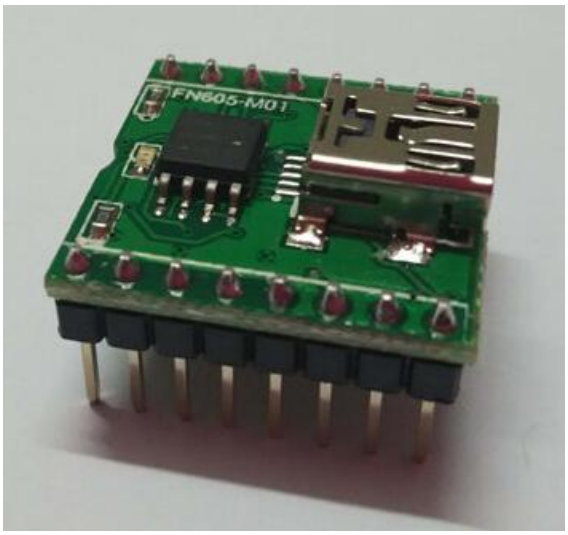
FN605-M01 MP3 Audio Module
Datasheet



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1. Overviews

1.1. Brief Introduction

FN605-M01 is a small high quality MP3 audio module developed by Flyron Technology Co., Ltd. A SOP16 package type MP3 main control IC is adopted, so the module is smaller and has quicker response speed. This module has a built-in SPI flash as the storage medium. Chang sound files via the mini USB to the SPI flash directly just like a USB flash drive without using any assistant PC software, which significantly improved operating efficiency. And it is built in a 3 watts amplifier on board that is able direct to drive a 3W speaker.

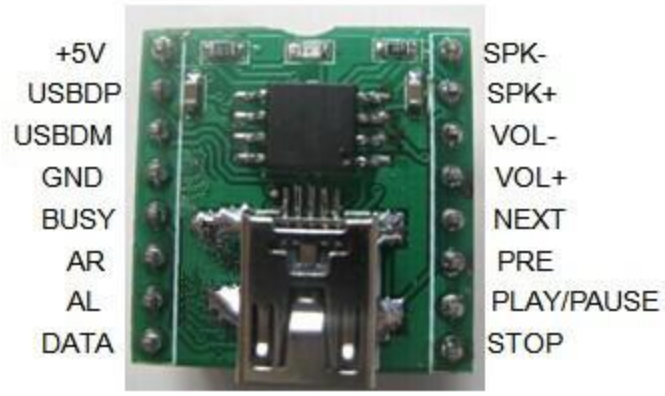
1.2. Features

- Supports MP3 audio format files, great sound quality.
- Supports storage of max. 3584 MP3 sound files.
- A 32Mbit(4MB)SPI flash memory is taken as the standard. Supports max. 128Mbit(16MB)flash.
- Load/update MP3 sound files via the mini USB port directly on PC(USB flash drive simulation).
- Supports key control mode and one line serial control mode.
- Supports USB sound card function.
- Built-in a 3W amplifier that is able to direct drive a 3W speaker.
- 16 levels adjustable sound volume.

1.3. Technical Parameters

Item	Description
Audio Format	Supports sampling rate 8Khz-44.1Khz, bit rate 8-224Kbps, and 16bit of MP3 audio files
USB Port	USB 2.0
Working Voltage	DC 3.3-5V
Rated Current	20-250mA(depends on the load)
IO Port Electrical Level	3.3V TTL electrical level
Size	20.3mmx20.4mm
Operating Temperature	-40-85 ℃
Humidity	5%~95%

2. Pin Configuration and Summary



Pin No.	Pin Name	Description	Notes
1	+5V	+5V power input	
2	USBDP	USB+	Connected with a USB flash drive
3	USBDM	USB-	
4	GND	Ground	
5	BUSY	Busy signal output	High level when working, and low level when standby
6	AR	Audio output right channel	Connected with an external audio amplifier
7	AL	Audio output left channel	
8	DATA	One line serial communication port	
9	STOP	Stop	
10	PLAY/PAUSE	Play/Pause	
11	PRE	Previous sound	
12	NEXT	Next sound	
13	VOL+	Volume up	
14	VOL-	Volume down	
15	SPK+	Speaker+	Drive a speaker less than 3W
16	SPK-	Speaker-	

3. Control Modes

FN605-M01 supports two control modes: key control mode and one line serial communication control mode. These two control modes are valid in the the same time, so it is very flexible for users to design their own projects based on actual demand.

3.1. Key Control Mode

Key Name	K1	K2	K3	K4	K5	K6
Description	Play/Pause	Next	Previous	Vol+	Vol-	Stop

Note: The functions of keys can be customized based on your demand.

3.2 One Line Serial Communication Control Mode

The built-in flash supports max. 3584 audio files. At one line serial communication control mode, MCU sends a 16 bit audio address to trigger the correspondent audio file.

3.2.1. Audio Addresses Description(0x0001-0x0E00)

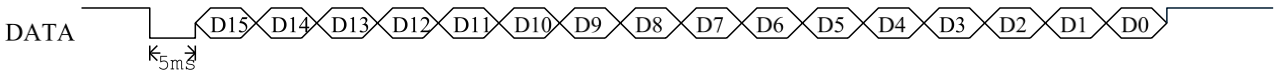
Command Code	Audio Address	Trigger Status	File name
0x0001	Address 1	Play the 1st audio file	0001.mp3
0x0002	Address 2	Play the 2nd audio file	0002.mp3
…	…	…	…
0x0BB8	Address 3000	Play the 3000th audio file	3000.mp3
…	…	…	…
0x0E00	Address 3584	Play the 3584th audio file	3584.mp3

3.2.2. Other Command Code Description(0xFFE0-0xFFFE)

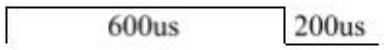
Command Code	Function	Notes
FFE0H-FFEFH	Sound volume adjustment	At playback or standby status, send the correspondent command to adjust the current sound volume. 16 levels sound volume adjustable, and FFE0H is the lowest while FFEFH is the highest.
FFF0H	Play	Play/restore current audio address
FFF1H	Pause	Pause playback of current audio address
FFF2H	Loop play single	Start single loop play after this command is sent
FFF3H	Cancel loop play	Cancel loop play after this command is sent

FFF4H	Next	Play next sound
FFF5H	Previous	Play previous sound
FFFEH	Stop	Stop playback
FFF6H	Loop play all	Start loop play all musics in the flash
FFF7H	Random play	Random play

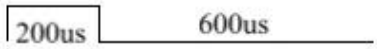
3.2.3. Timing Sequence Control



Pull down DATA line by 5ms, then send the16 bit data(send high first and low). Use the ratio of high level and low level to indicate values for each data bit.



high level:low level=3:1 represents 1



high level:low level=1:3 represents 0

Note: High level must be ahead of low level.

3.3. Example of One Line Serial Port Program

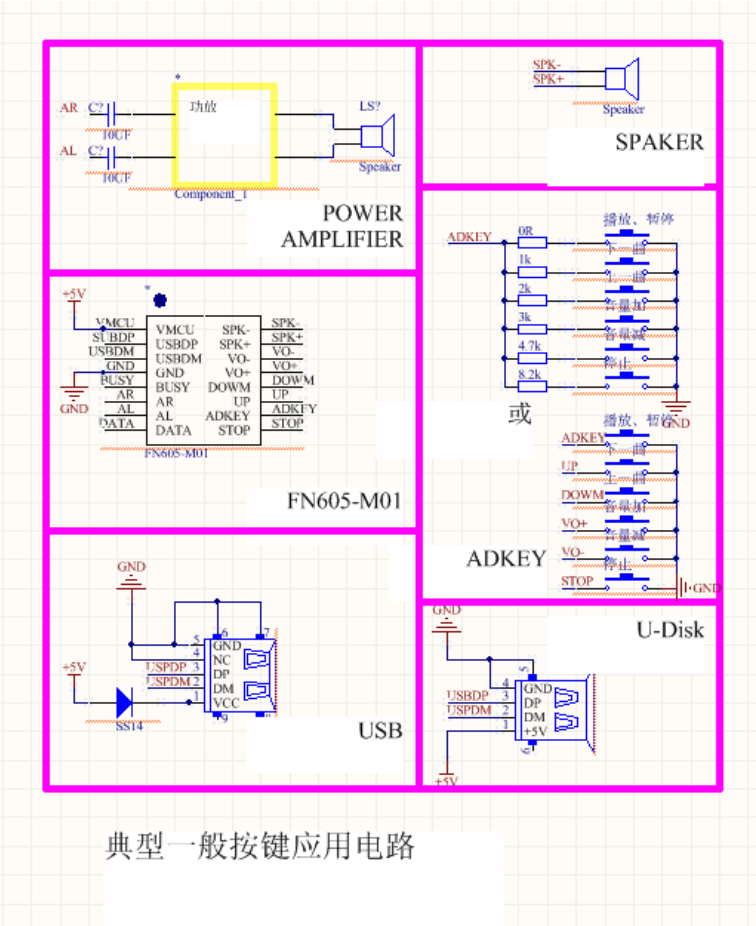
MCU: AT89C2051 External Crystal: 11.0592M

```
#define    MX6005_SDA     P3^2

void delayms ( uint xms )    //delay 1MS
{
     uint i ,j ;
     for(i=xms;i>0;i--)
          for(j=110;j>0;j--);
}

void delayus ( uint xus )//delay 100US
{
     uint i,j;
     for(i=xus;i>0;i--)
          for(j=10;j>0;j--);
}

void send_voice_data(uint ui_voice_data)
{
     uchar i;
```

```
    MX6005_SDA =0;
    delayms(5);
    for(i=0;i<16;i++)
    {
        MX6005_SDA =1;
        if( ui_voice_data &0x8000)
        {
            delayus(6);
            MX6005_SDA =0;
            delayus(2);
        }
        else
        {
            delayus(2);
            MX6005_SDA =0;
            delayus(6);
        }
        ui_voice_data <<=1;
    }
    MX6005_SDA =1;
}
```

4. Application Circuits

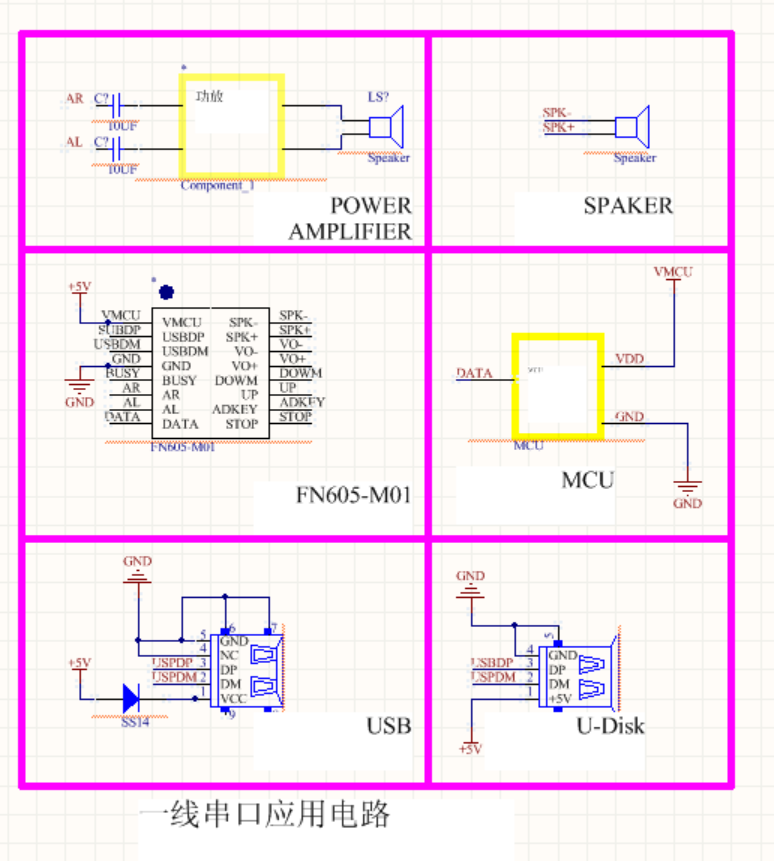
4.1. For Key Control Mode



典型一般按键应用电路

Note: When USB flash disk is connected, the module always works with it, and when USB flash disk is plugged out, the module then goes back to work with the built-in flash memory.

4.2. For One Line Serial Port Control Mode



Note: When USB flash disk is connected, the module always works with it, and when USB flash disk is plugged out, the module then goes back to work with the built-in flash memory.

5. Electrical Characteristics

Item	Description	Min. Value	Typical Value	Max. Value	Unit	Condition
VDD50	LDO input voltage	3.2	5.0	5.5	V	-
VCC33	LDO 3.3V output current	-	-	200	mA	Vout3.3>3.1V
SNR	Signal to noise ratio	-	85	-	dB	-
THD+N	Total harmonic distortion	-	-70	-	dB	No load
PWRAB	DAC output power	-	-	16	mW	16Ohm load, mono
VPP	DAC max. output voltage magnitude	-	-	2.8	V	-

6. PCB Size