Arduino Powered CNC Plotter

Aishwarya Gangad, Prachi Mayanale, Sakshi Thombre

Students, Electronics and Telecommunications

Sinhgad College of Engineering, Pune, India

Abstract: *The growing demand for automation and precision in manufacturing has led to widespread adoption of Computer Numerical Control (CNC) machines across various industries. However, the high cost and complexity of conventional CNC systems present limitations, particularly for academic, research, and small-scale prototyping purposes. This paper presents the design and development of a low-cost, medium-sized CNC plotter capable of performing tasks such as PCB drawing and drilling. The system is built using simple and affordable components, including an ATmega328 based Arduino microcontroller, stepper motors, and a servo motor. The machine operates using G-code instructions, which are generated through open-source software and interpreted by the motor drivers to control the movement along the X, Y, and Z axes. This enables precise sketching or drilling on a variety of surfaces. The proposed CNC plotter offers a compact, efficient, and cost-effective solution for applications in educational laboratories, PCB design, and automated sketching, addressing the need for accessible digital fabrication tools.*

Keywords: CNC, Arduino microcontroller, G-Code, IDE