

# **Development of a Mini PC-Based Mini CNC Router Machine for PCB Manufacturing in the Electromechanical Practice Course**

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## **ABSTRACT**

This research explores the theoretical and technical procedures for design, fabrication, assembly, and testing of electromechanical subsystems to develop a low-cost, high-precision three-axis mini CNC router machine with easy interface, high speed, power saving, safety, and durability for rapid prototyping machining, the components are small, and printing small features such as PCB printing. This research was carried out based on the ADDIE model, namely Analysis, Design, Development, Implementation and Evaluation. The analysis stage was carried out to identify the components needed in a Mini PC-based Mini CNC and its implementation as a learning medium. The design stage is carried out by designing a Mini CNC based on a Mini PC and its implementation according to the needs at the analysis stage, both in the form of hardware and software. The development stage is carried out by making a Mini CNC based on a Mini PC, starting from making and assembling the mechanical and electronic components, then installing and connecting the software to the electronic components used. Implementation stage, in this stage, Mini PC-based Mini CNC is implemented by printing the PCB design that has been made and testing whether the results of the tool's performance are in accordance with requirements and comparing it with the PCB printing process that has been carried out so far. The Evaluation Phase is carried out to get improvements from the implementation that has been carried out. The output of this research is the creation of a Mini CNC based on a Mini PC and its implementation, namely the manufacture of PCBs that can be used for learning Electromechanical Practices.

*Kata Kunci: Mini CNC Router, Mini PC, PCB, Electromechanical Practice, Learning Media*