DT-BL10

——2.4GHz Wi-Fi and BLE coexistence Module

Product Specification

Ver : 1.0 Date: August.28,2020

Features

- **General**
  - Chip: BL602
  - Module Size:16mm*20mm*3mm
  - Complete 802 .11 b/g/n solution for 2.4GHz band
  - 65 Mbps receive PHY rate and 65 Mbps transmit PHY rate using 20 MHz bandwidth
  - 32-bit RISC CPU
- **Standards Supported**
  - 802.11b/g/n compatible WLAN
  - 802.11e QoS Enhancement (WMM)
  - 802.11i (WPA, WPA2). Open, shared key, and pair-wise key authentication services
  - WiFi Direct support
  - Light Weight TCP/IP protocol
  - Power saving mechanism
- **WLAN PHY Features**
  - Wi-Fi and BLE coexistence
  - One Transmit and one Receive path (1T1R)
  - 20MHz/40MHz bandwidth transmission
  - DSSS with DBPSK and DQPSK, CCK modulation with long and short preamble
  - OFDM with BPSK, QPSK, 16QAM, and 640QAM modulation. Convolutional Coding Rate: 1/2, 2/3, 3/4, and 5/6
  - Maximum data rate 26Mbps in 802.11g and 65Mbps in 802.11n
  - Fast receiver Automatic Gain Control (AGC)
- **Peripheral Interfaces**
  - GPIO * 16;
  - UART *2;
  - IIC * 1;
  - SPI * 1;
  - EN * 1;
  - PWM *5;
  - 10-bit DAC * 1;
  - 12-bit ADC*1
  - SDIO 2.0 * 1;
- **Working temperature:** -20℃-85℃

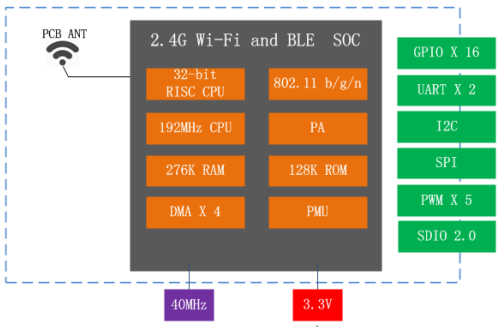
Application

- Serial transparent transmission;
- WiFi prober;
- Smart power plug/Smart LED light;
- Mesh networks;
- Sensor networks;
- Wireless location recognition;
- Wireless location system beacon;
- Industrial wireless control.

Module Type

Name	Antenna Type
DT-BL10	PCB ANT

Module Structure



Update Record

Date	Version	Update
2020-8-25	V1.0	First released

Table of Contents

1. Introduction

DT-BL10 Wi-Fi and BLE coexistence Module is a highly integrated single-chip low power 802.11n Wireless LAN (WLAN) network controller. It combines an RISC CPU , WLAN MAC, a lT1R capable WLAN baseband, RF, and Bluetooth in a single chip. It also provides a bunch of configurable GPIO, w hich are configured as digital peripherals for different applications and control usage.

DT-BL10 WiFi Module use BL602 as Wi-Fi and BLE coexistence soc chip.

DT-BL10 WiFi Module integrates internal memories for complete WIFI protocol functions. The embedded memory configuration also provides simple application developments.

DT-BL10 WiFi module supports the standard IEEE 802.11 b/g/n/e/i protocol and the complete TCP/IP protocol stack. User can use it to add the WiFi function for the installed devices, and also can be viewed as a independent network controller. Anyway, DT-BL10 WiFi module provides many probabilities with the best price.

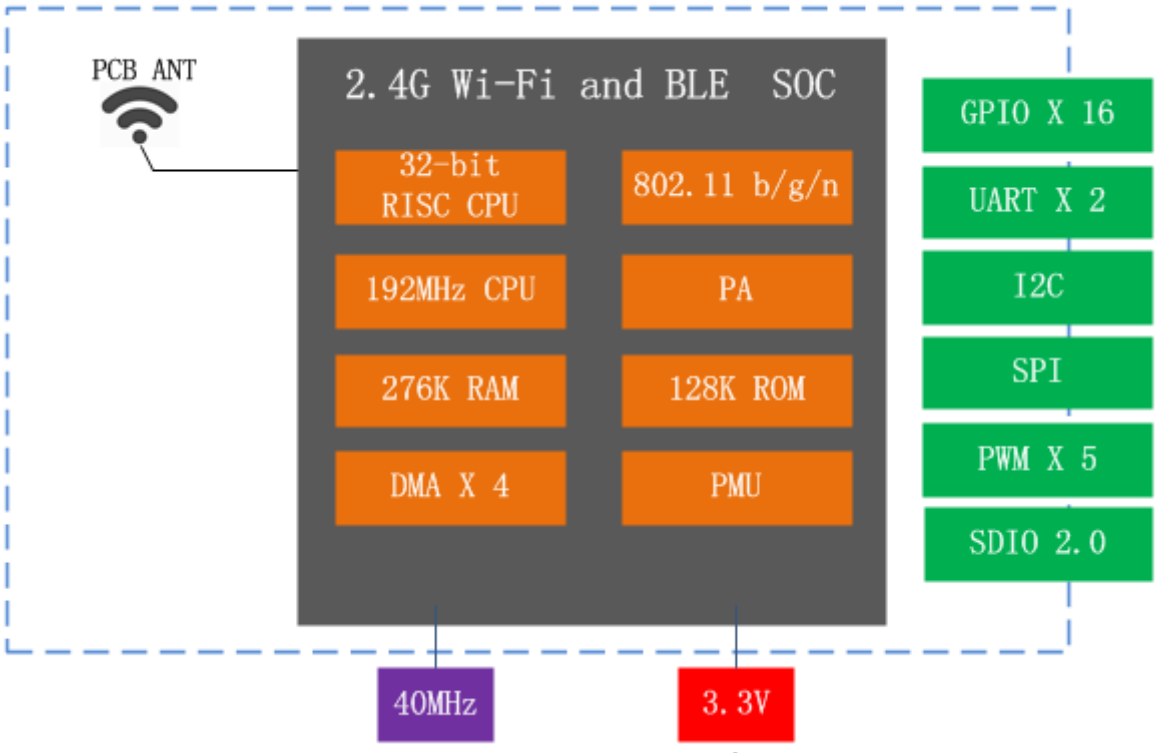


Fig. 1.1 DT-BL10 Module Structure

Technical parameters for DT-BL10 are listed as follows.

Table 1.1 DT-BL10 Parameters

Types	Items	Parameters
Wi-Fi	Frequency	2.4G~2.5G(2400M~2483.5M)
	Transmit power	802.11b: +19 dBm
		802.11g: +18dBm
		802.11n: +17 dBm
	Receiver sensitivity	802.11b: -91 dbm (11Mbps)
		802.11g: -77 dbm（54Mbps）
		802.11n: -73 dbm（MCS7）
	EVM	<-28dB @802.11g
		<-28dB @802.11n
	Antenna	PCB antenna
Hardware	CPU	32-bit RISC CPU
	Interface	UART/SDIO/SPI/I2C/GPIO /PWM
	Working voltage	3.0V ~ 3.6V
	Working current	Deep Sleep Mode:22mA
		Deep Standby Mode:2mA
		Average: mA ; Peak : mA; Inrush: mA
	Working temperature	-30 ℃ ~85 ℃
	Environment temperature	-30 ℃ ~ 105 ℃
	Shape	16mm x 20mm x 3mm
Software	Wi-Fi working mode	STA, SoftAP and sniffer modes
	Security mode	WPS / WEP / WPA / WPA2 / WPA3
	Encryption type	AES
	Update firmware	UART Download
	Software develop	SDK
	Network protocol	IPv4, TCP/UDP/HTTP/FTP/MQTT

2. Interface Definition

DT-BL10 module interface definition is shown as below。

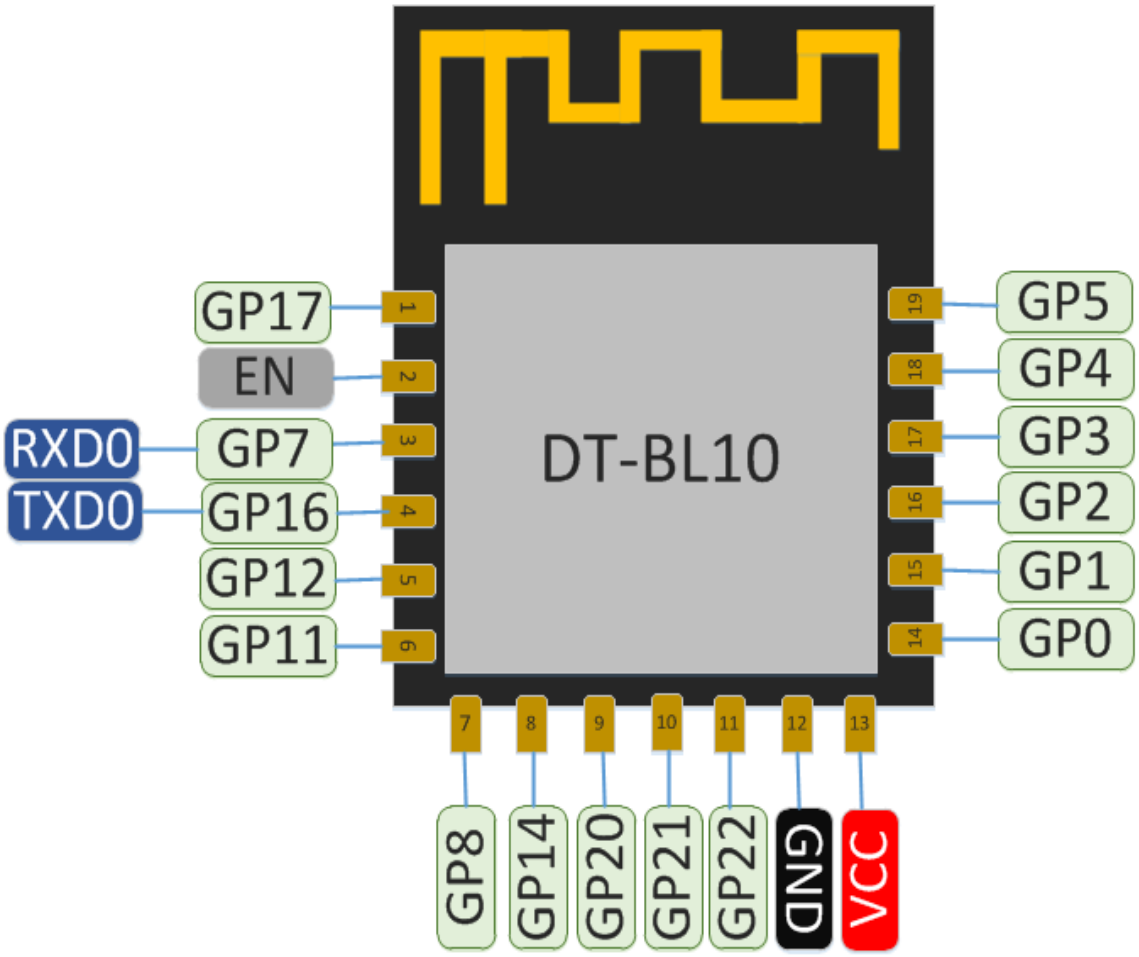


Fig. 2.1 DT-BL10 Pin Definition

Working mode and pin function is shown in Table 2.1.

Table 2.1 Working mode

Mode	GPIO8
UART Download Mode	High
Flash Boot Mode	Others

Table 2.2 Pin Function Definition

Num	Pin Name	Type	Function
1	GPIO17	I/O	SFLASH, SPI, I2C, UART, PWM, GPIO
2	EN	I/O	Chip enable
3	GPIO7	I/O	SPI, I2C, UART, PWM, GPIO
4	GPIO16	I/O	SPI, I2C, UART, PWM, GPIO
5	GPIO12	I/O	SPI, I2C, UART, PWM, AUXADC, GPIO
6	GPIO11	I/O	SPI, I2C, UART, PWM, AUXADC, GPIO
7	GPIO8	I/O	SPI, I2C, UART, PWM, AUXADC, GPIO
8	GPIO14	I/O	SPI, I2C, UART, PWM, AUXADC, GPIO
9	GPIO20	I/O	SFLASH, SPI, I2C, UART, PWM, GPIO
10	GPIO21	I/O	SFLASH, SPI, I2C, UART, PWM, GPIO
11	GPIO22	I/O	SFLASH, SPI, I2C, UART, PWM, GPIO
12	GND	P	Power
13	VDD33	P	Power
14	GPIO0	I/O	SDIO, SFLASH, SPI, I2C, UART, PWM, GPIO
15	GPIO1	I/O	SDIO, SFLASH, SPI, I2C, UART, PWM, GPIO
16	GPIO2	I/O	SDIO, SFLASH, SPI, I2C, UART, PWM, GPIO
17	GPIO3	I/O	SDIO, SPI, I2C, UART, PWM, GPIO
18	GPIO4	I/O	SDIO, SPI, I2C, UART, PWM, GPIO
19	GPIO5	I/O	SDIO, SPI, I2C, UART, PWM, GPIO

3. Size and Layout

Size for DT-BL10 can be shown as follows.

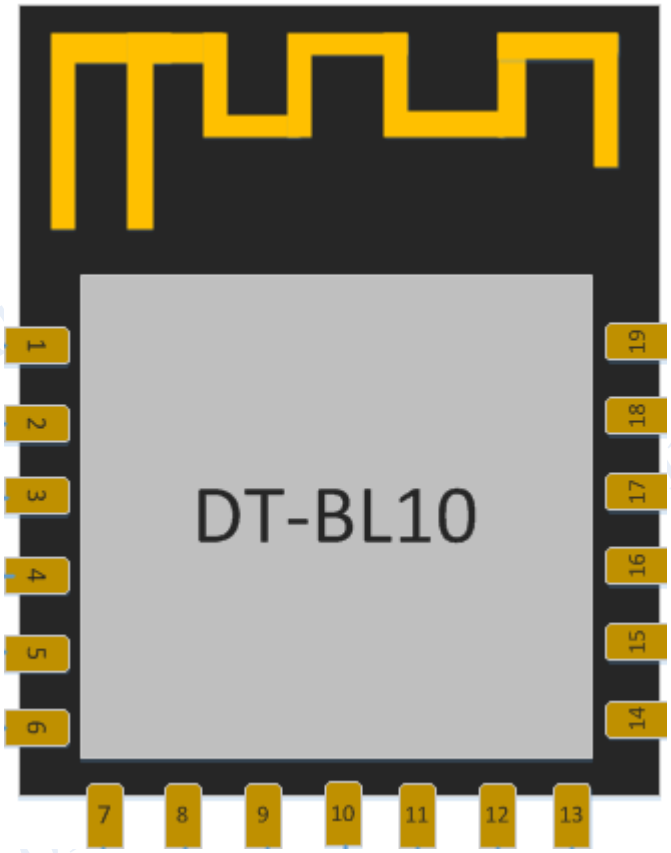
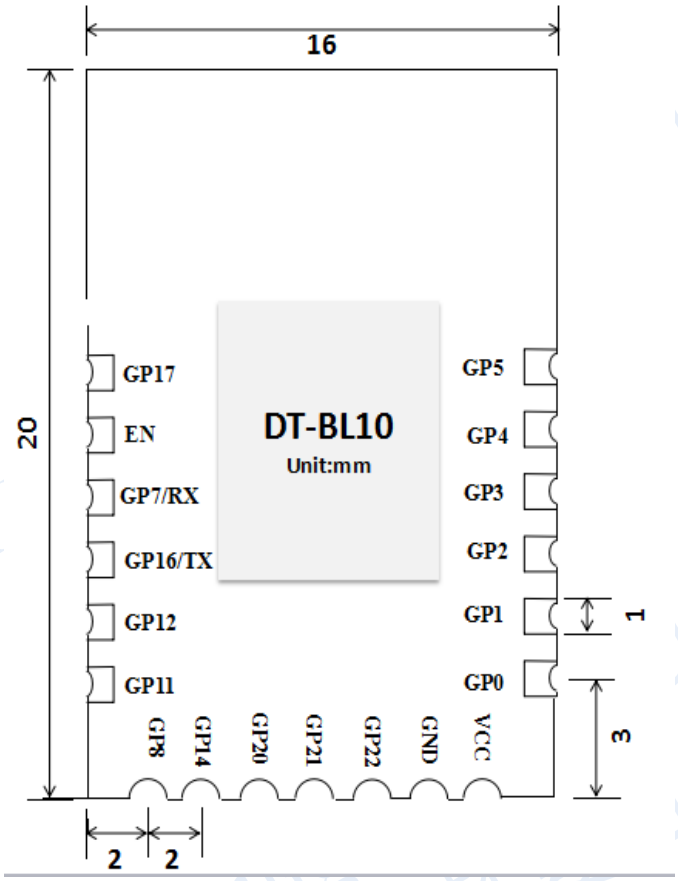


Fig. 3.1 Shape for DT-BL10



(a) Vertical View

(b) Side View

Fig. 3.2 Size for DT-BL10

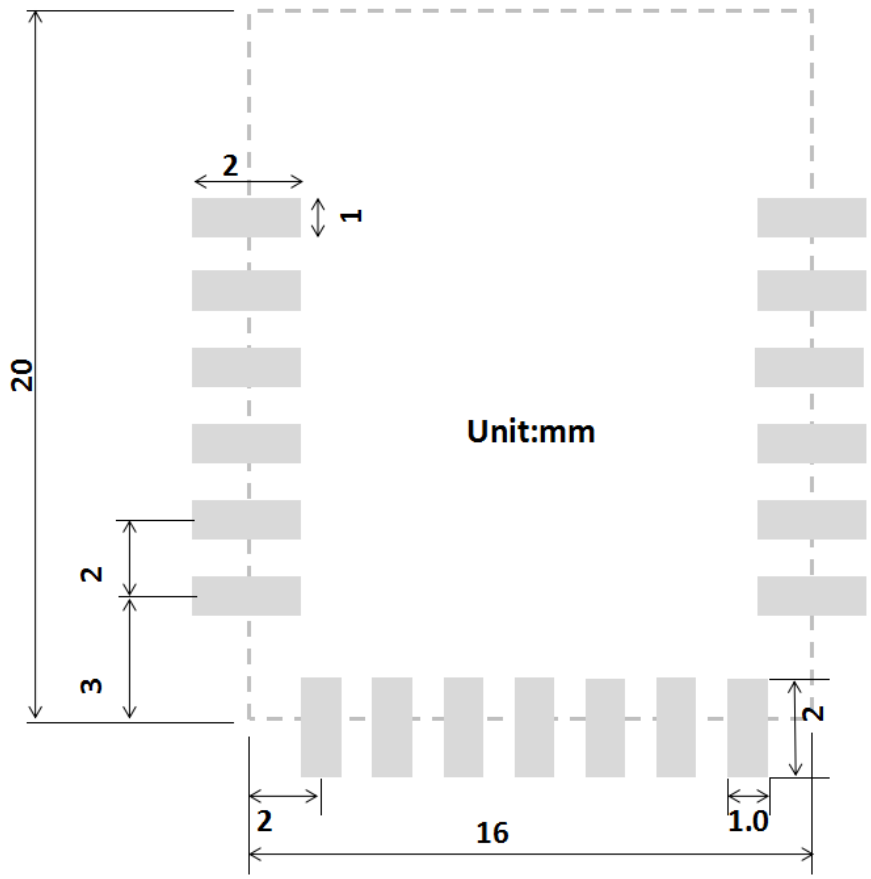


Fig. 3.3 PCB Layout for DT-BL10

4. Electronical Characteristics

Table 4.1 Electronical Characteristics

Parameters		Condition	Min	Classical	Max	Unite
Store Temperature		-	-30	Normal	105	℃
Sold Temperature		IPC/JEDEC J-STD-020	-	-	260	℃
Working Voltage		-	3.0	3.3	3.6	V
I/O	V_{IL}/V_{IH}	-	-/2.0	-	0.8/-	V
	V_{OL}/V_{OH}	-	-/2.4	-	0.4/-	
Electrostatic release quantity (Human model)		TAMB=25℃	-	-	2	KV
Electrostatic release quantity (Human model)		TAMB=25℃	-	-	0.5	KV

5. Power Consumption

Table 5.1 Power Consumption

Parameters	Min	Classical	Max	Unit
RX 11b	-	35	-	mA
RX 11g		39		

RX 11n		39		
TX(11b - 11Mbps @20dBm)	-	310	-	mA
TX(11g - 54Mbps@18dBm)	-	230	-	mA
TX(11n - MCS7@17dBm)	-	215	-	mA
MCU(Run Freq@ 192MHz)	-	22	-	mA
MCU(Standby Freq@<10MHz)	-	2	-	mA

6. RF Characteristics

The data in the following Table is gotten when voltage is 3.3V in the indoor temperature environment.

Table 6.1 Wi-Fi RF Characteristics

Parameters	Min	Classical	Max	Unite
Input frequencey	2412	-	2484	MHz
Input impedance	-	50	-	Ω
Input reflection	-	-	-10	dB
At 11b mode, output power consumption	-	20	-	dBm
At 11g mode, output power consumption	-	18	-	dBm
At 11n mode, output power consumption	-	17	-	dBm
Sensibility	-	-	-	-
802.11b, 1Mbps	-	-98	-	dBm
802.11g, 64Mbps	-	-93	-	dBm
802.11n, MCS7	-	-73	-	dBm

7. The Recommended Sold Temperature Curve

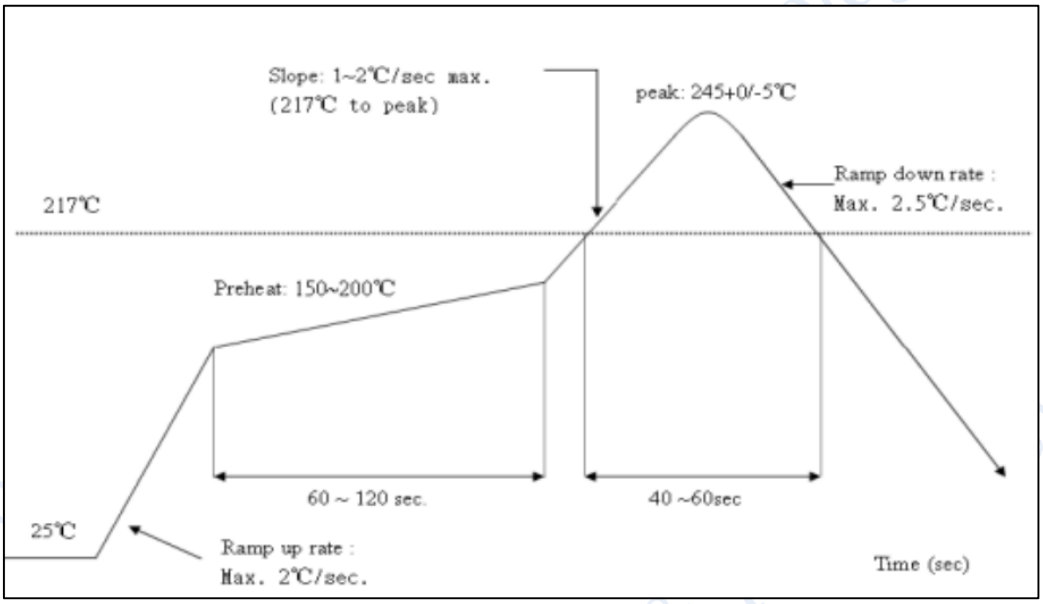


图 7. 1 Temperature Curve when sold

8. Minimum User System

This module can work just at 3.3V working voltage:

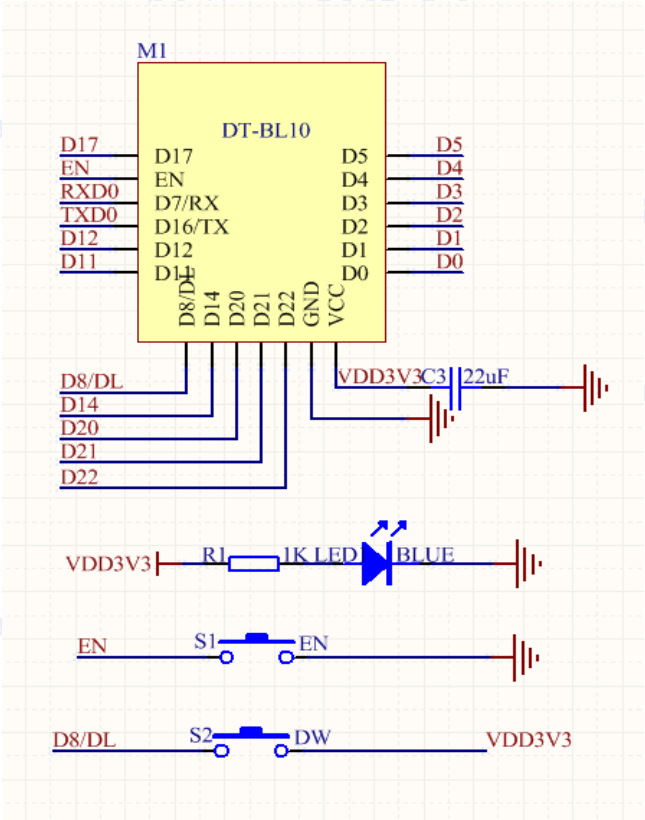


Fig.8.1 minimum system

Note

(1) the working voltage for module is DC 3.3V;

(2) the max current from IO of this module is 12mA;

(3) WiFi module is at download mode: D8 are High level, then module reset to power;

(4) Wi-Fi module is connected to RXD of the other MCU, and TXD is connected to RXD of the other MCU.

9. The Recommended PCB Design

DT-BL10 Wi-Fi module can be sold on PCB board directly. For the high RF performance for the device, please notice the placement of the module. There are three ways to use the module for WiFi Module with PCB antenna.

Solution 1:optical solution. The WiFi module is placed on the side of the board, and the antennas are all exposed, and there is no metal material around the antenna, including wires, metal casings, weight plates, and the like.

Solution 2:suboptical solution. The WiFi module is placed on the side of the board, and the antenna below is hollowed out. There is a gap of not less than 5 mm reserved with the PCB, and there is no metal material around the antenna, including wires, metal casings, weight plates, and the like.

Solution 3: The WiFi module is placed on the side of the board, and the PCB area under the antenna is empty, and copper cannot be laid.

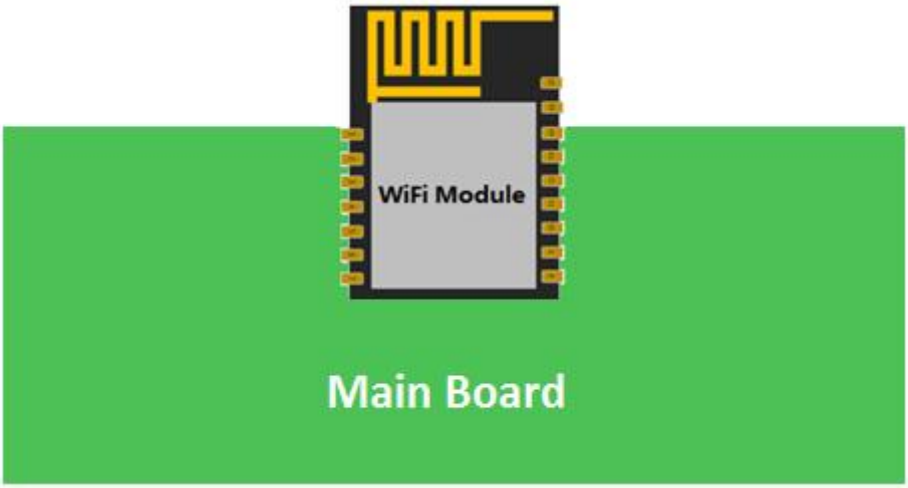


Fig.9.1 Solution 1

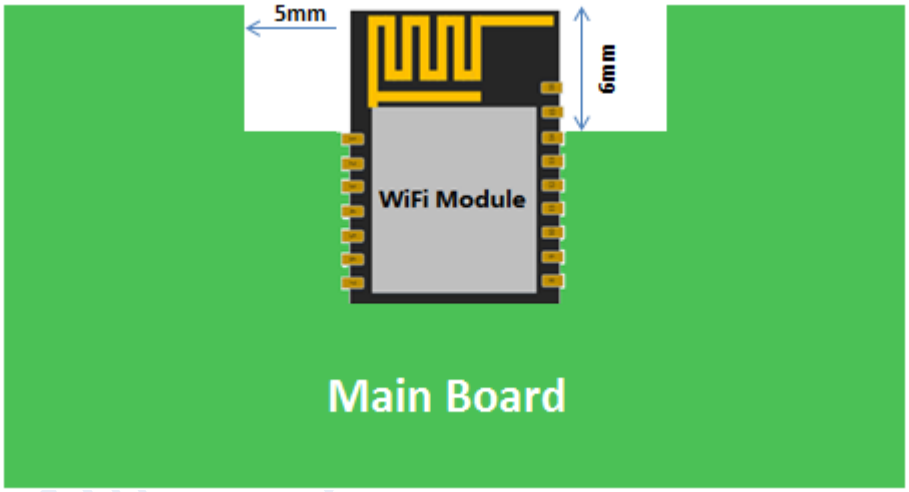


Fig.9.2 Solution 2

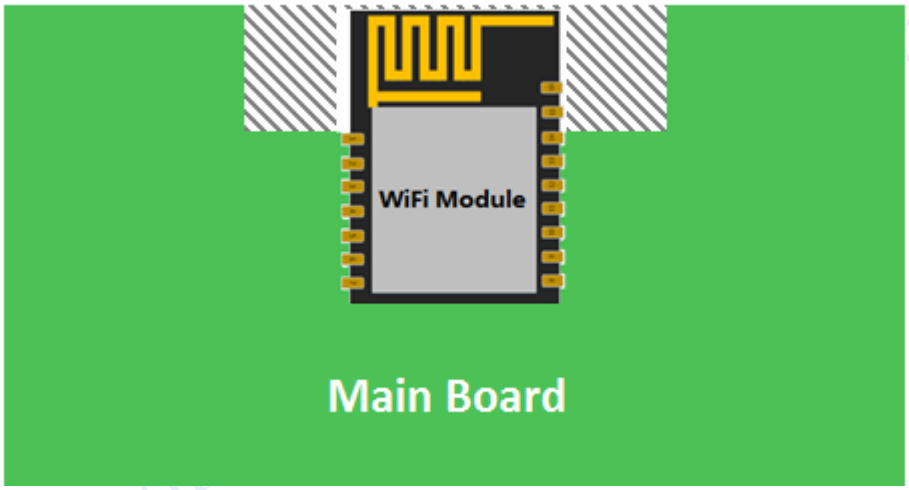


Fig.9.3 Solution 3

10. Peripheral Design Suggestion

Wi-Fi module is already integrated into high-speed GPIO and Peripheral interface, which may be generated the switch noise. If there is a high request for the power consumption and EMI characteristics, it is suggested to connect a serial 10~100 ohm resistance, which can suppress overshoot when switching power supply, and can smooth signal. At the same time, it also can prevent electrostatic discharge (ESD).