PCB ARTISTS
Route to Perfection

ES8388 Module

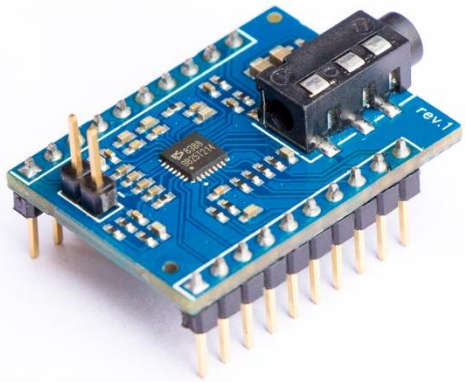
Datasheet v.1.0

INTRODUCTION

The PCB Artists ES8388 Module is designed to add smartphone-like audio recording and playback capability to your embedded design.

The module can be used with any I2S-enabled MCU or platform such as the ESP32, STM32, nRF52, etc.

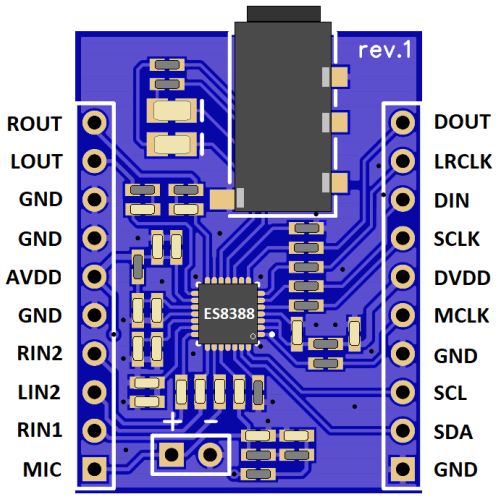
The PCB Artists ES8388 Module features separate analog and digital power domains with RC filters to provide the best possible audio quality and noise performance.



FEATURES

- Compatible with 1.8V and 3.3V MCUs
- Analog section can be powered directly by a Li-Po cell
- 3.5mm stereo headphone jack for audio playback
- Stereo microphone inputs, line inputs, and line outputs
- Standard I2S audio and I2C control interface
- Minimal audio noise ensured by design
- High quality audio playback: 10mA @ 3.3V
- High quality audio recording + playback: 18mA @ 3.3V
- All analog inputs and outputs available for use

PIN ASSIGNMENTS



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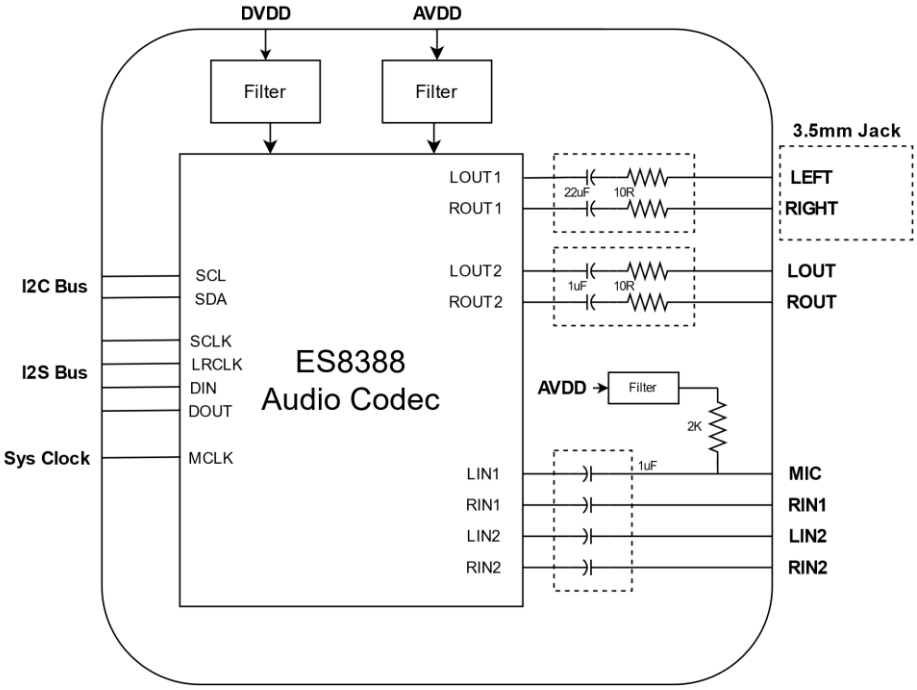
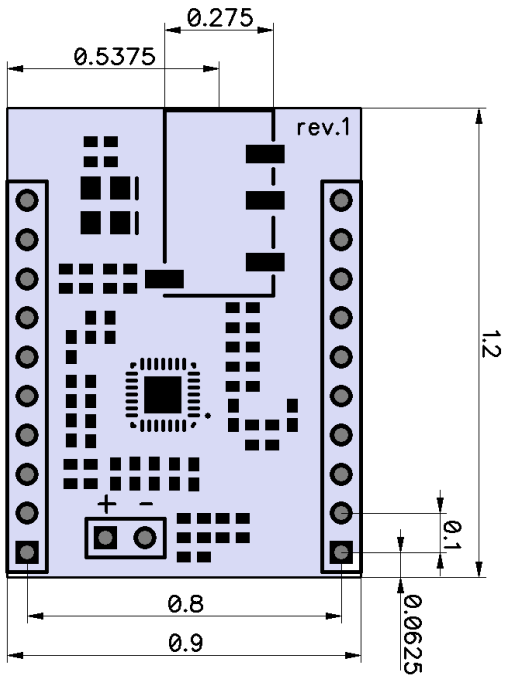
BLOCK DIAGRAM

A simplified block diagram of the PCB Artists ES8388 module is shown below.



MECHANICAL DIMENSIONS



(All dimensions are in inches)

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PIN DESCRIPTIONS

Pin names, their functions and respective power domains are listed below.

Pin #	Name	Domain	Description
1	ROUT	AVDD	Audio output, right
2	LOUT	AVDD	Audio output, left
3	GND	AVDD	Analog ground
4	GND	AVDD	Analog ground
5	AVDD	AVDD	Analog supply, 1.8V or 3.3V (5V, maximum)
6	GND	AVDD	Analog ground
7	RIN2	AVDD	Audio input #2, right
8	LIN2	AVDD	Audio input #2, left
9	RIN1	AVDD	Audio input #1, right
10	MIC	AVDD	Audio input #1, left (contains mic bias circuits)
11	GND	DVDD	Digital ground
12	SDA	DVDD	SDA, open drain (I2C control bus)
13	SCL	DVDD	SCL, open drain (I2C control bus)
14	GND	DVDD	Digital ground
15	MCLK	DVDD	Master clock input
16	DVDD	DVDD	Digital supply, 1.8V or 3.3V
17	SCLK	DVDD	Serial clock (I2S audio bus)
18	DIN	DVDD	Data input (I2S audio bus)
19	LRCLK	DVDD	Left/right or word clock (I2S audio bus)
20	DOUT	DVDD	Data output (I2S audio bus)

ELECTRICAL CHARACTERISTICS

Note: Some of the important specifications are listed below.
Please refer to ES8388 codec datasheet for a complete set of electrical specifications.

Recommended Operating Conditions

($-40^{O}C < T_A < +85^{O}C$)

Parameter	Min	Typ	Max	Unit
Analog supply voltage, AVDD	1.7	3.3	3.6	V
Digital supply voltage, DVDD	1.5	3.3	3.6	V

Analog Characteristics

(AVDD = 3.3V, $25^{O}C$, F_s = 48 kHz, MCLK/LRCLK = 256, 1 kHz sine input)

Parameter	Min	Typ	Max	Unit
Line Input Level	-	AVDD /3.3	-	V_{RMS}
Line input impedance	-	20	-	Kohm
Line Output Level	-	AVDD /3.3	-	V_{RMS}

I2S Bus Characteristics

Parameter	Min	Typ	Max	Unit
MCLK Frequency	-	-	51.2	MHz
LRCLK Frequency (F_S)	-	-	200	kHz
SCLK Frequency	-	-	26	MHz
Clock Duty Cycle (MCLK, LRCLK, SCLK)	40	50	60	%

I2C Bus Characteristics

Parameter	Min	Typ	Max	Unit
Bus frequency	-	-	400	kHz

ORDERING INFORMATION

For bulk pricing information and ordering, please reach out to us at hello@pcbartists.com.

To place an order online via our Store, please visit the product URL at https://pcbartists.com/product/es8388-module/

CUSTOMIZATION OPTIONS

Customization services are available for the ES8388 module. Customization includes:

- Module outline changes
- Pinout and pad type changes
- Addition of components like filters, amplifiers and speaker drivers

We also offer services for design, development and production of custom audio products.

Revision History

- **July 14, 2021**
  - Initial release