

MZ-BT02 V1.0

SPECIFICATION (BT+BLE)

Product model: MZ-BT02

Document number: xxxx

Hardware version: V1.0

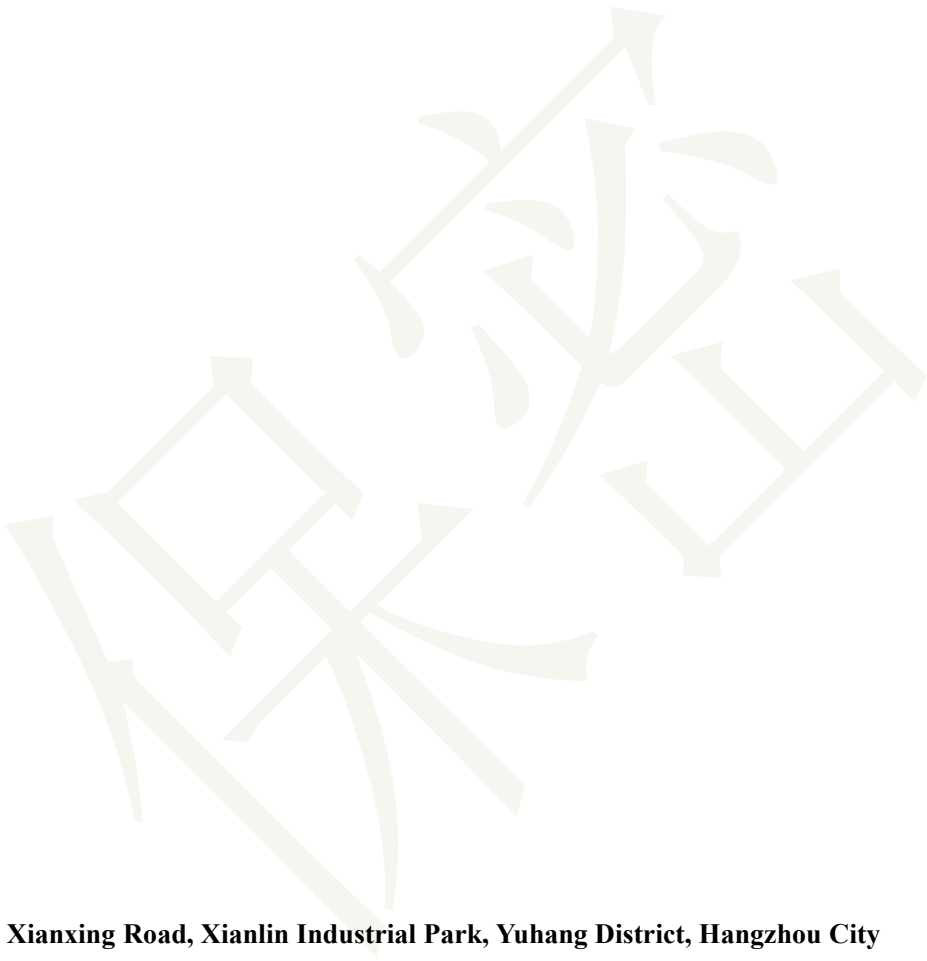
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Change History:

Version	Revision	Date	Revised by Reviewer



Address: No. 32 Xianxing Road, Xianlin Industrial Park, Yuhang District, Hangzhou City

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Summary:

The MZ-BT02 Bluetooth module is an intelligent wireless audio data transmission product independently developed by our company. It is a low-cost and cost-effective stereo wireless transmission solution, and the module

adopts AISPEECH's YT2228 chip QSOP28 packaging design. The MZ-BT02 Bluetooth module adopts a driver free method, and customers only need to connect the module to the application product to quickly achieve wireless music transmission, enjoy the fun of wireless music, and support simple data transmission functions. Support intelligent voice prompts and number reporting functions; Integrated TF card playback function; Integrated mobile USB flash drive playback function; Support internal LINE-IN; Supports internal MIC calls

2 Basic Features:

Working voltage from 2.8V to 4.2V

- Bluetooth 4.2

Support for classic Bluetooth and BLE dual mode

A2DP average 9 mA current

0.8 u deep sleep current

Bluetooth 5.0 Classic Low Energy Consumption

A2DP v1.3, AVRCP v1.6, HFP v1.7, HID v1.1, AVCTP v1.4, AVDTP v1.3, and SPP v1.2

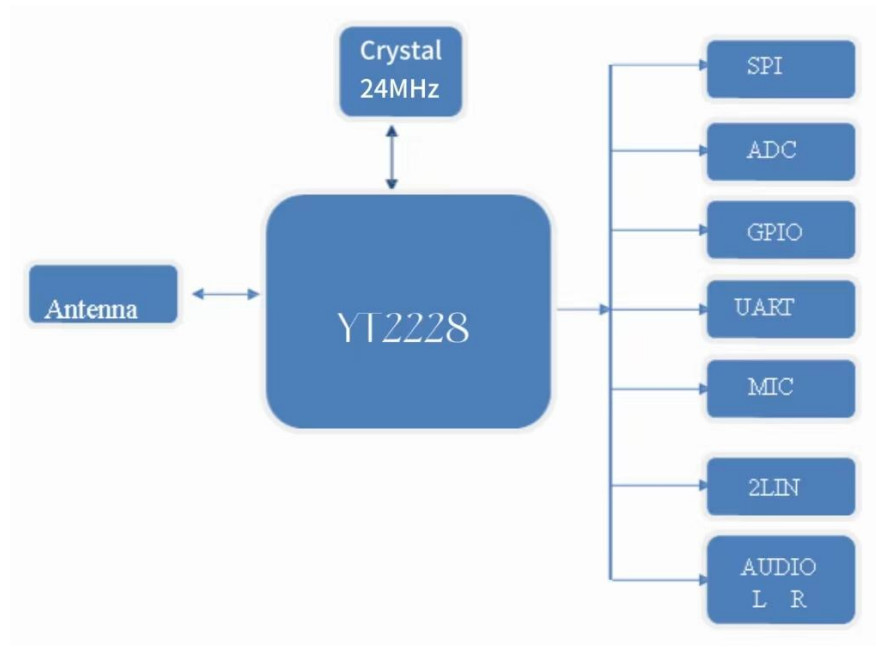
Two wire UART download interface

- 16 bit stereo ADC and DAC
- Stereo input and dual microphone

Five band digital hardware equalizer

True random number generator

1 Module block diagram:



2 performance parameter:

2.1 Module parameters

Module parameters	
wireless standards	Classic Bluetooth and BLE dual mode
working voltage	2.8-4.2V
support agreement	A2DP v1.3, AVRCP v1.6, HFP v1.7, HID v1.1, AVCTP v1.4, AVDTP v1.3, and SPP v1.2, GATT (BLE)
antenna	Internal Antenna
Frequency range	2.402GHz-2.480GHz
Transmitting power	MAX: 8dBm
receiver sensitivity	-88dBm@0.1%BER
Crystal oscillator	24MHZ
operation temperature	-20°C to +80°C
Expansion	UART, GPIO, ADC, PWM, I2C, MIC In/SPK Out
Encryption Type	True random number generator
online upgrade	support
size	13mm (W) x 26.9mm (L) x 2.4mm (H) (Tolerance: ± 0.1 mm)
authentication information	TBC.

2.2 recommended operating conditions

Operation range	Min	Typical	Max	Unit
Operating temperature range	-20	-	+80	° C
Battery (VDD) operation	2.8	+3.6	+4.2	V
AIO input	0	-	+3.0	V

2.3 limit parameter

Operation range	Min	Max	Unit
storage temperature	-40	+125	° C
VDD	-0.3	+4.2	V
Maximum Input Power		10	dBm

2.4 current

parameter	parameter	最小	典型	最大	单位
IVDD	Test conditions		0.4		uA
	deep sleep		4		uA
	Idle-Sniff		300		uA
	Working state (A2DP)		9		mA
	Working state (HFP)		9.5		mA

Note: The above test results are all in a room temperature environment of 25 degrees Celsius, with a 3.3V power supply mode

2.5 Audio indicators

parameter	Test conditions	MIN	typical	MAX	unit
DACout	600ohm load			0.55	Vrms
	16ohm load			0.45	Vrms
DAC out THD	0.55Vrms @600ohm load		75		dB
	0.4Vrms @ 6ohm load		75		dB
DAC Output signal-to-noise ratio	1 kHz sine wave		92		dB
DAC sampling rate		8		48	kHz
ADCSignal to Noise Ratio	1 kHz sine wave		96		dB
ADC sampling rate		8		48	kHz

2.1 RF parameter

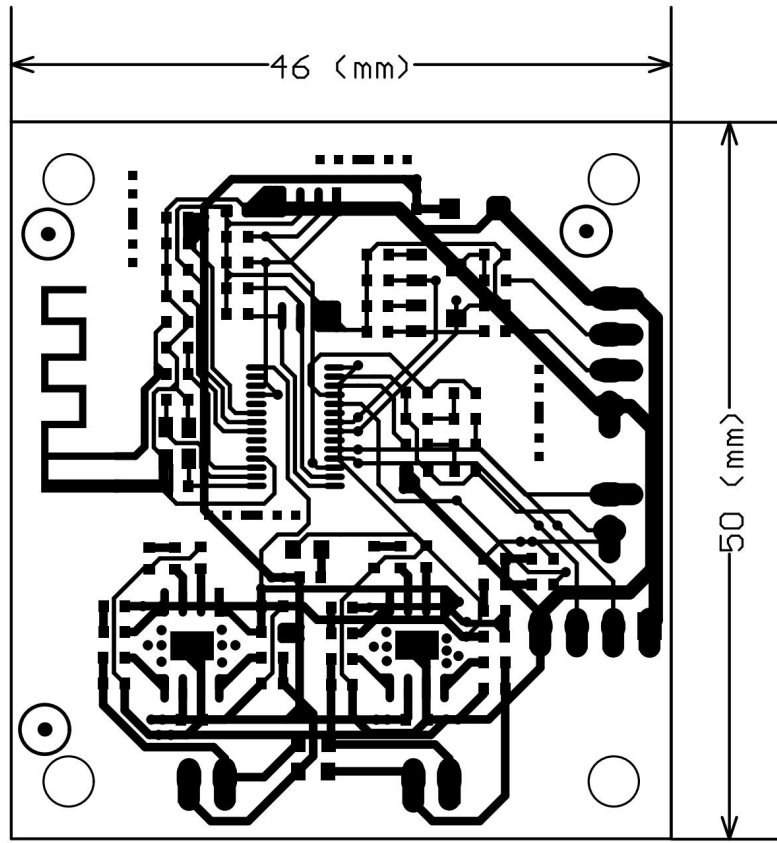
parameter	Test conditions	minimum	typical	MAX	unit
Operating Frequency		2402		2480	MHz
receiver sensitivity @ 1 Mbps	BER=0.001		-88		dBm
receiver sensitivity @ 2 Mbps	BER=0.0001		-91		dBm
receiver sensitivity @ 3 Mbps	BER=0.0001		-83		dBm
Maximum received signal strength	BER=0.001	0			dBm
Maximum transmission signal strength			8		dBm
RF power control range		30			dB

Note: The above test results are all in a room temperature environment of 25 degrees Celsius, with a 3.3V power supply mode

2.7 Static testing

project	condition	parameter	unit
Electrostatic discharge (human body model HBM)	human body model HBM , TAMB=25° C	+/- 2000	V
Electrostatic discharge amount (machine model MM)	machine model HBM , TAMB=25° C	+/-200	V

3 Dimensional drawing of 3 modules:



46mm(W) x 50mm(L) x 1.6mm(H) (Tolerance: $\pm 0.1\text{mm}$)

3.1 Pin Function Description:

1	CN1	Digital I/O	UART1_RXD/UART1_TXD
2	CN4	Digital I/O	MIC
3	CN2	Digital I/O	ISP
4	CN3,CN5	Digital I/O	SPEAKER

4 Circuit connection precautions:

During the use of MZ-BT02, please pay attention to avoiding the impact of interference sources such as power amplifiers, boost circuits, DC/DC circuits, etc. on the module, and avoiding the formation of a series circuit between the module power supply circuit and the high-power circuit unit, in order to improve the overall SNR of the entire machine.

5 Precautions:

A. Regarding the usage environment of wireless Bluetooth, wireless signals, including Bluetooth applications, are greatly affected by the surrounding environment, such as

Obstacles such as trees and metals can absorb wireless signals to a certain extent, thus reducing the distance of data transmission in practical applications

Affected to a certain extent.

B. Due to the fact that all Bluetooth modules need to be paired with existing systems and placed in a shell. Due to the impact of metal casing on wireless radio frequency signals

The number has a shielding effect. So it is recommended not to install it in a metal casing.

C. PCB layout board: The antenna part of the Bluetooth module is a PCB antenna. Due to metal weakening the function of the antenna, it is necessary to

When using a cloth board, it is strictly prohibited to lay or route wires under the module antenna. It would be better if it could be hollowed out.

D. If there are batteries, metal objects, LCD screens, speakers, etc. next to the module antenna, it is required to be at least 15mm away from the antenna (as shown in the

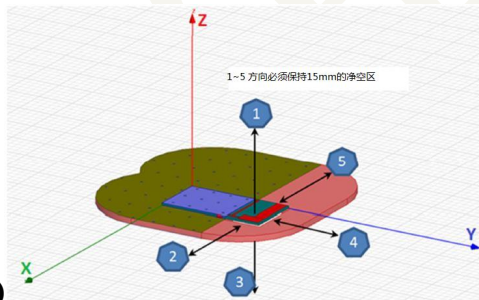


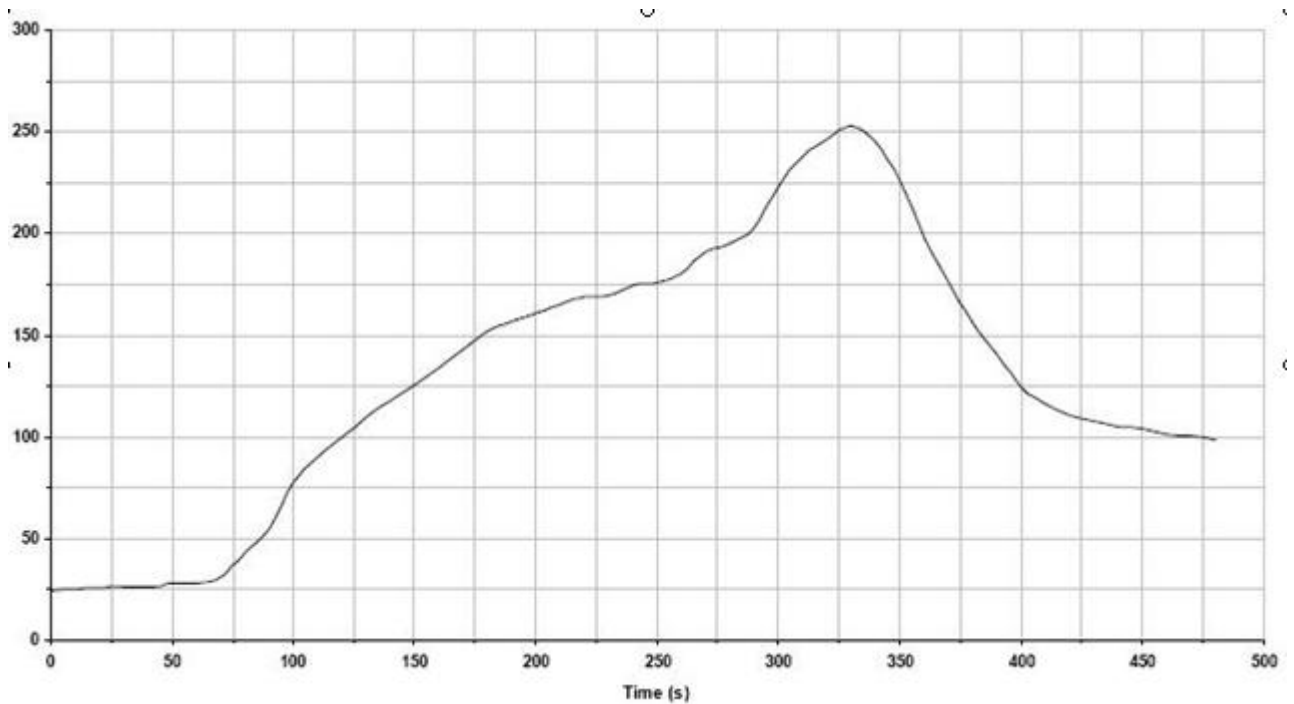
figure)

E. When laying out, it is recommended to use a star shaped power supply line and ensure good linearity of the Bluetooth module power supply. Additionally, the ground of the BT must be separated from the ground of the operational amplifier, power amplifier, MCU, etc., and there should be no other interference ground on the lower side of the BT

F. Do not use control cables, power cables, audio cables, MIC or other interference cables around the antenna

G. If there are rows of seats near the module antenna and metal mesh on the outer shell that affect the signal, it is recommended to choose a professional high gain antenna

4 Recommended reflux temperature:



Key features of the profile:

- Initial Ramp=1-2.5°C/sec to 175°C equilibrium
- Equilibrium time=60 to 80 seconds
- Ramp to Maximum temperature (250°C)=3°C/sec Max
- Time above liquidus temperature(217°C): 45 - 90 seconds
- Device absolute maximum reflow temperature: 250°C

FCC Statement:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01**2.2 List of applicable FCC rules**

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures

Not applicable

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

2.7 Antennas

This radio transmitter MZ-BT02 has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna No.	Operate frequency band	Antenna Type	Maximum antenna gain
Antenna 1	2402MHz~2480MHz	PCB Antenna	-0.25dBi

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID: **2A34L-MZ-BT02** "

2.9 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.