

# Vibration Sensor for Synchronizing Arduino Drums

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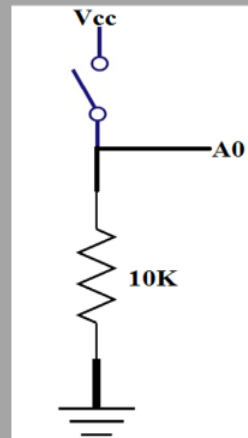
## Abstract

For the purposes of synchronizing an Arduino drum to a separate Arduino drum, it is necessary to sense the motion of the drum used as reference. In this project, a vibration sensor is used to for motion sensing. By treating the vibration sensor as a variable resistor in a voltage divider circuit, the motion of the reference drum can be determined after calibration of the vibration sensor. The sensing drum is controlled based on the determined motion of the reference drum.

## METHODS

### Circuit

- Vcc set to 5V output from ESP8266
- Vibration sensor acts closed when stationary, open when in motion
- A0 set to A0 pin on ESP8266, read using `analogRead()`



### Calibration Values

- When stationary, vibration sensor found to be open with almost all voltage dropped across 10K
- When moving, vibration sensor resistance increases such that voltage drop across resistor becomes roughly 1.0V

REFERENCE DRUM STATE	OUTPUT VOLTAGE	analogRead() OUTPUT
Stationary	4.8V	1000
Motion	0.6V	50

### Sensing Drum Control Method

- Constantly read A0 using `analogRead()`
- When `analogRead()` value drops significantly, reference drum is in motion
- If reference drum is measured to be in motion, sensing drum set to strike multiple times to back beat

## RESULTS

- Circuit calibrated well: reference drum motion detected perfectly
- Sensing drum controlled correctly to back beat of reference drum
- Sensing and control system can be easily extended to include more complex control of sensing drum

## LINKS

1. Arduino control code:  
[https://github.com/mwalker55/EE183DA/blob/master/lab3/mark\\_drum.ino](https://github.com/mwalker55/EE183DA/blob/master/lab3/mark_drum.ino)