



Lab 6: Positioning Motors

Tuesday 2/17 2:15pm

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Part 1

What voltage is on pin A0? 2.45 V

Oscilloscope:



What are the pulse durations of the waveform corresponding to the end of travel on each side?

4.75v (1.78ms) and 0v(545us)

Oscilloscope:



Modified Knob:

```
/*
Controlling a servo position using a potentiometer (variable resistor)
by Michal Rinott <http://people.interaction-ivrea.it/m.rinott>

modified on 8 Nov 2013
by Scott Fitzgerald
http://www.arduino.cc/en/Tutorial/Knob
*/

#include <Servo.h>

Servo myservo; // create Servo object to control a servo

int potpin = A0; // analog pin used to connect the potentiometer
int val; // variable to read the value from the analog pin

void setup() {
  myservo.attach(9); // attaches the servo on pin 9 to the Servo object
}

void loop() {
  val = analogRead(potpin); // reads the value of the potentiometer
  (value between 0 and 1023)
  val = map(val, 0, 1023, 0, 120); // scale it for use with the servo
  (value between 0 and 120)
```

```
myservo.write(val); // sets the servo position according to  
the scaled value  
delay(15); // waits for the servo to get there  
}
```

Experiment 1 Demo #1:

```
/*  
Controlling a servo position using a potentiometer (variable resistor)  
by Michal Rinott <http://people.interaction-ivrea.it/m.rinott>  
  
modified on 8 Nov 2013  
by Scott Fitzgerald  
http://www.arduino.cc/en/Tutorial/Knob  
*/  
  
#include <Servo.h>  
  
Servo myservo; // create Servo object to control a servo  
  
int potpin = A0; // analog pin used to connect the potentiometer  
int val; // variable to read the value from the analog pin  
  
volatile float sensor_val = 0;  
volatile float y1, y2, x, x1, x2;  
volatile float voltage[8]={2.930, 2.589, 1.734, 1.356, 1.092, 0.936, 0.801,  
0.724};  
volatile float distance[8]={5, 10, 15, 20, 25, 30, 35, 40};  
volatile float answer;  
  
void setup() {  
    myservo.attach(9); // attaches the servo on pin 9 to the Servo object
```


Problems we encountered:

Experiment 2

Waveform is weird because the voltage is being quickly switched on and off and it is using pwm to approximate a sine wave so we see a magnetic field collapsing.



Verify or disprove my theory that the motor requires 384 microsteps per revolution.

Verified

Run the motor 384 microsteps forward, wait 1 second, then 384 microsteps backwards:

```
int i;

void setup() {
  pinMode(8, OUTPUT);
```

```
pinMode(9, OUTPUT);
digitalWrite(8, LOW);
digitalWrite(9, LOW);
}

void loop() {
for (i = 0; i < 384; i++) {
    digitalWrite(9, HIGH);
    delay(1);
    digitalWrite(9, LOW);
    delay(1);
}

delay(1000);
digitalWrite(8, LOW);

for (i = 0; i < 384; i++) {
    digitalWrite(9, HIGH);
    delay(1);
    digitalWrite(9, LOW);
    delay(1);
}

delay(1000);
digitalWrite(8, HIGH);

}
```

Problems We Encountered

We did not encounter any problems at all in experiment 2