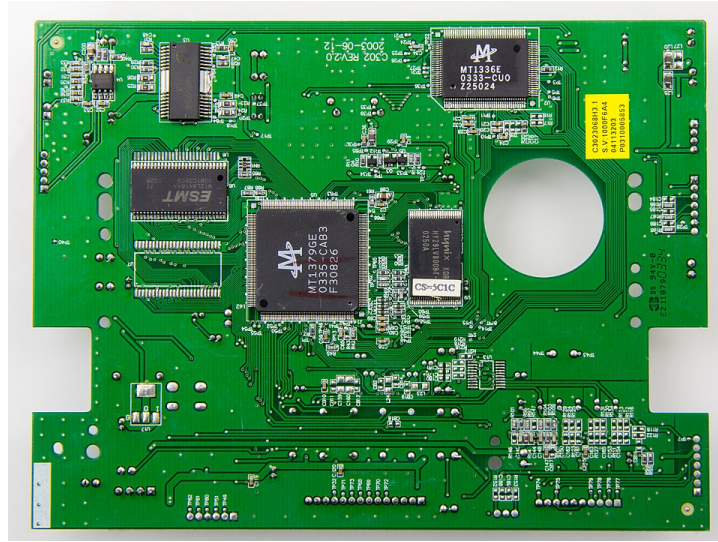


# Optimization of Component Placement on Electronic Circuit Boards using Path Length Optimization

Semester- / Masterthesis or Forschungspraxis

Robot Systems Group  
Laboratory for Product Development and Lightweight Design



**Figure 1** Placed Components on a printed circuit board (PCB) (Source: [https://en.wikipedia.org/wiki/Printed\\_circuit\\_board](https://en.wikipedia.org/wiki/Printed_circuit_board))

**Project Description:** We are seeking a dedicated Master student to undertake a pivotal research project aimed at enhancing the automated design of electronic circuit boards. The primary focus of this thesis will be on optimizing the placement of components on electronic boards by utilizing path length optimization techniques.

In electronic design, the efficient placement of components, such as placing decoupling capacitors close to microcontrollers, is crucial for performance and reliability. This project aims to develop a methodology and implement a Python-based software tool that automates this process. The software will analyze component relationships and layout constraints to optimize placement, thereby reducing path lengths and improving circuit efficiency.

The candidate will explore algorithmic solutions in path length optimization, and develop and test a Python application that can be integrated into existing electronic design automation workflows. The outcome of this project is expected to streamline the design process, reduce error rates, and enhance the overall quality of electronic board manufacturing.

**Desired Skills:** Ideal candidates will possess a strong foundation in Python programming and a keen interest in software development methodologies. Prior knowledge or experience in electronics, particularly in designing or building circuit boards, will be highly advantageous. This background will provide a valuable context for the optimization tasks and the understanding of practical constraints involved in electronic design.

Applicants are expected to demonstrate problem-solving skills, the ability to work independently, and a passion for advancing technological solutions in electronics manufacturing.

**Application Process:** Interested candidates should submit their application via email, including a detailed CV and a current transcript of records. Please send your applications to the Email mentioned below.

We look forward to reviewing your background and discussing how you can contribute to this innovative project.

## Contact

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