PROWARE®

User Guide

PW-MN561

300Mbps Wireless N Mini PCI Adapter

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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:

1) This device may not cause harmful interference.
2) This device must accept any interference received, including interference that may cause undesired operation.

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

The final end host device which contains this module must be labeled in a visible area with "Contains FCC ID: WWMMN561V2".

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.

"To comply with FCC RF exposure compliance requirements, this grant is applicable to only Mobile Configurations. The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

CE Mark Warning

CE ①

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.

National Restrictions

2400.0-2483.5 MHz

Country	Restriction	Reason/remark
Bulgaria		General authorization required for outdoor use and public service
France	Outdoor use limited to 10 mW e.i.r.p. within the band 2454-2483.5 MHz	Military Radiolocation use. Refarming of the 2.4 GHz band has been ongoing in recent years to allow current relaxed regulation. Full implementation planned 2012
Italy		If used outside of own premises, general authorization is required
Luxembourg	None	General authorization required for network and service supply(not for spectrum)
Norway	Implemented	This subsection does not apply for the geographical area within a radius of 20 km from the centre of Ny-Ålesund
Russian Federation		Only for indoor applications

Note: Please don't use the product outdoors in France.

CONTENTS

Package Contents

The following items should be found in your package:

➢ PW-MN561 300Mbps Wireless N Mini PCI Adapters

☞ **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 'Adapter' mentioned in this user guide stands for PW-MN561 300Mbps Wireless N Mini PCI Adapter without any explanations.

Chapter 1 Introduction

Thank you for choosing the **PW-MN561 300Mbps Wireless N Mini PCI Adapter**!

1.1 Overview of the Product

The adapter is an 802.11n client device; it is mainly designed to provide a high-speed and unrivaled wireless performance for wireless embedded system application, such as EPON. Of course, it also can be used into your notebook because of its standard Mini-PCI interface. With a faster wireless connection, you can get a better Internet experience, such as downloading, gaming, video streaming and so on.

With the 802.11n technology, higher throughput improvements using MIMO (multiple input, multiple output antennas), the PW-MN561's auto-sensing capability allows high packet transfer rate of up to 300Mbps for maximum throughput. It has good capability on anti-jamming, and it can also interoperate with other wireless (802.11b) products. The adapter 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 mini size and portable.

1.2 Features

➢ Complies with IEEE802.11n, IEEE802.11g, IEEE802.11b standards
➢ Supports WPA/WPA2 data security, IEEE802.1x authentication, TKIP/AES encryption, 64/128/152-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 32-bit mini-PCI 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 2000, XP, Vista, 7
➢ Built-in two internal antennas which are listed in a format of 2x2 for two receivers and two transmitters.

Chapter 2 Installation Guide

2.1 Hardware Installation

PW-MN561 has standard 32-bit Mini-PCI interface, and it is mainly designed to provide stability wireless function and performance for your system.

For installation, you must make sure that your device or system has the same slot for inserting this adapter. And then, it is necessary to clean the device's slot and adapter's gold finger to ensure both electrical properties fine. Finally, insert the adapter and finish the installation.

2.2 Software Installation

For it is mainly used in some embedded device, we don't provide separate driver or utility. If this adapter is used as its design, the device provider already integrates its driver to the whole system software.

In the other hand, some users will get and use it in their own device, such as notebook. In this condition, you can operate as the prompt of OS show to install driver.

☞**Note:**

In the second situation, the driver will be installed online.

Appendix A: Specifications

Normal	
Interface	32 bit Mini PCI Interface
Standards	IEEE802.11n; IEEE802.11g; IEEE802.11b;
Operating System	Windows 2000, XP, Vista
Throughput	300Mbps (Maximal)
Radio Data Rate	27/54/81/108/162/216/243/270Mbps 13.5/27/40.5/54/81/108/121.5/135Mbps 13/26/39/52/78/104/117/130Mbps 6.5/13/19.5/26/39/52/58.5/65Mbps 1/2/5.5/11Mbps (Auto Rate Sensing)
Modulation	11b:CCK,QPSK,BPSK; 11g:OFDM; 11n: QPSK,BPSK,16-QAM,64-QAM
Media Access Protocol	CSMA/CA with ACK
Data Security	WPA/WPA2; 64/128/152-bit WEP; TKIP/AES
Frequency	2.4 ~ 2.4835GHz
Spread Spectrum	Direct Sequence Spread Spectrum (DSSS)
Safety & Emissions	FCC, CE

Environmental and Physical	
Operating Temp.	0℃~40℃ (32℉~104℉)
Storage Temp.	-40℃~ 70℃ (-40℉~158℉)
Humidity	10% ~ 95% RH, Non-condensing

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)[3] 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 -** (**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 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 -** (**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).

➢ **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. 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 -** (**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 uses TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.