VM1200 Module Product Specification

The VM1200 is an industrial-grade dual-band Gigabit wireless repeater and bridge meticulously developed by Houtian Networks. It operates simultaneously on both 5GHz and 2.4GHz bands, utilizing digital-analog temperature-compensated frequency stabilization technology (TAFC) to deliver more stable WiFi signals with reduced disconnections.

Hardware features:

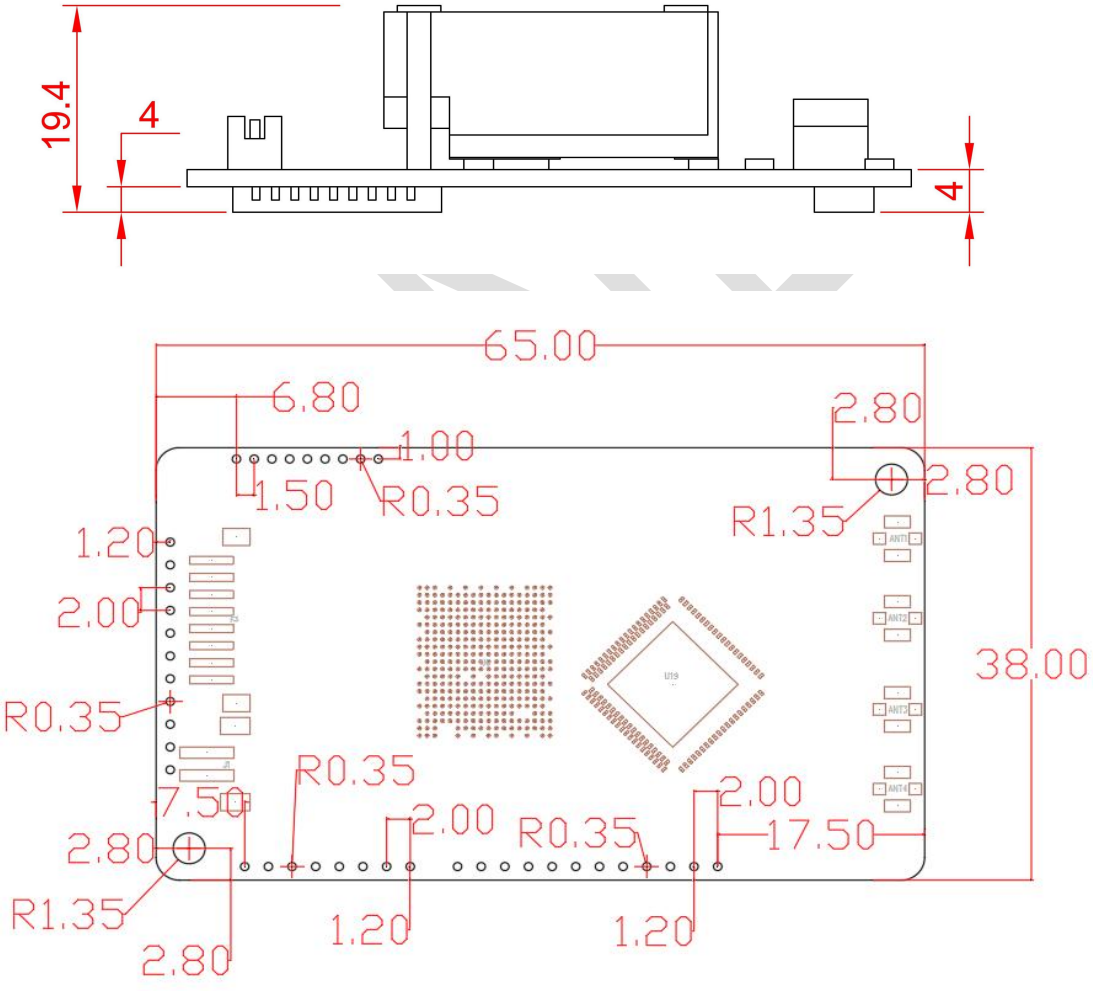
- Support wide voltage DC12V-DC24V power supply, two-stage automatic overvoltage protection (the upper limit of protection voltage is 27V);
- Support reverse connection protection of power supply;
- Power supply output ≥24W (typical supply: 12V/2A, ripple <100mV);
- WiFi working frequency band: 2.4GHz+5GHz;
- Wireless transmission rate: 300mbps (2.4g)+900mbps (5g);
- Transmit power: 18dBm/22dBm for 2.4G and 18dBm/23dBm for 5G;
- Point-to-point pairing barrier-free maximum transmission distance:2.4GHz:400m-600m、5GHz:400-600m;
- Built-in 4 high-power FEM and built-in intelligent automatic start-stop cooling fan;
- The module incorporates a low-noise amplifier (LNA), with reception sensitivity of 2.4 GHz: -76 dBm and 5 GHz: -77 dBm.
- Comes Standard with external antennas: 2 x 3dBi 5G antennas, 2 x 3dBi 2.4G antennas;;
- Provide dual UART TTL level (3.3V) data transmission interface;
- Using digital-analog temperature compensation frequency stabilization technology, WiFi signal is more stable and not easy to drop;
- Working environment temperature: -20℃ to 55℃.

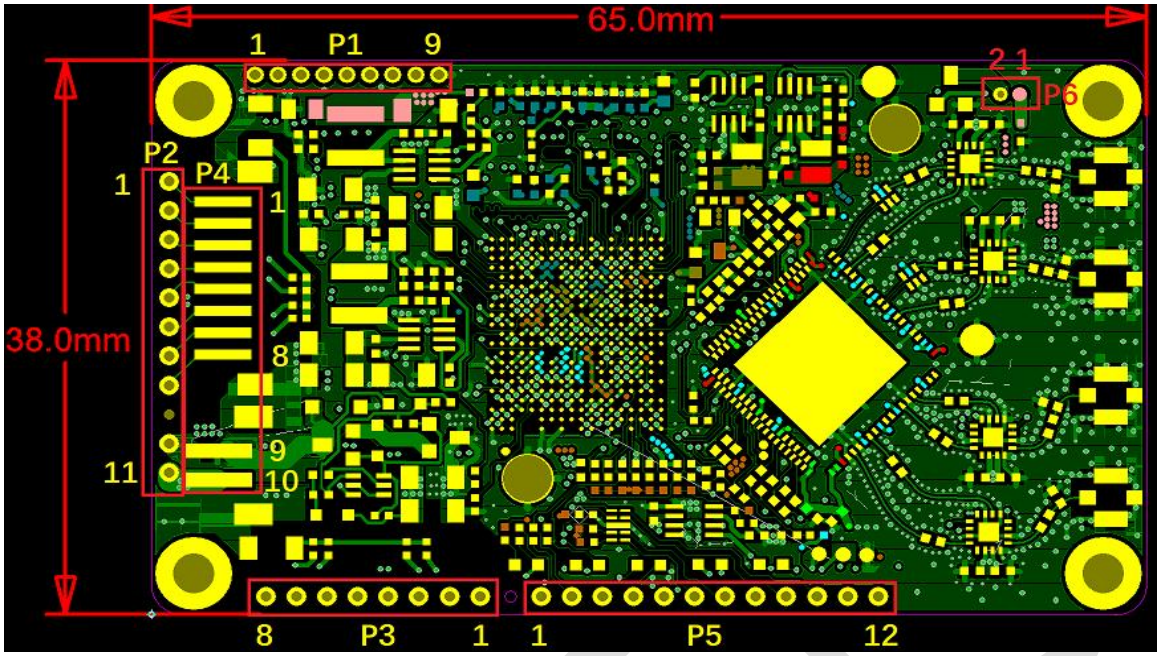
Functional features:

- Support routing mode and bridge relay mode;
- In routing mode, WiFi WAN access is supported;
- In routing mode, WAN/LAN switching of wired network ports is supported;
- Support WiFi intelligent bridge relay, which can realize wireless to wired and wired to wireless functions;
- Support WiFi transmission protocols such as 802.11ac, 802.11a and 802.11n;
- Support UART to UDP/TCP data bidirectional transparent transmission.
- Support UDP broadcast and VONETS format (one module can forward multiple IPS), and choose TCP client or TCP server forwarding mode;
- Support automatic reconnection of WiFi hotspots, with two hotspot matching modes: full matching authentication mode, SSID and password authentication mode;
- Support WiFi hotspot memory, with a maximum memory of 100 hotspots;
- Support simultaneous connection of more than 20 WiFi terminal devices;
- Support SSA protocol, built-in hot spot signal strength detection and reporting function, and realize WiFi mobile positioning;
- Support ICMP function, which is used to transfer control messages between IP hosts and routers;
- Support hotspot forced shutdown and WiFi hardware forced shutdown functions;
- Support antenna selection on/off;
- WiFi hotspot connection parameters import and export function;
- Using VDNS virtual domain name configuration technology to reduce the user configuration difficulties;
- Using WEB management, you can freely switch between Chinese and English configuration interfaces;
- Support networking online upgrade;

- Support IP layer transparent transmission and MAC layer transparent transmission two bridge modes to meet various bridge applications;
- IP layer transparent transmission (factory default), transparent transmission of IP layer data, can meet the vast majority of bridge applications;
- The MAC layer transparently transmits all data at or above the MAC layer (link layer), including IP layer data. MAC transparent transmission can solve some special applications for MAC layer encryption, such as GoPro camera, Cisco AP, Hikvision monitoring system etc.

One: Module Diagram (mm):



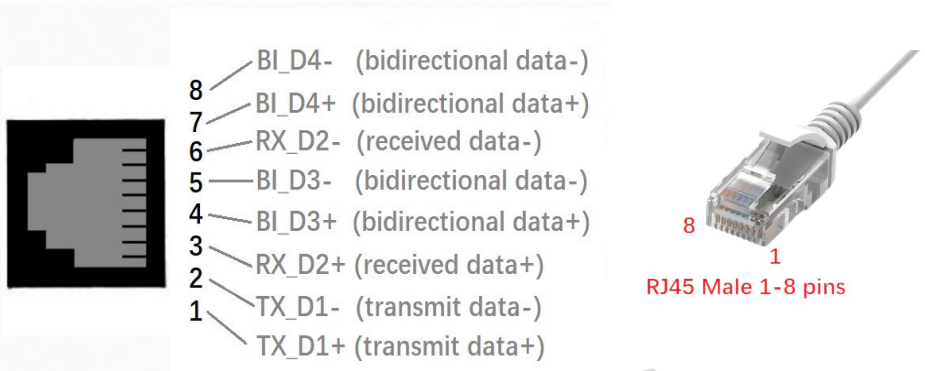


Two: P1、P2、P3、P4、P5 interface Definition Form

PIN Number		PIN Definition	Function Description	
P1			● Non isolated Ethernet port (with built-in coupling capacitor inside the module 0.1uF) ● Note: The motherboard does not need a network transformer.	Pin position connected to the motherboard network port
1		P1_D+		8
2		P1_D-		7
3		P1_C+		5
4		P1_C-		4
5		P1_B+		6
6		P1_B-		3
7		P1_A+		2
8		P1_A-		1
9		GND	Power supply ground of the module	Motherboard GND
P2	P4			Pin position connected to RJ45 network port
1	1	P2-D+	● Isolated Ethernet port, built-in network transformer, can be directly	8
2	2	P2-D-		7

3	3	P2-B+	connected to the network. Line; ● Low factory default for LAN port, in routing mode, also can pass. Go through the login configuration page and exchange WAN/LAN; ● Pins 1 to 8 of P2 and P4 are connected in parallel, which are actually The same network port (two interfaces can only choose one)	6
4	4	P2-C+		5
5	5	P2-C-		4
6	6	P2-B-		3
7	7	P2-A+		2
8	8	P2-A-		1
9		Empty	Empty feet without any connections	
10	1	GND	Module Power Supply Negative	
11	2	VIN+	Positive pole of module power supply, voltage range is DC12V--24V.	
P3				Pin position connected to the motherboard network port
1		P3-A-	● Isolated Ethernet port 2 (built-in network transformer, can be directly connected to the network cable); ● The factory default is LAN port, and in routing mode, WAN/LAN exchange can also be achieved by logging in to the configuration page;	1
2		P3-A+		2
3		P3-B-		3
4		P3-C-		4
5		P3-C+		5
6		P3-B+		6
7		P3-D-		7
8		P3-D+		8
P5				
1		P2_LED_N	P2 status indicator signal output	Open collector output, built-in 330Ω current-limiting resistor,
2		P3_LED_N	P3 status indicator signal	

			output	the output current is not more than 10ma, and the input voltage of PIN pin is not more than 5V.
3		P1_LED_N	P1 status indicator signal output	
4		LED_5G_N	5G status indicator signal output	
5		LED_2G4_N	2.4G status indicator signal output	
6		COM1_TX	UART1(TTL3.3V) transmission	UART standard interface, TTL3.3V
7		COM1_RX	UART1(TTL3.3V) reception	
8		GND	Power ground of the module	
9		COM2_TX	COM2 send UART	UART standard interface, TTL3.3V
10		COM2_RX	COM2 reception	
11		RESET	● Reset the signal input. After the module is started normally, keep this input pin low for more than 3 seconds, and the module will restore the factory parameters. ● Do not cut off power during factory recovery, otherwise the module may be damaged.	
12		POWER_EN	● The module power supply enables the control pin, the input control voltage is less than 1.4V, and the module power supply is turned off; ● When the input control voltage is greater than 1.6V, the power supply of the module is turned on, and the voltage of the PIN pin shall not exceed 6V, and the pin is turned on by default.	
P6				
1		Fan Power Positive	Connect the positive pole of the fan power cord.	
2		Fan Power Supply Negative	Connect the negative pole of fan power cord.	

Standard RJ45 female chassis connector pin definition reference	
Supplementary: Bridge+Relay mode: P2, P3, P1 are LAN; Routing mode: P3 is WAN, P2 and P1 are both LAN; Precautions for installation: 1. It is recommended to use plastic screws or put a soft gasket on the installation (plastic screws must be used at the antenna end of VM1200). 2. Do not tighten the screws too tightly, otherwise the PCB may be deformed and damage the module.	

Three: Hardware Spec

Interface P1	1) It is used to connect the professional power supply and network two-in-one dedicated cable provided by us; 2) Using a dedicated cable, can direct power and network connection testing;
Interface P2	P2 interface Definition Form
LED	Status Indication: Ethernet Port Status Light (Yellow); 2.4G WiFi Connection Status Light (Blue); 5G WiFi Connection Status Light (Green);
Antenna Interface	2*3dBi 2.4G Whip antennas 2*3dBi 5G Whip antennas
Module Size	65mm x 38mm x 19.4mm（L x W x H）
Module Weight(Including Antennas)	115g

Four: WiFi Related

Protocol Standard	IEEE 802.11ac, IEEE 802.11a; IEEE 802.11n, IEEE 802.11g, IEEE 802.11b;
WiFi Transmission Rate	2.4GHz band: 300Mbps 5GHz band: 900Mbps
Basic Function	1) Router mode, support WiFi WAN access and WAN/LAN exchange; 2) Transparent bridge (IP layer transparent, MAC layer transparent); 3) WiFi Hotspot exchange, WiFi hardware exchange; 4) 2.4G WiFi mode option: 11B/G/N, 11B/G, 11N, 11G, 11B; 5G WiFi mode option: 11AC/AN/A, 11AC/AN, 11A/N, 11A, 11N; 5) WiFi hotspot automatic reconnection, two hotspot matching methods: Full match authentication mode, SSID and password authentication mode; 6) WiFi hotspot memory, maximum memory 100 hotspots; 7) SSA signal strength detection and reporting function ; 8) Hotspot connection parameter import and export function;
Supported Band	2.4G band channel: 1-14; 5G band channel: 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 149, 153,157,161, 165
WiFi RF Power	2.4G: Normal Power: 18dBm; Enhanced Power: 21dBm. 5G: Normal Power: 18dBm; Enhanced Power: 23dBm.
Compliance acceptance sensitivity	-76dbm (2.4G) -77dbm (5G)
Application Method	WiFi Repeater (WiFi signal repeater), can extend WiFi transmission distance; WiFi Bridge: IP layer transparent transmission, MAC layer transparent transmission，WiFi access point (AP);;
WiFi Security	64/128/WEP security; WPA-PSK/WPA2-PSK, WPA/WPA2 Security mechanism;
System Function	Firmware Upgrade Reboot device Reset factory Account and password revise

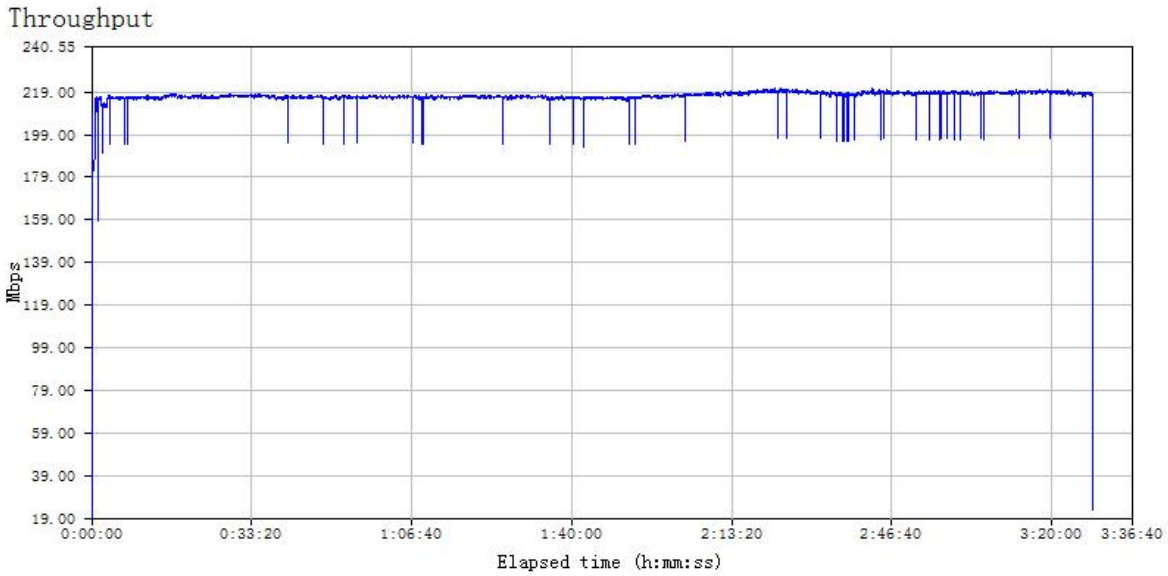
Five: Electrical performance parameters

1.Power supply parameters				
Supply Voltage Range	Input Power	Typical Power Supply	Power Ripple	Overvoltage protection
DC12V-24V	≤12W	DC12V/2A	＜100mV	27V

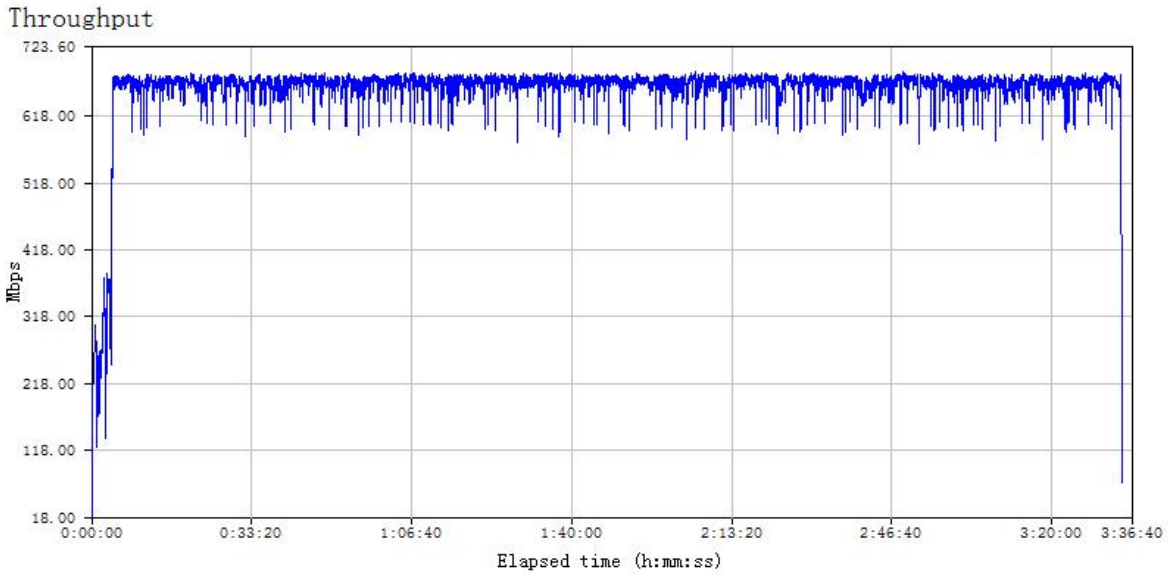
2. Working Electrical Performance Parameter Measurement Form (Environment Temperature: 30℃)				
Work Band	Supply Voltage	Work Stage	Work Current(mA)	Main chip temperature (℃)
2.4G	12V	Booting Up	180-600	30-45
		Standby	280-550	45-65
		Transfer Data	280-550	60-72
5G		Booting Up	180-550	30-45
		Standby	280-500	45-65
		Transfer Data	350-620	60-72
Dual Band		Booting Up	180-650	30-45
		Standby	300-600	45-68
		Transfer Data(2.4G)	350-700	60-72
		Transfer Data(5G)	450-800	60-73
		Transfer Data (Dual Band）	450-850	65-75

Six: Network Throughput Test Report

2.4G Throughput Test Fluctuation Chart:



5G (AC/A/N) Throughput Test Fluctuation Chart:



Seven: RF Test Report

2.4G RF Parameters Form (Hardware Version: 2.0)

Channel (Band)	1 （2412M）	3 （2422M）	6 (2437M)	7 (2442M)	9 (2452M)	11 (2462M)	13 (2472M)
Transmit Power 1	18.2	18.2	18.2	18.1	18.2	18.4	18.0

EVM1	-36	-36	-36	-36	-36	-36	-36
Transmit Power 2	21.5	21.5	21.5	21.7	21.7	21.3	20.9
EVM2	-30	-30	-31	-31	-30	-31	-32

5G RF Parameters Form (Hardware Version: 2.0)

Channel (Band)	36 （5180 M）	52 (5260M)	64 (5320M)	100 (5500M)	128 (5640M)	149 (5745M)	157 (5785M)	165 (5825 M)
Transmit Power 1	18.5	18.3	18.5	18.3	18.2	18.4	18.3	18.2
EVM1	-36	-33	-36	-36	-36	-36	-36	-36
Transmit Power 2	22.4	22.5	23.7	22.6	22.2	22.6	21.8	21.8
EVM2	-30	-30	-29	-29	-30	-29	-30	-29

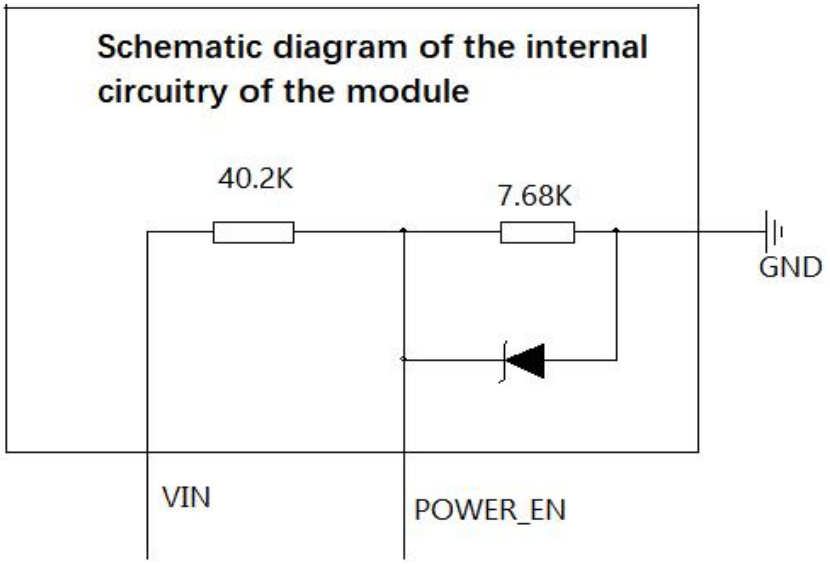
Eight: Antenna Matching Test Report:

Standing Wave Ratio Parameters Form (Hardware Version: 2.0)					
Band / ANT Channel	2.412GHz	2.432GHz	2.452GHz	2.462GHz	2.472GHz
ANT1	1.16	1.12	1.11	1.05	1.05
ANT2	1.09	1.10	1.09	1.03	1.03
Band / ANT Channel	5.180GHz	5.320GHz	5.550GHz	5.700GHz	5.825GHz
ANT1	1.07	1.12	1.07	1.20	1.21
ANT2	1.68	1.63	1.22	1.55	1.66

Nine：Common problems:

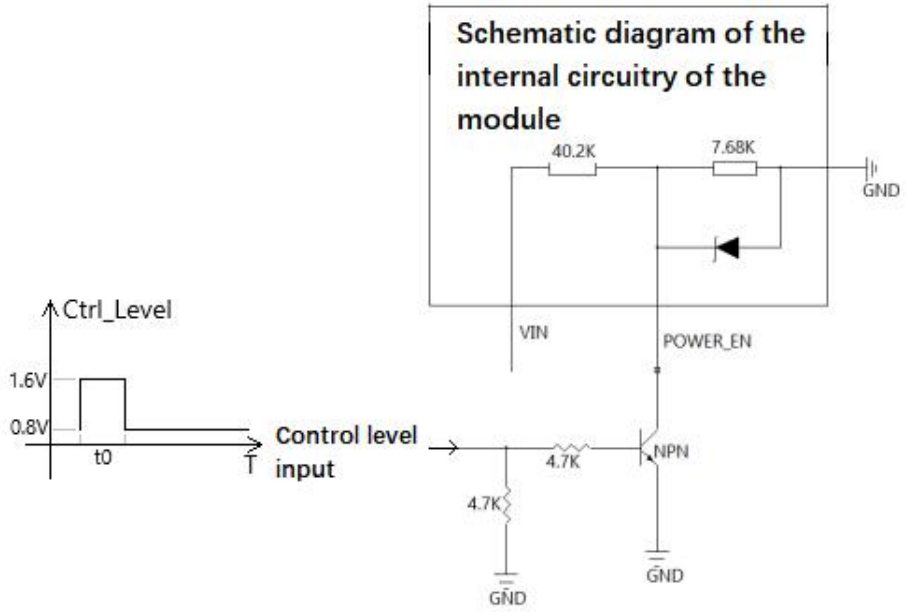
When using a non-independent power supply such as battery or motherboard to supply power to the module, the voltage may be unstable or have a large peak value at the moment of power supply startup, at this time, it is easy to damage the configuration parameters in the flash memory of the module. It is recommended to do a delayed start for the module, until the power supply voltage stabilizes before supplying power to the module. Module POWER_EN pin (PC-0)

description is as follows: external control circuit will POWER_EN pin to a low level (1.0V or less) to close the module power supply; POWER_EN pin to a high level (1.6V or more) to open the module power supply.



The control module delayed start circuit reference design has the following two options:

- Reference design 1

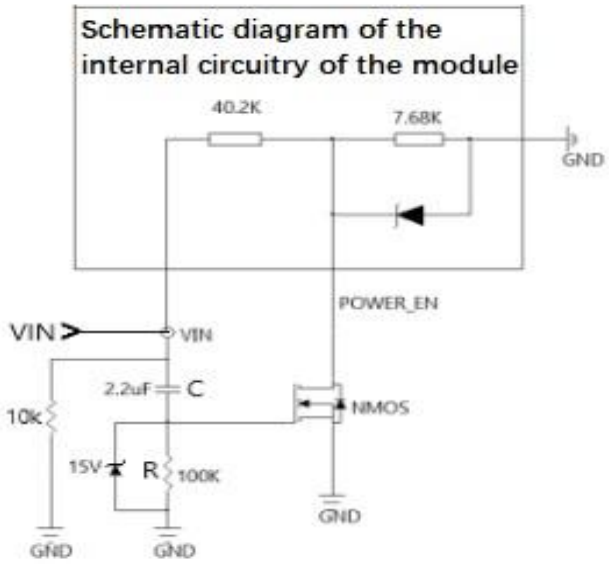


POWER_EN foot and GND access module, MCU connected to the microcontroller, the motherboard power-up so that the control level output high, transistor conduction, POWER_EN

foot is low, the module does not start; power supply stabilization so that the control level has been at a low level, the transistor cutoff, the POWER_EN foot is a high level, the module is normal operation.

The above figure t0 is the length of the delayed start.

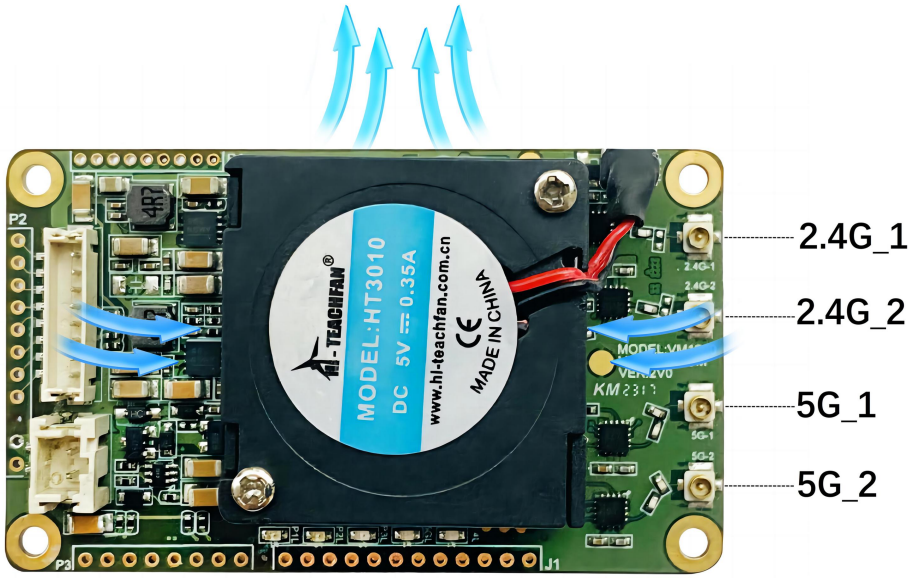
- Reference Design 2



VIN, POWER_EN foot and GND access module, motherboard power-up VIN to capacitor C charging, at this time the MOS tube conduction, POWER_EN foot for the low level, the module does not start; capacitor C is full of MOS tube cutoff, POWER_EN foot for the high level, the module starts. Resistor R is used to adjust the capacitor charging time, the larger the resistor charging time is longer delay start time is longer, 10K resistor is used for frequent unplugging and plugging the power supply when the capacitor discharges, 15V regulator is used to protect the MOS tube and capacitor rapid reverse discharge. The approximate formula for the length of the delay is: T = 1.4RC

Ten: Attachment: Product & Accessories Diagram

- **Front view:**



- 2*3dBi 2.4G Whip antennas、 2*3dBi 5G Whip antennas、DC Junction box；