MPX-8188

IEEE 802.11b/g/n Wi-Fi Mini Card

User's Manual

Edition 1.0
2016/03/17

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1 <Product Overview>

MPX-8188 IEEE 802.11 b/g/n PCIE WIFI module is a highly integrated wireless local area network (WLAN) solution to let users enjoy the digital content through the latest wireless technology without using the extra cables and cords. It enables a **high performance, cost effective, low power, compact solution** that easily fits onto two sides of the PCI Express half mini Card.

Compliant with the IEEE 802.11b/g/n standard, MPX-8188 uses Direct Sequence Spread Spectrum **(DSSS)**, Orthogonal Frequency Division Multiplexing **(OFDM), BPSK, QPSK, CCK** and **QAM** baseband modulation technologies.

Compare to 802.11g technology, 802.11n standard makes big improvement on speed and range.

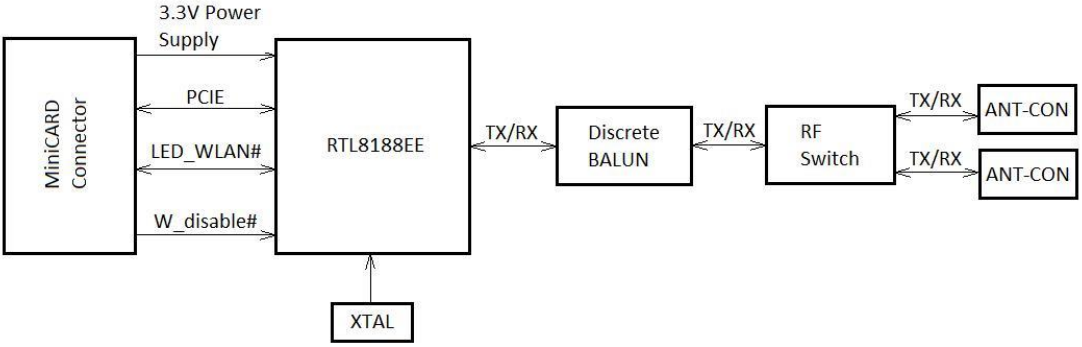
Faster Speed: WLAN up to 150Mbps data rate.

MPX-8188 module adopts Realtek **RTL8188EE** solution. The module design is based on the Realtek RTL8188EEsolution

2 <Features>

- High speed wireless connection up to 150 Mbps for Wi-Fi
- 2 antennas to support 1(Transmit) 1(Receive) diversity technology
- Support WLAN TX/RX diversity function
- Low power consumption and high performance
- Enhanced wireless security
- Support Mini card PCI-E 1.1 & 1.2 standard specification
- Support WOWL

3 <Block Diagram>



4 <General Specifications>

Product Description

Host Interface	PCI-E
Major Chipset	Realtek RTL8188EE
Dimension	26.65mm x 29.85mm X3.05mm (Tolerance remark in mechanical drawing)
WiFi VID/PID	10EC / 8179
WiFi SVID/SSID	1A3B / 1D38
Weight	6g
Antenna	Standard U.FL connector 1: Ant1 : Wi-Fi TX/RX 2.:Ant2 : Wi-Fi TX/RX

Operating Conditions

Voltage	3.3V +/-5%
Temperature	0~70°C
Storage Temperature	-40~+85°C

Electrical Specifications

Frequency Range	2.4 GHz ISM Bands 2.412-2.472,2.484 GHz
Modulation	802.11 g/n: OFDM 802.11b:CCK(11,5.5Mbps), DQPSK(2Mbps), DBPSK(1Mbps)
Output Power	802.11b: 16dBm +/-1.5dBm(11Mbps) 802.11g: 14dBm +/-1.5dBm(54Mbps) 802.11n: 13dBm +/-1.5dBm(HT20 MCS7) 802.11n: 13dBm +/-1.5dBm(HT40 MCS7)
Receive Sensitivity	802.11b: less than -80dBm(11Mbps) 802.11g: less than -68dBm(54Mbps) 802.11n: less than -64dBm at HT20 MCS7 802.11n: less than -61dBm at HT40 MCS7
Operating Range	Wi-Fi: Open Space:~300M / Indoor:~100M (The transmission speed may vary according to the environment)
Regulatory	FCC,CE…Follow Realtek RTL8188EE worldwide regulatory

4.1 < Recommended Operating Conditions >

Symbol	Parameter	Rating	Unit
Vdd33	I/O voltage	3.135~3.465	V

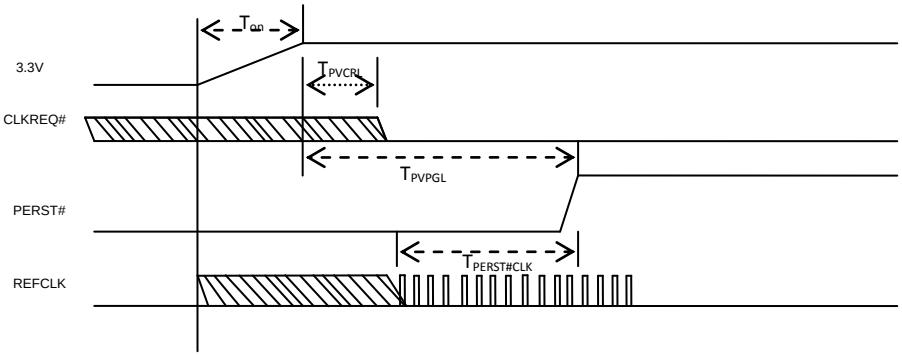
4.2 < Logic Level Characteristics >

Vcc=+3.3V +/- 5%
VIH (min)= 2.0V (v)
VIL (max)= 0.9V (v)
VIH=input high Voltage
VIL=input low Voltage

4.3 < LED mode behavior >

State	Definition	Interpretation
OFF	The LED is emitting no light.	Radio is incapable of transmitting. This state is indicated when the card is not powered, the W_DISABLE# signal is asserted to disable the radio, or when the radio is disabled by software.
ON	The LED is emitting light.	Radio is capable of transmitting. The LED should remain ON even if the radio is not actually transmitting. For example, the LED remains ON during temporary radio disablements performed by the Mini Card of its own volition to do scanning, switching radios/bands, power-management, etc. If the card is in a state wherein it is possible that radio can begin transmitting without the system user performing any action, this LED should remain ON.

4.4 < Power UP Sequencing >



RTL8188EE PCIe Bus Power Sequence

T_{on}: The main power ramp up duration

T_{PVCRL}: Power valid to CLKREQ# output active

$T_{PVPGL:}$ Power valid to PERST# input inactive

$T_{PERST\#CLK}$: Reference clock stable before PERST# inactive

The typical timing range

Symbol	Unit	Min	Typical	Max
T_{on}	ms	--	1.5	5
T_{PVCRL}	us	--		100
T_{PVPGL}	ms	1		--
$T_{PERST\#CLK}$	us	100		--

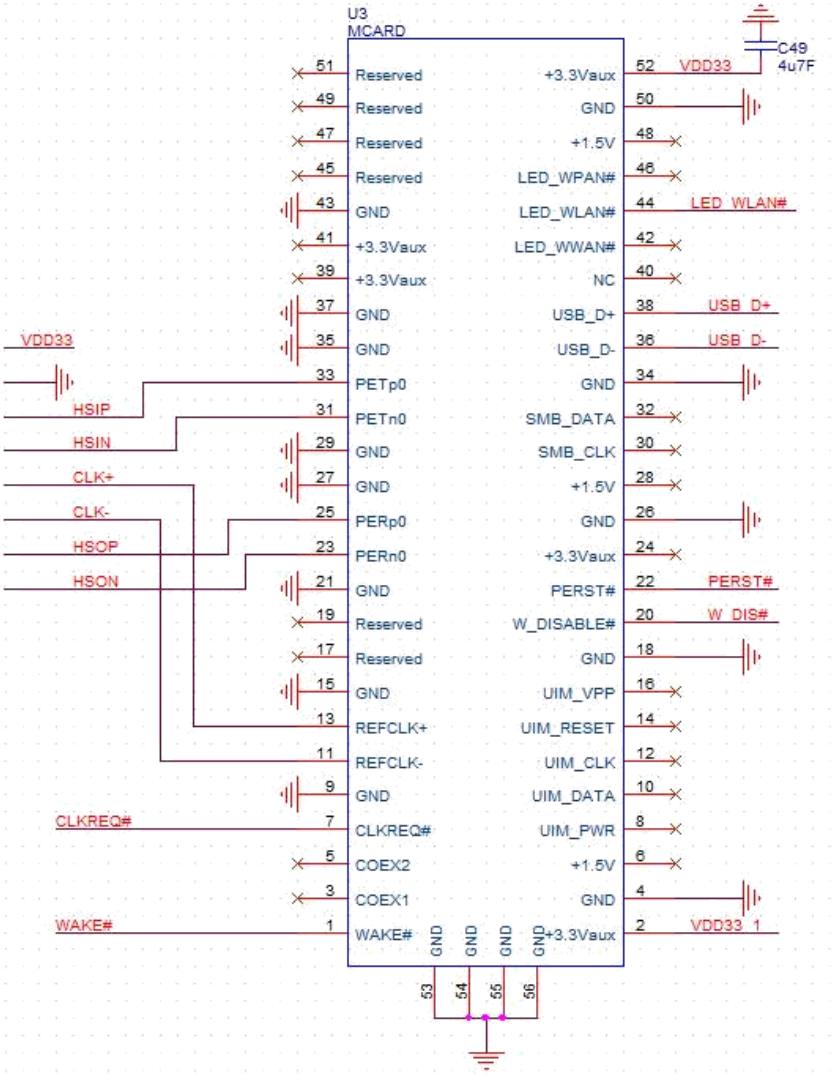
4.5 < Power Consumption >

Test Bed		DELL Vostro 3450P		
Test OS		Windows 8 Professional x64		
Test AP		D-LINK DIR-855		
Driver version		AZ_RTL8188CE_8188EE_8723AE_ Win8_2007.5.1024.2012_20121121		
Test voltage		3.3V		
Item		Disable ASPM Mode	L1 Mode	Note
WLAN Module No Connect AP	MAX	171.6 mA	149.4 mA	
WLAN Module Connect to the AP	MAX	180.7 mA	227.0 mA	
WLAN RF OFF		43.3 mA	4.3 mA	
Transmit Packet Test HT 40*		207.8 mA	173.6 mA	
Receiver Packet Test HT 40*		180.2 mA	145.8 mA	

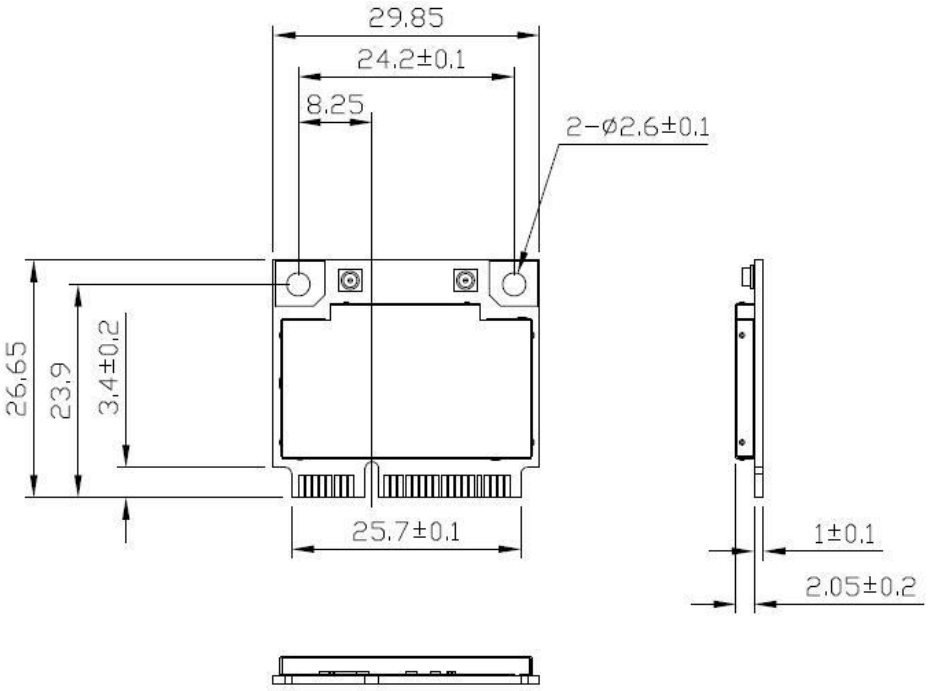
5 <Pin-out Definition>

Pin No.	Definition	Basic Description	Type
1	**WAKE#**	Power management event : open drain, active low Use to reactivate the PCI Express slot's main power rails and reference clocks. Connected internally to RTL8188EE.	O/D
2	**3.3V/3.3AUX**	3.3V/3.3AUX power supply (Use 3.3AUX for WOWL supporting)	VCC
3	**NC**	Floating Pin, No connect to anything.	GND
4	**GND**	Ground	
5	**NC**	Floating Pin, No connect to anything.	
6	**NC**	Floating Pin, No connect to anything.	
7	**CLKREQ_L**	Reference clock request	Output
8	**NC**	Floating Pin, No connect to anything.	
9	**GND**	Ground	GND
10	**NC**	Floating Pin, No connect to anything.	
11	**REFCLK-**	Differential reference clock.	Input
12	**NC**	Floating Pin, No connect to anything.	
13	**REFCLK+**	Differential reference clock.	Input
14	**NC**	Floating Pin, No connect to anything.	
15	**GND**	Ground.	GND
16	**NC**	Floating Pin, No connect to anything.	
17	**NC**	Floating Pin, No connect to anything.	
18	**GND**	Ground.	GND
19	**NC**	Floating Pin, No connect to anything.	
20	**W_DISABLE_L**	WLAN disable control.	Input
21	**GND**	Ground.	GND
22	**PERST_L**	PCI express fundamental reset.	Input
23	**PERN0**	Differential transmit.	Output
24	**NC**	Floating Pin, No connect to anything.	
25	**PERP0**	Differential transmit.	Output
26	**GND**	Ground.	GND
27	**GND**	Ground.	GND

28	**NC**	Floating Pin, No connect to anything.	
29	**GND**	Ground.	GND
30	**NC**	Floating Pin, No connect to anything.	
31	**PETN0**	Differential receive.	Input
32	**NC**	Floating Pin, No connect to anything.	
33	**PETP0**	Differential receive.	Input
34	**GND**	Ground.	GND
35	**GND**	Ground.	GND
36	**NC**	Floating Pin, No connect to anything.	
37	**GND**	Ground.	GND
38	**NC**	Floating Pin, No connect to anything.	
39	**NC**	Floating Pin, No connect to anything.	
40	**NC**	Floating Pin, No connect to anything.	
41	**NC**	Floating Pin, No connect to anything.	
42	**NC**	Floating Pin, No connect to anything.	
43	**GND**	Ground.	GND
44	**LED_WLAN_L**	Active low signal. The signal is used to provide status indicators via LED.	Output
45	**NC**	Floating Pin, No connect to anything.	
46	**NC**	Floating Pin, No connect to anything.	
47	**NC**	Floating Pin, No connect to anything.	
48	**NC**	Floating Pin, No connect to anything.	
49	**NC**	Floating Pin, No connect to anything.	
50	**GND**	Ground.	GND
51	**NC**	Floating Pin, No connect to anything.	
52	**3.3V/3.3AUX**	3.3V/3.3AUX power supply (Use 3.3AUX for WOWL supporting)	VCC

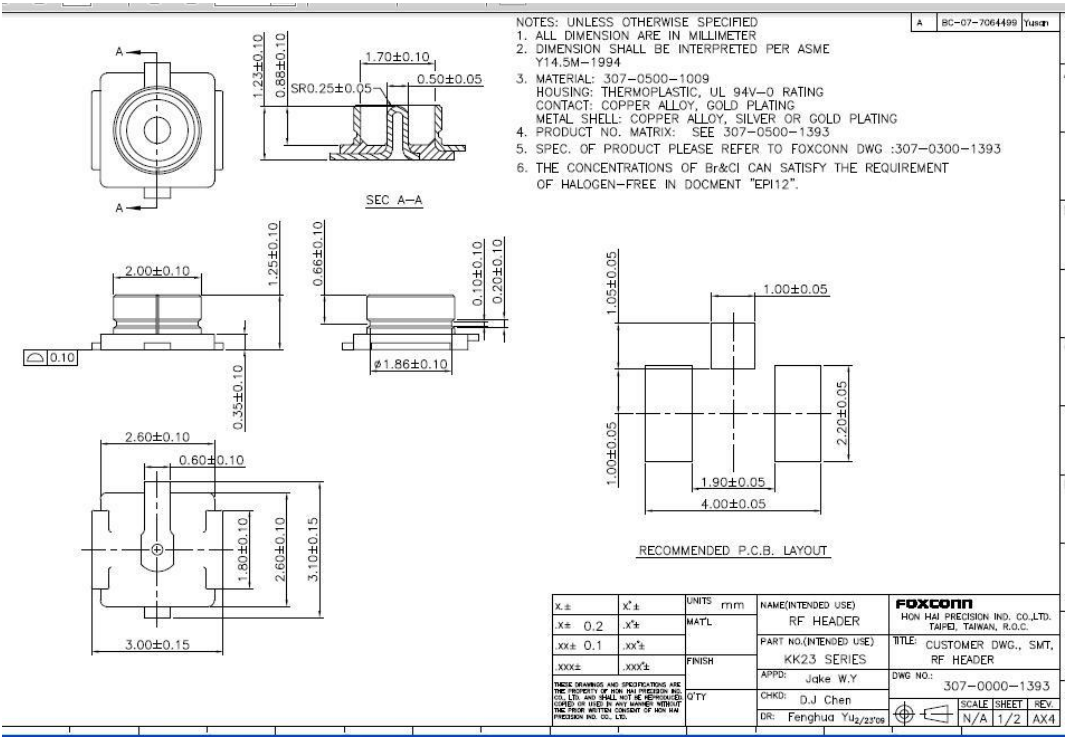

U3
MCARD
C49
4u7F
51 Reserved
49 Reserved
47 Reserved
45 Reserved
43 GND
41 +3.3Vaux
39 +3.3Vaux
37 GND
35 GND
33 PETp0
31 PETn0
29 GND
27 GND
25 PERp0
23 PERn0
21 GND
19 Reserved
17 Reserved
15 GND
13 REFCLK+
11 REFCLK-
9 GND
7 CLKREQ#
5 COEX2
3 COEX1
1 WAKE#
+3.3Vaux 52 VDD33
GND 50
+1.5V 48
LED_WPAN# 46
LED_WLAN# 44 LED_WLAN#
LED_WWAN# 42
NC 40
USB_D+ 38 USB_D+
USB_D- 36 USB_D-
GND 34
SMB_DATA 32
SMB_CLK 30
+1.5V 28
GND 26
+3.3Vaux 24
PERST# 22 PERST#
W_DISABLE# 20 W_DIS#
GND 18
UIM_VPP 16
UIM_RESET 14
UIM_CLK 12
UIM_DATA 10
UIM_PWR 8
+1.5V 6
GND 4
+3.3Vaux 2 VDD33_1
GND GND GND GND
53 54 55 56
VDD33
HSIP
HSIN
CLK+
CLK-
HSOP
HSON
CLKREQ#
WAKE#

6 <Pin-out Definition>



Tolerances unless otherwise specified : ±0.15mm

RF connector -1



Contact information

Any advice or comment about our products and service, or anything we can help you please don't hesitate to contact with us. We will do our best to support you for your products, projects and business.

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