

HongBo

HM7601 SIP Module

User Manual

Product

Version

Date

Document History

Date	Revised Contents	Revised by	Version
Oct. 18 th , 2015	Preliminary version	Derrick	1.0

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1. Description

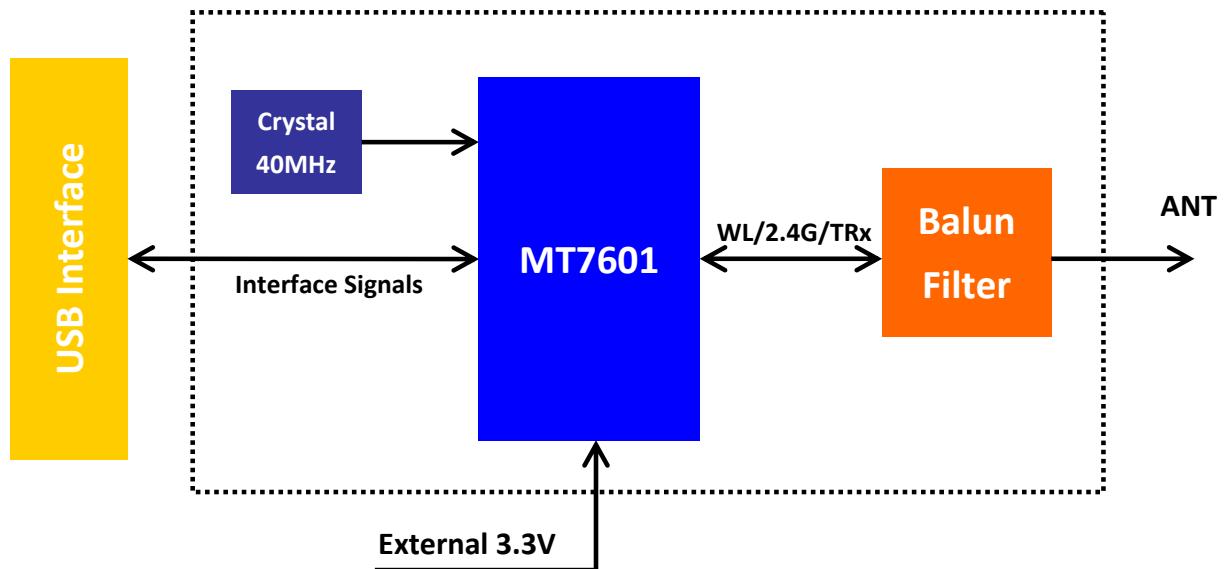
HM7601 is a low-cost Wi-Fi SIP module, which fully supports the features and functional compliance of IEEE 802.11b/g/n standards. It supports up to 150Mbps high-speed wireless network connections. Also, it is designed to provide excellent performance with low power consumption as well as a cost-effective solution. The module is able to be developed for Wi-Fi USB dongle, Wi-Fi camera, wireless module for IoT products..etc.

Feature

- Small dimension : 11mm X 11mm X 2.0mm
- Host interface : USB 2.0
- Support Orthogonal Frequency Division Multiplexing(OFDM), Complementary Code Keying(CCK), and Direct Sequence Spread Spectrum(DSSS) to provide a variety of data rates
- Integrated switching regulator enables direct connection to battery
- Support AP /STA / ad-hoc mode / Wi-Fi direct
- IEEE 802.11n (HT20 MCS7), IEEE 802.11g(OFDM 54Mbps) and IEEE 802.11b(DSSS 11Mbps)
- Support Wi-Fi Direct (WFA P-2-P Standard)
- Security: WFA WPA/WPA2 personal, WPS2.0, WAPI
- QoS: WFA WMM, WMM PS
- Compatible with Windows XP, Vista, W7 32/64, W8 32/64, W8.1 32/64
- Linux and MAC OS X
- Plug and play, easy set-up installation

1-1. Block Diagram

A simplified block diagram of the HM7601 SiP module is shown in the figure below.



1-2. Specification

Model Name	HM7601
Product Description	Wi-Fi SiP Module
Network Standard	IEEE 802.11b/g/n Compliant
Host Interface	USB 2.0
Operation Conditions	
Operating Voltage	3.3V typ.
Temperature	Operating : 0°C ~ 70°C Storage : -40°C ~ 125°C
Humidity	Operating : 10 ~ 95% (Non-Condensing) Storage : 5 ~ 95% (Non-Condensing)
Dimension	11mm X 11mm X 2.0mm
Package	Half hole stamp type
Electrical Specifications	
Frequency	2.4GHz ISM radio band
Channel	1~14
Modulation	DSSS, OFDM, 64-QAM, 16-QAM, QPSK, BPSK, CCK, DQPSK, DBPSK
Security	<ul style="list-style-type: none">■ WFA WPA/WPA2 personal■ WPS2.0■ WAPI
Operation System	Windows XP, Vista, W7 32/64, W8 32/64, W8.1 32/64 ; Linux and MAC OS X

2. Electrical Characteristics

2-1. Absolute Maximum Ratings

Symbol	Parameter	Min.	Max.	Unit
VDD33	Power supply	-0.3	3.6	V

2-2. Recommended Operation Conditions

Symbol	Parameter	Min.	Typ.	Max.	Unit
VDD33	Power supply	2.97	3.3	3.63	V

2-3. Current consumption

Description	Performance	
	Typ.	Units
Sleep mode	1.1	µA
RX Active, BW40, MCS7	151	mA
RX Listen	6	mA
RX Power saving, DTIM=1	15	mA
TX HT40, MCS7@15dBm	210	mA
TX CCK, 11M@19dBm	242	mA

Note: All result is measured at the antenna port and VDD33 is 3.3V.

2-4. RF Characteristics

2-4-1. RF Tx Specification (@module O/P)

802.11b Transmit					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency range		Channel 1		Channel 14	
Tx Power Level	1~11Mbps DSSS	16	18	20	dBm
Frequency tolerance		-10		10	ppm
Spectral Mask	11MHz→22MHz			-30	dBr
	> 22MHz			-50	dBr
Tx power-on	10%→90%		0.2	2	uS
Tx power-down	90%→10%		0.2	2	uS
Modulation accuracy	1/2/5.5/11 Mbps	4	8	20	%
802.11g Transmit					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency range		Channel 1		Channel 14	
Tx Power Level	6~54Mbps OFDM	14	16	18	dBm
Frequency tolerance		-10		10	ppm
Modulation accuracy	54Mbps		<-30	-25	dB
	48 Mbps		<-30	-22	dB
	36 Mbps		<-30	-19	dB
	24 Mbps		<-30	-16	dB
	18 Mbps		<-30	-13	dB
	12 Mbps		<-30	-10	dB
	9 Mbps		<-30	-8	dB
	6 Mbps		<-30	-5	dB
Spectral Mask	11MHz			-20	dBr
	20MHz			-28	dBr
	30MHz			-40	dBr
Spectral flatness	±10 sub-carrier	-2		2	dB
	±17→±26 sub-carrier	-4		2	dB

802.11n Transmit					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency range		Channel 1		Channel 14	
Tx Power Level	HT20 MCS0~7	13	15	17	dBm
Frequency tolerance		-10		10	ppm
Modulation accuracy	MCS 7		<-30	-28	dB
	MCS 6		<-30	-25	dB
	MCS 5		<-30	-22	dB
	MCS 4		<-30	-19	dB
	MCS 3		<-30	-16	dB
	MCS 2		<-30	-13	dB
	MCS 1		<-30	-10	dB
	MCS 0		<-30	-5	dB
Spectral Mask	11MHz			-20	dBr
	20MHz			-28	dBr
	30MHz			-45	dBr
Spectral flatness	±10 sub-carrier	-2		2	dB
	±17→±28 sub-carrier	-4		2	dB

2-4-2. RF Rx Specification (@module O/P)

802.11b Receiver					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency range		Channel 1		Channel 14	
Min. input (PER<8%)	11Mbps		-84	-76	dBm
	5.5Mbps		-87	-76	dBm
	2Mbps		-89	-80	dBm
	1Mbps		-92	-80	dBm
Max. input level	11Mbps		0		dBm
802.11g Receiver					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency range		Channel 1		Channel 14	
Min. input (PER<10%)	54Mbps		-71	-65	dBm
	48Mbps		-72	-66	dBm
	36Mbps		-77	-70	dBm
	24Mbps		-80	-74	dBm
	18Mbps		-83	-77	dBm
	12Mbps		-85	-79	dBm
	9Mbps		-87	-81	dBm
	6Mbps		-88	-82	dBm
Max. input level	6/54Mbps		0/-10		dBm
802.11n HT20 Receiver					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency range		Channel 1		Channel 14	
Min. input (PER<10%)	MCS 7		-70	-64	dBm
	MCS 6		-71	-65	dBm
	MCS 5		-73	-66	dBm
	MCS 4		-77	-70	dBm
	MCS 3		-80	-74	dBm
	MCS 2		-83	-77	dBm
	MCS 1		-85	-79	dBm
	MCS 0		-87	-82	dBm
Max. input level	MCS0/MCS7		-10/-14		dBm

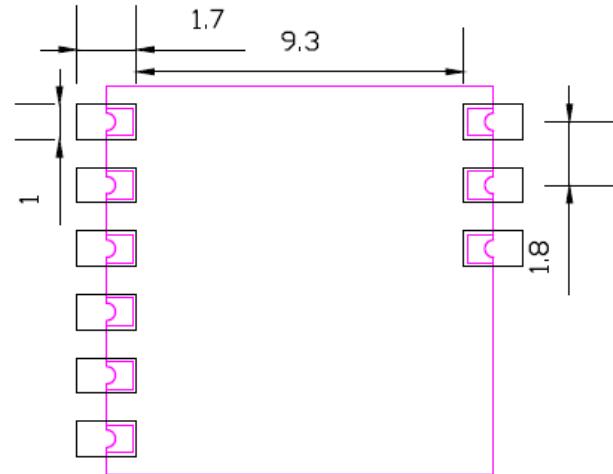
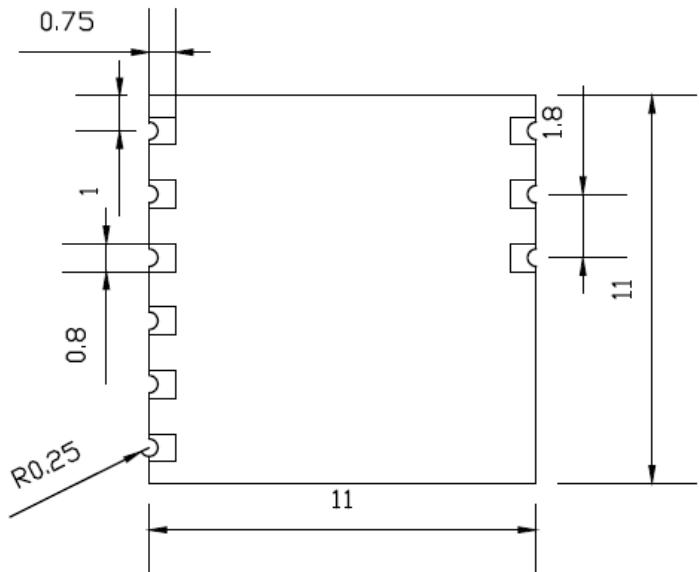
3. Pin Definition

3-1. Pin Description

Pin	Definition	I/O	Description
1	VDD33	Power	Main power supply
2	GND	Power	Ground
3	DP	AI0	D+ data input/output
4	DM	AI0	D- data input/output
5	WL_GPIO5	DIO	LED indicator control signal
6	WL_GPIO2	DIO	WPS button control signal
7	GND	Power	Ground
8	ANT_Module	RF	2.4GHz RF output
9	GND	Power	Ground

3-2. Pin Assignment and Mechanical Dimensions

The SiP module will conform to the following pin map, shown in the following diagram (top view)



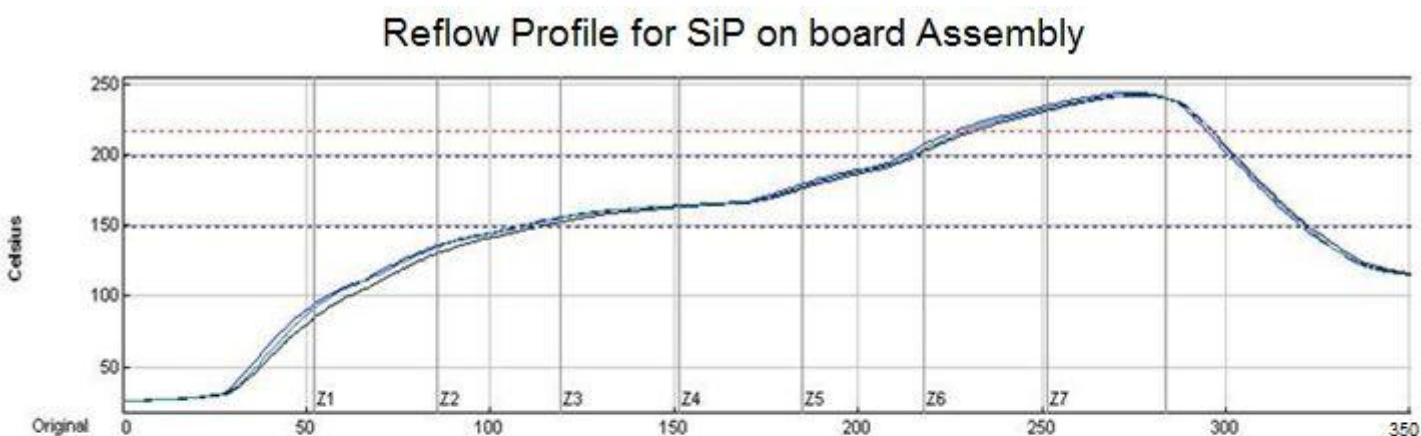
UNIT: mm

4. Regulation

The SiP module was pre-scanned with module level to comply with following standards:

- US/CAN: FCC CFR47 Part 15.247
- Europe: ETS 300-328 V1.6.1

5. Recommended Reflow Profile



Preheat time	150°C—200°C: 105+/-15sec
Dwell time	Over 220°C: 70+5/-10 sec
Peak Temp	240 +10/-5°C
Ramp Up/Down Rate	Up: 3 +0/-2 °C/ sec Down: 2 +0/-1°C/ sec

6. SiP Module Preparation

6-1. Handling

Handling the module must wear the anti-static wrist strap to avoid ESD damage. After each module is aligned and tested, it should be transport and storage with anti -static tray and packing. This protective package must be remained in suitable environment until the module is assembled and soldered onto the main board.

6-2. SMT Preparation

1. Calculated shelf life in sealed bag: 6 months at $<40^{\circ}\text{C}$ and $<90\%$ relative humidity (RH).
2. Peak package body temperature: 250°C .
3. After bag was opened, devices that will be subjected to reflow solder or other high temperature process must.
 - A. Mounted within: 168 hours of factory conditions $<30^{\circ}\text{C}/60\%$ RH.
 - B. Stored at $\leq 10\%$ RH with N2 flow box.
4. Devices require baking, before mounting, if:
 - A. Package bag does not keep in vacuumed while first time open.
 - B. Humidity Indicator Card is $>10\%$ when read at $23\pm 5^{\circ}\text{C}$.
 - C. Expose at 3A condition over 8 hours or Expose at 3B condition over 24 hours.
5. If baking is required, devices may be baked for 12 hours at $125\pm 5^{\circ}\text{C}$.

7. Federal Communications Commission (FCC) Statement

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.

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 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.

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 of the device.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or

transmitter.

2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

End Product Labeling:

This module is designed to comply with the FCC statement, **FCC ID :2AJICCG757560**

The host system using this module, should have label in a visible area indicated the following texts:

"Contains **FCC ID :2AJICCG757560**".

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as shown in this manual.