

# Project 1: Light Gauge

Luke Brandon

**Overview**—This project is a simple light sensor device with 2 modes, a light gauge and a light error timer, the details will be described in Sec. The outcome of this project was a fully functional light sensor device that meets all of the requirements as per the project requirements (laid out in more detail in section I).

## I. INTRODUCTION

**T**HIS project is to build a light sensor with 2 modes the first on which is light detection that positions a servo motor based on the intensity of the light, the second is a light timer that, while intense light is present, will count down from 30 seconds and display that remaining time with the servo motor. Once the servo motor is all the way to the left (0 seconds remaining) the error (red) LED will illuminate to show that the conditions are unfavorable, all other times there is a green LED illuminated. A push button is to be wired up in order to switch between the 2 modes, resetting every time the button is pressed. This is to be implemented using an Arduino and Arduino Studio.

## II. APPLICATION DESIGN

This application was designed in Arduino Studio and has a number of useful variables that are important to the function of the device. The main variables that are important are currentMode which keeps track of which mode the device is in (Mode 1 or Mode 2) and this is used to decide which logic to use in the main loop function. There is also the startMillis variable which stores the time (in milliseconds) that the countdown timer for Mode 2 was started, using this value we can determine how much time has passed and can position the servo correctly to display the time remaining, once 30 seconds have passed we can trigger the red error LED. There is also a lastServoUpdateMillis which stores the time (also in milliseconds) of when the servo position was last update, the servo is triggered to be updated if the time since last update is over 1000ms or 1 second, giving us roughly a 1 update per second cycle on the servo updating. The last important variable is the countingDown Boolean variable, this simply stores true or false of if the Mode 2 timer is currently counting down or not, allowing us to reset everything if it is no longer counting down or to keep counting if it is currently counting down. This application was designed with future work in mind. There is a scheme for setting up future functionality or "modes" that allow for the code to be easily read and also extended. There is a function that contains all of the logic for each mode, as well as a firstTimeSetup function that is run when switching to a new mode that contains any logic that should only be run once and not ran every loop while the Arduino is in that mode.

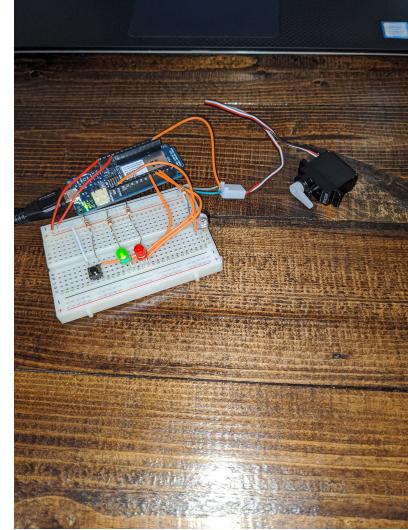


Fig. 1. Picture of the device fully assembled

## III. RESULTS

The result of this project was a fully functional 2-Mode light gauge that completes all of the supplied tests and accomplishes all of the project requirements as laid out in the project description (also described in section I).

## IV. FUTURE WORK

If this project were to be taken further, it would be possible to make the code cleaner than it is, there is some logic that could easily be put in its own function and abstracted away, however given that this project is quite small and simple, I decided not to spend the extra time doing so, but given more time and a larger project, it would be greatly beneficial to abstract out some of the logic or even create small libraries for things like timer control and led device control to make main logic much shorter and easier to follow.