11Mbps Wireless Ethernet Adapter

User's Manual

Version 1.0

June 26, 2003

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 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.

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.

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About this manual

This user's manual describes how to install and operate the Wireless Ethernet Adapter (Adapter). 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

Thank you for purchasing the WS300 Wireless Ethernet Adapter. This Ethernet adapter provides you with an innovative wireless networking solution. The WS300 is easy to set up and use. With this innovative wireless technology, you can share files and network resources on the network—without inconvenient wires!

The Wireless Ethernet Adapter Features

LAN Features

- **DHCP Client** – Enable the adapter to act as a DHCP client to receive IP address from DHCP Server in the wired Ethernet LAN.
- **Built-in 10BaseT LAN Port** – It's designed to connect the adapter with any Ethernet-ready devices, such as desktop PC,printer server and network printer/scanner.

Wireless Features

- **Standard Compliant** – The adapter complies with IEEE802.11b standard, and it is interoperable with IEEE802.11b-Compliant Equipment
- **Data Rate Auto Fall-Back** - Provides 11, 5.5, 2 and 1Mbps wireless data rate shifting dynamically to guarantee availability and reliability of wireless connections
- **Roaming** – Provides seamless roaming within 802.11b wireless LAN infrastructure.
- **Long Distance Reach** – Support 80M indoor and 300M outdoors long operating distance under normal environment condition.

Configuration & Management

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

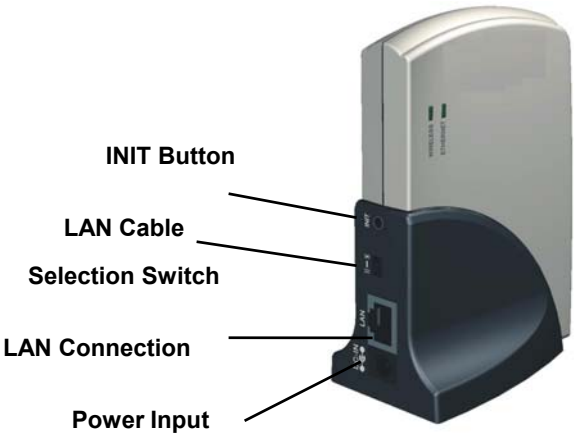
- One 11Mbps Wireless Ethernet adapter with dipole antenna connected
- One CD-ROM (Wireless Navigator utility software & user's manual included)
- One RJ-45 straight LAN Cable
- One Power Adapter
- One Quick Installation Guide

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

2.Hardware Installation

Physical Details

Rear Panel



INIT Button **"INIT"** mean "Initiation". While pressing the button, the adapter will reboot and reset current settings to factory default settings. The left indicator "DIAG" on adapter 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

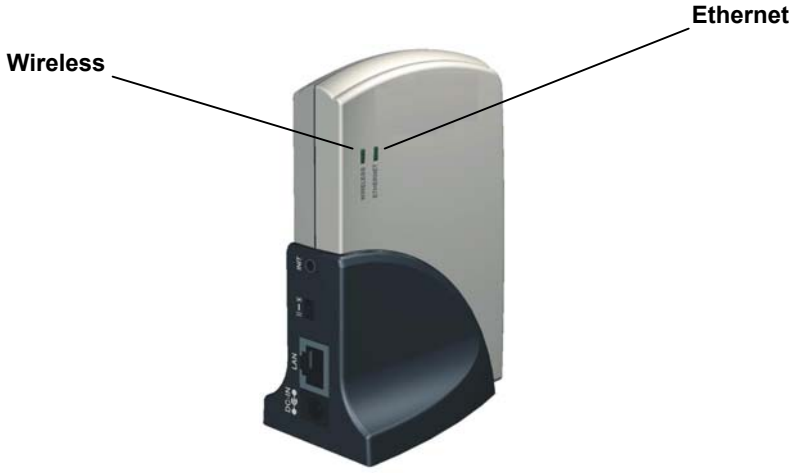
Selection Switch

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

Power Input Only use the power adapter supplied with the Ethernet adapter

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

LED Indications

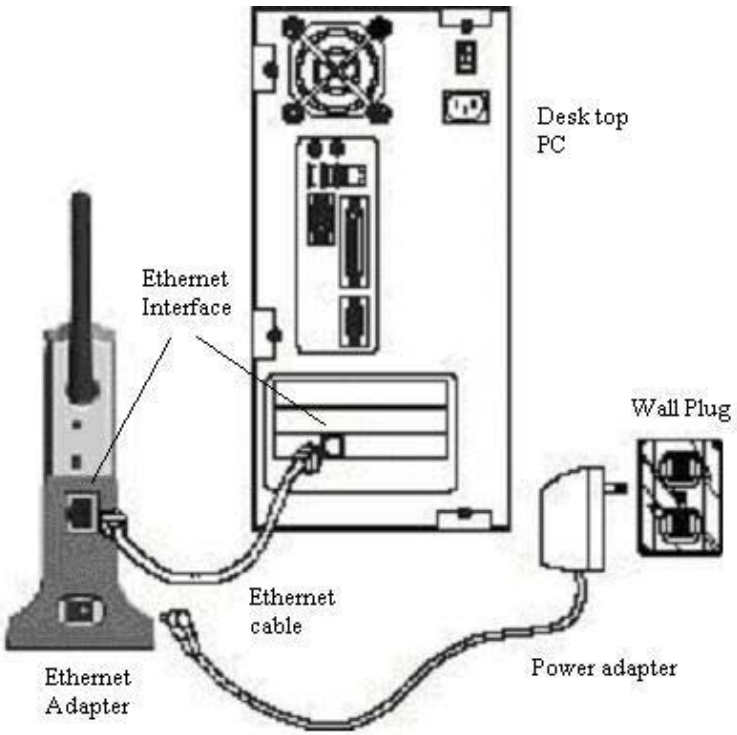


LED	Color	Status	Description
Ethernet	Green	ON	The Access Point power on
		OFF	The Access Point power off
Wireless	Green	OFF	No data forwarding between wireless and LAN ports.
		Blinking	Sending or Receiving data via wireless

Hardware Installation

Following illustration is an example showing how to install adapter with your PC.

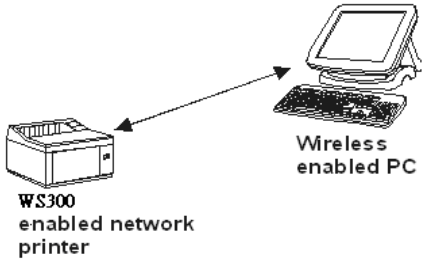
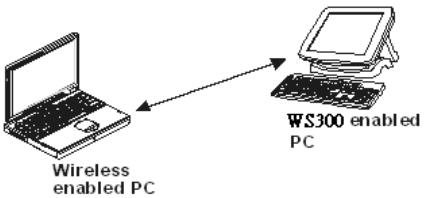
Be sure to use the supplied power adapter.



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

Connecting the Ethernet Adapter to Your Network

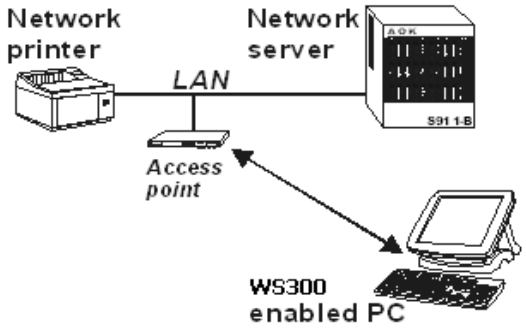
There are two network scenarios as below:

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. 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. **<PC to Network Printer>**  **<PC to PC >** 
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. 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: **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. **Roaming:** the access point enables a wireless LAN computer

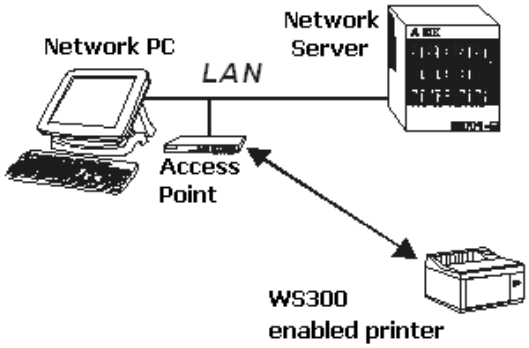
to move through a building and still be connected to the LAN.

Wired to wireless LAN connectivity: the access point bridges the gap between wireless LANs and their wired counterparts.

<PC to LAN>



<Printer to LAN>



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

3. Wireless Navigator Installation

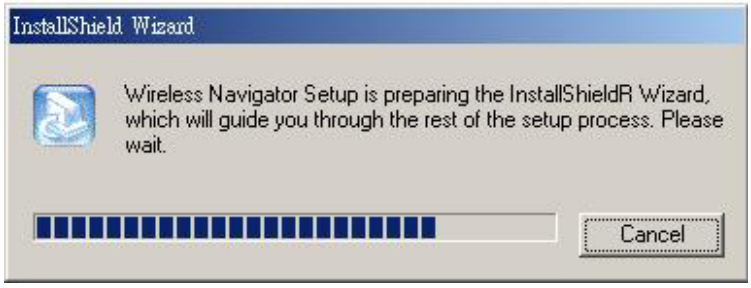
Install the Wireless Navigator

The Wireless Navigator Utility is provided to allow user easily to configure the adapter through any Windows-based PC. This section describes procedures for installing the Wireless Navigator Utility to PC.

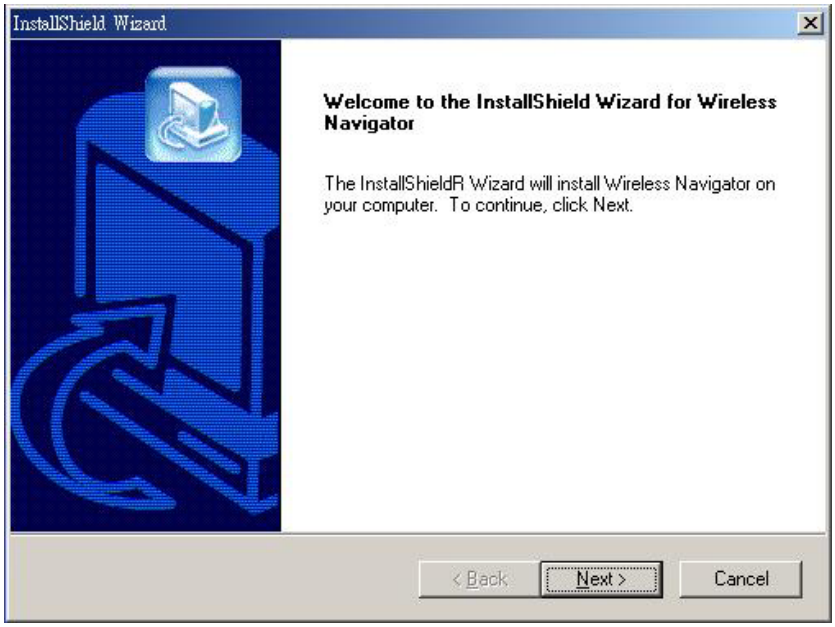
Note!	*Please make sure that your PC already has TCP/IP protocol installed. If not, please contact your administrator for details if you have problems of setting up this TCP/IP protocol in your PC.*

Note!	*Even your adapter is not connected with PC, but other Ethernet device, such as printer server. You still can install the Wireless Navigator in any PC located in the same IP subnet with the adapter. This utility can search the adapter via both wired and wireless Ethernet so that you still manage the adapter remotely.*

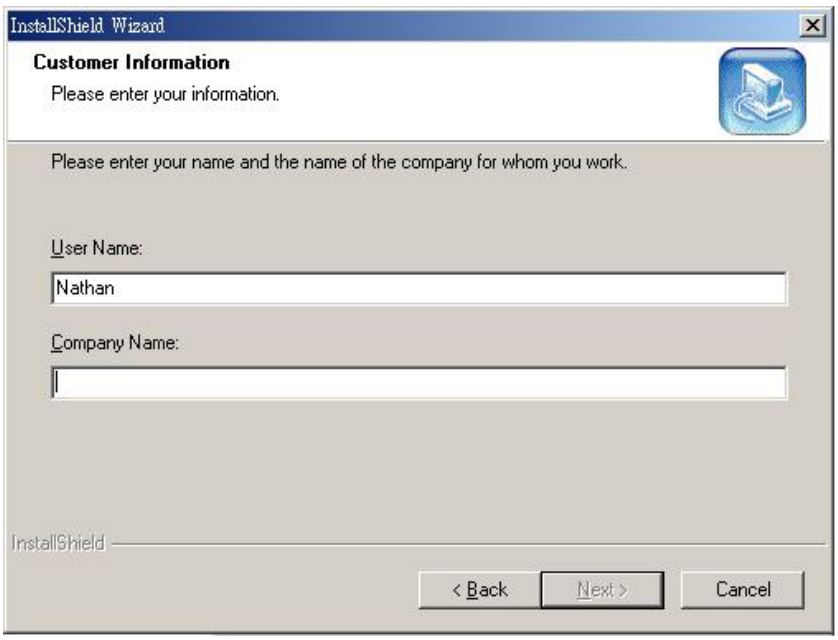
Step 1: Insert the installation CD-ROM into the CD-ROM drive. Run SETUP.EXE program on the CD-ROM. The following window will be shown automatically.



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

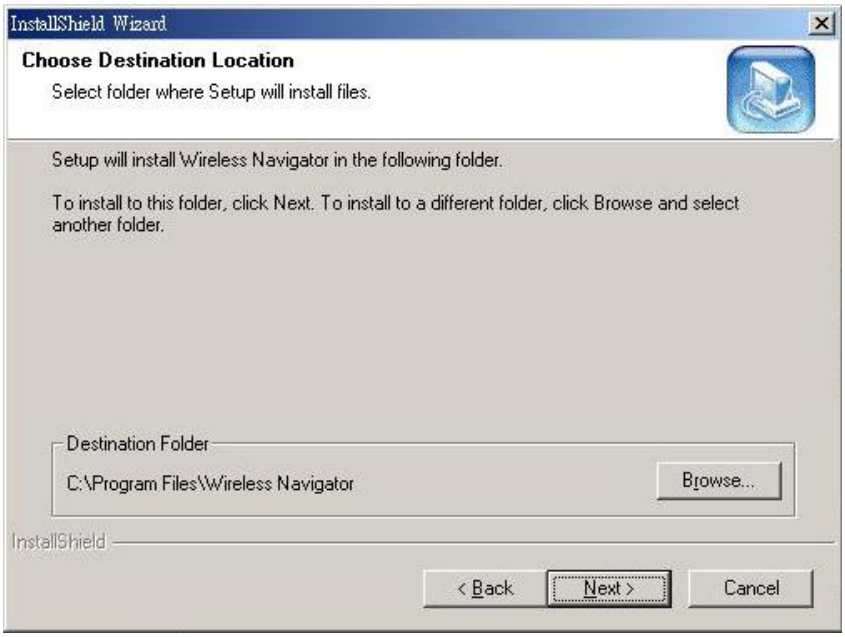


Step 3: Key in your User Name and Company Name, and click **Next** button to continue.

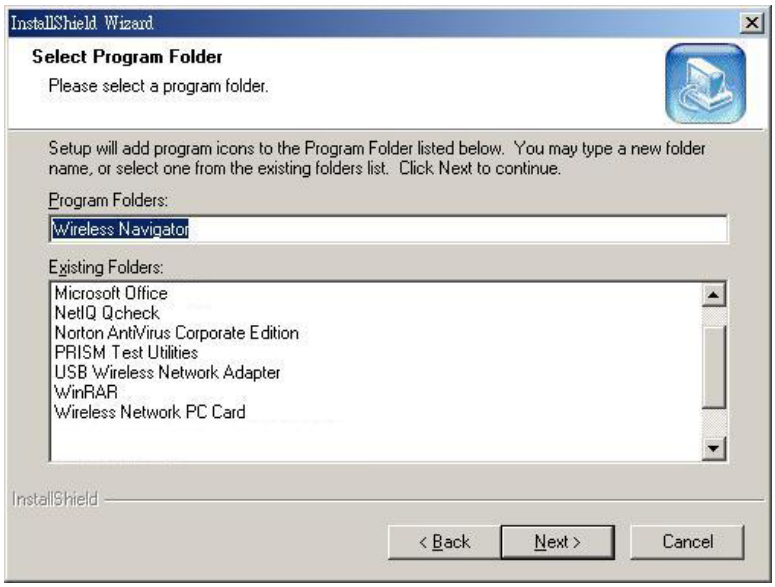


Step 4: The screen will show you the default destination chosen by the utility. If you want to install the Wireless Navigator in another location, click the **Browse** button and select an alternate destination. Click the **Next** button, when you are ready to continue. The

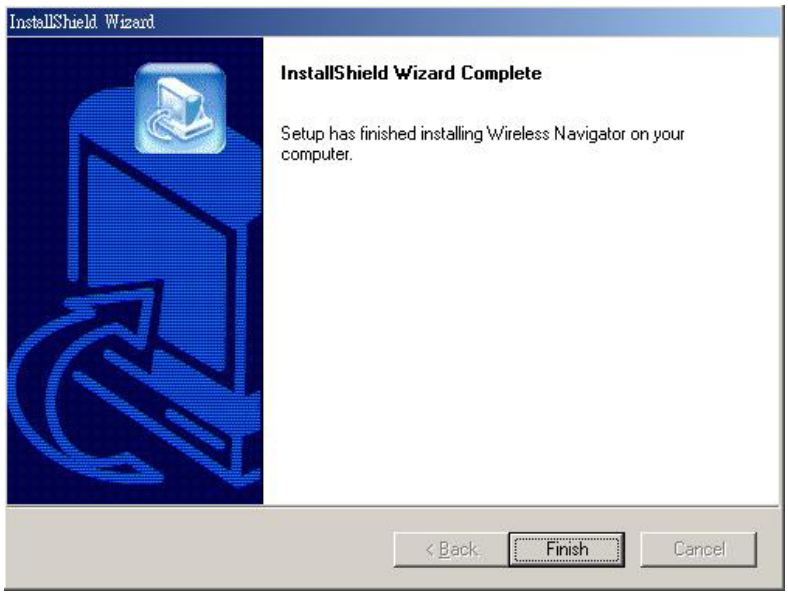
setup program will then begin to install the programs into the destination folder.



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.*

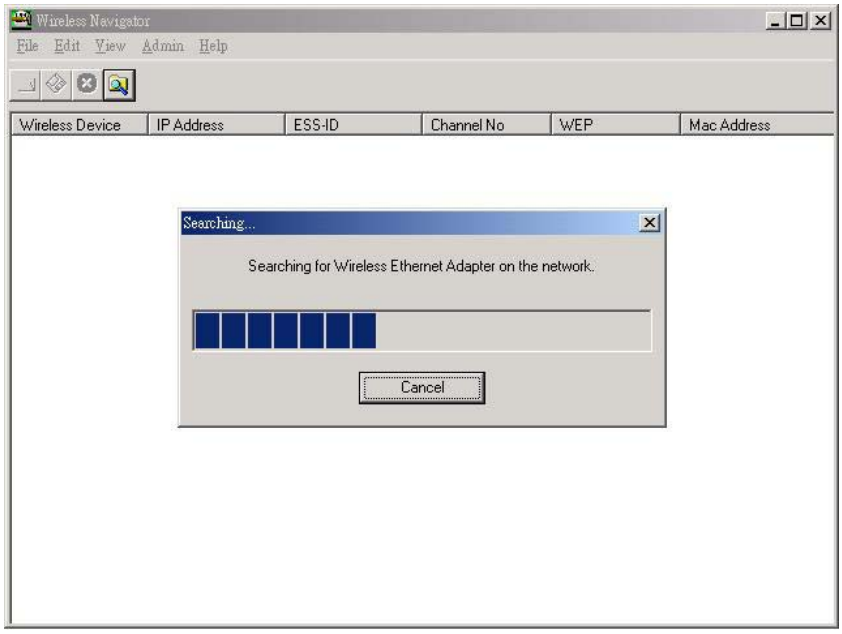
Startup and Login

Follow the procedures below to startup Wireless Navigator and connect to the adapter. Before you start the following procedures, please be sure that all the cables are well connected between PC and adapter, and your wireless LAN network is working. The utility will automatically search the adapter connected with the PC

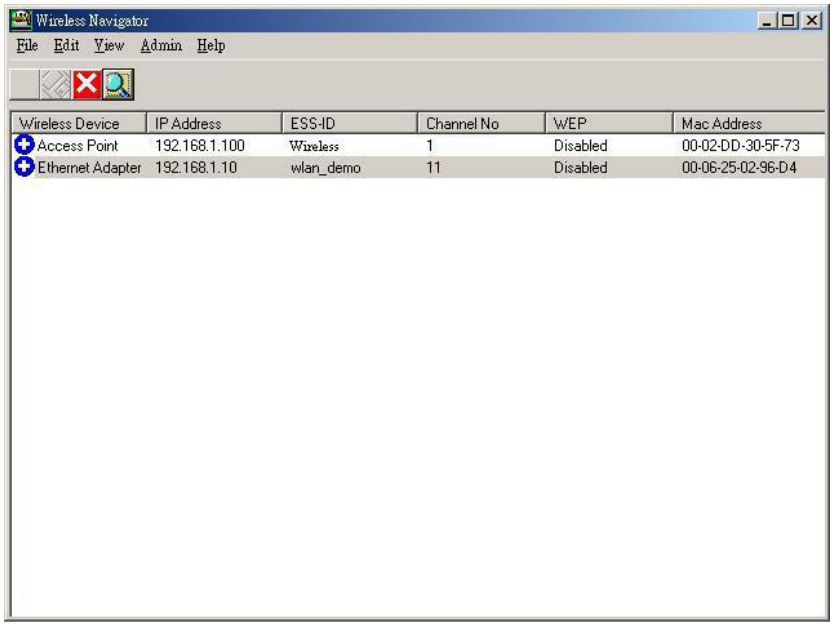
1. Refer to previous section " **Install the Wireless Navigator to your PC**" in order to startup the configuration.

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 the adapter.

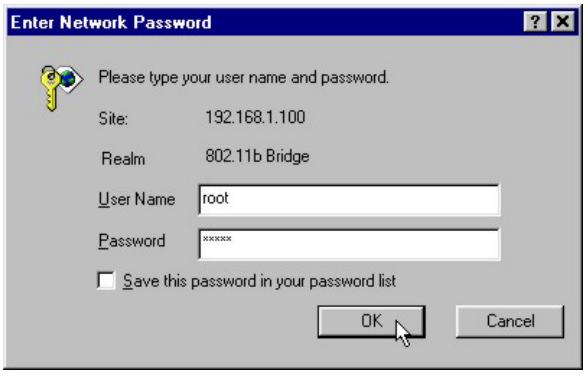


4. The utility will show the adapter found and other wireless devices found in the same network, where your PC is located.



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

5. Double-click on the adapter, then you will access into its built-in web server, and it will show as below. Then directly click **OK** button. **(Default user name is "root" and password is "admin")**.



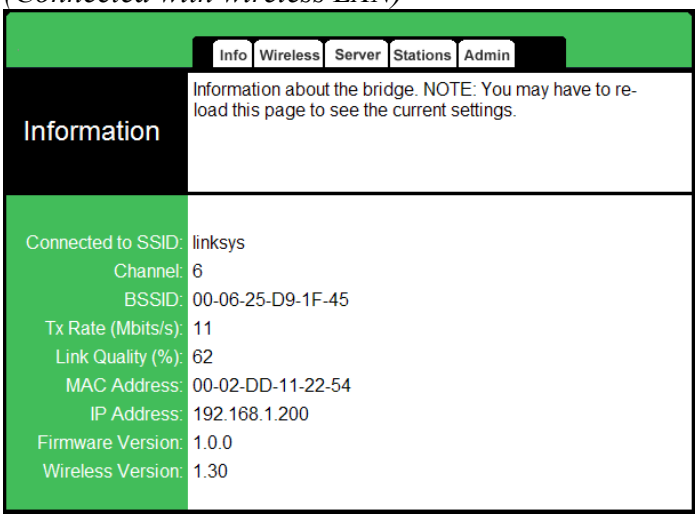
Note!	*If you cannot access into adapter's built-in web server, please make sure if your PC now is in the same subnet with adapter. Please use right-click of mouse to click on the adapter listed in Wireless Navigator.* **"Set IP address"** option will pop out, and then change IP address of AP to the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

6. Now you have entered the built-in web server of this adapter, and you can start configuration procedures described in the next character.

4. Configuring the Ethernet Adapter

The Info Tab

(Connected with wireless LAN)



SSID: displays current SSID this adapter uses.

If the adapter 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 adapter

Channel: displays the channel that the adapter uses now.

BSSID: displays MAC address of the AP that the adapter is connecting with.

Transmission Rate: the transfer data rate that the adapter is using in wireless LAN

Link Quality (%): displays the wireless LAN connection integrity when connected to an AP.

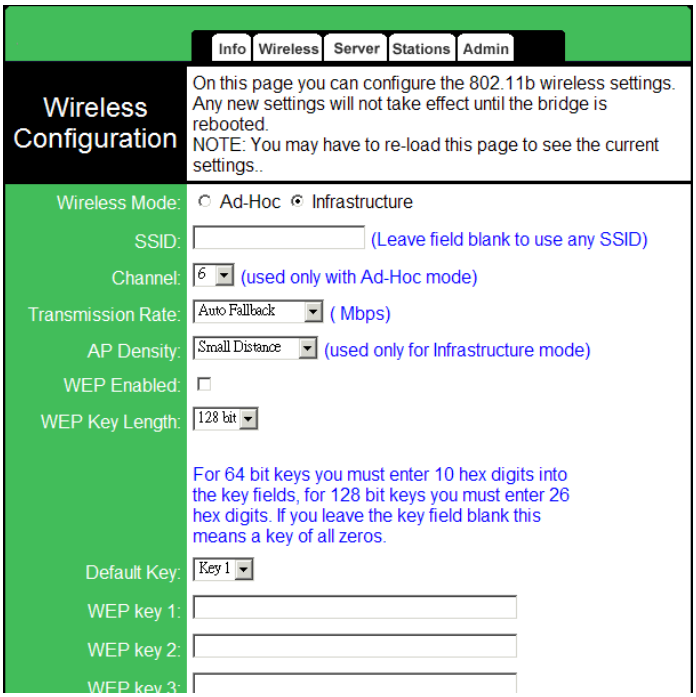
MAC address: displays the unique serial number burned into the adapter that identifies itself from other Ethernet devices.

IP address: displays the adapter's current IP address assigned by AP or router.

Firmware Version: displays the adapter's current firmware version

Wireless Version: displays the wireless module firmware version

The Wireless Tab



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

SSID: lets you set the Service Set Identifications:

Default SSID is "**Any**". When set to any, the adapter is allowed access to any nearby AP.

Channel: enables you to select a transmission channel.

Transmission Rate: displays a list of transfer rates.

AP density: enables you to set the relative number of access points near the WS300. Use this setting to reduce channel overlap and interference:

- **Low:** 1-2 nearby APs
- **Medium:** 3-4 nearby APs
- **High:** 5 or more nearby APs

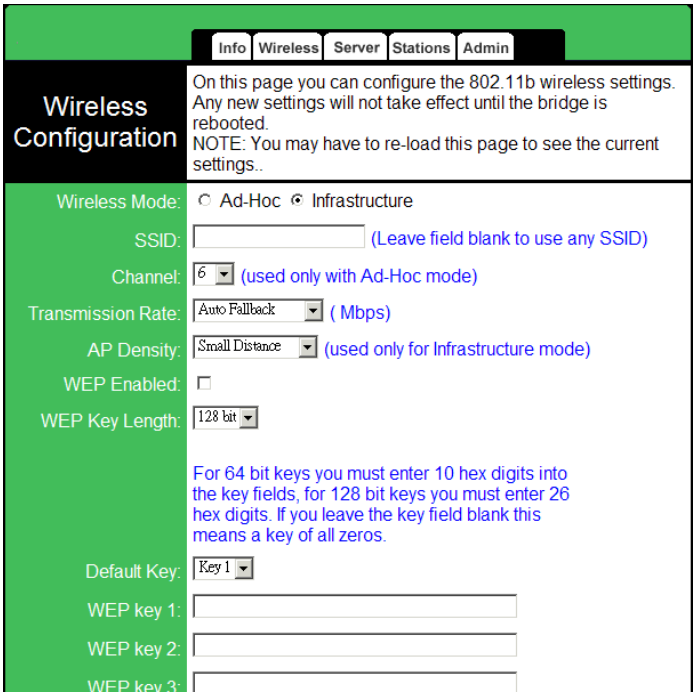
When connected in an infrastructure or ad-hoc mode, a list of nearby APs or peers is displayed at the bottom of the Info screen. When you re-load the web page, the list will be updated.

WEP enabled: Allows you to enable or disable Wired Equivalency Privacy (WEP) for encryption, with either 64- or 128-bit encryption.

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

Note: *Some APs do not support 128-bit encryption*

The Wireless Tab (Continued)



WEP key 1 ~ 4: Enables you to create an encryption scheme for Wireless LAN transmissions. Manually enter a set of values for each 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 in the AP shall be the same as in adapter, otherwise the communication will not work.

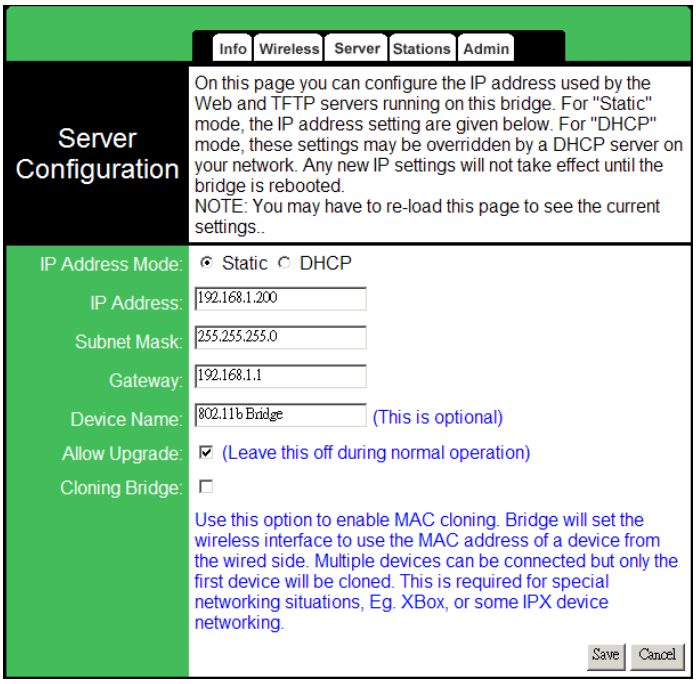
Note: *128-bit encryption requires more system resources than 64-bit encryption. Use 64-bit encryption for better performance.*

WEP key to use: sets which WEP key (1 ~ 4) to use when sending data. To connect to a Wi-Fi compliant wireless device, key #1 must be selected.

Note: *The receiver must use the same key.*

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

The Server Tab



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

IP Address: The static IP address you may assign to the adapter. The default value is "**192.168.1.200**".

Subnet Mask: The subnet mask you want to assign for the adapter. The default value is "**255.255.255.0**".

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

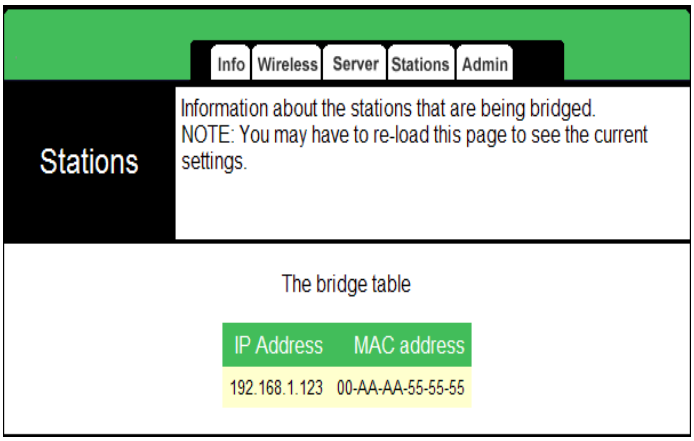
Device Name: optional device name setting

Allow upgrade : Check the box, and then it is allowed to upgrade firmware.

Cloning Bridge

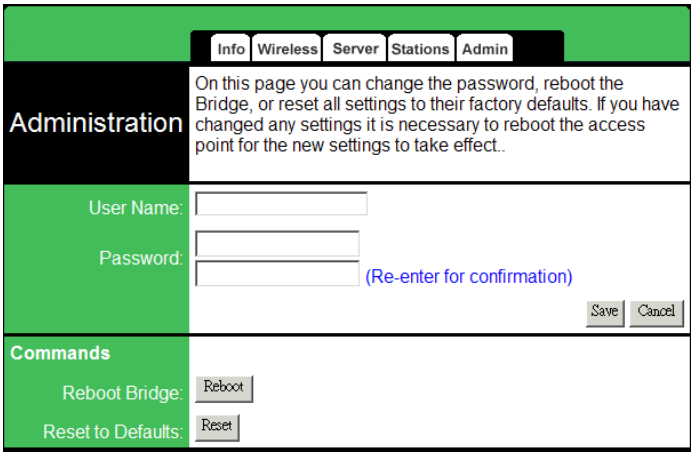
Note!	***You may need to reboot the adapter, and then re-load the page to see any new settings.***

The Stations Tab



The bridge table: display the stations IP address and Mac address

The Admin Tab



User Name: Default user name is none.

Password: Default password is none. For security concerns, please change it after finish the configuration.

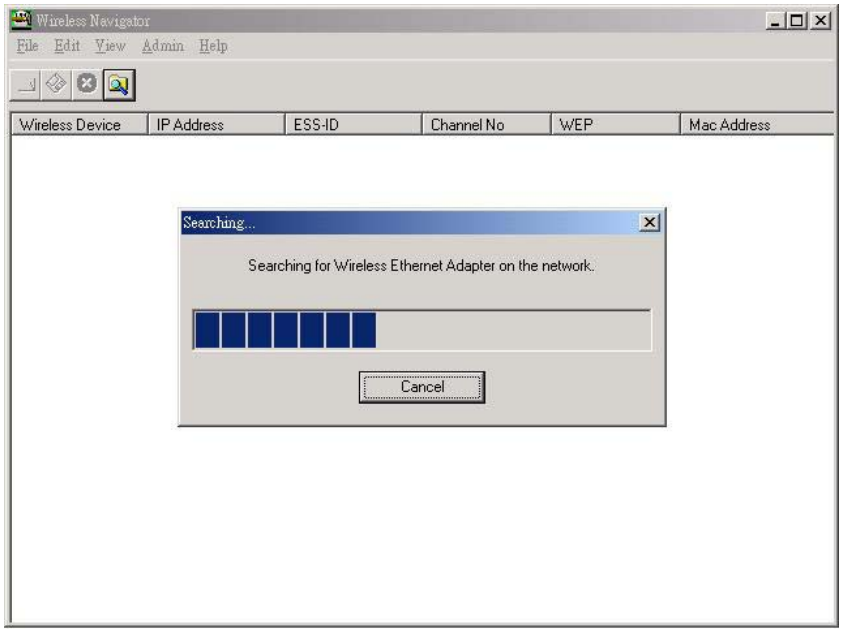
Reboot Bridge: When any setting was changed, the adapter MUST be reboot so that the change can be confirmed.

Reset to defaults: This option will ERASE all the current settings, and restore to the factory default settings.

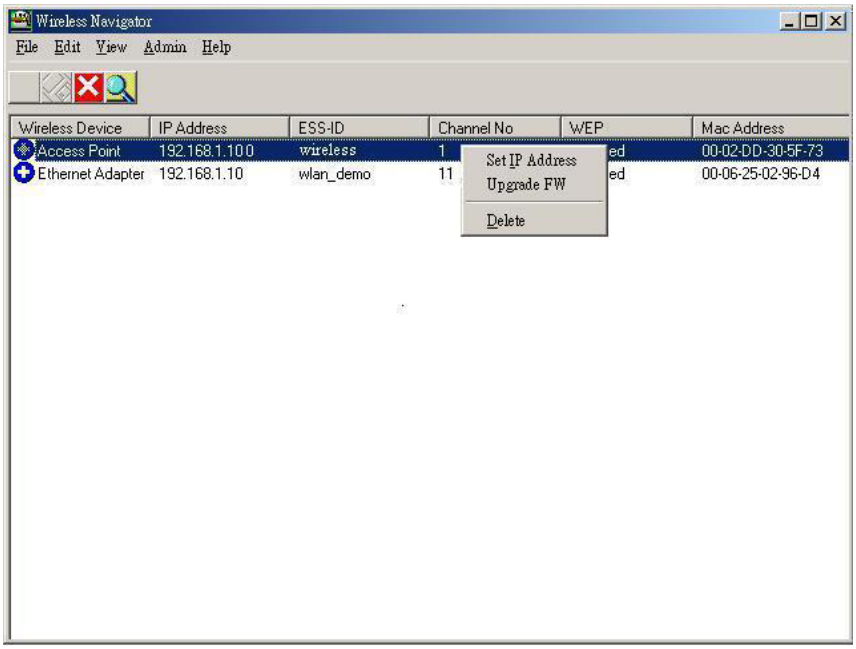
Note!	***You may need to reboot the adapter, and then re-load the page to see any new settings.***

5. Firmware Upgrade Procedure

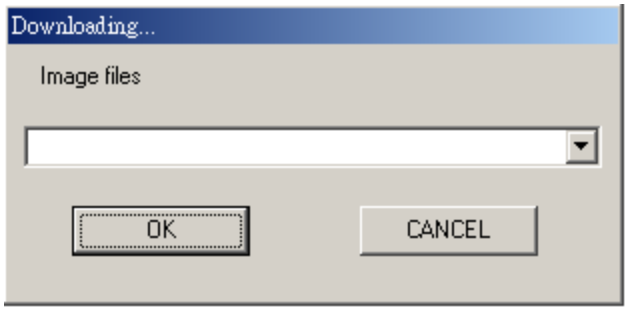
1. Click **Start** and select **Programs**, **Wireless Navigator** and then **Wireless Navigator.** Or, just double-click the **Wireless Navigator** icon on your desktop screen.
2. The Wireless Navigator starts up.



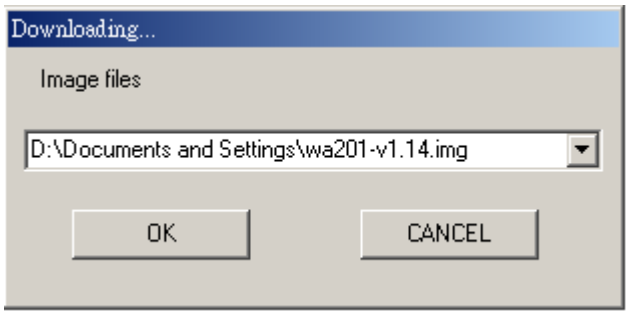
3. The utility starts searching for the adapter and APs. Choose the adapter that you would like to upgrade the firmware, and use the right-click of the mouse to enter the "**Upgrade FW**" option



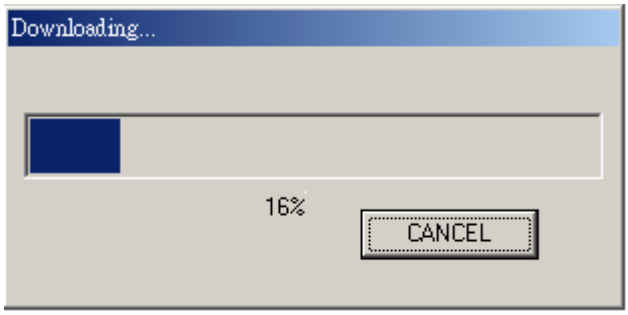
4. The download will begin. Key in the new firmware file name and location or click browsing to find the file in your computer.



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



6. The downloading begins.



7. After download finished, the adapter will reset automatically, and the left indicator "DIAG" on AP will be off and then begin flashing. When the indicator " DIAG" is always off again, the firmware upgrade is completed and successfully.

6. FAQ & Troubleshooting

This chapter provides solutions to problems usually encountered during the installation and operation of the Wireless Access Point. 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.

Q1: My PC can't locate the Wireless Ethernet adapter. How to check the problem?

A: Please follow the procedures below:

- Check if the Ethernet cable is well connected.
- Check if the IP addresses of your PC and Wireless Ethernet adapter both are on the same IP network. If not, you may use Wireless Navigator to set up adapter's IP address, or change your PC's IP address.

Q2: My adapter cannot communicate with Wireless Access Point. How to check the problem?

A: Please follow the procedures below:

- Check if you can use Wireless Navigator utility to access to the adapter first. If not, please go through the procedure of Q1.
- Check if the adapter is set to Infrastructure correctly.
- Check if the SSID of your adapter is the same as AP's. If not, please set it the same as the SSID of AP's.
- Check if the WEP is enabled either in your adapter or access point. If yes, please make sure that your adapter 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.

Q3: 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 Ethernet adapter's location and its antenna's direction. If you find the interference is the problem, changing to another channel may show the improvement.

Q4: Can I run an 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 application's user guide to determine if it supports operation over a network.

Q5: 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). Refer to the game's user guide for more information.

Q6: 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.

Q7: 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.

Q8: 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 application for mobile workers.

Q9: 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.

Q10: What is Spread Spectrum?

A: Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In the other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver

is not turned to the right frequency, a spread-spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

Q11: 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.

7. 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, it 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 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.

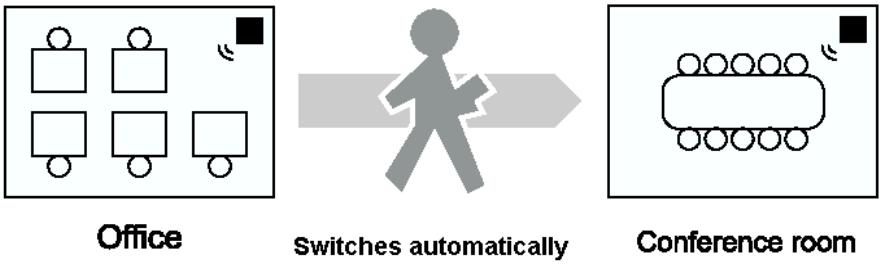
Protocol

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.



8. Product Specifications

This chapter describes the specifications of the product and the LAN port connector.

Wireless LAN Interface

Standards

IEEE 802.11/11b Compliant

Antenna

Built-in chip Antenna

Frequency Range

2.4～2.4835GHz (Industrial Scientific Medical Band)

DSSS - Direct Sequence Spread Spectrum

Data Transmission Rate

11Mbps / 5.5Mbps / 2Mbps / 1Mbps Auto Fall-Back

Access Mode

Infrastructure mode

Ad-hoc mode

Data Security

Provides both 64-bit & 128-bit WEP Encryption

Output Power

15 ~16.5 dBm

Receiving Sensitivity

-82dBm Min.

Roaming

IEEE 802.11 Compliant

Channels

11 Channels (US, Canada)

13 Channels (Europe)

14 Channels (Japen)

Coverage Area

Indoors:	up to 50M (165 ft.) @11Mbps
	up to 80M (265 ft.) @5.5 Mbps or lower
Outdoors:	up to 150M (500 ft.) @11 Mbps
	up to 300M (1000 ft.) @5.5 Mbps or lower

(Depending on environment)

Operating Environment

Operating Temperature: 0°C to 50°C degree

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

Humidity 10% to 90% non-condensing

WS310-A

802.11b Wireless Ethernet Bridge

Product Specification

Revision 1.0

Revision History

Date	Version	Author	Remark
04/30/2003	0.8	Nathan Yen	
06/26/2003	1.0	Lena Hsiao	Formal release

Introduction

The WS310-A is a compact wireless Ethernet client bridge, tailor-made for home and SOHO users in order to utilize the advantage of wire-free connectivity. This device simply and efficiently transmits the traffic between 10M Ethernet and 11M WLAN. It can easily bring the Ethernet-ready network devices, such as network printer/scanner/copier, desktop and notebook, into wireless LAN network without any inconvenient cable wiring efforts.

Major Features

- Adopt Agere HermesII WLAN chipsets, which are well-proven solution in the market today.
- Uses 2.4GHz ISM band, which fully complies with IEEE 802.11b
- Low interference & high susceptibility guarantee reliable performance.
- Dynamically shifts between 11, 5.5, 2, and 1 Mbps network speed, based on signal strength, for maximum availability and reliability of connection.
- Equipped with one standard 10Base-T interface for connecting with Ethernet-ready networked resources, such as PC and printer/scanner.
- Ensures great security by providing the 64-bit and 128-bit WEP (Wired Equivalent Privacy) encryption defined in the IEEE 802.11b standard.
- No driver is needed, neutral to any PC's OS.
- For bridging one client, it supports transparent bridging.

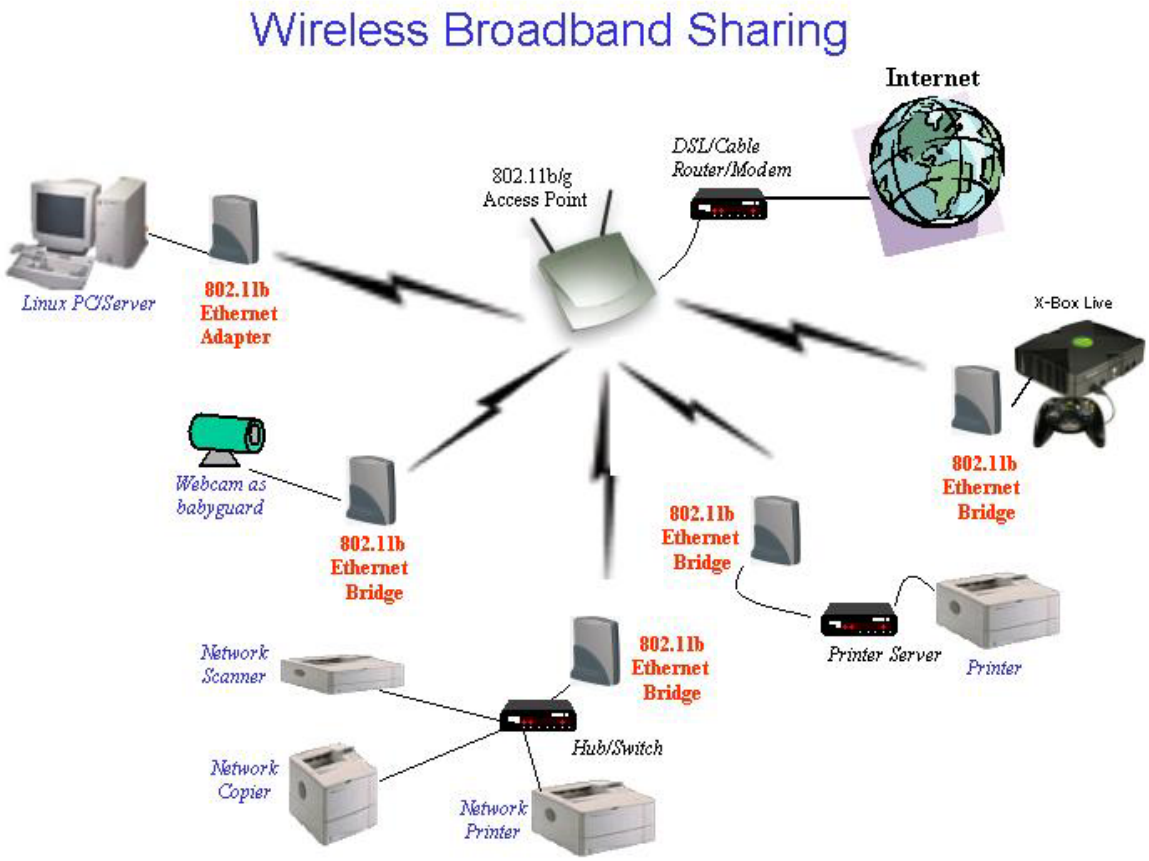
- For multiple-client bridging, will support only with TCP/IP protocol.

Benefits

- Make Ethernet-ready peripheral wireless, such as network printer/scanner/copier in office, and web camera, and X-Box at home.
- An alternative to enable non-Windows PC and server wireless, such as Linux PC/server and Mac.
- Convenient wireless network extension solution to bridge multiple Ethernet-ready peripherals or PCs from the corner of office.

Specifications

PHYSICAL SPECIFICATIONS	
Housing	Stand type with no screw design (Depending on customization)
Ethernet Interface	10Base-T (RJ-45) interface
Antenna	Internal chip Antenna
LED Display	Two LEDs indicating the status of Ethernet and Wireless
Crossover Selection	To connect to PC or Ethernet-ready devices
Initiate button	Restore all settings to factory default settings
Power adapter	Input: 5V DC, 1A
Dimensions (mm)	70.44 x 23 (44.48 with flat stand) x 108.54 (Depending on customization)
RADIO SPECIFICATIONS	
WLAN Standards	IEEE802.11/11b Industry Standards
Media Access Protocol	IEEE802.11
Frequency	Industrial Scientific Medical Band, World: 2.400GHz～2.484GHz Japan: 2.400GHz~2.484GHz plus 2.471GHz~2.487GHz

Operating Channels	11 Channels (USA, Canada) 13 Channels (Europe) 14 Channels (Japan)
Data Rate Shifting	11Mbps / 5.5Mbps / 2Mbps / 1Mbps
Modulation Technique	Direct Sequence Spread Spectrum (DSSS), BPSK / QPSK / CCK
Bit Error Rate	1E-5 @ -82dBm
Transmit Power	15 dBm ± 2dBm
Max Receiver Sensitivity	-82 dBm @ 11Mbps -85 dBm @ 5.5Mbps -88 dBm @ 2Mbps - 91 dBm @ 1Mbps
Coverage Area	Indoor: 50M @11Mbps , 80M @5.5Mbps or lower Outdoor: 150M @ 11Mbps , 300M @ 5.5Mbps or lower
Security	64-bit & 128-bit WEP Encryption
FIRMWARE/SOFTWARE SPECIFICATIONS	
Configuration Utility (Wireless Navigator)	Support Windows 95/98/Me/NT 4.0/2000 and Windows XP
Management	Built-in Web-based management
	1. Indicate current WLAN connection status 2. Configure Infrastructure/Adhoc, SSID, Channel, security settings, Site Survey and etc. 3. MAC cloning to enable on-line TV gaming, such as X-box and PS2
Firmware Upgrade	TFTP, or by Configuration Utility
Protocols	TFTP, ARP, IP, UDP, ICMP, TCP, DHCP client, HTTP for firmware upgrade and web-based management,
ENVIRONMENTAL	
Temperature	Operating Temperature: 0°C to 50°C degree Storage Temperature: –25°C to 70°C degree
Relative humidity	10% to 90% non-condensing
OTHERS	
Warranty	1 year

Application Diagram