WLAN-9100
The 11Mbps Wireless LAN Access Point

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CE Notification

The WLAN-9100 has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the WLAN-9100 system from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Information

This equipment has been tested and found to comply with the limits for a Class A digital devices pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication.

Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at this own expense.
The user should not modify or change this equipment without written approval from company name. Modification could void authority to use this equipment.

For the safety reason, people should not work in a situation which RF Exposure limits be exceeded. To prevent the situation happening, people who work with the antenna should be aware of the following rules:

1. Install the antenna in a location where a distance of 20 cm from the antenna may be maintained.
2. While installing the antenna in the location, please do not turn on the power of wireless card.
3. While the device is working, please do not contact the antenna.

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Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the unusual and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known. Your satisfaction is our number one concern. Here is a guide to Advantech's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

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We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For most frequently asked questions you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. Please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem and, with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and are able to be easily solved over the phone. In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products.

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Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase. This warranty does not apply to any products which have been repaired or altered by other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability as a consequence of such events under the terms of this Warranty. Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product ever does prove defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

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1. Collect all the information about the problem encountered (e.g. type of PC, CPU speed, Advantech products used, other hardware and software used etc.). Note anything abnormal and list any on-screen messages you get when the problem occurs.

2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.

3. If your product is diagnosed as defective, you have to request an RMA number. When requesting an RMA (Return Material Authorization) number, please access ADVANTECH's RMA website: http:// www.advantech.com.tw/rma. If the web sever is shut down, please contact our office directly. You should fill in the "Problem Repair Form",describing in detail the application environment, configuration, and problems encountered. Note that error descriptions such as "does not work" and "failure" are so general that we are then required to apply our internal standard repair process.

4. Carefully pack the defective product, a completely filled-out Repair and Replacement Order Card and a photocopy of dated proof of purchase (such as your sales receipt) in a shippable container. A product returned without dated proof of purchase is not eligible for warranty service.

5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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Chapter 1 Introduction

The WLAN-9100 is an efficient bridge between wired and wireless local area networks. It brings with it the advantage of network expandability and mobility for users. The WLAN-9100 is fully compliant with the IEEE 802.11(b) 11Mbps Wireless LAN standard, and features powerful functions such as: high-security WEP40 protection, a self-diagnostic configuration utility, Web management, SNMP and more. The WLAN-9100 is especially suitable for difficult-to-wire environments and mobile workers.

If placed anywhere along a LAN, the WLAN-9100 allows wireless stations to access transparently the corporate network.. By detecting WLAN-9100s automatically, wireless LAN devices can roam different areas so long as they are configured correctly. In addition, the WLAN-9100 also provides WEP40 standard and MAC Access Control for transmission security. This makes it suitable for high-security network. We also provide four convenient methods to configure WLAN-9100: Web management, telnet, configuration utility, RS-232. You can configure it via Internet remotely. For further protecting transmission security, WLAN-9100 adapts MAC access control to limit the specific wireless LAN devices to join the network.

1.1 Features and Benefits

- 11Mbps data rate by incorporating Direct Sequence Spread Spectrum technology.
- Fully IEEE 802.11b compatible. Allow inter-operation among multiple vendors.
- Seamless roaming within the 802.11 & 802.11b wireless LAN infrastructure.
- User authentication to enforce tight security.
- MAC address control.
- Supports WEP40 security standard.
- Highly efficient antenna provides a range of operation up to 800 feet in free space.
- Easy end-user installation, just plug and play
- Windows-based configuration utilities.
- Windows-based Diagnostic, Statistics Tools and Traffic Monitor.
- Tight design with light weight, compact size, and low power consumption.

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1.2 Specifications

Product	**WLAN-9100 Wireless LAN Access Point**
Wired Interface	10/100 base T (RJ-45)
Serial Port	DB9 RS-232 (configuration port)
Wireless Interface	11Mbps Wireless LAN
Modulation	DSSS (CCK, DQPSK, DBPSK)
Operation Frequency	N. America/FCC: 2412~2.462 GHz (11 channels) Europe CE/ETSI: 2.412~2.472 GHz (13 channels) Japan: 2.412~2.484 GHz (14 channels) France: 2.457~2.472 GHz (4 channels) Spain: 2.457~2.462 GHz (2 channels)
Speed Options	11M/5.5M/2M/1M, also support Auto Rate Selections
RF Technology	Direct Sequence Spread Spectrum
Power Supply	DC 12V (External power supply included)
RF Output Power	13 dBm
Sensitivity	-84dBm @ 11Mbps, PER < 8* 10-2
Antenna	Integrated dipole antenna

1-3 System Configurations

The WLAN-9100 Wireless Access Point can be configured in a variety of network system configurations.

Wireless Infrastructure

In a wireless infrastructure, the WLAN-9100 acts as a bridge. The Access Point connects the wireless clients together. The WLAN-9100 Access Point acts as a center point for all wireless communications. This would increase efficiency of the communications since the wireless adapters do not need to be within direct range of each other.

Wireless Infrastructure with Stations Attaching to a Wired LAN

The WLAN-9100 Wireless LAN Access Point will provide access to a your local LAN. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of wireless LAN PC users and an Access Point construct a Basic Service Set (BSS). Each wireless PC in this BSS can talk to any computer on your network via the Access Point.

Chapter 2 Hardware Installation

This chapter describes initial setup of the WLAN-9100.

2-1 Product Kit

Before installation, make sure that you the following items:

- **The WLAN-9100 Wireless LAN Access Point**……x 1
- **Quick Start Guide** ……..……...x 1
- **Power Adapter**……..…….x 1
- **Product CD (or Floppy Disk)**…….. ……x 1

If any of the above items are not included or damaged, please contact your local dealer for support.

2-2 System Requirements

Installation of the WLAN-9100 Wireless LAN Access Point requires:

1. An AC power outlet (100~240V, 50~60Hz) which supplies the power for the Access Point.
2. A 10/100 Base-T (UTP) Ethernet cable drop.

Note: (*Only if you want to re-configure the WLAN-9100 Wireless LAN Access Point instead of using factory default configuration…*) A PC with an available RS-232C port runs the configuration program.

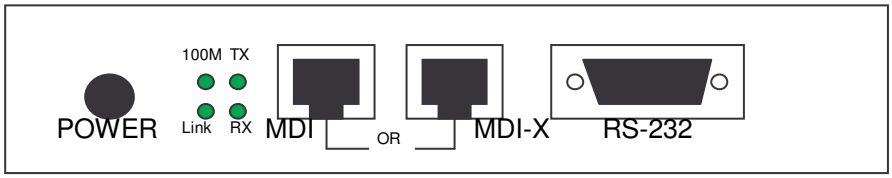
2-3 Mechanical Description

Top panel of the WLAN-9100:

The following table provides an overview of each LED activity:

LED Definition	Activity	Description
PWR	Continuous Green	Power enabled
AP	Continuous Green	The WLAN-9100 is ready in service.
WLAN	Flashing Green	**Off:** No wireless activity
		Flashing: Wireless RX/TX activity
LAN	Flashing Green	**Off:** No Ethernet traffic activity
		Flashing: Wired LAN traffic activity
LINK	Continuous Green	**Off**: no station connected to the Access Point
		On: with one or more stations associated to the WLAN-9100

Back panel of the WLAN-9100:



Power Socket

The power adapter plugs into the socket labeled “POWER”.

Ethernet Ports

The WLAN-9100 Wireless LAN Access Point supports two types of Ethernet ports: RJ-45 MDI daisy-chain port (labeled “MDI”) and RJ-45 MDI-X station port (labeled “MDI-X”). To connect the WLAN-9100 to a hub, use the MDI port; to connect the WLAN-9100 to a computer/station, use the MDI-X port. Both connection ports are used with a straight-through UTP cable. Please note that, these two RJ-45 ports cannot be used *at the same time*.

The four LEDs (100M/Link/Tx/Rx) next to the Ethernet ports indicate the Ethernet physical link status. The ‘Link’ LED is a good indicator for to see if you have proper Ethernet connection.

RS232 Port (Console Port)

The RS232 port is used for configuring the WLAN-9100. Use a null-modem RS232 cable when you desire to configure the WLAN-9100 under console mode. See the section "Access Point Console" on page 7 for detailed information.

2-4 Hardware Installation

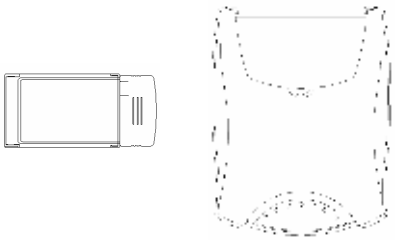
Take the following steps to set up your WLAN-9100.

- **Site Selection**

  Before installation, determine the Access Point location. Proper placement of the Access Point is critical to ensure optimum radio range and performance. You may use the Site Survey and Access Points Browser utility (The utilities included with the wireless PC Card) to choose a proper placement for your WLAN-9100. Typically, the best location to place your WLAN-9100 at your site is the center of your wireless coverage area. Try to place your mobile stations within the line of sight. Obstructions may impede performance of the Access Point.

- **Access Point Placement**

  You can place the Access Point on a flat surface such as a table or cabinet, or mount the unit on a vertical surface like a wall. The integrated antenna of your WLAN-9100 performs best in an open environment with as few obstructions as possible. In most situations placing the Access Point as pictured below will provide satisfactory performance results.



- **Connect the Ethernet Cable**

  The WLAN-9100 Wireless LAN Access Point supports 10/100M Ethernet connection. Attach your UTP Ethernet cable to the RJ-45 connector on the WLAN-9100. Then connect the other end of the RJ-45 cable to a hub or a station. Please be aware that, use the MDI port to connect the WLAN-9100 to a hub. Otherwise, please use the MDI-X port to connect the WLAN-9100 to a computer/station.

- **Connect the Power Cable**

  Connect the power adapter to the power socket on the WLAN-9100, and plug the other end of the power into an electrical outlet. The WLAN-9100 will be powered on and all five indicators on the top panel will flash in sequence to test the functionality of the indicators.

NOTE: ONLY use the power adapter supplied with the WLAN-9100. Otherwise, the product may be damaged.

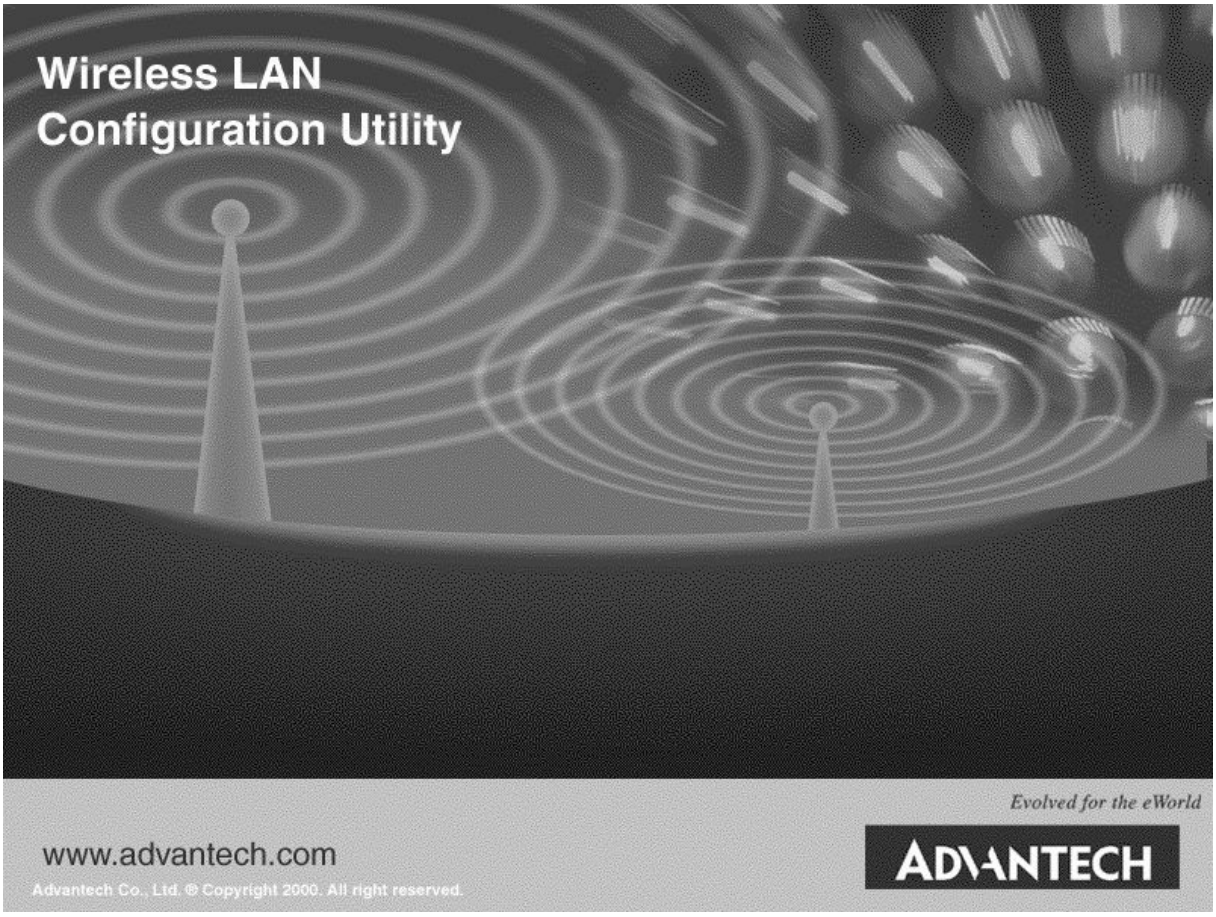
Chapter 3 Configuring the WLAN-9100

The WLAN-9100 Wireless LAN Access Point is shipped with default parameters, which will be suitable for the typical **infrastructure wireless LAN**. Just simply install the Access Point, power it on, and it is now ready to work. Nevertheless, you can still adjust configuration settings depending on how you would like to manage your wireless network. The WLAN-9100 allows for configuration either via the configuration utility, known as Access Point Manager, console port connection, or anywhere through a TCP/IP (Telnet) connection.

3-1 Using the Access Point Configuration Utility

Installed on your Windows 95/98/NT desktop computer, the Windows-based utility "***Access Point Manage***r" provides a user-friendly interface. The Access Point Manager enables you to configure all of your WLAN-9100 on the network more easily than ever before. The following gives instructions guiding you through the installations of the Access Point Manager utility.

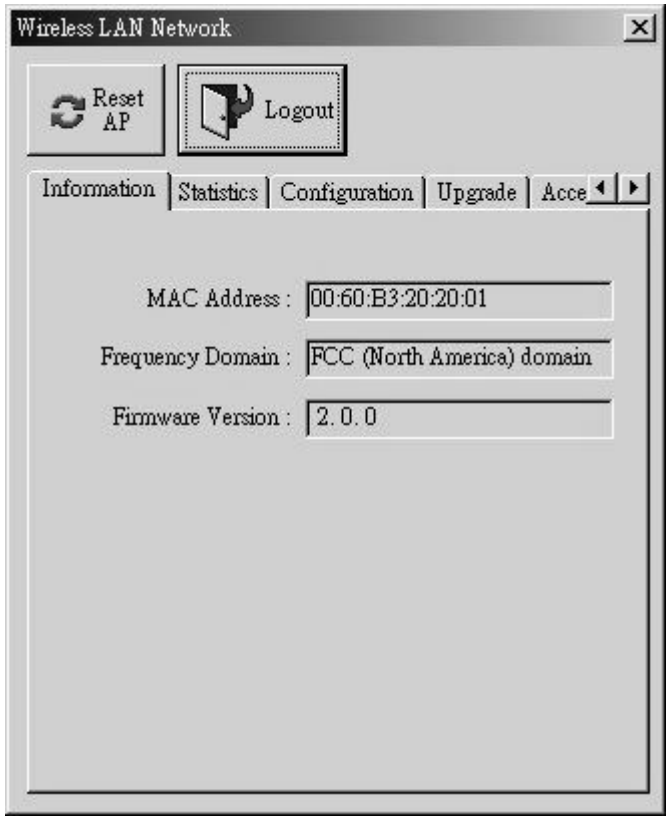
1. Insert the Software and Documentation CD into the CD-ROM drive, or the floppy disk that came with your product kit into the floppy drive on your computer.
2. From the Start menu on the Windows desktop, choose **Run**.
3. In the Run dialog box, type the path where the utility is located, then click **OK**. For floppy installation: **A:\setup**.
4. Follow the on-screen instructions to install the Access Point Manager.
5. Upon completion, go to **Program Files** and execute the Access Point Manager utility. It will begin to browse all the Access Points available on the network.


Wireless LAN
Configuration Utility
Evolved for the eWorld
www.advantech.com
ADVANTECH
Advantech Co., Ltd. © Copyright 2000. All right reserved.


Access Point Manager
File View About
wireless LAN
1 Access Point(s) found in your local network.

6. Double click an Access Point icon to access its property dialog box. Enter the password in the entry field. The default password is "**default**".

7. After entering the correct password, a configuration window appears. You will see the basic information of the Access Point, such as MAC Address, Frequency Domain and Firmware Version.



MAC Address: It is a hardware identification number that distinguishes the unit from others. You will see the number on the label located on the bottom of the WLAN-9100.

Frequency Domain: The regulated operating frequency per country.

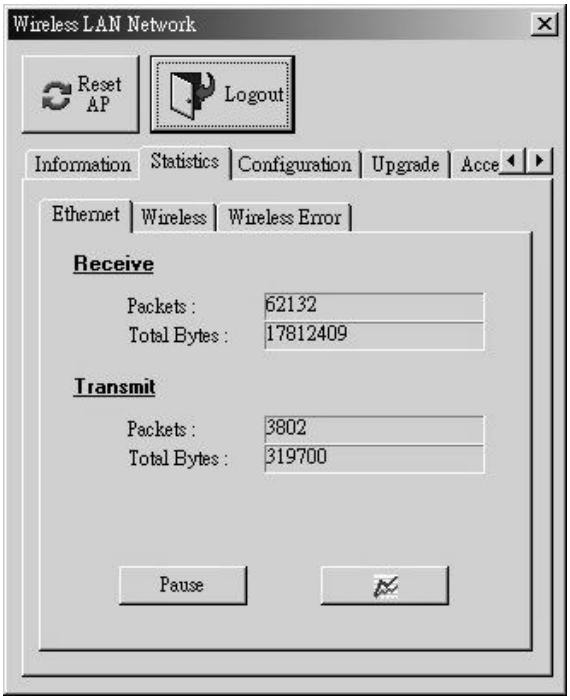
Firmware Version: Displays the firmware version that is equipped with your hardware.

Statistics

The statistics tab contains three of the following items for you to monitor the Ethernet and Wireless network traffic.

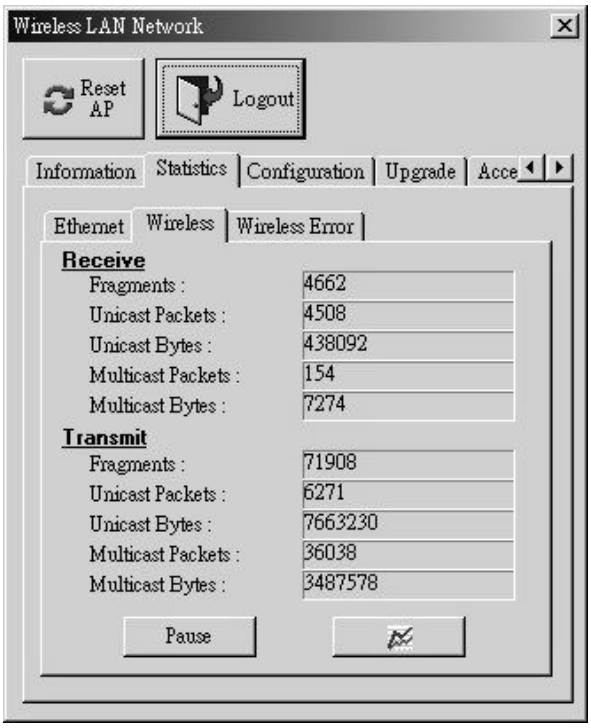
Ethernet:

You may monitor the TX/RX on the wired network.



Wireless:

You may monitor the TX/RX of the wireless network.



Wireless Error:

This item offers detailed information on error wireless packets that the AP receives and transmits.

Receive:

Packet FCS Errors: The number of wireless packets that fail during FCS transmission (Frame Check Status when accessing the wired network.

No Buffer: The number of wireless packets that the AP ignores due to insufficient memory.

Received WEP Errors: The number of wireless packets that have WEP encryption errors.

Transmit:

Deferred Transmission: The number of packets that have deferred transmission due to the fact that the medium is busy.

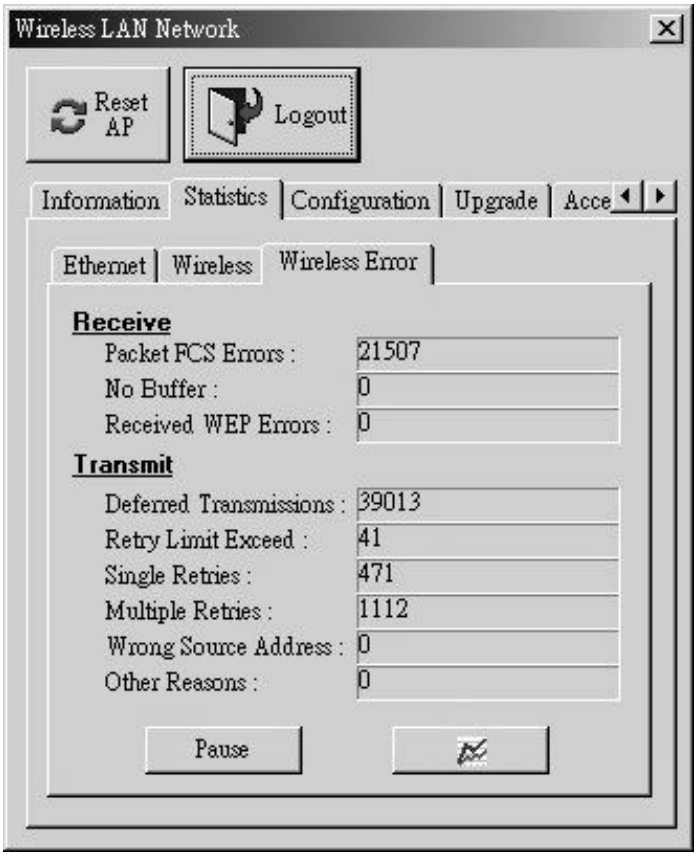
Retry Limit Exceed: The number of packets that are not sent due to the reason that the packets exceed the retry limits.

Single Tries: The number of packets that are successfully sent on the first retry.

Multiple Retries: The number of packets that are successfully sent after several retries.

Wrong Source Address: The number of packets that are ignored by the Access Point because the source client is not in its BSS.

Other reasons: Other reasons that cause errors.

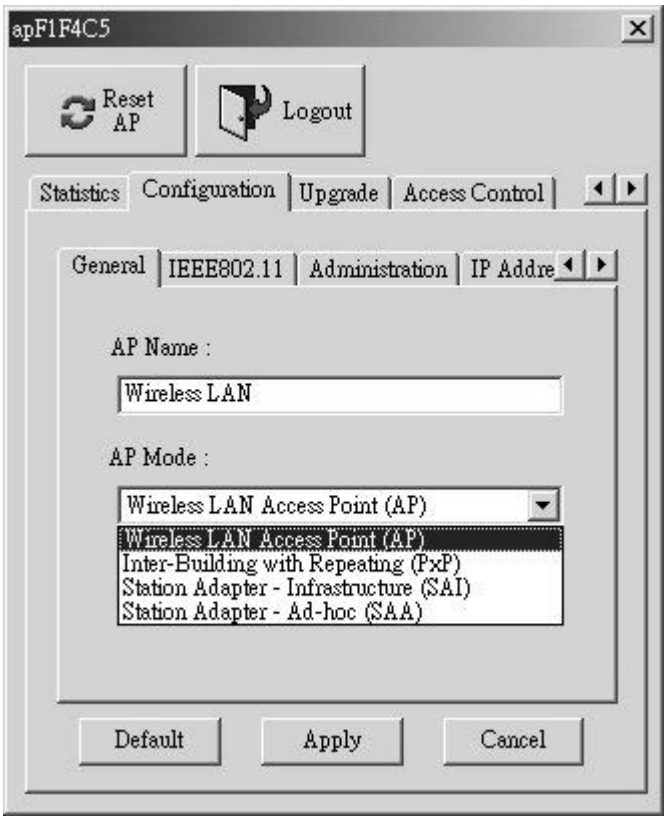


Configuration

The configuration tab contains 5 following items for you to make changes for the WLAN-9100.

General:

AP name: In this entry field, you may enter any name. This will enable you to manage your WLAN-9100 with more ease if you have multiple Access Point on the network.



AP mode: You may select the operation mode for your WLAN-9100.

- *Wireless LAN Access Point (AP)*: Served as a transparent Media Access Control (MAC) bridge between wired and wireless network.
- *Inter-Building with Repeating (PxP)*: Connect several separated networks with WLAN-9100. (To be available soon)
- *Station Adapter – Infrastructure (SAI)*: Served as a wireless station (infrastructure). Connected to a PC, it is able to access the network via Access Point.
- *Station Adapter – Ad-hoc (SAA)*: Served as a wireless station (Ad-hoc). Connected to a PC, this station adapter along with other wireless stations can establish a small wireless network without Access Points.

NOTE: When setting the operation mode to either PxP or SAA, you need to set the Access Points with the same channel. ESSID however can be ignored.

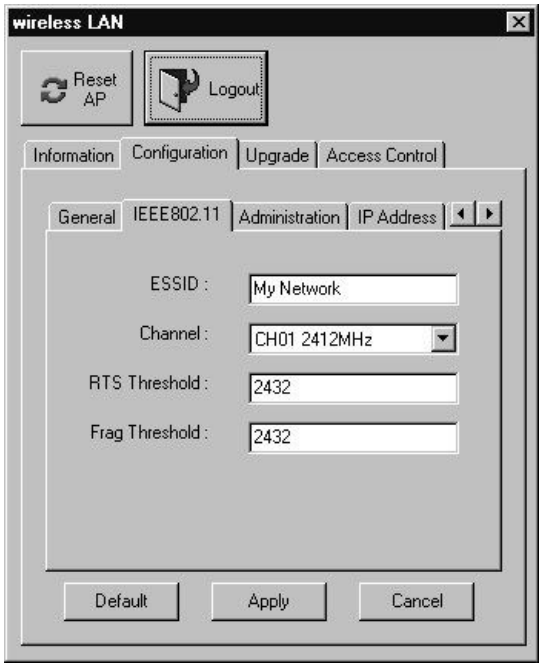
IEEE802.11:

ESSID: The ESSID is a unique ID given to the Access Point. Wireless clients associating to the WLAN-9100 must have the same ESSID. The ESSID can have up to 32 characters.

Channel: You may select any of the available channels as an operational channel for your WLAN-9100.

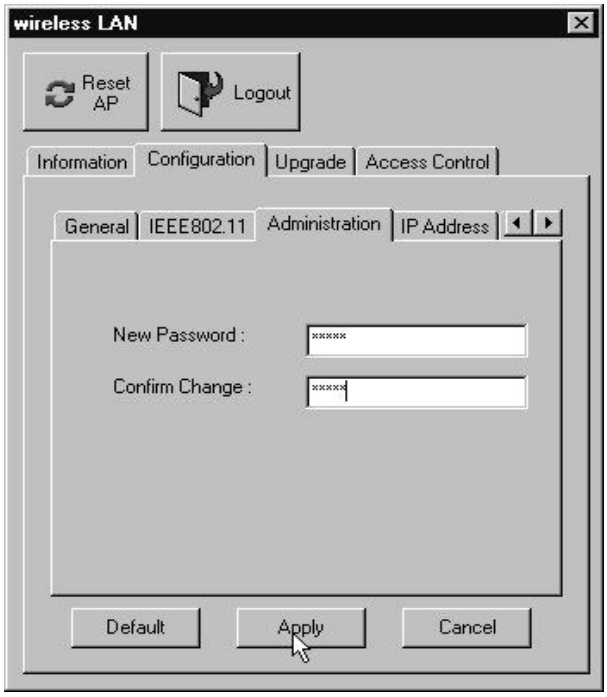
RTS Threshold: RTS Threshold is a mechanism implemented to prevent the "Hidden Node" problem. "Hidden Node" is a situation in which two stations are within range of the same Access Point, but are not within range of each other. Therefore, they are hidden nodes for each other. When a hidden station starts data transmission with the Access Point, it might not notice that another station is already using the wireless medium. When these two stations send data at the same time, they might collide when arriving simultaneously at the Access Point. The collision will most certainly result in a loss of messages for both stations. Thus, the RTS Threshold mechanism will provide the solution to prevent data collisions. When the RTS is activated, the station and its Access Point will use a Request to Send/Clear to Send protocol (RTS/CTS). The station will send an RTS to the Access Point, informing that it is going to transmit the data. Upon receipt, the Access Point will respond with a CTS message to all station within its range to notify all other stations to defer transmission. It will also confirm to the requesting station that the Access Point has reserved the channel for transmission.

Fragmentation Threshold: Fragmentation mechanism is used for improving the efficiency when there is high traffic within the wireless network. If you transmit large files in a wireless network, you can enable the Fragmentation Threshold and specify the packet size. The mechanism will split the packet into the packet size you set.



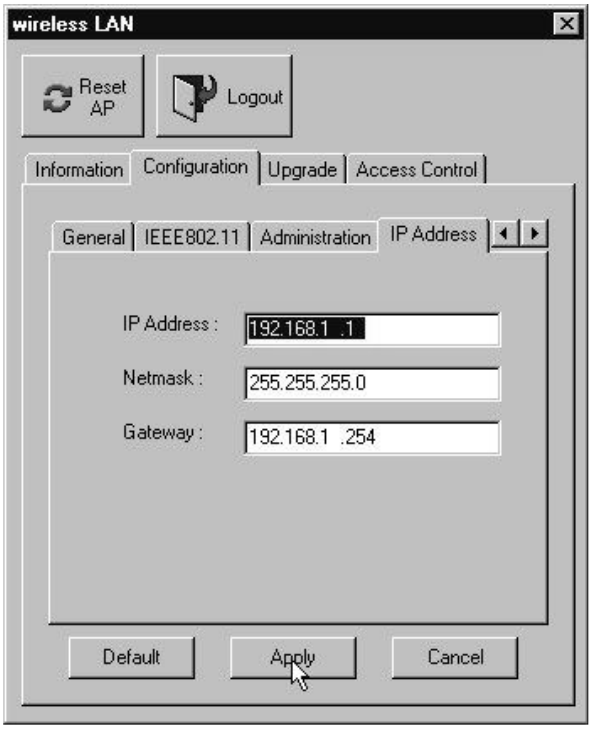
Administration:

You may change the default password by entering the new password. Enter the new password in the Confirm Change field to make the new setting take affect.



IP Address:

To enable remote access to the WLAN-9100 using Telnet, you must assign an IP address to the Access Point. You may also assign other related Internet addressing options, such as subnet mask or gateway address. Consult your network administrator to obtain an available IP address. (Default IP address: 192.168.1.1)



WEP:

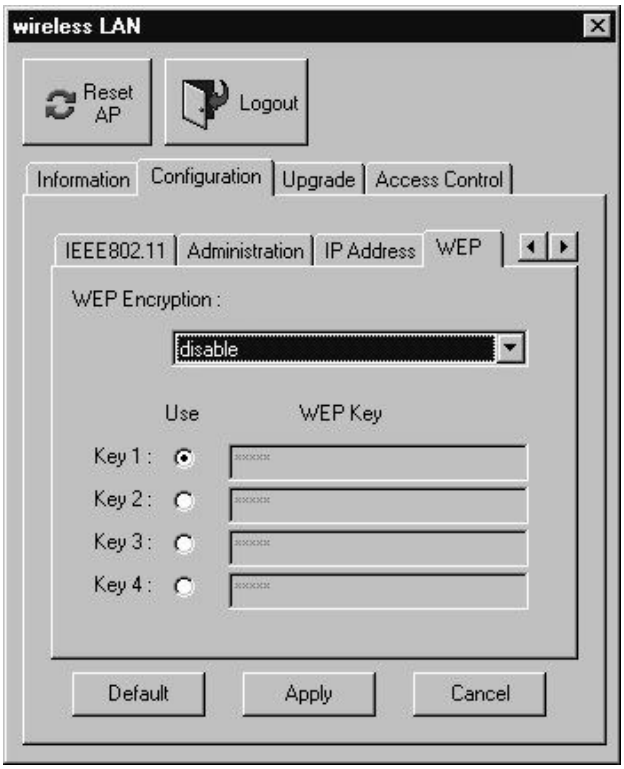
The WLAN-9100 Wireless LAN Access Point allows you to create up to 4 data encryption keys to secure your data from being eavesdropping by unauthorized wireless user. To activate and set the WEP keys, do the following:

- From the WEP encryption item, pull down the menu and it will list three options:
  Disable – Allows wireless adapters communicate with Access Points without any data encryption.

  WEP40 – Requires wireless stations to use data encryption when communicating with the Access Point.

  Optional WEP40 – Allows wireless clients to communicate with the Access Point with or without data encryption.

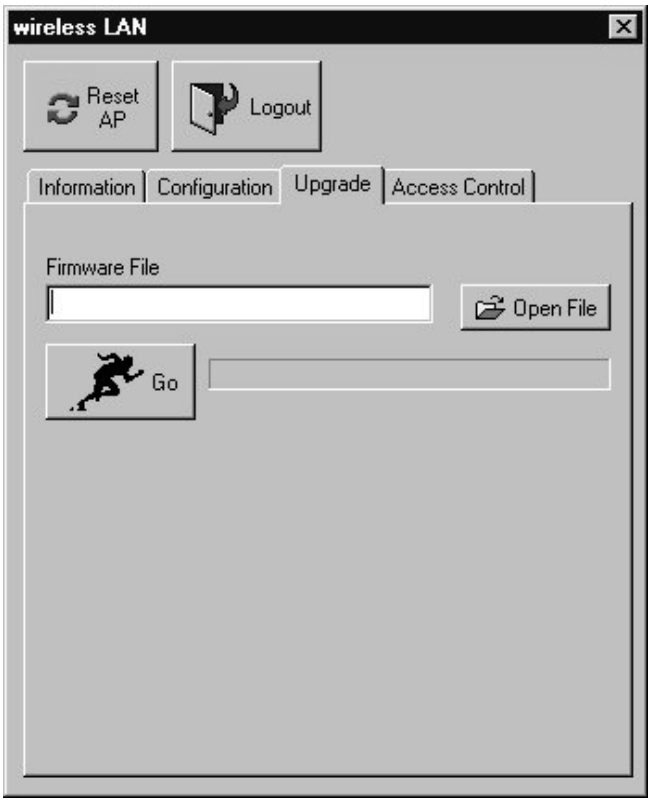
- When WEP40 or Optional WEP40 is selected, type five alphanumeric characters in the range of "a-z", "A-Z" and "0-9" (e.g. MyKey) in the WEP Key 1 entry field. Alternatively, you may enter 10 digit hexadecimal values in the range of "A-F" and "0-9", preceded by the characters "0x" values (e.g. 0x11AA22BB33). You can also enter WEP keys in the Key 2, Key 3 and Key 4 if you wish. WEP will only use 1 Key. You will have to select one WEP key as an active key before enabling use of encryption.



NOTE: The WEP key must be set up exactly the same on the Access Points as they are on the wireless client stations. If you use Key 1 on the Access Point and the value is (e.g. MyCar), the same must be assigned to Key 1 for all client stations.

Upgrade

This item is used for uploading the newest firmware of the Access Point. You may either enter the file name in the entry field or browse the file by clicking the Open File button. For information about the release of the newest firmware, contact your local reseller.



Access Control:

With the Access Control Table enabled, you can authorize wireless units to access the WLAN-9100 by identifying the MAC address of the wireless devices that are allowed access to transmit data. To create or edit the Access Control Table, do the following:

Go to the Access Control tab and select "**Enable Access Control**". Note that when you enable the Access Control Table without any MAC address in the table, no access is allowed to communicate with the Access Point.

Use the following buttons to manage the Access Control Table:

Add – to enter MAC addresses of authorized wireless devices one at a time.

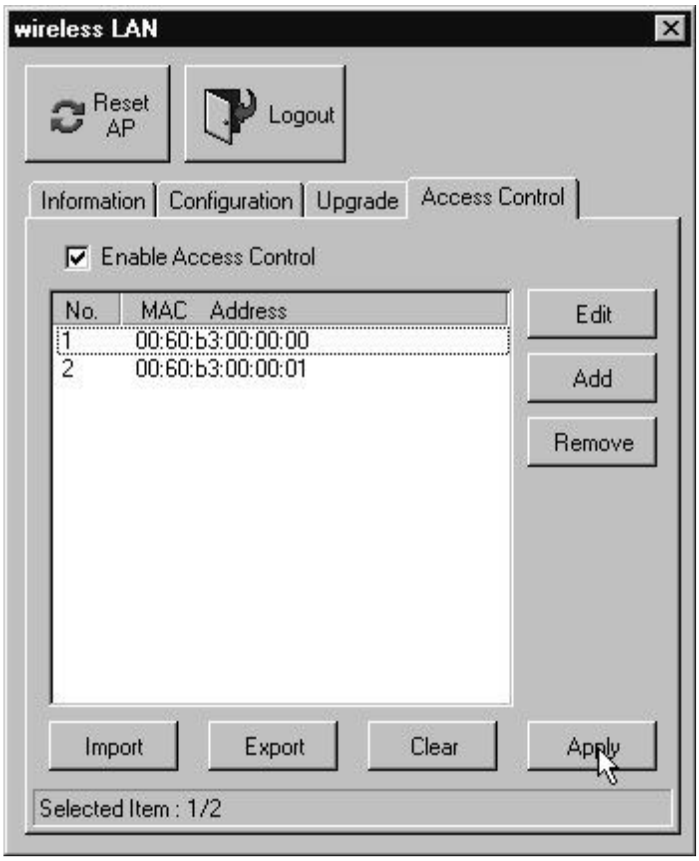
Edit – to change the entries in the table if you enter the incorrect MAC address.

Remove – to remove MAC addresses one at a time.

Clear – to remove all MAC addresses in the table.

Import – to import an existing Access Control Table.

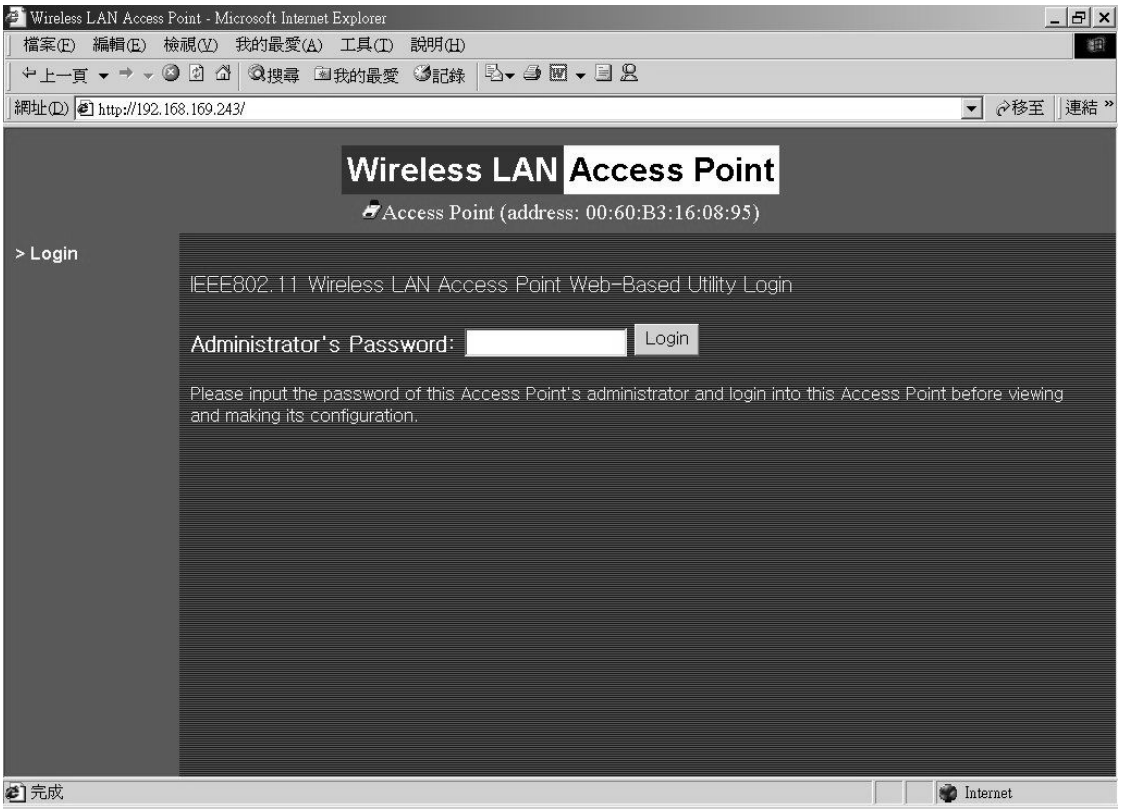
Export – to save the current Access Control Table to a location on your computer.
* You can save the file as a text document.



3-2 Using the Web Management

The built-in Web Management provides you with a user-friendly graphical user interface (web pages) to manage your WLAN-9100. An AP with an assigned IP address (e.g. ***http://192.168.1.1***) will allow you via web browser (e.g., Netscape Navigator 3.0 ~ 4.5 or MS Internet Explorer 4.0) to monitor and configure the Access Point.

1. Open your web browser.
2. Enter the IP address of your WLAN-9100 in the Address field (e.g. http://192.168.1.1). You will have access to the **Access Point Web Pages** of the access point.



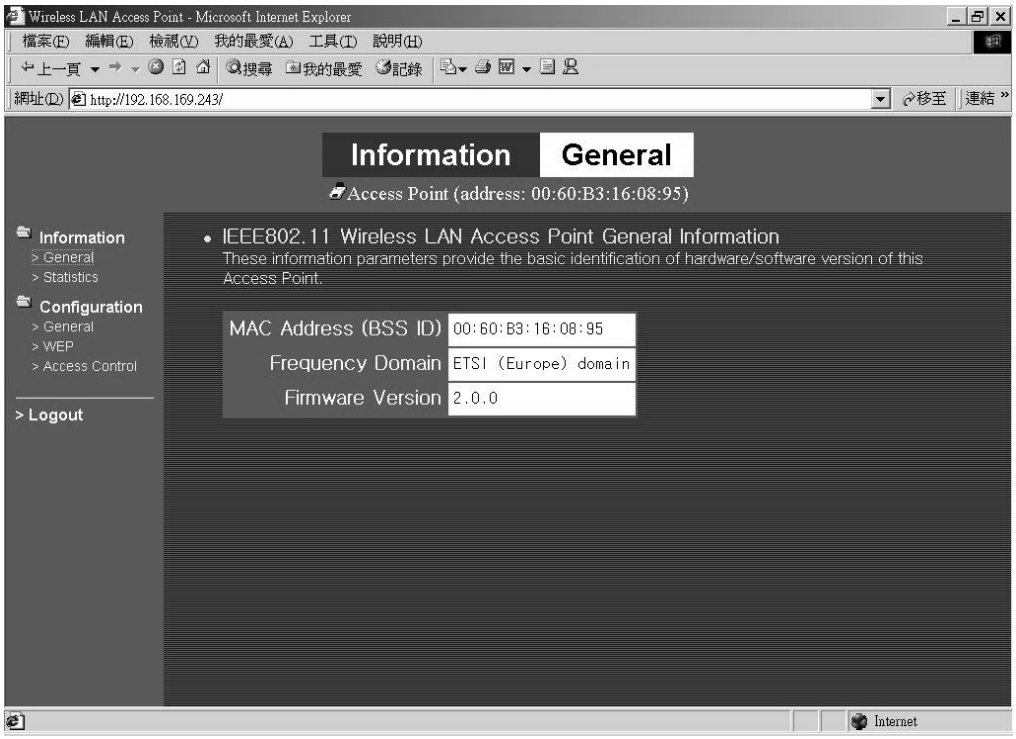
3. Enter the password to login to the WLAN-9100. The default password is **default**. The main page will show up.

The Access Point main page contains two items for you to manage your WLAN-9100.

Information

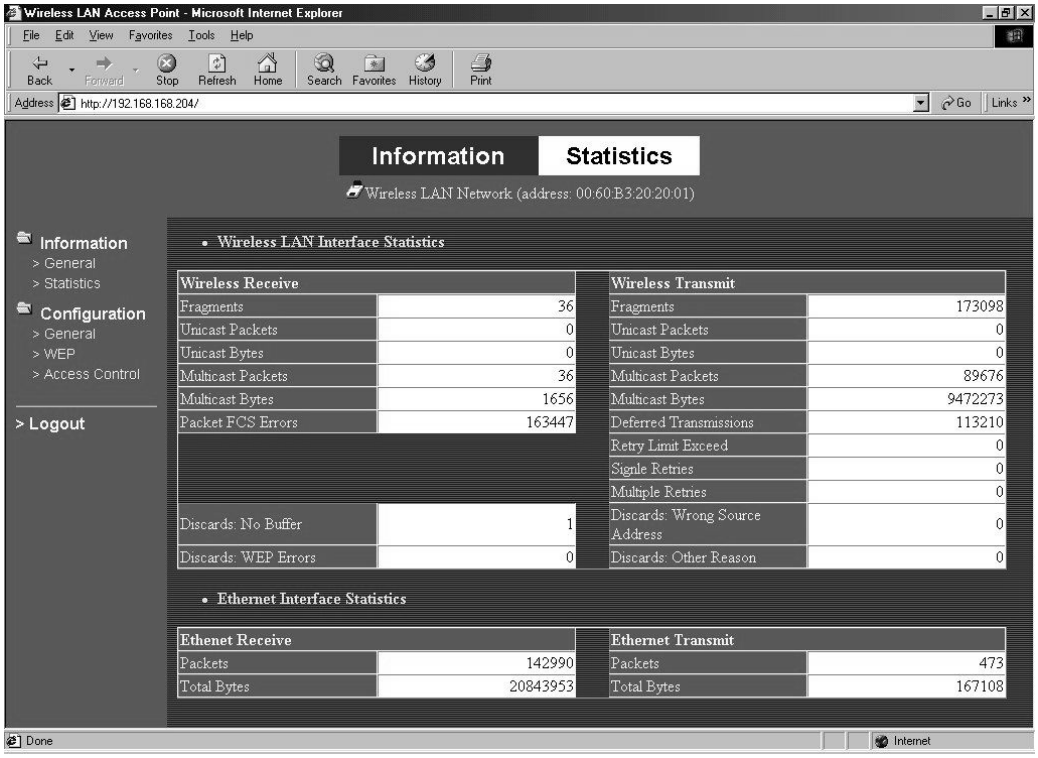
General

This item displays the general information of the WLAN-9100 such as the MAC address, Frequency Domain, and Firmware Version.



Statistics

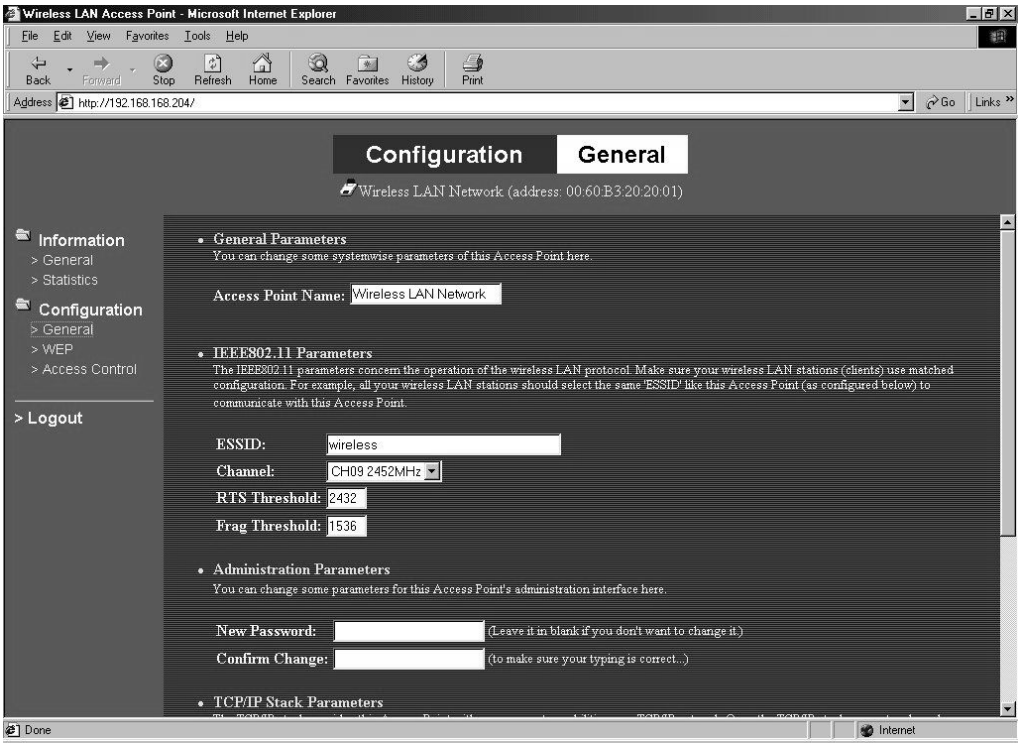
This item displays the Ethernet and wireless network traffic.



Configuration

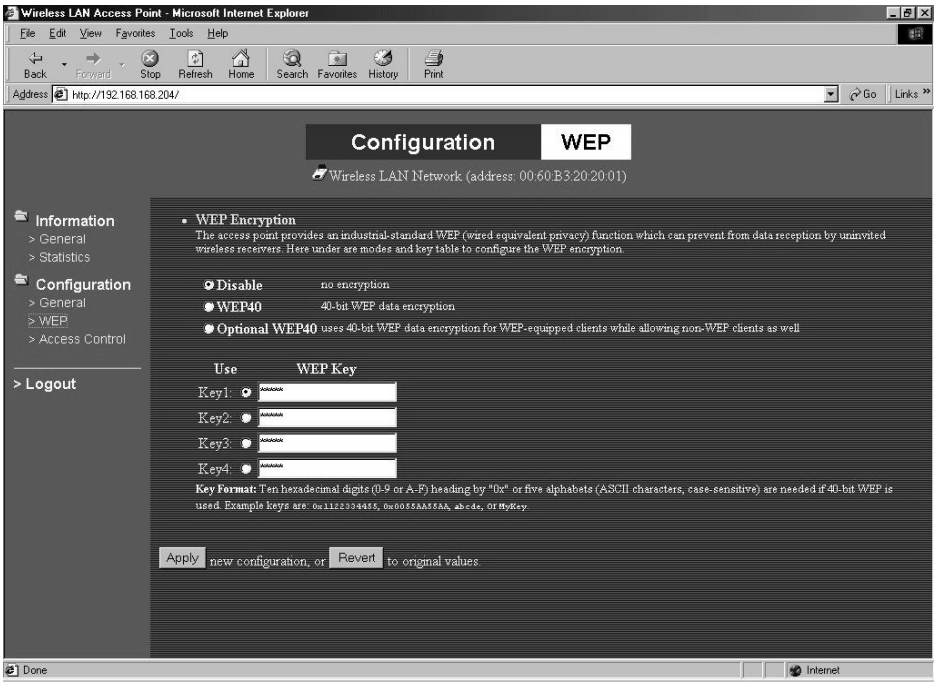
General

You may make the settings on the WLAN-9100 as ESSID, channel, AP mode, RTS threshold, fragment threshold and password.



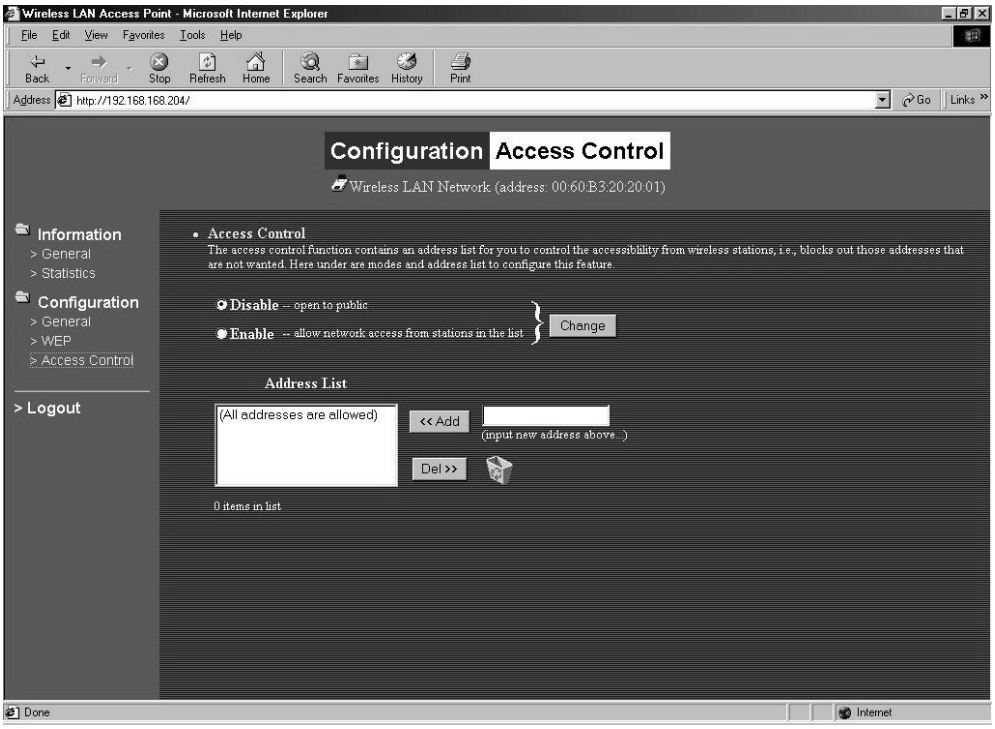
WEP

To prevent unauthorized wireless stations from accessing data transmitted over the network, the WLAN-9100 Wireless LAN Access Point offers WEP (Wired Equivalency Privacy). You can set up 4 encryption keys but choose one key to encrypt your data.



Access Control

The Access Control Table enables you to restrict wireless stations accessing the WLAN-9100 by identifying the MAC address of the wireless devices.



3-3 Using the Console Mode

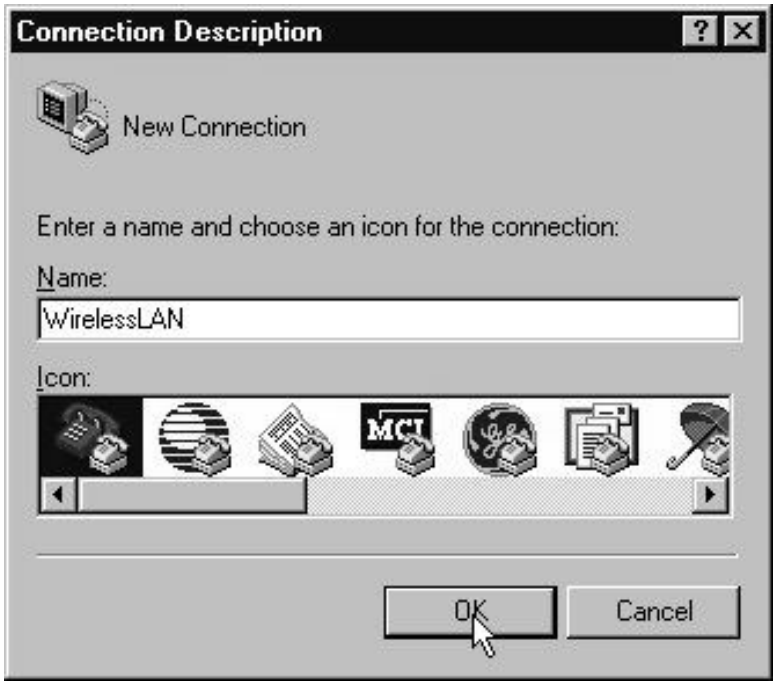
The WLAN-9100 can be configured via the command prompt console with either:

RS232 (serial) Connection: The RS232 port configuration is provided for advanced users to manage the WLAN-9100. You may use any terminal emulation program with a RS232 (serial) connection (e.g., Telix, ProCOMM, Windows 95/98/NT/2000's Hyper Terminal) to configure the WLAN-9100.

Telnet (TCP/IP) Connection: Assign an IP address to your WLAN-9100 through the RS232 connection or Access Point Manager and then telnet to the WLAN-9100 anywhere to get access to the Access Point console. Thus, you will be able to make the configuration via the TCP/IP connection.

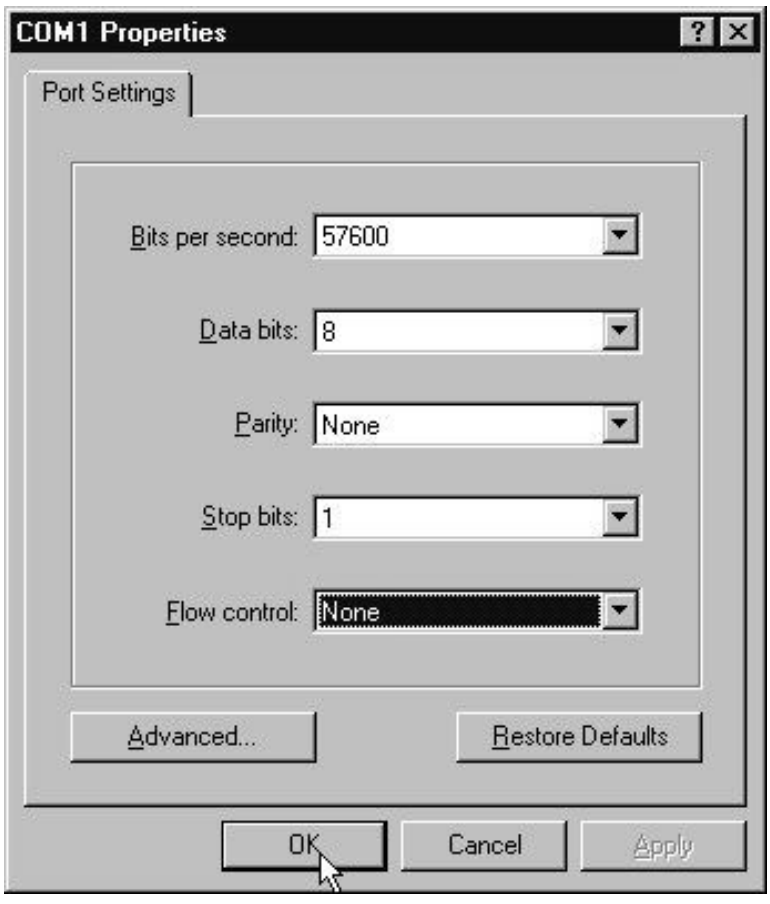
The following are the instructions to configure the WLAN-9100 through RS232 connection under Windows. Configuration through **Telnet** is the same as the RS232 configuration.

1. Attach the 9-pin or 25-pin connector of the RS232 cable to the COM port on your computer.
2. Connect the other end of the RS232 cable to the RS-232 port on your WLAN-9100.
3. From the **Start** menu, select **Program Files** and open the Terminal program.
4. Assign a name for the connection.

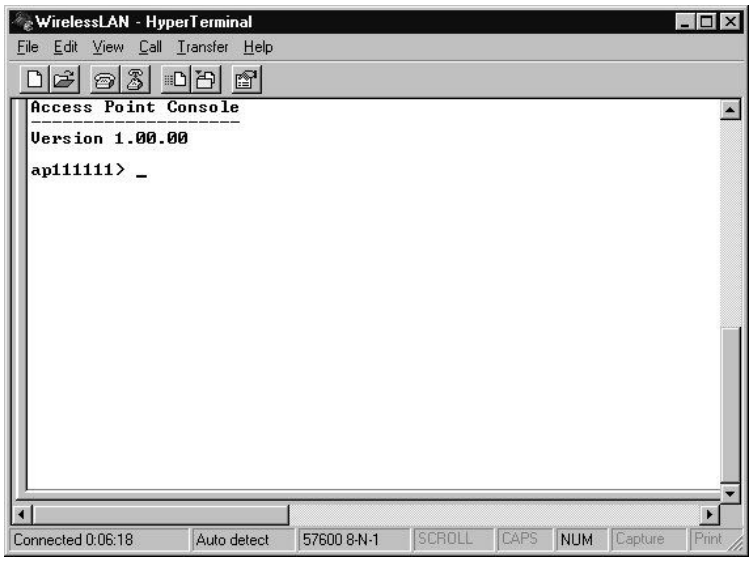


3-┌ -┐ Select the Com port and click **OK**.

5. Set the port settings to **57600 bps, 8 data bits, no parity, no flow control**. Click **OK**.



6. The WLAN-9100 console screen appears when the connection has been established.



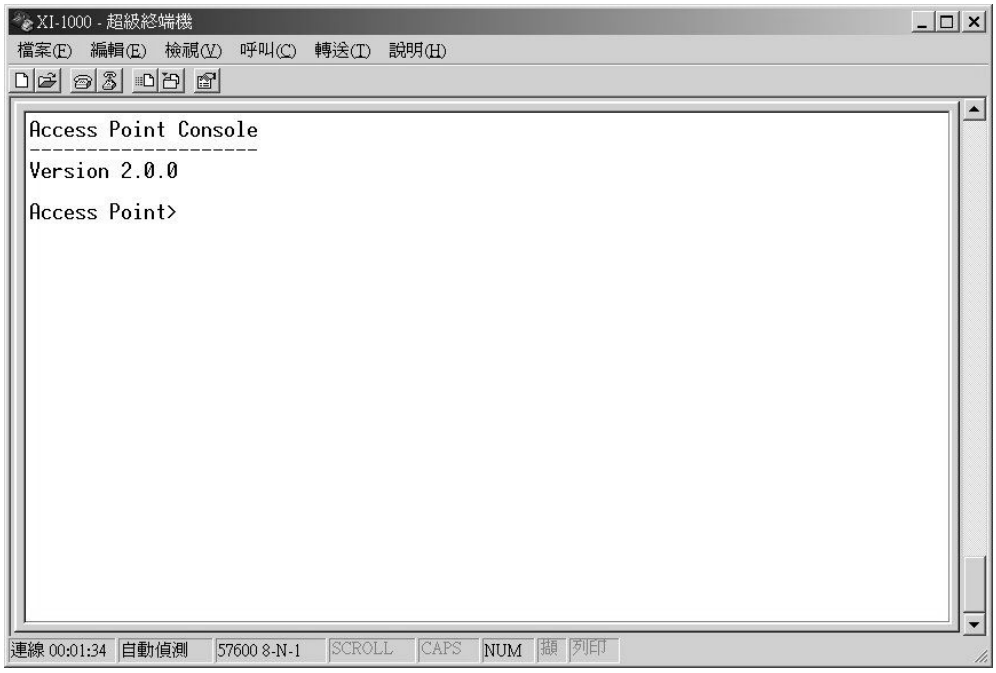
3-2-1 Basic Commands

The following are the commands provided for configuring the WLAN-9100. In loader mode, i.e., no valid firmware in the Access Point, only the commands with an asterisk (*) are provided.

NOTE: [xxx] stands for optional arguments.

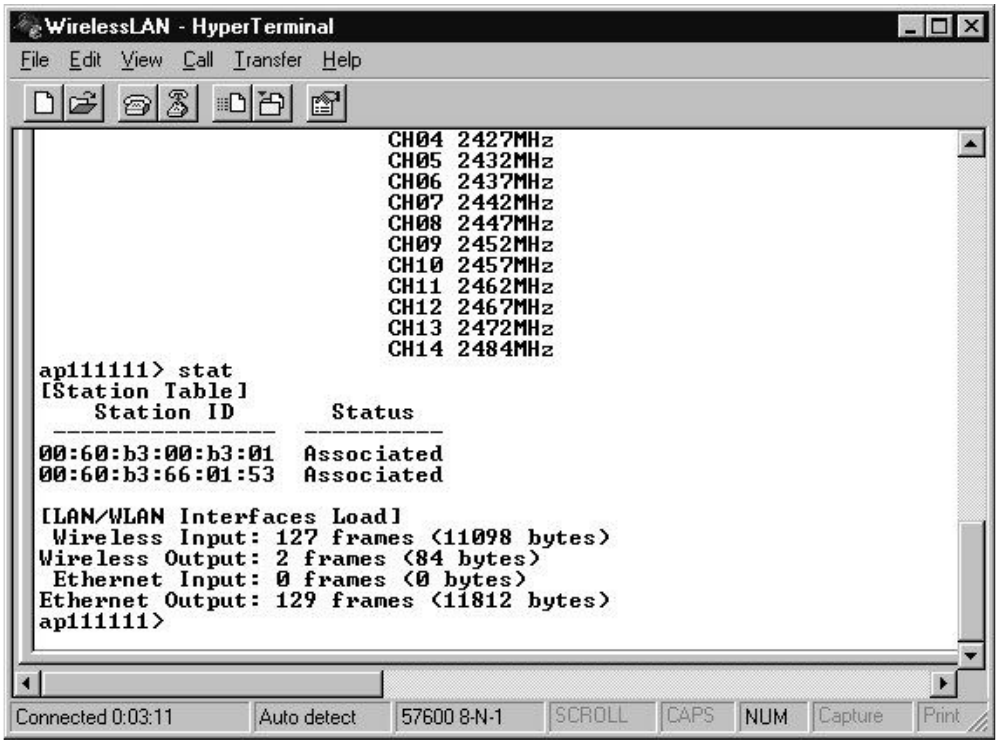
Info[*]

Display some basic information of the WLAN-9100, for example, firmware version, frequency domain, etc.



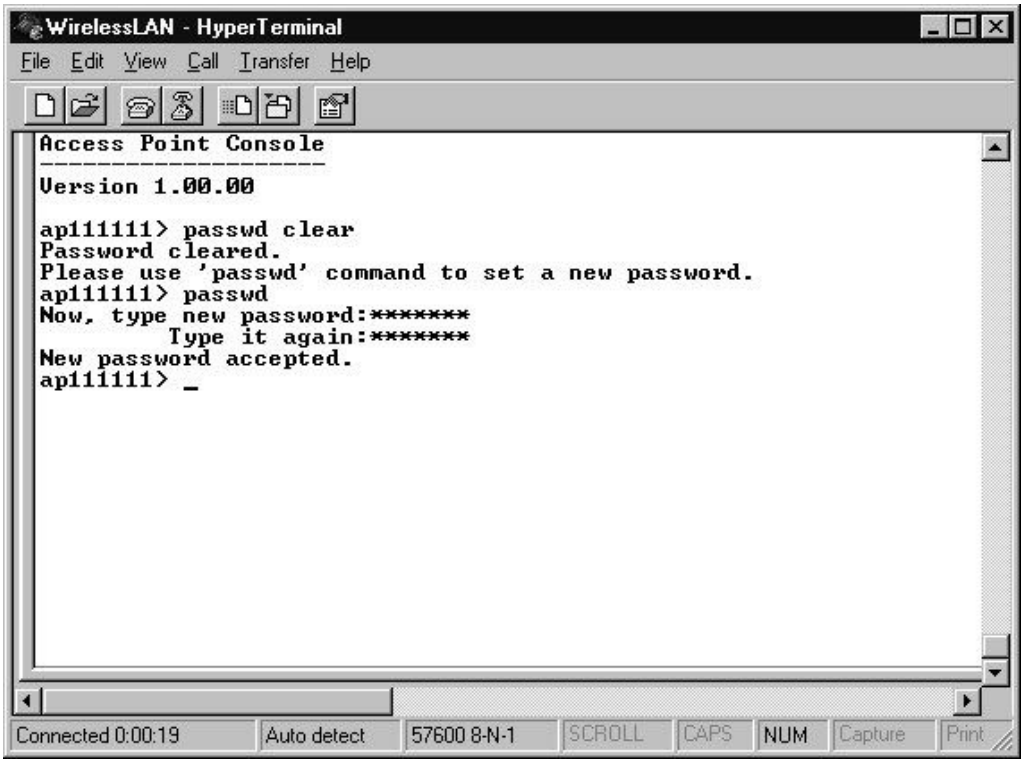
stat

Display the statistical values of the operation of the WLAN-9100, for example, association status, LAN/WLAN interface load, etc.



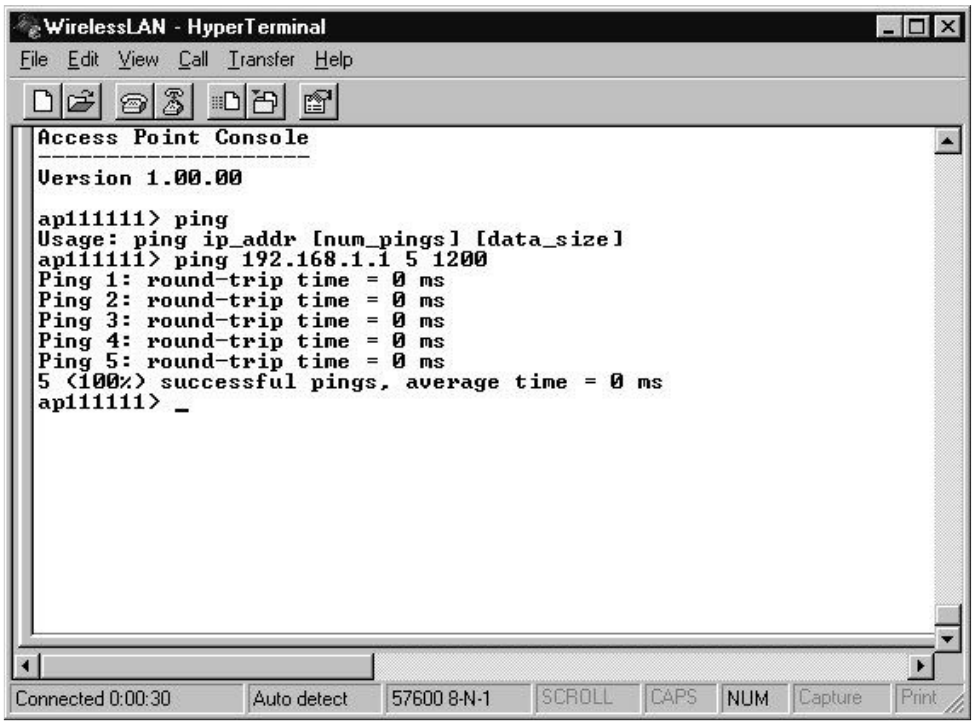
passwd [clear]

Change the password of the WLAN-9100. The *clear* option is used to delete the existing password if you miss it (This option is only available in RS232 console).



ping ip_addr [num_pings] [data_size]

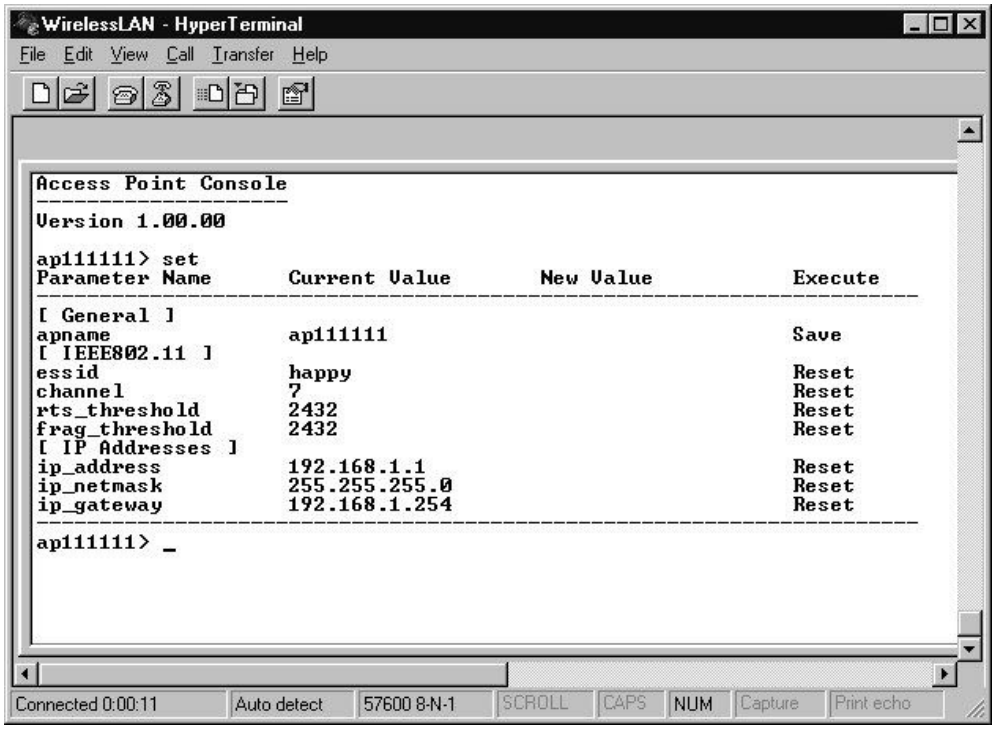
Ping (ICMP echo) to an *ip_addr* host with optional *num_pings* times with optional data size in a length of *data_size*.



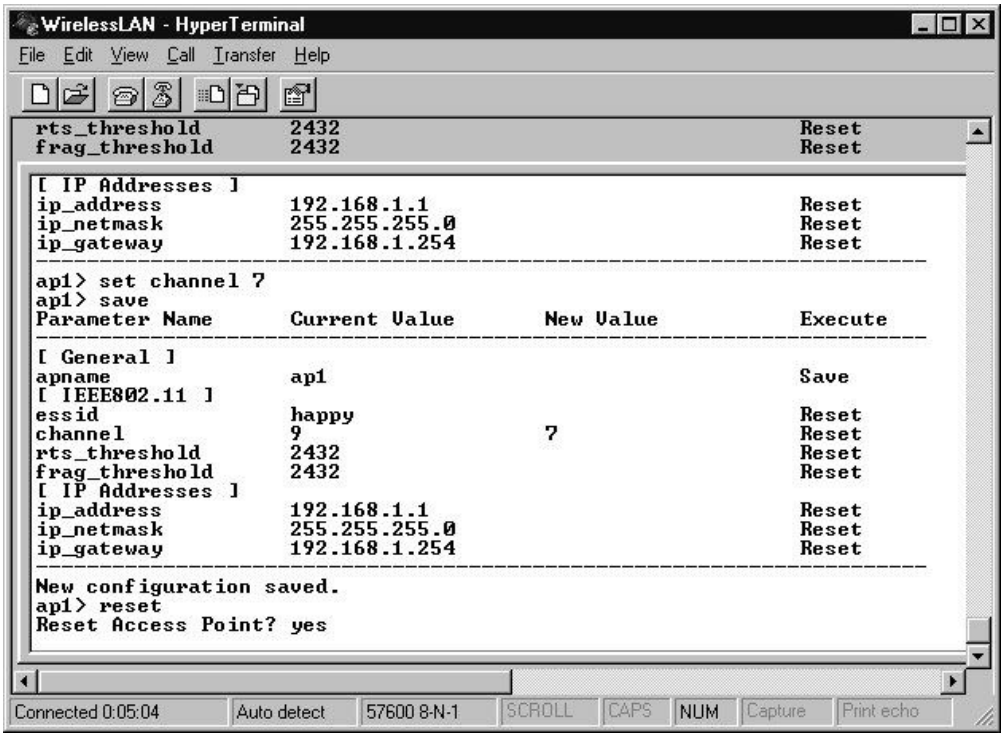
set

List the configuration information.

Set apname | channel | essid | rts_threshold | frag_threshold | ip_address | ip_netmask | ip_gateway



To change factory default settings, type "set xxx (parameter) xxxx (value). For example, `set channel 7` command will set the channel to number 7; `set essid "Your Network"` command will set the ESSID as *Your Network*. Remember that, a 'save' command is required for changes to take effect. Always reset your AP with the "Reset" command.



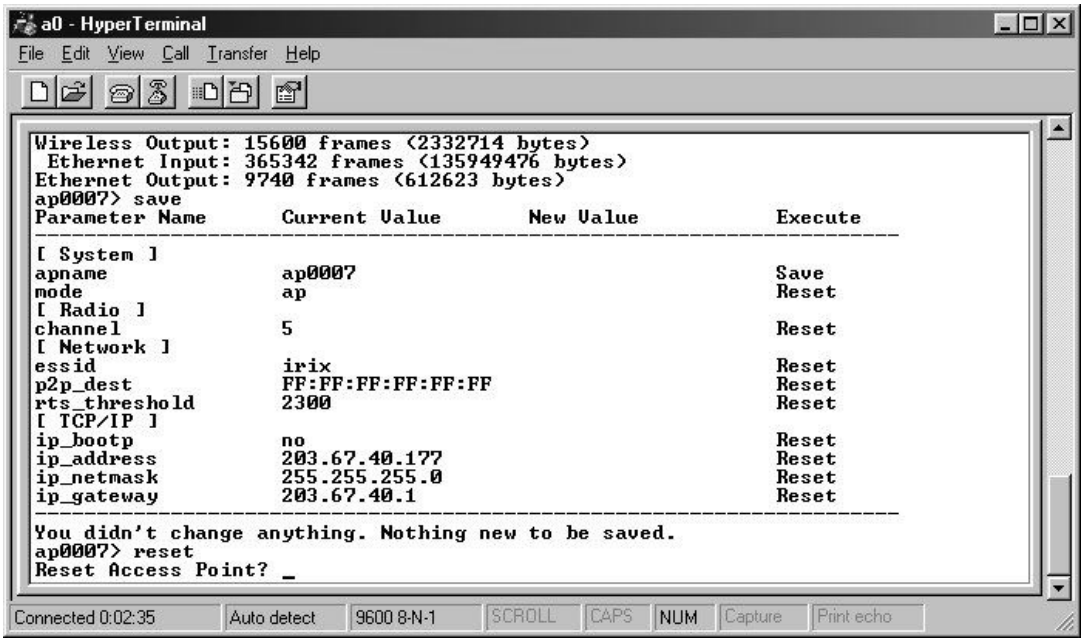
The following is a list of parameters you can make changes on the WLAN-9100.

Parameter	Description	Default Value
Apname	A textual name for the identification of the WLAN-9100.	`ApXXXXXX` *(where XXXXXX is the last six octets of Access Point's MAC address)*
Mode	The operation mode of the WLAN-9100. The Access Points supports the following modes: ap: Wireless LAN Access Point (AP). sai: Station Adapter – Infrastructure (SAI) saa: Station Adapter – Ad-hoc (SAA) pxp: Inter-Building with Repeating (PxP)	`Ap`
Channel	The radio channel number.	`1`
Essid	The ESS ID (a.k.a., SSID) of the Access Point.	`My Network`
rts_threshold	The threshold (number of bytes) for enabling RTS/CTS handshake. Data with its frame size larger than this value will perform the RTS/CTS handshake. Range of value: 0~2432.	`2432`
frag_threshold	The threshold (number of bytes) for the fragmentation boundary. Data will be transmitted in fragments which its size does not exceed this value. Range of value: 256~2432.	`2432`

ip_address	The IP address of the WLAN-9100.	192.168.1.1
ip_netmask	The subnet mask address of the WLAN-9100.	255.255.255.0
ip_gateway	The default gateway address of the WLAN-9100.	192.168.1.254

save

Save your new configuration. Remember that the "save command" is required every time you make the new configuration.



set default

Return the factory default settings of the WLAN-9100 except for the IP addresses. A 'save' command is required for changes to take effect.

cls[*]

Clear the console screen.

exit[*]

Exit the console.

?[*] *or help*[*]

Print a help screen.

rz[*]

Receive a firmware file by the Zmodem protocol. The console will enter Zmodem receiving mode and then use the "file upload" function of your terminal emulation program to upload a new firmware file (`ap.img`) to the Access Point. Upon completion, always remember to type the 'reset' command for running the WLAN-9100 with the new firmware.

reset[*]

Issue a reset signal. The WLAN-9100 will be reset if user confirms.

3-2-2 Advanced Settings for Security

This section describes the commands to control the security for WLAN-9100. To prevent unauthorized wireless stations from accessing data transmitted over the network, the WLAN-9100 Wireless LAN Access Point offers the following levels of security options.

- Access Control Table restricts wireless stations to access the Access Point.
- Data Encryption, known as WEP (Wired Equivalency Privacy), encrypts wireless data transmitted via wireless medium.

Access Control

auth mode | *add* | *del* | *list*| *clear*

The 'auth' command contains sub-commands that allow you to manage the access control (MAC address filter) of the WLAN-9100. The access control table consists of a list for you to control the accessibility of any wireless stations or repeaters. The sub-commands are listed below:

mode open | *allow*: set the access control mode. The definition of each mode is specified as follows:

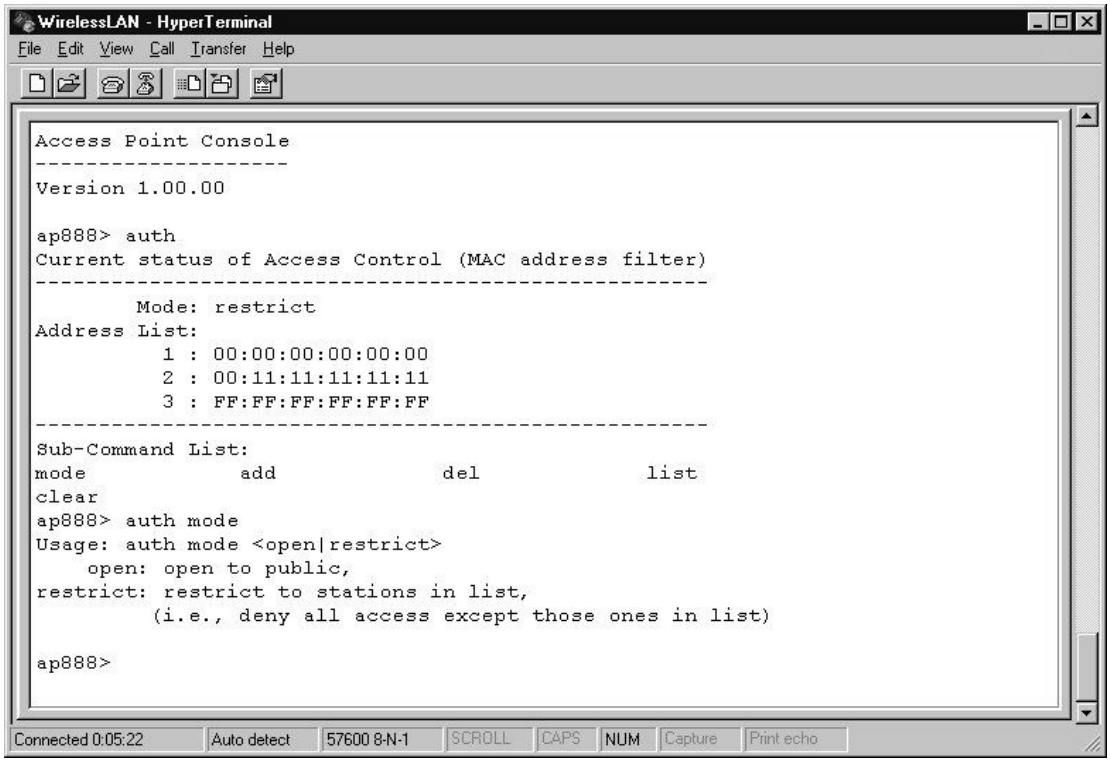
- *open*: open to public (default)
- restrict: only allow access of the authorized stations/repeaters in the table (no access is allowed if the list stays empty)

add mac_addr: add an address into the access control table

del mac_addr |*index*: delete a MAC address, or index an address from the access control table

list [start/end]: display the content of the access control mode and the address list. The optional arguments, start and end, can be affixed to select the range of items to be listed.

clear: clear all the addresses in the access control table.



WEP Keys

wep mode | *set* | *list*

The 'wep' command contains sub-commands that allow you to manage the data encryption (WEP, wired equivalent privacy) function provided with the WLAN-9100. The sub-commands are listed as follows:

mode disable | *wep40* | *wep40opt*: set the access control mode. The following are the definition of each data encryption mode.

- *none*: no encryption (default)
- *wep40*: use 40-bit WEP data encryption
- *wep40opt*: use 40-bit WEP data encryption for 40-bit WEP-equipped clients while allowing non-WEP clients associating to the WLAN-9100 as well.

set key1 key_text: set WEP Key#1 as *key_text*. 10 hexadecimal digits (0-9 or A-F) heading by "0x" or five alphanumeric values (ASCII characters, case-sensitive) are required if 40-bit WEP is used.
Example: 0x1122334455, 0x0055AA55AA, abcde, or MyKey.

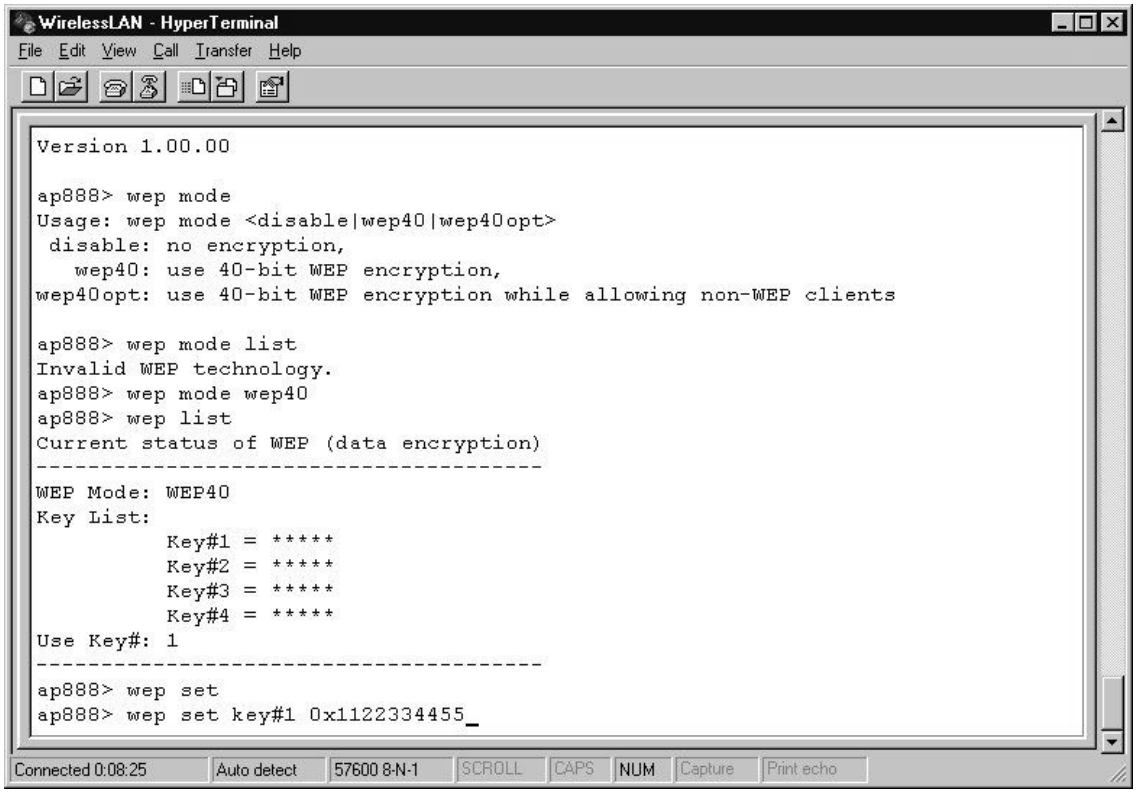
set key2 key_text: set WEP Key#2 as *key_text* with a same format as WEP Key#1.

set key3 key_text: set WEP Key#3 as *key_text* with a same format as WEP Key#1.

set key4 key_text: set WEP Key#2 as *key_text* with a same format as WEP Key#1.

set usekey 1|2|3|4: Select the WEP key to be used for encrypting data transmission. Only one key can be selected at a time.

list: Display current WEP settings.



Note: Your new WEP settings will take effect after resetting the WLAN-9100.

Chapter 4 Troubleshooting

If you have trouble using the WLAN-9100 Wireless LAN Access Point, the starting point to troubleshoot the problem with your Access Point is looking at the LED activity of the Access Point. The following is "LED Error Table" provided to assist you in diagnosing and solving operational problems.

PWR	AP	WLAN	LAN	LINK	Description/Action
Continuous Green	Continuous Green	Flash Green	Flash Green	Steady Green -	Normal operation where flickering indicates interface activity. ■ No action required.
	On	Off	Off	-	Normal operation that indicates there is no LAN activity. ■ No action required.
Off	Off	Off	Off	Off	Power failure. ■ Check the power cord. ■ Check the power supply.
Continuous Green	Off	Off	Off	Off	Invalid loader firmware or the micro-controller is dead. ■ Return the unit to the vendor for support.
	Blink Green	-	-	-	Invalid Access Point firmware. ■ Upgrade the firmware via the utility or console mode.
	Blink Green	Blink Green	-	-	Wireless LAN initialization failure ■ Check whether the wireless module has been properly installed.
	Blink Green	-	Blink Green	-	Ethernet initialization failure ■ Return the device to the vendor for support.

If you are still unable to solve the problem by checking the LED activity, the error may be caused from configuration mismatch, which prevents the WLAN-9100 from establishing a wireless connection with the network. You may check the following to ensure normal operation of the WLAN-9100.

- *WEP keys:* If data encryption is activated, always remember to set WEP keys exactly the same on the Access Point as are on the wireless stations.
- Access Control: Make sure that the MAC address of your WLAN-9100 is not included in the Access Control table of other wireless devices.

Appendix A Network Configuration

The 11Mbps Wireless LAN products support the same network configuration options of the legacy Ethernet LANs as defined by IEEE 802 standard committee.

The 11Mbps Wireless LAN products can be configured as:

- Ad-Hoc for departmental or SOHO LANs
- Infrastructure for enterprise LANs
- LAN-Interconnection for point-to-point link as a campus backbone.

A-1 Network Topology

- **Ad-Hoc**

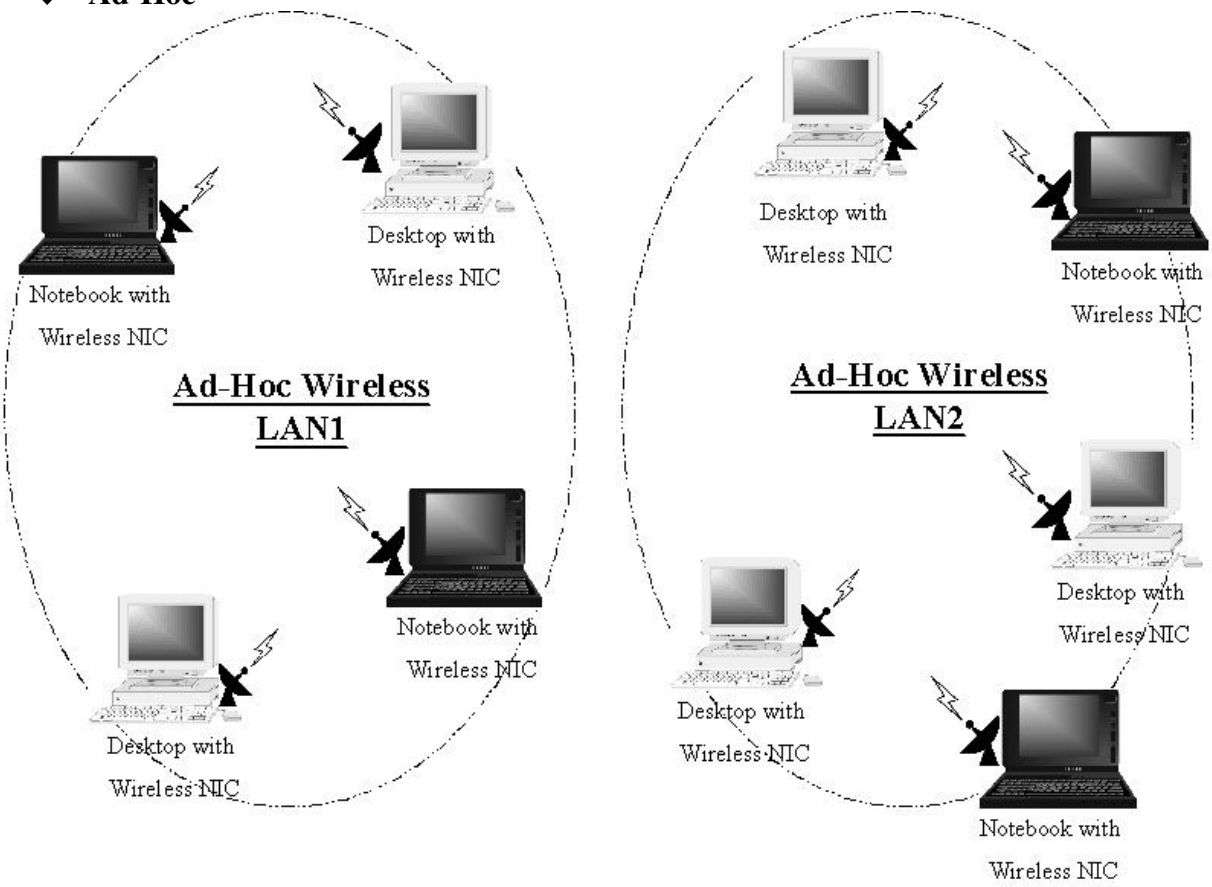


Fig An Example of Ad-Hoc Wireless LAN

An Ad-Hoc wireless LAN is a group of computers, each equipped with one wireless adapter, connected as an independent wireless LAN. Computers in a specific Ad-Hoc wireless LAN must be configured at the same radio channel.

Ad-Hoc wireless LAN is applicable at a departmental scale for a branch or SOHO operation.

◆ **Infrastructure**

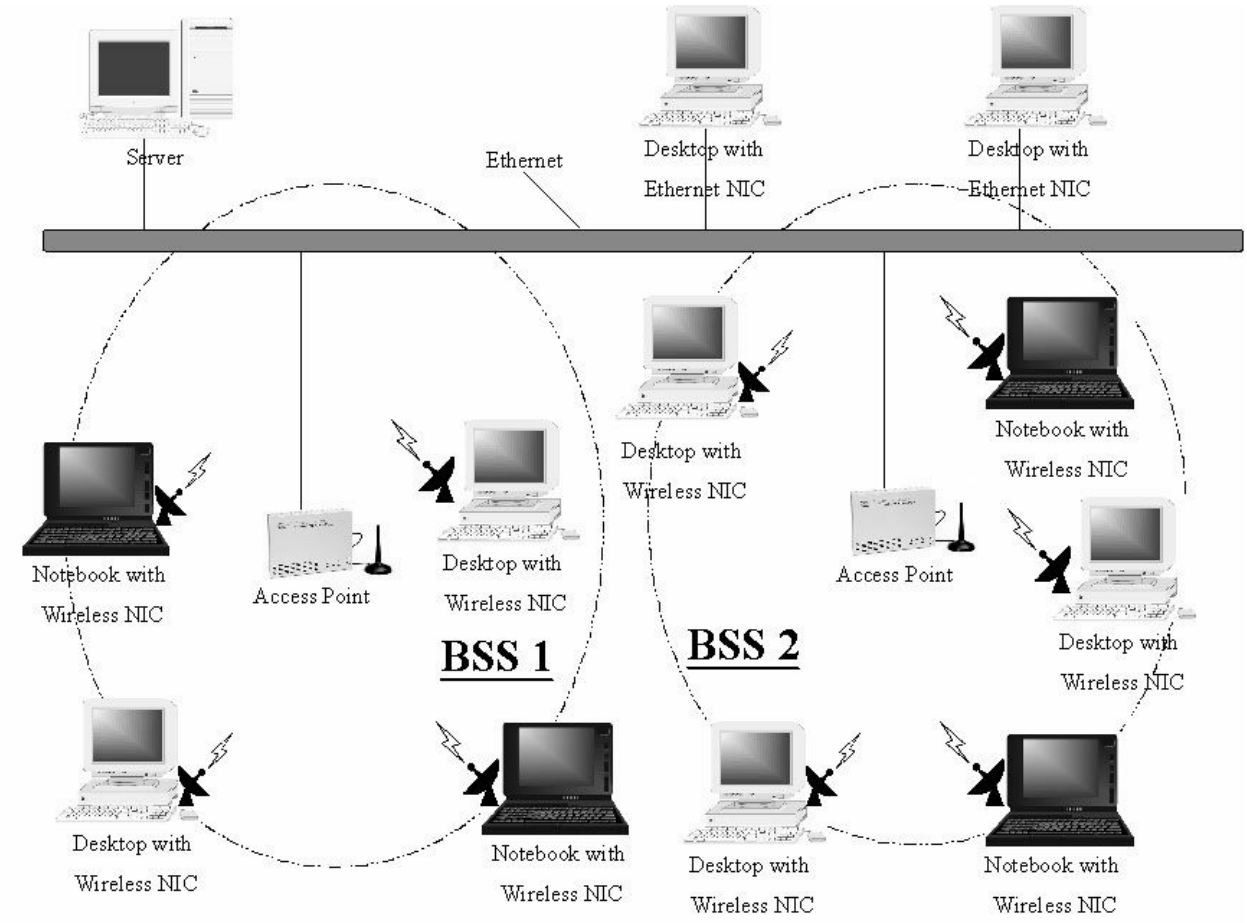


Fig An Example of Infrastructure Wireless LAN

The 11Mbps Wireless LAN devices provide access to a wired LAN for wireless workstations. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of wireless LAN PC users and an Access Point construct a Basic Service Set (BSS). Each wireless-equipped PC in this BSS can talk to any computer in the wired LAN infrastructure via the Access Point.

Infrastructure configuration will extend the accessibility of a wireless station to the wired LAN. Multiple Access Points will allow roaming and it will increase the transmission range. The Access Point is also able to forward data within its BSS. The effective transmission range in an infrastructure LAN is **doubled**.

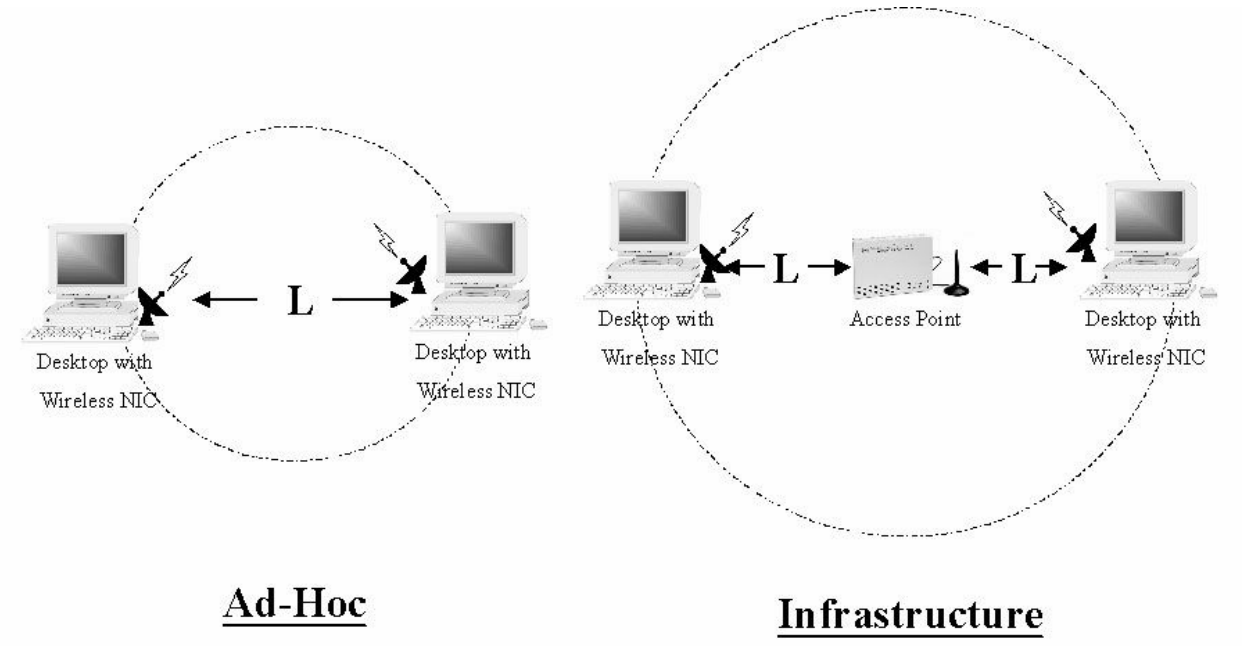


Fig The effective Transmission Range

Appendix B Glossary

Access Point - An internetworking device that seamlessly connects wired and wireless networks.

Ad-Hoc - An Ad-Hoc wireless LAN is a group of computers each with wireless adapters, connected as an independent wireless LAN.

Backbone - The core infrastructure of a network. The portion of the network that transports information from one central location to another central location where it is off-loaded onto a local system.

Base Station - In mobile telecommunications, a base station is the central radio transmitter/receiver that maintains communications with the mobile radio telephone sets within range. In cellular and personal communications applications, each cell or microcell has its own base station; each base station in turn is interconnected with other cells' base.

Bridge - An internetworking function that incorporates the lowest 2 layers of the OSI network protocol model.

BSS - Stands for "Basic Service Set," an Access Point and all the wireless clients that associated with it.

ESS - Stands for "Extended Service Set." More than one BSS can be configured as an Extended Service Set. Mobile users can roam between BSS in an ESS.

Ethernet - A popular local area data communications network, originally developed by Xerox Corp., which accepts transmission from computers and terminals. Ethernet operates on 10 Mbps baseband transmission over shielded coaxial cable or over shielded twisted pair telephone wire.

Infrastructure - An integrated wireless and wired LAN is called an Infrastructure configuration.

PCMCIA - Personal Computer Memory Card International Association, which develops standards for PC cards, formerly known as PCMCIA cards, are available in three "types" which are about the same length and width as credit cards, but range in thickness from 3.3 mm (Type I) to 5.0 mm (Type II) to 10.5 mm (Type III). These cards can be used for many functions, including memory storage, landline modems and wireless modems.

Roaming - A wireless clients around an ESS and get the continuous connection to the Infrastructure network.

RTS Threshold – Transmitters contending for the medium may not hear each other. RTS/CTS mechanism can solve this " Hidden Node Problem". If the packet size is smaller than the preset RTS Threshold size, the RTS/CTS mechanism will NOT be enabled.

Web Management - Network management by using web browser connecting to the target devices.