Objectives

Background

CharlyRobot is a table top three-axis CNC milling machine, received in a disassembled and nonfunctional state. Electrical and mechanical components were outdated.

Project Scope

- Restore CNC functionalities.
- Use surface recognition to find the center of the lens and to analyze the surface contour of the lens.
- Primarily used for Research and Development.

Test & Analysis

Motion Profiles – Have the ability to configure different motion profiles as needed

Square Wave Pass  Concentric Circles

Concentric Circles

Design Validation

- Arcus: Arcus 4EX-SA and included software provide configurable machine motion and operation.
- Repeatability: Machine can repeat movements to a .25 mm accuracy.
- Motion: Axis speed profiles are configurable.
- Expandability: Controller has available GPIOs. 8 digital outputs, 8 analog inputs, and 6 digital inputs.

Conclusion & Recommendation

- CharlyRobot’s functionality is restored (X, Y, and Z axes).
- It has the ability to locate the center of the lens and map the surface contour of the lens.
- It is recommended to retrofit and extend the photogate’s clearance to 125mm instead of 75mm so that it can analyze lenses with larger diameters.

Acknowledgement: On behalf of ISO, we would like to thank our sponsor, Arnaud Glacet, and our faculty advisor, Dr. Steven Yurkovich, for all of your assistance.

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