Directory

1. Overview

1.1 Brief introduction

   Yx5300-24ss is a voice chip to provide a serial port, perfect integration of the MP3 , WAV The hard decoding. At the same time, the software supports industrial-level serial communication protocol to Spiflash , TF Card or U Disk as a storage medium, the user can flexibly choose any one of the devices as the voice of the storage media. Through a simple serial port command to complete the playback of the specified voice, and how to play voice functions, no need for cumbersome low-level operation, easy to use, stable and reliable is the biggest feature of this product.

No need for any burner, no software,   USB Direct Burn Write   FLASH   .

1.2 Function

1 , support sampling rate (KHz): 8/11.025/12/16/22.05/24/32/44.1/48

2 , 24 Bit Dac Output, dynamic range support 90dB , signal to noise ratio support 85dB

3 , maximum support 16M bytes of Spiflash . For example W25q16[2m byte] , w25q128[16m byte]

4 , a variety of control modes, and port control mode, serial port mode, AD Key control mode

5 , miniUSB interface to update the voice file without installing any software. Support Xp And WIN7 System.

6 , support the combination playback function, can realize the timekeeping, the report temperature, to a certain extent can replace some expensive Tts Scheme

7 , 30 the level of the volume can be adjusted, 5 Level EQ can be adjusted [This feature is temporarily closed]

8 , self-belt 3W amplifier, the direct external speaker can complete the playback

9 , support 8 the trigger playback of the segment speech, IO Detection of the way, so suitable for carbon film buttons and so on occasions

Ten , can also support U disk, TF Card and Spiflash As storage media

1.3 Application

1 , car navigation voice broadcast

2 , Highway transportation inspection, toll station voice prompts;

3 , train station, bus station security check voice prompts;

4 , electric power, communication, financial business Hall voice prompts;

5 , the vehicle enters and exits the channel to verify the voice prompt;

6 , the police border inspection channel voice prompts;

8 , electric sightseeing car safe travel voice notice;

9 , mechanical and electrical equipment fault automatic alarm;

Ten , fire-fighting voice alarm prompts;

One , automatic broadcast equipment, regular broadcast

2. Programme description
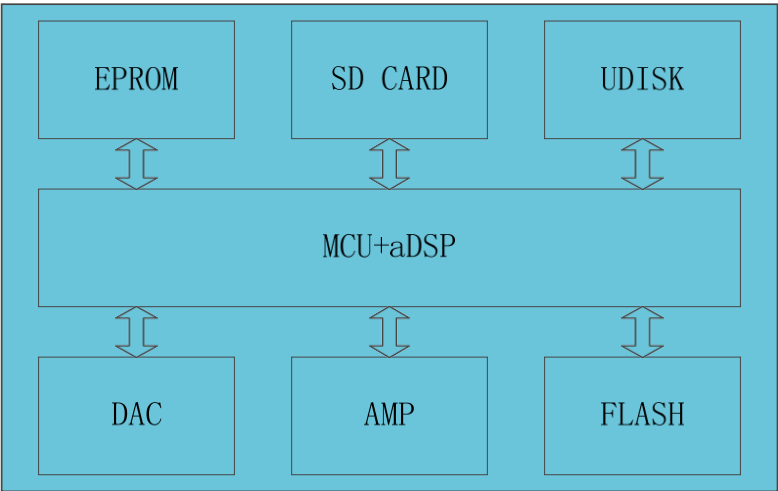
The chip is chosen   **Soc**   Scheme, which integrates a   **16**   Bit of   **MCU** , and a specially designed for audio decoding   **ADSP** , the method of hard decoding is used to guarantee the stability and sound quality of the system. Small package sizes are more responsive to the need for embedding other products

2.1 Parameter description

Name	Parameters
MP3 file format	1, support all bit rate 11172-3 and iso13813-3 Layer3 audio decoding
	2, sample 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 Standard
UART interface	Standard serial port, TTL level, baud rate can be set [user can not be set]
Input voltage	3.3v-5v[7805 a diode is the best for the rear cascade
Rated current	10ma[Static]
Low Power current	<200ua
Power	Drive headphones, Amplifier

Size	SSOP24 [Unit: MM]
Operating temperature	-40 degrees-80 degrees
Humidity	5% ~ 95%
Main chip model	YX5300-24SS [SSOP24]

Size   SSOP24 [Unit: MM]

-40 degrees-80
degrees
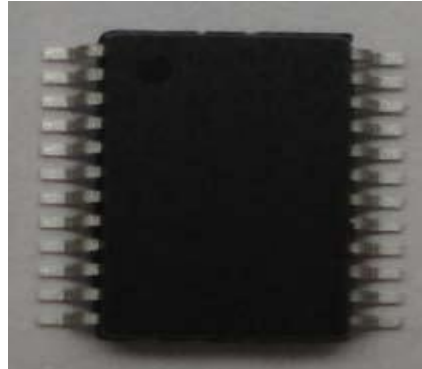
2.2 Pin description

Pin serial Number	Pin Name	Function description ion	Note
1	Dacl	Audio output left channel	Drive headphones, Amplifier
2	Dacr	Audio output Right Channel	Drive headphones, Amplifier
3	Vddio	3.3V Power output	Power to SPI Flsah
4	Vdd	5V Power Input	Can not exceed 5.2V
5	Vss	Power to	
6	TX	UART Serial Data output	TTL level of 3.3V
7	Rx	UART Serial Data input	TTL level of 3.3V
8	GDPIA7	Play indicator	Recommended to connect the transistor driver
9	Spics	Spi_cs Slice Select bus	
10	BUSY	Busy output	Low level output when playing
11	Spido	SPI_DO Data Bus	
12	Spiclk	SPI_CLK Data Bus	
13	GPIOA1	P01	Triggering the output of the outlet 1
14	GPIOA2	P02	Triggering the output of the outlet 2

15	GPIOA3	PO3	Triggering the output of the outlet 3
16	GPIOA4	PO4	Triggering the output of the outlet 4
17	GPIOB5	SD_CLK Clock Bus	Connect a TF card or an SD card
18	GPIOB6	Sd_cmd Command Bus	Connect a TF card or an SD card
19	GPIOB7	Sd_dat Data Bus	Connect a TF card or an SD card
20	usb-	Usb-dm	USB Port of Computer
21	usb+	usb+ DP	USB Port of Computer
22	NC	NC	
23	Vcom	Decoupling	
24	Dacvss	To	

3. Serial Communication Protocol

   Serial port as a common communication in the field of control, we carried out the industrial level of optimization, the addition of the frame of the calibration, restart, error handling measures, greatly enhance the stability and reliability of communications, while on this basis to expand a more powerful RS485 For networking functions, the communication baud rate of the serial port can be set by default 9600

3.1 Communication Format

Support asynchronous serial communication mode,

   through the serial port to receive the command

   of the host computer Communication standard:

   9600 bps
   Data   Bit: 1
   Check   Bit:
   none flow
   control
         Syste
   m: None

Format : $S VER Feedback Para1 Checksum$o		
$S	Start bit 0x7e	Each command feedback starts with $, i.e. 0x7e
VER	Version	Version information
Len	Number of bytes after Len	Checksum not counted
Cmd	Command word	Represents a specific action, such as play/pause, etc.
Feedback	Command Feedback	Do you need feedback, 1 feedback, 0 no feedback
Dat	Parameters	Associated with the front Len, no limit on length
Checksum	checksums [up to two bytes]	Cumulative and checksum [excluding starting bit $]

$0	End bit	End Bit 0xEF

For example, if we specify a playback **Spiflash** , you need to send : 7E FF DD EF

Data length is 6, it 6 bytes are **[FF 06 09 00 00 04]** 。 Start, end, and checksum are not evaluated. The resulting results are then added and then used 0 minus, namely " 0-**checksum**= verify the data. If you do not understand this, you can refer to our "Debugging Manual". In addition, users can also directly ignore the checksum, reference to our 5.3.4 Chapter description.

3.2 Communication instructions

Our newsletter is divided into the following two chunks
- Control instructions
- Query the parameters and status of the chip

3.2.1 Control instructions

Here is how the control chip works

CMD command	The corresponding function	Parameters (16-bit)
0x01	Next song	
0x02	A song.	
0x03	Specified track (NUM)	1-255
0x04	Volume +	
0x05	Volume	
0x06	Specify volume	0-30
0x07	Keep	Keep
0x08	Single loop specify track playback	Refer to 3.4.3
0x09	Specify Playback Device	Refer to 3.4.4
0x0A	Go to sleep--low power consumption	Power consumption 10MA
0x0B	Wake Up Sleep	
0x0C	Chip Reset	
0x0D	Play	
0x0E	Time out	
0x0F	Specify folder file name playback	Refer to 3.4.5
0x16	Stop it	
0x17	FLASH storage device only [TF card and U disk not supported]	See 3.4.7 for details
0x18	Keep	Keep
0x19	Set the currently playing track to loop play	Refer to 3.4.8
0x21	Turn on and off the DAC output of the chip	Refer to 3.4.9
0x22	Group Playback	Refer to 3.4.10

3.2.2 Query directives

Here is the status of the query chip and related parameters

CMD command Detailed (query)	The corresponding function	Parameters (16-bit)
0x3C	Keep	
0x3D	Keep	
0x3E	Keep	
0x3F	Send initialization parameters	0x1F (low 5 bits per person represents a folder)
0x40	return error, request to be sent again	
0x41	Response	
0x42	Query Current state	Refer to 3.4.10
0x43	Query Current Volume	
0x44	Query Current EQ	Keep
0x45	Keep	This version retains this feature
0x46	Keep	This version retains this feature
0x47	Total number of query Udisk files	Total number of files for the device
0x48	Query the total number of TF files	Total number of files for the device
0x49	Total number of files queried for FLASH	Total number of files in 5 folders
0x4B	Querying the current track of Udisk	Physical order
0x4C	Querying the current track of TF	Physical order
0x4D	Query the current track of FLASH	Return folder number and track pointer
0x4E	Query the track of a specified folder Total	Refer to 3.5.2
0x4F	Querying the total file for the current device Number of Clips	Refer to 3.5.3
0x61	Querying the current	FLASH only supported

	folder pointer	

folder pointer

3.3 The data returned by the chip

The chip will have data returned in key places. For the user to control the working status of the chip

- Data on the success of electrical initialization on the chip
- The chip has finished playing the current track data
- The chip successfully received the instruction returned by the ACK (answer)
- chip receives a frame data error [including data confiscation integrity, checksum error two cases]
- When the chip is busy, there is data coming, the chip will return the busy instruction
- U disk, TF Card Insert pull out, all data returned

3.3.1 The data returned by the power on the chip

(1) , chip on the electricity, need a certain amount of time to initialize, this time is required according to Tf Card, U disk, Spiflash How much of the device's file is decided, generally in less than 500ms This time. If the initialization data for this time module has not been sent out to indicate an error in module initialization, please check the hardware connection

(2) , module initialization returned data is the current valid folder , such as return 7E FF modified 3F xx xx EF

==> which 0x03 is representative of U Disk and Tf The two devices are online

U Disk--Online	7E FF + 3F xx xx EF	The relationship between the equipment is or
TF--Online	7E FF 3F xx xx EF	
PC--Online	7E FF 3F xx xx EF	
FLASH--Online	7E FF 3F/xx xx EF	
U disk, TF--online	7E FF modified 3F xx xx EF	

(3) , MCU You must wait for the chip initialization command to send the corresponding control instructions, otherwise sent instructions chip will not be processed. It will also affect the normal initialization of the chip.

3.3.2 The data returned by the track playback finished

U disk play the 1th song	7E FF + 3C xx xx EF	U disk play the 1th song finished
U disk play the 2nd song	7E FF 3C xx xx EF	U disk play the 2nd song finished
TF Card finished playing the 1th song	7E FF + 3D xx xx EF	TF Card plays the 1th tune finished
TF Card finished playing the 2nd song	7E FF 3D xx xx EF	TF Card plays the 2nd tune finished
FLASH Play the 1th song	7E FF modified 3E xx xx EF	FOLDER1 's 1th song is played out.
FLASH play the 2nd song	7E FF 3E/xx xx EF	FOLDER2 's 2nd song is played out.

1 , for a lot of trigger-type playback requirements, our chip correction to play a song automatically into the Stop state. If the user needs this type of application. You only need to specify the track playback. This way, the track will automatically stop when it is played, waiting for instructions

2 , in addition we specialize in opening up a Io As a status indicator for decoding and pausing. Please see section 5 Feet

(1) , playback state output Low level [many amplifiers have mute feet that can be used by this Io Direct Control](2) , playback suspend state, output high level. Chip sleep state. Also low level

3, after the chip power, the initialization of normal, the chip will automatically enter the device playback status. And stop decoding, waiting for the user to send the relevant instructions to play

4, another user after the specified device, the need to wait for 200ms time, and then send the specified track, because once the track is specified, the system will be the specified device for the initialization of the file system, if immediately send the specified track command, will cause the chip can not receive.

3.3.3 Chip answer the returned data

Chip Ack return	7E Ff 06 41 00 00 00 Xx Xx Ef	Description of successfully receiving data

(1) ， in order to enhance the stability between data communication, we increase the response processing， ackb The byte is the setting of whether a reply response is required. The advantage of this is to ensure that each communication has a handshake signal, the answer will indicate MCU The data sent, the chip has been successfully received, immediately processed.

(2) ， for the general application, the customer is free to choose, do not add this response processing is also possible.

3.3.4 The data returned by the chip error

Return busy	7E FF EF XX	When the chip is initialized in the file system
Currently in sleep mode	7E FF/xx EF	Sleep mode only supports specified devices
Serial Port receive error	7E FF x xx EF	The serial port one frame data did not receive completes
Checksum error	7E FF/xx EF	and checksum error
Specify file scope	7E FF-XX EF	The designation of the file exceeds the set range
The specified file was not found	7E FF for xx xx EF	Specifies that the file is not found
Data does not conform to rules	7E FF-XX EF	If the minimum is 1, send a 0

(1), in order to enhance the stability between data communication, we have added the error handling mechanism. The chip receives the data which does not conform to the format, will have the information feedback

(2), the customer is strongly advised to handle this command when the environment is relatively bad. If the application environment is general, you can not handle. (3), the chip return busy, basically is the chip on the electrical initialization time will return, because the chip needs to initialize the file system

(4), after the chip on the power, into the equipment state, equipment is **Spiflash** . If **Spiflash** If you are not online, you will automatically go to sleep.

(5), just refer to the tests we have given **Sdk** program, the porting inside the serial operation part, there will be no checksum error, where we strongly recommend the user to use our method of calibration. Because no one can guarantee that the data transmission will not be wrong.

(6), file specified section error, please refer to the following detailed

3.3.5 Device Insert Pull out message

U disk Insert	7E FF 3 a xx xx EF	
TF Insert	7E FF 3 x xx EF	
PC Insert	7E FF 3 xx xx EF	

U disk Pull out	7E FF + 3B xx xx EF	
TF Pull Out	7E FF 3B xx xx EF	
PC Pull-out	7E FF 3B xx xx EF	

(1) , in order to enhance the flexibility of the chip, we particularly increased the device insertion, pull-out instructions feedback. It is convenient for users to know the working status of Chips.

(2) , when the device is plugged in, we go to the device wait state by default, if the user inserts a lamp with U Disk, you can see U

The disc light flashes. You can also receive serial messages that are plugged in by the device.

3.4 Serial Port Control Instruction detailed

The following is a detailed description of the key areas -- for control Directives :

- Specify track Playback
- Specify the volume to play
- Specify which devices to play
- Full Loop playback Instructions
- Combined playback function [highlights]
- Play with the specified track with volume parameters

3.4.1 Specify song playback instructions **[** can refer directly to **3.4.7]**

We give the instruction to support the specified track playback, the song selection range of 0~255. actually can support more, because involves the file management reason, supports too many songs, can cause the system to operate slowly, the general application also does not need to support so many files. If the customer has an unconventional application, please communicate with us beforehand.

(1) , such as selecting the first song to play, the sending part of the

serial port   7E ff E6 EF 7E--- Start command

FF--- Version information

--- Data Length (does not contain checksums)

--- On behalf of the product number

--- Whether you need to answer [0x01: need to answer, 0x00: No need to return answer]

00 --- high byte of track   [DH]

01 --- low byte of track [DL], It represents

the first song to play   FF--- High-byte

checksum

E6--- Low-byte checksum

EF--- End command

(2) , for selections, if you choose the first   100 First, will   100 Converted to

16 into the system , default is Double byte , Just for   0x0064 .   **DH** =   0x00

Dl = 0x64

(3) , other operations, and so on, because the embedded domain uses   16 The system is one of the most convenient operations.

3.4.2 Specify volume playback Instructions

(1) , our system on the default volume of power is   30 level, if you want to set the volume , send the appropriate instructions directly

(2) , such as specifying that the volume is   15   -Level , command sent by serial port : 7E FF 0F ff D5 EF

(3) ,   DH = 0x00; DL = 0x0f   ,   15   Converted to   16   In the system   0x000f . You can refer to the description of the playlist section

3.4.3 Single Loop playback instructions

Loop through the specified 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 the second song
	7E Ff 06 08 00 01 01 Xx Xx Ef	Loop play the 1th Song of FOLDER1

(1), for some of the requirements of single loop playback, we have improved this control command 0x08 . In the operation Tf Card or U Disk is specified in the physical order in which the file is stored, and this is a matter for the user's attention. But in the operation FLASH , refer to the test instructions above, as specified in the folder partition.

(2), in the loop playback process, you can play the normal operation / pause, Previous, next, volume adjustment, including EQ and so on and the state is still loop play . you can turn off loop playback by specifying single to trigger playback or stop

3.4.4 Specify Playback Device

(1), our chip default is to support 4 types of playback devices , only
    Equipment online can specify the device to play the device is online,
    our software will automatically detect, no user relationship.

(4), look at the table, select the appropriate instructions to send

(3)、指定设备之后。芯片会自动进入停止解码状态，等待用户指定曲目播放。从接收到指定设备到芯片内部完成初始化文件系统。大概需要 200ms。请等待 200ms 之后再发送指定曲目的指令。

Specify playback Device-u disk	7E FF-xx-XX EF	XX xx: On behalf of the verification
Specify Playback device-TF card	7E FF the EF xx	
Specify Playback device-pc	7E FF + xx EF	

3.4.5 Specify folder file name playback

001xxx.mp3 of Folder 01	7E FF modified 0F xx xx EF	TF Card or U disk
100xxx.mp3 of Folder 11	7E FF 0F 0B xx xx EF	TF Card or U disk
255xxx.mp3 of Folder 99	7E FF 0F/FF xx xx EF	TF Card or U disk
The 1th Song of FOLDER1	7E FF modified 0F xx xx EF	[FLASH]
The 1th Song of FOLDER2	7E FF modified 0F xx xx EF	[FLASH]

(1) , the specified folder playback is the extended feature we developed, the default folder is named by ″ a",″one" In this way, for the stability of the system and the speed of song switching, the default maximum support per folder   255   Song , Maximum Support 99 A folder

(2) , such as specifying "a" folder's   100xxx.MP3   file , the command sent by the serial port is : 7E FF 0F x xx EF

DH: represents the name of the folder , Default Support   99 a file , that   01--99 The naming

DL: it represents the tracks. , default up to   255 Song, namely   0x01 ~ 0xFF

(3) , for the standard of the chip, you must specify both the folder and file name to lock a file. It is also possible to specify a folder individually or to specify a file name separately, but the management of the file will become worse. The specified folder and the specified track are supported   MP3 , WAV (4) , the following two diagrams illustrate folder and file name designation [about two drawings]

(5) , Spiflash Maximum Support   5 A   FOLDER , please do not exceed this range when the user operates.

3.4.6 Specifies that the folder starts looping

Specify a folder loop to play	7E Ff 06 17 00 00 02 FE E2 Ef	Specify 02 folder loop playback
	7E Ff 06 17 00 00 01 FE E3 Ef	Specify 01 folder loop playback
Specify that FOLDER loops play	7E Ff 06 17 00 03 01 Xx Xx Ef	FOLDER3 's 1th loop playback

(1) , for   Tf Card and   U   disk, the name of the folder must be   ″ --- ″ . Can not exceed 99

(2) , for   Spiflash , the user can   5 Any loop of a folder, refer to the reference instructions above.

    03 The specified folder is   FOLDER3

01 Specifies that the first song of the folder starts, if this is   the . Then from
            the first   2 The song starts looping through this folder

(3) , the user can send a stop command to end the loop playback.

3.4.7 Set the current track to loop play

Loop playback Turn off	7E Ff 06 19 00 00 00 FE E2 Ef	Single Loop playback Open
	7E Ff 06 19 00 00 01 FE E1 Ef	Single Loop playback off

(1) , and sends this instruction during playback, looping through the current track. If the current processing is paused or stopped, the chip will not respond to this directive

(2) , if you want to turn off the single loop playback, send off the instructions can be, so that the current track played after the completion of the stop.

3.4.8 Open and close   Dac

Set up Dac	7E Ff 06 1 00 00 00 FE E1 Ef A	Ope Dac n
	7E Ff 06 1 00 00 01 FE E0 Ef A	Off dac[High Resistance]

(1) , in some users need to overlay their own sound source of the occasion, you can pause the current playback of the voice, and then we chip   Dac   The output is set to high resistance so that users can share a power amplifier to play their own sound source, but Dac   The opening and closing, there will be a sound   Po   Voice, please the attention of the user friends.

(2) , chips can be closed at any time   DAC . If the voice is currently playing, the DAC , the chip will continue to play, but there is no sound. After the chip on the power is the default open   Dac , it will be closed only after it has been set to shut down. If you need to open it again, you need to open it by command   Dac   Had

3.4.10 instruction playback with volume parameters

Play with Volume	7E Ff 06 22 00 1E 01 Xx Xx Ef	Level 30, play the 1th song.
	7E Ff 06 22 00 0F 02 Xx Xx Ef	Level 15, play the 2nd song.

(1) , for some users hope that different voice settings to play a different volume, if in accordance with the old method before, is to set the volume, and then specify the track playback, so cumbersome, inconvenient. We hereby add this directive   0x22

(2) , the specific operation can refer to the two test instructions given above.

(3) , for   U Disk or   Tf Card, we specify the playback in the physical order. For   FLASH , then the default is   FOLDER1 Folder below.

3.5 Serial Query Instructions detailed

The following is a detailed description of the key areas -- for Query Directives :

■ Play Status Query directives

■ Specify folder track totals query

■ The total number of folders in the current device query

3.5.1 Querying for Devices currently online

Querying online devices	7E FF 3F BC EF	U disk is playing

(1) , chip in the process of work, will continue to detect equipment online situation, users can also through 0x3F This instruction is queried

(2)   , for example, if the data returned by the chip is   7E FF 3F 0A xx xx EF

    dl=0x0a = 0000 1010 Represents the   Tf Card and   FLASH   Online

 If   dl=0x1f= 0000 1111 Represents the   U disk, TF Card, PC , FLASH   All online

(3) , 0x0f--low four digits represent one kind of equipment.

3.5.2 Play Status Query directives

is playing	7E FF modified xx xx EF	U disk is playing
Pause Playback	7E FF-XX EF	The TF card is paused during playback
Stop playing	7E FF-xx-XX EF	In USB mode
	7E FF modified xx xx EF	FLASH is playing
	7E FF-XX EF	Chip in sleep

(1) , the module in the decoding process will have 3 The state is open to the user. The user can get the current state of the module through an instruction query

(2)   , playback pause is, is playing a track, artificial send

    instructions to suspend playback, play stop is that, a track

    play finished, the module is in the state of playback

    stopped

(3)   , if the returned data is   7E FF x The meaning of the EF representative is as follows:

DH = 0x02---Represents the current TF card device,

DL = 0x02---Represents the current "suspend in the TF card playback process"

(4)   , if the returned data is   7E FF x The meaning of the EF representative is as follows:

The meaning of DH		What the DL means	
0x01	Current equipment is U disk	0x00	Currently in play stop state
0x02	Current device is TF card	0x01	Currently in play State
0x04	Current device is USB disk	0x02	is currently in a paused state
0x08	Current device is FLASH disk		
0x10	Current is sleep mode		

3.5.2 Specify folder track totals query

Query the total number of folder tracks	7E Ff 06 4E 00 00 01 FE AC Ef	Query the total number of tracks in 01 folders
	7E Ff 06 4E 00 00 0B FE A2 Ef	Query the total number of tracks in 11 folders

(1) , if the user names the file according to the rules we set, ″ － ″,″ the ″And so on , so that you can query the total number of tracks in these folders. The valid files for the query include MP3 , WAV . Files in other formats are ignored.

(2) , if the folder for the query is empty [indicates no valid file] , then the serial port will return the following information directly
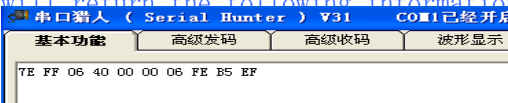
Error displaying query folder

(3) , if it is FLASH Query, directly to the query we give the Folder1--folder5 Can.

3.5.3 The total number of folders in the current device query

Query folder totals	7E Ff 06 4F 00 00 00 FE AC Ef	Query the total number of folders for the current device
	7E Ff 06 4F 00 00 03 FE AC Ef	FOLDER1 and FOLDER2 Effective

(1) , the user can make a query about the total number of folders for the current device. We only support the query for the number of folders under root directory. Folders containing folders are not supported. Also ask the user not to create an empty folder.

(2) , if the device has 5 a valid folder [folder has Mp3/wav file , an empty folder, and then the total number of query folders will return a 6 Folders. Therefore, it is recommended that users do not create empty folders.

(3) , in FLASH mode, the number of query folders returns the data and Tf Card and U Not the same, for example:

If the data is returned: 7E FF 4F/FE AC EF

which DL＝0x03 , representing the FOLDER1 And FOLDER2 Two folders have voice files, and Folder3-folder5

There are no valid files.

4. Reference circuit

Contention for the application of the chip, we provide a detailed design reference, so that you can quickly start to experience the powerful function of the chip

■   Serial communication interface, baud rate default   9600 , can be modified according to customer's requirements

■   of the external   Io   Key function can be customized according to customer demand

■   External single channel power amplifier reference circuit

4.1 Serial interface
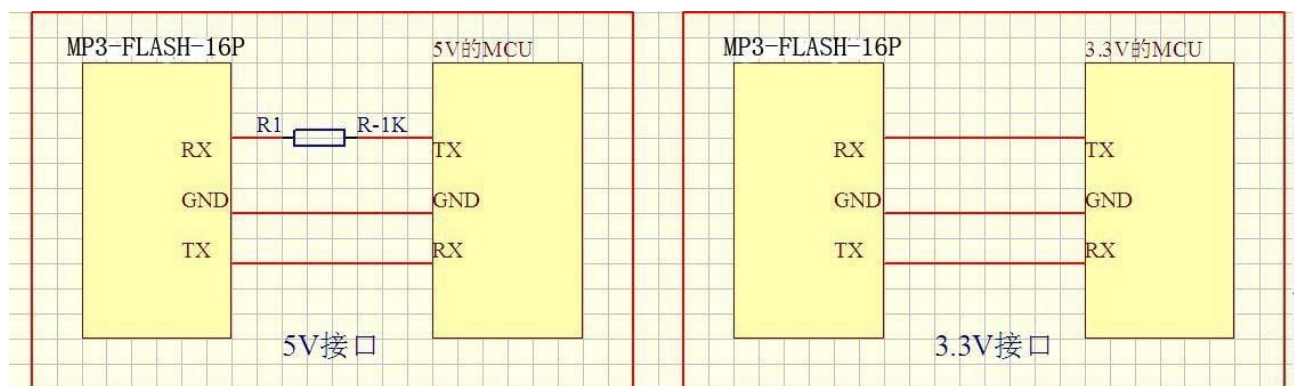
1 , the serial port of the chip is   3.3V   Of   Ttl   level, so the default level of the interface is   3.3V .

2 , if the system is   5V . Then it is recommended that the docking interface of serial port in series   1K   The resistance. This is enough to meet the general requirements,

3 , if applied to the occasion of strong electromagnetic interference, please refer to the "note" instructions.

4 , chips in   5V   And   3.3V   In the system are normal test, everything is normal. Are all used in a direct-attached way, and there is no string   1K

The resistance. The average chip is compatible   3.3V   And   5V   The level.

5 , but the user in the actual product development process, must be rigorous testing, pay attention to the level of conversion. It is strongly recommended that the user, under the conditions that can be modified, use   3.3V   Of   MCU , and responds to the call of environmental protection and low power consumption.

4.2 Key interface

The chip we're using is   Io   Press the way to replace the   AD   Keyboard access, the advantage of doing so is to make full use of the   MCU   More and more.   GPIO . Design cumbersome but not simple, we chip default configuration   6   The function of a key to assign, can be in any bad situation arbitrary control, or even can be used as with   MCU Communication interface. Our key assignments   4   Different types of functions, depending on the two resistance of the selection, please contact technical support.

■   One-on-one trigger playback, can be interrupted

■   Trigger playback on a one-to-one level to keep cycle

■   Play on a one-to-one trigger, not interrupted

■   Standard playback functions, such as up

and down, playback pause, and so on screen
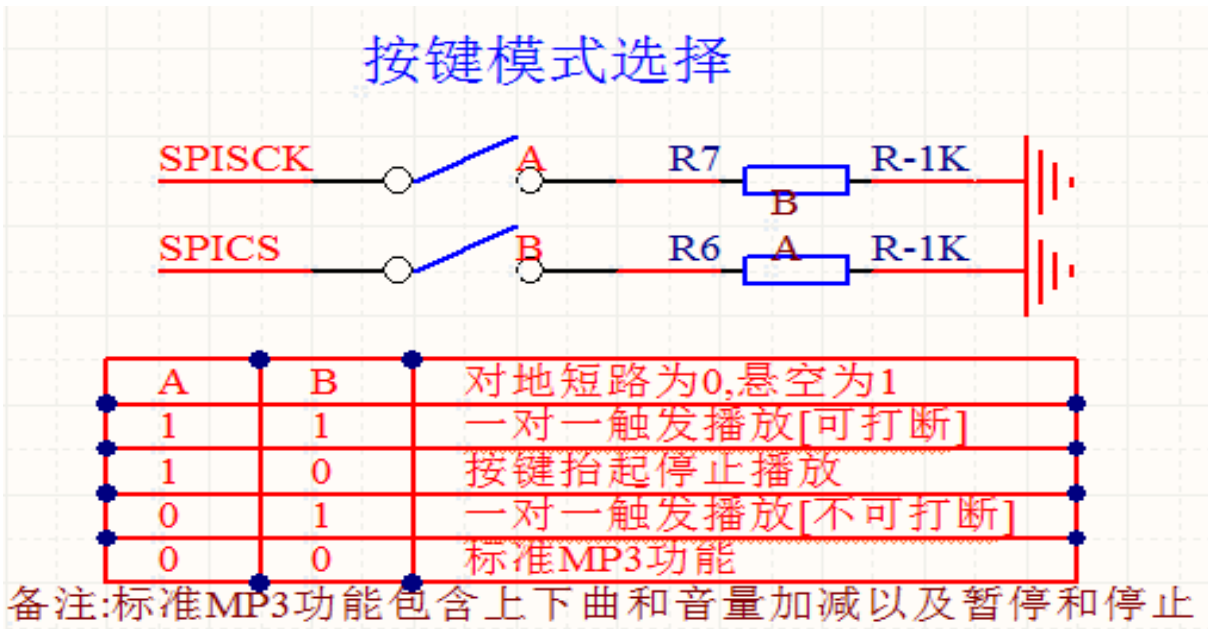
printing   1   Corresponding   A

silk screen   2   Corresponding   b[

Details   PCB]

The table above is selected   10   A functional logical table of keys. When two pins are suspended for [one-on-one triggering play can be interrupted]

6个按键
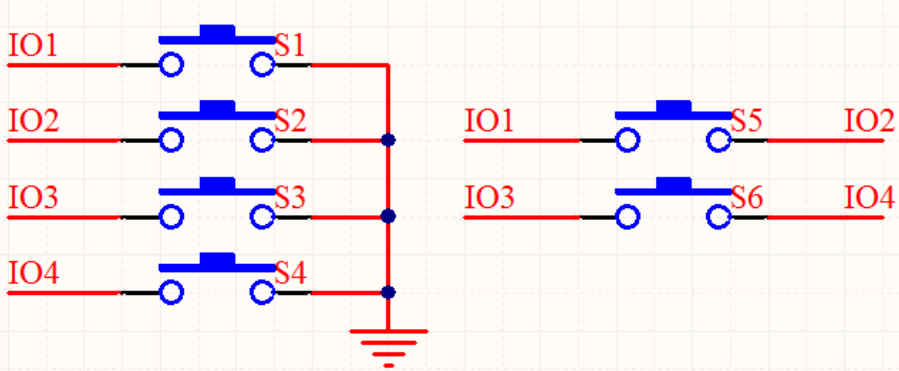
1、不使用的IO口可以直接悬空，不需要任何的上拉或者下拉电阻

The key to stay out of the chip is   s1-s4. the other   S5-s6 Users need to follow the
principle of the above diagram wiring

(1) , one-on-one trigger function [can be interrupted]

Trigger on a one-to-one	Short Press	Long Press	It's not loose.	Press the button to lift up
S1	1th paragraph [FOLDER1]			
S2	2nd paragraph [FOLDER1]			
S3	3rd paragraph [FOLDER1]			
S4	4th paragraph [FOLDER1]			
S5	5th paragraph [FOLDER1]			
S6	6th paragraph [FOLDER1]			
Note: This is a one-to-one trigger playback, can be interrupted [to the ground short circuit trigger 80ms effective]				

(2)   , press the button to lift stop playback function

Press the button to lift up and stop	Short Press	Long Press	It's not loose.	Press the button to lift up
S1		1th cycle [FOLDER1]		Stop it
S2		2nd cycle [FOLDER1]		Stop it
S3		3rd cycle [FOLDER1]		Stop it
S4		4th cycle [FOLDER1]		Stop it
S5		5th Cycle [FOLDER1]		Stop it
S6		6th cycle [FOLDER1]		Stop it
Note: This is to lift stop, long press loop play [to ground short circuit trigger 800ms effective]				

(3)   one-on-one trigger not interrupted

Trigger does not interrupt	Short Press	Long Press	It's not loose.	Press the button to lift up
S1	1th paragraph should not be interrupted [FOLDER1]			
S2	2nd paragraph should not be interrupted [FOLDER1]			
S3	3rd paragraph should not be interrupted [FOLDER1]			
S4	4th paragraph should not be interrupted [FOLDER1]			
S5	5th paragraph should not be interrupted [FOLDER1]			
S6	6th paragraph should not be interrupted [FOLDER1]			
Note: This is a one-to-one trigger playback, not interrupted [to ground short circuit trigger 80ms effective]				

(4) , standard playback function

Play function key	Short Press	Long Press s	It's not loose.	Press the button to lift up
S1	Next song		Volume +	
S2	A song.		Volume	
S3	Playback paused			
S4	Stop it			
S5	Volume +			
S6	Volume			
Note: This is the standard MP3 feature

4.3 External single channel Amplifier
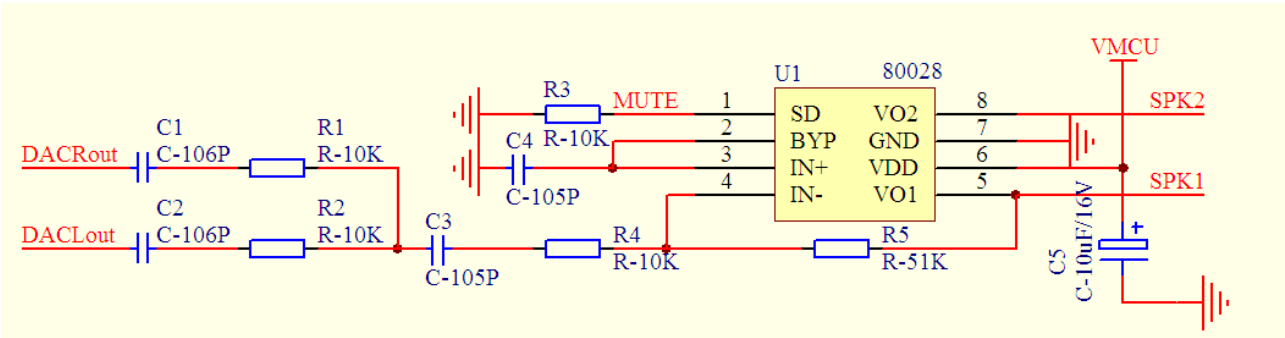
Here's the amp we're using 8002 , please refer to the specific parameters Ic Of datasheet . Applied to the general occasion enough, if the pursuit of more

4.4 The user adjusts the volume of the amplifier

Our chip by default is the maximum volume, if the user wants to reduce the volume, you can from the following 2 A place to modify

(1) , modify the chip Dac The output of the current limiting resistor, we default is

affixed   1K   resistance, the user wants to reduce the volume, can be appropriate to increase this resistance.   DAC   The resistance position refers to the following figure ″1 ″The Red box marked

(2) , modify the amplifier magnification, we default is ″ 51K ″The resistor, if the user wants to reduce the volume, may suitably reduce this resistance, may fix changes to   47K Or   33K . Seethesign of   the red box ″2″ below

4.4 Usb Update speech description

Our module can use mobile phone charging line to update voice directly, convenient and flexible. Our advantage is as follows

■   Can correct the information of the downloaded speech according to the customer's request

■   No software to install, direct update, no special downloader required

■   No compression and damage to the sound quality to ensure a higher quality experience

1 , plug in our mobile phone charge line, called   microUSB   Line. The computer will eject the following interface, and then the computer's   360   Software, or antivirus software

turned off, or plugged in   Usb   The following pop-up window is selected to allow the program to run:

2 , the computer will eject the following interface

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

（ 1   ） 2 ）
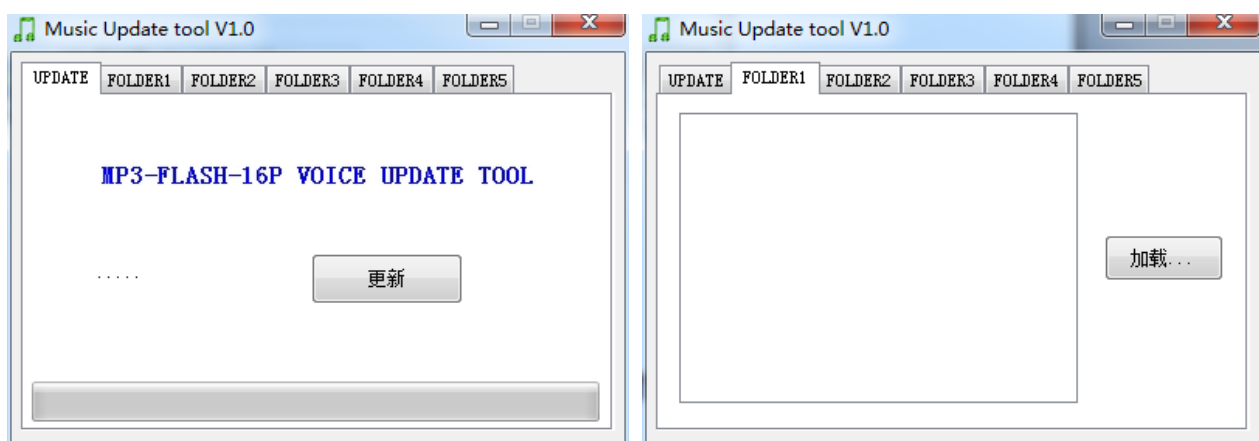
（ 1   ） 2 ）

2 , select the **FOLDER1** folder, as shown above (2 and click Load, will pop up a loaded speech
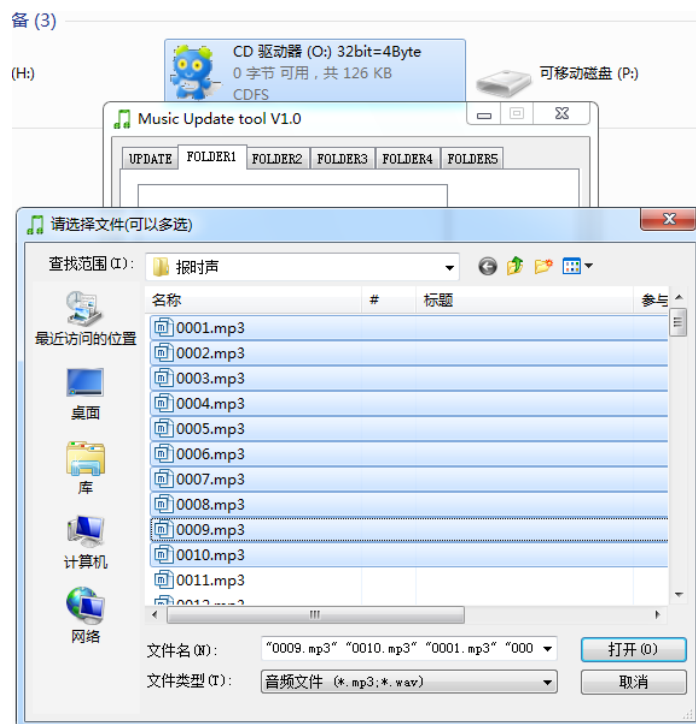
window, the following figure

Click the left mouse button to drag the selected, or press the keyboard **Ctrl** Key, one by one of the selected sound files

3 , select the voice that needs to be loaded at this time, click "Open" to add in the software.
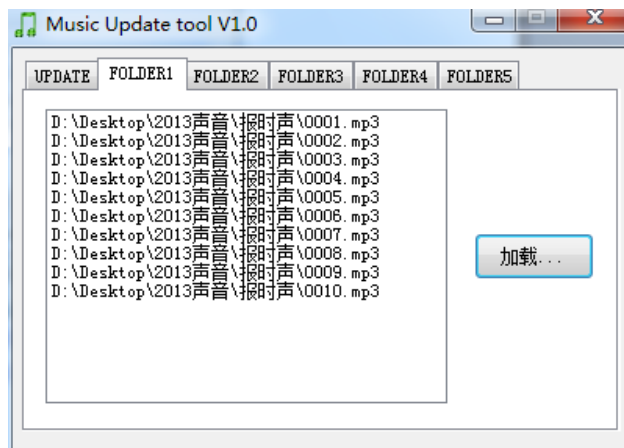
4 , and finally, back to " **UPDATE** interface, click the "Update" button, the following interface will appear

5 ,

From left to right in turn   3   window, the last window on behalf of the update completed, directly close this window, unplug   **Usb**   Line on it.

From left to right in turn   3   window, the last window on behalf of the update completed, directly close this window, unplug   **Usb**   Line on it.

38

5 , the current test we have   Spiflash   including China State, GD , Macronix and other market volume of the largest   FLASH . So   FLASH   There is no problem with compatibility. We've tested it.   FLASH . Most greatly   16M   byte [w25q128], all is no problem.

6 , because the update progress bar of our updated window is the maximum support only   8M BYTE, so use   16M   bytes of   FLASH , the following interface will appear, please the user friend Don't worry, this is normal

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

New

7 , updated Description:

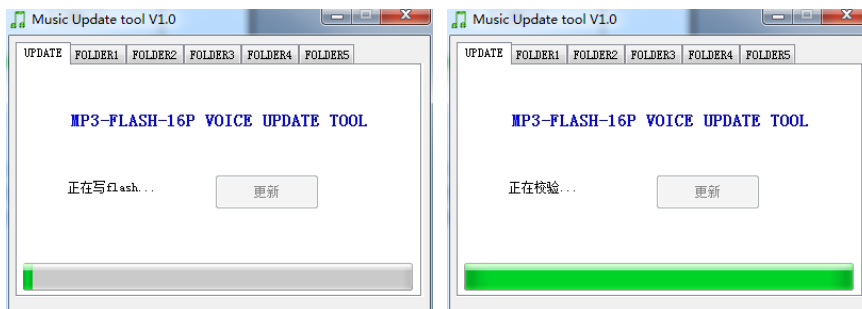(1) , our update window is reserved for   5   Area to be updated, named   Folder1--folder5. This version supports   5   Specified playback action for a zone

(2) ,   Folder1--folder5   This   5   Areas are not allocated space and are scalable. For example, I just use   FOLDER1 , do not use the other   4   File area, then this   4   Does a file area take up space? It's not going to happen.   10   a byte , can be ignored.   (3) , each FOLDER   Maximum Area support   255   Segment Voice [in the case of space permitting] . The size of a single voice is not required. Current   FLASH   Maximum Support   128Mbit . Is 16M   Byte of speech storage enough to satisfy most applications

(4) , if the user on the quality requirements are not high, you can choose the voice compression software, the   MP3   Or   Wav   Files are compressed to reduce the storage space that the files occupy. In order to reflect the high quality of our products, users are not advised to use

(5) ,   USB   The time to update the speech is based on the size of the voice file, and the greater the voice, the slower the update time.

(6) , once the speech has been updated, the previously saved speech will be deleted.

7 , notes:

(1) , our module does not need to install any software, insert the computer pop-up software is actually burned to   Spiflash . Occupied   200kb   of space. Very small, so users can ignore it directly.

(2) , users need to change their own   Spiflash . Please request the updated firmware from our technical support.

(3) , if the computer for the first time using our module, just plugged into the computer, it will take a certain amount of time, because at this time the computer will automatically enumerate my modules, determine identity and so on operation. May need   1 Minutes or so until the update window pops up.

4.5 User uses a blank **FLASH** Description

In the process of commissioning, the user will be replaced according to their own needs Flash Size to meet your needs, so you need the following three steps to complete FLASH The replacement.

- Ask us to get **FLASH** The update firmware
- Pass **Usb** interface to a blank **FLASH** To burn the firmware
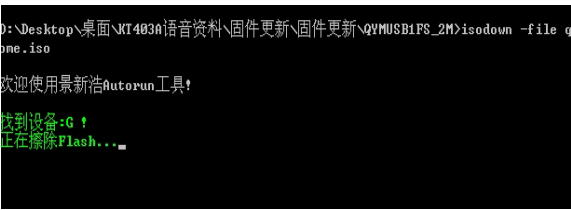- Pull **Usb** Cable, and then power on to normal use

1 , our firmware is divided into 4 section, please explain in detail below

名称	修改日期	类型
MP3-FLASH-16P_1M	2014/3/29 23:29	文件夹
MP3-FLASH-16P_2M	2014/3/29 23:28	文件夹
MP3-FLASH-16P_4M	2014/3/29 23:29	文件夹
MP3-FLASH-16P_8M	2014/3/29 23:28	文件夹
MP3-FLASH-16P_16M	2014/3/29 23:27	文件夹

名称	修改日期	类型	大小
32bit=4Byte.iso	2014/3/29 23:24	光盘映像文件	126 KB
ISODown.exe	2012/12/13 15:34	应用程序	144 KB
双击本文件烧写模块固件.bat	2014/3/29 23:30	Windows 批处理...	1 KB

Users according to their own **FLASH** Size to select the updated firmware. The firmware is the same size.

the right figure is actually through " Double-click this file to burn the module firmware . Bat " This batch calls " **ISDDown.exe** "Software will" **32bit=4byte.iso.iso** the mirrored file writes **FLASH** In This is open source tools, interested in the information can be consulted to understand the entire process.

2 , through **Usb** after inserting the computer, click " **Mydown.bat** , the following window will pop up

```
D:\Desktop\桌面\KT403A语音资料\固件更新\固件更新\QYMUSBiFS_2M>isodown -file q
ome.iso
欢迎使用景新浩Autorun工具!

找到设备:G！
正在擦除Flash...
```

3, after the completion of the update, the following interface will appear:

```
D:\Desktop\桌面\KT403A语音资料\固件更新\固件更新\QYMU
ome.iso
欢迎使用景新浩Autorun工具!

找到设备:G！
正在擦除Flash...OK!
正在写入Flash...
100.00%
写入成功!
正在校验...OK!

D:\Desktop\桌面\KT403A语音资料\固件更新\固件更新\QYMU
请按任意键继续．．．
```
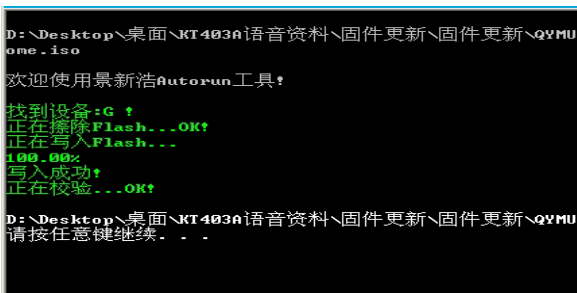
4, after the completion of the update, you can see the computer has been virtual

out of a "CDROM", so that the success of the statement.   Note: If any

exception occurs during the update process, it is not normal and you can change

the FLASH to determine the problem.

5. Attention matters

the use of chips , the key place to do the following description :
- of the Chip   GPIO   The characteristics
- Application of the Notes
- The attention of serial programming part

5.1 GPIO   The characteristics

IO Input characteristics						
Symbol	Parameters	Minimum	Typical	Biggest	Unit	Test conditions
V_{IL}	Low-level Input Voltage	-0.3	-	0.3*vdd	V	vdd=3.3v
V_{IH}	High-level Input Voltage	0.7VDD	-	vdd+0.3	V	vdd=3.3v
IO Output characteristics						
Symbol	Parameters	Minimum	Typical	Biggest	Unit	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 Points of attention in application

1 , the external interface of the chip are 3.3V Of Ttl level, so in the design of the hardware circuit, please pay attention to the conversion of the level. In addition, in the strong interference environment, please note that some of the electromagnetic compatibility of protection measures, GPIO Using Optocoupler isolation to increase Tvs Wait a minute

2 , Adkey The key values are in accordance with the general use of the environment, if in strong sensibility or capacitive load environment, please pay attention to chip power supply, the proposed separate isolation power supply, and then with the magnetic bead and inductance on the power filter, be sure to as much as possible to ensure the stability of the input power supply and clean. If there is no guarantee, please contact us to reduce the number of keystrokes and redefine the wider voltage distribution.

3 , serial communication, in the general use of the environment, pay attention to good level conversion can be. If the environment is strongly disturbed, or the long distance RS485 Application, then please pay attention to the signal isolation, in strict accordance with industrial standards to design communication circuits. Can contact us, we provide design reference

4 , we support the lowest sampling rate for audio files 8KHZ . That means less than 8KHZ The audio file is not supported and cannot be decoded properly. Users can use audio processing software to improve the sampling rate of audio files to solve this problem.

5 , the current of the chip in the sleep state 10MA The peak current can be achieved by the size of the volume on the playback 1 A . Power consumption will be relatively large. If used in a low-power situation, please control the chip or chip power supply. This will reduce the power consumption of the chip

6 , if the user directly using our chip with the amplifier, please select the appropriate speaker. Recommended Use 4 Ohm /3w . This is the best use of the configuration. Choose the other speakers, please note the load size, as well as the power of the two parameters

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

8 , our chips support the 8/11.025/12/16/22.05/24/32/44.1/48khz sampling rate of audio files, these are also the vast majority of the network audio files parameters. If the user's audio file sample rate is not in this range, it is not supported playback, but can

be converted through a dedicated software. Our advantage is lossless playback and high quality, so the user is less recommended to compress the audio.

5.3 Serial operation

The operation of the serial port, see the following process, we provide a complete reference routine, for users to refer to :

■ Operation Process of serial port

■ Description of serial port programming reference

■ Need to delay the operation of the serial port considerations

5.3.1 Serial Operation Flow
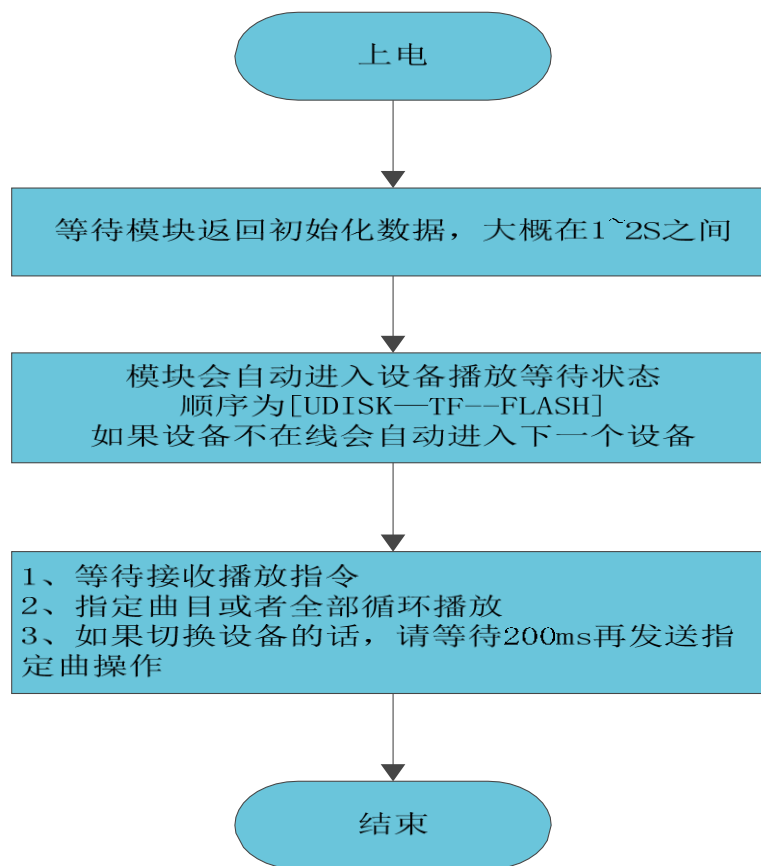
1 , we provide all the chips of the serial port part of the operation, are the same agreement, so do not worry about the different chip incompatible

2 , if the operation of the serial port, there is any do not understand, please be sure to contact us to obtain serial programming reference routines.

3 , our product updates, will also be in accordance with the current protocol version, to do backward compatibility.

5.3.2 Description of serial port programming reference

At present, we provide the serial port programming reference code, there are two parts, the first part is our test version of the test code, the relevant serial operation is more comprehensive, the other is the basic version, just a designated track example. Please the user patiently digest

5.3.3 Serial port programming needs the attention point of appropriate delay

1 , after the chip on the power, need to probably   1s-1.5s The time carries on the Hatsuhana the correlation operation, after initialization completes, will have the initialization related data to send out. Users can also ignore the data directly

2 , delay is required when the specified device is played   200ms Time, then send the specified track and so on related instructions.

3 , because the chip with the file system, under normal circumstances, the track is not
    greater than   1000 First words, the response rate is less than   50ms The tracks
    over   3000 After the first, the file system switching speed will be slower, the
    response speed in   100MS---1S Ranged between

4 , chip internal to the processing of the serial port is   10MS Processing once, so sequential instructions must be sent at intervals   20MS The delay. Otherwise, the previous instruction will be overwritten without execution.

5 , if the specified folder file name plays [0x0f directives] , the delay must be greater than   40ms , because it takes time for the chip to lock the file. As long as the relevant instructions related to folder file name lookup, 40MS The delay is essential. If the chip is currently looking for files, serial data is too frequent, will lead to the reduction of the chip

5.3.4 Important Notes for checksums

1 , contention for many users are not accustomed to the calibration of the communication methods, we have introduced a checksum with checksums without verification of a compatible way. An example is provided. If we send the combined playback instructions as follows :

Next play [without check]	7E FF (EF)	

| Next play [with check] | 7E FF 06 01 00 00 00   FE FA
Ef | |

The difference between two instructions is to omit the checksum 2 Bytes. These two-frame data can be received by the chip.

2 , because many users in the use of the process, many are used without crystal oscillator MCU . In this way, we must recommend that you add a checksum to ensure the stability of the communication.

3 , if users use STM32 Or Stc Wait a minute MCU , and is the external crystal oscillator, can be appropriate to dispense with the checksum. Because without the crystal oscillator MCU , the clock is relatively not so accurate, so there will be errors in the serial port, once the error is too large, will lead to communication errors. Please the user friend discretion.

5.3.5 MCU Selection of crystal oscillator

1 , in principle, we recommend that users use 11.0592MHZ Or the crystal oscillator of the phase multiple. This allows the serial port to produce
9600 The baud rate will be more accurate. Our chip serial error is allowed in 3% within the

2 , if the user is 12M When the crystal oscillator. The first thing to do is to make the following judgments

(1) , see what is MCU , 51 Or PIC , STM32 And so on, basically all with the baud rate generator, so produce
9600 The baud rate is basically no pressure.

(2) , see MCU Whether it is a hardware serial port, if it is Io Analog serial port, it is strongly recommended that users use 11.0592
of Crystal Oscillator

(3) , standards of Wuyi , such as: stc89c52 Or At89c52 And so on are the use of timers to generate baud rate, after a simple calculation can be calculated, 12M Crystals do 9600 The baud rate error is 0.16% , the normal operation is not any problem, but still need the user to conduct a comprehensive test

6. Disclaimer

■   Develop a knowledge of preparation

The company's products will provide as comprehensive as possible the development of templates, drivers and their application documentation to facilitate the use of users but also require users to familiarize themselves with the design of products used in the hardware platform and related   C   Knowledge of the language

■   Emi   And   Emc

The company's chip mechanical structure determines its   Emi   The performance must be different from the integrated circuit design. The company's chip chip   Emi

to meet the vast majority of applications, users have special requirements, must consult with us in advance .

The company's chip   Emc   The   performance is closely related to the design of the user backplane, especially the power circuit,   I/O   Isolation, reset circuit, the user in the design of the backplane must fully consider the above factors. We will strive to improve the company's chip electromagnetic compatibility characteristics, but not the final application of user products   Emc   performance provides any guarantee .

■   Power to modify a document

The company can retain any time without prior notice of the company's chip products related to the modification of the document power

■   Esd   Electrostatic release Point Protection

Part of the company's products built-in components   Esd   Protection circuit, but in the use of harsh environment, it is still recommended that users in the design of the backplane to provide   Esd   Protection measures, especially the power supply with   Io   Designed to ensure stable operation of the products, installation of the company's products to ensure safety, please first accumulate in the body of electrostatic release, such as wearing a reliable grounding of the electrostatic ring, touch access to the Earth's pipe, etc.

7. Reference routines

```
/****************************************************************************
 - Realization function: Realize the chip on the power to specify the first and second play,  the
   basic program for users to test
 - Day      Period: 2013-05-06
 - Operating Environment:              STC      crystal oscillator:   11.0592M      baud
 rate : 9600
```
- Preparation   Note: In Pu-Zhong Technology's   51   Debug on Development Board   OK---stc89c516rd+
```
         The test program must be a chip or chip solution with devices online, such as    U
         disk,   TF   Card,   FLASH
****************************************************************************/
```
#include "REG52.h"

```
#define                    Comm_baud_rate    9600//     serial port baud rate
#define                 Osc_freq        11059200//     operation
```
Crystal Oscillator: 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--);
}

```
/****************************************************************************
 - Function Description: Serial port   1   Class
 - Note      : Set to   9600   Baud rate
```
/void Serial_init (void)
{
```
    Tmod =                        0x20;//   Set up    T1  For the baud rate generator
    Scon =                        0x50;//0101,0000 8   bit data bits , No parity
    PCON =                   0x00
```
    th1=256-(OSC_FREQ/COMM_BAUD_RATE/32/12); set to   9600   Baud rate
    tl1=256-(OSC_FREQ/COMM_BAUD_RATE/32/12);
```
    TR1      = 1;             //  Timer    1
                             Open it
    REN      = 1;             //   Serial Port
                             1  Receive to
                             enable
    Es       = 1;             //   Serial Port
                             1  Interrupt
                             Enable to
```
}
void Uart_putbyte (int8u ch)
{
            sbuf= ch;
    while (! TI) {;}
    TI = 0;
}

```
/****************************************************************************
```

- function Description: The serial port sends out the command [including controls and Queries]
- Parameter description: CMD: to indicate control instructions, consult the instruction
  list, as well as the related instructions for the query.
                  Feedback: Whether you need to answer [0: no answer required, 1: answer required]
                  Data: parameters to transfer
/void Sendcmd (int8u len)

```
{
    int8u i = 0;
    Uart_putbyte (0x7E); Start
    For   (i=0 i<len; i++)// Data
    {
        Uart_putbyte (Send_buf[i]);
    }
    Uart_putbyte (0xEF);// End
}


/*************************************************************************
 - Function Description: Sum checksum   ---   The user can also omit this checksum, see   5.3.4
   The description
 - And check the following ideas:
    Send the instructions to remove the start and end. Will the middle of the   6   Byte to
add, and finally the inverse code. The receiving side will receive a frame of data, remove
the start and end. The intermediate data is added together with the received checksum byte.
Just for    0. This means that the data received is completely 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 byte   send_buf[1] =
                        0x06;//
    length
    SEND_BUF[2] =         cmd;//
    control instruction send_buf[3] =
    feedback;// need feedback
    SEND_BUF[4] = (int8u) (DAT >> 8);//datah
    send_buf[5] =        (int8u)       (DAT);
                        Datal          dosum
    (&send_buf[0],6);             Checksum
                        Sendcmd      (8);//
    Send this frame data
}

void Main ()
{
    serial_init ()// initialization settings for serial registers
    uart_sendcmd (0x03, 0, 0x01); play the first
    song Delay_ms (1000); Delay probably    6S
    uart_sendcmd (0x03, 0, 0x02); Play second
    song Delay_ms (1000); Delay probably    6S
```

```
    uart_sendcmd (0x03, 0, 0x04); play the fourth
    song   While  (1);
}
```

8. Pc Example of debugging instructions for Port serial port

The user can test the chip through the serial port software of the computer. Our chip serial port is Ttl level, please note that the level conversion

■   Control instructions

■   Query parameter directives

9.1 Control instructions

Serial debugging assistant for testing	Commands sent [with checksums]	Commands sent [without checksums]	Note
[Next song]	7E FF 06 01 00 00 00 FE FA Ef	7E FF (EF)	
[Previous song]	7E FF 06 02 00 00 00 FE F9 Ef	7E FF/EF	
[Specify tracks]	7E FF 06 03 00 00 01 FE F7 Ef	7E FF (EF)	Specify first play
	7E FF 06 03 00 00 02 FE F6 Ef	7E FF (EF)	Specify second head
	7E FF 0A FE EE Ef	7E FF 0A EF	Designation 10th
Volume Plus	7E FF 06 04 00 00 00 FE F7 Ef	7E FF/EF	
Volume reduction	7E FF 06 05 00 00 00 FE F6 Ef	7E FF/EF	
[Specify volume]	7E FF 1E FE D7 Ef	7E FF 1E EF	Specify a volume level of 30
[Assign EQ]	7E FF 06 07 00 00 01 FE F3 Ef	7E FF/EF	Keep
[Loop play track]	7E FF 06 08 00 00 01 FE F2 Ef	7E FF EF	Loop play the first song
	7E FF 06 08 00 00 02 FE F1 Ef	7E FF/EF	Loop second Song
	7E FF 0A FE E9 Ef	7E FF 0A EF	Loop to play the tenth song
	7E FF 06 08 00 01 01 FE F1 Ef	7E FF-EF	Loop the first song of FLASH's FOLDER1
	7E FF 06 08 00 02 01 FE F0 Ef	7E FF EF	Loop the first song of FLASH's FOLDER2
[Specify Playback device]	7E FF 06 09 00 00 01 FE F1 Ef	7E FF EF	Specify Playback Udisk
	7E FF 06 09 00 00 02 FE F0 Ef	7E FF (EF)	Specify play TF
	7E FF 06 09 00 00 03 FE EF Ef	7E FF/EF	Specify to play FLASH
[Enter sleep mode]	7E FF 0A 00 00 00 FE F1 Ef	7E FF more 0A EF	
[Wake up Sleep]	7E FF 0B 00 00 00 FE F0	7E FF more 0B EF	

	Ef		
[Chip Reset]	7E FF 0C 00 00 00 FE EF Ef	7E FF more 0C EF	
Play	7E FF 0D 00 00 00 FE EE Ef	7E FF more 0D EF	
Suspended	7E FF 0E 00 00 00 FE ED Ef	7E FF more 0E EF	
[Specify folder file name]	7E FF 0F 00 01 01 FE EA Ef	7E FF (0F) EF	"01" folder, Track is "001"
	7E FF 0F 00 01 02 FE E9 Ef	7E FF (0F) EF	"01" folder, Track is "002"

Stop playing	7E FF 06 16 00 00 00 FE E5 Ef	7E FF/EF	Stop software decoding
Specify a folder loop to play	7E FF 06 17 00 02 00 FE E2 Ef	7E FF EF	Specify 02 folder loop playback
	7E FF 06 17 00 01 00 FE E3 Ef	7E FF ' EF	Specify 01 folder loop playback
Random playback	7E FF 06 18 00 00 00 FE E3 Ef	7E FF/EF	Random playback
Single Loop playback	7E FF 06 19 00 00 00 FE E2 Ef	7E FF/EF	Single Loop playback Open
	7E FF 06 19 00 00 01 FE E1 Ef	7E FF ' EF	Single Loop playback off
Play with Volume	7E FF 01 1E FE BA Ef	7E FF 1E EF	Level 30, play the 1th song.
	7E FF 01 0F FE C9 Ef	7E FF 0F EF	Level 15, play the 1th song.
	7E FF 02 0F FE C8 Ef	7E FF 0F EF	Level 15, play the 2nd song.

9.2 Query parameter directives

Serial debugging assistant for testing	Commands sent [with checksums]	Commands sent [without checksums]	Note
Query Current state	7E FF 06 42 00 00 00 FE B9 Ef	7E FF/EF	
[Query Volume]	7E FF 06 43 00 00 00 FE B8 Ef	7E FF EF	
[Query Current EQ]	7E FF 06 44 00 00 00 FE B7 Ef	7E FF EF	
U Disk Total File number	7E FF 06 47 00 00 00 FE B4 Ef	7E FF EF	The total number of files for the current device
Total number of TF files	7E FF 06 48 00 00 00 FE B3 Ef	7E FF EF	
FLASH Total File Number	7E FF 06 49 00 00 00 FE B2 Ef	7E FF EF	
U disk Current Track	7E FF 4 B 00 00 00 FE B0 Ef	7E FF 4 EF	Currently playing tracks
TF Current Track	7E FF 4C 00 00 00 FE AF Ef	7E FF more 4C EF	
FLASH current Folder track pointer	7E FF 4D 00 00 00 FE AE Ef	7E FF more 4D EF	
Specify folder track totals query	7E FF 4E 00 00 01 FE AC Ef	7E FF (4E) EF	
Query tf/u Disk Total folder number	7E FF 4F 00 00 00 FE AC Ef	7E FF more 4F EF	Only TF cards and USB drives are supported