

AW-NE238H

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

(Single antenna)

<u>Datasheet</u>

Version 0.4

0B





Revision History

Document	Date	Modification	Initials	Approved
Release				
Version 0.1	2012/06/01	First release	Johnny Wei	Eric Lee
Version 0.2	2012/10/25	 Update: 1. Features 2. General Specifications 3. Power Consumption 4. Module Photo 	Johnny Wei Emily Wang	Eric Lee Ray Lee
Version 0.3	2012/12/05	 Update 1. General Specifications 2. Pin-out definition (basic description) 3. Mechanical Drawing - add RF connector drawing 4. Module Photo (FCC label) 	Johnny Wei Emily Wang	Eric Lee Ray Lee
Version 0.4	2013/06/06	Modify Pin1 definition description	Yvonne	Patrick





1. Introduction

AzureWave Technologies, Inc. introduces the pioneer of the IEEE 802.11b/g/n Wi-Fi half mini card module ---**AW-NE238H.** The AW-NE238H 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, AW-NE238H 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.

AW-NE238H 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
- 1 antennas to support 1(Transmit) × 1(Receive) technology
- 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

Model Name	AW-NE238H		
Product Description	IEEE 802.11 b/g/n Wi-Fi half mini card Module		
Host Interface	PCI-E		
Major Chipset	Realtek RTL8188EE		
Dimension	26.65 mm X 29.85 mm x 3.05 mm (See tolerance in mechanical drawing)		
Weight	2.9g		
WiFi VID/PID	10EC / 8179		
WiFi SVID/SSID	1A3B / 1F38		
Antonna	Standard *U.FL-R-SMT		
Antenna	1: Ant1 : Wi-Fi TX/RX		
Operating Conditions			
Voltage	3.3V +/- 5%		
Temperature	0~80 °C		
Storage temperature	-40~+85 °C		
Electrical Specifications			
Frequency Range	2.4 GHz ISM Bands 2.412-2.472 GHz, 2.484 GHz /		
Modulation	802.11g/n: OFDM		
modulation	802.11b: CCK(11, 5.5Mbps), DQPSK(2Mbps), DBPSK(1Mbps)		
	802.11b: 16 dBm		
Output Bower	802.11g: 14 dBm		
Output Power	802.11n: 13 dBm +/-1.5dBm (HT20 MCS7)		
	802.11n: 13 dBm		
	802.11b: less than -80 dBm (11Mbps)		
Dessive Constitution	802.11g: less than -68 dBm (54Mbps)		
Receive Sensitivity	802.11n: less than -64 dBm at HT20 MCS7		
	less than -61 dBm at HT40 MCS7		
	Open Space: 300m		
Operating Range	Indoor:100m		
	(The transmission speed may vary according to the environment)		
Regulatory	FCC, CE Follow Realtek RTL8188EE regulatory.		
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4-1. Recommended Operating Conditions

Symbol	Parameter	Rating	Unit
V _{dd33}	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

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.

2 IED mode bob





4-4. Power UP Sequencing



Figure 5. RTL8188EE PCIe Bus Power On Sequence

Ton: The main power ramp up duration

TPVCRL: Power valid to CLKREQ# output active

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

TPERST#-CLK: Reference clock stable before PERST# inactive

Table 11. The typical timing range

symbol	Unit	Min	Typical	Max		
Ton	ms		1.5	5		
T _{PVCRL}	us	÷.		100		
T _{PVPGL}	ms	1				
T _{PERST#-CLK}	us 🗸	100				





4-5. Power Consumption

Test Bed		DELL E6500		
Test OS		Windows 8 x64		
Test AP		D-LINK DIR-855		
Driver Version		AZ_RTL8188CE_8188EE_8723AE_Win8_2007.3.0809.2012_		
Dilver version		20120820		
Test Voltage		3.3V		
Item		L0 Mode	L1 Mode	NOTE
WLAN Module No Connect AP	MAX	176.2 mA	145.7 mA	
WLAN Module Connect to the AP	MAX	176.3 mA	145.4 mA	
WLAN RF OFF		44.8 mA	4.1 mA	
Transmit Packet Test HT 40*		272.8 mA	203.6 mA	
Receiver Packet Test HT 40*		188.2 mA	164.8 mA	

Note. The power consumption data were measured when NB operated in DC (battery) mode.





5. Connector Pin-out Definitions

Pin No.	Definition	Basic Description	Туре
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.	
4	GND	Ground.	GND
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	Electing Pin. No connect to anything	mpar
12		Differential reference clock	Input
14		Eleating Pin. No connect to anything	input
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		Floating Pin, No connect to anything.	
31	PEINU	Differential receive.	Input
32 33		Ploating Pin, No connect to anything.	Input
33	GND	Ground	GND
35	GND	Ground.	GND
36	NC	Floating Pin, No connect to anything.	
37	GND	Ground.	GND



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AzureWave	Technologies, li	nc.	
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
	OF A		





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	MCARD	
51	Bernard and a second second second	52 VDD33 4u7F
49	Reserved +3.3Vaux	50
× · · · · · · · · · · · · · · · · · · ·	Reserved GND	
	Reserved +1.5V	<u>48 ×</u>
45	Bernered	46
	Reserved LED_WFAN#	
	GND LED_WLAN#	
× · · · · · · · · · · · · · · · · · · × × 41	+3.3Vaux · · · · LED_WWAN#	42 × · · · · · · · · ·
× 39	+9.3Veux	40 ×
		38 USB D+
	GND USB_D+	
VDD33	GND · · · · · · · · · · · · · · · · · · ·	
33	PETp0 GND	34
HSIP 31	DET-0	32
HSIN	PETRO SMB_DATA	án í liter a li
	GND SMB_CLK	×
CLK+ 27	GND + +1.5V	28 × · · · · · · · · · ·
CLK- 25	PERp0 GND	26
HSOP 1 23	DED-0	24
	PERIO +3.3Vaux	
	GND PERST#	22 FERSI#
	Reserved W_DISABLE#	20 W DIS#
× 17	Reserved GND	18
15		16 V
	GND UIM_VPP	14 C
· · · · · · · · · · · · · · · · · · ·	REFCLK+ UIM_RESET	
	REFCLK- CONTRACTOR VIM_CLK	<u>12</u> × · · · · · · · · · ·
9	GND UIM DATA	<u>10 × </u>
CLKREQ# 7		8
· · · · · · · · · · · · · · · · · · ·	CLKREQ# UIM_PWR	
× · · · · · · · · · · · · · · · · × · ×	COEX2 +1.5V	• × · · · · · · · · ·
	COEX1 · · · · · · · · · · · · · · · · · · ·	4 [p. 1. 1. 1. 1.
WAKE# 1	WAKE# 0 0 0 0+2 3V/aux	2 VDD33 1
	: : : : : : : : : : : : : : : :	
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6. Mechanical Dimensions



Tolerances unless otherwise specified : ±0.15mm







RF connector -1







RF connector -2







7. Module Photo





