

# Digital Soldering station

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## Contribution Report

In this project, I played a significant role in several key areas, ensuring the successful completion of our advanced soldering station. My contributions can be categorized into the following domains:

### 1. SolidWorks Design

I was mainly responsible for the SolidWorks design of the soldering station. This involved:

- **3D Modeling:** Creating detailed 3D models of the soldering station components, ensuring precise dimensions and functional design.
- **Design Iterations:** Collaborating with the team to iterate on the design based on feedback, ensuring the final product met all technical and user requirements.

### 2. Software Development

I also took the lead in the software development aspect of the project, focusing on:

- **Temperature Control Algorithm:** Developing a robust PID control algorithm to regulate the soldering iron's temperature with high precision.
- **Microcontroller Programming:** Writing and debugging the code for the microcontroller that manages the soldering station's functions, including temperature control, sleep mode, and tip change mode.
- **User Interface:** Designing a user-friendly interface that displays real-time temperature readings and allows users to adjust settings easily.

### 3. Design Methodology

Throughout the project, I actively contributed to the overall design methodology, including:

- **Concept Development:** Participating in brainstorming sessions to develop innovative concepts and features for the soldering station.
- **Decision Making:** Assisting in the decision-making process by evaluating different design options and selecting the most feasible solutions.
- **Prototyping:** Helping to build and test prototypes to validate design concepts and refine the final product.

## 4. Circuit Design Finalization

In addition to my primary focus areas, I contributed to finalizing the circuit designs by:

- **Circuit Design Review:** Reviewing circuit schematics to ensure they met the project's requirements and industry standards.
- **Component Selection:** Assisting in selecting appropriate components that provided reliable performance and compatibility with the overall design.
- **Testing and Validation:** Helping to test and validate the circuits to ensure they functioned correctly and integrated well with the rest of the system.

## 5. Documentation Assistance

Lastly, I supported the documentation process by:

- **Design Documentation:** Assisting in creating detailed technical documents that described the solid works design, and software part of the soldering station.
- **Design methodology:** Contributed to developing the design methodology report based on the Cambridge model.

## 6. PCB design

I contributed to finalizing the PCB design by:

- **PCB Layout:** Assisting in the design of the PCB layout to ensure optimal component placement, signal integrity, and manufacturability.
- **Design Review:** Reviewing the PCB design to ensure it met all project requirements and industry standards.
- **Component Selection:** Helping to choose suitable components that provided reliable performance and compatibility with the overall design.
- **Testing and Validation:** Participating in the testing and validation process to ensure the PCB functioned correctly and integrated seamlessly with the rest of the system.

## 7. PCB Soldering and Testing

I contributed to soldering and testing the PCB:

- **PCB Soldering:** Assisted in soldering the PCBs to ensure all components were properly attached.
- **MCU Circuit Testing:** Participated in testing the Microcontroller Unit (MCU) circuit to verify its functionality.
- **Power Supply Circuit Testing:** Conducted tests on the power supply circuit to ensure it operated correctly.
- **Functionality Confirmation:** Verified that both circuits worked as intended and that the soldering was done accurately.