

# **LevelOne**

## **WNC-0200**

22Mbps Wireless PCI Adapter

### **User's Manual**

**Version: 1.0**

**Manufacturer's Disclaimer Statement**

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**FCC STATEMENT**

This product has been tested and complies with the specifications 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 according to 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 is found 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 or devices
- Connect the equipment to an outlet other than the receiver's
- Consult a dealer or an experienced radio/TV technician for assistance

**FCC Radiation Exposure Statement**

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

## **Table of Contents:**

<b>TABLE OF CONTENTS:</b> .....	<b>3</b>
<b>INTRODUCTION</b> .....	<b>4</b>
PRODUCT FEATURES.....	4
SYSTEM REQUIREMENTS.....	5
<b>GETTING STARTED</b> .....	<b>6</b>
GETTING TO KNOW THE LEVELONE WNC-0200 .....	6
WIRELESS NETWORK PCI Adapter's LEDs.....	6
SETTING UP THE WIRELESS NETWORK.....	6
INSTALLING YOUR LEVELONE WNC-0200.....	8
<b>CONFIGURING YOUR LEVELONE WNC-0200</b> .....	<b>15</b>
<i>Link Info. Page</i> .....	15
<i>Configuration Page</i> .....	16
<i>Security Page</i> .....	18
<i>SiteSurvey Page</i> .....	19
<i>About Page</i> .....	21
<b>APPENDIX A: TROUBLESHOOTING</b> .....	<b>22</b>
<b>APPENDIX B: NETWORKING BASIS</b> .....	<b>27</b>
<b>APPENDIX C: GLOSSARY</b> .....	<b>41</b>
<b>APPENDIX D: TECHNICAL SPECIFICATION</b> .....	<b>46</b>

## INTRODUCTION

**The LevelOne WNC-0200 Wireless PCI Adapter** delivers enhanced IEEE 802.11b high performance for up to 22Mbps, which is double of that offered by most of the current wireless products in the market.

The 22Mbps high data rate is made possible by the latest advanced TI wireless technology, which incorporates the new PBCC modulation method. Unlike the ordinary CCK modulation, not only the new PBCC modulation method offers double data rate for up to 22Mbps, but also it gives 20% more distance coverage.

The LevelOne WNC-0200 Wireless PCI Adapter is fully compatible with other 11Mbps wireless devices. The simple step-by-step installation allows you to have the wireless network setup in no time. The comprehensive configuration utility makes the setting control for the PCI Adapter easier than ever.

The LevelOne WNC-0200 Wireless PCI Adapter is an ideal wireless device that truly makes the idea of “wireless” come true. Please take a moment to read through this manual and get acquainted with this cutting-edge product.

## Product Features

- | Fully compatible with IEEE 802.11b standard for wireless.
- | Interoperable with existing IEEE 802.11b standard devices.
- | Supports new data modulation PBCC technology from Texas Instrument, which enables high data with double speed of up to 22Mbps.
- | 20% more transmitting and receiving coverage supported by PBCC modulation.
- | Supports auto data rate fallback under noisy environment or longer distance.
- | Enhanced security on WEP encryption from 64, 128 to the maximum of 256 bits.
- | Supports SiteSurvey function with profile.
- | Supports Roaming function to allow you to roam between different AP coverage areas.
- | Easy setup and installation with Install Wizard..

## **System Requirements**

- | Windows 95, 98, 98SE, Millennium, NT, 2000 and XP computers
  - | PC with Pentium III 600MHz system or above is recommended
  - | Equipped with at least one empty PCI standard v2.1 socket.
- One CD-ROM drive

## GETTING STARTED

### Getting To Know The LevelOne WNC-0200

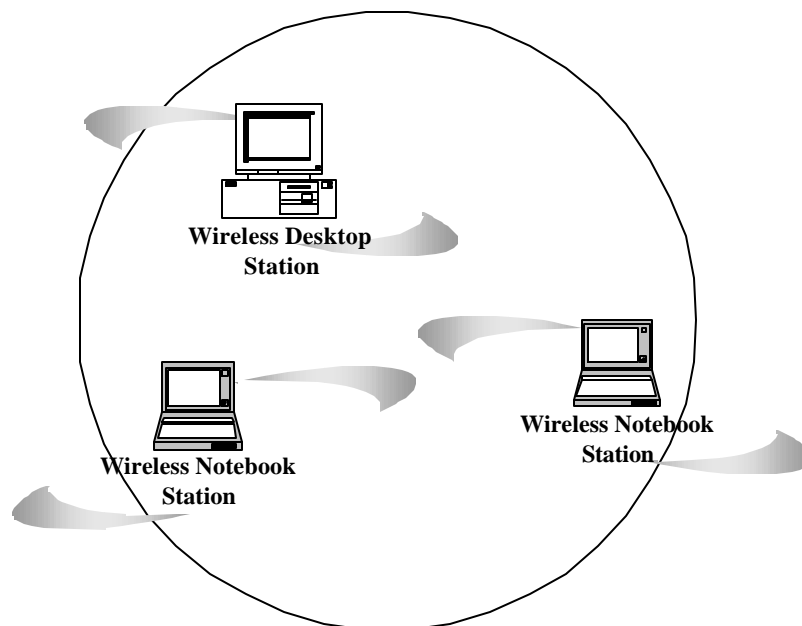
#### WIRELESS NETWORK PCI Adapter's LEDs

- Power LED
  - ON when the unit is powered up
  - Blink indicates wireless activity

### Setting Up The Wireless Network

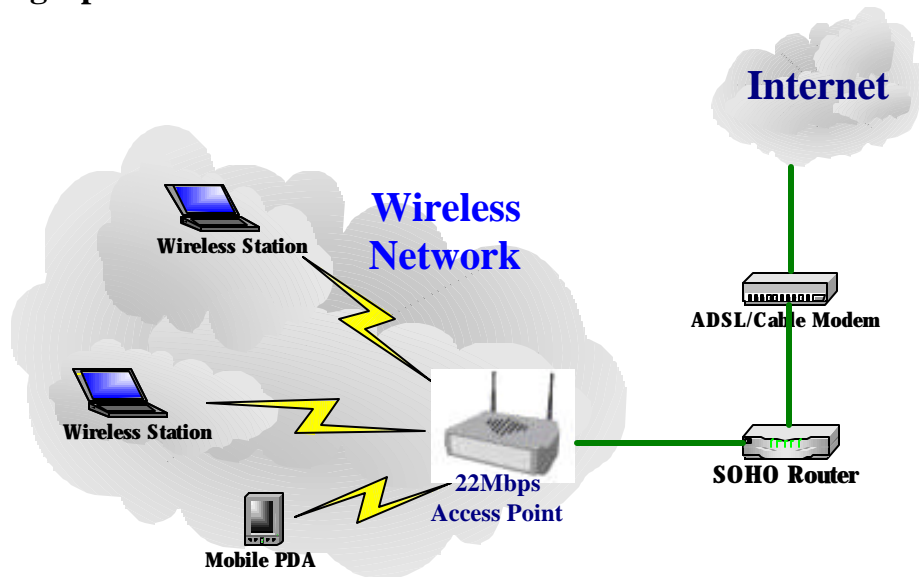
There two wireless network topologies that you can setup your wireless card with. One is called “**Ad-Hoc**”, and the other is “**Infrastructure**”. On an Ad-Hoc network, two or more computers each has at least one wireless network client device such as wireless PCI Adapter installed, establish point-to-point data communication with each other. While on an Infrastructure network, every wireless station communicates through Access Points.

#### Setting Up Ad-Hoc Network



The idea of AdHoc Network is rather simple. All the wireless station are set to use the same BSS ID and channel to establish communication linkage with each other to form a point-to-point network for data transmission and reception.

## Setting Up Infrastructure Network



In order to setup an Infrastructure of a wireless network such as the example shown above, you will need the following:

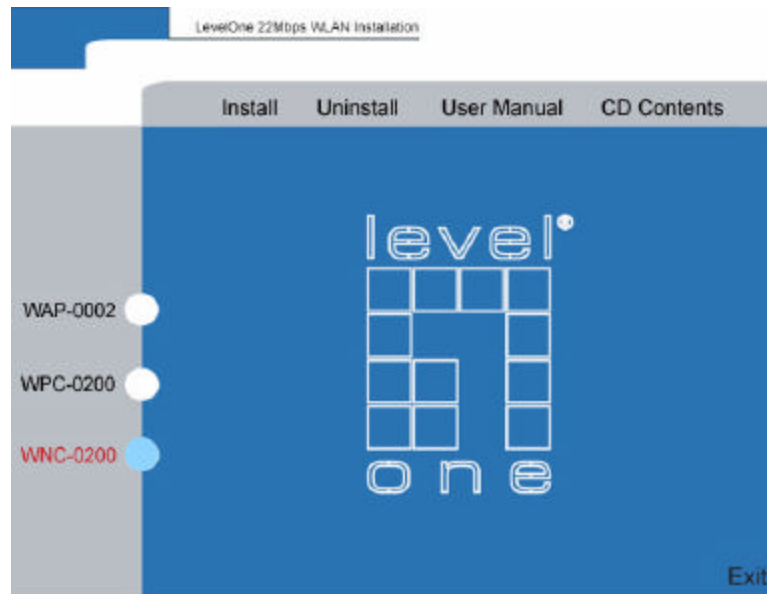
1. A broadband Internet connection.
2. ADSL or Cable modem provided by your ISP as part of the broadband connection installation.
3. A Router that connects to the ADSL/Cable modem for internet connection sharing.
4. An Access Point to connect with the Router to form a wireless infrastructure network.
5. Wireless clients equipped with wireless networking devices such as wireless PC Card for wireless connection.

In this case, all the wireless clients and Access Point operate under the same channel with the same ESSID. The wireless clients are all connected to the Access Point for data transmission.

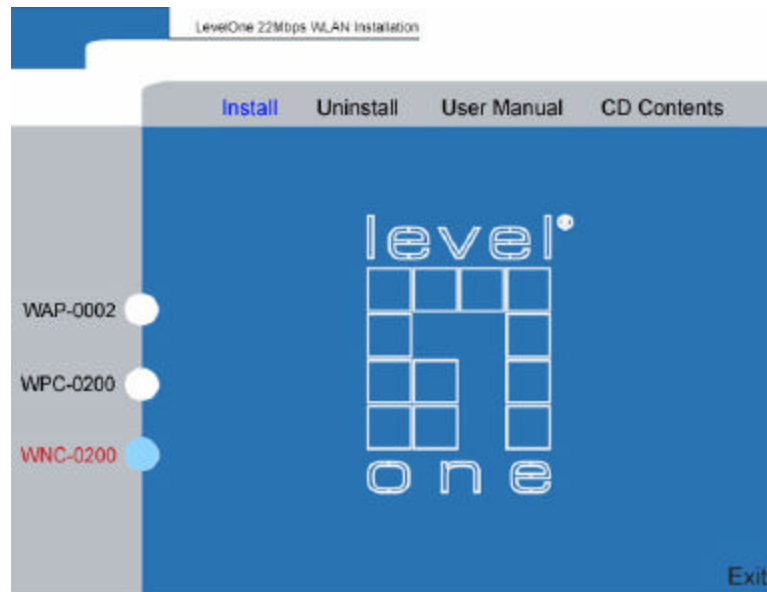
## Installing Your LevelOne WNC-0200

1. Turn on you notebook.
2. Insert the software installation CD into your CD-ROM drive
3. Make sure that the 22Mbps wireless PCI Adapter is **NOT** installed in your computer.
4. The main installation screen would appear, simply follow the steps below.

Click on  
“WNC-0200”

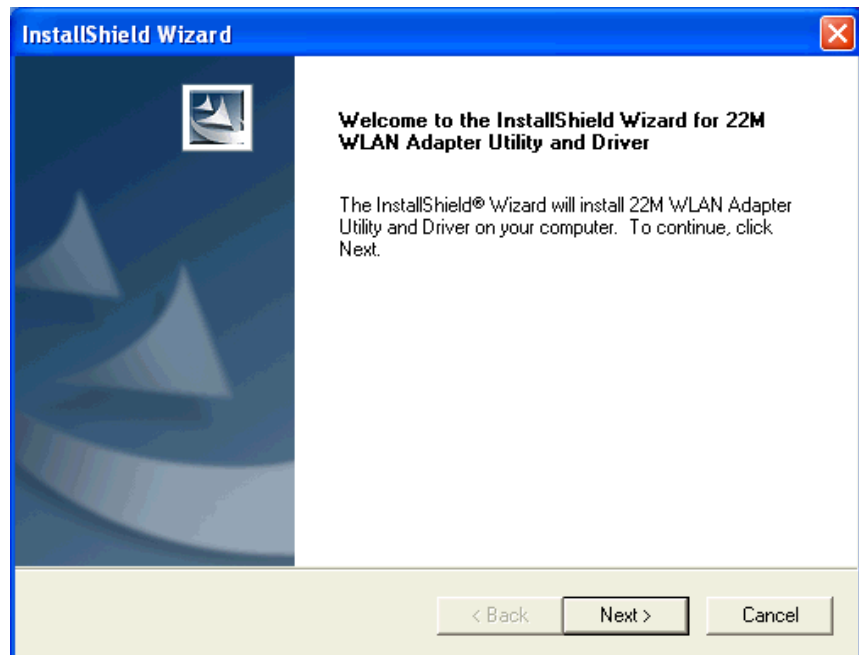


Click “**Install**” to  
start installation.

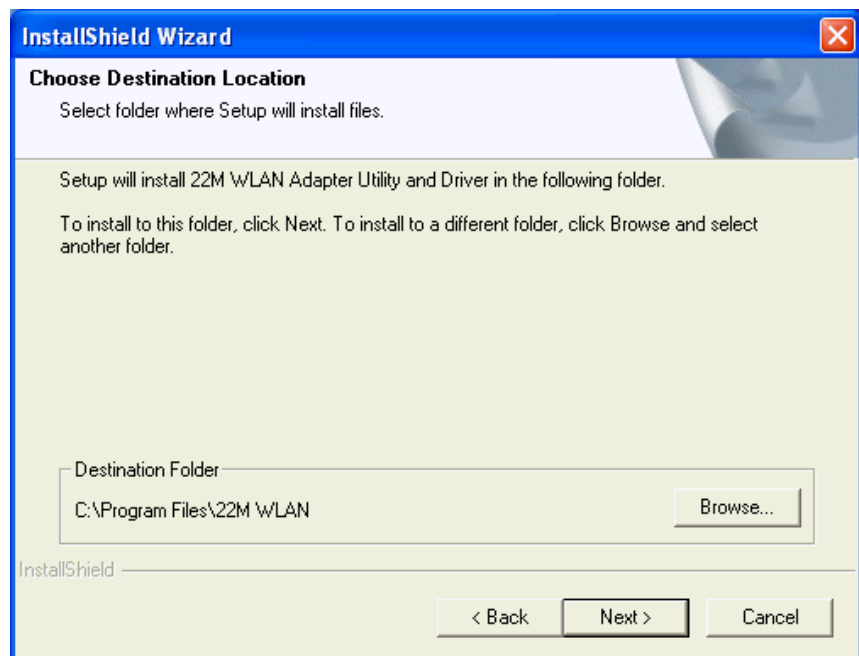




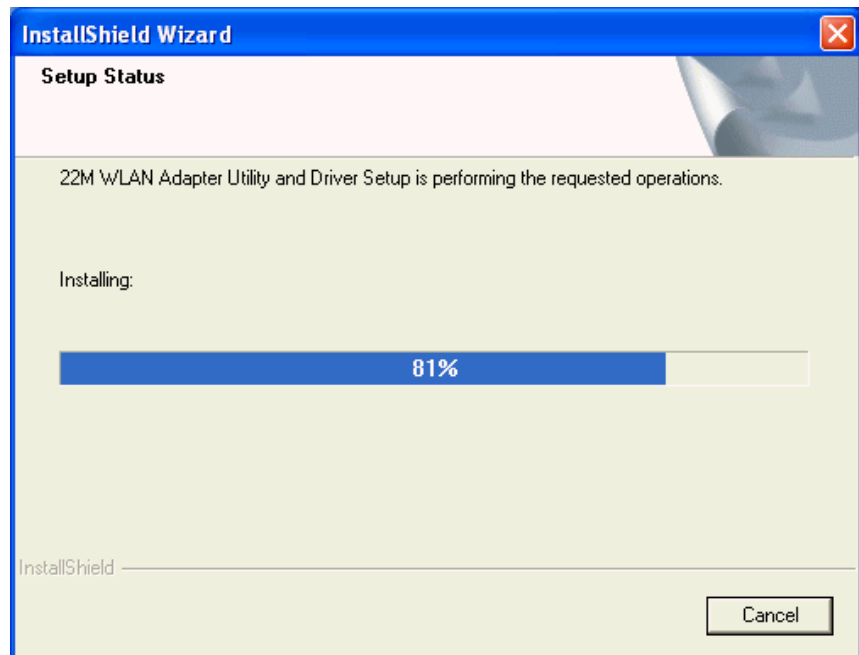
InstallShield Wizard starts. Click **“Next”** to continue.



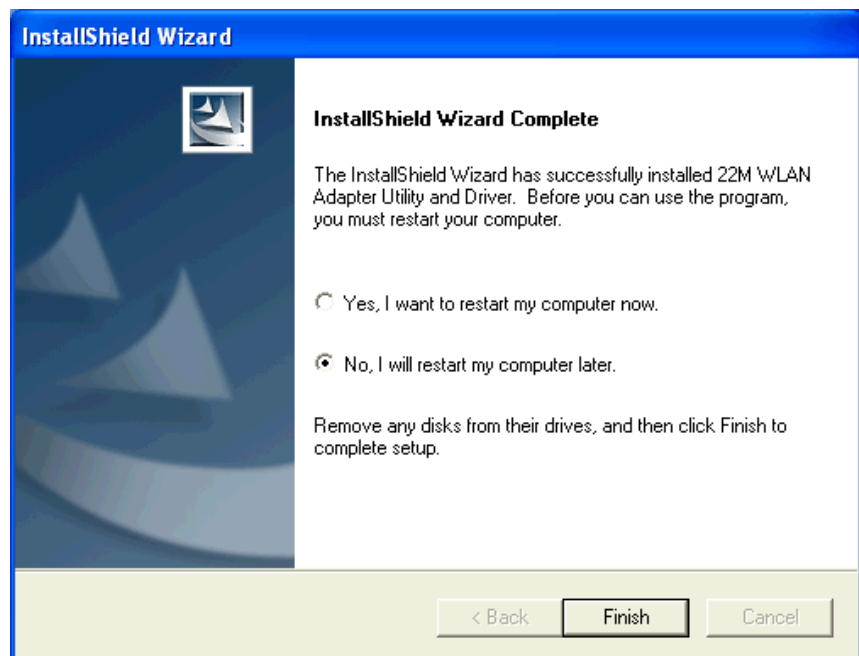
Click **“Next”** to install the program files in the default folder.



The setup program is now copying the necessary files to your local disk drive.

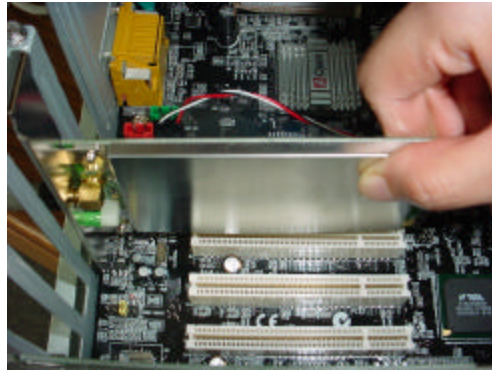


Select the second option, and click **‘Finish’** to complete the installation.



5. Turn off your notebook.
6. Insert the 22mpbs wireless Network PCI Adapter into the CardBus slot of your

notebook.

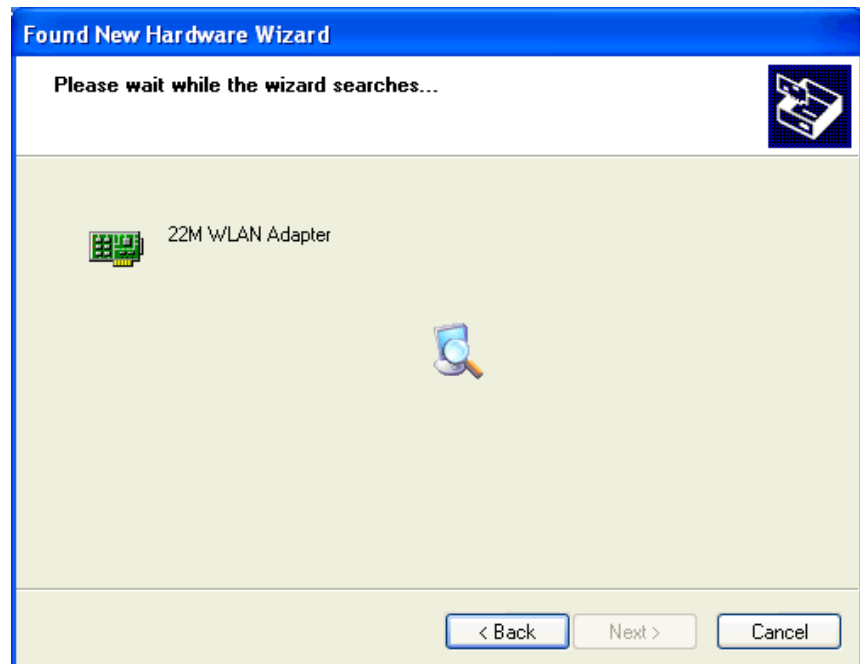


7. Turn on your notebook.
8. After the windows system initializes, the system will detect the existence of the 22mpbs wireless network PCI Adapter.
9. Since the system detects the LevelOne WNC-0200 Wireless PCI Adapter for the first time. The Found New Hardware Wizard will launch for installation.

Select the first option, and click **'Next'** to continue.



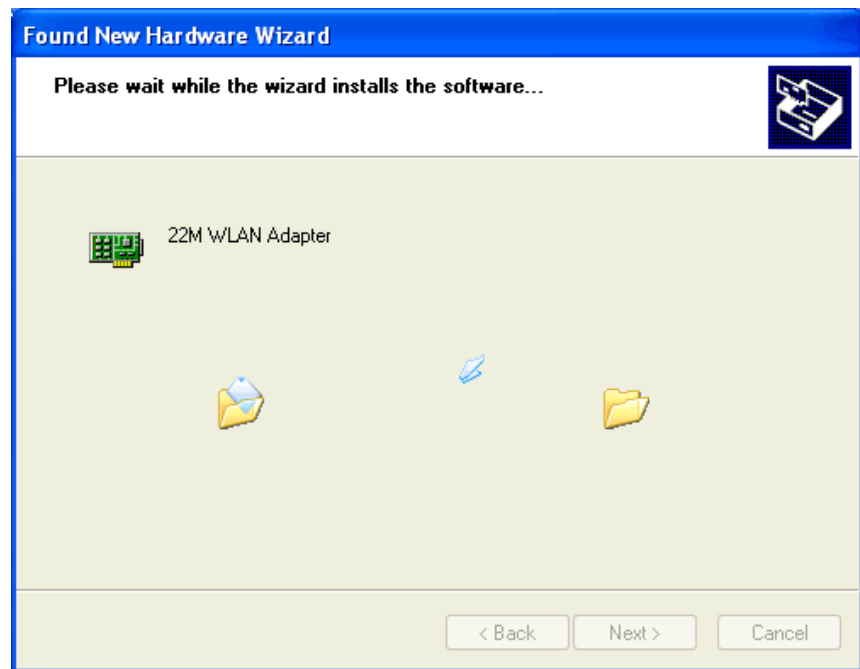
The screen will appear.



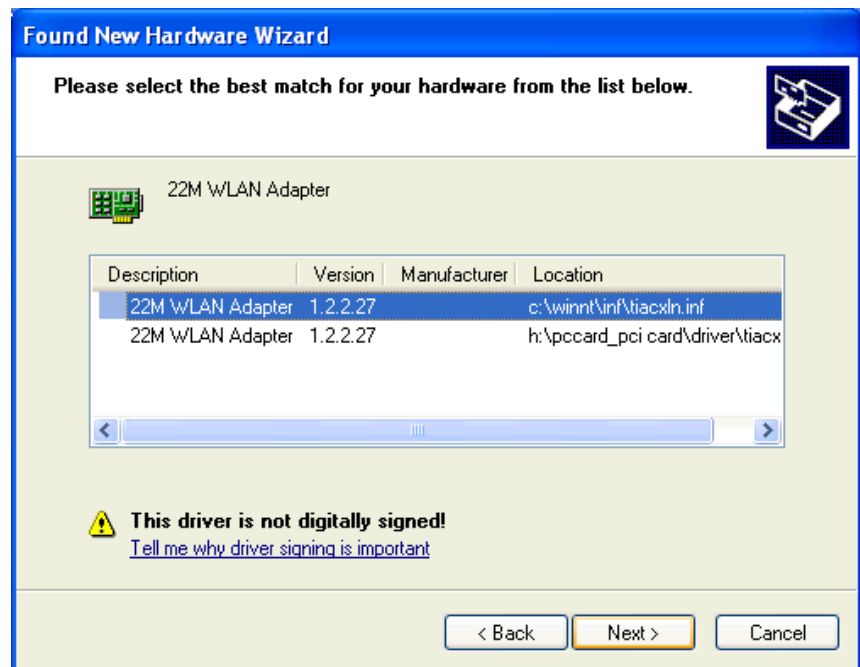
Click “**Continue Anyway**” to continue with hardware installation.



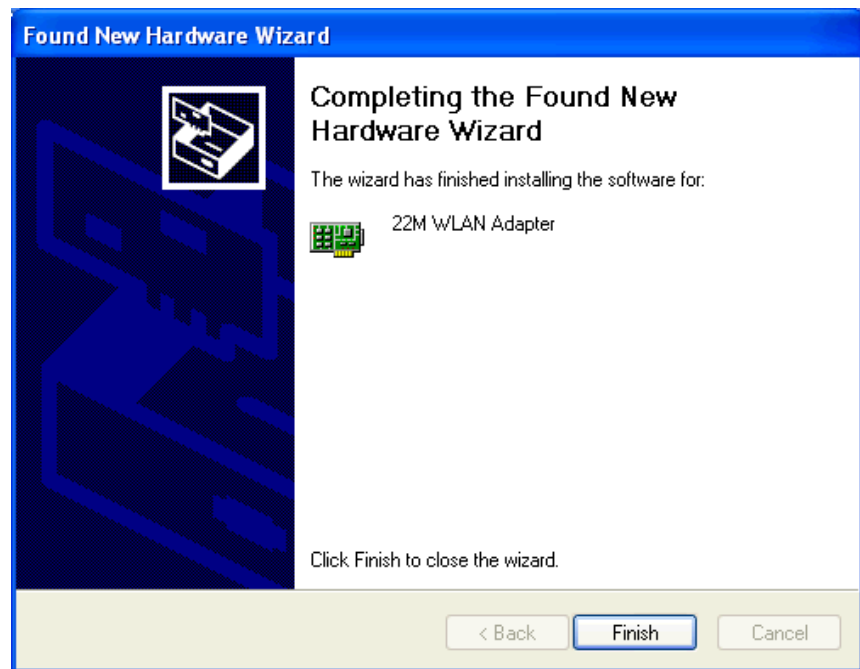
System is install the software for the 22mpbs wireless PC Card.



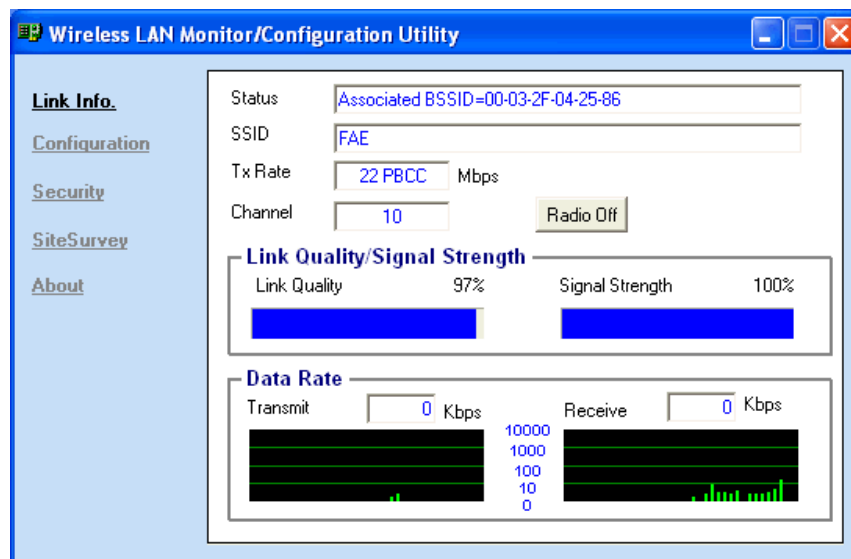
Click “Next” to continue



Click **“Finish”** to complete new hardware installation.



After successful installation, an utility program icon will appear on your desktop screen.  
Simply, double-click the icon to launch the utility.



# CONFIGURING YOUR LevelOne WNC-0200

## Link Info. Page

This is the default page when the utility starts up.

**Status:** Shows the BSSID associated, which can be used to identify the wireless network.

**SSID:** Shows current SSID, which must be the same for the wireless client and AP in order for communication to be established.

**TxRate:** Shows the current data rate used for transmitting.

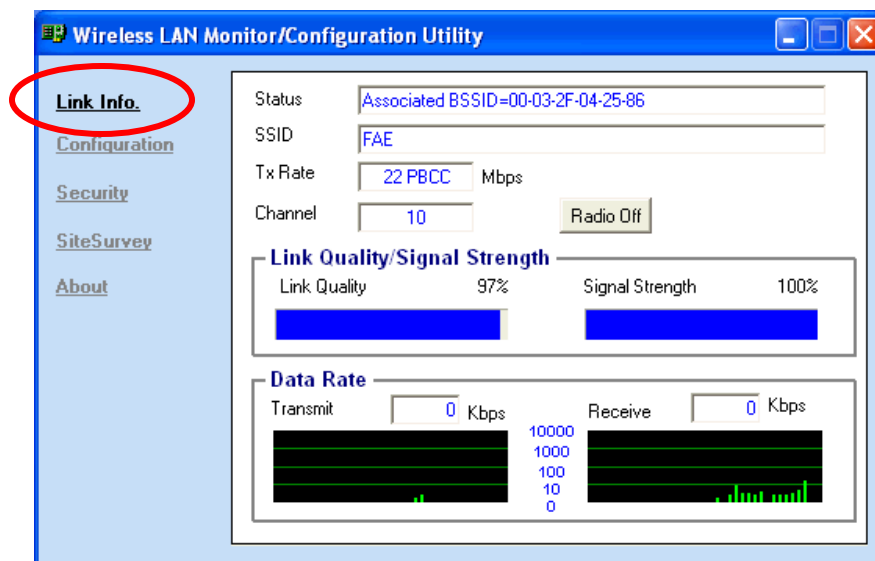
**Channel:** Shows the current channel for communication.

**Radio Off** button: When clicked, you disable the radio signal, and cut-off the wireless connection.

**Link Quality:** Shows the link quality of the LevelOne WNC-0200 Wireless PCI Adapter with the Access Point when operating under Infrastructure mode.

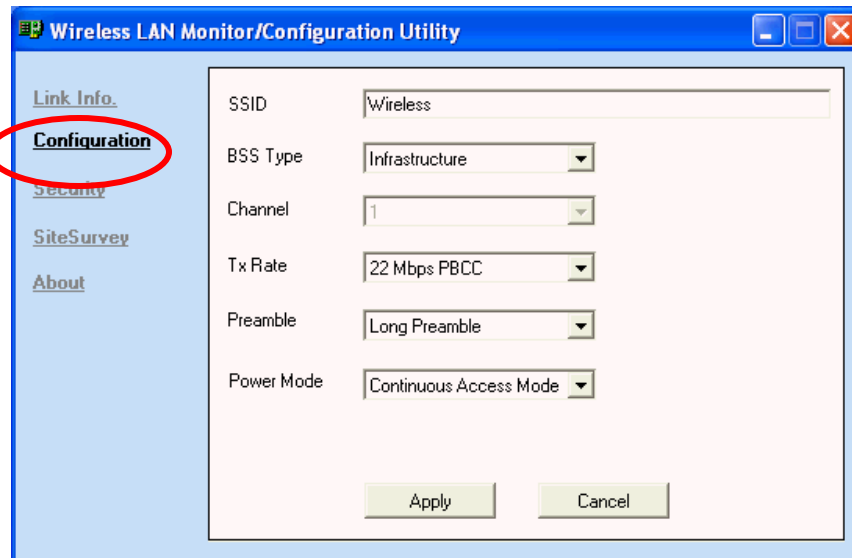
**Signal Strength:** Shows the wireless signal strength of the connection between the 22mpbs wireless Network PCI Adapter with the Access Point.

**Data Rate:** Shows the statistics of data transfer, and the calculation is based on the number of packets transmitted and received.



## Configuration Page

This is the page where you can change the basic settings of the Access Point with the minimum amount of effort to adjust a secure wireless network.



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

**BSS Type:** There are two types available for selection

- Infrastructure – to establish wireless communication with LAN and other wireless clients through the use the Access Points.
- Ad-Hoc – to establish point-to-point wireless communication directly with other wireless client devices such as wireless network PCI Adapter.

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

**Tx Rate:** Select the data rate for data transmission.

**Preamble:** Select **Long** or **Short** Preamble type. Preamble is a sequence of bits transmitted at 1Mbps that allows the PHY circuitry to reach steady-state demodulation and synchronization of bit clock and frame start. Two different preambles and headers are defined: the mandatory supported Long Preamble and header, which interoperates with the 1 Mbit/s and 2 Mbit/s DSSS specification (as described in IEEE Std 802.11), and an optional Short Preamble and header (as described in IEEE Std 802.11b). At the receiver, the Preamble and header are processed to aid in demodulation and delivery

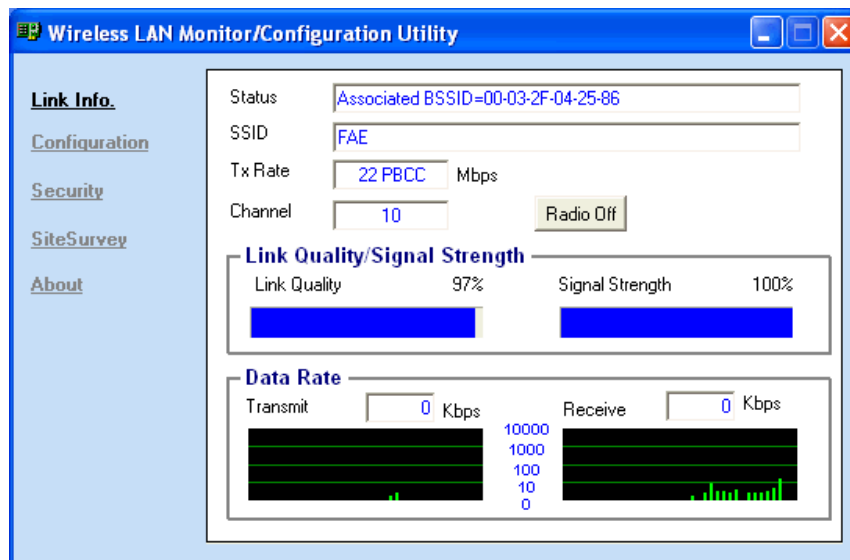


of the PSDU. The Short Preamble and header may be used to minimize overhead and, thus, maximize the network data throughput. However, the Short Preamble is supported only from the IEEE 802.11b (High-Rate) standard and not from the original IEEE 802.11. That means that stations using Short-Preamble cannot communicate with stations implementing the original version of the protocol.

**Power Mode:** There are 3 modes to choose from

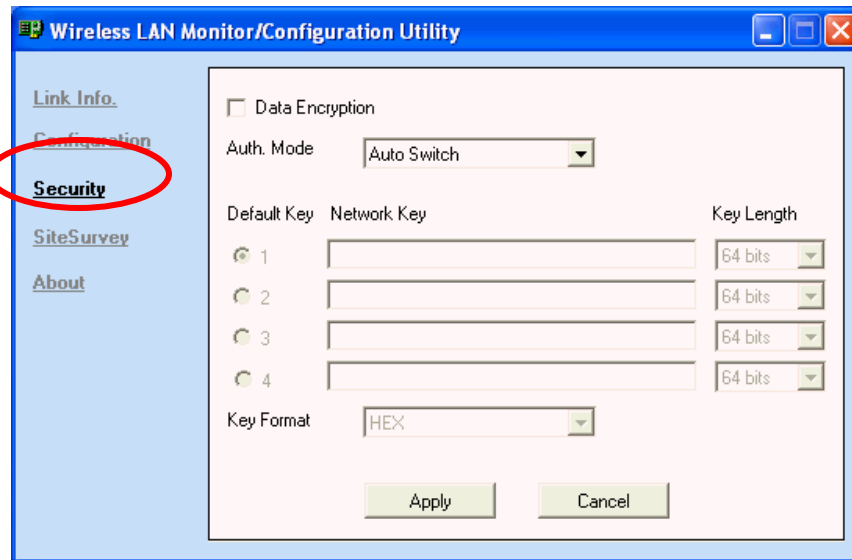
- Continuous Access Mode (default) – the PCI Adapter is constantly operating with full power and it consumes the most power
- Maximum Power Save – the PCI Adapter consumes the least power and only operates when there is wireless network activity.
- Power Save – the PCI Adapter consumes the moderate level of power.

For the changes made to any of the items above to be effective, click “**Apply**”. The screen will be changed back to **Link Info.** Page



## Security Page

This is the page where you configure Security settings of your 22Mbps wireless PCI Adapter.



**Data Encryption:** Click the box to enable Data Encryption feature.

**Auth. Mode:** There are three modes available to choose from.

- **Open Authentication** – the sender and receiver do not share secret Key for communication. Instead, each party generates its own key-pairs and ask the other party to accept it. The key is regenerated when the connection is established every time.
- **Shared Authentication** – the sender and receiver shares the common key for data communication, and the key is used for extended length of time.
- **Auto** – depend on the communication to establish, and automatically use the proper authentication mode.

The following will only be activated to allow for configuration when **Data Encryption** is enabled.

**Default Key:** select one of the 4 keys to use.

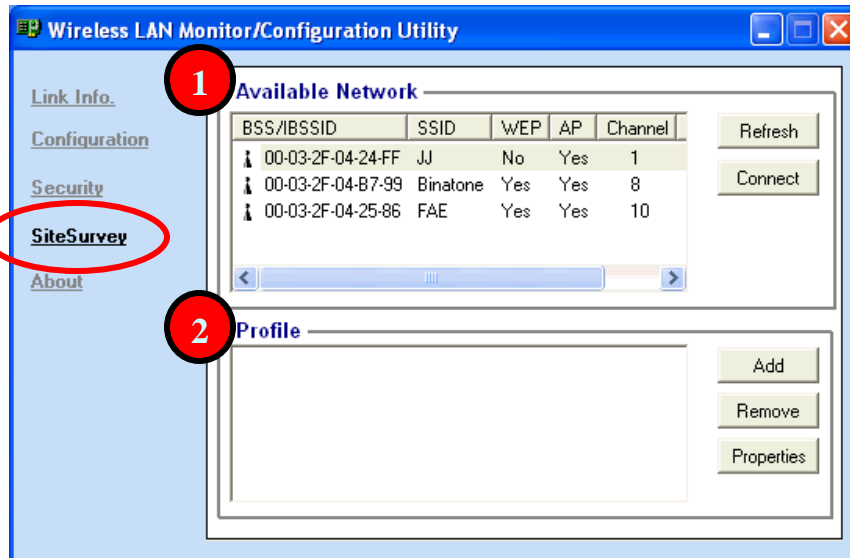
**Network Key:** enter values to these fields, either in HEX or ASCII formats. You only have to enter the key that you will use

**Key Length:** select 64, 128 or 256 bits as the length of the keys

**Key Format:** ASCII or HEX (Please refer to Appendix G: Glossary for details about these two formats).

## SiteSurvey Page

This page allows to utilize the SiteSurvey function to scan for the available wireless network (wireless clients and Access Points) and select one to establish wireless communication.



- 1 Available Network** – displays the wireless networks (wireless clients and Access Points) that are in your signal range. Select any one of them and establish communication by simply mouse **double-click** or a single click on the “**Connect**” button.

Click “**Refresh**” button to start scanning for available network again.

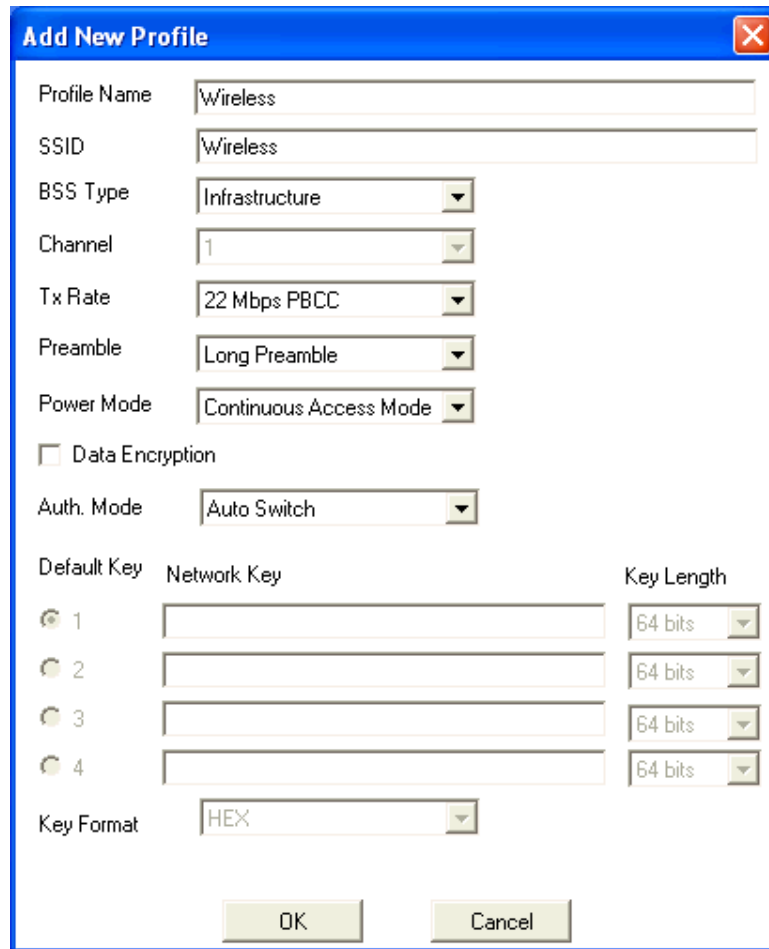
- 2 Profile** – You can create and manage the created profiles for Home, offices or public areas.  
By double-clicking on one of the created profile, the setting will adapt to the configuration such as SSID, channel, and WEP settings saved by that particular profile.

Click to select any one of the profiles, and you can

Click on “**Remove**” button to remove the profile, or

Click on “**Properties**” button to view and change its settings. The Properties is very similar to that of adding profile.

Click “**Add**” to add a profile, and the following screen would appear.



The "Add New Profile" dialog box contains the following fields and controls:

- Profile Name:** Text field with "Wireless" entered.
- SSID:** Text field with "Wireless" entered.
- BSS Type:** Dropdown menu with "Infrastructure" selected.
- Channel:** Dropdown menu with "1" selected.
- Tx Rate:** Dropdown menu with "22 Mbps PBCC" selected.
- Preamble:** Dropdown menu with "Long Preamble" selected.
- Power Mode:** Dropdown menu with "Continuous Access Mode" selected.
- Data Encryption:** Unchecked checkbox.
- Auth. Mode:** Dropdown menu with "Auto Switch" selected.
- Key Management Section:**
  - Default Key:** Four radio buttons labeled 1, 2, 3, and 4. Radio 1 is selected.
  - Network Key:** Four empty text input fields corresponding to the radio buttons.
  - Key Length:** Four dropdown menus, each with "64 bits" selected.
- Key Format:** Dropdown menu with "HEX" selected.
- Buttons:** "OK" and "Cancel" buttons at the bottom.

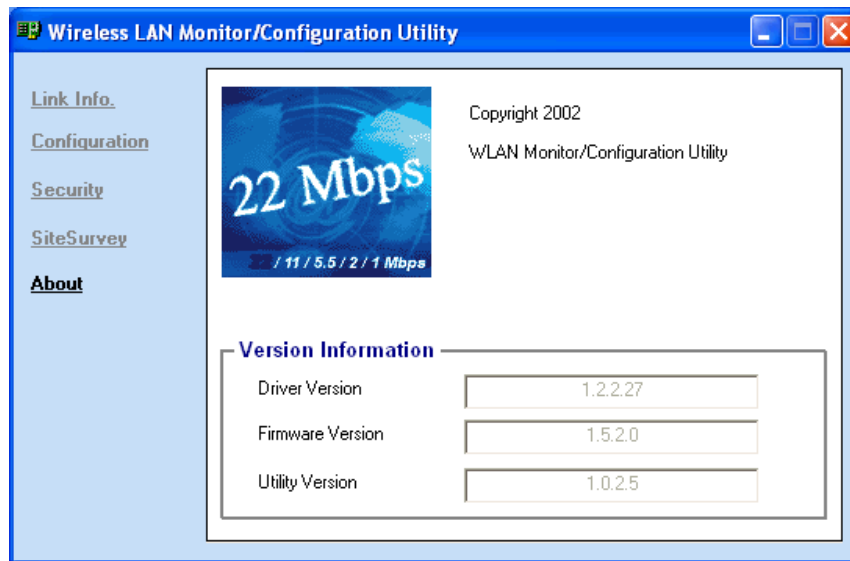
All the detail information about each settings and configuration item are described in previous Configuration and Security Page sessions. Please refer to those two sessions for more information.

When you finish enter the setting for this profile, click **“OK”** to add a new profile.

## About Page

This page displays some information about the 22mpbs PCI Adapter utility, which includes the version numbers for Driver, Firmware and Utility.

When there is new version of software available for upgrade, you will be able to identify by version numbers.



## APPENDIX A: TROUBLESHOOTING

This chapter provides solutions to frequently encountered problems that can occur during the installation and operation of the LevelOne WNC-0200 Wireless PCI Adapter. Please read through the following to solve your problems.

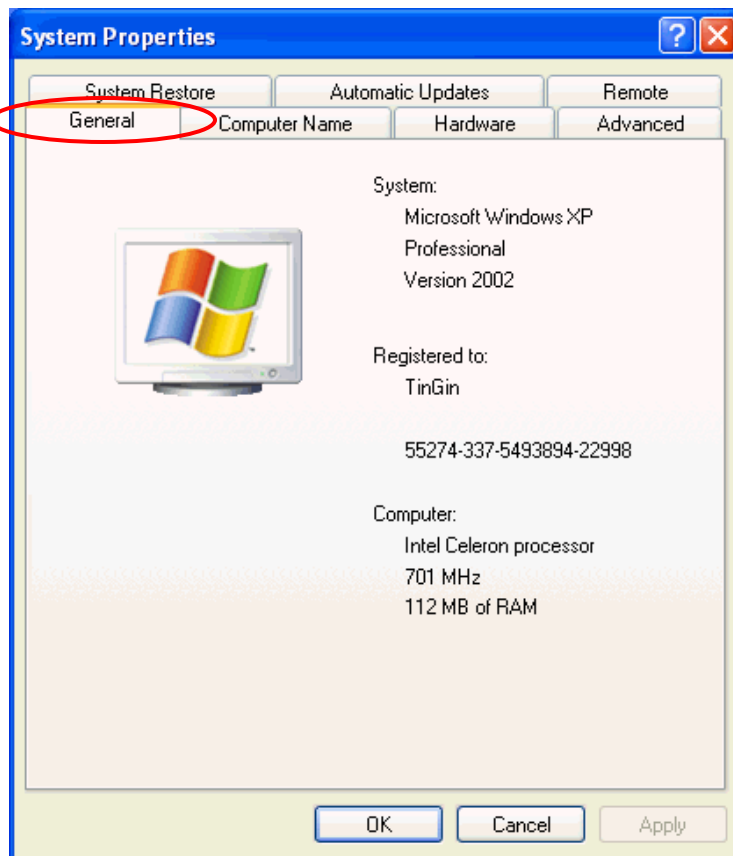
### 1. The wireless clients cannot access the network in the infrastructure mode.

- Check that the wireless network device is being installed and working properly.

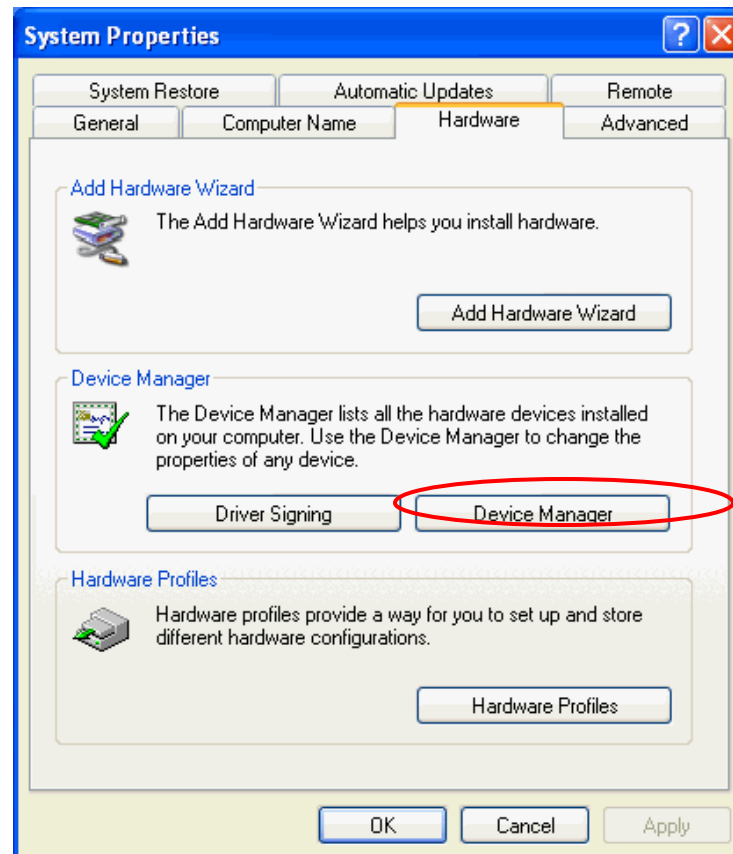
Go to “Start” >  
Right mouse click  
on “My Computer”  
> “Properties”



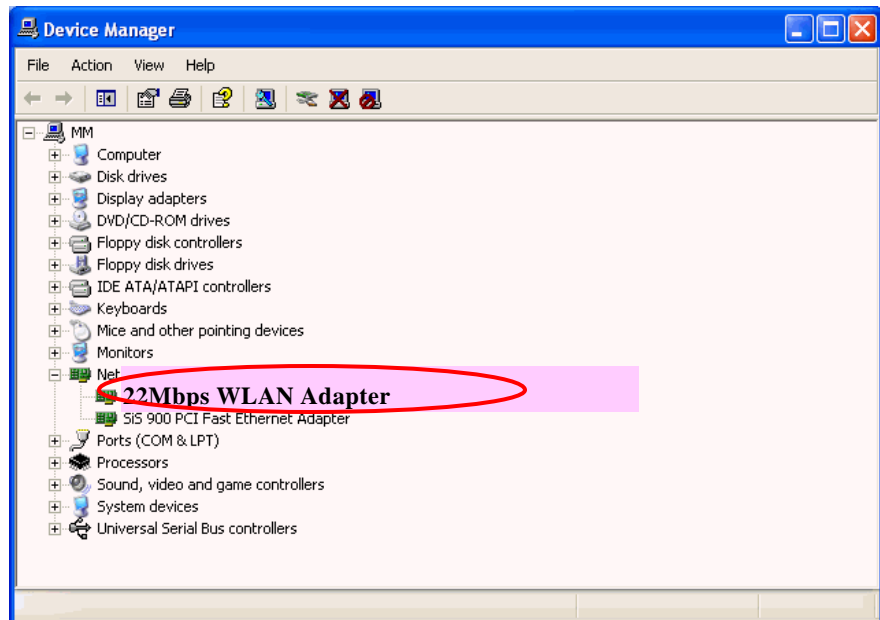
Go to "Hardware"



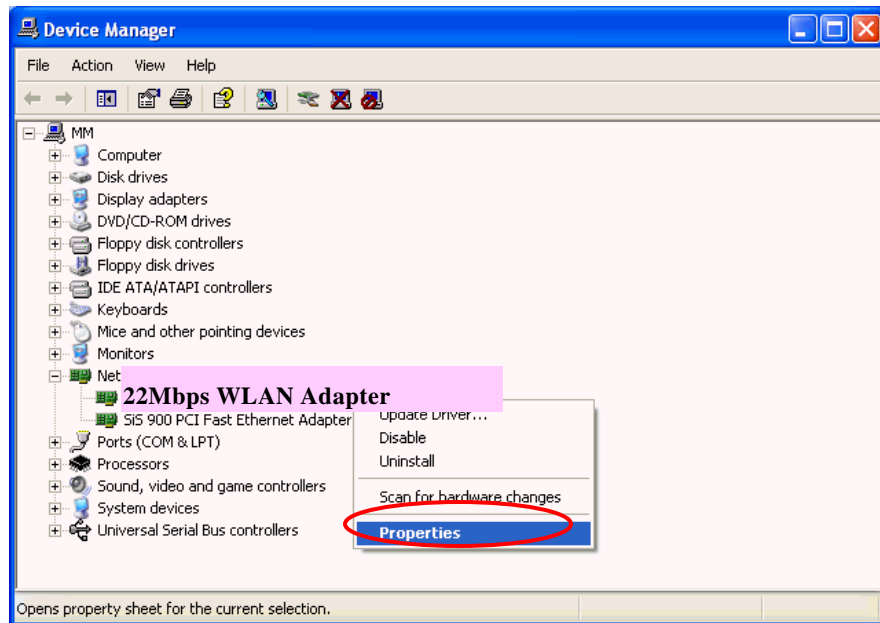
Go to "Device Manager"



Right mouse click  
on the wireless  
network adapter

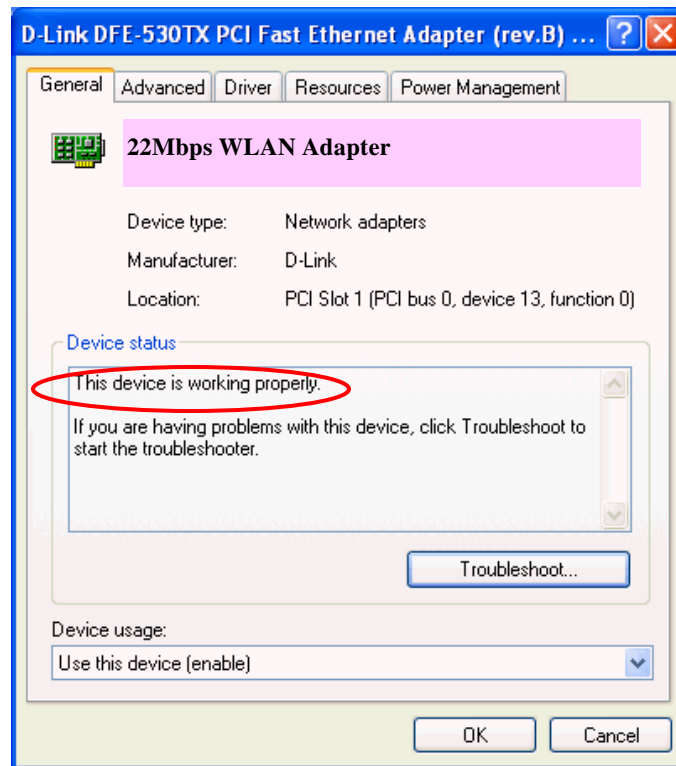


Go to “Properties”





Check and make sure that the network adapter is working properly



**2. What is the difference between 22Mbps and 11Mbps wireless products?**

**What's the benefit of 22Mbps Wireless Access Point?**

The 22Mbps is made possible by the new modulation method called PBCC developed by TI, which is different from the current CCK modulation method for 11Mbps. The 22Mbps Wireless Access Point offers double data rate than that of 11Mbps with 20% more distance coverage. The 22Mbps wireless products also operate in the 2.4GHz ISM band and they are backward compatible with 11Mbps wireless products.

**3. What is Roaming?**

Roaming is the ability of portable computers, e.g., Pocket PC and notebook, to have consistent and continuous data transmission/reception throughout an area covered by more than one Wireless Access Point. In order to achieve seamless connectivity, all the wireless clients and Access Points must be set to use the same SSID. When a user walked out of the coverage area of one AP into another, the wireless client network device will automatically reestablish connection with the new AP.

**4. What is a MAC Address?**

The Media Access Control (MAC) address is a unique number assigned by the manufacturer to any Ethernet networking devices, e.g. a network adapter, that

allows the network to identify it at the hardware level. Unlike IP addresses, which can be changed or dynamically assigned by the network, the MAC address of a networking device is permanent.

**5. What is WEP?**

Wired Equivalent Privacy (WEP) is a type of data encryption mechanism described in the IEEE 802.11 standard. The 22Mbps Wireless Access Point supports 64/128/256 bit shared key for WEP.

**6. Would the information be transmitted securely in the air?**

WLAN offers two layers of protection for security. First layer is on the hardware level. As with Direct Sequence Spread Spectrum (DSSS) technology, it has the inherent security feature of scrambling. Second of all, on the software level, the security control is made possible by Wired Equivalent Privacy (WEP) for access control.

**7. What is ISM band?**

The FCC and their counterparts outside of the U.S. have set aside bandwidth for unlicensed use in the ISM (Industrial, Scientific and Medical) band. The 24GHz unlicensed ISM band is available worldwide, which presents the opportunity for the global market of 802.11b high speed wireless products.

## APPENDIX B: NETWORKING BASIS

This chapter will help you learn the basics of home networking.

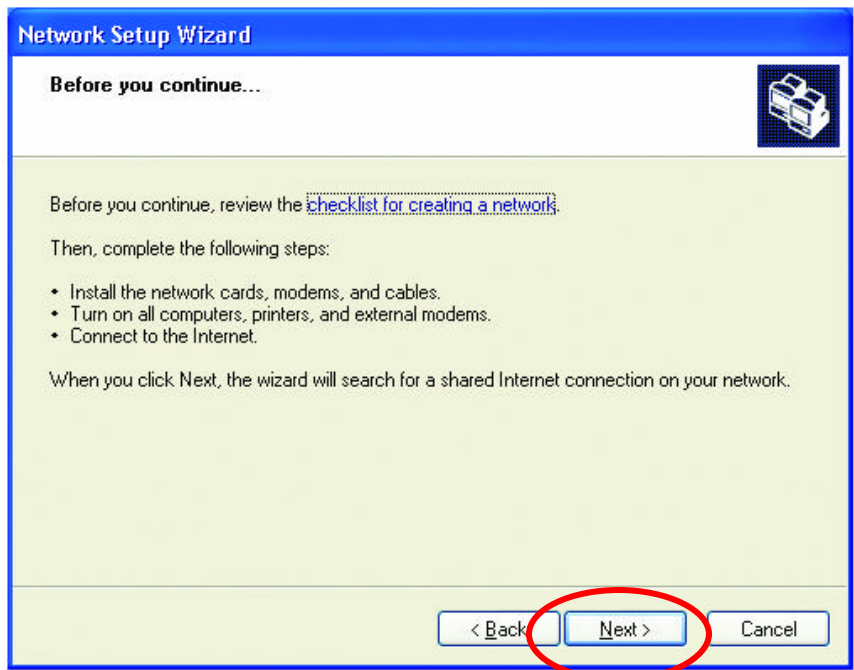
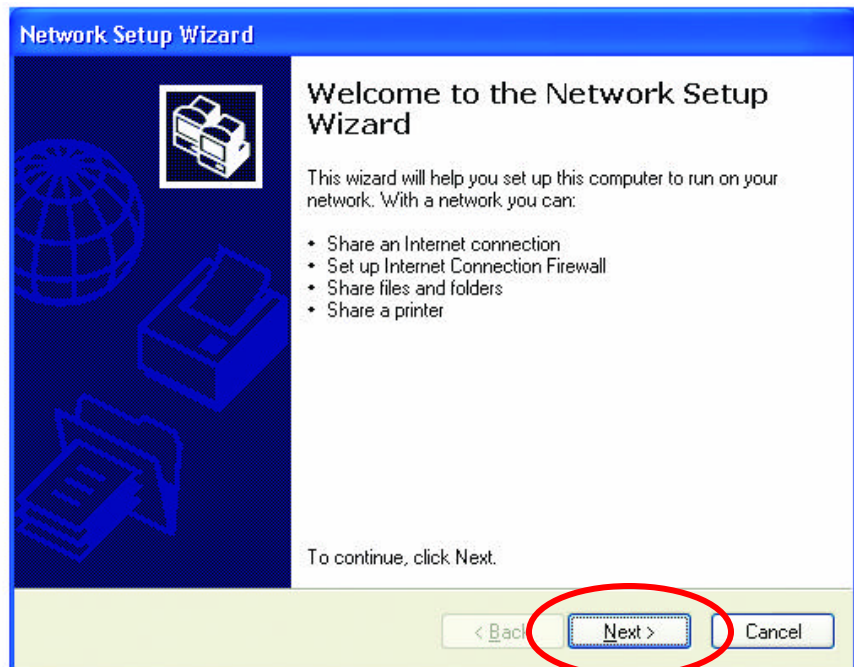
### Using the Windows XP Network Setup Wizard

Go to **Start menu > Control Panel > Network Connections**

In the menu on the left side of the window, select **“Set up a home or small office network”**

Click **“Next”** to proceed

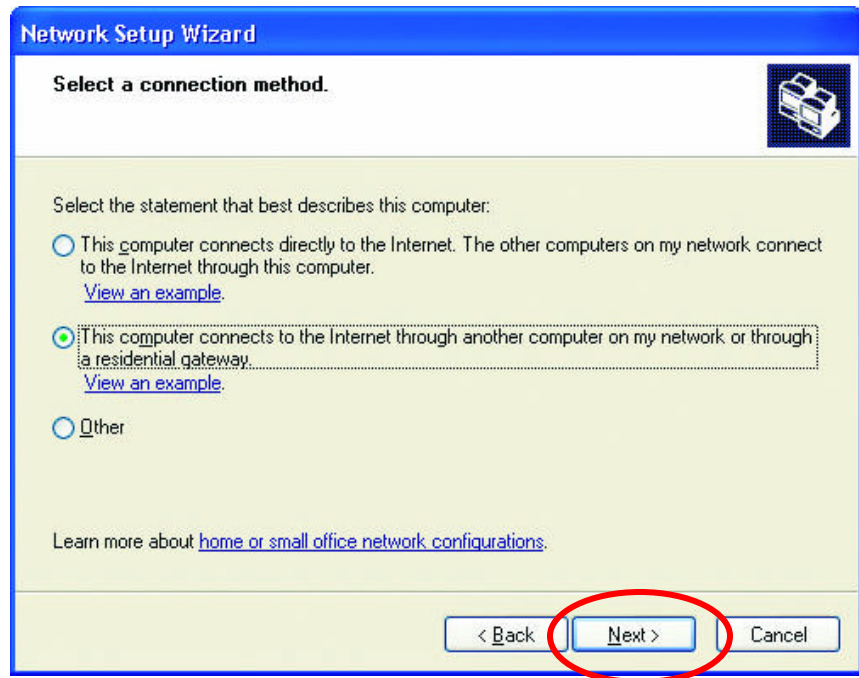
Click **“Next”** to continue



Select the option that best describes how you connect your computer to the Internet.

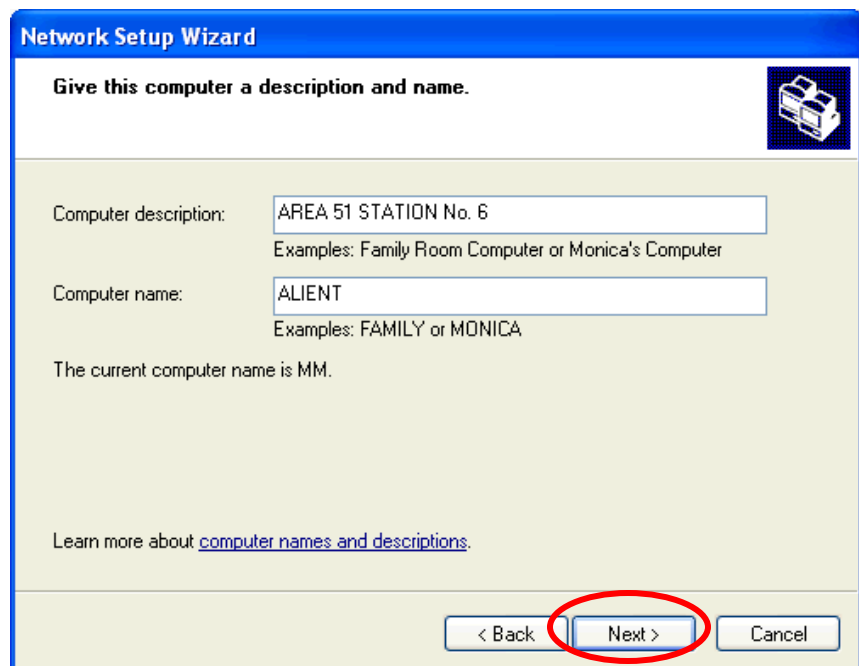
In the case of using router in the network, choose the second option.

Click “**Next**” to continue.



The screenshot shows the 'Network Setup Wizard' window with the title 'Select a connection method.' The instruction is 'Select the statement that best describes this computer:'. There are three radio button options: 1. 'This computer connects directly to the Internet. The other computers on my network connect to the Internet through this computer.' with a link 'View an example.' 2. 'This computer connects to the Internet through another computer on my network or through a residential gateway.' which is selected, with a link 'View an example.' 3. 'Other'. At the bottom, there is a link 'Learn more about home or small office network configurations.' and three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is circled in red.

1. Enter a short description for your computer.
2. Enter a name for your computer to be recognized among the network.
3. Click “**Next**” to continue.



The screenshot shows the 'Network Setup Wizard' window with the title 'Give this computer a description and name.' There are two text input fields: 'Computer description:' with the value 'AREA 51 STATION No. 6' and 'Examples: Family Room Computer or Monica's Computer'; and 'Computer name:' with the value 'ALIENT' and 'Examples: FAMILY or MONICA'. Below these fields, it says 'The current computer name is MM.' At the bottom, there is a link 'Learn more about computer names and descriptions.' and three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is circled in red.

Enter “**Workgroup name**” for your home network.  
Click “**Next**” to continue”

**Network Setup Wizard**

**Name your network.**

Name your network by specifying a workgroup name below. All computers on your network should have the same workgroup name.

Workgroup name:   
Examples: HOME or OFFICE

< Back **Next >** Cancel

Click “**Next**” and wait for the wizard to apply the settings.

**Network Setup Wizard**

**Ready to apply network settings...**

The wizard will apply the following settings. This process may take a few minutes to complete and cannot be interrupted.

Settings:

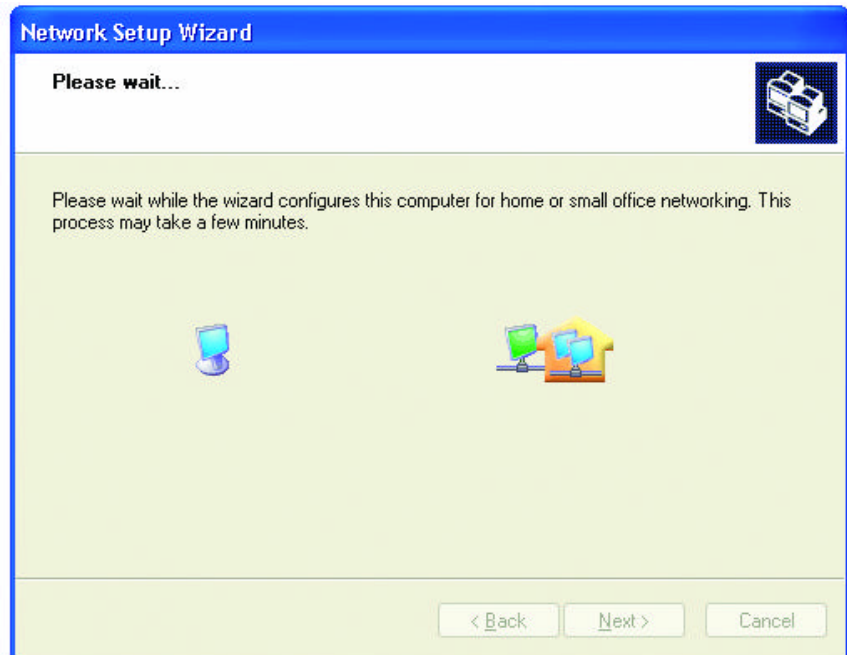
Internet connection settings:  
Connecting through another device or computer.

Network settings:

Computer description:	AREA 51 STATION No. 6
Computer name:	ALIENT
Workgroup name:	AREA51

To apply these settings, click Next.

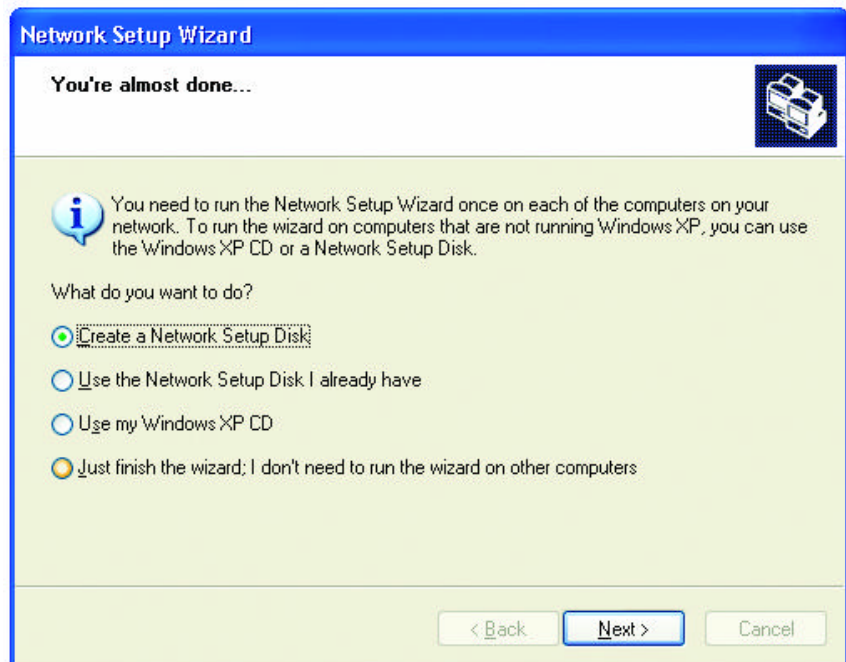
< Back **Next >** Cancel



You may create a network setup disk which saves you the trouble of having to configure every PCs in your network.

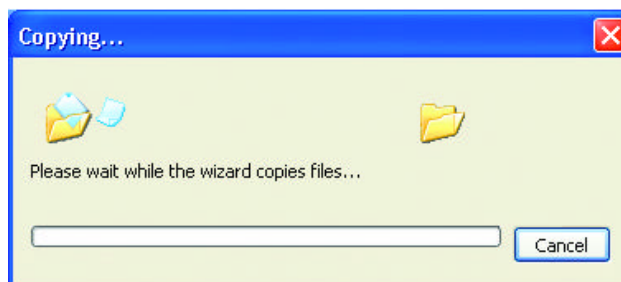
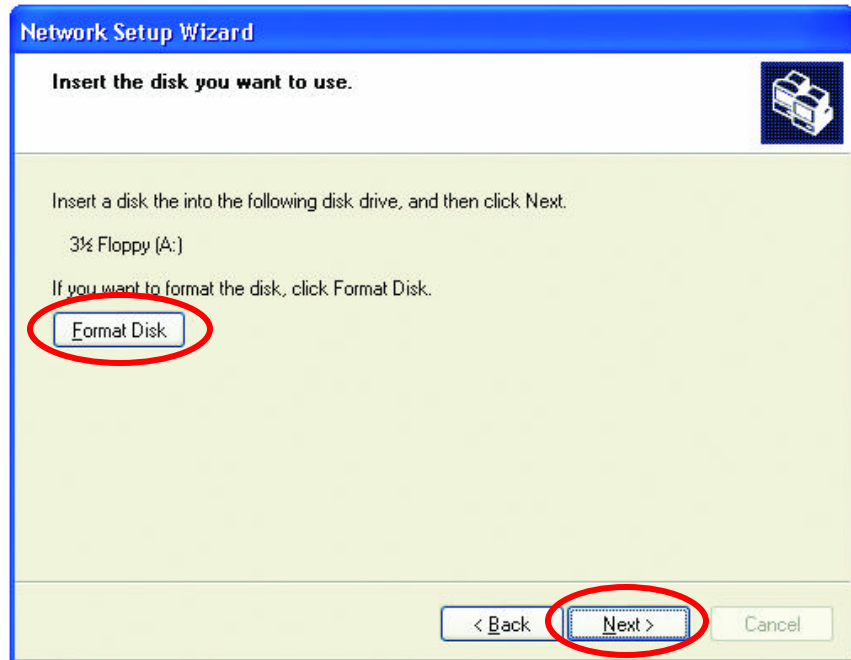
Select the first choice, and insert a floppy disk into your disk drive

Click “**N**ext” to continue.

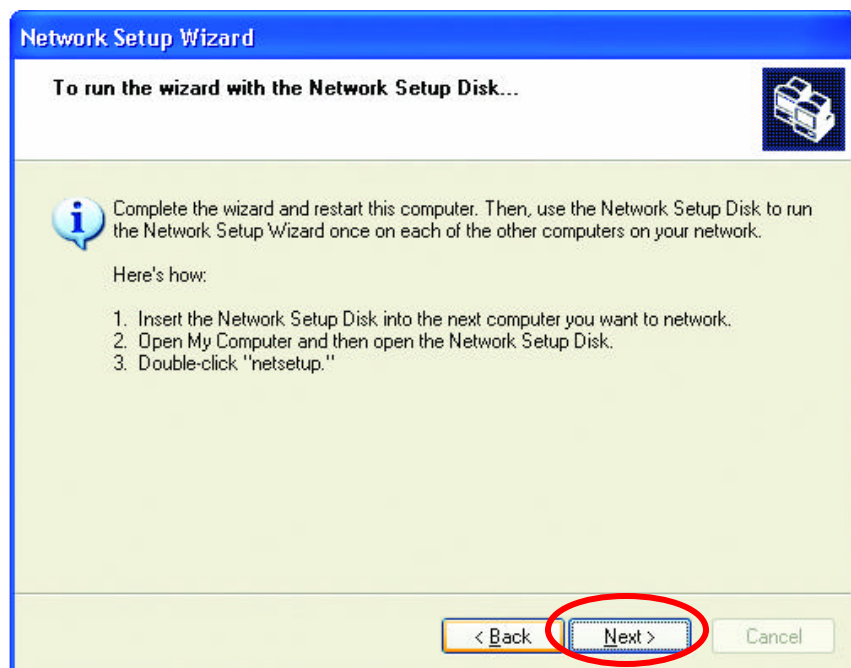


Click “**Format Disk**” if you wish to format the disk.

Click “**Next**” to copy the necessary files to the disk.

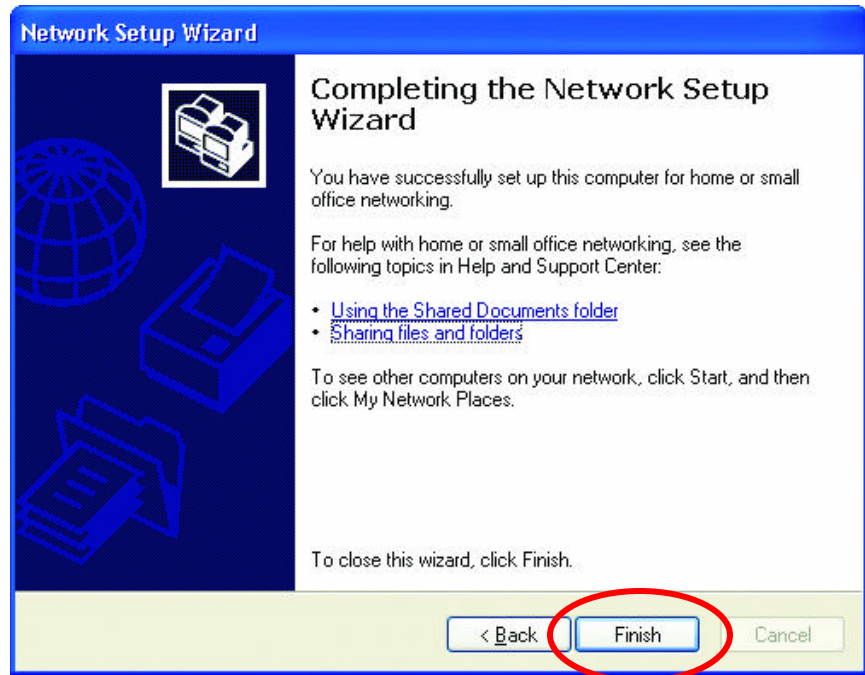


Click “**Next**” to continue with the Network Setup Wizard



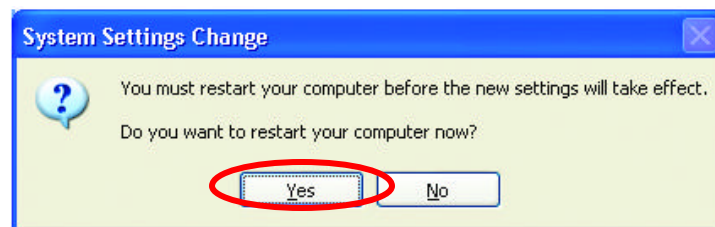
**!Note:** Now you may use the Network Setup Disk you just created in any PCs in your network that you wish to setup. Simply insert the Network Setup Disk into the disk drive of a PC, and open to browse the content of the disk with “My Computer” or “Windows File Manager”. Double-click and run the file “netsetup” for the program to handle the rest.

Click “**Finish**” to complete the Network Setup Wizard.



System will now have to restart in order for the new settings to be effective.

Click “**Yes**” to restart the computer

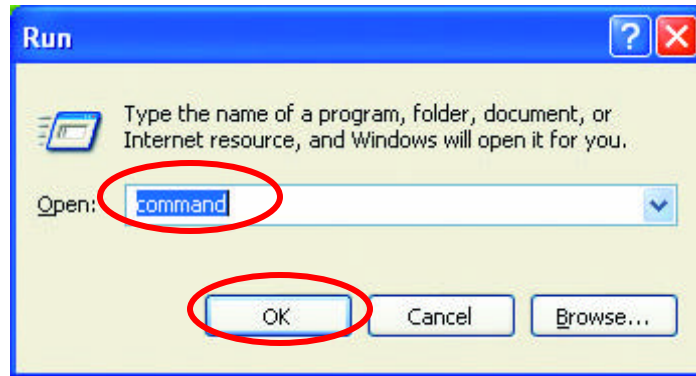




## Checking IP Address of Your Computer In Windows XP

Sometimes you will need to know the IP address of the computer that you are using. For example, when you want to make sure that your computer is in the same network domain as that of your Access Point for you can configure and access the AP.

Go to **Start** menu >  
**Run** > type  
“**command**”  
  
Click “**OK**”



When the command prompt window appears, type command “`ipconfig /all`” and press Enter. This command will display the IP addresses of all the network adapters in your computer.

```

C:\ Command Prompt
F:\Documents and Settings\lab4>ipconfig /all

Windows IP Configuration

    Host Name . . . . . : iqc4
    Primary Dns Suffix . . . . . : 
    Node Type . . . . . : Unknown
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No

Ethernet adapter Wireless Network Connection:

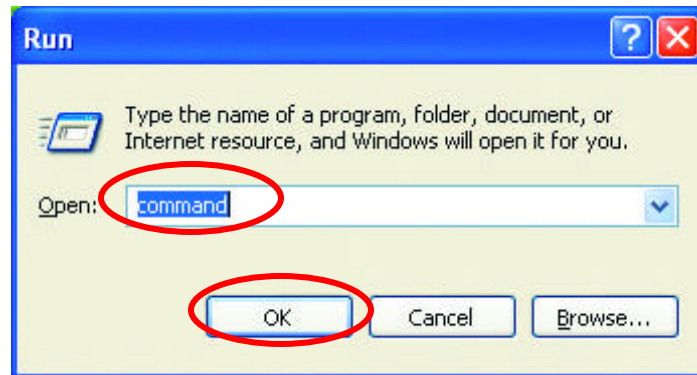
    Connection-specific DNS Suffix  : 
    Description . . . . . : D-Link Air DWL-650 Wireless Cardbus
    Adapter
    Physical Address. . . . . : 00-06-25-53-85-31
    Dhcp Enabled. . . . . : No
    IP Address. . . . . : 192.168.0.23
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.0.1
    DNS Servers . . . . . : 10.10.10.40
                           192.152.81.1

F:\Documents and Settings\lab4>
```

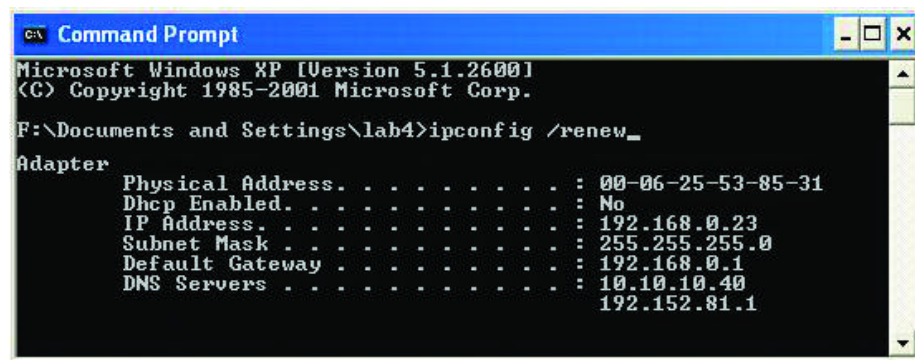
In this case, the IP address of your network adapter is 192.168.0.23, which means your Access Point must have an IP address of 192.168.0.xxx in order for you to be able to access it.

If the IP address is assigned by DHCP server on the network, there are chances you might have to release the IP and acquire it from DHCP server again. Here is how you do it.

Go to **Start** menu >  
**Run** > type  
“**command**”  
  
Click “**OK**”



Type command, “`ipconfig /renew`” in the command prompt window and press Enter. This command releases the current IP address and acquire it from the network, i.e. DHCP server, once more.



In this case, the IP address that we acquired is the same as previous one, 192.168.0.23. However, it's often that the acquired IP address of the network adapter might would not be the same.

**!Note:** To renew IP under Windows 98 and Windows ME, you will have to go to the **Start** menu > **Run** > type **winipcfg** and click “**OK**”. The Windows IP Configuration Menu window would appear, where you first click “release” button to release the current IP address, followed by clicking of “Renew” to acquire a new IP address from network.

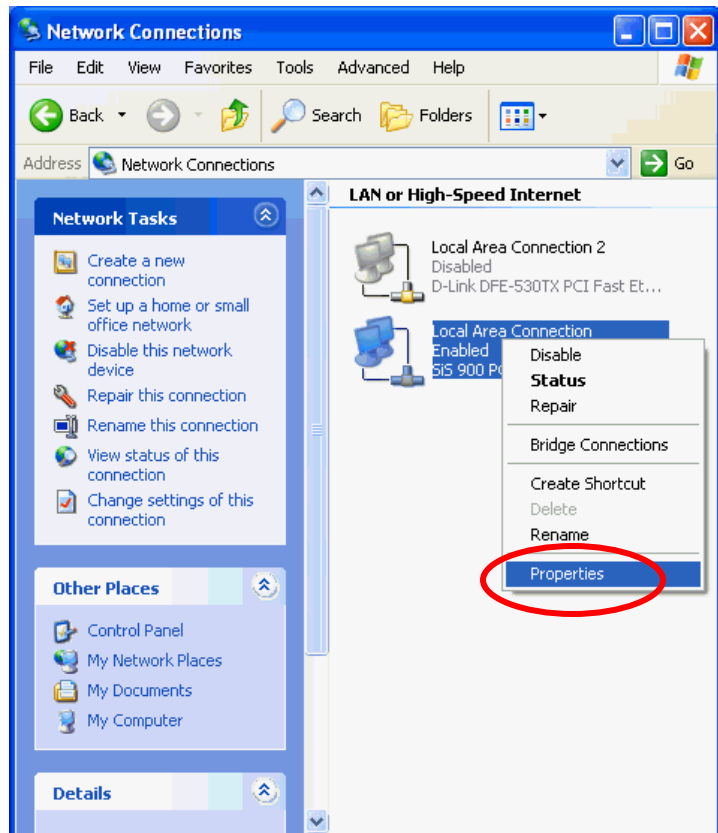
If the above methods for IP renew fail, you will have to try and restart the computer, which will reinitializes the network adapter settings during startup including renewing IP address. If you still have problems getting an IP address after computer restarts, you will have to consult with your MIS in your office or call computer and network technicians.

## Dynamic IP Address V.S. Static IP Address

By definition Dynamic IP addresses are the IP addresses that are being automatically assigned to a network device on the network. These Dynamically assigned IP addresses will expire and may be changed over time.

Static IP addresses are the IP addresses that users manually enter for each of the network adapters.

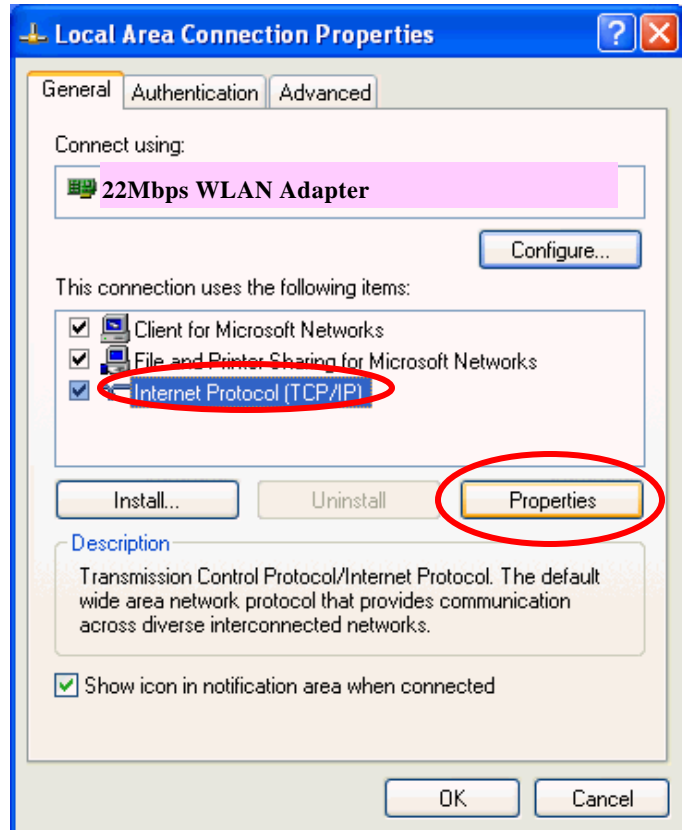
Go to **Start** menu > **Control Panel** > **Network Connections** > Right-click on the active **Local Area connection** > Select **“Properties”**



**!Note:** There might be two or more Local Area Connection to choose from. You must select the one that you will use to connect to the network.

The Local Area Connection Properties window would appear.

Select “**Internet Protocol (TCP/IP)**” and Click “**Properties**” to continue.

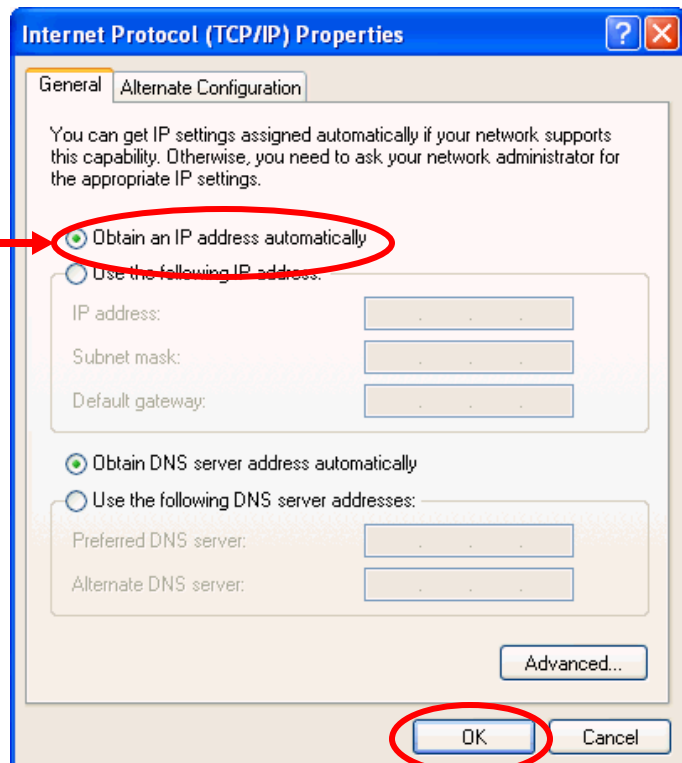


### Dynamically Assigned IP Address

The TCP/IP Properties window appears.

Select “**Obtain an IP address automatically**” if you are on a DHCP enabled network.

Click “**OK**” to close the window with the changes made



## Static IP Address

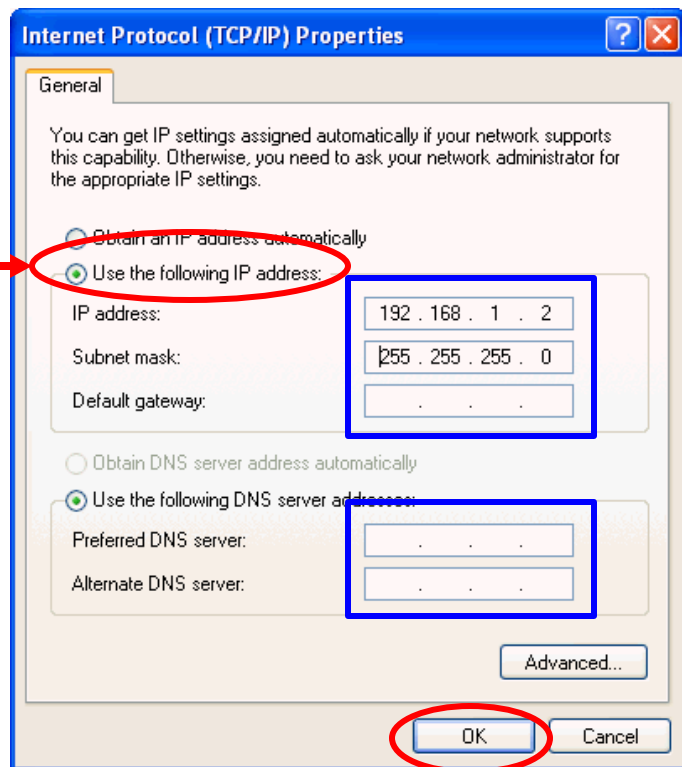
Select “**Use the following IP address**”

Enter the **IP address** and **subnet mask** fields.

Enter the IP address of the Router in the **Default gateway** field.

Enter the IP address of the Router in the **DNS server** field

Click “**Ok**” to close the window

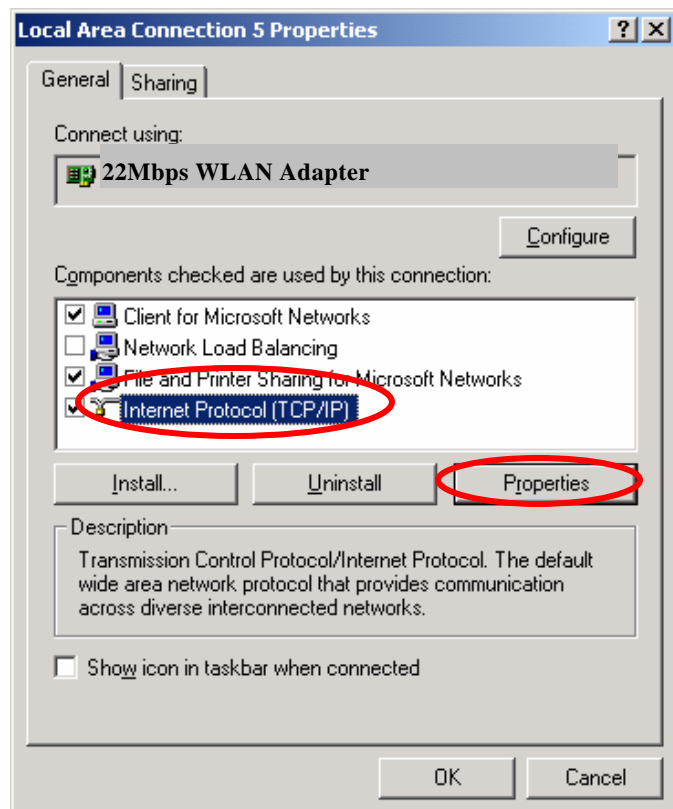


**!Note:** The IP address must be within the same range as the wireless route or Access Point.

## Wireless Network in Windows 2000

Go to **Start** menu > **Settings** > **Network and Dial-up Connections** > Double-click on the **Local Area Connection**

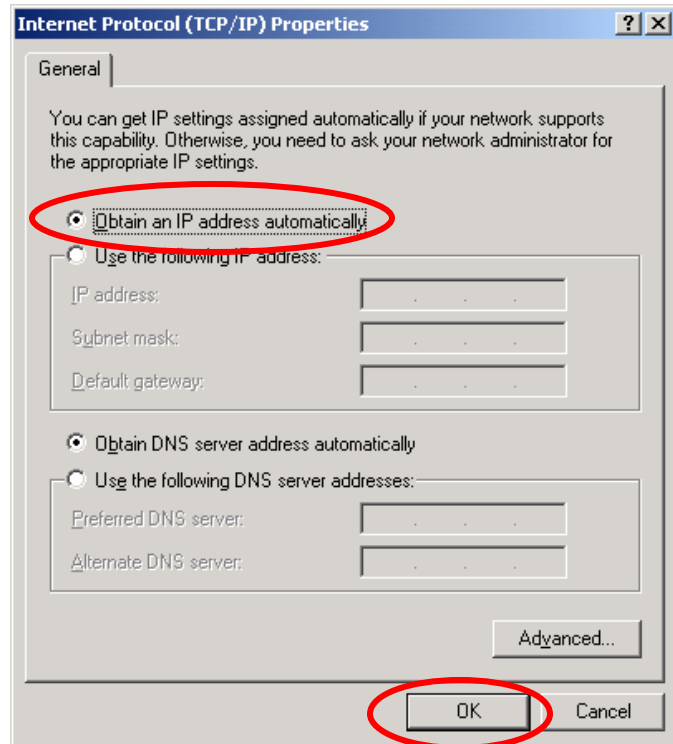
Select “**Internet Protocol (TCP/IP)**” and click “**Properties**”



The TCP/IP Properties window appears.

Select “**Obtain an IP address automatically**” if you are on a DHCP enabled network.

Click “**OK**” to close the window with the changes made



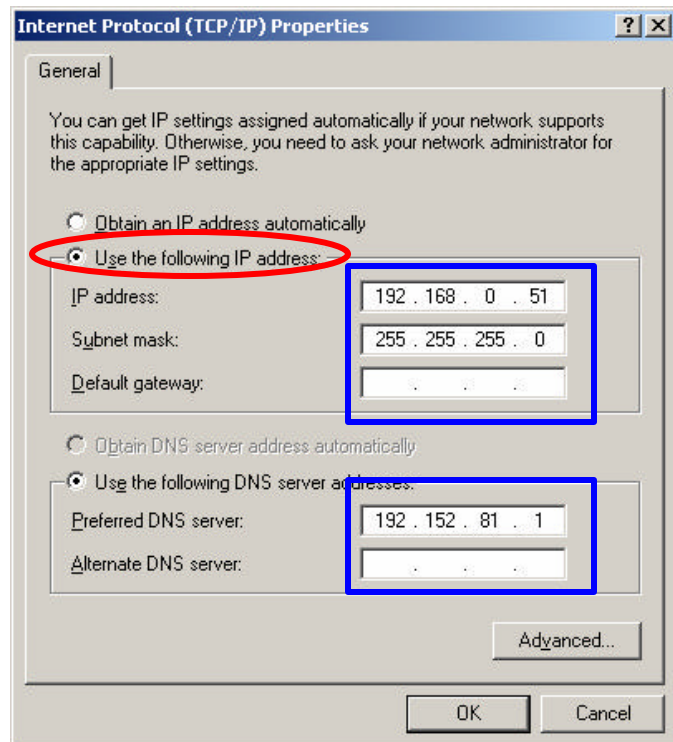
Select “**Use the following IP address**”

Enter the **IP address** and **subnet mask** fields.

Enter the IP address of the Router in the **Default gateway** field.

Enter the IP address of the Router in the **DNS server** field

Click “**Ok**” to close the window

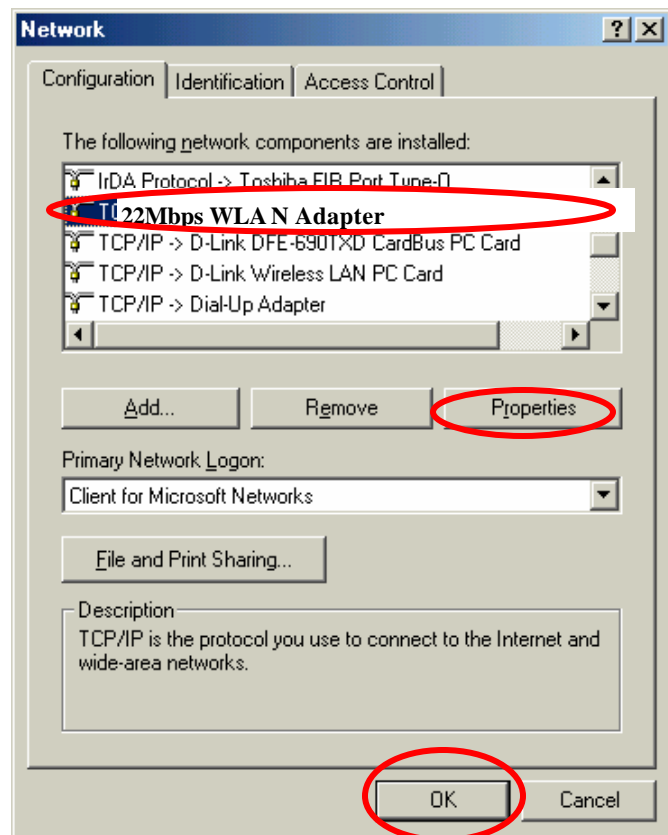


## Wireless Network In Windows 98 and Windows ME

Go to **Start** menu > **Settings** > **Control Panel** > Double-click on **Network**

Select **TCP/IP** of the network device

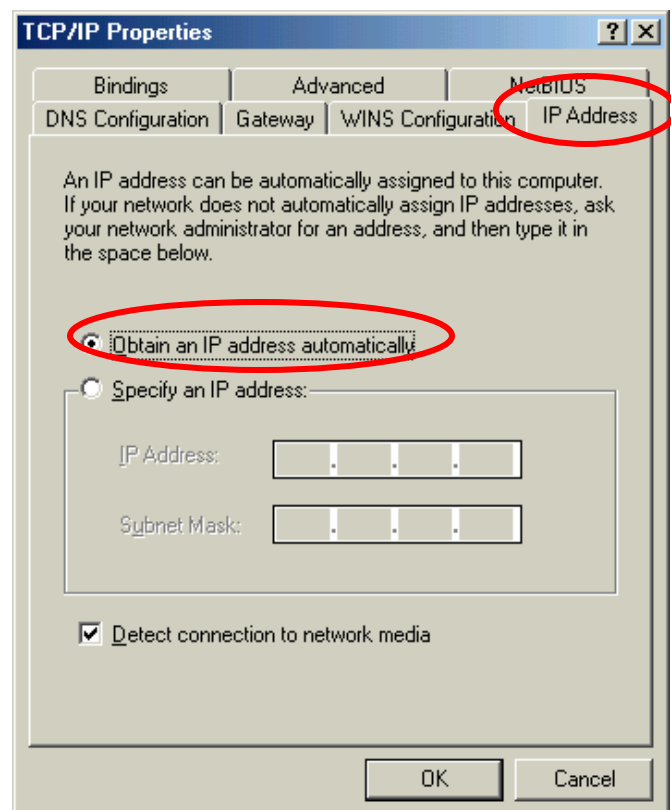
Click "**Properties**" to continue



The TCP/IP Properties window appears.

Select "**Obtain an IP address automatically**" if you are on a DHCP enabled network.

Click "**OK**" to close the window with the changes made



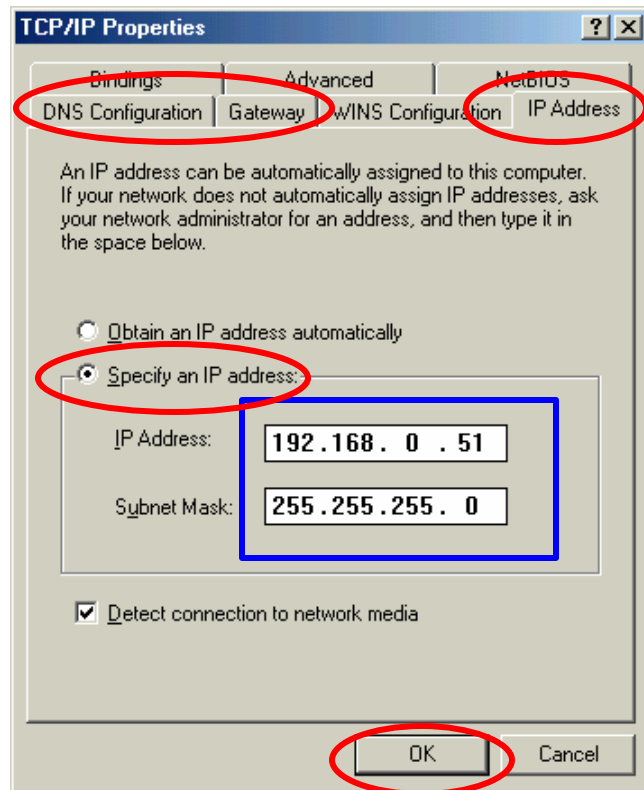
Select “**Use the following IP address**”

Enter the **IP address** and **subnet mask** fields.

Enter the IP address of the Router in the **Default gateway** field.

Enter the IP address of the Router in the **DNS server** field

Click “**Ok**” to close the window





## APPENDIX C: GLOSSARY

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

**Ad-Hoc ?** An independent wireless LAN network formed by a group of computers, each with an network adapter.

**AP Client** – One of the additional AP operating modes offered by 22Mbps Access Point, which allows the Access Point to act as an Ethernet-to-Wireless Bridge, thus a LAN or a single computer station can join a wireless ESS network through it.

**ASCII** – American Standard Code for Information Interchange, ASCII, is one of the two formats that you can use for entering the values for WEP key. It represents English letters as numbers from 0 to 127.

**Authentication Type ?** Indication of an authentication algorithm which can be supported by the Access Point:

1. Open System : Open System authentication is the simplest of the available authentication algorithms. Essentially it is a null authentication algorithm. Any station that requests authentication with this algorithm may become authenticated if 802.11 Authentication Type at the recipient station is set to Open System authentication.
2. Shared Key : Shared Key authentication supports authentication of stations as either a member of those who know s a shared secret key or a member of those who does not.

**Backbone ?** The core infrastructure of a network, which transports information from one central location to another where the information is unloaded into a local system.

**Bandwidth ?** The transmission capacity of a device, which is calculated by how much data the device can transmit in a fixed amount of time expressed in bits per second (bps).

**Basic Rate ?** the fixed transmitted and receiving data rate allowed by the AP with the value 1,2,5.5, 11 and 22 Mbps for selection.

**Beacon ?** A beacon is a packet broadcast by the Access Point to keep the network synchronized. Included in a beacon are information such as wireless LAN service

area, the AP address, the Broadcast destination addresses, time stamp, Delivery Traffic Indicator Maps, and the Traffic Indicator Message (TIM).

**Bit** ? A binary digit, which is either -0 or -1 for value, is the smallest unit for data.

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

**Browser** ? An application program that enables one to read the content and interact in the World Wide Web or Intranet.

**BSS** ? BSS stands for “Basic Service Set”. It is an Access Point and all the LAN PCs that associated with it.

**Channel**? The bandwidth which wireless Radio operates is divided into several segments, which we call them “Channels”. AP and the client stations that it associated work in one of the channels.

**CSMA/CA** ? In local area networking, this is the CSMA technique that combines slotted time-division multiplexing with carrier sense multiple access/collision detection (CSMA/CD) to avoid having collisions occur a second time. This works best if the time allocated is short compared to packet length and if the number of situations is small.

**CSMA/CD** ? Carrier Sense Multiple Access/Collision Detection, which is a LAN access method used in Ethernet. When a device wants to gain access to the network, it checks to see if the network is quiet (senses the carrier). If it is not, it waits a random amount of time before retrying. If the network is quiet and two devices access the line at exactly the same time, their signals collide. When the collision is detected, they both back off and wait a random amount of time before retrying.

**DHCP** ? Dynamic Host Configuration Protocol, which is a protocol that lets network administrators manage and allocate Internet Protocol (IP) addresses in a network. Every computer has to have an IP address in order to communicate with each other in a TCP/IP based infrastructure network. Without DHCP, each computer must be entered in manually the IP address. DHCP enables the network administrators to assign the IP from a central location and each computer receives an IP address upon plugged with the Ethernet cable everywhere on the network.

**DSSS** ? Direct Sequence Spread Spectrum. DSSS generates a redundant bit pattern for each bit to be transmitted. This bit pattern is called a chip (or chipping code). The longer the chip, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

**Dynamic IP Address** ? An IP address that is assigned automatically to a client station in a TCP/IP network by a DHCP server.

**Encryption** ? A security method that uses a specific algorithm to alter the data transmitted, thus prevent others from knowing the information transmitted.

**ESS** ? ESS stands for “Extended Service Set”. More than one BSS is configured to become Extended Service Set. LAN mobile users can roam between different BSSs in an ESS.

**ESSID** ? The unique identifier that identifies the ESS. In infrastructure association , the stations use the same ESSID as AP’s to get connected.

**Ethernet**? A popular local area data communications network, originally developed by Xerox Corp., that accepts transmission from computers and terminals. Ethernet operates on a 10/100 Mbps base transmission rate, using a shielded coaxial cable or over shielded twisted pair telephone wire.

**Fragmentation** ? When transmitting a packet over a network medium, sometimes the packet is broken into several segments, if the size of packet exceeds that allowed by the network medium.

**Fragmentation Threshold** – The Fragmentation Threshold defines the number of bytes used for the fragmentation boundary for directed messages. The purpose of "Fragmentation Threshold" is to increase the transfer reliability thru cutting a MAC Service Data Unit (MSDU) into several MAC Protocol Data Units (MPDU) in smaller size. The RF transmission can not allow to transmit too big frame size due to the heavy interference caused by the big size of transmission frame. But if the frame size is too small, it will create the overhead during the transmission.

**Gateway** ? a device that interconnects networks with different, incompatible communication protocols.

**HEX** – Hexadecimal, HEX, consists of numbers from 0 – 9 and letters from A – F.

**IEEE** ? The **I**nstitute of **E**lectrical and **E**lectronics **E**ngineers, which is the largest technical professional society that promotes the development and application of electrotechnology and allied sciences for the benefit of humanity, the advancement of the profession. The IEEE fosters the development of standards that often become national and international standards.

**Infrastructure** ? An infrastructure network is a wireless network or other small network in which the wireless network devices are made a part of the network through the Access Point which connects them to the rest of the network.

**ISM Band** ? The FCC and their counterparts outside of the U.S. have set aside bandwidth for unlicensed use in the ISM (Industrial, Scientific and Medical) band. Spectrum in the vicinity of 2.4GHz, in particular, is being made available worldwide.

**MAC Address ?** Media Access Control Address is a unique hex number assigned by the manufacturer to any Ethernet networking device, such as a network adapter, that allows the network to identify it at the hardware level.

**Multicasting ?** Sending data to a group of nodes instead of a single destination.

**Multiple Bridge –** One of the additional AP operating modes offered by 22Mbps Access Point, which allows a group of APs that consists of two or more APs to connect two or more Ethernet networks or Ethernet enabled clients together. The way that multiple bridge setup is based on the topology of Ad-Hoc mode.

**Node ?** A network junction or connection point, typically a computer or workstation.

**Packet ?** A unit of data routed between an origin and a destination in a network.

**PLCP ?** Physical layer convergence protocol

**PPDU ?** PLCP protocol data unit

**Preamble Type ?** During transmission, the PSDU shall be appended to a PLCP preamble and header to create the PPDU. Two different preambles and headers are defined as the mandatory supported long preamble and header which interoperates with the current 1 and 2 Mbit/s DSSS specification as described in IEEE Std 802.11-1999, and an optional short preamble and header. At the receiver, the PLCP preamble and header are processed to aid in demodulation and delivery of the PSDU. The optional short preamble and header is intended for application where maximum throughput is desired and interoperability with legacy and non-short-preamble capable equipment is not consideration. That is, it is expected to be used only in networks of like equipment that can all handle the optional mode. (IEEE 802.11b standard)

**PSDU ?** PLCP service data unit

**Roaming ?** A LAN mobile user moves around an ESS and enjoys a continuous connection to an Infrastructure network.

**RTS ? Request To Send.** An RS-232 signal sent from the transmitting station to the receiving station requesting permission to transmit.

**RTS Threshold ?** Transmitters contending for the medium may not be aware of 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.

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

in the wireless network.

**Subnet Mask** ? The method used for splitting IP networks into a series of sub-groups, or subnets. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets.

**TCP/IP** ? Transmission Control Protocol/ Internet Protocol. The basic communication language or protocol of the Internet. It can also be used as a communications protocol in a private network, i.e. intranet or internet. When you are set up with direct access to the Internet, your computer is provided with a copy of the TCP/IP program just as every other computer that you may send messages to or get information from also has a copy of TCP/IP.

**Throughput** ? The amount of data transferred successfully from one point to another in a given period of time.

**WEP** ? Wired Equivalent Privacy (WEP) is an encryption scheme used to protect wireless data communication. To enable the icon will prevent other stations without the same WEP key from linking with the AP.

**Wireless Bridge** – One of the additional AP operating modes offered by 22mpbs Access Point, which allows a pair of APs to act as the bridge that connects two Ethernet networks or Ethernet enabled clients together.

## APPENDIX D: TECHNICAL SPECIFICATION

<b>Standard</b>	802.11b compliant (wireless)
<b>Data Rate</b>	1 / 2 / 5.5 / 11 / 22 Mbps
<b>Emission Type</b>	Direct Sequence Spread Spectrum (DSSS)
<b>Data Modulation</b>	1 Mbps – BPSK 2 Mbps – QPSK 5.5 / 11 Mbps – CCK 5.5 / 11 / 22 Mbps - PBCC
<b>RF Frequency</b>	2400 MHz – 2497 MHz (Japan) 2400 MHz – 2483.5 MHz (North America, Europe) 2446.5 MHz – 2483.5 MHz (France)
<b>Operating Channel</b>	11 Channels (North America) 13 Channels (Europe) 14 Channels (Japan)
<b>RF Output Power</b>	16 ~ 18 dBm (typical)
<b>Sensitivity</b>	22MHz PBCC -80 dBm (Typically @25? $\pm 5?$ ) 11MHz PBCC - 85 dBm (Typically @25? $\pm 5?$ ) 11MHz CCK - 82 dBm (Typically @25? $\pm 5?$ )
<b>Security</b>	Wired Equivalent Privacy (WEP) 64 / 128 / 256 bit
<b>Antenna Type</b>	Dipole with Antenna Gain of 2 dBi max.
<b>Antenna Connector</b>	Reverse SMA
<b>Interface</b>	PCI Standard v2.2
<b>Dimension</b>	133.0 x 121.0 x 22.1 mm
<b>Memory</b>	8Kbytes EEPROM
<b>Power Voltage</b>	3.3 or 5V $\pm 5\%$
<b>Power Consumption</b>	Operation max. 650 mA by TX 350 mA by RX