

Electronics Workshop

Sensors: Bodies Creating Sound

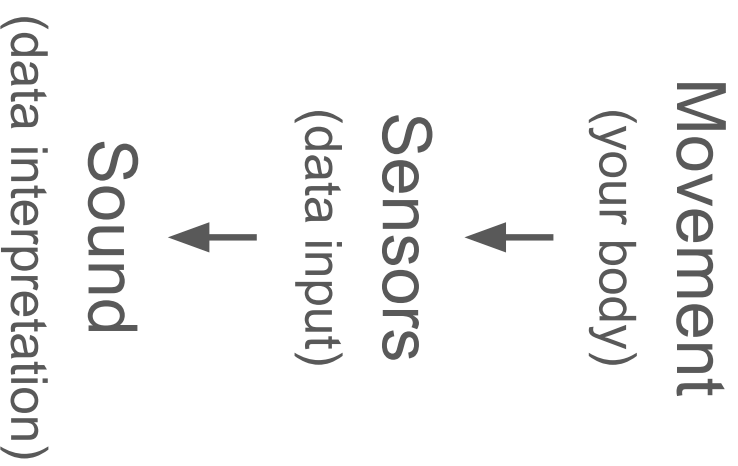
Creative Academy - Fall 2015

Natalie Metzger

Stephanie Smith

Introduction

The Basics



Sensors (data input)

Sensors: A numerical way to measure the physical world

What does the data look like?

A range of numbers. Examples: [0-100], [354-792]

Types of sensors:

- Proximity
- Light
- Flex / Bend
- Force
- Acceleration

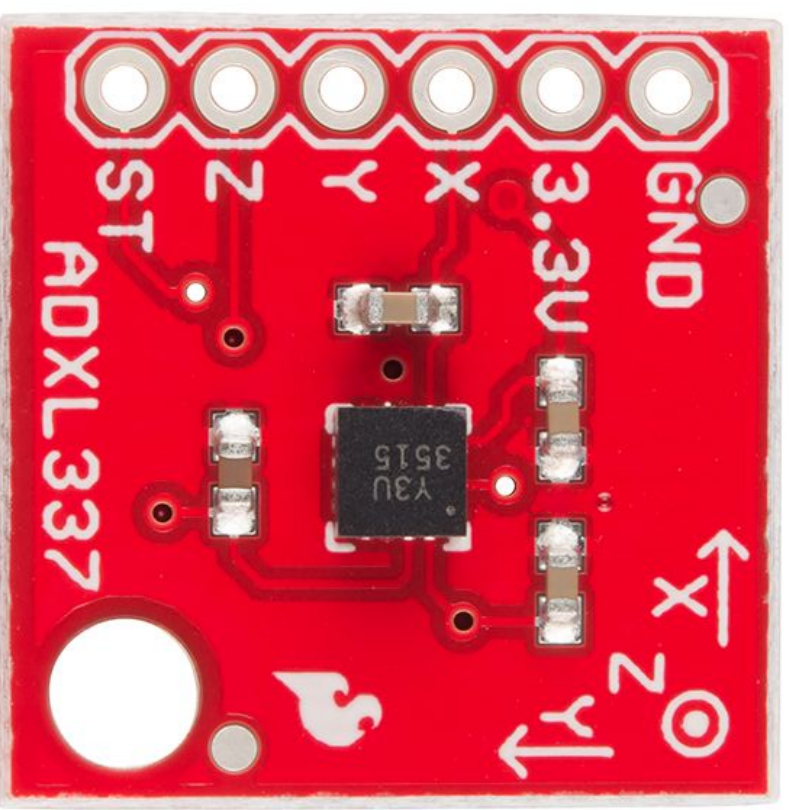
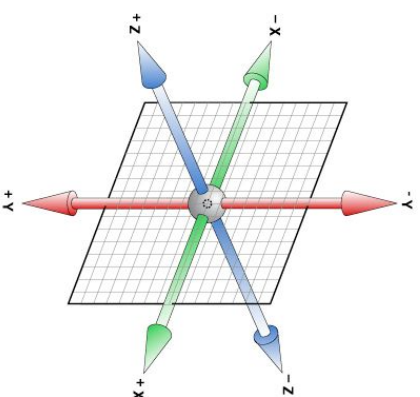
Our Sensor: Accelerometer

3-dimensional motion

Relative to gravity

Measures:

- Movement
- Direction of movement
- Orientation



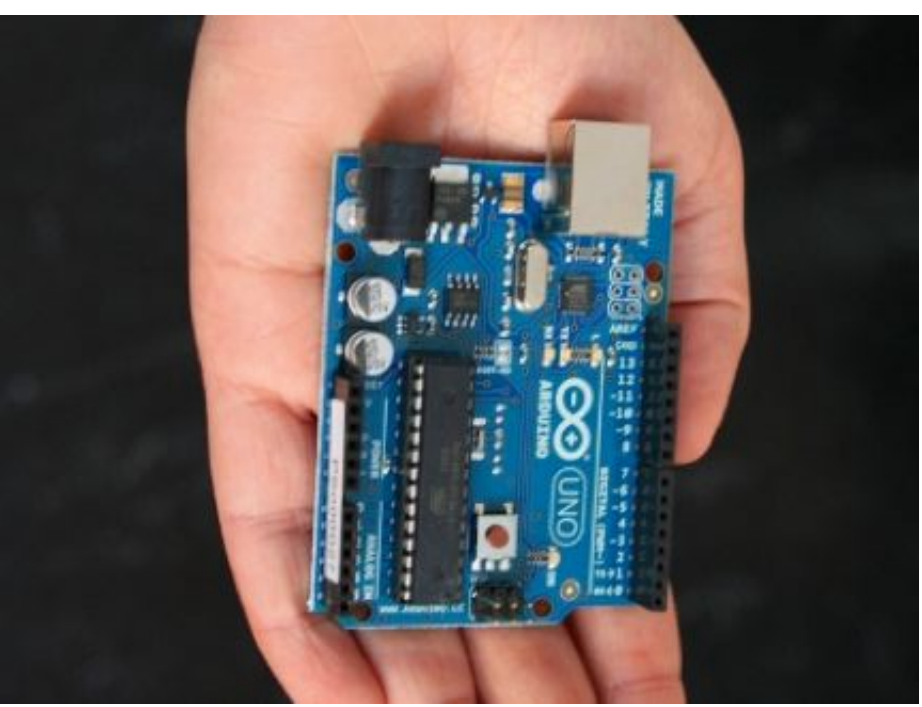
Sound (interpreting data)

We can interpret or “translate” data into a variety of controls or parameters:

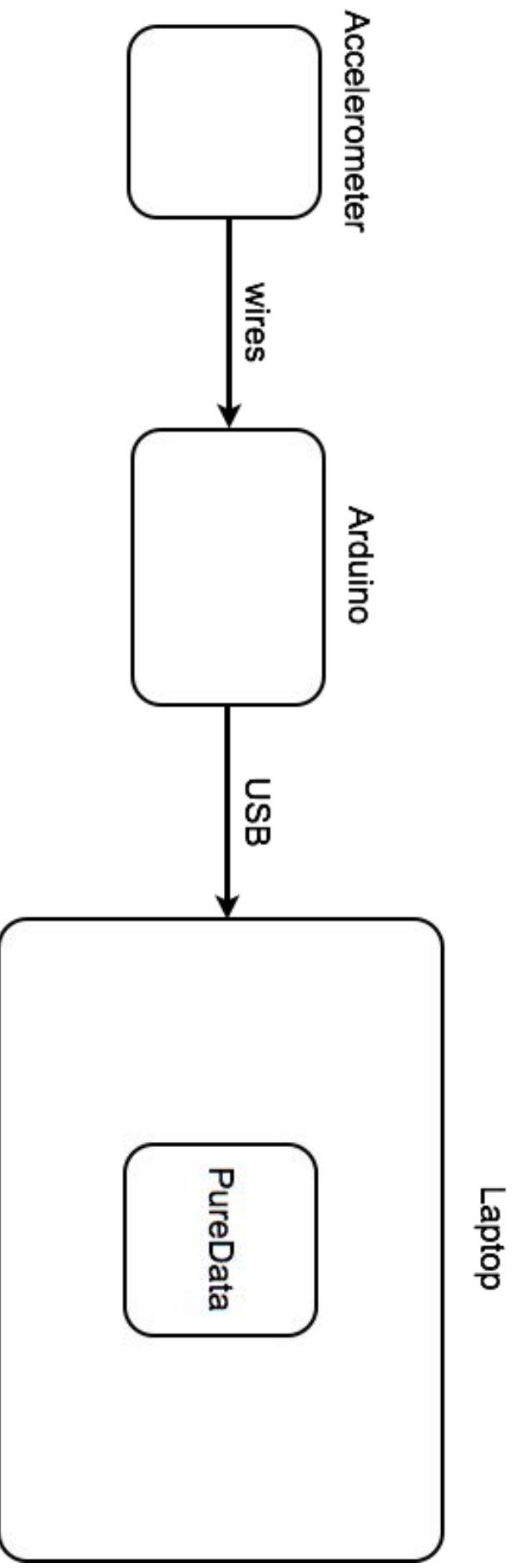
- frequency (pitch)
- volume (loudness)
- any slider or knob control
- can also use momentarily to activate triggers, buttons, or switches

Missing Link: Arduino UNO

- This is a microcontroller that can receive data input from sensors and relay it to software on our computers
- We will then use the software (PureData) to generate and control audio



Basic Setup



Demo

Kit Checklist

- Accelerometer
- 5 different colored wires
- Arduino UNO
- USB cable

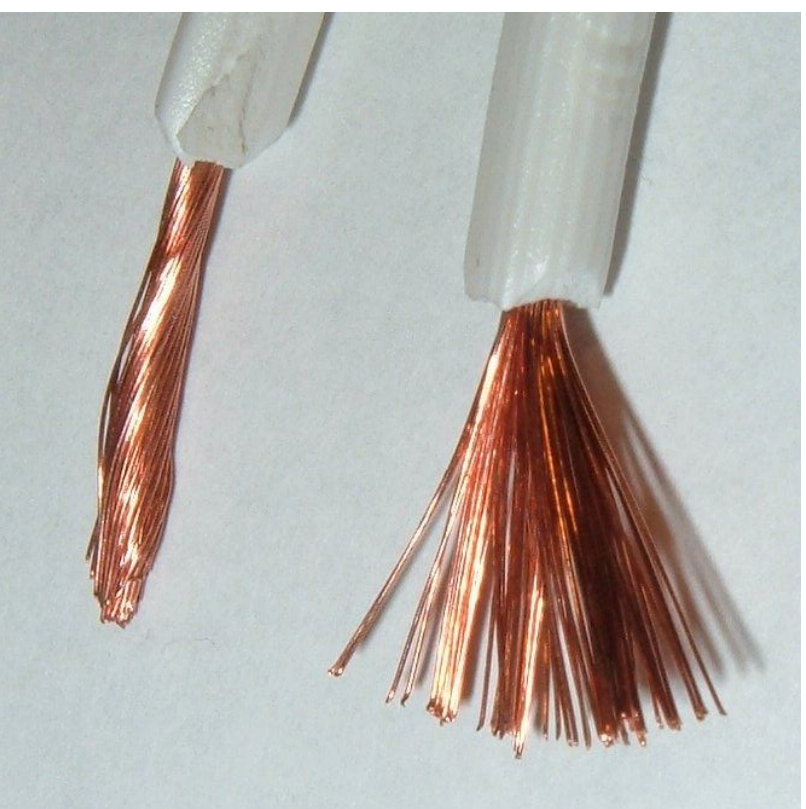
Assembling our Sensor

Overall Steps (each step described in detail on following slides)

1. Strip the wires (both ends)
2. Tin the wires (both ends)
3. Solder wires to the accelerometer
4. Braid the wires together

Step 1: Strip the Wire

- Strip both ends
- Take care to not cut through any of the wire strands
- Gently twist the exposed wire to keep strands together. Try to make it as smooth as possible.

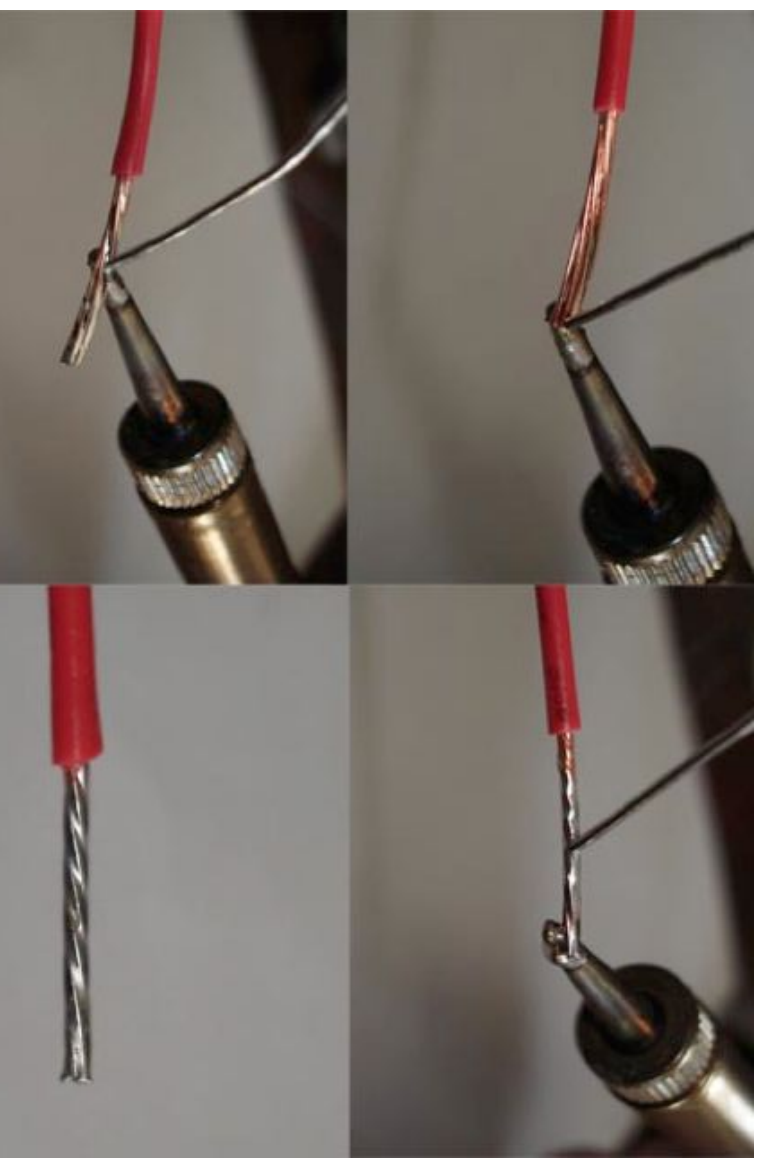


Step 2: Tin the Wire

Do not melt solder directly.

Try the following method:

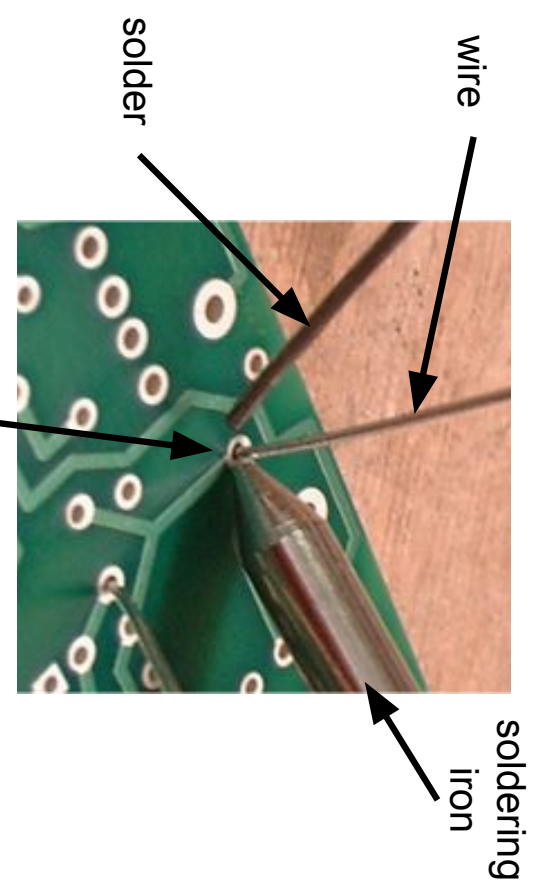
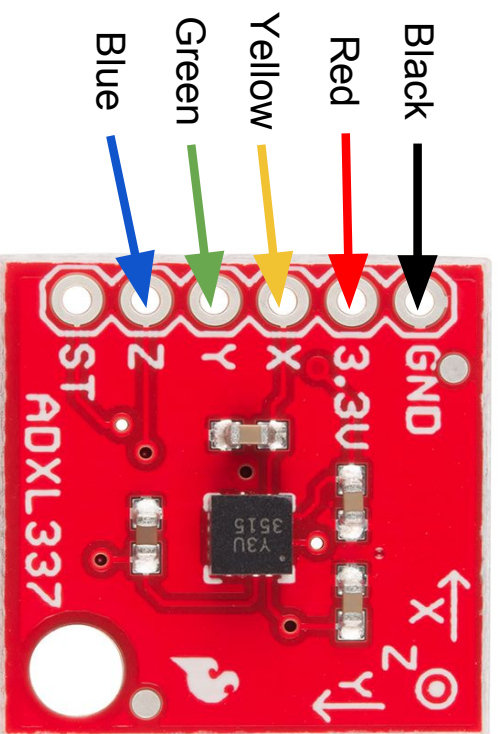
1. Heat the wire strands with the soldering iron.
2. Simultaneously press the solder onto the other side of the wire. Solder should melt and cover all exposed wire strands.



Step 3: Solder wires to the accelerometer

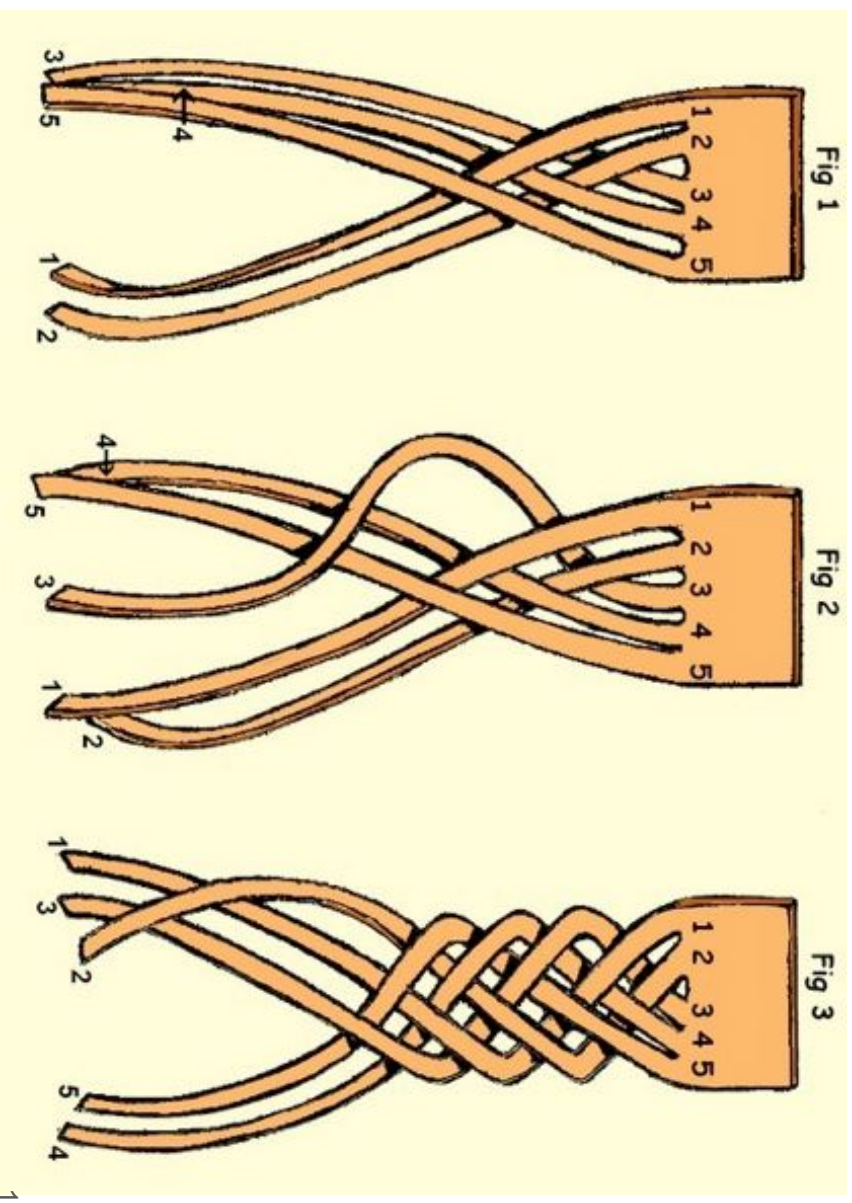
Do the following one wire at a time:

1. Thread wire through the soldering pad and bend it to keep in place
2. Heat junction of wire and solder pad first, then touch solder to the junction.



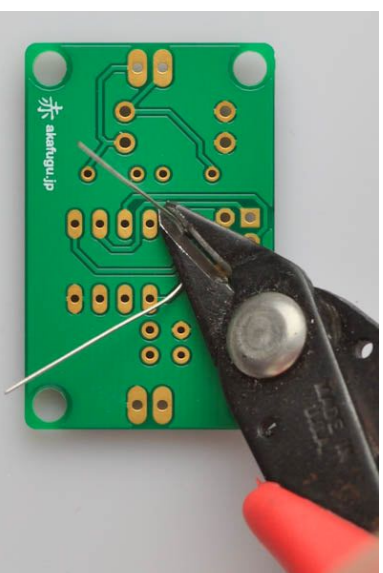
Step 4: Braid the Wires Together

1. Fig 1: Arrange the wire as illustrated (approach in this order: 3, 2, 4, 1, 5)
2. Fig 2: Bring wire 3, on the extreme left, to the center, over wires 4 and 5
3. Fig 3: Bring wire 2, on the extreme right, to the center, over wires 1 and 3
4. Carry on braiding, first with the outside left wire, then with the outside right one. Every time you do this ensure you are passing over two wires.



Finishing Touches

- Use wire clippers to trim excess wire
- Use heat shrink to tie off braid
- Use a hot glue gun to reinforce solder joints (reduces breakage)



Done!

