

USB HOST MP3 DECODER SOC

Datasheet

USB Host MP3 Decoder SOC

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1. Overview

A highly integrated SOC for MP3 player, DL7516 integrates MCU, MP3 decoder, USB Host controller, SD/MMC card controller, ADC, audio DAC and an IR decoder in a single chip. Compared with traditional flash-MP3 player DL7516 offers ultra low cost, low power consumption, flexible and more powerful host MP3 player solution.

1.1 Features

- Low power 0.18um CMOS technology
- Enhanced 8051, up to 10 times faster than standard 8051
- USB2.0 full-speed host controller
- SD/MMC card controller
- Support MPEG 1/2/2.5 layer2/3 decoding, data rate 32kbps ~ 320kbps, including VBR
- Support 9 sampling frequency:
8kHz/11.025kHz/12kHz/16kHz/22.05kHz/24kHz/32kHz/44.1kHz/48kHz
- Embedded sound equalizer
- Support tag format ID3v1 and ID3v2.4
- Support FAT16/FAT32 file system
- Embedded 16-bit DAC
- 1 channel AUX in
- 1 channel FM in
- 1 channel 6bit SARADC for peripheral controls
- Support IR Remote control
- GPIO for various purposes
- Embedded LDO, convert 5V to 3.3V and 1.8V
- Embedded Power-on-Reset
- Embedded ROM for program code storage

1.2 Chip Architecture

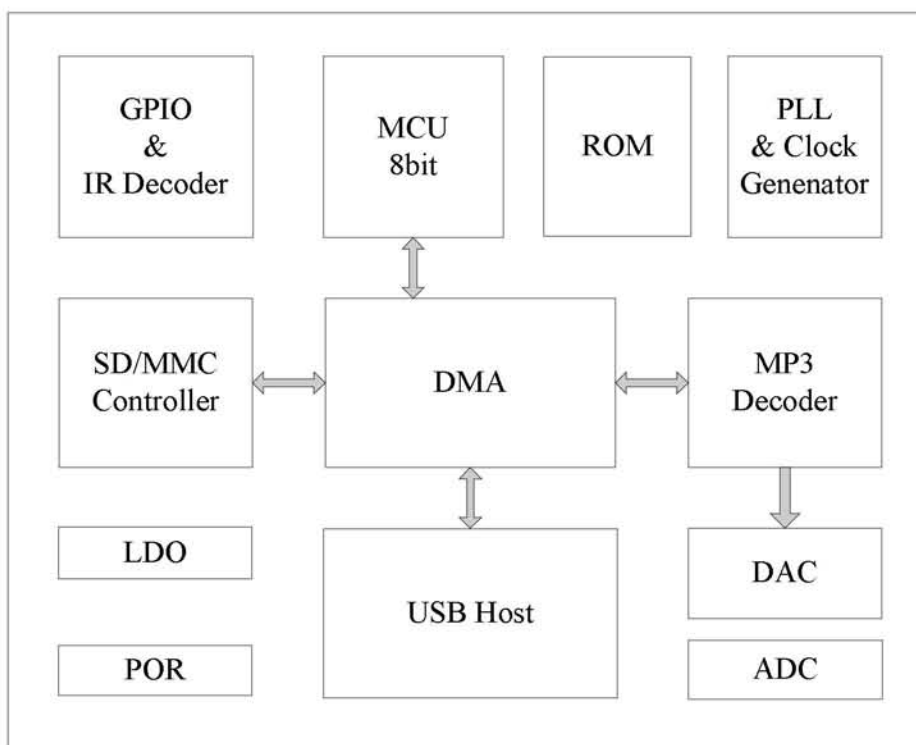


Figure 1 DL7516 Functional Block Diagram

2. System Application

● MP3 mini audio system

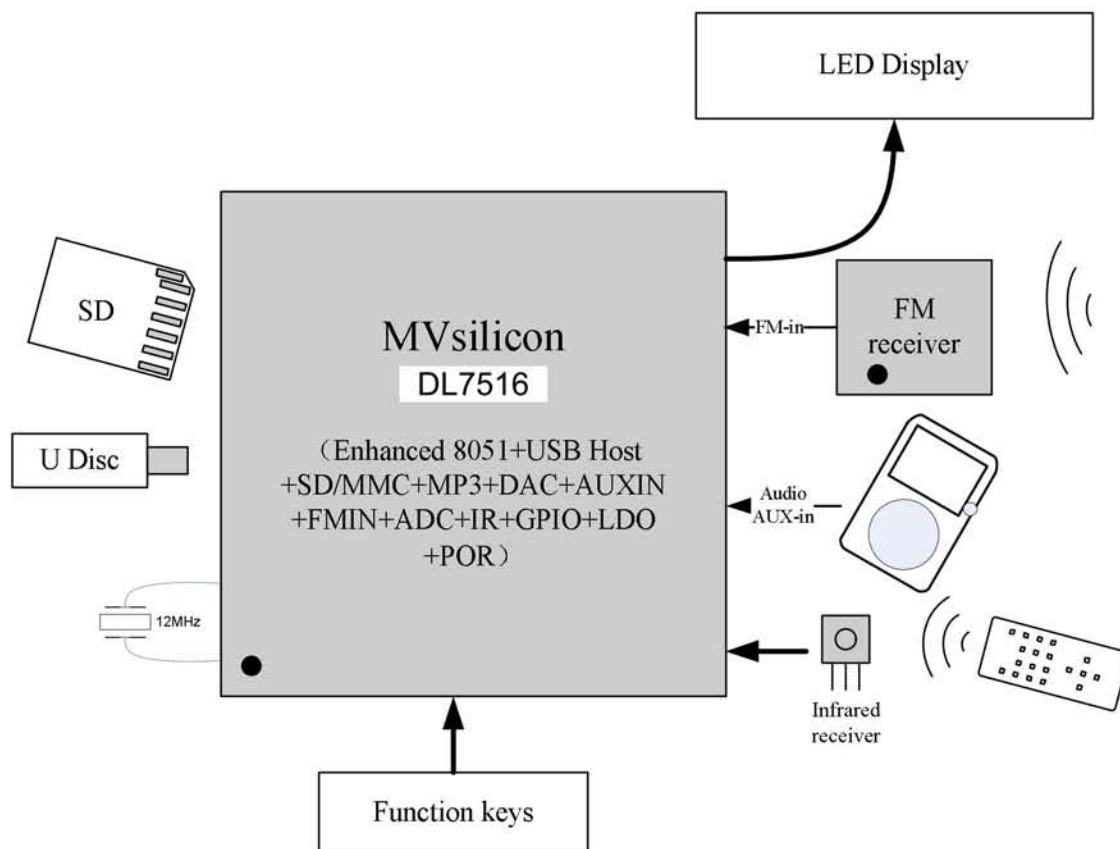


Figure 2 Mini Audio System

3. Pin Description

DL7516 is a CMOS device. Floating level on input signals causes unstable device operation and abnormal current consumption. Pull-up or Pull-down resistors should be used appropriately for input or bidirectional pins.

Notation	Description
I	Input
O	Output
I/O	Bidirectional
PWR	Power
GND	Ground

3.1 Pin Description

Table 1 Pin Description

Pin name	Pin #	Type	Description
USB interface pins			
USB_DP	27	I/O	USB Function D+ bus
USB_DM	26	I/O	USB Function D- bus
DAC interface pins			
DAC_R	12	AO	audio right channel output
DAC_L	13	AO	audio left channel output
DACVMID	11	AI	Internal voltage reference
DAC_AUX_R	14	AI	External AUX right channel in
DAC_AUX_L	15	AI	External AUX left channel in
GPIO/MCU IO pins			
GPIO_A[0]	7	I/O	GPIO PORT, bank A
GPIO_A[2]	25	I/O	GPIO PORT, bank A
GPIO_A[3]	22	I/O	GPIO PORT, bank A
GPIO_A[4]	24	I/O	GPIO PORT, bank A
GPIO_A[5]	23	I/O	GPIO PORT, bank A
GPIO_A[7:6]	17:16	I/O	GPIO PORT, bank A
GPIO_C[2]	8	I	GPIO PORT, bank C
GPIO_D[1:0]	21:20	I/O	GPIO PORT, bank D
GPIO_D[2]	5	I/O	GPIO PORT, bank D
GPIO_E[3:2]	18:19	I/O	GPIO PORT, bank E
CLK pins			
XIN	3	I	12MHz Crystal oscillator input for PLL
XOUT	4	O	12MHz Crystal oscillator output for PLL
Power/Ground pins			
DVSS	6	GND	ground for digital

LDO18O	2	PWR	LDO 1.8V out
LDO33O	28	PWR	LDO 3.3V out
LDO5V	1	PWR	LDO 5V power in
DACVDD33	9	PWR	power for DAC
DACVSS	10	GND	ground for DAC

4. Package

4.1 Package Diagram

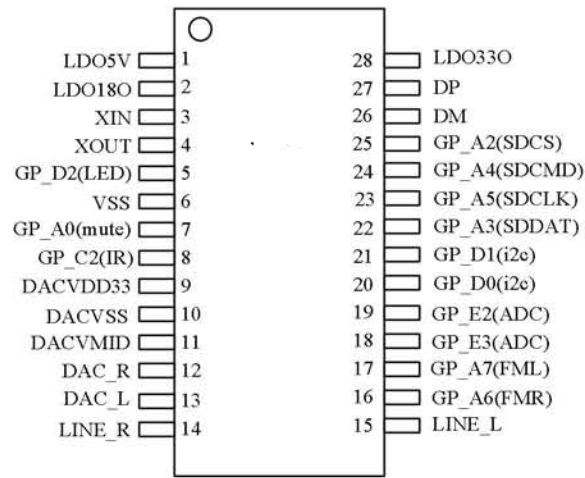


Figure 3 Package Diagram (SOP28 / TOP View)

4.2 Package Dimension Parameter

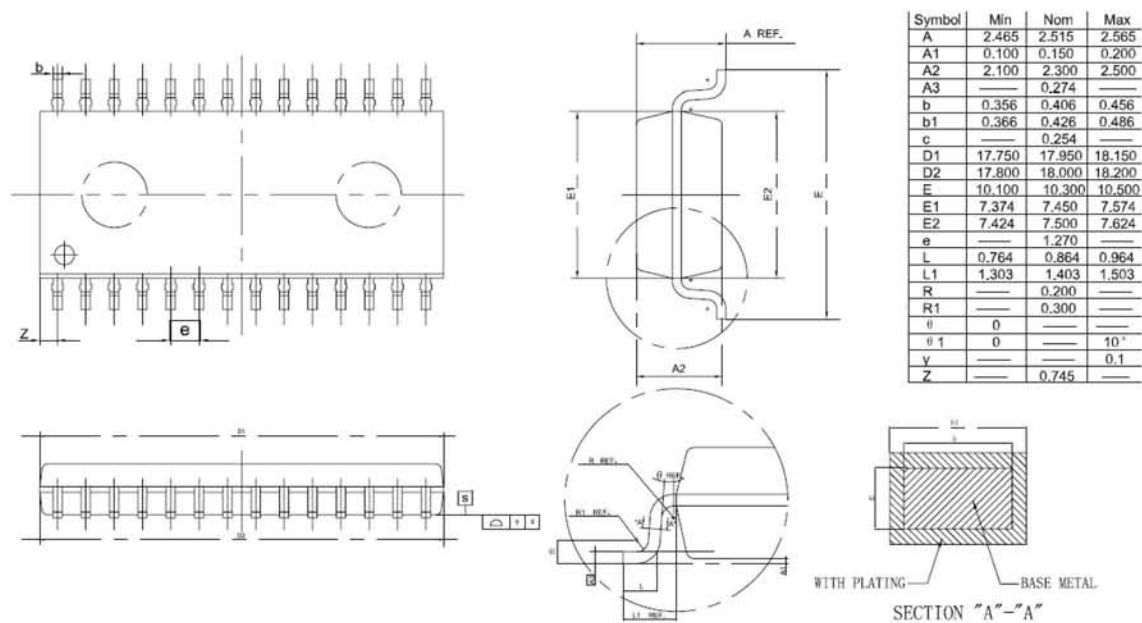


Figure 4 SOP28 Package Dimension Parameter

5. Electrical Specification

5.1 Absolute Maximum Ratings (Note 1)

Table 2 Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Power Supply Voltage (IO)	VCC_IO_AB	-0.5 to 4.6	V
Power Supply Voltage (Core)	VCC_CORE_AB	0 to 2	V
Storage Temperature	TEMP_STG	-65 to 150	C

5.2 Recommended Operating Conditions

Table 3 Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage (IO)	VCC_IO_OP	3	3.3	3.6	V
Power Supply Voltage (Core)	VCC_CORE_OP	1.62	1.8	1.98	V
Input Voltage (digital IO exclude GPIO C)	VIN	0		3.3	V
Input Voltage (GPIO C)	VIN	0		5	V
Operating Free Air Temperature	TEMP_OPR	-20		70	C

5.3 Electrical Characteristics

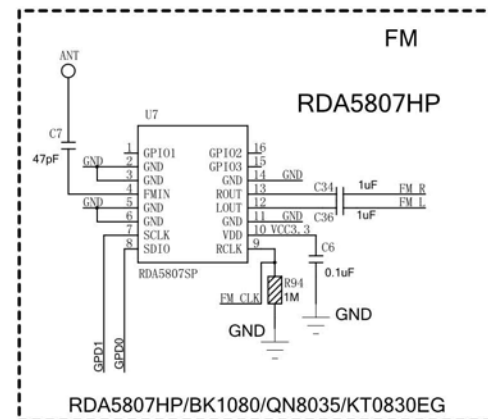
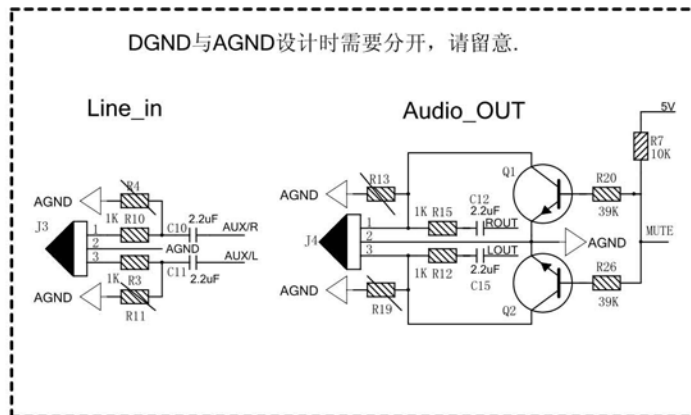
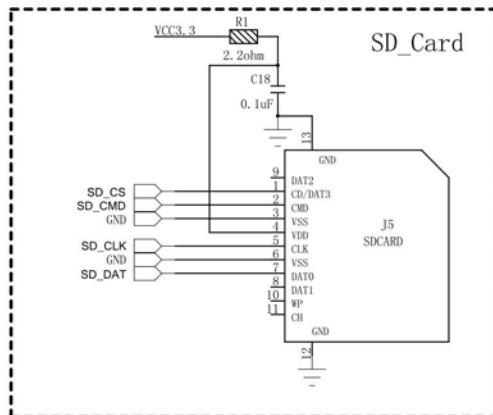
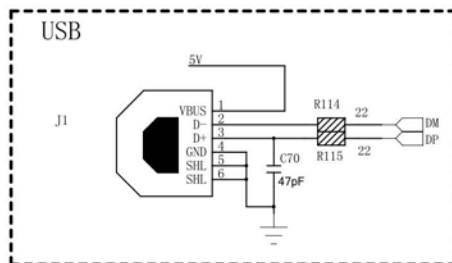
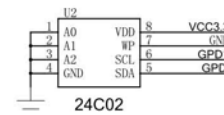
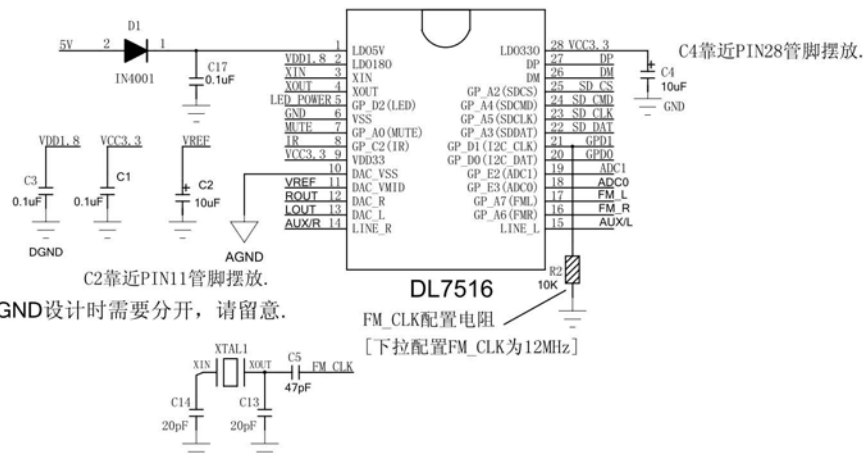
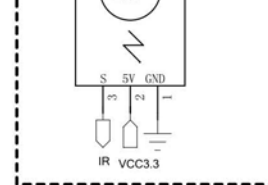
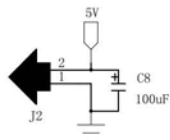
Table 4 Electrical Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
VIH	Input High Voltage		1.57		3.6	V
VIL	Input Low Voltage		-0.3		1.2	V
VOH	Output high voltage	@IOH=2mA	3.0			V
VOL	Output low voltage	@IOL=2mA			0.3	V
IL	Input leakage current		-10		10	uA
P_PLAY	Power consumption when playing	Playing mode		80		mW

Note:

1. “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the device should be operated at these limits.

R48
470ohm
-833761
Power



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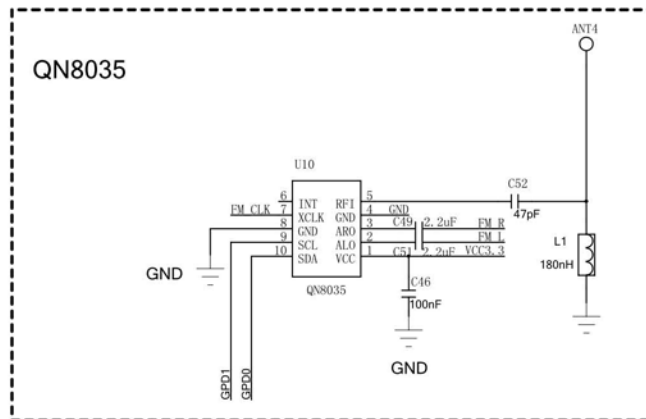
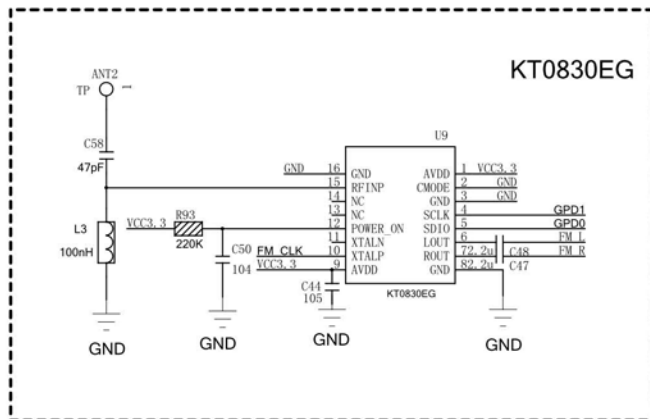
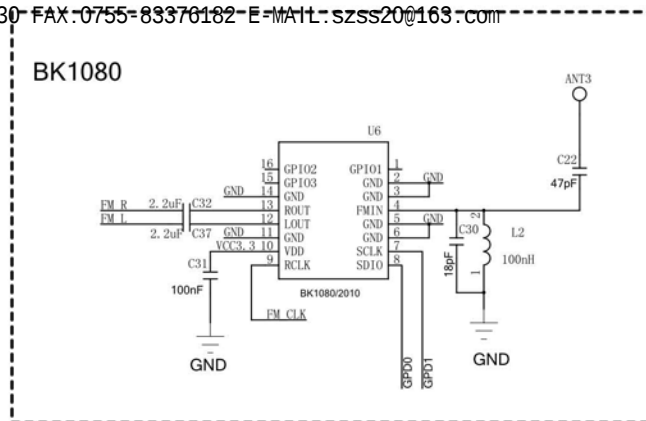
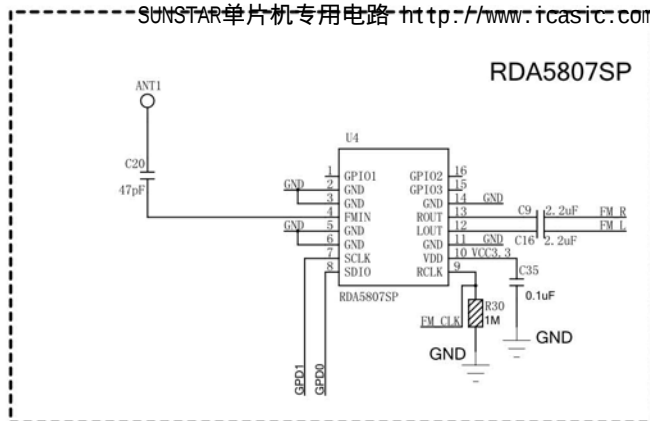
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Figure 1 shows two circuit diagrams for the ADC input of the AD7714. The left diagram is for a 10-bit ADC configuration, and the right diagram is for a 12-bit ADC configuration. Both diagrams show a series of switches (SW1 to SW12) connected to the ADC input, with various resistors (R5, R8, R9, R14, R16, R17, R18, R21, R22, R23, R24, R25, R27, R28, R29, R32, R34, R36, R37, R39, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100) and capacitors (C42, C43) connected to the AGND. The voltage levels for the 10-bit ADC range from 0V to 3.0V, and for the 12-bit ADC range from 0V to 3.0V.

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