# 2.4G 54Mbps
# Wireless LAN Dual Mode AP/Bridge

# User’ s Manual

Version 1.0

**FCC Warning**

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:

- 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.

You are cautioned that changes or modifications not expressly Combo AP/Bridge approved by the party responsible for compliance could void your authority to operate the equipment.

**FCC Radiation Exposure Statement**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and should be installed and operated with minimum distance 20cm between the radiator & your body.

Contain TX FCC ID: N89-WM601I

**CE Marking 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.

# Table of Contents

**About this manual**

This user' s manual describes how to install and operate the Wireless Combo AP/Bridge. Please read this manual before you install the product.

This manual includes the following topics:

- Product description, features and specifications
- Hardware installation procedures
- Software installation procedures
- Trouble shooting procedures

# 1. Introduction

Congratulations on your purchase of this 2.4G 54Mbps Wireless Combo AP/Bridge. This product is designed specifically for high-speed wireless LAN environment needs. It is easy to configure and operate even for non-technical users. Instructions for installing and configuring this product are included in this manual. Before you install and use this product, please read the manual carefully so you may take full advantage of its functions.

## The Wireless Combo AP/Bridge Features

### *Wireless Features*

- **11g Compliant** – The COMBO AP/BRIDGE complies with IEEE802.11g, and it is interoperable with IEEE802.11g-Compliant Equipment
- **Interoperable with IEEE802.11b** –Backward compatible with IEEE802.11b equipments
- **Flexible Connectivity** – Using external, detachable dipole antenna to serve various customers' needs in real world.
- **Data Rate Auto Fall-Back** - Provides 54, 48, 36, 24,12, 11, 9, 6, 5.5, 2 and 1Mbps wireless data rate shifting dynamically between 11g and 11b to guarantee availability and reliability of wireless connections
- **Roaming** – Provides seamless roaming within 802.11g and 802.11b wireless LAN infrastructure.

### *LAN Features*

- **Built-in 10/100M LAN Port** – It' s designed to connect the Wireless Combo AP/Bridge with any 10/100M LAN Hub/Switch or router. It' s also designed to connect with any Ethernet-ready devices, such as desktop PC, printer server, and network printer/scanner in Adapter mode.
- **DHCP Client** – Enable the Combo AP/Bridge to act as a DHCP client to receive IP address from DHCP Server in the wired Ethernet LAN.

### *Configuration & Management*

- **Easy to Setup** – With windows-based Wireless Navigator Utility, user can easily setup the IP address of this Combo AP/Bridge, and upgrade the firmware.
- **Easy to manage** – User can use any WEB browser from anywhere on the wired or wireless LAN to configure the Combo AP/Bridge easily.

### *Security*

- **Configuring Protection** – Provides password protection to prevent unauthorized users from changing the configuration
- **Wireless LAN Security** - Provide 64-bit & 128-bit Wired Equivalent Privacy encryption to protect the wireless data transmissions.

## Package Contents

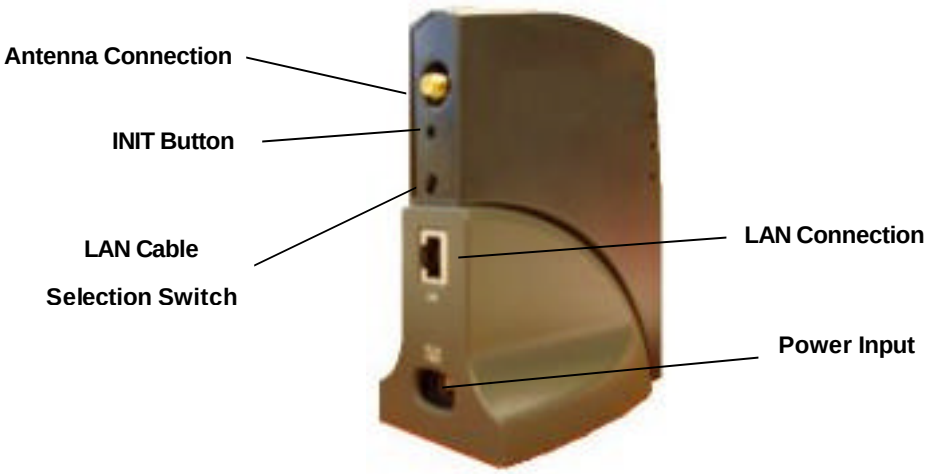
- One Wireless Combo AP/Bridge
- One External Antenna with Reversed SMA Connector
- One CD-ROM (Wireless Navigator utility software & user' s manual included)
- One UTP straight LAN Cable (RJ-45 connector)
- One Power Adapter
- One Quick Installation Guide

If any of the above items are damaged or missing, please contact your dealer immediately.

# 2. Hardware Installation

## Physical Details

### *Rear Panel*




**Antenna Connection** Please install the external dipole antenna directly into the reversed SMA connector of COMBO AP/BRIDGE. After the COMBO AP/BRIDGE starts to work, you may adjust the angle of the antenna or reposition the COMBO AP/BRIDGE to get a better performance and reach.

**INIT Button** **"INIT"** mean "Initiation". While pressing the button, the COMBO AP/BRIDGE will reboot and ERASE current settings, and restore to factory default settings. The left indicator "DIAG" on COMBO AP/BRIDGE will be off and then begin blinking. Then this initiation action will be completed when the indicator "DIAG" is always green instead of blinking.

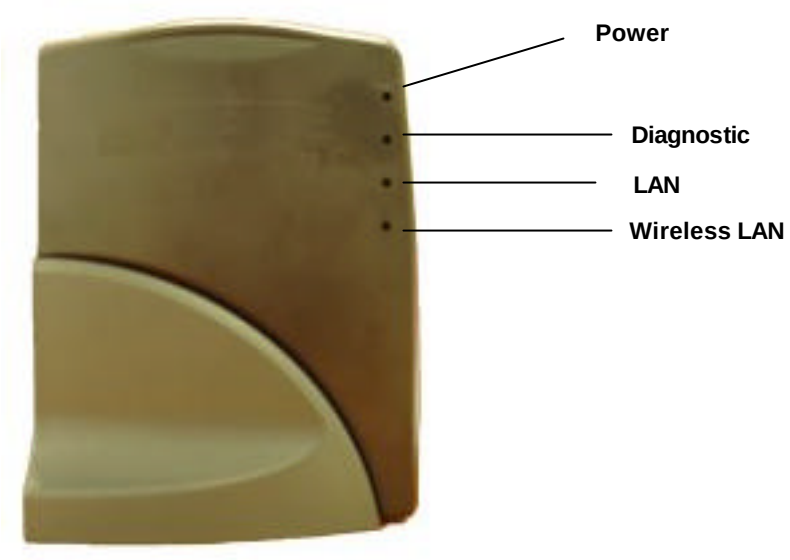
**LAN Cable Selection Switch**

| | |
|---|---|
| **X** | **Crossover:** the RJ-45 port Tx and Rx lines are reversed. Use this setting when you use the supplied **UTP straight** cable connected to PC. |
| **II** | **Straight:** the RJ-45 port Tx and Rx lines are normal. Use this setting when you have the supplied **UTP straight** cable connected to Hub/Switch or Router. **It is also the factory default setting.** |

**Power Input** Only use the power adapter supplied with the Access Point

**LAN Connection** Use standard LAN cable (UTP Straight, RJ-45 connector) to connect your PC, hub/switch or broadband router/modem to this port. v

## *LED Indications*

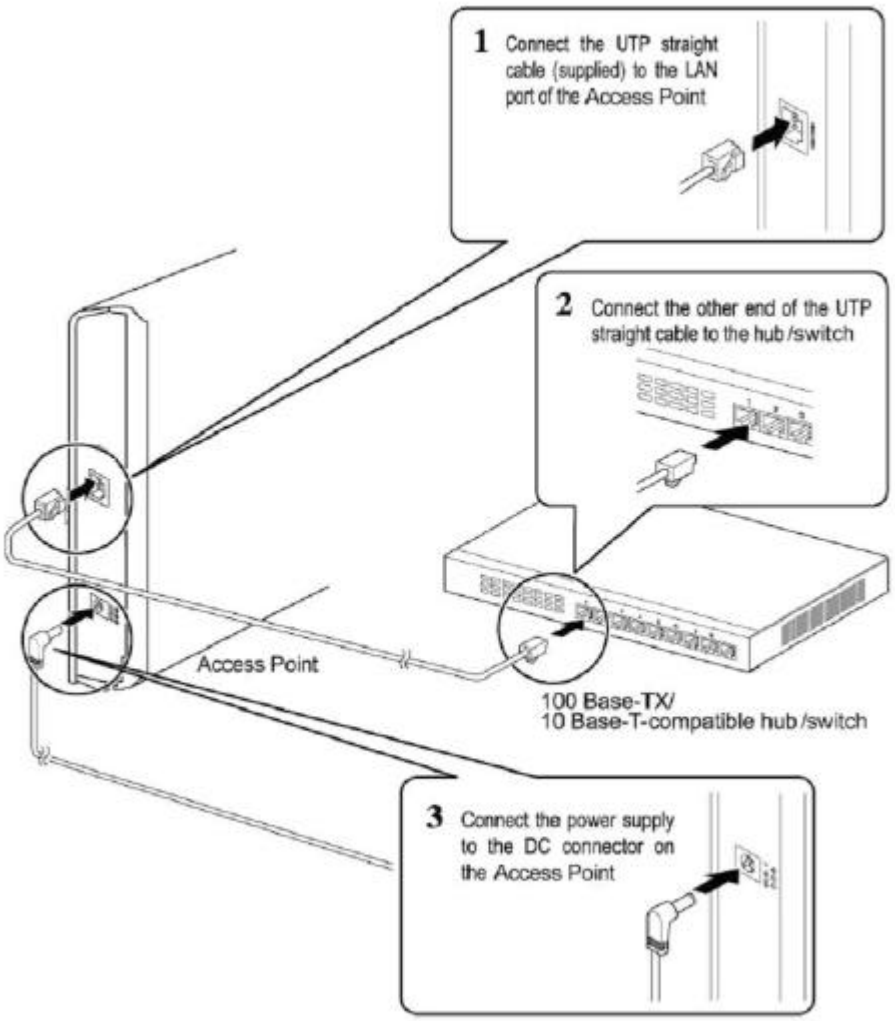



| LED | Color | Status | Description |
|---|---|---|---|
| **Power** | Green | ON | The Combo AP/Bridge power on |
| | | OFF | The Combo AP/Bridge power off |
| **DIAG** | Green | ON | 1) The Combo AP/Bridge is in normal operation mode<br>2) While in firmware upgrade process, it indicates the Combo AP/Bridge is writing the firmware into Flash ROM |
| | | Blinking | 1) The Combo AP/Bridge is in self-diagnostic mode.<br>2) While in firmware upgrade process, it indicates the Combo AP/Bridge is waiting the Wireless Navigator sending firmware image |
| | | OFF | 1) The Combo AP/Bridge starts to boot up the system.<br>2) While in firmware upgrade process, it indicates the firmware upgrade process is finished. |
| **LAN** | Green | ON | The LAN port is connected with any LAN port successfully |
| | | Blinking | Sending or receiving data |
| | | OFF | No connection, and neither data forwarding from LAN ports. |
| **WLAN** | Green | ON | Wireless port is connected with another wireless device(s) successfully |
| | | OFF | Wireless port is not connected to any device. |
| | | Blinking | Sending or Receiving data via wireless |

## AP Hardware Installation

Following illustration is an example showing how to install COMBO AP/BRIDGE with hub/switch.

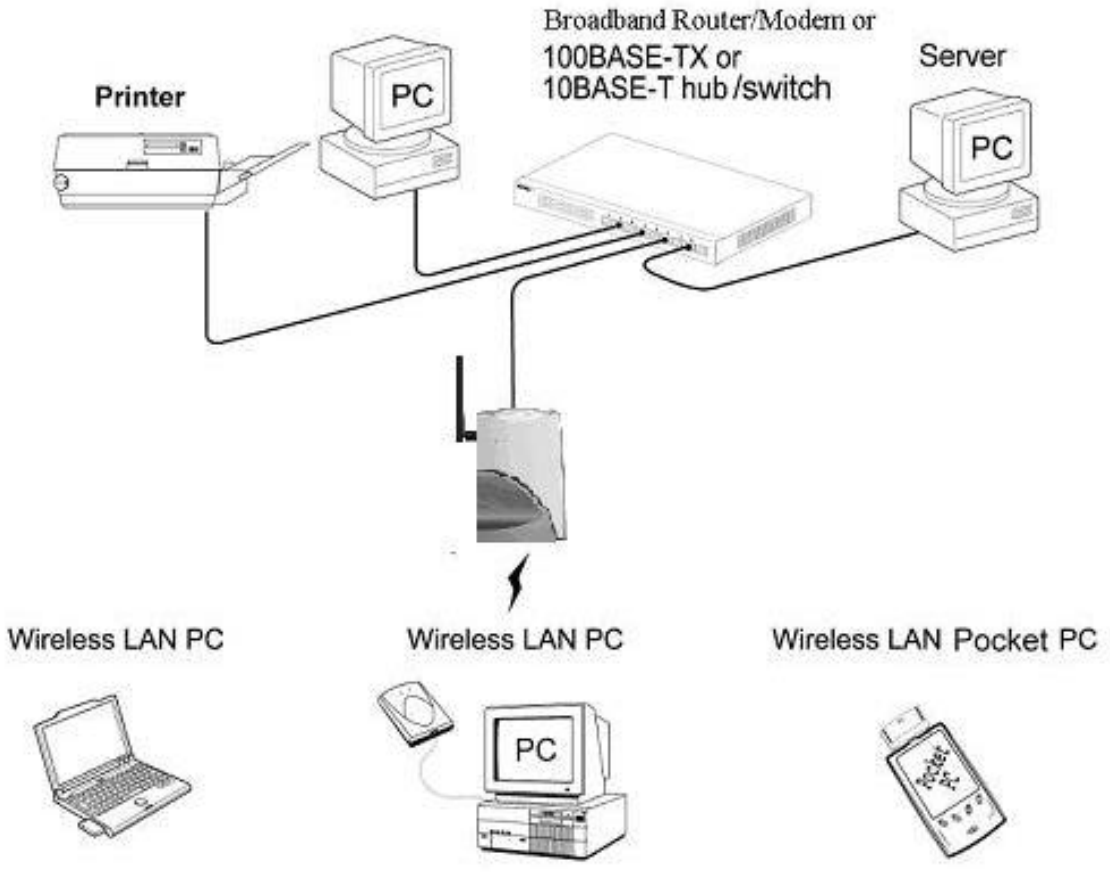
Be sure to use the supplied power adapter.



## Connecting the Access Point to your Network

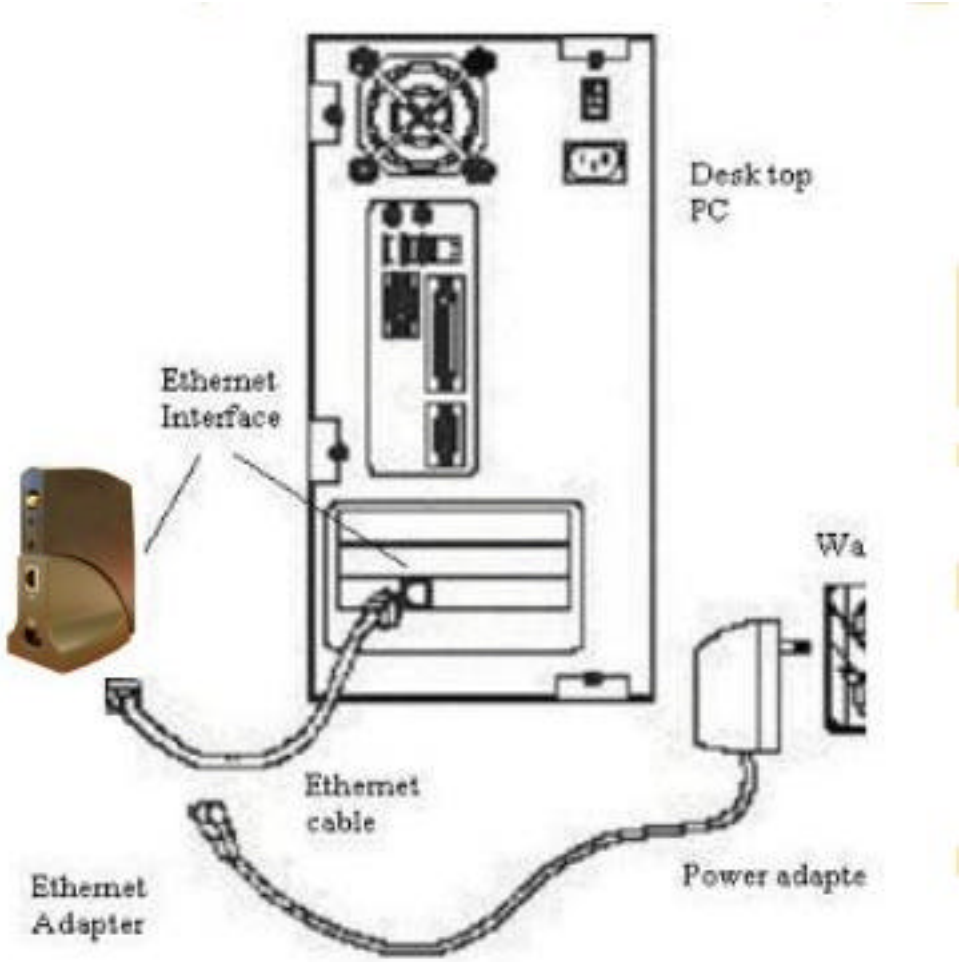
For optimal performance, usually the center of your wireless network is the best place for your COMBO AP/BRIDGE, with line of sight to all of your mobile stations. Try to place it in a position where can best cover your wireless network and is away from any potential source of interference. And normally, the higher you place the COMBO AP/BRIDGE, the better the wireless signal coverage will be.

The following picture describes how to use the COMBO AP/BRIDGE when communicating between wireless LAN and wired LAN.



## Bridge Hardware Installation

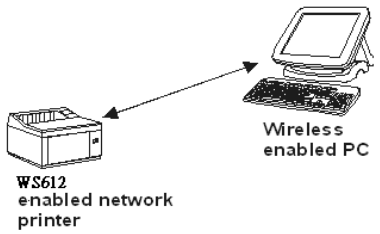
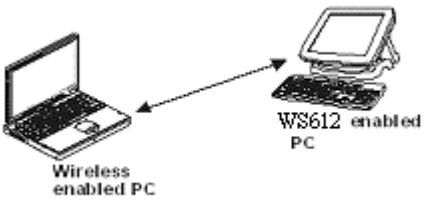
Following illustration is an example showing how to install Adapter with your PC.
Be sure to use the supplied power adapter.

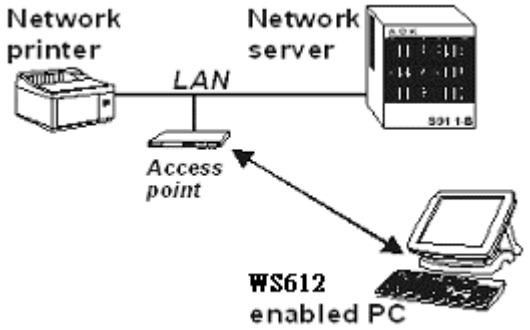
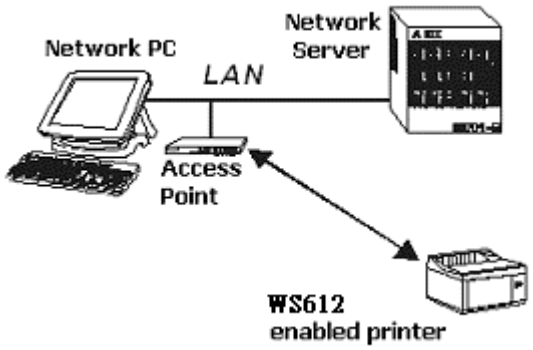



| **Note!** | *You may also connect the Adapter to other Ethernet-ready device, such as printer server.* |
|---|---|

# Connecting the Ethernet Adapter to Your Network

There are two network scenarios as below:

| | |
|---|---|
| **Ad-hoc Networking** | Also known as a **peer-to-peer** network, an ad-hoc network is one that allows all workstations and computers in the network to act as servers to all other users on the network.<br><br>Users on the network can share files, print to a shared printer, and access the Internet with a shared modem. However, with ad-hoc networking, users can only communicate with other wireless LAN computers that are in the same wireless LAN workgroup, and are within range.<br><br>**<PC to Network Printer>**<br>  <br><br>**<PC to PC >**<br>  <br> |
| **Infrastructure Networking** | Infrastructure networking differs from ad-hoc networking in that it includes an access point. Unlike the ad-hoc structure where users on the LAN contend the shared bandwidth, on an infrastructure network, the access point can manage the bandwidth to maximize bandwidth utilization.<br><br>Additionally, the access point enables users on a wireless LAN to access an existing wired network, allowing wireless users to take advantage of the wired networks resources, such as Internet, email, file transfer, and printer sharing. Infrastructure networking has the following advantages over ad-hoc networking:<br><br>**Extended range:** each wireless LAN computer within the range of the access point can communicate with other wireless LAN computers within range of the access point.<br><br>**Roaming:** the access point enables a wireless LAN computer to move through a building and still be connected to the LAN. |

| | |
|---|---|
| | **Wired to wireless LAN connectivity:** the access point Adapters the gap between wireless LANs and their wired counterparts.<br><br>**<PC to LAN>**<br>  <br><br>**<Printer to LAN>**<br>  <br> |

In the next charter, you will be guided to how to connect the Adapter to wireless LAN

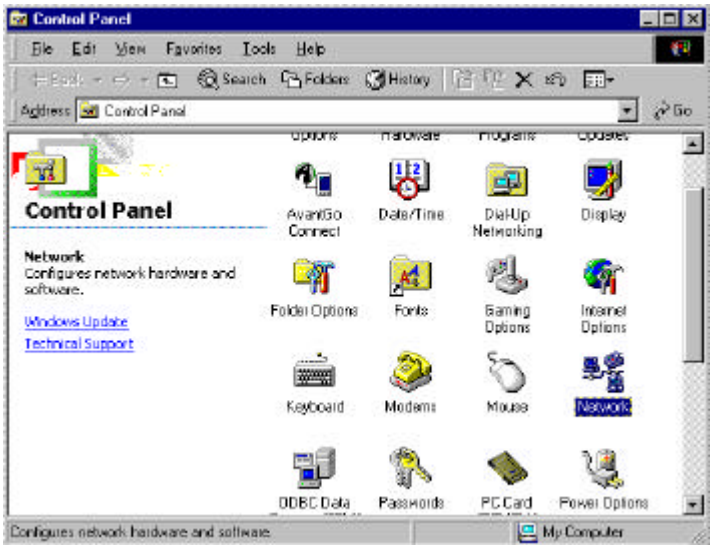
# 3. Wireless Navigator Installation

## Install TCP/IP Protocol

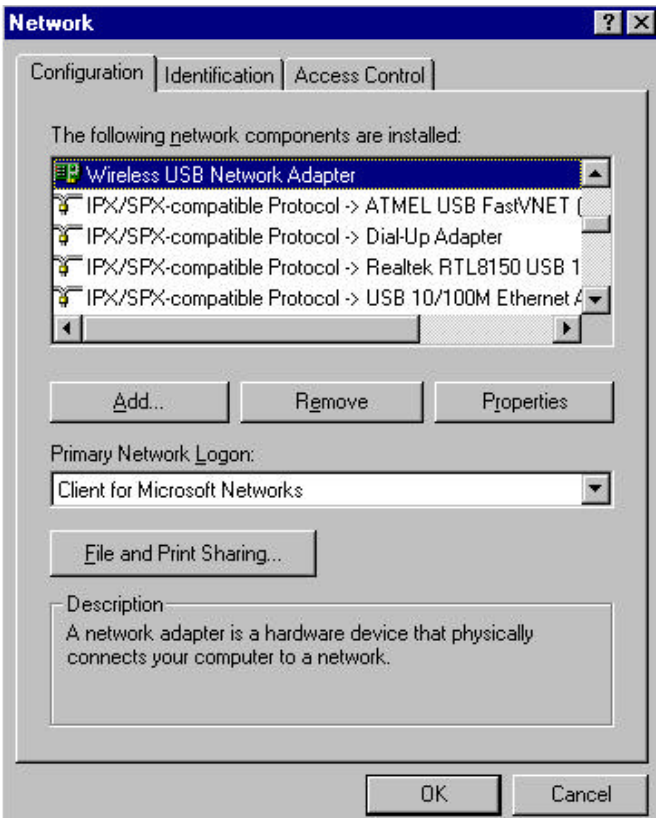
TCP/IP Protocols are necessary for computers to communicate on LAN and Internet.

| **Note!** | *If your PC already has TCP/IP protocol installed, please skip this section. Please contact your administrator for details if you have problems of setting up this TCP/IP protocol in your PC.* |
|---|---|

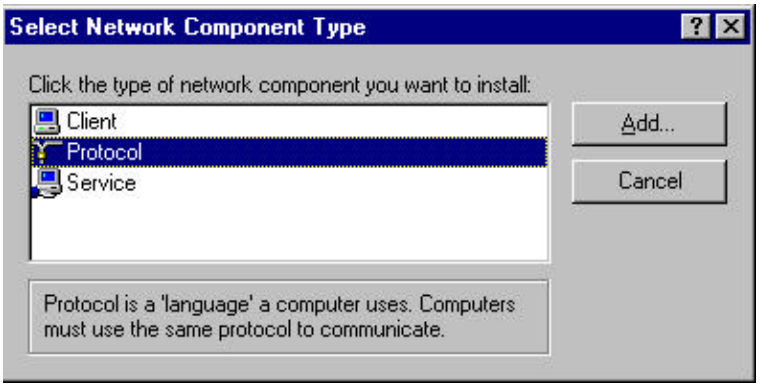
1. From the **Start** Menu, select **Settings** and bring up the **Control Panel**. From the Control Panel, double-click on the **Network** icon.



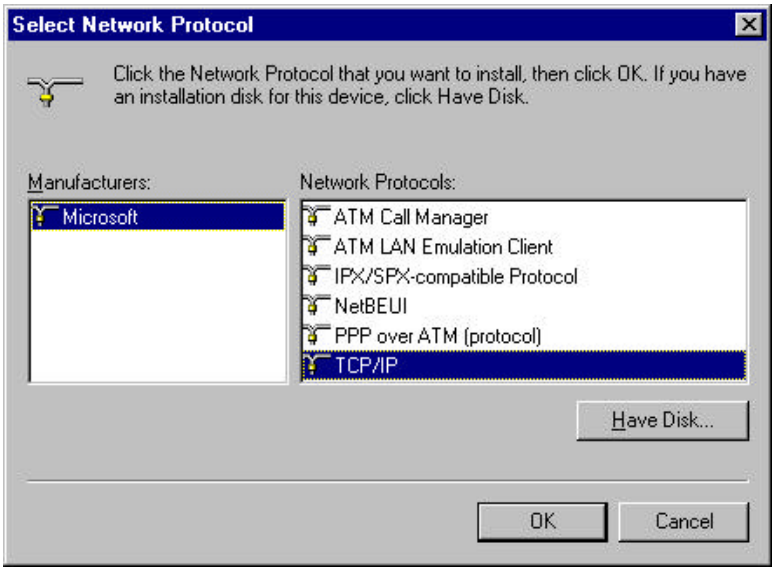
2. The screen shows the network components you have installed. Click the **Add** button to continue.




3. Highlight **Protocol** and click the **Add** button.



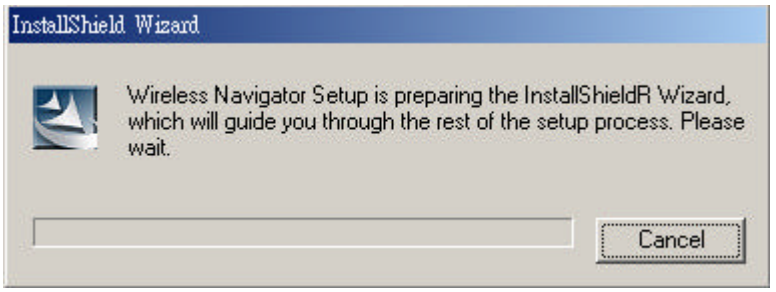
4. Select **Microsoft** from the list of "Manufacturers" and **TCP/IP** from the list of "Network Protocols" and click the **OK** button to finish the installation.



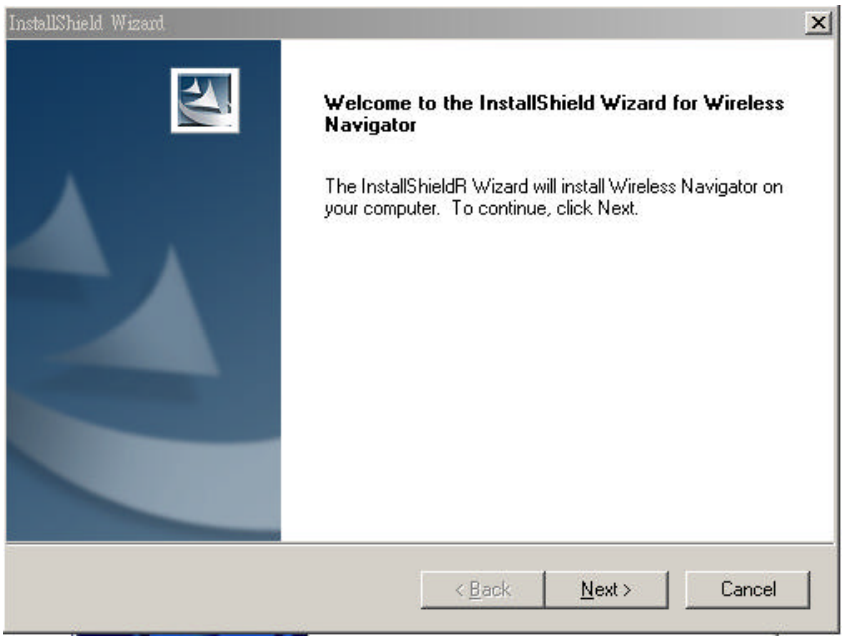
## Install the Wireless Navigator

The Wireless Navigator Utility is provided to allow user(s) easily to configure the AP through any Windows-based PC over wired or wireless LAN port. This section describes procedures for installing the Wireless Navigator Utility to PC.

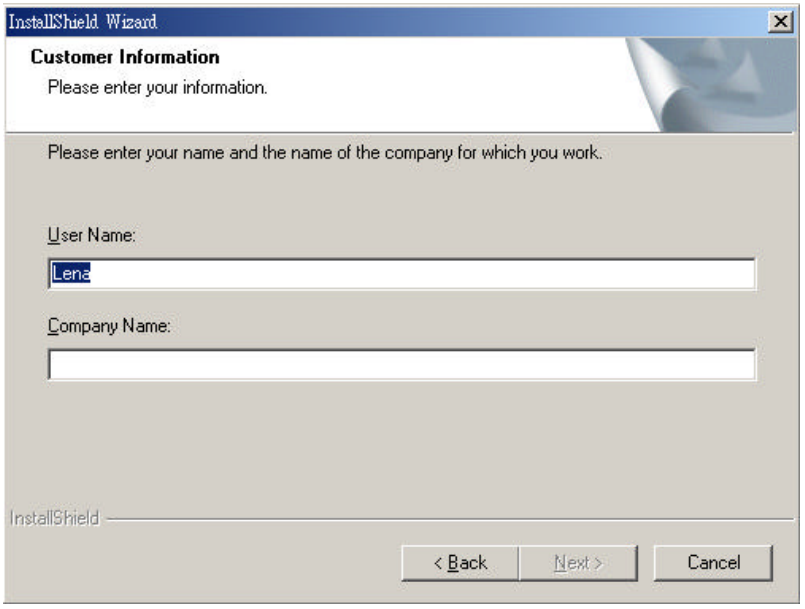
**Step 1:** Insert the installation CD-ROM into the CD-ROM drive. Run SETUP.EXE program on the CD-ROM. The following window will be shown automatically.



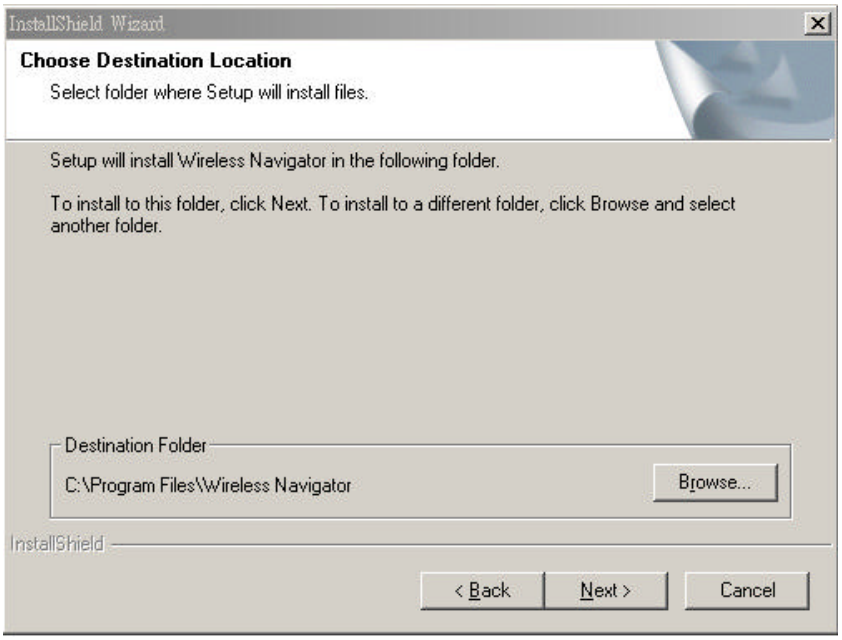

**Step 2:** After InstallShield Wizard preparation finished, the following window will be shown. Click the **Next** button to continue.



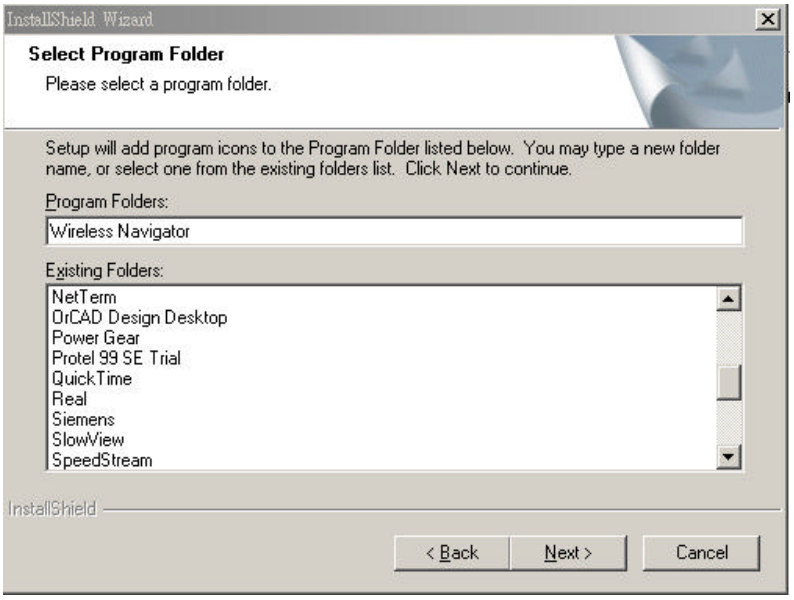
**Step 3:** Key in your User Name and Company Name, and click **Next** button to continue.



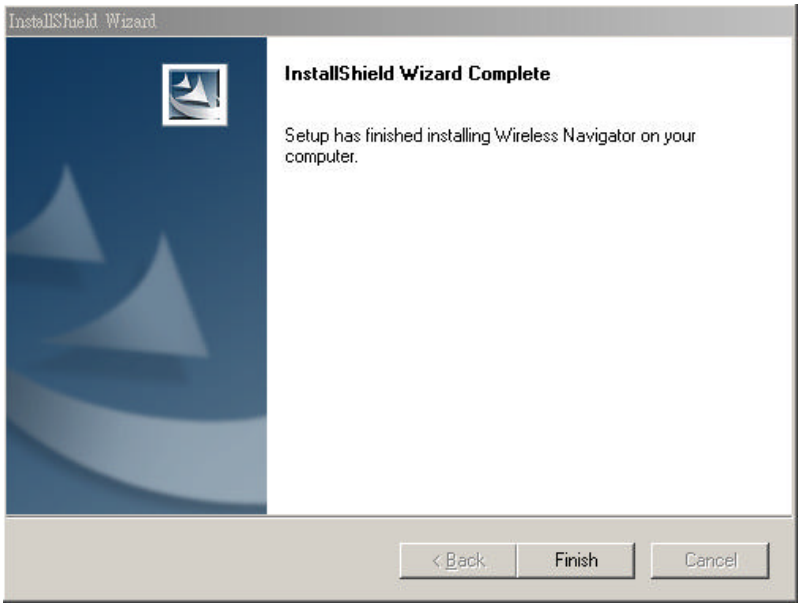

**Step 4:** The screen will show you the default destination chosen by the utility. If you want to install the Wireless Navigator in another location, click the **Browse** button and select an alternate destination. Click the **Next** button, when you are ready to continue. The setup program will then begin to install the programs into the destination folder.



**Step 5:** The screen will show you the Program Folder that the utility will use. You may type a new folder name to create a new program folder, or select one from the existing folder list, and click **Next** button to continue.




**Step 6:** The Wireless Navigator has been installed now. Please click the **Finish** button to complete installation.




**Note:** To remove Wireless Navigator Utility, click the **Start** button, and select **Programs**, **Wireless Navigator**, and **Uninstall**, and then follow the instruction on screen.

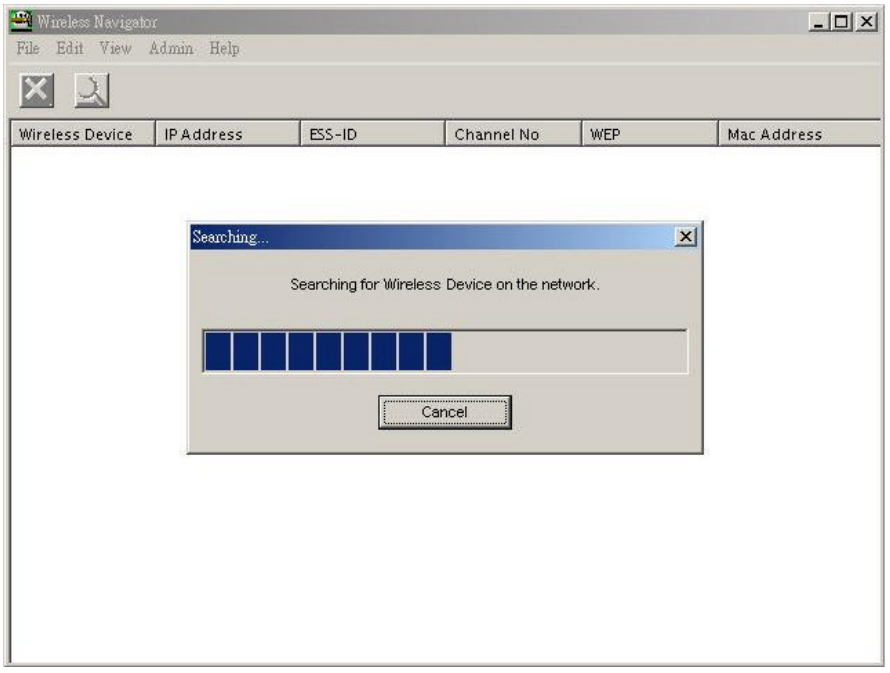
## Startup and Login

Follow the procedures below to startup Wireless Navigator and find the AP. Before you start the following procedures, please be sure to connect the Ethernet cable, connect the power cord, and then turn on the AP. All wireless clients shall be requested to set the their SSIDs same as the AP SSID in advance before starting the following procedures.

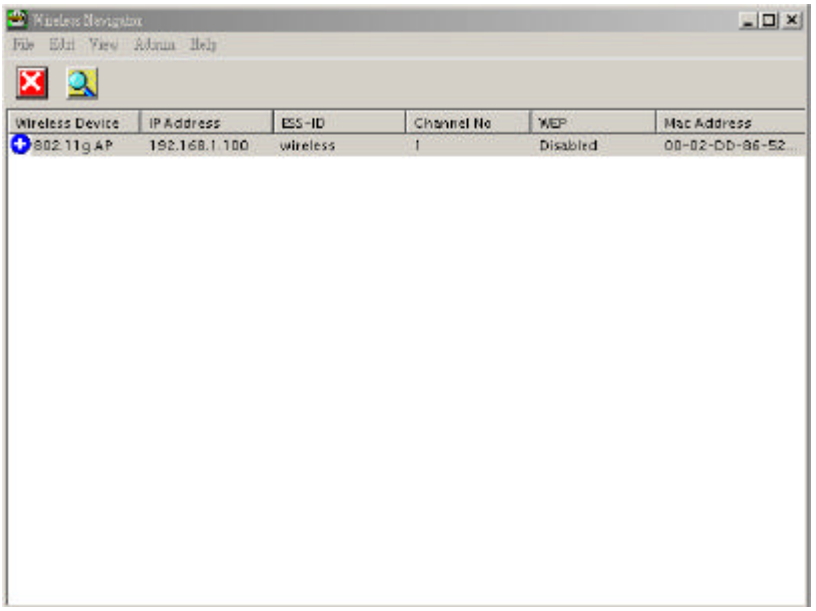
**1.** Refer to previous section " **Install the Wireless Navigator to your PC**" in order to startup the configuration.

**2.** Click **Start** and select **Programs**, **Wireless Navigator** and then **Wireless Navigator.** Or, just double-click the **Wireless Navigator** icon on your desktop screen.

**3.** The Wireless Navigator starts up, and searches AP via wired LAN or Wireless LAN.



**4.** The utility will show the AP and other wireless devices found in the same network, where your PC is located.

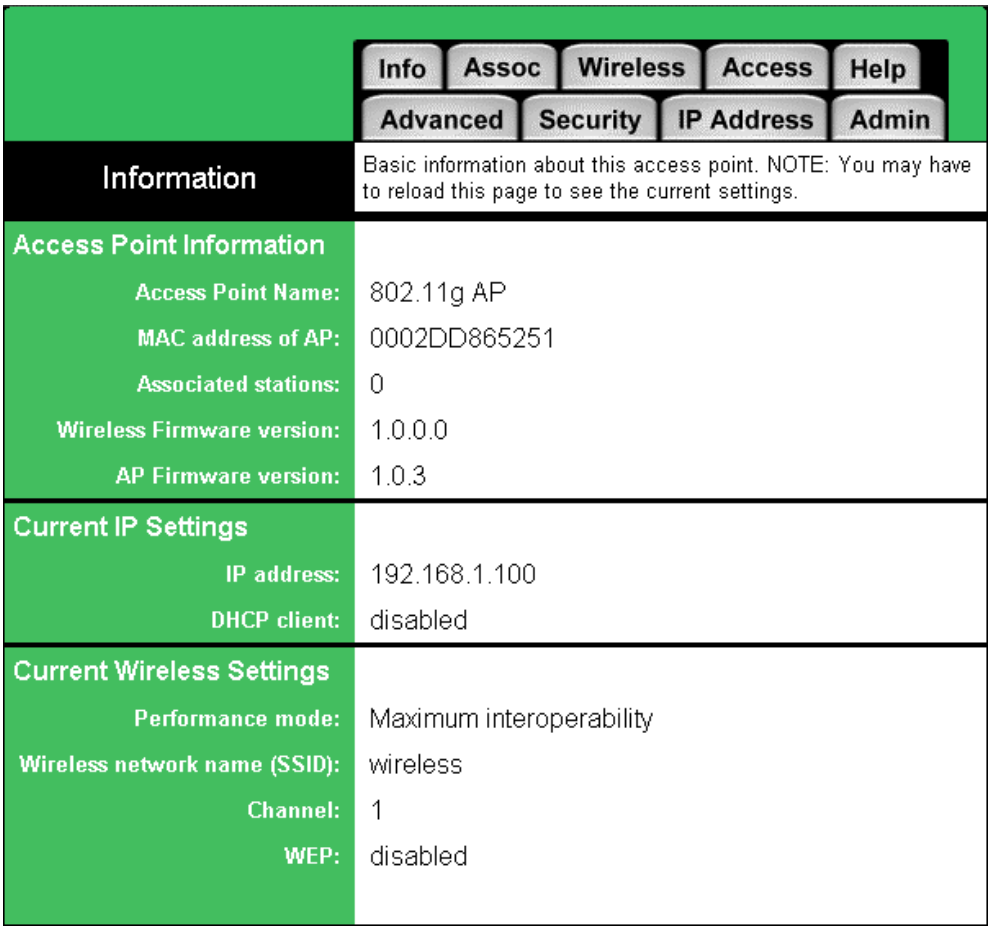



| | |
|---|---|
| **Note!** | *If the AP is not shown in the list, please make sure all the cables are well connected.* |

**5.** Double-click on the COMBO AP/BRIDGE, then you will access into its built-in web server, and it will show as below. Then directly click **OK** button. **The default setting is no user name and password is "admin".**.

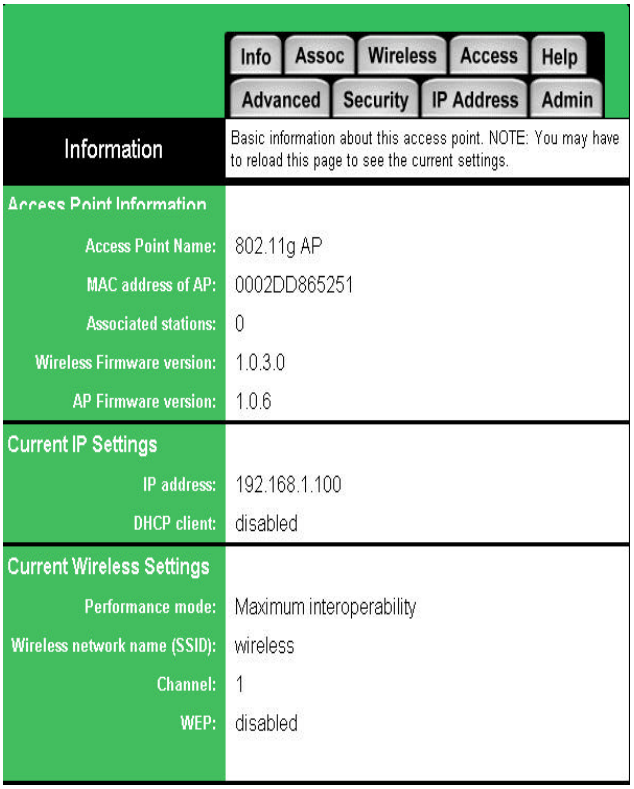

| | |
|---|---|
| **Note!** | *If you cannot access into COMBO AP/BRIDGE's built-in web server, please make sure if your PC now is in the same subnet with COMBO AP/BRIDGE. Please us right-click of mouse to click on the COMBO AP/BRIDGE listed in Wireless Navigator.* **"Set IP address"** option will pop out, and then change IP address of COMBO AP/BRIDGE to the same subnet as your PC. |

**6.** Then following screen will be shown. Now you have entered the built-in web server of this COMBO AP/BRIDGE, and you can start to configuration procedures.



# 4. Configuring the Access Point

## The Info Tab




**Info Tab:** Displays current AP settings.

**Access Point Information**

**Access point name:** displays current device name of the AP. You also can change the name.

**MAC address of AP:** displays the unique serial number burned into this AP that identifies itself from other Ethernet devices

**Associated stations:** displays the number of wireless client devices associated with this AP.

**Wireless Firmware version:** displays the version number of wireless LAN firmware embedded in this AP.

**AP version:** displays the version number of AP system firmware.

**Current IP settings**

**IP address:** displays current IP address of this AP.

**DHCP client:** displays if this AP enable DHCP client feature or not.

**Current Wireless Settings**

**Performance Mode:** displays the AP is set in Maximum interoperability mode or Maximum performance mode.

**Wireless network name (SSID):** displays current SSID of the AP. Please make sure that your wireless LAN is working properly under the effective reach range of the AP

**Channel:** displays the channel that the Access Point uses now.

**WEP:** displays the WEP function is enabled or disabled.

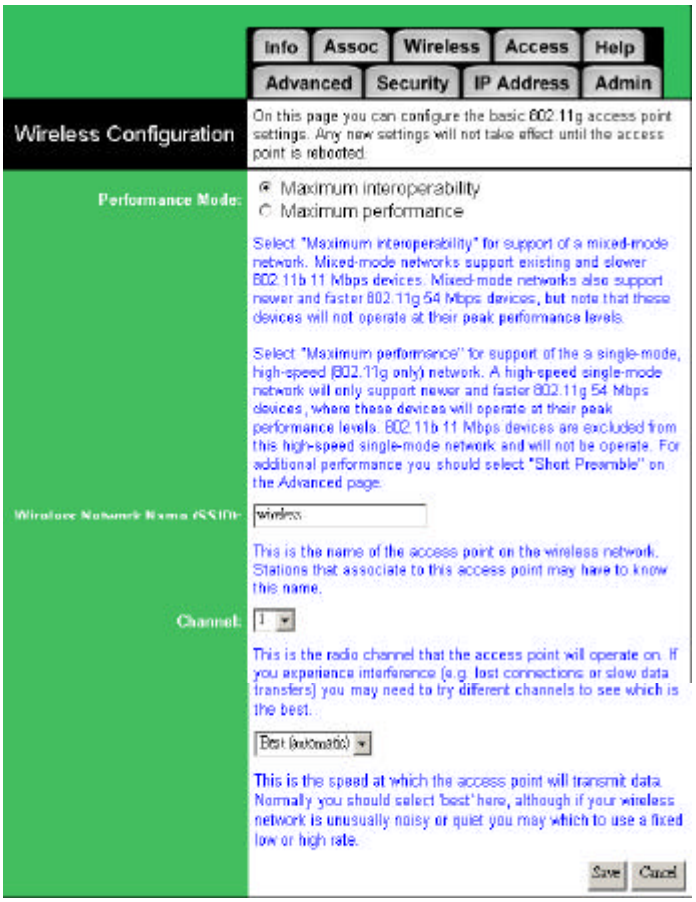
## The Assoc Tab


**Assoc Tab:** displays all the wireless clients, which are currently associated with this AP.

**Mac address:** displays the list of the MAC address of associated wireless client.

If you click the re-flash button of your web browser, then the list will be updated.

## The Wireless Tab




**Wireless Tab:** lets you select the network settings.

**Performance Mode:** In Maximum interoperability mode, the AP will accept to connect with both 802.11b and 802.11g client devices. In Maximum performance mode, the AP will only connect to 802.11g client devices for better performance.

**Wireless Network Name (SSID):** lets you set the Service Set Identification. Default SSID is " wireless" .

**Channel:** enables you to select a transmission channel. This setting only works i mode.

**Transmission Rate:** select transfer rate from an available list.

**Note:** Click button " **Save**" to store the settings. The settings will work after AP automatically reboots.

# The Access Tab

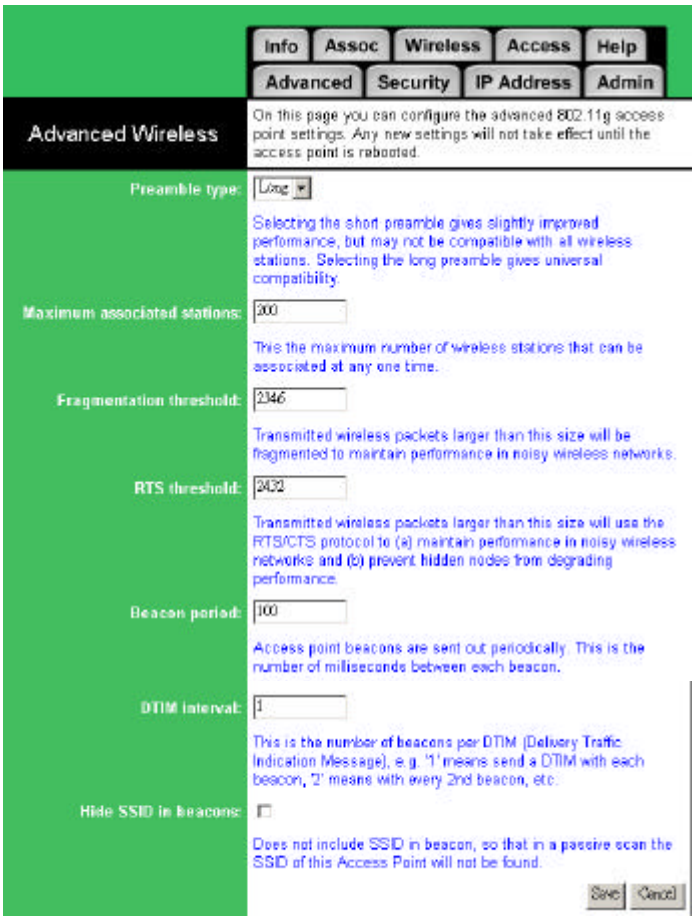

**Access Tab:** allows you to set the filter to specific wireless client device(s).

**Enable access control:** if it is checked, the AP will start to filter any wireless client device with MAC address listed below.

**MAC address :** please enter the MAC address of the wireless devices which need filtered in wireless LAN network. The device with same MAC address listed will not be able to associate with this AP.

**Note:** Click button " **Save**" to store the settings. The settings will work after AP automatically reboots.

# The Advanced Tab




**Advanced Tab:** allows you to configure advanced 802.11 settings

**Preamble type:** enables to select different preamble types: Long, Short or Auto. While Short type is selected, the performance may be improved with the possibility of incompatibility

**Maximum associated stations:** enables to set the limit of the maximum number of associated clients. In order to get a better performance, it is suggested to set "**8**" as the maximum number of associated clients to get a balanced performance

**Fragmentation threshold:** The threshold which a data packet will be fragmented.

**RTS threshold:** The threshold which a RTS packet will be sent before a data packet is sent.

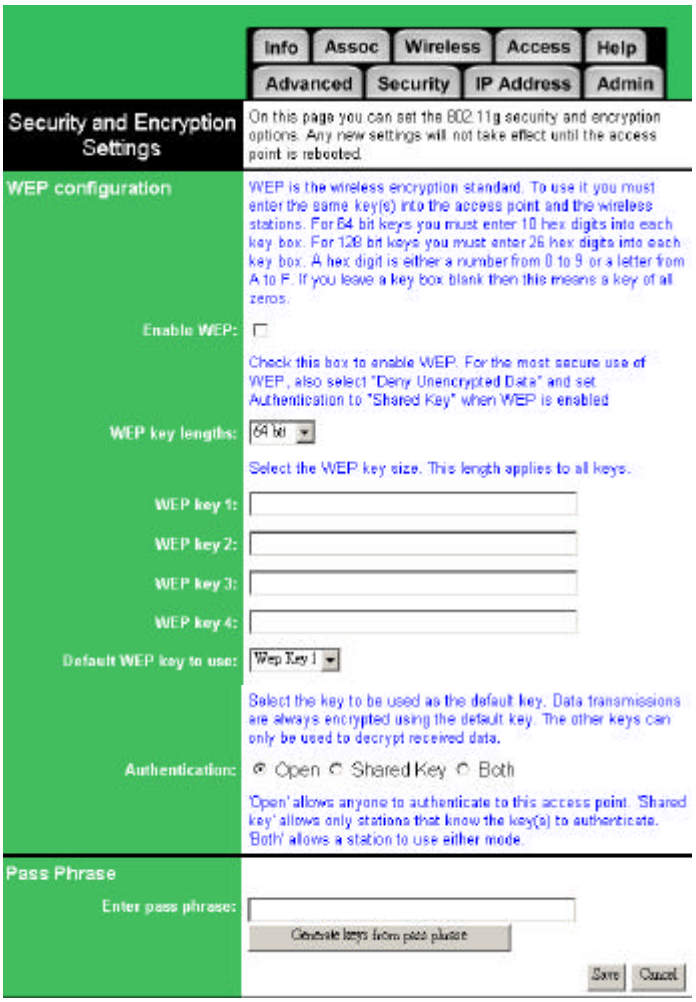
**Beacon period:** The period in millisecond a beacon will be sent.

**DTIM interval:** Number of beacon intervals between successive DTIM (Delivery Traffic Identification Maps).

**Hide SSID in beacons:** Does not include SSID in beacon for security protection.

**Note:** Click button "**Save**" to store the settings. The settings will work after AP automatically reboots.

# The Security Tab




**Security Tab:** displays 802.11b/g security and encryption options on this AP.

**WEP configuration:** Display the Wired Equivalent Privacy security configurations

**Enable WEP:** Enables the Wired Equivalent Privacy security function.

**WEP key length:** Selects 64-bit or 128-bit WEP encryption. Be sure that the key length setting in the AP shall be the same as in wireless clients, or the communication will not work.

**WEP key:** For 64-bit WEP encryption, a key of 10 hexadecimal characters in length must be filled in. For 128-bit WEP encryption, a key of 26 hexadecimal characters in length must be filled in. Be sure that the key values in the AP shall be the same as in wireless clients, or the communication will not work.

**Default WEP key to use:** Selects one of four key sets to be used for encryption. To connect to a Wi-Fi compliant wireless device, key #1 must be selected.

**Authentication:** Selects the mechanism of Open, Shared key, or both authentication algorithms.

**Pass Phrase:** A key of ASCII code, case-sensitive word to Generate the WEP key. You can use the same PASSPHRASE word to generate WEP key for each device when you use WEP

**Note:** Click button " **Save**" to store the settings. The settings will work after AP automatically reboots.

## The IP Address Tab


**IP Address Tab:** displays IP settings options on this AP.

**IP Address Mode:** Select " **Static**" or " **DHCP**" mode. For " **Static**" mode, the IP address settings are given by user. For " DHCP" mode, these settings will be overridden by a DHCP server on your network. The default setting is " **Static**"

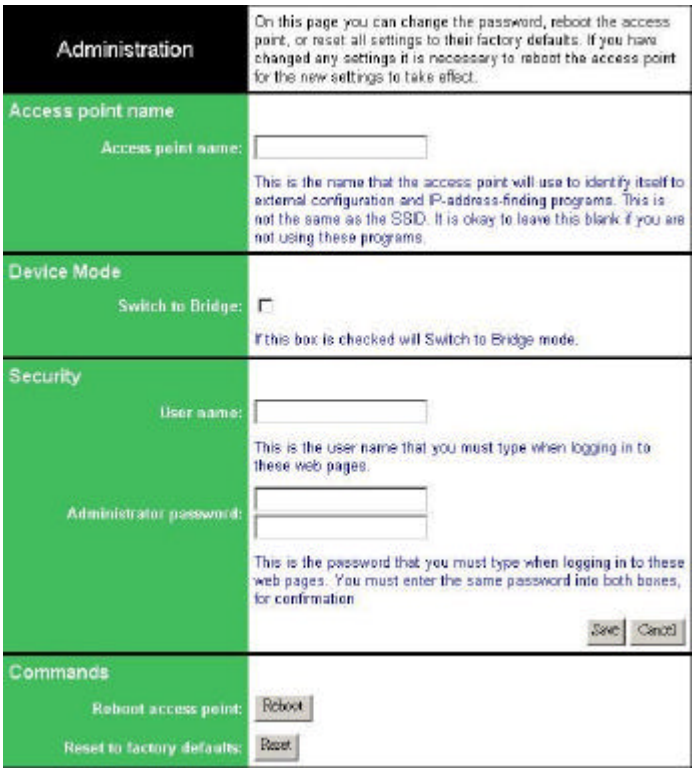
**Default IP Address:** The static IP address you want to assign to the AP. The default value is " **192.168.1.100**" .

**Default subnet mask:** The subnet mask you want to assign for the AP. The default value is " **255.255.255.0**" .

**Default gateway:** The internet gateway you want to assign for the AP. The default value is " **192.168.1.1**" .

**Note:** Click button " **Save**" to store the settings. The settings will work after AP automatically reboots.

# The Admin Tab




**Admin Tab:** Allows to change the device' s system configurations.

**Access point name :** With this unque name, the AP can be found easily via Wireless Nevigator Utility. It can be the nickname assigned by the adminstrator.

**Device Mode :** If the box is checked, this device will be switched to AP/ Bridge mode. Please refer to the Chapter 5 Configuring AP/Bridge for more setting instruction.

**User name:** This is the name used for login into the AP' s built Web User Interface.

**Administrator password:** Please key the same password in both columns, then click " Save" to valid the new password

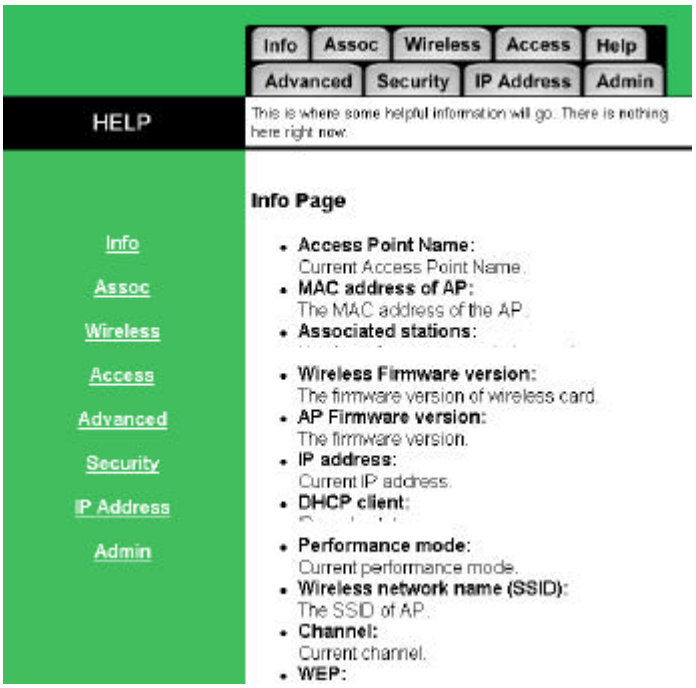
**Commands**

**Reboot access point:** When any setting was changed, the AP MUST be reboot so that the change can be confirmed.

**Reset to factory defaults:** This option will ERASE all the current settings, and return back to the factory defaults.

**Note:** Click button " **Save**" to store the settings. The settings will work after AP automatically reboots.

## The Help Tab

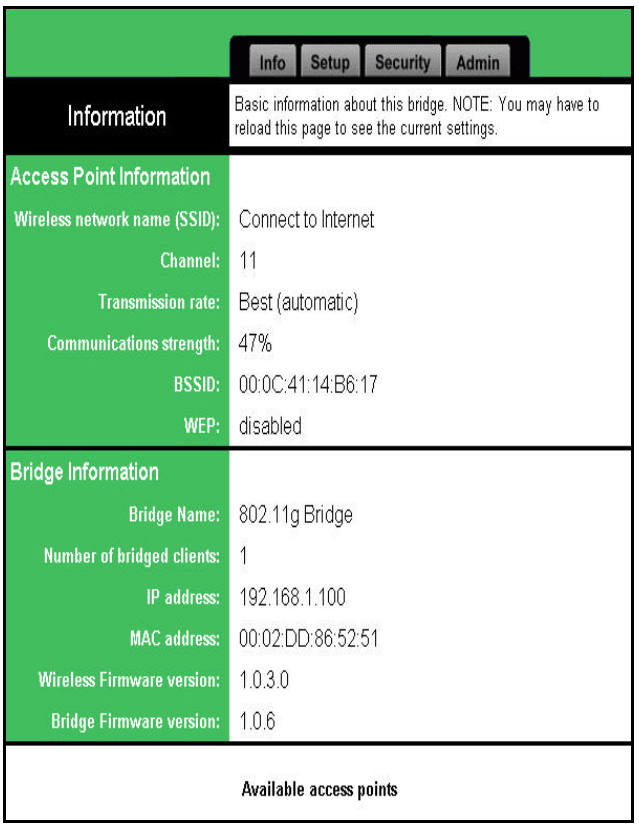



**HELP:** Displays the explanations of each setting shown in above seven tabs.

Please click those hyperlinks in right side, and then it will direct you the meaning of each setting.

# 5. Configuring the Ethernet Adapter

## The Info Tab




**Access Point information:** displays disconnected or associated connection status.

**Wireless network name (SSID):** displays current SSID of the Ethernet Bridge.

If the Ethernet Bridge found no AP or any other ad-hoc device, then SSID will show " **non-spec**" . Please make sure that your wireless LAN is working properly under the effective reach range of the Ethernet Bridge

**Channel:** displays the channel that the Ethernet Bridge uses now.

**Transmission Rate:** the transfer data rate that the Ethernet Bridge is using in wireless LAN

**Communications Strength:** displays the percentage of wireless LAN connection integrity when connected to an AP.

**BSSID:** displays MAC address of the AP that the Ethernet Bridge is connecting with.

**WEP:** displays MAC address of the AP that the Ethernet Bridge is connecting with.

**Ethernet Bridge Name:** Displays the name of this Ethernet Bridge (Ethernet Bridge).

**Number of Ethernet Bridged clients:** Displays number of devices that connected to the Ethernet Bridge.

**IP address:** displays the Ethernet Bridge' s current IP address assigned by user of DHCP of router.

**MAC address:** displays the unique serial number burned into the Ethernet Bridge that identifies itself from other Ethernet devices.

**Wireless Firmware version:** displays the Ethernet Bridge' s wireless part firmware version

**Ethernet Bridge Firmware version:** displays the Ethernet Bridge' s Ethernet Bridge part firmware version

# The Setup Tab


**Wireless Mode:** lets you select the network scenarios, either Ad-Hoc or Infrastructure. Default setting is " **Infrastructure**"

**Wireless Network Name (SSID):** lets you set the Service Set Identification. Default SSID is empty. When it sets to empty, the Ethernet Bridge is allowed access any nearby AP or wireless devices.

**Channel:** enables you to select a transmission channel. This setting only works in Ad-hoc mode. In infrastructure mode, the Ethernet Bridge will follow AP or router' s channel setting.

**Transmission Rate:** select transfer rate from an available list.

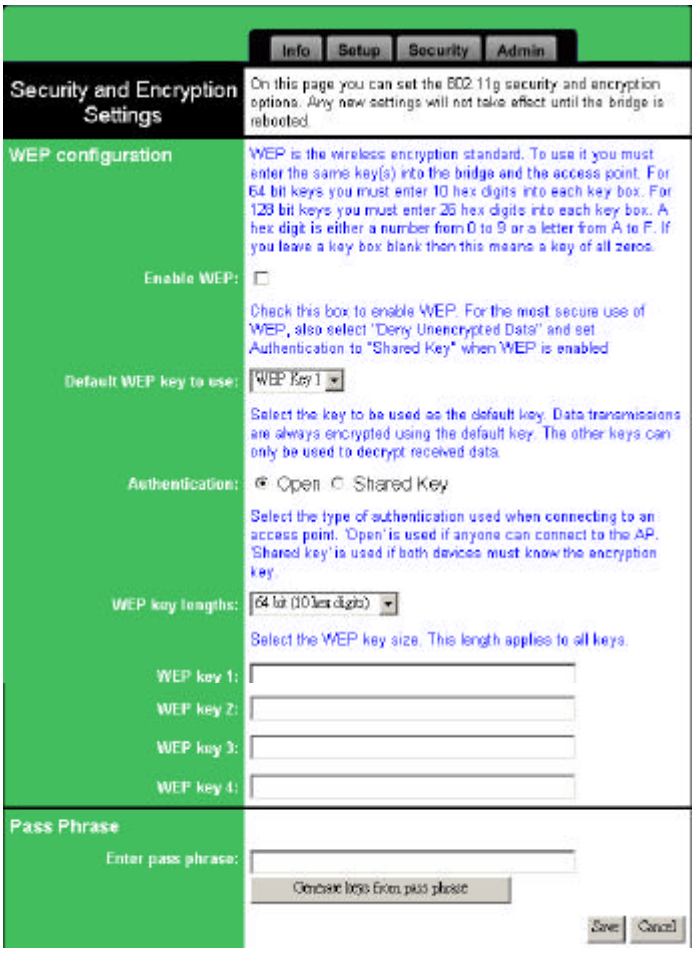
**Performance Mode:** In Maximum interoperability mode, the Ethernet Bridge will connect to both 802.11b and 802.11g devices. In Maximum performance mode, the Ethernet Bridge will only connect to 802.11g devices for better performance.

**Cloning:** If you want device support Mac cloning , please select Ethernet client mode,If not , please select WLAN Card mode,

Click button "Save" to store the settings. The settings will work after Ethernet Bridge reboot.

| Note! | ***You may need to reboot the Ethernet Bridge, and then re-load the page to see any new settings.*** |
|---|---|

## The Security Tab




**Enable WEP:** Allows you to enable or disable Wired Equivalency Privacy (WEP) for encryption, with either 64- or 128-bit encryption and set Authentication to "Shared Key" when WEP is enabled

**Default WEP key to use:** Select the key to be used as the default key. Data transmissions are always encrypted using the default key. The other keys can only be used to decrypt received data

**Authentication:** Select the type of authentication used when connecting to an access point. 'Open' is used if anyone can connect to the AP. 'Shared key' is used if both devices must know the encryption key.

**WEP key lengths:** Enables you to choose either a 64- or 128-bit encryption scheme. Be sure that the Ethernet Bridge' s WEP key must be the same as the AP' s, otherwise Ethernet Bridge still can not communicate with wireless LAN.

**WEP key 1 ~ 4:** Enables you to create an encryption scheme for Wireless LAN transmissions. You can manually enter a set of values or use pass phrase to generate WEP keys.

For 64-bit WEP encryption, a key of 10 hexadecimal characters in length must be filled in.

For 128-bit WEP encryption, a key of 26 hexadecimal characters in length must be filled in.. Be sure that the key in the AP shall be the same as in Ethernet Bridge, otherwise the communication will not work.

**Pass Phrase:** enter a pass phrase and click " generate" to generate WEP keys from pass phrase.

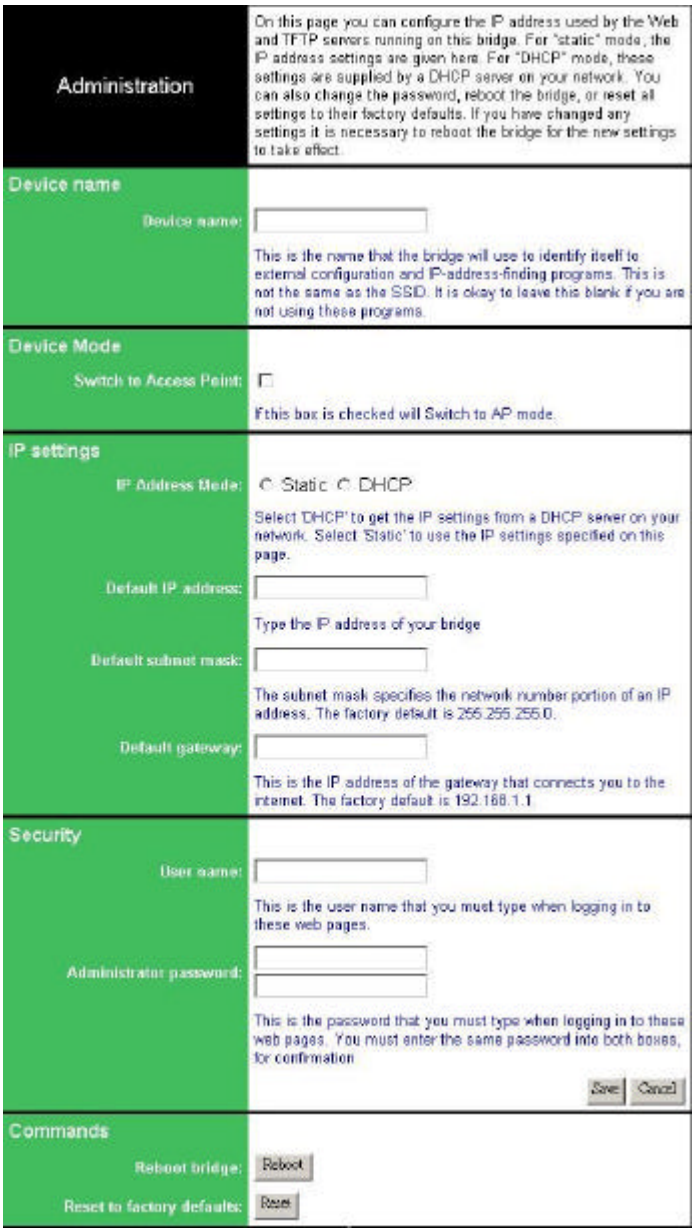
***Note:*** *Some APs do not support*

*128-bit encryption*

***Note:*** *128-bit encryption requires more system resources than 64-bit encryption. Use 64-bit encryption for better performance.*

| | |
|---|---|
| **Note!**  | ***You may need to reboot the Ethernet Bridge, and then re-load the page to see any new settings.*** |

# The Admin Tab




**Device Name:** This is the name that the Adapter will use to identify itself to external configuration and IP-address-finding programs. This is not the same as the SSID. It is okay to leave this blank if you are not using these programs.

**Device Mode:** If the box is checked, this device will be switched to AP/ Bridge mode. Please refer to the Chapter 5 Configuring AP/Bridge for more setting instruction.

**IP Address Mode:** Select 'DHCP' to get the IP settings from a DHCP server on your network. Select 'Static' to use the IP settings specified on this page.

**Default IP address:** Enter the static IP of ethernet Adapter. The default IP is " **192.168.1.100**" .

**Default subnet mask:** The subnet mask you want to assign for the Adapter. The default value is " **255.255.255.0**" .

**Default Gateway:** The gateway you want to assign for the Adapter. The default value is " **192.168.1.1**" .

**User name:** This is the user name that you must type when logging in to these web pages.

**Administrator password:** This is the password that you must type when logging in to these web pages. You must enter the same password into both boxes, for confirmation.

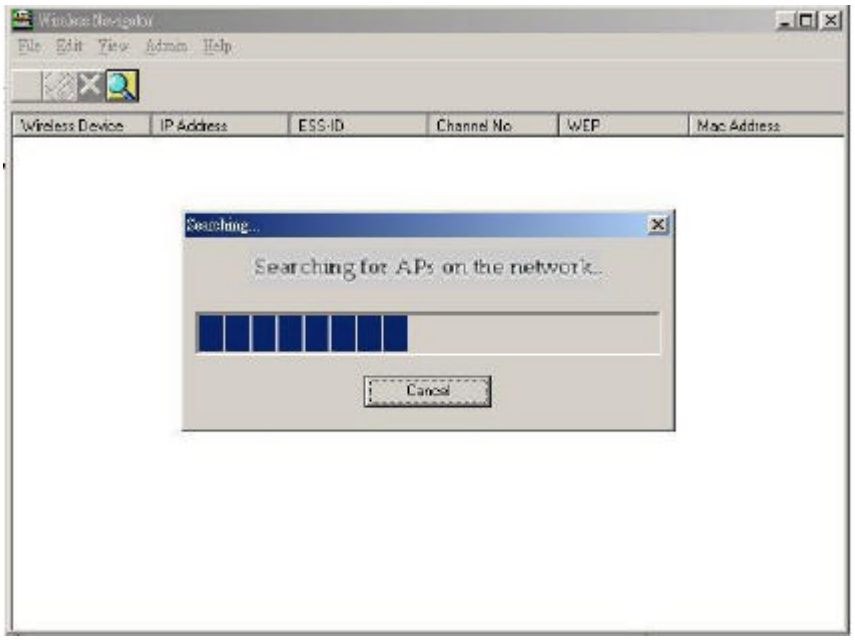
**"Reboot" button:** Click reboot button to reboot the Ethernet Adapter.

**"Reset" button:** Click reset button to will ERASE all the current settings, and restore settings to factory default.

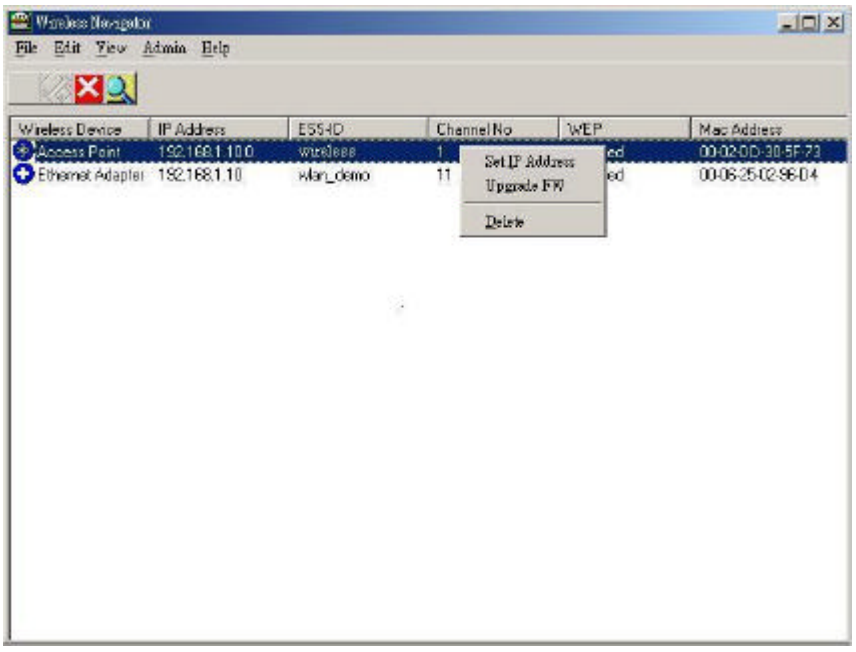
| Note! | ***You may need to reboot the Adapter, and then re-load the page to see any new settings.*** |
|---|---|

# 6. Firmware Upgrade Procedure

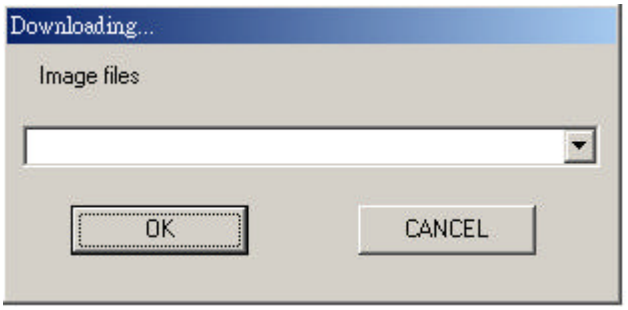
1. Click **Start** and select **Programs**, **Wireless Navigator** and then **Wireless Navigator.** Or, just double-click the **Wireless Navigator** icon on your desktop screen.
2. The Wireless Navigator starts up.



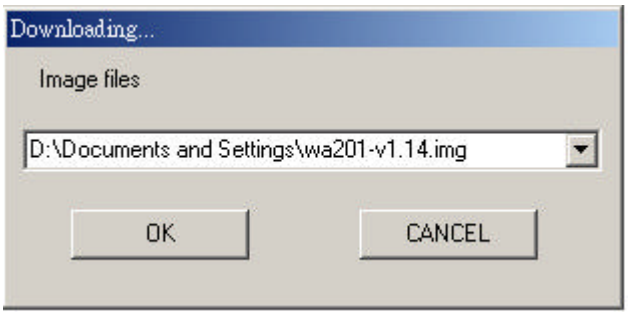

3. The computer starts searching for the Access Point and shows in the list. Choose the COMBO AP/BRIDGE that you would like to upgrade the firmware, and use the right-click of the mouse to enter the "**Upgrade FW**" option



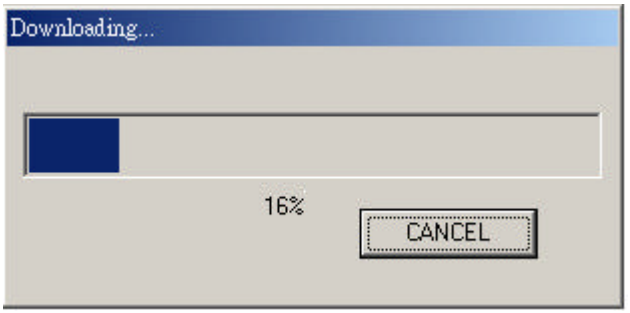
4. The download will begin. Key in the new firmware file name and location or click browsing to find the file in your computer.




5. After entering the file information, click **OK** to continue.




6. The downloading begins.




7. After download finished, the COMBO AP/BRIDGE will reset automatically, and the left indicator " DIAG" on COMBO AP/BRIDGE will be off and then begin flashing. When the indicator " DIAG" is always green instead of blinking, the firmware upgrade is completed and successfully.

# 7. FAQ & Troubleshooting

This Combo AP/Bridge provides solutions to problems usually encountered during the installation and operation of the Wireless Combo AP/Bridge. Please refer to the following descriptions to solve the problems. If you can' t find an answer here, please contact your dealer for further advices.

**Q: What is the IEEE 802.11g?**

A: IEEE is Institute of Electrical and Electronics Engineers, which is formulating a standard for the industry. IEEE 802.11g is submitted by IEEE and it is finalized in Q2, 2003. This wireless standard will allow 802.11b and 802.11g devices from different manufacturers to communicate with each other. 802.11g allows wireless connection performance to 54Mbps.

**Q: What is the IEEE 802.11b standard?**

A: The IEEE 802.11b Wireless LAN standards subcommittee, which is formulating a standard for the industry. The objective is to enable wireless LAN hardware from different manufacturers to communicate.

**Q: What' s Ad-hoc?**

A: An Ad-hoc wireless LAN is a group of computers, each with a WLAN Adapter, connected as an independent wireless LAN. Ad-hoc wireless LAN is applicable at a departmental scale for a branch or SOHO operation. But PLEASE be reminded that normally Access Point does not support Ad-hoc mode unless it has been changed to bridge mode.

**Q: What is Infrastructure?**

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

**Q: My PC can' t locate the Wireless Access Point. How to check the problem?**

A: Please follow the procedures below:

- Check if your PC has installed TCP/IP protocol.
- Check if the IP addresses of your PC and Wireless Access Point both are on the same IP network. If not, you may use Wireless Navigator to set up COMBO AP/BRIDGE' s IP address, or change your PC' s IP address.
- Check if your wireless LAN card is set to Infrastructure correctly.
- Check if the SSID of your wireless card is the same as COMBO AP/BRIDGE' s.

- Check if the WEP is enabled. If yes, please make sure that the wireless card in your PC and the Wireless Access Point both have the same setting for WEP, such as the key tables must match.
- At last, please check if radio interference is causing a problem; see if connection is possible when close to the Wireless Access Point. Remember that the connection range can be as short as 100 feet in poor environment.

**Q: The Wireless connection speed is very slow. How to improve the problem?**

A: The wireless system will connect at the highest possible speed, depending on the distance and the environment condition. To obtain the highest possible connection speed, you have to try to adjust the Access Point location and orientation. If you find the interference is the problem, changing to another channel may show a marked improvement.

**Q: Can I run an AP application from a remote computer over the wireless network?**

A: This will depend on whether or not the application is designed to be used over a network. Consult the AP application' s user guide to determine if it supports operation over a network.

**Q: Can I play computer games with other members of the wireless network?**

A: Yes, as long as the game supports multiple players over a LAN (local area network). Please also refer to the user guide of the game for more information.

**Q: What is Roaming?**

A: Roaming is the ability of a portable computer user to communicate continuously while moving freely throughout an area greater than that covered by a single Wireless Network Access Point. Before using the roaming function, the workstation must make sure that it is the same SSID with the Wireless Access Point of dedicated coverage area.

**Q: What is WEP?**

A: WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 64-bit or 128-bit as described in the IEEE 802.11 standard. It is designed to enhance the wireless LAN security.

# 8. Glossary

This section explains the glossary of terms used in this manual that are required to configure the network.

**Wireless Channel**

If there is more than one Wireless LAN network with different ESS-ID on the same floor, and they are communicating with each other, the baud rate may be slowed, due to the same radio frequency being used. If this happens, you can still communicate regardless of other LAN networks by using to use different frequencies (wireless channels).
Note: If they are communications using the wireless LAN, be sure to set all the Units the same wireless channel.

**DHCP Server**

When configuring the network TCP/IP, be sure to set the IP address in each personal computer and other devices. When there is a DHCP server on the network, you can assign IP addresses automatically to the personal computers and the Access Point on the network. For the Windows NT server and dial-up router, or other DHCP server function, refer to the Windows 2000, Windows NT, or dial-up router manual, or consult the manufacturer.

**ESS-ID**

This ID is used to prevent cross-communication during communication between the Access Point and personal computers within the wireless LAN. The Wireless LAN personal computers that have the same ESS-ID as the Access Point can communicate with the Access Point. The ESS-ID is case sensitive. You can enter a maximum of 32 alphanumeric characters, and the underline "_".

**LAN (Local Area Network)**

Read as one word. A LAN is a network in a comparatively small area, such as campus or within a single building. The LAN baud rate varies from 10 Mbps to 100 Mbps.

**MAC Address (Media Access Control Address)**

The MAC address is a physical address specific to each network card. The MAC address is configured from a total of six bytes as follows: A vendor code comprising the lead three bytes and a 3-byte user code. The vendor code is managed and assigned by IEEE. The user code is managed using a unique (unduplicated) number from the network card

manufacturer. That is, the MAC address is assigned as a physical address unique throughout the world. In an Ethernet LAN, the MAC address is used as a base to create a frame for sending and receiving.

### TCP/IP (Transmission Control Protocol/Internet Protocol)

TCP/IP is a protocol equivalent to the network and transport levels of the OSI reference model, and it is defined using RFC. Consequently, different terminals can communicate with each other using TCP/IP.

- Normally, TCP/IP includes the AP application protocols TELNET and FTP.
- TCP/IP is the standard Internet protocol.

### WEP (Encryption)

By setting an encryption key in the Access Point, you can prevent wireless packets from being decrypted externally.

### Firmware

Firmware is the name given to the software (programs) built into hardware such as the router, modem, and terminal adapter. This software is built into the hardware, so it can be said to be in-between hardware and software.

### Protocol

Protocols are the procedures and regulations for sending and receiving data between the network terminals. For example, if two computers are communicating, you can send the correct information according to the regulations by formatting all required information. The protocol such as which terminal sends first, what type of message, what type of message the receiving terminal should send in reply, the data format, and responses to communications errors are same of examples.

### Roaming Function

Using the roaming function and moving from one room to another room, you can switch the Access Point automatically. With the roaming function, you can easily move from the office to the conference room while maintaining access to the network.

# 9. Product Specifications

This Combo AP/Bridge describes the specifications of the product and the LAN port connector.

## *Wireless LAN Interface*

### Standards

IEEE 802.11/11g and 802.11b standard compliant

### Antenna

Single external antenna with reversed SMA connector

### Frequency Range

2.4 2.4835GHz ( Industrial Scientific Medical Band )

### Operating Channels

11b Mode:

11 Channels (USA, Canada)

13 Channels (Europe)

14 channels (Japan)

11g Mode:

11 Channels (USA, Canada)

13 Channels (Europe, Japan)

### Modulation Technology

CCK for 11b mode (1, 2, 5.5, 11Mbps)

OFDM for 11g mode (6, 9, 12, 24, 36, 48, 54Mbps)

### Data Transmission Rate

54Mbps / 48 / 36 / 24 / 12 / 11 / 9 / 6 / 5.5 / 2 / 1 Mbps Auto Fall-Back

### Access Mode

Infrastructure mode

Ad-hoc mode

### Data Security

Provides both 64-bit & 128-bit WEP Encryption

## Output Power

18 dBm @ 11M CCK

14 dBm @ 54M OFDM

## Roaming

IEEE 802.11 Compliant

## Operating Environment

Operating Temperature: 0°C to 50°C degree

Storage Temperature: –25°C to 70°C degree

Humidity 10% to 90% non-condensing