TG-01M-Kit Specification

Version V1.0

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Document Revision History

Version	Date	Description of Changes	Authored by	Approved by
V1.0	2021/01/15	First edition	Chen Cong	Xu Hong

1 Product Overview

The TG-01M-Kit is a versatile development board designed specifically for the TG-01M module. It features five PWM channels and exposes all available I/Os of the module via pin headers, facilitating independent development and debugging by developers.

The TG-01M operates in the 2.4G frequency band, Wi-Fi 802.11b/g/n, and BLE 5.0 baseband/MAC design. It comes with built-in 276 KB SRAM and 128 KB ROM, and provides a rich set of peripheral interfaces, including DSIO, SPI, I2C, IR remote, PWM, ADC, DAC, PIR, and GPIO. It supports AT command development and secondary development, as well as control via Android/iOS apps and Tmall Genie. With its high performance, low cost, and agile development features, the TG-01M is suitable for various low-power and high-performance application developments, such as products in electrical lighting, home appliances, home security, and intelligent detection.

Features

- Module model: TG-01M
- Interface type: Standard micro USB + 2.54 mm pin headers
- Supported interfaces: SDIO, SPI, UART, I2C, IR remote, PWM, ADC, DAC, PIR, GPIO
- Built-in R/G/B tri-color LED
- Built-in reset button and 1 user-defined button
- Supports direct voice control via Tmall Genie
- Supports control via Android/iOS App
- Complete 802.11b/g/n Wi-Fi + BLE SoC module, with data rates up to 150 Mbps
- Ultra-low power consumption: Sleep mode power as low as 0.5 μA, with network standby power as low as 40 μA (DTIM 10)
- Universal AT commands for quick start; supports secondary development with integrated Linux development environment

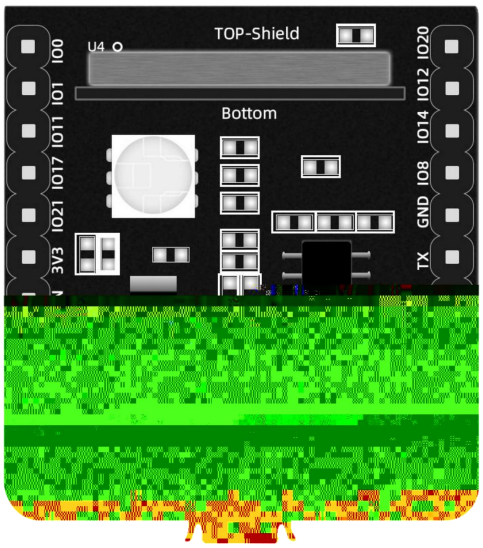
- Module utilizes an open-source, controllable RISC-V CPU with adjustable frequency from 1 to 160 MHz and 276 KB SRAM

Main Parameters

Table 1 Main Parameters Specifications

Model	TG-01M-Kit
Package	DIP-20（2.54 mm pitch standard pin header）
Dimensions	32.4*28.6*18.0(±0.2) mm
Frequency Range	2400~2483.5 MHz
Output Power	20 dBm
Receiver Sensitivity	-97 dBm
Interfaces	SDIO/SPI/UART/I2C/IR remote/PWM/ADC/DAC/PIR/GPIO
Operating Temperature	-40 ℃~85 ℃
Storage Conditions	-40 ℃~125 ℃, <90% RH
Power Supply Range	Micro USB supply voltage: 4.75 V to 5.25 V, recommended 5.0V; supply current: >500 mA
Available I/Os	15
UART Baud Rate	Support 110 to 460,800 bps, default 115,200 bps
Security	AES/SHA/PKA
SPI Flash	2 MB
Antenna Type	On-board antenna

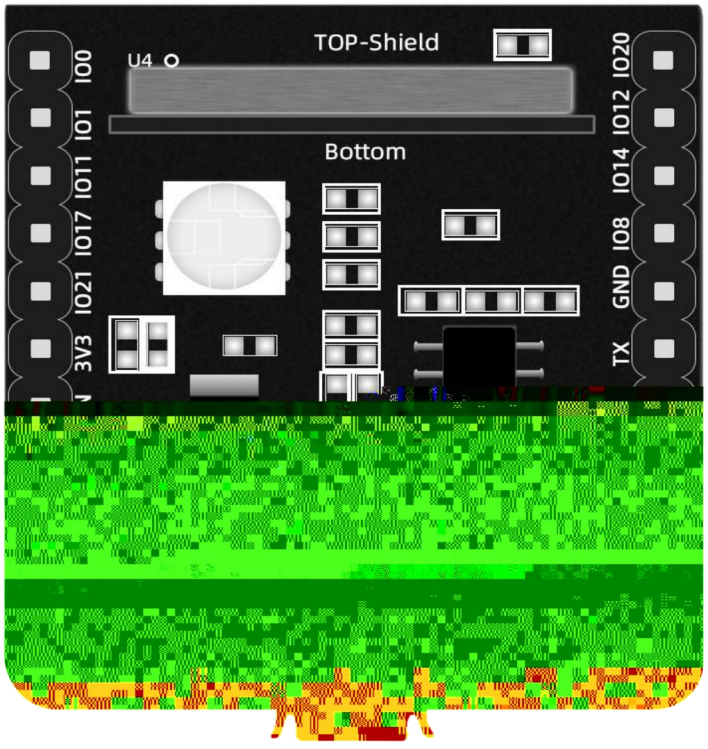
2 Appearance and Dimensions



3 Pin Definition

The TG-01M-Kit development board exposes a total of 20 pins, as shown in the pin diagram. The pin function definition table provides the detailed interface specifications.

TG-01M-Kit Pin Diagram



Pin Function Definition Table

Pin No.	Name	Function Description
1	IO0	SDIO, SFLASH, SPI, I2C, UART, PWM, GPIO
2	IO1	SDIO, SFLASH, SPI, I2C, UART, PWM, GPIO
3	IO11	SPI, I2C, UART, PWM, AUXADC, GPIO
4	IO17	SFLASH, SPI, I2C, UART, PWM, GPIO
5	IO21	SFLASH, SPI, I2C, UART, PWM, GPIO
6	3V3	Power supply
7	EN	Reset/Chip enable
8	IO22	SFLASH,SPI,I2C,UART,PWM,GPIO
9	IO2	SDIO,SFLASH,SPI,I2C,UART,PWM,GPIO
10	GND	Ground
11	3V3	Power supply
12	IO3	SDIO, SPI, I2C, UART, PWM, GPIO
13	IO4	SDIO, SPI, I2C, UART, PWM, GPIO
14	RX	SPI, I2C, UART, PWM, AUXADC, GPIO
15	TX	SPI, I2C, UART, PWM, GPIO
16	GND	Ground
17	IO8	SPI, I2C, UART, PWM, AUXADC, GPIO
18	IO14	SPI, I2C, UART, PWM, AUXADC, GPIO

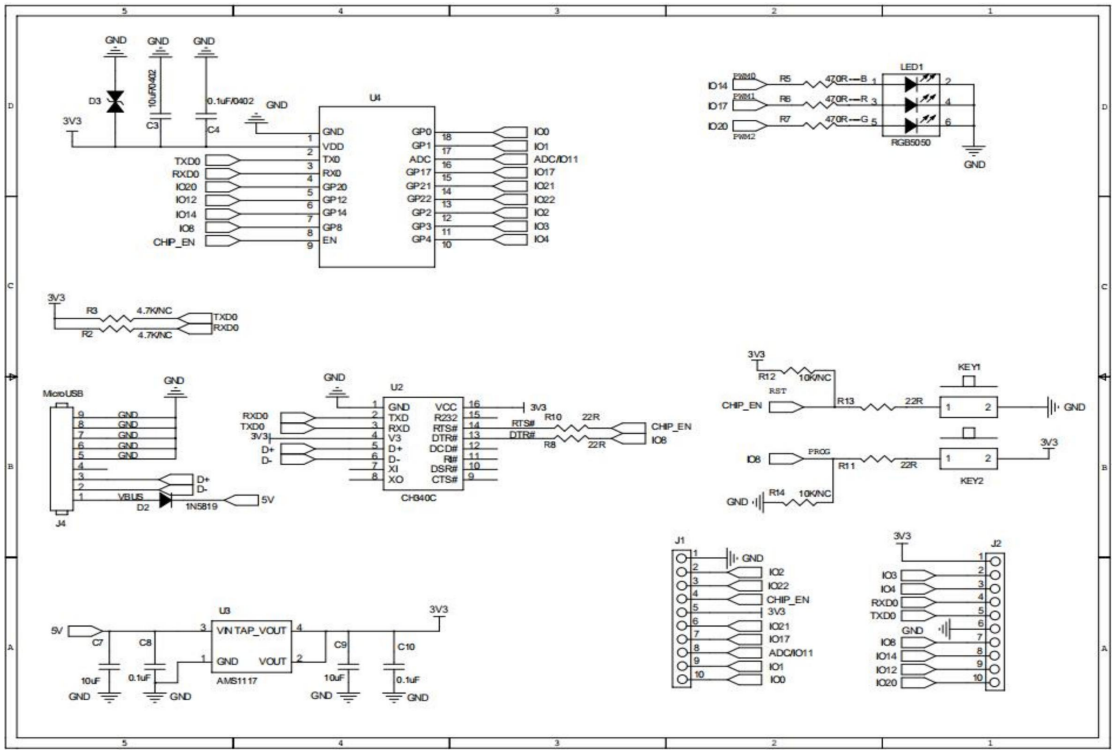
19	IO12	SPI, I2C, UART, PWM, AUXADC, GPIO
20	IO20	SFLASH, SPI, I2C,UART, PWM, GPIO

Table* Module Boot Mode Description

System Boot Mode			
Pin	**Default**	**SPI Boot Mode**	**Download Boot Mode**
EN/RST	Pull-up	Pull-up	Pull-up
IO8	Pull-up	Pull-down	Pull-up

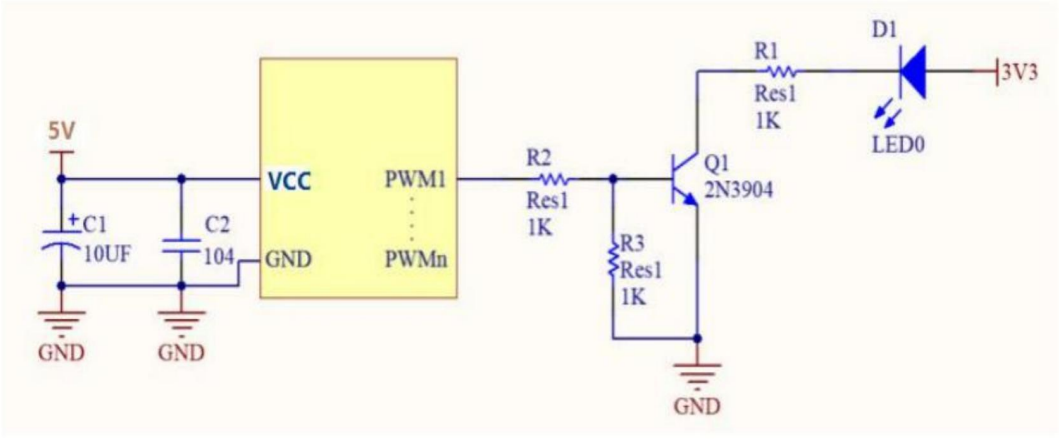
Note: The TG-01M-KIT development board requires manual pull-down of IO8 to enter boot mode.

4 Schematic Diagram



5 Design Guide

1. Application Circuit

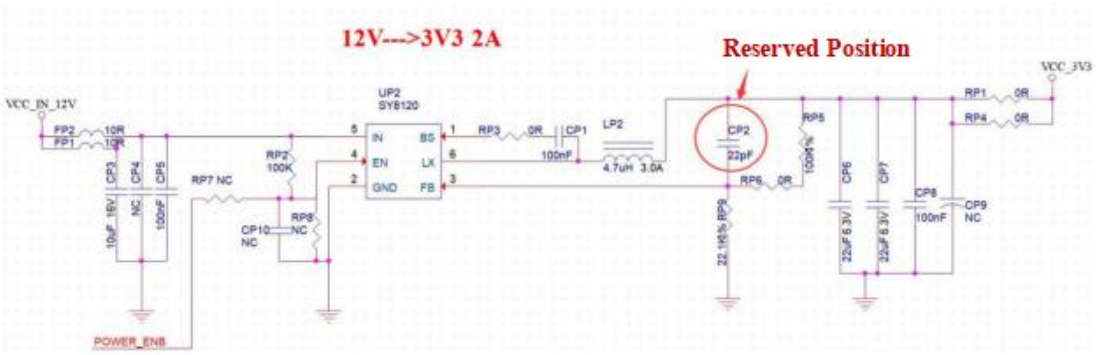


2. Antenna Layout Requirements

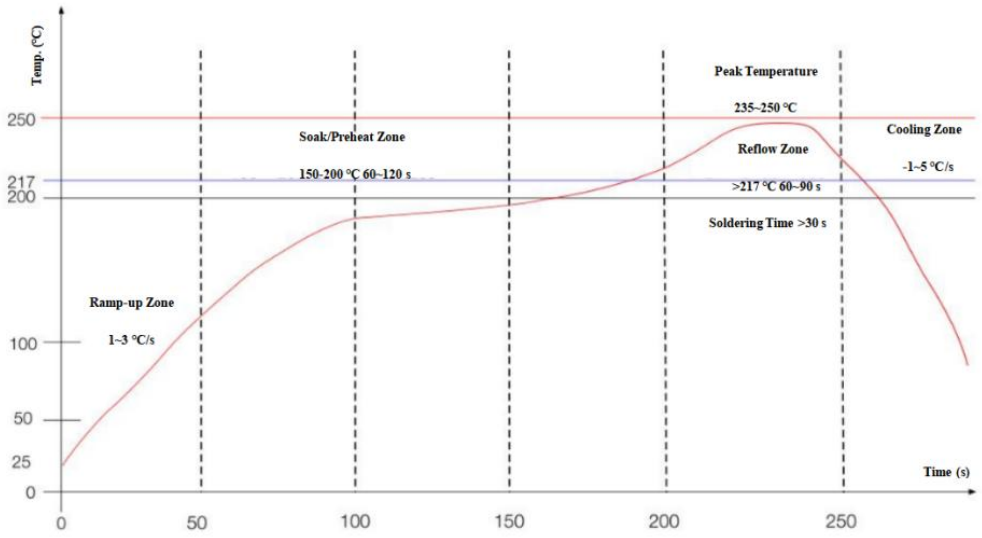
The area around the module's antenna must be kept free of metal components and should be positioned away from high-frequency devices.

3. Power Supply

- Micro USB: Recommended 5.0 V voltage, with peak current above 500 mA.
- LDO power supply is recommended; if using DC-DC, it is advised to control ripple within 30 mV.
- For the DC-DC power supply circuit, it is recommended to reserve space for a dynamic response capacitor, which can optimize output ripple under significant load variations.
- It is recommended to add ESD protection devices to the 5V power interface.



6 Reflow Soldering Profile



Ramp-up Zone: Temperature: 25~150 ℃ | Time: 60~90 s | Ramp Rate: 1~3 ℃/s

Soak/Preheat Zone: Temperature: 150~200 ℃ | Time: 60~120 s

Reflow Zone: Temperature: >217 ℃ | Time: 60~90 s Peak Temperature: 235~250 ℃ | Time at Peak: 30~70 s

Cooling Zone: Temperature: Peak Temperature: ~180 ℃ | Cooling Rate: -1~-5 ℃/s

Solder: Tin-Silver-Copper Lead-free Solder (SAC305)

7 Packaging Information

The TG-01M-KIT development board is packaged in an ESD bag.

8 Contact Information

Official Website: https://www.ai-thinker.com

Develop DOCS: https://docs.ai-thinker.com

Official Forum: http://bbs.ai-thinker.com

Sample Purchase: https://anxinke.taobao.com

Business Cooperation: sales@aithinker.com

Technical Support: support@aithinker.com

Company Address: Room 410, Block C, Huafeng Smart Innovation Port, Gusu Xixiang, Bao'an District, Shenzhen City, Guangdong Province, China

Contact Hotline: 0755-29162996