Eye record

1. Outline

1.1 Brief introduction

YX5200-24SS Is a provider of serial voice chip, perfectly integrated MP3 , WAV , WMA The hardware decoding. Meanwhile Software Support TF Card driver to support FAT16 , FAT32 File system. By simple serial command to complete the specified music player, and to play music and other functions, without tedious low-level, easy to use, stable and reliable is the most important feature of this product.

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 ,fully support FAT16 , FAT32 File system, maximum support 32G of TF Card support 32G of U plate, 64M Byte

NORFLASH 4 , A plurality of control modes are available. IO Control, serial port, AD Key control mode

5 , Broadcasting language spots feature, you can pause the background music being played. The ad finishes playing back background music continues to play

6 The audio data sorted by folder, supports up to 100 Folder, every folder can be assigned 255 Tracks

7 , 30 Level adjustable volume, 6 Kind EQ Optional

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;

7 , Multi-channel voice alarm or voice guidance device operation;

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. Module instructions
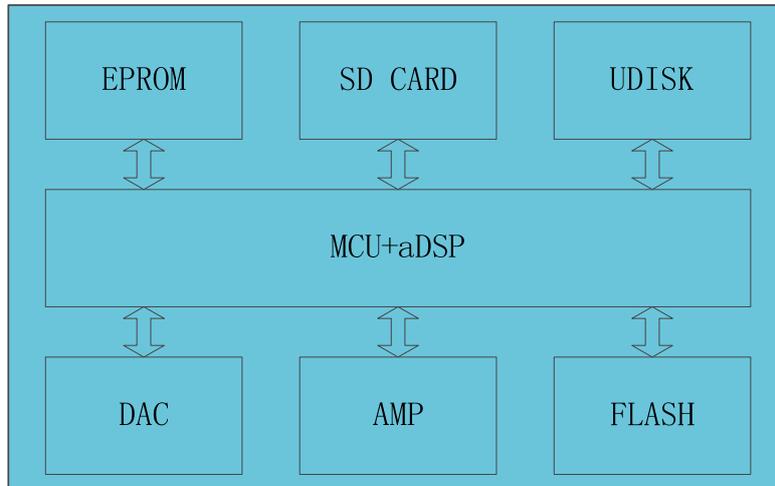
Module is selected SOC Program integrates a 16 Bit MCU And a specific audio decoding aDSP Using hardware decoding manner, and to further ensure the stability of the

sound system. More compact package size to meet the needs of other product embedded

2.1 Hardware parameters

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
Input voltage	3.3V-5V
Current Rating	15mA [U disk without]
size	23 (length) * 20 (W) [Unit: mm]
Operating temperature	- 40 degrees --80 degrees
humidity	5% to 95%

2.2 Pin Description
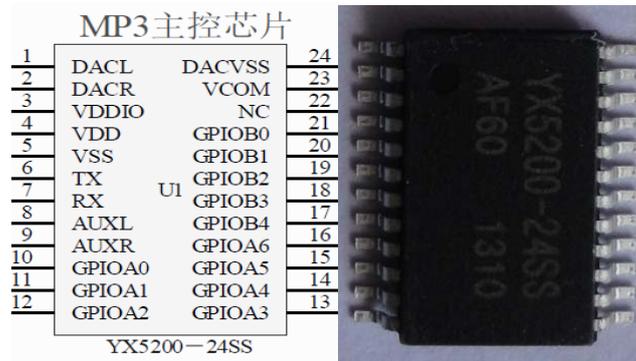
Pin name		Functional Description	Remark
1	DACL	Audio output left channel	Drive headphones, amplifier
2	DACR	Right channel audio output	Drive headphones, amplifier
3	VDDIO	3.3V power output	To TF card, SPI, 24C02 power supply
4	VDD	5V power input	Not exceed 5.2V
5	VSS	Power Ground	
6	TX	UART serial data output	
7	RX	UART serial data input	
8	NC	no	
9	AUXR	Play indicator	You will need to take triode
10	GPIOA0	Infrared remote control receiver	
11	GPIOA1	Busy output	Output high
12	GPIOA2	Chip select bus SPI_CS	
13	GPIOA3	SPI_DO data bus	
14	GPIOA4	SPI_CLK data bus	
15	GPIOA5	ADKEY2 external button	22K pullup
16	GPIOA6	ADKEY1 external button	22K pullup
17	GPIOB4	SD_CLK clock bus	0 ohm series 24C02 6 feet to make memory
18	GPIOB3	SD_CMD command bus	0 ohm series 24C02 5 feet to make memory
19	GPIOB2	SD_DAT data bus	
20	GPIOB1	USB- DM	Then U disk and the computer's USB port
twenty one	GPIOB0	USB + DP	Then U disk and the computer's USB port
twenty two	NC	Programming port	
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 [currently defaults to 0xff]
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
para1	Parameter 1	Query the high byte of data (such as song number)
para2	Parameter 2	Low byte data query
checksum	Checksum [occupies two bytes]	Accumulation and verification [excluding the start bit $]
$ O	End position	End bit 0xEF

For example, if we specify Play NORFLASH , 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 the results obtained into meal

3.2 Communication instruction

1 , Instructions directly transmitted, no return parameters

CMD command (instruction)	The corresponding function	Parameters (16)
0x01	next track	
0x02	previous piece	
0x03	Specify the track (NUM)	1-2999
0x04	Volume +	
0x05	volume-	
0x06	Specifies the volume	0-30
0x07	Specifies EQ0 / 1/2/3/4/5	Normal / Pop / Rock / Jazz / Classic / Bass
0x08	Single cycle specified track play 0-2999	
0x09	Specify the play set 1/2/3/4/5	U / SD / AUX / SLEEP / FLASH
0x0A	Goes to sleep - Low power consumption	
0x0B	Retention	
0x0C	Module reset	
0x0D	Broadcast	
0x0E	time out	
0x0F	Specified folder player	1-10 (needs its own set)
0x10	PA set (no)	[DH = 1: open PA] [DL: setting the gain 0-31]
0x11	Repeat All Tracks	[1: looping] [0: Stop looping]
0x12	MP3 tracks specified folder	0--9999
0x13	Commercials	0--9999
0x14	It supports 15 folders	See below for details
0x15	Stop spots, play background	
0x16	Stop play	

2 Parameters, query system

CMD command Detailed (check Inquiry)	The corresponding function	Parameters (16)
0x3C	STAY	
0x3D	STAY	
0x3E	STAY	
0x3F	Send initialization parameters	0 - 0x0F (the lower four bits each represent a device)
0x40	Returns an error, a retransmission request	
0x41	answer	
0x42	Query the current status	
0x43	Query current volume	
0x44	Query the current EQ	
0x45	Query current play mode	This version retains this feature
0x46	Query the current software version	This version retains this feature
0x47	The total number of file queries UDISK	
0x48	The total number of file queries TF card	
0x49	The total number of file queries FLASH	
0x4A	Retention	
0x4B	Query of the current track UDISK	
0x4C	Queries TF card of the current track	
0x4D	FLASH query of the current track	

3.3 Module returns data

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

- Successful initialization of the electrical module data

- Module finished playing the current track data

- **Module receives an instruction to return the success ACK (answer)**

- **Means for receiving a data error [forfeiture includes data integrity verification error in both cases]**

- Module is busy, the data over the command module returns busy

- **U plate, TF Card insertion and removal, the data are returned**

3.3.1. Return power data module

(1) , Power module, take some time to initialize, this time is the need to U plate, TF card, flash , General file determines how much of the other equipment in 1.5 ~ 3S This time. If this time is exceeded the module initialization data has not been sent out, indicating that module initialization error, please power reset module, additional hardware is connected to the detection

(2) , Module initialization data including line equipment, such as transmission 7E FF 06 3F 00 00 01 xx xx EF DL = 0x01 Electrical instructions on the course, only U Disk online. Referring to the other data table, a relationship between devices or

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 instruction issuing module initialization must wait to send a corresponding control command or instruction sent by the module will not be processed. But it will also affect the normal initialization module.

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 finishes playing the first one	7E FF 06 3D 00 00 01 xx xx EF TF card play the first one is completed
TF card finished playing the first two	7E FF 06 3D 00 00 02 xx xx EF TF card play the first two completed
FLASH finished playing the first one	7E FF 06 3E 00 00 01 xx xx EF FLASH play the first one is completed
FLASH finished playing the first two	7E FF 06 3E 00 00 02 xx xx EF FLASH play the first two completed

1 For a lot of demand triggered the play, we played a module after correction is automatically brought to a standstill. 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 And as an indication of the decoding is stopped. See 6 foot, GPIO1 (1) , Play status output low [mute amplifiers many feet, this can be IO Direct control]

(2) , Playback pause status, the output high. Module sleep. Also high

3 , Fight for the continuous playback application, can be achieved. if U After the first song is finished disc player, will return 7E FF 06 3C

00 00 01 xx xx EF 3C

　　　　　－－－－　　It represents the U disk command

00 01 ---- represents finished playing track. At this time, then sending a play command, the loop sequence can 4, after the power module, properly initialized, the module will automatically enter the play state device. And decoding stops, waiting for the user to send the relevant instruction to play

5, in addition to the 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 module Not receive.

3.3.3 Module response data returned

FLASH finished playing the first one	7E FF 06 3E 00 00 01 xx xx EF FLASH play the first one is completed

(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 transmitted, the module 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 Module error data returned

Busy on	When 7E FF 06 40 00 00 01 xx xx EF module in the system initialization file	
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 not find the specified		
file 7E FF 06 40 00 00 06 xx xx EF designated file is not found		
In-stream instruction error	7E FF 06 40 00 00 07 xx xx EF The current state does not accept spots	

(1) In order to strengthen the stability of the data communication between, we have added a data error handling mechanism. Module receives data does not match the 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) The module returns busy, the power module initialization time will return basically, because the module need to initialize the file system

(4) After the power module into the device state, is the order of the devices U plate-- TF card-- FLASH . in case U Disk and TF Cards are not online, it will automatically

enter FLASH status. If all devices are not online, the module will 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 description of the specified file name players"

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) To enhance the flexibility of the module, we have increased, the device is plugged in, pull out the instruction feedback. User to know the working status of the module.

(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

We conducted the following detailed description of key areas:

- Specified track play [played in physical order for storage]

- Specifies the volume of playback

- Specify the play equipment

- Specify a folder to play [There are a variety of ways, see the following detailed description]

- All loop instructions

3.4.1. Specify the song play command

Our instructions are given to support the specified track is playing, the choice of songs is 0 to 2999. In fact, it can support more, because it involves the cause of the file system to support 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 10 06 03 00 00 01 FF E6 EF 7E --- Start command

FF --- Version Information

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

03 --- On behalf of the command byte

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) If you choose the first 1000 The first play, first 1000 Converted to 16 Hex, the default is double-byte, it is 0x03E8 DH = 0x03;

DL = 0xE8 (4) 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 Specify the playback device

(1) Our modules are 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.

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

(3) , After the specified device. Decoding module automatically enters the stop state, waiting for the user to specify a track to play. Into the interior of the module completes 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: check on behalf of	the specified disk playback
device -SD 7E FF 06 09 00 00 02 xx	xx EF specified playback device -AUX	
	7E FF 06 09 00 00 03 xx xx EF	
Specify the playback device -FLASH	7E FF 06 09 00 00 04 xx xx EF	
Specify the playback device -PC	7E FF 06 09 00 00 05 xx xx EF refers to [the reader, sound card] mode	
Specify the playback device -SLEEP	7E FF 06 09 00 00 06 xx xx EF	

3.4.4 Specified folder player

01 specified folder inside 001xxx.mp3	7E FF 06 0F 00 01 01 xx xx EF
11 specified folder inside 100xxx.mp3	7E FF 06 0F 00 0B 64 xx xx EF
99 specified folder inside 255xxx.mp3	7E FF 06 0F 00 63 FF xx xx EF

(1) Specify the folder to play our developed extensions, naming the default folder is " 01 "," 11 " This way because our module does not support Chinese characters of the name of the

folder name recognition, stability and speed of the song in order to switch the system, the default maximum support at each folder 255 The song, most support 99 Classification

folders, if customers have special requirements, the need to classify according to the English name, we also can be achieved, but the name can only be " GUSHI "" ERGE "And the

English name of the composition. But mp3 File is a need to increase the prefix, you can "have to love. mp3 "Based on the changed" 002 can not help but love. mp3 . "

(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 to standard module, you must also 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]
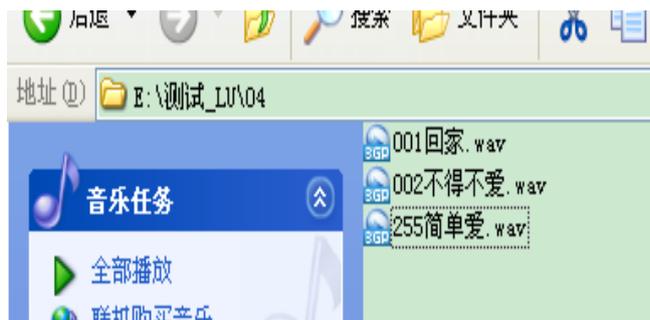
3.4.5 Designation MP3 Tracks play in a folder

Specifies the MP3 folder	7E FF 06 12 00 00 01 FE E8 EF "MP3" folder, track "0001"	
	7E FF 06 12 00 00 02 FE E7 EF "MP3" folder tracks for the "0002" 7E FF 06 12	
	00 00 FF FD EA EF "MP3" folder tracks for the "0255" 7E FF 06 12 00 07 CF FE	
	13 EF "MP3" folder, track is "1999"	
	7E FF 06 12 00 0B B8 FE 26 EF "MP3" folder, track is "3000"	

(1) On the basis of the specified folder and file names, we extend the functionality of a single folder, the folder must be named " MP3 "

(2) Up support 65536 Tracks, but in view of the operating speed of the file system, you may file with the increase, the switching speed of the track will slow down accordingly.

(3) Specify the file name as follows:

3.4.6 Stream ADVERT Advertising in the folder

Commercials	7E FF 06 13 00 00 01 FE E7 EF "ADVERT" folder tracks for the "0001" 7E FF 06 13 00	
	00 02 FE E6 EF "ADVERT" folder tracks for the "0002" 7E FF 06 13 00 00 FF FD E9 EF	
	"ADVERT" folder tracks for the "0255" 7E FF 06 13 00 07 CF FE 12 EF "ADVERT"	
	folder, track is "1999"	
	7E FF 06 13 00 0B B8 FE 25 EF "ADVERT" folder, track is "3000"	

(1) We support the insertion of other selections during playback of track to play, so it needs to be intercut to meet the needs of advertisers in the process of background music playback.

(2) ,send 0x13 After the instruction, the system stores the track currently being played IDV3 Information, and then play the tracks designated spots. Wait until after the insertion of a track is playing, the system will return to play that saved the break point to continue playing. Until it has finished playing.

(3) , Formatting is based on a device " ADVERT "The name of the folder in which to store needs to be intercut tracks, the track is set to" 0xxx + Track name. MP3 / WAV "

(4) In addition the system is paused or stopped if the current state, transmitting an instruction stream, are not responding, and an error message will be returned. If in the process of spots, you can continue the insertion of other tracks, but after finished playing, or return to the first store

IDV3 Information Service.

(5) Specify commercials are set as follows:

3.4.7 A single folder support 1000 Tracks

stand by 1000 first 7E FF 06 14 00 10 FF FD D8 EF designated as "01" folder, track is "0255"	
	7E FF 06 14 00 17 CF FE 01 EF designated as "01" folder tracks for the "1999" 7E FF 06 14 00
	C0 01 FE 26 EF file specified as "12" folder, track is "0001" 7E FF 06 14 00 C0 FF FD 28 EF file
	specified as "12" folder, track is "0255"
	7E FF 06 14 00 C7 CF FD 51 EF Designated as "12" folder, track is "1999"

For many customer requirements 10 Folders, each folder can manage 1000 Requirements of tracks, we have increased the entry instructions engineering users call, detailed as

follows:

(1) , Serial command byte 0x14 (2) Parameter is two bytes, if " Appointed as" 12 " Folders,

tracks as " 1999 '

Serial data: 7E FF 06 14 00 C7 CF FD 51 EF

among them 0xC7 with 0xCF As a parameter, combined to 0xC7CF. A total of 16 Including high bit 4 Representatives

folder named here C Represents the 12

The low 12 Name the file name indicates, here 7CF Representatives are 1999 , Which is the file prefix "1999" Tracks (3), Named folder is as

follows:

3.4.8 FLASH Fixed voice information stored

Track number	Track names	Track number	Track names
1	0.mp3	2	1.mp3
3	2.mp3	4	3.mp3
5	4.mp3	6	5.mp3
7	6.mp3	8	7.mp3
9	8.mp3	10	9.mp3
11	Female 10 da da .mp3	12	11Mp3 ringtones .mp3
13	12 Bund18 .mp3	14	13 home .wav
15	14 have to love .wav	16	

Note: which contains the MP3 , WAV Format audio files. Are without any compressed audio files. It does not contain any folder, located in the root directory of the file system

3.4.8 All loop instructions

0x11	循环播放	[1:循环播放][0:停止循环播放]

(1) , Some need to fight the root directory looping track request, we want to add this A control command 0x11 .

Loop start 7E FF 06 11 00 00 01 xx xx EF	Loop play all tracks
Loop Stop 7E FF 06 11 00 00 00 xx xx EF	Stop looping tracks

(2) In the loop process, the normal operation can play / pause, an upper, a lower, volume adjustment, comprising EQ and many more

(3) After the start loop, the module will stop playing device inside the track, the order of physical storage. Aired again after playing one side will continue again until it

receives the completed play, or pause command and so on

3.4.9 Play single cycle instruction

0x08	单曲循环指定曲目播放	0-2999

Loop start 7E FF 06 08 00 00 01 xx xx EF	Play the first song cycle
Loop Stop 7E FF 06 08 00 00 02 xx xx EF	The second song loop

(1) , Contention for some of the requirements needed to play a single cycle, we have improved it a control command 0x08 .

(2) In the loop process, the normal operation can play / pause, an upper, a lower, volume adjustment, comprising EQ and many more

And the state is still the loop can be triggered to play or go to sleep to close the loop shape by specifying a single.

3.4.10 Player Status command

Now Playing	7E FF 06 42 00 00 01 xx xx EF playing	
Pause playback	7E FF 06 42 00 00 02 xx xx EF playback is paused	
Stop play	7E FF 06 42 00 00 00 xx xx EF finished playing	
The current in the sleep state	7E FF 06 42 00 00 08 xx xx EF No device is online or designated sleep	

(1) The module will be available to users of four states in the decoding process. 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

3.4.11 Play Stop command

Stop playing ads	7E FF 06 15 00 00 00 FE E6 EF stop when the ad, back to the background music continues to broadcast
Stop play	7E FF 06 16 00 00 00 FE E5 EF Stop decoding software

(1) During playback module, we have two stops, one is to stop the current commercials, back to the current breakpoint continue to play background music. Another is

to stop all players, including background music

(2) If currently playing commercials, then sends a stop command 0x16 The chip will stop playing all tasks

3.4.12 Specified folder 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	

(1) , Naming the folder must be "01" — "99" . Not exceed 99 (2) , After the specified folder, will be in the specified folder inside the loop, it will not

stop, unless stopped sending instructions, etc.

3.4.13 Shuffle device file

Shuffle Playback	7E FF 06 17 00 00 02 FE E2 EF Play all files randomly cycle

(1) When this instruction random playback voice file stored inside the device, according to the physical order of play is random, regardless of whether the device with which the folder.

And the first voice file playback device must be inside the first voice file

3.4.14 The current track set to loop

Specify the file loop	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.

3.4.15 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 users can play a power amplifier to their own sources, but DAC The opening and closing, there will be soon po Tone, users friends attention. ,

The chip can be shut down at any time DAC . If you are currently playing voice, closed DAC The chip will continue to play, not just the 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

3.4.12 Sound card function

Module USB Mouth with a computer connection, you can MP3-TF-16P Sound module to play the computer, but the computer's output to be set at

Right-click the bottom right corner of the small computer speakers, such as 1 Map, and then left-click "playback device" dialog box, such as 2 FIG, right-click 'speaker CD002 'Right click the "set as the default device" here MP3-TF-16P There is sound output.
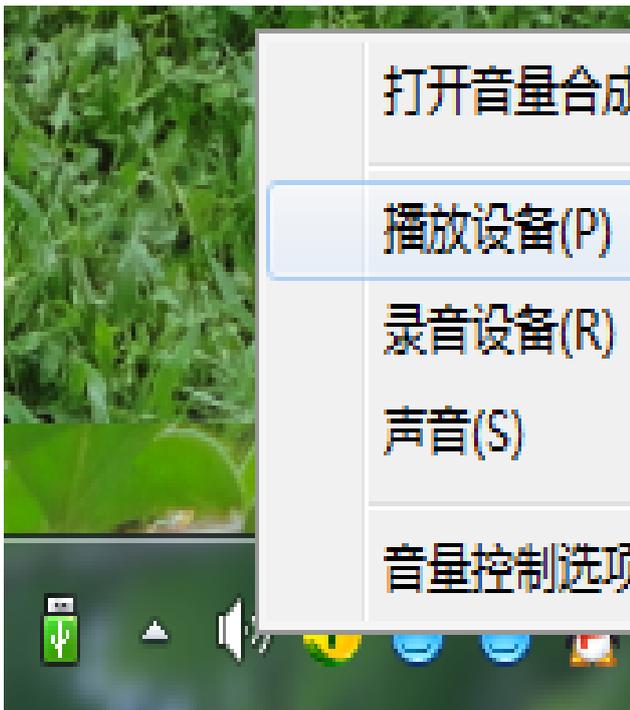
3.5 Button interface

We use the module AD Mode keys, to replace the traditional keyboard matrix connection, the benefits of doing so is to take full advantage of the

MCU Increasingly powerful AD Features. Design simple but not simple, we default configuration module 2 More AD mouth, 20 Resistance distribution of keys, if used in strong

electromagnetic interference or strong inductive, capacitive load occasions, please refer to our "Notes."

(1) Reference schematics
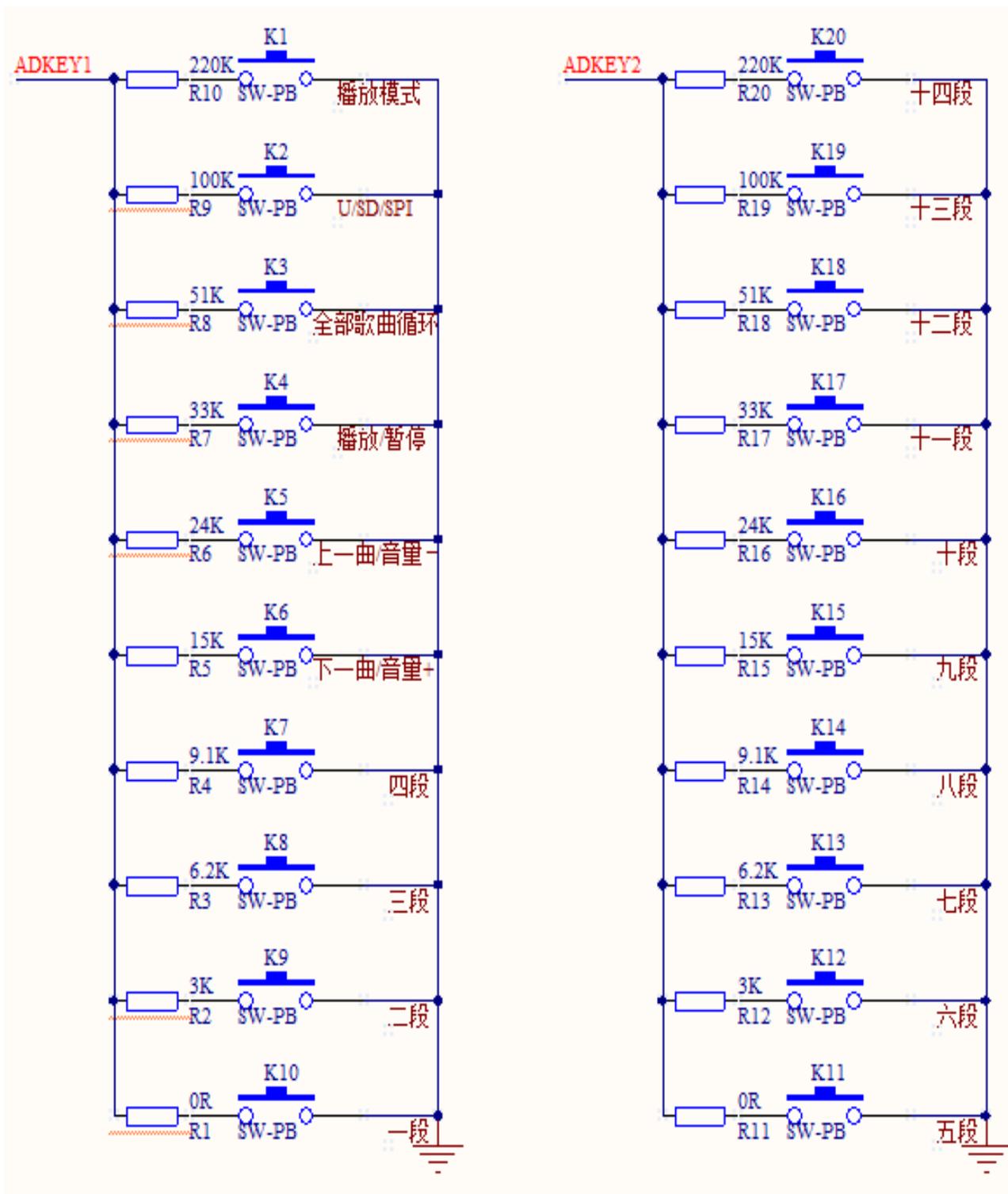
(2) , 20 Function keys allocation table

button	dog	Press	Remark
K1	Play Mode		Break switching / not interrupted
K2	Playback device is switched		U / TF / SPI / sleep
K3	Operating mode		Full cycle
K4	Play / Pause K5		
	previous piece	Volume +	
K6	next track	volume-	
K7	4	Loop 4	Press that loops until power down or press another button
K8	3	Loop 3	Press that loops until power down or press another button
K9	2	Loop 2	Press that loops until power down or press another button
K10	1	Loop 1	Press that loops until power down or press another button
K11	5	Loop 5	Press that loops until power down or press another button
K12	6	Loop 6	Press that loops until power down or press another button
K13	7	Loop 7	Press that loops until power down or press another button
K14	8	Loop 8	Press that loops until power down or press another button
K15	9	Loop 9	Press that loops until power down or press another button
K16	10	Loop 10	Press that loops until power down or press another button
K17	11	Loop 11	Press that loops until power down or press another button
K18	12	Loop 12	Press that loops until power down or press another button
K19	13	Loop 13	Press that loops until power down or press another button
K20	14	Loop 14	Press that loops until power down or press another button

3.6 Remote control function

button	dog	Remark
CH-	Operating mode	Interrupt / not interrupt
CH	Playback device is switched	U / TF / SPI / sleep
CH +	Play Mode	Full cycle
PREV	previous piece	Press and rapid volume -
NEXT	next track	Press and rapid volume +
PLAY / PAUSE	play / Pause	
VOL-	volume-	
VOL +	Volume +	
EQ	EQ switch	Normal / Pop / Rock / Jazz / Classic / Base
0	0	
100+	Sleeping	
200+	OK button	
1	1	
2	2	
3	3	
4	4	
5	5	
6	6	
7	7	
8	8	
9	9	

Remote control numeric keys with a specified function, such as by 1 Press the corresponding first paragraph 2 Corresponding to the second segment Determined according to the physical locations of the

Remote control number key functional combination, such as by 2 Press 1 , To play twenty one segment

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

3 , A serial communication interface, the default baud 9600 Can be modified according to customer requirements

4 ,external AD Key interface circuit, the function keys can be customized according to the needs of

5 , Mono external reference amplifier circuit

4.1 Serial Interface
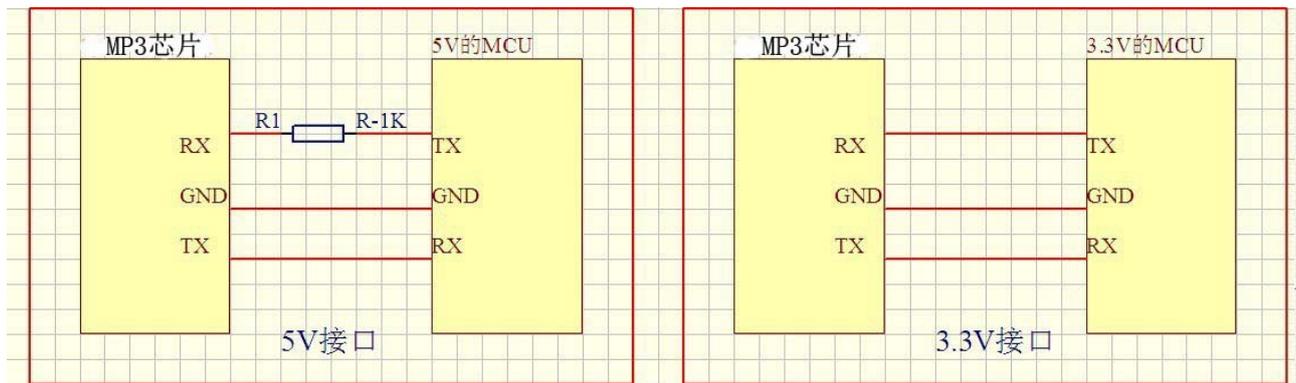
Chip serial port is 3.3V of TTL Level, so the default level interface for 3.3V . If the system is 5V . It is recommended that a series of serial ports in the docking interface 1K The

resistance. This is sufficient to meet the general requirements, if applied in the case of strong electromagnetic interference, please refer to the description "Notes" of. Chip 5V with 3.3V

The systems tested were normal, everything is normal. They are employed in the direct way, and not a string 1K The resistance.

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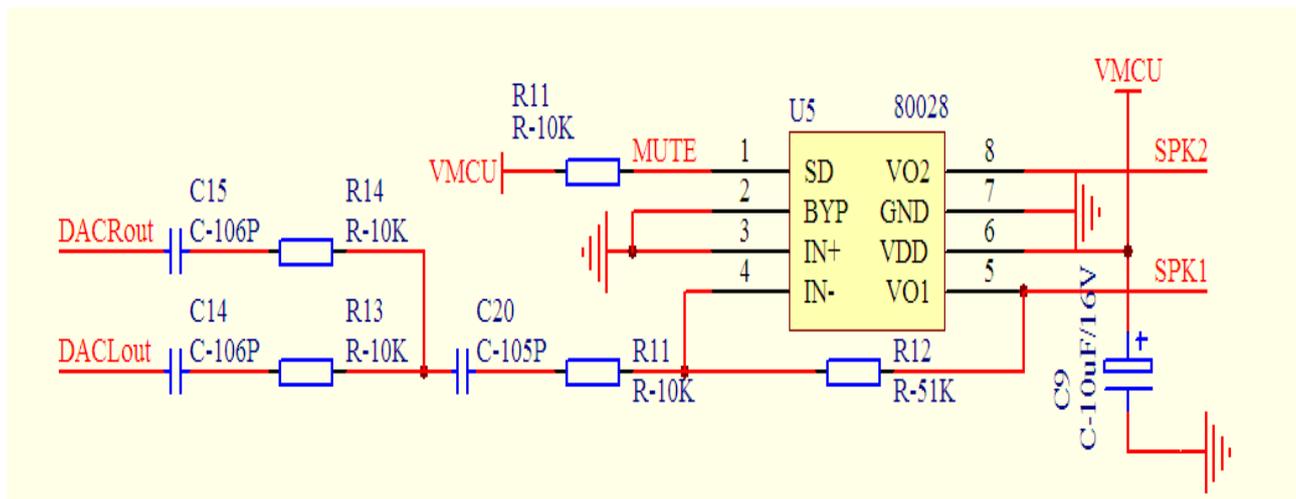
Here we use the power amplifier 8002 , Please refer to the specific parameters IC of datasheet . General enough to apply to the occasion, if the pursuit of higher quality, customers find

any other suitable amplifier.

4.3 External headphone circuit
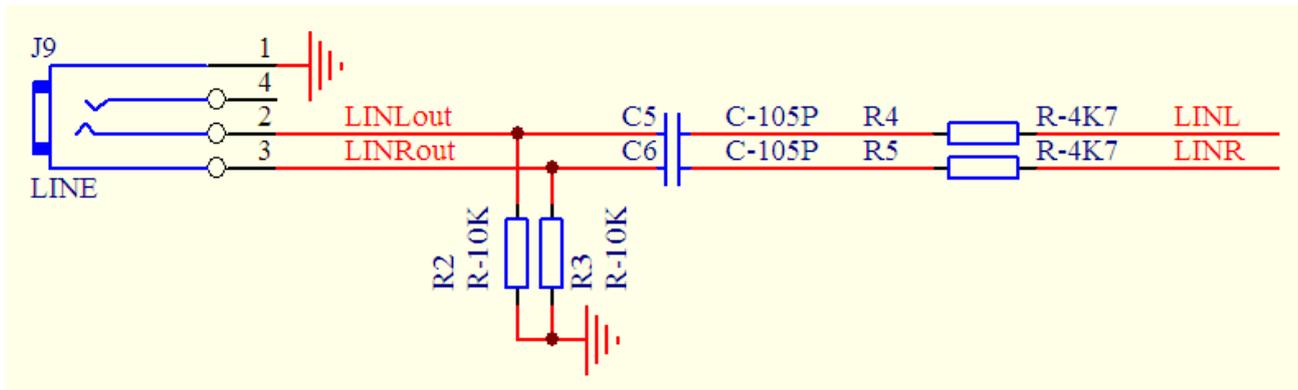
Here R4 with R5 It is a limiting resistor, to prevent excessive external audio amplitude (Vp-p A maximum of 3.0V) Affect system stability, C1

with C2 Blocking capacitor to prevent external audio sources affect the DC level of the internal chip offset; R2 with R3 Reserved for large power amplifier design with a resistor
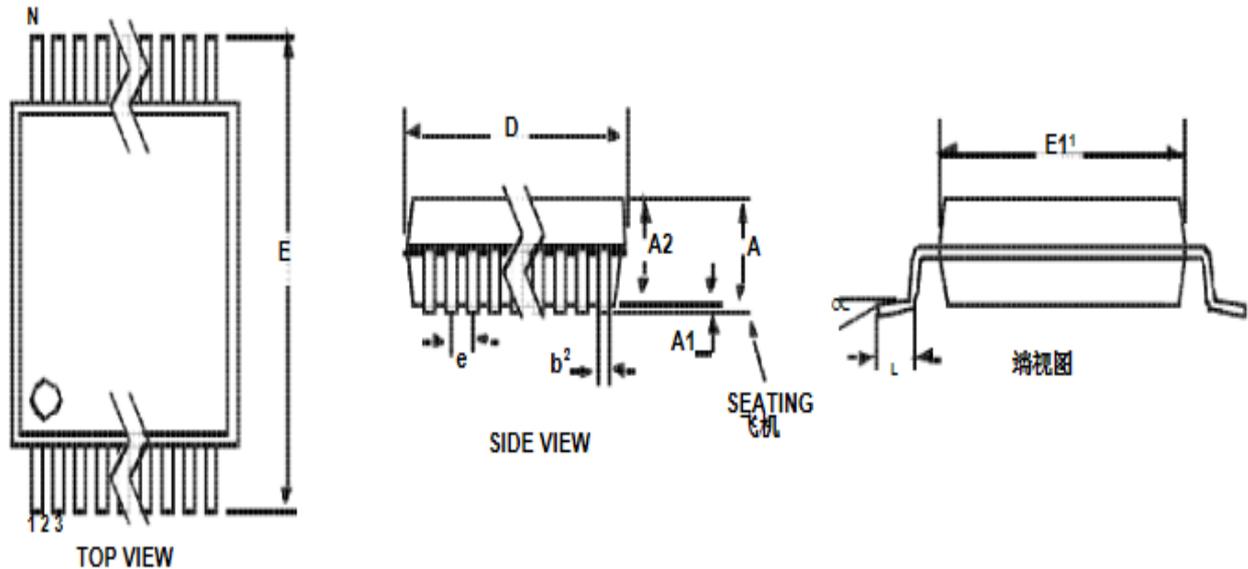
4.4 The main control circuit
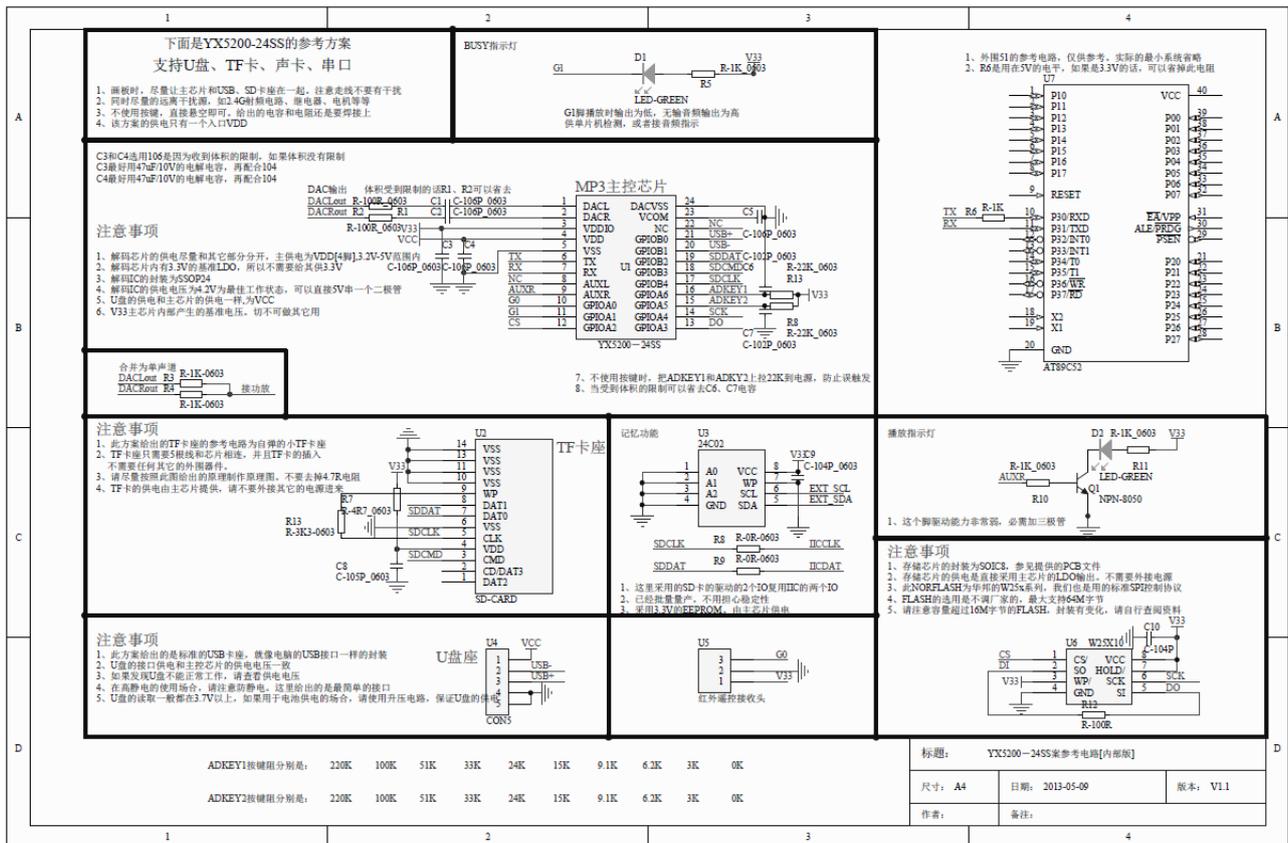
MP3 Simple master chip may not require the peripheral resistance and capacitance can still work

5 , YX5200-24SS Package FIG.

24L SSOP封装图

SIDE VIEW

SEATING 飞机

TOP VIEW

俯视图

DIM	INCHES			MILLIMETERS			注:
	MIN	NOM	MAX	MIN	NOM	MAX	
A	--	--	0.084	--	--	2.13	
A1	0.002	0.006	0.010	0.05	0.13	0.25	
A2	0.064	0.068	0.074	1.62	1.73	1.88	
b	0.009	--	0.015	0.22	--	0.38	2,3
D	0.311	0.323	0.335	7.90	8.20	8.50	1
E	0.291	0.307	0.323	7.40	7.80	8.20	
E1	0.197	0.209	0.220	5.00	5.30	5.60	1
e	0.022	0.026	0.030	0.55	0.65	0.75	
L	0.025	0.03	0.041	0.63	0.75	1.03	
∝	0°	4°	8°	0°	4°	8°	

JEDEC #：MO-150

控制尺寸为毫米.

注：3. "D"和"E1"是参考数据,不包括塑模毛边或突起,但不包括模具
　　　不匹配,并测量在分模线上,模具毛边或突起不得超过0.20毫米,每边.

　　　4.尺寸"b"不包括丹巴尔症/入侵.应允许丹巴尔症
　　　在"B"尺寸超过0.13 mm总在最大的物质条件.丹巴尔入侵不得减少尺寸"b"至少大于0.07毫米的物质条件.

　　　5.这些尺寸适用于0.10和0.25毫米的导线头间的导线的扁平部分.

1 ,Precautions

Using the module, the key place to do the following explanation:

- **Module GPIO Features**

- **In Notes applications**

- Serial Programming section of Note

6.1 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

6.2 Application Note points

1 , External interface module 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 power supply module, 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.

6 , 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

7 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 module in sleep 12ma About playing TF stuck at 15ma about. Power consumption will be relatively large. If the low-power applications, the power supply control module, or make the user of the chip. This can reduce the power consumption of the chip

6 The module supports module MP3 , WAV , WMA Three popular audio formats. But the default software support delivery is burned

MP3 , WAV Both formats. If special needs support WMA Demand format, please explain in advance
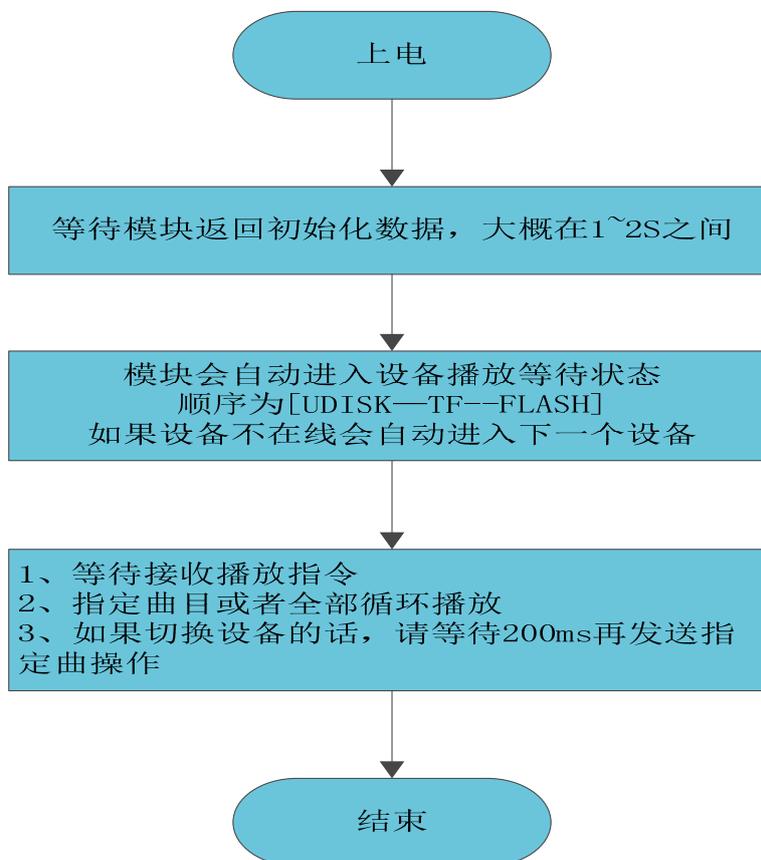
3 Our module supports 8 / 11.025 / 12/16 / 22.05 / 24/32 / 44.1 / 48KHZ audio file sampling rate, the vast majority of these parameters are also audio files on the network. If the sample rate of the audio file of the user is not in this range, playback is not supported, but it can be converted through a dedicated software.

6.3 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

6.3.1. Serial operating procedures

上电

等待模块返回初始化数据，大概在1~2S之间

模块会自动进入设备播放等待状态
顺序为[UDISK—TF--FLASH]
如果设备不在线会自动进入下一个设备

1、等待接收播放指令
2、指定曲目或者全部循环播放
3、如果切换设备的话，请等待200ms再发送指定曲操作

结束

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

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.

6.3.2. 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

6.3.3 Serial Programming delay the need for appropriate attention to points

1 After module power-up, 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 module has its own file system, under normal circumstances, the track is not greater 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 Disclaimer

- **Development Preliminaries**

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 the

hardware platform of their own design and related products used C Knowledge of language

- **EMI with EMC**

Module determines its mechanical structure EMI Performance will inevitably vary with integrated circuit design. Module EMI To meet the vast majority of applications, the user

if there are special requirements must be prior consultation with us.

Module 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 module, but not to the final user applications EMC Any

performance guarantee.

- **The power to amend the document**

One thousand music microelectronics to retain any time modify the relevant documents, without prior notice Power

- **ESD Electrostatic discharge protection point**

Products built some components 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, please install the product in order to ensure safety in the accumulation of electrostatic

discharge on the body, such as wearing a grounded wrist strap, touch a water pipe, etc. to earth

5 Version History

version	date	the reason
V1.0	2013/06/10 initially established finishing	
V1.1	2013/06/20	1, increasing the error handling module serial module returns see part 2, increasing the specified folder and file name specified operation
V1.2	2013/07/07	1, the device enters the power state, without entering sleep 2, that an increase of all 0x11 instruction loop is 3, AD is the key update stable release buttons 10
V1.3	2013/07/18	6, the default version defaults to 0xFF 7, increasing the loop instruction 0x08
V1.4	2013/08/25	1, instructions to update the player on a part of the bug 2, increase state query instruction 0x42 8, increase the specified folder MP3 songs to play 9, increase ADKEY selection function, start playback order grounding
V1.5	2013/09/18	1, increase advertising spots feature 2 on the basis of the 1.4 version, an increase of 10 folders, each folder support 1000 tracks 3, support for stopping the current commercials, return to the background music continues to play 4, stop decoding support
V1.6	2013/12/1	1, the specified folder loop 0x17 2, increasing the loop instruction 0x18 3, increasing the shuffle instruction 0x19 4, increasing the DAC opening and closing instructions 0x1A