TwinMOS

802.11g Series

G101/G231

Wireless LAN Adapter

User's Manual

TwinMOS®

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PACKAGE CONTENTS

Unpack your ***G101/G231 WLAN adapter*** kit and verify that all items are present.

- ***G101/G231*** Wireless LAN Adapter
- User's Manual (on CD)
- Driver (on CD)

If any of the items described appear to be damaged or missing, please contact your reseller.

INTRODUCTION

The ***G101/G231*** WLAN adapter is a wireless network client that complies with the IEEE 802.11b/g standard on wireless LANs. The IEEE 802.11b/g standards compliance means this adapter gives you the flexibility to connect it to any 802.11b/g network. The IEEE 802.11b/g Ethernet standard allows you to connect computers and devices at speeds up to 11Mbps, dependent upon the distance between wireless adapters, the configuration of your working environment, or the capabilities or limitations of your computer systems.

This ***G101/G231*** WLAN Adapter supports following WLAN features：

- Automatic transmit data rate select mechanism in the transmit range of 1, 2, 5.5, 6, 9, 12, 18, 24, 36, 48 and 54 Mbps.
- Center frequency channel selection (2.4 GHz)
- Roaming over multiple channels.
- Supports Cardbus interface for G231
- Supports MiniPCI interface for G101
- Supports power save mode
- Supports WPA
- Supports 64/128/152-bit Wired Equivalent Privacy (WEP), TKIP, AES data encryption.
- Plug and Play installation only for G231

This ***G101/G231*** comes with software drivers for the most popular Microsoft Windows operating systems and can be integrated into a larger network, running Windows XP, Windows 2000, Windows ME, or Windows 98 in either Ad-Hoc mode or infrastructure mode. This manual provides a quick introduction to wireless technology and its application as it relates to networking. Take a moment to read through this manual and familiarize you with wireless technology. You should also give yourself some time to become familiar with your new wireless network.

WIRELESS NETWORK OVERVIEW

A wireless local area network (LAN) is a flexible data communications system implemented as an extension to, or as an alternative for, a wired LAN. Using radio frequency (RF) technology, wireless LANs transmit and receive data over the air, minimizing the need for wired connections. Thus, wireless LANs combine data connectivity with user mobility.

A local area network that transmit and receive over the air typically in an unlicensed frequency such as the 2.4GHz band. A wireless LAN does not require lining up devices for line of sight transmission like IrDA. Wireless access points (base stations) are connected to an Ethernet hub or server and transmit a radio frequency over an area of several hundred to a thousand feet which can penetrate walls and other nonmetal barriers. Roaming users can be handed off from one access point to another like a cellular phone system. Laptops use wireless modems that plug into an existing Ethernet port or that are self contained on PC cards, while stand-alone desktops and servers use plug-in cards (ISA, PCI, etc.).

Wireless LANs offer the following productivity, convenience, and cost advantages over traditional wired networks：

Mobility - WLAN provide LAN users to access data in any location within the operating range of the WLAN. Ad-hoc management decisions based on real-time information can significantly improve worker efficiency.

Installation Speed and Simplicity - Installing a wireless LAN system can be fast and easy and can eliminate the need to pull cable through walls and ceilings.

Installation Flexibility - Wireless technology allows the network to go where wire cannot go.

Reduced Cost-of-Ownership - While the initial investment required for wireless LAN hardware can be higher than the cost of wired LAN hardware, overall installation expenses and life-cycle costs can be significantly lower. Long-term cost benefits are greatest in dynamic environments requiring frequent moves and changes.

Scalability - Wireless LAN systems can be configured in a variety of topologies to meet the needs of specific applications and installations. Configurations are easily changed and range from peer-to-peer networks suitable for a small number of users to full infrastructure networks of thousands of users that enable roaming over a broad area.

Installation Considerations

Designed to go up to 300 feet (100 meters) indoors and up to 900 feet (273 meters) outdoors, ***G101/G231*** WLAN adapter lets you access your network from virtually anywhere you want. Keep in mind, however, that the number and thickness of walls, ceilings or other objects that the wireless signals must pass thru may limit range. Typical ranges vary depending on the types of materials and background RF noise in your home or business. The key to maximizing range is to follow these basic principles:

Keep the number of walls and ceilings between the access point and your receiving device to a minimum - Each wall or ceiling can reduce your TwinMOS ***G101/G231*** Wireless product's range from 3-90 feet (1-30 meters.) For some businesses or for a large residential home deployment, it may be more beneficial to have more than one access point with overlapping coverage.

1. *Be aware of the direct line between Access Points, Residential Gateways, and Computers* - A wall that is 1.5 feet thick (.5 meters), at a 45-degree angle appears to be almost 3 feet (1 meter) thick. At a 2-degree angle it looks over 42 feet (14 meters) thick! Try to make sure that the Access Points and Adapters are positioned so that the signal will travel straight through a wall or ceiling for better reception.
2. *Building Materials make a difference* - A solid metal door or aluminum studs may have a negative effect on range. Try to position Access Points, Residential Gateways, and Computers so that the signal passes through drywall or open doorways and not other materials.
3. Make sure that the antenna is positioned for best reception by using the software signal strength tools included with your product.
4. Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices that generate RF noise, like microwaves, monitors, electric motors, etc.

For the average residence, range should not be a problem. If you experience low or no signal strength in areas of your home that you wish to access, consider positioning the Access Point in a location directly between the Residential Gateways and/or Computers that will be connected. Additional Access Points can be connected to provide better coverage in rooms where the signal does not appear as strong as desired.

Using radio frequency (RF) technology, WLANs transmit and receive data over the air, minimizing the need for wired connections. Thus, WLANs combine data connectivity with user mobility, and, through simplified configuration, enable movable LANs.

G101/G231 WIRELESS NETWORK SCENARIOS

The ***G101/G231*** WLAN adapter enables you to:

- Connect your computer to an Ad-Hoc workgroup of wireless computing devices (see Figure 1-1 on page 6).
- Connect your computer to a Small Office/Home Office (SOHO) network that includes a Residential Gateway (RG) access point (see Figure 1-2 on page 7).
- Connect your computer to a Local Area Network (LAN) Infrastructure that includes Access Points, or other IEEE 802.11 compliant LAN systems (see Figure 1-3 and Figure 1-4).
- Expand the capabilities of your Access Points, to support wireless devices that have been equipped with ***G101/G231***.

Ad-Hoc Workgroup

The Ad-Hoc workgroup configuration enables you to quickly set up a small wireless workgroup, where the workgroup participants can exchange files using features like “Files and Printer Sharing” as supported by Microsoft Networking.

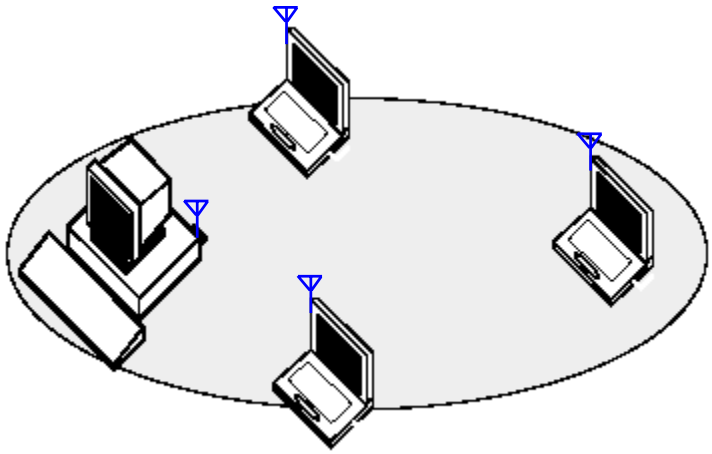


Figure 1-1 Ad-Hoc Wireless Workgroup

You can use this option to setup a temporary or ad-hoc network in environments where no access points are available (for example in Small Office/Home Office (SOHO) environments). As long as the stations are within range of one another, this is the easiest and least expensive way to set up a wireless network.

Home Networking

With the TwinMOS ***G101/G231*** WLAN adapter, wireless access to the Internet or other computers is at your fingertips. All you need to do is connect the wireless computers to an external cable, an xDSL or a ISDN modem and you are ready to：

- Share files and printers, and
- Access the Internet

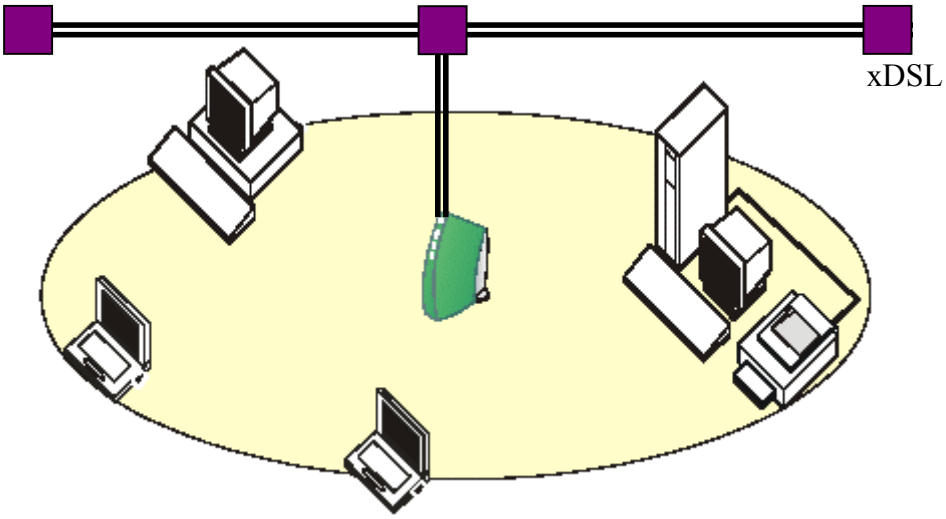


Figure 1-2 Connect to a Residential Gateway (RG)

Enterprise Networking

With the 11 Mbps Wireless LAN access point you can connect to a corporate Local Area Network (LAN) infrastructure to have wireless access to all network facilities. LAN Infrastructures may either be:

- Stand-alone wireless LANs (Figure 1-3).
- Wireless network infrastructures connected to an existing Ethernet network (Figure 1-4).

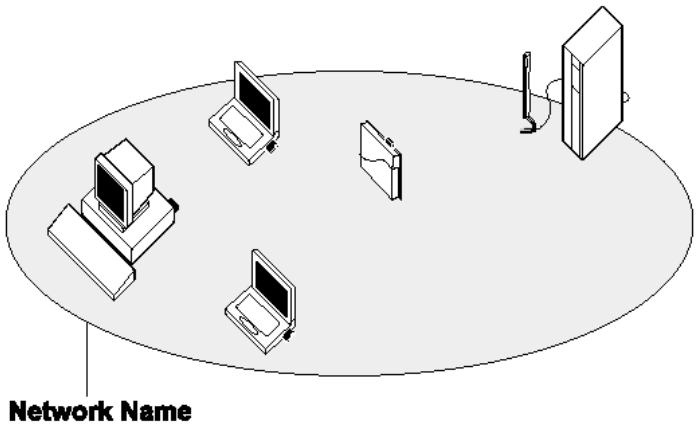


Figure 1-3 Stand Alone Wireless LAN

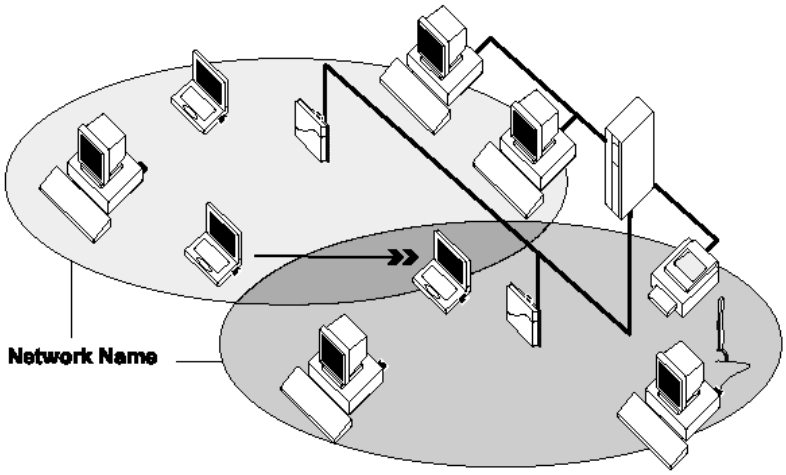


Figure 1-4 LAN Infrastructure

It's Easy

The ***G101/G231*** functions like any standard wired Ethernet card, but G101/G231 does not need any wires!

Where an Ethernet card requires a cable connection to a hub and/or patch panel, the cable physically ties you down to the location of the wired connection.

G101/G231 allows you to connect your computer to a Local Area Network (LAN) system from anywhere within the wireless coverage area. Expanding or re-designing your network is easy: Add or relocate access point, power-up your (new) wireless computers, and you're done!

Unlike Ethernet, TwinMOS ***G101/G231*** will enable you to roam throughout the network while remaining connected to the LAN.

Note : *The G101/G231 wireless adapter is a radio product. Refer to the flyer "Information to the User" for regulatory information that may apply in your country.*

INSTALLATION FOR WINDOWS (XP/2000/98SE)

The following section will assist you to install ***G101/G231*** WLAN adapter successfully. You will install driver firstly and then plug in the ***G101/G231*** WLAN adapter, and finally set the network properties to accommodate resource sharing and select the type of wireless network that you want to install.

In order to establish your wireless network connection, make sure some steps below will be performed.

- Install the Access Point (AP) at first if you use Access Point network mode.
- Install the driver using the Installation CD.
- Plug in the ***G101/G231*** wireless LAN adapter.
- Install the network protocol(s) required to communicate on your network. Most likely you will need the TCP/IP protocol.

The Octopus Wireless LAN Configuration Utility is installed simultaneously with the driver by executing the Setup.exe file. Note also that some versions of Microsoft Windows operating systems require administrator to install software. If this is the case for your operating system, be sure that you have such privileges before executing the Setup.exe file. To upgrade an existing driver, it is not necessary to remove your Octopus driver from your computer. Simply run the Setup.exe file to replace the existing driver with the latest version. After the new driver is installed, maybe you must restart the operating system (depend on the Windows' OS).

Please follow the following steps one by one in order to install the ***G101/G231*** WLAN adapter successfully.

Before you proceed with the installation, please notice following descriptions.

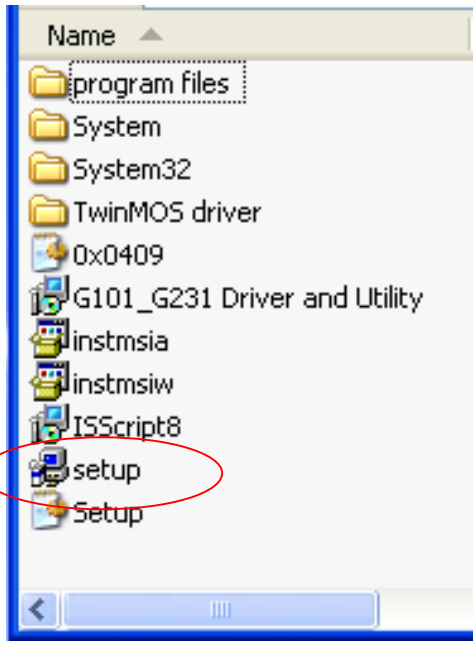
Note1: After running the driver package, the Notebook (or PC) with Win98 OS shall be restarted, for Win2000 or WinXP OS the Notebook (or PC) doesn't need to be restarted.

Note2: Please do not insert G101/G231 WLAN ***adapter into PCMCIA port of your computer until Application setup has been completed.***

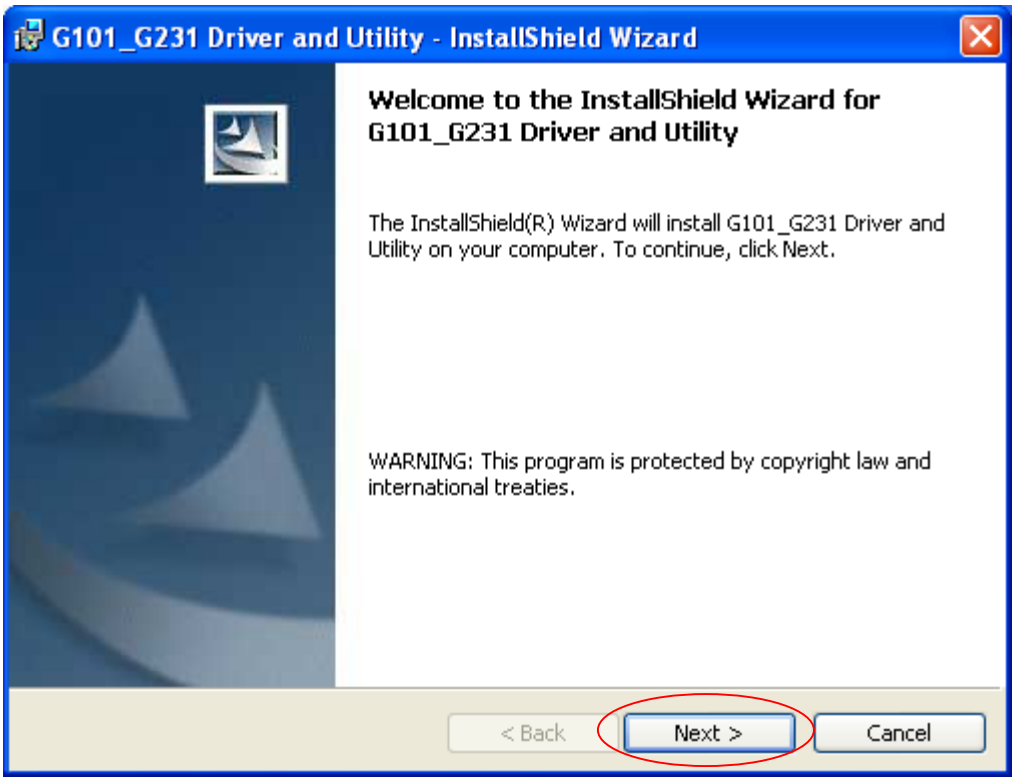
For Windows XP

Install the Driver and Utility

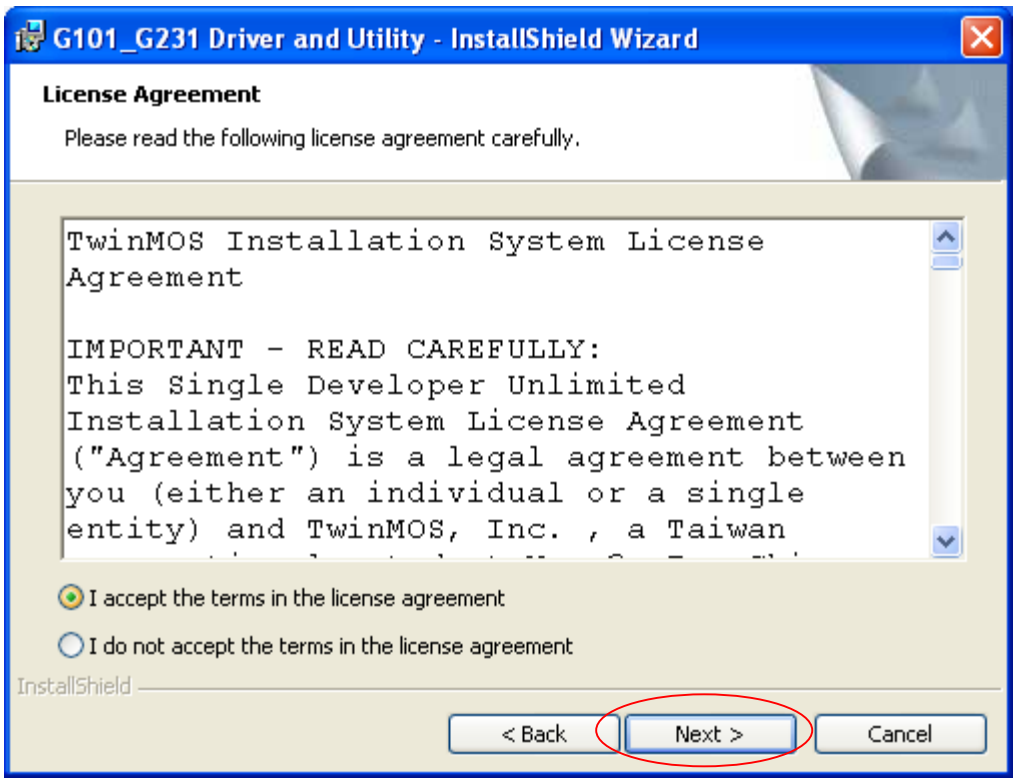
1. Insert the CD into the CD-ROM device and execute the "setup.exe" program for your purchace G101/G231 series to select .



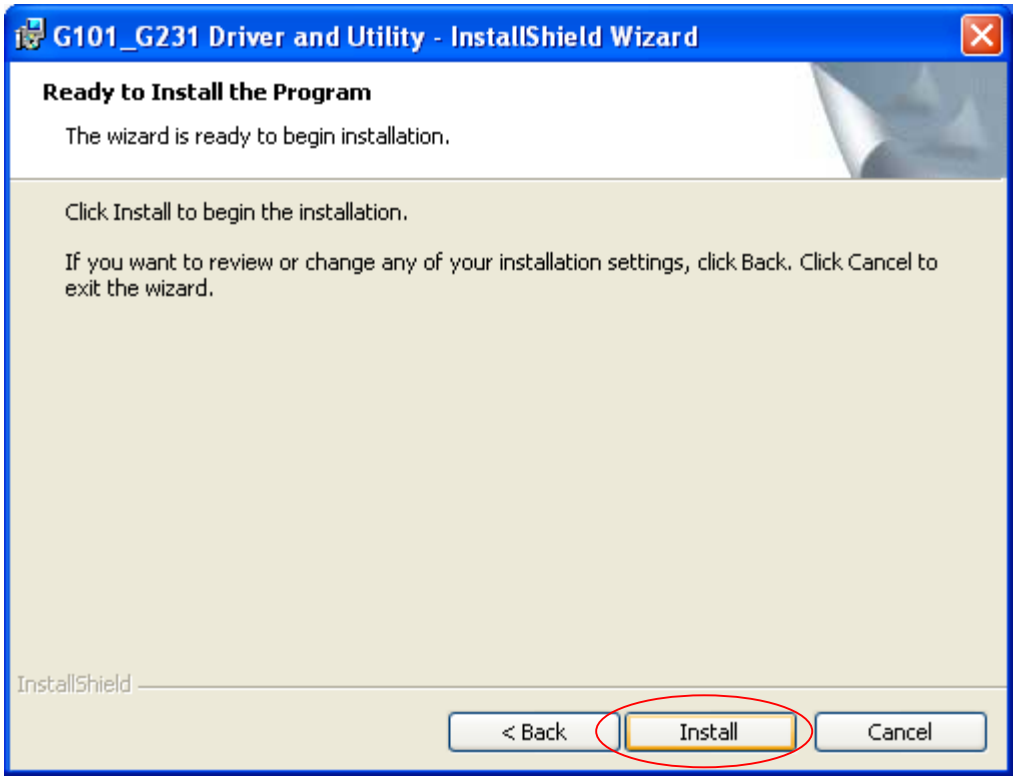
2. The InstallShield wizard box will appear, click "Next" to continue.



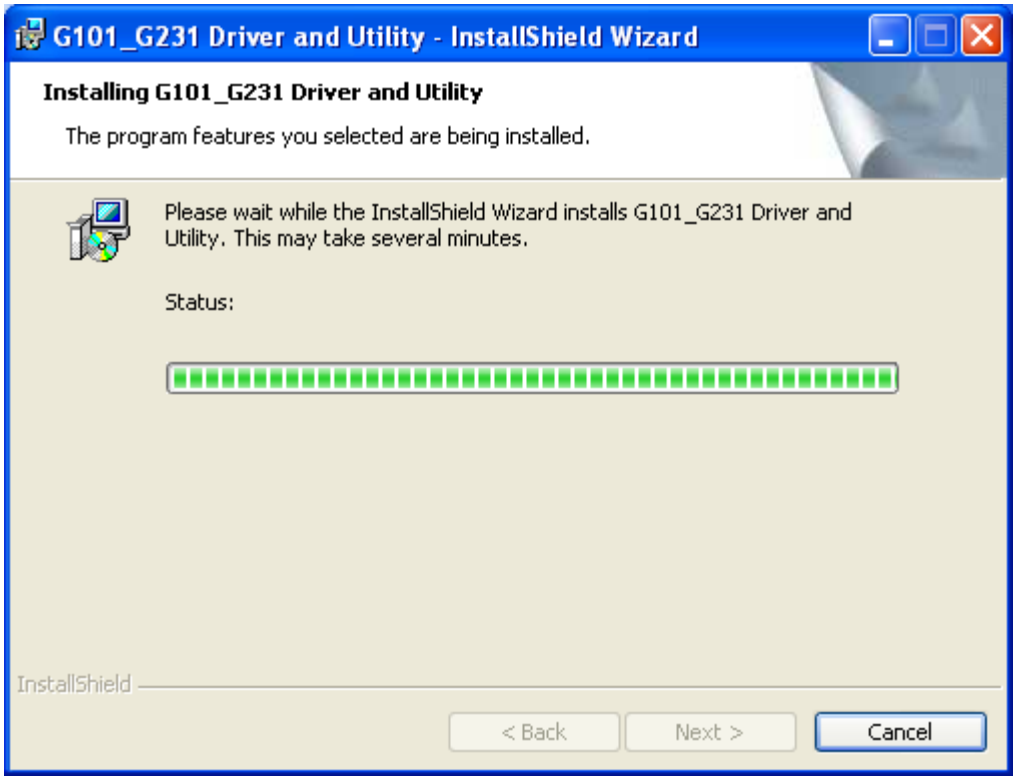
3. Licence Agreement ,Please choice “I accept the terms in the license agreement” and click "Next" to continue.



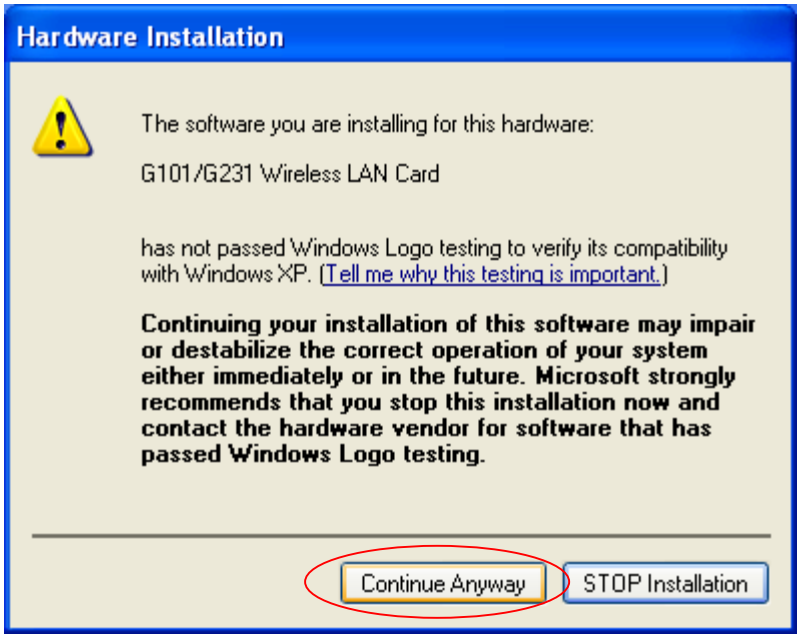
4. Click "Install" button to continue.



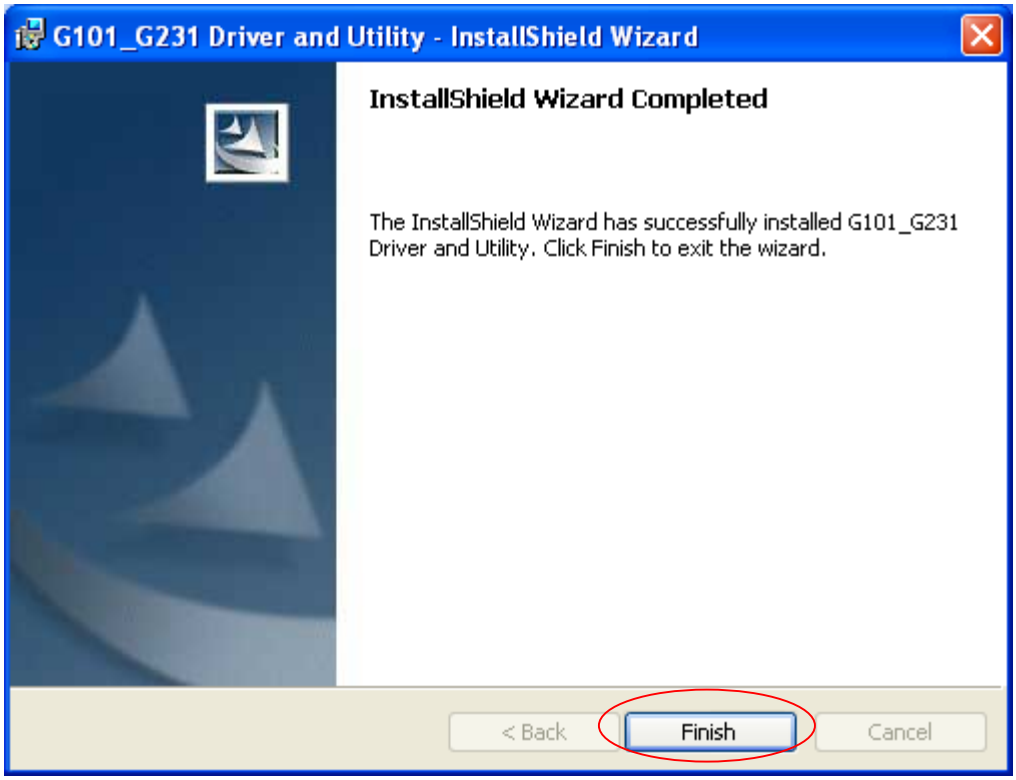
- The driver and utility are Installing.



- Don’t care below message and click "Continue Anyway" button to continue.



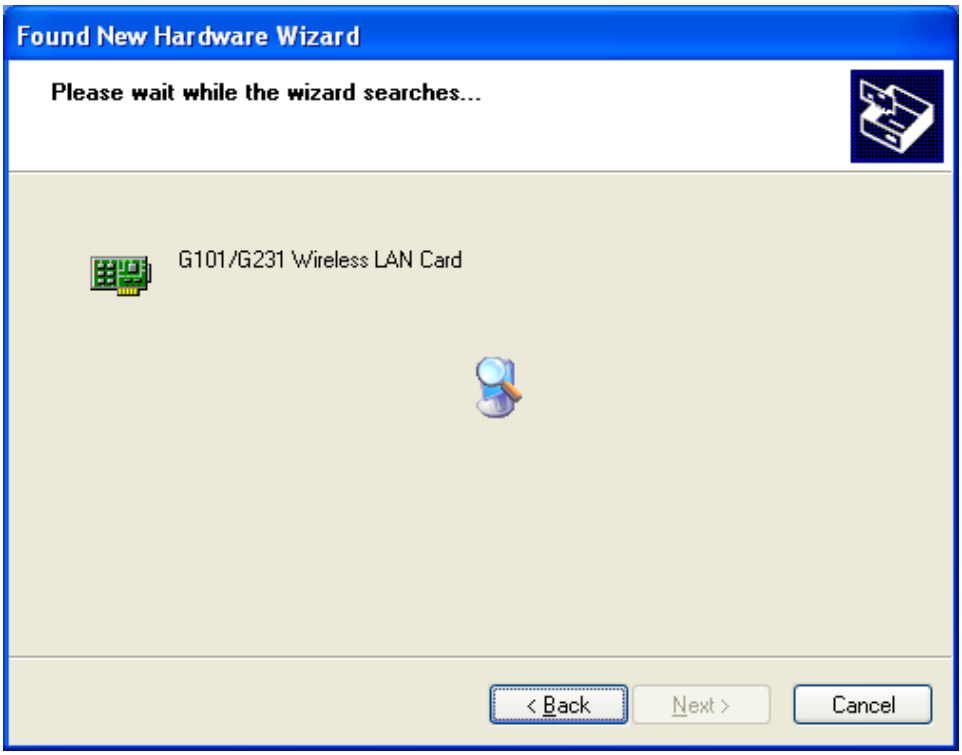
- Click finish button to complete install procedure.



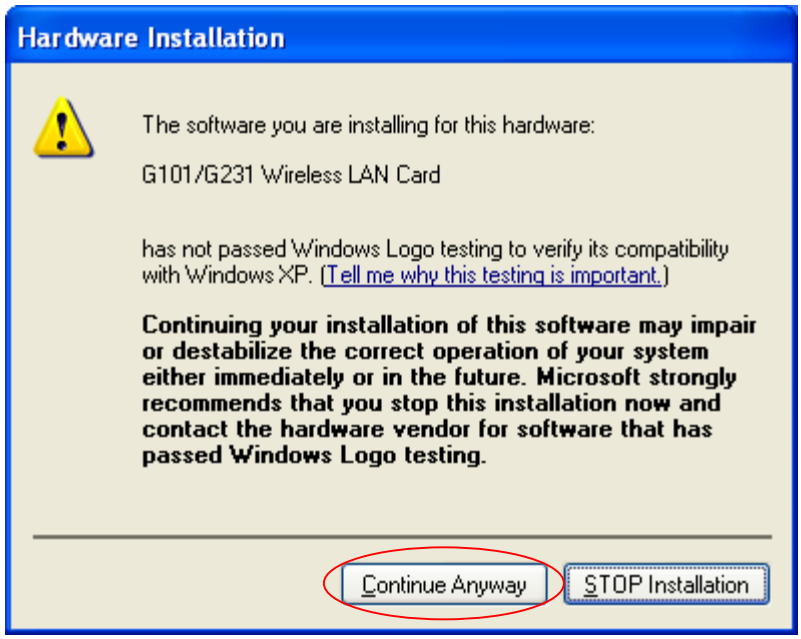
5.Insert the G101/G231 WLAN adapter into the MiniPCI slot/PCMCIA port of your computer, the system will automatically find the device and search for its software.

Note: Please turn-off computer before you insert G101.

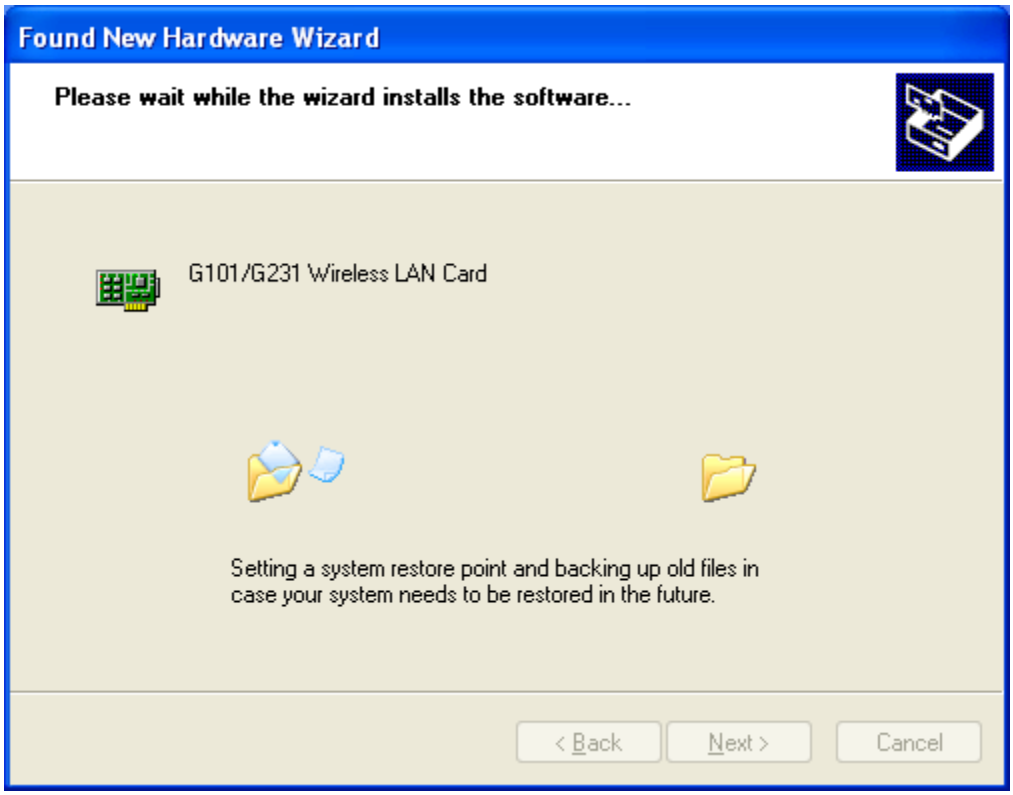
- Please wait while the wizard installs the software.



- Don’t care below message click "Continue Anyway" button to continue.



- Please wait while the wizard installs the software.



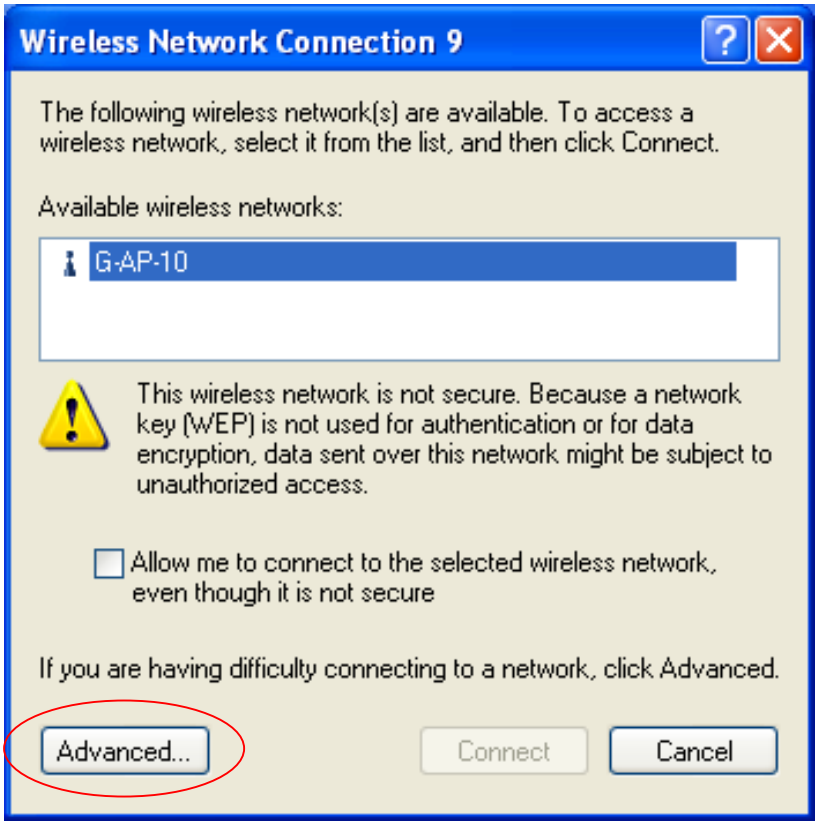
- Complete device install.

Using the Windows XP's Utility

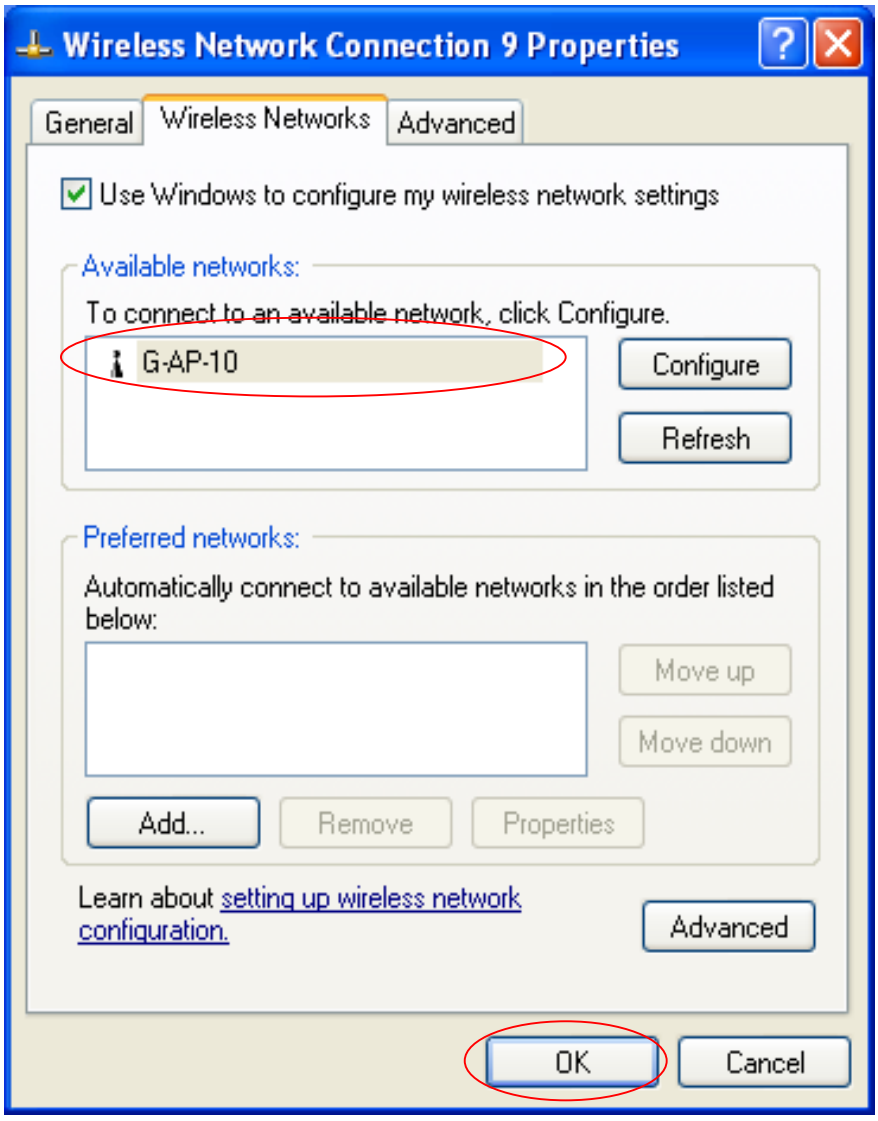
To connect to your wireless network, please do the following:

1.Double-click the icon marked in red in the taskbar and you may start using the Windows XP's wireless utility

- Get into Windows XP's utility, click "Advanced" button.



2.The “Connect to Wireless Network” window will contain a list of all the available Wireless Networks. Select the proper network for your needs. In this example, “TwinMOS-AP(G-AP-10)” network was selected as shown.

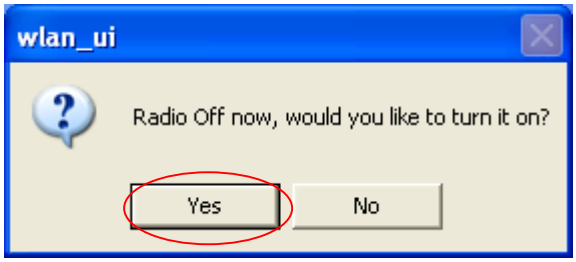


Using the Utility of G101/G231 adapter

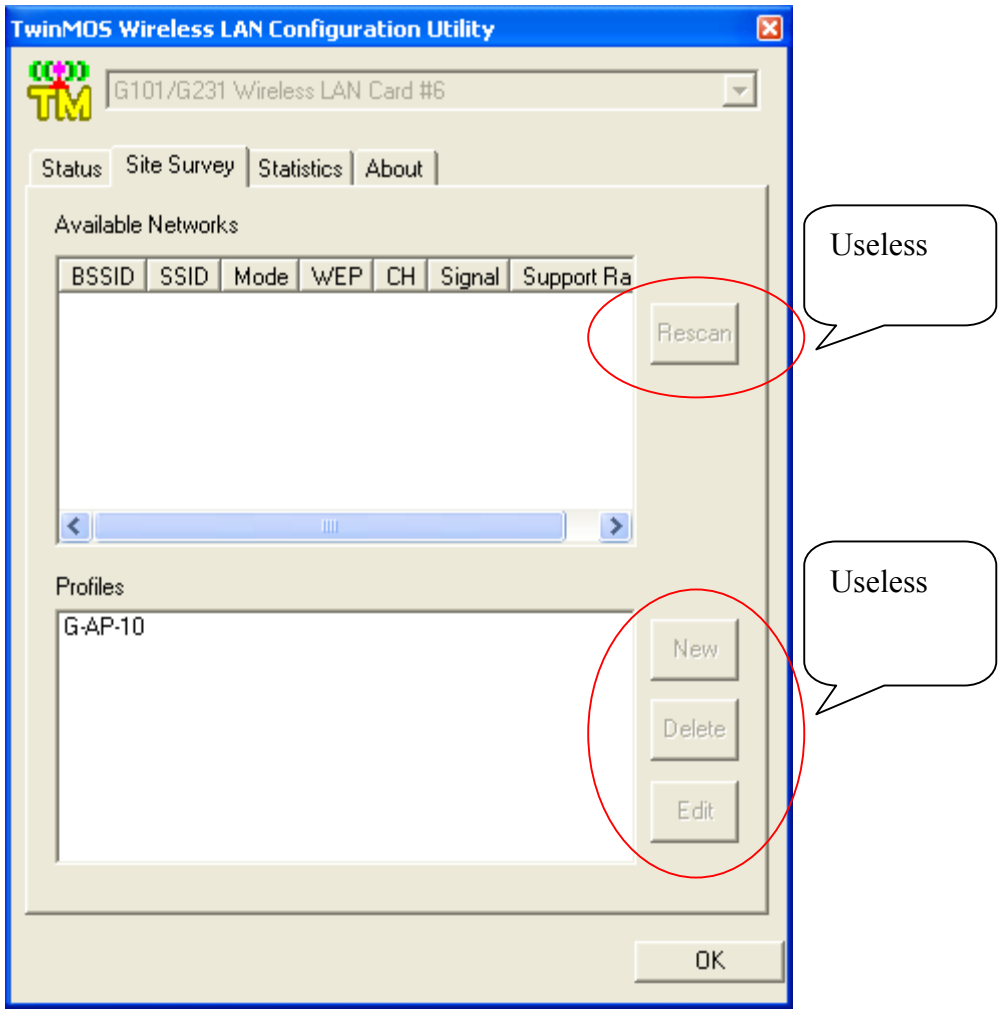
1. ***If you don't disable the XP's Utility, you can not use function of the adapter's utility.***

- Clicking on the utility icon.

- Click "Yes",then Radio ON



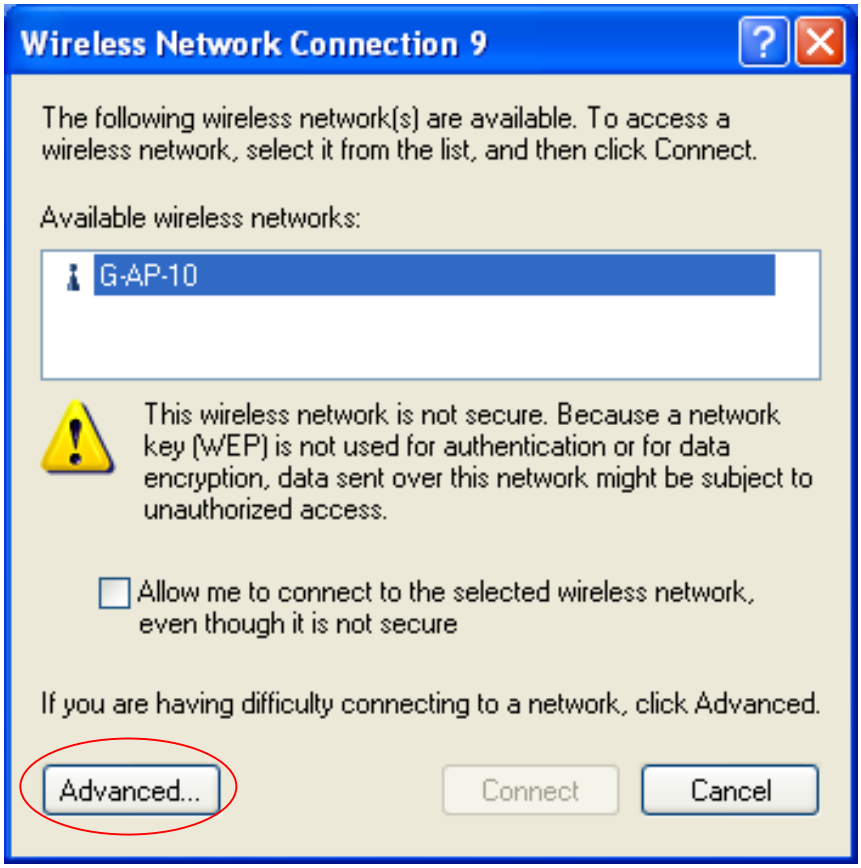
- ***You can not use function of the adapter's utility as below.***



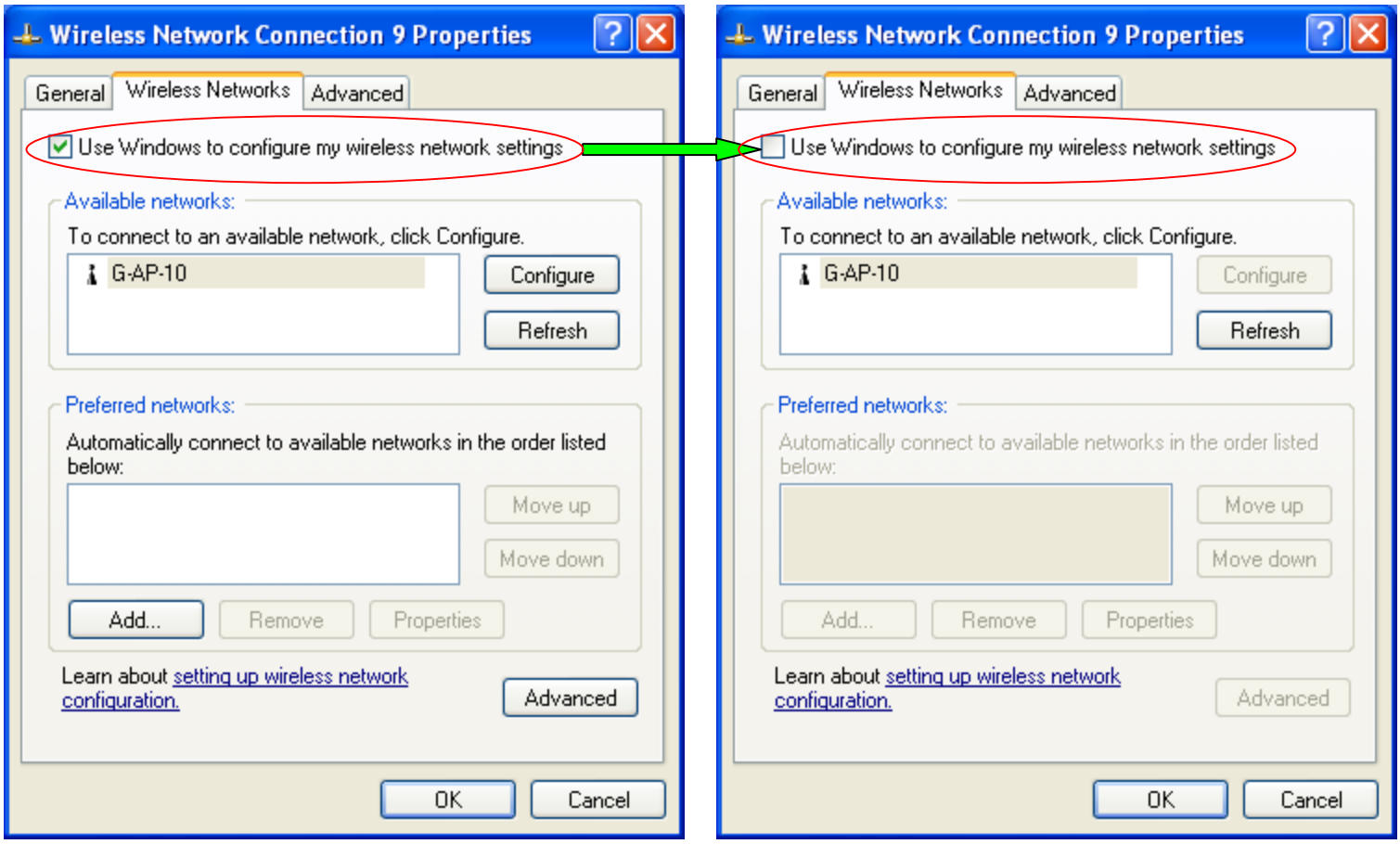
2. To Disable the XP's Utility for Using "TwinMOS Wireless LAN Configuration Utility"

- Double-click the icon marked in red in the taskbar and you may start using the Windows XP's wireless utility

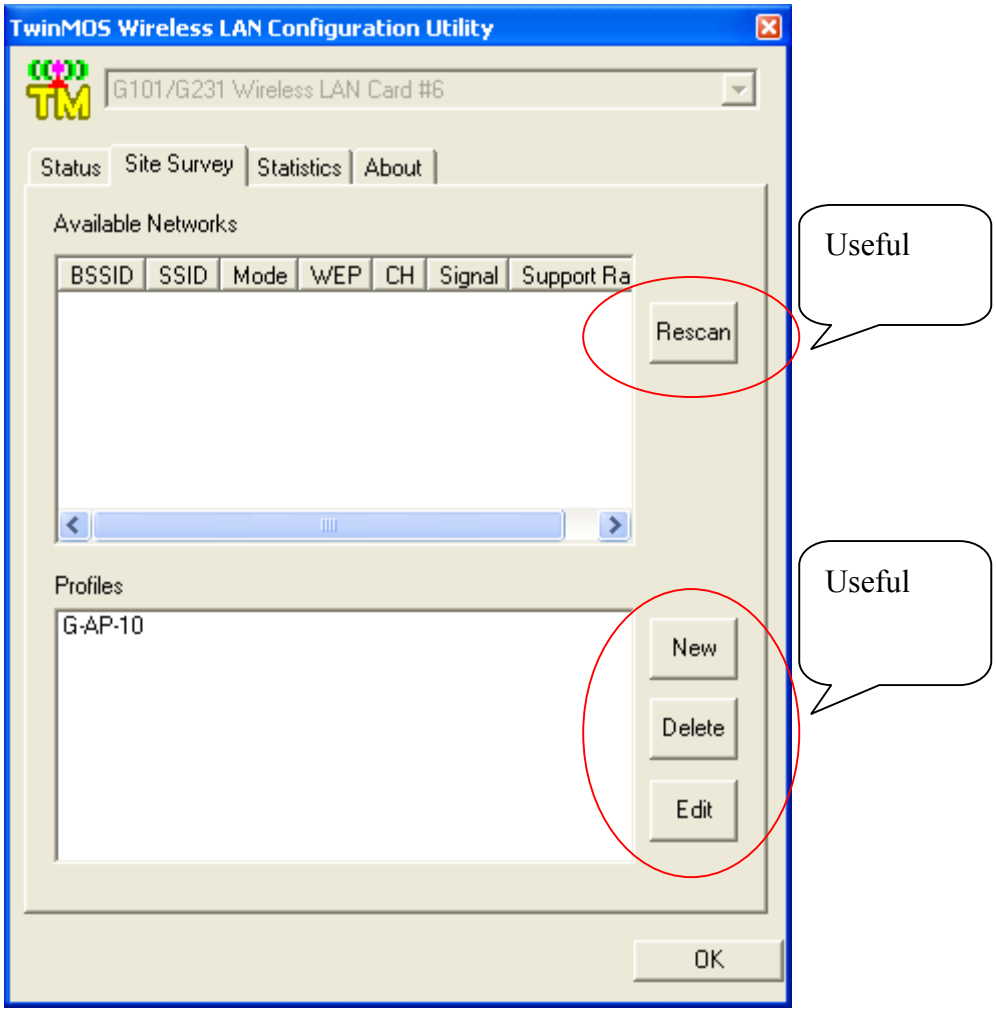
- Get into Windows XP's utility, click "Advanced" button.



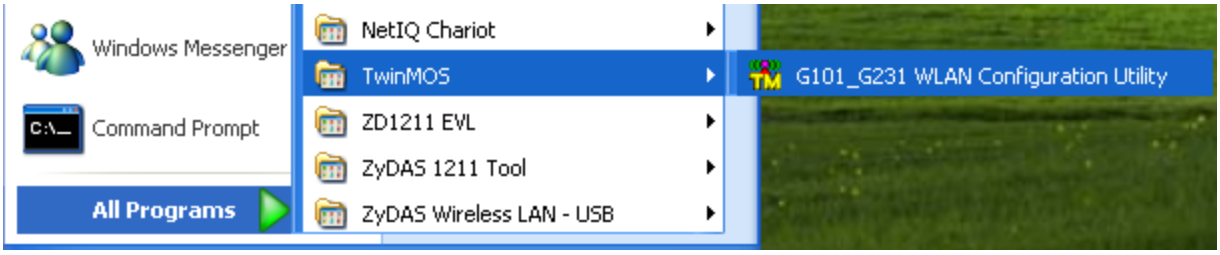
- In “Wireless Network Connection Properties“ screen, uncheck the setting “Use Windows to configure my wireless network settings“. Note that if you want to change back to the Windows XP built-in utility, check the item again.



- Clicking on the utility icon will start the Configuration Utility.

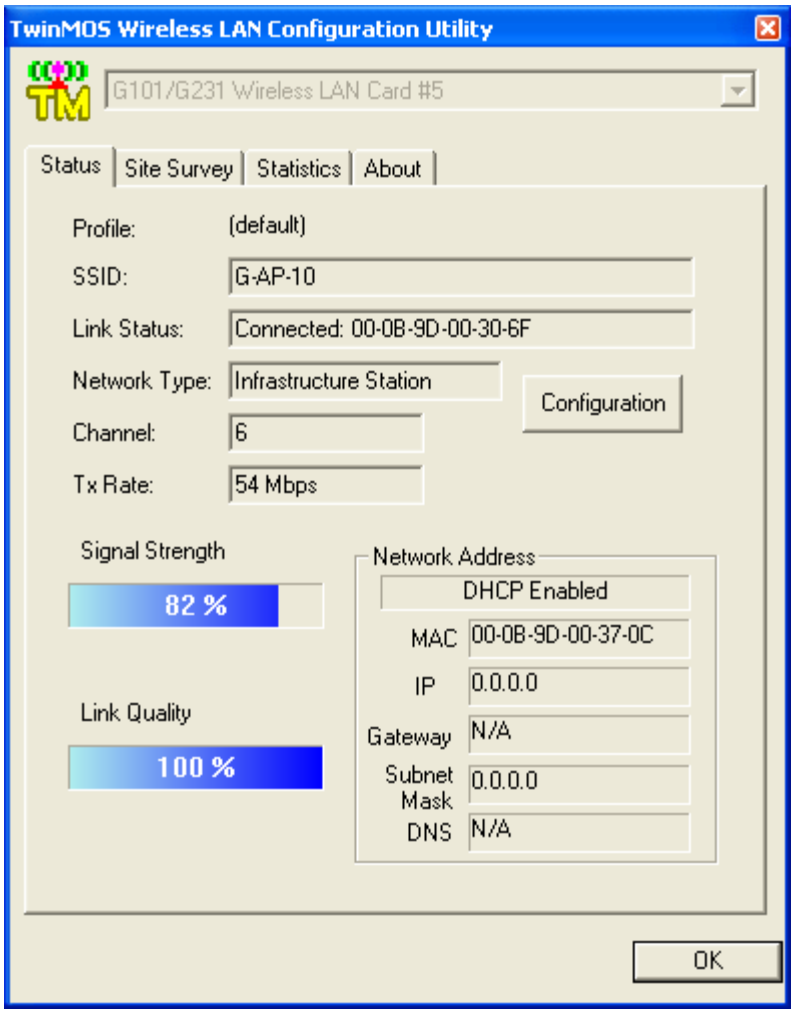


3. Please click "**All programs->TwinMOS->G101_G231 WLAN Configuration Utility**". Or to double-click on the icon shown below. The "TwinMOS WLAN Configuration" screen will appear.



- Or to double click the icon

- The "TwinMOS WLAN Configuration Utility" screen will appear.



Using WPA of the Windows XP's Utility

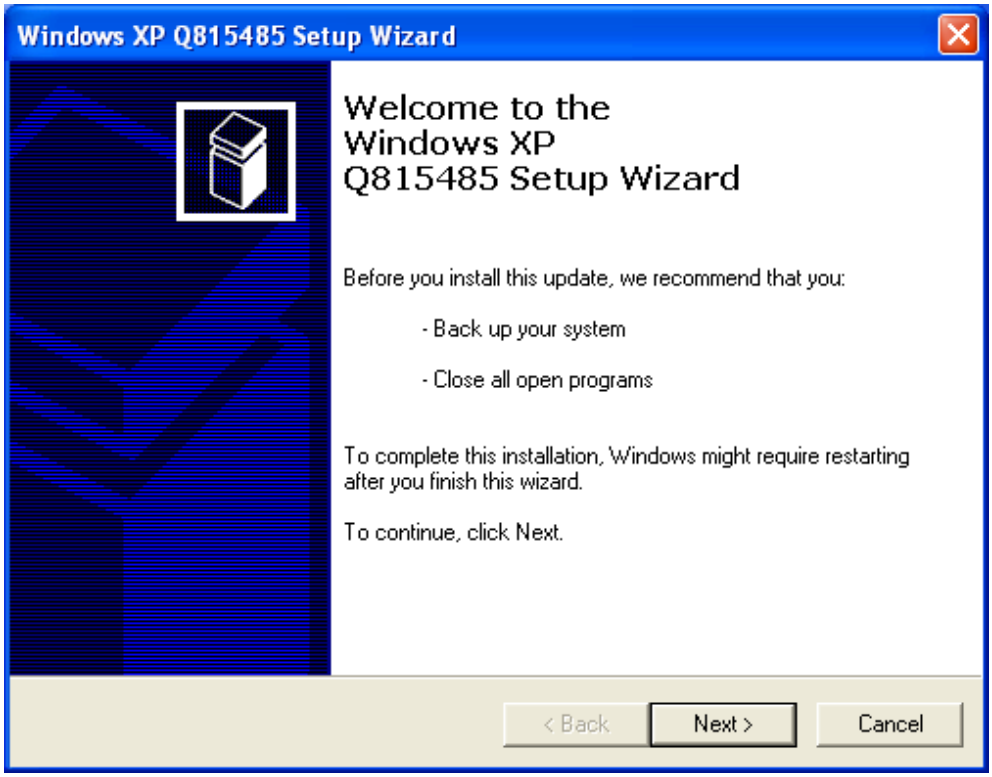
Note1: Before use the WPA feature, please install Windows XP Service Pack 1 with Windows XP Support Patch for Wi-Fi Protected Access program

Note2: Configure the card by Wireless built-in utility (Wireless Zero Configuration).

Note3: All devices in the network should use the same encryption method to ensure the communication.

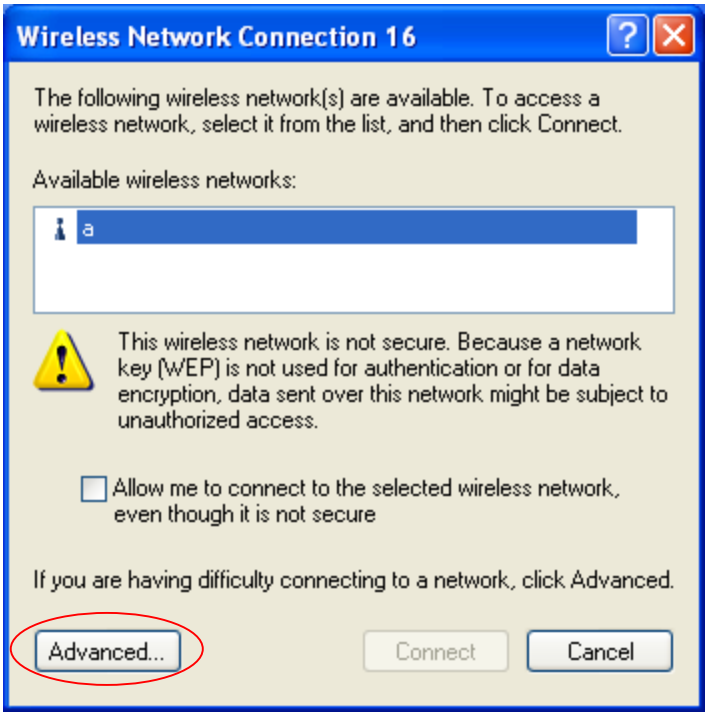
Wi-Fi Protected Access (WPA) is a specification of standards-based, interoperable security enhancements that strongly increase the level of data protection (encryption) and access control (authentication) for existing and future wireless LAN systems. The technical components of WPA include Temporal Key Integrity Protocol (TKIP) for dynamic key exchange, and 802.1x for authentication.

- Example :

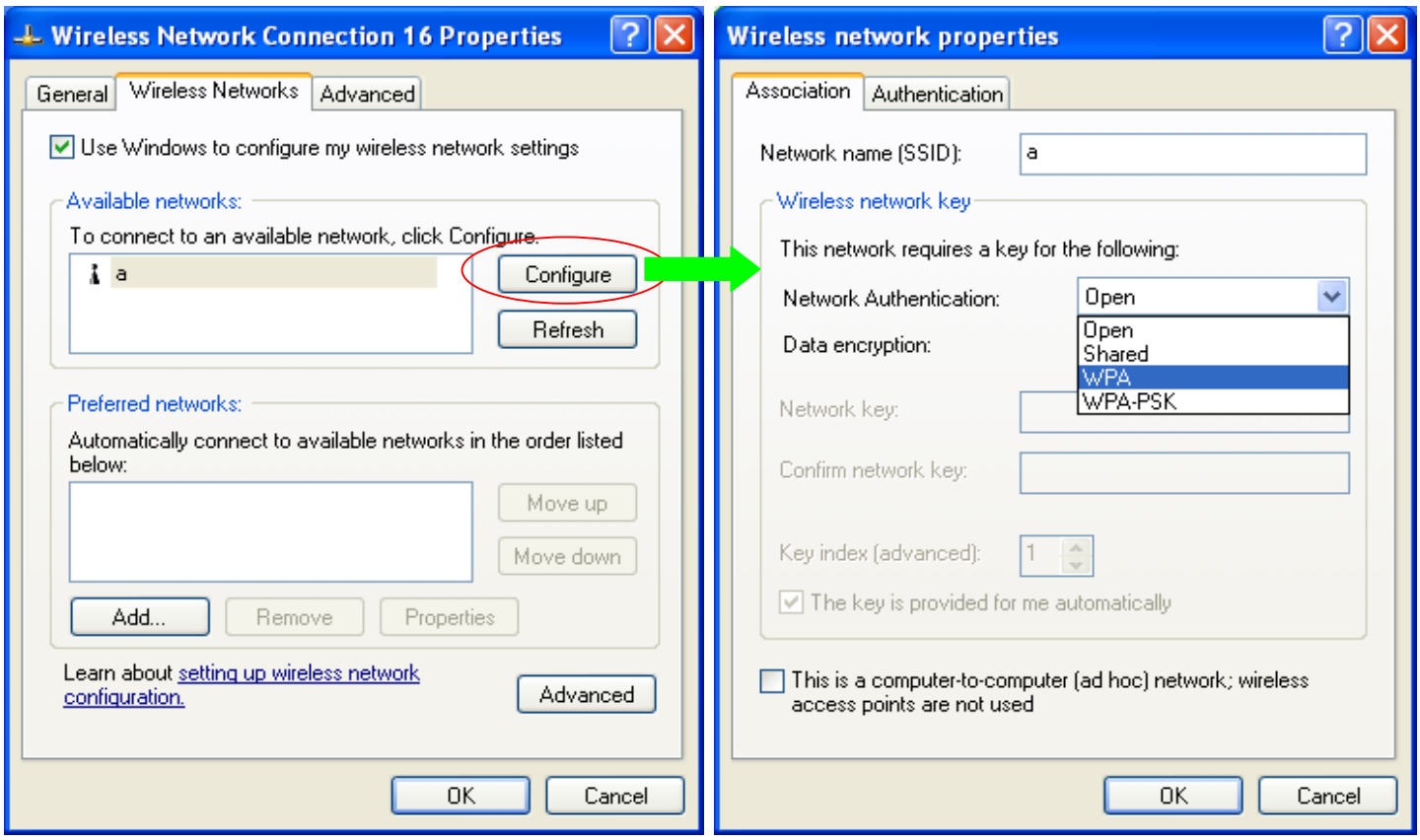


1: Right click the icon to select “View Available Wireless Networks”.

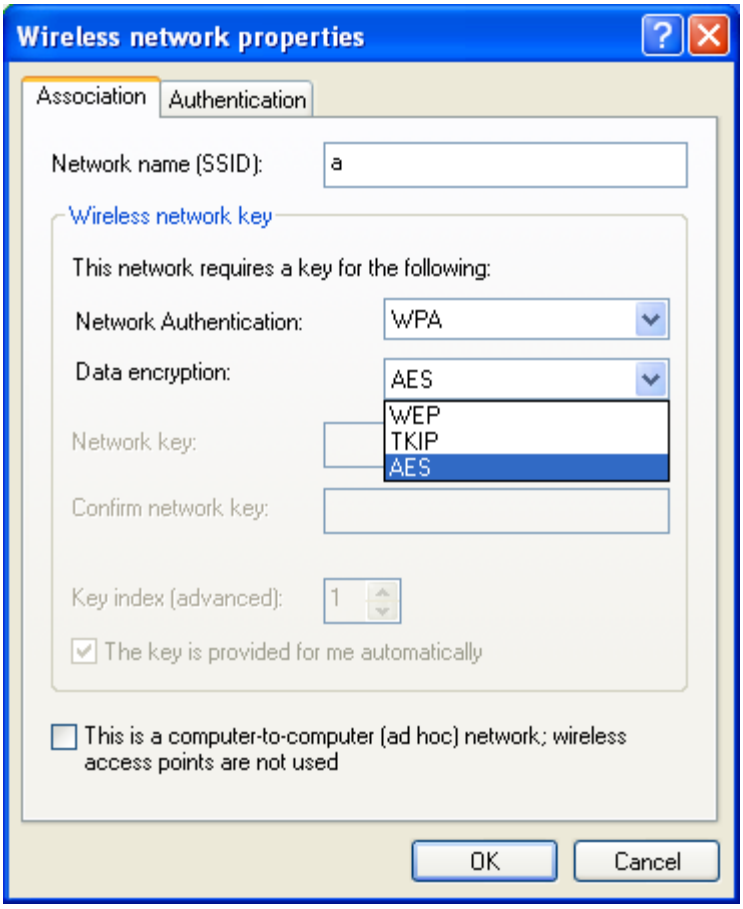
2: Click “Advanced” button from “Wireless Network Connection”.



3: Click“Configure” button to configure the WPA function for the current network.



- **Network Authentication**
  - **Open** –No authentication is needed among the wireless network.
  - **Shared** – Only wireless stations using a shared key (WEP Key identified) are allowed to connecting each other.
  - **WPA** – This mode is for enterprise with an authentication server (Radius Server), WPA-enabled access point, and a WPA-enabled client. Once WPA is enabled, all clients and access points on the network must be WPA-enabled in order to access the network.
  - **WPA-PSK** – It is a special mode designed for home and small business users who do not have access to network authentication servers. In this mode, known as Pre-Shared Key, the user manually enters the starting password in their access point or gateway, as well as in each PC on the wireless network. WPA takes over automatically from that point, keeping unauthorized users that don't have the matching password from joining the network, while encrypting the data traveling between authorize ddevices.

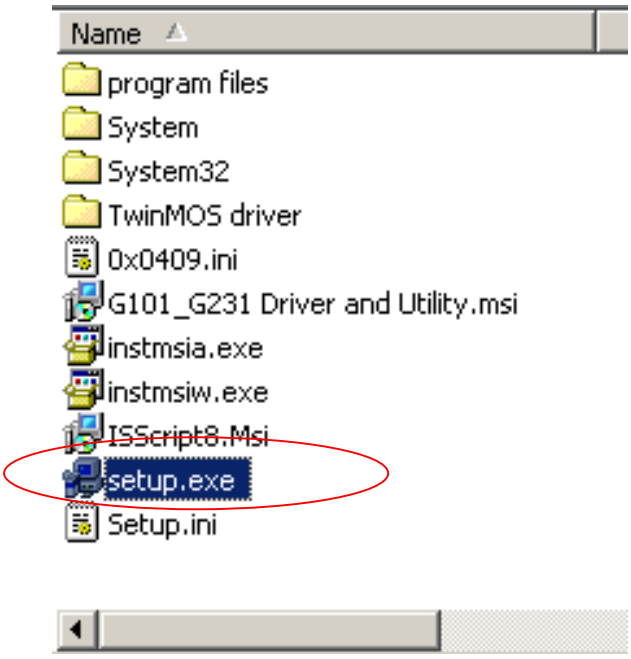


- **Data Encryption**
  - **WEP** – In WPA or WPA-PSK mode, WEP is also able to be the encryption method for the transmission data.
  - **TKIP** – TKIP (Temporal Key Integrity Protocol) changes the temporal key every 10,000 packets (a packet is a kind of message transmitted over a network.) This insures much greater security than the standard WEP security.
  - **AES** – AES has been developed to ensure the highest degree of security and authenticity for digital information and it is the most advanced solution defined by IEEE 802.11i for the security in the wireless network.

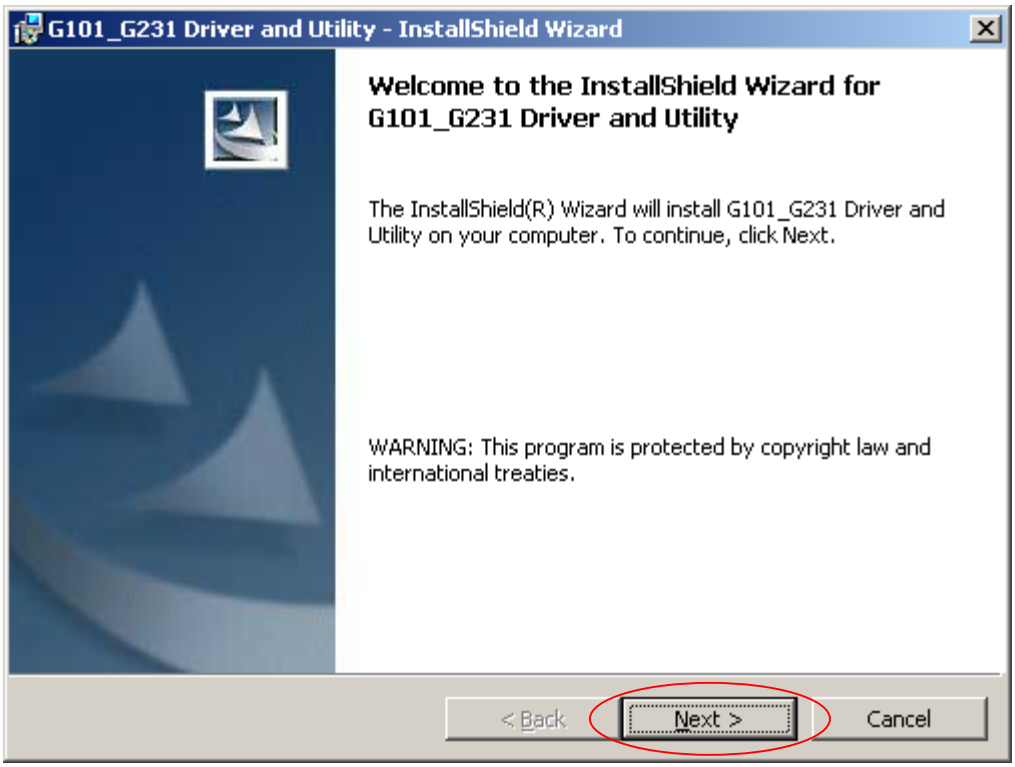
For Windows 2000

Install the Driver and Utility

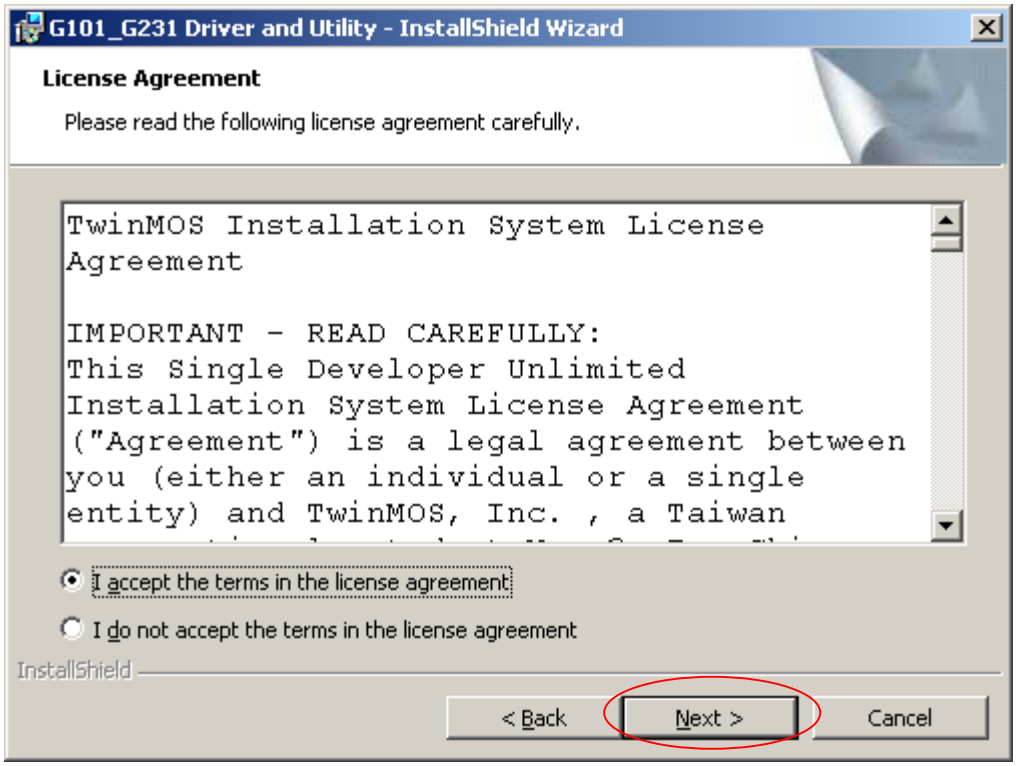
1.Insert the CD into the CD-ROM device and execute the "setup.exe" program for your purchace G101/G231 series to select .



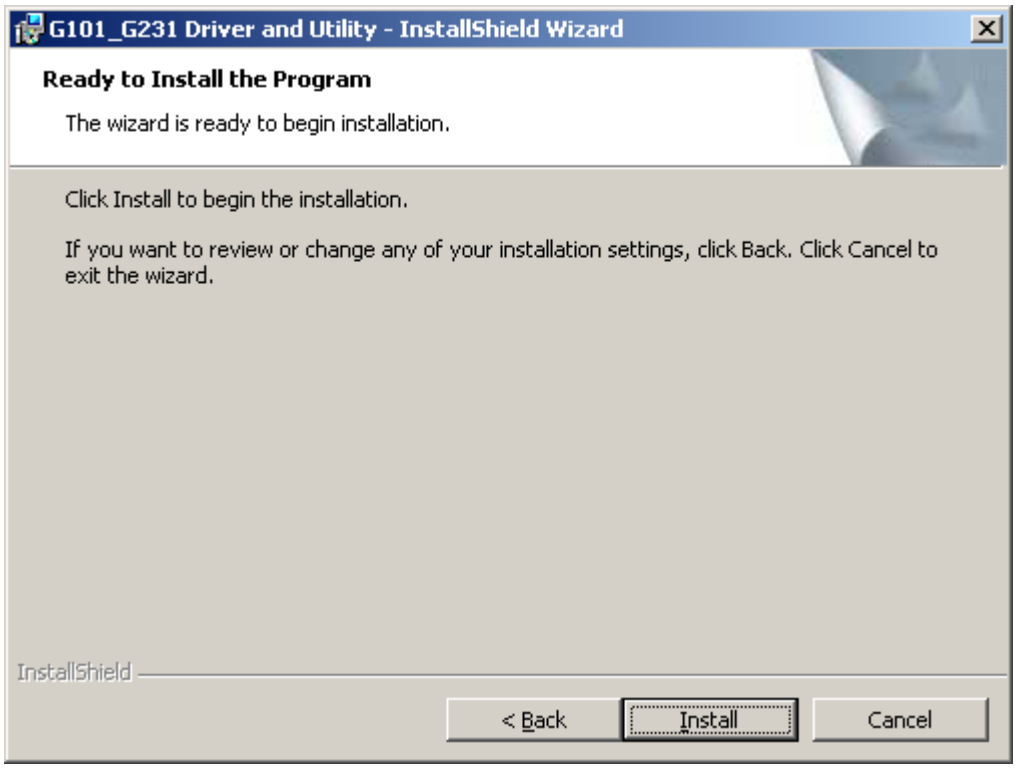
2. The InstallShield Wizard box will appear, click "Next" to continue.



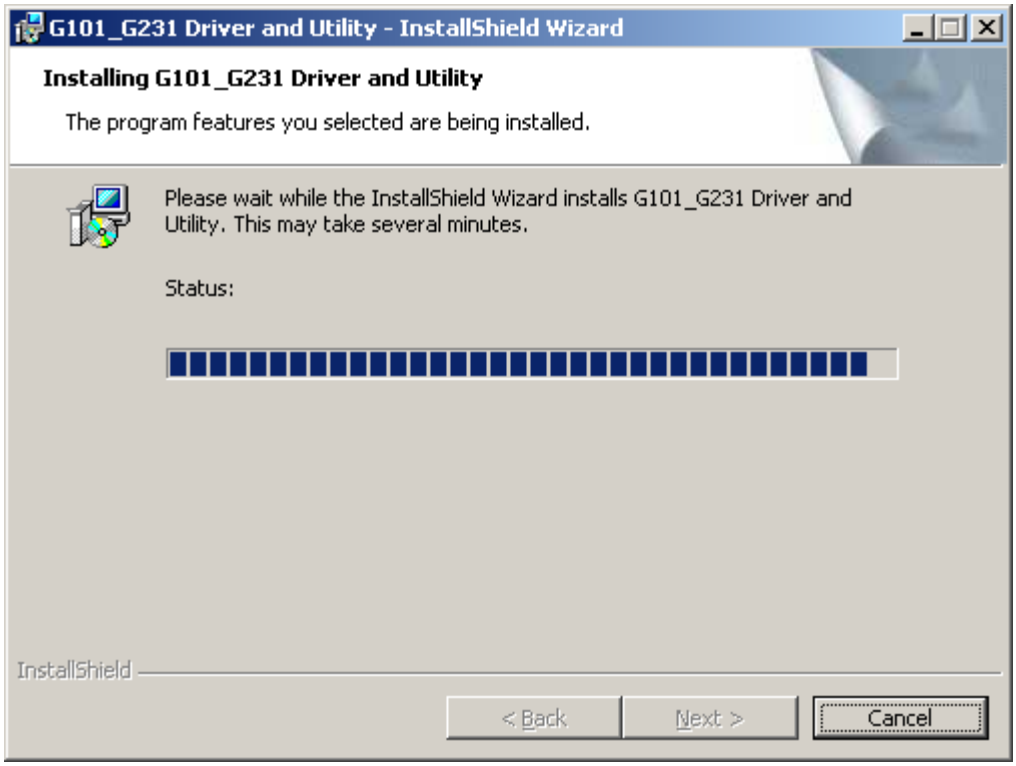
3. Licence Agreement ,Please choice “I accept the terms in the license agreement” and click "Next" to continue.



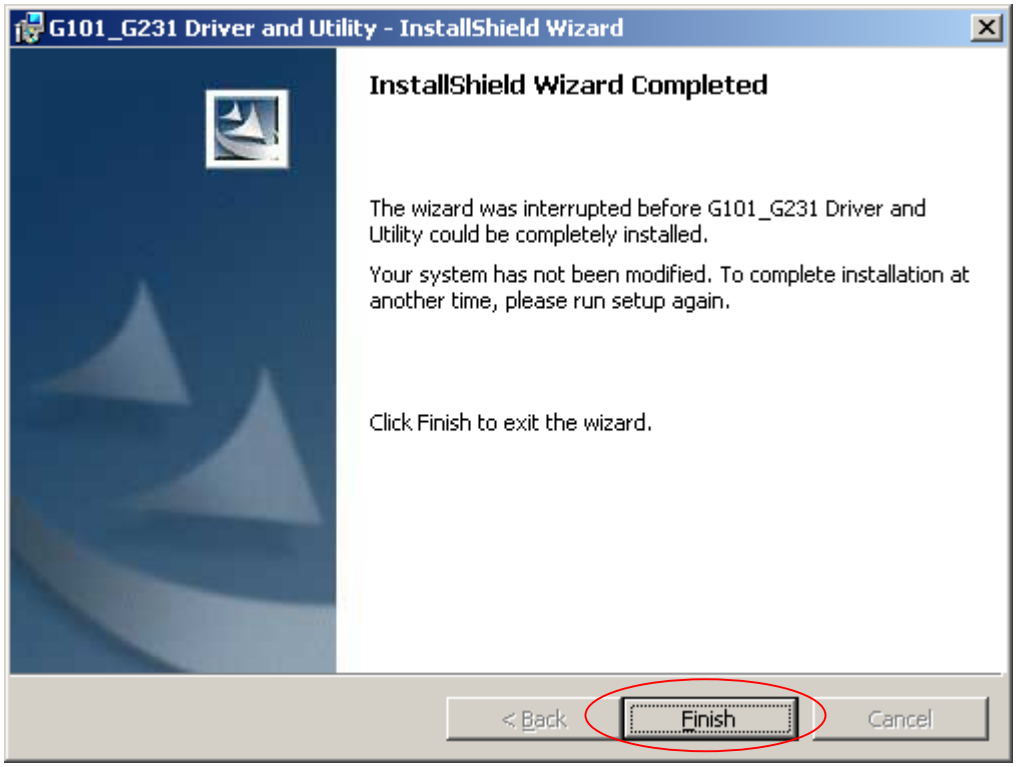
4. Click "Install" button to continue.



- The driver and utility are Installing.



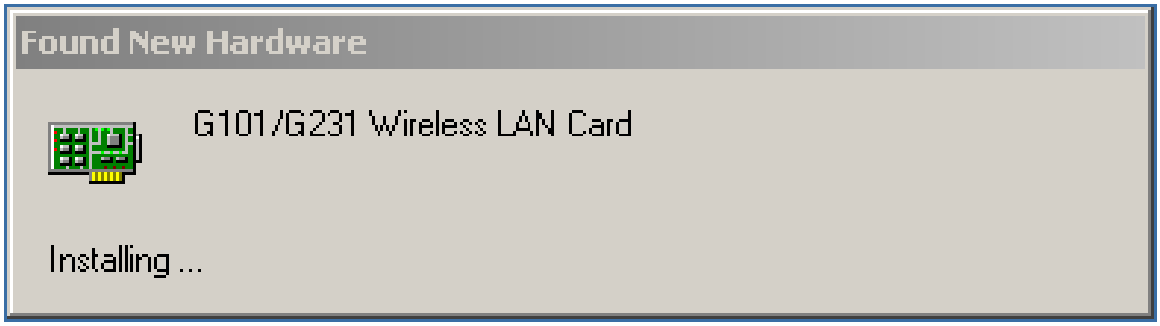
- Click Finish button to complete install procedure.



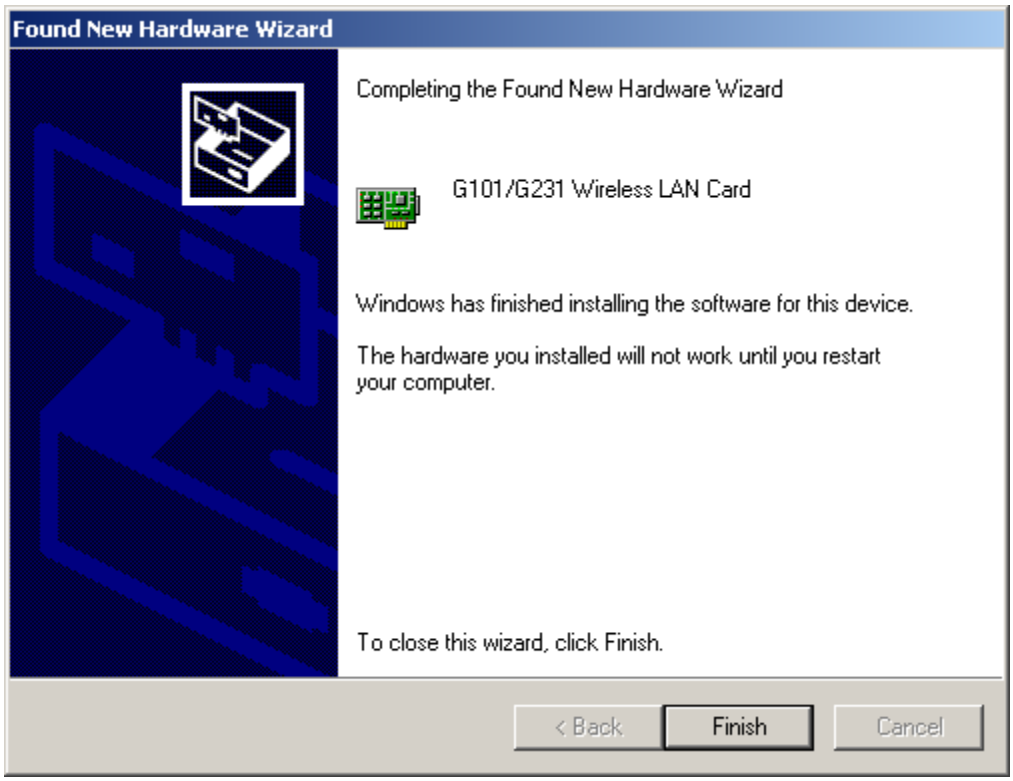
5. Insert the G101/G231 WLAN adapter into the MiniPCI slot/PCMCIA port of your computer, the system will automatically find the device and search for its software then the InstallShield Wizard finished installation and the system tray icon is loaded in the taskbar (see illustration below).

Note: Please turn-off computer before you insert G101.

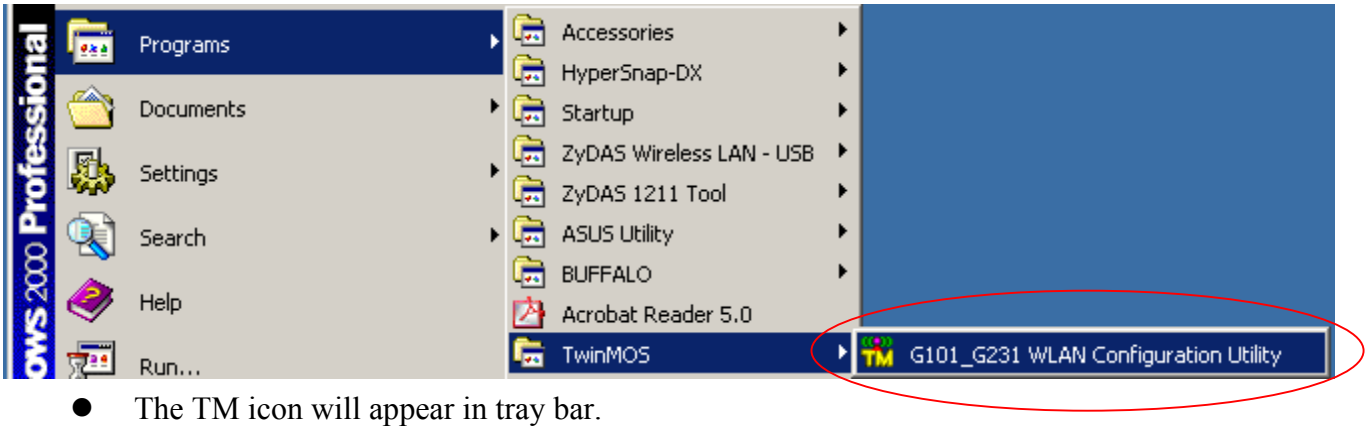
- Found New Hardware and Installing.



- Complete device install.

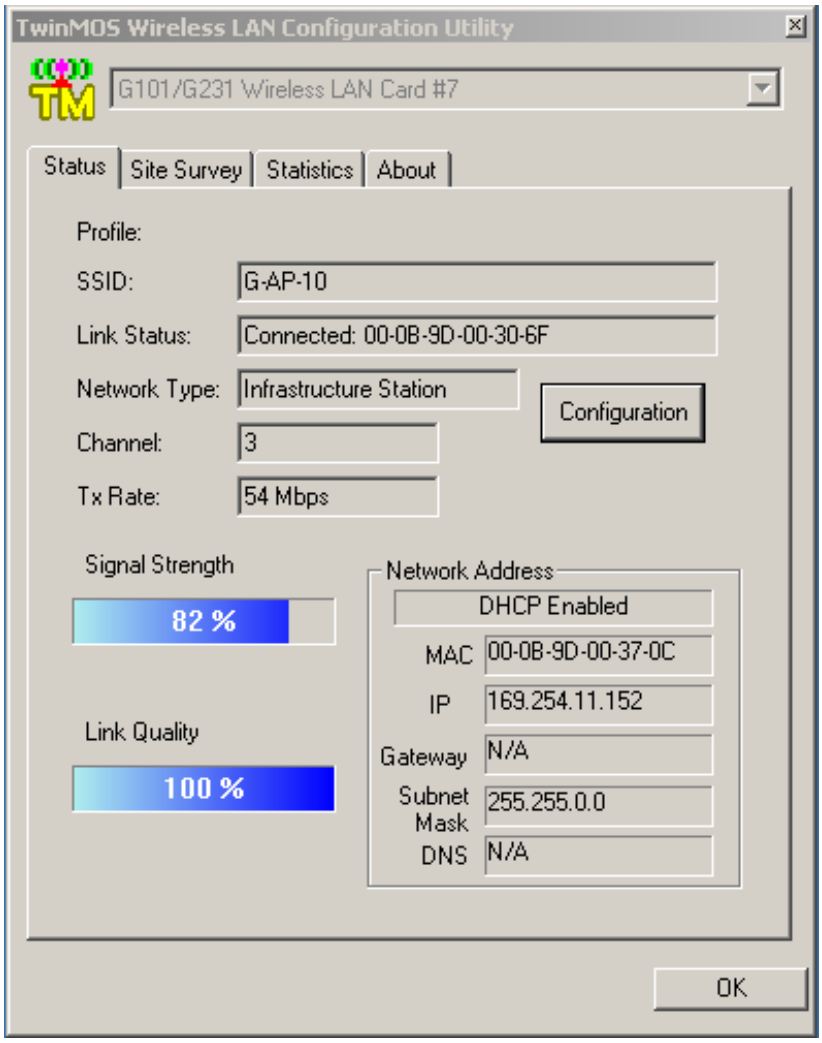


6.Please click "**Start-> programs->TwinMOS ->G101_G231 WLAN Configuration Utility**".



- The TM icon will appear in tray bar.

7.The "TwinMOS WLAN Configuration Utility" screen will appear.

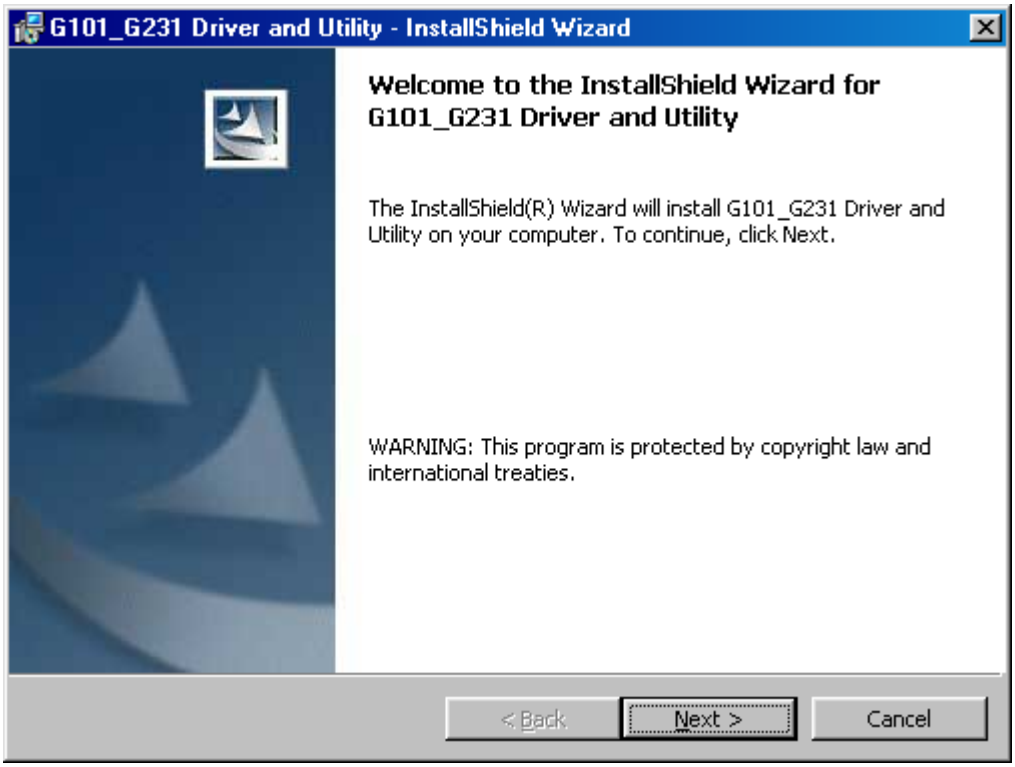


For Windows 98SE

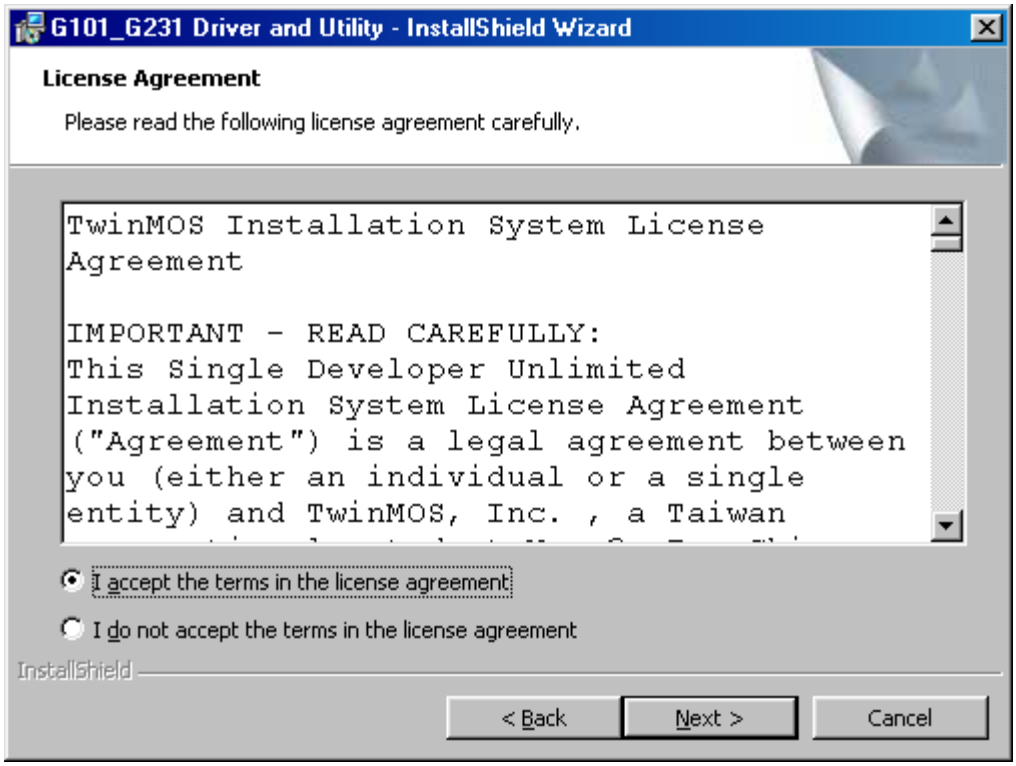
Install the Driver and Utility

1. Insert the CD into the CD-ROM device and execute the "setup.exe" program for your purchace G101/G231 series to select .

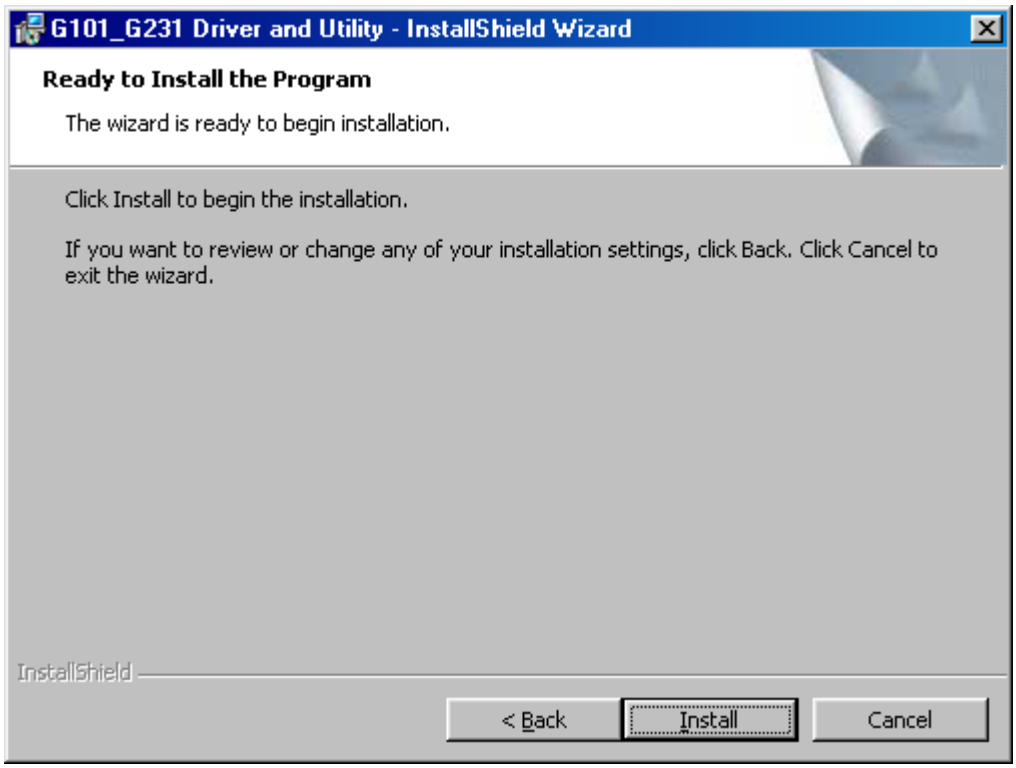
2.The InstallShield Wizard box will appear, click "Next" to continue.



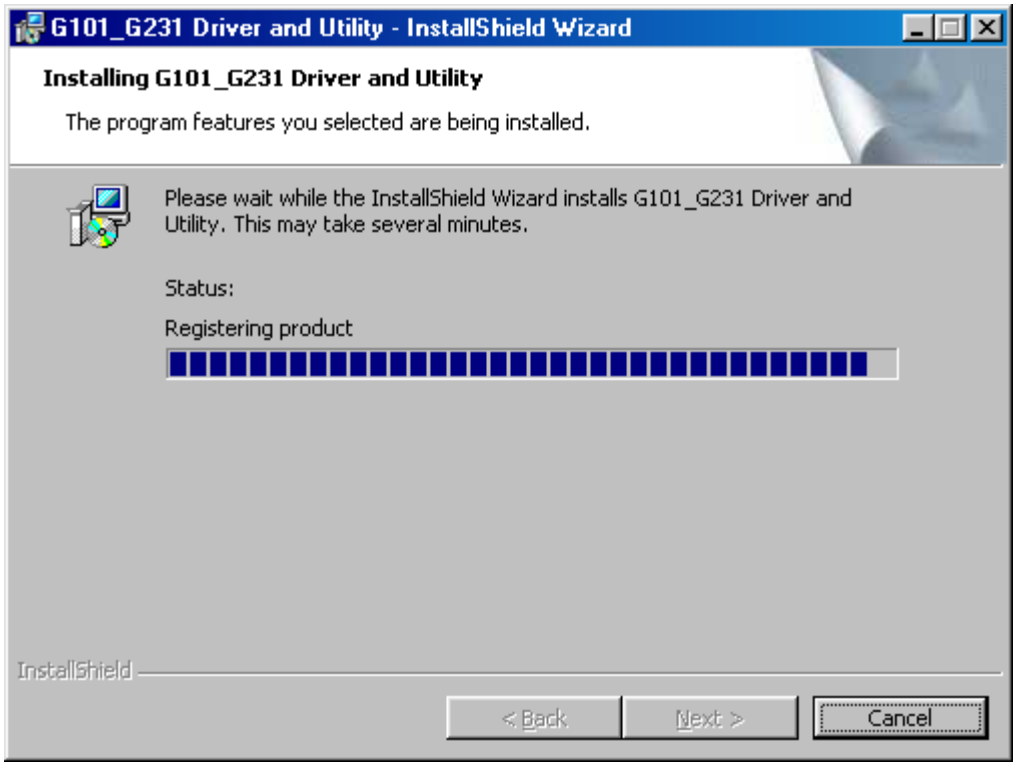
3. Licence Agreement ,Please choice “I accept the terms in the license agreement” and click "Next" to continue.



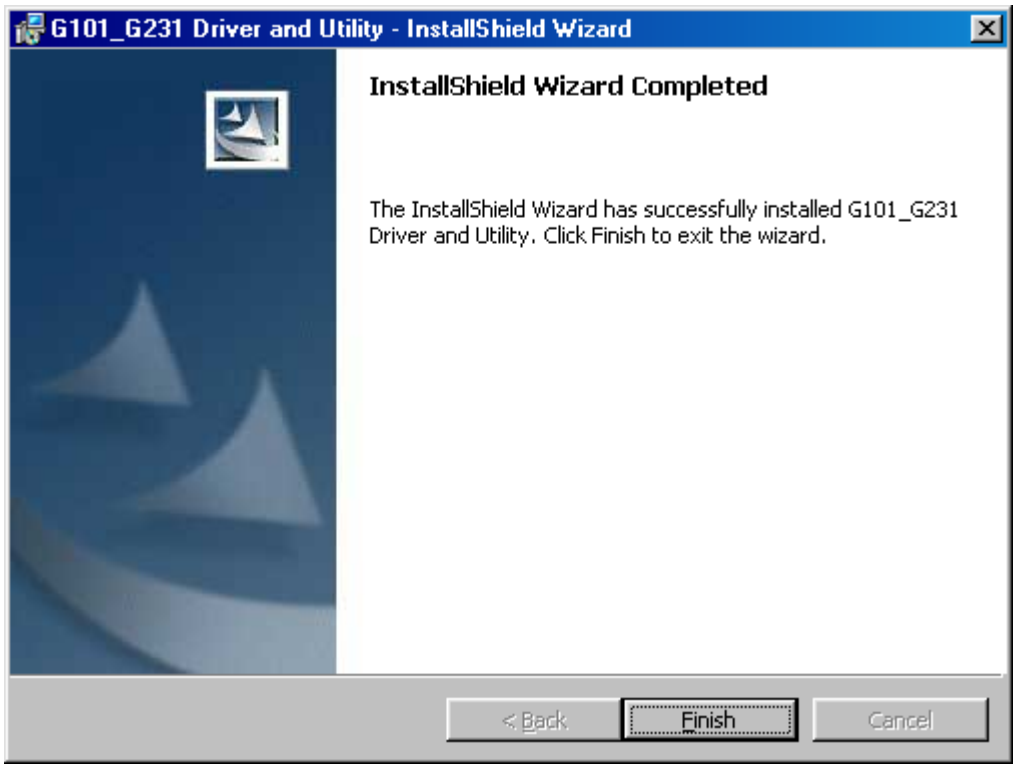
4.Click "Install" button to continue.



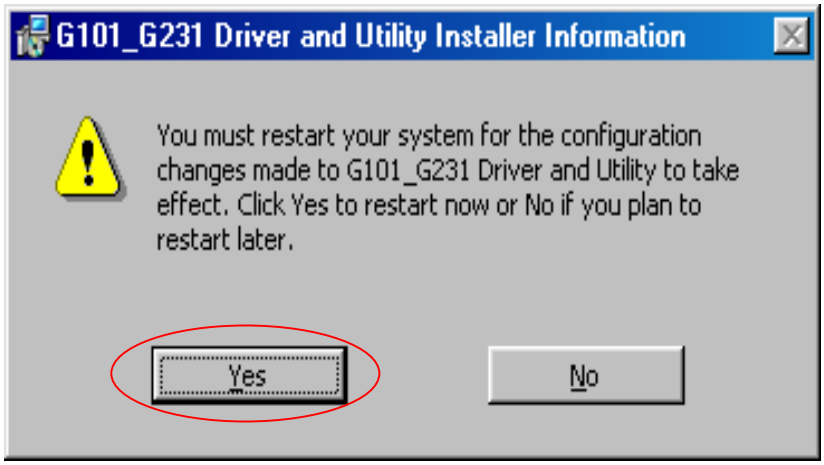
- The driver and utility are Installing.



- Click Finish button to complete install procedure.



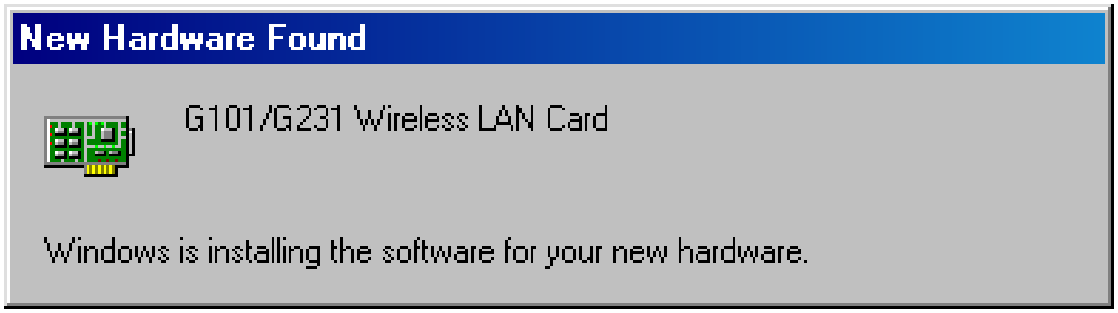
5. After running the driver package, the Notebook (or PC) with Win98 OS shall be restarted



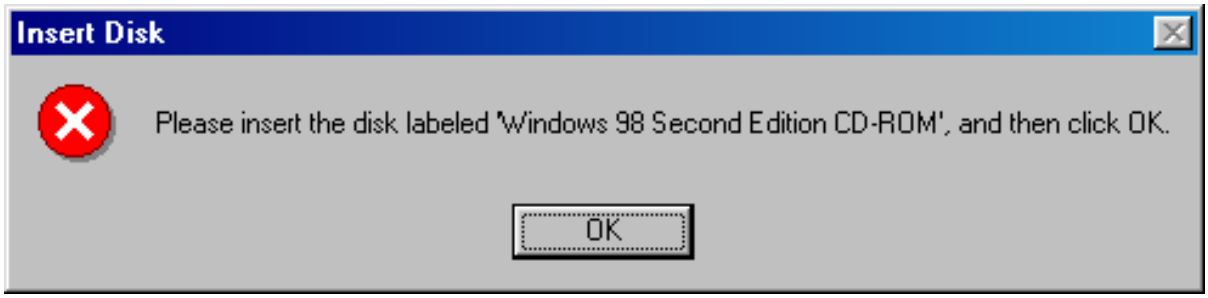
6. Insert the G101/G231 WLAN adapter into the MiniPCI slot/PCMCIA port of your computer, the system will automatically find the device and search for its software then the InstallShield Wizard finished installation and the system tray icon is loaded in the taskbar (see illustration below).

Note: Please turn-off computer before you insert G101.

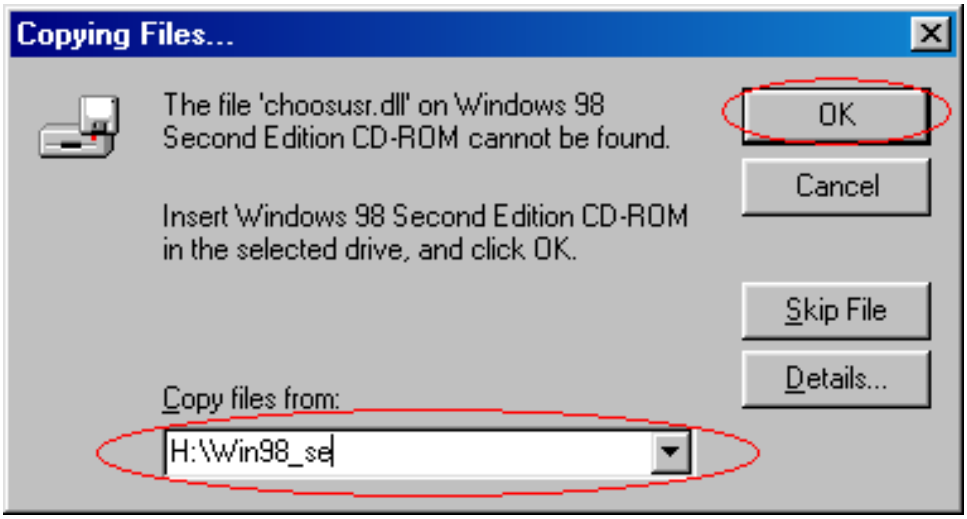
- New Hardware Found



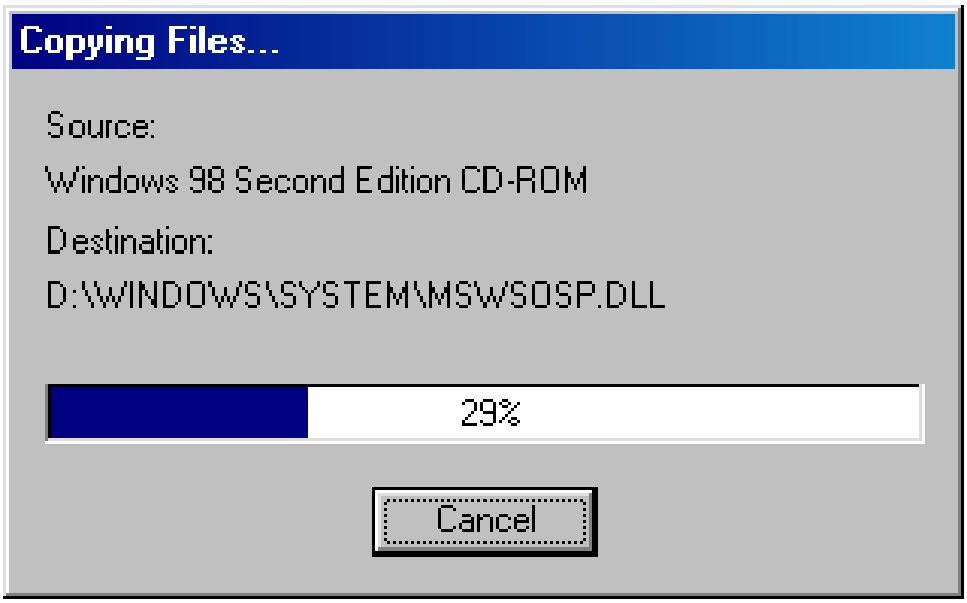
7. Please insert the disk labeled "Windows 98 Second Edition CD-ROM."



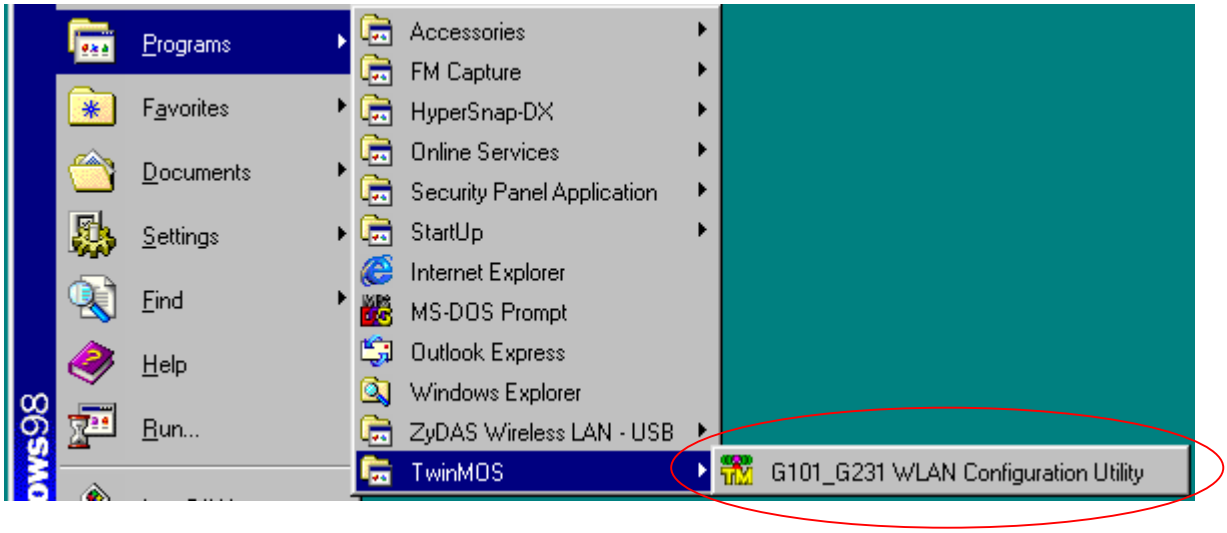
8. To choose Windows 98SE installing folder



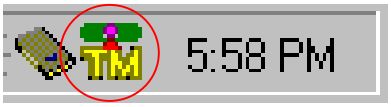
9. Copying Files



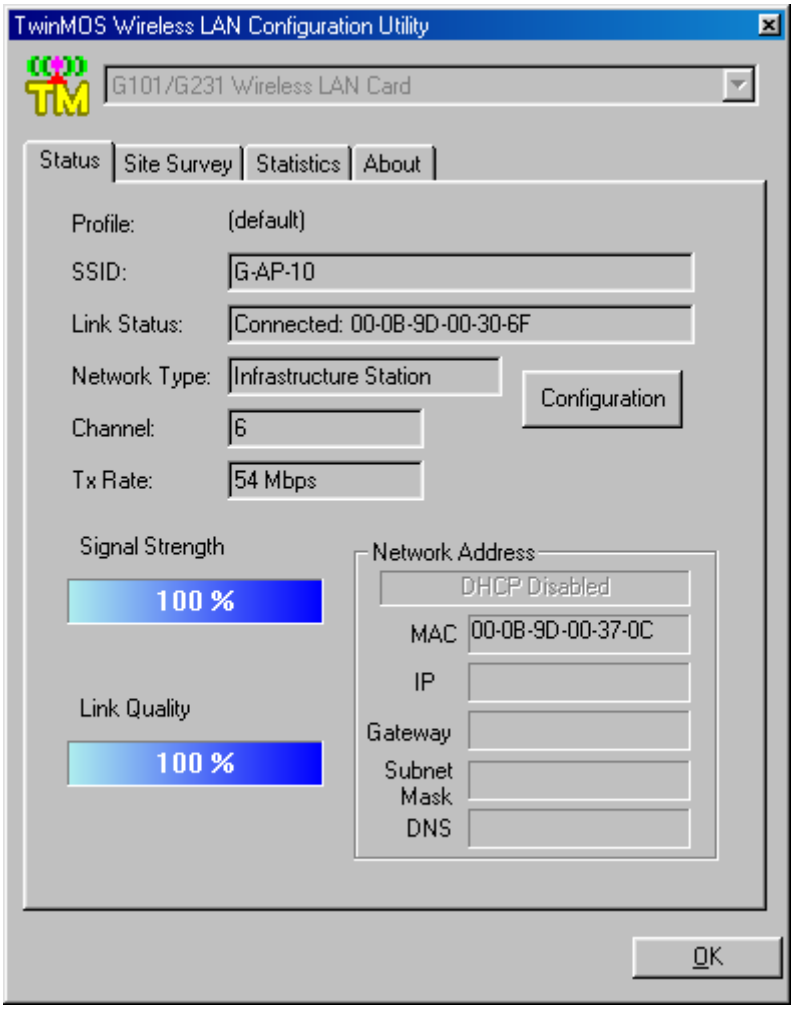
10. Please click "**Start-> programs->TwinMOS ->G101_G231 WLAN Configuration Utility**".



- The TM icon will appear in tray bar.



11. The "TwinMOS WLAN Configuration Utility" screen will appear.

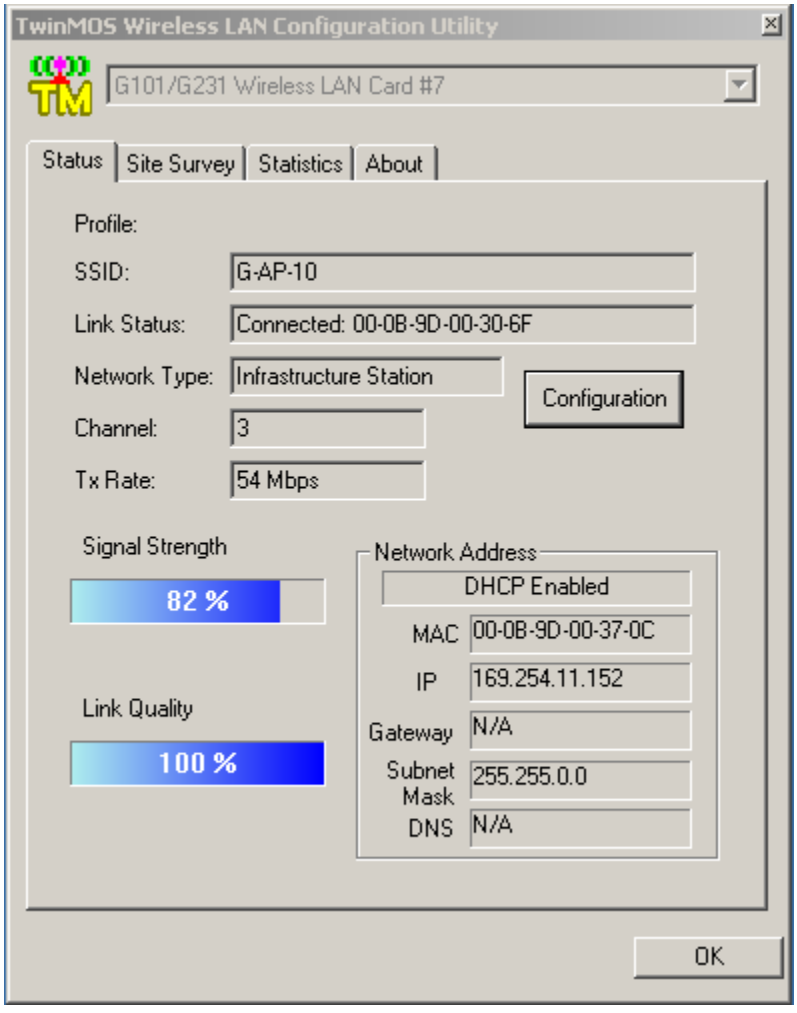


CONFIGURATION UTILITY

Note: The following Configuration Utility ***was operated under Windows 2000. (Procedures will be the same for Windows 98SE/XP)***

TwinMOS G101/G231 uses the Configuration Utility as the management software. The utility provides the user an easy interface to change any settings related to the wireless adapter. When the computer is started, the Configuration Utility starts automatically and the system tray icon is loaded in the toolbar (see illustration below.) Clicking on the utility icon will start the Configuration Utility.

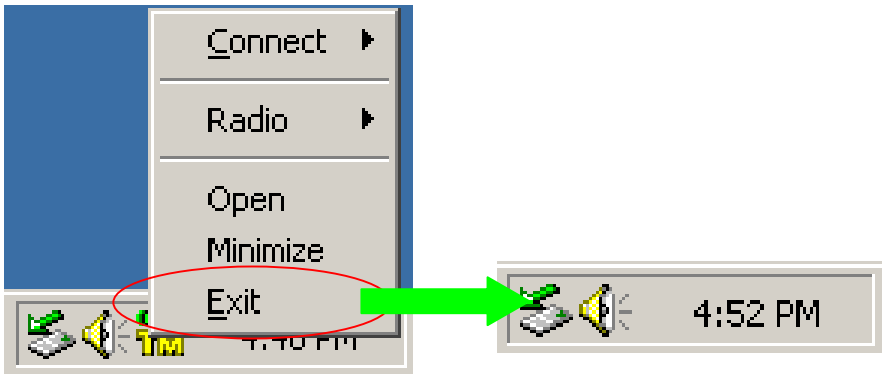
Double-click on the icon shown above. The screen below will appear.



Right-click on the icon shown below. The function of utility icon will appear.

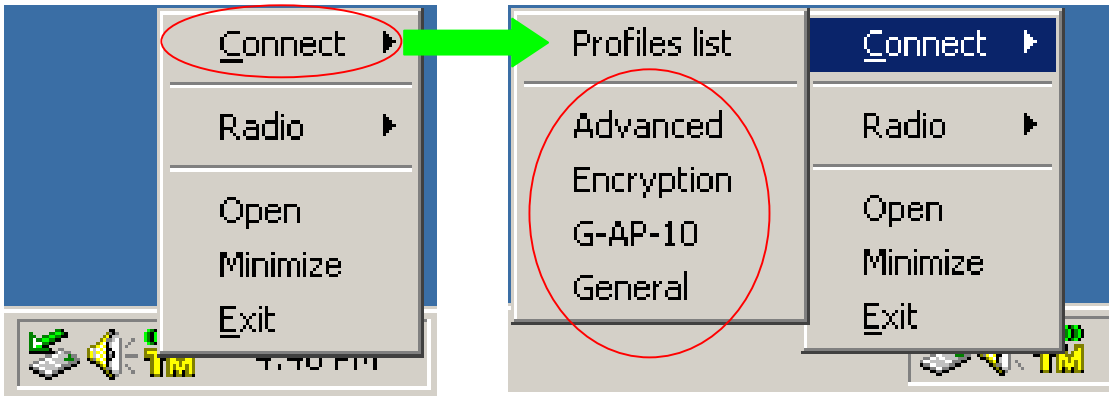
Exit

Clicking on the "Exit" Button will leave the Configuration Utility.



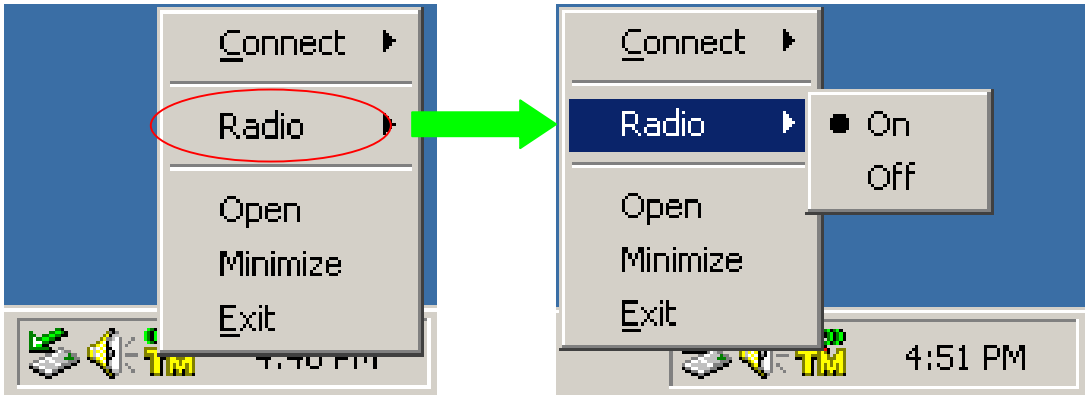
Connect

From "Profiles list" to select one of all profiles name (G-AP-10) to connect.



Radio

- **On –** Turn Radio on.
- **Off –** Turn Radio off.



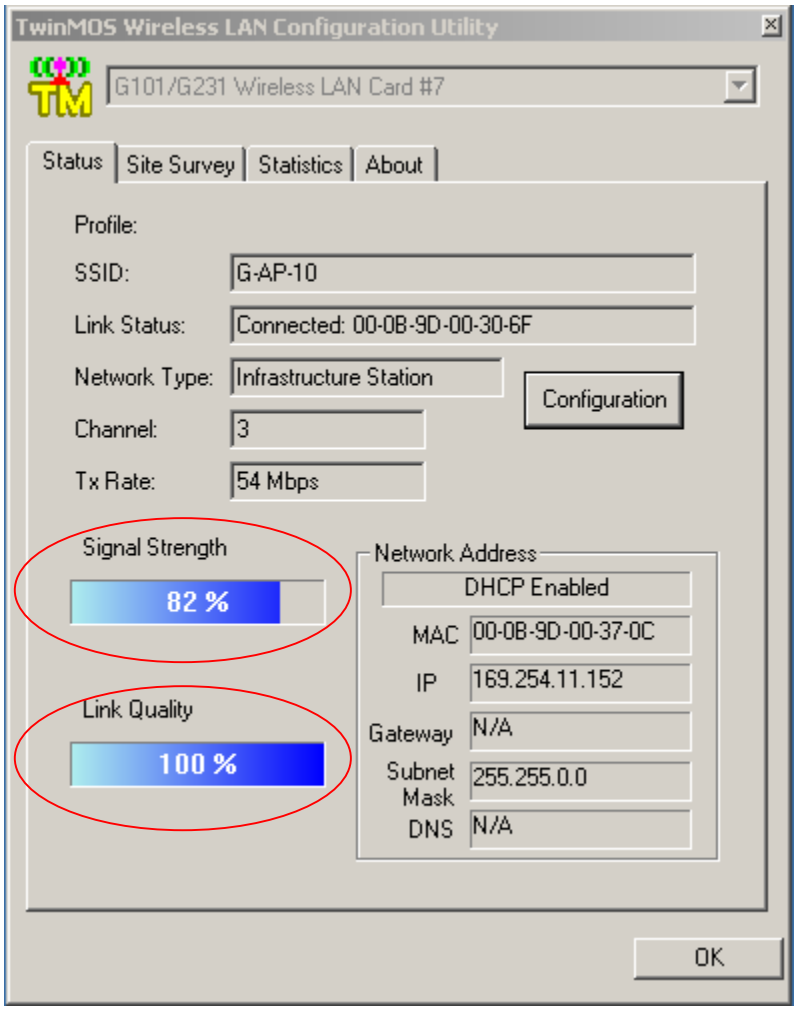
Status Tab

Signal Strength

This bar shows the signal strength level. The higher percentage shown in the bar, the more radio signal been received by the adapter. This indicator helps to find the proper position of the wireless device for quality network operation.

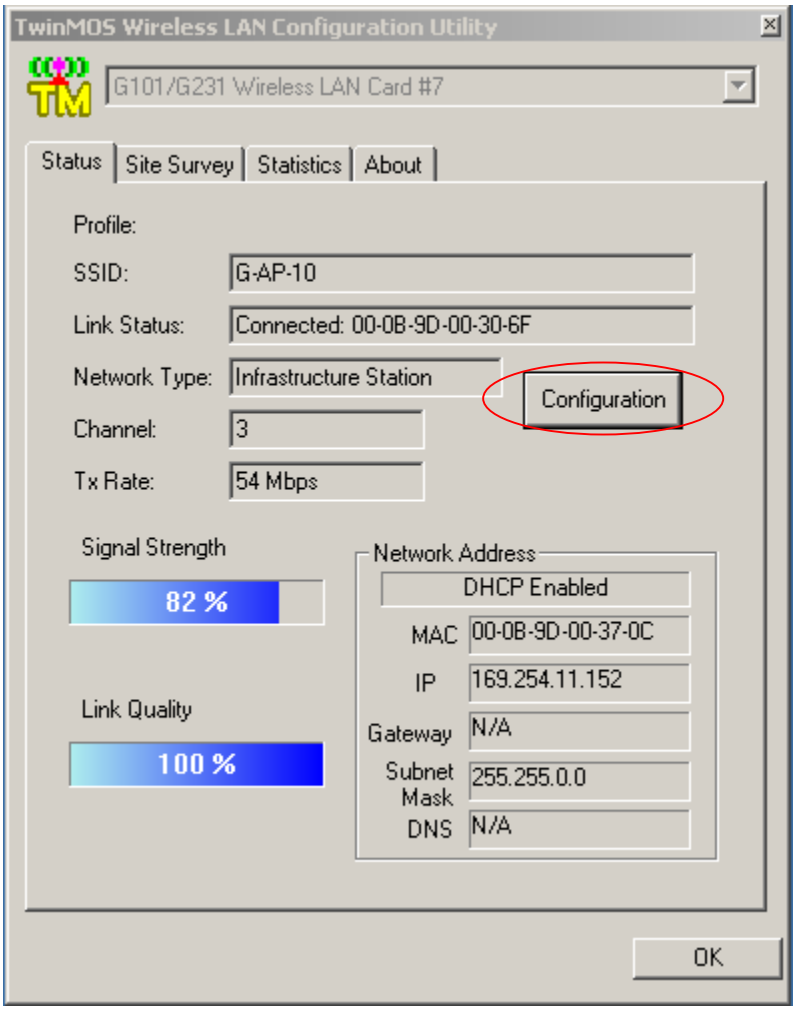
Link Quality

This bar indicates the quality of the link. The higher the percentage, the better the quality.



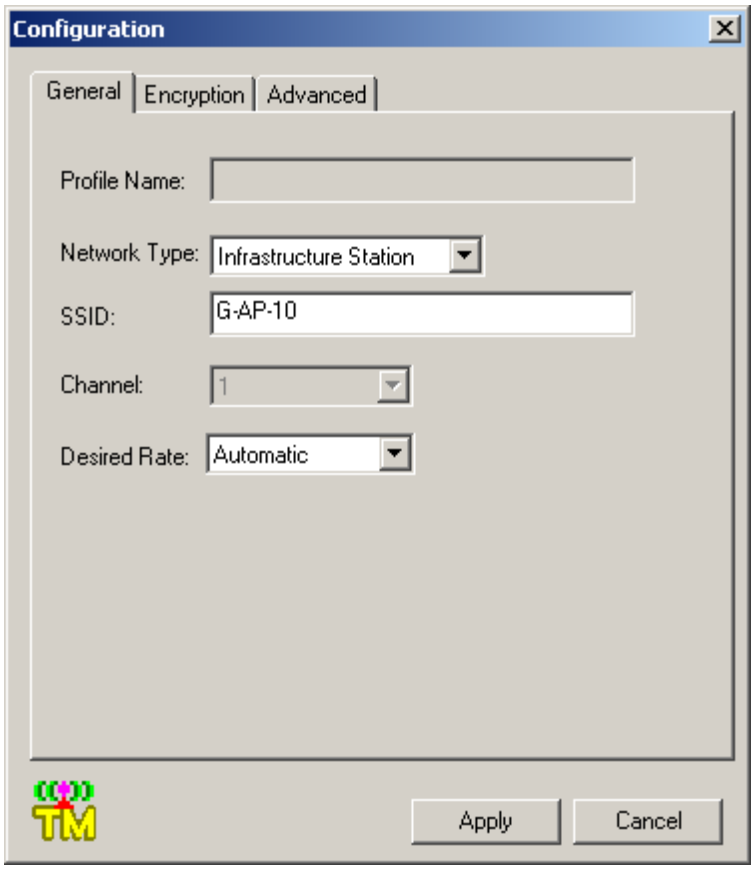
Configuration Table

Click the “Configuration Button” to get into the Configuration Table, as shown below.



General Tab

You can make changes to any of the fields shown below, without the need to restart your computer.



Profile name

A profile is a named set of operating parameters for your ***G101/G231*** WLAN adapter. To display the available profiles for your ***G101/G231*** WLAN adapter.

Network Type

The ***G101/G231*** WLAN adapter can operate in one of two modes, which are specified in the Mode field of the Configuration menu. Clicking the down arrow at the right of the Mode field displays the available modes.

• **Ad-Hoc Station**- This is the 802.11b/g Ad-Hoc mode of operation. In "Ad-Hoc" mode, only one wireless " cell " is supported for each different NETWORK NAME. All communication is done from client to client without the use of an Access Point. "Peer-to-Peer" networking uses the same NETWORK NAME for the wireless adapters in establishing the network connection. When "Ad-Hoc " mode is selected, the utility will provide a selection for setting the channel.

• **Infrastructure Station**- This mode of operation requires the presence of an 802.11b/g Infrastructure. All communication is done through the Infrastructure, which relays packets to other wireless clients as well as to nodes on a wired Ethernet network.

SSID

The name of the wireless network. This name cannot be longer than 32 characters. The default value is "any", which will automatically scan and connect the best performance Access point nearby. You may specify a SSID for the adapter and then only the device with the same SSID can interconnect to the adapter.

Channel

When communicating in Ad-Hoc mode, you must specify a channel on which communications will take place. This field is grayed in infrastructure mode because the Access Point automatically selects the channel.

Desired Rate

The Transmit Rate field specifies the rate at which the radio in your ***G101/G231*** WLAN adapter transmits and receives data. You can set this to the following fixed rates: 1 Mbps; 2 Mbps; 5.5 Mbps; 6 Mbps; 9 Mbps; 12 Mbps; 18 Mbps; 24 Mbps; 36 Mbps; 48 Mbps or 54 Mbps.

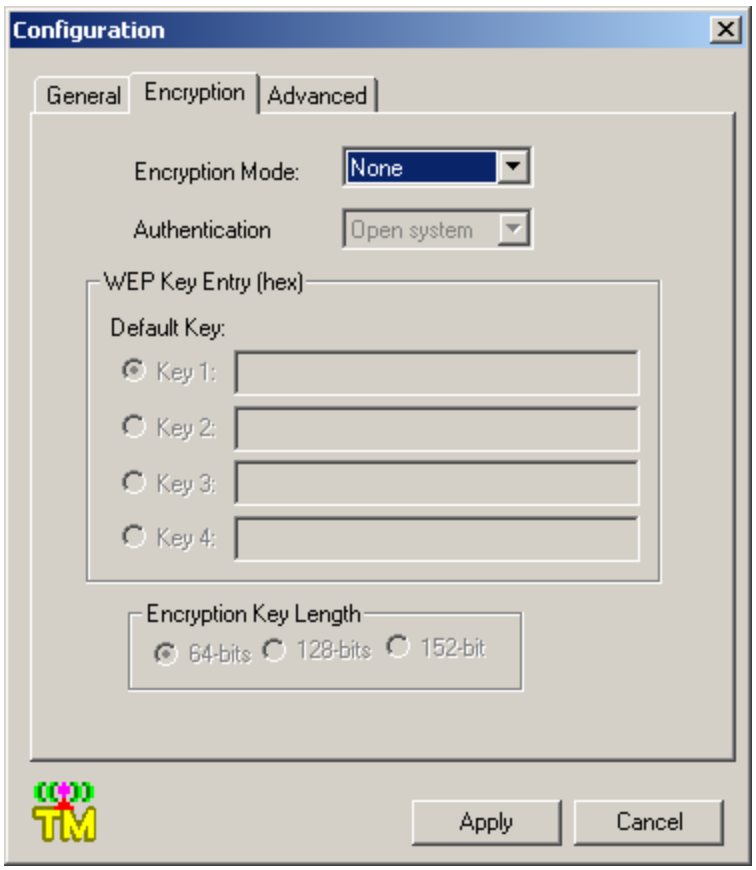
Automatic - When it is enabled, the device will choose the most suitable transmission rate automatically.

Apply

Click "Apply" button to save and implement the new settings.

Encryption Tab

To allows you to enhance the security of a network. Every station in a secured network should enable the Encryption function and the values of the Network Key should be the same.



Encryption Mode

- **None –** Disable to Encryption Tab.
- **WEP –** Enable to Encryption Tab.

Authentication

This setting has to be consistent with the wireless devices, which the adapter intends to connect.

- **Open System –** No authentication is needed among the wireless devices.
- **Shared Key –** Only wireless devices using a shared key (WEP Key identified) are allowed to connecting each other. Setup the same key as the wireless devices, which the adapter intends to connect.
- **Auto Swith –** Auto switch the authentication algorithm depending on the wireless devices, which the adapter is connecting to.

Default Key

Select one of the keys (1~4) as the encryption key.

Key Value

The keys are used to encrypt data transmitted in the wireless network. Fill the text box by following the rules below.

- **64-bit** – Input 10 digit Hex values (in the "A-F", "a-f" and "0-9"range) as the encryption keys. For example: "0123456aef".

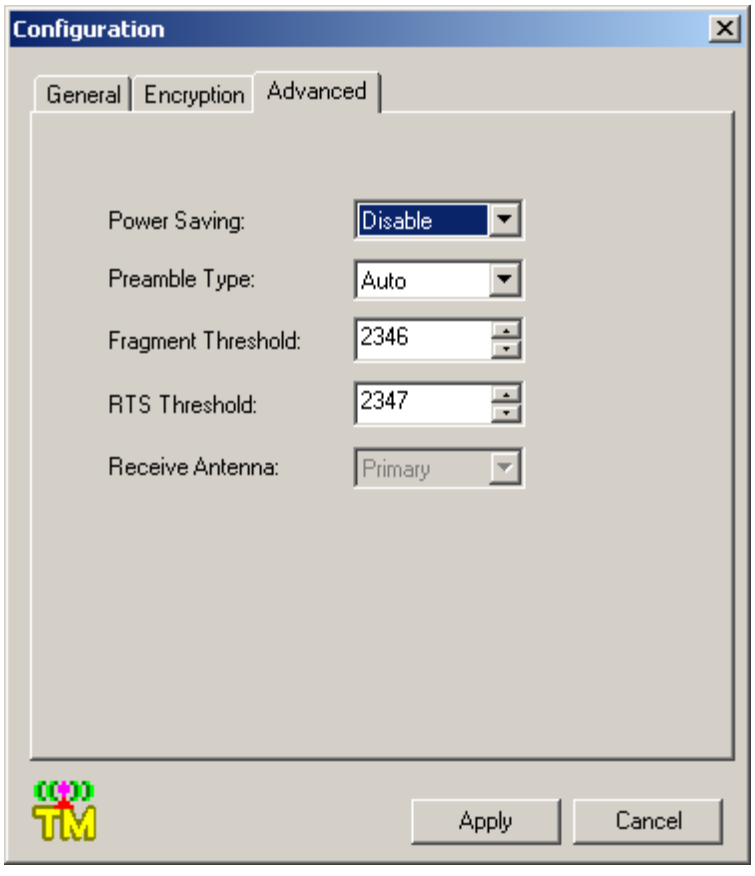
- **128-bit** – Input 26 digit Hex values (in the "A-F", "a-f" and "0-9" range) as the encryption keys. For example:"01234567890123456789abcdef".

- **152-bit** – Input 32 digit Hex values (in the "A-F", "a-f" and "0-9" range) as the encryption keys. For example:"0123456789012345678901234567 89ab ".

Encryption Key Length

You may select the 64-bit or 128-bit or 152-bit to encrypt transmitted data. Larger key length will provide higher level of security, but the throughput will be lower.

Advanced Tab



Power Saving

Power Saving mode allows your computer to use reduced power during idle time by going into "sleep" mode, saving energy costs.

- **Disable –**The card will always set in active mode.
- **Enable(Fast) –**Enable the card in the power saving mode when it is idle, but some components of the card is still alive. In this mode, the power consumption is larger than "Max" mode.
- **Enable(Max) –**Enable the card in the power saving mode when it is idle.

Preamble Type

defines the length of CRC block in the frames during the wireless communication.

- **Long –**"Long " can provide more reliable communication.
- **Short –**"Short " is suitable for high traffic wireless network.
- **Auto –**the card will auto switch the preamble mode depending on the wireless networks card is connecting to.

Fragment Threshold

The value defines the maximum size of packets, any packet size larger than the value will be fragmented. If you have decreased this value and experience high packet error rates, you can increase it again, but it will likely decrease overall network performance. Select a setting within a range of 256 to 2346 bytes. Minor change is recommended.

RTS Threshold

Minimum packet size required for an RTS (Request To Send). For packets smaller than this threshold, an RTS is not sent and the packet is transmitted directly to the WLAN. Select a setting within a range of 0 to 2347 bytes. Minor change is recommended

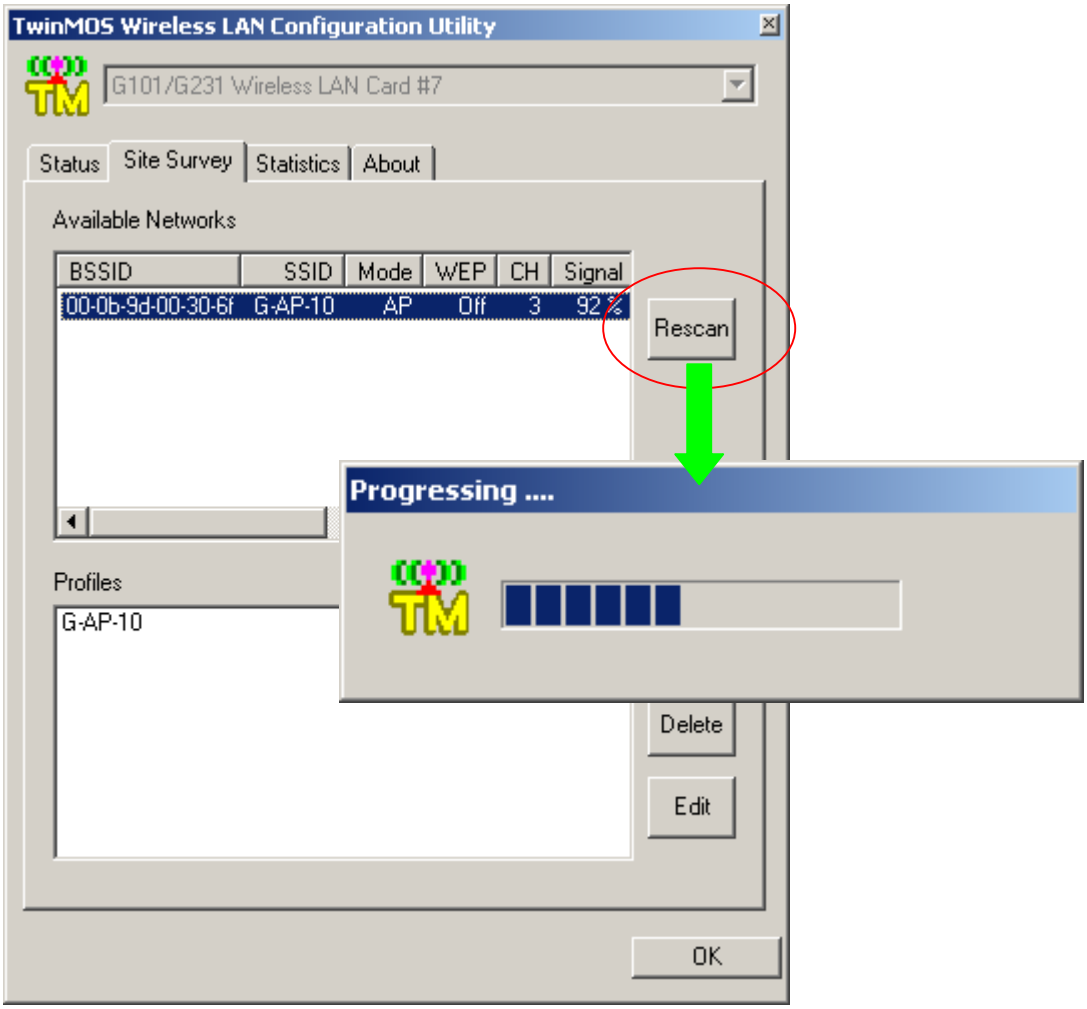
Receive Antenna

Define the receive antenna. If "Diversity" is selected, the card will auto switch to the antenna with high signal strength to receive data.

Site Survey Tab

Available Network

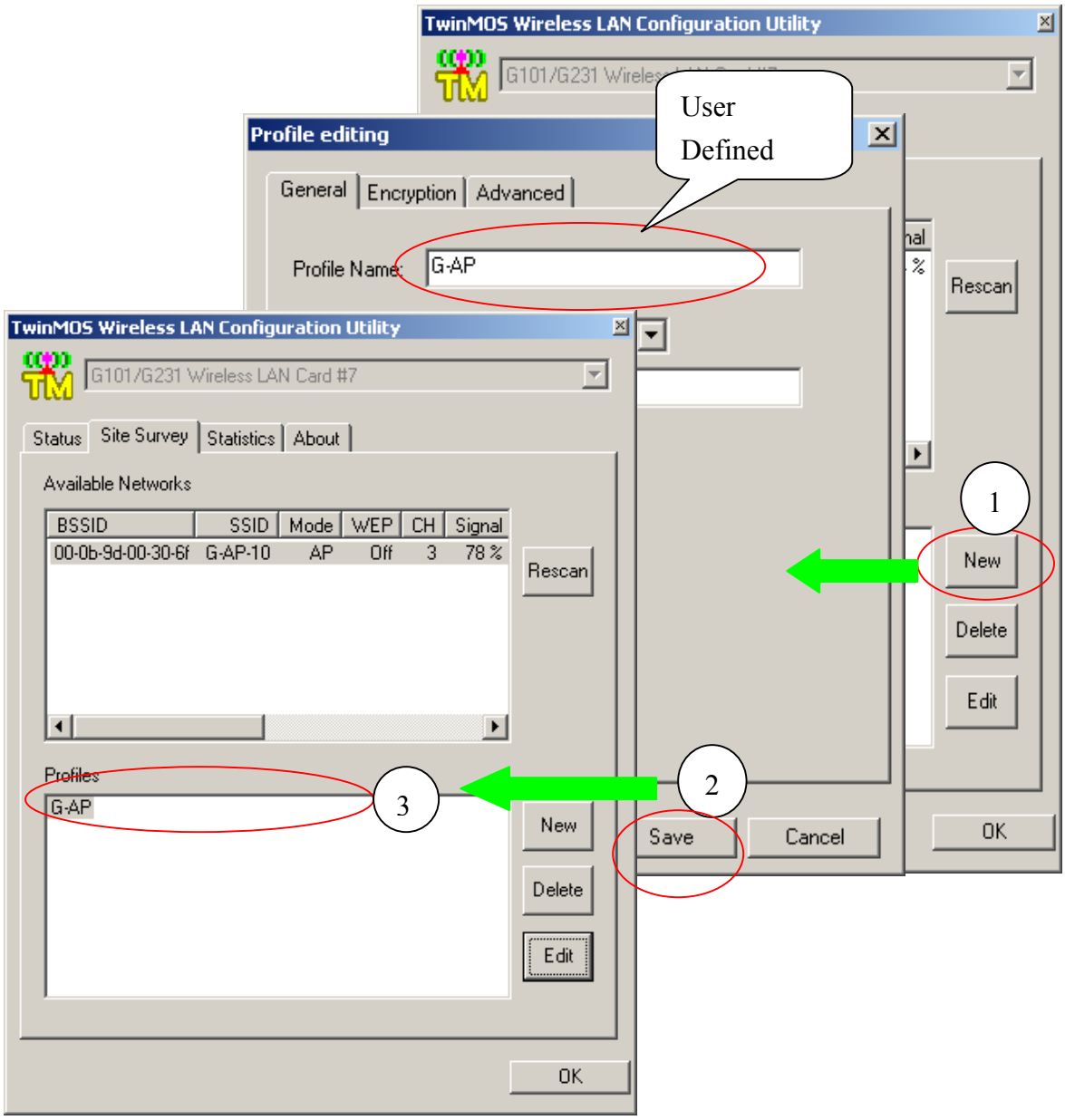
This screen shows all Access Points or Adapters nearby when operating in Infrastructure Station mode. If you want to connect to any device on the list, double-click the item on the list, and the adapter will automatically connect to the selected device.



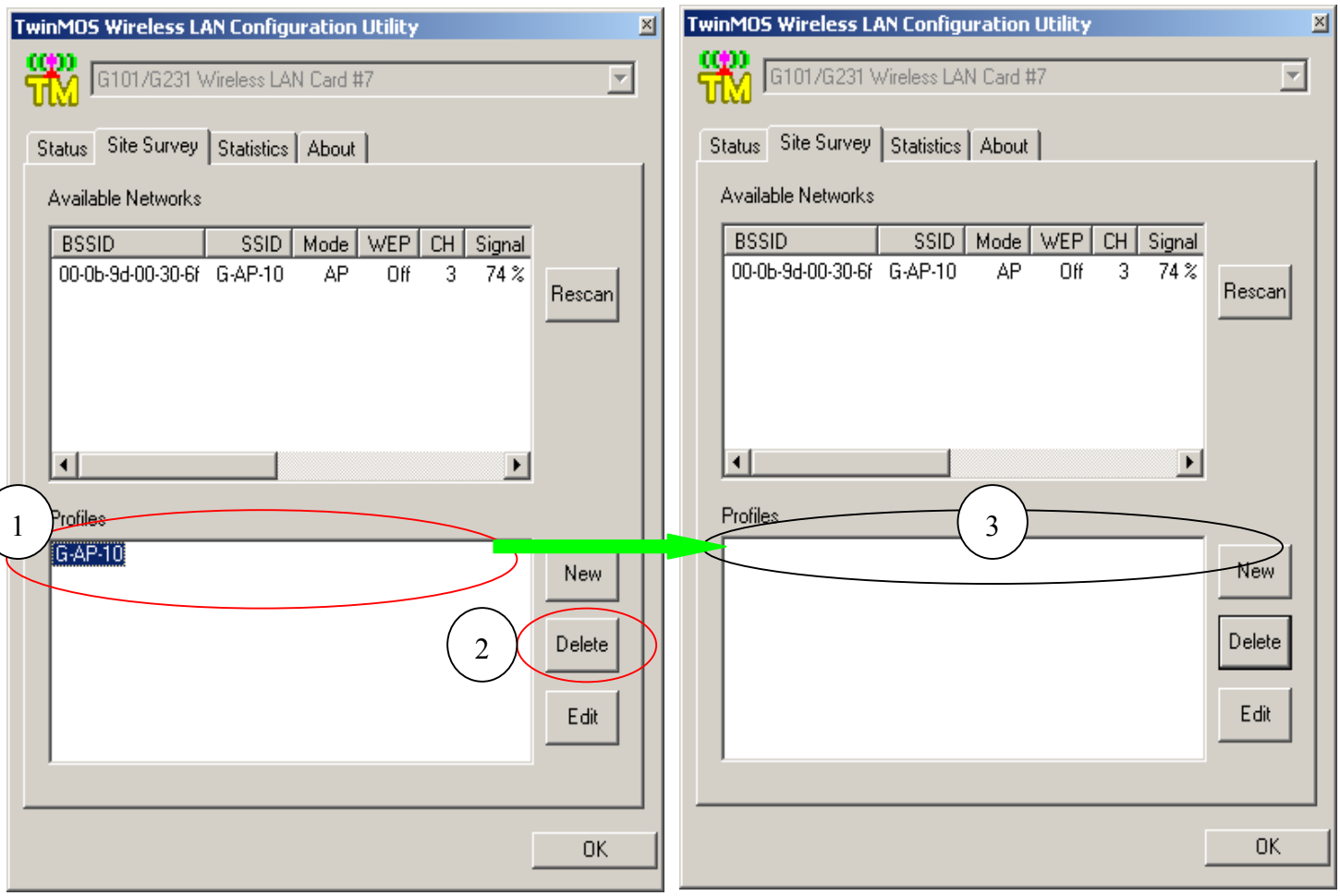
- **Rescan** –Click "Rescan" button to collect the BSSID, SSID, Mode, WEP, CH, Signal and Support Rates information of all the wireless devices nearby.

Profiles -A profile is a named set of operating parameters for your G101/G231 WLAN adapter. The Profile Page lets you set values for all parameters by selecting a previously defined profile. Profile Page to display the available profiles for your G101/G231 WLAN adapter.

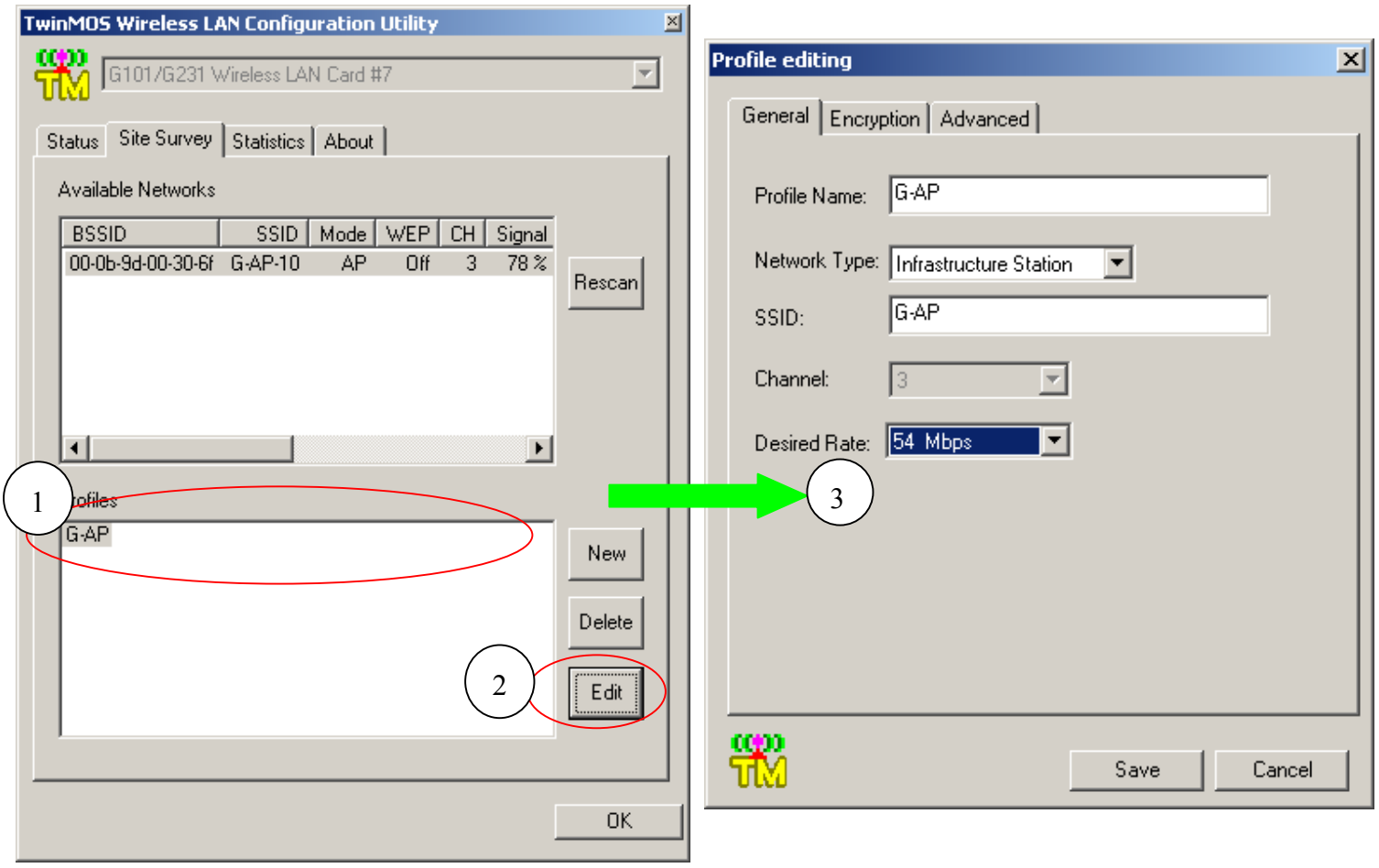
- **New –** 1. Click the "New" button to edit information of operating parameters for your ***G101/G231*** WLAN adapter.
  2.Click the "Save" button to save information of operating parameters for your "G-AP" profiles of user defined
  3.The Profiles Page shows "G-AP"



- **Delete –** 1.Click the item on the list.
  2.Click “Delete” button.
  3. delete “G-AP-10” profiles.

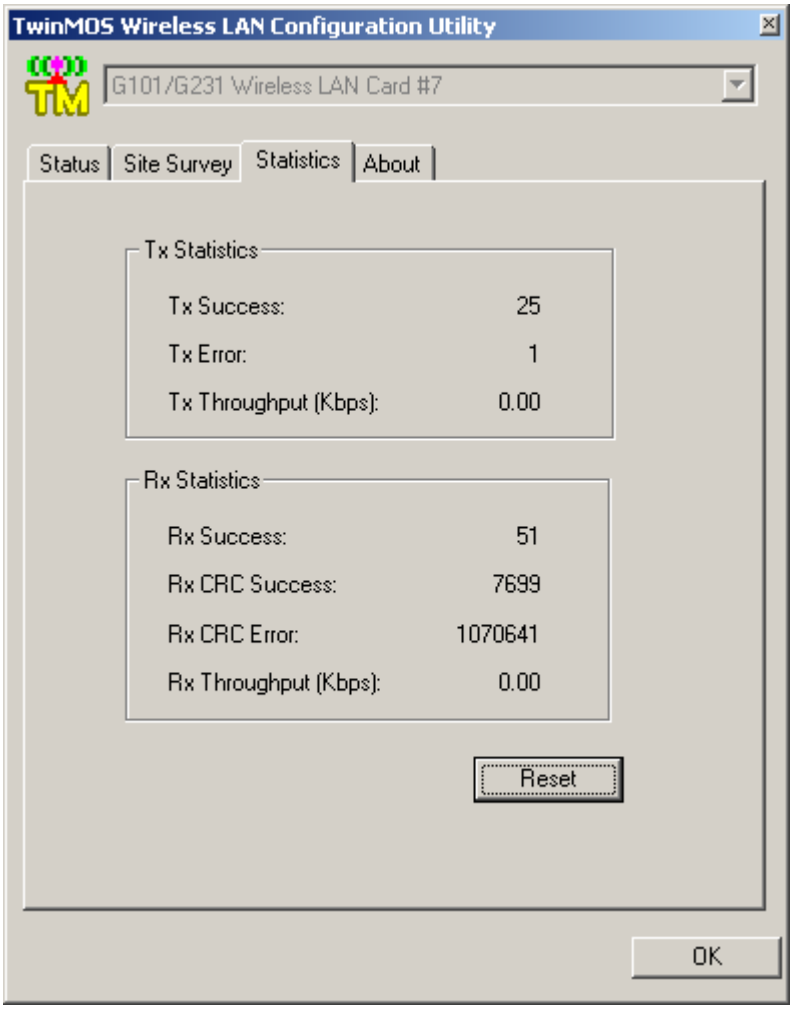


- **Edit –** 1.Click the item on the list.
  2.Click “Edit” button.
  3. Edit values for all parameters to “G-AP” profiles.



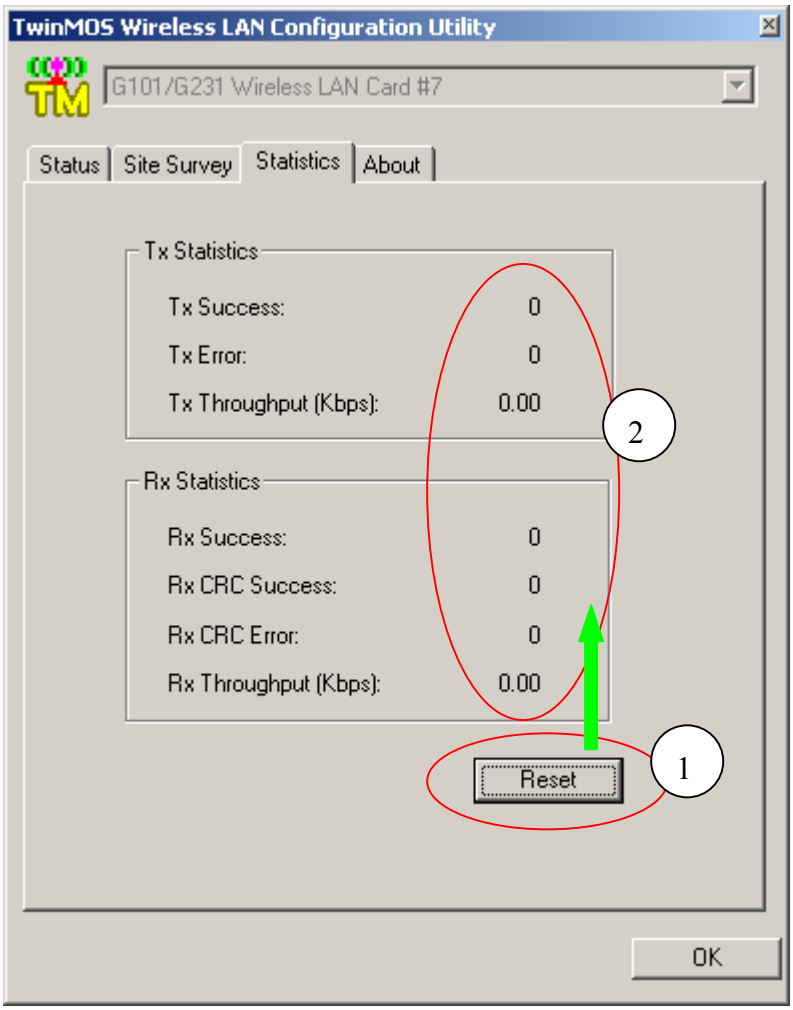
Statistics Tab

This option enables you to view the available statistic information with its Tx counts (Tx success, Tx error), Tx Throughput, and its Rx counts (Rx success, Rx error), Rx Throughput.



Reset–*1*.Click “Reset” button.

2.All content of Tx Statistics and Rx Statistics are being zero.



About Tab

The Information Page provides information on the version of the Network Driver, the Configuration Utility. In addition, this page also provides the TwinMOS HomePage and TwinMOS E-mail for service, as shown in the following illustration.

TROUBLESHOOTING

If you encounter some problems while installing the ***G101/G231*** WLAN adapter or you want to confirm whether your adapter is installed properly or not, we have listed the procedure for checking the various components after you have installed the adapter. In first part of Troubleshooting, we have suggested the users to check the various properties of the card to check the proper installation. In second section, we have listed the various problems that you may encounter during the installation and have also listed the possible solution. Check the first part to guess the probable reason of unsuccessful installation.

Please check the followings if you encounter some problem while installing the ***G101/G231*** or yours ***G101/G231*** are non-functional.

In Windows 2000:

To check that the ***G101/G231*** is installed properly, please do the following:

1. Check the Windows 2000 Diagnostics. See if there is any conflict in the Resource allocation or the I/O Address, IRQ allocations. If you find that the IRQ or I/O Addresses are already assigned to some other devices, you must change that value.
2. Go to the Control Panel. Double click on the Network Adapter, you will see *G101/G231* Wireless Adapter. Double clicking on that will show you the status of the *G101/G231* network adapter. If there are no error signs, the adapter has been installed properly.

In Windows XP:

To check that the ***G101/G231*** is installed properly, please do the following:

1. Go to START>CONTROL PANEL. Double-click on Network Connections. Right-click on LAN. Click Properties.
2. The *G101/G231* network adapter will appear, indicating proper installation.

TECHNICAL SPECIFICATIONS

Networking Characteristics

Compatibility	● IEEE 802.11 Standard for WLAN (DSSS) ● Wi-Fi certified by the TwinMOS
Host OS	Windows 98SE/ME/2000/XP
Media Access Protocol	CSMA/CA with ACK
Network Protocol	TCP/IP, IPX, NetBEUI

RF Characteristics

Frequency Range	2.400-2.4835 GHz, Direct Sequence Spread Spectrum (DSSS)
Operating Channels	● 1-11 United States (FCC) ● 1-11 Canada (DOC) ● 1-14 Japan (MKK) ● 1-13 Europe (Except Spain and France) (ETSI)
Modulation Technique	● OFDM with BPSK, QPSK, 16QAM, 64QAM (11g) ● DBPSK, DQPSK, CCK (11b)
Spreading	11-chip Barker Sequence
Transmit Power	● 17 dBm @ 11Mbps ● 13 dBm @ 54Mbps
Receive Sensitivity	● 11 Mbps 10^{-5} BER @ -83 dBm ● 54 Mbps 10^{-5} BER @ -67 dBm
Security	● 64/128/152-bit WEP Encryption ● WPA, TKIP, AES Data Encryption
Operating Range	Open Space：100 ~ 300m; Indoor: 30m ~ 100m The transmission speed varies in the surrounding environment.
EMC Certification	FCC Class B part 15B, 15C; R&TTE

FCC CAUTION

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

-Reorient or relocate the receiving antenna.

-Increase the separation between the equipment and receiver.

-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user‘s authority to operate the equipment.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

This EUT is incompliance with SAR for general population /uncontrolled exposure limits in ANSI/IEEE C95.1-1999 and had been tested in accordance with the measurement methods and procedures specified in OET Bulletin 65 Supplement C.