



TB-02-Kit_V2.0 Specification

Version V1.0

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Document Revision History

Version	Date	Description of Changes	Prepared by	Approved by
V1.0	2021-08-03	First edition	junx	Xu Hong

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1. Product Overview

The TB-02-Kit development board is a smart lighting development board designed for the TB-02 module. It features five built-in PWM channels, supporting independent adjustment of 7-color RGB LED and two warm/cool LED channels. All available I/Os of the module are exposed via pin headers for convenient development and debugging. The development board integrates a wealth of resources, including AT commands, SDK secondary development, supporting Bluetooth Mesh networking, Android/iOS app control and Wechat mini program control, as well as Tmall Genie voice direct control. Multiple development boards can be interconnected for mesh network debugging. All interfaces including GPIOs, PWM, I2C, ADC are accessible via 2.54 mm pin headers, enabling flexible peripheral connections. The UART interface supports firmware programming for quick and easy updates! Additionally, the SWS pin on the pin header can be used with Telink's official programming tool for firmware programming.

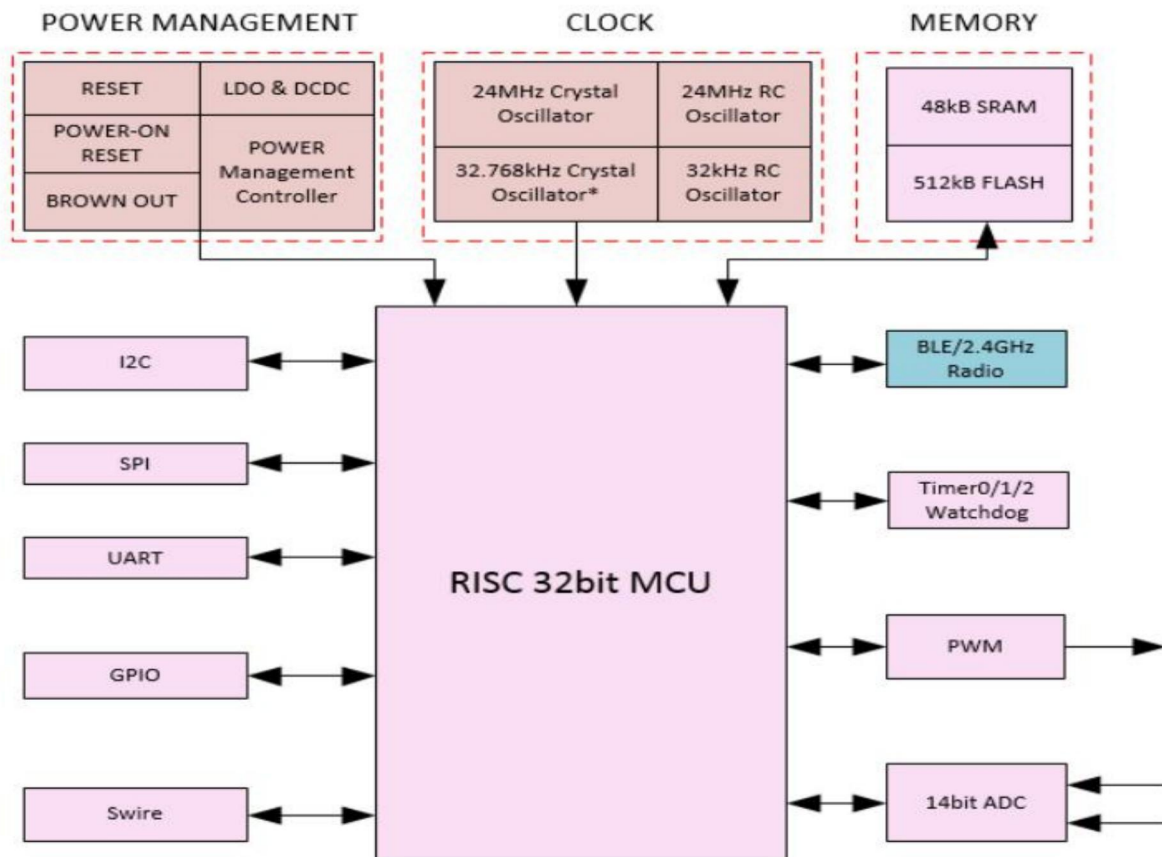


Figure 1 Chip Architecture Diagram

1.1. Features

- Module model: TB-02
- Two versions: Alibaba Tmall Genie dedicated version; standard AT version
- BLE 5.0, supports Mesh
- Interface type: Standard micro USB + 2.54mm pitch pin header
- Provides PWM, I2C, GPIO and ADC interfaces
- Equipped with integrated RGB three-in-one LED beads and warm/cool LED beads
- Features a reset button and one user-defined button
- Supports Tmall Genie voice direct control
- Supports Android/iOS app control and Wechat mini program control
- Supports AT commands and SDK secondary development

2. Key Specifications

Table 1 Key Specifications

Model	TB-02-Kit_V2.0 development board
Package	DIP-20 (2.54mm pitch standard pin header)
Dimensions	32.3*28.7*18.0 (±0.2)mm
Antenna Type	Onboard PCB antenna
Frequency Range	2400 – 2483.5MHz
Output Power	10±2dBm
Receiver Sensitivity	<-94dBm
Operating Temperature	-20 – 70°C
Storage Conditions	-40 – 125°C, <90% RH
Power Supply Range	Micro USB supply voltage: 4.75 – 5.25V, 5.0V recommended
Supported Interfaces	PWM/GPIO/UART/SPI/I2C/
Available I/Os	14
UART Baud Rate	Default 115200bps
Bluetooth	BLE 5.0
Power Consumption	Sleep mode: 0.8μA (module only) Standby mode: 3mA (module only) Full load mode (TX: 10 dBm): 23mA (module only) Development board baseboard: 4mA
SPI Flash	Built-in 512KByte

2.1. Electrical Parameters

TB-02-Kit_V2.0 development board is an ESD-sensitive device and requires special precautions during handling.



2.2. Electrical Characteristics

Absolute Maximum Ratings

Any value exceeding the following absolute maximum ratings may result in chip damage.

Parameter	Min	Typ	Max	Unit
Micro USB Power Supply Voltage	4.75	5.0	5.25	V
Operating Temperature	-20	-	+70	°C
Storage Temperature	-40	-	+125	°C

BLE RF Performance

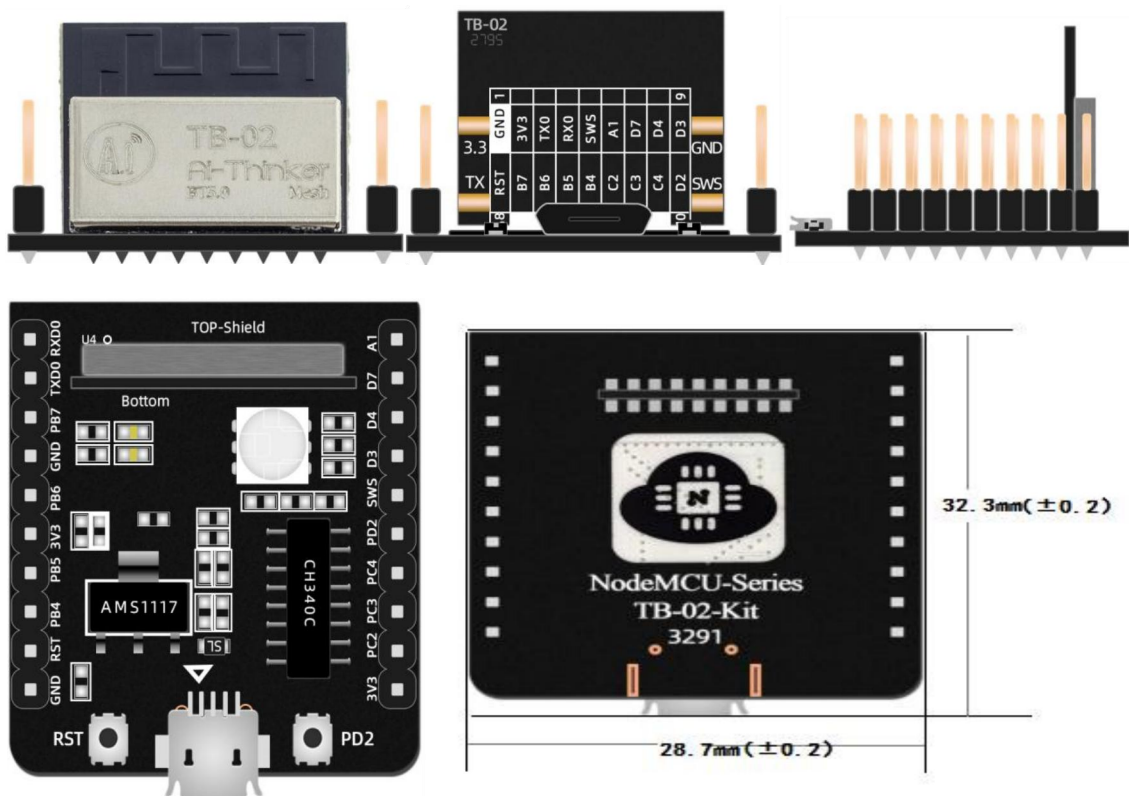
Description	Typ	Unit
Output Power		
Transmit Power	10±2	dBm
Receiver Sensitivity, BLE 1Mbps		
Sensitivity @30.8% PER	<-94	dBm

Power Consumption

The below power consumption values are measured with the module only.

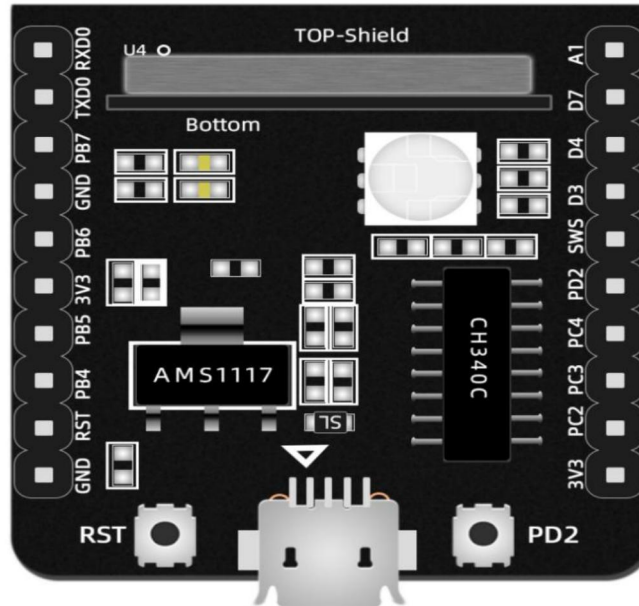
Mode	Min	Typ	Max	Unit
Transmit Power Consumption (10dBm)	-	23	-	mA
Standby Power Consumption	-	3	-	mA
Sleep	-	0.8	-	mA

3. Appearance and Dimensions



(Rendering for reference only; please refer to the actual product)

4. Pin Definition



TB-02-Kit_V2.0 Pin Diagram

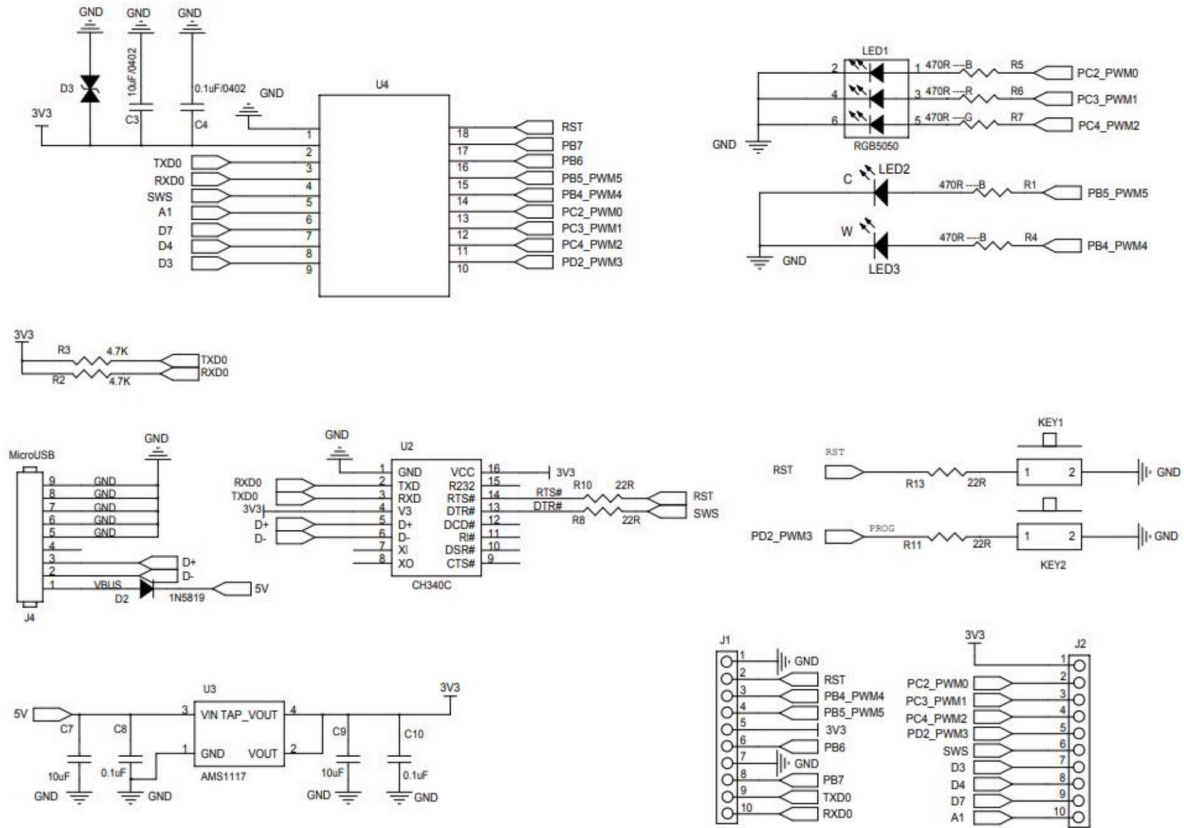
TB-02-Kit_V2.0 module exposes a total of 20 pins, as shown in the pin diagram. The pin function definition table provides the detailed interface specifications

TB-02-Kit_V2.0 Pin Function Definition

No.	Name	Function Description
1	RXD	UART_RX/GPIO PA0/PWM0 inverted output
2	TXD	UART_TX/GPIO PB1/PWM4 output/SAR ADC input
3	PB7	SPI_DO (data output)/UART_RX/SAR ADC Input/GPIO PB7
4	GND	Ground
5	PB6	SPI_DI (data input, I2C_SDA)/UART_RTS/SAR ADC input/GPIO PB6
6	3V3	Power supply
7	PB5	Cool/warm LED port C/PWM5 output/SAR ADC input/GPIO PB5
8	PB4	Cool/warm LED port W/PWM4 Output/SAR ADC input/GPIO PB4
9	RST	Reset (active low)
10	GND	Ground

11	3V3	Power supply
12	PC2	RGB LED B channel/PWM0 Output/I2C serial data (SDA)/32kHz crystal output (optional)/GPIO PC2
13	PC3	RGB LED R channel/PWM1 output/UART_RX (receive)/I2C serial clock (SCL)/32kHz crystal input (optional)/GPIO PC3
14	PC4	RGB LED G channel/PWM2 output/UART_CTS/PWM0 inverted output/SAR ADC input/GPIO PC4
15	PD2	GPIO PD2/PWM3 output/SPI chip select (active low)/I2S_LR
16	SWS	Single-wire slave (SWS)/UART_RTS/GPIO PA7
17	D3	GPIO PD3/PWM1 inverted output/I2S_SDI
18	D4	GPIO PD4/Single-wire master (SWM)/PWM2 inverted output/I2S_SDO
19	D7	GPIO PD7/SPI_Clock (SCK, or I2C_SCK)
20	A1	GPIO PA1/I2S_Clock

5. Schematic



6. Packaging Information

The TB-02-Kit_V2.0 is packaged in an ESD bag.

7. Related Model

Model	Power Supply	Package	Dimensions	Default Communication Interface
TB-02	3.3V	DIP-18/SMD-13	18.0*18.0*2.8 (±0.2) mm	UART
TB-02-Kit	5V	DIP-16	30.0*40.0*13.0 (±0.2) mm	UART
TB-02-Kit_V2.0	5V	DIP-20	32.3*28.7*18.0 (±0.2) mm	UART
More Product Information: https://docs.ai-thinker.com/blue_tooth				

8. Contact Information

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

Development DOCS: <https://docs.ai-thinker.com>

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

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