



# LevelOne

## User Manual

WAP-3000 / WAP-3100

**11g Wireless AP**

Ver. 1.0.1-0804

# Safety

## FCC WARNING

This equipment may generate or use radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made.

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

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

## CE Declaration of conformity

This equipment complies with the requirements relating to electromagnetic compatibility, EN 55022 class B for ITE, the essential protection requirement of Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

## CE Marking Warning

Hereby, Digital Data Communications, declares that this (Model-no. WAP-3000/3100) is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

The CE-Declaration of Conformity can be downloaded at:

<http://www.levelone.eu/support.php>



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# 1. About This User Manual

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Congratulations on your purchase of LevelOne 11g Wireless AP, WAP-3000 or WAP-3100. This manual helps to features the innovating wireless technology that can help you build a wireless network easily. This manual contains detailed instructions in operation of this product. Please keep this manual for future reference.

With Wireless LAN Access Point, computers can share data and Internet access in a wireless way. Setup Wizard utilities are built-in with LevelOne 11g Wireless AP for configuration and quick setup purposes.

Wireless LAN networking can wirelessly transmit and receive data, minimizing the need for wired connections, at a speed of up to 54Mbps. With Wireless LAN networking, you can locate your PC anywhere you want in a reachable wireless signal range without wires and cables.

Wireless LAN networking provides users with an access to real-time information anywhere in their organization. The mobility provides productivity and service, which are not available under wired networks.

LevelOne WAP-3100 11g Wireless PoE AP has an integrated 802.3af Power over Ethernet (PoE) PD (Power Device) support, allowing installation of this device in areas where power outlets are not readily available

## User Manual Overview

Introduction	Describes 11g Wireless AP.
Unpacking and Setup	Helps user to get started with the basic installation of the 11g Wireless AP.
Hardware Installation	Describes the LED indicators of the 11g Wireless AP
Configuration	Describes the functionalities and its settings.
Technical Specifications	Lists the technical (general, physical and environmental) specifications of the 11g Wireless AP.

## 2. Unpacking and Setup

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This chapter provides unpacking and setup information for the Access Point.

### Unpacking

Open the box of the 11g Wireless AP and carefully unpack it. The box should contain the following items:

- WAP-3000 or WAP-3100
- Antenna
- Power Adapter
- Quick Installation Guide
- CD Manual

If any item is found missing or damaged, please contact your local reseller for replacement.

### Setup

The setup of the Wireless Access Point can be performed using the following steps:

- Locate an optimum location for the Wireless Access Point (AP). The best place for your AP is usually the center of your wireless network, with line of sight to all of your mobile stations.
- Visually inspect the Ethernet RJ45 port connector and make sure that it is fully plugged in to the system's Ethernet switch port.
- Fix the direction of the antenna. Try to place the AP in a position that can best cover your wireless network. Normally, the higher you place the antenna, the better the performance will be. The antenna's position enhances the receiving sensitivity.
- Visually inspect if the Power Adapter was fully plugged to the device power jack.

## 3. Hardware Installation

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### Front panel

The figure below shows the LED Indicator of the LevelOne Wireless AP.



#### **Power:**

This indicator lights green when the Access Point receives power. Otherwise, it turns off.

#### **WLAN:**

The indicator blinking green whiles the wireless LAN activity.

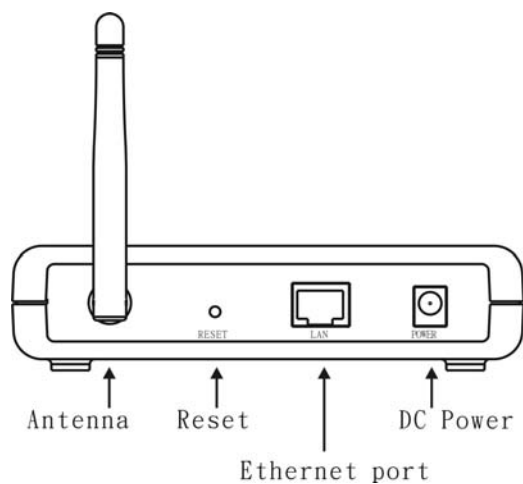
#### **LAN (Link/ACT):**

The indicator lights green when the LAN port is connected to an Ethernet network successful.

Otherwise, the indicator blinking green while transmitting or receiving data on the Ethernet network.

## Rear Panel

The figure below shows the rear panel of the Access Point



### LAN

Ethernet port with 10/100Mbps Fast Ethernet connections, connect this port to switch/hub.

### RESET

The Reset function is to reset the setting back to factory default setting, once you press the “RESET” button more than 5 seconds.

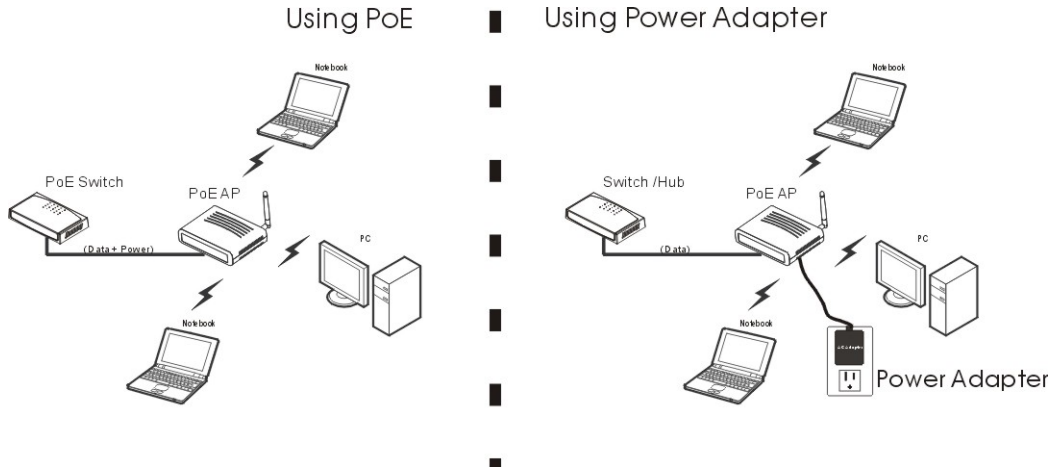
### Power

Connect the Power Adapter DC plug to the AP’s power jack.

### Antenna Connector

One Antenna connector connects with detachable dipole antenna.

# Hardware connections



## Connecting with power adapter

1. Plug in network cable to the Ethernet port of the Switch/Hub, and plug in the other end to the Ethernet port of the Wireless Access Point.
2. Plug in DC plug of the power adapter to the DC jack of the Wireless Access Point, and plug in the power adapter to the power outlet.

## Connecting with PoE switch (WAP-3100 only)

1. Plug in network cable to the Ethernet port of the **PoE Switch**, and plug in the other end to the Ethernet port of the Wireless Access Point.

## Check the installation

The LEDs of the Access Point are clearly visible and the status of the network link can be seen instantly:

1. With the power source on, once the device is connected, the Power, LAN and WLAN port LEDs will light up indicating a normal status.
2. If the LAN Port's Link indicator does not light up then check the RJ-45 cable if it is firmly feed to the RJ-45 port, while the LAN is link up to the Switch/Hub, the LAN port's LED will light up.



## 4. Configuring the Wireless LAN Access Point

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The Wireless Access Point has a Web GUI interface for the configuration. The AP can be configured through the Web Browser. A network manager can manage, control and monitor the AP from the local LAN. This section indicates how to configure the AP to enable its functions.

### Login to the Wireless AP through WLAN

Before configuring the Wireless AP through WLAN, make sure that the SSID, Channel and the WEP was set properly.

The default setting of the Wireless AP that you will use:

- SSID: default
- Channel: 6
- Wireless Encryption: disable
- IP address: 192.168.0.254

### Login

Before you configure this device, note that when the AP is configured through an Ethernet connection, make sure the manager PC must be set on same the **IP network**. For example, when the default network address of the default IP address of the AP is **192.168.0.254**, then the manager PC should be set at 192.168.0.x (where x is a number between 2 and 253), and the default subnet mask is 255.255.255.0.

Open Internet Explorer 5.0 or above Web browser.

Enter IP address **http://192.168.0.254** (the factory-default IP address setting) to the address location.



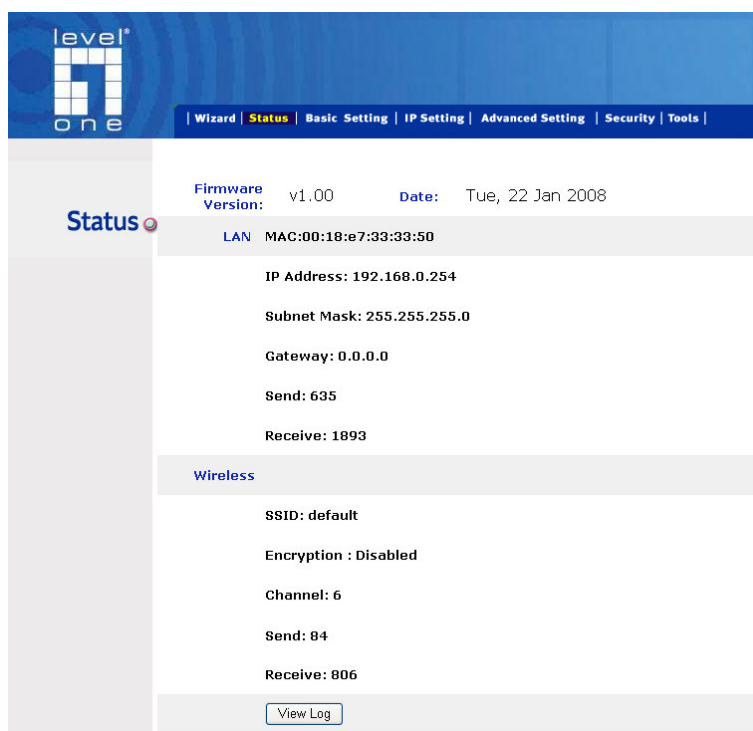
When there is a screen needs to enter the User name and Password, default Username is **“admin”** and Password is **“password”**



# Main Screen of the Access Point

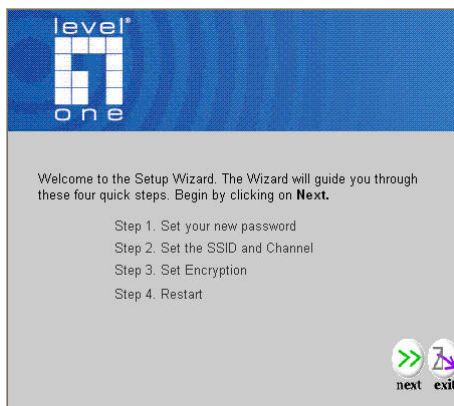
The screen will show the status of the AP when you login to the AP.

There are seven main functions included in the top side of the main screen: Wizard, Status, Basic Setting, IP Setting, Advanced Setting, Security and Tools. Point the selections in the top side of the menu screen.



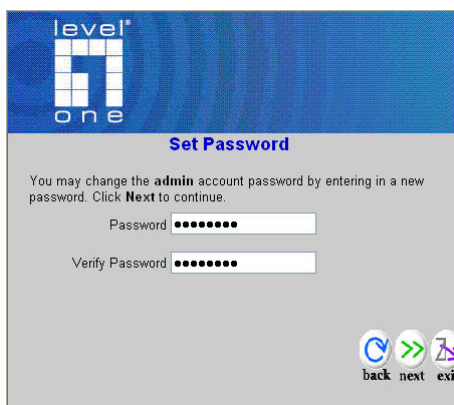
# Wizard

Setup wizard is provided as the part of the web configuration utility. User can simply follow the step-by-step process to get Access Point configuration ready to run in 4 easy steps by clicking on the “**Wizard**” button on the function menu. The following screen will appear. Please click “**Next**” to continue.



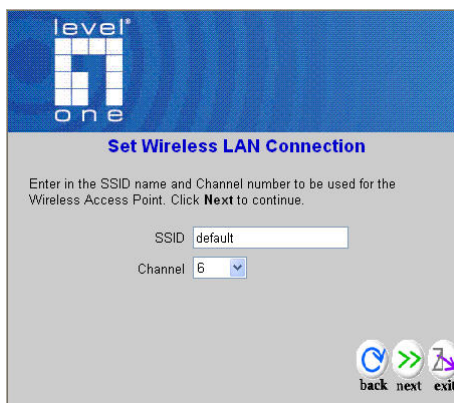
## Step 1: Set Password

User can change the password and then click “**Next**” to continue.



## Step2: Set WLAN Connection

Please type the name of SSID and select the Channel. Then, click “**Next**” to continue.



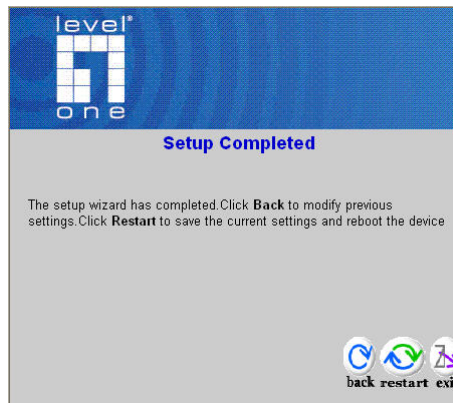
### Step 3: Set WEP Encryption

If user wants to enable WEP, please click **“Enabled”**. Then, select the key size of WEP encryption and enter the key value in the key text box. Please click **“Next”** to continue.



### Step 4: Restart

The Setup wizard is now completed. The new settings will be effective after the Access Point restarted. Please click **“Restart”** to reboot the Access Point. If user does not want to make any changes, please click **“exit”** to quit without any changes. User also can go back to modify the setting by clicking **“back”**.



# Status

This page as below shows the following information.

The screenshot shows the Level One Status page. At the top, there is a navigation bar with the following menu items: Wizard, Status (highlighted), Basic Setting, IP Setting, Advanced Setting, Security, and Tools. The main content area is titled "Status" and displays the following information:

- Firmware Version:** v1.00
- Date:** Tue, 22 Jan 2008
- LAN**
  - MAC: 00:18:e7:33:33:50
  - IP Address: 192.168.0.254
  - Subnet Mask: 255.255.255.0
  - Gateway: 0.0.0.0
  - Send: 635
  - Receive: 1893
- Wireless**
  - SSID: default
  - Encryption : Disabled
  - Channel: 6
  - Send: 84
  - Receive: 806

At the bottom of the page, there is a "View Log" button.

## Firmware Version

Shows the current firmware version and released date code.

## LAN

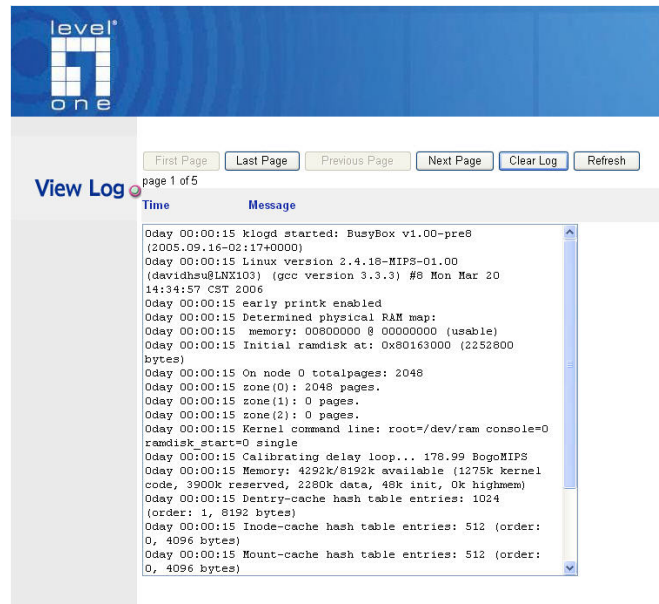
Shows the Mac address, IP address (default: 192.168.0.254), Subnet Mask, Gateway Address. The current LAN traffic calculated in terms of number of packets sent and received by AP through wired connection is also displayed.

## Wireless

Shows the Mac address, current SSID, the status of Encryption Function (Enable or Disable), the current using channel. The current wireless traffic calculated in terms of number of packets sent and received by AP through wireless communication is also displayed.

## View Log

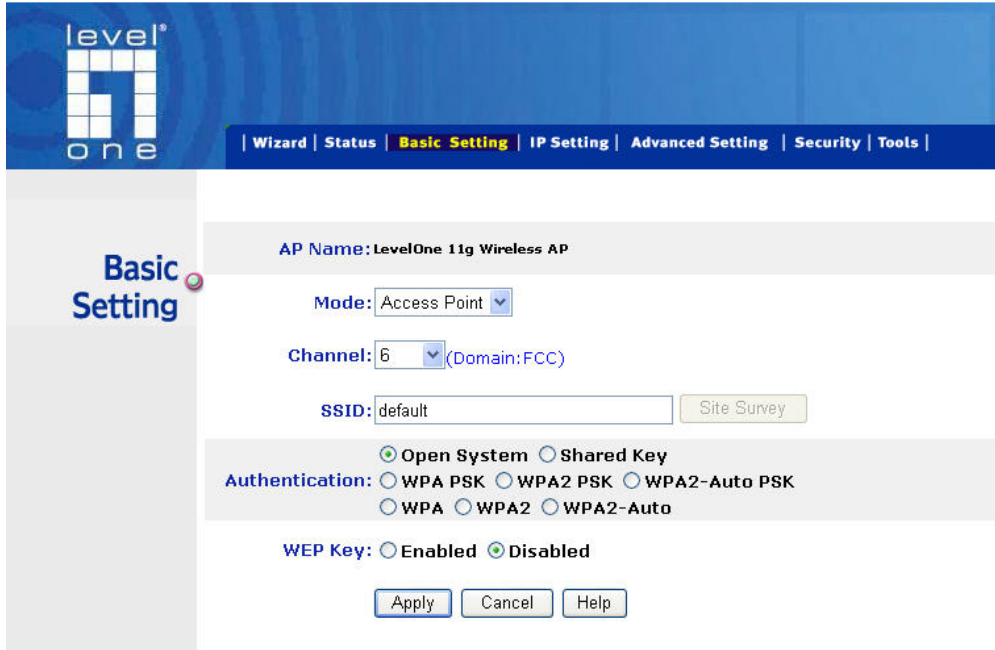
Once clicked, the page will change to login page. The login page records every event and the time that it happens.



User may clear the entries recorded in the log by clicking the “Clear Log” button, and refresh the screen to show the latest log entries by clicking the “Refresh” button.

# Basic Setting

This is the page allow user to change the access point settings.

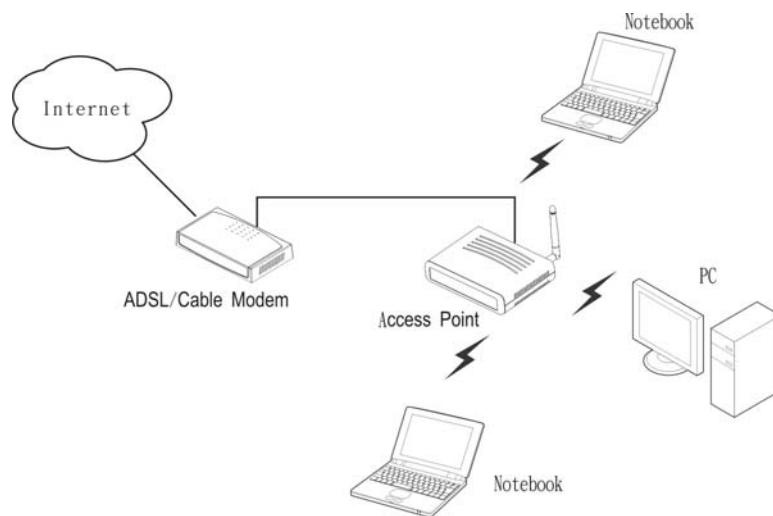


**AP Name:** The name of the AP, which can be used to identify the Access Point among the all the Access Points in the wireless network.

**Mode:** The WLAN AP supports five operation mode for Access Point, AP Client, WDS (Wireless Distribution System), AP+WDS and Repeater mode.

## Access Point Mode

Configure the AP to Access Point mode; with this mode, WLAN clients can access LAN or other WLAN clients through this AP.



***AP mode application***

**AP Name:** LevelOne 11g Wireless AP

**Mode:** Access Point ▼

**Channel:** 6 ▼ (Domain: FCC)

**SSID:** default

**Authentication:**  Open System  Shared Key  
 WPA PSK  WPA2 PSK  WPA2-Auto PSK  
 WPA  WPA2  WPA2-Auto

**WEP Key:**  Enabled  Disabled

### ***AP mode configuration***

**Channel:** The channel that AP will operate in. User can select the channel range from 1 to 11 for North America (FCC) domain, 1 to 13 for European (ETSI) domain and 1 to 14 for Japanese domain.

**SSID:** Service Set Identifier, which is a unique name shared among all clients and nodes in a wireless network. The SSID must be identical for each clients and nodes in the wireless network.

**Authentication Type:** The authentication type default is set to Open system. There are six options: Open system; Shared Key; WPA-PSK, WPA2-PSK, WPA and WPA2. User may want to set to Shared Key when the clients and AP in the same wireless network enable the encryption. All the nodes and hosts on the network must use the same authentication type.

**WEP Key:** To disable WEP security, click on the “Disable” option. To enable WEP security, there are 2 types to select – 64bits and 128 bits. When it is selected, the key value must be entered in ASCII or HEX format.

Note: When the WEP security is enabled, all the wireless clients that wish to connect to the Access Point must also have WEP enabled with the identical WEP Key value entered.



level one

Wizard | Status | **Basic Setting** | IP Setting | Advanced Setting | Security | Tools

Basic Setting

AP Name: LevelOne 11g Wireless AP

Mode: Access Point

Channel: 6 (Domain: FCC)

SSID: default Site Survey

Open System    Shared Key  
 Authentication:  WPA PSK    WPA2 PSK    WPA2-Auto PSK  
 WPA    WPA2    WPA2-Auto

WEP Key:  Enabled    Disabled

WEP Type:  64bits    128bits

Key Mode: HEX

Key:  1. [masked]  
 2. [masked]  
 3. [masked]  
 4. [masked]

Apply Cancel Help

### WPA-PSK / WPA2-PSK:

If WPA-PSK or WPA2-PSK is selected, user needs to set the key in the passphrase field as the below screen. The key length should be 8 characters at least.

level one

Wizard | Status | **Basic Setting** | IP Setting | Advanced Setting | Security | Tools

Basic Setting

AP Name: LevelOne 11g Wireless AP

Mode: Access Point

Channel: 6 (Domain: FCC)

SSID: default Site Survey

Open System    Shared Key  
 Authentication:  WPA PSK    WPA2 PSK    WPA2-Auto PSK  
 WPA    WPA2    WPA2-Auto

Passphrase: [input field]

Confirmed Passphrase: [input field]

Apply Cancel Help

### WPA / WPA2:

If WPA or WPA2 is selected, the below screen is shown. Please set the length of the encryption key and the parameters for the RADIUS server.



### **RADIUS Server 1:**

Enter the IP address of and the Port used by the Primary Radius Server, enter the Shared Secret, which is used by the Radius Server.

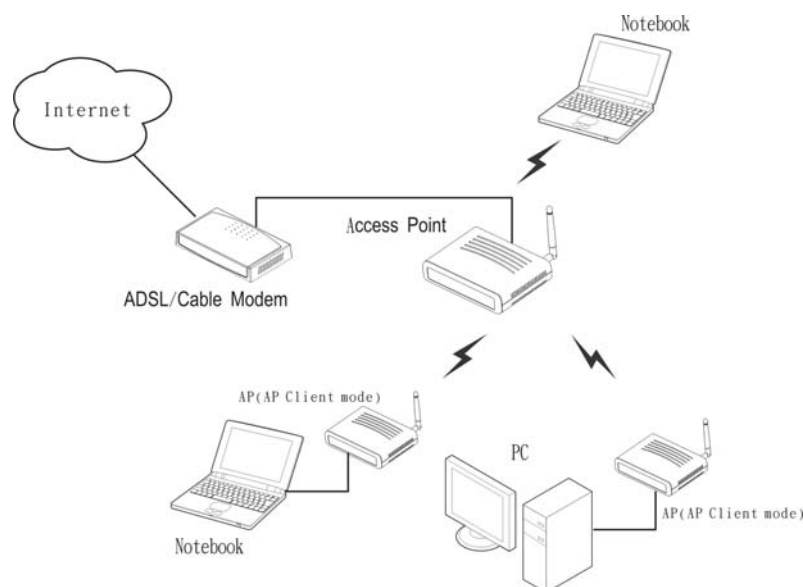
### **RADIUS Server 2: (optional)**

Enter the IP address of and the Port used by the Secondary Radius Server, enter the Shared Secret, which is used by the Radius Server.

**Apply:** For the changes made to any of the items above to be effective, click “Apply”. The new settings are now been saved to Access Point and will be effective once the Access Point restarts.

### **AP Client mode**

Configure the AP to AP Client mode; the AP will be a wireless Ethernet adapter transforms any Ethernet-enabled devices to have the wireless function.



***AP Client mode application***

**AP Name:** LevelOne 11g Wireless AP

**Mode:** AP Client

**Channel:** 6 (Domain: FCC)

**SSID:** default

Open System  Shared Key

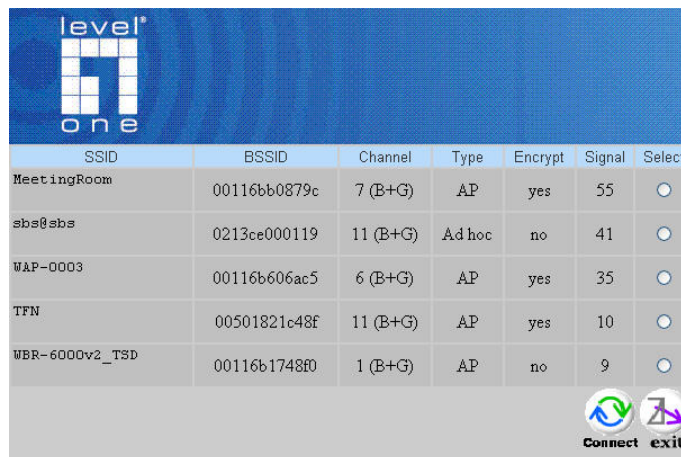
**Authentication:**  WPA PSK  WPA2 PSK  WPA2-Auto PSK  
 WPA  WPA2  WPA2-Auto

**WEP Key:**  Enabled  Disabled

### AP Client mode configuration

**SSID:** Service Set Identifier, which is a unique name shared among all clients and nodes in a wireless network. The SSID must be identical for each clients and nodes in the wireless network.

**Site Survey:** This button allows user to enable the Site Survey function to scan for the available wireless network (wireless clients and Access Points) and establish wireless communications with one. Selected one of them in list to establish communications and click “Connect” button.



SSID	BSSID	Channel	Type	Encrypt	Signal	Select
MeetingRoom	00116bb0879c	7 (B+G)	AP	yes	55	<input type="radio"/>
sbs@sbs	0213ce000119	11 (B+G)	Ad hoc	no	41	<input type="radio"/>
WAP-0003	00116b606ac5	6 (B+G)	AP	yes	35	<input type="radio"/>
TFN	00501821c48f	11 (B+G)	AP	yes	10	<input type="radio"/>
WBR-6000v2_TSD	00116b1748f0	1 (B+G)	AP	no	9	<input type="radio"/>

**Authentication Type:** The authentication type default is set to Open system. There are four options: Open system; Shared Key; WPA-PSK and WPA2-PSK. User may want to set to Shared Key when the clients and AP in the same wireless network enable the WEP encryption. All the nodes and hosts on the network must use the same authentication type.

**WEP Key:** To disable WEP security, click on the “Disable” option. To enable WEP security, there are 2 types to select – 64bits and 128 bits. When it is selected, the key value must be entered in ASCII or HEX format.

Note: When WEP security is enabled, all the wireless clients that wish to connect to the Access Point must also have WEP enabled with the identical WEP Key value entered.

level one

Wizard | Status | **Basic Setting** | IP Setting | Advanced Setting | Security | Tools

Basic Setting

AP Name: LevelOne 11g Wireless AP

Mode: AP Client

Channel: 6 (Domain: FCC)

SSID: default Site Survey

Open System
  Shared Key  
 Authentication:
  WPA PSK
  WPA2 PSK
  WPA2-Auto PSK  
 WPA
  WPA2
  WPA2-Auto

WEP Key:  Enabled  Disabled  
 WEP Type:  64bits  128bits  
 Key Mode: HEX

Key:
  1. \*\*\*\*\*  
 2. \*\*\*\*\*  
 3. \*\*\*\*\*  
 4. \*\*\*\*\*

Apply Cancel Help

## WPA-PSK / WPA2-PSK:

If WPA-PSK or WPA2-PSK is selected, user needs to set the key in the passphrase field as the below screen. The key length should be 8 characters at least.

level one

Wizard | Status | **Basic Setting** | IP Setting | Advanced Setting | Security | Tools

Basic Setting

AP Name: LevelOne 11g Wireless AP

Mode: AP Client

Channel: 6 (Domain: FCC)

SSID: default Site Survey

Open System
  Shared Key  
 Authentication:
  WPA PSK
  WPA2 PSK
  WPA2-Auto PSK  
 WPA
  WPA2
  WPA2-Auto

Passphrase: \*\*\*\*\*  
 Confirmed Passphrase: \*\*\*\*\*

Apply Cancel Help

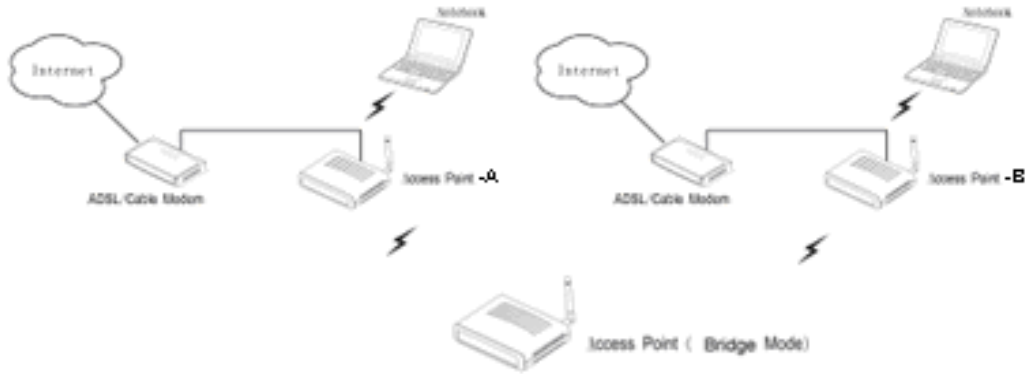
**Apply:** For the changes made to any of the items above to be effective, click “Apply”. The new settings are now been saved to Access Point and will be effective once the Access Point restarts.



For entering to the Web Setting page after changing to AP Client mode, change your PC/Notebook IP address to 192.168.0.x. After changing your IP address, type 192.168.0.254 on the Web browser to enter the setting of this Wireless AP.

## Bridge mode

Configure the AP to Bridge mode; a point-to-point configuration in which the AP relays frames from one other 802.11 bridge onto an adjacent Ethernet LAN.



### *Bridge mode application*

The Bridge need to fill all the AP's MAC address in the "Remote AP Mac" list, the maximum of one Bridge can join eight AP to be one group.

level one

Wizard | Status | **Basic Setting** | IP Setting | Advanced Setting | Security | Tools

Basic Setting

AP Name: LevelOne 11g Wireless AP

Mode: Bridge

Channel: 9 (Domain: ETSI)

Remote AP Mac: 1. The MAC address of AP-A, 2. The MAC address of AP-B

3. [ ] 4. [ ]

5. [ ] 6. [ ]

7. [ ] 8. [ ]

WDS Security: WEP 64bits

WEP Key: ASCII [ ]

Passphrase: (8~63 char.) [ ]

Apply Cancel Help

### *Bridge mode configuration*

**Security Type:** The security type default is set to none. There are four options: WEP 64bits; WEP 128bits; WPA-PSK and WPA2-PSK.

**WEP Key:** To enable WEP security, there are 2 types to select – 64bits and 128 bits. When it is selected, the key value must be entered in ASCII or HEX format.

Note: When WEP security is enabled, all the wireless clients that wish to connect to the Access Point must also have WEP enabled with the identical WEP Key value entered.

The image shows two side-by-side screenshots of the configuration interface for an AP. Both screenshots show the 'AP Name' as 'LevelOne 11g Wireless AP', 'Mode' as 'Bridge', and 'Channel' as '9 (Domain:ETSI)'. Below these are fields for 'Remote AP Mac' with eight numbered input boxes. The left screenshot shows 'WDS Security' set to 'WEP 64bits', with a 'WEP Key' dropdown set to 'Hex' and a 'Passphrase' field. The right screenshot shows 'WDS Security' set to 'WEP 128bits', with a 'WEP Key' dropdown set to 'Hex' and a 'Passphrase' field. Both screenshots have 'Apply', 'Cancel', and 'Help' buttons at the bottom.

### WPA-PSK / WPA2-PSK:

If WPA-PSK or WPA2-PSK is selected, user needs to set the key in the passphrase field as the below screen. The key length should be 8 characters at least.

The image shows two side-by-side screenshots of the configuration interface for an AP. Both screenshots show the 'AP Name' as 'LevelOne 11g Wireless AP', 'Mode' as 'Bridge', and 'Channel' as '9 (Domain:ETSI)'. Below these are fields for 'Remote AP Mac' with eight numbered input boxes. The left screenshot shows 'WDS Security' set to 'WPA-PSK', with a 'WEP Key' dropdown set to 'Hex' and a 'Passphrase' field. The right screenshot shows 'WDS Security' set to 'WPA2-PSK', with a 'WEP Key' dropdown set to 'Hex' and a 'Passphrase' field. Both screenshots have 'Apply', 'Cancel', and 'Help' buttons at the bottom.

**Apply:** For the changes made to any of the items above to be effective, click “Apply”. The new settings are now been saved to Access Point and will be effective once the Access Point restarts

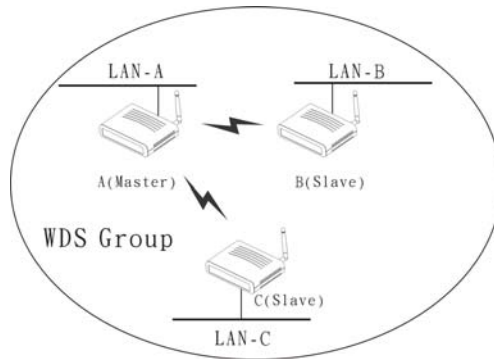
## WDS mode

With WDS (Wireless Distribution System) mode, user can use wireless media to communicate two or more LANs through the AP with WDS mode, all of the LAN will be combined in the WDS group, for example:

Single WDS group application:

When there are three APs joined to the WDS group, one of the AP in WDS mode will be the Master, the other two APs will be the Slave, all of the APs in the WDS group must use the same wireless channel and the same security setting, the Master need to fill all the Slave's MAC address in the "Remote AP Mac" list, and the Slave need to fill the Master's MAC address in the "Remote AP Mac" list, the maximum of one Master can join eight Slave to be one WDS group.

In this example, LAN-A can communicate with LAN-B and LAN-C, and LAN-B can communicate with LAN-C through the AP-A. All of LANs will be at the same LAN environment coming through LAN-A.



**WDS mode application (Single WDS group)**

<p><b>AP Name:</b> LevelOne 11g Wireless AP</p> <p><b>Mode:</b> WDS</p> <p><b>Channel:</b> 9 (Domain:ETSI)</p> <p><b>SSID:</b> <input type="text"/> <input type="button" value="Site Survey"/></p> <p><b>Authentication:</b> <input checked="" type="radio"/> Open System <input type="radio"/> Shared Key  <input type="radio"/> WPA PSK <input type="radio"/> WPA2 PSK <input type="radio"/> WPA2-Auto PSK  <input type="radio"/> WPA <input type="radio"/> WPA2 <input type="radio"/> WPA2-Auto</p> <p><b>WEP Key:</b> <input type="radio"/> Enabled <input checked="" type="radio"/> Disabled</p> <p><b>Remote AP Mac:</b> 1. <input type="text"/> 2. <input type="text"/>  3. <input type="text"/> 4. <input type="text"/>  5. <input type="text"/> 6. <input type="text"/>  7. <input type="text"/> 8. <input type="text"/></p> <p><b>WDS Security:</b> WEP 64bits</p> <p><b>WEP Key:</b> ASCII <input type="text"/></p> <p><b>Passphrase:</b> (8~63 char.) <input type="text"/></p> <p><input type="button" value="Apply"/> <input type="button" value="Cancel"/> <input type="button" value="Help"/></p>	<p><b>AP Name:</b> LevelOne 11g Wireless AP</p> <p><b>Mode:</b> WDS</p> <p><b>Channel:</b> 9 (Domain:ETSI)</p> <p><b>SSID:</b> <input type="text"/> <input type="button" value="Site Survey"/></p> <p><b>Authentication:</b> <input checked="" type="radio"/> Open System <input type="radio"/> Shared Key  <input type="radio"/> WPA PSK <input type="radio"/> WPA2 PSK <input type="radio"/> WPA2-Auto PSK  <input type="radio"/> WPA <input type="radio"/> WPA2 <input type="radio"/> WPA2-Auto</p> <p><b>WEP Key:</b> <input type="radio"/> Enabled <input checked="" type="radio"/> Disabled</p> <p><b>Remote AP Mac:</b> 1. <input type="text"/> 2. <input type="text"/>  3. <input type="text"/> 4. <input type="text"/>  5. <input type="text"/> 6. <input type="text"/>  7. <input type="text"/> 8. <input type="text"/></p> <p><b>WDS Security:</b> WEP 64bits</p> <p><b>WEP Key:</b> ASCII <input type="text"/></p> <p><b>Passphrase:</b> (8~63 char.) <input type="text"/></p> <p><input type="button" value="Apply"/> <input type="button" value="Cancel"/> <input type="button" value="Help"/></p>
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*Master setting (AP-A)*

*Slave setting (AP-B and AP-C)*

**WDS mode configuration for Example-1**

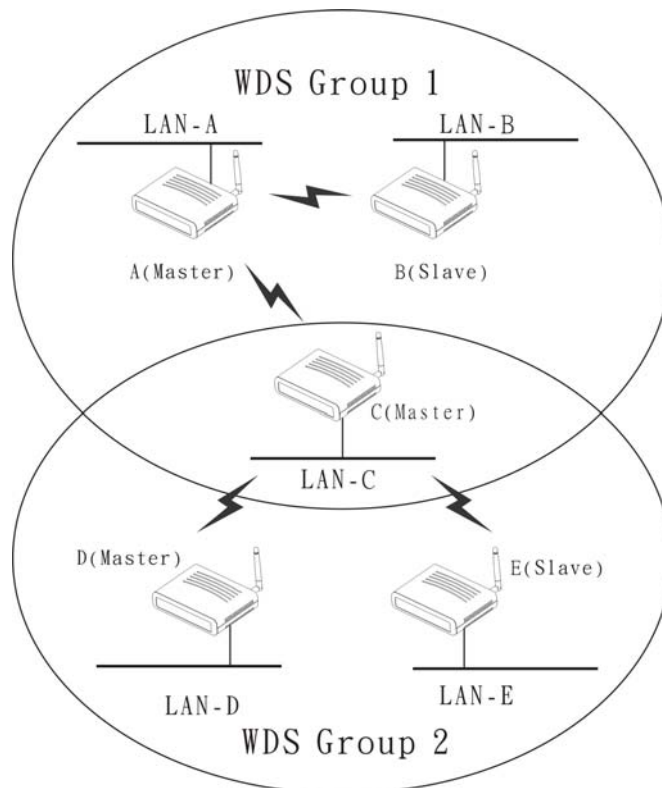
## Multiple WDS group application:

When there are five APs to be joined into two separated WDS groups, the members of WDS group 1 are AP-A, AP-B, and AP-C, and the members of WDS group 2 are AP-C, AP-D, and AP-E. AP-C will join both of WDS group 1 and WDS group 2, each WDS Group 1 will be one master and the other will be slave.

The AP-A and AP-C will be both as a Master AP for both WDS Groups, the AP-A represents for the master of WDS Group 1, the AP-C represents for the master of the WDS Group 2 and at the same time AP-C will be the slave of WDS Group 1, so all of the APs in the two WDS groups must use the same wireless channel and same security, the Master needs to fill all of Slave's MAC address in the "Remote AP Mac" list, and the Slave needs to fill the Master's MAC address in the "Remote AP Mac" list, maximum allow one Master can be joined eight Slaves to be one WDS group.

In this example, LAN-A can communicate with LAN-B and LAN-C, and LAN-B can communicate with LAN-C through the AP-A. LAN-B will have the same LAN environment coming through LAN-A.

LAN-E can communicate with LAN-B and LAN-D, LAN-E can communicate with LAN-D through AP-C, LAN-E can communicate with LAN-B through AP-C and AP-A, LAN-E will have the same LAN environment coming through LAN-A.



**WDS mode application (Multiple WDS group)**



AP Name: 802.11g Wireless LAN

Mode: WDS

Channel: 9

Remote AP Mac: 1. The MAC address of AP-B 2. The MAC address of AP-C

3. 4.

5. 6.

7. 8.

WDS Security: WEP 64bits

WEP Key: ASCII

Passphrase: (8~63 char.)

Apply Cancel Help

Master setting (AP-A, WDS Group 1)

AP Name: 802.11g Wireless LAN

Mode: WDS

Channel: 9

Remote AP Mac: 1. The MAC address of AP-A 2.

3. 4.

5. 6.

7. 8.

WDS Security: WEP 64bits

WEP Key: ASCII

Passphrase: (8~63 char.)

Apply Cancel Help

Slave setting (AP-B, WDS Group 1)

AP Name: 802.11g Wireless LAN

Mode: WDS

Channel: 9

Remote AP Mac: 1. The MAC address of AP-A 2. The MAC address of AP-D

3. The MAC address of AP-E 4.

5. 6.

7. 8.

WDS Security: WEP 64bits

WEP Key: ASCII

Passphrase: (8~63 char.)

Apply Cancel Help

Master setting (AP-C, WDS Group 2)

AP Name: 802.11g Wireless LAN

Mode: WDS

Channel: 9

Remote AP Mac: 1. The MAC address of AP-C 2.

3. 4.

5. 6.

7. 8.

WDS Security: WEP 64bits

WEP Key: ASCII

Passphrase: (8~63 char.)

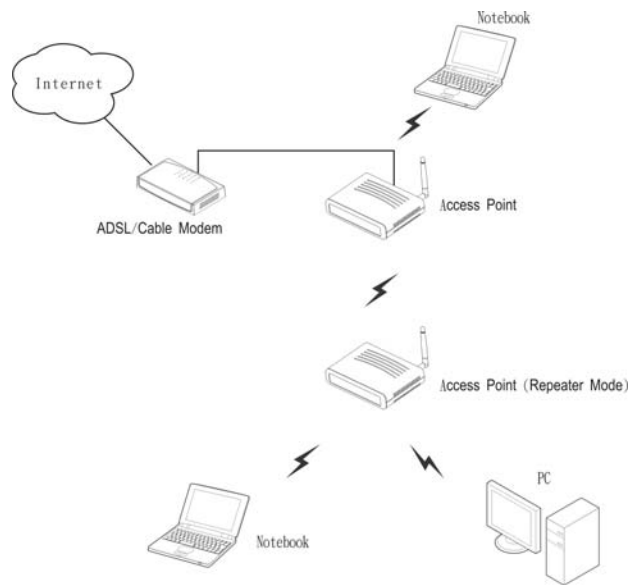
Apply Cancel Help

Slave setting (AP-D and AP-E, WDS Group 2)

**WDS mode configuration for Example-2**

## Repeater mode

Configure the AP to Repeater mode; the AP will be a wireless LAN repeater that will be extended the WLAN coverage range.



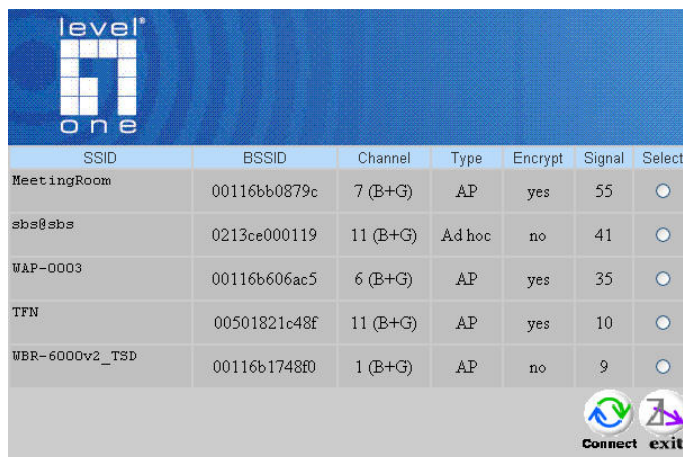
**Repeater mode application**

AP Name: 802.11g Wireless LAN  
Mode: Repeater  
Channel: 9  
SSID: [ ] Site Survey  
Authentication:  Open System  Shared Key  
 WPA-PSK  WPA2-PSK  
 WPA  WPA2  
WEP Key:  Enabled  Disabled  
Apply Cancel Help

**Repeater mode configuration**

**SSID:** Service Set Identifier, which is a unique name shared among all clients and nodes in a wireless network. The SSID must be identical for each clients and nodes in the wireless network.

**Site Survey:** This button allows user to enable the Site Survey function to scan for the available wireless network (wireless clients and Access Points) and establish wireless communications with one. Selected one of them in list to establish communications and click “Connect” button.



SSID	BSSID	Channel	Type	Encrypt	Signal	Select
MeetingRoom	00116bb0879c	7 (B+G)	AP	yes	55	<input type="radio"/>
sbs@sbs	0213ce000119	11 (B+G)	Ad hoc	no	41	<input type="radio"/>
WAP-0003	00116b606ac5	6 (B+G)	AP	yes	35	<input type="radio"/>
TFN	00501821c48f	11 (B+G)	AP	yes	10	<input type="radio"/>
WBR-6000v2_TSD	00116b1748f0	1 (B+G)	AP	no	9	<input type="radio"/>

Connect exit

**Authentication Type:** The authentication type default is set to Open system. There are four options: Open system; Shared Key; WPA-PSK and WPA2-PSK. User may want to set to Shared Key when the clients and AP in the same wireless network enable the WEP encryption. All the nodes and hosts on the network must use the same authentication type.

**WEP Key:** To disable WEP security, click on the “Disable” option. To enable WEP security, there are 2 types to select – 64bits and 128 bits. When it is selected, the key value must be entered in ASCII or HEX format.

Note: When WEP security is enabled, all the wireless clients that wish to connect to the Access Point must also have WEP enabled with the identical WEP Key value entered.



AP Name: 992.11g Wireless LAN

Mode: Repeater

Channel: 11

SSID: [text box] Site Survey

Authentication:  Open System  Shared Key

Authentication:  WPA-PSK  WPA2-PSK

WPA WPA2

WEP Key:  Enabled  Disabled

WEP Type:  64bits  128bits

Key Mode: HEX

Key: 1. [text box]

2. [text box]

3. [text box]

4. [text box]

Apply Cancel Help

## WPA-PSK / WPA2-PSK:

If WPA-PSK or WPA2-PSK is selected, user needs to set the key in the passphrase field as the below screen. The key length should be 8 characters at least.



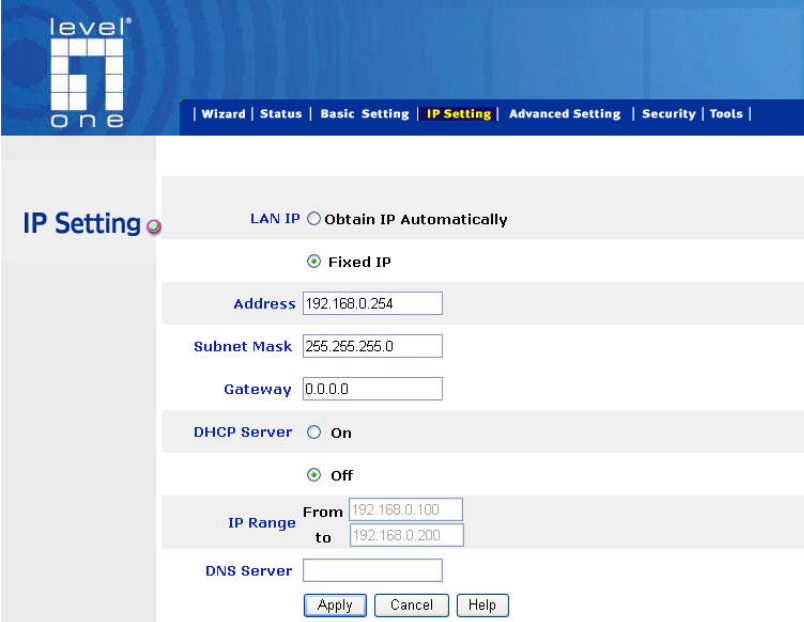
The screenshot displays a configuration window for an Access Point (AP) named "002.11g Wireless LAN". The "Mode" is set to "Repeater". Below this, there are fields for "Channel" and "SSID", with a "Site Survey" button next to the SSID field. The "Authentication" section is highlighted with a red box and contains the following options: "Open System", "Shared Key", "WPA-PSK" (selected), "WPA2-PSK", "WPA", and "WPA2". Below the authentication options are two text input fields: "Passphrase:" and "Confirmed Passphrase:", both containing masked characters (dots). At the bottom of the highlighted area are three buttons: "Apply", "Cancel", and "Help".

**Apply:** For the changes made to any of the items above to be effective, click "Apply". The new settings are now been saved to Access Point and will be effective once the Access Point restarts.

## 5. IP Setting

---

This page allows user to configure the IP and DHCP settings of the Access Point.



The screenshot shows the 'IP Setting' configuration page for a Level One device. The page has a blue header with the 'level one' logo and a navigation menu with options: Wizard, Status, Basic Setting, IP Setting (highlighted), Advanced Setting, Security, and Tools. The main content area is titled 'IP Setting' and contains the following settings:

- LAN IP:** Radio buttons for 'Obtain IP Automatically' and 'Fixed IP'. 'Fixed IP' is selected.
- Address:** Text box containing '192.168.0.254'.
- Subnet Mask:** Text box containing '255.255.255.0'.
- Gateway:** Text box containing '0.0.0.0'.
- DHCP Server:** Radio buttons for 'On' and 'Off'. 'Off' is selected.
- IP Range:** 'From' text box contains '192.168.0.100' and 'to' text box contains '192.168.0.200'.
- DNS Server:** Empty text box.

At the bottom of the form are three buttons: 'Apply', 'Cancel', and 'Help'.

The default IP address of this access point is 192.168.0.254 with the subnet mask of 255.255.255.0. User can type in other values for IP Address, Subnet Mask and Gateway and click “**Apply**” button for the changes to be effective.

User can also set the Access Point to obtain the IP from a DHCP server, but it is not recommended. Select the option “Obtain IP Automatically” and click “**Apply**” button for the changes to be effective.

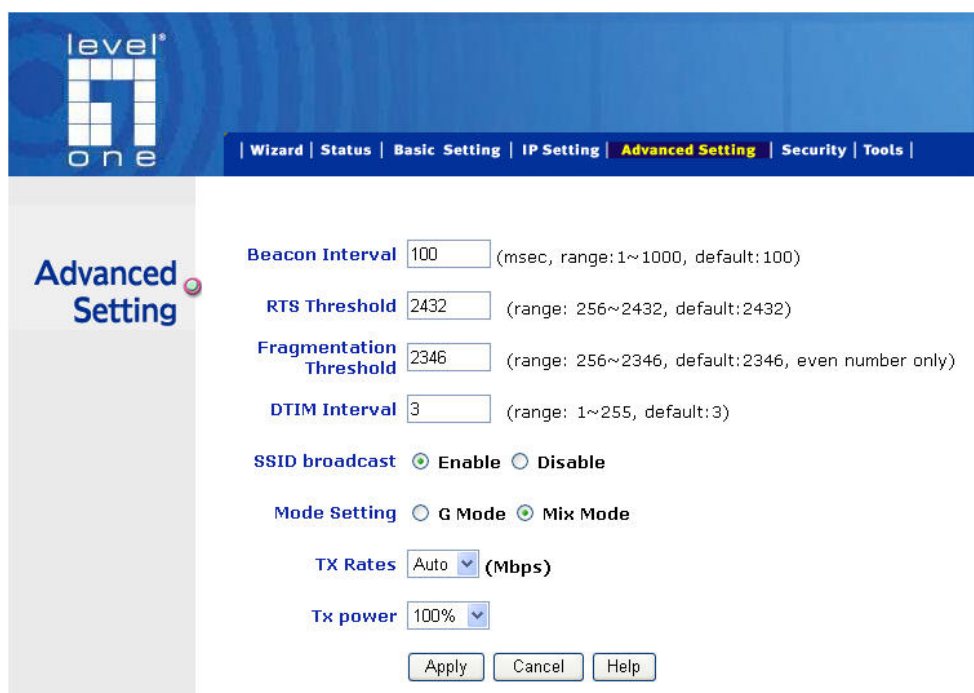
**DHCP Server:** It is not recommended to enable the DHCP Server if user has a DHCP server running in LAN network because it probably will cause possible the conflict of IP assignment. Enable the DHCP server function by selecting the option “**On**”, and enter the IP range.

**DNS Server:** Type up to DNS IP address in the text boxes. Your ISP will provide you with this information.

Click “**Apply**” for the changes to be effective

## Advanced Setting

This page contains configurations for advanced users, which the change reflects the wireless performance and operating modes.



level one

Wizard | Status | Basic Setting | IP Setting | **Advanced Setting** | Security | Tools

**Advanced Setting**

**Beacon Interval**  (msec, range: 1~1000, default: 100)

**RTS Threshold**  (range: 256~2432, default: 2432)

**Fragmentation Threshold**  (range: 256~2346, default: 2346, even number only)

**DTIM Interval**  (range: 1~255, default: 3)

**SSID broadcast**  Enable  Disable

**Mode Setting**  G Mode  Mix Mode

**TX Rates**  (Mbps)

**Tx power**

**Beacon Interval:** To set the period of time in milliseconds that AP sends out a beacon. Default is 100 milliseconds.

**RTS Threshold:** To set the size of RTS/CTS packet size. Default is 2432 bytes.

**Fragmentation Threshold:** To set the number of bytes used for the fragmentation boundary for directed messages. Default is 2346 bytes.

**DTIM Interval:** This value indicates the interval of the Delivery Traffic Indication Message (DTIM). A DTIM field is a countdown field informing clients of the next window for listening to broadcast and multicast messages. When the access point has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM interval value. Access point clients hear the beacons and awaken to receive the broadcast and multicast messages.

**SSID Broadcast:** While SSID Broadcast is enabled, all wireless clients will be able to communicate with the access point. For secure purpose, user may want to disable SSID broadcast to allow only those wireless clients with the AP SSID to communicate with the access point.

**Mode Setting:** To set AP's operation as G Mode for 802.11g only or Mix Mode for 802.11b/802.11g.

**TX Rates:** Select one of the wireless communications transfer rates, measured in megabytes per second, based upon the speed of wireless adapters connected to the WLAN.

# Security

This page is where user configures the security features supported by this Access Point.

The screenshot shows the Level One Security configuration interface. It includes a navigation bar with tabs for Wizard, Status, Basic Setting, IP Setting, Advanced Setting, Security (selected), and Tools. The main content area is titled 'Security' and contains several sections: 'Password' with fields for 'AP Password New' and 'Confirm', and buttons for 'Apply', 'Cancel', and 'Help'; 'MAC Filter' with radio buttons for 'Disabled MAC Filters', 'Only allow PCs with MAC listed below to access device', and 'Only deny PCs with MAC listed below to access device'; a 'MAC address' field with six input boxes and a 'Clear' button; a 'Connected PCs' dropdown menu and a 'Clone' button; and another set of 'Apply', 'Cancel', and 'Help' buttons. Below this is a 'MAC Filter List' section with a table header 'MAC Address'.

**Password:** Allow user to change the new login password. Here are the necessary steps:

1. Enter the new password in the “**AP Password New:**” field.
2. Enter the new password again in the “**Confirm**” field.
3. Click “**Apply**”

**MAC Filter:** MAC Filter function controls the MAC of the network devices that are listed in this table for access authorization or denial. There have three choices:

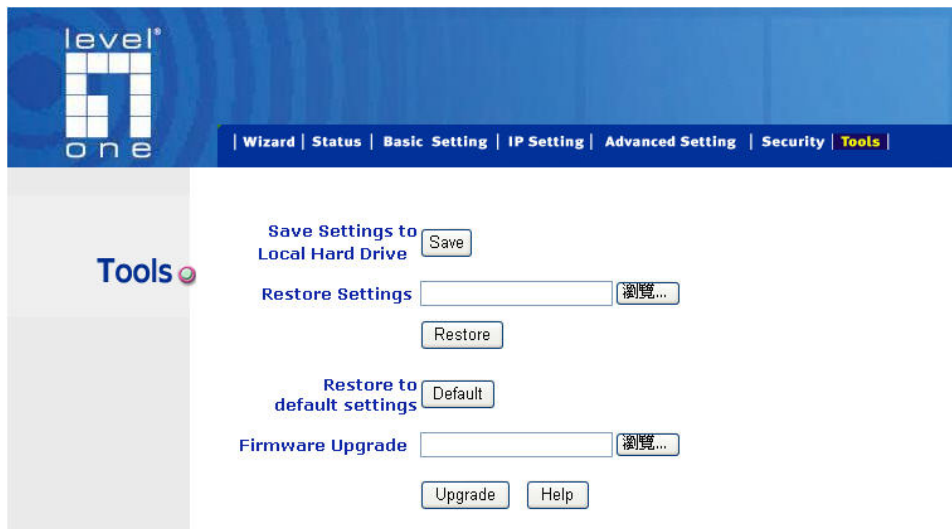
- ◆ Disable MAC Filters
- ◆ Only **allow** PCs with MAC listed below to access device
- ◆ Only **deny** PCs with MAC listed below to access device

The maximum number of MAC addresses that can be stored is 50. User can browse through the MAC address saved by selecting the MAC Filter List.

For any changes made in the security page, click “Apply” for the changes to be effective.

# Tools

Four functions are provided in this page, Backup, Restore Settings, Restore default settings and Firmware Upgrade.



**Save Settings to Local Hard Drive:** Click on “**Save Settings to Local Hard Drive**” button, which will open a FileSave Dialog box, where user gets to save all the current settings and configurations to a file.

**Restore Settings:** Click on the “**Browse**” button to open a FileOpen Dialog box, where user gets to select the file, which saves previous settings and configurations. Upon selecting the saved file, click “**Restore**” and complete the restore process when the access point re-operates after it restarts.

**Restore to default settings:** Click on “**Default**” button to restore the access point back to its manufacture default settings.

**Firmware Upgrade:** Click on the “**Browse**” button to open a FileOpen Dialog box, where gets to select the firmware file, which download from the web for the latest version. Upon selecting the firmware file, click “**Upgrade**” and complete the firmware upgrade process when the Access Point re-operates after it restarts.



## Technical Specifications

<b>General</b>	
Standards	IEEE 802.11b/g IEEE 802.3u 10/100BASE-TX Fast Ethernet IEEE 802.3af Power over Ethernet (WAP-3100 only)
Signal Type:	DSSS (802.11b) OFDM (802.11g)
Modulation:	QPSK / BPSK / CCK / OFDM
LED Indicators:	Power, LAN (Link/Activity), WLAN (Link)
Frequency	2412 MHz ~ 2462 MHz (FCC) 2412 MHz ~ 2472 MHz (ETSI) 2400 MHz ~ 2484 MHz (Japan)
Channel	1 ~ 11 Channels (FCC) 1 ~ 13 Channels (ETSI)
Data Encryption:	64 bit / 128 bit WEP Encryption, WPA, WPA2, WPA-PSK, WPA2-PSK
Data Transfer Rate	Fast Ethernet: 10/100Mbps Wireless: Up to 54Mbps (with Automatic Scale Back)
Receiver Sensitivity	54Mbps: Typical -68 dBm @10% PER 11Mbps: Typical -81 dBm @8% PER
Transmit Power	802.11g: Minimum 13dBm typically 802.11b: Minimum 15dBm typically
Transmission Range:	Outdoor: 100~300M (depends on environment) Indoor: 50~100M (depends on environment)
Network Cables	2-pair UTP/STP Cat. 3,4,5 (100 m)
Interface	1 x 10/100Mbps RJ45 port
Antenna:	1 x 2 dBi Dipole Antenna
<b>Physical and Environmental</b>	
DC inputs	DC 7.5V /1A
Power Consumption	4.2W (Max)

Temperature	Operating: 0 ~ 40 °C, Storage: -10 ~ 70 °C
Humidity	Operating: 10% ~ 90%, Storage: 5% ~ 90%
Dimensions	140 x 98 x 30 mm (W x H x D) without Antenna
EMI:	FCC Class B, CE Mark B,

This product incorporates open source code into the software and therefore falls under the guidelines governed by the General Public License (GPL) agreement.

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