP will also support AP mode when it is in Bridge (Point to Multi-Point) mode.

Here is an example of how to configure multi-point bridging. Please do the following:
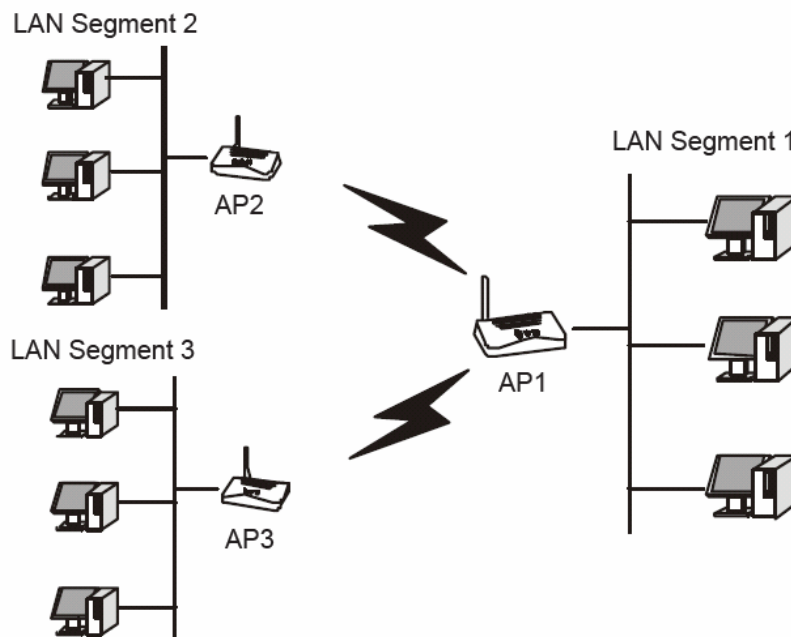
Figure 3-10 Point to Multi-point Bridge

1. Configure the Operating Mode of the TL-WA601G Access Points.

- Because it is in the central location, configure TL-WA601G (AP1) on LAN Segment 1 in Point-to-Multi-Point Bridge mode. The MAC addresses of AP2 and AP3 are required in AP1.

- Configure TL-WA601G (AP2) on LAN Segment 2 in Point-to-Point Bridge mode with the MAC Address of AP1.

- Configure the TL-WA601G (AP3) on LAN 3 in Point-to-Point Bridge mode with the MAC Address of AP1.

2. Verify the following parameters for all access points.

- All TL-WA601G Access Points use the same Channel, and security settings if any.

- All Point-to-Point APs must have AP1's MAC address in its AP MAC address field, and AP1 must have all All Point-to-Point APs' MAC addresses.

3. Verify connectivity across the LANs.

- A computer on any LAN segment should be able to connect to the Internet or share files

and printers with any other PCs or servers connected to any of the three LAN segments.

- Wireless stations will not be able to connect to the TL-WA601G Access Points in the illustration above. If you require wireless stations to access any LAN segment, you can add TL-WA601G Access Points configured in Wireless Access Point mode to any LAN segment.

) **Note:**

You can extend this multi-point bridging by adding additional TL-WA601Gs configured in Point-to-Point mode for each additional LAN segment. Furthermore, you can extend the range of the wireless network with wireless antenna accessories.

3.4.3 Site Survey

After selecting a mode and pressing button **Survey**, you can view all of APs around you.

AP List

AP Count: 3

ID	BSSID	SSID	Signal	Channel	Security	Choose
1	00-19-77-75-67-88	TP-LINK	25 dB	6	OFF	Connect
2	00-18-84-A3-C1-51	TP-LINK_137B00	29 dB	6	OFF	Connect
3	00-18-84-A3-C1-52	TP-LINK	32 dB	6	ON	Connect

Refresh

Figure 3-11 Site Survey

➢ **SSID -** The SSID of the AP.

➢ **BSSID -** The BSSID of the AP, usually also the MAC address of the AP.

➢ **Signal -** The signal received from the AP.

➢ **Channel -** The channel the AP works in.

➢ **Security -** The AP communicates in privacy.

➢ **Choose -** Choose one AP from list to connect to.

Press one of **Connect** in list to select an AP to connect to. Then the basic settings will show again. You can save settings and reboot to take effective.

) **Note:**

If wireless is disabled, surveying can't work. And if Access Point mode is selected, there is no reason and no choice to connect to another AP, as it showed below.

AP List

AP Count: 2

ID	BSSID	SSID	Signal	Channel	Security
1	00-0C-43-30-52-E0	TP-LINK_137B00	27 dB	6	OFF
2	00-19-BE-1F-FE-F0	TP-LINK	33 dB	6	ON

[Refresh]

3.4.4 Security Settings

You can select one of the following security options:

Wireless Security

○ **Disable Security**

○ **WEP**

Type:	Automatic ▾	
WEP Key Format:	Hexadecimal ▾	

Key Selected	WEP Key	Key Type
Key 1: ⊙		Disabled ▾
Key 2: ○		Disabled ▾
Key 3: ○		Disabled ▾
Key 4: ○		Disabled ▾

○ **WPA/WPA2**

Version:	Automatic ▾
Encryption:	Automatic ▾
Radius Server IP:	
Radius Port:	1812 (1-65535, 0 stands for default port 1812)
Radius Password:	
Group Key Update Period:	86400 (in second, minimum is 30, 0 means no update)

○ **WPA-PSK/WPA2-PSK**

Version:	Automatic ▾
Encryption:	Automatic ▾
PSK Passphrase:	
	(The Passphrase is between 8 and 63 characters long)
Group Key Update Period:	86400 (in second, minimum is 30, 0 means no update, only be valid in AP mode.)

[Save]

Note: Some security mode can not be selected since it can not be supported by the current wireless mode.

Figure 3-12 Wireless Securities

➢ **Disable Security -** The wireless security function can be enabled or disabled. If disabled, the wireless stations will be able to connect the AP without encryption. It is recommended

strongly that you choose one of following options to enable security.

➢ **WEP -** Select 802.11 WEP security.

- **Type -** You can select one of following types:

  1) **Automatic -** Select Shared Key or Open System authentication type automatically based on the wireless station's capability and request.

  2) **Shared Key -** Select 802.11 Shared Key authentication.

  3) **Open System -** Select 802.11 Open System authentication.

- **WEP Key Format -** You can select ASCII or Hexadecimal format. ASCII Format stands for any combination of keyboard characters in the specified length. Hexadecimal format stands for any combination of hexadecimal digits (0-9, a-f, A-F) in the specified length.

- **WEP Key settings -** Select which of the four keys will be used and enter the matching WEP key information for your network in the selected key radio button. These values must be identical on all wireless stations in your network.

- **Key Type -** You can select the WEP key length (64-bit, or 128-bit, or 152-bit.) for encryption. "Disabled" means this WEP key entry is invalid.

  1) **For 64-bit encryption -** You can enter 10 hexadecimal digits (any combination of 0-9, a-f, A-F, zero key is not permitted) or 5 ASCII characters.

  2) **For 128-bit encryption -** You can enter 26 hexadecimal digits (any combination of 0-9, a-f, A-F, zero key is not permitted) or 13 ASCII characters.

  3) **For 152-bit encryption -** You can enter 32 hexadecimal digits (any combination of 0-9, a-f, A-F, zero key is not permitted) or 16 ASCII characters.

☞ **Note:**

If you do not set the key, the wireless security function is still disabled even if you have selected Shared Key as Authentication Type.

➢ **WPA/WPA2 -** Select WPA/WPA2 based on Radius Server.

- **Version -** You can select one of following versions,

  1) **Automatic -** Select WPA or WPA2 automatically based on the wireless station's capability and request.

  2) **WPA -** Wi-Fi Protected Access.

  3) **WPA2 -** WPA version 2.

- **Encryption -** You can select either Automatic, or TKIP or AES.

- **Radius Server IP -** Enter the IP address of the Radius Server.

- **Radius Port -** Enter the port that radius service used.

- **Radius Password -** Enter the password for the Radius Server.

➢ **WPA-PSK/ WPA2-PSK -** Select WPA based on pre-shared passphrase.

- **Version -** You can select one of following versions

  1) **Automatic -** Select WPA-PSK or WPA2-PSK automatically based on the wireless station's capability and request.

2) **WPA-PSK -** Pre-shared key of WPA.

3) **WPA2-PSK -** Pre-shared key of WPA2.

- **PSK Passphrase -** You can enter a passphrase between 8 and 63 characters long.

- **Group Key Update Period -** Specify the group key update interval in seconds. The value can be either 0 or at least 30. Enter 0 to disable the update.

Be sure to click the **Save** button to save your settings on this page.

☞ **Note:**

The AP will reboot automatically after you click the Save button.

3.4.5 MAC Filtering

The Wireless MAC Filtering for wireless networks is set on this page, Figure 3-13:
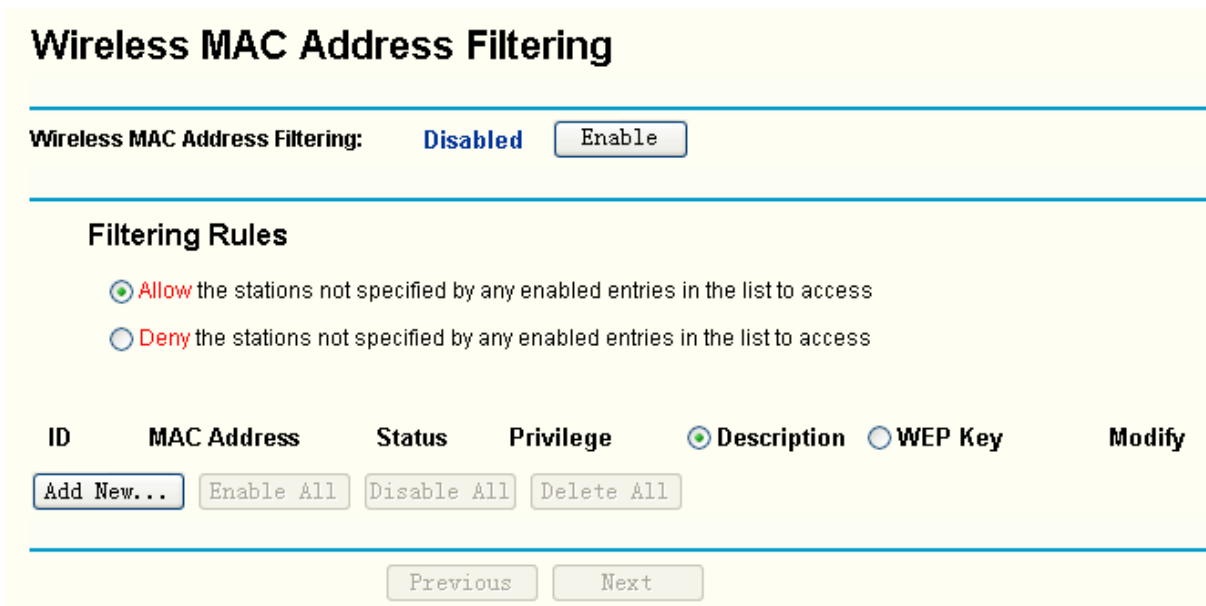

Figure 3-13 Wireless MAC address Filtering

The Wireless MAC Address Filtering feature allows you to control wireless stations accessing the AP, which depend on the station's MAC addresses.

➢ **MAC Address -** The wireless station's MAC address that you want to access.

➢ **Description -** A simple description of the wireless station.

➢ **Privilege - Allow** means allowing the station to access the AP. **Deny** means denying the station to access the AP. **64-bit,** or **128-bit,** or **152-bit** means assigning a unique WEP key to access the AP.

➢ **WEP Key -** Specify a unique WEP key (in Hexadecimal format) to access the AP.

➢ **Status -** The status of this entry, either **Enabled** or **Disabled**.

To disable the Wireless MAC Address Filters feature, keep the default setting, **Disable**.

To set up an entry, click **Enable**, and follow these instructions:

Step1：First, you must decide whether the unspecified wireless stations can or cannot access the AP. If you desire that the unspecified wireless stations can access the AP, please select

the radio button **Allow the stations not specified by any enabled entries in the list to access**, otherwise, select the radio button **Deny the stations not specified by any enabled entries in the list to access**.

Step2：To Add a Wireless MAC Address filtering entry, click the **Add New…** button. The "Add **or Modify Wireless MAC Address Filtering entry"** page will appear, shown in Figure 3-14:

Add or Modify Wireless MAC Address Filtering entry

MAC Address:	
Description:	
Privilege:	allow
WEP Key:	
Status:	Enabled

Save   Back

Figure 3-14 Add or Modify Wireless MAC Address Filtering entry

To add or modify a MAC Address Filtering entry, follow these instructions:

1. Enter the appropriate MAC Address into the **MAC Address** field. The format of the MAC Address is XX-XX-XX-XX-XX-XX (X is any hexadecimal digit). For example: 00-0A-EB-B0-00-0B.

2. Enter a simple description of the wireless station in the **Description** field. For example: Wireless station A.

3. **Privilege -** Selects the privileges for this entry, one of **Allow** / **Deny** / **64-bit** / **128-bit** / **152-bit**.

4. **WEP Key -** If you select **64-bit**, **128-bit** or **152-bit** in the **Privilege** field, enter any combination of hexadecimal digits (0-9, a-f, A-F) in the specified length. For example: 2F34D20BE2.

5. **Status -** Select **Enabled** or **Disabled** for this entry on the **Status** pull-down list.

6. Click the **Save** button to save this entry.

To add additional entries, repeat steps 1-6.

) **Note:**

When 64-bit, or 128-bit, or 152-bit is selected, WEP Key will be enabled.

To modify or delete an existing entry:

1. Click the **Edit** or **Delete** button in the **Modify** column in the MAC Address Filtering Table.

2. Enter the value as desired in the **Add or Modify Wireless MAC Address Filtering entry** page, and click the **Save** button.

You can click the **Enable All** button to make all the entries effective, click the **Disable All** button to make all the entries ineffective, click the **Delete All** button to delete all the entries.

Click the **Next** button to go to the next page and click the **Previous** button to return to the previous page.

For example:

If you desire that the wireless station A with MAC address 00-0A-EB-00- 07-BE be able to access the AP, the wireless station B with MAC address 00-0A-EB- 00-07-5F not be able to access the AP, and the wireless station C with MAC address 00-0A-EB-00-07-8A be able to access the AP when its WEP key is 2F34D20BE2E54B326C5476586A, while all other wireless stations cannot access the AP, you should configure the **Wireless MAC Address Filtering** list following these steps:

1. Click the **Enable** button to enable this function.

2. Select the radio button: **Deny the stations not specified by any enabled entries in the list to access** for **Filtering Rules.**

3. Delete all or disable all entries if there are any entries existing already.

4. Click the **Add New...** button and enter the MAC address 00-0A-EB-00-07-BE in the **MAC Address** field, enter wireless station A in the **Description** field, select **Allow** in the **Privilege** pull-down list and select **Enabled** in the **Status** pull-down list. Click the **Save** and the **Back** button.

5. Click the **Add New...** button and enter the MAC address 00-0A-EB-00-07-5F in the **MAC Address** field, enter wireless station B in the **Description** field, select **Deny** in the **Privilege** pull-down list and select **Enabled** in the **Status** pull-down list. Click the **Save** and the **Back** button.

6. Click the **Add New...** button and enter the MAC address 00-0A-EB-00-07-8A in the **MAC Address** field, enter wireless station C in the **Description** field, select **128-bit** in the **Privilege** pull-down list, enter 2F34D20BE2E54B326C5476586A in the **WEP Key** field and select **Enabled** in the **Status** pull-down list. Click the **Save** and the **Back** button.

    The filtering rules that configured should be similar to the following list:

) **Note:**

If you select the radio button **Allow the stations not specified by any enabled entries in the list to access** for **Filtering Rules,** the wireless station B will still not be able to access the AP, however, other wireless stations that are not in the list will be able to access the AP.
If you enable the function and select the **Deny the stations not specified by any enabled entries in the list to access** for **Filtering Rules,** and there are not any enable entries in the list, thus, no wireless stations can access the AP.

3.4.6 Wireless Statistics

This page shows **MAC Address**, **Current Status**, **Received Packets** and **Sent Packets** for each connected wireless station.

Figure 3-15 The AP attached wireless stations

➢ **MAC Address -** The connected wireless station's MAC address

➢ **Current Status -** The connected wireless station's running status, one of STA-AUTH / STA-ASSOC / STA-JOINED / WPA / WPA-PSK / WPA2 / WPA2-PSK / AP-UP / AP-DOWN / Disconnected

➢ **Received Packets -** packets received by the station

➢ **Sent Packets -** packets sent by the station

You cannot change any of the values on this page. To update this page and to show the current connected wireless stations, click on the **Refresh** button.

If the numbers of connected wireless stations go beyond one page, click the **Next** button to go to the next page and click the **Previous** button to return the previous page.

) **Note:**

This page will be refreshed automatically every 5 seconds.
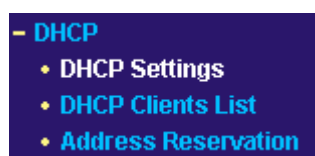
3.5   DHCP

Figure 3-16 The DHCP menu

There are three submenus under the DHCP menu (shown in Figure 3-16): **DHCP Settings**, **DHCP Clients List** and **Address Reservation.** Click any of them, and you will be able to configure the corresponding function. The detailed explanations for each submenu are provided below.

3.5.1 DHCP Settings

The System can be set up as a DHCP (Dynamic Host Configuration Protocol) server, which provides the TCP/IP configuration for all the PCs that are connected to the system on the LAN. The DHCP Server can be configured on the page (shown in Figure 3-17):

Figure 3-17 DHCP Settings

➢ **DHCP Server - Enable** or **Disable** the DHCP server. If you disable the Server, you must have another DHCP server within your network or else you must manually configure the computer.

➢ **Start IP Address -** This field specifies the first of the addresses in the IP address pool. 192.168.1.100 is the default start address.

➢ **End IP Address -** This field specifies the last of the addresses in the IP address pool. 192.168.1.199 is the default end address.

➢ **Address Lease Time -** The **Address Lease Time** is the amount of time a network user will be allowed connection to the system with their current dynamic IP Address. Enter the amount of time, in minutes, the user will be "leased" this dynamic IP Address. The range of the time is 1 ~ 2880 minutes. The default value is 120 minutes.

➢ **Default Gateway -** (Optional.) Input the IP Address of the gateway.

➢ **Default Domain -** (Optional.) Input the domain name of your network.

➢ **Primary DNS -** (Optional.) Input the DNS IP address provided by your ISP. Or consult your ISP.

➢ **Secondary DNS -** (Optional.) Input the IP address of another DNS server if your ISP provides two DNS servers.

) **Note:**

To use the DHCP server function of the AP, you must configure all computers on the LAN as "Obtain an IP Address automatically" mode. This function will take effect until the AP reboots.

25

3.5.2 DHCP Clients List

This page shows **Client Name, MAC Address, Assigned IP** and **Lease Time** for each DHCP Client attached to the AP (Figure 3-18):

Figure 3-18 DHCP Clients List

➢ **Index -** The index of the DHCP Client

➢ **Client Name -** The name of the DHCP client

➢ **MAC Address -** The MAC address of the DHCP client

➢ **Assigned IP -** The IP address that the AP has allocated to the DHCP client.

➢ **Lease Time -** The time of the DHCP client leased. Before the time is up, DHCP client will request to renew the lease automatically.

You cannot change any of the values on this page. To update this page and to show the current attached devices, click on the **Refresh** button.

3.5.3 Address Reservation

When you specify a reserved IP address for a PC on the LAN, that PC will always receive the same IP address each time when it accesses the DHCP server. Reserved IP addresses should be assigned to servers that require permanent IP settings. This page is used for address reservation (shown in Figure 3-19).

Figure 3-19 Address Reservation

➢ **MAC Address -** The MAC address of the PC of which you want to reserve IP address.

➢ **Assigned IP Address -** The IP address of the AP reserved.

To Reserve IP addresses:

1. Click the **Add New...** button to add a new Address Reservation entry.

2. Enter the MAC address (The format for the MAC Address is XX-XX-XX-XX-XX-XX.) and IP address in dotted-decimal notation of the computer you wish to add.

3. Click the **Save** button when finished.

To modify A Reserved IP address:

1. Select the reserved address entry as you desire, and modify it. If you wish to delete the entry, make all of the entry fields blank.

2. Click the **Save** button.

To delete all Reserved IP addresses:

Click the **Clear All** button.
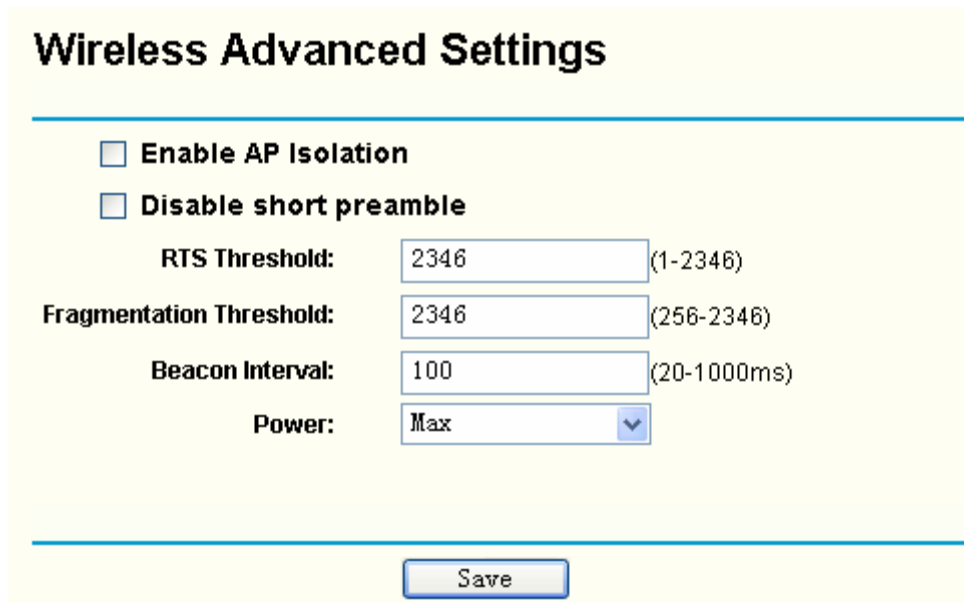
Click the **Save** button.

Click the **Next** button to go to the next page and Click the **Previous** button to return the previous page.

➢ **Note:**

The function won't take effect until the AP reboots.

3.6 Wireless Settings

You can configure wireless advanced settings on this page.

Figure 3-20 AP Wireless Advanced Settings

➢ **Enable AP Isolation -** Isolate all connected wireless stations so that wireless stations can not access each other through WLAN. This option is available only for AP mode.

➢ **Disable short preamble -** Disable short preamble and use long preamble only. 802.11b mode supports only long preamble and this parameter will be ignored.

➢ **RTS threshold -** RTS/CTS Threshold, the packet size that is used to determine if RTS/CTS should be sent.

➢ **Fragmentation threshold -** The maximum packet size used for fragmentation.

➢ **Beacon Interval -** The interval time between two successive beacons.

➢ **Power -** The transmit power of the access point.

) **Note:**

Limited by local law regulations, version for North America does not have power selection option. The wireless advanced settings for this version are shown below.

) **Note:**

The AP will reboot automatically after you click the Save button.

3.7 System Tools

Figure 3-21 The System Tools menu

There are five submenus under the System Tools menu (shown in Figure 3-21): **Firmware, Factory Defaults, Reboot, Password, and Syslog.** Click any of them, and you will be able to configure the corresponding function. The detailed explanations for each submenu are provided below.

3.7.1 Firmware

The page (shown in Figure 3-22) allows you to upgrade the latest version of firmware for the AP.

Figure 3-22 Firmware Upgrade

New firmware versions are posted at www.tp-link.com and can be downloaded for free. If the AP is not experiencing difficulties, there is no need to download a more recent firmware version, unless that version has a new feature that you want to use.

) **Note:**

When you upgrade the AP's firmware, you may lose its configuration settings, so make sure you write down the AP settings before you upgrade its firmware.

To upgrade the AP's firmware, follow these instructions:

1.   Download a more recent firmware upgrade file from the TP-LINK website (www.tp-link.com).

2.   Click **Browse** to view the folders and select the downloaded file.

3.   Click the **Upgrade** button.

➤   **Firmware Version -** displays the current firmware version.

➤   **Hardware Version -** displays the current hardware version. The hardware version of the upgrade file must accord with the current hardware version.

) **Note:**

Do not turn off the AP or press the Reset button while the firmware is being upgraded.
The AP will reboot after the Upgrading has been finished.

3.7.2 Factory Defaults

This page (shown in Figure 3-23) allows you to restore the factory default settings for the AP.

Figure 3-23 Restore Factory Default

Click the **Restore** button to reset all configuration settings to their default values.

•   The default **User Name**: admin

- The default **Password**: admin

- The default **IP Address**: 192.168.1.1

- The default **Subnet Mask**: 255.255.255.0

) **Note:**

Any settings you have saved will be lost when the default settings are restored.

3.7.3 Backup & Restore

This page (shown in Figure 3-25) allows you to save all configuration settings to your local computer as a file or restore the AP's configuration.

Backup & Restore

Backup:	Backup
File:	[ ] Browse... Restore

Figure 3-24 Save or Restore the Configuration

Click the **Backup** button to save all configuration settings to your local computer as a file.

To restore the AP's configuration, follow these instructions:

- Click the **Browse** button to find the configuration file which you want to restore.

- Click the **Restore** button to update the configuration with the file whose path is the one you have input or selected in the blank.

) **Note:**

The current configuration will be covered with the uploading configuration file. Wrong process will lead the device unmanaged. The restoring process lasts for 20 seconds and restart automatically then. Keep the power of the device on during the process, in case of any damage.

3.7.4 Reboot

This page (shown in Figure 3-25) allows you to reboot the AP.

Reboot

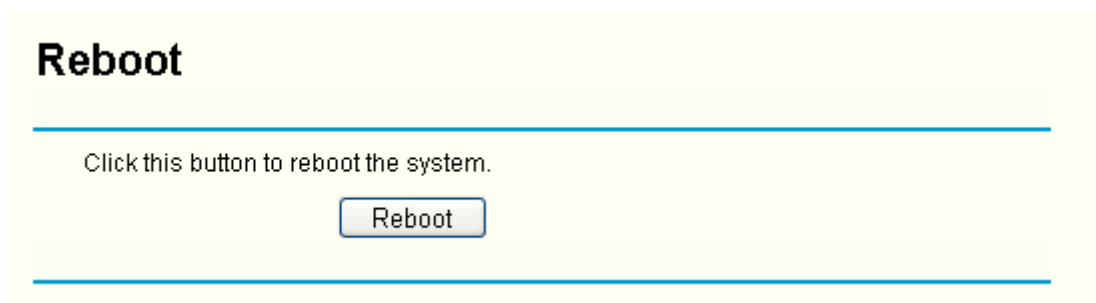Click this button to reboot the system.

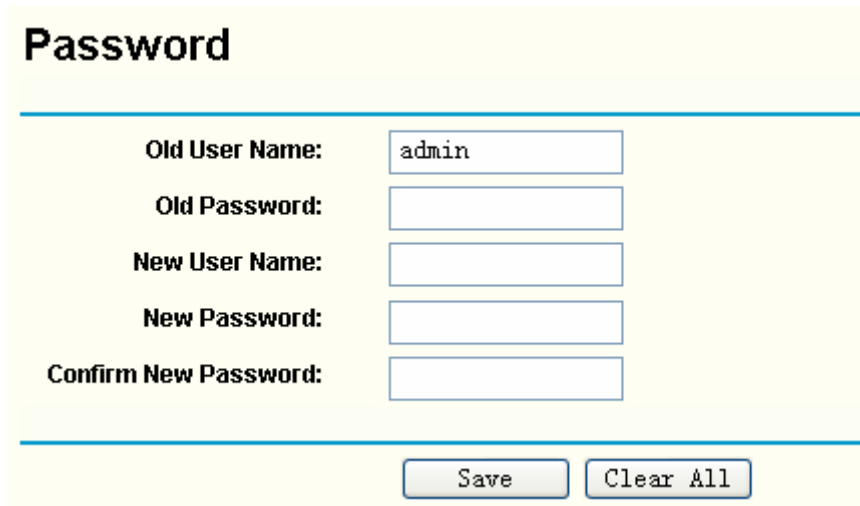Reboot

Figure 3-25 Reboot the AP

Click the **Reboot** button to reboot the AP.

Some settings of the AP will take effect only after rebooting, which include:

- Change LAN IP Address. (System will reboot automatically)

- DHCP service function.

- Static address assignment of DHCP server.

- Upgrade the firmware of the AP (system will reboot automatically).

- Restore the AP's settings to factory default (system will reboot automatically).

3.7.5 Password

This page (shown in Figure 3-26) allows you to change the factory default user name and password of the AP.

Figure 3-26 Password

It is strongly recommended that you change the factory default user name and password of the AP. All users who try to access the AP's web-based utility or Quick Setup will be prompted for the AP's user name and password.

☞ Note:

The new user name and password must not exceed 14 characters in length and must not include any spaces. Enter the new Password twice to confirm it.

Click the **Save** button when finished.

Click the **Clear All** button to clear all.

3.7.6 Syslog

This page (shown in Figure 3-27) allows you to query the Logs of the AP.

Figure 3-27 System Log

The AP can keep logs of all traffic. You can query the logs to find what happened to the AP.

Click the **Refresh** button to refresh the logs.

Click the **Clear ALL** button to clear all the logs.

Appendix A: Glossary

108M Super G™ WLAN Transmission Technology - 108M Super G™ WLAN Transmission Technology employs multiple performance-enhancing techniques including packet bursting, fast frames, data compression, and dynamic turbo mode that combine to improve the throughput and range of wireless networking products. Users can experience link rates of up to 108Mbps, twice the industry-standard maximum data link rate of 54Mbps, while preserving full compatibility with traditional 802.11g or 802.11b networks. 108M Super G™ products offer the highest throughput performance available on the market today. In dynamic 108M mode, the device can attach 802.11b, 802.11g and 108Mbps Super G™ devices at the same time in an integrated environment.

2x to 3x eXtended Range™ WLAN Transmission Technology - The WLAN device with 2x to 3x eXtended Range™ WLAN transmission technology make its sensitivity up to 105 dBm, which gives users the ability to have robust, longer-range wireless connections. With this range-enhancing technology, a 2x to 3x eXtended Range™ based client and access point can maintain a connection at as much as three times the transmission distance of traditional 802.11b and 802.11g products, for a coverage area that is up to nine times greater. A traditional 802.11b and 802.11g product transmission distance is about 300m. A 2x to 3x eXtended Range™ based client and access point can maintain a connection transmission distance may be up to 830m.

802.11b - The 802.11b standard specifies a wireless networking at 11 Mbps using direct-sequence spread-spectrum (DSSS) technology and operating in the unlicensed radio spectrum at 2.4GHz, and WEP encryption for security. 802.11b networks are also referred to as Wi-Fi networks.

802.11g - specification for wireless networking at 54 Mbps using direct-sequence spread-spectrum (DSSS) technology, using OFDM modulation and operating in the unlicensed radio spectrum at 2.4GHz, and backward compatibility with IEEE 802.11b devices, and WEP encryption for security.

Access Point (AP) - A wireless LAN transceiver or "base station" that can connect a wired LAN to one or many wireless devices. Access points can also bridge to each other.

DNS (**D**omain **N**ame **S**ystem) **–** An Internet Service that translates the names of websites into IP addresses.

Domain Name - A descriptive name for an address or group of addresses on the Internet.

DoS (**D**enial **o**f **S**ervice) **-** A hacker attack designed to prevent your computer or network from operating or communicating.

DSL (**D**igital **S**ubscriber **L**ine) **-** A technology that allows data to be sent or received over existing traditional phone lines.

ISP (**I**nternet **S**ervice **P**rovider) **-** A company that provides access to the Internet.

MTU (**Maximum Transmission Unit**) **-** The size in bytes of the largest packet that can be transmitted.

SSID - A **S**ervice **S**et **Id**entification is a thirty-two character (maximum) alphanumeric key identifying a wireless local area network. For the wireless devices in a network to communicate with each other, all devices must be configured with the same SSID. This is typically the configuration parameter for a wireless PC card. It corresponds to the ESSID in the wireless Access Point and to the wireless network name.

WEP (**W**ired **E**quivalent **P**rivacy) **-** A data privacy mechanism based on a 64-bit or 128-bit or 152-bit shared key algorithm, as described in the IEEE 802.11 standard.

Wi-Fi - A trade name for the 802.11b wireless networking standard, given by the Wireless Ethernet Compatibility Alliance (WECA, see http://www.wi-fi.net), an industry standards group promoting interoperability among 802.11b devices.

WLAN (**W**ireless **L**ocal **A**rea **N**etwork) **-** A group of computers and associated devices communicate with each other wirelessly, which network serving users are limited in a local area.

WPA (Wi-Fi Protected **A**ccess) **-** WPA is a security technology for wireless networks that improves on the authentication and encryption features of WEP (Wired Equivalent Privacy). In fact, WPA was developed by the networking industry in response to the shortcomings of WEP. One of the key technologies behind WPA is the Temporal Key Integrity Protocol (TKIP). TKIP addresses the encryption weaknesses of WEP. Another key component of WPA is built-in authentication that WEP does not offer. With this feature, WPA provides roughly comparable security to VPN tunneling with WEP, with the benefit of easier administration and use. This is similar to 802.1x support and requires a RADIUS server in order to implement. The Wi-Fi Alliance will call this, WPA-Enterprise. One variation of WPA is called WPA Pre Shared Key or WPA-PSK for short - this provides an authentication alternative to an expensive RADIUS server. WPA-PSK is a simplified but still powerful form of WPA most suitable for home Wi-Fi networking. To use WPA-PSK, a person sets a static key or "passphrase" as with WEP. But, using TKIP, WPA-PSK automatically changes the keys at a preset time interval, making it much more difficult for hackers to find and exploit them. The Wi-Fi Alliance will call this, WPA-Personal.

Appendix B: Specifications

General	
Standards and Protocols	IEEE 802.3, 802.3u, 802.11b and 802.11g, TCP/IP, DHCP
Safety & Emission	FCC、CE
Ports	One 10/100M Auto-Negotiation LAN RJ45 port supporting Auto MDI/MDIX
Cabling Type	10BASE-T: UTP category 3, 4, 5 cable (maximum 100m) 　　　　　　 EIA/TIA-568 100Ω STP (maximum 100m) 100BASE-TX: UTP category 5, 5e cable (maximum 100m) 　　　　　　 EIA/TIA-568 100Ω STP (maximum 100m)
LEDs	POWER, SYSTEM, LAN, WLAN
Wireless	
Wireless Data Rates	108/54/48/36/24/18/12/9/6Mbps or 11/5.5/3/2/1Mbps
WEP	64/128/152 bits
Wireless Certification	Wi-Fi WPA
Physical and Environment	
Working Temperature	0℃~40℃ (32℉~104℉)
Working Humidity	10% ~ 90% RH, Non-condensing
Storage Temperature	-40℃~70℃(-40℉~158℉)
Storage Humidity	5% ~ 90% RH, Non-condensing

Appendix C: FAQ

1. No lights are lit on the access point.

It takes a few seconds for the power indicator to light up. Wait a minute and check the power light status on the access point if the access point has no power.

    1) Make sure the power cord is connected to the access point.

    2) Make sure the power adapter is connected to a functioning power outlet. If it is in a power strip, make sure the power strip is turned on. If it is plugged directly into the wall, verify that it is not a switched outlet.

    3) Make sure you are using the correct TP-LINK power adapter supplied with your access point.

2. The LAN light is not lit.

There is a hardware connection problem. Check these items:

    1) Make sure the cable connectors are securely plugged in at the access point and the network device (hub, switch, or router).

    2) Make sure the connected device is turned on.

    3) Be sure the correct cable is used. Use a standard Category 5 Ethernet patch cable. If the network device has Auto Uplink™ (MDI/MDIX) ports, you can use either a crossover cable or a normal patch cable.

3. I cannot access the AP with a wireless capable computer.

There is a configuration problem. Check these items:

    1) You may not have restarted the computer with the wireless adapter to have TCP/IP changes take effect. Restart the computer.

    2) The computer with the wireless adapter may not have the correct TCP/IP settings to communicate with the network. Restart the computer and check that TCP/IP is set up properly for that network. The usual setting for Windows the Network Properties is set to "Obtain an IP address automatically."

    3) The access point's default values may not work with your network. Check the access point default configuration against the configuration of other devices in your network.