Home Project #1

Basic Circuit

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EML480 Introduction to Mechatronics

Date of Submission: 07-09-2025

Fall, 2025

Introduction:

This project explores the fundamentals of electronic circuits using a Raspberry Pi Pico, resistors, capacitors, a push button, and a red LED. In a breadboard, a circuit is built to observe the result of using different configurations of resistors and capacitors and evaluating the changes.

Materials used:

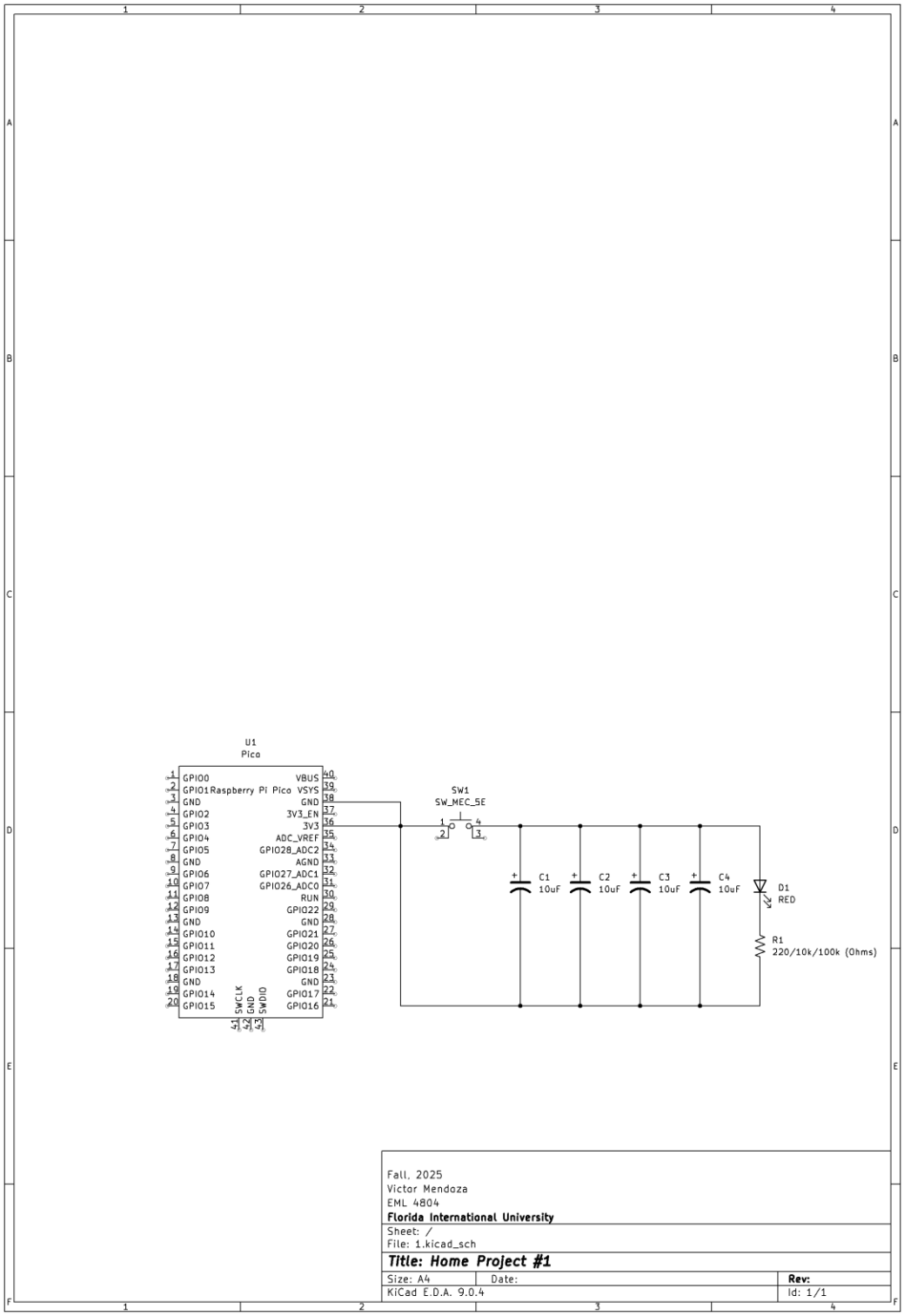
1. Breadboard
2. Raspberry PICO board
3. Power module and LiPo battery in the holder or USB cable
4. Red LED
5. Resistor 220-Ohm
6. Resistor 10-kOhm
7. Resistor 100-kOhm
8. Tactile switch
9. 4 x 10µF electrolytic capacitors
10. 6 Wires

Picture:

Video link:

https://www.youtube.com/shorts/yANbNP8BvLw

Diagram:


U1
Pico
Raspberry Pi Pico
GPIO0
GPIO1
GND
GPIO2
GPIO3
GPIO4
GPIO5
GND
GPIO6
GPIO7
GPIO8
GPIO9
GND
GPIO10
GPIO11
GPIO12
GPIO13
GND
GPIO14
GPIO15
VBUS
VSYS
GND
3V3_EN
3V3
ADC_VREF
GPIO28_ADC2
AGND
GPIO27_ADC1
GPIO26_ADC0
RUN
GPIO22
GND
GPIO21
GPIO20
GPIO19
GPIO18
GND
GPIO17
GPIO16
SWCLK
GND
SWDIO
SW1
SW_MEC_5E
C1
10uF
C2
10uF
C3
10uF
C4
10uF
D1
RED
R1
220/10k/100k (Ohms)
Fall, 2025
Victor Mendoza
EML 4804
Florida International University
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File: 1.kicad_sch
Title: Home Project #1
Size: A4
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Conclusions:

This experiment successfully demonstrated how simple electronic components interact with the circuit's behavior. By varying resistance and capacitance in the circuit, the effect on the LED decay time was clearly observed and how the power of the light varied. The use of the breadboard, Raspberry, and KiCAD schematics design reinforced essential practical skills.

References:

- Raspberri Pi Pico Library: https://github.com/ncarandini/KiCad-RP-Pico/tree/main
- How to use a breadboard https://learn.sparkfun.com/tutorials/how-to-use-a-breadboard/all
- Raspberry Pi Pico usage https://www.raspberrypi.com/documentation/microcontrollers/pico-series.html