

# Encoder Automation Table

*Showcasing the power of encoders.*

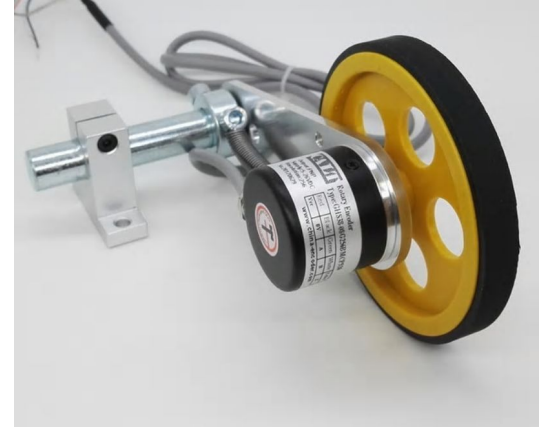
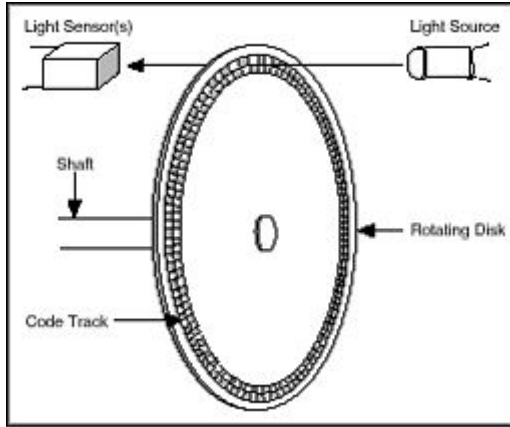
***360 Designs***

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# Sponsor:



# What's an encoder?



Encoders very accurately measure angles which can easily translate to distance, velocity, and acceleration.

# Project Description

- Design and create an automated, interactive modular display that highlights EPC's encoders for a variety of purposes.

# Value Proposition

- The Encoder Automation Table will:
  - ◆ showcase EPC products at trade shows
  - ◆ provide an attractive display to encourage individuals to inquire more about EPC products
  - ◆ aid in the training of new employees at EPC

# Design for Module 1 (Programmable Encoder)

## → Minigame

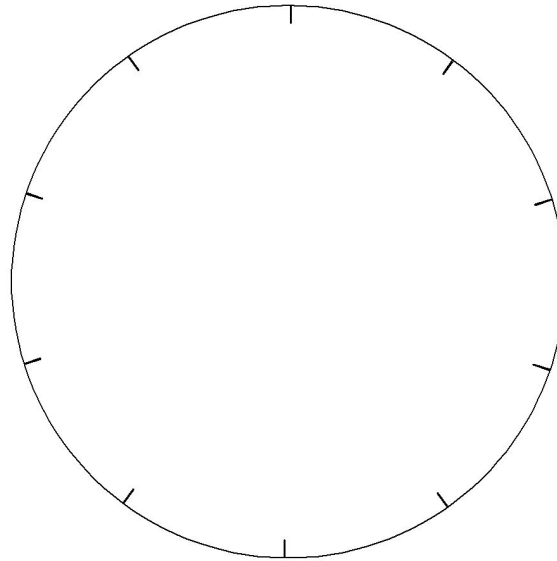
- ◆ User will attempt to guess length of a given point on the linear actuator
- ◆ The linear encoder will provide feedback to determine the actual distance travelled
- ◆ Accuracy will determine success or failure
- ◆ Success will only be achievable by programming the encoder to modify the resolution . . .

# Design for Module 1 (cont.)

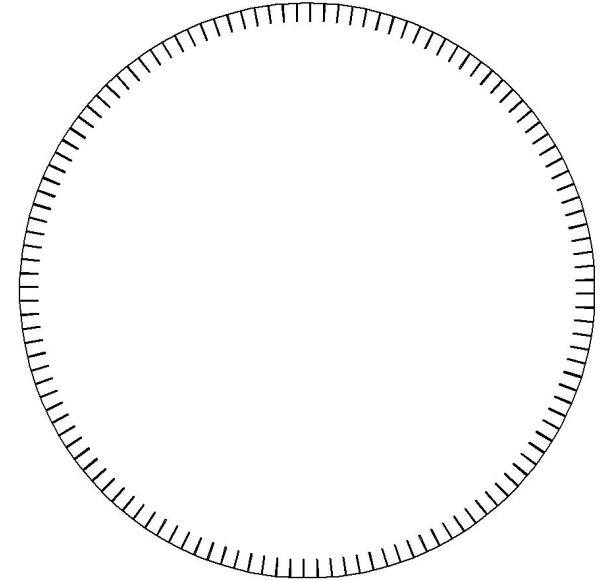
## → Resolution

- ◆ The Model 25 SP can be programmed to have a specific resolution
  - Resolution is the number of ticks/points that the encoder counts per resolution
  - Capable of the range of 1 and 65,536

# Model 58TP Programmable Encoder



Lower Resolution (8)



Higher Resolution (128)



# Project Learning

- Synthesizing budgets and purchasing
- Organizing multi-disciplinary tasks to provide synergy
- 3D modeling, rendering, and animation to effectively communicate design plans
- Learning a new language to program the Unitronics display
- Working with the client as demands and ideas morph

# Unresolved Issues

- Programming the Unitronics display
- Testing the stepper motor with micro stepping to determine maximum accuracy
- Machining to mount the linear encoder and rack to the display
- Testing to determine maximum allowable resolution that will be accurate for the ball screw

# Plan for the Future

## → January 2019:

- ◆ Finish an initial prototype for presentation to EPC
  - Receive advice for revisions
- ◆ After revisions:
  - Begin design for second module (absolute encoder)
    - Aim to finish second module by end of March, and begin 3rd module (if possible)

# How will the motion be controlled?



Unitronics HMI+PLC Unistream 10.4 Multitouch  
32 bit processor  
Digital and analog input/output modules

# 360 Designs Initial Budget

Expense Items	Cost
Motors	\$75
Sensors	\$200
Labor	\$150
Shop use	\$150
Parts	\$600
Travel	\$300
Misc. Items	\$200
Prototype	\$325
Total Expenses	\$2000
Budget Total	\$4000

