Team 15: Refreshable Tactile Function Grapher for Blind and Visually Impaired (BVI) Students and Teachers

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Need

32% of BVI students are tactile learners **BVI Students**

Roughly 225,000 tactile BVI students in the USA

A student's ability to learn graphing related concepts is limited

Most current graphing solutions produce underdeveloped visual results

Objective

Develop a device which takes a mathematical function from a computer as input and rapidly outputs an easily transformable tactile graph.

Design Inputs

Size: not larger than 18 x 24 inches

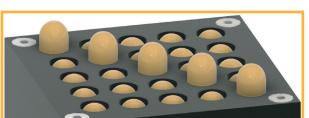
Time: graph is produced in under 10 min

User: operable by students who are BVI

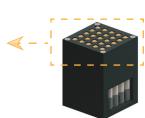
Standrds: The Braille Authority of North America

Features: user can perform graph transformations

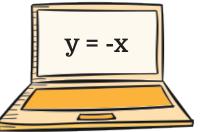
Solution



Pins are raised accordingly



a software



User inputs a desired function using

Design & Build

Pin Head Clicker

Solenoid

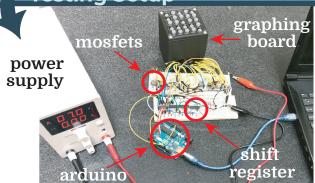


Overview of internal



Full Assembly

Testing Setup



Results

Test

Time

Test

Test

Actuation |

Height Height of individual line elements (pins) is raised 0.03125 inch Test Spacing

Spacing of continuous lines is 0.125

Line actuation is produced in under 1 min

50% of the solenoids are actuated*

*testing is still in progress

Future Plans

Revisions:

- Build and test entire scaled prototype.
- Add the ability to communicate with other devices.

Impact:

- Provides rapid production and transformation of tactile graphs to the classroom environment.
- BVI students are empowered to explore a field of study opportunity to independently contribute to mathematical societal applications.