MH2024K-16SS

MH2024K-24SS

(GD3200A/B/D)

Datasheet

Guangzhou GuoDian Information

Technology Co.,LTD

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For typical application schematics, please see the last page.

Selection Note:

Model function	Package support	support USB flash drive	support TF/SD card	support SPI-Flash	Serial port (UART) Variable baud rate	Remark
GD3800D playback chip	SOP16	ÿ	ÿ	ÿ	ÿ (600bps~1.5Mbps)	replace GD58 series
GD3200B (MH2024K-16SS) Play chip	SOP16	ÿ	ÿ	×	× (fixed 9600bps)	replaces YX5200
GD3200A (MH2024K-24SS) Play chip	QSOP24	ÿ	ÿ	×	× (fixed 9600bps)	replaces YX5200
GD3200D playback chip	SOP16	ÿ	ÿ	ÿ	ÿ (2400bps~2Mbps)	replace YX5200
GD5001B playback chip	QSOP24	ÿ	ÿ	ÿ	ÿ (2400bps~2Mbps)	replace WT5001
GD3900D recording/playback/ Loudspeaker	SOP16	ÿ	ÿ	ÿ	ÿ (2400bps~2Mbps)	replace GD59 series

1 Overview

1.1 Introduction

GD3200A/GD3200B **has serial port control function and supports** MP3, WAV, WMA **formats**

The **hard-decoding** SOC **chip can be connected to external storage devices such as** TF/SD card, SPI-Flash, USB flash drive, etc., and supports FAT.

FAT16, FAT32 file system. The specified music can be played through simple serial port commands, and

How to play music and other functions, without tedious underlying operations, easy to use, stable and reliable is the key of this product

The biggest feature.

In addition, the chip is also a deeply customized product, specially developed for the field of fixed voice playback.

The solution can be customized to support G726, G729, FLAC, APE, M4A, ALAC, AMR, DTS,

Decoding of audio formats such as MIDI and MTY .

1.2 Functionality

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. Fully support FAT, FAT16, FAT32 **file systems,**

4. Support up to 128M bit SPI-Flash, 32G **TF** card , **and** 32G **USB** flash drive;

5. Control mode: serial port mode, AD button control mode;

6. Broadcast voice interruption function, which can pause the background music being played;

7. Audio data is sorted by folder, supporting up to 99 **folders, and each folder can be allocated** 255

First song;

8. 30 **levels of volume adjustable, 6 EQ** options **available;**

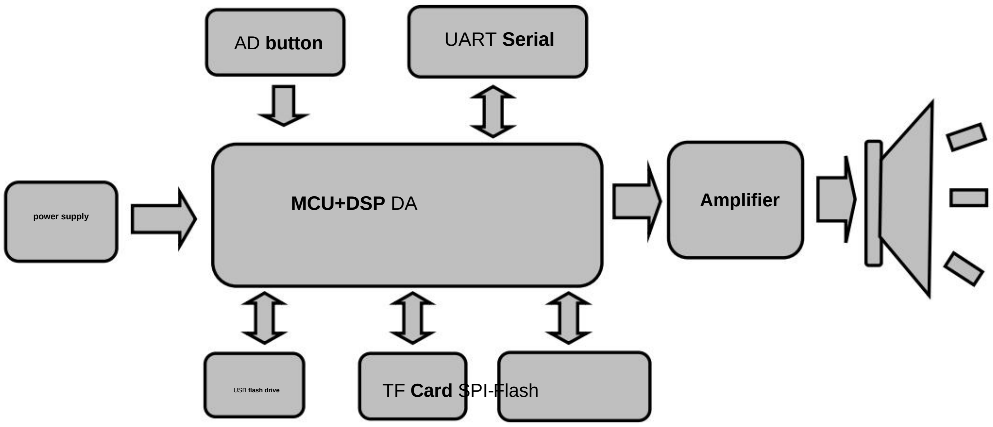
9. SPI-Flash can be plugged in externally. When connected to a computer, the drive letter of SPI-Flash can be displayed **to update the content;**

10. The music with the specified file name can be played through the serial port (Uart);

1.3 Electrical parameters

name	parameter
Audio file formats	**1. Support** MP3, WAV, WMA
	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**	Full speed USB 2.0 OTG controller
UART **Interface**	**Standard serial port, TTL** level, baud rate 9600bps
Input voltage	The power supply is 3.2V-5V, the best is 4.2V
Rated current	20ma[without USB **flash drive]**
size	**Standard** SOP16 package
Operating temperature	-40ÿ to +85ÿ
humidity	**5%** ~ 95%

2. Chip usage instructions



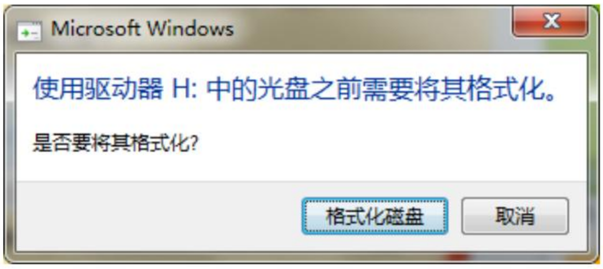
The chip uses a SOC **solution, integrates a** 32 **-bit DSP, and uses hard decoding.**

The system stability and sound quality are guaranteed. The small package size is more suitable for embedding in other products.

2.1 SPI-Flash to change the voice content

Taking 16M flash **operation as an example, the specific operations are as follows.**

2.1.1 Insert USB to connect to computer

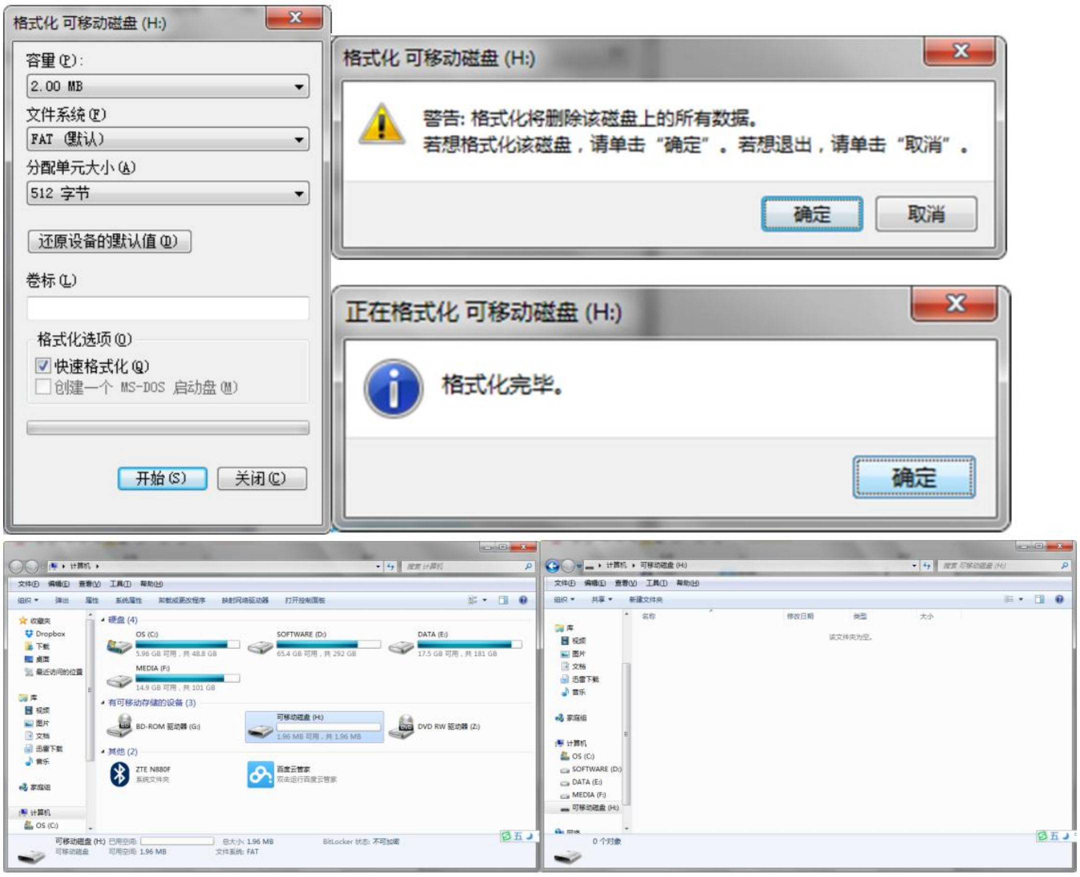


Microsoft Windows

使用驱动器 H: 中的光盘之前需要将其格式化。

是否要将其格式化?

2.1.2 Formatting the Disk



格式化 可移动磁盘 (H:)

容量(P): 2.00 MB

文件系统(F): FAT (默认)

分配单元大小(A): 512 字节

卷标(L):

格式化选项(O)

☑ 快速格式化(Q)

☐ 创建一个 MS-DOS 启动盘(M)

格式化 可移动磁盘 (H:)

警告: 格式化将删除该磁盘上的所有数据。
若想格式化该磁盘，请单击“确定”。若想退出，请单击“取消”。

正在格式化 可移动磁盘 (H:)

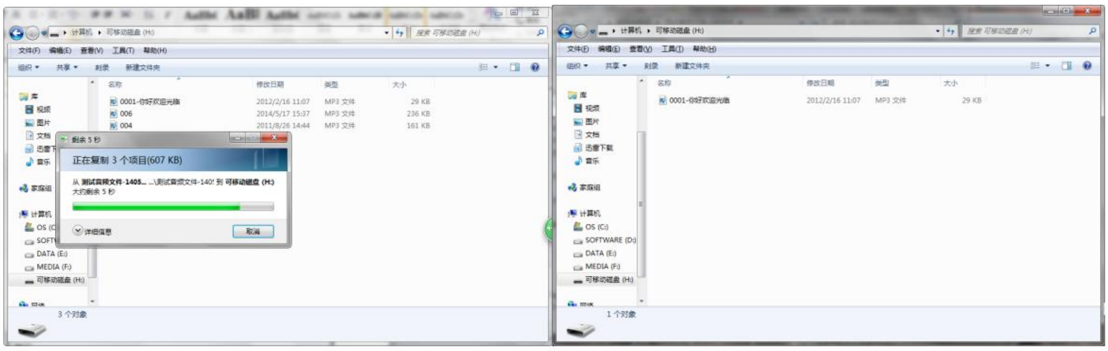
格式化完毕。

As shown in the figure, it can be used as a USB **flash drive. When** the flash **is used for the first time,** 2.1.1 is required.

After the operation is completed once, if the flash **is not formatted or deleted later, it is not necessary**

Repeat the above steps.

2.1.3 Loading Voice


计算机 ▸ 可移动磁盘 (H:)
搜索 可移动磁盘 (H:)
文件(F) 编辑(E) 查看(V) 工具(T) 帮助(H)
组织 ▾ 共享 ▾ 刻录 新建文件夹
库
视频
图片
文档
迅雷下载
音乐
家庭组
计算机
OS (C:)
SOFTWARE (D:)
DATA (E:)
MEDIA (F:)
可移动磁盘 (H:)
网络
详细信息
取消

名称	修改日期	类型	大小
0001-你好欢迎光临	2012/2/16 11:07	MP3 文件	29 KB
006	2014/5/17 15:37	MP3 文件	236 KB
004	2011/8/26 14:44	MP3 文件	161 KB

剩余 5 秒

正在复制 3 个项目(607 KB)

从 测试音频文件-1405... ...\测试音频文件-140! 到 可移动磁盘 (H:)
大约剩余 5 秒

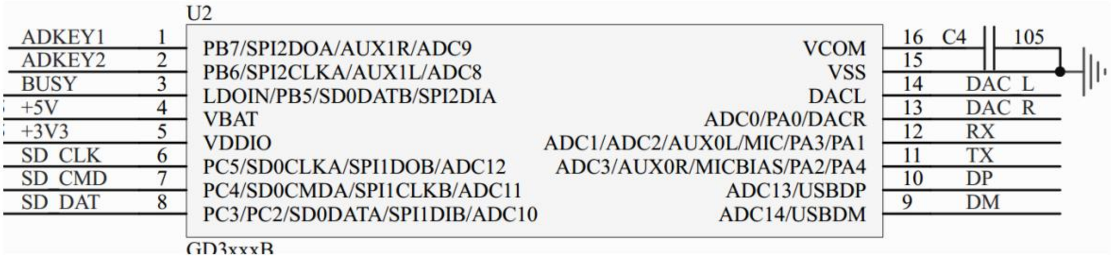
3 个对象

名称	修改日期	类型	大小
0001-你好欢迎光临	2012/2/16 11:07	MP3 文件	29 KB

1 个对象

As shown in the picture above, just drag the voice file into the USB **drive. The operation** is exactly the same as that of SD **card and USB drive.**

2.2 Chip Pin Description


U2
ADKEY1
ADKEY2
BUSY
+5V
+3V3
SD_CLK
SD_CMD
SD_DAT
1
2
3
4
5
6
7
8
PB7/SPI2DOA/AUX1R/ADC9
PB6/SPI2CLKA/AUX1L/ADC8
LDOIN/PB5/SD0DATB/SPI2DIA
VBAT
VDDIO
PC5/SD0CLKA/SPI1DOB/ADC12
PC4/SD0CMDA/SPI1CLKB/ADC11
PC3/PC2/SD0DATA/SPI1DIB/ADC10
VCOM
VSS
DACL
ADC0/PA0/DACR
ADC1/ADC2/AUX0L/MIC/PA3/PA1
ADC3/AUX0R/MICBIAS/PA2/PA4
ADC13/USBDP
ADC14/USBDM
16
15
14
13
12
11
10
9
C4
105
DAC_L
DAC_R
RX
TX
DP
DM
GD3xxxB

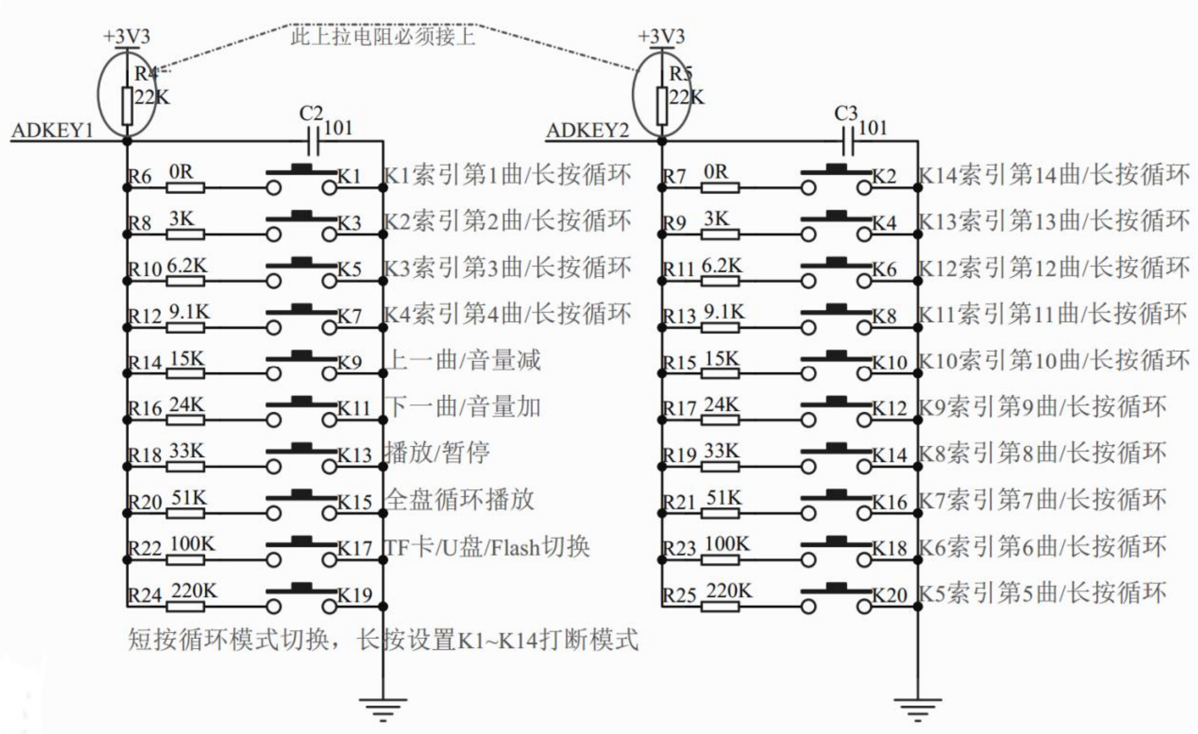
Pin No.	Pin Name	Function Description	Notes
1	ADK1	ADKEY2 external button must **be pulled up at** 22K	
2	ADK2	ADKEY1 external button must **be pulled up at** 22K	
3	BUSY	Busy **output decoding output signal**	
4	VDD	5V **power input cannot exceed 5.2V**	
5	VDDIO	3.3V **power output to** power TF card, SPI, 24C02	
6	**SPI_DO /SD_CLK**	**SPI_DO data bus** SD_CLK **clock bus**	SPI-flash **and TF/SD card can only be selected** **Next device**
7	SPI_CLK/SD_CMD	**SPI_CLK data bus** SD_CMD **command bus**	
8	**SPI_CS /SD_DAT**	**SPI_CS chip select bus** SD_DAT **data bus**	
9	DM	USB	
10	DP	USB	
11	TX	UART **serial data output**	Baud rate: 9600bps
12	RX	UART **serial data input**	
13	DAC_R	**Audio output right channel**	
14	DAC_L	**Audio output left channel**	
15	VSS	**Power Ground**	
16	VCOM	**Coupling foot**	

3. Control method description

3.1 Button Interface

The **chip uses** AD **keys to replace the traditional matrix keyboard connection. The advantage of this is that it makes full use of** the **increasingly powerful** AD **function** of the MCU . The chip is configured with 2 AD ports by default, and **the resistance value of 20 keys is allocated. If it is used in places with strong electromagnetic interference or strong inductive or capacitive loads, please refer to the "Precautions".**

AD **button resistance corresponding function reference diagram:**


+3V3
此上拉电阻必须接上
+3V3
R4
22K
ADKEY1
C2
101
R6 0R K1
K1索引第1曲/长按循环
R8 3K K3
K2索引第2曲/长按循环
R10 6.2K K5
K3索引第3曲/长按循环
R12 9.1K K7
K4索引第4曲/长按循环
R14 15K K9
上一曲/音量减
R16 24K K11
下一曲/音量加
R18 33K K13
播放/暂停
R20 51K K15
全盘循环播放
R22 100K K17
TF卡/U盘/Flash切换
R24 220K K19
短按循环模式切换，长按设置K1~K14打断模式
R5
22K
ADKEY2
C3
101
R7 0R K2
K14索引第14曲/长按循环
R9 3K K4
K13索引第13曲/长按循环
R11 6.2K K6
K12索引第12曲/长按循环
R13 9.1K K8
K11索引第11曲/长按循环
R15 15K K10
K10索引第10曲/长按循环
R17 24K K12
K9索引第9曲/长按循环
R19 33K K14
K8索引第8曲/长按循环
R21 51K K16
K7索引第7曲/长按循环
R23 100K K18
K6索引第6曲/长按循环
R25 220K K20
K5索引第5曲/长按循环

3.2 **Serial communication format**

Support asynchronous serial communication

mode Baud rate : 9600 bps **Parity**

bit : none Data bit : 8

Stop bit : 1 **Flow**

control : none

Format: $S VER Len CMD Feedback para1 para2 checksum $O		
$S starts at 0x7E. **Each command feedback starts with $, i.e. 0x7E**		
VER	Version 0xFF **version information [currently defaults to** 0xff]	
Len	**Number of bytes after** len **VER + Len +** CMD **+** Feedback **+** para1 **+** para2	
CMD	**Command words represent specific operations, such as play/pause, etc.**	
Feedback **Command feedback: whether feedback is needed, 1 for feedback, 0 for no feedback**		
para1	**Parameter 1: High byte of the data to be queried (such as the song number)**	
para2 **parameter 2 query data low byte**		
Checksum	**checksum [occupies two bytes] Cumulative checksum [only counts the length bit data superposition]**	
$O **end bit** 0xEF	end bit 0xEF	

If we specify to play SPI-Flash, we need to send: 7E FF 06 09 01 00 04 FE ED EF

The data length is 6 bytes , **which are [FF** 06 09 01 00 **04], excluding the start bit [7E], checksum**

and [FE **ED], end bit [EF]; the checksum is calculated as the length bit. After adding all the data, the result is taken.**

Counter +1.

3.3 Communication instructions

3.3.1 Directly sent command with return code.

The function corresponding to		**Order**
	is 0x01 **next song**	
0x02 **Previous song**		
0x03 **Specify index to play** 0x04		**Two bytes in length, supports up to 65535 audio segments**
Volume increase 0x05		Maximum level 30
Volume decrease		Minimum level 0
0x06 **Specify volume**		**0~30 levels of volume adjustment**
0x07 Specify EQ0/1/2/3/4/5 0x08		Normal/Pop/Rock/Jazz/Classic/Bass
Specify track index Single song loop play 0x09		**Two bytes in length, supports up to 65535 audio segments**
Specify playback device 0x0A		**1: U disk; 2: TF** card; 4: Flash
Shutdown 0x0B		**After shutdown, the IC's second pin (ADK2) can wake up and restart the device**
NC (reserved) 0x0C **Reset**		**Invalid command**
and restart		
0x0D **Play**		
0x0E **Pause**		
0x0F **Play the file name in the specified folder**		Folder name: 01~99 (FF **indicates the specified root directory file name);** The first three digits of the file name must be numbers 001~999?.mp3
0x10 **NC (reserved)** 0x11		**Invalid command**
Play the entire disc in a loop		1: loop play; 0: stop loop play
0x12 **Specify the file name in the "MP3" folder to play**		**Less than 10000, identify the first 4 digits 0001~9999?.mp3** Above 10000, identify the first 5 digits 10000~65535?.mp3
0x13	Specify the file name under the "ADVERT" folder **Insert**	**Less than 10000, identify the first 4 digits 0001~9999?.mp3** Above 10000, identify the first 5 digits 10000~65535?.mp3

0x14 **Play the file name in the specified folder**	Folder name: 01~15; see the command description for details. The first 4 digits of the file name must be numbers 0001~4095?.mp3
0x15 **Stop the current insert and return to the background file playback**	
0x16 **Stop playing**	
0x17 **Specify the folder name to play in a**	Folder name: 01~99 corresponds to 99 folders
loop 0x18 **Play the entire disk randomly**	
0x19 **Set single song to play in loop**	**0: single loop; 1: cancel single loop;** **This command has no playback function and needs to be sent in playback state.**
0x1A **Current song (mute) MUTE setting**	**0: Unmute; 1: Mute**
0x25 Insert the file name in the folder "ADVERT1~9" broadcast	**You can specify** ADVERT1~9, a total of 9 folders **001?~255?.mp3 file name insert (recognize the first 3 digits).**

3.3.2 System response parameters

Command corresponding function	Parameters (16 bits)
0x3A **Equipment online information**	01: Udisk **inserted,** 02: TF/SD **insert,** **04: PC Insertion**
0x3B **Device offline information**	01: **Unplug Udisk,** 02: **Unplug TF/SD card.** **04: Unplug** the PC
0x3C When the USB **disk playback ends, return to the current song index**	
0x3D TF **card playback ends and returns to the current song index**	
0x3E Flash **playback ends and returns to the current song index**	
0x3F **NC (reserved)** 0x40	**Invalid command**
Return error, request resend	
0x41 **Command receiving response**	

3.3.3 Set system parameters (write 8-bit HEX)

Functions corresponding to the	Parameters (16 bits)
0x42 **Query the current**	**01: Play; 02: Pause; 03: Stop**
status 0x43 **Query the current**	**Level 00~30**
volume 0x44 **Query the current** EQ	[0/1/2/3/4/5] Normal/Pop/Rock/Jazz/Classic/Bass
0x45 **Query the current cycle mode**	**01: Full loop; 02: Single loop; 03: File** **Clip loop; 04: Random loop; 05: Single play** **06: Single seamless loop**
0x46 **Query the current software version**	**Please view** the return value in ASCII
0x47 **Query the total number of** UDISK files	
0x48 **Query the total number of files in the** TF card	
0x49 **Query the total number of** FLASH files	
0x4A **NC (reserved)** 0x4B	**Invalid command**
Query the current track of UDISK	

0x4C **Query**	**the current track of the** TF card	
0x4D **Query**	**the current track of** FLASH	
0x4E **Query**	**the total number of files in the current folder**	
0x4F **Query**	**the total number of folders**	

3.4 Data returned by the chip

The chip will return data at key locations so that users can control the working status of the chip.

ÿ •Data of successful chip power-on initialization;

•ÿ The chip has finished playing the data of the current track;

•ÿ The chip successfully receives the ACK (response) returned by the command;

•ÿThe chip receives a frame of data with an error [including two situations: data is not received completely and verification is wrong];

•ÿ When the chip is busy, if data comes in, the chip will return a busy instruction;

•ÿ The data will be returned when the USB disk or TF **card is inserted or removed.**

3.4.1 Data returned when the chip is powered on

(1) When the chip is powered on, it takes a certain amount of time to initialize. This time depends on the USB flash drive, TF **card,**

The time is determined by the number of files on the flash **device, usually** 1.5 to 3 seconds .

The initialization data of the chip has not been sent out for a period of time, indicating that the chip initialization error occurs. Please reset the chip.

Power supply, and also check the hardware connection.

(2) Chip initialization data includes the lower four bits DL (bit0~bit3) **of the low byte of the online device data .** For example,

7E FF 06 3F 00 00 01 FE BB EF; DL=0x01 **indicates that during the power-on process, only** the USB **flash drive is online.**

Please refer to the following table for its data and the relationship between the devices:

Data bit	**Bit3(PC) Bit2(Flash) Bit1(SD) Bit0(U disk)**			
[0x01]: U	0 0		0	1
disk online [0x02]: TF/SD	0	0	1	0
card online [0x03]: U disk, TF/SD	0	0	1	1
card online [0x04]:	0	1	0	0
Flash online [0x05]: U disk, Flash **online** 0 **[0x06]:**		1	0	1
TF/SD card, flash **online** 0 [0x07]: U disk, TF/SD		1	1	0
card, flash **online** 0		1	1	1

(3) The MCU must wait for the chip initialization command to be issued before sending the corresponding control command. Otherwise,

The chip will not process the sent command, and it will also affect the normal initialization of the chip.

3.4.2 Data returned after the track is played

The USB **drive has finished playing the** first **track**	7E FF 06 3C 00 00 01 FE BE EF USB **flash drive**	**playback of** the first **track is complete**
The USB **drive has finished playing the** second **track**	7E FF 06 3C 00 00 02 FE BD EF USB **disk playback of**	the second **track is complete**
TF/SD **card disk finished playing the** third	**track** 7E FF 06 3D 00 00 03 FE BB EF USB **disk finished**	playing the third track
TF/SD **card disk finished playing the** 4th	**track** 7E FF 06 3D 00 00 04 FE BA EF USB **disk finished**	playing the 4th track
Flash **finished playing the** 5th **song**	7E FF 06 3E 00 00 05 FE B8 EF USB **flash drive**	**playback of the** 5th **track is complete**

Flash **finishes playing the** sixth	7E FF 06 3E 00 00 06 FE B7 EF	USB **flash drive playback of the** 6th **track is complete**

song (1) **, and the playback is paused, outputting a high level.**

(2) **For continuous playback applications, this can be achieved. If** the USB **flash drive finishes playing the first song,**

Return 7E FF 06 3C 00 00 01 FE BE EF

3C ---- **indicates** the USB **flash drive command;**

00 **01----Indicates that the song has been played. At this time, send the command to play the next song, and the songs will be played in sequence.**

put.

(3) After the chip is powered on and initialized normally, the chip will automatically enter the device playback state and stop decoding.

Waiting for the user to send relevant playback instructions.

(4) In addition, after the user specifies the device, he needs to wait for 200ms **before sending the specified track.**

Because once the track is specified, the system will initialize the file system of the specified device.

Sending a specified track command will cause the chip to not receive it.

3.4.3 Data returned by chip error

Return	7E FF 06 40 00 00 01 xx xx EF	**chip during file system initialization**
busy Currently in sleep mode	7E FF 06 40 00 00 02 xx xx EF	**sleep mode**
Serial port receiving error	7E FF 06 40 00 00 03 xx xx EF	**The serial port has not received a frame of data.**
Verification error	7E FF 06 40 00 00 04 xx xx EF	**and checksum error**
Specified file exceeds the range	7E FF 06 40 00 00 05 xx xx	**The specified** EF **file 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**
Insertion command error	7E FF 06 40 00 00 07 xx xx EF	**The current state does not accept insertion**

3.4.5 Device plug-in and unplug-out messages

USB **flash drive insertion**	7E FF 06 3A 00 00 01 xx xx EF
TF **Insert**	7E FF 06 3A 00 00 02 xx xx EF
TF **pull out**	7E FF 06 3B 00 00 01 xx xx EF
Unplug the PC	7E FF 06 3B 00 00 02 xx xx EF

3.5 Detailed explanation of serial port commands

3.5.1 Specify song playback instructions

(1) For example, to select the first song to play, the sending part of the serial port is 7E 10 06 03 00 00 01 FF E6 EF 7E

---Start command

FF---version information

06---Data length (excluding checksum)

03---represents the command byte

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

00---High byte of the track [DH]

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

FF---high byte of checksum

E6---low byte of checksum

EF---End command

(2) For song selection, if you select the 100th song , **first** convert 100 **into** hexadecimal , **the default is double byte, which is** 0x0064. DH=0x00; DL=0x64. **(3) If you select the** 1000th song **to play, first** convert 1000 **into** hexadecimal , **the default is double byte, which is** 0x03E8; DH=0x03; DL=0xE8. (4) The operation of other songs can be deduced in the same way, because hexadecimal **is the most convenient operation in the embedded field .**

3.5.2 Specify volume playback command (0x06)

(1) When the system is powered on, the default volume is 30 **levels. If you want to set the volume, just send the corresponding command. (2) For example, to set the volume to** 15 **levels, the command sent by the serial port is: 7E** FF 06 06 00 00 0F FF D5 EF. **(3) DH=0x00;DL=0x0F, 15 is converted to** hexadecimal **as 0x000F. Please refer to the instructions in the section on playing tracks.**

3.5.3 Specify playback device (0x09)

After specifying the device, the chip will automatically enter the stop decoding state and wait for the user to specify the track to play. Receive the designated device to complete the initialization of the file system inside the chip. It takes about 200ms. Please wait 200ms **before sending the**

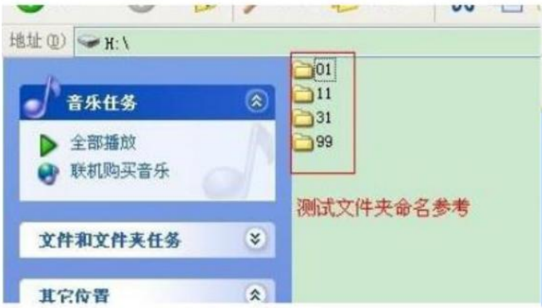
command for the designated track. Designated playback device-U disk 7E FF 06 09 00 00 01 xx xx EF xx **xx:**		
represents verification Designated playback device-SD disk 7E FF 06 09 00 00 02 xx		
xx EF **Designated playback device-FLASH** 7E FF 06 09 00 00 04 xx xx EF		

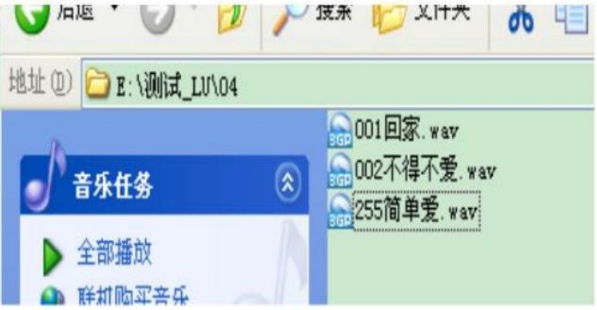
3.5.4 Play in a specified folder (0x0F)

001?.mp3 in the specified folder 01	7E FF 06 0F 00 01 01 xx xx EF	**The command only recognizes the first** 3 **digits, and "?" represents any number of characters.**
100 ?.mp3 **in the specified folder 11**	7E FF 06 0F 00 0B 64 xx xx EF	
255?.mp3 in the specified folder 99	7E FF 06 0F 00 63 FF xx xx EF	
254?.mp3 in the specified root directory FF	7E FF 06 0F 00 FF FE xx xx EF	

Note: When the folder name is "FF", it means that the file name in the specified root directory is played. **(1) Specifying folder playback is an extended function we have developed. The default folder naming method is "01" and "11". Because our chip does not support the recognition of folder names with Chinese characters, for the stability of the system and the speed of song switching, each folder supports a maximum of** 255 **songs by default, and supports a maximum** of 99 **folders. If the customer has special requirements and needs to classify according to English names, we can also** achieve it, but the name can only be composed of English names such as "GUSHI" and "ERGE". However, the mp3 **file needs to add a prefix, which can be changed from "Have to Love.mp3" to "002 Have to** Love.mp3".

(2) For example, to 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: represents the name of the folder, and supports** 99 **files by default, that is, 01--99 ; DL: represents the track, and the default maximum number of songs is** 255 , that is, 0x01~0xFF. (3) **For the standardization of the chip, you must specify both the folder and the file name to lock a file. It is also possible to specify a folder or a file name alone, but this will make file management worse. Specifying folders and specifying tracks supports MP3, WAV (4) The following two screenshots illustrate the specification of folders and file names [divided into two**

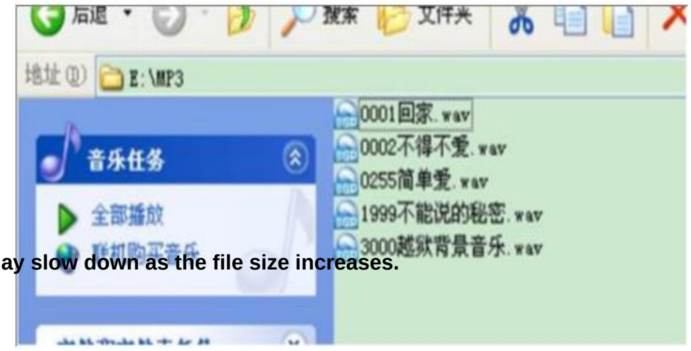

地址(D) H:\
音乐任务
全部播放
联机购买音乐
文件和文件夹任务
其它位置
01
11
31
99
测试文件夹命名参考


后退
搜索
文件夹
地址(D) E:\测试_LU\04
001回家.wav
002不得不爱.wav
255简单爱.wav
音乐任务
全部播放
联机购买音乐

3.5.5 Playing tracks in a specified MP3 folder

Command format	7E FF 06 12 00 00 01 FE E8 EF **"MP3" folder, track "0001"**
	7E FF 06 12 00 0B B8 FE 26 EF **"MP3" folder, track "1999"**
	7E FF 06 12 00 FF FF FC EB EF **"MP3" folder, track number "65535"**
	7E FF 06 12 00 27 10 FE B2 EF **"MP3" folder, track number "10000"**

Note: When the number of files is less than 10,000 , **the first** 4 **digits must be** 4 **digits. When it exceeds** 10,000 , **the first** 5 **digits must be digits.** **(1) The specified file name is as shown in the figure on the right: (2) Based on the specified folder and file name, we extend the function of a single folder. The folder name must be "MP3". (3) A maximum of** 65,536 **tracks are supported, but given the operating speed of the file system, the speed of track switching may slow down as the file size increases.**

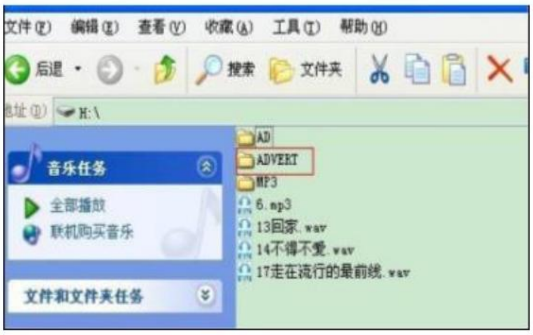

后退
搜索
文件夹
地址(D) E:\MP3
0001回家.wav
0002不得不爱.wav
0255简单爱.wav
1999不能说的秘密.wav
3000越狱背景音乐.wav
音乐任务
全部播放
联机购买音乐

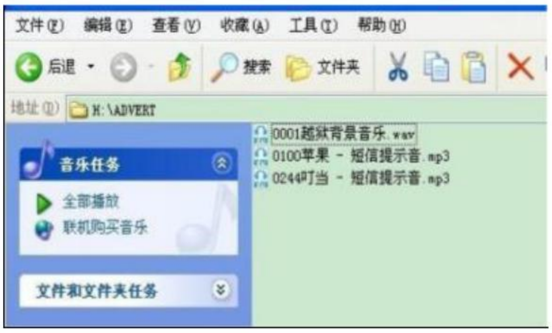
3.5.6 Insert the audio in the ADVERT folder

Command format	7E FF 06 13 00 00 01 FE E8 EF **"ADVERT" folder, track "0001"**
	7E FF 06 13 00 0B B8 FE 25 EF **"ADVERT" folder, track "1999"**
	7E FF 06 13 00 FF FF FC EB EF **"ADVERT" folder, track number "65535"**
	7E FF 06 13 00 27 10 FE B2 EF **"ADVERT" folder, track number "10000"**

Note: When the number of files is less than 10,000 , **the first** 4 **digits must be** 4 **digits, and when it exceeds** 10,000 , **the first** 5 **digits must be numbers.**

(1) We support inserting other tracks during the song selection process, so as to meet the need to insert advertisements during the background music. (2) After sending the 0x13 command, the system will store the IDV3 information **of the currently playing track , and then play the specified insert track. After the inserted track is played, the system will return to the saved breakpoint to continue playing. Until the playback is completed. (3) The setting format is to create a folder named "ADVERT" in the device and store** the tracks to be inserted. When the number of tracks is less than 10,000 , **the track is set to "xxxx+track** name.MP3/WAV". When the number of tracks is greater than 10,000 , **the track is set to "xxxxx+track name.MP3/WAV", where** x **represents a digit. (4) If the system is currently in the pause or stop state, sending the insert command is only used as a general playback command. If other tracks can be inserted during the insert process, but after the playback is completed, it will return to the breakpoint information stored for the first time to continue playing. (5) The settings for specifying insert ads are**

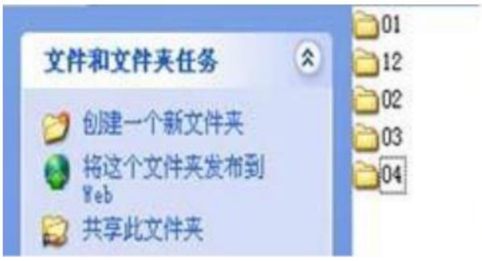

文件(F) 编辑(E) 查看(V) 收藏(A) 工具(T) 帮助(H)
后退 搜索 文件夹
地址(D) H:\
音乐任务
全部播放
联机购买音乐
文件和文件夹任务
AD
ADVERT
MP3
6.mp3
13回家.wav
14不得不爱.wav
17走在流行的最前线.wav

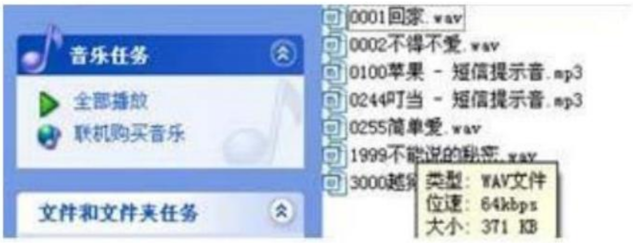

文件(F) 编辑(E) 查看(V) 收藏(A) 工具(T) 帮助(H)
后退 搜索 文件夹
地址(D) H:\ADVERT
音乐任务
全部播放
联机购买音乐
文件和文件夹任务
0001越狱背景音乐.wav
0100苹果 - 短信提示音.mp3
0244叮当 - 短信提示音.mp3

3.5.7 Support **4095 tracks in a specified folder**

Command format	7E FF 06 14 00 10 FF FD D8 EF **specifies the folder as "01" and the track as "0255"**
	7E FF 06 14 00 17 CF FE 01 EF **Folder designated as "01", track number "1999"**
	7E FF 06 14 00 C0 01 FE 26 EF **Folder designated as "12", track "0001"**
	7E FF 06 14 00 C7 CF FD 51 EF **specifies the folder named "12" and the track name is "1999"**

(1) The command byte of the serial port is 0x14 **(2) The parameter is two bytes, specifying the folder name "12" and the track name "1999?.mp3" The serial port data: 7E** FF 06 14 00 C7 CF FD 51 EF **Among them,** 0xC7 **and** 0xCF **are parameters, which are combined into** 0xC7 **CF. There are** 16 **bits in total, and the upper** 4 bits **represent the folder name. Here,** C **represents 12, and the lower** 12 bits **represent the file name. Here,** 7CF **represents** 1999, which is the track with the file prefix "1999?.mp3". **(3) The folder is named as follows:**


文件和文件夹任务
创建一个新文件夹
将这个文件夹发布到Web
共享此文件夹
01
12
02
03
04


音乐任务
全部播放
联机购买音乐
文件和文件夹任务
0001回家.wav
0002不得不爱.wav
0100苹果 - 短信提示音.mp3
0244叮当 - 短信提示音.mp3
0255简单爱.wav
1999不能说的秘密.wav
3000越狱
类型: WAV文件
位速: 64kbps
大小: 371 KB

3.5.8 All loop playback instructions

Start loop playback 7E FF 06 11	00 00 01 xx xx EF **Loop playback of all tracks Stop**	**loop playback** 7E FF 06 11
00 00 00 xx xx EF **Stop loop play**	**back of tracks (1) During loop playback, you can**	**operate the normal operations**

of play/pause, previous song, next song, volume adjustment, including EQ **, etc. (2) After the loop playback starts, the chip will continuously play**

the tracks in the device in the physical order of storage. After playing once, it will continue to play until receiving the stop, pause, etc. command.

3.5.9 Specify the track index to play a single track in a loop

0x08	**Control commands support 0-65535** 7E FF 06 0	8 00 00 01 xx xx EF
	loop play the first **song** 7E FF 06 08 00 FF FF xx	xx EF **loop play** the
	65535th **song (1) During the loop play, you can**	**operate the normal play/pause,**

previous song, next song, volume adjustment, including EQ **, etc. and the status is still loop play. You can use the stop command to stop the loop play status.**

3.5.10 Playback status query command

Command: 7E FF 06 42 00 00 00 EF

return command	**Playing** 7E FF	**meaning**
06 42 00 00 01 xx	xx EF **Playing Paused** 7E FF 06 42 00 00 02 xx xx EF **Pau**	**sed during**
playback Stoppe	**d** 7E FF 06 42 00 00 03 xx xx EF **Playing completed (1) Th**	**e chip will have four states**
open to the user	**during the decoding process. The user can obtain the cu**	**rrent state of**

the chip through command query. (2) Play pause means that a track is being played and a command is sent to pause the playback. Play

stop means that a track is played and the chip is in the play stop state.

3.5.11 Playback stop command

Stop insert 7E F	F 06 15 00 00 00 FE E6 EF **Stop insert, return to back**	**ground music and continue playing Stop playing**
7E FF 06 16 00 0	0 00 FE E5 EF **Stop software decoding**	

3.5.12 Loop playback of specified folders

Specify folder to play in loop 7E	FF 06 17 00 00 02 FE E2 EF **Specify folder** 02 to pl	ay in loop 7E FF 06 17 00 00 01 FE E3
EF **Specify** folder 01 **to play in lo**	**op (1)** The folder naming method must be "01"---"99",	and cannot exceed 99. **(2) After**

specifying a folder to play in loop, the voice of the folder will be played in loop continuously, and the instruction will be to send a stop command.

3.5.13 Randomly play device files

Random play	7E FF 06 18 00 00 00 FE E3 EF	**Random play of the entire device**	
Stop playing	7E FF 06 18 00 00 01 FE E3 EF	**Stop random play**	

(1) This command randomly plays the voice files stored in the device in the physical order.

It does not matter whether the device has a folder or not. And the first audio file played must be the first audio file in the device.

A voice file.

3.5.14 Set the current track to loop

Set loop play	7E FF 06 18 00 00 00 FE E3 EF	**Single song loop play on**	
Cancel loop play	7E FF 06 18 00 00 01 FE E3 EF	**Single song loop play off**	

(1) Sending this command during playback will loop the current track.

If the chip is in stop or stopped state, it will not respond to this command.

(2) If you want to turn off the single song loop playback, just send the command to turn it off. This will turn off the current song.

When you're done playing, stop.

3.5.15 Turn on and off the mute function of the current song

	7E FF 06 1A 00 00 00 FE E1 EF **Turn on the sound**	
Instructions	7E FF 06 1A 00 00 01 FE E0 EF **Turn on mute**	

3.5.16 Query the number of tracks in the current folder

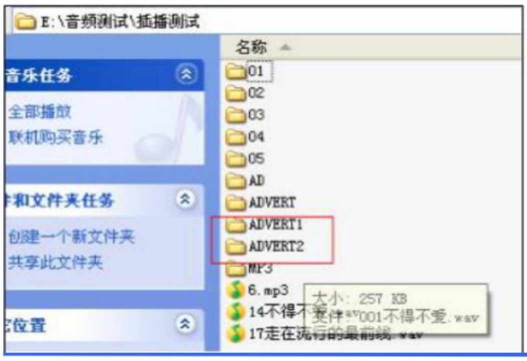
instruction	7E FF 06 4E 00 00 00 FE AC EF **Query the total number of tracks in the current folder**

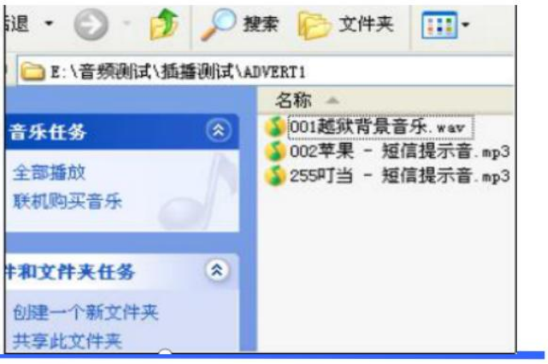
3.5.17 Query the total number of folders on the current device

instruction	7E FF 06 4F 00 00 00 FE AB EF **Query the total number of folders on the current device**

3.5.18 Multi-folder insert function

Command	7E FF 06 25 00 01 01 FE D4 EF	**"ADVERT1" folder, track "001"**
Command	7E FF 06 25 00 01 02 FE D3 EF	**"ADVERT1" folder, track "002"**
Command	7E FF 06 25 00 02 01 FE D3 EF	**"ADVERT2" folder, track "001"**


E:\音频测试\插播测试
名称
音乐任务
全部播放
联机购买音乐
和文件夹任务
创建一个新文件夹
共享此文件夹
位置
01
02
03
04
05
AD
ADVERT
ADVERT1
ADVERT2
MP3
6.mp3
14不得不爱
17走在流行的最前线.wav
大小：257 KB
文件：001不得不爱.wav


退
搜索
文件夹
E:\音频测试\插播测试\ADVERT1
名称
音乐任务
全部播放
联机购买音乐
和文件夹任务
创建一个新文件夹
共享此文件夹
001越狱背景音乐.wav
002苹果 - 短信提示音.mp3
255叮当 - 短信提示音.mp3

(1) Folders can support up to 9 **folders, that is, from** ADVERT1 to ADVERT9. **Please follow the rules we give for** folder commands , otherwise errors will occur. Please note the folder naming format in the figure above. **(2) The maximum number of files under a single insert folder cannot exceed** 255, that is, "255xxx.MP3/WAV". **Please note the file name naming format in the figure above. (3) Improved the related applications of insert. For example, if the currently playing file is in a single loop or current folder loop, even if an insert comes in, it will not change the current state, and it will still be a single loop or folder loop, unless the user uses a stop command or other. (4) For the principle of insert, please refer to 3.5.6.**

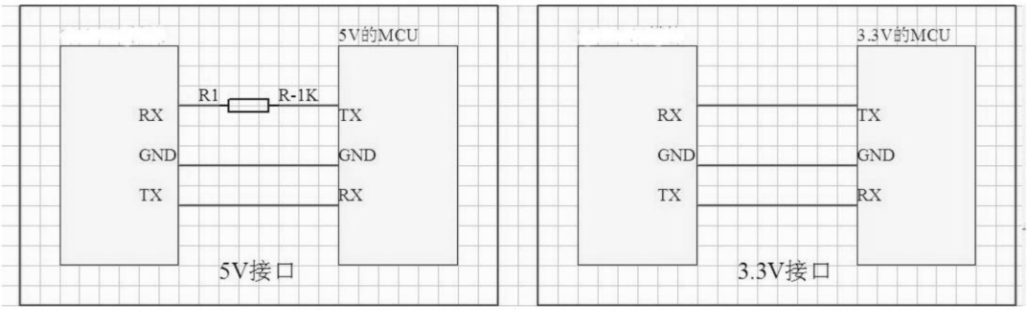
3.5.19 Specify file index and volume for playback (only GD3300B supports this function)

Instruction	7E FF 06 22 00 1E 01 EF	**Set the volume to 30 (0x1E is 30) and play the first song**
Instruction	7E FF 06 22 00 0F 02 EF	**Set the volume to 15 (0x0f is 15) and play the second song**

4. Reference Circuit

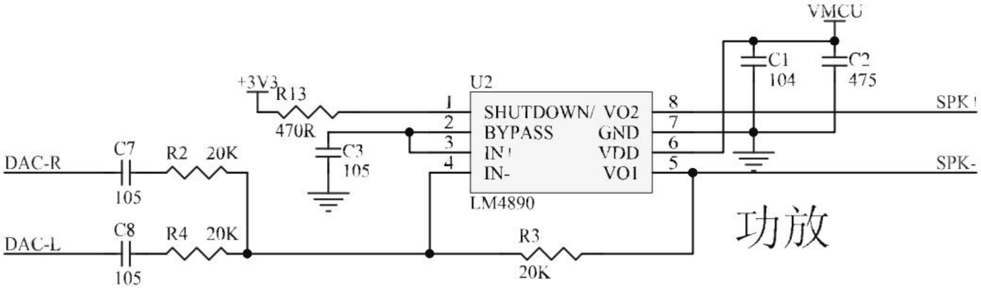
We provide detailed design reference for chip application. n Serial communication interface, the baud rate is 9600 by default and can be modified according to customer requirements; n External AD **button interface circuit; n External mono amplifier reference circuit;**

4.1 Serial Interface



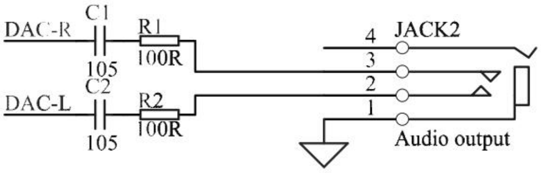
The serial port of the chip is 3.3V **TTL** level, so the **default interface level is 3.3V. If the system is 5V. It is recommended to connect a** 1K **resistor in series to the serial port docking interface. This is enough to meet general requirements. If it is used in places with strong electromagnetic interference, please refer to the instructions in "Precautions". The chip has been tested normally in both** 5V **and** 3.3V systems, and everything is normal. It is directly connected and there is no 1K resistor **in series .**

4.2 External Mono Amplifier


VMCU
C1
104
C2
475
+3V3
R13
470R
U2
1
2
3
4
SHUTDOWN/
BYPASS
IN+
IN-
VO2
GND
VDD
VO1
8
7
6
5
SPK+
SPK-
C3
105
DAC-R
C7
105
R2
20K
DAC-L
C8
105
R4
20K
LM4890
R3
20K
功放

Here we take the LM4890 amplifier as an example. For specific parameters, please refer to the IC datasheet. **If you need a higher power amplifier, please find a suitable amplifier by yourself.**

4.3 External headphone circuit


DAC-R
C1
105
R1
100R
DAC-L
C2
105
R2
100R
JACK2
4
3
2
1
Audio output

Here R1 and R2 **are limiting resistors to prevent the external sound source from having too large an amplitude (the maximum value of Vp-p is 3.0V). Affects the stability of the system. C1 and C2 are DC blocking capacitors to prevent the DC level of the external sound source from affecting the chip. Internal bias.**

5. GD3200A/GD3200B/GD3200D package (see schematic diagram for details)

6. **Notes**

IO input characteristics						
Symbolic	**parameters**	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Conditions**
VIL	Low-Level Input Voltage **-0.3** 0.7V		**- 0.3***	**VDD** V		**VDD=3.3** V
VIH	High-Level Input Voltage	DD	**- VDD**	**+ 0.3** V		**VDD=3.3** V
IO output characteristics						
Symbolic	**parameters**	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Conditions**
VOL	Low-Level Output Voltage	-	-	0.33	V	**VDD=3.3** V
VOH	High-Level Output Voltage	**2.7**	-	-	V	**VDD=3.3** V

1. The external interfaces of the chip are all 3.3V TTL level , **so in the design of the hardware circuit, please pay attention to Level conversion problem.**

In addition, in a strong interference environment, please pay attention to some electromagnetic compatibility protection measures. GPIO uses optocoupler isolation. Add TVS, **etc.**

2. The ADKEY **key values are based on the general usage environment. If the key is set under strong inductive or capacitive load In this environment, please pay attention to the power supply of the chip. It is recommended to use a separate isolated power supply, and also add magnetic beads and inductors When filtering the power supply, you must ensure that the input power is as stable and clean as possible. If this is not possible, Please contact us to reduce the number of buttons and redefine wider voltage distribution.**

3. For serial communication, in general use environment, just pay attention to level conversion. If there is strong interference environment, Or long-distance RS485 **applications, please pay attention to signal isolation and strictly follow industrial standard design. Communication circuit. Please contact us and we will provide design reference.**

7. Disclaimer

nPreparatory knowledge for

development GD **series products will provide as comprehensive development templates, drivers and application documentation as possible to facilitate users' use, but users are also required to be familiar with the hardware platform used in their product design and related** C **language knowledge.**

n EMI and EMC The mechanical

structure of the GD **series chips determines that their** EMI **performance must be different from that of the integrated circuit design.** The EMI of GD **series chips can meet most applications. If users have special requirements, they must negotiate with us in advance.**

The EMC performance of the GD **series chips is closely related to the design of the user's baseboard, especially the power circuit, I/O isolation, and reset circuit. The user must fully consider the above factors when designing the baseboard. We will strive to improve** the electromagnetic compatibility characteristics of the GD series chips, but we do not provide any guarantee for the EMC performance **of the user's final application product .**

nRight to modify documents

Guangzhou Guodian Technology Co., Ltd. reserves the right to modify the relevant documents of GD **series products at any time without prior notice.**

n ESD electrostatic discharge protection

Some components of the GD series products have built-in ESD **protection circuits. However, in harsh operating environments, users are still recommended to provide** ESD **protection measures when designing the baseboard, especially the power supply and** IO **design, to ensure stable operation of the product, such as wearing a reliably grounded anti-static ring, touching a water pipe connected to the ground, etc.**

注意：

由于支持TF 卡和SPI-Flash 为不同版本，购买及使用时请分清所需要的版本，以免出错。

官网：www.gdkeji.cn
www.gdkeji.com

电话：020-29881643

Tips:

Since the supported TF card and SPI flash are different versions，please distinguish the required versions when purchasing and using them to avoid errors.

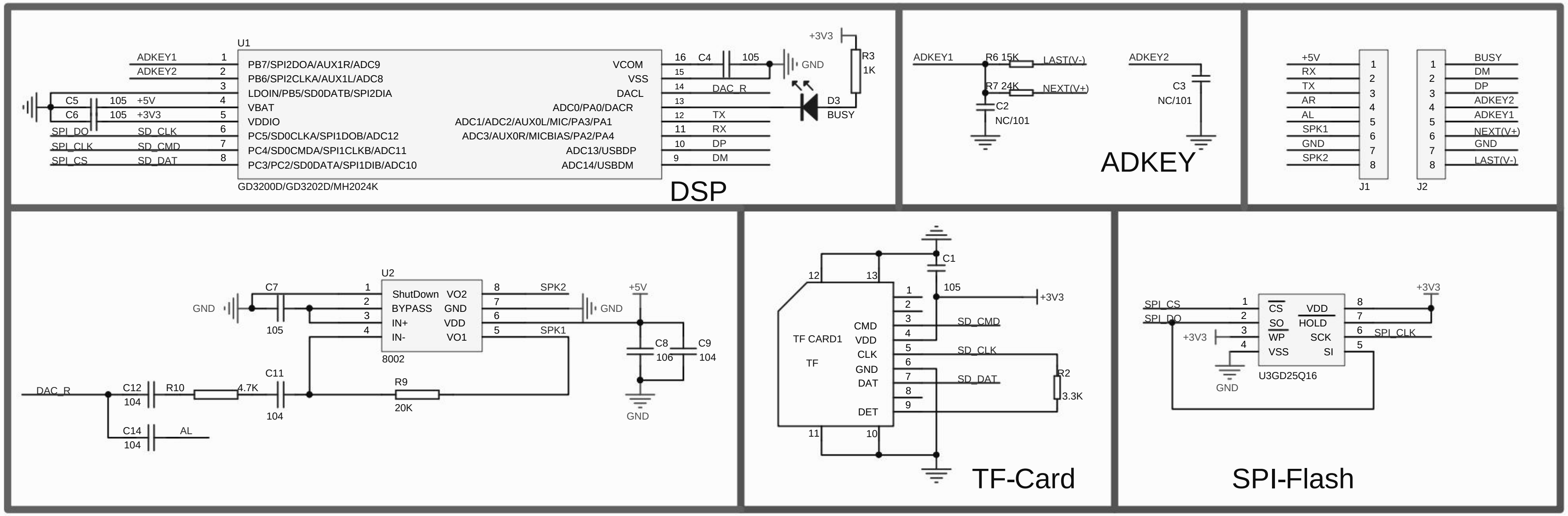
Our Taobao store is: gdkeji.taobao.com

If you want to contact me in real time, please add my

My wechat: GDkeji_ luo

My QQ: 515393967

Our Web: www.gdkeji.cn
www.gdkeji.com


DSP
U1
GD3200D/GD3202D/MH2024K
ADKEY1
ADKEY2
C5 105 +5V
C6 105 +3V3
SPI_DO SD_CLK
SPI_CLK SD_CMD
SPI_CS SD_DAT
PB7/SPI2DOA/AUX1R/ADC9
PB6/SPI2CLKA/AUX1L/ADC8
LDOIN/PB5/SD0DATB/SPI2DIA
VBAT
VDDIO
PC5/SD0CLKA/SPI1DOB/ADC12
PC4/SD0CMDA/SPI1CLKB/ADC11
PC3/PC2/SD0DATA/SPI1DIB/ADC10
VCOM
VSS
DACL
ADC0/PA0/DACR
ADC1/ADC2/AUX0L/MIC/PA3/PA1
ADC3/AUX0R/MICBIAS/PA2/PA4
ADC13/USBDP
ADC14/USBDM
C4 105
GND
DAC_R
TX
RX
DP
DM
+3V3
R3 1K
D3 BUSY
ADKEY
ADKEY1
R6 15K
LAST(V-)
R7 24K
NEXT(V+)
C2 NC/101
ADKEY2
C3 NC/101
J1
+5V
RX
TX
AR
AL
SPK1
GND
SPK2
J2
BUSY
DM
DP
ADKEY2
ADKEY1
NEXT(V+)
GND
LAST(V-)
U2
8002
C7
GND
105
ShutDown
BYPASS
IN+
IN-
VO2
GND
VDD
VO1
SPK2
SPK1
+5V
C8 106
C9 104
DAC_R
C12 104
R10 4.7K
C11 104
R9 20K
C14 104
AL
TF-Card
C1 105
+3V3
TF CARD1
TF
CMD
VDD
CLK
GND
DAT
DET
SD_CMD
SD_CLK
SD_DAT
R2 3.3K
SPI-Flash
U3GD25Q16
SPI_CS
SPI_DO
+3V3
CS
SO
WP
VSS
VDD
HOLD
SCK
SI
SPI_CLK
GND

Title		
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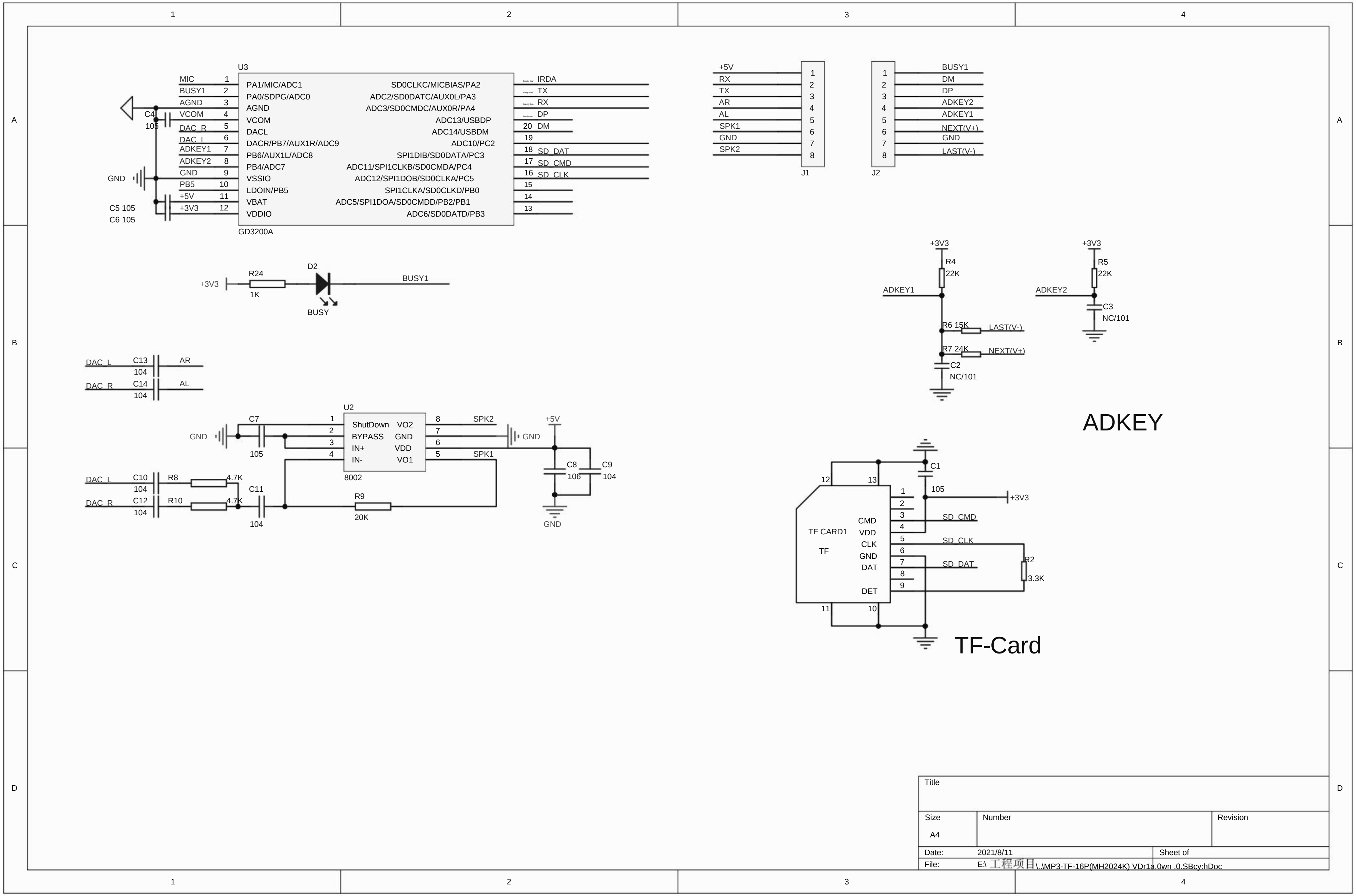
U3
GD3200A
MIC 1 PA1/MIC/ADC1
BUSY1 2 PA0/SDPG/ADC0
AGND 3 AGND
VCOM 4 VCOM
DAC_R 5 DACL
DAC_L 6 DACR/PB7/AUX1R/ADC9
ADKEY1 7 PB6/AUX1L/ADC8
ADKEY2 8 PB4/ADC7
GND 9 VSSIO
PB5 10 LDOIN/PB5
+5V 11 VBAT
+3V3 12 VDDIO
SD0CLKC/MICBIAS/PA2 IRDA
ADC2/SD0DATC/AUX0L/PA3 TX
ADC3/SD0CMDC/AUX0R/PA4 RX
ADC13/USBDP DP
ADC14/USBDM 20 DM
ADC10/PC2 19
SPI1DIB/SD0DATA/PC3 18 SD_DAT
ADC11/SPI1CLKB/SD0CMDA/PC4 17 SD_CMD
ADC12/SPI1DOB/SD0CLKA/PC5 16 SD_CLK
SPI1CLKA/SD0CLKD/PB0 15
ADC5/SPI1DOA/SD0CMDD/PB2/PB1 14
ADC6/SD0DATD/PB3 13
C4 105
GND
C5 105
C6 105
+5V RX TX AR AL SPK1 GND SPK2
J1 1 2 3 4 5 6 7 8
J2 1 2 3 4 5 6 7 8
BUSY1 DM DP ADKEY2 ADKEY1 NEXT(V+) GND LAST(V-)
+3V3 R24 1K D2 BUSY BUSY1
DAC_L C13 104 AR
DAC_R C14 104 AL
U2 8002
ShutDown 1 8 VO2 SPK2
BYPASS 2 7 GND
IN+ 3 6 VDD
IN- 4 5 VO1 SPK1
GND C7 105
+5V GND C8 106 C9 104 GND
DAC_L C10 104 R8 4.7K
DAC_R C12 104 R10 4.7K
C11 104 R9 20K
+3V3 R4 22K ADKEY1
R6 15K LAST(V-)
R7 24K NEXT(V+)
C2 NC/101
+3V3 R5 22K ADKEY2
C3 NC/101
ADKEY
TF CARD1 TF
CMD VDD CLK GND DAT DET
12 13 11 10
C1 105 +3V3
SD_CMD SD_CLK SD_DAT
R2 3.3K
TF-Card
1 2 3 4
A B C D
Title
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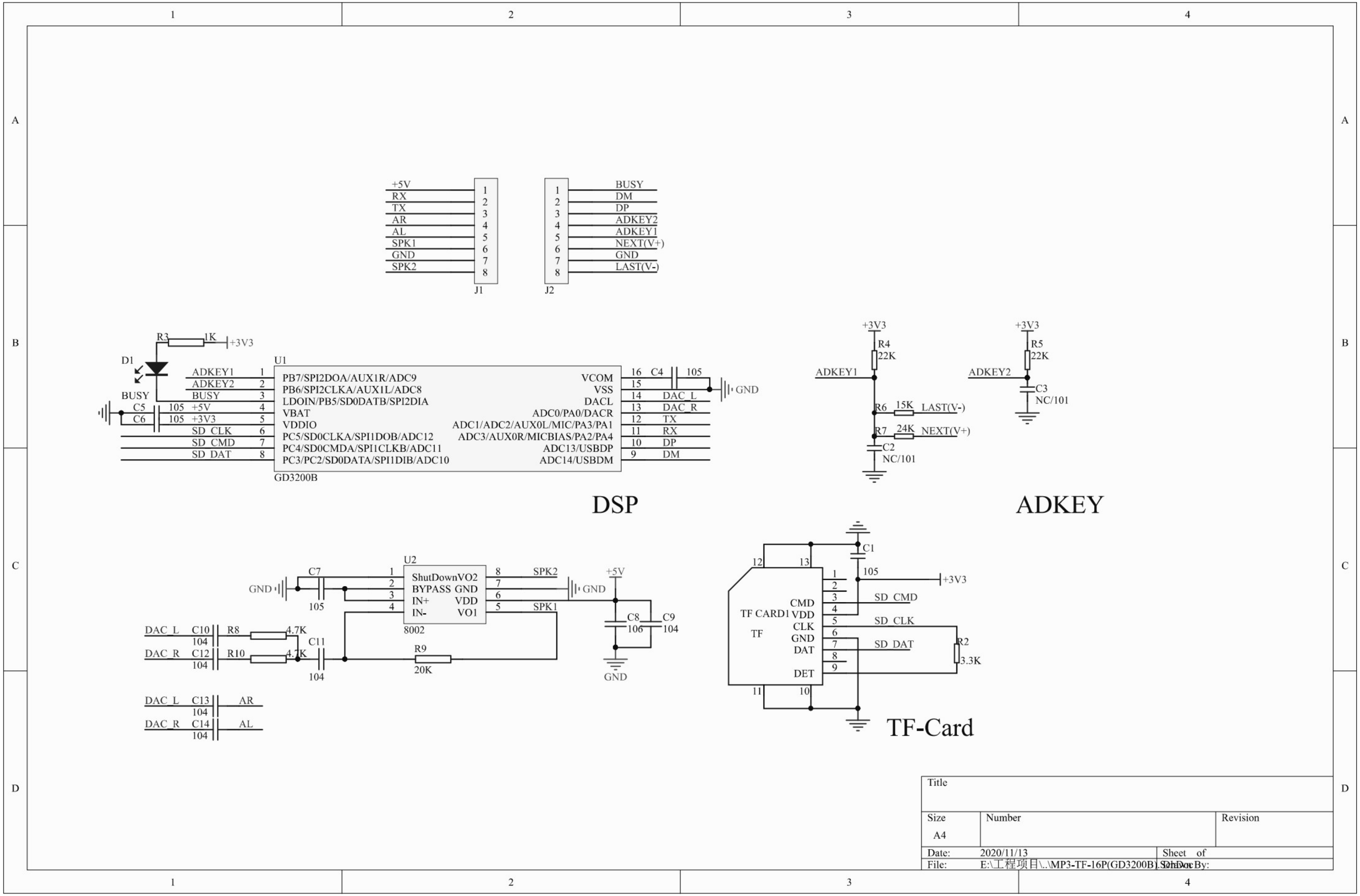
J1
+5V
RX
TX
AR
AL
SPK1
GND
SPK2
J2
BUSY
DM
DP
ADKEY2
ADKEY1
NEXT(V+)
GND
LAST(V-)
R3
1K
+3V3
D1
BUSY
U1
GD3200B
ADKEY1
ADKEY2
BUSY
C5
105
+5V
C6
105
+3V3
SD_CLK
SD_CMD
SD_DAT
PB7/SPI2DOA/AUX1R/ADC9
PB6/SPI2CLKA/AUX1L/ADC8
LDOIN/PB5/SD0DATB/SPI2DIA
VBAT
VDDIO
PC5/SD0CLKA/SPI1DOB/ADC12
PC4/SD0CMDA/SPI1CLKB/ADC11
PC3/PC2/SD0DATA/SPI1DIB/ADC10
VCOM
VSS
DACL
ADC0/PA0/DACR
ADC1/ADC2/AUX0L/MIC/PA3/PA1
ADC3/AUX0R/MICBIAS/PA2/PA4
ADC13/USBDP
ADC14/USBDM
C4
105
GND
DAC_L
DAC_R
TX
RX
DP
DM
DSP
+3V3
R4
22K
ADKEY1
R6
15K
LAST(V-)
R7
24K
NEXT(V+)
C2
NC/101
+3V3
R5
22K
ADKEY2
C3
NC/101
ADKEY
U2
8002
C7
105
GND
ShutDown
BYPASS
IN+
IN-
VO2
GND
VDD
VO1
SPK2
SPK1
GND
+5V
C8
106
C9
104
GND
DAC_L
C10
104
R8
4.7K
DAC_R
C12
104
R10
4.7K
C11
104
R9
20K
DAC_L
C13
104
AR
DAC_R
C14
104
AL
C1
105
+3V3
TF CARD1
TF
CMD
VDD
CLK
GND
DAT
DET
SD_CMD
SD_CLK
SD_DAT
R2
3.3K
TF-Card
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