

**ELEC 313 Lab 4
DC Motor Driver**

OBJECTIVE: The objective of this experiment is to construct and observe the operation of a DC Motor Driver.

EQUIPMENT: Compact L298 Motor Driver Kit
6V DC Motor
Power Supply, Function Generator, Oscilloscope, Multimeter

PRIOR PREPARATION (Lab #4a):

1. Obtain the Compact L298 Motor Driver Kit from your instructor (1 kit per person).
2. Construct the kit according to the included directions.
3. Obtain a 6V DC motor from your instruction (1 motor per team).
4. Solder wire leads to the motor terminals, so it can be used with the DC Motor Driver.

EXPERIMENT (Lab #4b)**Part I**

- 1) Connect the (+) and (-) terminals of the Motor Driver Board to the 6V terminals of the DC power supply via the breadboard.
- 2) Connect the regulated +5V (H) output of the Motor Driver Board to the breadboard, so it can be used to enable the driver logic.
- 3) Connect wires to the motor output terminals on the left side of the Motor Driver Board.
- 4) Connect inputs L1, L2, and Enable (E1-2) to logic L (0V). Set the output of the DC power supply to 6V and measure the motor output voltage. Change the inputs L1, L2, and Enable according to Table 1 below and record the results.

Enable	L1	L2	V _{out}	LED	Motor
L	L	L			
L	L	H			
L	H	L			
L	H	H			
H	L	L			
H	L	H			
H	H	L			
H	H	H			

Table 1: Logic Table.

- 5) Turn off the output of the DC power supply and connect the 6V DC motor to the motor output of the Motor Driver Board. Set the output of the DC power supply to 6V and set the inputs L1, L2, and Enable to complete Table 1 above by recording the direction of motor rotation.
- 6) Set L1, L2, and Enable so that the motor rotates clockwise (according to Table 1). Adjust the DC power supply from 6V down to 3V in 0.1V increments and observe the effect on motor speed.
- 7) Turn off the output of the DC power supply and disconnect the DC motor.

Part II: Pulse Width Modulation

- 1) Set the function generator to a frequency of 20 kHz and select a square wave. Connect Channel 1 of the oscilloscope to the output of the function generator and set the square wave for 0V to 5V using the offset.
- 2) Set L1 and L2 for clockwise rotation and connect the Enable to the output of the function generator. Ensure there is a common ground for all components. Turn on the DC power supply and set the output to 6V.
- 3) Adjust the %Duty of the square wave from 20% to 80% in 10% increments and record the motor output voltage.
- 4) Turn off the output of the DC power supply and reset the %Duty of the function generator to 50%. Connect the 6V DC motor to the motor output of the Motor Driver Board. Set the output of the DC power supply to 6V.
- 5) Adjust the %Duty of the square wave from 50% to 80% in 1% increments and observe the effect on motor speed.

LAB REPORT

The lab report should be in standard format and include the following additional items:

- 1) Using the measured and observed results, discuss how the Motor Driver Board can be used to control both the speed and direction of a DC motor.