

Lab 02

Stepper Motor

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CSE 4355- Section 001

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Coil A Connected

@10.4V

Mass of Weight: 225 g

Distance: 12.3 cm = 0.123 m

Force: $0.225 \text{ kg} \cdot 9.8 \text{ m/s}^2 = 2.207 \text{ N}$

Torque: $2.207 \text{ N} \cdot 0.123 \text{ m} = 0.271 \text{ Nm}$

Current: 0.296 A

@9.4V

Mass of Weight: 225 g

Distance: 11.0 cm

Torque: $2.207 \text{ N} \cdot 0.11 \text{ m} = 0.243 \text{ Nm}$

Current: 0.272 A

@8.4V

Mass of Weight: 225 g

Distance: 9.6 cm

Torque: 0.212 Nm

Current: 0.240 A

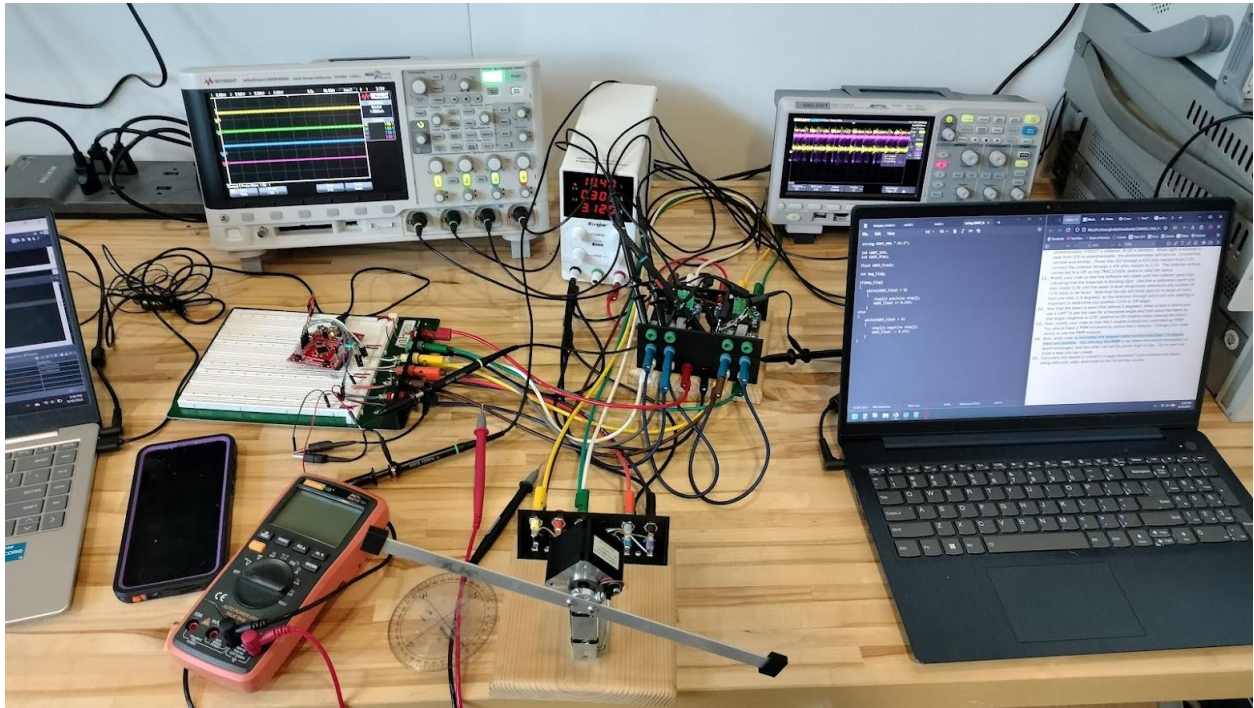
- Generally we notice that we can hold the same mass at a further distance with more voltage (increase in voltage $\rightarrow$ increase in torque)

All 4 Coils Connected

A	A'	B	B'	Direction
+	-	*	*	Clockwise
*	*	+	-	Clockwise
-	+	*	*	Clockwise
*	*	-	+	Clockwise

- We showed that we could manually step the motor through 1.8 degrees (full steps).
- Clockwise was the observed direction, if we reversed the pattern we would see a reverse in direction of rotation.

TM4C Driving Coils



- Picture of full setup with TM4C driving 1/16th microstepping