Eye rrecord

1. Outline

1.1 Brief introduction

YX5300-24SS Is a provider of serial voice chip, perfectly integrated MP3 , WAV The hardware decoding. At the same time the level of software support industrial serial communication protocol to SPIFLASH , TF Card or U The disk as a storage medium, the user can flexibly choose any of which apparatus as a storage medium speech. By simple serial command to complete the specified voice playback, as well as how to play back voice and other functions, without tedious low-level, easy to use, stable and reliable is the most important feature of this product.

Without any writer, no software, USB Direct programming FLASH .

1.2 Features

1 It supports sampling rates (KHz): 8 / 11.025 / 12/16 / 22.05 / 24/32 / 44.1 / 48 2 , twenty four Place DAC Output dynamic range support 90dB SNR support 85dB 3 , Maximum support 16M Byte SPIFLASH . E.g W25Q16 [2M byte], W25Q128 [16M byte]

4 , A variety of control modes, control mode parallel port, serial port mode, AD Key control mode

5 , Miniusb Interface update voice files, without having to install any software. stand by XP with WIN7 system.

6 To support the combination playback, you can achieve timekeeping, reported temperature, to a certain extent, can replace some of the expensive TTS Program

7 , 30 Level adjustable volume, 5 level EQ Adjustable [This feature is temporarily open]

8 , Comes 3W Amplifier, external speakers directly to complete playback

9 ,stand by 8 Triggering playback voice segment, IO Detectable manner, therefore suitable for applications like carbon film key

10 , Can support U plate, TF Card and SPIFLASH As the storage medium

1.3 application

1 , Car navigation voice broadcast

2 , Road transport inspectors, toll station voice prompts;

3 , Train, bus safety inspection voice prompts;

4 , Electricity, communications, finance and business offices voice prompts;

5 , Into the vehicle, a tunnel authentication voice prompt;

6 , Public security frontier inspection channel voice prompts;

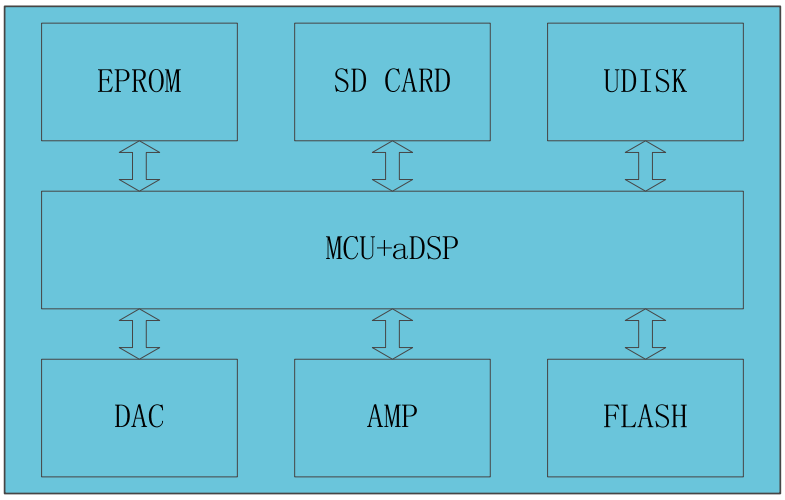
8 , Electric sightseeing bus safety with voice announcement;

9 , Electrical Equipment failure alarm;

10 , Voice fire alarm;

11 , Automatic broadcasting apparatus, broadcast the timing

2. plan description

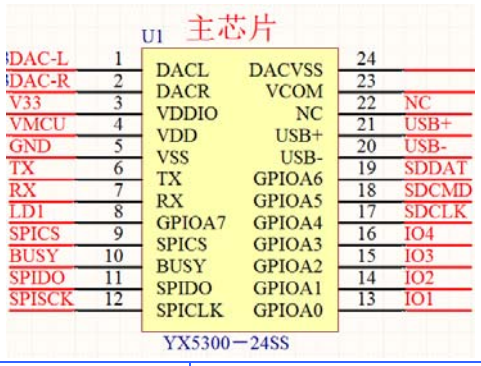


The chip used is SOC Program integrates a 16 Bit MCU And a specific audio decoding aDSP Using hardware decoding manner, and to further ensure the stability of the sound system. More compact package size to meet the needs of other product embedded

2.1 Parameter Description

name	parameter
MP3 file format	1, all the bit rates supported 11172-3 and ISO13813-3 layer3 audio decoder 2, the sampling rate
	support (KHZ): 8 / 11.025 / 12/16 / 22.05 / 24/32 / 44.1 / 48 3, support Normal, Jazz, Classic , Pop,
	Rock and other sound effects
USB interface	2.0
UART interface	Standard serial port, TTL level, the baud rate can be set [a user can not be located]
Input voltage	3.3V-5V [7805 after a diode cascade is the best]
Current Rating	10MA [static]
Low Power Current	<200uA
power	Drive headphones, amplifier
size	SSOP24 [Unit: mm]
Operating temperature	- 40 degrees --80 degrees
humidity	5% to 95%
The main chip models	YX5300-24SS [SSOP24]

2.2 Pin Description



Pin name		Functional Description	Remark
1	DACL	Audio output left channel	Drive headphones, amplifier
2	DACR	Right channel audio output	Drive headphones, amplifier
3	VDDIO	3.3V power output	Power supply to the SPI flsah
4	VDD	5V power input	Not exceed 5.2V
5	VSS	Power Ground	
6	TX	UART serial data output	3.3V TTL level
7	RX	UART serial data input	3.3V TTL level
8	GDPIA7	Play indicator	Connected transistor drive recommended
9	SPICS	Chip select bus SPI_CS	
10	BUSY	Busy output	Output low when playing
11	SPIDO	SPI_DO data bus	
12	SPICLK	SPI_CLK data bus	
13	GPIOA1	P01	Trigger output 1
14	GPIOA2	P02	2 trigger outputs
15	GPIOA3	P03	Trigger output 3
16	GPIOA4	P04	Trigger output port 4
17	GPIOB5	SD_CLK clock bus	Then TF card or SD card
18	GPIOB6	SD_CMD command bus	Then TF card or SD card
19	GPIOB7	SD_DAT data bus	Then TF card or SD card
20	USB-	USB- DM	Computer's USB port
twenty one	USB +	USB + DP	Computer's USB port
twenty two	NC	NC	
twenty three	VCOM	Decoupling	
twenty four	DACVSS	Ground	

3. Serial communication protocol

Serial commonly used as a control in the field of communication, we optimize the industrial level, the added parity frames, retransmission, error handling measures, greatly enhance the stability and reliability of communication, while based on the extended stronger RS485

For networking functions, serial communication baud rate can be set on their own, default 9600

3.1 Communication format

It supports asynchronous serial communication mode via the serial port of a host computer to accept

Communication Standard: 9600

bps Data bits: 1 parity bit: none

Flow control: none

Format: $ S VER Len CMD Feedback para1 para2 checksum $ O		
$ S	Start bit 0x7E	Each command $ feedback are beginning, that is, 0x7E
VER	version	Version Information
Len	After the number of bytes len	The checksum is not counted
CMD	Command word	A specific operations, such as play / pause, etc.
Feedback	Command feedback	The need for feedback, feedback, feedback is not 0
dat	parameter	And in front of the associated len does not limit the length
checksum	Checksum [occupies two bytes]	Accumulation and verification [excluding the start bit $]
$ O	End position	End bit 0xEF

For example, if we specify Play SPIFLASH , You need to send: 7E FF 06 09 00 00 04 FF dd EF

Data length 6, This 6 Bytes are [FF 06 09 00 00 04] . Not counting the start, end, and verification. And then accumulates the results obtained, and then 0 Reduction, namely " 0-checksum = Check data. "If you do not understand this, we can refer to the" Commissioning Manual. "In addition users can also directly ignore check, refer to our 5.3.4 Section Description.

3.2 Communication instruction

Our newsletter is divided into two blocks

- Control instruction
- Query chip parameters and status

3.2.1. Control instruction

Here is how to control the chip work

CMD command	The corresponding function	Parameters (16)
0x01	Under a	
0x02	On a 0x03	
	Specify the track (NUM)	1-255
0x04	Volume +	
0x05	Volume	
0x06	Specifies the volume	0-30
0x07	Retention	Retention
0x08	Single cycle specified track play	See 3.4.3
0x09	Specify the playback device	See 3.4.4
0x0A	Goes to sleep - Low power consumption	Power 10MA
0x0B	Wake-sleep	
0x0C	Chip reset	
0x0D	Play	
0x0E	Pause	
0x0F	Play the file name specified folder	See 3.4.5
0x16	Stop	
0x17	FLASH memory devices only [not support the TF card and U disk]	See 3.4.7 Description
0x18	Retention	Retention
0x19	Of the currently playing track set to loop	See 3.4.8
0x21	DAC output chip opening and closing	See 3.4.9
0x22	Combination Play	See 3.4.10

3.2.2. Query command

Here is the status query the chip and associated parameters

Detailed CMD command (query)	The corresponding function	Parameters (16)
0x3C	Retention	
0x3D	Retention	
0x3E	Retention	
0x3F	Send initialization parameters	0x1F (5 each represents a lower folder)
0x40	Returns an error, a retransmission request	
0x41	answer	
0x42	Query the current status	See 3.4.10
0x43	Query current volume	
0x44	Query the current EQ	Retention
0x45	Retention	This version retains this feature
0x46	Retention	This version retains this feature
0x47	Total number of files The total number of file	queries UDISK equipment
0x48	The total number of queries TF file	Total number of files equipment
0x49	Total number of files Total file number	5 query FLASH folder
0x4B	Query the current track of the physical order	UDISK
0x4C	Query current track physical order of TF	
0x4D	FLASH query returns the current track number	and track folders pointer
0x4E	The total number of tracks query specified folder	See 3.5.2
0x4F	Query the current device of the total number of folders	See 3.5.3
0x61	Query the current folder pointer only supports	FLASH

3.3 Chip returned data

Chip will have to be returned data in key areas. For the user to control the working status of the chip

- Successful on-chip power-on initialization data
- Chip finished playing the current track data
- **Chip successfully receives the return instruction ACK (answer)**
- The chip receives a data error [forfeiture includes data integrity verification error in both cases]
- When the chip is busy, the data over the chip will return busy instruction
- **U plate, TF Card insertion and removal, the data are returned**

3.3.1. On-chip power returned data

(1) , On power-up, initialization will take some time, this time is the need to TF card, U plate, SPIFLASH , General file determines how much of the device in less than 500ms

This time. If this time is exceeded the module initialization data has not been sent out, indicating that module initialization error, check the hardware connection

(2) , Module initialization data returned valid for the current folder, such return 7E FF 06 3F 00 00 03 xx xx EF ==> among them 0x03 It represents U Disk

and TF The two devices online

U disk - Online	7E FF 06 3F 00 00 01 xx xx EF	Or is the relationship between devices
TF - Online	7E FF 06 3F 00 00 02 xx xx EF	
PC - Online	7E FF 06 3F 00 00 04 xx xx EF	
FLASH - online 7E FF 06 3F 00 00 08 xx xx EF U disk, TF - online 7E		
FF 06 3F 00 00 03 xx xx EF		

(3) , MCU After the chip initialization must wait to issue instructions to send the corresponding control command, or instruction sent by the chip will not be processed. But it will also

affect the normal initialization of the chip.

3.3.2 Track has finished playing the returned data

U disk finished playing the first one	7E FF 06 3C 00 00 01 xx xx EF U disk player first one is completed	
U disk finished playing the first two	7E FF 06 3C 00 00 02 xx xx EF U disk player completed the first two	
TF card player finished the first one	7E FF 06 3D 00 00 01 xx xx EF TF card play the first one finished TF card to play out the first	
two 7E FF 06 3D 00 00 02 xx xx EF	TF card play the first two completed FLASH player After the first one 7E FF 06 3E 00 01 01 xx	
xx EF FOLDER1 the first one finished playing	FLASH After the first two players 7E FF 06 3E 00 02 02 xx xx EF FOLDER2 the first	
two players finish		

1 For a lot of demand triggered the play, we play one after the chip corrected to automatically comes to a halt. If you need this type of application. Only you need to specify the tracks to play. In this way, the track has finished playing will automatically stop, waiting for instructions

2 In addition, we opened up a special IO As an indication of state of the decoder and pause. See 5 foot

(1) , Play status output low [mute amplifiers many feet, this can be IO Direct control]

(2) , Playback pause status, the output high. Chip sleep. It is low

3, after the chip is powered on, initialized properly, the device will automatically enter the chip play state. And decoding stops, waiting for the user to send the relevant instruction to play

4, another user after a specified device, it is necessary to wait for 200ms of time, and then sends the specified track, because once the designated track, the system will initialize the specified device file system, if the designated track command sent immediately, will lead to the chip Not receive.

3.3.3 Chip response data returned

Chip return ACK	7E FF 06 41 00 00 00 xx xx EF Description successfully received data	

(1) In order to strengthen the stability of the data communication between, we have increased the response processing, ACKB Whether the need is to set byte reply response. The benefit of this is to ensure that each communication has a handshake, receiving the response says MCU Data transmission, the chip has been successfully received and handled immediately.

(2) For general applications, customers are free to choose, without this response processing is also possible.

3.3.4 Chip error data returned

Busy on	When 7E FF 06 40 00 00 01 xx xx EF chip in the file system initialization	
The current in sleep mode 7E FF 06 40 00 00 02 xx xx EF sleep mode supports only the specified device		
Serial receive error	7E FF 06 40 00 00 03 xx xx EF serial port does not receive a complete data	
Check error	7E FF 06 40 00 00 04 xx xx EF and check error	
Specify the file of range 7E FF 06 40 00 00 05 xx xx EF specified file exceeds the range set unspecified file is found 7E FF		
06 40 00 00 06 xx xx EF designated file is not found data does not comply with the rules 7E FF 06 40 00 00 08 xx xx EF As a		
local minimum, the transmission is 0		

(1) In order to strengthen the stability of the data communication between, we have added a data error handling mechanism. Chip receive non-compliant data format, all information will be fed back out

(2) In the environment is a bad situation, strongly recommends that customers process this command. If the application environment in general, can not handle.

(3) Chip return to busy, on-chip power-on initialization time will return basically, because the chip need to initialize the file system

(4) After the power chip, device state is entered, the device is SPIFLASH . in case SPIFLASH Is not online, it will automatically go to sleep.

(5) As long as we give the reference test SDK Program, which serial transplant operation section, it will not cause an error message, here is strongly recommended that users check the way we give. Because no one can guarantee transmission of data without errors.

(6) , Part of the file specified error, please refer to the following Detailed

3.3.5 Message insertion and removal device

U disk into	7E FF 06 3A 00 00 01 xx xx EF	
Insert TF	7E FF 06 3A 00 00 02 xx xx EF	
PC insert	7E FF 06 3A 00 00 04 xx xx EF	
U disk pull out	7E FF 06 3B 00 00 01 xx xx EF	
TF pull out	7E FF 06 3B 00 00 02 xx xx EF	
PC pull out	7E FF 06 3B 00 00 04 xx xx EF	

(1) In order to increase the flexibility of the chip, we have increased, the device is plugged in, pull out the instruction feedback. User to know the working status of the chip.

(2) , When the device is plugged in, the device waits for us to enter the state, if the user inserts a lighted U Disk, you can see U Disk light flashes. You can also receive serial device into the message.

3.4 Detailed instructions serial control

We conducted the following detailed description of key areas - For control instructions :

- Specify the track to play
- Specifies the volume of playback
- Specify the play equipment
- All loop instructions
- Combination playback [highlights]
- Specify the track playing with volume parameters

3.4.1. Specify the song playback instruction [direct reference 3.4.7]

Our instructions are given to support the specified track is playing, the choice of songs is 0 ~ 255. In fact, it can support more, because it involves the reasons for document management, supporting too many songs, will lead to a slow operating system, the general application does not need the support of so many files. If the customer has unconventional application, please communicate with us in advance.

(1) , For example, select the first song playback, the serial transmission section 7E FF 06 03 00 00 01 FF E6 EF 7E --- Start command

FF --- Version Information

06 --- The data length (not including parity)

03 --- No representative of the product

00 --- Need to answer [0x01: We need to answer, 0x00: No return answer]

00 --- High byte track [DH] 01 --- Low byte track [DL], Here it represents the first song to play

FF --- High byte parity

E6 --- Low byte parity

EF --- End command

(2) For selections, if you select the first 100 First, first 100 Converted to 16 Hex, the default is double-byte, it is 0x0064 .

DH = 0x00; DL = 0x64 (3) Other operations and so on can be, because the use of the embedded field 16 Radix is the most convenient method of operating.

3.4.2 Specifies the volume of playback instruction

(1) We default volume on the system power is 30 Level, to set the volume, then the corresponding instruction can be transmitted directly

(2) Such as a designated volume 15 Level, the serial transmission of commands: 7E FF 06 06 00 00 0F FF D5 EF (3) , DH = 0x00; DL = 0x0F , 15 Converted to 16 Hex is 0x000F . Can be described with reference to playing track portion

3.4.3 Play single cycle instruction

Loop Specify the track 7E	FF 06 08 00 00 01 xx xx EF loop play the first song	
	7E FF 06 08 00 00 02 xx xx EF loop of the second song 7E FF 06 08 00 01 01 xx xx	
	EF loop of the first one FOLDER1	

(1) , Contention for some of the requirements needed to play a single cycle, we have improved it a control command 0x08 . In operation TF Card or U Disc according to the physical order of the specified file is stored in the user's attention to this point. But in operation FLASH When, in accordance with the specified folder partition, please refer to the above test instructions.

(2) In the loop process, the normal operation can play / pause, an upper, a lower, volume adjustment, comprising EQ Etc. and the state is still the loop can trigger or stop play to close the loop by specifying a single state

3.4.4 Specify the playback device

(1) Our chip is supported by default 4 Types of playback devices, only the device can be specified device to play online

Device is online, our software will automatically detect, without user relationship.

(4) , See table, select the appropriate command transmitted

(3) , After the specified device. Decoding chip automatically enters the stop state, waiting for the user to specify a track to play. Chip to complete the initialization file to the specified device from the receiving system. Probably need 200ms . Please wait 200ms After resending command specified track.

-U disk playback device designated	7E FF 06 09 00 00 01 xx xx EF xx xx: Specifies the check on behalf of the playback	
device -TF card 7E FF 06 09 00 00 02 xx xx EF specified playback device -PC		
	7E FF 06 09 00 00 04 xx xx EF	
Specify the playback device -FLASH	7E FF 06 09 00 00 05 xx xx EF	
Specify the playback device -SLEEP	7E FF 06 09 00 00 06 xx xx EF	

3.4.5 Play the file name specified folder

Folder of 001xxx.mp3 01	7E FF 06 0F 00 01 01 xx xx EF TF card or U	disk
Folder of 100xxx.mp3 11	7E FF 06 0F 00 0B 64 xx xx EF TF card or U	disk
Folder 99 255xxx.mp3	7E FF 06 0F 00 63 FF xx xx EF TF card or U	disk
FOLDER1 first one	7E FF 06 0F 00 01 01 xx xx EF [FLASH]	
FOLDER2 first one	7E FF 06 0F 00 02 01 xx xx EF [FLASH]	

(1) Specify the folder to play our developed extensions, naming the default folder is " 01 "," 11 " In this way, the stability and speed of the song in order to switch the system, each folder under the default maximum support 255 The song, most support 99 Folders

(2) , For example, specify " 01 " Folder 100xxx.MP3 File, serial port to send commands to: 7E FF 06 0F 00 01 64 xx xx EF DH: It represents the name of the folder, the default support 99 Files that 01--99 Named

DL: On behalf of the tracks, most default 255 Song that 0x01 ~ 0xFF (3) In order standard of chips, be sure to specify the folder and file names, to lock a file. Specify a separate folder or specify the file name alone is possible, but to manage such files will be worse. Specified folder and specify the tracks are supported MP3 , WAV (4) The following two sectional view illustrating the folder and file names designated [two left and right in FIG]

(5) , SPIFLASH Supports up 5 More FOLDER Please user operation, do not exceed this range.

3.4.6 Specified folder start loop

Specified folder loop	7E FF 06 17 00 00 02 FE E2 EF 02 designated folder loop 7E FF 06 17 00 00	
	01 FE E3 EF 01 designated folder loop	
Designated FOLDER loop	7E FF 06 17 00 03 01 xx xx EF FOLDER3 of a loop	

(1) ,for TF Card and U Disk, folder naming must be "01" --- "99" . Not exceed 99 (2) ,for SPIFLASH The user can 5 Any number of folders in a loop, please refer to the above reference instruction.

03 Specified folder FOLDER3 01 The first song of the beginning of the specified folder, if there is 02 . Well, from the first 2 Song cycle begins play this folder

(3) The user can send a stop instruction to end the loop.

3.4.7 The current track set to loop

Loop On Off	7E FF 06 19 00 00 00 FE E2 EF single loop open	7E FF 06 19 00 00 01
	FE E1 EF single closed loop	

(1) , Send this command during playback, the current track is looped. If the current process is paused or stopped, the chip does not respond to this command

(2) If you want to turn off single loop, sending commands to shut down, so will after the current track has finished playing, stop.

3.4.8 Opening and closing DAC

Set up DAC	7E FF 06 1A 00 00 00 FE E1 EF-Open DAC	7E FF 06 1A 00 00 01
	FE E0 EF off the DAC [Hi-Z]	

(1) In some cases the user needs to overlay their own sound source, you can pause the current playback voice, and then we die DAC Output is set to high impedance, so that users can share their own power amplifier for audio playback, but DAC The opening and closing, there will be soon po Tone, users friends attention.

(2) , The chip can be shut down at any time DAC . If you are currently playing voice, closed DAC The chip will continue playing, but no sound of it. After power chip is enabled by default DAC Only be set after the close, it will be closed. If we need to open, we need to open by Directive DAC The

3.4.10 Instructions with the playback volume parameter

Play with volume	7E FF 06 22 00 1E 01 xx xx EF	30 volume play the first one
	7E FF 06 22 00 0F 02 xx xx EF	15 volume play the first two

(1) For some users hope for Different set the volume of voice playback, according to previous old method is to first have set the volume, and then specify the track is playing, this operation cumbersome and inconvenient. We hereby increase the entry instructions 0x22 (2) Is given, the specific operation may refer to the above two test instructions.

(3) ,for U Disk or TF Card, we follow the order specified physical play. for FLASH , It is the default FOLDER1 Folder.

3.5 Detailed instructions serial query

We conducted the following detailed description of key areas - For query commands :

- Player Status command
- The total number of tracks specified folder inquiry
- The current total number of queries folder on your device

3.5.1 Query currently online equipment

Online inquiry equipment	7E FF 06 3F 00 00 00 FE BC EF U disk being played	

(1) Chip in the course of their work, will continue testing equipment online, users can also 0x3F This instruction queries

(2) , For example, if chip data are returned 7E FF 06 3F 00 00 0A xx xx EF

DL = 0x0A = 0000 1010 represents TF Card and FLASH If online DL = 0x1F = 0000 1111 represents

U plate, TF card, PC , FLASH Are online

(3) , 0x0F-- lower four bits represents an apparatus.

3.5.2 Player Status command

Now Playing	7E FF 06 42 00 01 01 xx xx EF U disk being played	
Pause playback	7E FF 06 42 00 02 02 xx xx EF TF card playback is paused	
Stop play	7E FF 06 42 00 04 00 xx xx EF in USB mode 7E FF 06 42 00	
	08 01 xx xx EF FLASH playing	
	7E FF 06 42 00 10 00 xx xx EF The chip is in sleep	

(1) Module in the decoding process will 3 States open to users. The user can query the current state of the instruction by the obtaining module

(2) Play pause means, is playing a track, artificial send commands to pause playback,

Play Stop means a track has finished playing, playback module is in a stopped state

(3) If the returned data 7E FF 06 42 00 02 02 xx xx EF representatives explain the meaning of the following: DH = 0x02 ---

represents the current TF card equipment, DL = 0x02 --- represents the current "TF card playback is paused "

(4) If the returned data 7E FF 06 42 00 02 02 xx xx EF representatives explain the meaning of the following:

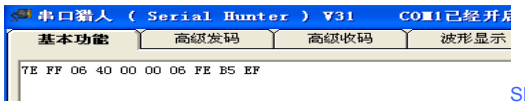
DH meaning		DL meaning	
0x01	The current device is a U disk	0x00 currently playing stopped	
0x02	The current device is a TF card	0x01 currently playing state	
0x04	The current device is a USB disk	0x02 is currently in a suspended state	
0x08	The current device is a FLASH disk 0x10		
	Currently SLEEP mode		

3.5.2 The total number of tracks specified folder inquiry

Queries folder total number of tracks	7E FF 06 4E 00 00 01 FE AC EF query the total number of tracks 01 folders	
	7E FF 06 4E 00 00 0B FE A2 EF 11 the total number of tracks query folder	

(1) If the user name the file according to the rules we have set. " 01 "" 02 "Wait, so you can track the total number of the files inside the folder query. Queries include valid documents MP3 , WAV . Other file formats are ignored.

(2) If the query file folder is empty [for no valid documents], then the serial port will directly return the following information



Show Query Folder error

(3) ,if FLASH Query, the query directly given us FOLDER1 - FOLDER5 It can be.

3.5.3 The current total number of queries folder on your device

Queries folder totals 7E FF	06 4F 00 00 00 FE AC EF query the current device folder totals	
	7E FF 06 4F 00 00 03 FE AC EF FOLDER1 effective and FOLDER2	

(1) , The current user can query the total number of device folder. We only support the number of files in the "Root" folder. It does not support folder which contains folders. Also please do not create an empty folder.

(2) If the device has 5 Valid folder [folder inside MP3 / WAV File], an empty folder, then the total number of queries folder, will return there 6 Folders. It is recommended that users do not create an empty folder.

(3) ,in FLASH Mode, the number of queries folder and return data TF Card and U Disk is not the same, an example:

If the returned data: 7E FF 06 4F 00 00 03 FE AC EF

among them DL = 0x03 , It represents FOLDER1 with FOLDER2 There are two folders voice files, FOLDER3-FOLDER5

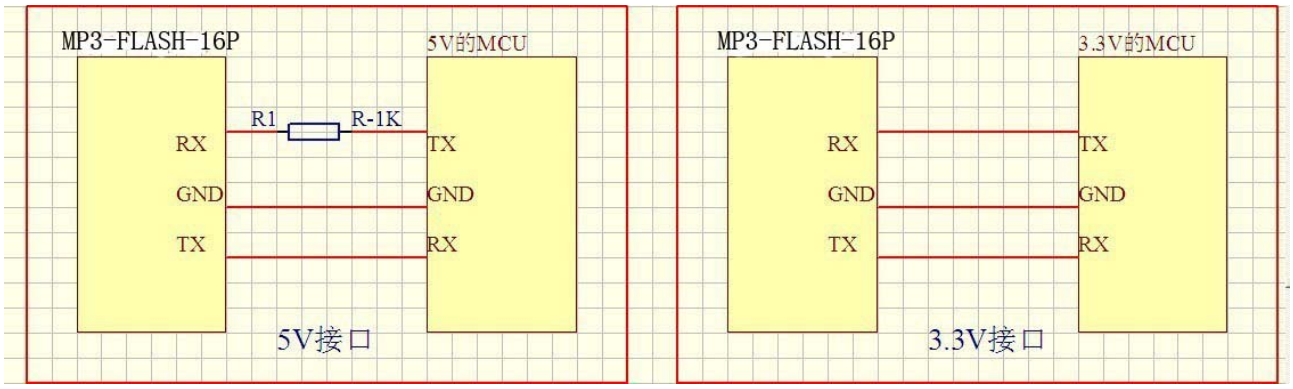
There is no valid documents.

4. Reference circuit

Contention for the application of the chip, we provide a detailed reference design, so you can quickly get started to experience the powerful features of the chip

- A serial communication interface, the default baud 9600 Can be modified according to customer requirements
- External IO The function keys can be customized according to customer demand
- Mono external reference amplifier circuit

4.1 Serial Interface



1 Chip serial port is 3.3V of TTL Level, so the default level interface for 3.3V .

2 If the system is 5V . It is recommended that a series of serial ports in the docking interface 1K The resistance. In this way sufficient to meet the general requirements,

3 If used where the strong electromagnetic interference, see "Notes" below.

4 , Chips 5V with 3.3V The systems tested were normal, everything is normal. They are used in the direct way, and not a string 1K

The resistance. The chips are compatible with the general 3.3V with 5V Level.

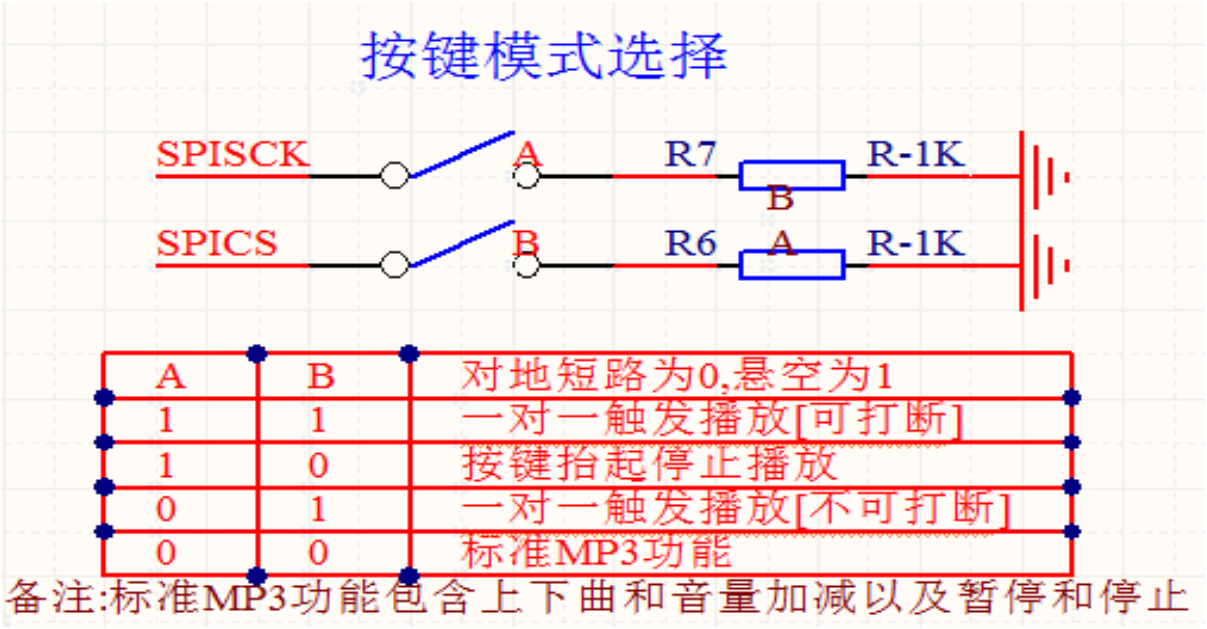
5 But in the actual user of the product development process must be rigorous testing, pay attention to the level of conversion. Strongly recommends that users can modify under the conditions of use 3.3V of MCU In response to environmental protection, low power consumption of the call.

4.2 Button interface

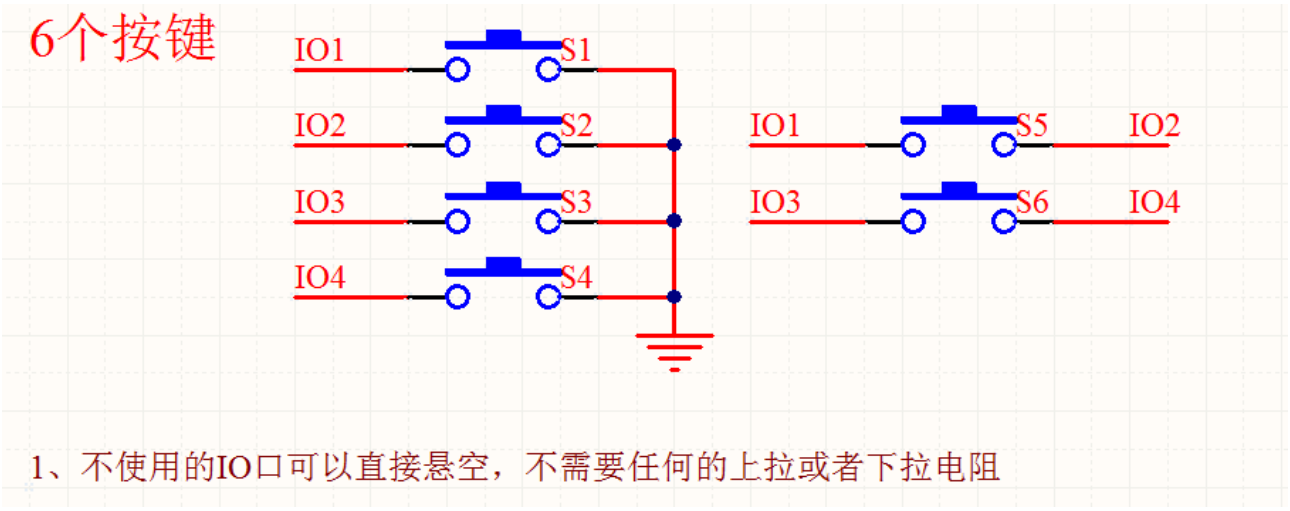
We use the chip IO Key way, replacing AD Keyboard connection, the benefits of doing so is to make full use of MCU More and more and more GPIO . Design tedious but not simple, we chip the default configuration 6 Function keys is assigned, can be freely controlled in the case of any adverse, even as the MCU Communications interface. Our key assignments 4 Different types of functions, to be selected according to two resistors, contact support.

- One trigger play can be interrupted
- One trigger playback level remains can be recycled
- One trigger play can not be interrupted
- Standard playback functions, such as up and down song, playback pause, and

so on screen 1 correspond A Screen Printing 2 correspond B [See PCB]



The table above is selected 10 Logic function keys of the table. It is suspended two pins [one player can trigger interrupted]



The key is to stay out of the chip S1-S4. other S5-S6 Users themselves connected according to the principle of FIG.

(1) , One trigger function [be interrupted]

One trigger	dog	Press	Pressing not loose	Button lift
S1	Paragraph 1 [FOLDER1] S2			
	Paragraph 2 [FOLDER1] S3			
	Paragraph 3 [FOLDER1] S4			
	Paragraph 4 [FOLDER1] S5			
	Paragraph 5 [FOLDER1] S6			
	Paragraph 6 [FOLDER1]			
Note: This is one trigger playback, you can break [80ms short circuit to trigger effective]				

(2) , Stop the playback button lift

Lift stop button Press		Press	Pressing the lift button is not loose	
S1		Paragraph 1 cycle [FOLDER1]		stop
S2		Paragraph 2 cycle [FOLDER1]		stop
S3		Paragraph 3 cycles [FOLDER1]		stop
S4		Paragraph 4 cycles [FOLDER1]		stop
S5		Paragraph 5 cycles [FOLDER1]		stop
S6		Paragraph 6 cycles [FOLDER1]		stop
Note: This is the lift stopped, press and slide show [short circuit triggered 800ms effective]				

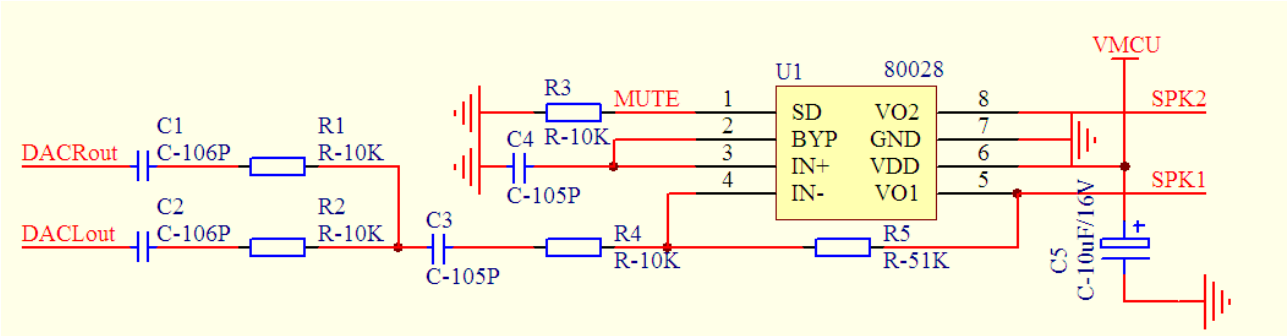
(3) One trigger an interrupt

Do not interrupt trigger	dog	Press the button pressing is not loose lift		
S1	Paragraph 1 is not interrupted [FOLDER1]			
S2	Paragraph 2 is not interrupted [FOLDER1]			
S3	Paragraph 3 is not interrupted [FOLDER1]			
S4	Paragraph 4 is not interrupted [FOLDER1]			
S5	Paragraph 5 is not interrupted [FOLDER1]			
S6	Paragraph 6 is not interrupted [FOLDER1]			
Note: This is one trigger to play, not to interrupt [80ms short circuit to trigger effective]				

(4) Standard playback

Playback function keys	dog	Press	Pressing not loose	Button lift
S1	next track		Volume +	
S2	previous piece		volume-	
S3	play / Pause			
S4	stop			
S5	Volume +			
S6	volume-			
Note: This is the standard MP3 functions				

4.3 External mono amplifier



Here we use the power amplifier 8002 , Please refer to the specific parameters IC of datasheet . General enough to apply to the occasion, if the pursuit of higher quality, customers find any other suitable amplifier.

4.4 The user adjusts the volume amplifier

Our chip is power-on default maximum volume, if the user wants to decrease the volume themselves, from below 2 Local modification

(1) , Modify the chip DAC Output current limiting resistor, our default is posted 1K Resistance, the user wants to decrease the volume, this resistance can be appropriately increased. DAC FIG resistance of the reference position " 1 "The red frame marks

(2) , Modify the magnification power amplifier, we posted the default is " 51K "Resistance, if the user wants to decrease the volume, this can be appropriately reduced resistance, may be modified to 47K or 33K . See the red box under the map " 2 "The mark

4.4 USB Update the voice instructions

Our modules can use the phone charging cable directly update the voice, convenient and flexible. Our advantages are as follows

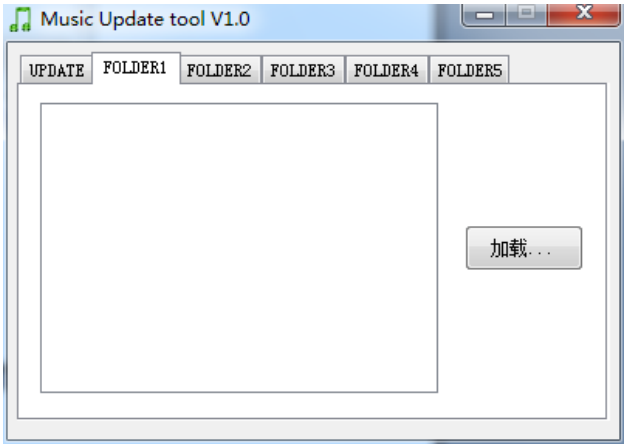
- In accordance with customer requirements, correct window Download voice
- No need to install any software updates directly and does not require a dedicated downloader
- Without any compression and damage to the sound quality, ensure a higher quality experience

1 , Plug in our cell phone charging cable, call MicroUSB line. The computer will pop up the following interface, then the computer 360 Software, antivirus software or off, or plug USB The following pop-up window option allows the program to run:

2 , The computer will pop up the following interface

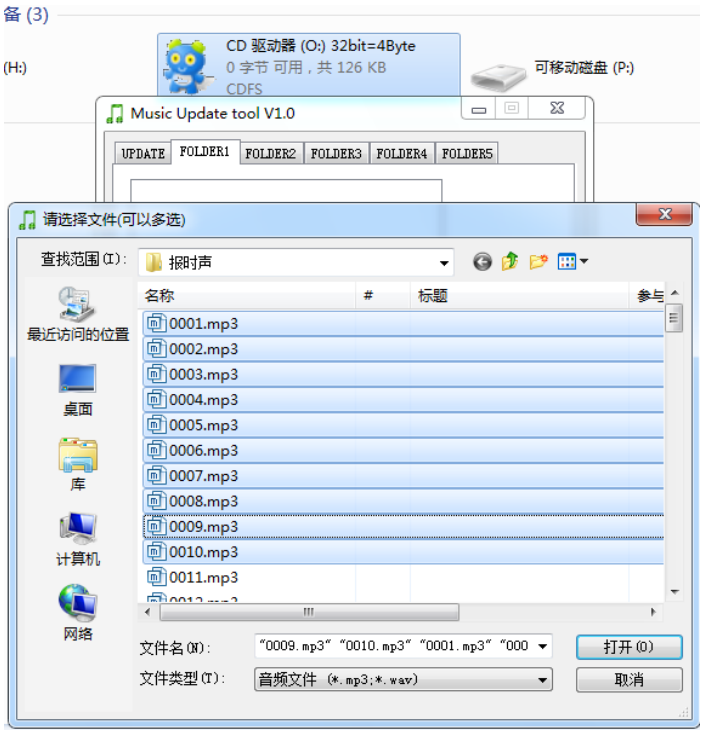
1 Double-click the left mouse button, the computer will pop up the following interface (1)

(1)



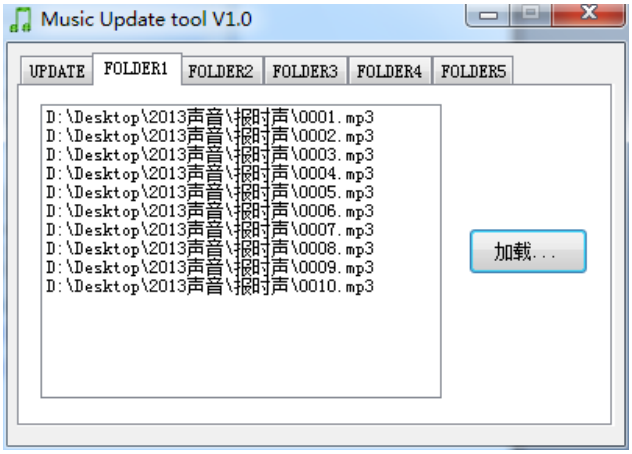
(2)

2 , Select the " FOLDER1 "Folder, as shown above (2) And click Load, a window will pop up loaded voice, as shown below



Point the left mouse button and drag to select or pressing keyboard Ctrl Button, select a sound file of a

3 In this case you need to load the selected voice, click "Open" to add the software.



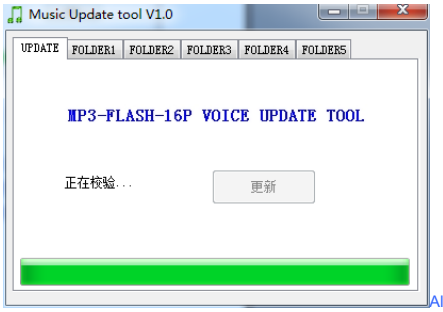
4 And finally, back to " UPDATE "Screen, click" Update "button, the following interface will appear

5 ,

From left to right 3 Windows, window represents the last update finished, just close the window, unplug USB Line on it

5 Now we've tested SPIFLASH Including Winbond, GD , The largest market Macronix, etc. FLASH . and so FLASH Compatibility issues. We tested FLASH . Up to 16M byte[W25Q128], Are no problem.

6 Since we update the progress bar window is updated only supports a maximum 8M Bytes, so use 16M Byte FLASH When will appear the following interface, the user's friends do not worry, this is normal



Although progress bar has not changed, but still more in new

7 Update description:

(1) We update window reserved 5 Regional update, named FOLDER1 - FOLDER5. This release supports 5 Specify the playback operation zones

(2) , FOLDER1 - FOLDER5 This 5 And areas not been allocated, is telescopic. For example, I just use FOLDER1 Do not use other 4 A file area, and that this 4 A file area will occupy space? It will occupy less than 10 Bytes can be ignored.

(3) ,Every FOLDER Supports up area 255 Voice segment [in the case of space permits]. Single voice size is not required. Currently FLASH Maximum support 128Mbit . That is 16M Bytes of voice storage, sufficient for most applications

(4) If the sound quality less demanding users can choose to use voice compression software, MP3 or WAV File is compressed to reduce the storage space occupied by the file. In order to reflect the high quality of our products, so the user does not recommend the use of

(5) , USB Update the voice of the time, is based on, the larger the audio file size is determined voice, the slower the update time.

(6) , Voice once been updated, the previously saved voice will be deleted.

7 , Notes:

(1) , Our software modules without having to install any software, pop into the computer to actually burn SPIFLASH . Take up 200kb Space. It is small, so the user can simply ignore.

(2) , If the user needs to put on their own SPIFLASH . Please obtain a copy of the firmware update to our technical support.

(3) If the computer for the first time to use our module, just into the computer, it will take some time, because the computer will automatically enumerate my module to determine the identity, etc. operations. might need 1 Minutes or so, until the update pop-up window.

4.5 User blank FLASH Explanation

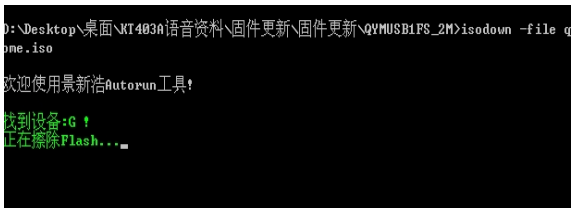
Users in the process of debugging, will be replaced in accordance with their needs flash Size to meet their own needs, so you need to complete the following three steps FLASH Replacement.

- We get asked FLASH Firmware Update
- by USB Interface blank FLASH Firmware burn
- Unplug USB Cable, then can be used normally energized

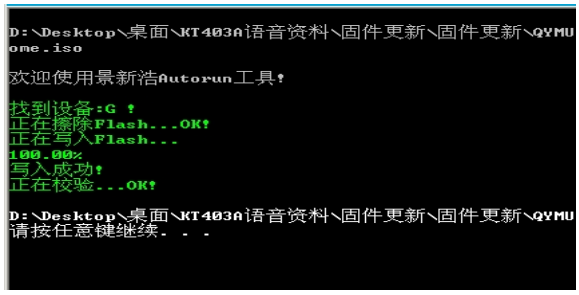
1 Our firmware into 4 Parts, explain in detail below

Users according to their own FLASH Size to select the firmware update. The size of the firmware is the same. In fact right through " Double-click this file writing module firmware. bat " This batch calls " ISDDown.exe "Software" 32bit = 4Byte.iso.iso "Write image file FLASH in. This is an open source tool, interested can access information on their own, to understand the whole process.

2 ,by USB After inserting the computer, click " mydown.bat ", The following window will pop up



3. After the update is complete, the following interface will appear:



4. After the update is complete, we can see that the computer has been out of a virtual "CDROM", to explain this success.

NOTE: If during the update process, any unusual, is not normal, you can replace FLASH to identify the problem.

5. Precautions

Use of the chip, the key place to do the following explanation:

- Chip GPIO Features
- In Notes applications
- Serial Programming section of Note

5.1 GPIO Features

IO input characteristics						
Symbol	Parameter	Minimum	Typical	Maximum	Units	Test Conditions
V_{IL}	Low-Level Input Voltage	- 0.3	-	0.3 * VDD	V	VDD = 3.3V
V_{IH}	High-Level Input Voltage	0.7VD D	- VDD + 0.3		V	VDD = 3.3V
IO output characteristics						
Symbol	Parameter	Minimum	Typical	Maximum	Units	Test Conditions
V_{OL}	Low-Level Output Voltage	-	-	0.33	V	VDD = 3.3V
V_{OH}	High-Level Output Voltage	2.7	-	- V		VDD = 3.3V

5.2 Application Note points

1 , External interface chip are 3.3V of TTL Level, so the hardware design, note that the level of power conversion problems. Also in strong interference environment, note that some protective measures electromagnetic compatibility, GPIO Using optocoupler isolation, increase TVS and many more

2 , ADKEY The key values are in accordance with the general use environment, if a strong inductive or capacitive load environment, note that the chip power supply, recommended to use separate isolated power supply, and additional beads inductor matched filtering a power supply to to ensure a clean and stable power supply input as possible. If it can not be guaranteed, please contact us to reduce the number of keys, redefine wider voltage distribution.

3 , Serial communication, in the general environment, pay attention to a good level conversion. If strong interference environment, or long distance RS485 Application, please note that signal isolation, strictly in accordance with standard industrial design communication circuit. You can contact us, we offer a reference design

4 We support a minimum sample rate of the audio file is 8KHZ . That is less than 8KHZ The audio file is not supported, it can not properly decode and play. Users can use audio processing software to increase the sampling rate of the audio file to solve this problem.

5 The current state of the chip in sleep 10MA Left, playback, depending on the size of the volume, the peak current can be achieved 1A . Power consumption will be relatively large. If the low-power applications, or ask the user to control the power chip chip. This can reduce the power consumption of the chip

6 , If the user directly using our own chip amplifier, please select the appropriate speaker can be. Recommended Use 4 ohm/ 3W . This is the best configuration results. Choose other speakers, please note the size of the load, and the power of these two parameters

7 The chip supports MP3 , WAV Two kinds of mainstream audio formats.

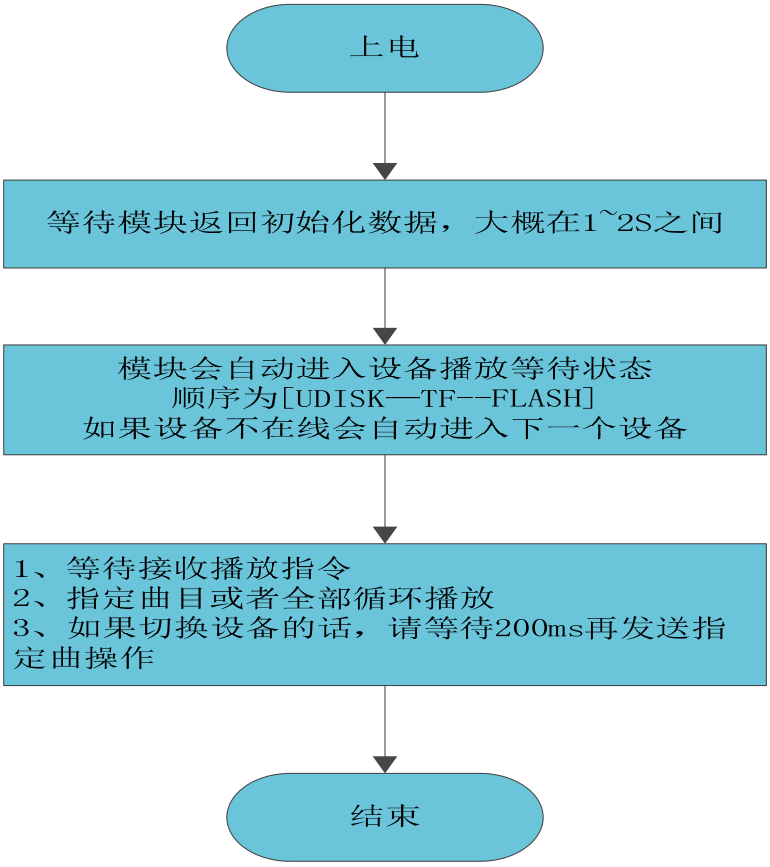
8 The parameters of our chip supports 8 / 11.025 / 12/16 / 22.05 / 24/32 / 44.1 / 48KHZ sampling rate of an audio file, which is the vast majority of audio files on the network. If the sample rate of the audio file of the user is not in this range, playback is not supported, but it can be converted through a dedicated software. Our advantage is high quality playback and non-destructive, so he did not recommend that users of audio compression.

5.3 Serial operation

Serial operation section, see the following process, we provide a complete reference routines, for reference:

- Serial port operation process
- DESCRIPTION serial programming reference
- Note the serial operation requires delay

5.3.1. Serial operating procedures



1 , Part of the serial operation of all the chips provided by our company, are the same agreement, so do not worry is not compatible with different chips

2 If the serial port operations, have any do not understand, be sure to contact us for serial programming reference routine.

3 Updating our products, they will certainly according to the current protocol version, so backwards compatibility.

5.3.2. DESCRIPTION serial programming reference

Currently serial programming reference code we provide, there are two parts, the first part of our beta test code, related to serial operation is more comprehensive, and the other is the basic version, but specified examples of track. Please be patient user digest

5.3.3 Serial Programming delay the need for appropriate attention to points

1 , After the chip is powered on, it takes about 1S-1.5S Time related operations early flowers, after initialization is complete, there will initialize the relevant data is sent out. Users can also directly ignore these data

2 , When designated player device, you need to delay 200ms Time, and then send the specified track, etc. related directives.

3 Because the chip comes with a file system, under normal circumstances, the track is not more than 1000 First, then, the response rate is lower than 50ms of Tracks over 3000 After the first, the switching speed of the file system will slow down a little, response speed 100ms — 1S Ranging between

4 , The processing of the serial port chip is 10MS Treated once, so that the continuous transmission instruction must be spaced 20MS Delay. Otherwise preceding instruction will be overwritten and not enforced

5 If the specified folder the file name players [0x0F Instructions], the delay must be greater than 40ms Because the chip is locked file takes time. As far as the relevant command file folder name lookup, 40MS The delay is essential. If the chip is currently find the file, serial data over too often, can lead to a reset of the chip

5.3.4 Important check

1 To fight for a lot of users are less accustomed to checking of communication, we will introduce a way compatible with and without checksum verification. for example. If we send a command to play a combination of the following:

Under a play [without parity]	7E FF 06 01 00 00 00 EF	
Under a play [with parity]	7E FF 06 01 00 00 00 FE FA EF	

The differences between the two instructions, the checksum is omitted 2 Bytes. Both the frame data may be received by each chip.

2 Because many users use of the process, many of which we are without the use of crystal MCU . In this case, we recommend that you add must check in this way, to ensure the stability of communication.

3 If the user uses STM32 or STC and many more MCU , And the crystal is a plug, it can be dispensed with an appropriate check. Because without crystal MCU The clock is relatively less accurate, so there will be an error serial, once the error is too large, it will cause communication error. Please users friends at their discretion.

5.3.5 MCU Crystal selection

1 In principle, we recommend that you use 11.0592MHZ Or multiple crystal phase. This allows serial produces

9600 Baud rate would be more accurate. Our error is allowed in the serial chip 3% Within

2 , If the user 12M When the crystal. The first thing the following judgment,

(1) What to see is MCU , 51 or PIC , STM32 Etc., basically comes baud rate generator, is generated

9600 Baud rate and basically had no pressure.

(2) ,Look MCU Whether the hardware serial ports, if it is IO Simulate serial port, it is strongly recommended that you use 11.0592

Crystal

(3) ,standard 51 ,Such as: STC89C52 or AT89C52 And so we are using the timer to generate the baud rate, after a simple calculation can be calculated, 12M

Crystal do 9600 Baud rate error Yes 0.16% , Is running without any problems, but still requires the user to conduct a comprehensive test

6. Disclaimer

- **Development Preliminaries**

The company's products will provide the fullest possible development of templates, driver and application documentation for ease of use but also requires the user to be familiar with their own design products used by the hardware platform and related C Knowledge of language

- **EMI with EMC**

The company determines its mechanical structure of the chip EMI Performance will inevitably vary with integrated circuit design. The company's chip chip EMI To meet the vast majority of applications, the user if there are special requirements must be prior consultation with us. The company's chips EMC Performance is closely related to the design of the user base, in particular a power supply circuit, I / O Isolation, reset circuit, a user must consider the above factors in the design of the bottom plate. We will strive to improve the electromagnetic compatibility characteristics of the company's chips, but not to the final user applications EMC Any performance guarantee.

- **The power to amend the document**

The Company will retain any modifications to the time the company chip product-related documentation without prior notice Power

- **ESD Electrostatic discharge protection point**

Our products are part of the component-embedded ESD Protection circuit, but the use of harsh environment, it is still recommended that users in the design of the floor ESD Protection measures, especially with power IO Designed to ensure the stable operation of the product, install the company's products to ensure safety, please electrostatic discharge accumulated in the body, such as wearing a wrist strap is properly grounded, earth touch access to tap water pipe, etc.

7. Reference routine

```
/ *************************************************** ****************************
 - Function: electrical chip are designated music playing the first and second curved, basic program for the user to test
 - date : 2013-05-06
 - Operating environment: STC   Crystal: 11.0592M   Baud rate: 9600
 - Remark : In Pu in science and technology 51 Development board debugging OK --- STC89C516RD +
              The test procedure is a chip or chip program must have equipment line, such as U plate, TF card, FLASH
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * /
#include "REG52.h"

#define COMM_BAUD_RATE 9600                 // Baud rate
#define OSC_FREQ              11,059,200         // Crystal Run: 11.05926MHZ
static INT8U Send_buf [10] = {0};

void Delay_Ms (INT32U z) {

    INT32U x = 0, y = 0; for (x =
  110; x> 0; x--) for (y = z; y> 0;
  y--);}

/ *************************************************** ****************************
 - Description: Serial 1 initialization
 - Note:          Set as 9600 Baud Rate
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * /
void Serial_init (void) {TMOD

= 0x20;                                      // Set up T1 Baud Rate Generator.
    SCON = 0x50;                             // 0101,0000 8 Data bits, no parity
    PCON = 0x00;                             // PCON = 0;
    TH1 = 256- (OSC_FREQ / COMM_BAUD_RATE / 32/12); // Set as 9600 Baud Rate
    TL1 = 256- (OSC_FREQ / COMM_BAUD_RATE / 32/12); TR1
              = 1;                           // Timer 1 turn on
    REN        = 1;                          // Serial ports 1 Receive enable
    ES        = 1;                           // Serial ports 1 Interrupt Enable
} Void Uart_PutByte (INT8U ch) {

    SBUF = ch; while
  (TI!) {;} TI = 0;}

/ *************************************************** ****************************
 - Functional Description: Serial transmission command out [including control and query]
 - Parameter Description: CMD: Represents control instructions, please refer to the instruction list, also includes instructions related queries
                feedback: Need to answer [ 0: No reply, 1: Need to answer]
                data: Parameter transfer
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * /
void SendCmd (INT8U len)
```

```
{
        INT8U i = 0;
        Uart_PutByte (0x7E); // Starting
        for (i = 0; i <len; i ++) // data
        { Uart_PutByte (Send_buf [i]);} Uart_PutByte


        (0xEF); // End
}
```

/ *** *****************************

- Description: checksum --- Users can also omit this check, see 5.3.4 instruction of
- And verify the following idea:

Instruction sent to remove start and end. The middle 6 Bytes are accumulated, the last inversion code. The receiving end will be received frame of data, start and end removed. Intermediate accumulation data, plus parity bytes received. Just as 0. This represents the received data is correct.

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * /
void DoSum (INT8U * Str, INT8U len) {

        INT16U xorsum = 0; INT8U
        i;
        for (i = 0; i <len; i ++) {

                xorsum = xorsum + Str [i];}

        xorsum             = 0 -xorsum;
        * (Str + i)        = (INT8U) (xorsum >> 8);
        * (Str + i + 1) = (INT8U) (xorsum & 0x00ff);}


void Uart_SendCMD (INT8U CMD, INT8U feedback, INT16U dat) {

        Send_buf [0] = 0xff;               // Reserved bytes
        Send_buf [1] = 0x06;               // length
        Send_buf [2] = CMD;                // Control instruction
        Send_buf [3] = feedback; // The need for feedback
        Send_buf [4] = (INT8U) (dat >> 8); // datah Send_buf
        [5] = (INT8U) (dat);                       // datal
        DoSum (& Send_buf [0], 6);                 // check
        SendCmd (8);               // This data frame transmission
}

void main ()
{Serial_init (); // Serial register initial setting

        Uart_SendCMD (0x03, 0, 0x01); // Playing the first
        Delay_Ms (1000); // Probably delay 6S Uart_SendCMD (0x03, 0, 0x02); // The
        first play of the second
        Delay_Ms (1000); // Probably delay 6S Uart_SendCMD (0x03, 0, 0x04); // The
        first play of the fourth
        while (1);}
```

8. PC End of the serial debug instruction instance

Users can test the chip by the end of the serial computer software. Our chip is a serial TTL Level, note the level conversion

- Control instruction
- Query parameters command

9.1 Control instruction

Serial debugging assistant test	Command sent [with parity]	Command sent [without parity]	Remark
[next song]	7E FF 06 01 00 00 00 FE FA EF	7E FF 06 01 00 00 00 EF	
[On a]	7E FF 06 02 00 00 00 FE F9 EF	7E FF 06 02 00 00 00 EF	
[Specify the track]	7E FF 06 03 00 00 01 FE F7 EF	7E FF 06 03 00 00 01 EF designated the first song to play	
	7E FF 06 03 00 00 02 FE F6 EF	7E FF 06 03 00 00 02 EF designated second song	
	7E FF 06 03 00 00 0A FE EE EF	7E FF 06 03 00 00 0A EF specifies the first 10	
Volume Up	7E FF 06 04 00 00 00 FE F7 EF	7E FF 06 04 00 00 00 EF	
Volume down	7E FF 06 05 00 00 00 FE F6 EF	7E FF 06 05 00 00 00 EF	
[Specified volume]	7E FF 06 06 00 00 1E FE D7 EF	7E FF 06 06 00 00 1E EF specified volume to 30	
[Designated EQ]	7E FF 06 07 00 00 01 FE F3 EF	7E FF 06 07 00 00 01 EF reserved.	
[Loop Tracks]	7E FF 06 08 00 00 01 FE F2 EF	7E FF 06 08 00 00 01 EF loop playing the first	
	7E FF 06 08 00 00 02 FE F1 EF	7E FF 06 08 00 00 02 EF loop second song	
	7E FF 06 08 00 00 0A FE E9 EF	7E FF 06 08 00 00 0A EF loop tenth first	
	7E FF 06 08 00 01 01 FE F1 EF	7E FF 06 08 00 01 01 EF first song loop of the FLASH FOLDER1	
	7E FF 06 08 00 02 01 FE F0 EF	7E FF 06 08 00 02 01 EF loop play the first song of the FLASH FOLDER2	
[Specify playback device]	7E FF 06 09 00 00 01 FE F1 EF	7E FF 06 09 00 00 01 EF designated player UDISK	
	7E FF 06 09 00 00 02 FE F0 EF	7E FF 06 09 00 00 02 EF designated player TF	
	7E FF 06 09 00 00 03 FE EF EF	7E FF 06 09 00 00 03 EF designated player FLASH	
[Goes into sleep mode]	7E FF 06 0A 00 00 00 FE F1 EF	7E FF 06 0A 00 00 00 EF	
[Wake-sleep]	7E FF 06 0B 00 00 00 FE F0 EF	7E FF 06 0B 00 00 00 EF	
[Chip Reset]	7E FF 06 0C 00 00 00 FE EF EF	7E FF 06 0C 00 00 00 EF	
[Play]	7E FF 06 0D 00 00 00 FE EE EF	7E FF 06 0D 00 00 00 EF	
[time out]	7E FF 06 0E 00 00 00 FE ED EF	7E FF 06 0E 00 00 00 EF	
[Specified folder filename]	7E FF 06 0F 00 01 01 FE EA EF	7E FF 06 0F 00 01 01 EF	"01" folder, track "001"
	7E FF 06 0F 00 01 02 FE E9 EF	7E FF 06 0F 00 01 02 EF	"01" folder, track is "002"

Stop play	7E FF 06 16 00 00 00 FE E5 EF	7E FF 06 16 00 00 00 EF stop decoding software	
Specified folder loop	7E FF 06 17 00 02 00 FE E2 EF	7E FF 06 17 00 02 00 EF 02 designated folder loop	
	7E FF 06 17 00 01 00 FE E3 EF	7E FF 06 17 00 01 00 EF 01 designated folder loop	
Shuffle Playback	7E FF 06 18 00 00 00 FE E3 EF	7E FF 06 18 00 00 00 EF Shuffle	
Single Loop	7E FF 06 19 00 00 00 FE E2 EF	7E FF 06 19 00 00 00 EF single loop oper	
	7E FF 06 19 00 00 01 FE E1 EF	7E FF 06 19 00 00 01 EF single closed loop	
Play with volume	7E FF 06 22 00 1E 01 FE BA EF	7E FF 06 22 00 1E 01 EF	30 volume play the first one
	7E FF 06 22 00 0F 01 FE C9 EF	7E FF 06 22 00 0F 01 EF	15 volume play the first one
	7E FF 06 22 00 0F 02 FE C8 EF	7E FF 06 22 00 0F 02 EF	15 volume play the first two

9.2 Query parameters command

Serial debugging assistant test	Command sent [with parity]	Command sent [without parity]	Remark
Query the current status	7E FF 06 42 00 00 00 FE B9 EF	7E FF 06 42 00 00 00 EF	
[Query Volume]	7E FF 06 43 00 00 00 FE B8 EF	7E FF 06 43 00 00 00 EF	
[Query the current EQ]	7E FF 06 44 00 00 00 FE B7 EF	7E FF 06 44 00 00 00 EF	
The total number of files U disk	7E FF 06 47 00 00 00 FE B4 EF	7E FF 06 47 00 00 00 EF current total number of files equipment	
The total number of files TF	7E FF 06 48 00 00 00 FE B3 EF	7E FF 06 48 00 00 00 EF	
FLASH total number of files	7E FF 06 49 00 00 00 FE B2 EF	7E FF 06 49 00 00 00 EF	
U disk current track	7E FF 06 4B 00 00 00 FE B0 EF	7E FF 06 4B 00 00 00 EF currently playing track	
TF current track	7E FF 06 4C 00 00 00 FE AF EF	7E FF 06 4C 00 00 00 EF	
FLASH current folder track pointer 7E FF	06 4D 00 00 00 FE AE EF	7E FF 06 4D 00 00 00 EF	
The total number of tracks specified folder inquiry	7E FF 06 4E 00 00 01 FE AC EF	7E FF 06 4E 00 01 00 EF	
Query TF / U disk total number of folders	7E FF 06 4F 00 00 00 FE AC EF	7E FF 06 4F 00 00 00 EF only supports TF card and U disk	