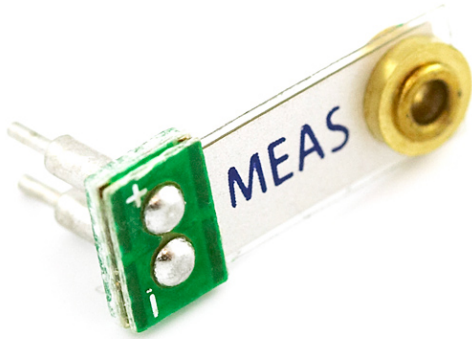


Piezo Vibration Sensor



Equivalent Circuit

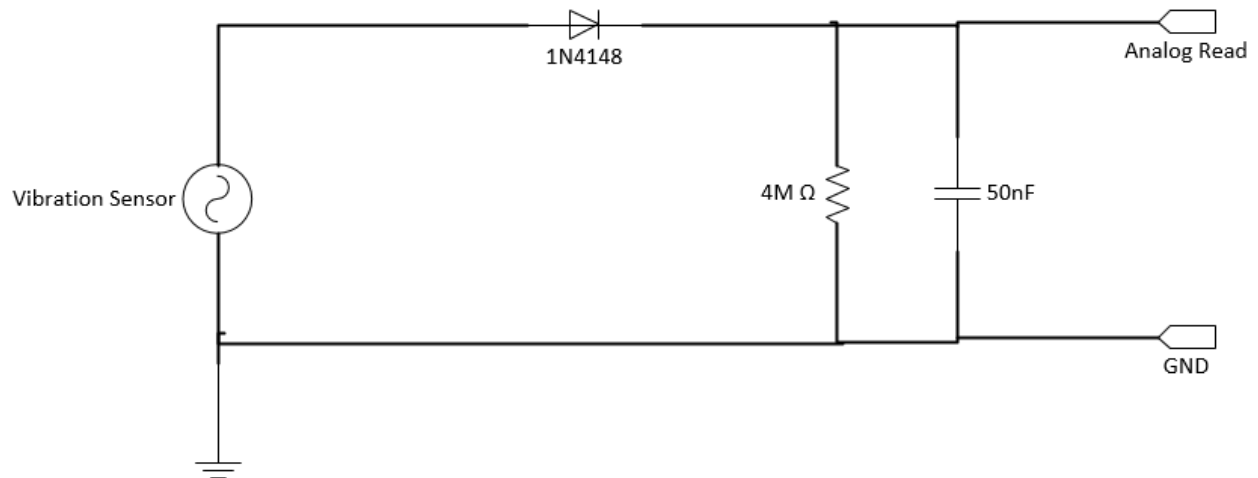
Equivalent circuit is a 244pF capacitor in series with a variable voltage source. Variable voltage is proportional to the acceleration on the on sensor.

How to Use

The schematic for a circuit that connects the piezo-vibration sensor is shown in the figure below. A diode, 4M Ω resistor, and a 50 nF capacitor are used to interface device to any of the Arduino analog input pins. Using this circuit a voltage signal having an approximate peak value read from the analog readpin A0 of ~120 using the setup indicated below.

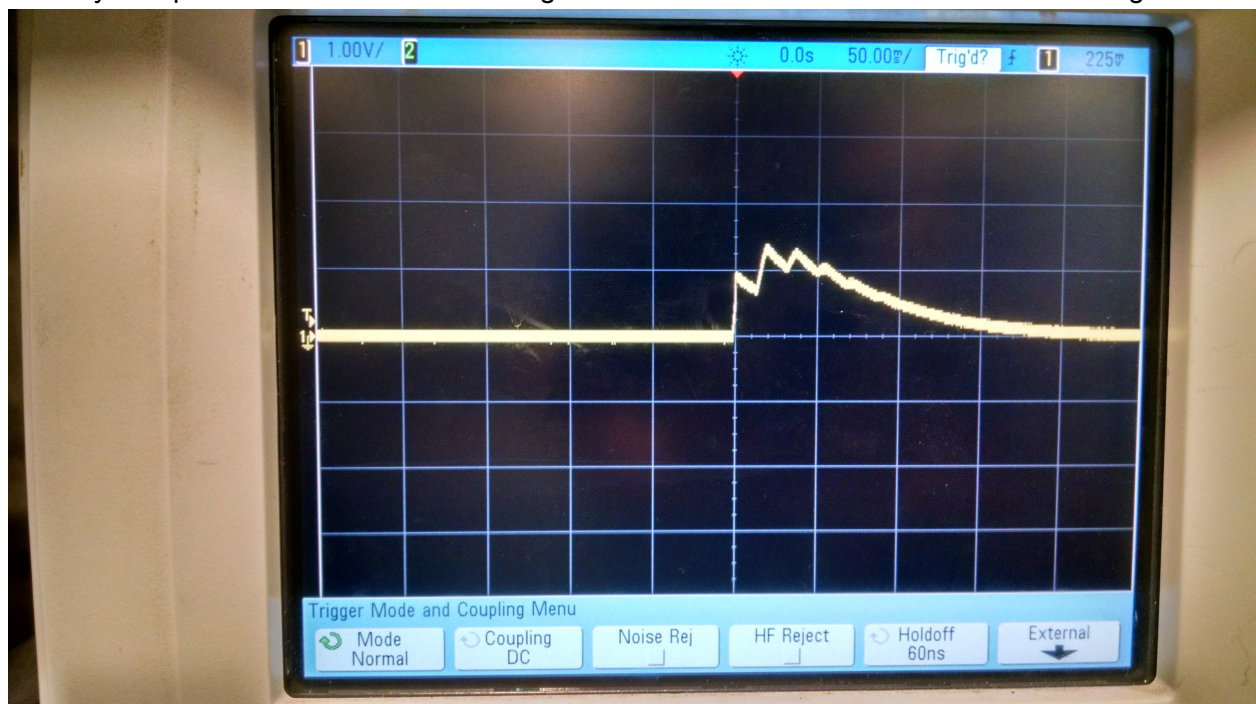
Diode - Since the sensor produces a transient periodic signal that produces negative and positive voltages, a rectifier is needed to eliminate the negative voltage swings since the Arduino cannot handle negative voltages. The diode provides this function.

Resistor and Capacitor – these elements provide some filtering so that the part of the signal that changes very quickly is smoothed out so that it can be detected by the A/D converter on the Arduino processor. The Arduino sampling period may not be fast enough to catch signals like a clap without these parts.

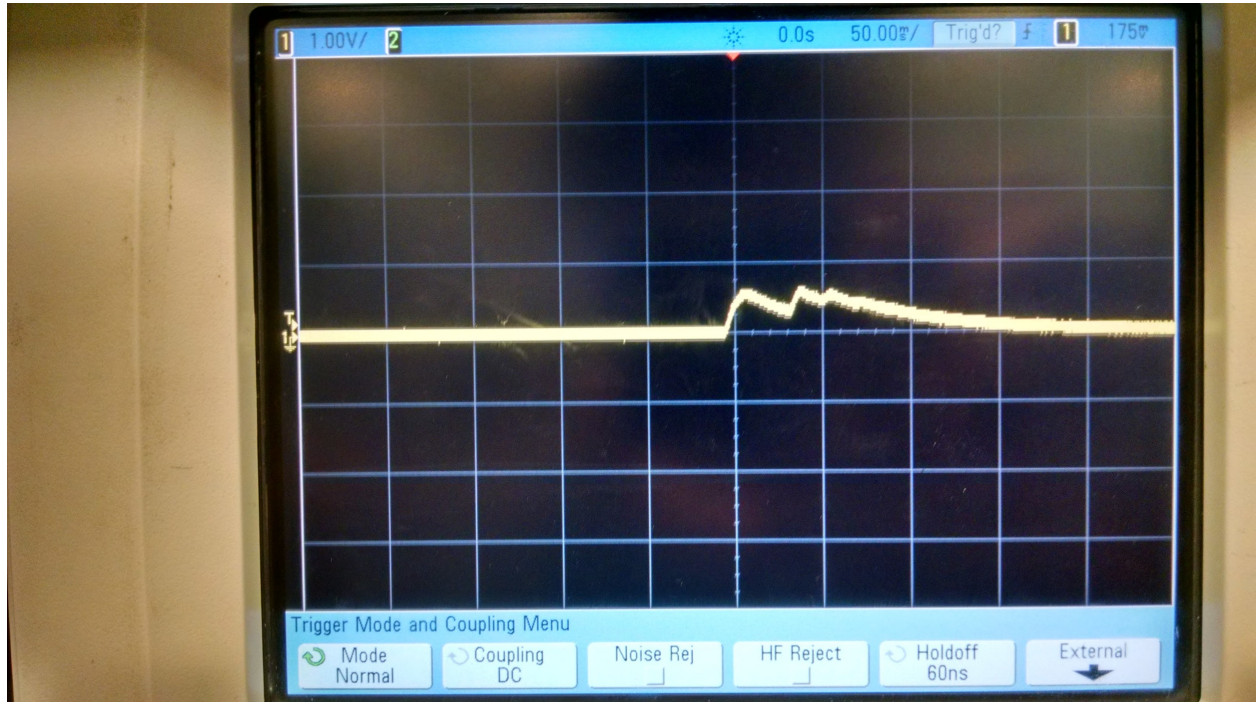


(4M Ohm can be built by 4 1M Ohm resistors in series and 50nF can be built by 2 100nF capacitors in series).

When you tap the sensor hard the reading from the circuit above looks like the following:



When you tap it lighter, the settling time is similar and the peak amplitude drops:



You are recommended to write a code that triggers when the reading exceeds a certain threshold and holds the largest value for 20-100 loop() executions (save the largest value in a global variable for 20 to 100 loop() iterations, during the iteration, replace the variable and zero the iteration counter if a larger value is detected). This should be able to pick up the peak reading from the sensor. It should also filter out the low amplitude oscillations.