

# **RF-WM-20CMB1**

## **Hardware Datasheet**

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# 1 Device Overview

## 1.1 Description

RF-WM-20CMB1 module is a new embedded WiFi module launched by RF-Star. The module adopts Realtek's RTL8720CM chip design, built-in high performance KM4 MCU, and contains a variety of peripherals: UART, SPI, I2C, SDIO, GPIO, etc.

The module supports 802.11b /g/n Wi-Fi standard and Bluetooth standard protocol, and has large capacity storage space (FLASH:2MB, ROM:384KB) (FLASH is external, up to 128MB) and running space (SRAM:256KB+PSRAM:4MB).

## 1.2 Applications

- Cloud connectivity
- Home automation
- Home appliances
- Access control
- Security systems
- Smart energy
- Internet gateway
- Industrial control
- Smart plug
- Smart metering
- Wireless audio
- IP network sensor nodes

## 1.3 Functional Block Diagram

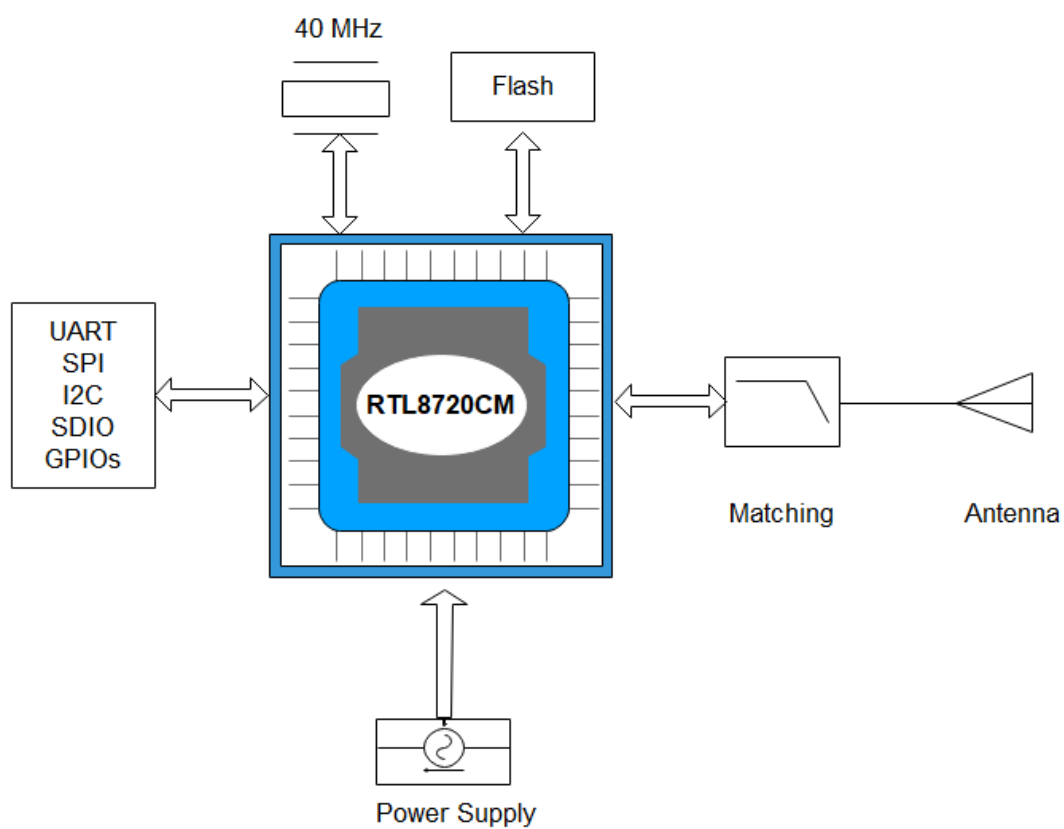


Figure 1. Functional Block Diagram

## 2 Module Configuration and Functions

### 2.1 Module Parameters

	Parameter
Type of Antenna	Type of Antenna
Supply Power Voltage	3.3±0.3V
Operating Temperature	-20 ~ +85 °C
Operating Temperature	-55 ~ +125 °C
Package	SMT Packaging

### 2.2 WiFi

	Parameter
Operating frequency	2412MHz to 2462MHz
Wireless network standard	802.11 b/g/n
Transmit power (typ)	11b (11Mbps@CCK) : 17.0dBm 11g (54Mbps@OFDM) : 15.0dBm 11n (72Mbps@MCS7) : 13.0dBm
Transmit power (typ)	11b (11Mbps@CCK) : -86dBm 11g (54Mbps@OFDM) : -73dBm 11n (72Mbps@MCS7) : -69dBm
Encryption scheme	WPA/WPA2

## 3 Module dimensions and definitions

### 3.1 Dimension

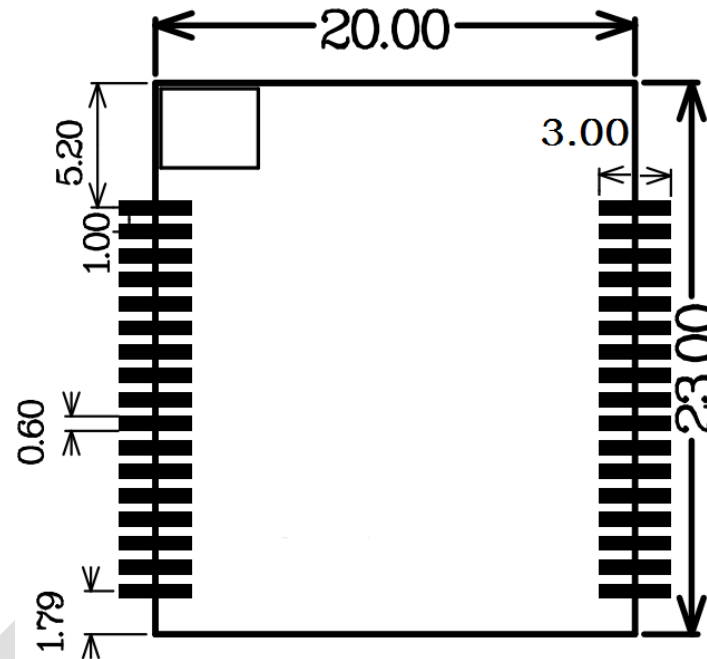


Figure 3-1 The dimension of module

### 3.2 Pin figure

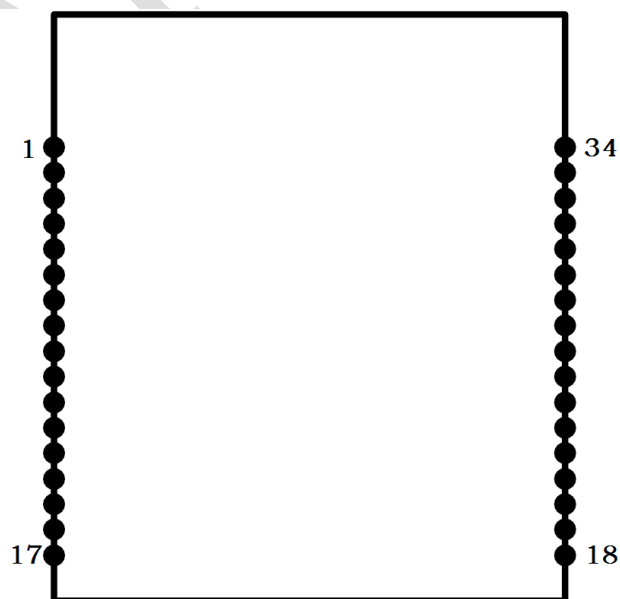


Figure 3-2 The pin figure of module

### 3.3 Pin Functions

Pin	Name	Description
1	RFOUT	RF signal output pin
2	GND	Ground
3	GND	Ground
4	VCC	3.3 V power supply
5	GPIOA_0	GPIO pin, the MUX function can be referred to pin multiplexing table
6	GPIOA_1	GPIO pin, the MUX function can be referred to pin multiplexing table
7	GPIOA_2	GPIO pin, the MUX function can be referred to pin multiplexing table
8	GPIOA_3	GPIO pin, the MUX function can be referred to pin multiplexing table
9	GPIOA_4	GPIO pin, the MUX function can be referred to pin multiplexing table
10	NC	NC
11	CHIP_EN	Chip enable pin, can be used for reset
12	GPIOA_13	GPIO pin, the MUX function can be referred to pin multiplexing table
13	NC	NC
14	NC	NC
15	NC	NC
16	GPIOA_14	GPIO pin, the MUX function can be referred to pin multiplexing table
17	NC	NC
18	GND	Ground
19	VCC	3.3 V power supply
20	NC	NC
21	NC	NC
22	NC	NC
23	NC	NC
24	NC	NC
25	GPIOA_17	GPIO pin, the MUX function can be referred to pin multiplexing table
26	GPIOA_18	GPIO pin, the MUX function can be referred to pin multiplexing table
27	GPIOA_19	GPIO pin, the MUX function can be referred to pin multiplexing table
28	GPIOA_20	GPIO pin, the MUX function can be referred to

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		pin multiplexing table
29	GPIOA_23	GPIO pin, the MUX function can be referred to pin multiplexing table
30	GPIOA_15	GPIO pin, the MUX function can be referred to pin multiplexing table
31	GPIOA_16	GPIO pin, the MUX function can be referred to pin multiplexing table
32	NC	NC
33	NC	NC
34	GND	Ground

Table 3-1 Pin Functions

note:

- 1、CHIP\_EN is the module hardware reset pin and does not clear WiFi distribution information.
- 2、CHIP\_EN pin if not used to keep in the air, other pins are not used to keep in the air.
- 3、Pins PIN30 and 31 (GPIOA\_15 and GPIOA\_16) are module download program and debug LOG information input and output.
- 4、PIN6 (GPIOA\_0) serves as the Download auxiliary pin and needs to be short-connected to 3.3 V to enter the Download mode.

### 3.4 Pin Multiplexing

PIN name	JTAG	UART Group	SPI Group	I2C Group	PCM Group	SDIO Group
GPIOA_0	JTAG_CLK	UART1_RX			PWM0	
GPIOA_1	JTAG_TMS	UART1_TX			PWM1	
GPIOA_2	JTAG_TDO	UART1_RX	SPI_CS <sub>n</sub>	I2C_SCL	PWM2	
GPIOA_3	JTAG_TDI	UART1_TX	SPI_SCL	I2C_SDA	PWM3	
GPIOA_4	JTAG_TRST	UART1_CTS	SPI_MOSI		PWM4	
GPIOA_13		UART0_RX			PWM7	
GPIOA_14		UART0_TX			PWM2	SDIO_INT
GPIOA_15		UART2_RX	SPI_CS <sub>n</sub>	I2C_SCL	PWM3	SD_D2
GPIOA_16		UART2_TX	SPI_SCL	I2C_SDA	PWM4	SD_D3
GPIOA_17					PWM5	SD_CMD
GPIOA_18					PWM6	SD_CLK
GPIOA_19		UART2_CTS	SPI_MOSI	I2C_SCL	PWM7	SD_D0
GPIOA_20		UART2_RTS	SPI_MISO	I2C_SDA	PWM0	SD_D1
GPIOA_23					PWM7	

Table 3-2 Pin Multiplexing



## ● Contact Us

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The OEM must certify the final end product to comply with unintentional radiators (FCC Sections 15.107 and 15.109) before declaring compliance of the final product to Part 15 of the FCC rules and regulations. Integration into devices that are directly or indirectly connected to AC lines must add with Class II Permissive Change.

The OEM must comply with the FCC labeling requirements. If the module's label is not visible when installed, then an additional permanent label must be applied on the outside of the finished

product which states: "Contains transmitter module FCC ID: 2AD2W-LOWSC5711FABI".

Additionally, the following statement should be included on the label and in the final product's user manual:

"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 interferences, and

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

operation." The module is limited to installation in applications. Separate approval is required for all other operating configurations, including portable configuration with respect to Part 2.1093 and different antenna configurations. A module or modules can only be used without additional authorizations if they have been tested and granted under the same intended end use operational conditions, including simultaneous transmission operations. When they have not been

tested and granted in this manner, additional testing and/or FCC application filing may be required. The most straightforward approach to address additional testing conditions is to have the grantee responsible for the certification of at least one of the modules submit a permissive change application. When having a module grantee file a permissive change is not practical or feasible, the following guidance

provides some additional options for host manufacturers. Integrations using modules where additional testing and/or FCC application filing(s) may be required are: (A) a module used in devices requiring additional RF exposure compliance information (e.g., MPE evaluation or SAR testing); (B) limited and/or split modules not meeting all of the module requirements; and (C) simultaneous transmissions for independent collocated transmitters not previously granted together. This Module is full modular approval, it is limited to OEM installation ONLY. Integration into devices that are directly or indirectly connected to AC lines must add with Class II Permissive Change. (OEM) Integrator has to assure compliance of the entire end product include the integrated Module. Additional measurements (15B) and/or equipment authorizations (e.g. Verification) may need to be addressed depending on co-location or simultaneous transmission issues if applicable. (OEM) Integrator is reminded to assure that these installation instructions will not be made available to the end user

#### FCC

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 interference 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.

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.

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

\* RF warning for Portable device:

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

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