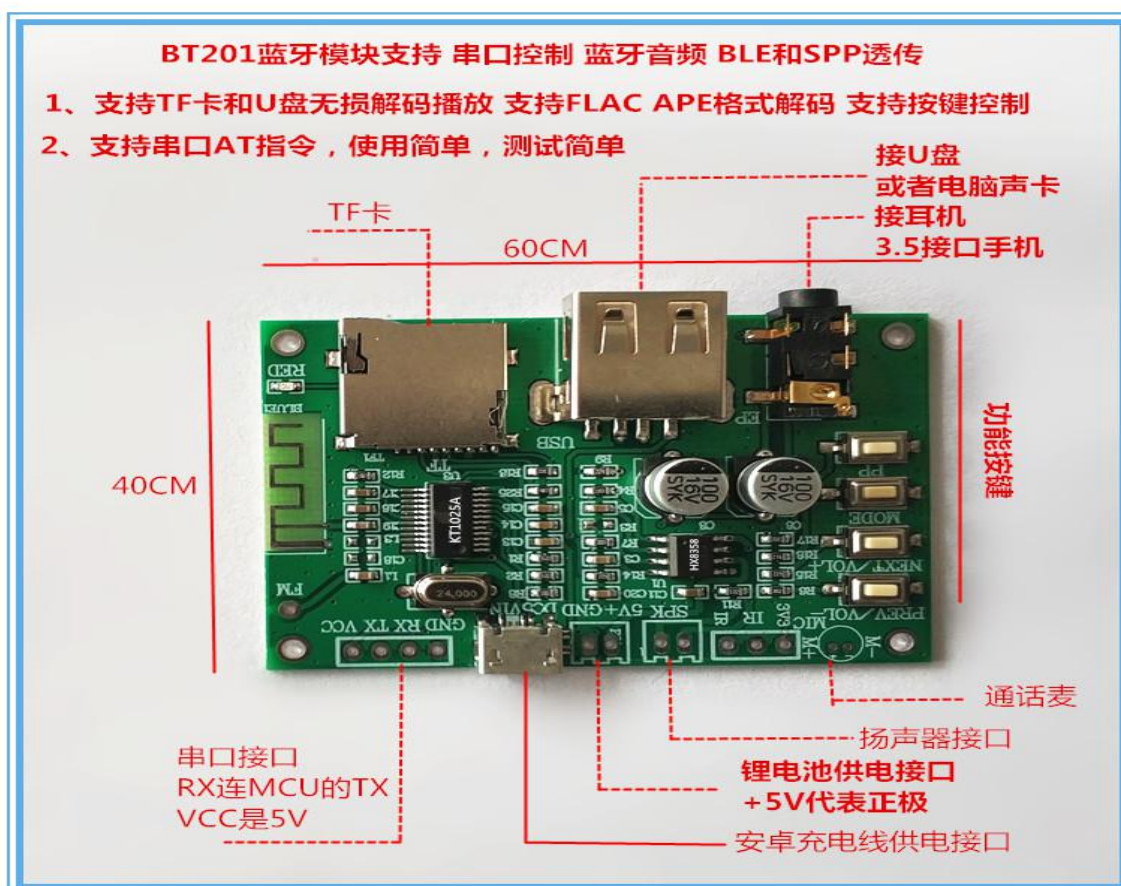


BT201 Module Manual

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Catalog.....	2
1. overview.....	5
1.1 brief introduction.....	5
1.2 Brief Description of Functions and Characteristics - Support for AT Serial Port Instruction Control.....	5
1.3 Professional Terminology Description.....	5
1.4 Product application scenarios.....	6
1.5 A brief description of the function of the module [using serial port control is not necessary to look at].....	6
1.6 Quick Start Description of Modules.....	7
2. Programme description.....	8
2.1 Parameter description.....	8
3. Serial Communication Protocol.....	9
3.1 Communication format.....	9
3.2 Communication instructions.....	10
3.2.1 Common function-related control instructions.....	10
3.2.2 Music-related control instructions.....	11
3.2.3 Bluetooth-related control instructions.....	12
3.2.4 Common function-related query instructions.....	14
3.2.5 Music-related query instructions.....	14
3.2.6 Bluetooth-related query instructions.....	15
4. Detailed Description of Serial Instructions - Public Section.....	17
4.1 Data returned actively by modules.....	17
4.1.1 Data returned by call on chip [QA] [QT] [QM] [QN] [QK] [QG] [Q1].....	17
4.1.2 The chip receives the successful return of serial instructions [OK].....	17
4.1.3 Return of Error Information on Chip [ER].....	18
4.2 Detailed description of the public part - control instructions.....	18
4.2.1 Play volume of specified chip [CA] [CB] [CC] [CD] [CE] [CF].....	18
4.2.2 Pot Rate of Designated Chip [CT].....	19
4.2.3 Designated chip mode [CM].....	19
4.2.4 Setting module silence and DAC closing and opening details [CU] [CS].....	20
4.2.5 Mode Description for Setting Up Automatic Entry on Chip [CP].....	20
4.2.6 Setting the function of chip auto-return data to turn off and turn on [CR].....	20
4.2.7 Set TF Card U Disk Play Once Stop or Sequential Loop Play [CJ].....	21
4.2.8 Recording function - whether to turn on [RE].....	21
4.2.9 Set whether to turn on the prompt [CN].....	21
4.2.10 Setting EQ [CQ] - Audio is not supported for the time being.....	21
4.2.11 Set Bluetooth Auto Switch to Background [CK].....	22
4.2.12 Set whether Bluetooth opens the background [CG].....	22
4.2.13 Set whether the key function is turned off and turned on [C1] [C2] [C3] [C4].....	22
4.3 Detailed description of the public section -- query instructions.....	23
4.3.1 Common status query return instructions [QA] [QT] [QN] [QK].....	23
4.3.2 Queries for working patterns and instructions returned [QM].....	23
5. Detailed description of serial instructions--Music part.....	24
5.1 Detailed description of music-related control instructions.....	24
5.1.1 UData returned after initialization of disk or TF card [M1] [M2] [MT] [MK] [MF].....	24

5.1.2 UInformation returned by disk or TF card after playback [MV] [MD] [MO].....	25
5.1.3 TFCard or U Disk - PC Sound Card - Insert and Pull Back Information [MU].....	25
5.1.4 TFCard or U-Disk Instructions - Some Basic Functions in Common Use [AA].....	25
5.1.5 TFCard or U-Disk Instructions - Song Sequence Play [AB].....	26
5.1.6 TFCard or U-Disk Instructions -- File Folder Loop Play in the specified Path [AF].....	26
5.1.7 TFCard or U-Disk Instructions -- Play a file in the specified path once [AJ].....	27
5.1.8 TFCard or U-Disk Instructions - Specified Play Mode Single All Random [AC].....	27
5.1.9 Recording function - TF card or U disk - simple application [RC].....	27
5.1.10 TFCard or U-Disk Instruction -- File Read Data TXT Read [AR].....	29
5.1.11 TFCard or U disk reads TXT and other formats of file serial port to issue [advanced function].....	30
5.1.12 TFCard or U-Disk Instructions -- Designate Path to Delete Files [AL].....	30
5.1.13 Recording function -- TF card or U disk -- specify folder file name to record [RP] [RB] [RV].....	31
5.2 Detailed description of music-related query instructions.....	32
5.2.1 TF Or the U disk queries the current playing file name [MF].....	32
5.2.2 TF Or the time processing [MT] [MK] of the U disk querying the currently playing file.....	33
6. Detailed description of serial instructions--Bluetooth part.....	34
6.1 Bluetooth Relevance-Control Instruction-Detailed Description.....	34
6.1.1 Set Bluetooth's name and password [BD] [BE] [BM].....	34
6.1.2 Setting up Bluetooth Protocol Function [B1] [B2] [B3].....	34
6.1.3 Enabling Bluetooth bles and EDRs [B4] [B5].....	35
6.1.4 Designated telephone number to call [BT].....	35
6.1.5 Bluetooth Audio Related Control Command [BA].....	35
6.1.6 MAC Settings for Bluetooth--EDR--BLE[BS].....	35
6.2 Detailed description of Bluetooth-related query instructions.....	36
6.2.1 Bluetooth Current Status Return - EDR Simple State [TS].....	36
6.2.2 Bluetooth Current Status Return - BLE Simple State [TL].....	36
6.2.3 Bluetooth Call Number Return [TT]6.2.3 Bluetooth Call Number Return [TT].....	36
7. Detailed description of Bluetooth transmission---BLE.....	38
7.1 BLEThe Legendary Explanation.....	38
7.2 BLEUUID description.....	38
7.3 BLEDemonstration of the effect.....	38
7.4 BLETest instructions.....	38
7.5 BLETest Instruction of Bluetooth Chip for Mobile Terminal Control.....	39
7.6 BLEUUID instructions modified by AT instructions.....	39
7.7 BLETime Interval of Data Pass-through Packets.....	40
7.8 BLEBroadcast Packet Modification Description [UR] [TR].....	40
8. Detailed description of Bluetooth transmission--- SPP.....	41
8.1 SPP The Legendary Explanation.....	41
8.2 SPP Demonstration of transmission effect.....	41
8.3 SPP Transmit test instructions.....	41
9. Module update firmware program and serial port test instructions.....	42
9.1 Description of firmware for module updates.....	42
9.2 Possible doubts or problems in module updates -- unsuccessful updates	42
9.3 Explanation of Module Serial Port Debugging Assistant	43
10. FAQ.....	44
11.The Difference between KT1025A Chip and KT1025B Chip.....	45

12. Referenced Program Example.....	46
13. Notes that need to be modified.....	47
14. BQB Certificate and test instructions for FCC.....	48
14.1 Bluetooth BQB Authentication Instructions.....	48
14.2 Explanation of Bluetooth FCC Frequency Fixing Test.....	48
15. Disclaimer.....	49
16. Version History16. Version History.....	50
17. Qingyue Bluetooth Series Products Recommendation.....	52
17.1 Bluetooth BT201 Bluetooth Scheme.....	53
17.2 Bluetooth BT321F Bluetooth Transmitting Scheme.....	53
17.3 Bluetooth BT301 Bluetooth Audio Scheme.....	54
17.4 Bluetooth BT401 Bluetooth Audio Scheme.....	54

1. overview

1.1 brief introduction

KT1025A The chip is a four-in-one single chip that supports Bluetooth, U disk and TF card. The highlight of the chip is to support non-destructive music playing, simple serial AT control function, BLE transmission and SPP transmission function. It greatly reduces the difficulty of developing embedded Bluetooth in other products.

Remarks:

1. The BT201 module scheme is only a test board. Later shipment we use chips or other modules. The software is completely seamless and compatible.
2. The BT201 module scheme has a very convenient interface to upgrade firmware, which can be seen in Chapter 9. There are also many quick application documents.

1.2 Brief Description of Functions and Characteristics - Support for AT Serial Port Instruction Control

Function partition	Function description
Public function	116-bit Stereo DAC with headphone amplifier, SNR >= 95dB
	2The chip automatically generates the MAC address of Bluetooth without scrolling.
Music function	1Support full decoding of MP3, WAV, WMA, FLAC, AAC, APE formats
	2Supporting 128G U disk and TF card, breakpoint memory and track memory
Bluetooth Functional Characteristics	1Supporting Bluetooth Audio Transfer Connection, Mobile Phone Transfer Music, Supporting Playback pause, Up and Down Switching
	2Supporting Bluetooth Call Function, User Settings Cancellation, Supporting Answering, Hanging, Callback, Rejection and other Functions
	3Bluetooth Version 5.0 supports HFP/A2DP/AVRCP/HSP/GAVDP/IOP/SPP/BLE with a distance of about 10M
	4Class 24 dbM frequency range is 2.4-2.480 G
	5Support BLE transmission function, connect BT201-BLE separately to support SPP transmission function

1.3 Professional Terminology Description

function	Remarks
Public function	It refers to the functions that all modes have, such as adjusting volume, muting, switching mode, resetting, etc.
Music, MUSIC, Equipment	It refers to inserting TF and U disc playback function.
Bluetooth mode	Bluetooth here supports both audio and BLE and SPP data transmission.
BLE	This is a standard protocol for Bluetooth communication, and Bluetooth audio is independent of each other.
SPP	This is also a link of Bluetooth communication protocol, and Bluetooth audio is in the same place.
transparent	It means what the mobile phone sends to Bluetooth, which is sent through serial port,

transmission	and vice versa.
serial port	It refers to the external interface of Bluetooth chip, that is UART interface.
Backstage	This means that when playing music, Bluetooth resources are not released and Bluetooth data communication is still possible.

1.4 Product application scenarios

1. Bluetooth Audio Products	For example: Bluetooth speaker, Bluetooth headset, car Bluetooth, etc.
2. Bluetooth Digital Products	For example: Intelligent door lock, vehicle OBD detection, intelligent car, printer, medical equipment data acquisition
3. Bluetooth Digital and Audio Products	For example: Bluetooth Music Lamp, Bluetooth Broadcasting Note: Require ultra-low power consumption, choose this scheme is not appropriate.

1.5 A brief description of the function of the module [using serial port control is not necessary to look at]

Module Overall Function Description	
Bluetooth Playback Function	Support mobile phone connection module, and play music, about 10 meters away
Playing U Disk and TF Card Function	1. Support playing MP3, WAV, WMA, FLAC, APE format music in the device root directory 2. Insert U disk or TF card, it will play automatically, and it has power-off memory function. 3. Playing on U disk or TF card is the serial number of playback according to the order in which the copies are entered.
Infrared remote control function	Default does not support
Bluetooth Call Function	Default support
Radio function	Not supported, you need to see our BT301 solution
AU X-ray input function	Not supported, you need to see our BT301 solution
headphones	1Module with headphone socket to support plugging in headphones
External speaker function	1Supporting speakers with external 4 ohm 3W or less
Remarks: 1. Module power-on automatically detects whether the U disk or TF card is inserted or not. If it is not inserted automatically into Bluetooth, wait for the phone to connect. 2. Bluetooth name is "BT201-AUDIO" [This is the Bluetooth name of the audio – you need to play music to connect this] 3. Bluetooth name is "BT201-BLE" [This is Bluetooth name of Bluetooth BLE – BLE data connection is required] 4. If you insert U disk or TF card, play U disk or TF card automatically. 5. If you insert a U disk or TF card, you need to switch through the mode button.	

6. The module has its own indicator. It is flash when entering Bluetooth. The connection success is always bright and the playback is slow flash.

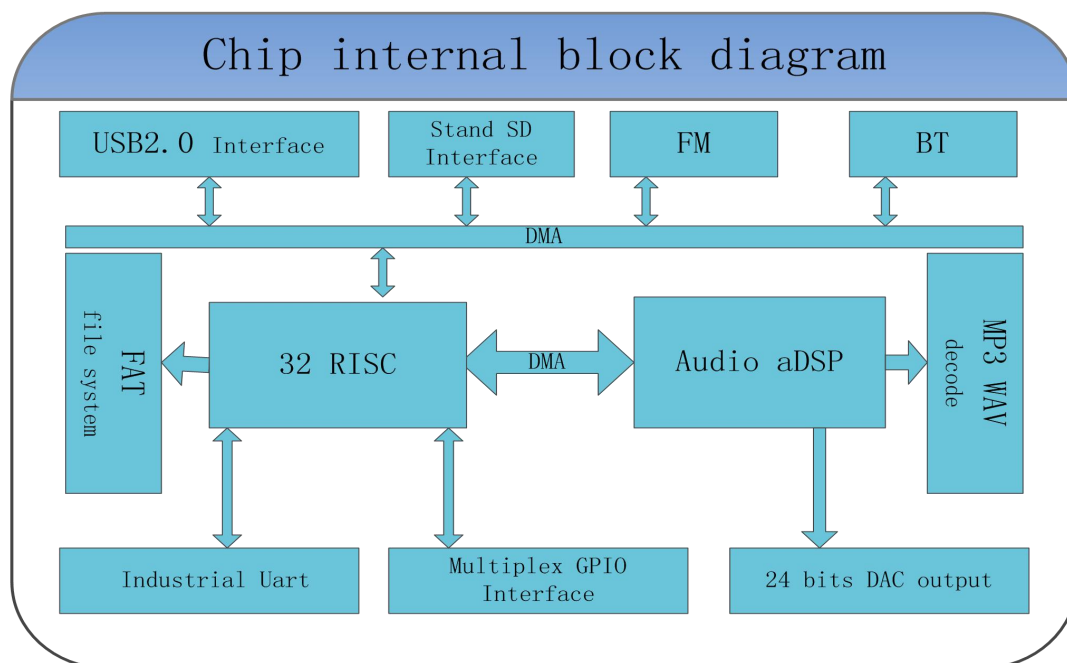
Key Function Description			
Key serial number	Short press	Long press	Hold on for a long time
PREV/V-	Last song		Volume -
NEXT/V+	Next song		Volume +
MODE -- Switching Mode	Switching Bluetooth and U-disk TF Cards		
PP -- Play pause	Play pause		

1.6 Quick Start Description of Modules

If only the ordinary function is a simple Bluetooth player, then the superfluous function can be ignored directly. What we do is fully compatible.

Video link: <https://v.qq.com/x/page/h0767kjh6z.html>

2. Programme description



The chip chooses SOC scheme, integrates a 32-bit MCU and an aDSP specially for audio decoding. Hard decoding is adopted to ensure the stability and sound quality of the system. Smaller package size is more suitable for embedding other products.

2.1 Parameter description

Name	parameter
MP3 file format	1Supporting all bit rates 11172-3 and IS013813-3 layer3 audio decoding
	2Sampling rate support (KHZ): 8/11.025/12/16/22.05/24/32/44.1/48
	3Support Normal, Jazz, Classic, Pop, Rock and other sound effects
USB interface	2.0standard
UART interface	Standard serial port, TTL level, baud rate can be set. Connecting PC requires level conversion [e.g. CH340G-USB to TTL]
input voltage	3.3V-5V [7805 rear cascade with one diode is the best]
Rated current	20mA[static]
Low Power Current	<200uA
Modular power amplifier power	Driving 4 ohm 3W horn, using HX8358 chip [5W digital power amplifier]
Chip DAC Driver	The main chip DAC can only drive headphones.

working temperature	[-40 degrees] - [80 degrees]
humidity	5% ~ 95%
Main Chip Model	[KT1025A-QSSOP24 Stereo] [KT1025B-Mono]

3. Serial Communication Protocol3. Serial Communication Protocol

As a common communication in the field of control, AT serial instructions are optimized and customized, which greatly simplifies the user's difficulty. Please operate strictly according to the instruction format we give.

3.1 Communication format

Supporting asynchronous serial communication mode, receiving command communication standard sent by PC through serial port: data bit:8115200 BPS - Users can set instructions through serial ports as detailed in 4.2.2 Stop bit: 1 check bit: none flow control: none Note: All instructions are designed regularly, not randomly divided, you can find the rules below.	
Control Instruction Format: AT+<CMD>[<param>]rn - - All characters, not hexadecimal numbers Data feedback format: <IND>[<param>]rn	
Data feedback format: <IND>[<param>]rn	
Data characteristics	Detailed description
AT+	The control command is the control command given to BT201 by the control host, starting with "AT+"
<CMD>	It is followed by < CMD > control, usually two characters. instructions
[<param>]	If there are parameters behind the CMD, follow closely[<param>]
\r\n	Finally, end with "r\n", character type is newline, windows is the return key.Hexadecimal is 0x0D, 0x0A
<IND>	1. Data Feedback < IND > as the BeginningIt's Bluetooth that feeds back state and data information to the host."IND" means feedback. The < param > parameters are transmitted immediately after < IND >.
	2The parameters returned by BT201 are followed by

Here <CMD> highlights:

Because the chip is a running system, the main program is divided as follows:

Function partition	command	Remarks
--------------------	---------	---------

Common Instruction Characteristics	AT+C?	Common instructions begin with AT + C, followed by "?" It is the detailed function command.
Musical Instruction Characteristics	AT+A?	Music instructions begin with AT + A, followed by "?" It is the detailed function command.
Bluetooth instruction characteristics	AT+B?	Bluetooth instructions begin with AT + B, followed by "?" It is the detailed function command.

Here <CMD> highlights:

Because the chip is a running system, the main program is divided as follows:

Give an example	command	Remarks
Control instruction 1	AT+CB\r\n	Delegate playback pause
Control instruction 2	AT+CA20\r\n	Representatives set the volume to level 20
Result 1 returned by the query	QA+01	See 4.4.1 for details. The query information returned by 4.4.1 is always Qn+xx, where n corresponds to the previous one.
Result 2 returned by the query	QG+01	See 4.2.12 for details.

3.2 Communication instructions

Our communication is divided into the following two parts

- Control and reference instructions – see 3.2.1 and 3.2.2 and 3.2.3
- Query instructions and reference instructions – see 3.2.4 and 3.2.5 and 3.2.6

3.2.1 Common function-related control instructions

Common Section – Control Instruction – Description		
CMD	Corresponding functions	Detailed description
AT+CA	Specified volume	There are parameters behind. See 4.2.1 for details.
AT+CB	Play pause	See 4.2.1 for details.
AT+CC	Next song	See 4.2.1 for details.
AT+CD	Last song	See 4.2.1 for details.
AT+CE	Volume +	See 4.2.1 for details.
AT+CF	Volume –	See 4.2.1 for details.

AT+CT	set baud rate	There are parameters later, see 4.2.2 for details.
AT+CM	Setup mode	There are parameters later, see 4.2.3 for details.
AT+CU	Set mute	There are parameters later, see 4.2.4 for details.
AT+CS	Setting DAC High Resistance	There are parameters later, see 4.2.4 for details.
AT+CZ	Chip reset	Soft Reset of Chip
AT+CW	Chip Recovery Exit Settings	Restore factory settings and clear all previously remembered parameters
AT+CP	Power on mode	There are parameters later, see 4.2.5 for details.
AT+CR	Automatic Return Function	The key parameters of the chip will be returned automatically. Here it can be turned off. See 4.2.6 for details.
AT+CJ	Mono Trigger Play	See 4.2.7 for details.
AT+CN	Set the prompt tone	See 4.2.9 for details.
AT+CQ	Setting Play EQ	See 4.2.10 for details.
AT+CK	Setting Bluetooth Switching Background	See 4.2.11 for details.
AT+C1	Set the button function to close	See 4.2.13 for details.
AT+C2	Chip Actively Returns Data	See 4.2.14 for details.
AT+C3	Retain	See 4.2.15 for details.
AT+C4	Whether Bluetooth Calls Back	See 4.2.16 for details.

Common part - control instructions - Examples	
CMD	Detailed description
AT+CA30\r\n	Set the volume to level 30
AT+CB\r\n	Pause when playing and play when pausing
AT+CC\r\n	Next song
AT+CD\r\n	Last song
AT+CE\r\n	Volume +, add to level 30 and it won't move.
AT+CF\r\n	Volume -
AT+CM00\r\n	Switch mode, next mode, see 4.2.3 for details
AT+CZ\r\n	Chip reset
AT+CW\r\n	Chip Recovery Default Parameters
AT+CR00\r\n	Turn off auto-return function
AT+CJ01\r\n	Set to single trigger play

3.2.2 Music-related control instructions

Music - related control instructions - Instructions		
CMD	Corresponding functions	Detailed description
AT+AA	Setting Play Mode	There are parameters behind. See 5.1.4 for details.

AT+AB	Specify physical sequential playback	See 5.1.5 for details.
AT+AC	Specify playback mode	See 5.1.6 for details.
AT+AD	Specified Play Device	undetermined
AT+AE	Specifies the EQ to play	To be determined – not supported
AT+AS	Specify the speed of playback	To be determined – not supported
AT+AF	Specify folder to play circularly	See 5.1.6 for details.
AT+AJ	Specify folder file name to play once	See 5.1.7 for details.
AT+AR	Specify a file to read data -- read TXT	See 5.1.10 for details.
AT+AL	Specify a path to delete files	See 5.1.12 for details.

Music – Related Control Instructions – Examples	
CMD	Detailed description
AT+AA00\r\n	stop playing
AT+AB01\r\n	First Play of Specifying Physical Number
AT+AC01\r\n	Specify Mono Loop Play Mode
AT+AF/USB_UPDA/*???r\n	Specify "USB_UPDA" folder for circular playback
AT+AJ/02*/0111_11??? r n	Specify the "011_11" file under the "02xxx" folder to stop playing once
AT+AR/02*/011*??? r n	Specify that the "011xxx" file under the "02xxx" folder is read and sent through the serial port
AT+AL/02*/011*??? r n	Specify "011xxxx" file deletion under "02xxx" folder

3.2.3 Bluetooth-related control instructions

Bluetooth – related control instructions – Instructions		
CMD	Corresponding functions	Detailed description
AT+BA	Bluetooth control related commands	See 6.1.5 for details.
AT+BD	Setting EDR Bluetooth Name	Here EDR refers to Bluetooth audio and SPP. There are parameters later, see 6.1.2 for details.
AT+BE	Setting EDR Connection Password	There are parameters later, see 6.1.3 for details.
AT+BM	Setting BLE Bluetooth Name	BLE here means "low power Bluetooth"
AT+BN	Setting BLE Connection Password	
AT+BS	Setting the MAC	See 6.1.6 for details. BLE address does not need to be set, and

	address of EDR	it is automatically generated on the basis of EDR.
AT+B1	Simple Password Settings	Only 00 or 01, 00 stands for closing, 01 stands for opening.
AT+B2	call settings	Ditto
AT+B3	Bluetooth Audio Settings	Ditto
AT+B4	Control the opening and closing of BLE	See 6.1.3 for details.
AT+B5	Control EDR's Open and Close	
AT+BT	Designated Number Dialing	See 6.1.3 for details.
AT+U0	Specify service UUID	For details, see 7.6
AT+U1	Specified signature 1	
AT+U2	Specified signature 2	
AT+U3	Specified signature 3	

Bluetooth – Related Control Instructions – Examples	
CMD	Detailed description
AT+BAxx\r\n	See 6.1.5 for details.
AT+BD1234[r]\n	Here is the Bluetooth name "1234" for setting EDR.
AT+BE5432rn	Here set the connection password of EDR to "5432"
AT+BM2345rn	Here is the Bluetooth name for BLE "2345"
AT+B100\r\n	This 00 stands for 0x00, closing the paired password, that is, the next connection does not require a password to connect directly.
AT+B201\r\n	This 01 stands for 0x01, for opening Bluetooth calls, and if it's 00, it's turning off Bluetooth calls.
AT+B300\r\n	This 00 stands for 0x00, it stands for turning off Bluetooth audio, that is, the connection is successful, it can't play music, and vice versa.
AT+B400\r\n	This 00 represents 0x00, which means to close ble 01 and turn it on. See 6.1.3 for details
AT+B501\r\n	This 01 stands for 0x01, which means to turn on EDR and turn off otherwise. See 6.1.3 for details
AT+BT10086\r\n	Specify the phone number "10086"
AT+U0F000\r\n	Specify service UUID as F000
AT+U1F001\r\n	Specify signature 1 as F001
AT+U2F002\r\n	Specify signature 2 as F002
AT+U3F003\r\n	Specify signature 3 as F003

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3.2.4 Common function-related query instructions

Public Section - Query Instruction - Description		
CMD	Corresponding functions	Detailed description
AT+QA	Query volume	See 4.3.1 for details.
AT+QT	Query Baud Rate	See 4.3.2 for details.
AT+QM	Query working mode	See 4.3.3 [0: Bluetooth] [1: MP3 for details. If you need to know the device, query the device AT+MD]
AT+QN	Query for prompt sound	See 4.3.4 for details.

Public Section - Query Instructions - Examples	
CMD	Detailed description
AT+QA\r\n	The chip returns "QA+30r\n", representing the volume returned to the host at 30.
AT+QT\r\n	The chip returns "QT + 03 r n", representing a return baud rate of 38400.
AT+QM\r\n	The chip will return "QM+01r\n", representing the return mode of operation as "Play U disk or TF card"
AT+QN\r\n	The chip returns "QN+01r\n", representing the chip with a prompt sound.

3.2.5 Music-related query instructions

Music section - inquiry instructions - Instructions		
CMD	Corresponding functions	Detailed description
AT+M1	Play file physical number WULIXUHAO WULIXUHAO of current device	
AT+M2	Total number of files for current devices	
AT+MC	Current playback mode	When singles or loops or folder loops and so on
AT+MD	Current playback device	Udisk or TF card
AT+MF	Long File Name of Currently Played Files	See 5.2.1 for details.
AT+MP	Current playing status	
AT+MT	Total time for current file playback	

AT+MK	Time when the current file has been played	
AT+MV	Current on-line equipment	See 5.1.2 for details.
AT+MO	Data returned after the current playback	This is the active return of the chip, no query is needed. See 5.1.2 for details.
AT+MU	Insert and unplug device messages	See 5.1.3 for details.

Music Part – Query Instructions – Examples		
CMD	Detailed description	
AT+M1\r\n	The chip returns "M1+000002\r\n", which indicates that the physical number of the file being played is 2.	
AT+M2\r\n	The chip will return "M2+000010\\\r\n", representing the total number of files returned to the current device.	
AT+MD\r\n	The chip will return "MD+01rn", which means that the U disk is currently playing.	
AT+MF\r\n	The chip returns "MF+/Andy Lau~1MP3" which represents the name of the short music file currently playing.	
AT+MP\r\n	The chip will return to its current state, stop [0], play [1], pause [2]	
AT+MT\r\n	The chip returns the total time of the currently playing file	
AT+MK\r\n	The chip will return the time that is currently playing.	

3.2.6 Bluetooth-related query instructions

Bluetooth Part--Query Instruction--Explanation		
CMD	Corresponding functions	Detailed description
AT+TE	Bluetooth Query--Query Password	
AT+TD	Bluetooth Query--Query Name--EDR	
AT+TA	Bluetooth Query--Query Address--EDR	
AT+TM	Bluetooth Query--Query Name--BLE	
AT+TB	Bluetooth Query--Query Address--BLE	
AT+TI	Bluetooth Query - Query whether to connect IOS	undetermined
AT+TS	Bluetooth Query -- Query Current Status	
AT+TT	Look up the number of the call	See for details
AT+T1	Bluetooth Query - Query for Simple Password	The default is to enter the password "0000"

AT+T2	Bluetooth Query – Query if there is a call	The default is hfp, or Bluetooth calls.
AT+T3	Bluetooth Query – Query whether to bring A2DP	The default is a2dp, or Bluetooth audio
AT+T4	Bluetooth Query – Query whether to bring ble	To be determined, the default is with ble functionality
AT+T5	Bluetooth Query – Query with EDR	To be determined, the default is EDR
AT+T6	Query Service UUID	For details, see 7.6
AT+T7	Query signature 1	
AT+T8	Query signature 2	
AT+T9	Query signature 3	

Bluetooth Part--Query Instructions--Examples	
Return instructions from aircraft	Detailed description
TE+0000	Return the password of the current Bluetooth connection to "0000"
TD+BT201-AUDIO	Returns the name of the current Bluetooth EDR as "BT201-AUDIO"
TA+9EE884AB8BCC	Returns the MAC address of the current Bluetooth EDR as "9E E8 84 AB 8B CC" totaling 6 bytes
TM+BT201_BLE	Returns the name of the current Bluetooth BLE as "BT201-AUDIO"
TB+9EE884AB8BCD	Returns the MAC address of the current Bluetooth BLE as "9E E8 84 AB 8B CC" totaling 6 bytes
TS+01	This status indicates that Bluetooth is currently connected successfully, but no music has been played yet.
T1+01	Represents the default need to enter a password of "0000"
T2+01	Representative Chip Supports HFP
T3+01	Delegate chip support A2DP
T4+01	Support for BLE on behalf of chip
T5+01	Delegate chip supports EDR
TT+13510250437	The current number is 1351050437.

4. Detailed Description of Serial Instructions – Public Section

4.1 Data returned actively by modules

The chip will return data in key places. Users can control the working status of the chip

On-chip Initialization Successful Data	See 4.4.1 for details.
The chip successfully receives the ACK returned from the instruction (response)	See 4.4.2 for details.
Error message return	See 4.4.3 for details.

4.1.1 Data returned by call on chip [QA] [QT] [QM] [QN] [QK] [QG] [Q1]

AT+VER2.3-20190517	This represents the firmware version and the last update date. Because you want to add functionality and bug fixes, it changes
QA+30\r\n	The volume returned by power on the chip is level 30. See 4.2.1 for details.
QM+00\r\n	The "Bluetooth mode" when the power returns to the mode on the chip is detailed in 4.2.3.
QN+01\r\n	On-chip default start prompt sounds, such as Bluetooth status prompt sounds, see 4.2.9 for details.
QK+01\r\n	The chip supports non-Bluetooth state. Bluetooth audio is automatically switched to Bluetooth. See 4.2.11 for details.
QG+01\r\n	The default chip is to turn on Bluetooth backstage, see 4.2.12 for details.
Q1+01\r\n	The default function of the chip is to turn on the AD button. See 4.2.13 for details.
.....	Others are recording, and some information about Bluetooth. The answer can be found in the chapters of the Bluetooth section.

1The above parameters are the active return of power on the chip to let the user know that the initialization of the chip is successful. The above data chip only returns once when power on.

2The user sends control instructions. It's better to wait until the above instructions are received before starting.

4.1.2 The chip receives the successful return of serial instructions [OK]

OK\r\n	Chip Receives Instructions and Returns to Host—Only Compete to Send Control Instructions to Host
--------	--

1This data is only the response that the chip returns to the host, usually the response that the host sends control instructions, but the query instructions will not be returned.

3If a query instruction is sent by the host, the result of the query is returned. The host sends control instructions and responds with "OK"

4.1.3 Return of Error Information on Chip [ER]

ER+1\r\n	The received data frame is not correct
ER+2\r\n	The received command does not exist, that is, the AT + KK string you sent can not be found.
ER+3\r\n	When recording, the device is not online, or other errors
ER+4\r\n	The instructions sent are out of range, or the format of the instructions is incorrect.
ER+5\r\n	Specify the device [TF or U disk], and the device is not online or abnormal
ER+6\r\n	Specify the path of the device [TF or U disk], and the path does not have a return error
ER+7\r\n	undetermined
ER+8\r\n	undetermined

Real-time feedback will be given to some wrong states within the chip. For details, please refer to the table above.

4.2 Detailed description of the public part - control instructions

Following is a detailed description of some possible misunderstandings about public functions. Public functions refer to the parts that each task will be processed at the same time. Priority within the chip is the highest.

4.2.1 Play volume of specified chip [CA] [CB] [CC] [CD] [CE] [CF]

AT+CA30\r\n	The specified volume is 30
AT+CA15\r\n	Designated Volume 15
AT+CB\r\n	No parameters are required later. This command is to play and pause. Bluetooth Connection Successful and Invalid
AT+CC\r\n	No parameters are required later. Function is the next song. Bluetooth Connection Successful and Invalid
AT+CD\r\n	No parameters are required later. Function is the last song. Bluetooth Connection Successful and Invalid
AT+CE\r\n	No parameters are required later. The function is volume + [attention max. 30]. Any state is valid
AT+CF\r\n	No parameters are required later. The function is volume - [attention minimum 0]. Any state is valid

1The maximum volume of the system is 30, and the minimum is 0. The chip will automatically memorize when power fails.

2Each mode has the same volume, that is to say, the volume is the volume of the whole system, not the volume of a single mode.

3Users have two choices, they can use the volume + [CE] and the volume - [CF] directives directly, or they can specify the volume [CA] by themselves.

4CB instruction is only valid in Bluetooth connection or in TF card U disk playing mode. Bluetooth failed to connect successfully, sending this instruction is invalid

In Bluetooth music, if the phone does not turn on the player, sending this instruction may also be effective.

4.2.2 Pot Rate of Designated Chip [CT]

AT+CT01\r\n	Baud rate 9600	AT+CT04\r\n	Baud rate 57600
AT+CT02\r\n	Baud rate 19200	AT+CT05\r\n	Baud rate 115200
AT+CT03\r\n	Baud rate 38400	AT+CT06\r\n	Baud rate 256000

1. Once the baud rate is set, the chip will remember. Next time you turn on, the baud rate becomes what you set it to be.
2. After setting the baud rate, please wait for 1 second, then send the reset command, or restart the power, and re-initialize the serial port settings of the chip.
3. If you want to restore the default baud rate, please send the command to restore the factory settings.
4. At this time, the chip will automatically erase all configurations.
5. Because the main frequency of our chip is very high, so try to set the baud rate of the serial port as high as possible, the higher the better.
6. Baud rate is low, when playing music, sending instructions, there will be silk noise, because the serial port interrupts the interruption of understanding code.

4.2.3 Designated chip mode [CM]

AT+CM00\r\n	Switch to the next mode of operation
AT+CM01\r\n	Specify working mode as Bluetooth
AT+CM02\r\n	Specify the mode of operation as "U disk" play, if the U disk is not online, it will return error information, and do not process.
AT+CM03\r\n	Specify the mode of operation as "TF Card" playback, ibid.
AT+CM04\r\n	Specify working mode as music mode for scenarios with only one device
AT+CM05\r\n	Specify working mode as voiceover input AUX, this version is retained
AT+CM07\r\n	The specified mode of operation is "sound card", which is the audio played by the computer connected to the USB chip, and the TF card can be copied at the same time.
AT+CM08\r\n	Specify that the chip goes into idle mode, releases all resources, and is in a waiting state

1. If no mode exists, please do not switch to this mode. After switching modes, we also need to see if the mode is successfully switched. This is based on the return data given by each mode. This is described earlier.
2. Since the internal processing of U disk and TF card is under one task, the switching between them is relatively troublesome. If you only use one of the U disk or SD card, you are advised to use the command AT+CM4\r\n.
3. After switching to AUX, there are only two choices: silence and playback. Refer to "AT + CB" or "AT + CU [4.2.4]. The mute of AUX is actually set to 0 – the current version does not have this function due to lack of IO, so you can see the scheme of BT301.

4.2.4 Setting module silence and DAC closing and opening details [CU] [CS]

AT+CU00\r\n	un-mute
AT+CU01\r\n	Mute
AT+CU02\r\n	If it is silent at present, it will be cancelled. Otherwise, silence.
AT+CS00\r\n	Turn off DAC, when DAC output is high resistance
AT+CS01\r\n	Open the DAC and the DAC will play the sound normally.

1. The silence of the chip refers to the continuation of the current playback, just adjust the silence to 0, you can't hear the sound.
2. Closing DAC is equivalent to completely disconnecting DAC. The purpose of this is that if the user needs to do external sound input function, then the sound source of external sound input can be directly connected to the DAC of the chip and the DAC can be turned off. Then the chip will not absorb or interfere with external sound input.
3. The purpose of closing DAC is to make it easy for users to hang FM chips or input voice.
4. Note that after the DAC is turned off, if the chip needs to be restored to play, it needs to open the DAC or send the specified other mode.

4.2.5 Mode Description for Setting Up Automatic Entry on Chip [CP]

AT+CP00\r\n	Power-on Automatically Enter Bluetooth
AT+CP01\r\n	Power-on enters a waiting state, requiring users to send mode instructions
AT+CP02\r\n	Power on to make judgments, play devices with devices, and enter Bluetooth without devices.
AT+CP03\r\n	Reserve
AT+CP04\r\n	Reserve

1. Similarly, setting up here also requires the next power-on to work.
2. The purpose of adding this instruction is to facilitate users. Some customers need to use Bluetooth directly, while others need equipment to enter the device.
3. Note that if Bluetooth is not powered on once, then Bluetooth data transmission is invalid, because Bluetooth must be initialized once before it can run in the background.

4.2.6 Setting the function of chip auto-return data to turn off and turn on [CR]

AT+CR01\r\n	Turn on auto-return function
AT+CR00\r\n	Turn off auto-return function

1. If you don't want to return a message every half a second in Bluetooth, you can turn it off with this command.
2. You don't want a TF card or a U disk, and you can turn it off by returning messages every second.

4.2.7 Set TF Card U Disk Play Once Stop or Sequential Loop Play [CJ]

AT+CJ01\r\n	Open – Single Trigger Play
AT+CJ00\r\n	Close – Loop sequential playback

1.For MUSIC playback, we present two application modes.

(1) The basic way to enter music is to play in a circular sequence, play and then broadcast, without stopping.This is called "cyclic sequential playback"

(2) Personalized mode, entering music means stopping, waiting for the user to specify the playback, and stopping when the playback is completed.This is called "Single Trigger Play"

2.This setting is memory-based. After setting up, it will take effect at that time and automatically save when power failure occurs.

4.2.8 Recording function - whether to turn on [RE]

AT+RE01\r\n	Turn on – At this point, the chip has recording function
AT+RE00\r\n	Turn Off – When the chip recording function is turned off

1.Recording function is a minority application, so we use a hidden scheme. If you don't set it to open, it will be closed by default.

2.After the instruction setting is opened, the chip will be powered down and saved. Next time, it will not need to be set up again.

4.2.9 Set whether to turn on the prompt [CN]

AT+CN01\r\n	Turn on -- The chip will automatically play the prompt sound.
AT+CN00\r\n	Turn off -- the chip will turn off the prompt sound at this time -- power off and save

1By default, the chip has prompt tone, which is when booting or switching mode. If it is not needed, it can be turned off.

2After the instruction setting is opened, the chip will be powered down and saved. Next time, it will not need to be set up again.

4.2.10 Setting EQ [CQ] - Audio is not supported for the time being

AT+CQ00\r\n	default	AT+CQ03\r\n	CLASSIC
AT+CQ01\r\n	ROCK	AT+CQ04\r\n	JAZZ
AT+CQ02\r\n	POP	AT+CQ05\r\n	COUNTRY

1.Sound effect is fixed, setting is not saved, every power-on is the default sound effect, that is, the first.

2.Sound effect is global, playing MP3 or Bluetooth is effective.

3.Description: This function is temporarily retained

4.2.11 Set Bluetooth Auto Switch to Background [CK]

AT+CK00\r\n	Turn off – do not automatically switch to Bluetooth
AT+CK01\r\n	Turn on – currently playing TF card, if Bluetooth has audio or telephone, then automatically switch to Bluetooth.

1. If Bluetooth has audio or telephone, we will switch to Bluetooth by default, because Bluetooth is running in the background and memory resources have not been released.

2. To add this instruction is to satisfy the requirement that Bluetooth audio or calls are available without switching to TF card.

3. TF card is currently playing. If Bluetooth is connected, the sound of TF card will be interrupted slightly.

4. This function does not affect Bluetooth's BLE and SPP functions

5. On-chip Telecom will automatically return to QK+01, which represents the current default opening.

4.2.12 Set whether Bluetooth opens the background [CG]

AT+CG00\r\n	Close-Bluetooth does not run in the background
AT+CG01\r\n	Open-Bluetooth Background

10 Our basic function is that Bluetooth actually exists in memory for a long time, so even if you play TF card, you can normally search for Bluetooth.

2 The purpose of this is to make Bluetooth data transmission effective in all modes

3 In order to meet the requirement of "Bluetooth Background Running" conveniently, we add this instruction, which will not take effect until the power is cut off.

4 In this way, Bluetooth can be completely released when playing TF card. Similarly, Bluetooth data transmission is only effective in Bluetooth mode.

5 On-Chip Telecom will automatically return to QG+01, representing the default current Bluetooth running background.

4.2.13 Set whether the key function is turned off and turned on [C1] [C2] [C3] [C4]

AT+C100\r\n	Close the AD button – 14 feet of the chip can be pulled up without 22K
AT+C101\r\n	Turn on the AD button – the 14 of the chip must be pulled up 22K
AT+C200\r\n	When the chip is turned off, the active return information will be returned when the chip is powered on or when the state is switched on. This is turned off.
AT+C201\r\n	When the chip is turned on, it will actively return information when the chip is powered on or when the state is switched on. The default is this.
AT+C300\r\n	Retain
AT+C301\r\n	Retain
AT+C400\r\n	Bluetooth is set to power on and not return
AT+C401\r\n	Bluetooth is set to call back to the last pair of devices, the main contention for audio default is this

And power-off preservation, the next power-on will take effect.

On-chip Telecom will automatically return to Q1+01, which represents the default function of opening AD keys.

4.3 Detailed description of the public section -- query instructions

See Chapter 3.2.4 below for details.

4.3.1 Common status query return instructions [QA] [QT] [QN] [QK]

Examples of query instructions sent by host	
CMD	Detailed description
AT+QA\r\n	The chip returns "QA+30rn", representing the volume returned to the host at 30.
AT+QT\r\n	The chip returns "QT + 03 r n", representing a return baud rate of 38400.
AT+QM\r\n	The chip will return "QM+01r\n", representing the return mode of operation as "Play U disk or TF card"
AT+QN\r\n	The chip returns "QN+01rn", representing the chip with a prompt sound.
AT+QK\r\n	The chip will return to "QK + 01 r n" on behalf of the chip to actively return to Bluetooth, as explained in Chapter 4.2.11.

1. AT+QA is a good command to understand. See the setting volume section in 4.2.1 for details.
2. AT+QT is a query instruction that is well understood. See Chapter 4.2.2 for details.
3. AT+QK

4.3.2 Queries for working patterns and instructions returned [QM]

AT+QM\r\n	The chip will return "QM+01r\n", which means that the return mode is "Bluetooth mode".
QM+00	On-chip power is empty mode, so return to 00
QM+01	Represents Bluetooth Mode
QM+02	U-Disk Play Representing Music Mode
QM+03	TF Card Playing Representing Music Mode
QM+04	SPIFLASH Play on behalf of Music Mode – This version is not supported
QM+05	Representational AUX External Sound Input Mode – This version does not support
QM+06	Input mode of representative sound PC sound card
QM+07	Representational FM Radio Mode
QM+08	Representational sound REC recording mode
QM+09	Represents fake shutdown mode, i.e. idle mode

If you understand it together with Chapter 4.2.3, it will be clearer.

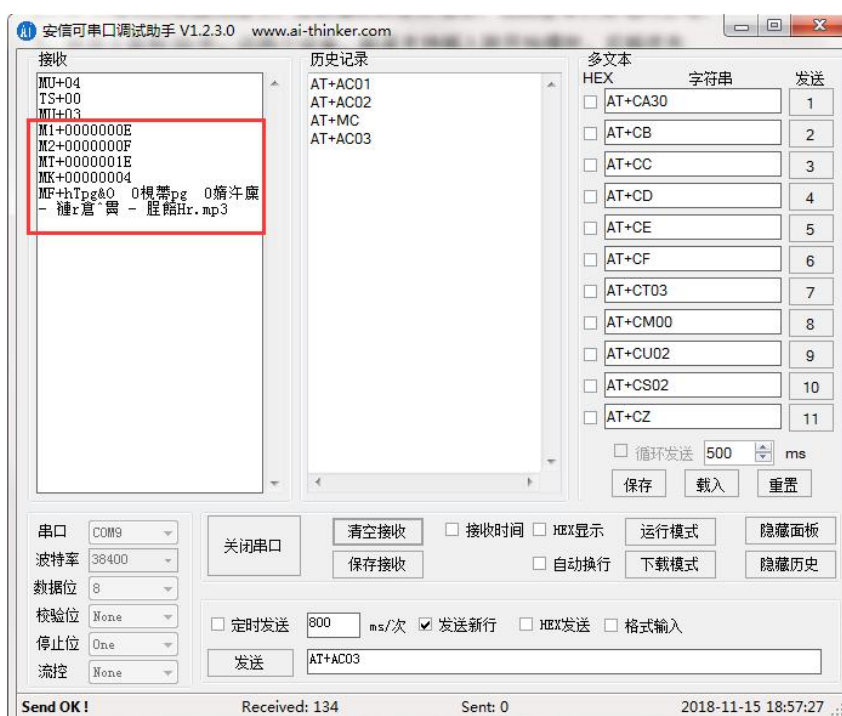
5. Detailed description of serial instructions--Music part

Details are as follows:

5.1 Detailed description of music-related control instructions

The function of MUSIC only includes reading U disk and playing TF card. The power-off storage part is built in the chip, which can store the following information.

1. The physical number of the song played by the U disk, the breakpoint information currently played,



and the U disk and SD card, both of which support insertion and start playing. Post interpolation priority

2. The physical number of the song played by TF card, the breakpoint information currently played, that is, every time the power is off, the chip will automatically go to the breakpoint and start playing.

5.1.1 UData returned after initialization of disk or TF card [M1] [M2] [MT] [MK] [MF]

1. The chip will return the above information at the beginning of playback

M1+0000000E	The file playing by the current device is 0x0E
M2+0000000F	The total number of files on the current device is 0x0F. Note that it is a legitimate audio file.

MT+0000001E	The total time of the current file is 0x1E seconds
MK+00000004	The current file has been played to 0x04 seconds
MF+XXXXXXX	The name of the file currently playing is xxxxx.Here the file name is complete

5.1.2 UInformation returned by disk or TF card after playback [MV] [MD] [MO]

MV+04	This refers to the on-line equipment, refers to the TF card on-line, that is, BIT (2)
MD+04	This refers to the current work of the TF card, that is, BIT (2)
MO+00000005	The current play is the fifth song.

Here the U disk occupies the 0th place, TF occupies the 2nd place.

= 1 stands for online, = 0 stands for offline. At any time, only one device is working, playing music. On-line is just physical on-line.

5.1.3 TFCard or U Disk - PC Sound Card - Insert and Pull Back Information [MU]

MU+01	U disk insertion
MU+02	U disk pull-out
MU+03	TF card insertion
MU+04	TF Card pull out
MU+05	Connecting PC--The function of card reader and USB sound card can be realized
MU+06	PC pulls out

Insertion and pull-out of the device, all of the above information is returned to the user actively.

5.1.4 TFCard or U-Disk Instructions - Some Basic Functions in Common Use [AA]

AT+AA00	Stop it	AT+AA04	Fast forward
AT+AA01	Play [pause to start playing, and vice versa]	AT+AA05	Quick retreat
AT+AA02	Pause [when playback starts pausing, otherwise invalid]	AT+AA06	Next folder
AT+AA03	Play, pause [two state loop switch]	AT+AA07	Last folder
		AT+AA08	Delete the currently playing file

1"Stop" means to stop the current file and start from scratch when playing. "Pause" is to stop at the current time, and then play from this location.

2Upper and lower folders are valid only if there are folders in your device, otherwise they are invalid.

3, AT+AA08 This command refers to deleting files currently playing

5.1.5 TFCard or U-Disk Instructions - Song Sequence Play [AB]

AT+AB1	Play the first file of the specified device
AT+AB11	Play the 11th file of the specified device
AT+AB111	Play the 111 files of the specified device
AT+AB65536	Play 65536 files for specified devices

1. Here, in order to facilitate the user to write the program, you can unify it, how to use it conveniently and how to use it.

(1) Here, if you send AT+AB1 is the first broadcast, send AT+AB000001 is the first broadcast. We handled it internally.

(2) So when users use it, they are flexible. You can specify a fixed number of characters.

1. The order of playback here is physical, that is, the order of copy to the device, not according to the number 01/02 you gave. You can refer to document 09 in folder 11 for detailed reference.

2. All files, searches, and sorting within the chip are in physical order. Please be clear.

5.1.6 TFCard or U-Disk Instructions -- File Folder Loop Play in the specified Path [AF]

AT+AF/01*/*???	Specify "01 Welcome Mode" folder to play circularly
AT+AF/02*/*???	Specify "02 Forest Mode" folder for circular playback
AT+AF/03*/*???	Specify "03 Seascape Mode" folder to play circularly
AT+AF/USB_UPDA/*???	Specify "USB_UPDA" folder for circular playback

名称	修改日期	类型	大小
01迎宾模式	2018-11-12 15:18	文件夹	
02森林模式	2018-11-12 15:18	文件夹	
03海景模式	2018-11-12 15:18	文件夹	
04舒畅模式	2018-11-12 15:18	文件夹	
USB_UPDA	2018-11-12 15:18	文件夹	

1. Here we give an example of AT+AF/01*/*???

(1) Where AT + AF is not explained, that is, command.

(2) Next, / 01* represents a folder with a prefix of 01 under the root directory, which means that as long as your folder has a prefix of 01, it can be recognized. Here * stands for "wildcards" and for anything.

(3) The purpose of doing so is actually to facilitate some customers who need Chinese naming applications, while Chinese is not so easy to write programs.

(4) Next to /*.???? This represents any file under the folder, that is, the first one. In fact, you can also specify a name here.

(5) Pay attention to the following???? Represents all the files, here you can change to MP3 or WAV, so that he only searches for MP3 or WAV suffix files.

2. It is suggested that if the name is given in Chinese, it should be prefixed with wildcards. If commanded in English, it's flexible.

3. No empty folders are allowed in the device

4. After the folder is specified here, the contents of the folder will be automatically played back and forth.

5.1.7 TFCard or U-Disk Instructions -- Play a file in the specified path once [AJ]

AT+AJ/01*/011_11???	Specify "01???" File in folder "011_11???" Play once.
AT+AJ/02*/011*.??	Specify "02???" File play once in folder 011???.???

1 Principle Reference 5.1.6, not explained here

2 The folder and file name specified here must be played under the folder. The root directory is not supported.

See video demo for details: https://v.qq.com/x/page/y08649_mgh1l.html

5.1.8 TFCard or U-Disk Instructions - Specified Play Mode Single All Random [AC]

AT+AC00	Set to Full Cycle
AT+AC01	Setting up a single device cycle
AT+AC02	Set it to a single loop
AT+AC03	Set to Play Randomly on Single Device
AT+AC04	Set to Folder Loop

1. If you only need a single song cycle and all the cycles, you can just choose what you need. Redundant can be ignored

2. Full cycle refers to two device cycles, provided that you have two devices online, and if there is only one device, it is still a device cycle.

3. A single device is a device. Circulate only within this device

4. Folder loops. If the currently playing track is in the folder, he will play the folder loops, otherwise it will be invalid.

5.1.9 Recording function - TF card or U disk - simple application [RC]

AT+RC00	Waiting to enter the recording state, i.e. stopping state	AT+RC04	Continue recording - only in pause mode
AT+RC01	Start recording	AT+RC05	Recording stop
AT+RC02	Pause and continue recording	AT+RC06	Play the current recording
AT+RC03	Recording pause - only in the recording state	AT+RC07	Delete the current recording

1. Note that the recording function is turned off by default. It needs to be turned on by instruction. The next time the power is on, it will be turned on by default. See 4.2.8.

2. If recording is required, the device must be on-line and inserted into TF card or U disk to take effect. The state of the recording can also be seen in the indicator lamp. Refer to the BT201 module.

(1) Recording flash, stop state is slow flash, pause state is always bright

(2) The PP key of the test board is to start recording and pause. The Mode key is short-click switch mode and long-click delete recording.

2. You must first specify that you enter the recording state and wait, then send the instruction to start recording. At this time, the recording will start automatically.

(1) Sampling rate of MP3, 128KBS

(2) Recording files are generated under the "KT_REC" folder

3. The recording process can be paused, then continue recording, send RT02

4. If the recording is completed and no playback is needed, send 03 instructions, and then stop.

(1) If you want to play, issue 04 instructions, which will automatically stop, and then go to play the just recorded file.

(2) If you have finished recording, you must specify to switch to the mode of work you need, otherwise the current resources will still be reserved for the recording thread.

(3) After entering MUSIC, you can specify the path to play the previous recordings and check the rules of finding the generated recordings in detail.

After entering music, you can still delete files, see 5.1.4. Note that all recordings must be played in a playback state.

5. In the recording process, the chip will automatically return to the current recording state when the state changes.

(1) RC+00 -- Represents the stop state of recording RC+01 -- Represents the start state of recording.

(2) RC+02 -- Represents the pause state of recording RC+03 -- Represents the broadcast state of recording.

(3) RC+04 -- Represents the state of completion of recording and playback RC+05 -- Represents the state of completion of recording and playback.

(4) RC+06 -- Represents deletion of the just recorded state RC+07 -- Represents completion of recording initialization -- enters the state of recording return.

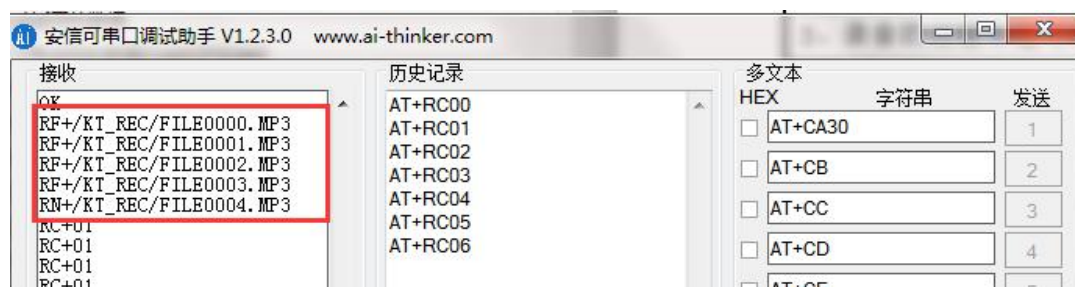
6. Recording is in accordance with the record file will be fixed under the KT_REC folder, it is impossible to change. The newly added files may be numbered FILE0001 - FILE9999 in turn. Rules for folder and file name generation

7. Every time the recording is opened, the files in KT_REC will be retrieved. Starting from 0001, if 0001 exists, 0002 will be generated. If 0002 exists, 0003 will be generated. It will be judged in this way until it finds the file name that does not exist, then it will start recording and generating recording files.

At the same time, there is some information when generating recorded files.

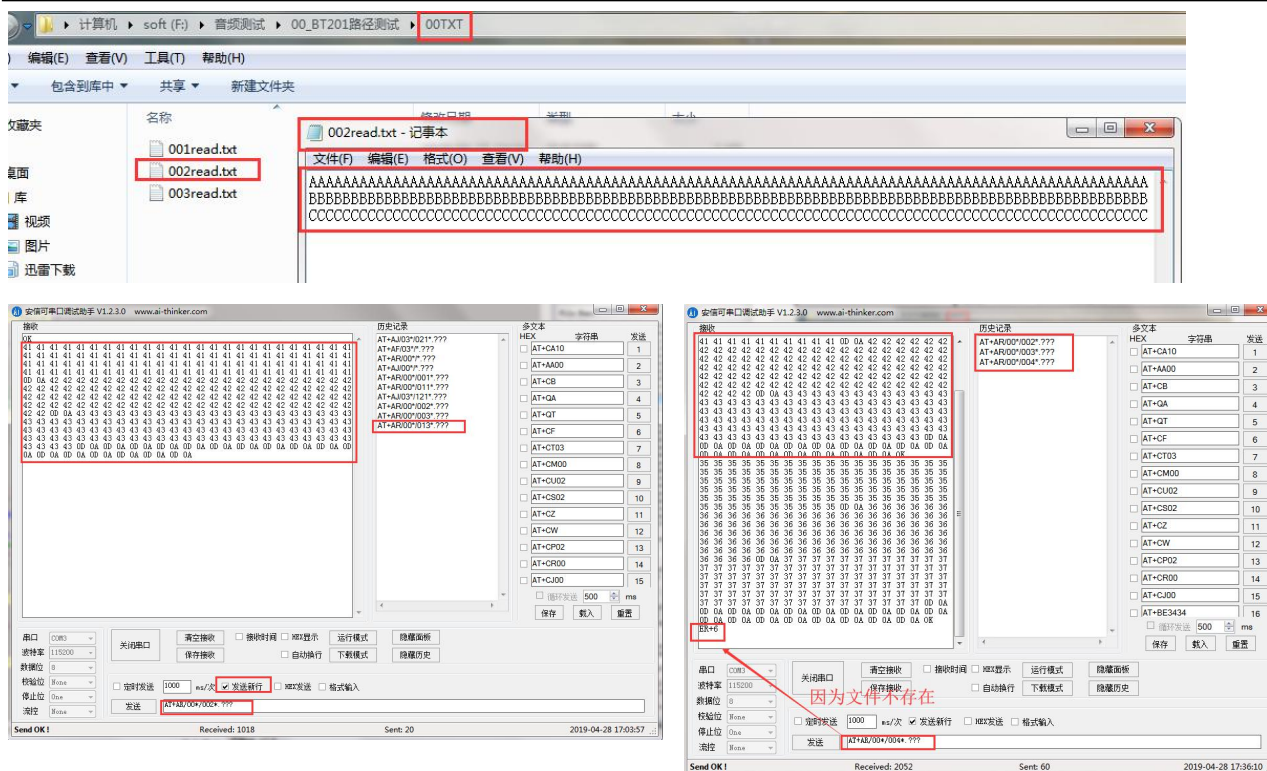
1. Existing filename RF+

2. The newly generated file name, RN + is shown in the following screenshot



5.1.10 TFCard or U-Disk Instruction -- File Read Data TXT Read [AR]

AT+AR/00*/002*.???	Specify 002xxx.??? File reading in the "00xxx" folder
AT+AR/00*/003*.???	Specify "00????????????????????????????" File reading in the folder



1 Principle Reference 5.1.6, which is not explained here. After sending this instruction, the chip stops playing the current music.

2 Serial ports will be sent in the form of hexadecimal. Attention is sent one to one. Notice the corresponding character "A" of 0x41 in the TXT shown above. Among them, 0x42 pairs of characters "B".

3 If the file to be read is less than 512 bytes, then read once and exit. Music stops at this point.

4 If the file to be read is greater than 512 bytes. For user's convenience, we set it to read 512 bytes once, and then forward it to the next 512 bytes with a delay of 500 ms. Until the front part is finished. Convenient for users to save while collecting

6. There is no requirement for file type. Users can either be txt, bin or any other. Here, TXT is used as an example to illustrate.

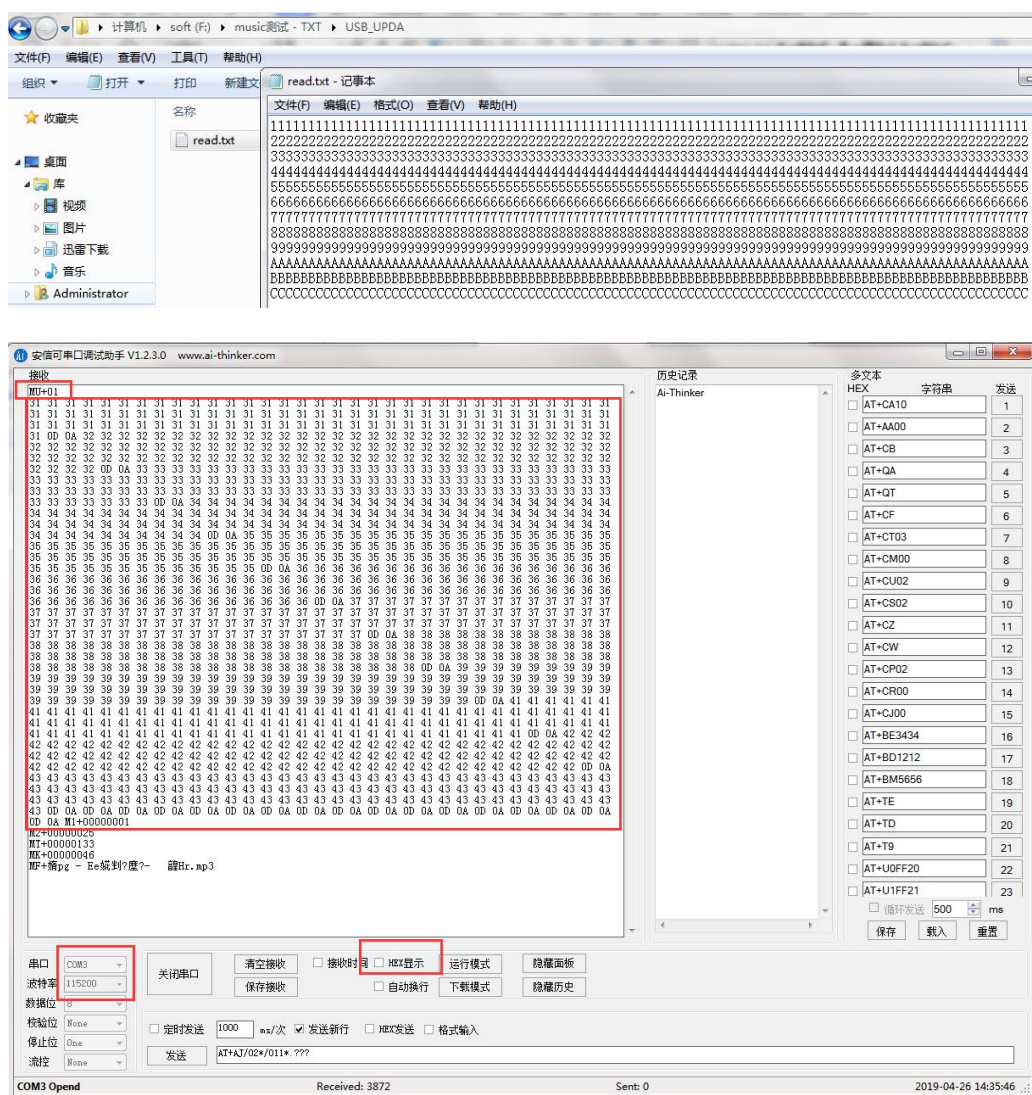
7. The more content of TXT file, the longer time it takes. The actual reading time is based on the test. It reads 512 bytes at a time, up to 2 ms.

8. When the user needs to read the file, the serial port can send instructions. Only after the initialization of U disk or TF card is completed.

9. Error ER6 is returned if the read fails or the file does not exist. See 4.1.3 for details. If read successfully, the corresponding data will be returned.

Above is the effect of the actual test as shown in the above three figures.

5.1.11 TFCard or U disk reads TXT and other formats of file serial port to issue [advanced function]



1. TXT documents must exist under the "USB_UPDA" folder and be named "read.txt". This function is automatic reading.
 2. If the file you need to read is a bin file, the same is true. The file to be read must be renamed read.txt
 3. All files are readable, but please note that the name must be changed again.
- See "19" under our other document "11 Functional Manual Quick Application" folder for details.

5.1.12 TFCard or U-Disk Instructions -- Designate Path to Delete Files [AL]

AT+AL/00*/002*.???	Specify 002xxx in the "00xxx" folder and delete it.
AT+AL/02*/*???	Specify "02?????" any file in the folder. Note that only one file can be deleted at a time

1. Deleting can only delete files, but can not delete a folder at a time. If a folder has more than one file, it needs to send deletion commands many times.
2. There are two ways to delete files. This is only the first way. Another way is to refer to Chapter

5.1.4. AT+AA08

5.1.13 Recording function -- TF card or U disk -- specify folder file name to record [RP] [RB] [RV]

AT+RP/KT2REC/20190506	Generate KT2REC folder and generate 20190506.MP3 file in it
AT+RP/KT-REC/190506	Generate KT-REC folder and 190506.MP3 file

AT+RB00	Setting Recording Bit Rate of 16 KBS	AT+RB05	Setting Recording Bit Rate 96 KBS
AT+RB01	Setting Recording Bit Rate 24 KBS	AT+RB06	Setting Recording Bit Rate 128kbs
AT+RB02	Setting recording bit rate 32 KBS	AT+RB07	Setting recording bit rate 144 KBS
AT+RB03	Setting recording bit rate 48 KBS	AT+RB08	Setting Recording Bit Rate 160kbs
AT+RB04	Setting recording bit rate 64 KBS		

AT+RV35	The gain of setting MIC is 35.Mic's recording gain is 0 - 63, default is 35.
AT+RV63	The increase of setting MIC is 63.The recommended value is between 30 and 40, depending on the actual test.

1. Recording must be generated under the folder, not in the root directory.

(1) The sampling rate of recording is fixed at 48KHZ.

(2) Files are automatically packaged into MP3 format. The volume and sound quality are the best.

2.For example, the serial port sends AT+RP/KT-REC/20190506. The processing flow of the chip is as follows.

(1) The chip will get the path of / KT-REC/20190506, and then get the name of the folder "KT-REC".

(2).Here the user can modify it to 123456. The length must be 6 characters.There must be no more, no less.Can't Be Chinese CharactersNote that this is a fixed, folder name length can not be changed, dead rule

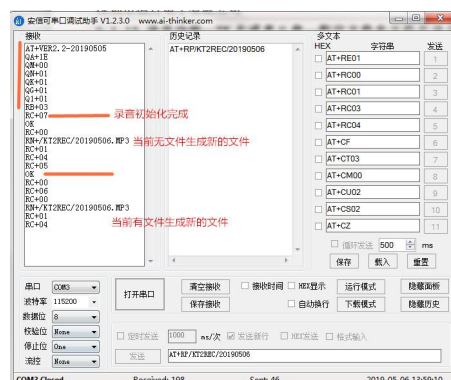
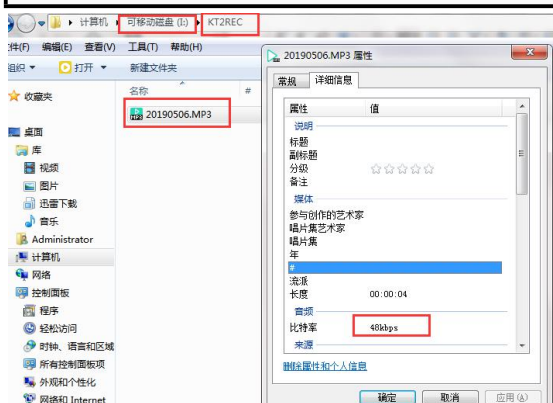
(3) Generated file name "20190506".The length of this is also limited to no more than eight characters.Less but not more

(4) The current device exists/KT-REC/20190506.Then the chip deletes the file first, and then generates a new file.

3. The size of bit rate is directly related to the quality of recording and the size of MP3 files generated by recording.The recording bit rate is set and saved on power failure.

(1) The default bit rate of the chip is 48 kbs, which is good enough and is not recommended.If you must set it, it is recommended not to exceed 128 KBS at most.

(2) On-chip power will return the bit rate value of chip memory.See the output information of power-on serial port for details.



4. As shown in the left-hand chart above, an example is given for the information of the generated file. Interactive screenshots of recorded serial ports as shown in the right-hand image above

(1) After the chip enters the recording mode, it will first return to "RC+07", which represents the completion of recording initialization, and then stay in this state.

(2) After recording, the chip will return to RC+01, representing that the recording is in progress. RC+04 stands for the recorded files before playback. See Chapter 5.1.9 for details.

(3) RC+05 represents that the recording file has been played, and then stays in this state.

(4) If the current file and the file received by the serial port have the same name, the existing file will be deleted first and RC+06 will be returned.

5.2 Detailed description of music-related query instructions

See Chapter 3.2.5 for details.

5.2.1 TF Or the U disk queries the current playing file name [MF]

MF+001_Chen0Punch-Everytime-Boji Hr.mp3	001_Chen, Punch - Everytime - Ringtone Edition. mp3
---	---

1. The information printed by serial debugging assistant on the left and the actual information on the right.

2. If you use a serial debugging assistant to print out information, it will be scrambled for Chinese characters or other words, whereas English and numbers are correct.

3. Analyse the data and convert it into hexadecimal data as follows

```
30 00 30 00 31 00 5F 00 43 00 68 00 65 00 6E 00
01 30 50 00 75 00 6E 00 63 00 68 00 200 2D 00
20 00 45 00 76 00 65 00 72 00 79 00 74 00 69 00
6D 00 65 00 200 00 2D 00 200 00 C3 94 F0 58 48 72
2E 00 6D 00 70 00 33 00
```

(1) The place marked red is the coding of Chinese characters, totaling three Chinese characters "ringtone version", one Chinese character with two bytes, using "UNICODE coding".

(2) Even the first 0 takes up 2 bytes, that is, 0030 [Note the encoding of the Chinese character bell== 0x94C3]

(3) The following websites can be consulted: <https://bianma.supfree.net/chaye.asp?Id=94C3>

4. For non-Chinese or English words, it is not clear at present. If you support it, you can communicate what you know.

```

MB+00000001
MC+0000000F
MT+00000012
MK+00000000
MF+001_Chen 0Punch - Everytime - 脛脩Hr.mp3
MB+00000002
MC+0000000F
MT+00000012
MK+00000000
MF+002_K.Will - 世t? P乾? - 脛脩Hr.mp3
MB+00000003
MC+0000000F
MT+00000035
MK+00000000
MF+003_Ngc(惡m - N-\1\ - 脛脩Hr.mp3
MB+00000004
MC+0000000F
MT+0000001D
MK+00000000
MF+004_互Y??- 颯 - 脛脩Hr.mp3
MB+0000000A
MC+0000000F
MT+0000002E
MK+00000000
MF+颯甚P[ - 淩@w前R?U?`Lk - DJHr脛脩.mp3

```

5. The screenshot above is the information printed by the serial debugging assistant. The actual file name is as follows.

001_Chen, Punch - Everytime - Ringtone Edition. mp3

002_K. Will - Cocktail! Cocktail # - Ringtone Edition. mp3

003_Li Ronghao - No will - Ringtone Edition. mp3

004_Liang Jingru-Question-Ringtone Edition. mp3

Longmeizi - Singing Love Songs with Spirits - DJ Ring tone. mp3

5.2.2 TF Or the time processing [MT] [MK] of the U disk querying the currently playing file

MT+0000001D	The total current file time is 0x1D seconds
MK+00000000	The current playing time is 0 seconds.

1. Here we will give the total time of the current file and the playback time.

2. When users use it, they only need to know the total time, and then play the time, then they can count the time by themselves.

3. Because we are audio Bluetooth, audio playback is interrupted, and UART is also interrupted. If you frequently query the current time, it may cause a slight noise in the playback sound.

6. Detailed description of serial instructions--Bluetooth part

6.1 Bluetooth Relevance-Control Instruction-Detailed Description

1. See Chapter 3.2.3 for details. There are many examples in it. They are also very clear. You can take a careful look at them.

1AT+B1 here to set a simple password, in fact, when the mobile phone is connected, you do not need to enter the password manually.

2AT+B2 is set up for calling. If your product does not need to talk, it can be shut down here. Next time you call, there will be no call function.

3AT + B3 This is the setting of audio, if you do not need to play music, here can also be turned off.

6.1.1 Set Bluetooth's name and password [BD] [BE] [BM]

AT+BDAUDIOrn	Set Bluetooth name to "AUDIO"
AT+BE1234[r]n	Set the Bluetooth connection password to "1234"
AT+BM2345rn	Here is the Bluetooth name for BLE "2345"

1. After setting the name of Bluetooth, you need to reset the chip, issue instructions or power off, so that the new Bluetooth name will be displayed. Our default Bluetooth name is "BT201-AUDIO".

2. The maximum Bluetooth name is "32" bytes. Please do not exceed this range.

3. After setting the Bluetooth password, we need to reset the chip, issue instructions or turn off the power. We will ask for the password. Our default Bluetooth name is "0000".

4. The maximum Bluetooth password set is "4" bytes. Please do not exceed this range.

5. If the AT command modifies the Bluetooth name, notice that your phone may not update synchronously, or display the previous name.

(1) Because you have only changed the name of Bluetooth, the MAC address of Bluetooth has not changed, so the name will not be updated on the other side of the mobile phone.

(2) What you need to do is try a new mobile search, or delete the matching information from the previous mobile phone and search again.

(3) As long as the Bluetooth name is set, the Bluetooth name must be updated, no doubt. On-chip power also returns Bluetooth name for you to see.

6.1.2 Setting up Bluetooth Protocol Function [B1] [B2] [B3]

AT+B100\r\n	This 00 stands for 0x00, closing the paired password, that is, the next connection does not require a password to connect directly.
AT+B201\r\n	This 01 stands for 0x01, for opening Bluetooth calls, and if it's 00, it's turning off Bluetooth calls.
AT+B300\r\n	This 00 stands for 0x00, it stands for turning off Bluetooth audio, that is, the connection is successful, it can't play music, and vice versa.
AT+B401\r\n	This default is 0x01

This is a personalized function, which is not needed by ordinary customers. You can look carefully when

you need it. The latter parameter 00 turns off [disable], and 01 turns on [enable]

6.1.3 Enabling Bluetooth ble and EDRs [B4] [B5]

AT+B400\r\n	Here is the function to turn off BLE. The default is 0x01.
AT+B501\r\n	Here is the function of turning on EDR. This default is 0x01

This is a personalized function, which is not needed by ordinary customers. You can look carefully when you need it.

1. The function of opening and closing BLE here is convenient for some customers who only need audio and do not need data transmission.
2. When BLE is off, you can't search for the name of BLE, and the chip won't broadcast to the outside world. The next power-on after setting is valid
3. If you turn off EDR, then your mobile phone will only search for the name of BLE, and only do data communication. The same next power-on is effective (1) So that the chip does not have Bluetooth audio playback function, and your mobile phone can not search the name of Bluetooth audio.

6.1.4 Designated telephone number to call [BT]

AT+BT13510250437rn	Specify the call number "13510250437"
AT+BT10086rn	Specify the phone number "10086"

To use it here, the software must turn on the call function. At the same time, it is in the connection success state and non-call state. These three conditions must be met to be effective.

6.1.5 Bluetooth Audio Related Control Command [BA]

AT+BA00\r\n	Call back a phone call	AT+BA04\r\n	Answer the phone
AT+BA01\r\n	Disconnect	AT+BA05\r\n	Scanning Device - Turn on Broadcast Status
AT+BA02\r\n	Refuse to accept	AT+BA06\r\n	Reserve
AT+BA03\r\n	Hang up [only on calls]	AT+BA07\r\n	Reserve

1AT+BA01rn Disconnect This only works after the connection is successful
2AT+BA04rn If there is a telephone coming in at present, issue this command, then answer it. In the process of receiving, the relay will hang up.

6.1.6 MAC Settings for Bluetooth--EDR--BLE[BS]

AT+BS 123456781234rn	Set the MAC address of EDR to 0x120 X34 0x56 0x78 0x120 X34 The address of BLE is 0x130x34 0x56 0x78 0x120 x34.
AT+BSABCDEF 123456rn	Set the MAC address of EDR to 0xAB 0xCD 0xEF 0x120 X34 0x56

This is a personalized function, which is not needed by ordinary customers. You can look carefully when

you need it.

1If the MAC address is not set, a Bluetooth MAC address will be defaulted in the chip.
2If the user sets the MAC address, the setting of the MAC address is the priority in the chip.
3Because the chip is dual mode, there are two Bluetooth names, that is, two Bluetooth MAC addresses. The address of BLE is associated with the address of EDR. The first byte + 1 of the MAC address in the EDR is processed.

6.2 Detailed description of Bluetooth-related query instructions

Many states of Bluetooth will be returned to the user actively, so it is not necessary for the user to query actively unless special needs arise.

6.2.1 Bluetooth Current Status Return - EDR Simple State [TS]

TS+00	Bluetooth has not been connected successfully and is in a waiting pairing state
TS+01	Bluetooth has been successfully connected, but no music has been played yet.free
TS+02	Music playing
TS+03	Talking on the phone

1. Here we give four states, which are very simple.EDR refers to Bluetooth audio and communication
2. You can choose to query or not.Users can also turn off the chip auto-return function, see 4.2.6
3. The formal modification here is that the chip status changes will be returned actively, otherwise it will not be returned.
4. Note: For Bluetooth, there is no concept of pause.Bluetooth has only four states.Even if the mobile phone manually clicks pause, the Bluetooth chip displays the state of "TS + 01" which is idle.

6.2.2 Bluetooth Current Status Return - BLE Simple State [TL]

TL+00	BLE is empty	TL+04	BLE disconnect
TL+01	BLE is idle	TL+05	BLE Opens Listening State
TL+02	BLE is broadcasting	TL+06	BLE in Scanning State - Host
TL+03	BLE Connection Successful	TL+07	BLE Search Completion - Host

- 1.Here we give eight states, very simple.The first six represent the slave state, and the second two represent the host state.
- 2.The chip will return on its own initiative and the user can turn it off. See 4.2.6
- 3.The formal modification here is that the chip status changes will be returned actively, otherwise it will not be returned.

6.2.3 Bluetooth Call Number Return [TT]6.2.3 Bluetooth Call Number Return [TT]

TT+13510250437	The other party's telephone number is 1351050437
TT+10086	The other party's telephone number is 10086.

1. Here we return to the user voluntarily, once every 2 seconds, until the phone is connected or hung up.

2. You can choose to query, or you can choose not to query. You can also turn off the chip auto-return function, see 4.2.6

7. Detailed description of Bluetooth transmission---BLE

At present, BLE and SPP dual-mode data transmission is supported, and the module can realize transmission through. At present, both BLE and SPP can only serve as followers. That is the "SERVER" end.

For instructions on Bluetooth data transmission, see another document, "26_Detailed instructions on Bluetooth data transmission and AT instructions. pdf"

7.1 BLEThe Legendary Explanation

1Maximum 128 bytes per throughput, support 16-bit or 128-bit UUID -- 128-bit needs special customization
2If you use BLE as data transmission, please connect the Bluetooth name "BT201-BLE" of the module.
3Can use BLE alone, without audio function, see 6.1.3 for details.
4Of course, BLE can also be turned off, as detailed in 6.1.3

7.2 BLEUUID description

1The main UUID is "FFF0"
2UUID of feature 1 is "FFF1", and feature is "WRITE" and "NOTIFY".
3UUID of feature 2 is "FFF2" and feature is "READ" and "NOTIFY".
4The UUID of feature 3 is "FFF3" and the feature is "WRITE" - this feature is specially designed for controlling Bluetooth chip on the mobile terminal. See Chapter 7.5 for details.
5If you need a special UUID, you can contact us to customize and modify the settings at the bottom of the module. But the average 16-bit UUID user can set it up by himself. No problem. See Chapter 7.6 for details.

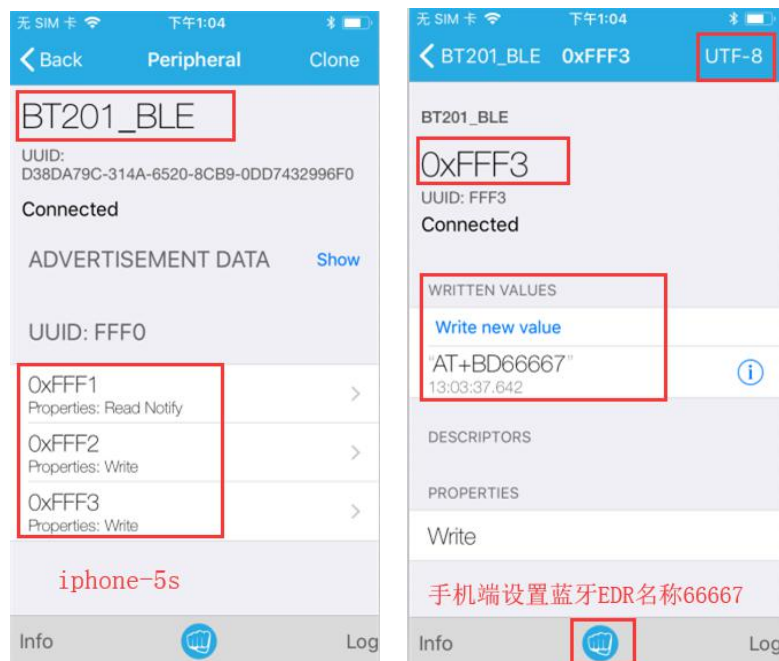
7.3 BLEDemonstration of the effect

1 <https://v.qq.com/x/page/q07660m1bta.html> BLE transmission effect demonstration:

7.4 BLETest instructions

1. Android mobile IOS mobile phone [Apple], recommended the use of "Lightblue" software
2. Apple can search and download directly in "App Store"
3. Android, we will provide the installation program in the package.
4. Please note that Android phones can also test BLE. Testing BLE is not necessarily limited to Apple phones.
5. Android BLE is not unusable, but not usable. Android version must be above 4.3 version to support BLE.
6. Because Android's BLE is not easy to use, there will be dual models. Android uses SPP. Apple BLE
7. Because if Apple wants to use SPP, it needs to buy MFI certification chips, which are super expensive and no one is using them at present.
8. If the Bluetooth name has not been changed by default, connect to the Bluetooth name "BT201-BLE"
9. BLE test instructions demo video: https://v.qq.com/x/page/o0766ubm78n.html

7.5 BLETest Instruction of Bluetooth Chip for Mobile Terminal Control



1. The test of this function uses lightblue, and the mobile phone can only be an iPhone.
2. Because only lightblue software in the iPhone can send strings. Android doesn't.
3. AT+BD667 here is to set the name of EDR to "66667", note that there is no need to add "rn". Because the phone can't type this, we automatically add " r n" inside.
4. This function can be used or not. The actual test can be tested by using the Wechat applet "Search BT201 Bluetooth Assistant"

7.6 BLEUUID instructions modified by AT instructions

AT+U0F000rn	Specify service UUID as F000
AT+U1F001rn	Specify signature 1 as F001, and its feature is "write"+ "listen"
AT+U2F002rn	Specify signature 2 as F002, which is read + listen
AT+U3F003rn	Specify signature 3 as F003 and its feature is "write"

1. Here we present three features in order to meet the different needs of many customers.
 - (1) Some customers want to write and listen to different features, so that the interaction between mobile phone and Bluetooth can be more reliable.
 - (2) Some customers only need to transmit a small amount of data, so they need to write and listen on a signature.
2. When setting up user settings, it's better to set up all four of them, whether you use them or not.
3. If there is no APP customer, it is recommended to use signature 1 and signature 2. Separate two distinct features
4. If you want to change our chips for the products already produced, you just need to modify the UUID.

5.Feature 3 is designed for mobile phone to send AT commands directly to control Bluetooth chip.

7.7 BLETime Interval of Data Pass-through Packets

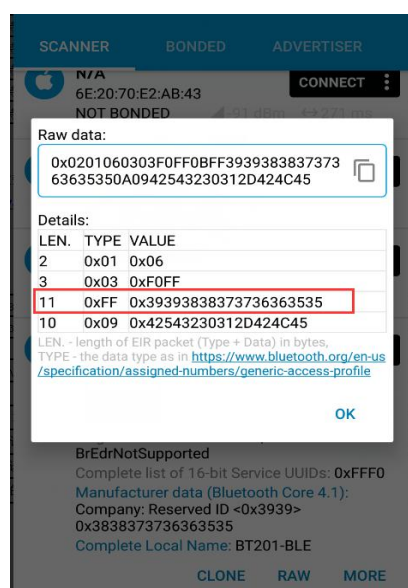
Uart baud rate 9600	The minimum packet interval of 20 milliseconds is set to 30 milliseconds.
Uart baud rate 19200	The minimum packet interval of 16 milliseconds is set to 20 milliseconds.
Uart baud rate 38400	The minimum packet interval of 10 milliseconds is set to 15 milliseconds.
Uart baud rate 57600	Minimum 8 milliseconds packet interval is set to 10 milliseconds.
Uart baud rate 115 200	The minimum packet interval of 6 milliseconds is set to 8 milliseconds.
Uart baud rate 256000	The minimum packet interval of 4 milliseconds is set to 6 milliseconds.

BLE's massive data-intensive live demo video:<https://v.qq.com/x/page/c0843j975hl.html>

7.8 BLEBroadcast Packet Modification Description [UR] [TR]

AT+UR9988776655rn	Set the data of Bluetooth BLE broadcasting package to "9988776655", and note that it is a string.
AT+UR123456789Arn	Set the data of Bluetooth BLE broadcasting package to "123456789A", and note that it is a string.
AT+TR\r\n	Query the broadcast package data of the chip, and the chip will return "TR + 9988776655"

1. Bluetooth BLE broadcasting package is actually a bit complicated, but users can not care, we reserve 10 bytes of space for customers to fill.
2. When users set it, they must set 10 bytes. Even if you only use one byte, you must fill all 10 bytes.
3. Once the setup is successful, the next time the chip is powered on, the data of the broadcast packet will be changed.
4. For details, please refer to our other document, 17xxxx document in folder 02. Mobile App uses On the phone side, Android installs NRF Connect APP. Apple installs lightblue.



8. Detailed description of Bluetooth transmission--- SPP

Spp is still a classic Bluetooth 2.1 protocol. It is not recommended for use. New products are recommended for direct use. BLE

For instructions on Bluetooth data transmission, see another document, "26_Detailed instructions on Bluetooth data transmission and AT instructions. pdf"

8.1 SPP The Legendary Explanation

1.Maximum 256 bytes per throughput
2. If you use SPP as data transmission, please do not actively connect the module's "BT201-BLE" Bluetooth name, or the BLE Bluetooth name set by yourself.
3.Note that SPP belongs to a sublink in EDR.
4.SPP data transmission and BLE are mutually exclusive. If you only use SPP data transmission, please turn off BLE.

8.2 SPP Demonstration of transmission effect

1. Demonstration of SPP Transmitting Effect: <https://v.qq.com/x/page/b0766jqw0p5.html>

8.3 SPP Transmit test instructions

1.Android mobile phone test using the "Bluetooth Serial Port" app, can be downloaded in the "App Treasure"
2. If the Bluetooth name has not been changed by default, connect to "BT201-AUDIO" Bluetooth
3.SPP test instructions demo video: https://v.qq.com/x/page/e0766bz15fw.html

SPP's large amount of data transmission demonstration video:

<https://v.qq.com/x/page/c0843j975hl.html>

9. Module update firmware program and serial port test instructions

9.1 Description of firmware for module updates

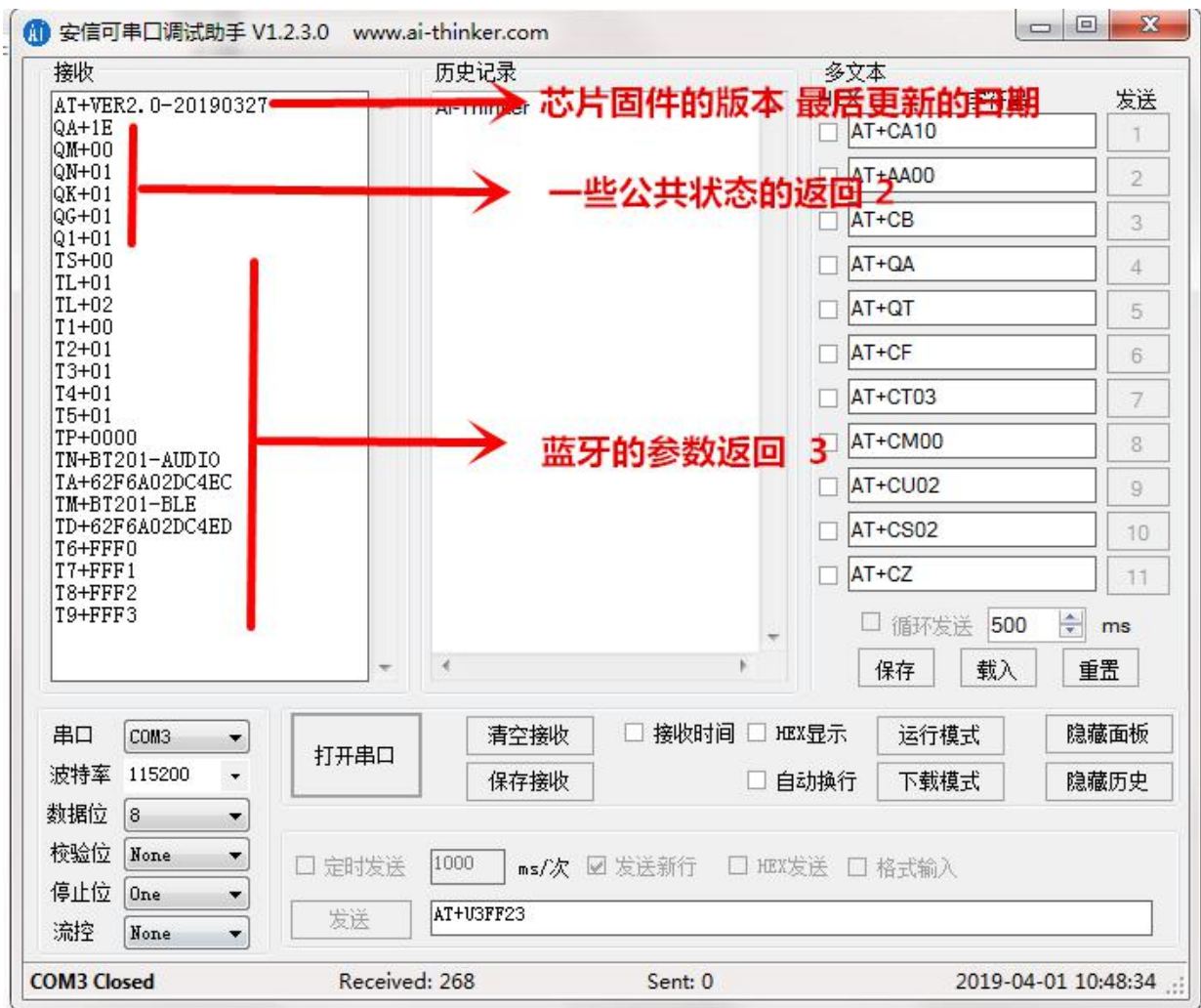
1. Because what we do is a test board, the user directly tests the function, so it is not very compact.
2. In the later stage, we will have a complete set of modular products.
3. The chip has many functions and can't achieve a standard firmware. So we reserve the interface of the upgrade program for BT201 module. The upgrade method is as follows:
1. Copy the file "updata. bfu" to TF card and U disk. There must be at least three MP3 audio files in TF card or U disk for reading file system.
2. Turn on the prototype and insert the U disk. At this time, the program will be updated automatically. It will take about 30 seconds to complete.
3. The phenomenon of successful upgrade is that if the horn is answered, the horn will always sound. If there is a light, the phenomenon may be ---- The upgrade is always bright, the upgrade is finished and extinguished
4. After the introduction of this method, the machine that normally makes the prompt sound will have the prompt sound if the U disk or TF card is inserted.
5. Attention, after the upgrade, you must delete the upgrade file in the card, or you will repeat the upgrade. Do not unplug TF card or U disk during upgrade, otherwise the module will be completely dead and can only be repaired back to the factory.
6. Firmware Update Video Demo: https://v.qq.com/x/page/f0766kfjzob.html

9.2 Possible doubts or problems in module updates -- unsuccessful updates

Question 1	Do you have any requirements for this TF card and U disk?
Answering question	TF card and U disk must be FAT or FAT32 file system, maximum support 32G.
Question 2	Why would I "Updata. bfu" file copy to TF card upgrade, then insert the prototype upgrade, start playing music directly
Answering question	1. Note "updata.bfu". This file name must be matched one by one, no more or less letters. 2. Updata is the file name and BFU is the suffix name of the file 3. When you are on Windows, please be sure to open "Display File Suffix Name".
Question 2	Why would I Updata. bfu file copy to TF card upgrade. Then power the prototype, did not enter the upgrade?

Answering question	1.For our upgrade, we must first electrify the template and then insert the TF card. 2.The principle of upgrading is as follows [U disk is the same] (1) After the chip detects the TF insertion, it will automatically initialize the TF card and file system. (2) All of these OK, go to the "updata. bfu" file, and if you find it, go to the upgrade. (3) If any of the above links goes wrong, it will lead to unsuccessful upgrading.
--------------------	--

9.3 Explanation of Module Serial Port Debugging Assistant



testing environmentBT201 test board serial port software: serial debugging assistant_aithinker_serial_tool_v1.2.3
1.Receiving window, the chip returns the data to the computer.This is the firmware version and the date of final modification.
2.For the return of some common parameters, see Section 4.3 for more information about whether volume mode Bluetooth runs in the background, etc.
3.Some parameters of Bluetooth, such as uuid, etc. are detailed in Chapter 6.
4.The default baud rate of the chip manufacturer is 115200

Many of the information returned here can be ignored by users, because the purpose of this is to make it easy for customers to see when debugging for the first time.

10. FAQ

problem	1.Can this module connect to the mobile phone to play music?Do you have a call?
Answering question	Yes, the module supports Bluetooth audio and Bluetooth calls.On this basis, data transmission is also supported.

problem	2.Your board is too big to be embedded in our products. I want to buy chips by myself. Is that OK?Is the periphery complex?
Answering question	Yes, our module is just designed to facilitate user testing. The board is designed so that customer testing is very convenient and efficient. If you need chips, we will provide you with a reference design. It's very simple. Just copy it directly.

problem	3.I can't read so many materials. I just need to connect my mobile phone to play music, take a call, and press the button to control it.
Answering question	Yes, our default function is OK, and other places we don't understand are OK, because we are a full-featured product. There is no exclusion from multiple functions.

problem	4.I don't need the call function. What should I do about it?
Answering question	You can turn off the call function by serial command. Bluetooth will not have a call after the next call, and vice versa.

problem	5.I don't need BLE data function, how to shield it?
Answering question	This can't be shielded because we have two-mode Bluetooth. There must be two Bluetooth names.

problem	6.I don't need music function, just BLE and SPP transmission function. What should I do?
Answering question	This can turn off Bluetooth's A2DP through serial AT command, and vice versa.

11. The Difference between KT1025A Chip and KT1025B Chip

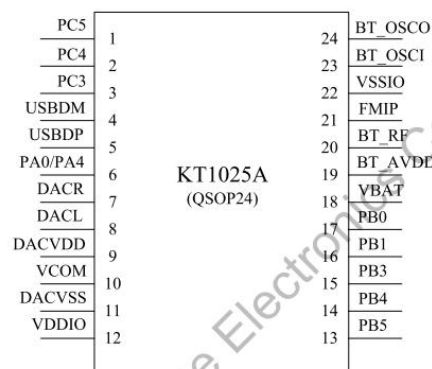


Figure 1-1 KT1025A_QSOP24 Package Diagram

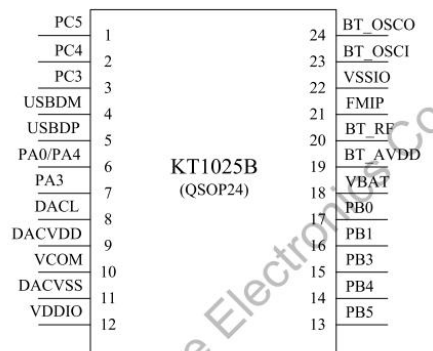


Figure 1-1 KT1025B_QSOP24 Package Diagram

problem	1. What's the difference between KT1025A and KT1025B? Why do we make two models? How do I choose the type?
Answering question	1. KT1025A is stereo output, the original factory's pricing strategy is higher. Cost-insensitive recommendation 2. KT1025B is not stereo output, the original location is lower, the chip is identical, but the price is lower. 3. Therefore, in the process of user use, if only one speaker is connected, KT1025B is recommended. 4. The difference is that if the seven legs of the chip are to be connected with two speakers, there is no choice but KT1025A. 5. The unit price of KT1025A is 0.3RMB higher than that of KT1025B. Please pay attention to the selection.

problem	2. Why are KT1025A and KT1025B chips cheap? Is there a lack of performance?
Answering question	(1) Chips, we use the category with the largest shipment volume, because the shipment volume is huge, so the competition is fierce, and the cost is naturally low. (2) The original purpose of the chip is to make Bluetooth speakers, headphones, storytellers and other products. Large quantity leads to low cost (3) Only the chip has audio playback and data functions, so we have developed software to support these functions. (4) There is no doubt about the performance of the chip, and the customers who understand it are very clear that we already have a large number of customers on board. (5) Is it true that if I only need data transmission, not audio, it will be cheaper. Wrong, chip costs are low, but development costs are high.

problem	3.Which test module is KT1025B?Are DEMO boards available?
Answering question	Module we have, model called "BT201", and KT1025A chip share a test board, software is fully compatible.

12. Referenced Program Example

```

/*****
- 功能描述： 串口发送一个字节
- 隶属模块： 外部
- 参数说明：
- 返回说明：
- 注：
1、每种芯片的串口输出的方式不一样，这里是我们自己的芯片的方式
2、您也只用修改这个接口封装一下即可
*****/

void func_send_byte( u8 dat )
{
    ctrl_uart_write(dat) ;/*替换这个接口*/
}

/*****
- 功能描述： 串口发送字符串
- 隶属模块： 外部
- 参数说明：
- 返回说明：
- 注：
*****/

void func_UartPutStr (const char *Str )
{
    while ( *Str)
    {
        func_send_byte ( *Str );
        *Str++;
    }
}

/*****
- 功能描述： 串口接收处理 --- 参考
- 隶属模块： 外部
- 参数说明：
- 返回说明：
- 注：
1、串口接收都是采用中断的方式，一定要设置一个超时的计数器，超时做错误处理
2、由于我们所有的命令都是以0x0D和0x0A作为结束，所以只用检测0x0A就认为接收完成
*****/

void uart_isr_rcv(u8 uto buf)
{
    g_uart_flag. uart_timeout = UART_TIMEOUT ;/*一般100ms*/
    g_uart_flag. uart_stop = 0;
    buf_uart1.buf[buf_uart1.index++] = uto buf; /*字符存到缓存中*/
    if(uto_buf == 0x0A) /*收到数据0x0A则认为一帧数据结束了*/
    {
        g_uart_flag. uart_stop = 1; /*接收完成标志位置1*/
        g_uart_flag. uart_analysis = 1; /*分析数据使能打开*/
        g_uart_flag. uart_timeout = 0 ;
        uart_rcv_ok_pro(buf_uart1.buf ,buf_uart1.index) ;/*这里就是接收完成之后的处理*/
        /*这里添加你自己的应用程序*/
    }
}
```

```

/*****
- 功能描述: main
- 隶属模块: 外部
- 参数说明:
- 返回说明:
- 注:
*****/
void main ()
{
    uart_init() /*串口初始化*/
    delay_2ms(500) /*延时1秒*/
    func_UartPutStr("AT+CA30\r\n") /*设置音量级为30级*/
    delay_2ms(500) /*延时1秒*/
    func_UartPutStr("AT+CA15\r\n") /*设置音量级为15级*/
    delay_2ms(500) /*延时1秒*/
    func_UartPutStr("AT+BD12345678\r\n") /*设置蓝牙名为12345678*/
    delay_2ms(500) /*延时1秒*/
    func_UartPutStr("AT+CT02\r\n") /*设置波特率为19200 -- 参考手册*/
    delay_2ms(500) /*延时1秒*/

    while(1) ;
}

```

13. Notes that need to be modified

1. At present, there are five prompt tones supported in the chip

Music mode	Music.mp3	
Bluetooth mode	Bt.mp3	
Successful connection	Connect.mp3	
Connection disconnect	Disconnect.mp3	
Incoming call	Ring.mp3	

2. If you need to change the prompt tone, please provide the above file. The file must be compressed.

3. The size of 5 files can not exceed 17KB, which is limited by the memory space inside the chip.

4. The volume of the prompt sound should be edited by software. You can put it in the TF card and play it. Is the sound appropriate?

14. BQB Certificate and test instructions for FCC

Note that if Bluetooth is not used, Bluetooth antenna must not be drawn. Because if you draw it, it will cause unnecessary trouble.

14.1 Bluetooth BQB Authentication Instructions

1. At present, the BQB certificate of the original chip has already come down, so there is no need to worry about the problem of BQB certification. We will sort out the information in detail and issue it again.

2. The form of publication is a separate document, as well as a description of videos, certificates and tools related to authentication.

To be continued...

14.2 Explanation of Bluetooth FCC Frequency Fixing Test

1. FCC frequency fixing. The original factory provides special software, which is connected by USB to TTL.

2. The choice of serial port is the two ports of USB of our chip.

(1) So when you design the hardware. These two IO ports must be left with pads. Recommendation: VCC TX RX GND four feet

(2) When the chip has passed FCC certification at the same time, it has to burn a separate program. We will also provide you with it.

3. The form of publication is a separate document, as well as a description of videos, certificates and tools related to authentication.

To be continued...

15. Disclaimer

■ Developing Preparatory Knowledge

Qingyue electronic products will provide as comprehensive as possible development templates, drivers and application instructions for users to use, but also need users to be familiar with the hardware platform used in their design products and the relevant C language knowledge.

■ EMI and EMC

The mechanical structure of Qingyue electronic series module determines that its EMI performance must be different from the integrated circuit design. The EMI of Qingyue series modules and chips can satisfy most applications. If users have special requirements, they must consult with us beforehand.

The EMC performance of the chip or module is closely related to the design of the user's bottom board, especially the power supply circuit, I/O isolation and reset circuit. Users must fully consider the above factors when designing the bottom board. We will strive to improve the EMC characteristics of the series products, but will not provide any guarantee for the EMC performance of the final application products.

■ Right to modify documents

Clear Moon Electronics reserves the right to modify documents related to chips or modules at any time without prior declaration.

■ ESD Electrostatic Discharge Point Protection

Some components of Qingyue electronic products have built-in ESD protection circuit, but in the harsh environment, users are still advised to provide ESD protection measures when designing the bottom board, especially power supply and IO design, in order to ensure the stable operation of the products. In order to ensure safety, install chips or module products, the static electricity accumulated on the body should be released first, such as wearing reliable grounded electrostatic rings. Touch tap pipes that connect to the earth, etc.

16. Version History16. Version History

Version history		
Edition	date	Reason
V1.0	2018-04-27	1. Primary release of BLE transmission function OK SPP transmission function OK serial port control function OK
V1.4	2018-11-01	1. Additional test instructions for serial debugging assistants – see Chapter 9 for details 2. Descriptions of new KT1025A and KT1025B – See Chapter 11 for details.
V1.5	2018-11-12	1. New music playback, designated track playback, see 5.1.5 for details. 2. Adding music playback and specifying folders to play circularly. See 5.1.6 for details. 3. Adding Bluetooth designated number to dial and obtaining caller number can be seen in 6.1.3 and 6.2.2 for details. 4. Selection of new boot-ups and priority of online playback devices are detailed in 4.2.5. 5. The new Bluetooth half-second message is closed. See 4.2.6 for details. 6. Setting up new music playing mode by adding status query, time query and playback serial number query 7. The message inserted and pulled out by the new music device is returned, and the message played by music is finished.
V1.6	2018-11-15	1. Query the long file name of the new audio file and return the playing time of the new music
V1.7	2018-11-20	1. Closing and opening of new BLE and new EDR, see 6.1.3 for details. 2. Adding BLE status query and adding a UUID to control Bluetooth chip for mobile phone. See 7.5 for details.

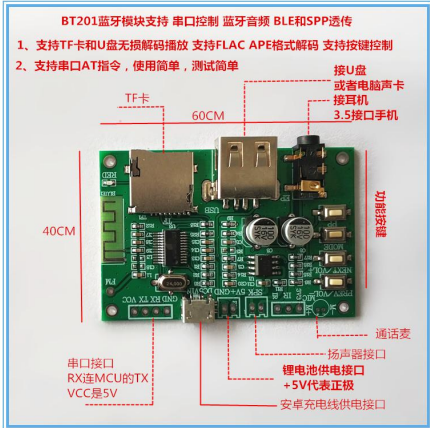
		3. Modify the way of active return of Bluetooth status, see 6.2.1 and 6.2.2 for details.
V1.8	2018-11-30	1. Adding new users to modify UUID, see Chapter 7.6 to improve known bugs 2. Add recording function and delete file function. See 5.1.9 Add prompt sound shutdown interface for details. 3. Changing the default serial port baud rate to 115200
V1.9	2018-12-29	1. Modify the DAC to a bug with high configuration. Increase information returned by errors 2. Perfecting Documentation
V2.0	2019-01-05	1. The new Bluetooth Background Instruction does not automatically switch, see 4.2.11 for details. 2. Adding Bluetooth related control commands, see 6.1.5 for details. 3. Perfecting descriptive errors in documents
V2.1	2019-03-24	1. Added AT+C?Designation, as detailed in 4.2.13 2. Modifying Descriptive Errors in Documents 3. This version is very small and downward compatible.
V2.2	2019-04-26	1. Customization of the new Bluetooth broadcasting package, as detailed in Chapter 7.8 2. Adding read-specified file serial port to send out, see 5.1.11 and 5.1.10 for details. 3. Add and delete files of TF card or U disk, see 5.1.12 for details. 4. Perfect descriptive bugs in documents. Before the software version is compatible at the same time
V2.3	2019-05-07	1. Adding the specified folders and file names for recording, as detailed in Chapter 5.1.13 – The main updates are recording and reading TXT. 2. Improving the encapsulation in the database, as well as the specifications and encapsulation references of KT1025A and KT1025B 3. Improving document descriptive bugs 4. Detailed understanding of the new model can be found in Section 4.3.2. 5. The MAC settings of the new bluetooth, as well as detailed instructions, are detailed in 6.1.6.

17. Qingyue Bluetooth Series Products Recommendation

programme	Shipping mode	Characteristic
BT201 Bluetooth solution	Chip IC: KT1025A-QSOP24 KT1025B-QSOP24	1. Bluetooth audio, TF card U disk playback, Bluetooth BLE and SPP transmission. Serial AT Instruction Control Application scenario: -- Main product (1) Bluetooth Dual-Analog Digital Transmission, Application of BLE (2) The application scenario of Bluetooth audio + data transmission is suitable for the occasion of audio + data transmission.
BT321F Bluetooth Audio Transmitting Scheme	Chip IC: KT1025A-QSOP24 KT1025B-QSOP24	1Bluetooth audio stereo emission to speakers or headphones 2Serial AT instruction operationThe transmitter supports U disk, TF card, AUX, SPIFLASH. Application scenario: -- Main product (1) Bluetooth Transmitting + Voice Prompt Type Products (2) Highlights in the sound of spiflash for: adult voice products and other occasions
BT301 Bluetooth Audio Scheme	Chip IC: KT1025A-QSOP24 KT1025B-QSOP24	1. Bluetooth audio, TF card U disk playback, Bluetooth dual-mode transmission 2. Support FLASH playback and USB download voice. SPIFLASH and TF cards can only choose 1 from 2. 3. Supporting AUX input, FM functionality [this firmware is separate] Application scenarios: (1) Bluetooth digital transmission + voice prompt type products (2) Highlights in the support of spiflash playback for: voice broadcast + Bluetooth data transmission

BT401 Bluetooth	Modular: BT401 module-Default version	1. Supporting Bluetooth dual-mode digital transmission BLE and SPP transmission.Audio DAC Output 2. Module BQB certification and module delivery.Requirements for module classes 3.It is also suitable for Bluetooth MIDI, OBD, printer and so on. Application scenario: Bluetooth digital + voice prompt type products support spiflash playback
BT421 Bluetooth	Modular: BT401 module-Upgrade firmware	1Support Bluetooth dual-mode digital transmission BLE and SPP transmission.I2S audio host output 2Module BQB certification, module shipment. Application Scenario: Vehicle-borne DSP, High Power I2S Requirements

17.1 Bluetooth BT201 Bluetooth Scheme

BT201蓝牙模块支持 串口控制 蓝牙音频 BLE和SPP透传 1、支持TF卡和U盘无损解码播放 支持FLAC APE格式解码 支持按键控制 2、支持串口AT指令，使用简单，测试简单  40CM 60CM 串口接口 RX连MCU的TX VCC是5V 接U盘 或者电脑声卡 接耳机 3.5接口手机 扬声器接口 锂电池供电接口 +5V代表正极 安卓充电线供电接口 通话麦	功能简介 1、支持蓝牙音频、BLE 数传、U 盘播放、TF 卡播放，SPIFLASH。支持 MP3、WAV、FLAC、APE 格式解码 2、串口 AT 指令控制。支持修改波特率、修改蓝牙名、指定设备播放、和手机数据透传 3、支持 BLE 和 SPP 双模数据透传，同时还可以播放蓝牙音频，不冲突 4、支持蓝牙通话，多按键控制，上一曲、下一曲、播放暂停、调音量等等简单功能。 5、支持获取播放的完整文件名,串口指定路径播放，循环或者单次播放 6、支持 128KBS 的录音功能。录音到 TF 卡或者 U 盘，录音删除回放等等 7、丰富的使用资料，参考 pcb、使用视频教程、手机透传视频教程、串口 AT 视频教程 8、超低的成本，量大价优，超级简单的外围，5 颗电容搞定 9、轻松对接已有的 APP，或者开发微信小程序。实现手机操控
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17.2 Bluetooth BT321F Bluetooth Transmitting Scheme

蓝牙发射接收二合一立体声方案 支持串口AT指令控制  支持USB电脑声卡 支持TF U盘 spiflash设备 音源发射 支持随机搜索 指定设备连接	BT321F--功能简介 1、支持蓝牙音频立体声发射和接收，二合一。蓝牙发射 支持连接蓝牙耳机、蓝牙音箱等等从设备 2、蓝牙接收 支持连接手机、平板、电脑等等主设备。以及一些常用的控制功能 3、蓝牙发射支持的音源：AUX 输入、U 盘、TF 卡、电脑PC 声卡、SPIFLASH存储器 4、蓝牙发射的声音延迟：小于 300ms 支持串口 AT 指令控制 5、丰富的使用资料，参考 pcb、使用视频教程、手机透传视频教程、串口 AT 视频教程 6、超低的成本，量大价优，超级简单的外围，5 颗电容搞定 7、蓝牙发射支持：上电随机搜索、列表搜索(和手机端一样的效果)、指定地址或者名称去连接 8、功能固件我们自己研发，非常灵活，即使有不能满足的需求，也是可以沟通开发
--	---

17.3 Bluetooth BT301 Bluetooth Audio Scheme



支持SPIFLASH, 支持AUX, 支持BLE和SPP蓝牙数传
支持U盘和TF卡, 支持串口控制

BT301 方案---功能简介
1、支持蓝牙音频、BLE 数传、U 盘播放、TF 卡播放，SPIFLASH。支持 MP3、WAV、FLAC、APE 格式解码
2、串口 AT 指令控制。支持修改波特率、修改蓝牙名、指定设备播放、和手机数据透传
3、支持 BLE 和 SPP 双模数据透传，同时还可以播放蓝牙音频，不冲突
4、支持蓝牙通话，多按键控制，上一曲、下一曲、播放暂停、调音量等等简单功能。
5、支持获取播放的完整文件名,串口指定路径播放，循环或者单次播放
6、支持 USB 虚拟 spiflash 为 U 盘，拷贝语音或者调试非常的方便
7、丰富的使用资料，参考 pcb、使用视频教程、手机透传视频教程、串口 AT 视频教程
8、超低的成本，量大价优，超级简单的外围，5 颗电容组成最小系统。可以远程升级固件
9、轻松对接已有的 APP，或者开发微信小程序。实现手机操控，语音提示等功能
10、功能固件我们自己研发，非常灵活，即使有不能满足的需求，也是可以沟通开发

17.4 Bluetooth BT401 Bluetooth Audio Scheme



尺寸：23 *15.5MM

- ▶ TF U盘无损
- ▶ 蓝牙音频
- ▶ 蓝牙通话
- ▶ 蓝牙BLE透传
- ▶ 串口AT指令

▶ 串口AT指令设置波特率、蓝牙名、MAC地址
▶ 支持获取完整的歌曲名 支持外音输入AUX
▶ 支持I2S数字音频输出，也支持DAC模拟输出 灵活

BT401 模块---功能简介
1、支持蓝牙音频、BLE 数传、U 盘播放、TF 卡播放，SPIFLASH。支持 MP3、WAV、FLAC、APE 格式解码
2、串口 AT 指令控制。支持修改波特率、修改蓝牙名、指定设备播放、和手机数据透传
3、支持 BLE 和 SPP 双模数据透传，同时还可以播放蓝牙音频，不冲突。模组支持 I2S 作为主机或者从机
4、支持蓝牙通话，多按键控制，上一曲、下一曲、播放暂停、调音量等等简单功能。
5、支持获取播放的完整文件名,串口指定路径播放，循环或者单次播放
6、支持 128KBS 的录音功能。录音到 TF 卡或者 U 盘，录音删除回放等等
7、丰富的使用资料使用视频教程、手机透传视频教程、串口 AT 视频教程
8、超低的成本，标准固件的模块 超大批量成本低于 5X。
9、轻松对接已有的 APP，或者开发微信小程序。实现手机操控
10、功能固件我们自己研发，非常灵活，即使有不能满足的需求，也是可以沟通开发