

## ABSTRACT

*The need for internet access in the digital age encourages the use of data vouchers, but manual production is inefficient and slow. Data vouchers are equipped with code labels that are rubbed to display serial numbers or codes for users. The process of rubbing labels on data vouchers is often done manually, which is time-consuming and tends to be inefficient. Thus, to increase productivity and accuracy, CNC (Computer Numerical Control) machines can be used to create label rubbing tools with GRBL (G-code-Based Router Language) support. CNC can be controlled through programmed commands that have been determined by code. This design aims to design and build a CNC-based data voucher production sistem using a GRBL controller. This sistem is designed to improve efficiency and precision in data voucher label scraping.*

*Design parameters, such as cutting speed, scrubber power, and dimensional accuracy, are tested to obtain optimal results. The design of this control system adopts a GRBL controller that can be used to control the movement of CNC machine tools on the X, Y and Z axes. The supporting components are the DRV8825 motor driver which can be used to control the operation of stepper motors and Nema-17.*

*The test results show that the sistem is able to produce vouchers scrub with high quality and low error rates through two tests conducted on Y Axis shows good performance. However, there is a difference between the coordinates given through the GRBL controller perangkat lunak and the results obtained from the hardware with an average value at 0.45% and the X Axis test shows better performance by making improvements to the changes in the voucher design to be more complex at the cutting speed and re-testing to obtain an average value at 0.00%.*

**Keywords:** *CNC (Computer Numerical Control), GRBL Controller, Voucher Scrub production, Scrubber cutting, G-Code*