Stress Detection and Management System

ECE 445
Team #30
Hong Lee
Yong Ho Kwon
Udara Cabraal

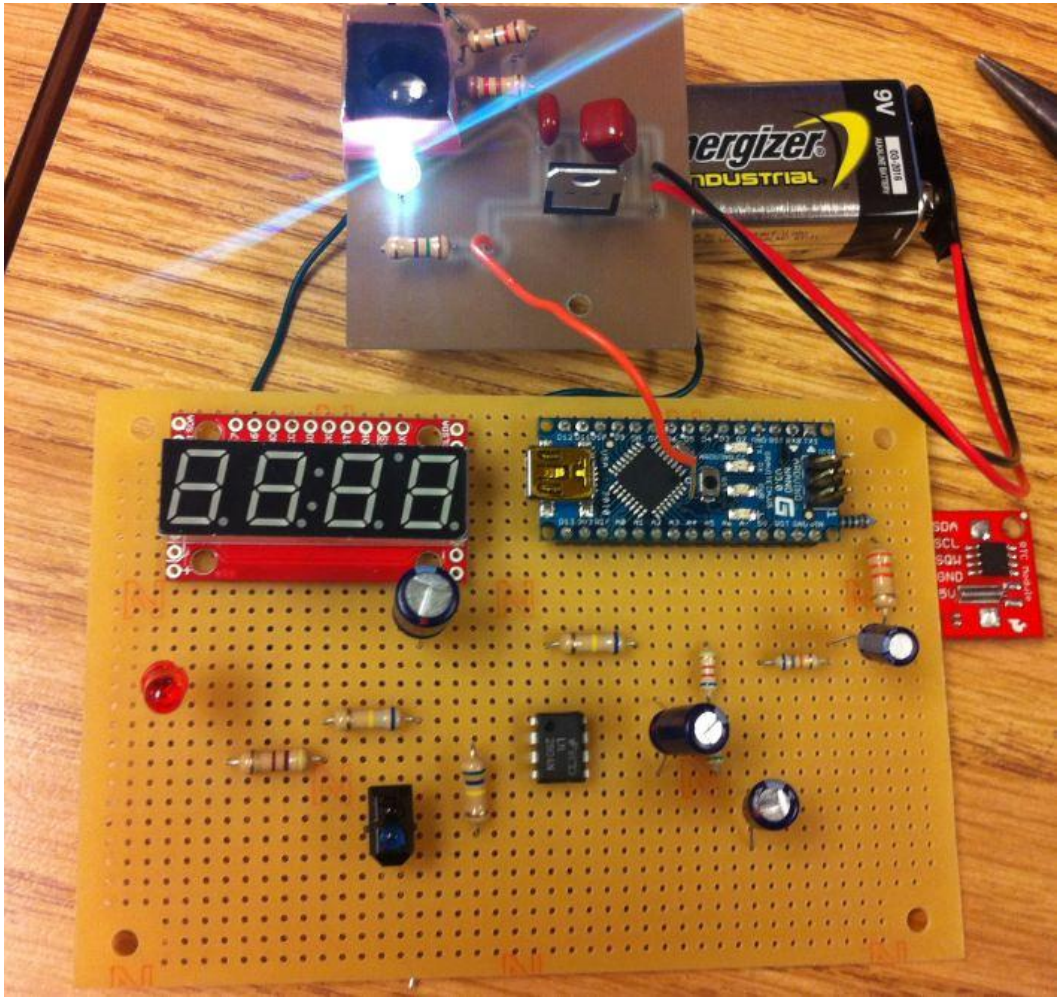
Introduction

- Stress is a cause of all kinds of disease
- People do not know what and where they get stressed from
- This device help user to alleviate the stress

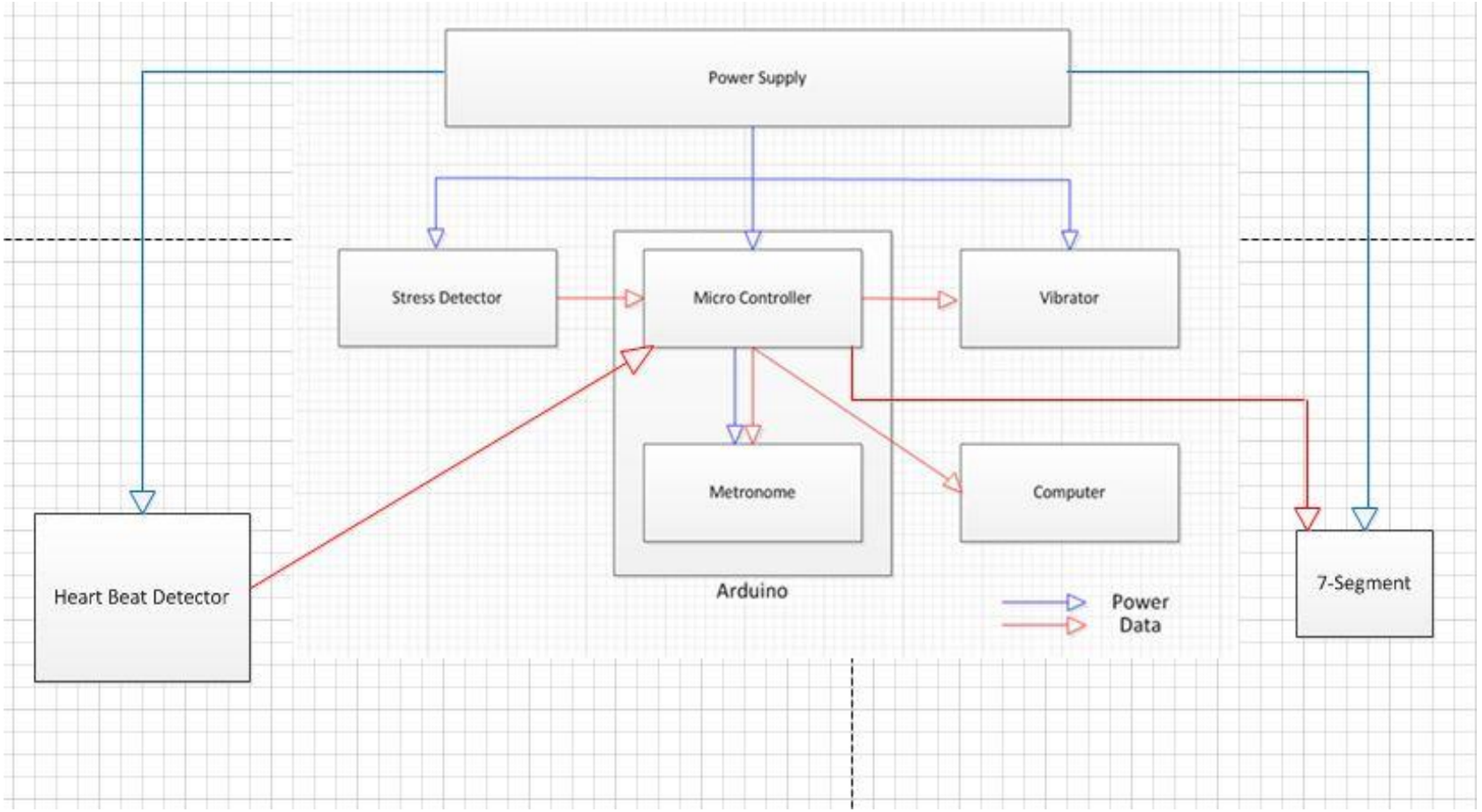
Objective

- Monitoring device / management device
- Small, Portable Size
- Convenience
- Practical

System Overview



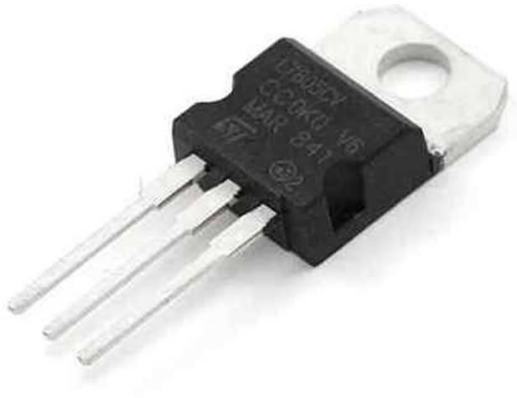
Module Overview

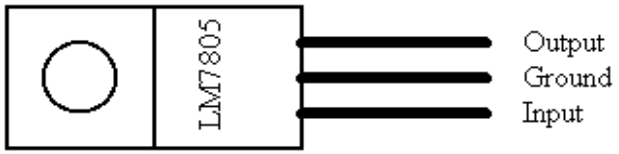


Power Supply

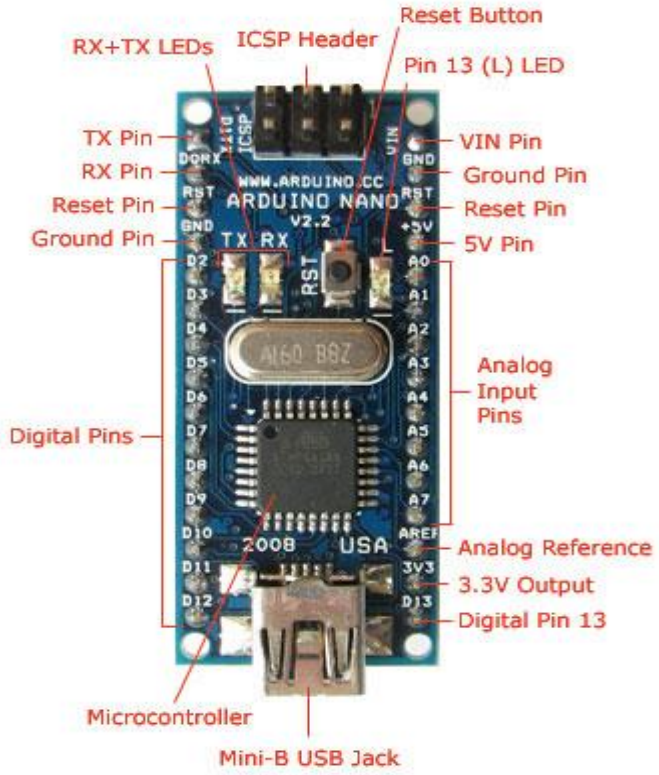
- 9V Alkaline Battery

- +5V Regulator

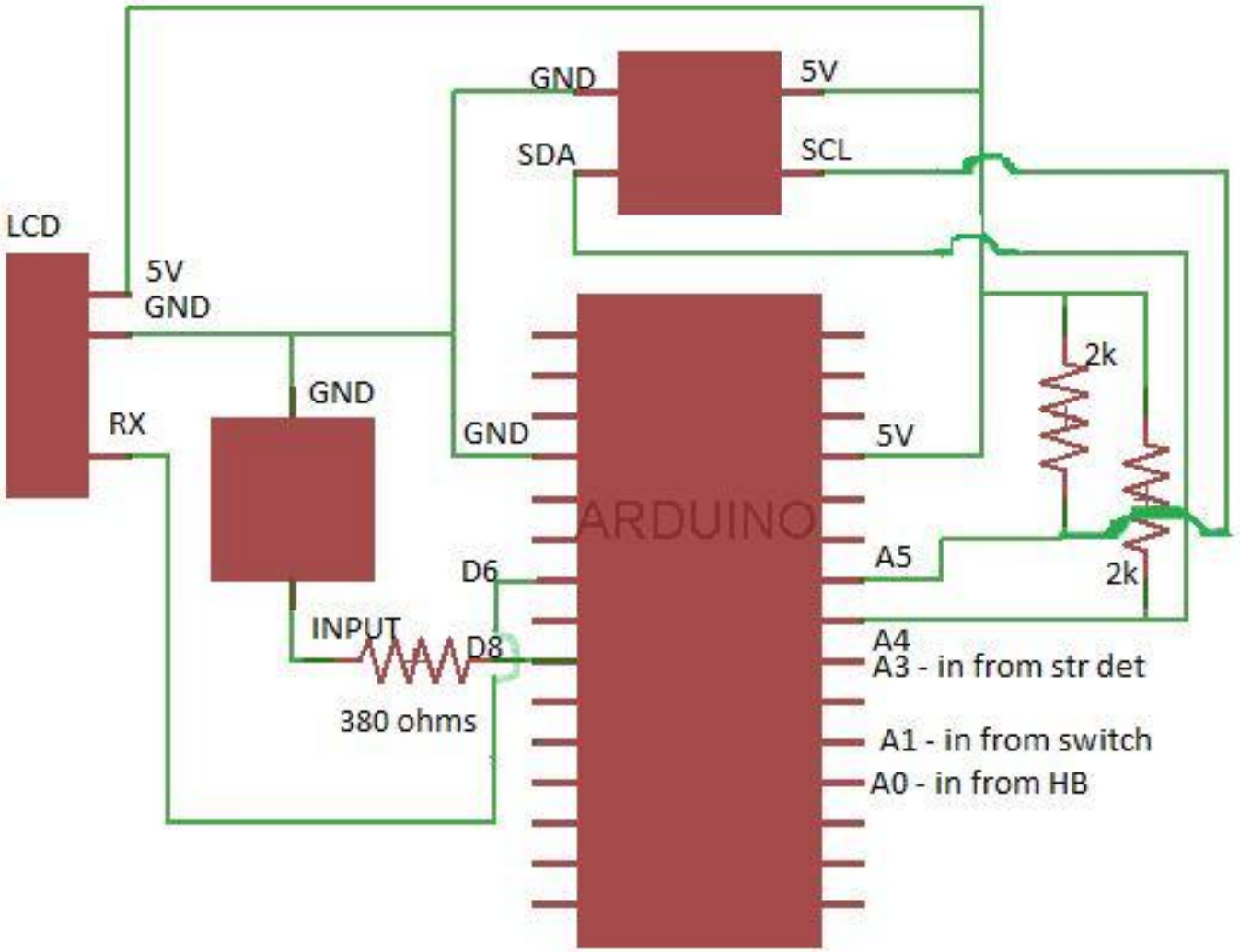




Microcontroller



- Arduino Nano 3.0 (ATmega 328)


GND
5V
SDA
SCL
LCD
5V
GND
GND
RX
GND
5V
2k
2k
ARDUINO
D6
A5
INPUT
D8
A4
A3 - in from str det
380 ohms
A1 - in from switch
A0 - in from HB

Stress Detector

Stress Dots


Stress
Square


Blue 91° - Relaxed
Green 87° - Calm
Red 84° - Nervous
Black 79° - Tense
Warm your hands to Warm your Mood

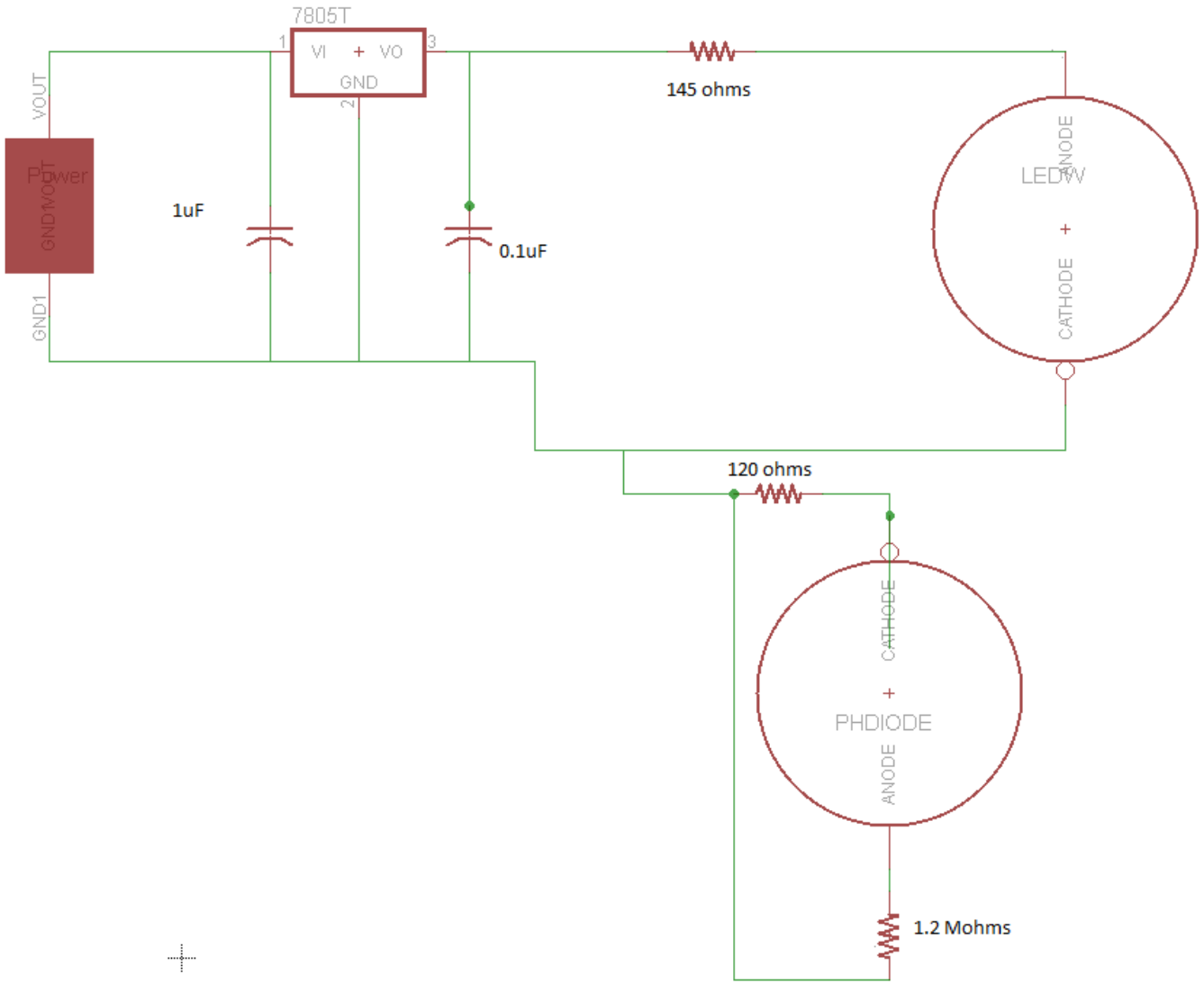
Color detection Test

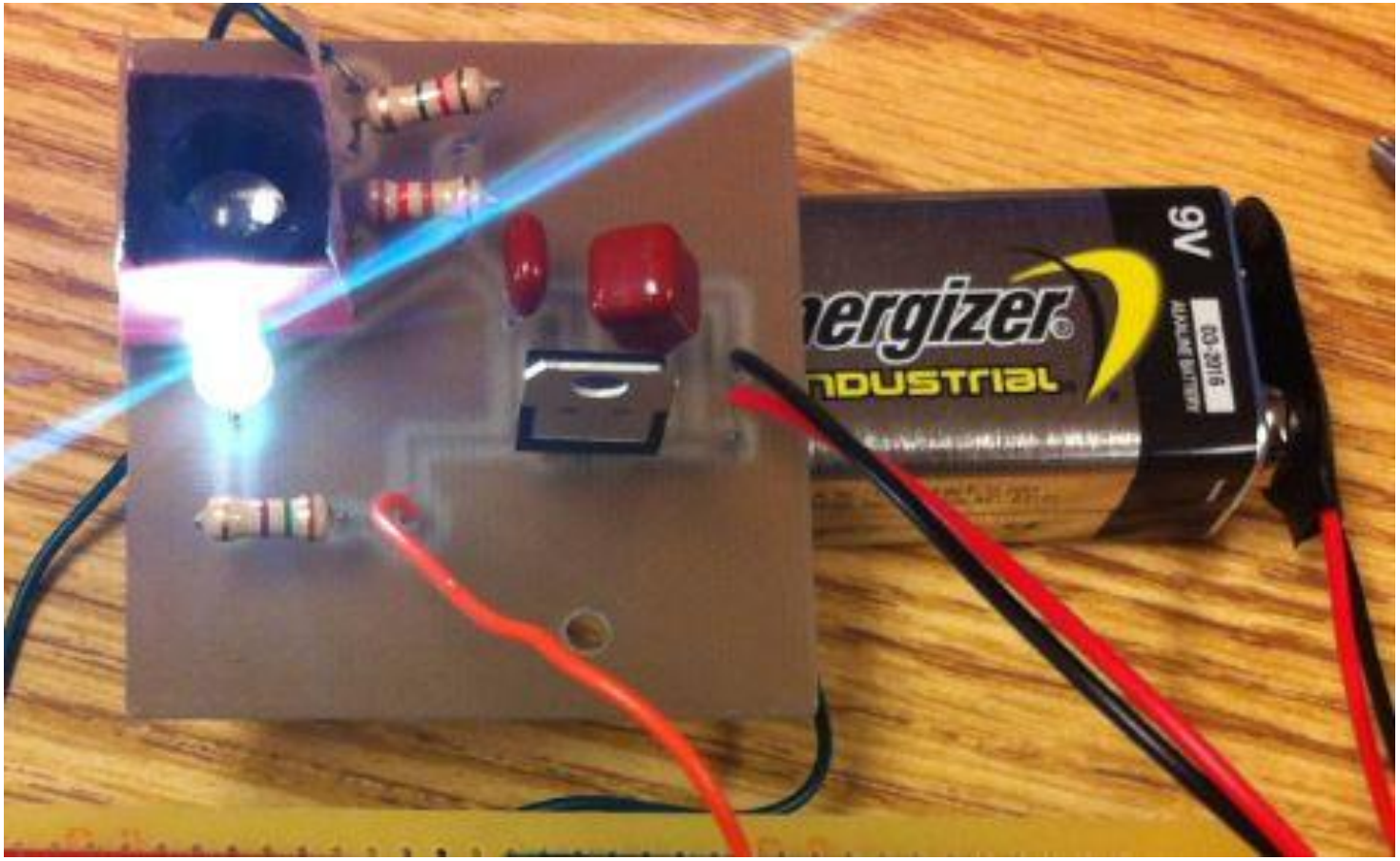
- LED

- Photodiode

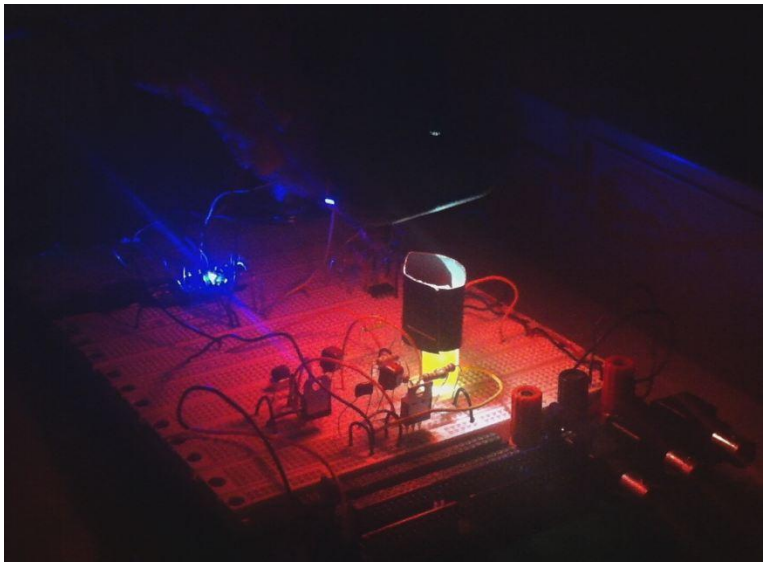
Trial	Green	Red	Difference
1	0.161V	0.229V	0.068V
2	0.168V	0.225V	0.057V
3	0.164V	0.226V	0.062V
4	0.165V	0.228V	0.063V
5	0.168V	0.227V	0.059V

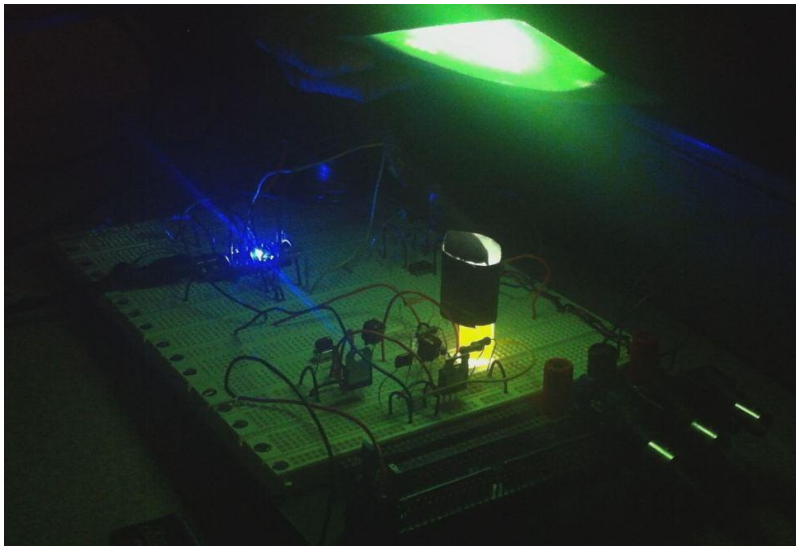
Average Difference = 0.0618V


7805T
VI
VO
GND
VOUT
GND/VOUT
GND1
1uF
0.1uF
145 ohms
LED
ANODE
CATHODE
120 ohms
PHDIODE
CATHODE
ANODE
1.2 Mohms


9V
ergizer
ndustrial

Stress detecting test

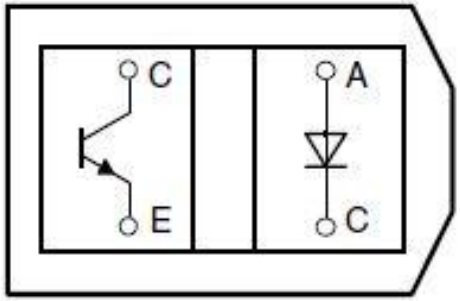




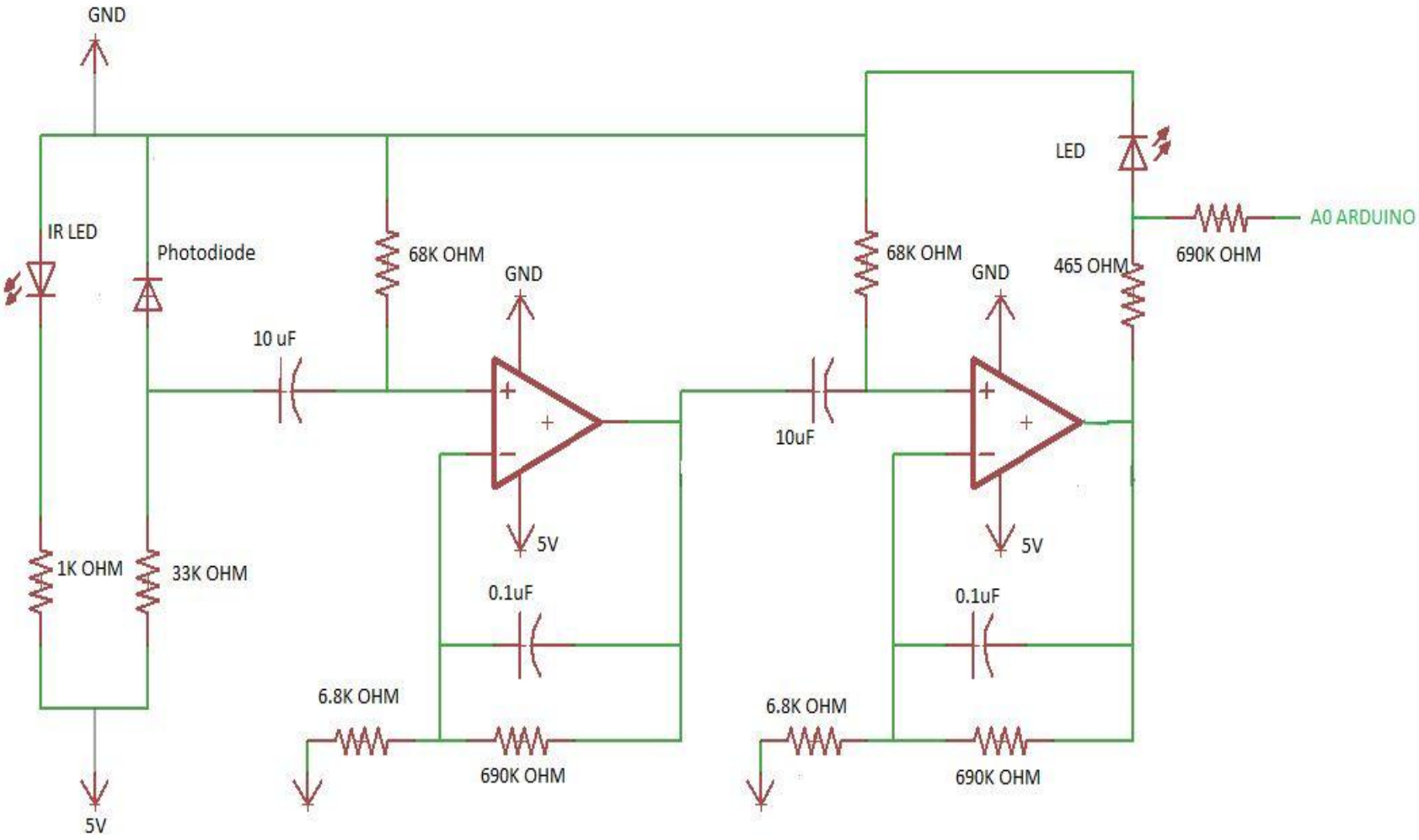
- Stressed
- Relaxed

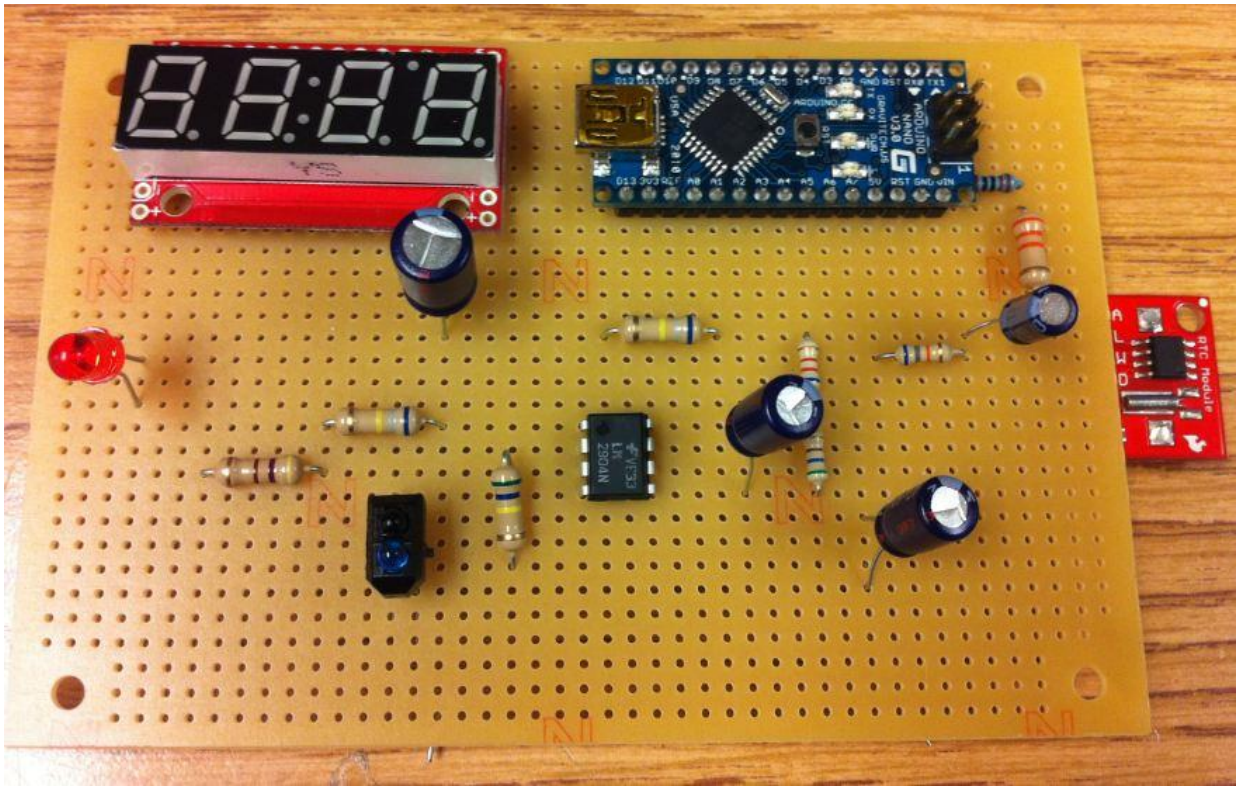
Heart Beat Detector

TCRT5000L



- Infrared LED and Phototransistor package


GND
IR LED
Photodiode
68K OHM
10 uF
GND
5V
1K OHM
33K OHM
0.1uF
6.8K OHM
690K OHM
5V
LED
68K OHM
GND
465 OHM
690K OHM
A0 ARDUINO
10uF
5V
0.1uF
6.8K OHM
690K OHM


ARDUINO
NANO
RTC Module

Heart Beat Tests

Trial#	From Detector	Actual Heartbeat
1	65	69
2	63	64
3	59	61
4	69	62
5	72	61
6	62	69
7	66	73
Ave	65.14	65.57

Tolerance = 0.6%

Success

- Magnifying changed color
- Storing stress time
- Accurate heart beat rate
- Signal output to vibrator and speaker

Difficulties

- Isolating photodiode
- Software interference

Recommendation

- Complete design before request PCB
- Find better way to isolate photodiode
- Design PCB as small as possible
- Better have wireless communication between device and controller

Thank you