

MP-G-BR-05, EXT. 2

802.11G 16BIT WIRELESS LAN MINI PCI ADAPTER



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www.usi.com.tw



Introduction

The Mini-PCI Adapter type-III B is a high-speed 54 Mbits/s wireless networking card providing a multimode 802.11 b/g or 11g mode only connectivity for enterprise and home wireless LAN access.

The Mini-PCI Card uses direct sequence spread spectrum (DSSS), Orthogonal Frequency Division Multiplexing (OFDM) technology, and implements DBPSK, DQPSK, and CCK, OFDM modulation, as defined in the *IEEE*®802.11b, g. This gives a very robust radio channel, which is made even better by the excellent receiver sensitivity and delay spread robustness.

In environments with radio interference, the Mini-PCI Card, because of its acknowledgment protocol and its option to be tuned to another frequency channel, continues to run.

Superior echo path management makes it suitable for areas with a large delay spread, for example, warehouses. This reduces the number of cells required and, therefore, reduces the total cost of ownership.

A firmware-based architecture is capable of supporting the latest industry standards in the security and quality of service (QoS), as the draft 802.11i and 802.11e standards, respectively.

The Mini-PCI Card is complemented by drivers and networking tools for various versions of the *Windows*® operating system. USI provides extensive technical documentation on integration issues such as antenna design, customizing drivers, and management software.



Features

- Automatic fallback: 54 Mbit/s, 48 Mbit/s, 36 Mbit/s, 24 Mbit/s, 18 Mbit/s, 12 Mbit/s, 11 Mbit/s, 9 Mbit/s, 6 Mbit/s, 5.5 Mbits/s, 2 Mbits/s, or 1 Mbit/s.
- Feature with Afterburner technology for this 54g platform, Products with this new technology provide up to 40 percent greater throughput than typical standard 802.11g systems without impacting the performance of neighboring wireless LANs.
- Low power consumption.
- Automatic power management to reduce battery use.
- Easy integration into mobile and hand-held platforms. It's flexible for design and antenna placement.
- External antenna diversity.
- Support AES-CCM, WPA (SSN-TKIP), and WEP (64-bit/128-bit or 152-bit).
- Corresponding to *IEEE* 802.11b/g specification.
- Interoperable with other *IEEE* 802.11 a/b/g compliant systems.
- Conformable to industry-standard Mini-PCI Card Type III-B specification.
- WDS support
- WHQL pre-test and Wi-Fi pre-test.

802.11 b/g Wireless LAN Mini-PCI Adapter

EXECUTIVE SUMMARY

This document outlines the product requirements for an 802.11g mini PCI adapter 16 Bits– here after referred as “ MP-G-BR-05 Ext2“.RoHS version

This product is targeted for first shipments in **Q4**, 2005

By using Broadcomchipset solution which including;

BCM4318 SoC MAC+BB+Transceiver

SiGe SE2521A34 for 11g PA and SE2521A60 as alternative

Physical Dimension/Packaging

The Mini-PCI Card has been designed to conform to the Mini-PCI specification, as defined in Mini-PCI Specification Rev 0.1.

All dimensions in this section have a tolerance as permitted in the Mini-PCI Specification.

Dimension: 59.8 mm x 44.8 mm x 5.0 mm (actually Max thickness is 3.3mm on metal shield , there is no component on the bottom side of this card)

Weight: Less than 25 g

Package: Bulk in 200 pcs.

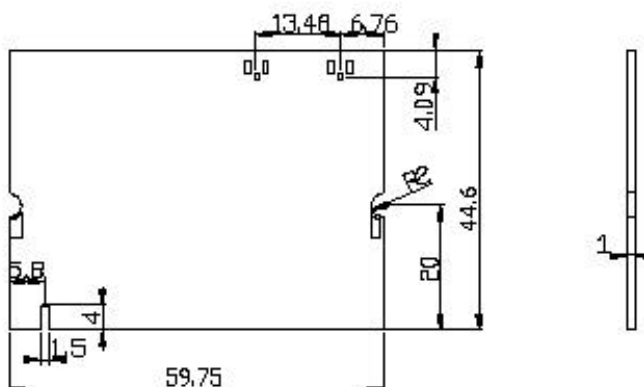


Figure 1. Mini-PCI Type III-B dimension

Mechanically unique coaxial connectors for two external antennas.

Operating Conditions

Operating Temperature	0° to 70° Celsius
Operating Humidity	90% (non-condensing)
Storage Temperature	-10°C to +75°C ambient temperature
Storage Humidity	95% (non-condensing)

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Voltage and Current

The MP-G-BR-05 will comply with the following features and standards

Voltage	3.3 VDC from host(+/-0.2V)
Current	802.11g (Typ.)
Transmit	<450mA
Receive	<350mA
Stand By	<50mA

Wireless Specification

The MP-G-BR-05 will comply with the following features and standards:

Features	Description
WLAN Standards	IEEE 802 Part 11b/g
Antenna Connector	Hirose connector supported with diversity
Data Rates	1, 2, 5.5, 11 Mbps for 802.11b 6, 9, 12, 18, 24, 36, 48, 54 Mbps for 802.11g and 125Mbps for AfterBunner
Medium Access Protocol	CSMA/CA (Collision Avoidance) with ACK

RF specification

Features	Description
Frequency Band	2412 – 2462 MHz
Number of Channels	11 Channels
Modulation	DBPSK, DQPSK, CCK DSSS for 802.11b & g DPSK, QPSK, 16QAM, 64QAM OFDM for 802.11 g
Supported Rates	1, 2, 5.5, 11 Mbps for 802.11b 6, 9, 12, 18, 24, 36, 48, 54 Mbps for 802.11g
Maximum Receive Level	-20dBm (with PER< 10%) for 802.11g
Antenna	External (Hirose U-F-L)

Typical Output Power

17 dBm for 11b

15 dBm for 11g

Note: Actual output power may vary based on manufacturing process variations

802.11g Receive Sensitivity

Data Rates	Receive Sensitivity
54 Mbps	-68 dBm (typ)
11 Mbps	-84 dBm (typ.)
6 Mbps	-85 dBm (typ.)
1 Mbps	-90 dBm (typ.)

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Note: Actual receive sensitivity for individual products may vary based on manufacturing process and environmental variations

Antenna Specifications

The Mini-PCI adapter is available in two variants: unique coax connectors with diversity function.

On-Board Diversity Switch

This variant of the Mini-PCI Card has connectors for two external passive antennas: MAIN and AUX. One of the antennas is used for transmission, and the DSP selects which of the two to use for reception, based on signal strength.

The coax connectors for the antennas are mechanically unique, so that no off-the-shelf connector will fit (FCC requirement).

Switch electronics for selection between the two antennas for reception of the stronger receive signal is provided onboard.

Security

At the physical layer, transmissions are encrypted using WEP; three levels of encryption are possible :

- 40-bit key plus 24-bit initialization vector
 - 104-bit key plus 24-bit initialization vector
 - 128-bit key plus 24-bit initialization vector
- AES, TKIP, WPA draft 802.11i are supported.

Attacks have been made on WEP by exploiting various weaknesses. The Mini-PCI Card implements random setting of the initialization vector and utilizes WEPplus, which prevents initialization vectors that result in weak keys being used. WEPplus is completely compatible with WEP.

For those operating systems that support it either natively or with an add-on supplement (i.e, *Windows 98*, *Windows 98SE*, *Windows ME*, *Windows 2000*, *Windows XP*, the 802.1x, WPA/TKIP SSN security standard are implemented. This offers port-based network access control, and automatic key distribution.

Software/Driver

Due to 16-bit architecture is not suitable for current Windows OS (Win98;Win2K;WinXP) , so it only support Linux's based driver.

Driver for WiFi is pre-tested under Ver.3.90.11.0.

Performance

Table 1. Characteristics at Different Rates

The real operating range will be different by measurement environment and condition.

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802.11b/g

Data Rates	Operating Distance
54 Mbps	70m
11 Mbps	370m
6 Mbps	330m
1 Mbps	550 m

Mini-PCI Card Pinout

The Mini-PCI Card connects to a host through the Mini-PCI interface bus. The connector pin-out is defined in the *Mini-PCI Specification*.

- Support 2 control signals to the host via the Mini-PCI Connector pin 11 for RF On and pin 13 is used as a hardware radio on/off switch.

International Channel Frequencies

The Mini-PCI Card uses frequencies in the 2.4 GHz to 2.5 GHz ISM band, as defined by IEEE 802.11.

The channels available in the regional variants of the Mini-PCI Card are:

- FCC: 1 to 11
- ETSI: 1 to 13
- Japan: 1 to 14

Regulatory Body Approvals/Compliance

USI will perform pre-test for the following international regulations: approval is a matter for the OEM once the device is integrated into a host platform.

Description	Country	Compliance
Electromagnetic Compatibility	USA	FCC CFR47 Part 15B, Class II
	Europe	89/336/EEC, ETS 301 489-1&17 (2.4GHz) EN61000-3-2 (Harmonic AC Current emissions) EN55022 Class II, EN50082-1 (Immunity)
Product safety	International	CB (IEC 60950)
Radio Regulations	USA	FCC CFR47 part 15 C, para 15.247,295,209
	Europe	EN 300-328

Ordering Information

USI 802.11g 16Bit miniPCI Adapter Model No. MP-G-BR-05, Ext.2

Specifications are subject to change without notice.

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Installation Description

(This Installation Manual is not provided to the consumer.)

WLAN Module (Model: MP-G-BR-05 Ext.2) shall be installed in a product of D&M Holdings Inc., Denon Brand Company only. When MP-G-BR-05 Ext.2 is installed in the final product, we as OEM shall consider the following points;

1. Since MP-G-BR-05 Ext.2 owns its FCC ID, we shall affix an exterior label on the outside of the final product if the FCC ID is not visible. The exterior label shall use wording such as either "Contains Transmitter Module FCC ID: BV2-MPGBR052/ IC: 6963A-MPGBR052" or "Contains FCC ID: BV2-MPGBR052/ IC: 6963A-MPGBR052".
2. MP-G-BR-05 Ext.2 complies with requirements of sub-sections 15.203, 15.205, 15.207 and 15.247 in FCC Rules Part 15 and IC Rule of RSS-210/ RSS-Gen. We shall install MP-G-BR-05 Ext.2 in accordance with their requirements. MP-G-BR-05 Ext.2 complies with requirements of the sub-section 2.1091. When installers install MP-G-BR-05 Ext.2 into a product, they shall ensure that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines in accordance with the sub-section 15.247(i) in FCC Rules Part 15 and also IC Rules RSS-102. The WLAN module can be equipped on any product, if the distance between radiator and person's body keep at least 20cm or more.
3. Attached photos and drawings are an example of location of MP-G-BR-05 Ext.2 on the final product. We do not exhibit this information to end-users or website. Because, users may obtain an idea of modifying this module from the information.
4. It only can be installed to the host that has a regulator (PQ070XZ01ZxH or BAXXDD0WHFP) (or similarly specification regulator).

【FCC/ IC Users Manual Statement】

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

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

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

This equipment complies with FCC/IC radiation exposure limits set forth for uncontrolled equipment and meets the FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET65 and RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment should be installed and operated with at least 20cm and more between the radiator and person's body (excluding extremities: hands, wrists, feet and ankles).