

# **PROWARE**

The Reliable Partner

## **PW-MN527**

### **300Mbps Wireless N USB Module**

#### **User Guide**

**Version 1.0**

**July 31, 2012**

**PROWARE TECHNOLOGIES CO., Ltd.**

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## Important:

**This product is only for Consumer Electronics device factory's using. Terminal customers will not have direct access to buy and use this product.**

## Revision History

Release	Date	Revision	Initials
1.0	2012-7-31	First release.	

## FCC STATEMENT



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## FCC RF 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 & your body.

**This device is intended only for OEM integrators under the following conditions:**

- The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

**IMPORTANT NOTE:** In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

### **End Product Labeling**

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: **WWMMN527V1** . The grantee's FCC ID can be used only when all FCC compliance requirements are met.

### **Manual Information To the End User**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

### **CE Mark Warning**

# CE 1588

This is a class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

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## Package Contents

The following items should be found in your package:

- PW-MN527 300Mbps Wireless N USB Module

 **Note:**

Make sure that the package contains the above items. If any of the listed items are damaged or missing, please contact with your distributor.

### Conventions:

The 'Module' mentioned in this user guide stands for PW-MN527 300Mbps Wireless N USB Module without any explanations.

# Chapter 1 Introduction

Thank you for choosing the **PW-MN527 300Mbps Wireless N USB Module!**

## 1.1 Overview of the Product

The module is an 802.11n client device. It is mainly designed to provide a high-speed and unrivaled wireless performance for wireless embedded system application. With a faster wireless connection, you can get a better Internet experience without the cost of running network cables.

With the 802.11n technology, the PW-MN527 auto-sensing capability allows high packet transfer rate of up to 150Mbps for maximum throughput. It has good capability on anti-jamming, and it can also interoperate with other wireless (802.11b/g/n) products. The module supports WEP, WPA and WPA2 encryption to prevent outside intrusion and protect your personal information from being exposed.

With unmatched wireless performance, reception, and security protection, it is easily to be used in different kinds of wireless embedded system for its size and portable.

### **Note:**

The PW-MN527 is designed to be used in the set-top box;

The Antennas printed on the PCB will not be in use under any circumstance.

## 1.2 Features

- Complies with IEEE802.11n, IEEE802.11g, IEEE802.11b standards
- Supports WPA/WPA2 data security, IEEE802.1x authentication, TKIP/AES encryption, 64/128-bit WEP encryption
- Supports high rate of up to 300Mbps for maximum throughput, supports automatically adjust to lower speeds due to distance or other operating limitations
- Provides USB interface
- Supports Ad-Hoc and Infrastructure modes
- Good capability on anti-jamming
- Supports roaming between access points when configured in Infrastructure mode
- Ease to configure and provides monitoring information
- Supports Windows XP, 7



## Chapter 2 Installation Guide

### 2.1 Hardware Installation

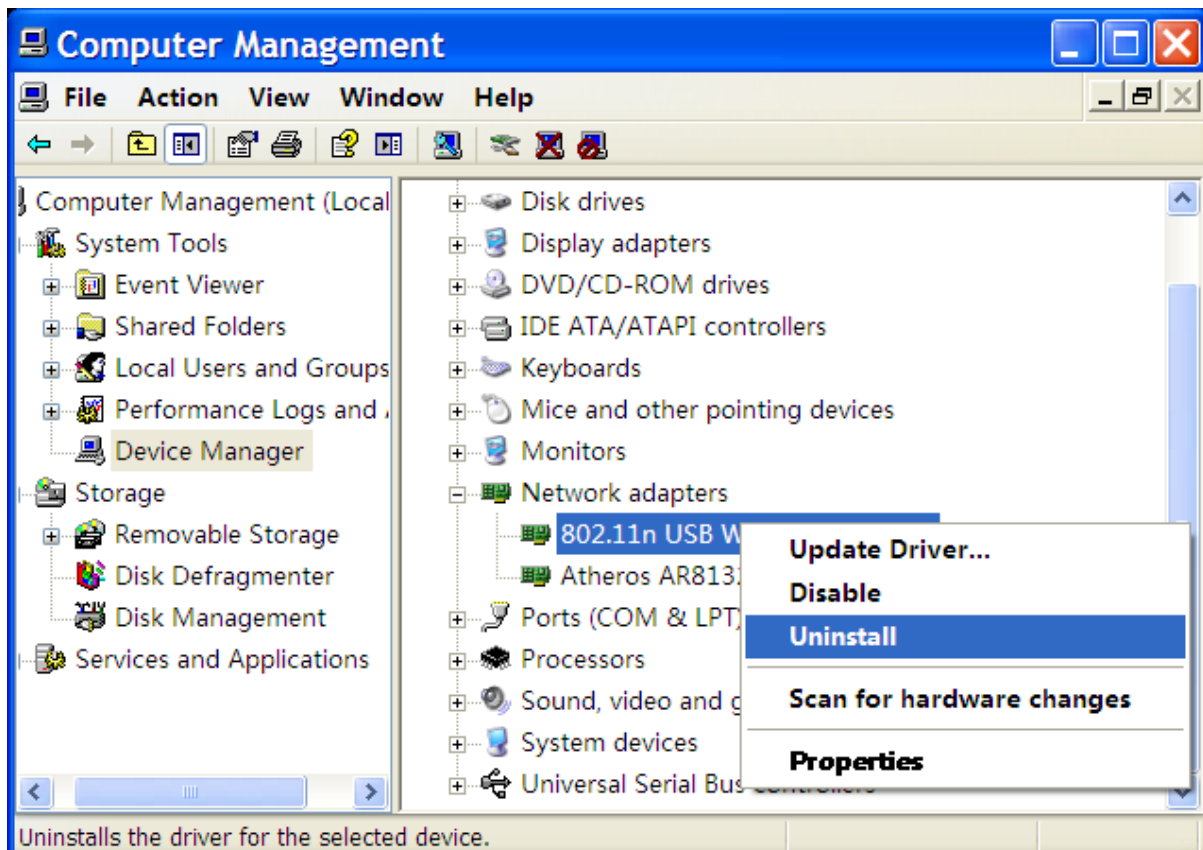
PW-MN527 has USB interface, and it is mainly designed to provide stability wireless function and performance for your system.

For installation, you must be sure to connect this module to your device or system with a connecting wire first. Then, the promoted Found New Hardware Wizard will pop up if the Module is installed correctly.

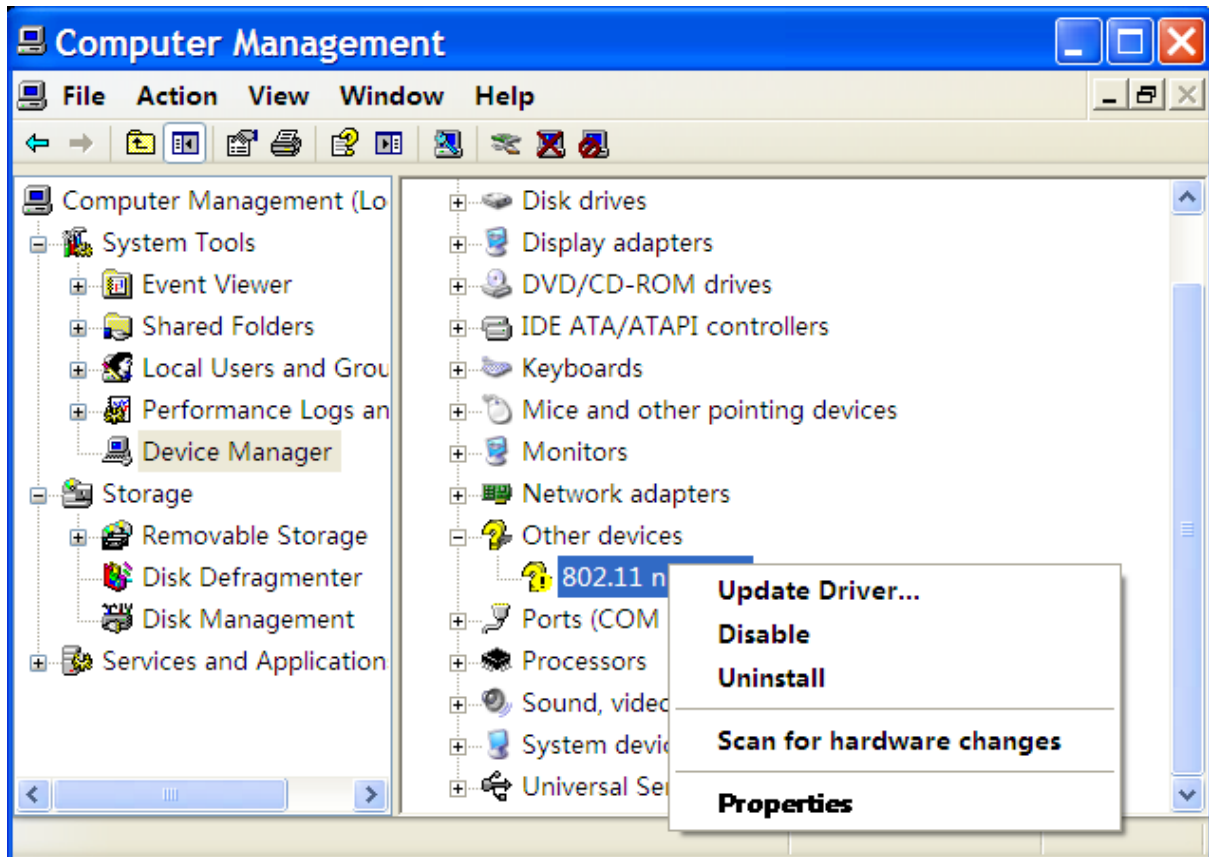
### 2.2 Software Installation

Take PW-MN527 300Mbps Wireless N USB Module XP driver for example as below:

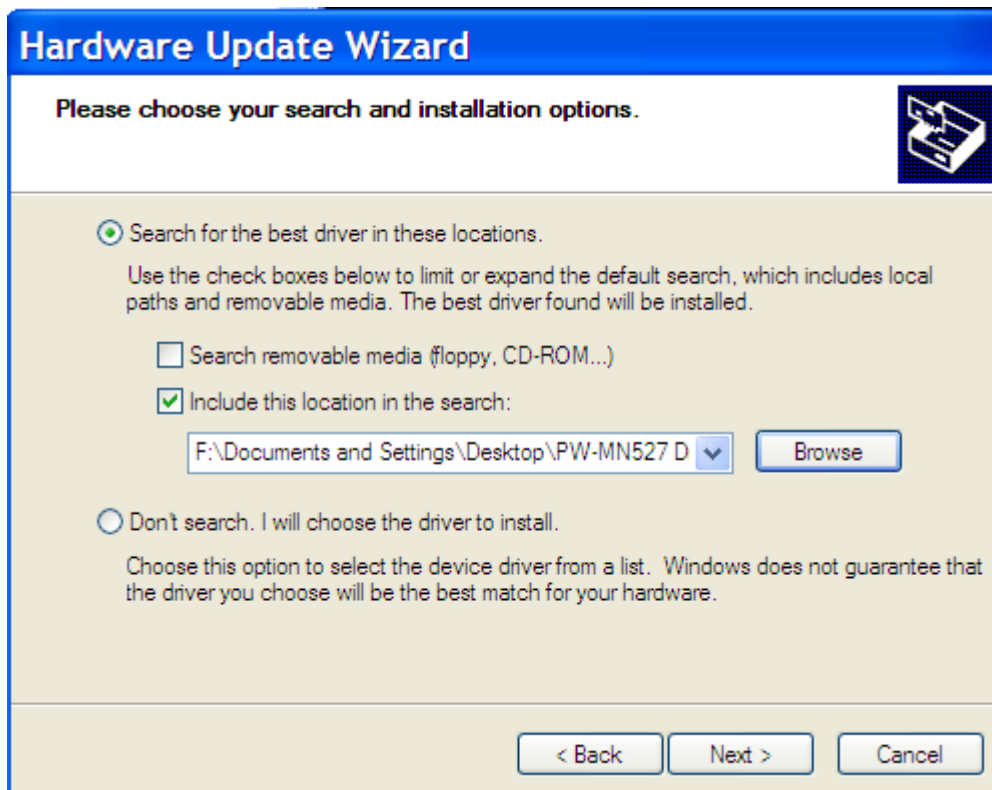
1. First decompress the driver package to the local PC. The generated x86 directory is for XP 32bit, and x64 directory is for XP 64bit.
2. Plug in the card and open the device manager. If the card has been installed before, please uninstall it first.



3. Click 'Update Driver...' to update the driver



4. Select 'Install from a list or specific location (Advanced)' and then click 'Next'



5. Select 'Search for the best driver in these locations' and then click 'Browse'

## Hardware Update Wizard

Please choose your search and installation options.



Search for the best driver in these locations.

Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.

Search removable media (floppy, CD-ROM...)

Include this location in the search:

F:\Documents and Settings\Desktop\PW-MN527 D

Browse

Don't search. I will choose the driver to install.

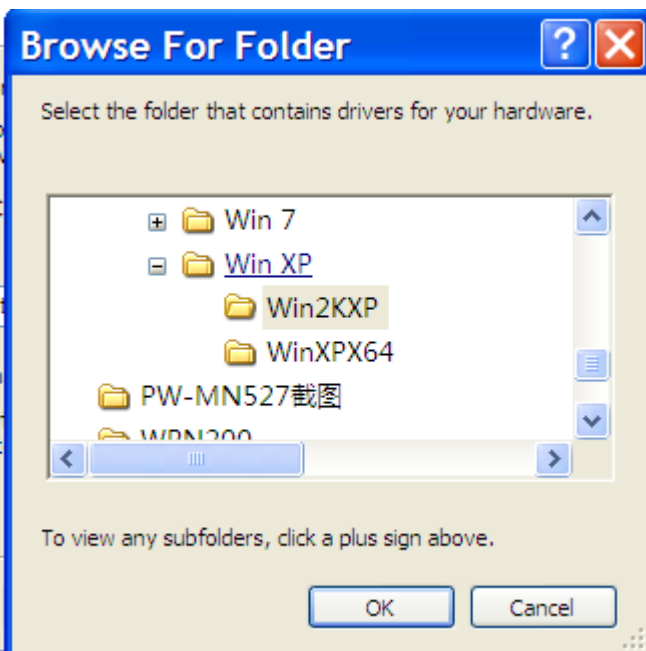
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

< Back

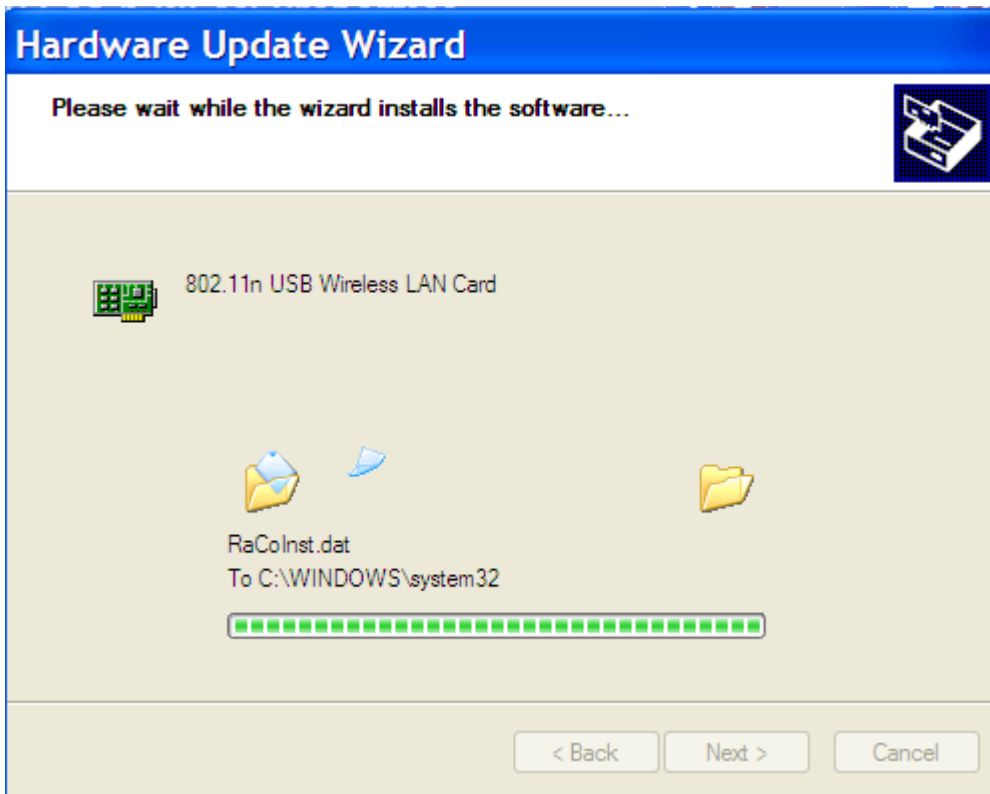
Next >

Cancel

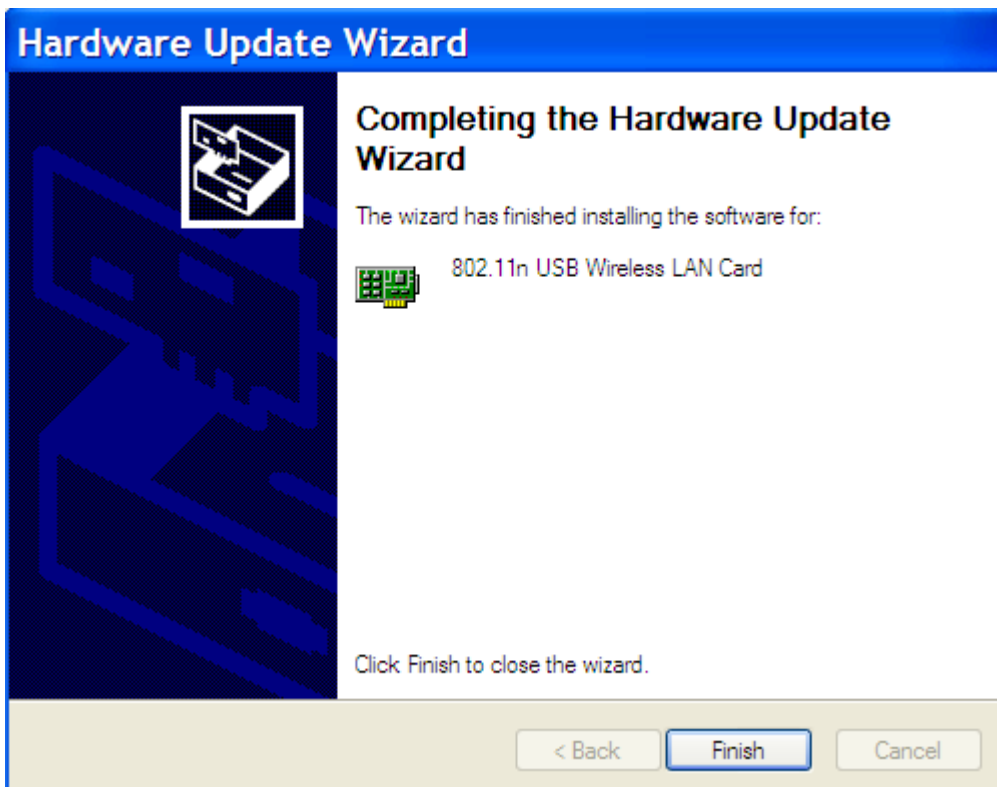
6. Select the file which we decompress at step 1 and then click 'OK'



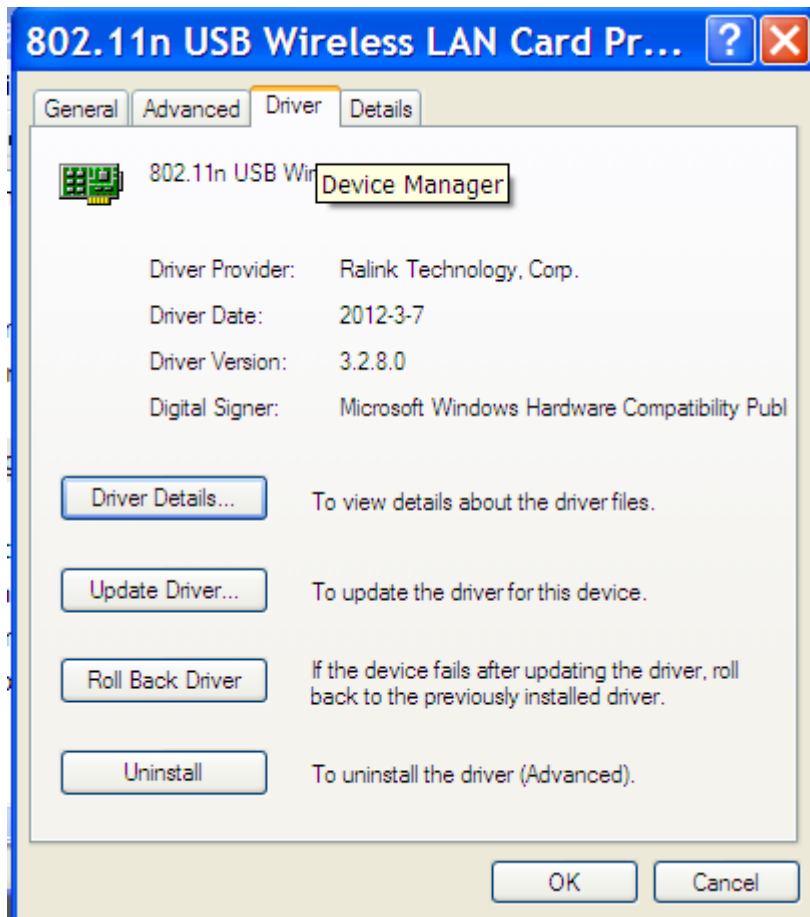
7. Click 'Next' to start the driver update



8. Finally click 'Finish'



9. If you want to check if the driver is installed successfully, please click 'Properties' of the card in the Device Manager. Click driver label to see the detail information.



## Chapter 3 Linux Installation Guide (For Consumer Electronics)

### 3.1 Hardware Installation

For the Consumer Electronics products which use PW-MN527, it must provide a corresponding connector for the module. After connecting the module to the device, the hardware installation is finished.

### 3.2 Software Installation

For the Consumer Electronics products, the Linux Driver of PW-MN527 is embedded in default. So the module is a plug and play device. After connecting the module to the device, PW-MN527 will work well.

## Appendix A: Specifications

<b>Normal</b>	
Interface	USB 2.0 Interface
Standards	IEEE802.11n; IEEE802.11g; IEEE802.11b;
Operating System	Windows XP, 7
Throughput	300Mbps (Maximal)
Radio Data Rate	11b: up to 11Mbps (Dynamic) 11g: up to 54Mbps (Dynamic) 11n: up to 300Mbps (Dynamic)
Modulation	BPSK, QPSK, 16-QAM, 64-QAM, DBPSK, DQPSK, and CCK
Media Access Protocol	CSMA/CA with ACK
Data Security	WPA/WPA2; 64/128-bit WEP; TKIP/AES
Frequency	2.4 ~ 2.4835GHz
Spread Spectrum	Direct Sequence Spread Spectrum (DSSS)
Safety & Emissions	FCC, CE

 **Note:**

For regional restriction, products sold in the USA are restricted to channel 1~11; and there is no option for the users in the USA to choose other counties.

<b>Environmental and Physical</b>	
Operating Temp.	0°C~60°C (32°F~140°F)
Storage Temp.	-40°C~ 80°C (-40°F~176°F)
Humidity	10% ~ 90% RH, Non-condensing
PCB Size	43.00* 17.00* 1.6 mm (1.7 * 0.67 * 0.06 in)

## Appendix B: Glossary

- **802.11b** - The 802.11b standard specifies a wireless product 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.
- **802.11n** - 802.11n builds upon previous 802.11 standards by adding MIMO (multiple-input multiple-output). MIMO uses multiple transmitter and receiver antennas to allow for increased data throughput via spatial multiplexing and increased range by exploiting the spatial diversity, perhaps through coding schemes like Alamouti coding. The Enhanced Wireless Consortium (EWC)<sup>[3]</sup> was formed to help accelerate the IEEE 802.11n development process and promote a technology specification for interoperability of next-generation wireless local area networking (WLAN) products.
- **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 - (Direct-Sequence Spread Spectrum)** - 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 of 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 - (Frequency Hopping Spread Spectrum)** - 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).

- **WEP - (Wired Equivalent Privacy)** - 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. To gain access to a WEP network, you must know the key. The key is a string of characters that you create. When using WEP, you must determine the level of encryption. The type of encryption determines the key length. 128-bit encryption requires a longer key than 64-bit encryption. Keys are defined by entering in a string in HEX (hexadecimal - using characters 0-9, A-F) or ASCII (American Standard Code for Information Interchange – alphanumeric characters) format. ASCII format is provided so you can enter a string that is easier to remember. The ASCII string is converted to HEX for use over the network. Four keys can be defined so that you can change keys easily.
- **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 - (Wireless Local Area Network)** - A group of computers and associated devices communicate with each other wirelessly, which network serving users are limited in a local area.
- **WPA - (Wi-Fi Protected Access)** - A wireless security protocol uses TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.