Team 35

Design and Build a 3D Printer

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Customer Background

Purdue University – wanting to supply incoming freshmen with basic 3D printers for experimentation/learning

Problem Statement

- Accessibility & affordability of 3D printer kits
- End-customer are future classes of Purdue engineering students

Requirements

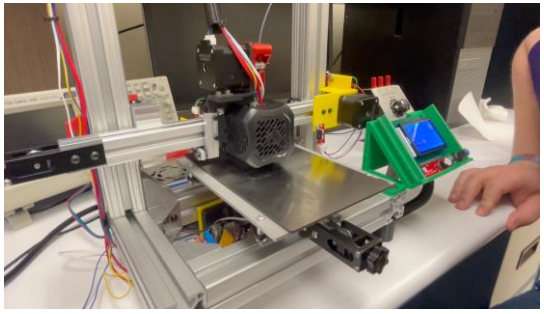
- Fully functional
- Able to be assembled in learning factory environment
- 5"x5"x5" working envelope
- Packaged for transport
- Scalable design
- Come with 1 test print pre-loaded
- Autodesk compatible
- Come with assembly/ operating instructions
- Compatible with common power sources (wall outlets)

Experimentation and Concepts

- Magnetic bed envelope moves along the y axis.
- Extruder, nozzle, and motor moves horizontally across the x axis gantry beam.
- Entire gantry moves up and down the z axis posts

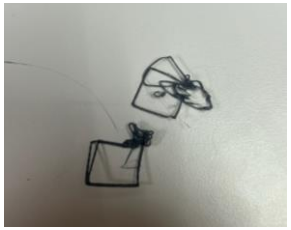
Final Design

- 12in x 12.5in x 18.5in exterior structure in 1515C
- 1010C Y axis beam (13.5in) & x axis gantry beam (12in) - both beams have belts and tensioners.
- Main structure connected by angular brackets
- Motor mounts & electrical mounts are 3D printed
- Hammer nuts & bolts with angular brackets are how the beams are connected



Testing

- Limit switch location and limits testing
- Nozzle temperature / filament
- Sticking filament to the magnetic bed
- Variations of 3D printed parts



Test Print Results

First LCD Mount Version

Final LCD Mount Version