



深圳市奥金瑞科技有限公司
SHENZHEN OGEMRAY TECHNOLOGY CO.,LTD

Specification

UART WiFi Module

GWF-KM22

(2.4GHz 802.11 b/g/n)

Ver: 1.2

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1. Introduction

1.1 Profile

The GWF-KM22 module operates in 2.4GHz ISM frequency band with low power consumption; it applies a highly integrated MAC/BBP in the MT7681 chipset, support IEEE的802.11b/g/n standards with 1T1R technology.

This module supports TCP/IP, UDP protocol, its low cost and low power consumption, easy using characteristics make the wireless connection become easy and reliable.

The single side components mounted module provide 1 UART interface and 4 GPIO ports. The on-board antenna easy the downstream RF hardware technology requirement. A set of future provided serial AT commands can simplify software design, thus a normal, simple, cheap MCU can be used to control the WiFi module easily.

The module includes a number of TCP/IP-based connectivity protocols enabling a low-cost, low-complexity system to contain full-featured internet connectivity and reliable information exchange. This module is mainly used in a multitude of smart home appliances and consumer electronics such as remote control, thermostats, power socket, WIFI audio transmission, LED control, wireless sensor, etc and other applications.

1.2 Features

- Supports 2.4GHz, 802.11b/g/n Client and AP mode
- Internal MCU development SDK supported.
- Smart WiFi configuration supported.
- Provide 1 UART and 4 GPIO ports.
- Support WEP,WPA2 encryption mode
- Selection Client and AP mode
- RF ON/OFF control, Sleep mode power management.
- Optional onboard antenna .



1.3 Block diagram

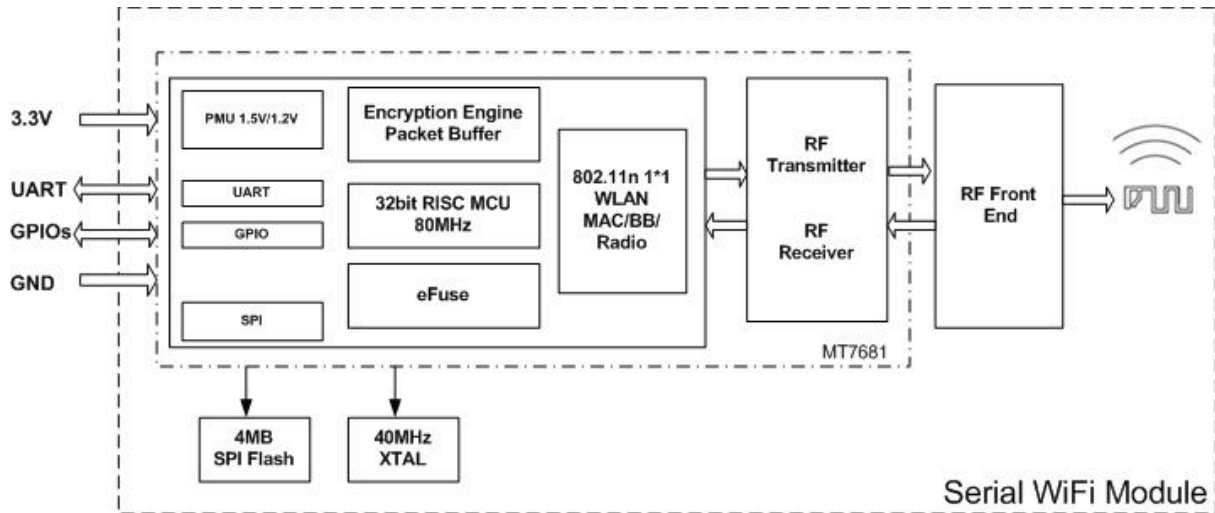


Fig. 1-1 Block diagram--The onboard antenna used



1.4 Outline



Fig. 1-2 Outline reference picture

1.5 Specification

Table1 1 - 1 General Specification

Protocol and interface	
WiFi Protocol	IEEE 802.11b/g/n
Data interface	1 UART, Max data rate:115200bps
I/O ports	4 GPIO





LED display	Link/Activity display	
Memory size		
External SPI Flash	4Mbit	
WiFi Features		
WiFi mode	Client / Soft AP mode	
Encryption	WPA2-PSK, WEP (more will be available later)	
WiFi RF Characteristics		
Frequency	ISM band, 2412~2462MHz.	
Tx power (Peak value)	802.11b (CCK) 11Mbps: 19.5+/-1dBm	
	802.11g (OFDM) 54Mbps: 21.5+/-1dBm	
	802.11n(HT20@MCS7),20.5+/-1dBm	
Rx sensitivity	802.11b: -86+/-1dBm; 802.11g: -72+/-1dBm, 802.11n (HT20), -68+/-1dBm;	
Operation Voltage and Current (Typical)		
Power supply	3.3+/-0.05 VDC	
Current	1.1mA	Sleep mode
	6mA	RX listen mode
	15mA	RX power saving, DTIM=1
	70mA	RX Active、MCS7
	220mA	802.11g (OFDM) 54Mbps
	210mA	802.11n (HT20@MCS7)
	245mA	802.11b (CCK) 11Mbps
Operation Condition		
Operating temperature	-10°C to +60°C	
Storage temperature	-20°C to +80°C	



Operating humidity	20% to 80%
Physical	
Size	30*18mm
Weight	2.4g

1.6 Pinout configuration

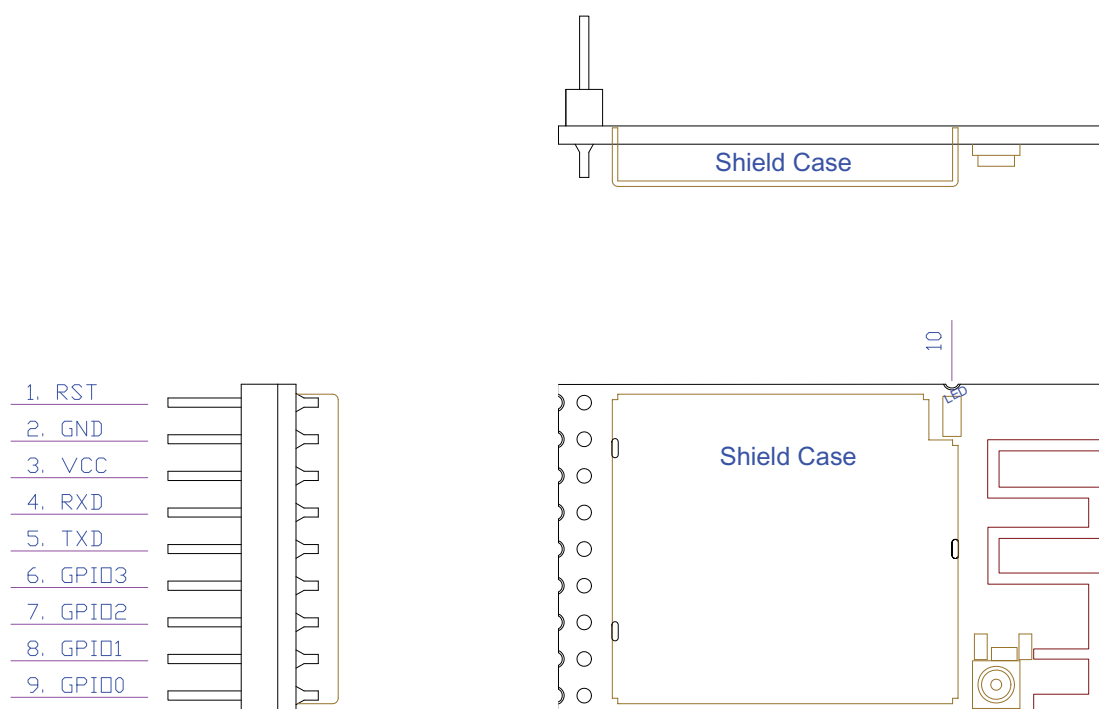


Fig. 1-3 Pin definition overview

Table1 1 - 2 Pin configuration

Pin	Name	Description
1	RST	External reset active low
2	GND	GND



3	VCC	3.3V
4	RXD	UART_RXD(UART Receive data)
5	TXD	UART_TXD(UART transmit data)
6	GPIO3	GPIO3
7	GPIO2	GPIO2
8	GPIO1	GPIO1
9	GPIO0	GPIO0
10	NC	Not Connection

Notes: 1. GPIO0~3 can be pulled up to low or high
 2. For the time being only UART/GPIO supported
 3. Pin 10 must ben't connected
 4. GPIO1 has been reserved for a AT command mode switching, high level is the AT command mode, low level is pure data model

1.7 Characteristics

Table 1-3 Absolute Max Rating

Symbol	Description	Max rating	Unit
VCC	3.3V power input	-0.3~3.6	V
VESD	ESD protection (HBM)	2000	V

Table 1-4 DC Characteristic

Symbol	Description	Condition	Min	Typ	Max	Unit
3.3VD	Power supply	3.3V	2.97	3.3	3.63	V
V _{IL}	Input low voltage	LVTTTL	-0.28	N/A	0.6	V
V _{IH}	Input low voltage		2.0	3.3	3.63	V
V _{T-}	Negative trigger		0.68	N/A	1.36	V
V _{T+}	Positive trigger		1.36	N/A	1.7	V
V _{OL}	Output low voltage		I _{OL} I=1.6~14mA	-0.28	N/A	0.4
V _{OH}	Output high voltage	I _{OH} I=1.6~14mA	2.4	N/A	3.63	V
R _{PU}	Input pull-up resistance	PU=high, PD=low	40	N/A	190	KΩ
R _{PD}	Input pull-down resistance	PU=low, PD=high	40	N/A	190	KΩ



2. Reminds to hardware design

2.1 Application

The module is designed with an UART interface, it support TCP/IP protocol, users can use the UART port to transfer data via WiFi connection to other internet devices.



Fig. 2-1 To use external MCU

2.2 GPIO Descriptions

The KM22 module designed with 4 GPIO port , the fastest interrupt request time is about 1ms。

Each GPIO port can be individually configured as an input or output via software. To stabilize the interface communication, you can add a pull-push circuit as below:

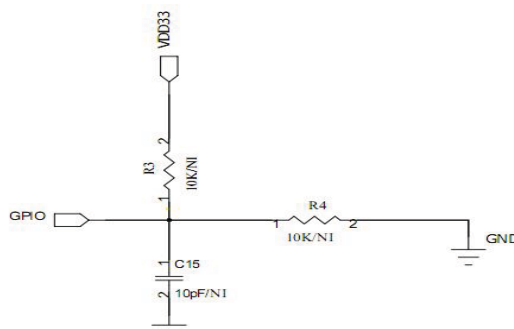


Fig. 2-2 Reference design of GPIO pins

Notes: The supply voltage is 3.3V for this module. The default voltage setting of GPIO is also 3.3V. Should other voltage system be applied, a voltage converter must be used.

Remarks: the GPIO3 was default assigned for LED display, if this port must be used for other



purpose; please specify the requirement when ordering, so that the onboard LED can be removed during production.

2.2.1 LED Display

When an external LED to be used, a recommended connection shows as below:

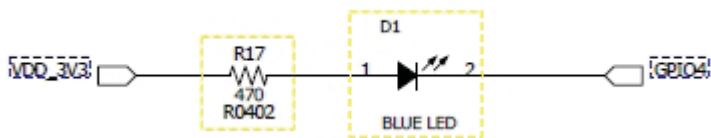


Fig. 2-3 Reference design for external LED connection

* the 470 ohm resistor can be changed to a value depends on the brightness of the LED.

2.3 UART interface

UART interface			
Pin	Pin name	I/O	Instruction
4	RXD	I	UART_RXD(UART Receive data)
5	TXD	O	UART_TXD (UART transmit data)

Table 2- 1 UART interface

The Super terminal or Tera or SecureCRT tool can be sued to test or debug the UART。

The UART setting is 115200, 8-N-1; A reference design connection like:



Fig. 2-4 UART reference connection diagram



2.4 Power supply

Table 2-2 pin configuration

pin	Symbol	Description
2	GND	Ground
3	3.3VD	3.3Vpower input

Since the module needs clean and low ripple 3.3V DC power supply, please properly design the power supply to this module, otherwise the RF performance of the module might be deteriorated.

2.5 RF output

A、onboard antenna



place 1nH inductance on the place
when using the on board antenna

Fig. 2-5 Reference pic with onboard antenna



2.6 Dimensions

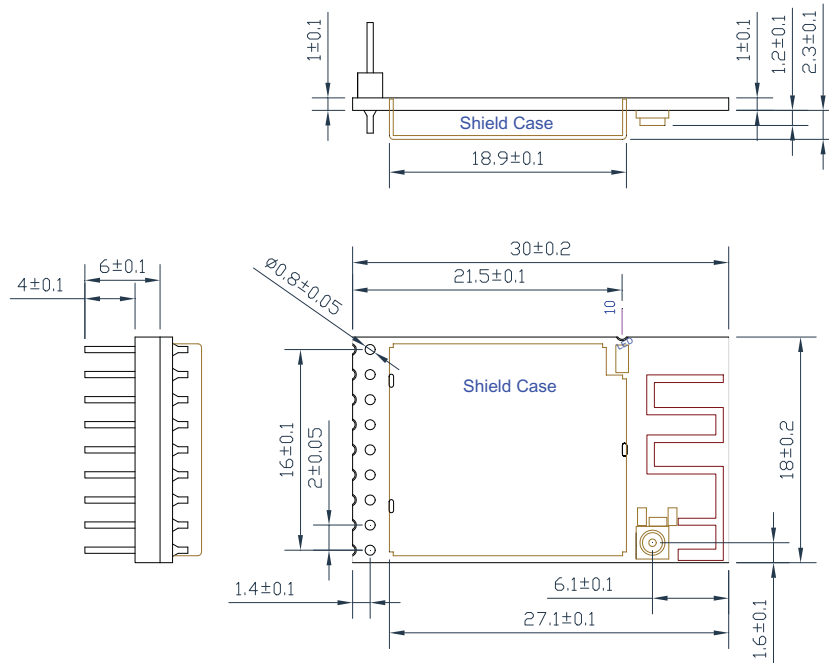


Fig. 2-6 Dimensions

2.7 Clear place to use the module

The following drawing shows a recommended footprint which can be a reference for a main PCB design.

The clear space requirement for onboard antenna is suit for either pin header or semi-holes connection application.



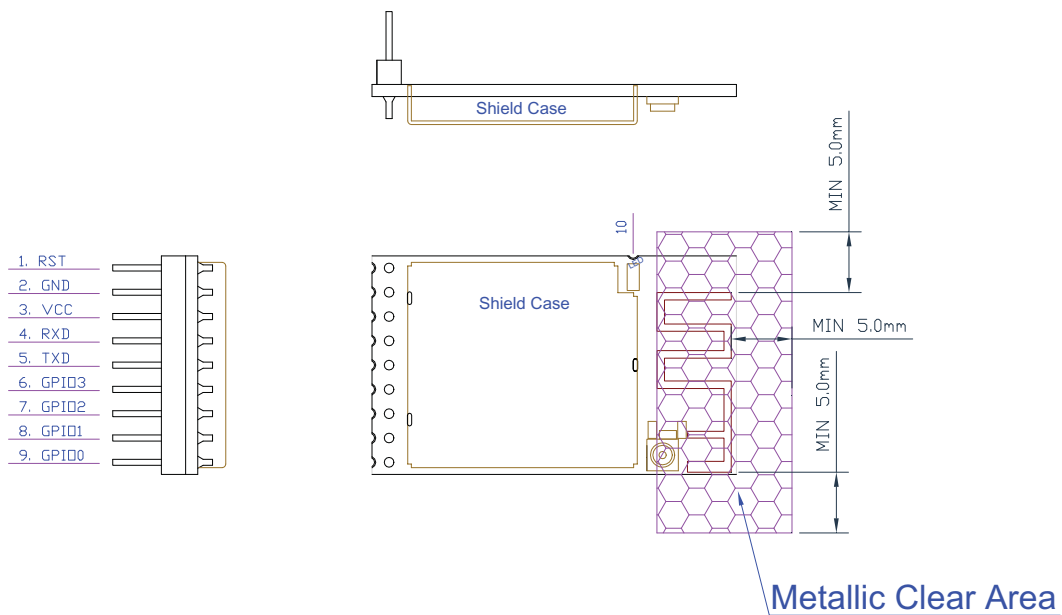


Fig. 2-7 Clear space needed

Note: Pin 10 must be connected

3. Software descriptions

Right now, to develop customized application, the SDK software pack provided by the chipset manufacturer MTK is recommended to use. Other kind of software supported is not available yet.

3.1 AT command

This module applies the chipset MT7681, it has its own internal MCU which can be used to fulfill some sort of software functions. For most of users, to simplify the technology requirement of software programming, an external cheap or simple MCU might be used. In this kind of application, the internal MCU of MT7681 will be limited and can't be approached by normal users.

When an external MCU is selected, several future integrated AT commands may be provided and useful to expedite the software design rather than spend much time to know the kernel Linux driver of the MT7681

The command format:

AT#Command -Parameters +enter





Command	Parameters	Descriptions
Ver	none	Display ver
Reboot	none	Reboot
Default	none	Load default
Smtconn	none	Start smart connection mode
Conn_AP	-sSSID -pPassword	Connect ap
Uart_Wifi	-n(0/1) -m(0/1) -i(ip-addr) -l(local port) -r(remort port)	Open TCP/UDP Server/Client
Mac	none	Display the device MAC
GPIO	-p(pin) -w(0/1) -r(0/1)	Write/Read GPIO
WMode	-w(0/1)	Switch to AP/STA mode
Puredata	none	Enter the pure data mode

4.Certificate and Approval

Table 4- 1 Certificates and Approval

Certificates	Remarks
FCC part15	Not ready yet
CE	Not ready yet
RoHS	Not ready yet

5.Disclaimer

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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.

Caution!

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

FCC Radiation Exposure Statement

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device, for example, USB dongle like transmitters is forbidden.

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: Contains Transmitter Module FCC ID: YWTWF7681KMX or Contains FCC ID: YWTWF7681KMX

when the module is installed inside another device, the user manual of this device must contain below warning statements;

1. 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.
 - (2) This device must accept any interference received, including interference that may cause undesired operation.





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

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

