REFLOW OVEN FOR SOLDERING SMD COMPONENTS

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INTRODUCTION



AIM : To design and implement a reflow oven, which is a machine used for reflow soldering of SMD components to PCBs

ELECTRICAL SUBSYSTEM

THE CIRCUIT

PCB DESIGN





MECHANICAL SUBSYSTEM

THE LAYOUT

IMAGE



TOP VIEW

FRONT VIEW

CONTROL SUBSYSTEM

REFLOW CURVE

CONTROL FLOW

PID CONTROL



PROBLEMS FACED

<u>PCB</u>

Problem: We required higher current SMPS for the heating element and PCB traces may not be able to handle that current.
Solution: Circuits reconstructed on perforated boards. Traces created using solder iron.



The high-power circuitry was implemented separately using thick wires.

HEATING ELEMENT

Problem: Initially, the heating element would not go over 180 degrees C.
Solution: Multiple versions of the heating element were tried out, of various resistances, wire lengths and arrangements.





Thick copper plate was used to increase heat capacity and retain heat.

PROBLEMS FACED

<u>ADC</u>

Problem: The MAX31865 module was not sending data from Pt100 in time for both Pt51 and Pt128x.
Solution: We shifted to using an ADC MCP 3008 with Pt51 for calculating the temperature values from the Pt100 sensor



HEAT PROTECTION

Problem: A major problem was
to protect the casing and circuitry from heat.
Solution: The casing walls closest to the hot plate and in contact with the screws were made of wood instead of acrylic.



Fans, a cooling chamber and air slits were used for dissipation of heat.

CONCLUSION

Putting the subsystems together



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The setup worked as intended

<u>Working video</u>

THANK YOU