# WIFI Module Specification
HM-WF1200
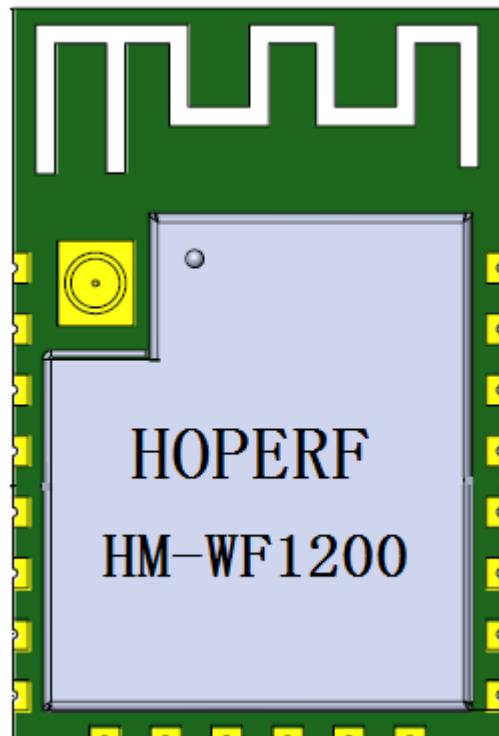
1. Overview

The HM-WF1200 module is developed by Shenzhen Hope Microelectronics Co., Ltd. It uses the OPL1200 SoC chip and the main feature of the OPL1200 chip is the addition of 8M-bit embedded flash memory as the main flash memory of the system. The 8M-bit embedded flash is used to store user applications and system patches. OPL1200 SoC chip has a fully integrated 2.4GHz radio transceiver and a baseband processor for Wi-Fi 802.11b and Smart Bluetooth applications. It can be used as a standalone application-specific communication processor or as a wireless data link in a hosted MCU system, as well as extremely low power. It supports a flexible memory architecture for storing profiles, stacks and custom application code, and can be updated using Over-The-Air (OTA) technology. Smart Bluetooth protocol stack and Wi-Fi TCP/IP stack are stored in dedicated ROM. OPULINKS OPL1200 SoC is equipped with ARM® dual processors Cortex-M0 and M3 to handle different processes. All software runs on the ARM®Cortex®-M0 processor, while the more intensive application-specific activities run on the ARM®Cortex®-M3 processor. Any external MCU can be connected via SPI, I2C or UART interface, and sensors or other devices can be connected via GPIOs. The transceiver interface is directly connected to the antenna, which is fully compliant with Wi-Fi 802.11b and Bluetooth 5.0 BLE standards. Integrating antenna switch, radio frequency balun, power amplifier (PA) and low noise amplifier (LNA), OPL1200 allows Wi-Fi and Smart Bluetooth to minimize PCB area design and external component requirements. The functional block diagram of OPL1200 is shown below.
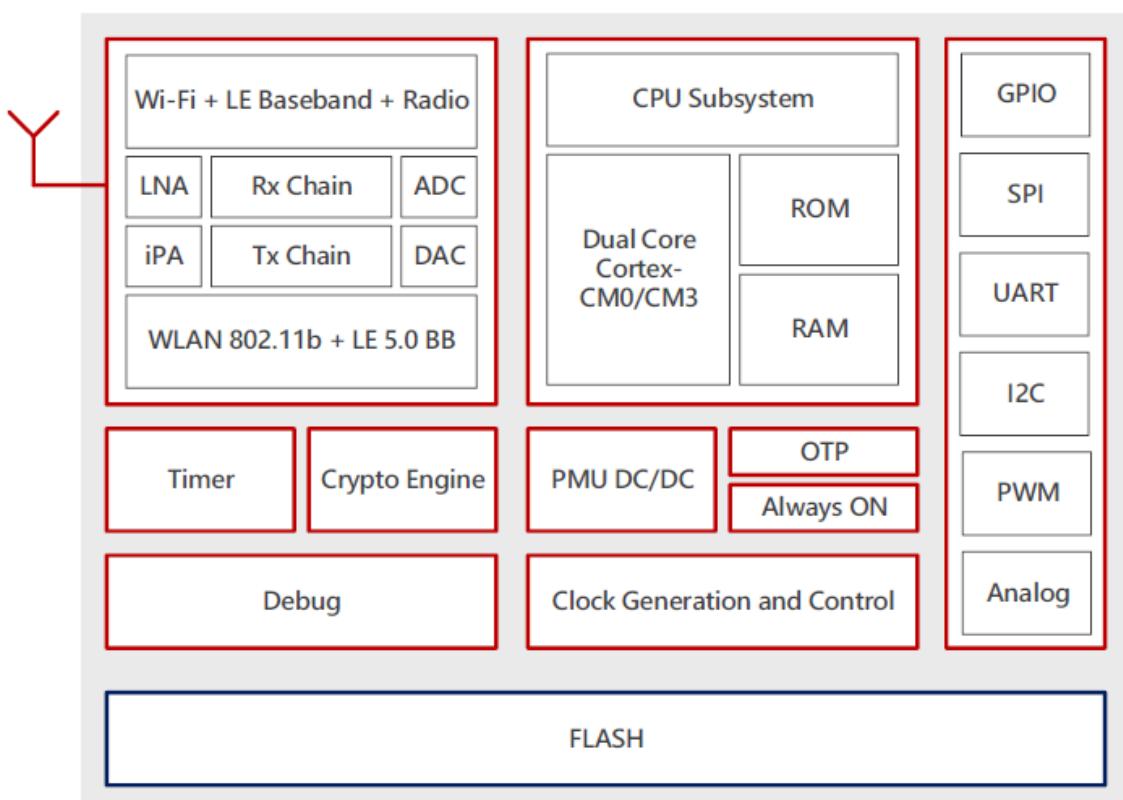
Figure 1 OPL1200 Functional Block Diagram

2. Product Features

1. **Processor**
- ARM®Cortex®-M3 application processor
- ARM®Cortex®-M0 link controller

2. **WiFi**
- 802.11b, up to 11Mbps
- Dual ARM core processor M0/M3
- Ultra-low power consumption
- Excellent RF performance
- Support STA mode
- Integrated PMU
- Support WPA/WPA2 security
- Automatic beacon scanning and discovery
- Built-in TCP/IP stack
- Integrated dual power amplifier: low (-2 dBm), high (+10 dBm)
- Complete hardware security encryption engine
- DC analog input
- Extensive peripheral equipment

- Built-in 8M-bit flash based on OPL1000 chip

3. Smart Bluetooth
- Compliant with Bluetooth 5.0 BLE specification, capable of 2Mbps data rate
- Slave mode support
- Adaptive Frequency Hopping (AFH)
- Support all GATT-based configuration files
- Built-in BLE stack
- Supports up to 8 concurrent BLE connections
- Maximum output power: +2dBm
- Receiving sensitivity: -93dBm

4. Power Management
- Integrated step-down DC-DC converter
- Support button batteries and alkaline batteries

5. Clock
- Built-in low-power 32KHz RC oscillator
- Support optional external 32KHz crystal (±150ppm max)

6. Interface
- General GPIO: 16
- The data rate of two serial ports is up to 3Mbps
- Three SPI interfaces
- A set of I2C bus 100KHz, 400KHz
- 10-bit ADC input, up to 16 channels
- 6 GPIO pins with 16mA drive capability
- 6 PWMs

Antenna information

Antenna Type: Dipole antenna with non-standard SMA connector(50ohm);
Antenna Gain:3dBi
Antenna Manufacturer: Shenzhen tuopu Cloud Technology Co., Ltd

3. Product Pin Definition

Front View

Bottom View
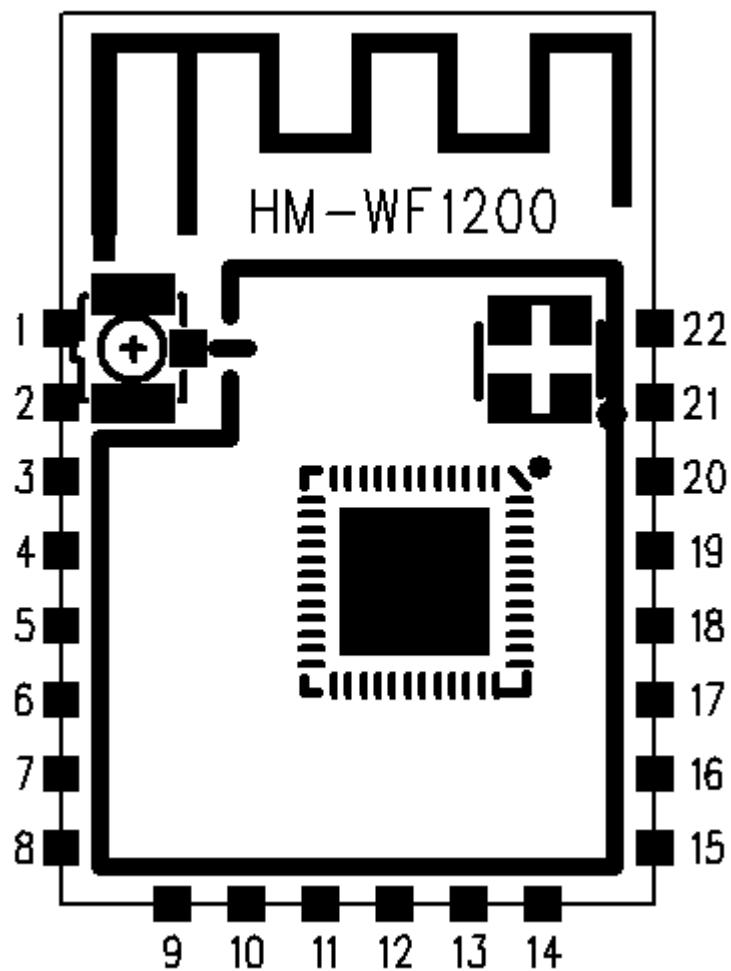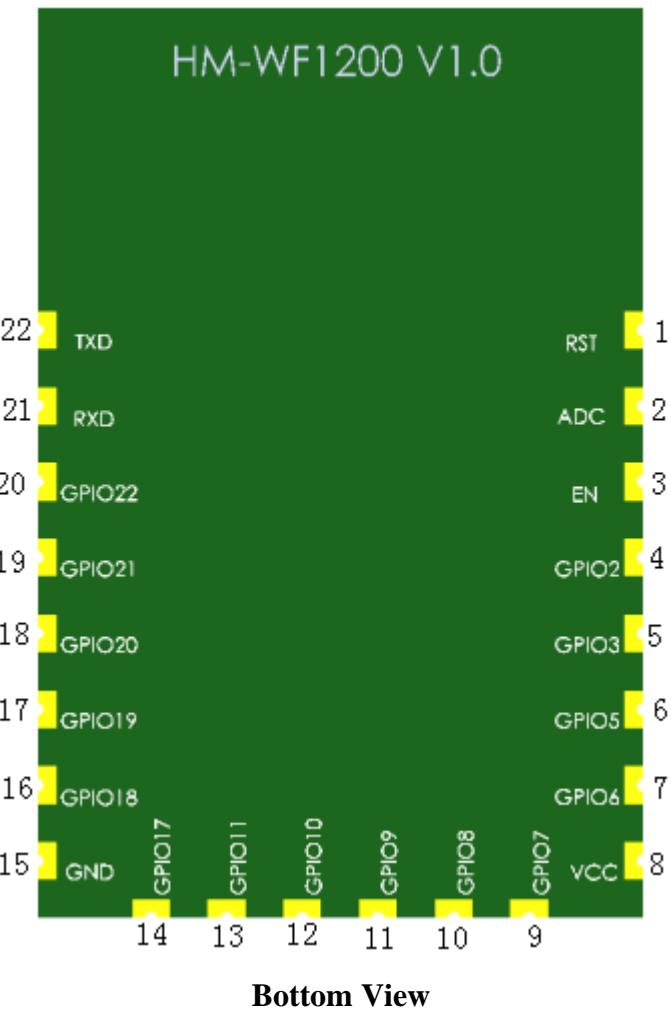
Figure 2 HM-WF1200 Module Pin Distribution

Pin No.	Name	Description
1	RST	Reset, download mode: externally pulled down, operating mode: floating or externally pulled up
2	ADC	A/D conversion result. Input voltage range: 0-1V, value range: 0-1024
3	EN	Chip enable terminal, active high
4	GPIO2	Universal input/output
5	GPIO3	Universal input/output
6	GPIO5	Universal input/output
7	GPIO6	Universal input/output
8	VCC	3.3V power supply, external power supply, current recommended above 300mA
9	GPIO7	Universal input/output
10	GPIO8	Universal input/output
11	GPIO9	Universal input/output
12	GPIO10	Universal input/output
13	GPIO11	Universal input/output
14	GPIO17	Universal input/output
15	GND	Grounded
16	GPIO18	Universal input/output
17	GPIO19	Universal input/output
18	GPIO20	Universal input/output
19	GPIO21	Universal input/output
20	GPIO22	Universal input/output
21	RXD	Serial data receiving
22	TXD	Serial data transmission

4.Electrical Parameters

4.1 Operating Voltage

Category	Min	Typical	Max	Unit	Test conditions: working temperature 0°C~70°C
VCC	2.0	3.3	3.6	V	

4.2 Wi-Fi RF Receiving

Parameter Settings	Condition	Min	Typical	Max	Unit
Frequency Range		2412		2462	MHz
Receiving Sensitivity 11b @ 8% PER	− 1Mpbs			-83	dBm
	− 11Mpbs			-76	dBm
Maximum Receiving Level	802.11b	-15			dBm

4.3 Wi-Fi RF Transmitting

Parameter Settings	Condition	Min	Typical	Max	Unit
Frequency Range		2412		2462	MHz
Output Power	802.11b	--	10	--	dBm
EVMC Value	802.11b 11Mbps	--	-20	--	dB

4.4 Current Consumption

WiFi Mode					
Parameter Settings	Condition	Min	Typical	Max	Unit
Transmitting Mode (continuous)	802.11b/11M/10dBm		115		mA
Receiving Mode	802.11b/11M		17.5		mA
Associated Idle	@DTIM=1		1.0		mA
	@DTIM=3		400		uA
Deep Sleep Mode			30		uA
Timer Sleep Mode			50		uA

Bluetooth Mode					
Parameter Settings	**Condition**	**Min**	**Typical**	**Max**	**Unit**
Transmitting Mode (continuous)	0dBm		12		mA
Receiving Mode			12		mA

5.Module Dimensions
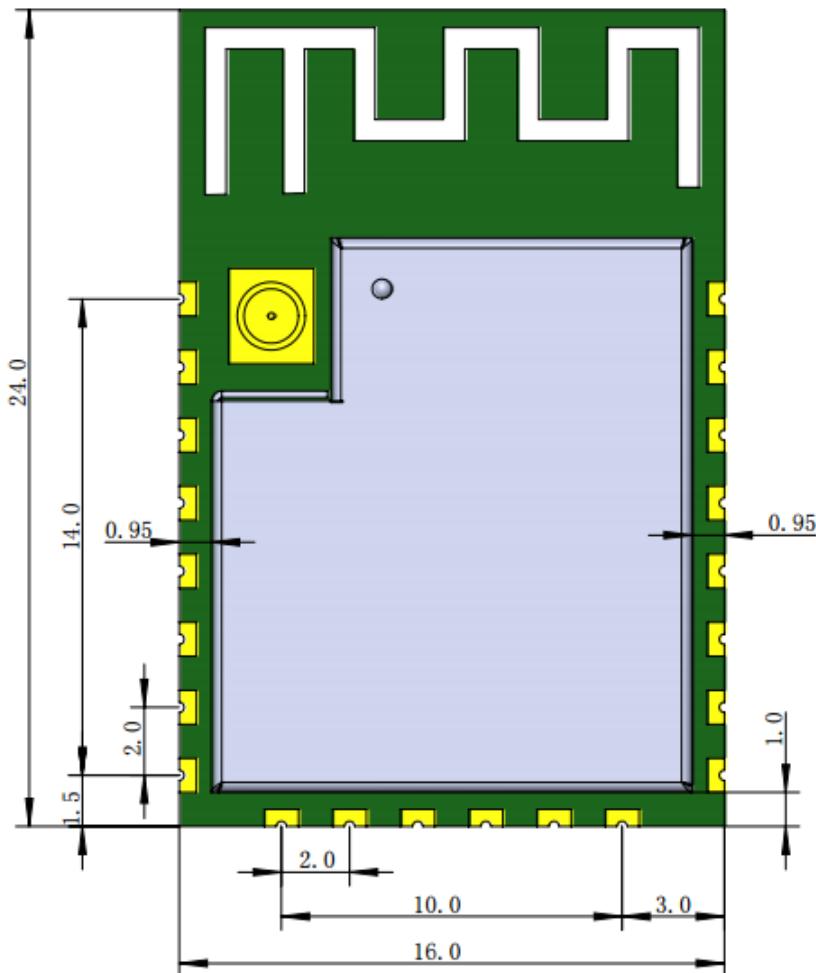
Module Dimensions (Unit: mm)

6.Application Circuit
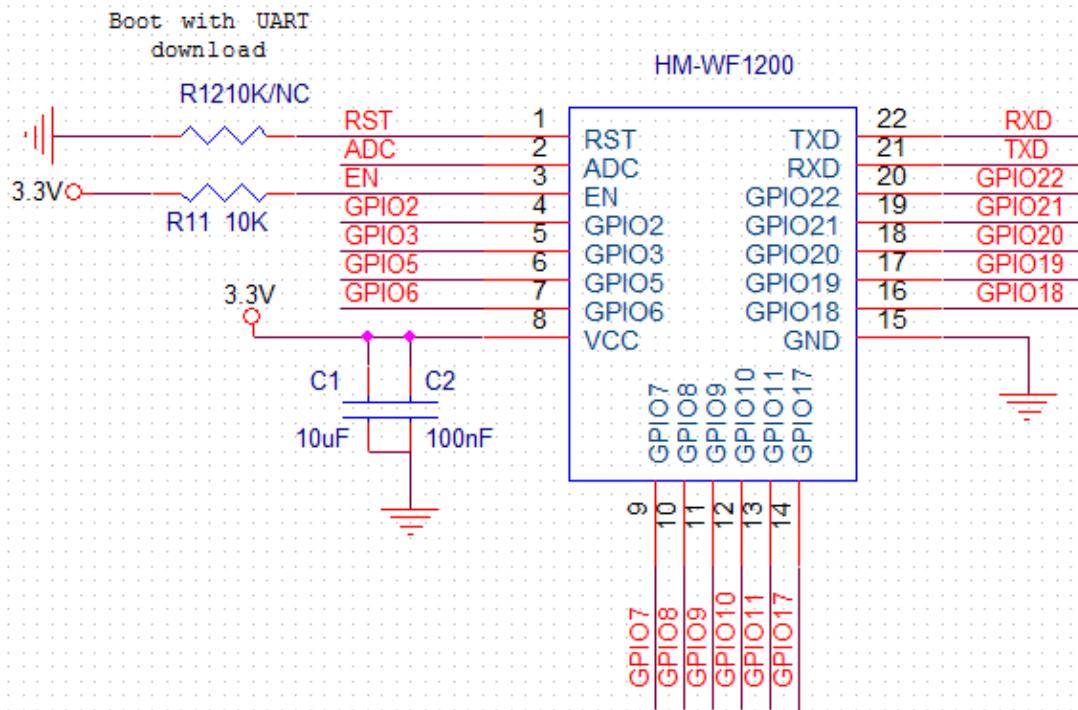
Contact Information

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FCC Statement
FCC standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

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.

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

Note: 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.

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 if without further C2PC certify include SAR .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:2AYNTTWMC502401BW Or Contains FCC ID: 2AYNTTWMC502401BW"

When the module is installed inside another device, the user manual of the host 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.
Note: 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.
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.
Any company of the host device which install this modular with modular approval should perform the test of radiated & conducted emission and spurious emission,etc. according to FCC part 15C : 15.247 and 15.209 & 15.207 ,15B Class B requirement, Only if the test result comply with FCC part 15C : 15.247 and 15.209 & 15.207 ,15B Class B requirement，then the host can be sold legally.