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Using XoNano impact foam with your Arduino Uno

The following instructions were prepared using an Arduino Uno

**Required Materials:**

* Breadboard
* TI 2N3904 BJT transistor (or BTJ transistor of similar specifications)
* Resistors (49kΩ, 270Ω, 20kΩ, 22kΩ)
* Jumper wires

**Circuit:**

The following circuit interfaces between XoNano impact foam and the Arduino.

**Customizing your experience:**

If you are a DIY kind of XoNano user, you may want to personalize the Arduino script. You will likely want to utilize debug mode. Do activate debug mode and print debug messages to the Serial Monitor, connect pin A0 to your rail voltage. Unplugging A0 or plugging A0 to ground will deactivate debug mode and return the board to production mode.

Calibration information (high/low sensitivity)

**Testing and Data Analysis**

Once your Arduino Uno is connected as per the instructions above, you can begin gathering and analyzing data. **Make sure that you do not have debug mode on – nothing should be plugged into pin A0!**

1. Type in your rails voltage in the Arduino script in the area labeled *USER: PLEASE INPUT YOUR RAIL VOLTAGE HERE.* This will help normalize the Arduino’s ADC arbitrarily scaled values to understandable voltage values.
2. Run the program and open the Serial Monitor by selecting Tools -> Serial Monitor or by pressing ctr + shift + M
3. Once an impact has occurred, comma-delimited values will be written to the Serial Monitor in the following format

<Impact Strength>

<Rails Voltage>

Timestamp in ms, raw signal, smoothed signal

WEAK

3.7

1054, 456, 487

1056, 489, 490

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1. Data from one impact is several hundred lines long. It will end with 2 blank lines.
2. Copy all the impact data EXCLUDING IMPACT STRENGTH into a word processing program and save it unchanged as a .csv file.
3. Run *read\_arduino\_impact.py* and follow on-screen instructions