Bluetooth Module CQ_F20_01 User Manual

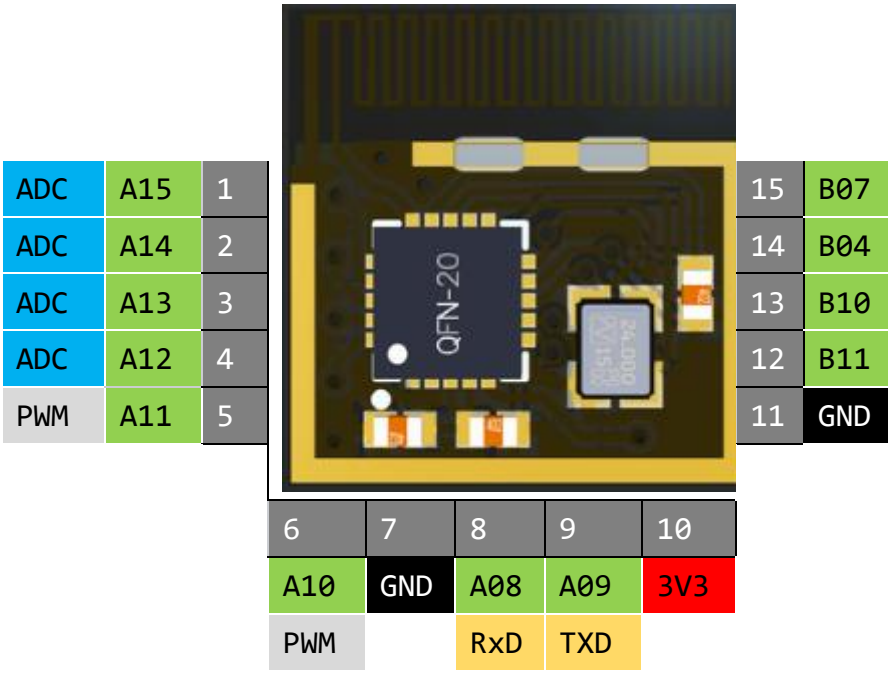
1. Introduction

CQ_F20_01 regular size Bluetooth module, this module is a **single-mode** Bluetooth module, supports BLE5.4 protocol, is stable and reliable, has complete functions, and the communication distance exceeds most similar products on the market. The optimal distance can reach 200 meters, the minimum power consumption is as low as 0.6uA, and the ultra-large MTU, single packet data is up to 500Byte, and sub-packeting is not required in most cases.

Through the complete AT commands, users can change the device name, baud rate, sleep state, and control GPIO output, acquisition, PWM output, ADC acquisition, and realize the function expansion of ordinary MCU.

model	CQ_F20_01
protocol	Single-mode Ble5.4
Transmission distance	Up to **200 meters** (test process: line of sight without interference, Redmi K60)
Transmit power	0dbm
Receiving sensitivity	-95dbm
Transmission rate	>10kByte/s
Operating Voltage	2.3~3.3V
Average working current	5.5mA
Sleep current	0.6μA
AT operable peripherals	IO output, IO acquisition, ADC acquisition, PWM output
Operating temperature	-20℃~+80℃
Size	10mm×10mm
UUID Service	FFF0 (changeable by command)
UUID Notify characteristic (sent from slave to master)	FFF1 (changeable by command)
UUID write characteristic (master sends to slave)	FFF2 (changeable by command)
Maximum data length of a packet	500Byte (if supported by the mobile phone)

2. Pin Diagram



Footer	name	Function Description
1	PA15	Ordinary input and output GPIO port, can be used as ADC function port
2	PA14	Ordinary input and output GPIO port, can be used as ADC function port
3	PA13	Ordinary input and output GPIO port, can be used as ADC function port
4	PA12	Ordinary input and output GPIO port, can be used as ADC function port
5	PA11	Ordinary input and output GPIO port, can be used as PWM function port
6	PA10	Ordinary input and output GPIO port, can be used as PWM function port
7	GND	Negative pole of power supply
8	PA08	RXD can be set as a normal GPIO port and restarted as a UART port
9	PA09	TXD can be set as a normal GPIO port and restarted as a UART port
10	3V3	Positive power supply, range 2.3V~3.6V

11	GND	Negative pole of power supply
12	B11	General input and output GPIO port
13	B10	General input and output GPIO port
14	B04	General input and output GPIO port
15	B07	General input and output GPIO port

3. AT command set

1、<AT><AT+HELP>Get AT command help

2、<AT+VERS> query version number

3、<AT+BAUD> query or set baud rate

4、<AT+NAME> query or module name

5、<AT+SLEEP> enters sleep mode

6、<AT+RESET> Device restart

7、<AT+DISC> disconnect

8、<AT+ADDR>Get Bluetooth MAC address

9、<AT+PWM>Set PWM

10、 <AT+GIO> Get gpio status

11、 <AT+SIO> Set gpio output

12、 <AT+ADC> Get ADC data

13、 <AT+PSW>Set Bluetooth connection password

14、 <AT+FACTORYPIN> Set the factory reset pin

15、 <AT+BLELED> Set the Bluetooth status indicator pin

16、 <AT+FACTORY>Restore factory settings

17、 <AT+UUID> Set the UUID of the service and characteristic

18、 <AT+UPDATA> Upgrade command

Notice:

1. The default baud rate of the serial port is 115200. It cannot be directly connected to the computer USB port, but can only be connected to the TTL serial port.
2. AT commands are valid at any time (regardless of whether the Bluetooth is currently connected or not connected). Any command sent by either party (whether the module

sends it to the Bluetooth host, or the Bluetooth host sends it to the module) can trigger the relevant AT command as long as the command header is "AT", and the command will be sent to the other party synchronously.

3. All symbols are **entered in English** .
4. **A maximum of 30 AT commands can be sent at one time. A semicolon should be added between each AT command. Spaces and carriage returns do not affect the execution of commands, so there should be no spaces when setting the device name.**
5. **The mobile phone needs to apply for the maximum MTU. Otherwise, the default maximum size of each data packet is 20 bytes. The MTU applied by different mobile phones may be different, and it needs to be determined based on the actual situation of the mobile phone.**
6. All IOs with less than two digits need to be padded with 0 in front. For example, A5 needs to be written as A05.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

2.2 List of applicable FCC rules

FCC Part 15 Subpart C 15.247.

2.3 Specific operational use conditions

The module can be used for mobile applications with a maximum -0.58dBi antenna. The host manufacturer installing this module into their product must ensure that the final compos it product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation. The host manufacturer 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 show in this manual.

2.4 Limited module procedures

Not applicable. The module is a Single module and complies with the requirement of FCC Part 15.212.

2.5 Trace antenna designs

Not applicable. The module has its own antenna, and doesn't need a host sprinted board microstrip trace antenna etc.

2.6 RF exposure considerations

The module must be installed in the host equipment such that at least 20cm is maintained between the antenna and user's body; and if RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

2.7 Antennas

Antenna Specification are as follows: Type: PCB Antenna Gain: -0.58dBi Max. This device is intended only for host manufacturers under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna; The module shall be only used with the internal antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a „unique" antenna coupler. As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

2.8 Label and compliance information

Host product manufacturers need to provide a physical or e-label stating "Contains **Bluetooth module, Model: CQ_F20_01, FCC ID:2B**GTJ-**CQ-F20**" with their finished product

2.9 Information on test modes and additional testing requirements

Host manufacturer must perform test of radiated & conducted emission and spurious emission, e.t.c according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

2.10 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Federal Communication 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.

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.

Warning: Changes or modifications made to this device not expressly approved by Suzhou Chaoqiansi Information Technology Co., Ltd may void the FCC authorization to operate this device.

Note: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user ’s authority to operate the equipment.

RF exposure statement:

The transmitter must not be colocated or operated in conjunction with any other antenna or transmitter. This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a Minimum distance of 20cm between the radiator and any part of your body.

FCC Caution:

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

IMPORTANT NOTES

Co-location warning:

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

OEM integration instructions:

This device is intended only for OEM integrators under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the external antenna(s) that has been originally tested and certified with this module. As long as the conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination. with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End product labeling:

The end product must be labeled in a visible area with the following: “Contains Transmitter Module **FCC ID: 2BGTJ-CQ-F20**”.

Information that must be placed in the end user manual:

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 show inthis manual.