Manuals+ — User Manuals Simplified.

Xiaoteng Technology XT-ZB1 Coexistence Module User Manual

Contents

Shenzhen Xiaoteng Technology XT-ZB1 Coexistence Module
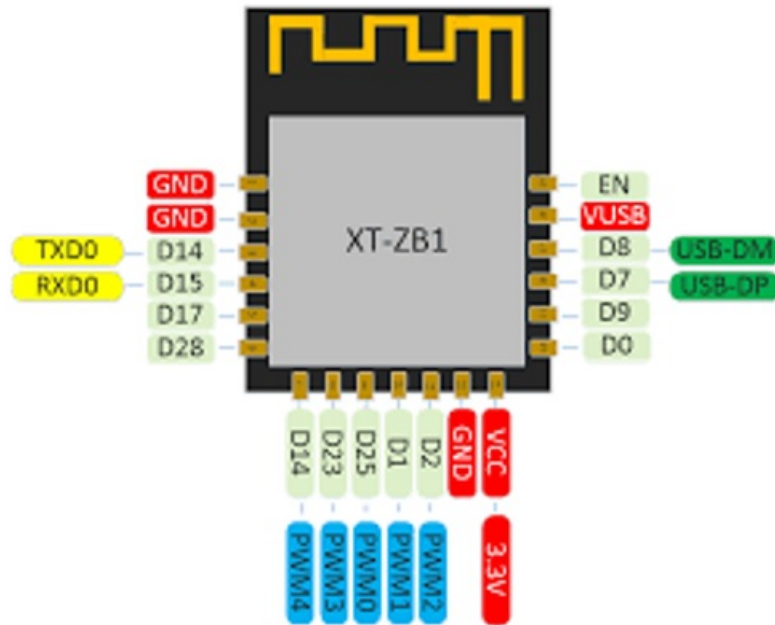
Features

- **General**
  - Chip: BL702C 8Mbit Flash embedded
  - Module Size:16mm*20mm*3mm
  - Bluetooth® Specification v5.0
  - Zigbee 3.0, Base Device Behavior, CoreStack R21, Green Power
  - 2.4 GHz RF transceiver
  - Support BLE/Zigbee coexistence
- **Standards Supported**
  - IEEE 802.15.4 MAC/PHY
  - Bluetooth® Low Energy 1Mbps and 2Mbps
  - Bluetooth® Long Range Coded 500Kbps and125Kbps
  - Integrated balun, PA/LNA
- **MCU Features**
  - 32-bit RISC CPU with FPU
  - One RTC timer update to one year
  - CPU frequency configurable from 1MHz to144MHz
  - JTAG development support
  - XIP QSPI Flash/pSRAM with hardwareencryption support
  - 132KB RAM
  - 192KB ROM
  - 1Kb eFuse
- **Peripheral Interfaces**
  - USB2.0 Full-Speed interface
  - GPIO * 12;
  - UART * 2;
  - IIC * 1;
  - SPI * 1;

- EN * 1;
- PWM *5;
- 10-bit DAC * 1;
- 12-bit ADC*1;
- PIR * 1;
- IR remote control interface
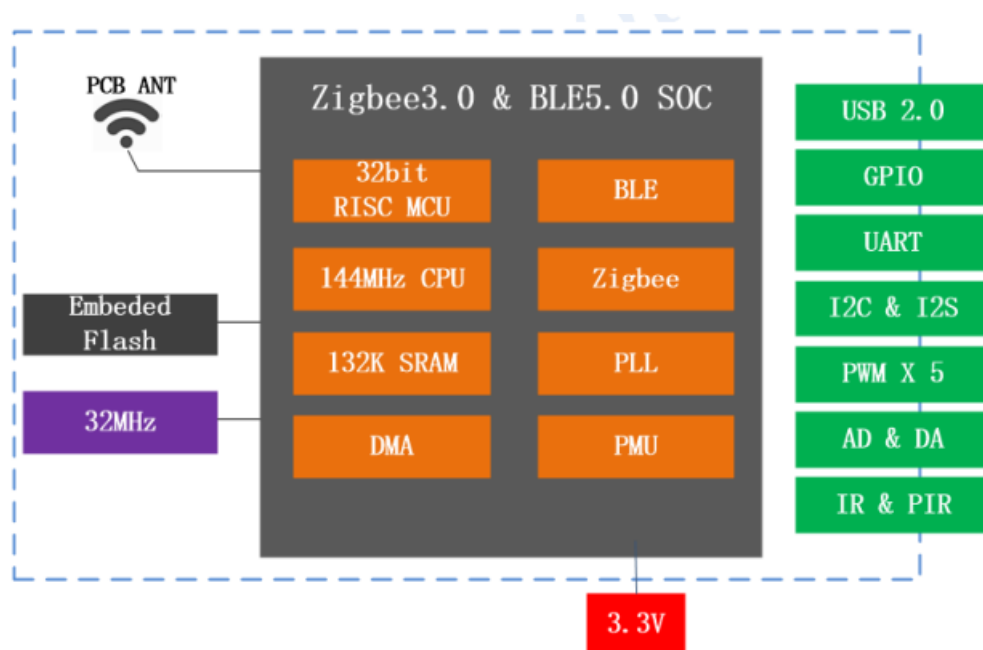- **Working temperature: -40°C-105°C**

Applications

- Serial transparent transmission;
- Smart power plug/Smart LED light;
- Sensor networks;
- Industrial wireless control;

Module Type

Name	Antenna Type
XT-ZB1	PCB ANT

Module Structure

Update Record

Date	Version	Update
2021-9-2	V1.0	First released

Introduction

- XT-ZB1 is highly integrated BLE and Zigbee combo module for IoT applications.
- XT-ZB1's wireless subsystem contains 2.4G radio, BLE + Zigbee baseband and MAC designs.
- The microcontroller subsystem contains 32-bit RISC CPU, high-speed cache and memories.
- Power Management Unit controls ultra-low-power modes. Moreover, varieties of security features are supported.
- Peripheral interfaces include UART, PWM, USB, I2C, ADC, DAC and GPIOs.

Technical parameters for XT-ZB1 are listed as follows.

Table 1.1 XT-ZB1 Parameters

Types	Items	Parameters
RF	Zigbee Sensitivity	-104 dBm @250Kbps
	BLE Sensitivity	-104 dBm @120Kbps
		-100 dBm @500Kbps
		-97 dBm @1Mbps
		-94 dBm @2Mbps
	TX Power	0-14 dBm
	TX EVM	11%
	Antenna	PCB antenna
Hardware	CPU	32-bit RISC CPU
	Interface	UART/GPIO/PWM
	Working voltage	2.5V ~ 3.6V
	Working current	3.5mA @RF only
		17mA @TX 10dBm
		45mA @TX 14dBm
	Working temperature	-40°C ~ 105°C
	Storage temperature	-45°C ~ 1 35°C
	Shape	16mm x 20mm x 3mm
Software	Encryption type	AES 128/192/256
	Update firmware	UART Download
	Software develop	SDK

Interface Definition
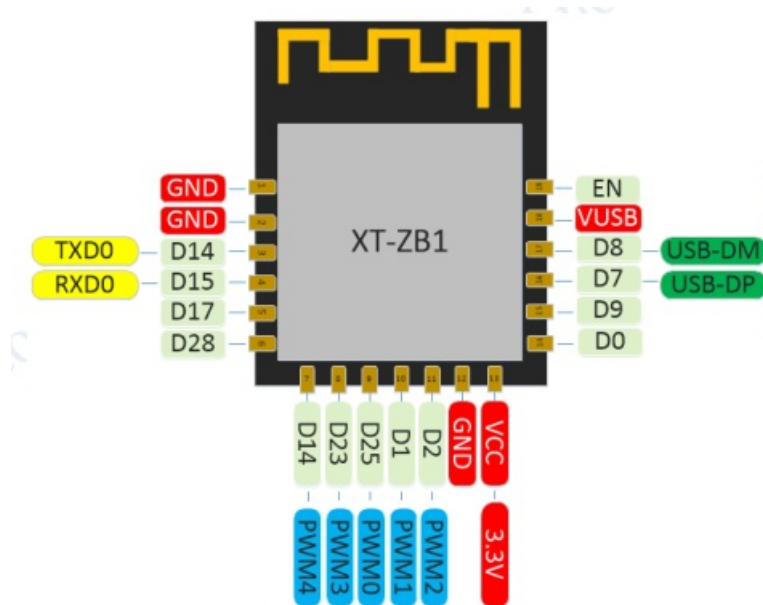
XT-ZB1 module interface definition is shown as below

Fig.2.1 XT-ZB1 Pin Definition

Working mode and pins function are shown in Table 2.1.

Table.2.1 Working mode

Mode	D28
UART Download Mode	High
Flash Boot Mode	LOW(default)

Table.2.2 Pins Function Definition

Num.	Pin Name	Type	Function
1, 2, 12	GND	P	Power ground
3	TXD0	I/O	GPIO14, SS, SCL, ADC_CH5, I2S_DIO, PWM_CH4
4	RXD0	I/O	GPIO15, SCLK, SDA, ADC_CH1, I2S_DIO, PWM_CH0

5	D17	I/O	GPIO17, MISO/MOSI, SDA, I2S_FS, PWM_CH2, DAC
6	D28	I/O	GPIO28, MISO/MOSI, SCL, I2S_BCLK, PWM_CH3
7	D23	I/O	GPIO23, SCLK, I2S_DI, SDA, PWM_CH3, IRTX
8	D25	I/O	GPIO25, MISO/MOSI, SDA, I2S_FS, PWM_CH0
9	D27	I/O	GPIO27, SCLK, SDA, RCLK_O/DI, PWM_CH2
10	D9	I/O	GPIO9, MISO/MOSI, SDA, I2S_FS, PWM_CH4, ADC_CH7
11	D1	I/O	GPIO1, MISO/MOSI, SDA, I2S_FS, PWM_CH1
13	VCC	P	Power, 3.3V
14	D0	I/O	GPIO0, MISO/MOSI, SCL, I2S_BCLK, PWM_CH0
15	D2	I/O	GPIO2, MISO/MOSI, SCL, I2S_DIO, PWM_CH2
16	D7	I/O	USB_DP, SCLK, SDA, PWM_CH2, ADC_CH6
17	D8	I/O	USB_DM, MISO/MOSI, SCL, PWM_CH3, ADC_CH0
18	VUSB	P	USB power
19	EN	I/O	Chip enable; Built-in Pull-up

Size and Layout

Shape for XT-ZB1 can be shown as follows.
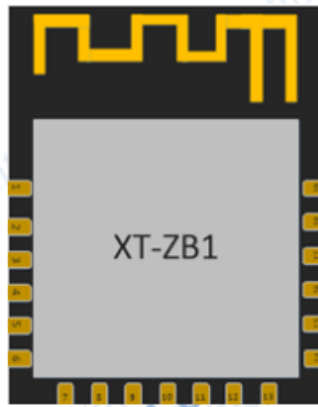
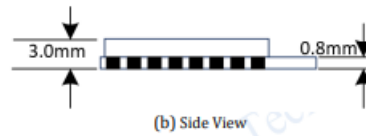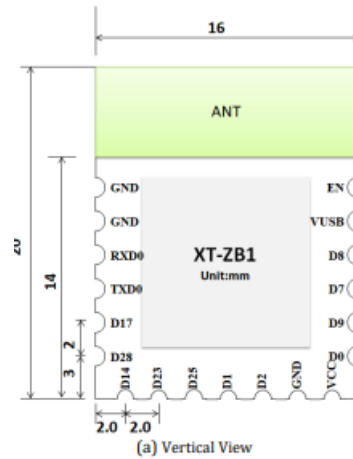Fig.3.1 Shape for XT-ZB1

(a) Vertical View

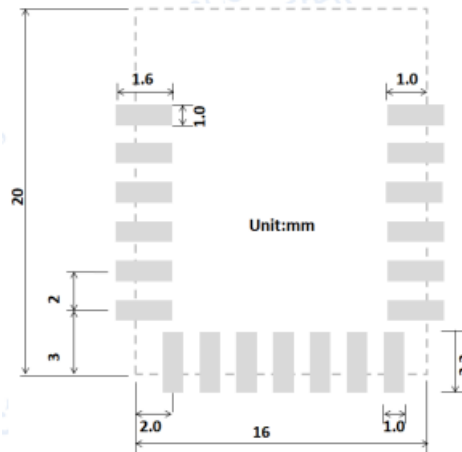(b) Side View

Fig.3.2 Size for XT-ZB1

Fig.3.3 PCB Layout for XT-ZB1

Electrical Characteristics

Table 4.1 Electrical Characteristics

Parameters	Condition	Min	Classical	Max	Unit
Store Temperature	–	-40	Normal	125	°C
Sold Temperature	IPC/JEDEC J-STD-020	–	–	260	°C
Working Voltage	–	2.5	3.3	3.6	V
I/O VIL/VIH	–	-/2.0	–	0.8/-	V
I/O VOL/VOH	–	-/2.4	–	0.4/-	
Electrostatic release quantity (Human model)	TAMB=25°C	–	–	2	KV
Electrostatic release quantity (Human model)	TAMB=25°C	–	–	0.5	KV

Power Consumption

Table 5.1 Power Consumption

Parameters	Min	Classical	Max	Unit
RX only	–	3.5	–	mA
TX 0dbm	–	4.8	–	mA
TX 10dbm	–	17	–	mA
TX 14dbm	–	45	–	mA
Run in RAM @RC32M 144MHz	–	8.44	–	mA
Run in RAM @RC32M 32MHz	–	3.36	–	mA
Run in FLASH @RC32M 144MHz	–	7.72	–	mA
Run in FLASH @RC32M 32MHz	–	3.39	–	mA
Hibernate Mode	–	1.2	–	uA
Shut Down	–	0.1	0	uA

RF Characteristics

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

Table 6.1 RF Characteristics

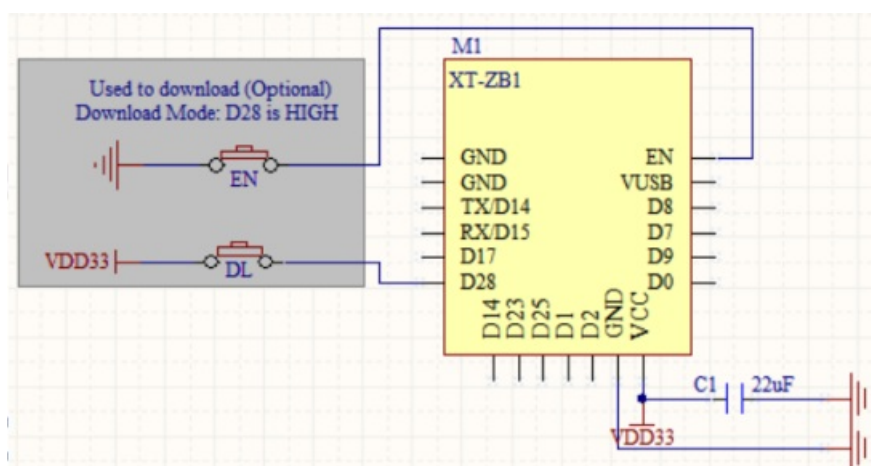| Parameters	Min	Classical	Max	Unite
TX				
TX Power	0	0	14	dBm
TX EVM	–	11	13	%
Sensibility				
Zigbee @250Kbps	–	-104	–	dBm
BLE @125Kbps	–	-104	–	dBm
BLE @500Kbps	–	-100	–	dBm
BLE @1Mbps	–	-97	–	dBm
BLE @2Mbps	–	-94	–	dBm

Recommended Sold Temperature Curve
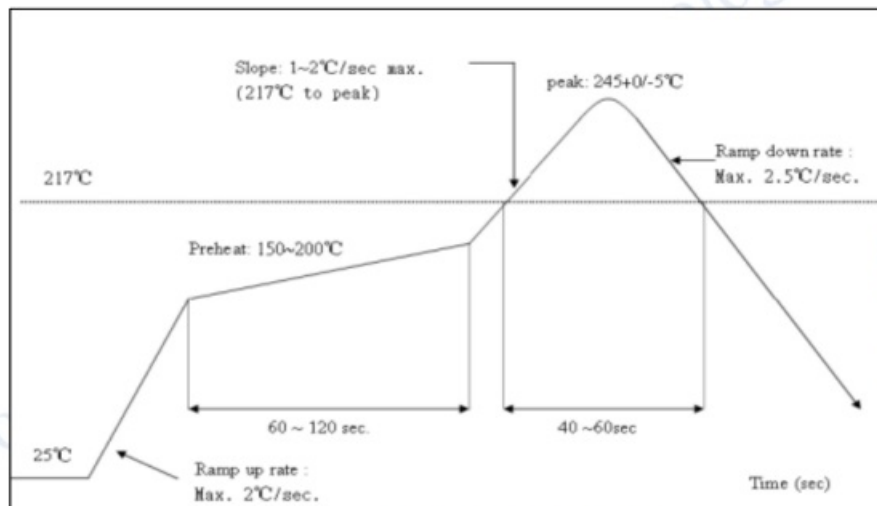
图 7.1 Temperature Curve when Sold

Minimum User System

This module can work just at 3.3V working voltage:

Note

1. The working voltage for module is DC 3.3V;
2. The max current from IO of this module is 12mA;
3. Zigbee module is at download mode: D28 are High level, then module reset to power on;
4. Zigbee module is connected to RXD of the other MCU, and TXD is connected to RXD of the other MCU.

The Recommended PCB Design

- XT-ZB1 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 RF Module with PCB antenna.
- Solution 1: optical solution. The RF 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: sub-optical solution. The RF 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 RF module is placed on the side of the board, and the PCB area under the antenna is empty, and copper cannot be laid.
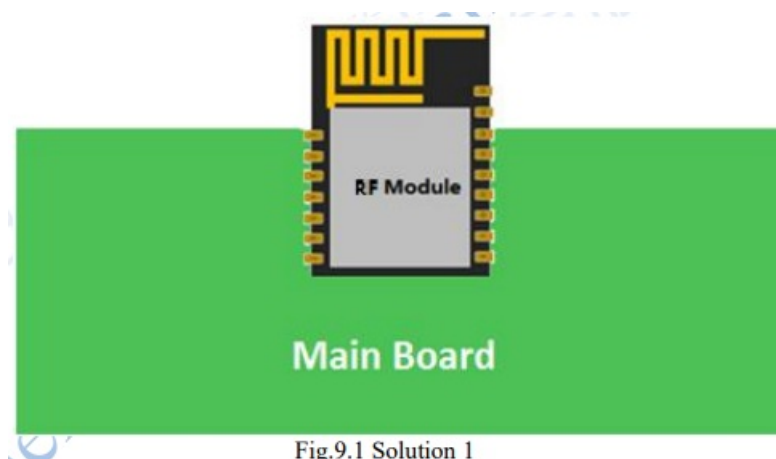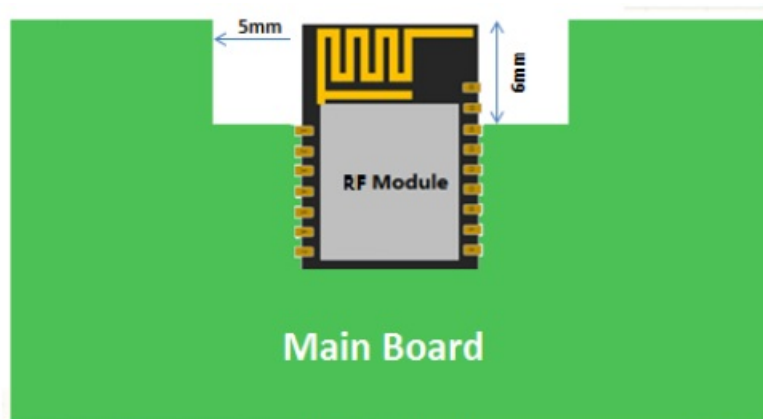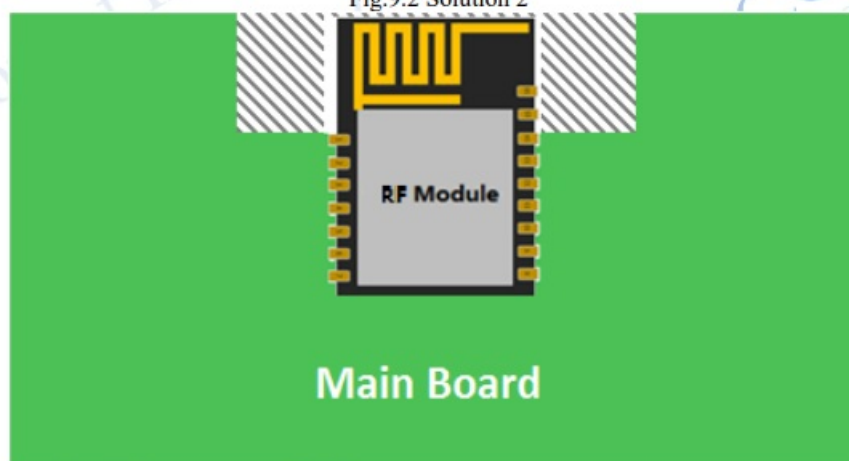
Fig.9.1 Solution 1

Fig.9.2 Solution 2

Fig.9.3 Solution 3

Peripheral Design Suggestion

XT-ZB1 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).

Documents / Resources

[Shenzhen Xiaoteng Technology XT-ZB1 Coexistence Module](#) [pdf] User Manual
XT-ZB1 Zigbee3.0 and BLE5.0 Coexistence Module