

IEEE 802.11b/g Wireless SDIO/SPI Module

Zcomax™ Technologies, Inc. has released a latest addition to the AirRunner™ wireless LAN embedded adapter line. The XG-182M is an IEEE 802.11b/g SDIO and SPI module that has been designed with the integration market in mind.

With its low profile external antenna connector and small form factor, the XG-182M will fit into most any embedded design supporting the SDIO and SPI interfaces. The XG-182M is a high performance module that exceeds both IEEE 802.11b/g and FCC regulatory requirements.

The XG-182M's design was selected to help reduce the overall costs associated with wireless embedded modules by supporting the industries most popular interfaces, eliminating the need for custom designs to fit existing product lines. The XG-182M module is a robust plug and play ready device that supports windows CE and Linux.

With an excellent price / performance ratio and the field-proven reliability associated with the Marvell chipset, the XG-182M is a superb choice for any wireless application requiring both quality and reliability. For samples and availability contact your sales representative today.

***XG-182M at a glance***

- IEEE 802.11b/g Compliant
- 16 dBm Tx Output Power (peak)
- -82 dBm @ 11 Mbps Rx Sensitivity
- Hirose U.FL Antenna Connector
- SDIO/SPI Host Interface Via Board To Board Connector or LGA Pad
- FCC and ROHS Compliant
- MAC/BB/RF Marvell 88W8686
- Driver support – Linux, CE and
Customized Drivers are Available.



Table of Contents

	Page
<i>Product Brief</i>	3
<i>Physical Specification</i>	4
<i>RF Specification</i>	4
<i>Electrical Specification</i>	5
<i>Antenna Connector Specification.</i>	5
<i>Environmental</i>	5
<i>Absolute Maximum Rating.</i>	5
<i>Security.</i>	6
<i>Reliability.</i>	6
<i>Interoperability.</i>	6
<i>International Frequencies</i>	6
<i>Warranty</i>	6
<i>Mechanical Drawing</i>	7
<i>NAIS Connector Specification.</i>	8
<i>XG-182M LGA Drawing</i>	9
<i>Pin definition</i>	10, 11

Product Brief:

Zcomax has designed the perfect IEEE 802.11b/g WLAN small form factor module. The Zcomax XG-182M is an SDIO and SPI module that was designed to target the embedded and small form factor markets, specifically for such applications as cellular phones, video, voice and multimedia applications where size, power consumption and reliability are essential. Other markets and intended devices are widely supported but we cannot possibly list them all here. With our ability to provide drivers and / or source code for qualified customers we can truly be a one stop source for all your wireless needs.

Main Features include:

- MAC/Baseband/RF WLAN system-on-chip (SoC)
- IEEE 802.11g wireless LAN standard
- IEEE 802.11b wireless LAN standard
- Bluetooth coexistence interface supported
- IEEE 802.11i security standard
- WPA/WPA2/WPA-PSK/WPA2-PSK
- AES /40-and 128-bit WEP/TKIP support based on 802.11i standard
- Quality of Service (QoS) compliant to the WMM and draft IEEE 802.11e standards
- IEEE 802.1x security standard
- EAP-TLS/EAP-TTLS/EAP-PEAP
- Deep sleep mode supported, lower power consumption
- RoHs compliant

Physical Specification:

Host Interface	SDIO / SPI - Board to Board Connector (NAIS) - LGA Pad (optional)
EEPROM	8Kbit
Dimensions (L x W x H)	20mm(L) * 23mm(W) * 3.85mm (H)
Weight	≤ than 10 g

RF Specification:

Frequency Range (GHz)	North America: 2.412 ~ 2.462
	Japan TELEC: 2.412 ~ 2.484 802.11b
	Japan TELEC: 2.412 ~ 2.472 802.11g
	Europe ETSI: 2.412 ~ 2.472
	Spain: 2.457 ~ 2.462
Frequency Drift	<25KHz
Transmitter Output Power IEEE 802.11b IEEE 802.11g	14 dBm, 16dBm (Average, Peak Power) 12 dBm, 14dBm (Average, Peak Power)
Antenna Impedance	50 ohms
Media Access Protocol	CSMA/CA w/ACK
802.11b Data rates 802.11g Data rates	11, 5.5, 2, 1 Mbps 54, 48, 36, 24, 12, 9, 6 Mbps
Modulation	48/54 Mbps (QAM-64) 24/36 Mbps (QAM-16) 12/18 Mbps (QPSK) 6/9 Mbps (BPSK)
Receiver Sensitivity @ PER < 10% for 802.11g @ PER < 8% for 802.11b	54 Mbps -68 dBm 11 Mbps -82 dBm

Electrical Specification:

Supply Voltage	3.3 Vdc, +/- 7%
Supply Voltage Ripple	120mV (pp) max.
Power-on startup time	<600 ms
Power Supply	Current Consumption 400mA (Typ) Peak Current Consumption < 700mA
	Internal Voltage +3.3V,+1.8V,+1.2V
Power Save mode current	< 10 ~ 20mA (depending on host)
Sleep mode current	< 4.8mA

Antenna Connector Specification (supports Diversity)

Connector Type	One Hirose U.FL-R-SMT 50Ω
Manufacturer	Hirose Electronic Co. Ltd.
Part Number	U.FL-R-SMT
P/N Mating Connector	U.FL-LP-XXX

Environmental

Working Temperature	0 ~ 55°C, 90% relative humidity (non-condensing)
Storage Temperature	-20 ~ 80°C, 90% relative humidity (non-condensing)

Absolute Maximum Rating

Stress above those listed in Absolute Maximum Rating may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in standard specifications is not implied.

Supply Voltage	6.5V
I/O Voltage	-0.5V ~ VCC+0.3V
Storage Temperature	-20 ~ +80°C, 95% relative humidity (non-condensing)
Barometric Pressure	740 hPa ~ 1050 hPa

Security (IEEE 802.11i, 802.11x security standard and 802.11e)

The XG-182M supports the following security features according to the latest Marvell driver and firmware.

- WPA / WPA2 / WPA-PSK / WPA2-PSK
- 40 and 128-bit WEP
- EAP-TLS/EAP-TTLS/EAP-PEAP
- AES/40 and 128-bit WEP/TKIP

Reliability (MTBF)

Mean Time to Failure is rated at 150,000 hours.

Interoperability

The XG-182M interoperates with any IEEE 802.11g and 802.11b compliant devices.

International Frequencies

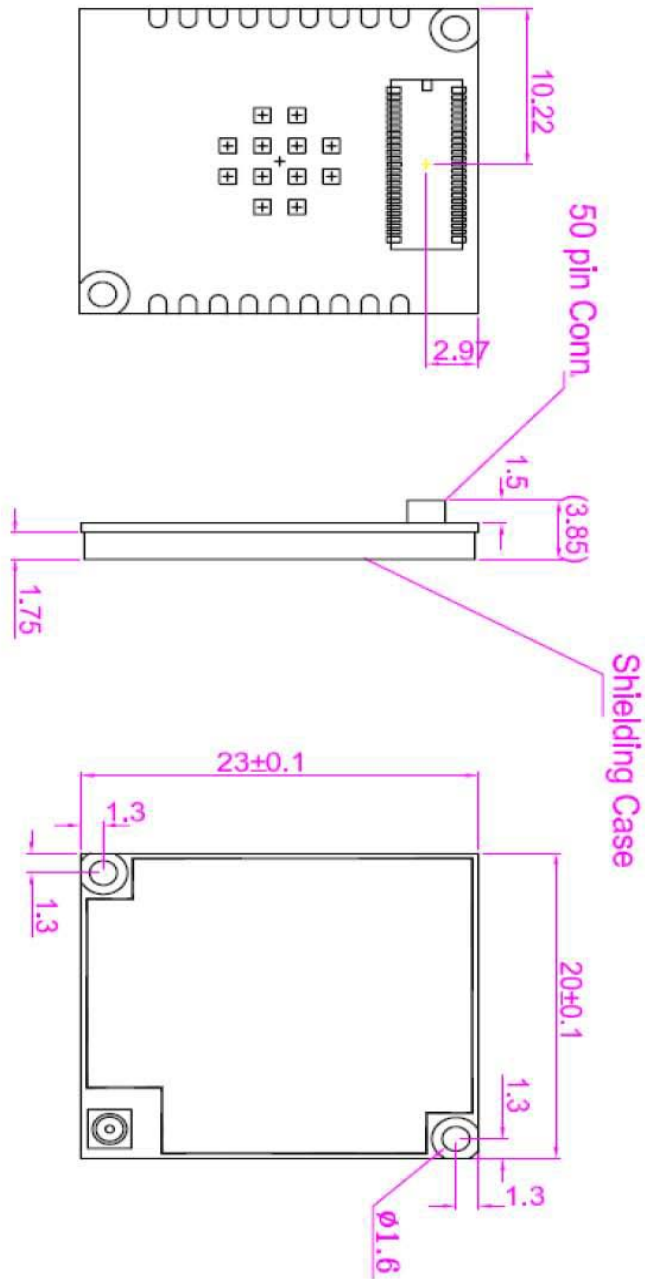
Regulatory requirements at different countries mandate different operating frequencies (channels). The XG-182M may be factory configured to support different frequency requirements. Allowable channels for each typical domains are listed below.

Domain	Allowable channels
FCC	Channels 1 ~ 11
ETSI	Channels 1 ~ 13
Telec 802.11b	Channels 1 ~ 14
Telec 802.11g	Channels 1 ~ 13

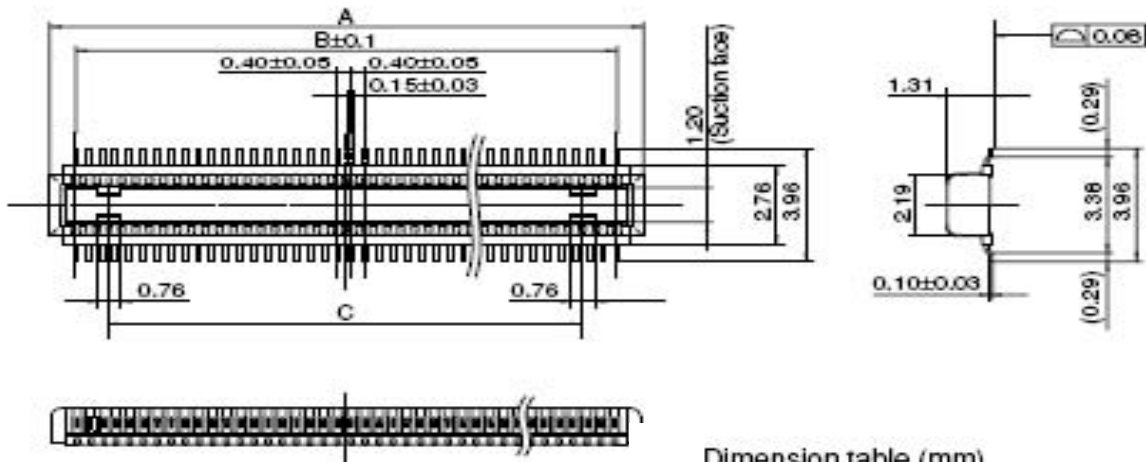
Warranty

The XG-182M is warranted to up to 12 months against manufacturing defects.

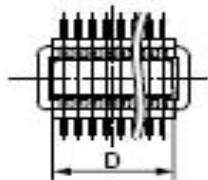
Mechanical Drawing



NAIS Connector Specification



Max. 18 contacts



Dimension table (mm)

Number of contacts/ dimension	A	B	C	D
14	3.9	2.4	—	3.04
16	4.3	2.8	—	3.44
20	5.1	3.6	1.6	—
22	5.5	4.0	2.0	—
24	5.9	4.4	2.4	—
26	6.3	4.8	2.8	—
28	6.7	5.2	3.2	—
30	7.1	5.6	3.6	—
34	7.9	6.4	4.4	—
36	8.3	6.8	4.8	—
40	9.1	7.6	5.6	—
44	9.9	8.4	6.4	—
50	11.1	9.6	7.6	—
54	11.9	10.4	8.4	—
60	13.1	11.6	9.6	—
64	13.9	12.4	10.4	—
70	15.1	13.6	11.6	—
80	17.1	15.6	13.6	—
90	19.1	17.6	15.6	—
100	21.1	19.6	17.6	—

Note: "Products with V notch" and "products with V notch and post edge horseshoe bend" are mating compatible.

LGA Drawing

Fig 1 XG-182M See-Through Drawing

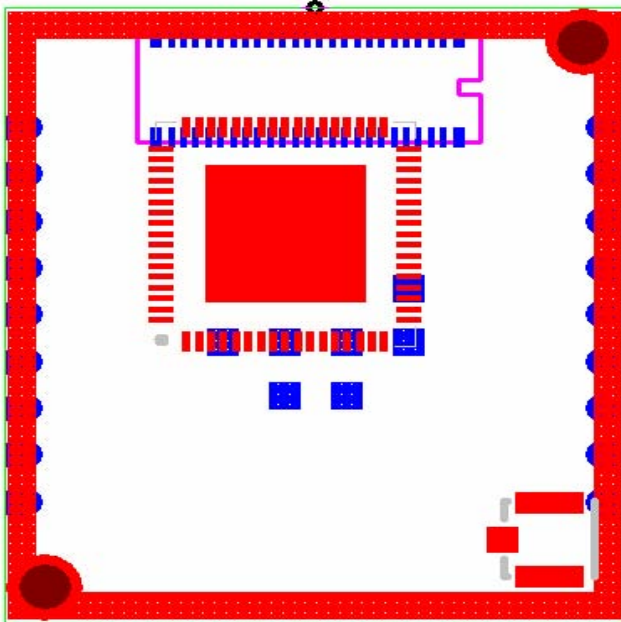


Fig 2 XG-182M Top View Drawing

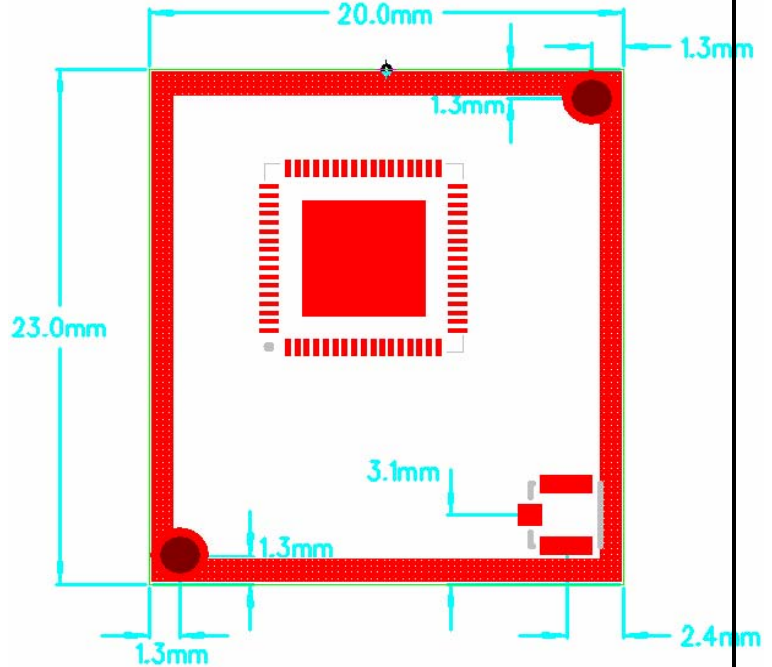
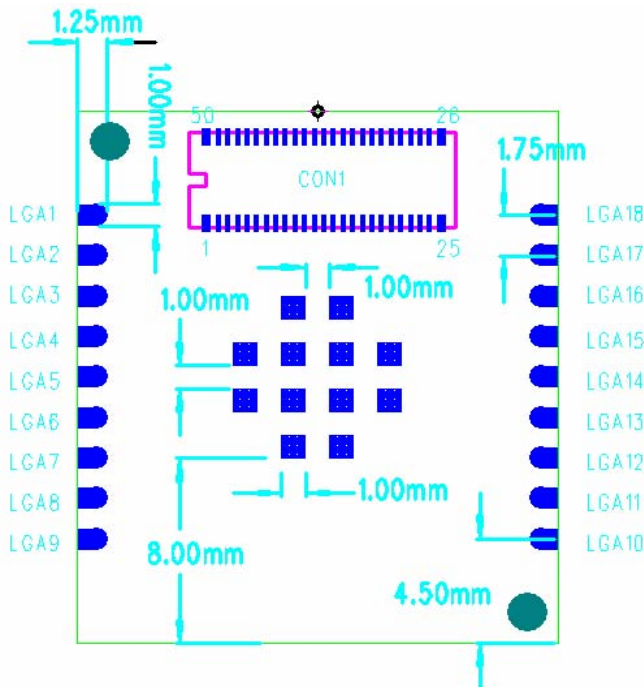


Fig 3 XG-182M Bottom View Drawing



XG-182M Pin Definition of CON1 (NAIS AXK850145Y) and LGA

CON1 Pin #	LGA Pin#	Pin Name	I/O	Connection	Description
2	17	BT_STATE	I	88W8686 Pin.56	Bluetooth State 0 = normal priority, Rx 1 = high priority, Tx Priority is signaled after BT_PRIORITY has been asserted. After priority signaling, BT_STATE indicates the Tx/Rx mode of Bluetooth radio.
3	6	BT_FREQ	I	88W8686 Pin.57	4-Wire BCA Mode: Bluetooth Frequency Asserted (logic high) when the Bluetooth transceiver hops into the restricted channels defined by the coexistence mechanism. 2-Wire, 3-Wire BCA Mode: Tie to ground (VSS)
4	7	BT_TX_CONFIRM	O	88W8686 Pin.58	Bluetooth WLAN Active 2-Wire BCA Mode: When high, WLAN is transmitting or receiving packets. 3-Wire BCA Mode: 0 = Bluetooth device allowed to transmit 1 = Bluetooth device not allowed to transmit This pin drives low when PDn is asserted. In WLAN Sleep mode, all I/O pads are powered down. This pad must stay at a low state even in power down mode.
5	8	BT_PRIORITY	I	88W8686 Pin.59	Bluetooth Priority 2-Wire BCA Mode: When high, Bluetooth is transmitting or receiving high priority packets. 3-Wire BCA Mode: When high, Bluetooth is transmitting or receiving packets.
49	9	SDIO_SPI_SELECT	O	88W8686 Pin.22 or Pin.24	High or NC for SDIO, low for SPI interface
9	13	SPI_SDI/SD_CMD	I/O	88W8686 Pin.43	G-SPI Mode: SPI_SDI G-SPIData Input SDIO 4-bit Mode: SD_CMD Command/Response SDIO 1-bit Mode: SD_CMD Command Line SDIO SPI Mode: SD_CMD Data Input
10	12	SPI_SINTn/SD_D2	I/O	88W8686 Pin.46	G-SPI Mode: SPI_SINTn G-SPI Interrupt Output (active low) SDIO 4-bit Mode: SD_D2 Data Line Bit[2] or Read Wait (optional) SDIO 1-bit Mode: SD_D2 Read Wait (optional) SDIO SPI Mode: SD_D2 Reserved
25	11	SPI_SCSn/SD_D0	I	88W8686 Pin.44	G-SPI Mode: SPI_SCSn G-SPI Chip Select Input (active low) SDIO 4-bit Mode: SD_D0 Data Line Bit [0] SDIO 1-bit Mode: SD_D0 Data Line SDIO SPI Mode: SD_D0 Data Output

**XG-182M Pin Definition of CON1 (NAIS AXK850145Y) and LGA
(Continued)**

CON1 Pin #	LGA Pin#	Pin Name	I/O	Connection	Description
32	16	SPI_CLK/SD_CLK	I/O	88W8686 Pin.42	G-SPI Mode: SPI_CLK G-SPI Clock Input SDIO 4-bit Mode: SD_CLK Clock Input SDIO 1-bit Mode: SD_CLK Clock Input SDIO SPI Mode: SD_CLK Clock Input
34	15	SPI_SDO/SD_D1	I/O	88W8686 Pin.45	G-SPI Mode: SPI_SDO G-SPI Data Output SDIO 4-bit Mode: SD_D1 Data Line Bit [1] SDIO 1-bit Mode: SD_D1 Interrupt SDIO SPI Mode: SD_D1 Reserved
35	14	SD_D3	I/O	88W8686 Pin.47	SDIO 4-bit Mode: SD_D3 Data Line Bit [3] SDIO 1-bit Mode: SD_D3 Reserved SDIO SPI Mode: SD_D3 Card Select (active low)
39	5	GPIO0	I/O	88W8686 Pin.11	Internal pull-up General Purpose Input/Output These pins are asynchronous to internal clocks. Several of these pins can be selected to perform alternate functions such as an LED controller. When not used, these pins should be left floating. GPIO1 – LED output (strap pin) (Tx power or Rx ready LED) GPIO0 – external oscillator control/SLEEPn; Wake up control During power down sleep mode, the external crystal oscillator is disabled, and, if implemented, also powered down by GPIO0
46	4	GPIO1	I/O	88W8686 Pin.40	
13,38	2,3	3.3V	Power	—	Power supply from host
1, 50	1,18,10	GND	Ground	—	Ground
6,7,8,11,12,14,15,16,17,18,19,20	NC	NC	NC	NC	NC