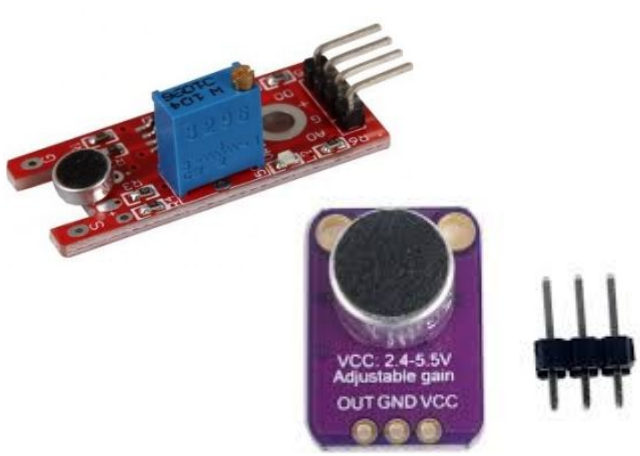
Sound Sensor
(Technical Note)

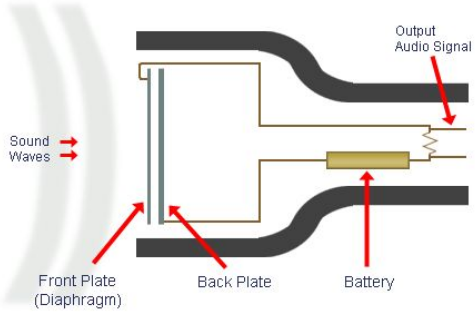
What is Sound Sensor?



These sound sensors use electret microphones to pick up sound signal and generate analog signal that can me read through an analog-to-digital converter in a microcontroller. These devices produce high-quality analog signal that could be converted to digital data to record or transfer over a network. Some units have an alarm output in addition to the analog out.
Electret microphones are quite inexpensive and have high sound sensitivity.

Applications

Devices like desktop phone and high-end sound recorders commonly use electret microphones. The sound sensor shown here could be used to design any such devices in their digital form.



Sound recorder: Digital recorder converts analog sound signal to digital and stores in memory to be played back.

Remote Sound Listening: The sound data is sampled and sent over a network to be converted back to analog.

References:

1. https://www.mediacollege.com/audio/microphones/condenser.html

Z2M Part Number:
EMS-00004-A
EMS-00004-C

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(Application Note)

Project

Simple Volume Unit meter (VU): A VU meter displays the level of the sound volume. Here a single LED is used to show the sound level through its brightness.

Procedure

Sound Sensor Module:

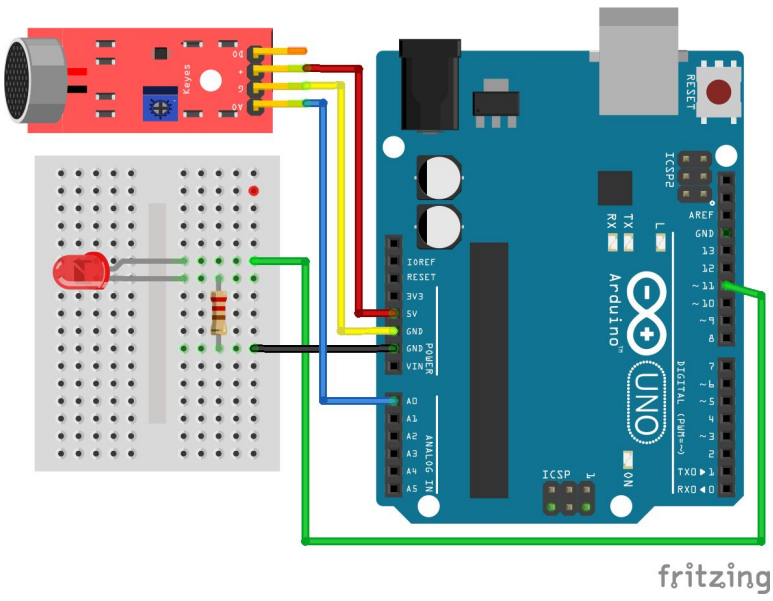
- Connect **+/VCC** pin of sensor to **5V** of Arduino
- Wire **G/GND** pin of the sensor to **GND** of the Arduino
- Connect **A0/OUT** pin to **A0** pin of Arduino

LED:

- Connect **anode(+)** of LED to **11**th pin of Arduino
- Connect **cathode(-)** of LED to **GND** of Arduino

Upload the code to Arduino and open Serial Monitor to check the sound level detected by the sensor.

Schematic



Challenge Yourself

1. Create a VU meter with a sound sensor and a servo motor that shows the dynamic sound pressure levels?
2. Using two sound sensors create a direction sensor that identifies the direction of source of the sound.

Components Required

Component	Part No.	Qty
Arduino UNO	EMX-00001-A	1
Sound Sensor	EMS-00004-A or C	1
Resistor 220 Ohm	EDR-00001-220Z	1
LED	EDD-00002-A	1

Code

```
/*Attaching the LED to the 11th pin of Arduino*/
const int led = 11;
/*Attaching the Sound Sensor to pin A0 of
Arduino*/
const int sound = A0;
/*Initialising variables named soundval and
bright*/
int soundVal = 0;
int bright;

void setup ()
{
/*Making the connected pin to LED as OUTPUT
pin*/
  pinMode(led,OUTPUT);
/*Making the connected pin to Sound Sensor as
INPUT pin*/
  pinMode(sound,INPUT);
  Serial.begin(9600);
}

void loop ()
{
  /*Reading the analog value from the sound
sensor and storing it in the variable*/
  soundVal = analogRead(sound);
  /*Print out the sound level value*/
  Serial.println("soundVal = ");
  Serial.println(soundVal);

/*Arduino analogWrite range is 0-255,
recalibrate the range of soundVal (0-1023).
Determine the background soundVal from Serial
Monitor (516 in this case)*/
  bright = map(soundVal,516,1023,0,255);
  bright = max (0,bright);
/*Set LED brightness according to sound loudness
detected*/
  analogWrite(led,bright);
/*Set delay of 0.2s. If it is too slow, change
it to lower number.*/
  delay(200);
}
```