Marwadi University
Marwadi Chandarana Group

NAAC A+

CNC/PCB Plotter/2D Printing

ABSTRACT

- This project outlines the creation of a custom 3-axis CNC/PCB plotter, with mechanical parts fabricated using an Ender 3 3D printer.
- User designs from Inkscape are translated into G-code (via JS Cut) to control the plotter's movements.
- An Arduino Uno microcontroller precisely manages the X, Y, and Z axes for accurate plotting.
- The resulting plotter achieves pen-based drawing or PCB tracing, offering a tailored alternative to commercial options.
- The project demonstrates a cost-effective method for building specialized hardware by integrating 3D-printed components with accessible software and electronics.

LIST OF COMPONENTS

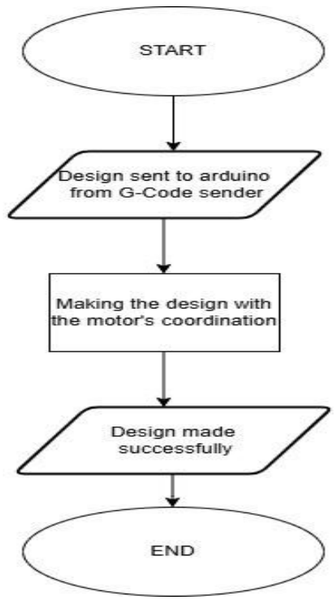
- Arduino Uno
- 3 Stepper motors (specify type/model if possible)
- 3 drivers
- Power supply
- Pen
- 3D-printed structural components
- Jumper wires.

ICT WORKSHOP-(09CT1015), IA-30, P-1

PREPARED BY

Jash Jani:- 92400957004

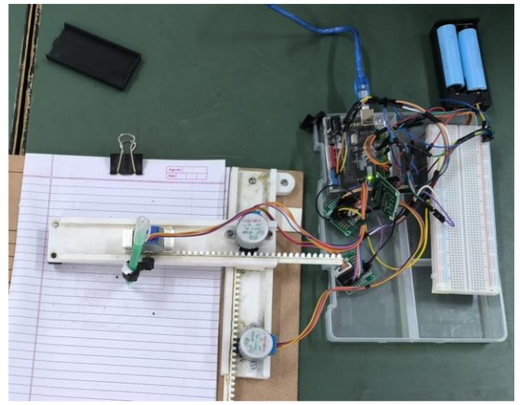
BLOCK DIAGRAM / FLOW CHART

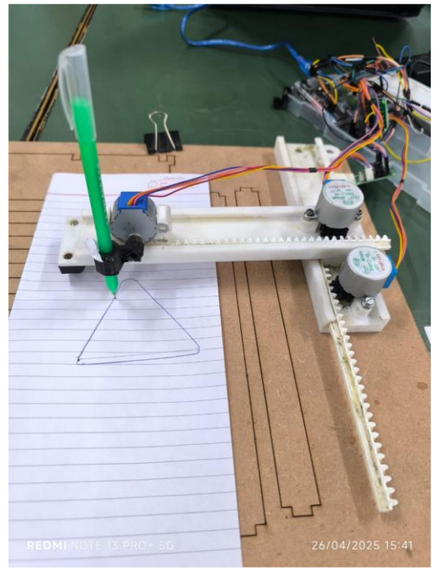


DESCRIPTION

In this project, the user begins by designing their desired image (or PCB layout) using **Inkscape**, a vector graphics editor.[1] This design is then saved as an SVG (Scalable Vector Graphics) file. To prepare the image for the plotter, the SVG file is opened and further processed in **JS Cut**. This software translates the vector graphics into a set of G-code instructions, which dictate the precise movements required for plotting. This generated G-code is then uploaded to the **Arduino Uno** microcontroller, serving as the central control unit for our custom-built CNC/PCB plotter. The Arduino processes these instructions, meticulously controlling the movement of the plotter's X, Y, and Z axes.[2] Notably, key mechanical components for this CNC/PCB plotter were **fabricated using an Ender 3 3D printer**. By precisely coordinating the motion of these axes, the plotter's tool is guided along the exact path specified in the G-code, ultimately resulting in the creation of the intended drawing or PCB traces. Through this process, we have successfully designed and constructed a functional CNC/PCB plotter, leveraging the rapid prototyping capabilities of the Ender 3 for its structural elements, Inkscape for design, JS Cut for G-code generation, and an Arduino Uno with UGS for control.

OUTPUT PHOTOS





CONCLUSION

This project successfully demonstrates the feasibility of repurposing a 3D printer into a 3-axis drawing robot. By utilizing the precise control of the Arduino Uno and the robust mechanics of the Ender 3, we have created a versatile machine capable of reproducing digital designs on a physical surface. This project highlights the potential for innovative applications of 3D printing technology beyond its traditional additive manufacturing role.