TF CARD MP3 DECODER BOARD

Previous/Vol--
Play/Pause
Next/Vol++

GND BAT+ SP- SP+
0V 3.3V to 5V Regulated DC

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TF Card MP3 Decoder Board -- GPD2856A

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This TF card MP3 decoder board utilises the GPD2856A MP3 decoder IC, and has an on-board 2-watt L/R mixed mono audio ampli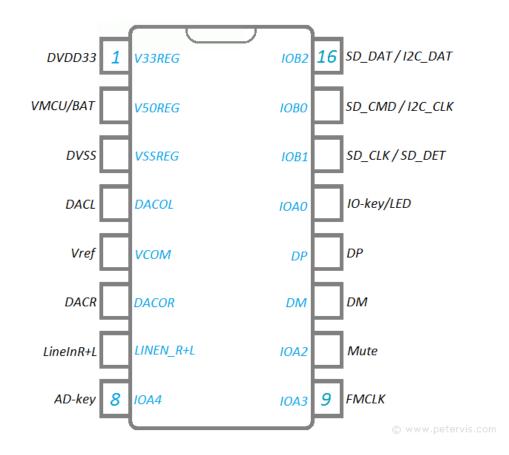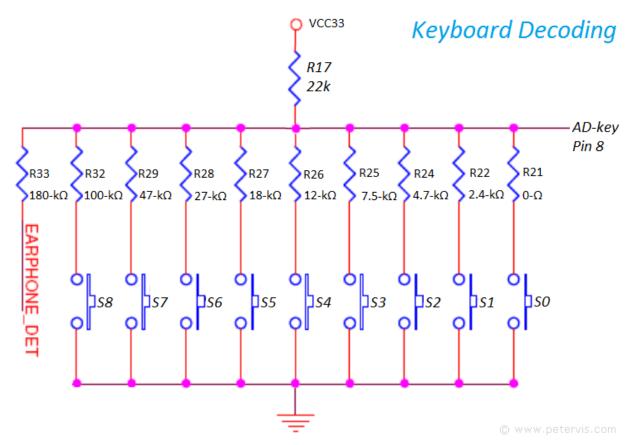fier IC (8002). This module is the updated version of the earlier GPD2846A TF card MP3 decoder board, and in this latest version, there is a TF card slot for a micro-SD memory card, and an LED power indicator. The board measures 35-mm × 22-mm, and requires only a power supply, direct speaker connection, and switches. The manufacturer recommends a working voltage of 3.7-V or 5-V.
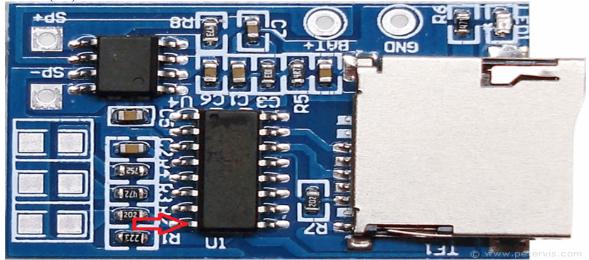
Review

At some point, all engineers wonder what it would be like to build a small MP3 player using one of the latest ICs coming out. I was doing just that looking for a simple IC and found the GPD8256A single chip MP3 player solution. Just as I was about to buy it, I found a readymade module that potentially saved me hours of soldering work and squinting into my microscope. Long live the people's republic of China!

The GDP2856A is a single chip MP3 player solution that was available in version 2.0 form at some time in 2013. It was for use in MP3 player applications with FM radio, and therefore designed to operate with RDA5807, BK1080, and RTC6207E single chip FM radio solution ICs.

DVDD33	**1** V33REG	IOB2 **16**	SD_DAT / I2C_DAT
VMCU/BAT	V50REG	IOB0	SD_CMD / I2C_CLK
DVSS	VSSREG	IOB1	SD_CLK / SD_DET
DACL	DACOL	IOA0	IO-key/LED
Vref	VCOM	DP	DP
DACR	DACOR	DM	DM
LineInR+L	LINEN_R+L	IOA2	Mute
AD-key	**8** IOA4	IOA3 **9**	FMCLK

Looking at the pinout, I noticed that that this IC has stereo output, and a USB interface, which they were not able to implement on the board due to lack of space; hence, it has great hacking potential for hobbyists. In addition, this IC also has some useful functions that they were not able to provide because there was space for connecting only three switches. For example, it also has an audio equalizer function that can cycle through normal, classic, bass, live, rock, and pop, sound options. We could implement this; however, this mod requires additional resistors and a switch. In the following sections of this article, I show how keyboard decoding works and how the additional functions could be implemented.

The keyboard decoding is very simple, and from the pinout, we can see that pin 8 (AD-key) decodes the switch input. Usually microcontrollers have an analogue-to-digital converter (ADC) for this type of input where each switch feeds a uniquely different voltage and the ADC measures it to determine which switch it was. Hence, each switch has a resistor associated with it, and they all form one-half of a potential divider (PD) network with resistor R17.
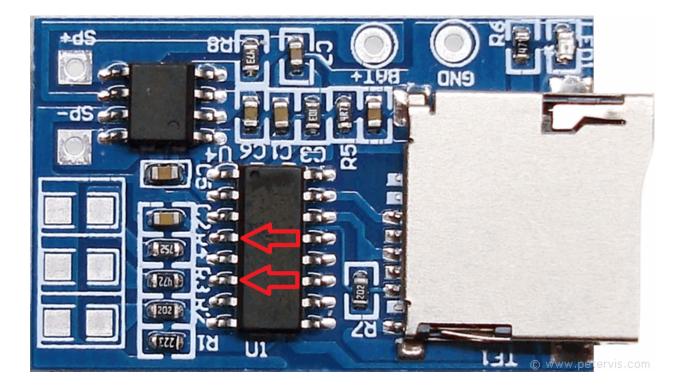
The centre point of the resistive PD connects to pin 8 (AD-key), which is a port that measures the voltage received. When the user presses S1, then resistor R22 forms a PD with R17, and the voltage formed at the centre goes to pin 8. If the user presses S2, then R24 forms a PD with R17, and so forth.

按鍵	MP3 模式（沒 Roption）		
	按鍵名稱	短按	長按
S1	Prev/V--	Previous	Volume--
S2	P/P/Mode	Play/Pause	Mode 切換
S3	Next/V++	Next	Volume++
S4			
S5	P/P	Play/Pause	
S6	Repeat	單曲/全曲循環	
S7	Mode	Mode 切換	
S8	EQ	EQ 切換	

Looking at the IC documentation, I learnt that my Chinese was not very good, however, I do speak the universal computer language of 1's and 0's, and therefore it was not difficult to figure out. Without the radio IC, there are two possible options for switch configurations and their functions. Since the switches provided are for Previous, Play/Pause, and Next; we can deduce that this is the default keyboard arrangement. In this arrangement, the equalizer function is through switch 8. Hence, in order to enable this hack we will require a 100-kΩ resistor forming a PD with R17. However, the resistors do not need to be on the board. You just need a 22-kΩ resistor and 100-kΩ resistor forming a PD across VCC and ground, together with a switch. The output of the PD then connects to pin 8 (AD-key).

Stereo Output Hack

Although they mix the left and right channels of the audio by joining the output pins, we can see that the GPD2856C has stereo output. DAC-Output-Left (pin 4), and DAC-Output-Right (pin 6) will have the necessary outputs.