# ELN340 WINTER 2020

## Project 2- STEPPER MOTOR CONTROL

**Description:**

Students will design, build and program, using the ESP8266 – Micropython microcontroller, a stepper motor controller to do the following:

1) Speed/position control:

   Prompt the user to enter 1 for speed control or 2 for position control. Repeat prompt until a valid entry is made.

   If the command prompt was 1 prompt the user to enter an integer speed ranging from 20 rpm to 60 rpm. Repeat prompt until a valid entry is made. The stepper motor will then rotate at the desired speed until the hardware reset is pressed.

   If the command was 2, prompt the user to enter N for north, W for west, E for east or S for south and the motor will move to that position. Always move in the most efficient direction. Continue to prompt the user.

2) Open Loop servo

   A potentiometer will be used to control the position setpoint. The stepper motor will track the pot's absolute position (as opposed to relative position) as it is moved. As with all stepper control systems, the program assumes the stepper is at NORTH position at startup. A demonstration simulation will be provided by the professor to help explain the operation.

**Procedure:**

1) **Initially, the students will program/output the stepper codes manually in order to determine the steps per revolution for the motor. Implement a simple interface where the user enters either a "F" or a "B" and the stepper moves one step forward, or one step backward each time the user enters a character. Include this in your report.**

2) **Step the motor around a complete revolution and vary the time delay between steps to determine the minimum delay between steps at which the motor begins to slip or miss steps. This delay should be increased by at least 50% safety margin (if min delay is 5mS then at least 7.5mS should be used in the program).**

## Equipment:

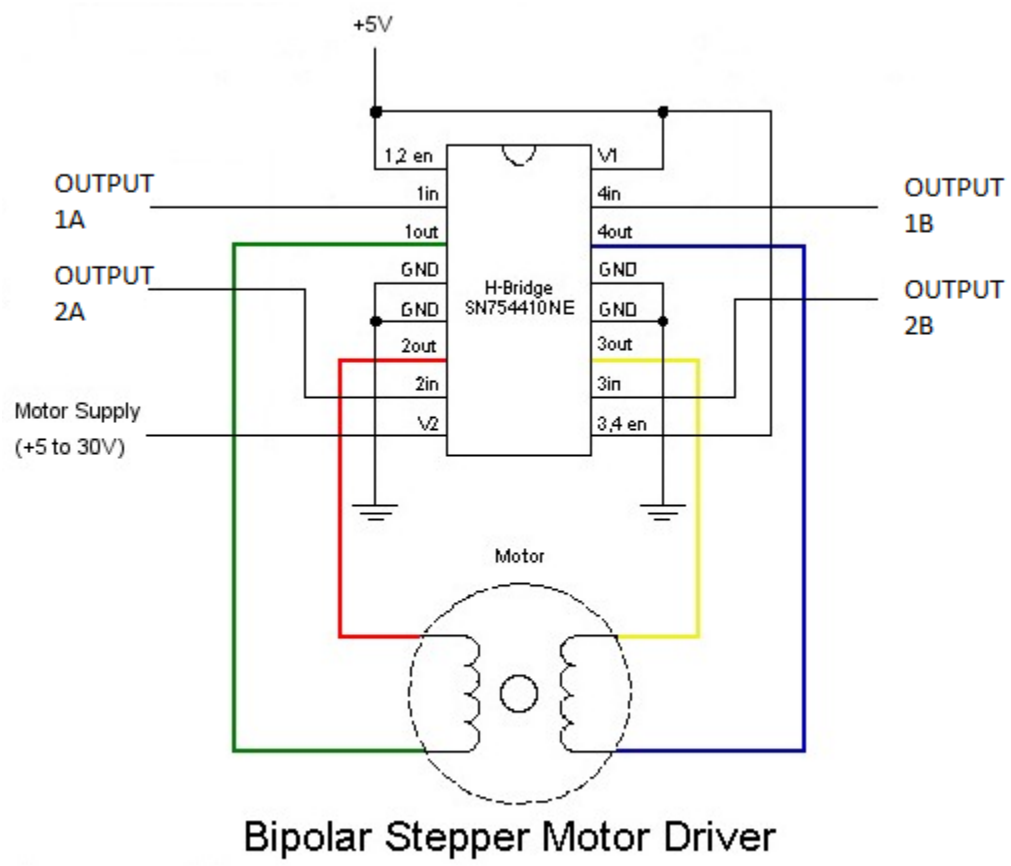
Stepper motor: various bipolar type supplied by professor.

H-bridge: SN754410 or L293D

Motor power supply (connected to pin 8):

ESP8266 MICROCONTROLLER

Basic Circuit:




SN754410.pdf for more information on the H-bridge.

Typical switching sequence (full step):

0101 1A 2A 1B 2B

0110

1010

1001