TG-02F-Kit Specification

Version V1.0.0

Document resume

Version	Date	Develop/revise content	Edition	Approve
V1.0.0	2022.05.10	First Edition	Cong Chen	Hong Xu

Content

1. Product Overview

TG-02F-Kit is a Bluetooth development board developed by Shenzhen Ai-Thinker Technology Co., LTD. The core processor chip TG7120B(SOP16) is a highly integrated bluetooth System-level chip (SoC) with low power consumption, designed for Internet of Things (IoT), mobile devices, wearable electronic devices, smart home and other applications.

TG-02F-Kit development board features a high-performance low-power 32-bit CK802 processor, 64KB SRAM, 512KB Flash, 96KB ROM, 256 bit efuse. In addition, the TG-02F-Kit development board supports security mechanisms under the BLE protocol, applications and OTA upgrades, and has a variety of unique hardware security mechanisms, hardware encryption supports AES algorithm.

TG-02F-Kit provides rich peripheral interfaces, including UART, PWM, ADC, I2C, SPI, PDM, DMA and up to 11 IO ports. The TG-02F-Kit development board supports Bluetooth Low Energy: BLE5.1, BLE Mesh. Bluetooth rate support: 125Kbps, 500Kbps, 1Mbps, 2Mbps. Support broadcast extension, multi-broadcast, channel selection.

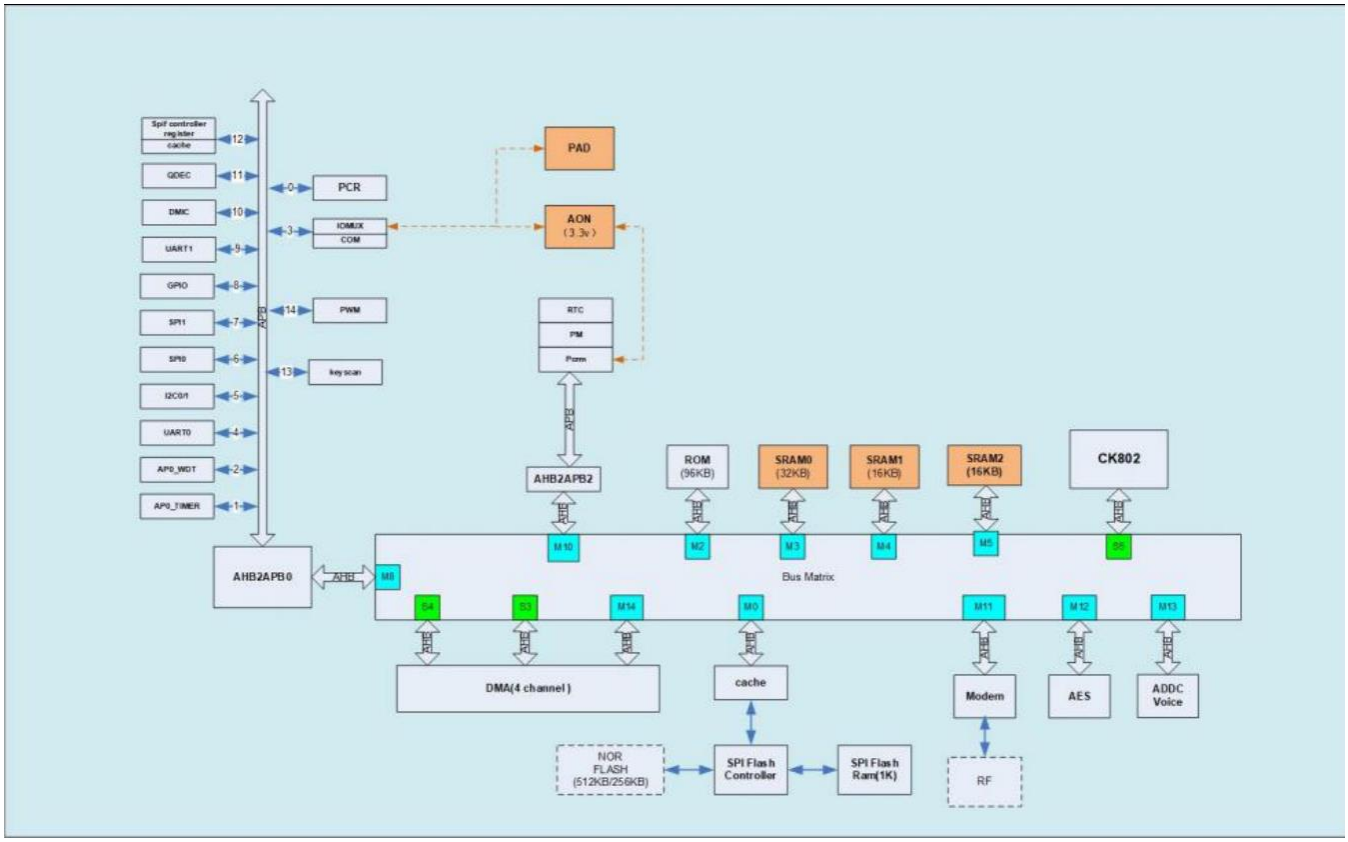

Figure 1 Main chip architecture diagram

1.1. Characteristic

- Support BLE5.1，Rate support：125Kbps，500Kbps，1Mbps，2Mbps
- 64 KB SRAM，512KB flash, 96 KB ROM，256 bit efuse
- Support UART/GPIO/ADC/PWM/I2C/SPI/PDM/DMA
- Package: DIP-30
- Multiple sleep modes are supported and the deep sleep current is less than 1uA
- General AT commands to get started quickly
- Support secondary development, integrated Windows development environment

2. Main parameters

Table 1 Description of the main parameters

Development board mode	TG-02F-Kit
Suitable module	TG-02F
Package	SMD-22
Size	49.66*25.40(±0.2)mm
Antenna	On-board antenna
Frequency	2400 ~ 2483.5MHz
Operating temperature	-40 ℃ ~ 85 ℃
Storage temperature	-40 ℃ ~ 125 ℃ , < 90%RH
Power supply	Support voltage: 5V，Supply current ≥200mA
Interface	UART/GPIO/ADC/PWM/I2C/SPI/PDM/DMA
IO	11
UART rate	Default 115200 bps
Bluetooth	BLE5.1
Security	AES-128
SPI Flash	512KB

2.1. The power supply selection

You can choose one of the following two power supply methods to power the TG-02F-Kit:

- Powered by Micro-USB interface (default)
- 3V3 and GND or 5V and GND pin header power supply

It is recommended to choose the first power supply method: Micro-USB interface power supply.

2.2. Static electricity requirements

TG-02F-Kit development board is a static-sensitive device and requires special precautions when handling it.

Figure 2 ESD preventive measures

2.3. Electrical characteristics

Table 2 Electrical characteristics table

Parameters		Conditions	Min.	Typical value	Max.	Unit
Interface power supply (Micro-USB)		VCC	4.5	5	5.3	V
Supply voltage (pin header)		VCC	2.7	3.3	3.6	V
I/O	VIL/VIH	-	-0.3/0.75VCC	-	0.25VCC/VCC+0.3	V
	VOL/VOH	-	N/0.8VIO	-	0.1VIO/N	V
	IMAX	-	-	-	12	mA

2.4. Bluetooth RF Performance

Table 3 Bluetooth RF performance Table

Description	Typical value			Unit
Working frequency	2400 - 2483.5			MHz
Output Power				
Model	Min.	Typical value	Max.	Unit
BLE 2Mbps	-20	8	10	dBm
BLE 1Mbps	-20	8	10	dBm
BLE 500Kbps	-20	8	10	dBm
BLE 125kbps	-20	8	10	dBm
Receive Sensitivity				
Model	Min.	Typical value	Max.	Unit
BLE 2Mbps	-	-94	-	dBm
BLE 1Mbps	-	-95	-	dBm

3. Appearance Dimensions

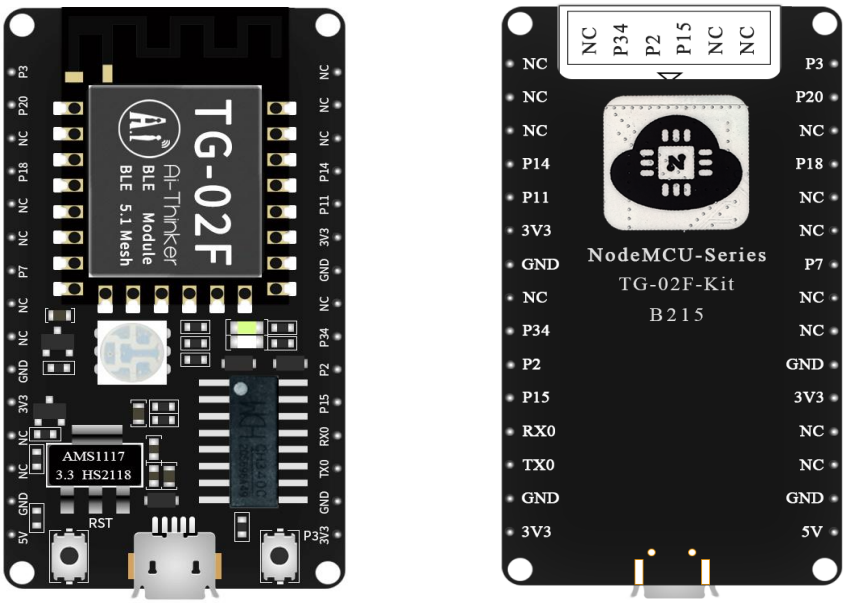

Figure 3 Appearance of the development board (the picture and silk screen are for reference only, the actual product shall prevail)

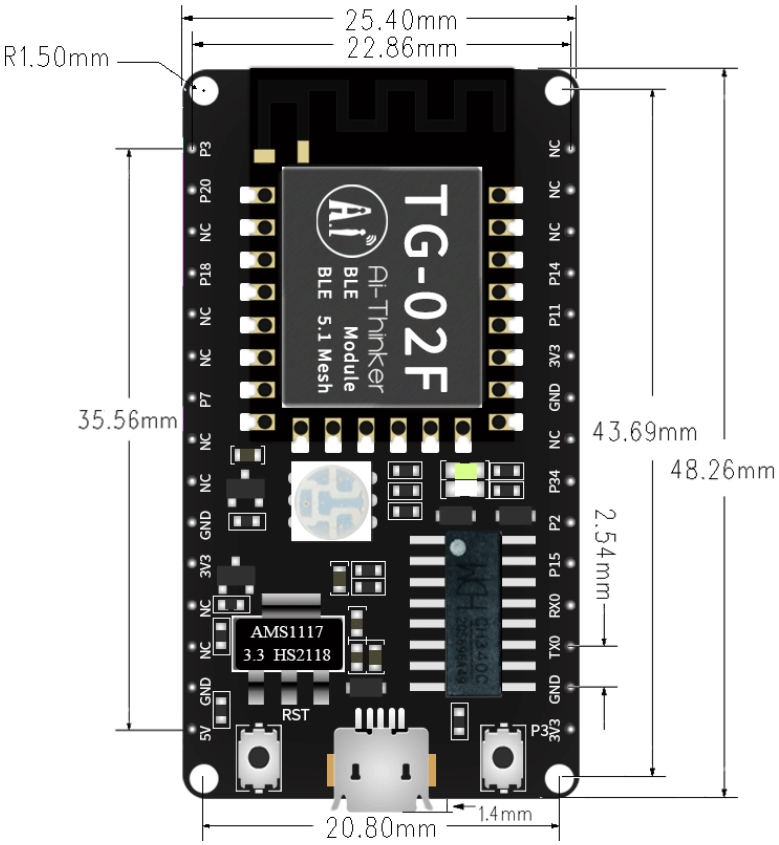

Figure 4 Development Board Dimensions

4. Description of indicator lights and buttons

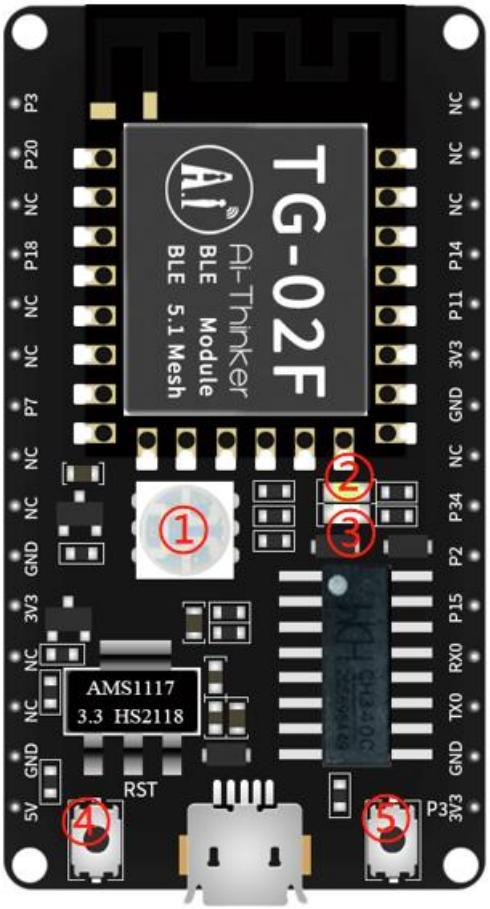

Figure 5 TG-02F-Kit indicator light and button position

Table 4 TG-02F-Kit indicator light and button position

①	RGB light（Corresponding to P18,P20,P15）
②	Cool light（Corresponding to P34）
③	Warm light（Corresponding to P2）
④	Reset button
⑤	P3 button (Corresponding to P3. Press and hold for more than 3s to automatically unbind and restart; after entering shallow sleep, short press P3 to exit hibernation)

5. Pin definition

TG-02F-Kit has a total of 20 interfaces, as shown in the pin diagram, the pin function definition table is the interface definition.

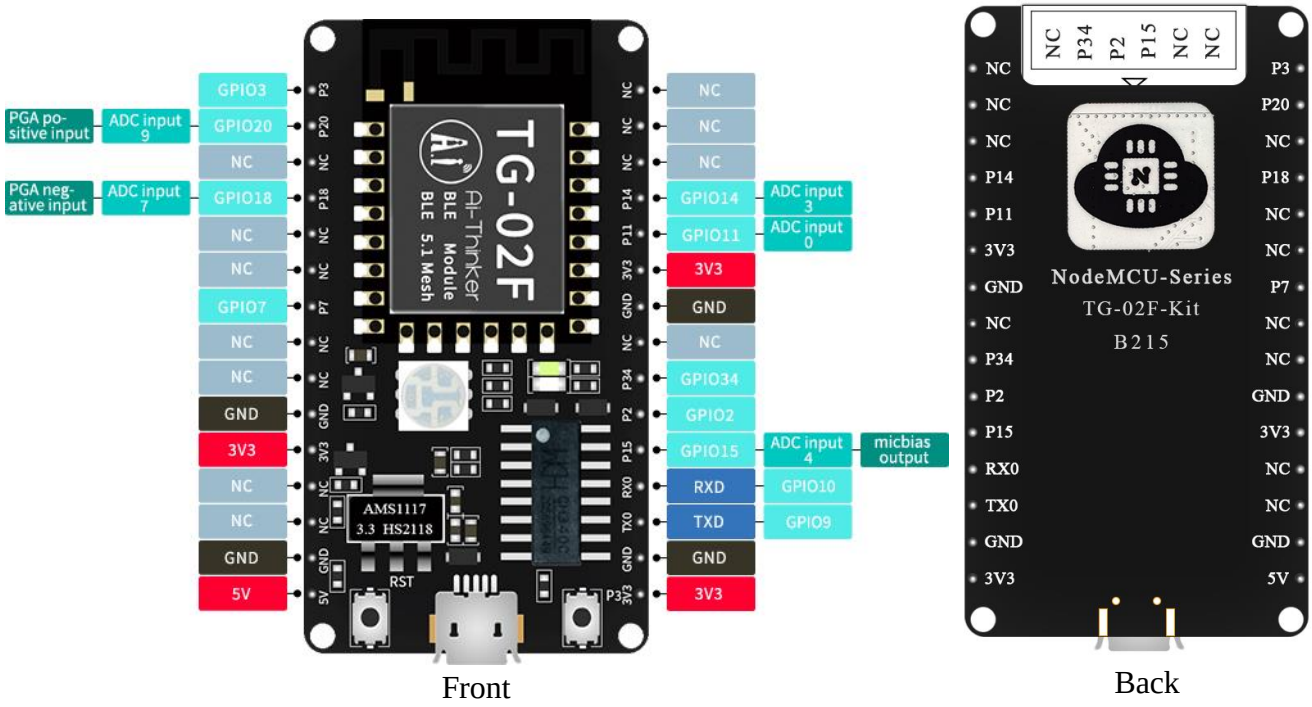

Figure 6 Schematic diagram of the development board pins

Table 5 Pin function definition table

No.	Name	Function
1	P3	GPIO3
2	P20	GPIO20/ ADC input 9 / PGA positive input
3	NC	Empty
4	P18	GPIO18/ ADC input 7 / PGA negative input
5	NC	Empty
6	NC	Empty
7	P7	GPIO7
8	NC	Empty
9	NC	Empty

10	GND	Ground
11	3V3	3.3V power supply
12	NC	Empty
13	NC	Empty
14	GND	Ground
15	5V	5V power supply
16	3V3	3.3V power supply
17	GND	Ground
18	TX0	TXD/GPIO9
19	RX0	RXD/GPIO10
20	P15	GPIO15/ ADC input 4 / micbias output
21	P2	GPIO2
22	P34	GPIO34
23	NC	Empty
24	GND	Ground
25	3V3	3.3V power supply
26	P11	GPIO11/ADC input 0
27	P14	GPIO14/ADC input 3
28	NC	Empty
29	NC	Empty
30	NC	Empty

6. Schematic

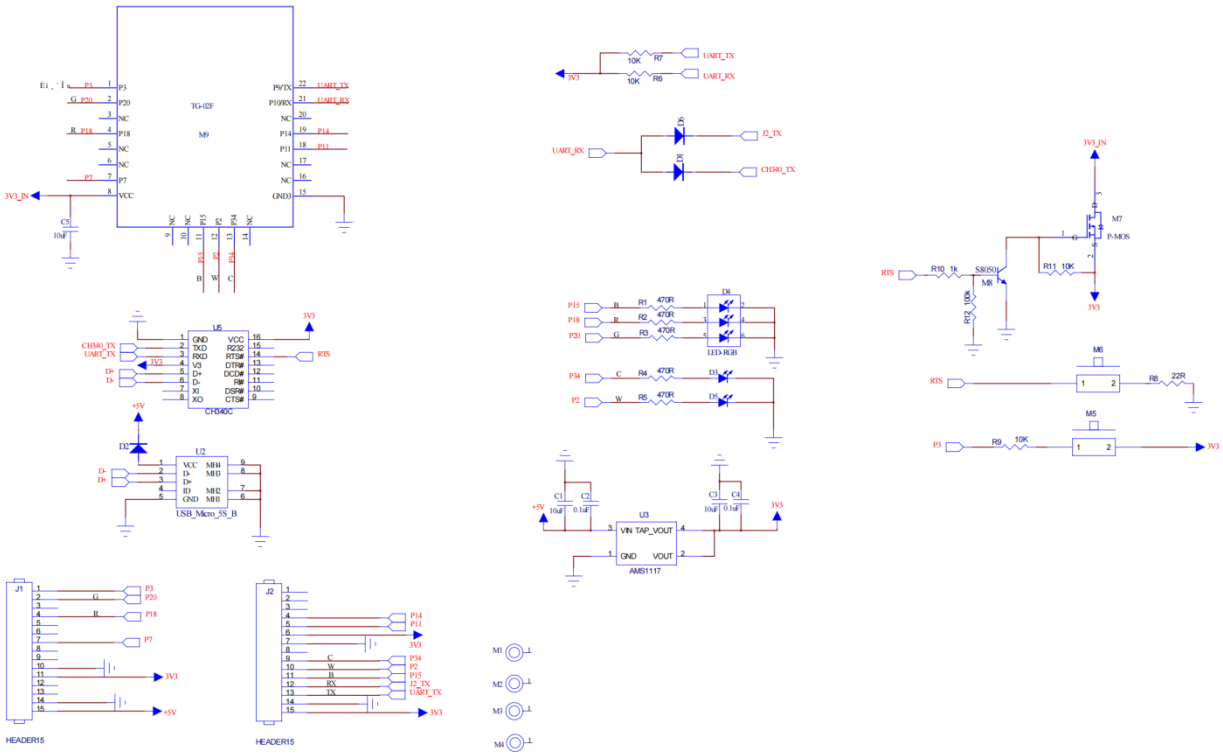

Figure 7 Schematic diagram of the development board

7.Product related models

Table 6 Product related model list

Model	Power Supply	Package	Size	Antenna
TG-02F	2.7V ~ 3.6V，I≥200mA	SMD-22	24.0*16.0*3.1(±0.2)mm	Default on-board PCB antenna Optional external spring antenna
TG-02M	2.7V ~ 3.6V，I≥200mA	DIP-18 Gold finger plug-in	18.0*18.0*2.8(±0.2)mm	On-board PCB antenna
TG-02	2.7V ~ 3.6V，I≥200mA	SMD-20	18.6*12.2*2.8(±0.2)mm	On-board PCB antenna
TG-02F-Kit	5V, I>200mA	DIP-30	49.66*25.40(±0.2)mm	On-board PCB antenna
TG-02M-Kit	5V, I>200mA	DIP-20	32.73*28.45(±0.2)mm	On-board PCB antenna
TG-02-Kit	5V, I>200mA	DIP-19	45.54*29.93(±0.2)mm	On-board PCB antenna
Product related information : https://docs.ai-thinker.com				

8. Product Packaging Information

Table 7 Packaging Information Sheet

Packing list	Packing method	Quantity per pack (static bag)	Quantity per pack (sealed bag)
TG-02F-Kit	Foam + static bag	1pcs	20pcs

9.Contact us

Ai-Thinker official website　Office forum　Develop DOCS

LinkedIn　Tmall shop　Taobao shop　Alibaba shop

Technic support email：support@aithinker.com

Domestic business cooperation：sales@aithinker.com

Overseas business cooperation：overseas@aithinker.com

Company Address：Room 403,408-410, Block C, Huafeng Smart Innovation Port, Gushu 2nd Road, Xixiang, Baoan District, Shenzhen.

Tel：+86-0755-2916299

WeChat mini program

WeChat official account

Disclaimer and copyright notice

The information in this article,including the URL address for reference,is subject to change without notice.

The document is provided"as is"without any guarantee responsibility,including any guarantee for merchantability,suitability for a specific purpose,or non-infringement,and any guarantee mentioned elsewhere in any proposal,specification or sample.This document does not bear any responsibility,including the responsibility for infringement of any patent rights arising from the use of the information in this document.This document does not grant any license for the use of intellectual property rights in estoppel or other ways,whether express or implied.

The test data obtained in the article are all obtained from Ai-Thinker's laboratory tests,and the actual results may vary slightly.

All brand names,trademarks and registered trademarks mentioned in this article are the property of their respective owners,and it is hereby declared.

The final interpretation right belongs to Shenzhen Ai-Thinker Technology Co.,Ltd.

Notice

Due to product version upgrades or other reasons,the contents of this manual may be changed.

Shenzhen Ai-Thinker Technology Co.,Ltd.reserves the right to modify the contents of this manual without any notice or prompt.

This manual is only used as a guide.Shenzhen Ai-Thinker Technology Co.,Ltd.makes every effort to provide accurate information in this manual.However,Shenzhen Ai-Thinker Technology Co.,Ltd.does not guarantee that the contents of the manual are completely free of errors.All statements and information in this manual And the suggestion does not constitute any express or implied guarantee.