

AW-GM320

IEEE 802.11 b/g Wireless LAN Module

Datasheet

Version 0.3

Document release	Date	Modification	Initials	Approved
Version 0.1	2008/03/26	Initial Version	Max Huang	CE Huang
Version 0.2	2008/05/23	1. Modify function block 2. Pin35 description change 3. Revise Mechanical Dimension	Max Huang	CE Huang
Version 0.3	2008/05/28	1. Modify the description of pin 12, pin19, pin48, pin50 and pin52. 2. Modify description of antenna.	Max Huang	CE Huang

Inspired by wireless

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1. General Description

1-1. Product Overview and Functional Description

AzureWave Technologies, Inc. introduces the first IEEE 802.11b/g WLAN module, ---**AW-GM320**. The module is targeted to mobile devices including, **Digital Still Cameras (DSCs)**, **Portable Media Players (PMPs)**, and **Gaming Devices, Notebook** which need small footprint package, low power consumption, multiple interfaces and OS support. By using AW-GM320, the customers can easily enable the Wi-Fi embedded applications with the benefits of **high design flexibility, short development cycle, and quick time-to-market**.

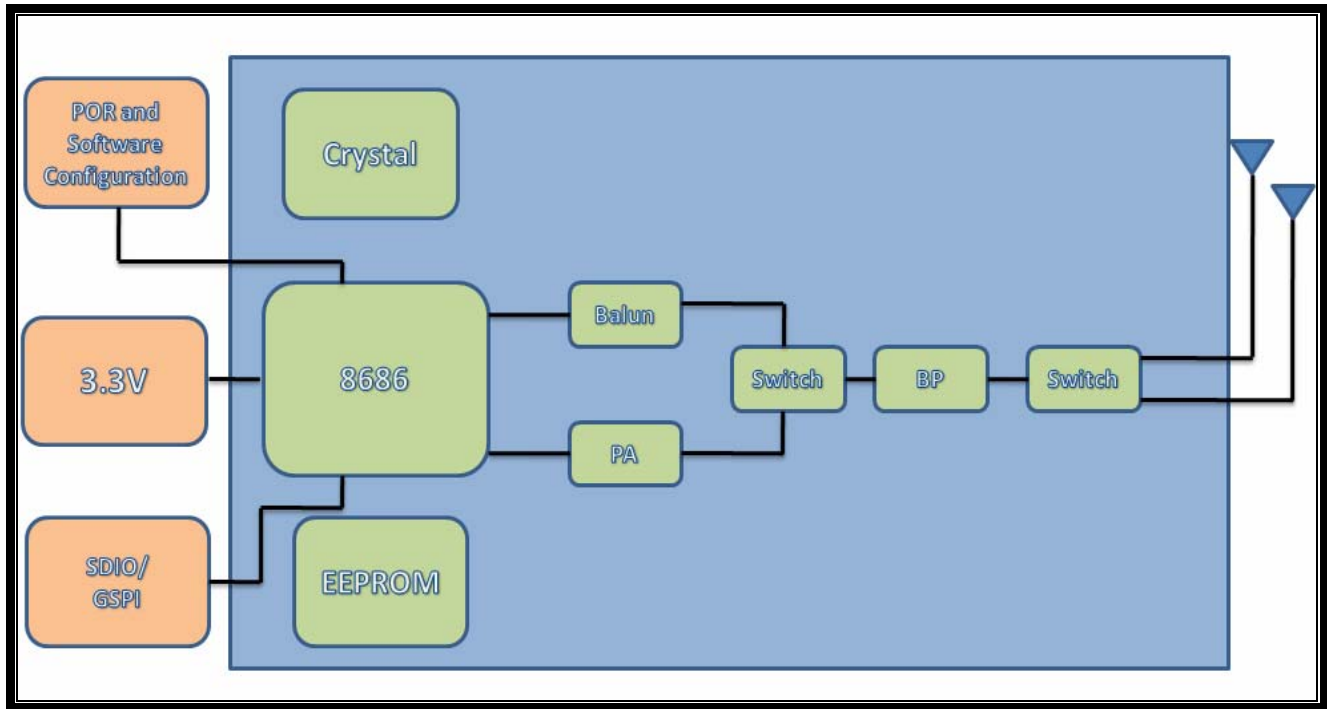
Compliance with the IEEE 802.11b/g standard, the AW-GM320 uses Direct Sequence Spread Spectrum (**DSSS**), Orthogonal Frequency Division Multiplexing (**OFDM**), **DBPSK**, **DQPSK**, **CCK** and **QAM** baseband modulation technologies. A high level of integration and full implementation of the power management functions specified in the IEEE 802.11 standard minimize the system power requirements by using AW-GM320. In addition to the support of **WPA/WPA2** and **WEP** 64-bit and 128-bit encryption, the AW-GM320 also supports the **IEEE 802.11i** security standard through the implementation of **Advanced Encryption Standard (AES)/Counter Mode CBC-MAC Protocol (CCMP)**, and **WEP** with **TKIP** security mechanisms. The AW-GM320 also supports **IPSec** with **DES/3DES/AES** encryption and **MD5/SHA-1** authentication. For the video, voice and multimedia applications, the AW-GM320 supports **802.11e Quality of Service (QoS)**. The AW-GM320 supports **SDIO** and **G-SPI** for WLAN to the host processor.

1-2. Key Features

- ✚ **SDIO, G-SPI interfaces support for WLAN**
- ✚ **Multiple power saving modes for low power consumption**
- ✚ **IEEE 802.11i for advanced security**
- ✚ **Quality of Service (QoS) support for multimedia applications**
- ✚ **WLAN drivers for Vista, WinXP, WinCE, Linux 2.6, WinMobile 5.0/6.0**
- ✚ **Lead-free design**

1-3. Block Diagram

A simplified block diagram of the AW-GM320 module is depicted in the figure below.



AW-GM320 function block

1-4. Specifications Table

Model Name	AW-GM320
Product Description	Wireless LAN Module IC
WLAN Standard	IEEE 802.11b/g, Wi-Fi compliant
Host Interface	SDIO/G-SPI
Operating Conditions	
Voltage	3.3V
Temperature	Operating: 0 ~ 80°C
Humidity	15% ~ 95%
Dimension	30mm*30mm*4mm
Package	Irregular Half Mini card
Electrical Specifications	
Frequency Range	2.4 GHz ISM radio band
Number of Channels	802.11b: USA, Canada and Taiwan – 11 Most European Countries – 13 France – 4, Japan – 14 802.11g: USA and Canada – 11 Most European Countries – 13
Modulation	DSSS, OFDM, DBPSK, DQPSK, CCK, 16-QAM, 64-QAM
Output Power	802.11b: typical 17dBm +/- 2dBm 802.11g: typical 15dBm +/- 2dBm
Antenna	Dual IPEX antenna port
Receive Sensitivity	802.11b: typical -86 +/- 3dBm at 11Mbps 802.11g: typical -71 +/- 3dBm at 54Mbps
Medium Access Protocol	CSMA/CA with ACK
Data Rates	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps
Power Consumption	TX g mode 54MHz: TBD mA(CW mode) b mode 11MHz: TBDmA(CW mode) RX g mode: TBD mA b mode: TBD mA Deep Sleep Mode: TBDmA
Security	◆WEP 64-bit and 128-bit encryption with H/W TKIP processing ◆WPA/WPA2 (Wi-Fi Protected Access)

	◆ AES-CCMP hardware implementation as part of 802.11i security standard
Operating System Compatibility	Win CE 4.2/.NET, Win CE 5.0, Linux, Pocket PC 2004/2005
Co-Existence	Cell phone(GSM/DCS/WCDMA/UMTS/3G) co-existence

2. Electrical Characteristics

2-1. Absolute Maximum Ratings

Symbol	Parameter	Condition	Min	Typ	Max	Units
3.3V	Module power supply		3.1	3.3	4.6	V

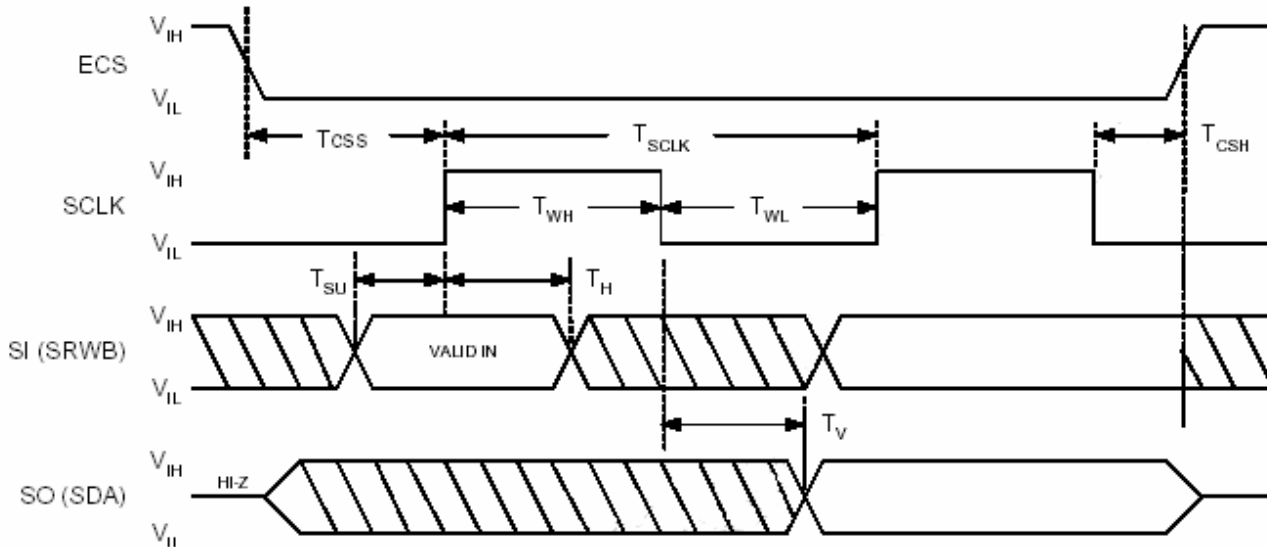
2-2. Recommended Operating Conditions

Symbol	Parameter	Condition	Min	Typ	Max	Units
3.3V	Module power supply		3	3.3	3.6	V

3. Interface Protocol Timing

3-1. G-SPI Host Interface Protocol Timing

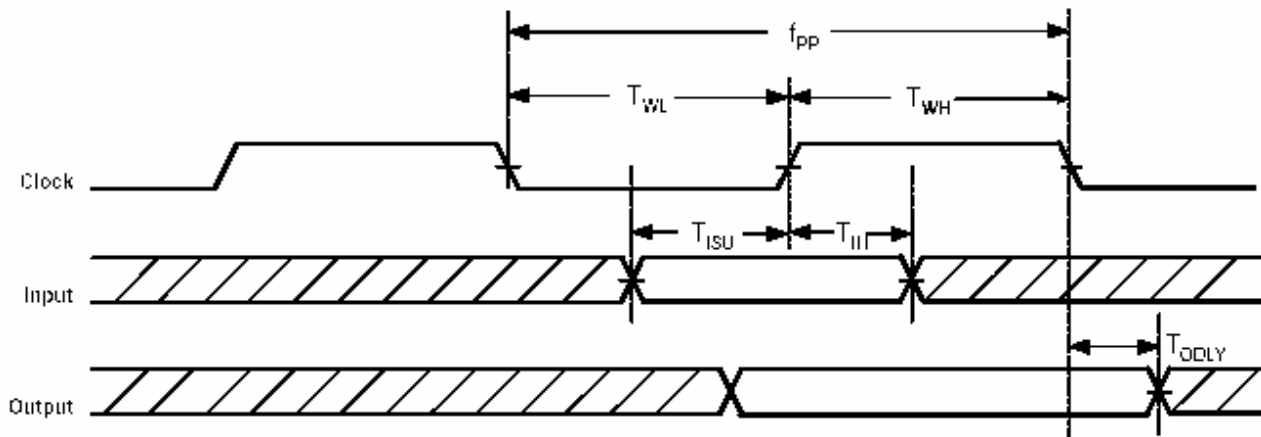
Referred from Marvell hardware specifications



Symbol	Parameter	Condition	Min	Typ	Max	Units
T1	Clock Period		20			ns
T2	Clock high		5			
T3	Clock Low		9			
T4	Clock Rise Time				1	
T5	Clock Fall Time				1	
T6	SDI Hold Time		2.5			
T7	SDI Setup Time		2.5			
T8	SDO Hold Time		5			
T9	SDO Setup Time		1			
T10	SCSn Fall to Clock		5			
T11	Clock to SCSn Rise		0			
T12	SCSn Rise to SCSn Fall		400			

3-2. SDIO Host Interface Protocol Timing

Referred from Marvell hardware specifications



Over full range of values specified in the recommended operating conditions unless otherwise specified.

Symbol	Parameter	Condition	Min	Typ	Max	Units
f_{pp}	CLK Frequency		0		45	MHz
T_{WH}	CLK High Time		11.1			ns
T_{WL}	CLK Low Time		11.1			
T_{ISU}	Input Setup Time		5			
T_{IH}	Input Hold Time		5			
T_{ODLY}	Output Delay Time		0		15	

4. Pin Definition

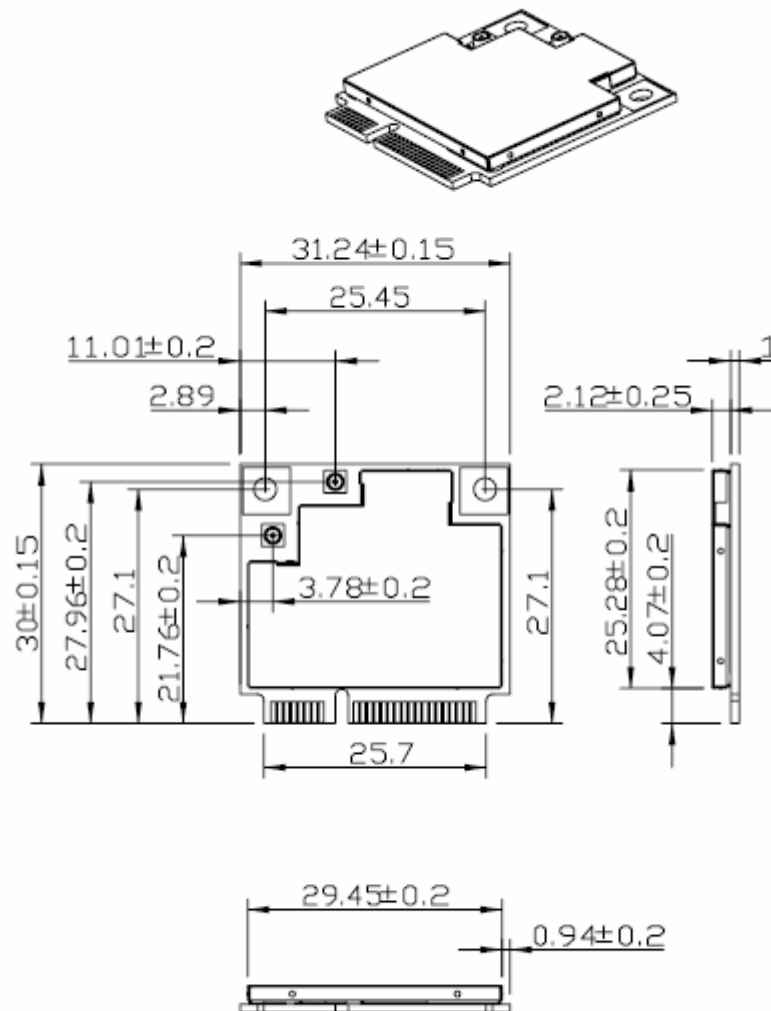
4-1. Pin Assignment

Pin No	Definition	Basic Description	Type	
1	SD_CLK/ SPI_CLK	SDIO 4-bit Mode: Clock Input SDIO 1-bit Mode: Clock Input SDIO SPI Mode: Clock Input G-SPI Mode: G-SPI Clock Input	I/O	
2	3.3V	3.3V Power supply	I	
3	SD_CMD/ SPI_SDI	SDIO 4-bit Mode: Command/Response SDIO 1-bit Mode: Command Line SDIO SPI Mode: Data Input G-SPI Mode: G-SPI Data Input	I/O	
4	GND			
5	SD_DAT[0]/ SPI_SCSn	SDIO 4-bit Mode: Data line bit[0] SDIO 1-bit Mode: Data line SDIO SPI Mode: Data output G-SPI Mode: G-SPI Chip Select Input(active low)	I	
6	RESETn	RESETn: Internal pull-up Reset(active low at least 10ns) (1)When the customer uses the RESETn mode, the SDIO/SPI interface must reboot.	I	
7	SD_DAT[1]/ SPI_SDOn	SDIO 4-bit Mode: Data line bit[1] SDIO 1-bit Mode: Interrupt SDIO SPI Mode: Reserved G-SPI Mode: G-SPI Data Output(active low)	I/O	
8	SLEEP_CLK	Clock input for external sleep clock Note: SLEEP_CLK is used by the WLAN MAC. The input clock frequency is typically 32kHz/32.768kHz/3.2kHz. The Bluetooth radio chip supply is 3.2kH. The WLAN requires 32kHz.	I	
9	SD_DAT[2]/ SPI_SINTn	SDIO4-bit Mode: Data line bit[2]or Read Wait(optional) SDIO 1-bit Mode: Read Wait(optional) SDIO SPI Mode: Reserved G-SPI Mode: Active G-SPI Interrupt Output(active low)	I/O	
10	PDn	PDn: Internal pull-up Full Power Down(active low as long as system need) 0=full power down mode 1=normal mode Connect to power down pin of host	I	
11	SDIO Card Detect	Tie to ground.		
12	WIFI Wake Up Host	Host Wake up WIFI, reserved for future use, left test point or NC.	I/O	
13	SD_DAT[3]	SDIO 4-bit Mode: Data line bit[3] SDIO 1-bit Mode: Reserved SDIO SPI Mode: Card Select(active low)	I/O	
14	3.3V	3.3V Power supply	I	
15	LED	Transmit power or receive ready LED.		
16	3.3V	3.3V Power supply	I	
17	GND			
18	GND			
19	Host Wake UP WIFI	WLAN MAC wake-up in /Interrupt in Software uses this pin or though SDIO as a method of getting the device out of deep sleep, note (1)	I/O	
20	NC			

Pin No	Definition	Basic Description	Type	
21	Host interface select(1)	Host Interface select: SDIO: floating (default in pad) SPI: Tie 100k to ground	O	
22	NC			
23	GND			
24	NC			
25	NC			
26	NC			
27	NC			
28	NC			
29	GND			
30	3.3V	3.3V Power supply	I	
31~33	NC			
34	GND			
35	ECSN	SDIO: Tie to GND GSPI: Floating	O	
36~39	NC			
40	GND			
41	NC			
42	Host interface select(2)	Host Interface select: SDIO: floating (default in pad) SPI: Tie 100k to ground	O	
43~47	NC			
48,50,52	Test pins	Please left test points	I/O	
49,51	NC			

Note: Pin 19 is used to wake up the device that is in deep sleep. The driver triggers Pin 19 when the user requests it exit Deep Sleep Mode. After the device is awakened by the GPIO signal, the firmware sends a signal to the driver. The pin 19 signal is level triggered for at least 30us.

5. Mechanical Dimension



Caution:

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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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

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.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This radio transmitter (IC: 9919A-COM06) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Gain of antenna: 2.0dBi max.
Type of antenna: Omni-directional
Impedance of antenna: 50ohm

Le présent émetteur radio (IC: 9919A-COM06) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.
Gain d'antenne: 2.0dBi maximal
Type d'antenne: 50 ohm, Omni-directionnel

Information for the OEM Integrators

This device is intended for OEM integrators only. Please see the full grant of equipment document for restrictions.

Label Information to the End User by the OEM or Integrators

If the FCC ID of this module is not visible when it is installed inside another device, then the outside of the device into which the module is installed must be label with "Contains FCC ID: Z2TCOM06 and IC: 9919A-COM06".

MPE Reminding

Les antennes installées doivent être situées de façon à ce que la population ne puisse y être exposée à une distance de moins de 20 cm. Installer les antennes de façon à ce que le personnel ne puisse approcher à 20 cm ou moins de la position centrale de l' antenne.

La FCC des états-unis stipule que cet appareil doit être en tout temps éloigné d'au moins 20 cm des personnes pendant son fonctionnement.

To satisfy FCC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation.

To ensure compliance, operations at closer than this distance is not recommended.