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# AU6210K Datasheet

## USB Host MP3 Decoder SOC

Rev0.1

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## Revision History

<b>Date</b>	<b>Revision</b>	<b>Description</b>
	<b>V0.1</b>	<b>Initial</b>

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## 1. Overview

A highly integrated SOC for MP3 player, AU6210K integrates MCU, FM receiver, MP3 decoder, OTG, SD/MMC card controller, SARADC, Audio DAC, segment LED/LCD display driver, RTC, IR decoder, touch key and key tone generator in a single chip, AU6210K offers low cost, low power consumption, flexible and more powerful host MP3 player solution.

### 1.1 Features

- | Enhanced 8051, up to 10 times faster than standard 8051
- | Embedded FM receiver
- | OTG 2.0 full-speed controller
- | SD/MMC card controller
- | Support MP3 decode
- | Embedded sound equalizer
- | Support FAT16/FAT32 file system
- | Embedded 18-bit Audio CODEC
- | Support auxiliary audio input
- | Embedded SARADC for peripheral controls
- | Embedded RTC
- | Embedded NVM to save external EEPROM
- | Support led display during battery charging.
- | Support segment LED/LCD display.
- | Touch key IO support
- | Embedded key tone generator.
- | Support IR Remote control
- | GPIO for various purposes
- | Embedded LDO
- | Embedded Power-on-Reset
- | Embedded 32KB OTP for program code storage



## 1.2 Chip Architecture

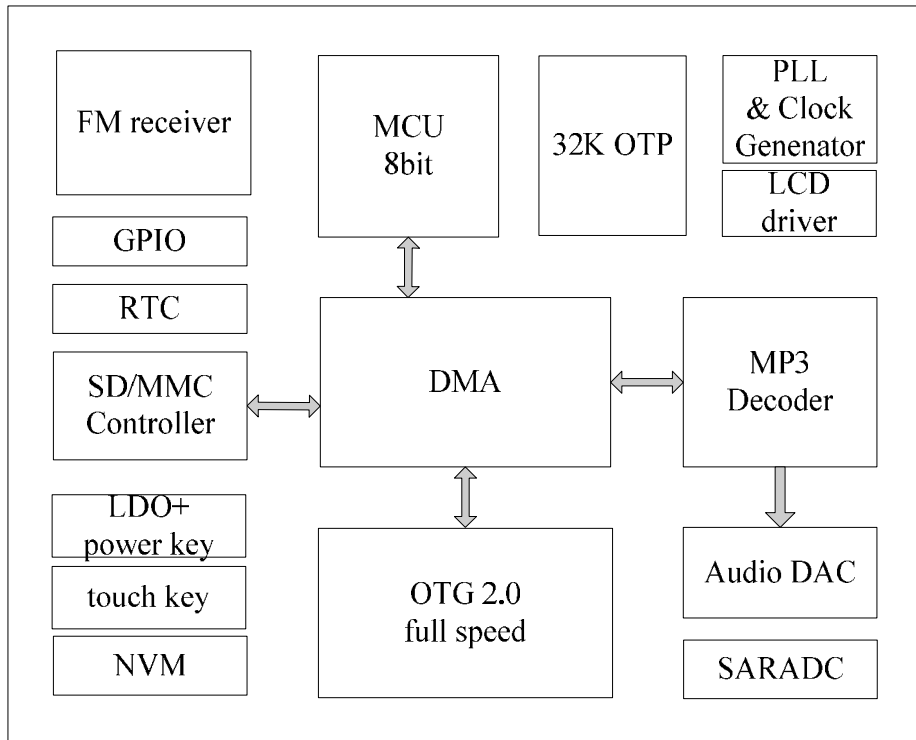


Figure 1 AU6210K Functional Block Diagram

## 2. System Application

### I MP3 audio system

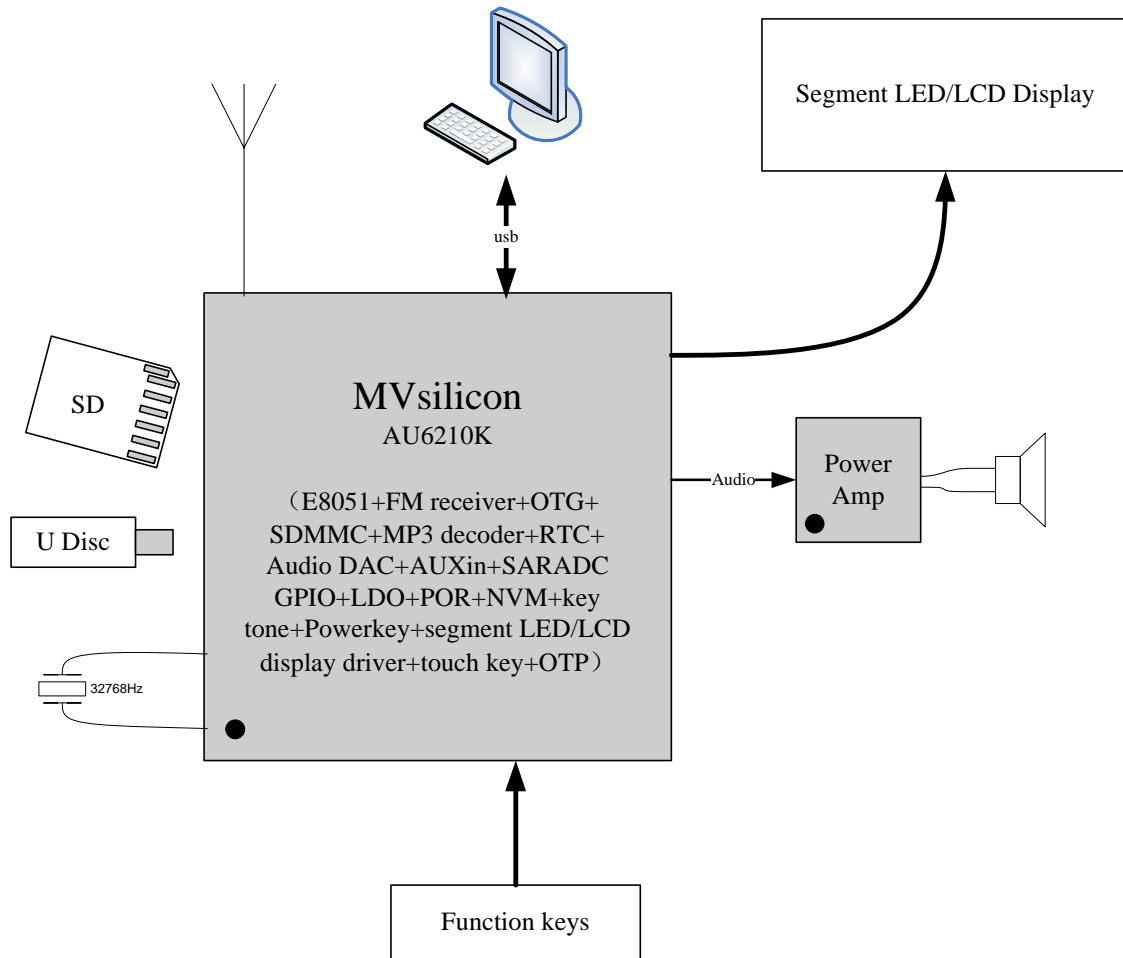


Figure 2 MP3 Audio System

### 3. Pin Description

AU6210K 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
<b>USB interface pins</b>			
<b>USB_DP</b>	24	I/O	USB Function D+ bus
<b>USB_DM</b>	25	I/O	USB Function D- bus
<b>Audio CODEC interface pins</b>			
<b>DAC_R</b>	4	AO	audio right channel output
<b>DAC_L</b>	5	AO	audio left channel output
<b>DACVMID</b>	3	AI	Internal voltage reference
<b>DAC_LINER</b>	7	AI	Audio aux right in
<b>DAC_LINEL</b>	8	AI	Audio aux left in
<b>DACVCOM</b>	9	AI	Audio common output
<b>GPIO/MCU IO pins</b>			
<b>GPIO_A[7:3]</b>	30:26	I/O	GPIO PORT, bank A
<b>GPIO_A[2:0]</b>	23:21	I/O	GPIO PORT, bank A
<b>GPIO_B[7:0]</b>	38:31	I/O	GPIO PORT, bank B
<b>GPIO_D[7:0]</b>	46:39	I/O	GPIO PORT, bank D
<b>GPIO_E[2:0]</b>	20:18	I/O	GPIO PORT, bank E
<b>CLK pins</b>			
<b>XIN</b>	10	I	32.768KHz Crystal oscillator input for PLL
<b>XOUT</b>	11	O	32.768KHz Crystal oscillator output for PLL
<b>FM pins</b>			
<b>RFI</b>	1	AI	FM Antenna input
<b>Power/Ground pins</b>			
<b>FMVSS</b>	48	GND	Ground for FM
<b>FMVDD</b>	47	PWR	power for FM
<b>DVSS</b>	17	GND	ground for digital

<b>LDOIN</b>	14	PWR	LDO power in
<b>LDO330</b>	13	PWR	LDO 3.3V out
<b>COREVDD</b>	16	PWR	power for core
<b>DACVDD</b>	6	PWR	power for DAC
<b>DACVSS</b>	2	GND	ground for DAC
<b>RTCVDD</b>	12	PWR	Power for RTC
<b>MISC pins</b>			
<b>POWER_KEY</b>	15	I	Power Key

## 4. Package

### 4.1 Package Diagram

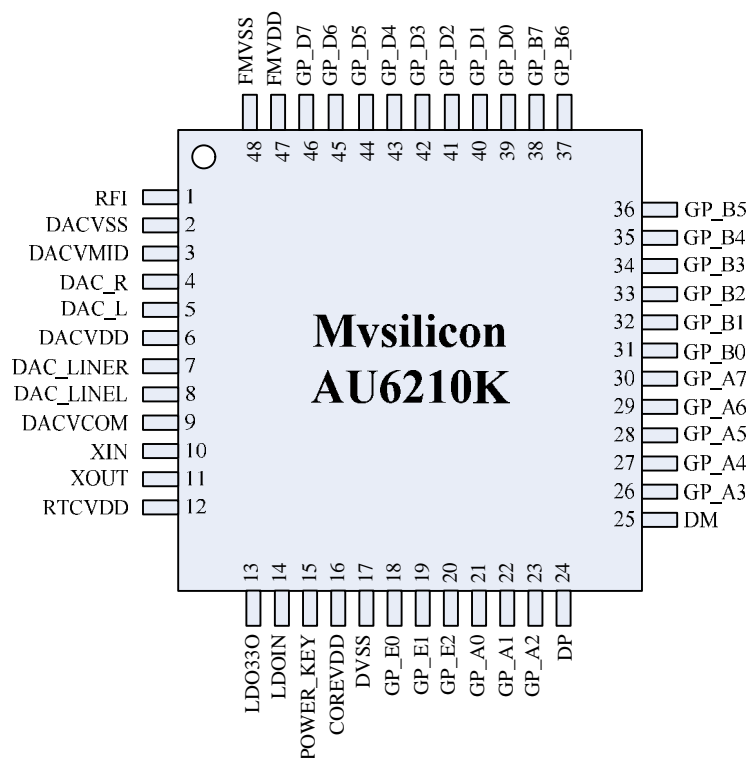


Figure 3 Package Diagram (LQFP48-7x7mm / TOP View)

## 4.2 Package Dimension Parameter

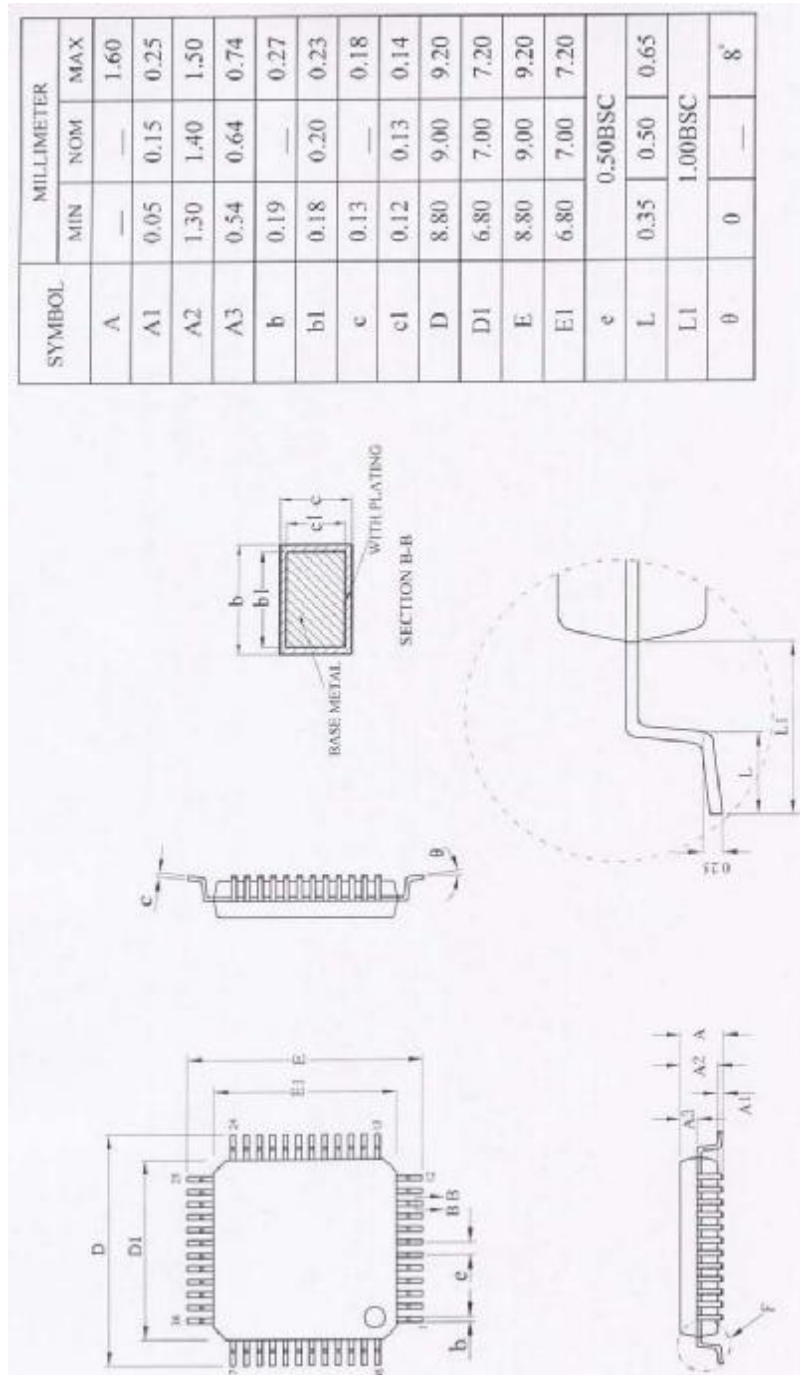


Figure 4 LQFP48-7x7mm Package Dimension Parameter

## 5. Electrical Specification

### 5.1 Absolute Maximum Ratings (Note 1)

Table 2 Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
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 (LDO)	VCC_LDO	3.35		5	V
IO Input Voltage	VIN	0		3.6	V
Operating Free Air Temperature	TEMP_OPR	-20		75	C

### 5.3 Electrical Characteristics

Table 4 Electrical Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V <sub>IH</sub>	Input High Voltage		1.6		3.6	V
V <sub>IL</sub>	Input Low Voltage		-0.3		1.4	V
V <sub>OH</sub>	Output high voltage	@IOH=2mA	3.0			V
V <sub>OL</sub>	Output low voltage	@IOL=2mA			0.3	V
I <sub>L</sub>	Input leakage current		-10		10	uA
P <sub>PLAY</sub> current	Current consumption when playing	Playing mode		20		mA
RTC current	Current consumption for RTC & NVM			13		uA

### 5.4 Audio Performance

Table 5 MP3 Audio Performance

Characteristics	Min	Typ	Max	Unit
Frequency Response 20Hz ~ 18KHz		<0.5%		DB
THD+N(1KHz out = 950mv rms)		0.1%		%
S/N (1KHz out = 950mv rms)		75		DB
L/R Channel Difference		0		DB
L/R Channel Separation		75		DB
DAC WITH 32OHM Loading OUT POWER		>20		MW

Table 6 Line in Audio Performance

Characteristics	Min	Typ	Max	Unit
Frequency Response 20Hz ~ 20KHz		<0.5%		DB
THD+N(1KHz out = 950mv rms)		0.05%		%



S/N (1KHz out = 950mv rms)		75		DB
L/R Channel Difference		0		DB
L/R Channel Separation		75		DB

Table 7 FM Audio Performance

Characteristics	Min	Typ	Max	Unit
RX_Sensitivity (Mono)		<2		uV
RX_S/N (Stereo)		64		DB
RX_S/N (Mono)		60		DB
L/R Channel Difference (Mono)		0		DB
L/R Channel Separation (Stereo)		45		DB
RX_THD (Mono)		0.1%		%

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.

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