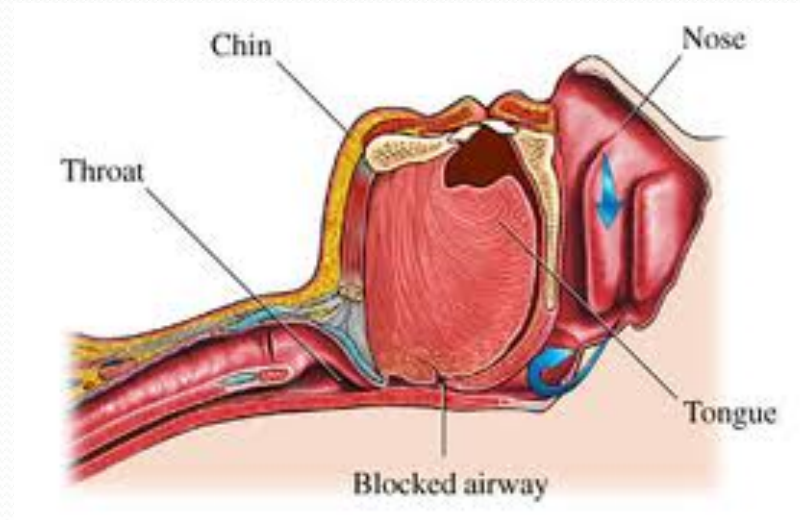


Sleep Apnea Feedback Device

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What is Sleep Apnea?

- when a person temporarily stops breathing while they are asleep
- usually caused by an obstruction in the throat
- unable to complete a full cycle of sleep



Treatment

- an oxygen mask (CPAP) is commonly used
- forces a stream of oxygen down the airway
- uncomfortable and difficult to become accustomed to



Objective

- Create a feedback device to measure tongue strength
 - It was to receive a force (from the tongue) and respond with an audio or visual cue.
 - The device had to include an Analog Digital Converter (ADC)
 - Doctors believe that tongue strength relates to this disorder

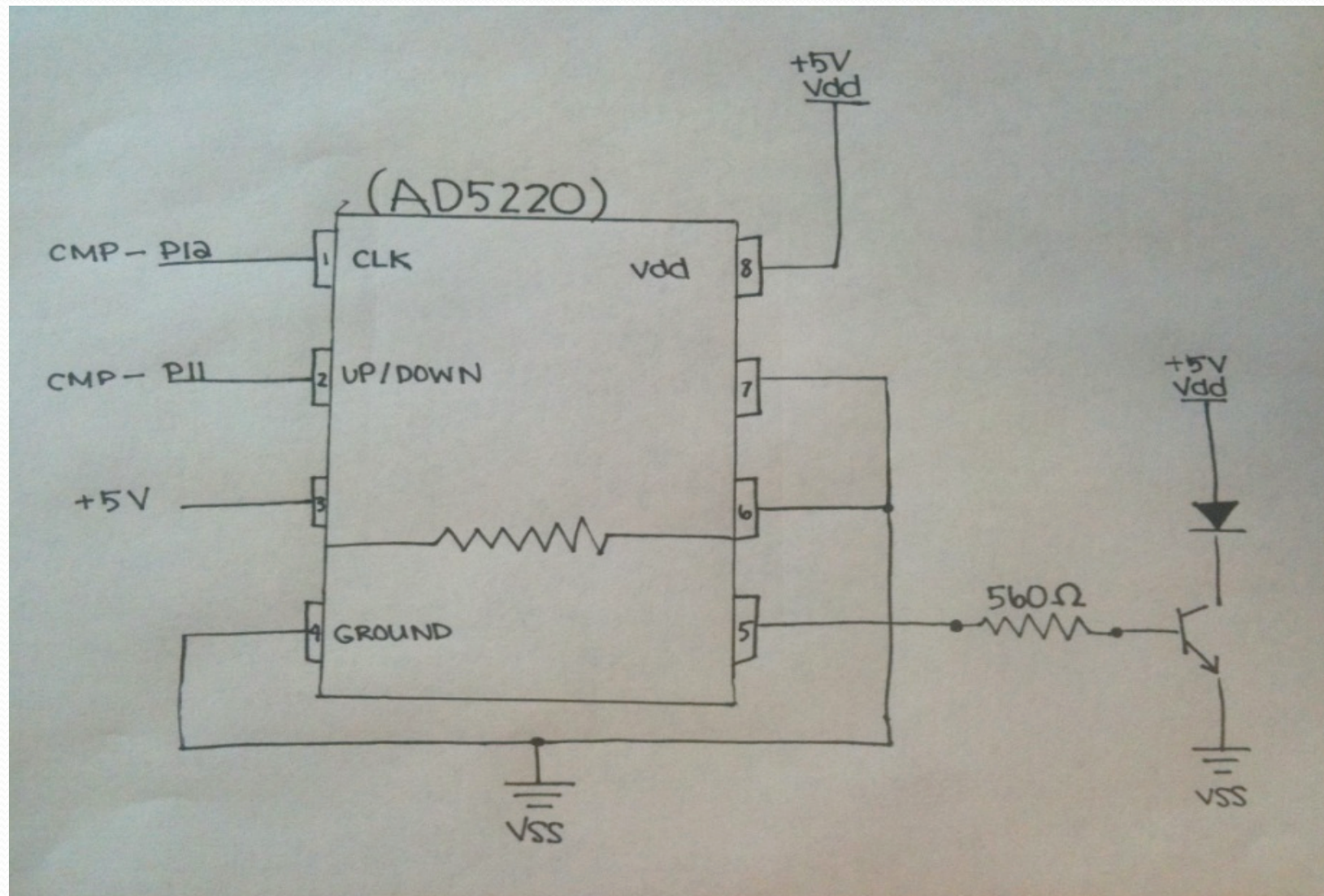




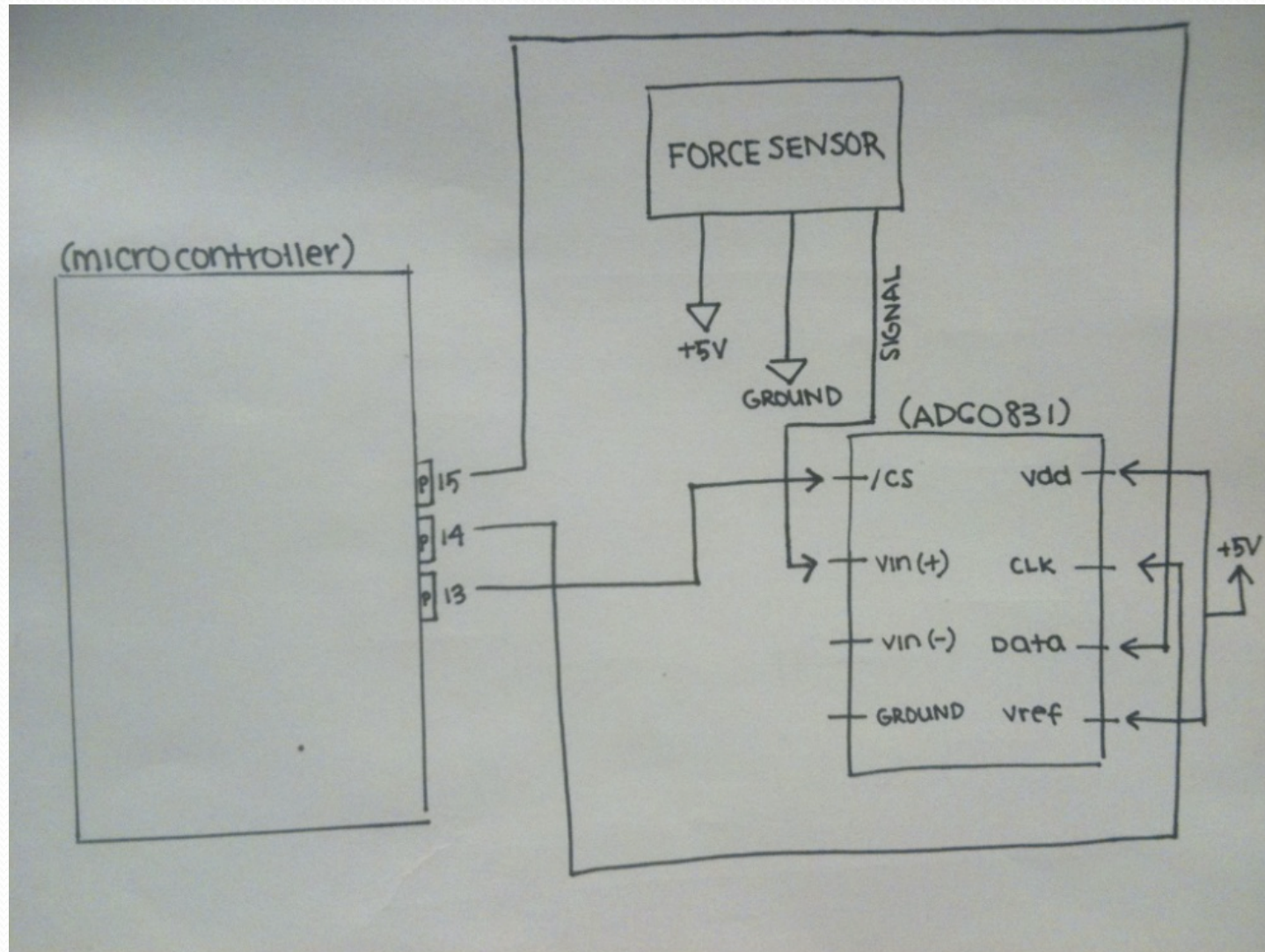
Programming

- Create a code using BASIC that would receive information from the force sensor and cause an audio or visual reaction
- We optimized the intensities by changing both the hardware and software of each device
- Linear relationship

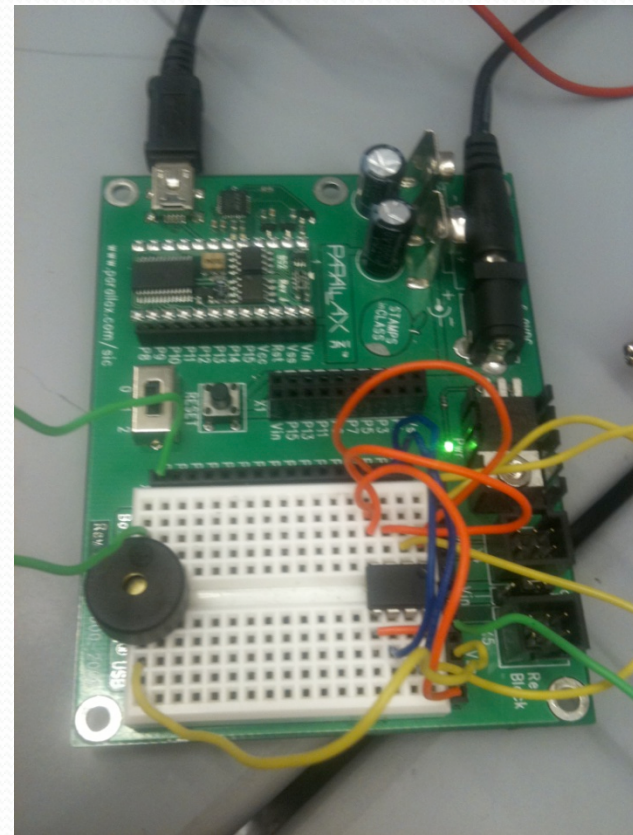
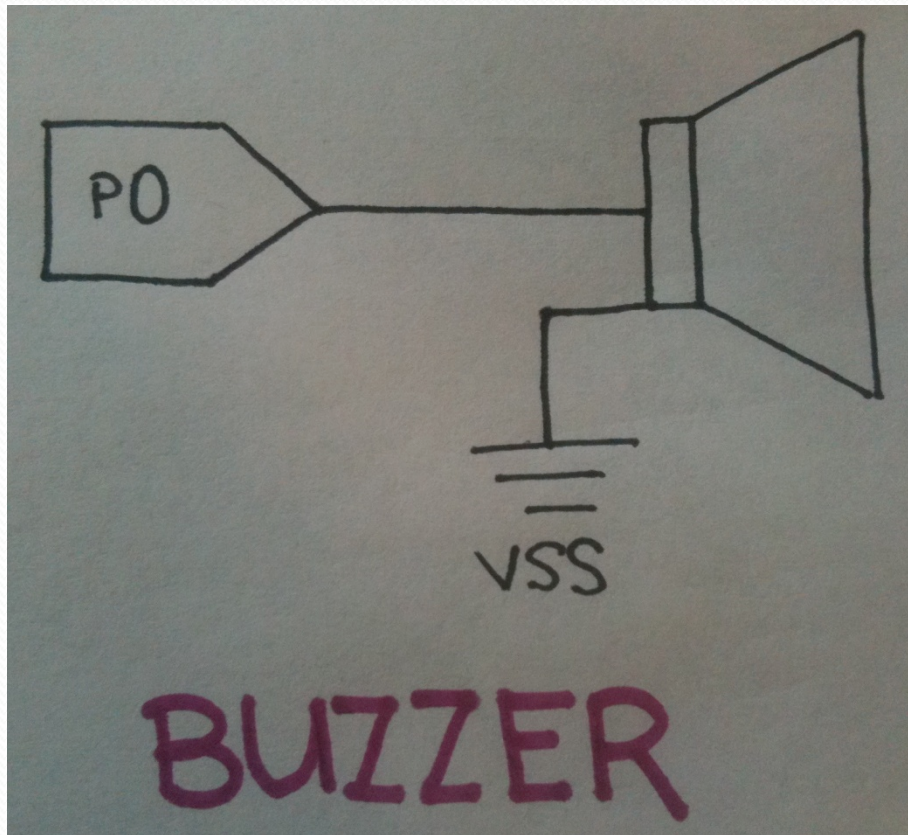
Digital Potentiometer



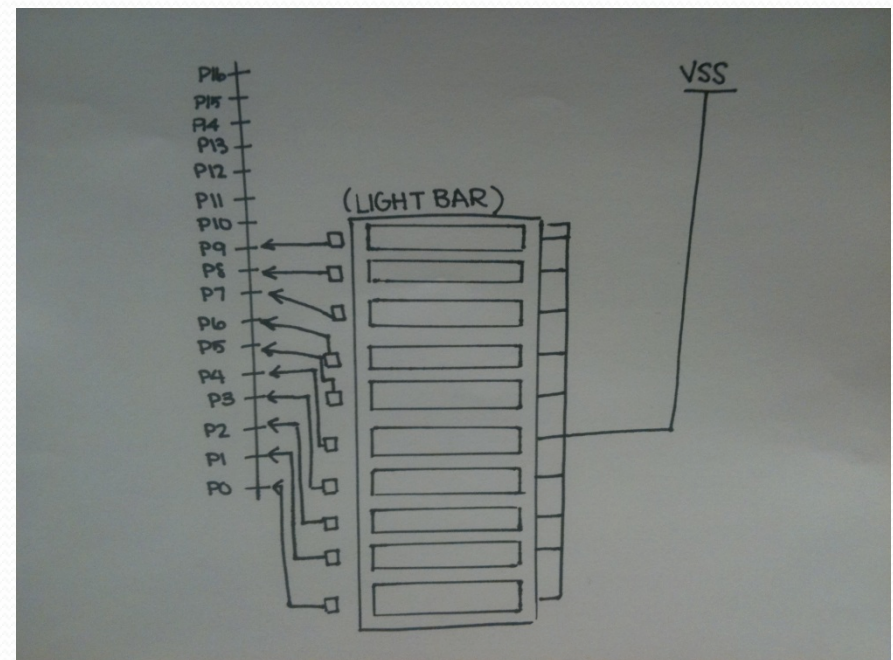
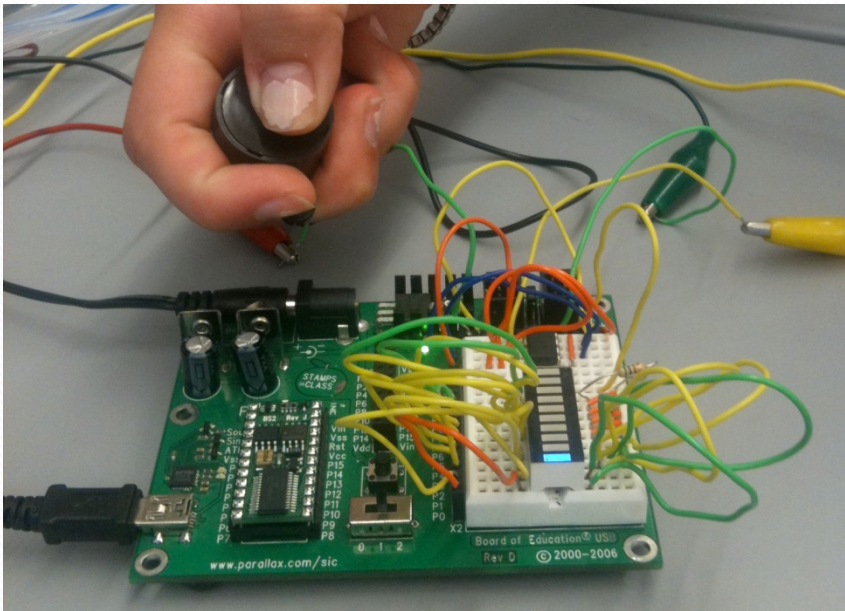
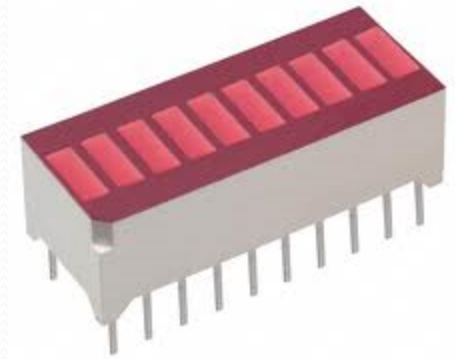
ADC Chip Connection/Force Sensor Attachment



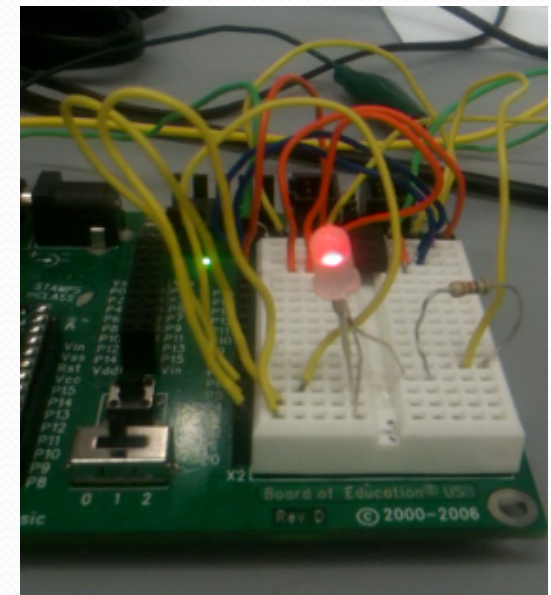
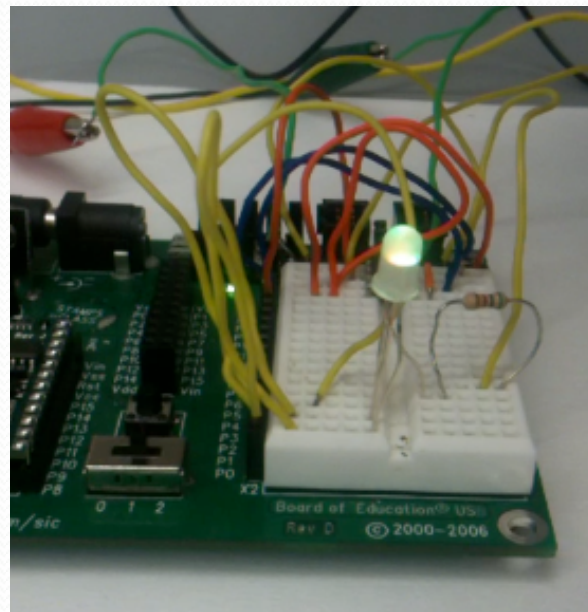
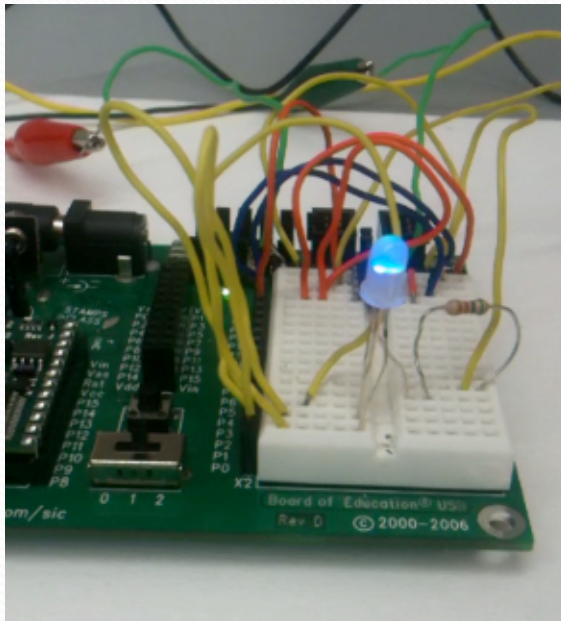
Audio: Buzzer



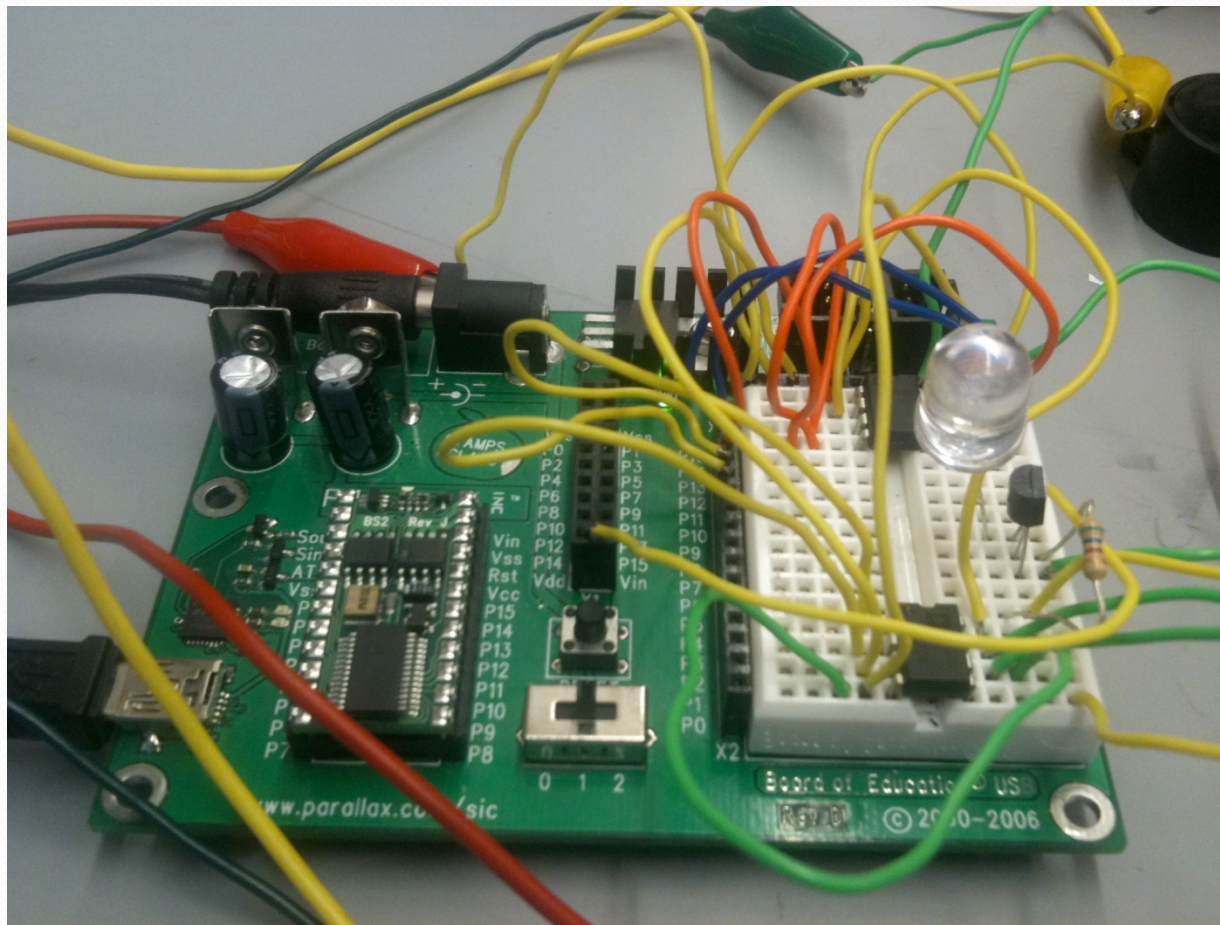
Visual 1: LED Bar Graph



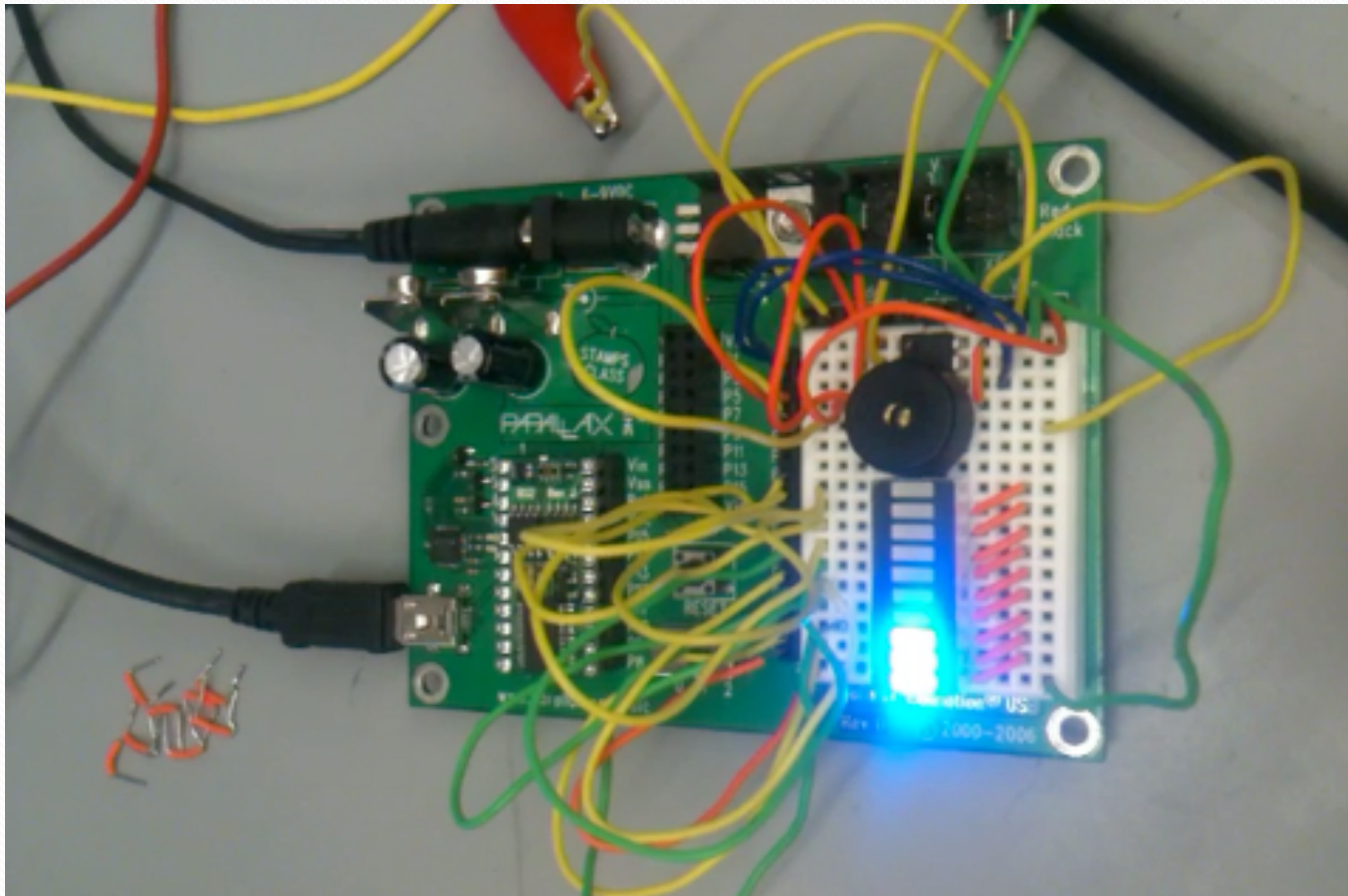
Visual 2: Multi-Color LED



Visual 3: LED Dimmer



Audio/Visual





Conclusion

- Best Device: Audio/Visual
 - Uses both sound and sight to ensure proper measurement
 - LED Bar Graph is clear and specific
- Real device is being tested at Cornell's Weill Medical School in NYC
- Not a treatment
 - Rather a test to relate tongue strength and sleep apnea



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- Claire

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