

Accurate Acoustic Sensor - Sound Frequency to Voltage Converter

The project presented here is a sensitive sound sensor. The circuit converts sound frequency and outputs DC voltage. The board consists of LM358 OPAMP and LM2907 IC. LM358 is used as a dual-stage microphone preamplifier and LM2907 acts as a frequency to voltage converter. The circuit provides analog voltage output when it detects sound. The output of the sensor is proportional to the audio sound frequency detected through the condenser microphone. The output voltage swings from 3.5V to 10.8V proportional to frequency 330Hz to 933Hz. Output is zero when the sound frequency is below 330Hz. Users may try with other frequency ranges, which can be changed using the following formula, $V_o = R_9 \times C_6 \times V_{CC} \times f$. The sensor has better response and accuracy than many sound sensors available on the market. The operating Supply is 12V DC and consumes 20mA current. Jumper J1 and J2 are closed for normal microphone operation.

Note: Note: Output voltage of the sensor is dependent on frequency not on sound level. Output DC voltage is proportional to sound frequency detected using the microphone. Ordinary sound sensors' output swings with sound level.

Optional Direct Audio Signal input: Circuit also has optional provision to feed direct audio signal.

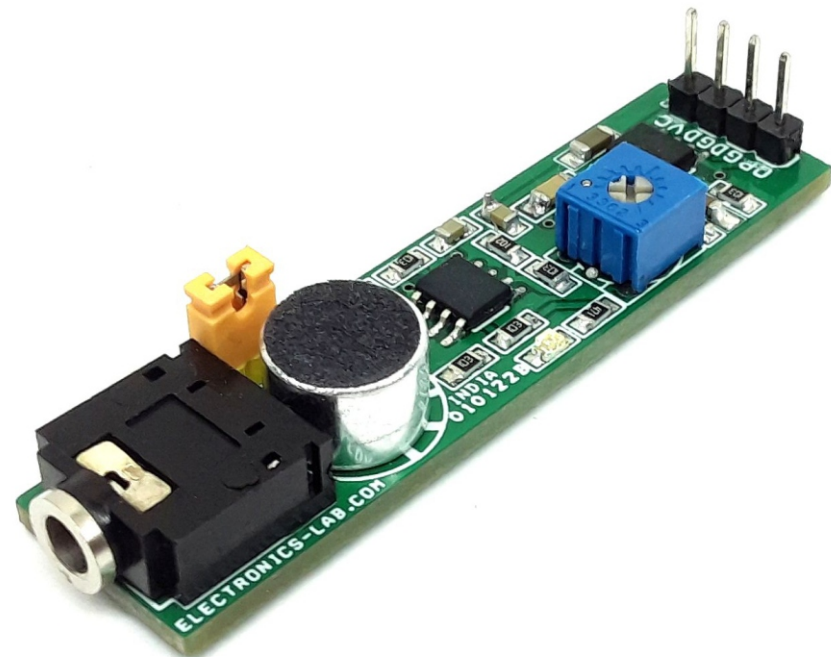
- Install following components for direct audio input: CN2 3.5MM EP socket, Jumper J3 (Solder Jumper located under PCB) closed, 10K trimmer Potentiometer to adjust the input audio signal, input signal should not exceed peak 28V.
- CN2 Stereo Audio Socket Digi Key Part # CP1-3525N-ND, PR1 Trimmer Potentiometer 10K Digi key Part # 478-601030-ND
- Do not install following components for direct audio signal, J1, J2 Jumper (Solder Jumper Located under PCB) R2, R3, U1, R4, R6, R8, C4, R5, R7

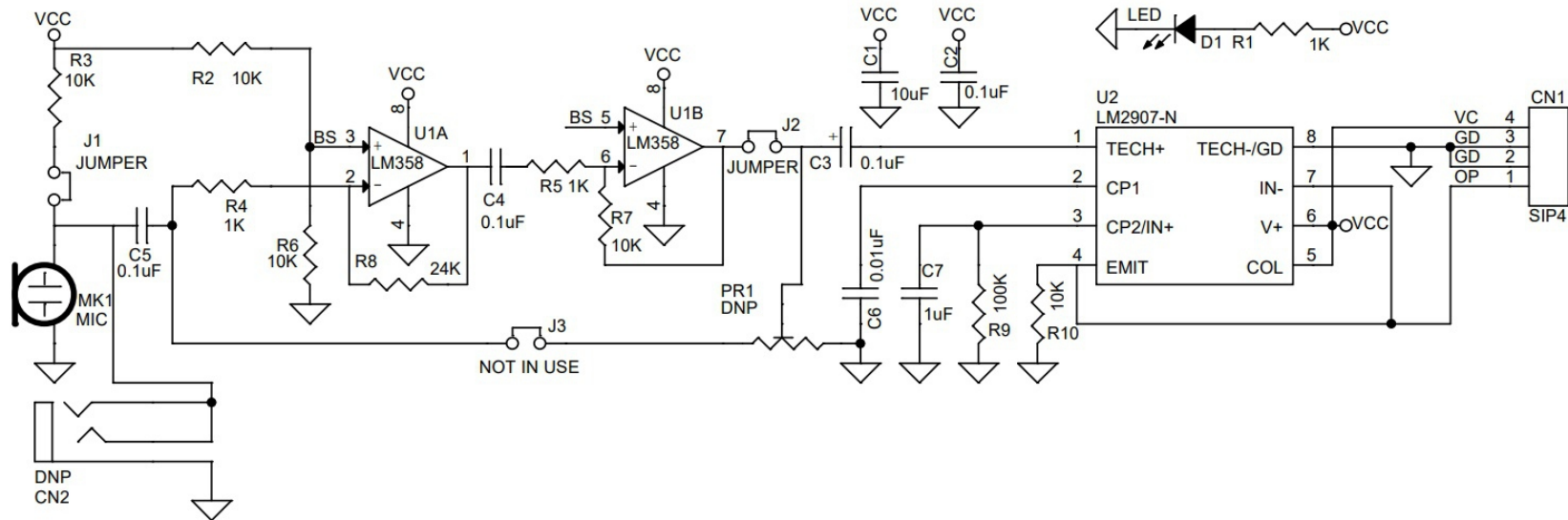
Connections Cn1

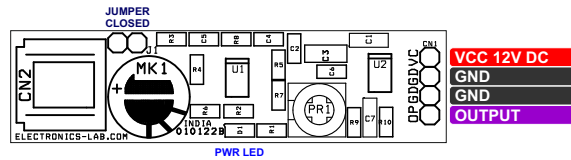
- CN1 Pin 1 VCC 12V DC Input
- CN1 Pin 2 GND
- CN1 Pin 3 GND
- CN1 Pin 4 DC Voltage Output
- Jumper J1: Closed
- Jumper J2: Closed (Solder Jumper located Under PCB)
- D1 Power LED
- MK1 Condenser Microphone (Sound Sensor)

Features

- Operating Power Supply 12V DC @ 20mA
- Header Connector for Power input and Signal Output
- Output DC Voltage 3.5V to 10.80V DC
- Frequency Response 330Hz to 933 Hz
- On Board Micro-Phone to Detect the Sound
- Optional Direct Audio Input Facility with Input Signal Adjust Trimmer
- Power LED
- PCB Dimensions 56.83 x 15.24mm







BOM						
NO.	QNTY.	REF.	DESC.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	4 PIN MALE HEADER CONNECTOR	WURTH	DIGIKEY	732-5317-ND
2	2	PR1,CN2,J3	DNP			DO NOT INSTALLED
3	1	C1	10uF/16V SMD SIZE 1206	YAGEO/MURATA	DIGIKEY	
4	4	C2,C3,C4,C5	0.1uF/50V SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
5	1	C6	0.01uF/25V SMD SIZE 1206	YAGEO/MURATA	DIGIKEY	
6	1	C7	1uF/16V SMD SIZE 1206	YAGEO/MURATA	DIGIKEY	
7	1	D1	LED SMD SIZE 0805	LITE ON INC	DIGIKEY	160-1427-1-ND
8	1	J1	JUMPER-2 MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5315-ND
9	1	J1	SHUNT FOR JUMPER J1	SULLINS CONCT	DIGIKEY	S9001-ND
10	1	MK1	MIC-CONDENSOR MICROPHONE	PUI AUDIO	DIGIKEY	668-1484-ND
11	3	R1,R4,R5	1K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
12	5	R2,R3,R6,R7,R10	10K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
13	1	R8	24K 1% -5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
14	1	R9	100K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
15	1	U1	LM358 SO8	TI	DIGIKEY	296-1014-1-ND
16	1	U2	LM2907-N SO8	TI	DIGIKEY	LM2907M-8-ND

