

**California Polytechnic State University Pomona**

DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING

IINTRO TO MICROCONTROLLERS LAB

ECE 3301L

Report #1

**LAB 1 – Introduction to Function Generator, Oscilloscope, Matlab**

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Presented to

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# INTRODUCTION

## Objective:

In this lab, students will use their knowledge of C and the Pickit to integrate the use of the PIC’s PWM, or pulse width modulation, to control the speed of a fan. Students will use the principle of the duty cycle to increase or decrease the fan’s speed. This is to be added to the previous lab and controlled with the previously used remote.

## Summary

For Hardware, students are introduced to a 12V fan, as well as a 12V power adapter that wires into the breadboard. These components will be retrofitted within the previous lab’s circuit. Students must be careful to not let the 12 volts supplied by the power jack into the main circuit’s power.

For Software, students must use C language and some supplied code to create the subroutine that controls the fan itself. This includes usage of the T3CON register and PWM. The use of these two components will allow students to control the speed of the fan. The fan’s RPM and duty cycle will also be translated and indicated on RGB LEDs with corresponding colors.

# DATA AND RESULTS

**Part A**

A screen shot of a computer

Description automatically generated

A screen shot of a black background

Description automatically generated

**Part B1:**

A black background with white text

Description automatically generated

Calculated rpm = (111/2)\*60 = 3330

**Lowered Speed:**

A screen shot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

**75% Duty Cycle:**

A black screen with white text

Description automatically generated

A screen shot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

Calculated PWM from channel 1: (101/2) \* 60 = 3030

**Maxing Out Duty Cycle and RPM:**

A screenshot of a computer program

Description automatically generated

**Zeroing Out Duty Cycle and RPM:**

A screenshot of a computer

Description automatically generated

**Turning the Fan On and then Back Off:**

A screen shot of a black screen

Description automatically generated

# CONCLUSION

In this lab, students successfully integrated the fan into the framework of the previous lab. The fan was able to be controlled using specific buttons on the remote, as well as using the buzzer to indicate that buttons were pressed or if the duty cycle was at its thresholds. This further deepened student’s knowledge of how to program the PIC and make use of one of its timers. This lab was a great example on how basic fans on a computer may function, giving insight into how microcontrollers are used in daily life.