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**1.** Overview

**1.1** Introduction

YX5300-24SS is a voice chip that provides a serial port, which perfectly integrates MP3 and WAV hard decoding.

At the same time, the software supports industrial-grade serial communication protocols, using SPIFLASH, TF card or U disk as the storage medium.

Users can flexibly choose any of these devices as the storage medium for voice. By simple serial command

Can complete the function of playing the specified voice and how to play the voice, without the need for tedious low-level operations, easy to use,

Stability is the biggest feature of this product.

No need for any writer, no software, USB flash programming directly.

**1.2** Features

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

2, 24-bit DAC output, dynamic range supports 90dB, signal-to-noise ratio supports 85dB

3. Supports up to 16M bytes of SPIFLASH. For example W25Q16 [2M bytes], W25Q128 [16M bytes]

4. Multiple control modes, parallel port control mode, serial port mode, AD key control mode

5. Miniusb interface updates voice files without installing any software. Supports XP and WIN7 systems.

6. Supports the combined playback function, which can realize time and temperature reporting, and can replace some expensive TTS solutions to a certain extent

7, 30-level volume adjustable, 5-level EQ adjustable [This function is not open yet]

8. Comes with a 3W power amplifier, which can be played directly by external speakers.

9. Supports 8-segment voice trigger playback and IO detection, so it is suitable for occasions such as carbon membrane keys

10.Support U disk, TF card and SPIFLASH as storage media at the same time

**1.3** Application

1.Vehicle navigation voice broadcast

2. Road transportation audit and voice prompts at toll stations;

3. Voice prompts for railway station and bus station security check;

4. Voice prompts for the electricity, communications and financial business halls;

5. Voice prompts for vehicle entry and exit verification;

6. Voice prompts for the border inspection channels of public security;

8. Voice notification for safe driving of electric sightseeing cars;

9. Automatic alarm for mechanical and electrical equipment failure;

10, fire voice alarm prompt;

11, automatic broadcast equipment, regular broadcast

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**2.** Program description

The chip uses the SOC solution, which integrates a 16-bit MCU and an aDSP specifically for audio decoding.

The decoding method ensures the stability and sound quality of the system. Small package size better meets the needs of embedding other products

**2.1** Parameter description

name

parameter

MP3 file format

1.Support all bit rate 11172-3 and ISO13813-3 layer3 audio decoding

2.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 standard

UART interface

Standard serial port, TTL level, baud rate can be set [user cannot set]

Input voltage

3.3V-5V [7805 series diode is the best after the stage]

Rated current

10MA [static]

Low power consumption 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]

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**2.2** Pin description

Pin number

Pin name

Function description

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

Powering SPI flsah

4

VDD

5V power input

Cannot exceed 5.2V

5

VSS

Power ground

6

TX

UART serial data output

3.3V TTL level

7

RX

UART serial data input

3.3V TTL level

8

GDPIA7

Play indicator

Recommended for triode driver

9

SPICS

SPI\_CS Chip Select Bus

10

BUSY

Busy output

Output low level during playback

11

SPIDO

SPI\_DO data bus

12

SPICLK

SPI\_CLK data bus

13

GPIOA1

P01

Trigger output port 1

14

GPIOA2

P02

Trigger output 2

15

GPIOA3

P03

Trigger output 3

16

GPIOA4

P04

Trigger output port 4

17

GPIOB5

SD\_CLK clock bus

Connect TF card or SD card

18

GPIOB6

SD\_CMD command bus

Connect TF card or SD card

19

GPIOB7

SD\_DAT data bus

Connect TF card or SD card

20

USB-

USB- DM

Computer's USB port

twenty one

USB +

USB + DP

Computer's USB port

twenty two

NC

NC

twenty three

VCOM

Decoupling

twenty four

DACVSS

Ground

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**3.** serial communication protocol

Serial port is a kind of communication commonly used in the control field. We have carried out industrial-level optimizations, verifying, resending,

Measures such as error handling greatly enhance the stability and reliability of communication, and at the same time can expand a more powerful RS485

Networking function, the communication baud rate of the serial port can be set by itself, the default is 9600

**3.1** Communication format

Support asynchronous serial communication mode, accept commands sent from host computer through serial port

Communication standard: 9600 bps

Data bits: 1

Check digit: none

Flow control: none

Format: $ S VER Len CMD Feedback para1 para2 checksum $ O

$ S

Start bit 0x7E

Each command feedback starts with $, which is 0x7E

VER

version

Version Information

Len

number of bytes after len

Checksum is not counted

CMD

Command word

Indicates specific operations, such as play / pause, etc.

Feedback

Command feedback

Whether feedback information is needed, 1 feedback, 0 no feedback

dat

parameter

Associated with the previous len, unlimited length

checksum

Checksum [occupies two bytes]

Accumulation and checksum [Do not count start bit $]

$ O

End bit

End bit 0xEF

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

The data length is 6, these 6 bytes are [FF 06 09 00 00 04]. Does not calculate start, end, and check. Then for the obtained

The results are accumulated and then subtracted by 0, that is, "0-checksum = check data". If you don't understand it here, you can refer to our "Debug

Manual ". In addition, users can also ignore the calibration directly, please refer to our section 5.3.4.

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**3.2** Communication instructions

Our newsletter is divided into the following two blocks

∎ Control instructions

∎ Query the parameters and status of the chip

**3.2.1** Control instructions

Here is how the control chip works

CMD command

Corresponding function

Parameter (16-bit)

0x01

next track

0x02

previous piece

0x03

Assigned tracks (NUM)

1-255

0x04

Volume +

0x05

volume-

0x06

Specify the volume

0-30

0x07

Keep

Keep

0x08

Single loop specified track playback

See 3.4.3 for details

0x09

Specify playback device

See 3.4.4 for details

0x0A

Go to sleep-low power

10MA

0x0B

Wake up sleep

0x0C

Chip reset

0x0D

Play

0x0E

time out

0x0F

Specified folder file name playback

See 3.4.5 for details

0x16

stop

0x17

Only for FLASH storage devices [TF card and U disk are not supported]

See 3.4.7 for details

0x18

Keep

Keep

0x19

Set the currently playing track to loop

See 3.4.8 for details

0x21

Turn the DAC output of the chip on and off

See 3.4.9 for details

0x22

Group play

See 3.4.10 for details

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**3.2.2** Query instructions

Here is the query chip status and related parameters

Detailed CMD command (query)

Corresponding function

Parameter (16-bit)

0x3C

Keep

0x3D

Keep

0x3E

Keep

0x3F

Send initialization parameters

0x1F (low 5 digits each represents a folder)

0x40

Error returned, request resend

0x41

Answer

0x42

Query the current status

See 3.4.10 for details

0x43

Query the current volume

0x44

Query the current EQ

Keep

0x45

Keep

This version retains this feature

0x46

Keep

This version retains this feature

0x47

Query the total number of UDISK files

Total number of files on the device

0x48

Query the total number of TF files

Total number of files on the device

0x49

Query the total number of FLASH files The total number of files in 5 folders

0x4B

Query UDISK's current track physical order

0x4C

Query the current track of TF

Physical order

0x4D

Querying the current track of FLASH returns the folder number and track pointer

0x4E

Query the tracks of the specified folder

total

See 3.5.2 for details

0x4F

Query the total files of the current device

Number of clips

See 3.5.3 for details

0x61

Query the current folder pointer

Only supports FLASH

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**3.3** Data returned by the chip

The chip will return data in key places. For users to control the working status of the chip

∎ Data successfully initialized when the chip is powered on

∎ The chip has finished playing the data of the current track

∎ The chip successfully receives the ACK (response) returned by the instruction

∎ The chip received a frame of data error [including data confiscation complete and verification error]

∎ When the chip is busy, when data comes over, the chip will return a busy instruction

∎ Insert and remove the U disk and TF card, all data will be returned

**3.3.1** Data returned from chip power-on

(1) When the chip is powered on, it takes some time to initialize.

It depends on the number of cases. Generally, the time is less than 500ms. If more than this time the module's initialization data has not been sent

Come out, the module initialization error, please check the hardware connection

(2) The data returned by the module initialization is the current valid folder, such as 7E FF 06 3F 00 00 03 xx xx EF

==> Where 0x03 represents U disk and TF two devices are online

USB flash drive-online

7E FF 06 3F 00 00 01 xx xx EF

Yes or 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 must wait for the chip initialization command before sending the corresponding control command, otherwise the sent chip will not

To deal with. It will also affect the normal initialization of the chip.

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**3.3.2** Data returned after track playback

U disk finishes track 1

7E FF 06 3C 00 00 01 xx xx EF

U disk finishes track 2

7E FF 06 3C 00 00 02 xx xx EF

TF card finishes track 1

7E FF 06 3D 00 00 01 xx xx EF TF Card

TF card finished song 2

7E FF 06 3D 00 00 02 xx xx EF TF Card

FLASH Completed the first song 7E FF 06 3E 00 01 01 xx xx EF FOLDER1 Completed the first song

FLASH Completed the second song 7E FF 06 3E 00 02 02 xx xx EF FOLDER2 Completed the second song

1. For many trigger-type playback requirements, our chip is corrected to automatically stop after playing a song. If the user needs

Such applications. Just specify the track to play. In this way, the track will stop automatically after playing, waiting for instructions

2. In addition, we specially set up an IO as a status indicator for decoding and suspension. See pin 5

(1). Low level of playback status [Many amplifiers have mute feet, which can be controlled directly through this IO]

(2) The playback is paused and the output is high. Chip sleep state. Also low

3. After the chip is powered on, the initialization is normal and the chip will automatically enter the device playback state. And stop decoding, waiting for the user to send a broadcast

Related instructions

4. In addition, after specifying the device, the user needs to wait 200ms before sending the specified track, because once the track is specified,

The system will initialize the file system of the specified device. If the specified track command is sent immediately, the chip will not receive it.

**3.3.3** Data returned by chip response

Chip returns ACK

7E FF 06 41 00 00 00 xx xx EF indicates successful data reception

(1) In order to enhance the stability between data communications, we have added response processing. The ACKB byte is to set whether or not a response should be sent.

answer. The advantage of this is to ensure that there is a handshake signal for each communication. When the response is received, it indicates that the data sent by the MCU and the chip has become

Received, and deal with immediately.

(2) For general applications, customers can choose freely, and it is also possible not to add this response processing.

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**3.3.4** Data returned by chip error

Back busy

7E FF 06 40 00 00 01 xx xx EF chip during file system initialization

Currently in sleep mode 7E FF 06 40 00 00 02 xx xx EF Sleep mode only supports specified devices

Serial port receiving error

7E FF 06 40 00 00 03 xx xx EF

Check error

7E FF 06 40 00 00 04 xx xx EF and check error

Specify file out of range

7E FF 06 40 00 00 05 xx xx EF The file specified exceeds the set range.

The specified file was not found 7E FF 06 40 00 00 06 xx xx EF The specified file was not found

Data does not conform to rules

7E FF 06 40 00 00 08 xx xx EF If the minimum value is 1, the transmission is 0.

(1) In order to strengthen the stability between data communications, we have added a data error handling mechanism. The chip receives data that does not conform to the format,

There will be information feedback

(2) In the case of harsh environment, it is strongly recommended that customers deal with this order. If the application environment is normal, you don't need to deal with it.

(3) The chip returns busy, basically it will return when the chip is powered on and initialized, because the chip needs to initialize the file system

(4) After the chip is powered on, it enters the device state, and the device is SPIFLASH. If SPIFLASH is not online, it will automatically

Go to sleep.

(5) As long as we refer to the test SDK program given by us and transplant the serial port operation part, there will be no verification error. Here

It is strongly recommended that users use the verification method we give. Because no one can guarantee that the transmission of data will not go wrong.

(6). There is an error in the specified part of the file, please refer to the detailed explanation below.

**3.3.5** Device insertion and removal messages

USB stick inserted

7E FF 06 3A 00 00 01 xx xx EF

TF insert

7E FF 06 3A 00 00 02 xx xx EF

PC plug

7E FF 06 3A 00 00 04 xx xx EF

Unplug the USB stick

7E FF 06 3B 00 00 01 xx xx EF

TF unplug

7E FF 06 3B 00 00 02 xx xx EF

PC unplug

7E FF 06 3B 00 00 04 xx xx EF

(1) In order to enhance the flexibility of the chip, we have especially added the command feedback for device insertion and removal. Convenient for users to know the chip

Working status.

(2) When the device is inserted, we enter the device waiting state by default. If the user inserts a U disk with a light, you can see the U

The panel light flashes. You can also receive serial messages inserted by the device.

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**3.4** Serial Control Instructions

Below we detail the key points- for control instructions :

∎ Specified track playback

∎ Specify playback volume

∎ Specifying the playback device

∎ All loop playback instructions

∎ Combined playback function [Highlight]

∎ Specified track playback with volume parameters

**3.4.1** Specify Song Play Instructions **[** You can directly refer to **3.4.7]**

The instructions we give support the specified track playback, and the song selection range is 0 ~ 255. In fact, it can support more because

For reasons related to file management, supporting too many songs will lead to slow system operation, and general applications do not need to support this.

Many files. If customers have unconventional applications, please communicate with us beforehand.

(1) For example, select the first song to play, the sending part of the serial port 7E FF 06 03 00 00 01 FF E6 EF

7E --- Start command

FF --- Version Information

06 --- Data length (excluding checksum)

03 --- represents product number

00 --- Whether a response is required [0x01: A response is required, 0x00: No response is required]

00 --- high byte of track [DH]

01 --- The low byte of the track [DL], which represents the first song playing

FF --- High byte of parity

E6 --- Low byte of parity

EF --- end command

(2) For the selection, if you select the 100th song, first convert 100 to hexadecimal. The default is double-byte, which is 0x0064.

DH = 0x00; DL = 0x64

(3) Other operations can be analogized in turn, because it is the most convenient operation to use hexadecimal in the embedded field.

**3.4.2** Specify volume playback instruction

(1) The default volume on our system is 30 levels. If you want to set the volume, just send the corresponding command

(2) For example, if the volume is specified as level 15, the command sent by the serial port: 7E FF 06 06 00 00 0F FF D5 EF

(3), DH = 0x00; DL = 0x0F, 15 is converted into hexadecimal 0x000F. Follow the instructions in the track section

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**3.4.3** Single loop play instruction

Repeat the specified track 7E FF 06 08 00 00 01 xx xx EF

Loop 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 1 of FOLDER1

(1). For some requirements that require single-loop playback, we improve this control instruction 0x08. When operating a TF card or U disk,

It is specified in accordance with the physical order of file storage. Users should pay attention to this. But when operating FLASH, it is divided according to folders

Specified, please refer to the test instructions above.

(2) During the loop playback, normal play / pause can be performed.

And the status is still looping. You can turn off the looping status by specifying a single song to trigger playback or stop.

**3.4.4** Specify the playback device

(1) Our chip supports 4 types of playback devices by default. Only when the device is online can the designated device be played.

Whether the device is online, our software will automatically detect it, no user relationship is required.

(4), see the table below, select the appropriate command to send

(3) After specifying the equipment. The chip will automatically enter the stop decoding state, waiting for the user-specified track to play. From receiving the specified device to

The initialization of the file system is completed inside the chip. It takes about 200ms. Please wait 200ms before sending the command for the specified track.

Specify playback device-USB stick

7E FF 06 09 00 00 01 xx xx EF xx xx: represents calibration

Specify playback device-TF card

7E FF 06 09 00 00 02 xx xx EF

Specify playback device-PC

7E FF 06 09 00 00 04 xx xx EF

Specify playback device-FLASH 7E FF 06 09 00 00 05 xx xx EF

Specify playback device -SLEEP 7E FF 06 09 00 00 06 xx xx EF

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**3.4.5** Specified folder file name playback

001xxx.mp3 7E FF 06 0F 00 01 01 xx xx EF TF card or U disk in folder 01

100xxx.mp3 in folder 11 7E FF 06 0F 00 0B 64 xx xx EF TF card or USB flash drive

Folder 255xxx.mp3 7E FF 06 0F 00 63 FF xx xx EF TF card or USB flash drive

FOLDER1

7E FF 06 0F 00 01 01 xx xx EF [FLASH]

FOLDER2 song 1

7E FF 06 0F 00 02 01 xx xx EF [FLASH]

(1) The specified folder playback is an extension function we have developed. The default folder name is "01", "11", in order

The stability of the system and the speed of song switching. By default, each folder supports a maximum of 255 songs and a maximum of 99 folders.

(2) For example, specify the 100xxx.MP3 file in the "01" folder. The command sent by the serial port is: 7E FF 06 0F 00 01 64 xx xx EF

DH: stands for the name of the folder.It supports 99 files by default, that is, the names of 01-99.

DL: Represents the track, the default is up to 255 songs, that is, 0x01 ~ 0xFF

(3) In order to standardize the chip, a folder and file name must be specified at the same time to lock a file. Specifying a folder or list individually

It is also possible to specify the file name independently, but the management of the file will be worse. Specified folders and designated tracks support MP3, WAV

(4) The following two pictures illustrate the specification of the folder and file name. [Left and right pictures]

(5), SPIFLASH supports up to 5 FOLDER, please do not exceed this range when operating.

**3.4.6** Specifying the folder to start loop playback

Specified folder loop playback

7E FF 06 17 00 00 02 FE E2 EF Specified 02 folder loop playback

7E FF 06 17 00 00 01 FE E3 EF Specified 01 folder loop playback

Specify FOLDER to loop

7E FF 06 17 00 03 01 xx xx EF FOLDER

(1) For TF card and U disk, the folder must be named "01" --- "99". Cannot exceed 99

(2) For SPIFLASH, the user can play any of the 5 folders in a loop, please refer to the above reference instructions.

03 The specified folder is FOLDER3

01 The first song of the specified folder starts, if it is 02 here. Then loop this folder starting from track 2

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

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**3.4.7** Set the current track to play in a loop

Loop playback on and off

7E FF 06 19 00 00 00 FE E2 EF

Single loop playback on

7E FF 06 19 00 00 01 FE E1 EF

Single loop playback off

(1) Sending this instruction during playback will play the current track in a loop. If processing is currently paused or stopped, then

The chip will not respond to this command

(2) If you want to turn off the loop playback of a single song, just send the command to close it. This will stop the current track after it is finished playing.

**3.4.8 Turning the DAC** on and off

Setting up the **DAC**

7E FF 06 1A 00 00 00 FE E1 EF

On DAC

7E FF 06 1A 00 00 01 FE E0 EF

Off DAC [High impedance]

(1) In some occasions where users need to superimpose their own sound source, they can pause the currently playing voice first, and then input the DAC of our chip

The output is set to high impedance, so users can share a power amplifier to play their own audio source, but the DAC is turned on and off, will

There is a po sound, please pay attention to users.

(2) The chip can turn off the DAC at any time. If voice is currently playing and the DAC is turned off, the chip will continue to play,

Just no sound. After the chip is powered on, the DAC is turned on by default. It is turned off only after it is set to turn off.

If you need to open it again, you need to open the DAC by instructions.

**3.4.10** Instruction playback with volume parameter

Play with volume

7E FF 06 22 00 1E 01 xx xx EF

Play volume 1 at 30 levels

7E FF 06 22 00 0F 02 xx xx EF

Play volume 2 at 15 levels

(1) According to some users' wishes, set different volume for different voices to play. If you follow the old method, it is first

After setting the volume, and then specify the track to play, this operation is tedious and inconvenient. Hereby we add this instruction 0x22

(2) For specific operations, refer to the two test instructions given above.

(3) For U disk or TF card, we designate the playback according to the physical order. For FLASH, it defaults to FOLDER1

Under the folder.

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**3.5** Serial Query Instruction

Below we detail the key points- for query instructions :

∎ Play status query instruction

∎ Query of the total number of tracks in the specified folder

∎ Query the total number of folders of the current device

**3.5.1** Query the currently online device

Check online device 7E FF 06 3F 00 00 00 FE BC EF U disk is playing

(1) During the operation of the chip, the online status of the device will be continuously detected. The user can also query through the instruction 0x3F

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

DL = 0x0A = 0000 1010 represents TF card and FLASH online

If DL = 0x1F = 0000 1111 means U disk, TF card, PC, FLASH are all online

(3), 0x0F-the lower four bits represent a device.

**3.5.2** Play status query instruction

Now Playing

7E FF 06 42 00 01 01 xx xx EF U disk is playing

Pause playback

7E FF 06 42 00 02 02 xx xx EF TF card paused during playback

Stop play

7E FF 06 42 00 04 00 xx xx EF in USB mode

7E FF 06 42 00 08 01 xx xx EF FLASH Now playing

7E FF 06 42 00 10 00 xx xx EF chip is sleeping

(1) There will be 3 states open to the user during the decoding process. Users can query the current status of the module through instructions

(2). Pause means that a track is being played and the artificial sending instruction is paused.

Stopped playback means that once a track is finished playing, the module is in a stopped state

(3) If the returned data is 7E FF 06 42 00 02 02 xx xx EF The meaning is explained as follows:

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

DL = 0x02 --- represents the current "paused during TF card playback"

(4) If the returned data is 7E FF 06 42 00 02 02 xx xx EF The meaning is explained as follows:

Meaning of DH

Meaning of DL

0x01

The current device is a USB stick

0x00 is currently stopped playing

0x02

The current device is a TF card

0x01 is currently playing

0x04

The current device is a USB stick

0x02 is currently paused

0x08

The current device is a flash disk

0x10

Currently in SLEEP mode

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**3.5.2** Query of Total **Number of** Tracks in Specified Folder

Query total folder track number 7E FF 06 4E 00 00 01 FE AC EF Query total track number of folder 01

7E FF 06 4E 00 00 0B FE A2 EF Query the total number of tracks in the 11 folder

(1) If the user names the files according to the rules we set, "01", "02", etc., then the files in these folders can be

The total number of tracks. Valid files include MP3, WAV. Files in other formats are ignored.

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

Error displaying query folder

(3). If it is a FLASH query, directly query FOLDER1--FOLDER5 that we have given.

**3.5.3** Querying the Total Number of Folders of the Current Device

Query the total number of folders

7E FF 06 4F 00 00 00 FE AC EF Query the total number of folders of the current device

7E FF 06 4F 00 00 03 FE AC EF FOLDER1 and FOLDER2 are valid

(1) The user can query the total number of folders on the current device. We only support querying the number of folders in the "root directory".

Folders are not supported. Also please do not create empty folders.

(2) If there are 5 valid folders in the device [MP3 / WAV files in the folder] and an empty folder, then query the files

When the total number of folders is returned, there are 6 folders. So users are advised not to create empty folders.

(3) In FLASH mode, the data returned by querying the number of folders is not the same as the TF card and U disk, for example:

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

Where DL = 0x03, which means that FOLDER1 and FOLDER2 have voice files, and FOLDER3-FOLDER5

There are no valid documents.

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**4.** Reference circuit

For the application of the chip, we provide a detailed design reference, so that you can experience the power of the chip faster

∎ Serial communication interface, the default baud rate is 9600, which can be modified according to customer requirements

∎ Functions of external IO buttons can be customized according to customer requirements

∎ Reference circuit for external mono amplifier

**4.1** Serial interface

1. The serial port of the chip is 3.3V TTL level, so the default interface level is 3.3V.

2. If the system is 5V. Then it is recommended to connect a 1K resistor in series with the docking interface of the serial port. This is enough to meet the general requirements,

3. If it is used in the occasion of strong electromagnetic interference, please refer to the "Precautions".

4. The chip has been tested normally in 5V and 3.3V systems, and everything is normal. Both use the direct connection method, and no 1K

The resistance. General chips are compatible with 3.3V and 5V levels.

5. However, in the actual product development process, users must strictly test and pay attention to the level conversion. It is strongly recommended that users

Under the modified conditions, a 3.3V MCU is used to respond to the call for environmental protection and low power consumption.

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**4.2** Button interface

The chip uses the IO key method instead of the AD keyboard connection. The advantage of this is to make full use of the MCU.

More and more GPIO. The design is cumbersome but not simple. Our chip is configured with 6 key functions by default, which can be used in any harsh environment.

The occasional control can be used as a communication interface with the MCU. Our buttons are assigned 4 different types of functions,

According to the selection of the two resistors to ground, please contact technical support.

∎ One-to-one trigger playback can be interrupted

∎ One-to-one trigger playback, level can be looped

∎ Trigger one-on-one playback without interruption

∎ Standard playback functions, such as up and down songs, playback pause, etc.

Silkscreen 1 corresponds to A Silkscreen 2 corresponds to B [see PCB for details]

The above table is a function logic table for selecting 10 keys. When two pins are suspended, [One-to-one trigger playback can be interrupted]

The keys left by the chip are S1—S4. Other S5—S6 require the user to perform wiring according to the principle shown in the figure above.

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**(1)** One-to-one trigger function **[** can be interrupted **]**

One to one trigger

dog

Press

Not loose

Key up

S1

Paragraph 1 [FOLDER1]

S2

Paragraph 2 [FOLDER1]

S3

Paragraph 3 [FOLDER1]

S4

Paragraph 4 [FOLDER1]

S5

Paragraph 5 [FOLDER1]

S6

Paragraph 6 [FOLDER1]

Note: This is a one-to-one trigger playback, which can be interrupted [short-circuit to ground trigger 80ms effective]

**(2)** Press the key to stop the playback function

Button lift stop

dog

Press

Not loose

Key up

S1

The first cycle [FOLDER1]

stop

S2

The second cycle [FOLDER1]

stop

S3

The third cycle [FOLDER1]

stop

S4

The fourth cycle [FOLDER1]

stop

S5

The fifth cycle [FOLDER1]

stop

S6

The sixth paragraph loop [FOLDER1]

stop

Remarks: This is to stop lifting, press and hold the loop to play [800ms short circuit to ground trigger effective]

(3) One-to-one trigger cannot be interrupted

Trigger without interruption

dog

Long press without loosening

Key up

S1

Unstoppable paragraph 1 [FOLDER1]

S2

Uninterruptible paragraph 2 [FOLDER1]

S3

Unstoppable paragraph 3 [FOLDER1]

S4

Uninterruptible paragraph 4 [FOLDER1]

S5

Paragraph 5 cannot be interrupted [FOLDER1]

S6

Paragraph 6 cannot be interrupted [FOLDER1]

Note: This is a one-to-one trigger playback, which cannot be interrupted [short-circuit to ground trigger 80ms effective]

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twenty one

**(4)** Standard playback function

Play function buttons

dog

Press

Not loose

Key up

S1

next track

Volume +

S2

previous piece

volume-

S3

play / Pause

S4

stop

S5

Volume +

S6

volume-

Note: This is the standard MP3 function

**4.3** External Mono Amplifier

Here we use 8002 for the power amplifier. For specific parameters, please refer to the IC datasheet. It should be enough for general occasions.

High sound quality, please customers to find the right amplifier.

**4.4** User adjusts the volume of the amplifier

Our chip defaults to the highest power-on volume. If the user wants to reduce the volume by himself, he can modify it from the following 2 places

(1) Modify the current-limiting resistance of the DAC output of the chip. We default to 1K resistor. If the user wants to reduce the volume, he can increase

Increase this resistance. Refer to the red box mark of “1” in the figure below for the DAC resistance position.

(2) Modify the magnification of the power amplifier. We default to “51K” resistor. If you want to reduce the volume, you can reduce it appropriately.

If this resistance is small, it can be modified to 47K or 33K. See the mark in the red box "2" below

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**4.4 USB** Update Voice Instructions

Our module can directly update the voice using the mobile phone charging cable, which is convenient and flexible. Our advantages are as follows

∎ The window information of download voice can be corrected according to customer requirements

∎ No need to install any software, update directly, no special downloader required

∎ No compression or damage to the sound quality, ensuring a higher sound quality experience

1. Plug in our mobile phone charging cable, which is called MicroUSB cable. The computer will pop up the following interface, and then the computer's 360 software,

Either the antivirus software is turned off, or the following window pops up after plugging in the USB to allow the program to run:

2.The computer will pop up the following interface

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

(1)

(2)

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twenty three

2. Select the "FOLDER1" folder, as shown in the figure above (2) and click Load, a window for loading voice will pop up, as shown below

Click the left mouse button and drag to select, or press the keyboard Ctrl key to select the sound files one by one

3. At this point, select the voice to be loaded, and click "Open" to add it to the software.

4. Finally, return to the "UPDATE" interface and click the "Update" button, the following interface will appear

5.

There are 3 windows in order from left to right. The last window represents the update is complete. Close this window directly and unplug the USB cable.

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5. At present, the SPIFLASH we tested includes the largest FLASH in the market such as Winbond, GD, and Wanghong. So FLASH's

There are no issues with compatibility. FLASH we tested. The maximum is 16M bytes [W25Q128], which is all right.

6. Since the update progress bar of our updated window only supports 8M bytes at most, when using 16M bytes of FLASH, it will output

Now the following interface, please friends and friends do not worry, this is normal

Although the progress bar has not changed, it is still changing.

new

7. Updated description:

(1), our update window reserves 5 areas for update, named FOLDER1--FOLDER5. This version supports 5

Area specified playback operation

(2) FOLDER1--FOLDER5 These 5 areas are not scalable and are scalable. For example, I just use FOLDER1,

Do not use the other four file areas. Will these four file areas take up space? Yes, it takes less than 10 bytes and can be ignored.

(3) Each FOLDER area supports up to 255 voices [where space permits]. The size of a single voice is not required

of. Currently FLASH supports a maximum of 128Mbit. That is, 16M bytes of voice storage, which is sufficient for most applications.

(4) If the user does not have high requirements for the sound quality, he can choose his own voice compression software to compress MP3 or WAV files.

Reduce storage space occupied by files. In order to reflect the high sound quality of our products, users are not recommended to use it this way

(5) The USB update time is determined by the size of the voice file. The larger the voice, the slower the update time.

(6) Once the voice is updated, all previously saved voices will be deleted.

7. Remarks:

(1) Our module does not need to install any software. The software popped into the computer is actually burned to SPIFLASH. 200kb space

between. It's small, so users can ignore it.

(2) Users can change their own SPIFLASH if needed. Please ask our technical support for updated firmware.

(3) If the computer uses our module for the first time, it will take some time when it is just inserted into the computer, because the computer will automatically

Enumerate my modules, determine identity, and more. It may take about 1 minute until the update window pops up.

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**4.5** User uses blank **FLASH** instructions

In the process of debugging, the user will change the size of the flash to meet their needs according to their needs. This requires the following three

Steps to complete the FLASH replacement.

∎ Ask us for updated firmware for FLASH

∎ Firmware burning of blank FLASH through USB interface

∎ Unplug the USB cable, and then power on, it can be used normally

1. Our firmware is divided into 4 parts, which will be explained in detail below.

The user selects the updated firmware according to his / her FLASH size. The size of the firmware is the same.

The picture on the right is actually called "ISDDown.exe" through a batch process of "double-clicking this file to flash the module firmware.bat".

The "32bit = 4Byte.iso.iso" image file is written in the FLASH. This is an open source tool. If you are interested, you can check the information yourself.

To understand the entire process.

2. After plugging into the computer via USB, click "mydown.bat", and the following window will pop up

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

4. After the update is completed, you can see that the computer has a virtual "CDROM", which indicates success.

Note: If any abnormality occurs during the update process, it is abnormal. You can replace the FLASH to determine the problem.

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**5.** Notes

The use of the chip, the key points are explained as follows:

∎ Features of the chip's GPIO

∎ Notes on application

∎ Attention of serial programming part

**5.1** Features of **GPIO**

IO input characteristics

Symbolic parameter

Smallest

typical

maximum

unit

Test Conditions

V IL

Low-Level Input

Voltage

-0.3

-

0.3 \* VDD

V

VDD = 3.3V

V IH

High-Level Input

Voltage

0.7VD

D

-

VDD + 0.3

V

VDD = 3.3V

IO output characteristics

Symbolic parameter

Smallest

typical

maximum

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

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**5.2** Points to note in the application

1. The external interface of the chip is 3.3V TTL level, so in the design of the hardware circuit, please pay attention to the problem of level conversion.

In addition, in the environment of strong interference, please pay attention to some protection measures of electromagnetic compatibility. GPIO adopts optocoupler isolation, increase TVS, etc.

2. The values ​​of the ADKEY keys are in accordance with the general use environment. If it is in an inductive or capacitive load environment, please pay attention to the chip

It is recommended to use a separate isolated power supply. In addition, it is equipped with magnetic beads and inductors to filter the power supply.

The power supply is stable and clean. If it cannot be guaranteed, please contact us to reduce the number of keys and redefine a wider voltage distribution.

Match.

3, serial communication, in general use environment, pay attention to good level conversion. If strong interference environment, or long distance RS485

Application, then please pay attention to the isolation of the signal, and design the communication circuit in strict accordance with the industry standards. Contact us and we provide design

reference

4. We support a minimum sample rate of 8KHZ for audio files. In other words, audio files below 8KHZ are not supported and cannot be corrected.

Often decoded and played. Users can use audio processing software to increase the sampling rate of audio files to solve this problem.

5. The current of the chip in the sleep state is about 10MA. During playback, depending on the volume, the peak current can reach 1A. Power consumption

It will be bigger. If it is used in low power consumption, please control the chip or the power supply of the chip. This can reduce the power consumption of the chip

6. If the user directly uses the power amplifier that comes with our chip, please select the appropriate speaker. 4 ohms / 3W is recommended. this is

Use the configuration that works best. When using other speakers, please pay attention to the two parameters of load size and power.

7. The chip supports two mainstream audio formats: MP3 and WAV.

8. Our chip supports audio files with 8 / 11.025 / 12/16 / 22.05 / 24/32 / 44.1 / 48KHZ sampling rate, these are also network

Parameters on most audio files. If the sample rate of the user's audio file is not within this range, it is not supported for playback, but

It can be converted by special software. Our advantage is lossless playback and high sound quality, so users are not recommended

Frequency for compression.

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**5.3** Serial operation

For the operation of the serial port, please refer to the following flow. We provide a complete reference routine for users' reference:

∎ Serial port operation flow

∎ Explanation of serial programming reference

∎ Precautions for delay in serial operation

**5.3.1** Serial operation procedure

1. The operation of the serial part of all chips provided by our company is the same protocol, so do not worry about the incompatibility of different chips

2. If you do not understand the operation of the serial port, please contact us for a serial programming reference routine.

3. The update of our products will also be backward compatible according to the current protocol version.

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**5.3.2** Explanation of Serial Programming Reference

The serial programming reference code we currently provide has two parts. The first part is the test code of our beta version.

The related serial port operation is more comprehensive, the other is the basic version, just an example of specifying the track. Ask users to be patient

**5.3.3** Serial port programming requires attention

1. After the chip is powered on, it takes about 1S-1.5S to perform the related operations. After initialization, there will be an initial phase.

Related data is sent out. Users can also ignore the data directly

2. After the designated device plays, it needs to delay for 200ms, and then send the designated track and other related instructions.

3. Because the chip comes with a file system, under normal circumstances, the response speed is less than 50ms if the number of tracks is not greater than 1000.

After more than 3,000 tracks, the file system switching speed will be slower, and the response speed will be between 100ms --- 1S

4. The internal processing of the serial port by the chip is performed once every 10MS, so a continuous instruction must be sent with a delay of 20MS.

Otherwise, the previous instructions will be overwritten and not executed.

5. If the specified folder file name plays [0x0F instruction], the delay must be greater than 40ms, because it takes time for the chip to lock the file.

As long as the relevant instructions for folder file name search are involved, a delay of 40MS is essential. If the chip is currently looking for text

Data, the serial port data comes too frequently, which will cause the chip to reset

**5.3.4** Important instructions for calibration

1. A lot of users are not used to the communication method of verification. We have introduced compatible methods with and without verification. for example

Bright. If we send the combined play instruction as follows:

Play next song [without verification]

7E FF 06 01 00 00 00 EF

Play next song [with check]

7E FF 06 01 00 00 00 FE FA EF

The difference between comparing the two instructions is to omit the 2 bytes of the checksum. Both frames of data can be received by the chip.

2. Because many users use MCU without crystal in the process of using. In this case, we must suggest that you add

Check this method to ensure the stability of communication.

3. If the user uses MCUs such as STM32 or STC, and the external crystal is connected, the calibration can be omitted properly. because

MCU without crystal oscillator, the clock is relatively inaccurate, so there will be errors in the serial port. Once the error is too large, it will cause communication errors.

User friends please consider for yourself.

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**5.3.5 MCU** Crystal Selection

1. In principle, we recommend that users use 11.0592MHZ or crystal multiples. This allows the serial port to generate

The baud rate of 9600 will be more accurate. The error of our chip serial port is allowed within 3%

2. If the user is at 12M crystal. First make the following judgments,

(1), see what MCU, 51 or PIC, STM32, etc., basically have their own baud rate generator, so

The baud rate of 9600 is basically no pressure.

(2) Check whether the MCU is a hardware serial port. If it is an IO analog serial port, it is strongly recommended that users use 11.0592.

Crystal

(3), standard 51, such as: STC89C52 or AT89C52, etc. all use the timer to generate the baud rate.

After a simple calculation, it can be calculated that the error of the 9600 baud rate of the 12M crystal is 0.16%.

Any problems, but users still need to fully test

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**6.** Disclaimer

∎ Development knowledge

Our company's products will provide as comprehensive development templates, drivers and application description files as possible for the convenience of users, but also need to use

Customers are familiar with the hardware platform and related C language used in designing their products

∎ **EMI** and **EMC**

The company's chip mechanical structure determines that its EMI performance is necessarily different from the integrated circuit design. EMI of our chip

Can meet most applications, users have special requirements, they must consult with us in advance.

The EMC performance of the company's chips is closely related to the design of the user backplane, especially the power circuit, I / O isolation, reset circuit, and the user.

The above factors must be fully considered when designing the base plate. We will work hard to improve the electromagnetic compatibility characteristics of our chips,

No guarantees are provided for end application EMC performance.

∎ Power to modify documents

The company reserves the right to modify the relevant documents of the company's chip products at any time without prior notice

∎ **ESD** electrostatic discharge point protection

Some of our company's products have built-in ESD protection circuits, but it is still recommended that users design the backplane when the environment is harsh.

Provide ESD protection measures, especially power and IO design, to ensure the stable operation of the product, install our products to ensure safety

Please first discharge the accumulated static electricity on your body, for example, wear a reliable grounded electrostatic ring, and touch the water pipe connected to the ground

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**7.** Reference routine

/ \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-Realization function: the first song and the second song are designated to be played when the chip is powered on.

-Date: 2013-05-06

-Operating environment: STC crystal: 11.0592M baud rate: 9600

-Remarks: Debugging on 51 development board of Puzhong Technology OK --- STC89C516RD +

The test program must be a chip or a device with a chip online, such as a USB flash drive, a TF card, or a flash.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* /

#include "REG52.h"

#define COMM\_BAUD\_RATE 9600 // Serial port baud rate

#define OSC\_FREQ

11059200 // Run 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 initialization

-Note: Set to 9600 baud rate

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* /

void Serial\_init (void)

{

TMOD = 0x20;

// Set T1 as the baud rate generator

SCON = 0x50;

// 0101,0000 8 data bits, no parity

PCON = 0x00;

// PCON = 0;

TH1 = 256- (OSC\_FREQ / COMM\_BAUD\_RATE / 32/12); // Set to 9600 baud rate

TL1 = 256- (OSC\_FREQ / COMM\_BAUD\_RATE / 32/12);

TR1 = 1;

// Timer 1 is on

REN = 1;

// Serial port 1 receiving enable

ES = 1;

// Serial port 1 interrupt enable

}

void Uart\_PutByte (INT8U ch)

{

SBUF = ch;

while (! TI) {;}

TI = 0;

}

/ \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-Function description: Send command from serial port [including control and query]

-Parameter description: CMD: indicates the control instruction, please refer to the instruction table, and also include the related instructions for inquiry

feedback: Whether a response is required [0: No response required, 1: Response required]

data: parameters passed

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* /

void SendCmd (INT8U len)

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{

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 check --- Users can also omit this check, see description in 5.3.4

-The idea of ​​checksum is as follows:

The command sent removes the start and end. Accumulate the 6 bytes in the middle, and then invert. The receiving end will receive

Frame of data, remove the start and end. The intermediate data is accumulated, plus the received check byte. Exactly 0. This will replace

The data received by the table 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 bytes

Send\_buf [1] = 0x06; // length

Send\_buf [2] = CMD; // Control instruction

Send\_buf [3] = feedback; // Whether feedback is needed

Send\_buf [4] = (INT8U) (dat >> 8); // datah

Send\_buf [5] = (INT8U) (dat); // datal

DoSum (& Send\_buf [0], 6);

//check

SendCmd (8);

// Send this frame data

}

void main ()

{

Serial\_init (); // Initial setting of serial port register

Uart\_SendCMD (0x03, 0, 0x01); // Play the first song

Delay\_Ms (1000); // The delay is about 6S

Uart\_SendCMD (0x03, 0, 0x02); // Play the second song

Delay\_Ms (1000); // The delay is about 6S

Uart\_SendCMD (0x03, 0, 0x04); // Play the fourth song

while (1);

}

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| --- |
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**8. PC** serial port debugging instruction example

Users can test the chip through the serial port software on the computer. Our chip serial port is TTL level, please pay attention to the level conversion

∎ Control instructions

∎ Query parameter instruction

**9.1** Control instructions

Serial debugging assistant for testing

Command sent [with verification]

Command sent [without verification]

Note

[next song]

7E FF 06 01 00 00 00 FE FA EF

7E FF 06 01 00 00 00 EF

[Previous song]

7E FF 06 02 00 00 00 FE F9 EF

7E FF 06 02 00 00 00 EF

[Specified track]

7E FF 06 03 00 00 01 FE F7 EF

7E FF 06 03 00 00 01 EF Specify the first play

7E FF 06 03 00 00 02 FE F6 EF

7E FF 06 03 00 00 02 EF Specify the second song

7E FF 06 03 00 00 0A FE EE EF

7E FF 06 03 00 00 0A EF Designated 10th

Volume up

7E FF 06 04 00 00 00 FE F7 EF

7E FF 06 04 00 00 00 EF

Volume down

7E FF 06 05 00 00 00 FE F6 EF

7E FF 06 05 00 00 00 EF

[Specify the volume]

7E FF 06 06 00 00 1E FE D7 EF

7E FF 06 06 00 00 1E EF Specify volume level 30

[Specify EQ]

7E FF 06 07 00 00 01 FE F3 EF

7E FF 06 07 00 00 01 EF Reserved

[Loop track]

7E FF 06 08 00 00 01 FE F2 EF

7E FF 06 08 00 00 01 EF

7E FF 06 08 00 00 02 FE F1 EF

7E FF 06 08 00 00 02 EF Loops the second song

7E FF 06 08 00 00 0A FE E9 EF

7E FF 06 08 00 00 0A EF loop tenth song

7E FF 06 08 00 01 01 FE F1 EF

7E FF 06 08 00 01 01 EF Loops the first song of FOLDER1 of FLASH

7E FF 06 08 00 02 01 FE F0 EF

7E FF 06 08 00 02 01 EF Loops the first song of FOLDER2 of FLASH

[Specify playback device]

7E FF 06 09 00 00 01 FE F1 EF

7E FF 06 09 00 00 01 EF Designated UDISK

7E FF 06 09 00 00 02 FE F0 EF

7E FF 06 09 00 00 02 EF Designated TF

7E FF 06 09 00 00 03 FE EF EF

7E FF 06 09 00 00 03 EF Designated FLASH

[Enter sleep mode]

7E FF 06 0A 00 00 00 FE F1 EF

7E FF 06 0A 00 00 00 EF

[Wake up sleep]

7E FF 06 0B 00 00 00 FE F0 EF

7E FF 06 0B 00 00 00 EF

[Chip reset]

7E FF 06 0C 00 00 00 FE EF EF

7E FF 06 0C 00 00 00 EF

[Play]

7E FF 06 0D 00 00 00 FE EE EF

7E FF 06 0D 00 00 00 EF

[time out]

7E FF 06 0E 00 00 00 FE ED EF

7E FF 06 0E 00 00 00 EF

[Specified folder file name]

7E FF 06 0F 00 01 01 FE EA EF

7E FF 06 0F 00 01 01 EF "01" folder with track "001"

7E FF 06 0F 00 01 02 FE E9 EF

7E FF 06 0F 00 01 02 EF "01" folder with track "002"

|  |
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Stop play

7E FF 06 16 00 00 00 FE E5 EF

7E FF 06 16 00 00 00 EF Stop software decoding

Specified folder loop playback

7E FF 06 17 00 02 00 FE E2 EF

7E FF 06 17 00 02 00 EF Specify 02 folder for loop playback

7E FF 06 17 00 01 00 FE E3 EF

7E FF 06 17 00 01 00 EF Specified 01 folder loop playback

Shuffle Playback

7E FF 06 18 00 00 00 FE E3 EF

7E FF 06 18 00 00 00 EF Random play

Single loop play

7E FF 06 19 00 00 00 FE E2 EF

7E FF 06 19 00 00 00 EF

7E FF 06 19 00 00 01 FE E1 EF

7E FF 06 19 00 00 01 EF

Play with volume

7E FF 06 22 00 1E 01 FE BA EF

7E FF 06 22 00 1E 01 EF Play the first song at 30 levels

7E FF 06 22 00 0F 01 FE C9 EF

7E FF 06 22 00 0F 01 EF Play the first song at 15 levels

7E FF 06 22 00 0F 02 FE C8 EF

7E FF 06 22 00 0F 02 EF Plays track 2 at 15 levels

**9.2** Query parameter instructions

Serial debugging assistant for testing

Command sent [with verification]

Command sent [without verification]

Note

Query the current status

7E FF 06 42 00 00 00 FE B9 EF

7E FF 06 42 00 00 00 EF

[Query volume]

7E FF 06 43 00 00 00 FE B8 EF

7E FF 06 43 00 00 00 EF

[Query current EQ]

7E FF 06 44 00 00 00 FE B7 EF

7E FF 06 44 00 00 00 EF

Total number of files on USB flash drive

7E FF 06 47 00 00 00 FE B4 EF

7E FF 06 47 00 00 00 EF Total number of files of the current device

TF Total Files

7E FF 06 48 00 00 00 FE B3 EF

7E FF 06 48 00 00 00 EF

FLASH Total Files

7E FF 06 49 00 00 00 FE B2 EF

7E FF 06 49 00 00 00 EF

USB track current track

7E FF 06 4B 00 00 00 FE B0 EF

7E FF 06 4B 00 00 00 EF currently playing track

TF current track

7E FF 06 4C 00 00 00 FE AF EF

7E FF 06 4C 00 00 00 EF

FLASH Current folder track pointer

7E FF 06 4D 00 00 00 FE AE EF

7E FF 06 4D 00 00 00 EF

Specify the total number of tracks in the folder

7E FF 06 4E 00 00 01 FE AC EF

7E FF 06 4E 00 01 00 EF

Query the total number of TF / U disk folders

7E FF 06 4F 00 00 00 FE AC EF

7E FF 06 4F 00 00 00 EF only supports TF card and U di