

## ECEN 4856 Laboratory Exercise 4

In this exercise, the teams will familiarize themselves with the Allen Bradley Micrologix 1000 PLC. The lab contains Four (4) parts, many parts building on the knowledge gained from the prior components. Please read the directions carefully and:

1. Create a new project which will be used to implement the desired function(s) on the PLC.
2. Write the ladder logic necessary to complete the task.
3. Correctly wire up LEDs, switches, etc. to the PLC to provide the appropriate inputs and outputs.
4. Verify that your code works correctly by observing the function while actuating switches and other inputs.
5. Demonstrate the function of the logic to the instructor.

A team lab report is to be submitted providing well documented code with a brief explanation of your work on each part (a few sentences). Summarize what you learned after completion of the lab and offer comments and suggestions. Reports are due Tuesday October 28<sup>th</sup>.

### Part I (for review only)

Overview: If you are unfamiliar with the Micrologix PLC, please see the *Example ON/OFF Circuit* on E34 & E35 of the Micrologix manual. This exercise should allow you to practice entering the basic components in Ladder Logic.

### Part II

The basic garage door opener: Utilizing the provided components: pushbuttons, light, switches and motors attempted to create a basic garage door opener. The motor (light) should be actuated whenever the pushbutton to open/close the door is selected. There should be position switches to indicate when the door is up or down. Once the door reaches the appropriate position the door should stop. (Since we can't easily reverse the motor direction, write code to handle the up/down direction but only actuate the same output)

### Part III

Garage door with light: Now add an output light for your garage door opener as well as a light pushbutton. Anytime the door is running, the light should be on and stay on for 30 seconds after the door stops. Additionally, the pushbutton should be able to toggle the light on and off at any time.

### Part IV

Error status: Using the light from Part3, generate logic to flash the light if an error condition exists. The light should flash for 15 seconds and the opener should be disabled while the light flashes. The light should indicate the following errors: the motor runs or more than 30 seconds without seeing the appropriate position switch being picked up and/or if the motor runs or attempts to run with both position switches picked up.