MSI MS-3871
Wireless 11b/g/n + Bluetooth BT2.1 EDR
Combo Slim Module

User's Guide

FCC Caution

1. The 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.
2. FCC RF Radiation Exposure Statement: The equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.
3. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
4. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

FCC Statement

This device is intended only for OEM integrators under the following
1) The antenna must be installed such that 20 cm is maintained between antenna and users, and
2) 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 required. However, the OEM integrator is still responsible for testing end-product for any additional compliance requirements required with module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Important Note

In the event that these conditions can not be example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid the FCC ID can not be used on the final product. In these circumstances, 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 antenna may be installed such that 20 cm may be maintained between antenna and users (for example access points, routers, wireless ADSL and similar equipment). The final end product must be labeled in a area with the following: "Contains TX FCC ID: I4L-MS3871".

Manual Information for End Users

The end user must not have manual instructions to remove or install device. The user manual for end users must include the following information in a prominent location: "IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements, the antenna 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 operating in conjunction with any other antenna or transmitter." as a result of e-mail transmission."

Important Safety Precautions

Always read and follow these basic safety precautions carefully when handling any piece of electronic component.

1. Keep this *User's Guide* for future reference.
2. Keep this equipment away from humidity.
3. Lay this equipment on a reliable flat surface before setting it up.
4. The openings on the enclosure are for air convection hence protects the equipment from overheating.
5. All cautions and warnings on the equipment should be noted.
6. Never pour any liquid into the opening that could damage or cause electrical shock.
7. If any of the following situations arises, get the equipment checked by a service personnel:
   - Liquid has penetrated into the equipment
   - The equipment has been exposed to moisture
   - The equipment has not work well or you can not get it work according to User's Manual
   - The equipment has dropped and damaged
   - If the equipment has obvious sign of breakage
8. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 100° C OR BELOW -20^OC, IT MAY DAMAGE THE EQUIPMENT.
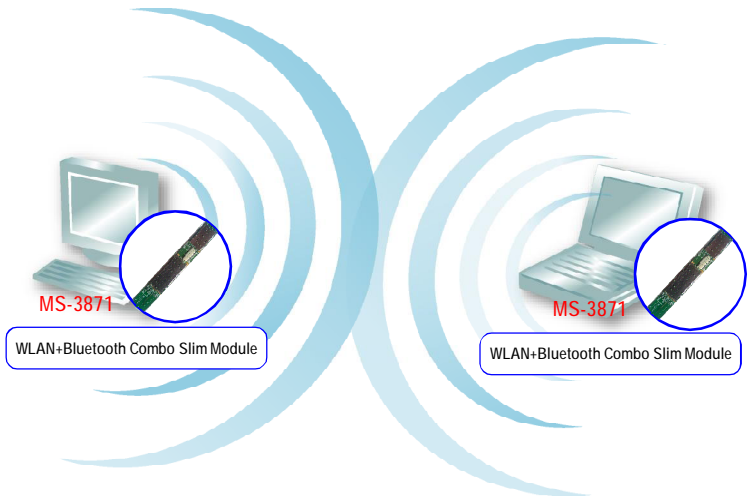
① Introduction

MSI latest combo module MS-3871, the Wireless 11b/g/n+ Bluetooth Combo Slim Module, which can be used to integrate with such systems as notebook, mini-barebone, portable PC. With MSI MS-3871 embedded inside, a system could provide users with the ability and flexibility to connect up to Internet wirelessly via **802.11b/g/n** with speed up to 150Mbps, and to link with peripherals wirelessly through **Bluetooth™ v2.1** and advanced **EDR (Enhanced Data Rate)** technology. **Bluetooth™ v2.1** technology increases the data rate of **Bluetooth™ v1.1/1.2** from 1.0Mbps to 2.1Mbps.

MSI MS-3871 is taking advantage of leading technologies from Ralink and CSR. It addresses the co-existence issues in PAN (Personal Area Network) and WLAN (Wireless Local Area Network) markets by providing true simultaneous connectivity while deploying IEEE 802.11b/g/n and Bluetooth v2.1 Along with this combo solution, a system installed with a single module is able to offer dual mode capability of WiFi and Bluetooth™. It will benefit system vendors in miniaturization of system dimension and BOM cost reduction, as well as also make users happy with the all-in-one functionality.

1.2.1 In WLAN Environment

Ad-hoc Mode : An Ad-hoc network is a local area network or other small network, especially one with wireless or temporary plug-in connections, in which some of the network devices are part of the network only for the duration of a communications session. Users in the network can share files, print to a shared printer, and access the Internet with a shared modem. In this kind of network, new devices can be quickly added; however, users can only communicate with other wireless LAN computers that are in this wireless LAN workgroup, and are within range.

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WLAN+Bluetooth Combo Slim Module

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⬤ **Infrastructure Mode :** The difference between Infrastructure network and Ad-hoc network is that the former one includes an Access Point. In an Infrastructure network, the Access Point can manage the bandwidth to maximize bandwidth utilization. Additionally, the Access Point enables users on a wireless LAN to access an existing wired network, allowing wireless users to take advantage of the wired networks resources, such as Internet, email, file transfer, and printer sharing. The scale and range of the Infrastructure networking are larger and wider than that of the Ad-hoc networking.

1.2.2 In Bluetooth Connection

The term "Bluetooth" refers to a worldwide standard for the wireless exchange of data between two devices. In order to exchange data, two Bluetooth devices must establish a connection. Before a connection is established, one device must request a connection with another. The second device accepts (or rejects) the connection. The originator of the request is known as the client. The device that accepts (or rejects) the request is known as the server. Many Bluetooth devices can act as both client and server. Every Bluetooth device that provides a service must be prepared to respond to a connection request. Bluetooth software is always running in the background on the server, ready to respond to connection requests.

Bluetooth-enabled Devices

>>> 1.3 Specifications

Hardware Specification	Operation voltage	3.3V+/-10%
	Operating System	Microsoft® Windows® XP 32/ 64-bit, Vista 32/64-bit, Win7 32/64-bit
	Environmental	- Operating Temperature: $0 \sim 65^{O}C$ - Operating Humidity: $10 \sim 90\%$, non-condensing
	Dimensions (WxDxH)	80 x 6 x 3 mm
	Weight	3.5g

WLAN **Specification**	Network Standard	IEEE 802.11b/g/n
	Frequency Band	2.400-2.4835 GHz
	Data Rate	IEEE 802.11b (auto-fallback): - CCK: 11, 5.5 Mbps - DQPSK: 2 Mbps - DBPSK: 1 Mbps
		IEEE 802.11g (auto-fallback): - OFDM: 54, 48, 36, 24, 18, 12, 9 and 6 Mbps
		IEEE 802.11n (auto-fallback): -OFDM: 6.5 to 150 Mbps (Follow MCS 0~7 standard)
	Media Access Control	CSMA/CA with ACK
	Transmission	IEEE 802.11b (DSSS), IEEE 802.11g/n (OFDM)
	Network Architecture	Ad-hoc Mode (Peer-to-Peer); Infrastructure Mode
	Antenna Type	PCB printed antenna
	Power Consumption	802.11b (11 Mbps): 328mA@3.3V in continuous Tx 231mA@3.3V in Rx
		802.11g (54Mbps): 313mA@3.3V in continuous Tx 233mA@3.3V in Rx
		802.11n: HT20MHz: 308mA@3.3V in continuous Tx / 232mA@3.3V in Rx (MCS7) HT40MHz: 325mA@3.3V in continuous Tx/ 283mA@3.3V in Rx (MSC7)
		233mA@3.3V in standby mode

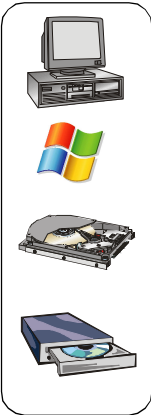|		
Channel	IEEE 802.11g/n: Ch. 1-11 – N. America Ch. 1-13 – Japan Ch. 1-13 – Europe ETSI Ch. 10-11 – Spain Ch. 10-13 – France	
	IEEE 802.11b: Ch. 1-11 – N. America Ch. 1-14 – Japan Ch. 1-13 – Europe ETSI Ch. 10-11 – Spain Ch. 10-13 – France	
Output Power	802.11b (11Mbps): 17.0 +/-1 dBm 802.11g (54Mbps): 14.0 +/-1 dBm 802.11n : 13.0 +/-1 dBm	
Receiver Sensitivity (Typical Value)	802.11b (11Mbps): CCK@8% PER = -76dBm 802.11g (54Mbps): OFDM@10% PER = -65dBm 802.11n draft 6.0: HT20 @ 10% PER = -64 dBm HT40 @ 10% PER = -61dBm	

	Network Standard	Bluetooth v2.1 Class II +EDR
	Frequency Band	2.400 - 2.4835 GHz
	Data Rate	Up to 3Mbps
	Channel	79 sub-channels
	Transmission	FHSS (Frequency Hopping Spread Spectrum)
Bluetooth	Modulation	n/4 DQPSK@2Mbps, 8DQPSK@3Mbps
Specification	Antenna Type	PCB printed antenna
	Power Consumption	66mA in continuous Tx 8.6mA in standby mode
	Max. Output Power	-4~4 dBm
	Max. Input Level	-20 dBm@BER<0.1%
	Receiver Sensitivity	-82dBm @ BER<0.1%
	Range	Up to 10 m operating range (outdoor operating range)
	Physical Links	Support ACL and SCO link
	Network Capabilities	Support piconet point-to-point and point-to multipoint connections
	Link Manager	3-slot Packets: Yes 5-slot Packets: Yes Slot Offset: Yes Timing Accuracy: Yes Switch: Yes Hold Mode: Yes Sniff Mode: Yes Test Mode: Yes Park Mode: Yes RSSI: Yes Power Control: Yes Authentication: Yes Encryption: Yes

>>> 1.4 System Requirements

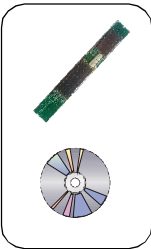Before installing MS-3871, your PC should meet the following items:

- Windows® XP 32/ 64-bit, Vista 32/64-bit, Win7 32/64-bit operating system.

- Minimum 5MB free disk space for installing the driver and utilities.

- One CD-ROM drive, double speed or higher.

>>> 1.5 Package Contents

Unpack the package and check all the items carefully. If any item contained is damaged or missing, please contact your local dealer as soon as possible. Also, keep the box and packing materials in case you need to ship the unit in the future. The package should contain the following items:

- One Wireless 11b/g/n + Bluetooth Combo Slim Module.

- One Installation CD-ROM including drivers, utilities, and the manual files.

2 **Software Installation**

This chapter describes the procedures of installing the driver and utility. Follow the instruction step by step to finish the installation. If you use Windows® 98SE/ME, please prepare the Windows® Setup CD at hand before installing the driver; because the system will ask you to insert the Setup CD to copy files during the installation.

Please **NOTE** that the MS-3871 should be installed into your computer before installing the driver and utility. Then, the operating system will detect a new device and start to configure the new device. Click *Cancel* here to start installation from the InstallShield Wizard.

Click

Tip: The MS-3871 adapter should be installed into your PC before installing the driver and utility.

Insert the software CD into your CD-ROM drive, and the Setup program should launch automatically.

If the Autorun program doesn't launch automatically, click **Start** at the taskbar and select **Run...**. Type *E:\setup.exe* (where *E* is your CD-drive) in the Open box and click *OK* to launch the Setup program manually.

The main screen of Setup program will appear as below.

1. Click the Install WLAN Driver button.

2. The welcome screen of InstallShield Wizard appears. Click *Next*.

3. Read and accept the License Agreement; then, click *Next*.

4. Click *Install* and the program will copy the necessary files to the system. The progress indicator shows the installing status.

5. Click *Finish* when the WLAN driver installation is completed.

1. Click the Install Bluetooth Driver button.

2. The welcome screen of InstallShield Wizard appears. Click *Next*.

3. Read and accept the License Agreement; then, click *Next*.

4. Click *Next* to install the driver in the default destination folder.

5. Click *Install* and the program will copy the necessary files to the system. The progress indicator shows the installing status.

6. Click *Finish* when the bluetooth driver installation is completed.

Click the Exit button.

The Wireless LAN icon and Bluetooth icon will appear in the status bar.

Bluetooth icon

Wireless LAN icon