TP-LINK®

User Guide

TL-WN320G
54M Wireless USB Adapter

• 2.4GHz • 802.11g/b

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FCC STATEMENT

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(0) This device may not cause harmful interference.

(0) This device must accept any interference received, including interference that may cause undesired operation.

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

FCC RF Radiation Exposure Statement:

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

CE Declaration of Conformity

For the following equipment: TL-WN320G

Is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility (89/336/EEC), Low-voltage Directive (73/23/EEC) and the Amendment Directive (93/68/EEC), the procedures given in European Council Directive 99/5/EC and 89/3360EEC.

The equipment was passed. The test was performed according to the following

European standards:

- EN 300 328 V.1.4.1 (2003)
- EN 301 489-1 V.1.4.1 (2002) / EN 301 489-17 V.1.2.1 (2002)
- EN 60950-1: 2001

European standards dictate maximum radiated transmit power of 100mW EIRP and frequency range 2.400-2.4835GHz; In France, the equipment must be restricted to the 2.4465-2.4835GHz frequency range and must be restricted to indoor use.

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Package Contents

The following contents should be found in your box:

- One TL-WN320G Wireless USB Adapter
- One USB extension cable
- Quick Installation Guide
- One TL-WN320G Wireless Adapter Resource CD, including:
  - Utility and Drivers
  - User Guide
  - Other Helpful Information

Note: If any of the listed contents is damaged or missing, please contact the retailer from whom you purchased the TL-WN320 Wireless Adapter for assistance.

Chapter 1: Introduction

1.1 Overview of the product

The TP-LINK TL-WN320G Wireless USB Adapter gives you the flexibility to install your PC or notebook PC in the most convenient location available, without the cost of running the network cables.

Its auto-sensing capability allows high packet transfer up to 54Mbps for maximum throughput, or dynamic range shifting to lower speeds due to distance or operating limitations in an environment with a lot of electromagnetic interference. It can also interoperate with all 11Mbps wireless (802.11b) products. Your wireless communications are protected by up to 128-bit WEP and WPA encryption, so your data stays secure.

1.2 Features

- Complies with IEEE802.11g, IEEE802.11b standards
- Supports WPA data security, TKIP/AES encryption, 64/128-bit WEP encryption
- Supports 54/48/36/24/18/12/9/6/11/5.5/2/1Mbps wireless LAN data transfer rates
- Provides USB interface
- Supports Ad-Hoc and Infrastructure modes
- Supports roaming between access points when configured in Infrastructure mode
- Eases configuration and provides monitoring information
- Supports Windows 98SE, Me, 2000, XP
- Internal Antenna

1.3 LED Status

LED Indications	Status	Working Status
Green	Lit	The adapter has power
Green	Flashing	The adapter is active.

Chapter 2: Installation Guide

2.1 Software Installation

2.1.1 Overview

The Adapter's Setup Wizard will guide you through the installation procedure for Windows 98SE, Me, 2000, XP. The Setup Wizard will install the Utility and drivers.

If you install the hardware before the software, the system will prompt "Found New Hardware Wizard", click the **Cancel** button, and run the Setup Wizard program on the CD-ROM.

The Setup steps for windows 98SE, Me, 2000 and windows XP are very similar. The following setup steps are for windows 2000.

2.1.2 Software Installation for Windows 2000

0. Insert the Resource CD into your CD-ROM drive, click the **Start** button and choose **Run**. In the field that appears, enter F:\XXX\Setup.exe (if "F" is the letter of your CD-ROM drive; XXX presents the setup program path, which is labeled on the Resource CD), figure 2-1 should then appear.

0. You can click the **Cancel** button to end the installation on the Preparing Setup screen, figure 2-1. Otherwise, the Setup Wizard will display a screen similar to that shown in figure 2-2 after a moment.

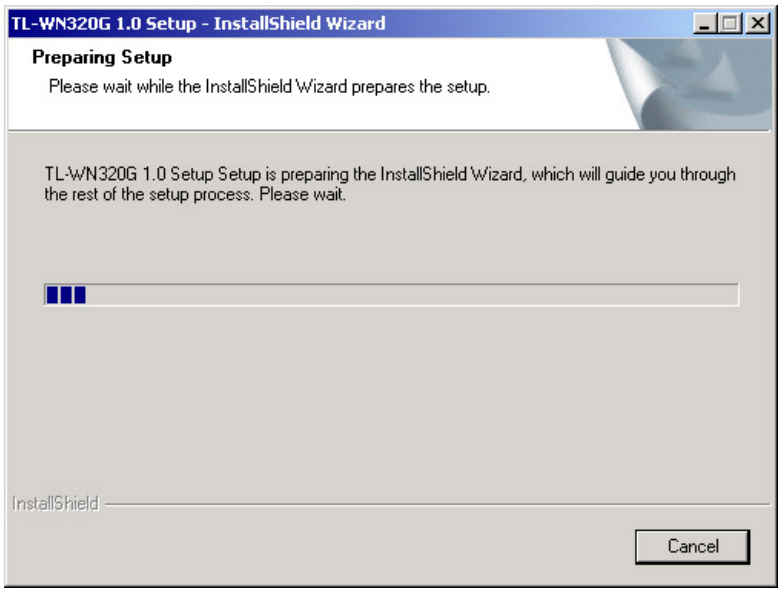

Figure 2-1 Preparing Setup

0. To continue, click the **Next** button on the screen, figure 2-2. Click the **Cancel** button to end the Installation.

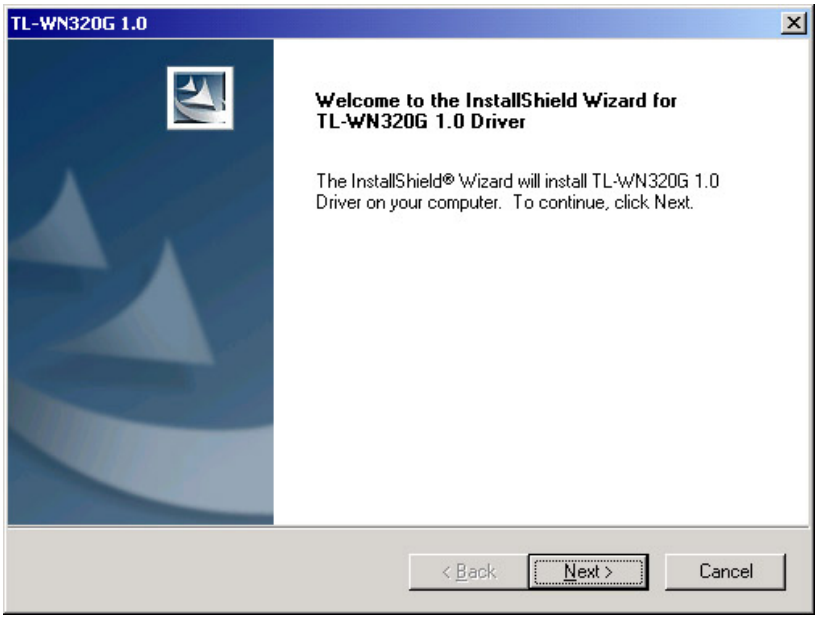

Figure 2-2 Start Setup

0. The Setup Wizard will ask you to choose a Setup type in figure 2-3. It is recommended that you select all (including **TL-WN320G 1.0 Driver** and **TL-WN320G 1.0 Utility)**. Select **TL-WN320G 1.0 Driver** only to install driver only, select **TL-WN320G 1.0 Utility** to install utility only. You can click the **Browse...** button to change the **Destination Folder** for the software. Click the **Next** button to continue the Installation. Click the **Back** button to return to the previous page, or click the **Cancel** button to end the Installation.

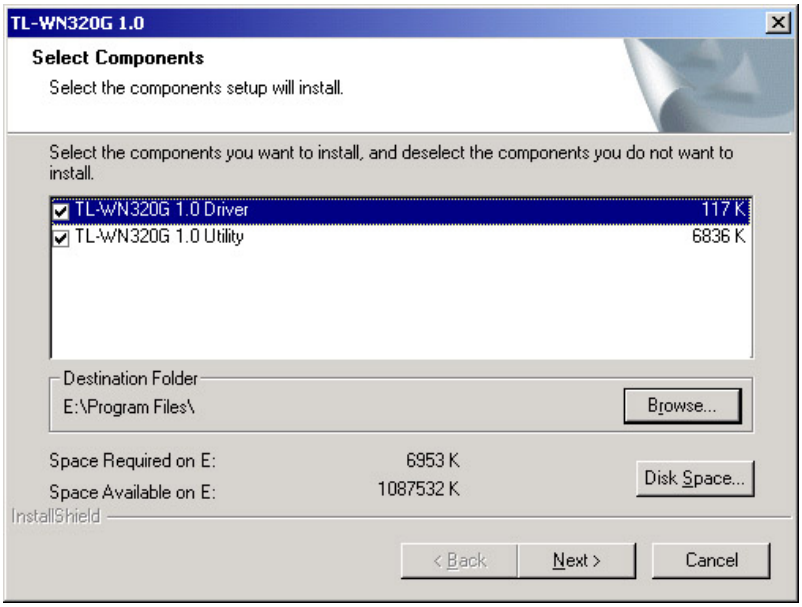

Figure 2-3 Select the setup type.

0. While files are copying, you will see a warning box shown in figure 2-4. Please select **YES** to continue installation. Our drivers have been tested thoroughly, and are able to work with the operating system.

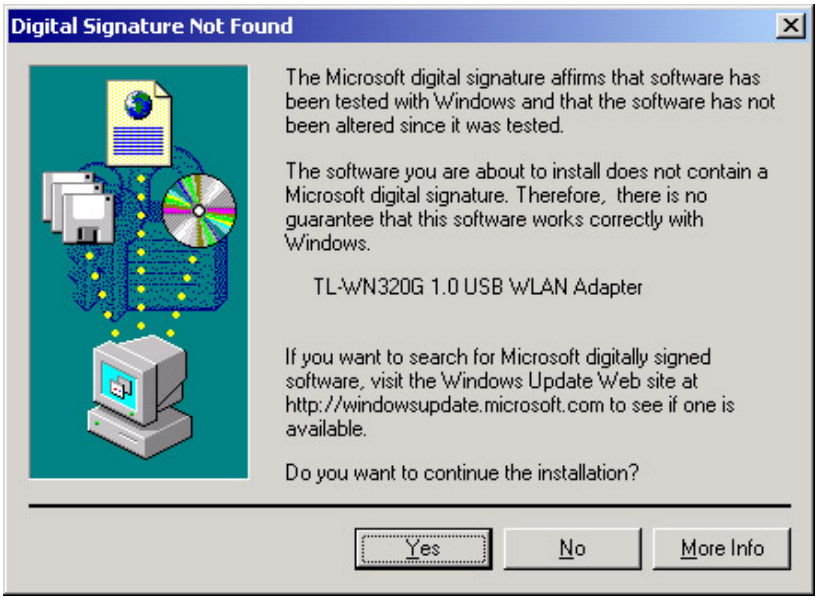

Figure 2-4 Windows 2000 Warning Box

Note: In Windows XP, the warning box is similar to that shown figure 2-5, Please select **Continue Anyway** to continue installation.

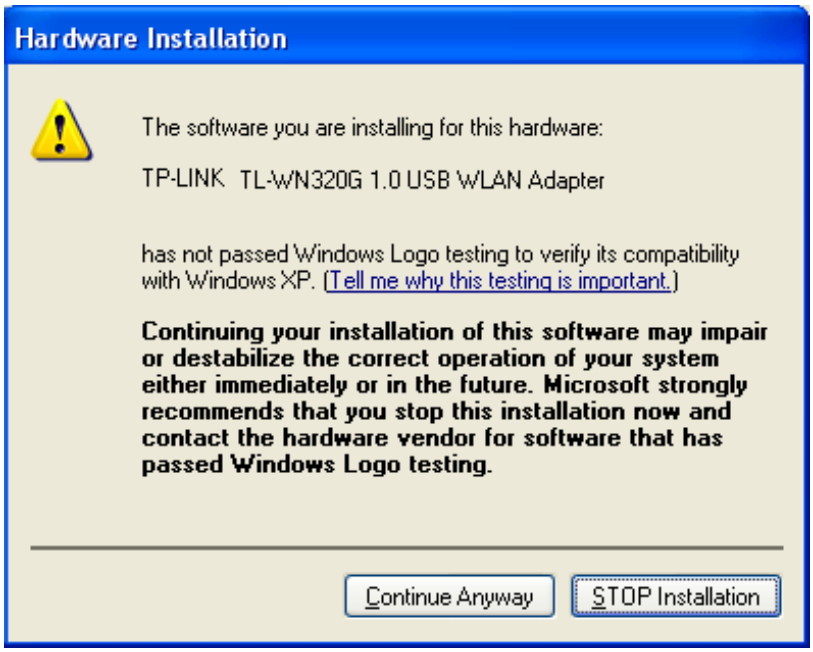

Figure 2-5 Windows XP Warning Box

0. After the files have been successfully copied, the screen in figure 2-6 will appear. Click the **Finish** button to finish the wizard.

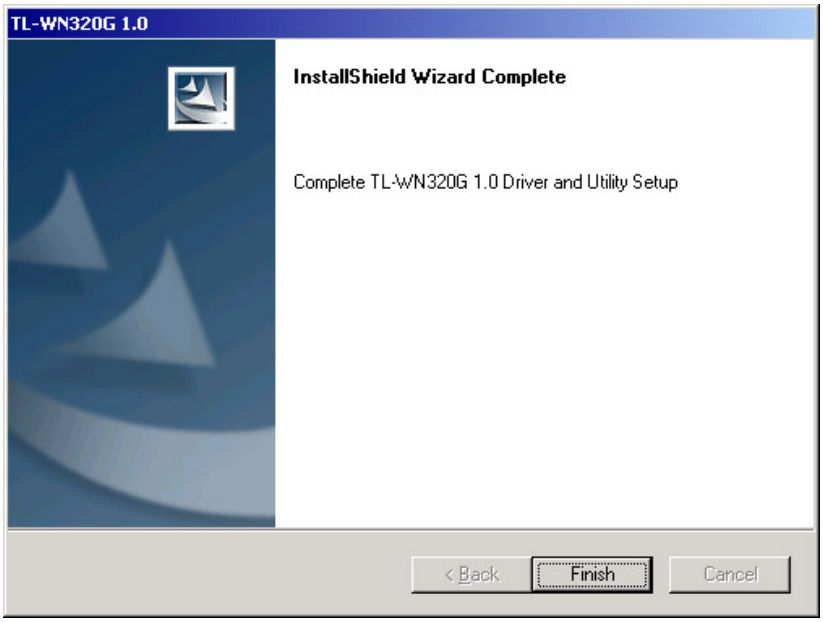

Figure 2-6 Finish

0. After installing the software, Please plug the adapter into your PC. If you need instructions as to how to do this, please refer to section 2.2 Hardware Installation. If you have plugged it into you PC already, please un-plug it and plug it back in. The OS will automatically detect the adapter and automatically setup the driver for the adapter. If it does not, please follow the setup steps to finish the driver installation.

After installing the driver successfully, you should see an icon, or , appear in your system tray

2.2 Hardware Installation

0. Connect one end of the USB cable to the Adapter.

0. Connect the other end of the USB cable to the USB port on your computer. Because the Adapter gets its power from the host, there is no external power supply. The LED should light up when the Adapter is plugged in and the PC is on.

2.3 Uninstall Software

2.3.1 Uninstall the driver software from your PC

0. On the Windows taskbar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
0. Double-click the **System** icon, click on the **Hardware** tab in the **System** window that appears.
0. Click on the **Device Manager** button, double-click **Network Adapters,** and then right-click **TL-WN320G 1.0 USB WLAN Adapter.**

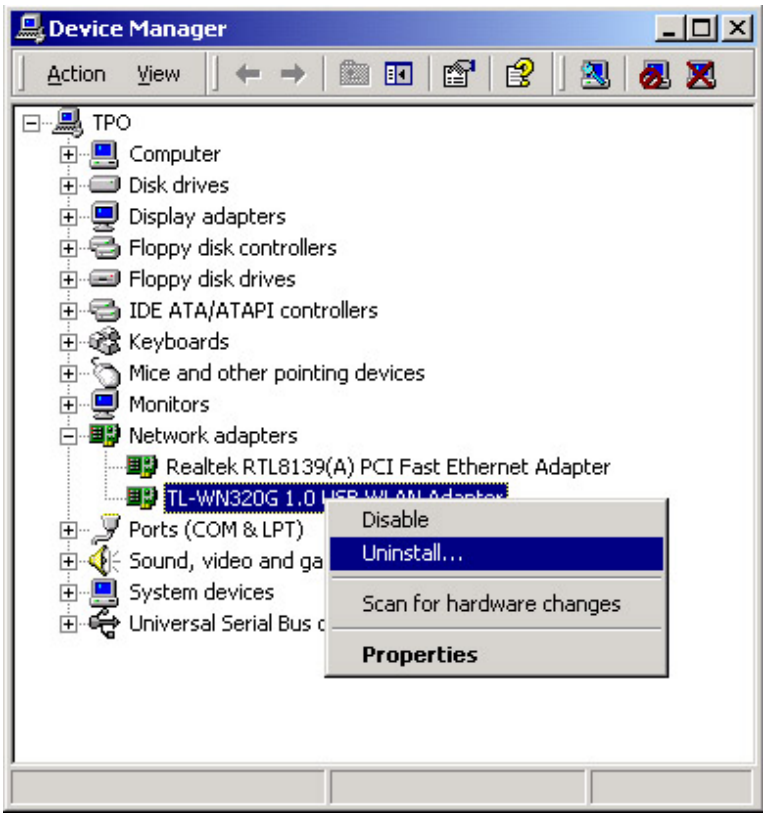

Figure 2-7 uninstall driver

0. Click **Uninstall...**, shown in above figure 2-7, the system will uninstall the driver software of the adapter from your PC.

2.3.2 Uninstall the utility software from your PC

0. You can uninstall the utility software by clicking the **Start**>**Program**>**TP-LINK**> **TL-WN320G 1.0**>**Uninstall TL-WN320G 1.0 Utility**, shown in figure 2-8:

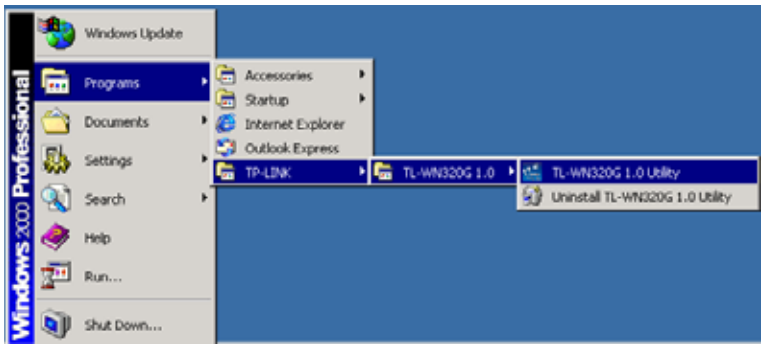

Figure 2-8 uninstall utility software

0. Please follow the Install Shield Wizard steps, the system will uninstall the utility software from your PC automatically.

Chapter 3: Configuration

TP-LINK TL-WN320G Wireless USB Adapter can be configured by its utility. This section describes how to configure your Wireless USB Adapter for wireless connectivity on your Wireless Local Area Network (WLAN) and use the data security encryption features.

After the Adapter's driver and utility has been installed, the adapter's tray icon, or , will appear in your system tray. It means the utility is running on your system. If the utility does not run, you can run the utility by clicking: **Start**> **Program**> **TP-LINK**> **TL-WN320G 1.0**> **TL-WN320G1.0 Utility**. If the icon still does not appear, the driver or utility may be installed incorrectly or the adapter is unplugged, please try again.

Icon , means the connection has been established. Icon , means there is no connection.

Double-click the icon and the configuration screen of the utility will appear. You can also run the utility by clicking: **Start**> **Program**> **TP-LINK**> **TL-WN320G 1.0**> **TL-WN320G1.0 Utility**. The utility provides a complete and easy to use set of tools to:

- Display current status information
- Edit and add configured profiles
- Display current diagnostics information

The section below introduces these above capabilities.

Note: If your OS is Windows XP, you can use Windows XP to configure the wireless network settings. (To use this function, you must update Windows XP to Windows XP sp1).

If you want to use Windows XP to configure wireless network settings, you should exit the utility. Right-click the icon , at the bottom of the screen, and click **Exit** to exit the utility.

3.1 Network Status

The Network Status tab displays the adapter's current status.

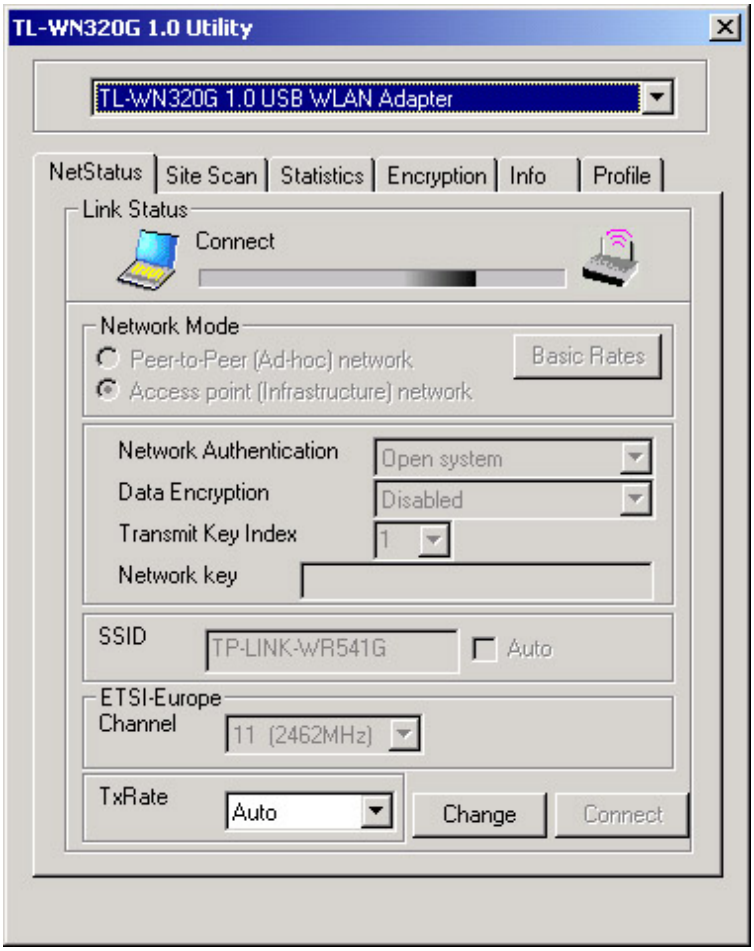

Figure 3-1 Network Status

The following table describes the items found on the Network Status screen.

- **Link Status -** Shows whether the station is connected to the wireless network.
- **Network Mode -** Displays the wireless mode, either Ad-hoc or Infrastructure mode.
- **Network Authentication -** Displays which authentication type that the driver is using. There are four options: **Open System**, **Shared-Key System**, **Auto Switch** and **WPA-PSK**.

  - **Open System -** IEEE802.11 Open System authentication.
  - **Shared-Key System -** IEEE802.11 Shared Key authentication.
  - **Auto Switch -** Select **Shared-Key System** or **Open System** authentication type automatically based on the wireless station request.
  - **WPA-PSK -** WPA authentication type based on pre-shared passphrase.

- **Data Encryption -** Displays which encryption type that the driver is using. When you select **Open System**, **Shared-Key System**, or **Auto Switch** as **Network Authentication,** there are two options: **WEP** and **Disabled**. If you select **WPA-PSK** as **Network Authentication,** there are **TKIP** and **AES** options instead of **WEP** and **Disabled.**
- **Transmit Key Index -** Displays which key group that the adapter is using.
- **Network Key -** The value of the Key in use. When you select **WPA-PSK** as

Network Authentication, this option will change to Passphrase.

- **SSID (S**ervice **S**et **Id**entification**) -** The IEEE 802.11 wireless network name. For the wireless devices in a network to communicate with each other, all devices must be configured with the same SSID. This value is case-sensitive. For example, *TP-LINK* is NOT the same as *TP-Link*.
- **Channel -** Shows the current channel in use. This field determines which operating frequency will be used.
- **TxRate -** Shows the current Transfer rate.

Click the **Change** button to modify the above items. After you have modified any desired items on this page, you can click the **Connect** button to establish the wireless network connection or click the **Undo** button to restore previous values.

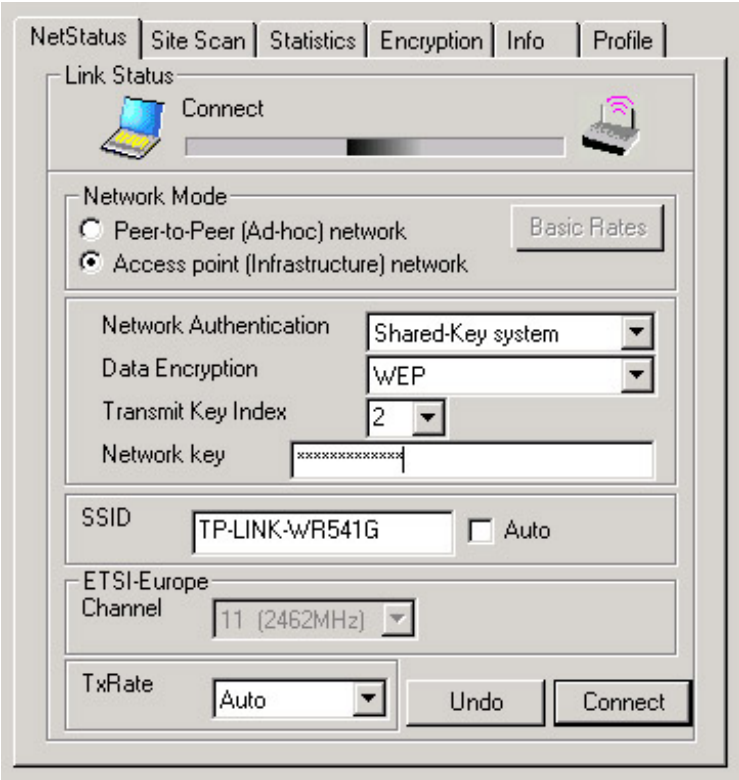

Figure 3-2 Modify – Shared-Key system

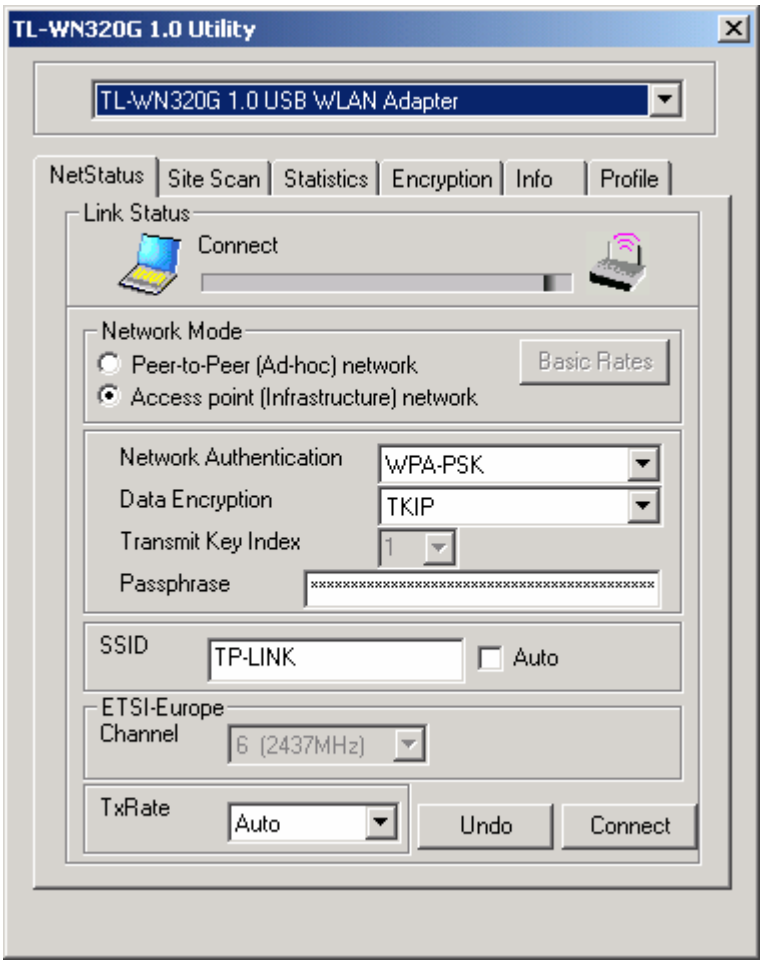

Figure 3-2a Modify - WPA-PSK

3.2 Site Scan

Click the **Site Scan** tab of the Utility and the **Site Scan** screen will appear, figure 3-3. On the **Site Scan** screen you can scan the Available Infrastructure and Ad Hoc Networks.

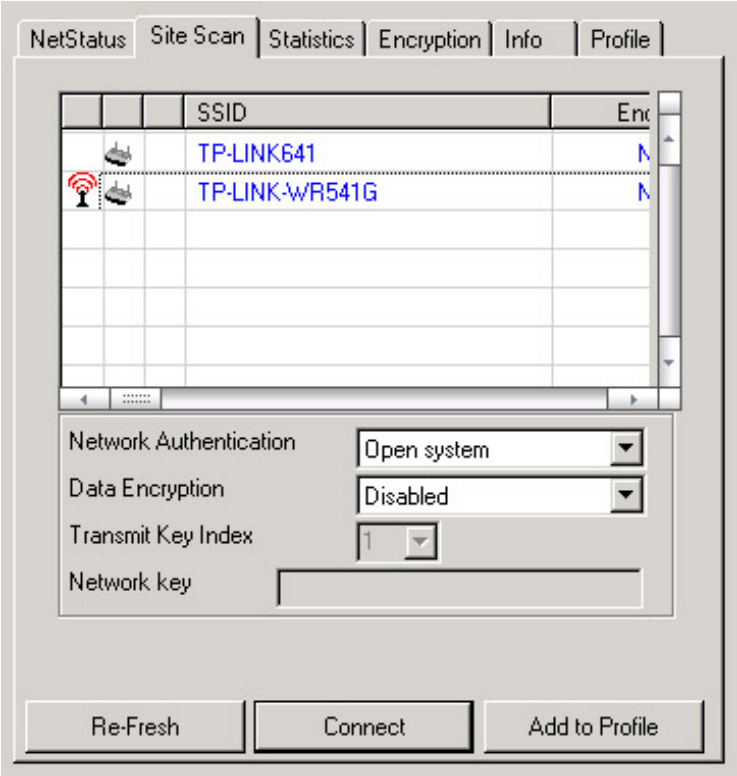

Figure 3-3 Site Scan tab

Click the **Re-Fresh** button to refresh the list at any time. Highlight an SSID and click the **Connect** button to connect to an available network. If the network is encrypted, you should complete the network encryption items first.

If you want to save the current configuration for the connection, please click the **Add to Profile** button and the utility will prompt a screen for configuration, shown in figure 3-4:

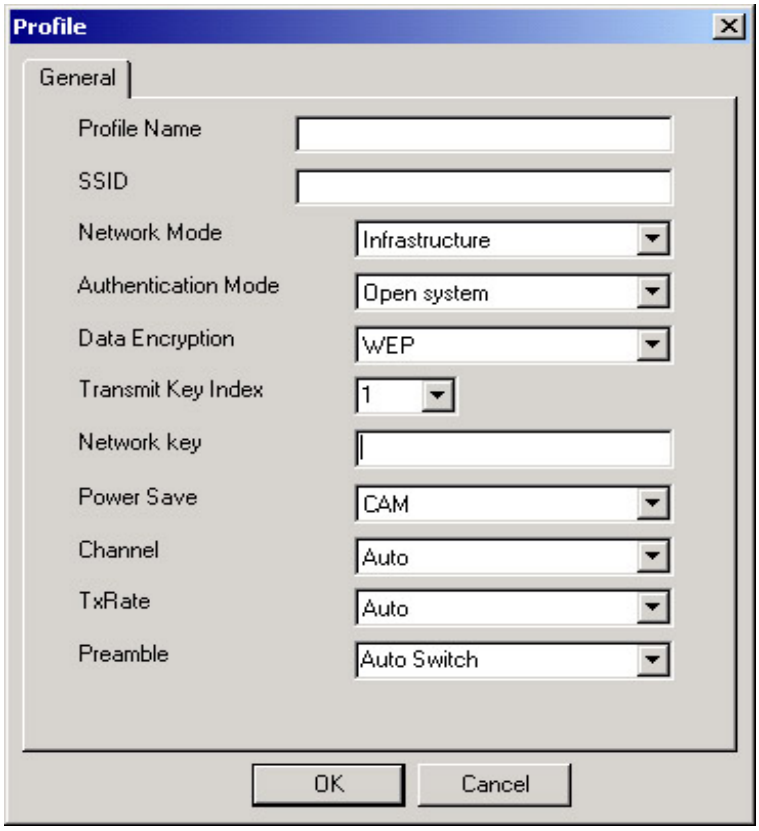

Figure 3-4 Profile

Fill in the above items carefully and click OK to save it. The items found on the Network Status screen are described below:

- **Profile Name -** The name of current selected configuration profile.
- **Power Save -** The power save mode, either **CAM** or **MAX PSP**, or **Fast PSP**
  - **CAM -** Continuous Access Mode.
  - **MAX PSP -** Maximum Power Saving.
  - **Fast PSP -** Fast Power Saving mode.
- **Preamble -** Specifies the preamble setting in 802.11b. The default setting is Auto Switch (access point mode), which allows both short and long headers in the 802.11b frames. The adapter can only use short radio headers if the access point supports and uses them.

Note:

0. If you need instructions as to how to configure other items on this screen, please refer to section 3.1 Network Status.
0. The last four items usually need not change.

3.3 Statistics

The **Statistics** tab shows receiving and transmitting statistical information.

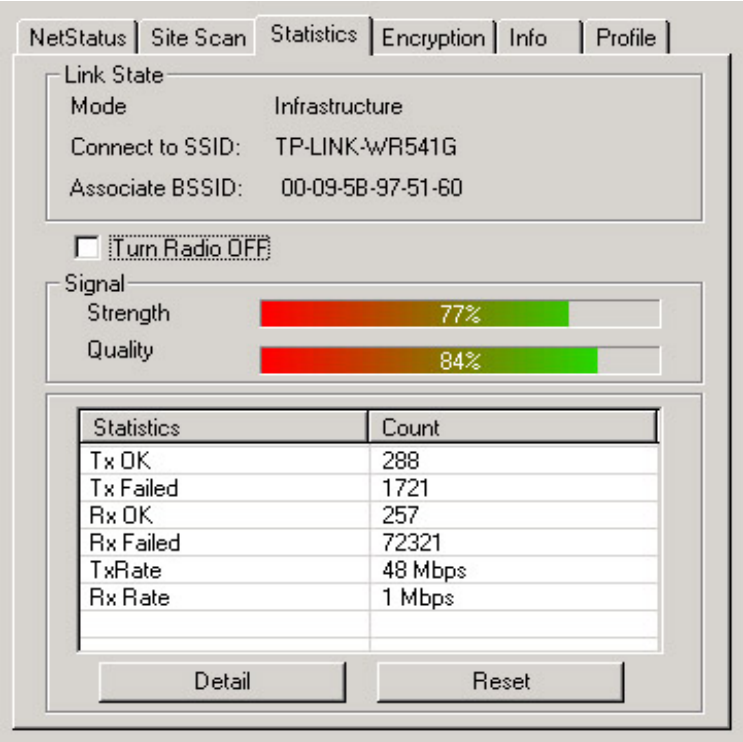

Figure 3-5 Statistics tab

- **Link State -** Displays the current link status for the wireless adapter including **Mode**, **Connect to SSID** and **Associate BSSID**.
  - **Mode -** Displays the current network mode, either **Ad-hoc** or **Infrastructure**.
  - **Connect to SSID -** Displays the current SSID of the wireless network the adapter has connected to.
  - **Associate BSSID -** Displays the current BSSID of the wireless network the adapter associated.
- **Signal Strength** and **Signal Quality -** Display the strength and quality of the signal. In Ad-Hoc mode, this item will not be displayed here.
- **Turn Radio OFF -** The wireless radio of this adapter can be enabled or disabled. You can turn the wireless radio off by selecting the check-box.
- **Statistics Information -** This field displays receiving and transmitting statistics information of the adapter, including Tx OK, Tx Failed, Rx OK and Rx Failed. If you desire more information about this adapter, please click the **Detail** button. Click the **Reset** button to reset the count of the statistics information.

3.4 Encryption

On this Screen, you can configure the WEP key or view the configured WEP key.

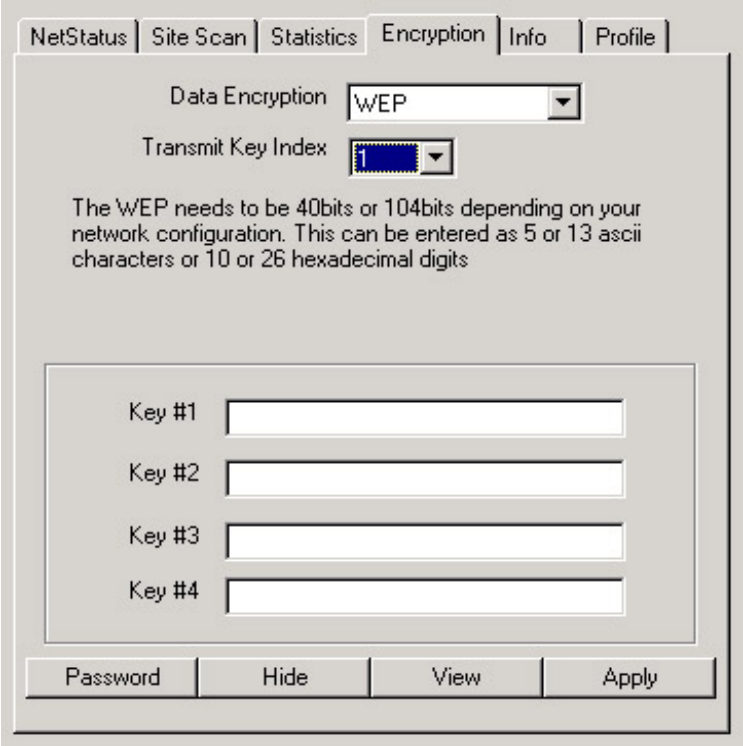

Figure 3-6 Encryption tab

- **Data Encryption**: Selects the data encryption type, either WEP or Disabled. If you select Disabled, the following fields do not need to be filled.
- **Transmit Key Index**: Selects which the key group that the adapter will use.
- **Key #1, Key #2, Key #3, Key #4**: The Key groups. You can enter 10 hexadecimal digits (any combination of 0-9, a-f, A-F) or 5 ASCII characters for 64-bit (also called 40bits) encryption. You can enter 26 hexadecimal digits (any combination of 0-9, a-f, A-F) or 13 ASCII characters for 128-bit (also called 104bits) encryption.

Click the **Password** button to enter the password for viewing the key.
Click the **Hide** button to hide the keys in "*" format.
Click the **View** button to view hidden keys. Note: you need to enter the password to view hidden keys. The password can be set by clicking the **Password** button.
Click the **Apply** button to save the keys.

3.5 Info

This screen displays some information about this adapter, including Driver Date, Driver Version, Utility Date, Utility Version, MAC Address, IP Address, SubMask, Power Save mode and Preamble.

- **Driver Date -** The creation date of the wireless network adapter driver.
- **Driver Version -** The version of the wireless network adapter driver.
- **Utility Date -** The creation date of this utility.
- **Utility Version -** The version of this utility.
- **MAC Address -** The MAC address of the wireless network adapter.
- **IP Address -** The IP address of the wireless network.
- **SubMask -** The subnet mask of the wireless network.

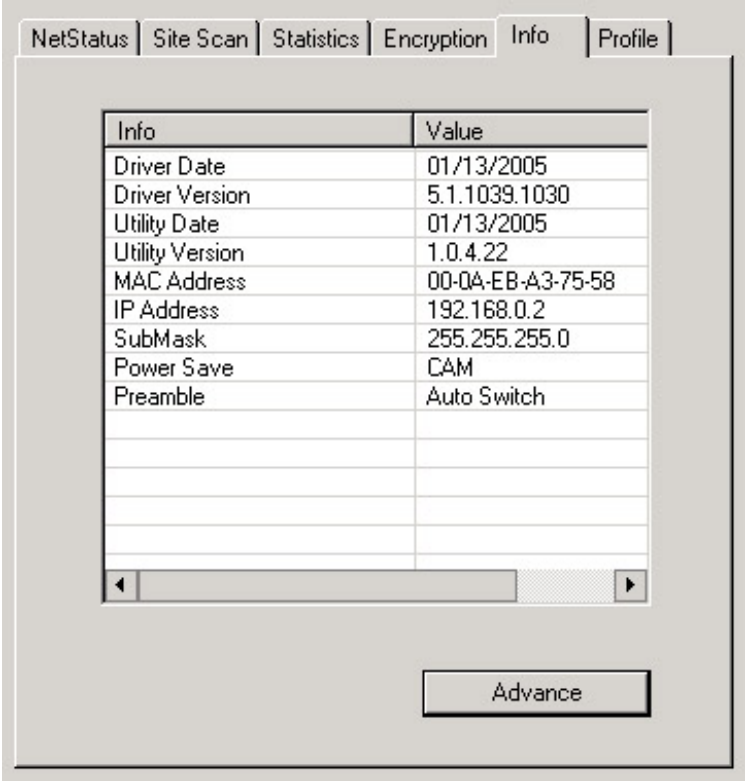

Figure 3-7 Info.

The screen will appear shown in figure 3-8, after you click the **Advance** button. On this screen, you can configure **Power Save** mode and **Preamble** mode.

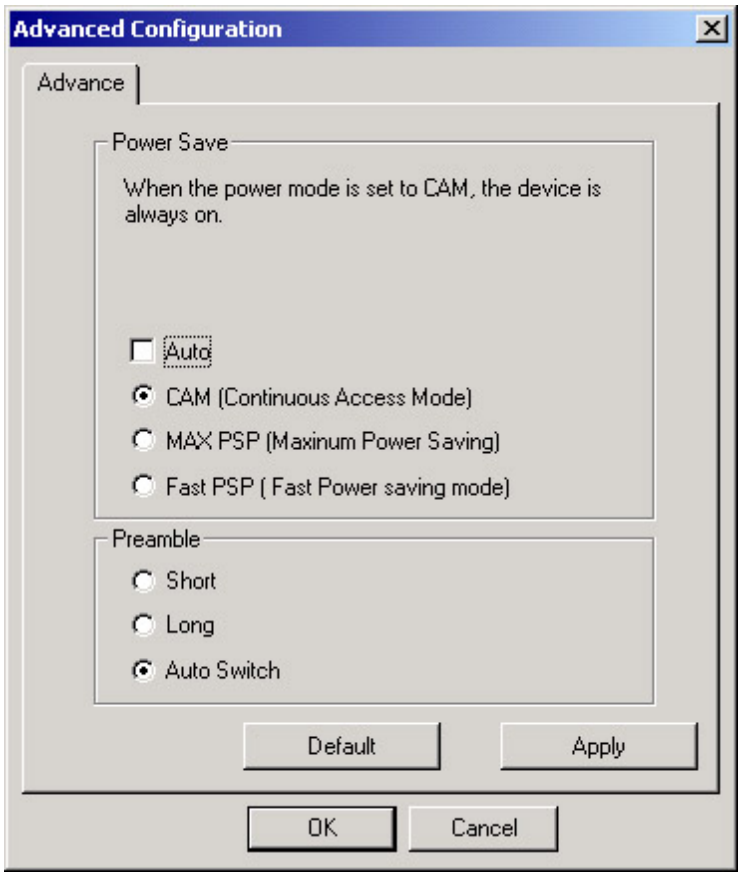

Figure 3-8 Advanced configuration

3.6 Profile

Click the **Profile** tab of the utility and the **Profile** screen will appear, figure 3-9. The **Profile** screen provides tools to:

- Create a profile
- Delete a profile
- Edit a profile
- Add to Profile

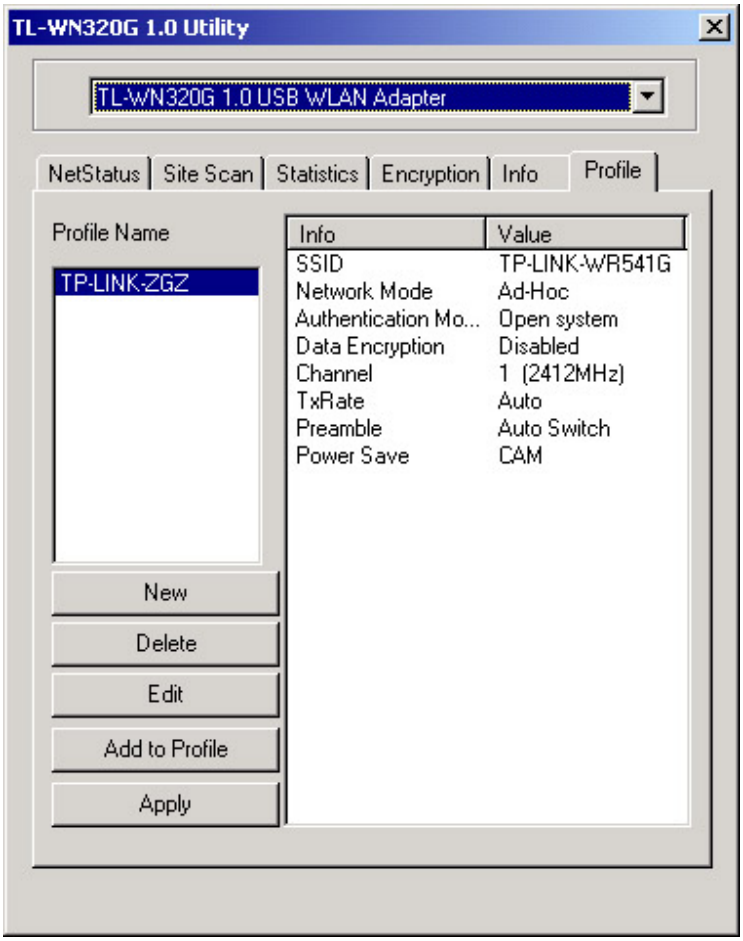

Figure 3-9 Profile Tab

To create a new profile, click the **New** button on the Profile tab, the **Profile** configuration screen will appear shown in figure 3-10. If you need instructions as to how to configure profile, please refer to section 3.2 Site Scan.

To edit a profile, highlight the desired profile name on **Profile Name** list, and click the **Edit** button, the **Profile** configuration screen will appear shown in figure 3-10.

To delete a profile, highlight the desired profile name on **Profile Name** list, and click the **Delete** button.

To switch to another profile, highlight the desired profile name on **Profile Name** list, and click the **Apply** button.

If the utility scans automatically and establishes a connection, the **Add to Profile** button

will be enabled, click this button and enter a name to save this profile.

Note: Do not forget to click the **Apply** button when you create a new profile for connection.

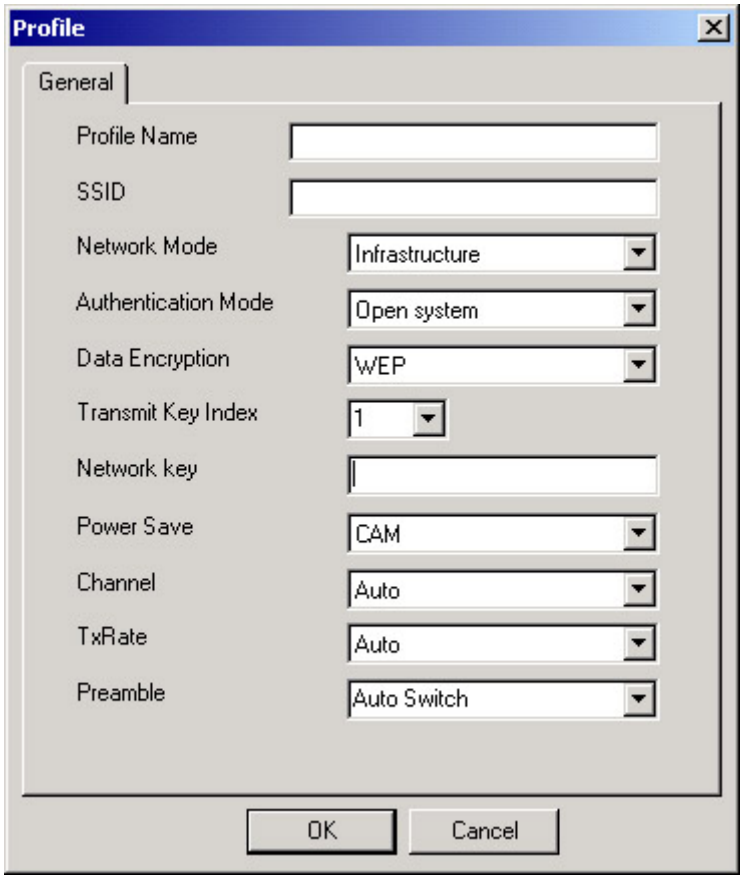

Figure 3-10 Profile configuration

3.7 An example for application

Suppose you have an installed and using AP, its SSID is TPLINK and adopts 64-bit encryption with the key 0123456789. To establish a connection with this AP, you should follow these steps below:

0. Launch TL-WN320G 1.0 Utility.
0. Click the **Profile** tab of the utility and click the **New** button on the screen that appears.
0. The Profile configuration screen will appear, please enter *Test* for the Profile Name, *TPLINK* for the SSID, select *Infrastructure* for the Network Mode, select *WEP* for the Data Encryption and enter *0123456789* for Network key.
0. Click **OK** to save this profile.
0. Click **Apply** on the Profile screen. The utility will establish a connection with this AP by configured profile.

Appendix A: Specifications

Normal	
Interface	A-type USB 2.0 Connector
Standards	IEEE802.11b; IEEE802.11g
Operating System	Windows 2000; Windows XP; Windows Me; Windows 98SE
Transmission Distance	In door up to 100m, out door up to 300m (it is limited to the environment).
Radio Data Rate	54/48/36/24/12/9/6/11/5.5/2/1 Mbps (Auto Rate Sensing)
Modulation	1M DBPSK; 2M DQPSK; 5.5M, 11M CCK; 6M, 9M, 12M, 18M, 24M, 36M, 48M, 54M OFDM;
Media Access Protocol	CSMA/CA with ACK
Transmit Power	18dBm (Typical)
Data Security	WPA; 64/128 BIT WEP; TKIP/AES
Frequency	2.4 ~ 2.4835GHz
Spread Spectrum	Direct Sequence Spread Spectrum (DSSS)
Power Consumption	Typically 480mA in full Transmit (TX), 420mA in full Receive (RX)
Safety & Emissions	FCC, CE

Physical Environmental	
Operating Temp	0℃~40℃ (32℉~104℉)
Storage Temp	-40℃ – 70℃ (-40℉~158℉)
Humidity	10% - 95% RH, Non-condensing
Dimensions (W×D×H)	3.9×1.2×.4 in. (100×30×11 mm)

Appendix B: Glossary

- **802.11b -** The 802.11b standard specifies a wireless networking at 11 Mbps using direct-sequence spread-spectrum (DSSS) technology and operating in the unlicensed radio spectrum at 2.4GHz, and WEP encryption for security. 802.11b networks are also referred to as Wi-Fi networks.

- **802.11g -** specification for wireless networking at 54 Mbps using direct-sequence spread-spectrum (DSSS) technology, using OFDM modulation and operating in the unlicensed radio spectrum at 2.4GHz, and backward compatibility with IEEE 802.11b devices, and WEP encryption for security.

- **Ad-hoc Network -** An ad-hoc network is a group of computers, each with a wireless adapter, connected as an independent 802.11 wireless LAN. Ad-hoc wireless computers operate on a peer-to-peer basis, communicating directly with each other without the use of an access point. Ad-hoc mode is also referred to as an Independent Basic Service Set (IBSS) or as peer-to-peer mode, and is useful at a departmental scale or SOHO operation.

- **DSSS** (**D**irect-**S**equence **S**pread **S**pectrum) **-** DSSS generates a redundant bit pattern for all data transmitted. This bit pattern is called a chip (or chipping code). Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the receiver 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. However, to an intended receiver (i.e. another wireless LAN endpoint), the DSSS signal is recognized as the only valid signal, and interference is inherently rejected (ignored).

- **FHSS** (**F**requency **H**opping **S**pread **S**pectrum) **-** FHSS continuously changes (hops) the carrier frequency of a conventional carrier several times per second according to a pseudo-random set of channels. Because a fixed frequency is not used, and only the transmitter and receiver know the hop patterns, interception of FHSS is extremely difficult.

- **Infrastructure Network -** An infrastructure network is a group of computers or other devices, each with a wireless adapter, connected as an 802.11 wireless LAN. In infrastructure mode, the wireless devices communicate with each other and to a wired network by first going through an access point. An infrastructure wireless network connected to a wired network is referred to as a Basic Service Set (BSS). A set of two or more BSS in a single network is referred to as an Extended Service Set (ESS). Infrastructure mode is useful at a corporation scale, or when it is necessary to connect the wired and wireless networks.

- **Spread Spectrum -** Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case

of narrowband transmission, but the trade off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread-spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

- **SSID -** A **S**ervice **S**et **Id**entification is a thirty-two character (maximum) alphanumeric key identifying a wireless local area network. For the wireless devices in a network to communicate with each other, all devices must be configured with the same SSID. This is typically the configuration parameter for a wireless PC card. It corresponds to the ESSID in the wireless Access Point and to the wireless network name.
- **WEP** (**W**ired **E**quivalent **P**rivacy) **-** A data privacy mechanism based on a 64-bit or 128-bit or 152-bit shared key algorithm, as described in the IEEE 802.11 standard.
- **Wi-Fi -** A trade name for the 802.11b wireless networking standard, given by the Wireless Ethernet Compatibility Alliance (WECA, see http://www.wi-fi.net), an industry standards group promoting interoperability among 802.11b devices.
- **WLAN** (**W**ireless **L**ocal **A**rea **N**etwork) - A group of computers and associated devices communicate with each other wirelessly, which network serving users are limited in a local area.
- **WPA** (**W**i-Fi **P**rotected **A**ccess) **-** A wireless security protocol use TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.

Appendix C: Contact Information

For help with the Installation or operation of the TP-LINK TL-WN320G Wireless Adapter, please contact us.

E-mail: support@tp-link.com
Website: http://www.tp-link.com