



F-6985 V1.0

Datasheet

(BT+BLE Module)

Model: MZ-BT01

Hardware Version: V2.0

File Version: V1.2

Effective on: 2020-08-08

File include (C-CHIP) confidential documents, without permission, can not be disclosed



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1 Summary:

MZ-BT01 Bluetooth module is an intelligent wireless audio data transmission product developed by C-Chip. It is a low-cost and very effective stereo wireless transmission solution. The module is designed based on BEKEN BK3266 QFN32. The MZ-BT01 Bluetooth module adopts the drive free mode. Customers can easily access to wireless transmission of music, and support data transmission by simply adding the module into their product. It support voice prompt and speech calling-number; It also has integrated TF card playing function; mobile USB flash disk playback function; Support internal line-in; internal mic calls

2 Features:

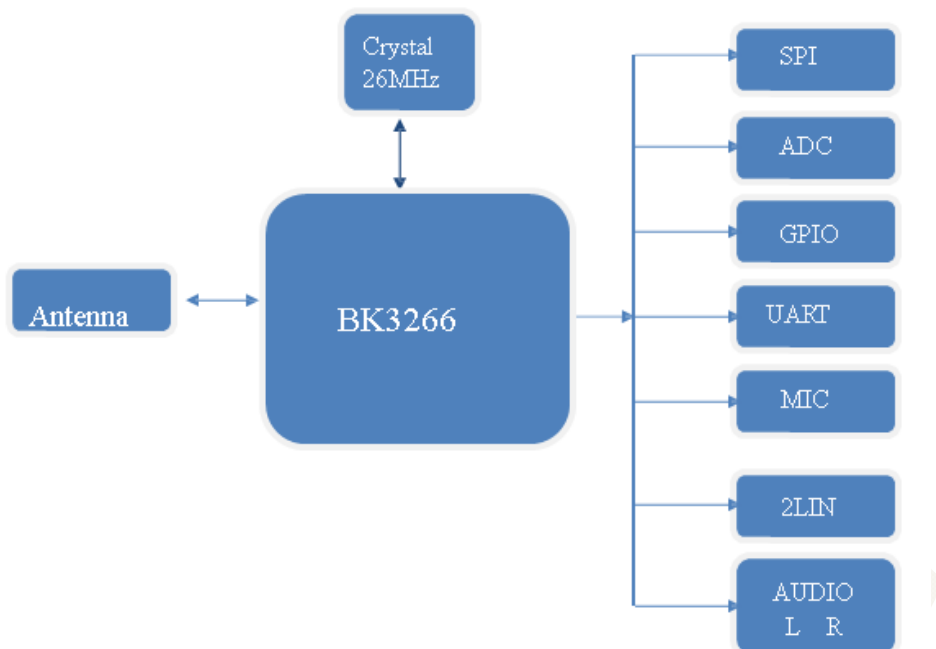
- Operation voltage from 2.8 V to 4.2 V
- 9 mA average current for A2DP
- 300 uA for 500 ms sniff current
- 0.8 uA deep sleep current
- Bluetooth 5.0 classic and low energy
- A2DP v1.3, AVRCP v1.6, HFP v1.7, HID v1.1, AVCTP v1.4, AVDTP v1.3, and SPP v1.2
- True wireless stereo and two active link
- Two wires UART download interface
- 16 bits stereo ADC and DAC
- Stereo line in and dual microphone
- Five bands digital hardware equalizer
- True random number generator

3 Application Field

- Bluetooth stereo speaker
- Bluetooth stereo headset
- Bluetooth control and multimedia hybrid



4 Block diagram:



5 Characteristics:

5.1 Module Characteristics

Characteristics	
Wireless standards	Bluetooth Classic & BLE
Voltage	2.8-4.2V
Protocol	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	Built-in
Frequency range	2.402GHz-2.480GHz
Transmission power	Max: 1.289dBm
Receiving sensitivity	-88dBm@0.1%BER
Crystal	26MHZ
Temperature	-20°C to +80°C
Interfaces	UART, GPIO,ADC,PWM, I2C, MIC In/SPK Out
Encryption type	True random number generator
OTA	Supported
Dimension	13mm(W) x 26.9mm(L) x 2.4mm(H) (Tolerance: ±0.1mm)
Certifications	TBC.



5.2 Recommended Operating Conditions

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

5.3 Absolute Maximum Ratings

Maximum ratings	Min	Max	Unit
Storage temperature	-40	+125	°C
VDD	-0.3	+4.2	V
Maximum input power		10	dBm

5.4 Current

Item	Condition	Min	Typ	Max	Unit
IVDD	Deep sleep		0.4		uA
	Sleep Current		4		uA
	Idle-Sniff		300		uA
	Working condition (A2DP)		9		mA
	Working condition (HFP)		9.5		mA
Note: The measurement above is at 25 degree and 3.3 V battery voltage					

5.5 Audio characteristics

Item	Condition	Min	Typ	Max	Unit
DAC Out	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 out SNR	1 kHz sine wave		92		dB
DAC Sampling rate		8		48	kHz
ADC SNR	1 kHz sine wave		96		dB
ADC Sampling rate		8		48	kHz



5.6 RF characteristics

Item	Condition	Min	Typ	Max	Unit
Working frequency		2402		2480	MHz
Receiving sensitivity @ 1 Mbps	BER=0.001		-88		dBm
Receiving sensitivity @ 2 Mbps	BER=0.0001		-91		dBm
Receiving sensitivity @ 3 Mbps	BER=0.0001		-83		dBm
Max Receiving sensitivity	BER=0.001	0			dBm
Max Transmitting sensitivity			8		dBm

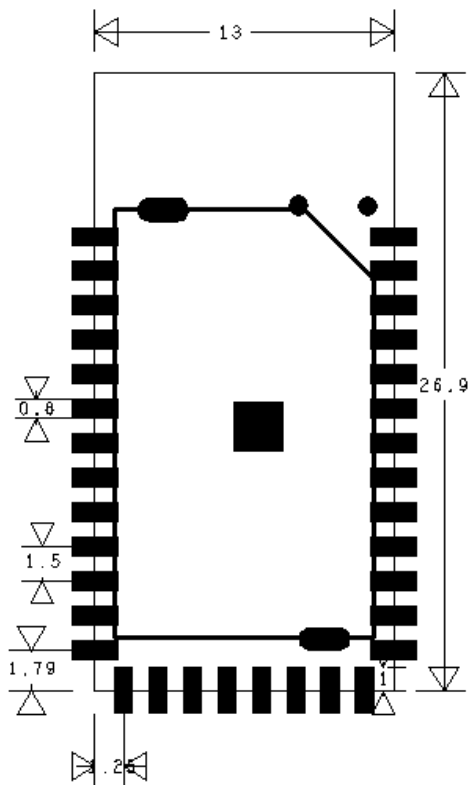
Note: The measurement above is at 25 degree and 3.3 V battery voltage

5.7 ESD Ratings

Item	Condition	Value	Unit
ESD_HBM	Human Body Model, TAMB=25° C	+/- 2000	V
ESD_MM	Man Machine Model, TAMB=25° C	+/-200	V

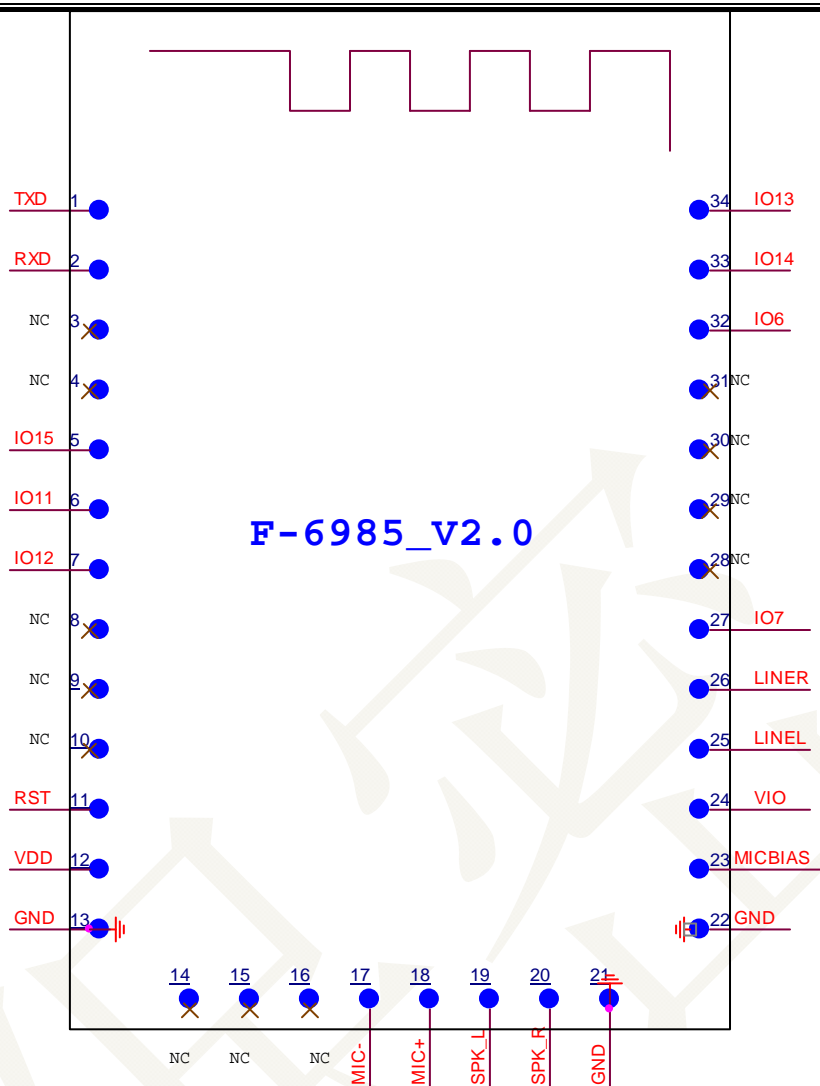


6 Package and Pin Definition:



13mm(W) x 26.9mm(L) x 2.4mm(H) (Tolerance: $\pm 0.1\text{mm}$)

6.1 Pin definition:



6.2 Pin description:

Pin	Name	I/O	Description
1	TXD	Digital I/O	GPIO0/UART1_TXD
2	RXD	Digital I/O	GPIO1/UART1_RXD
3	NC	NC	NC
4	NC	NC	NC
5	IO15	Digital I/O	GPIO15, also as GPIO3, SPI_SCK/ADC2/CLKOUT Soft shut down and wake up (active high)
6	IO11	Digital I/O	GPIO11, JTAG_TCK/PWM2/ADC4/PCM_SYNC/SD_CLK/SPI 2_SCK
7	IO12	Digital I/O	GPIO12, JTAG_TMS/PWM3/PCM_CLK/SD_CMD/SPI2_MOS I
8	NC	NC	NC
9	NC	NC	NC
10	NC	NC	NC
11	RST	Analog	Active low pin reset



12	VDD	Analog	Power, 3 V
13	GND	GND	GND
14	NC	NC	NC
15	NC	NC	NC
16	NC	NC	NC
17	MIC-	Analog	Microphone input negative
18	MIC+	Analog	Microphone input positive
19	SPK_L	Analog	Audio left channel positive
20	SPK_R	Analog	Audio right channel positive
21	GND	GND	GND
22	GND	GND	GND
23	MICBIAS	Analog	Microphone reference voltage
24	VIO	Analog	Power for I/O
25	LINEL	Analog	Line in L
26	LINER	Analog	Line in R
27	IO7	Digital I/O	General purpose IO/PWM5
28	NC	NC	NC
29	NC	NC	NC
30	NC	NC	NC
31	NC	NC	NC
32	IO6	Digital I/O	General purpose IO/PMW4
33	IO14	Digital I/O	General purpose IO/PMW4
34	IO13	Digital I/O	General purpose IO/PWM3

7 Software development note

7.1 Serial TX is P00, RX is P01, Baud rate 9600

7.2 Hardware reset, pin RST, low level activate.

7.3 Serial AT commands

8 AT commands

8.1 The corresponding functions are realized by inputting a specific string to the serial port.

8.2 Table of Commands

Commands	Receiving data	Function description
AT	OK	Test whether serial communication is successfully established with the host computer.
AT+NAME	+NAME=F-6985 OK	Query module name, respond with + name = module name.
AT+NAME=ABC	OK	Change the module name to ABC
AT+NAME=ABC,0	OK	Change the module name to ABC without address suffix.



AT+NAME=ABC,1	OK If address last 4 digits are ab02, then display name change to ABC-ab02	Change the module name to ABC with address suffix.
AT+PLIST	+PLIST{ +PLIST=1,iPhone,fa555334fh46 +PLIST=2,Samsung,fa555334fh46 +PLIST} OK	Query the pairing list. The first byte of the response data is the list order, followed by the name, and the last 12 bytes are the MAC address.
AT+PLIST=0	OK	Clear all pairing records
AT+VER	+VER=BT906,V1.0.0,20200804 OK	Query version number
AT+ADDR	+ADDR=fa58fc256544 OK	Query Mac address
AT+STAT	+STAT=1,1,1,1,1,1 OK	Query module status. The statuses are: +DEVSTAT,+HFPSTAT,+A2DPSTAT ,+AVRCPSTAT,+SPPSTAT,GATTSTAT
AT+REBOOT	OK	Soft reset
AT+BAUD	+BAUD=115200 OK	Query Bode rate
AT+BAUD=9600	OK Effect immediately	Change Bode rate to 9600, 9600 changeable, for example: AT+BAUD=115200
AT+HFPSTAT	+HFPSTAT=3 OK	HFP Status query
AT+HFPDIAL	OK	Last redial
AT+HFPANSW	OK	Answer current call
AT+HFPCHUP	OK	When an incoming call rejects the current call, hang up the current call
AT+MICMUTE	OK +MICMUTE=1	Turn on the mic when the mic is off, turn off the mic when it is on, and turn off the success feedback +MICMUTE=1, +MICMUTE=0
AT+HFPADTS	OK +HFPAUDIO=0	Switch to the module when the voice is on the phone, and switch to the phone when the voice is on the module Switch to module success feedback + hfpaudio = 1, switch to mobile phone success feedback + hfpaudio = 0
AT+AVRCPSTAT	+AVRCPSTAT=3 OK	AVRCP Status query
AT+A2DPSTAT	+A2DPSTAT=4 OK	A2DP Status query
AT+PLAYPAUSE	OK	Pause music when music is playing, and play music when music is paused
AT+STOP	OK	Stop music
AT+FORWARD	OK	Next Song
AT+BACKWARD	OK	Previous Song
AT+VOLUME	+VOLUME=10 OK	Query current volume
AT+VOLUME=+	+VOLUME=11 OK	Volume up
AT+VOLUME=-	+VOLUME=9 OK	Volume down
AT+VOLUME=6	+VOLUME=6 OK	Directly set to the specified volume 6. After '=', set the specified volume for '0' ~ '16'
AT+PLAYSTAT	+PLYASTAT=1	Playback status query



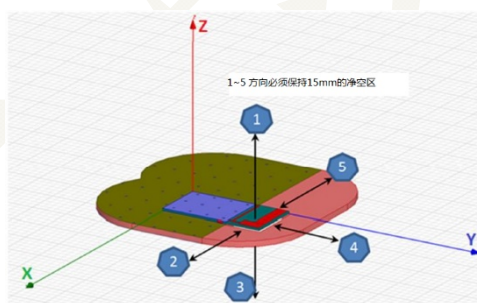
	OK	
AT+A2DPDISC	OK	Disconnect and start pairing
AT+SPPSTAT	+SPPSTAT=3 OK	SPP Status query

9 Circuit connection note:

Please avoid amplifier, booster line, DC/AC circuit disturbance etc., to avoid module power supply loop in series with large power components for higher SNR.

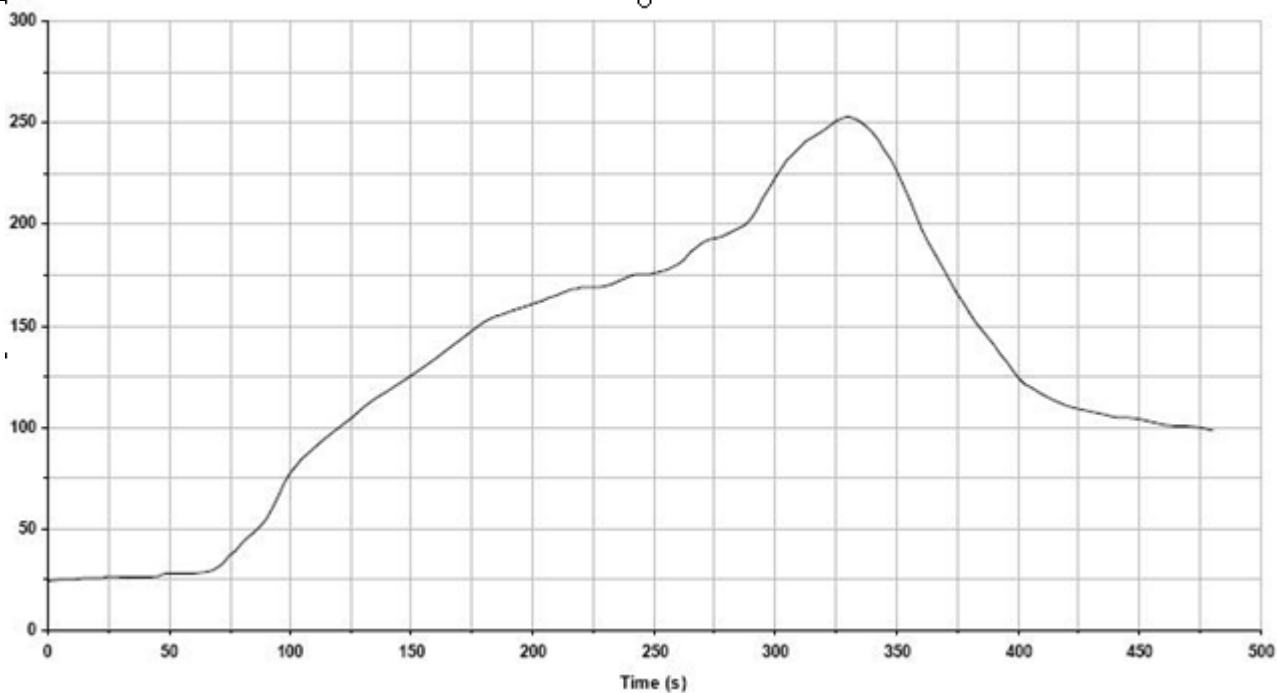
10 Application Note

- A. When using, avoid influence from amplification and voltage booster circuit, DC/DC circuit.
Avoid power supply circuit in series with high-power components for minimum disturbance.
- B. If there are battery, metal, LCD screen, speaker etc. nearby, keep antenna distance for minimum 15mm, as shown below.



- C. PCB layout: Since metal will weaken antenna function, GND and trace shall be avoided under antenna when drawing the PCB (better void below it).
- D. It is recommended that do not put the module in metal shell because of the shielding effect for RF signals.
- E. As for WIFI environment, signal can be easily affected by environmental conditions, such as trees, metal and obstacles can absorb signals which will affect data transmission distance.

11 Recommended Reflow Temperature



Key features of the profile:

- Initial Ramp= $1-2.5^{\circ}\text{C}/\text{sec}$ to 175°C equilibrium
- Equilibrium time=60 to 80 seconds
- Ramp to Maximum temperature (250°C)= $3^{\circ}\text{C}/\text{sec}$ 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.

This equipment should be installed and operated with minimum distance 20cm between the radiator&your body.



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. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

2.7 Antennas

This radio transmitter E70-915T30S 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	0dBi

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-BT01".

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.

THE END!