

Sinhgad College of Engineering, Pune – 41.
Department of Electronics & Telecommunication Engineering

Internship In PCB Manufacturing

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Industry Details :-

- **Name of Industry** :- Excellon circuit
- **Address of the Industry**:-S.N.44/47, Heramb complex Renuka Ind Estates, Shed No 3,4 Paranjape Abhiruchi Parisar , opp. Paranjpe , Narhe , Pune , Maharashtra , 411041
- **Details of the External Mentor from Industry:-**
 - **Name** :-Mr. Satish Jodhawat
 - **Post** :- Sr. Embedded Engineer
 - **Contact Number** :-9975522997
 - **Website Address of the Industry** :- <https://excellon-circuit.business.site/>

Introduction :-

- ❑ Excellon Circuit is a Group of Highly Professional people who had a vast experience in PCB design and its manufacturing .
- ❑ The company when started as a start up the company has the aim of only designing the PCB which consist of of fabrication data, verification of data etc they have designing teams at Panchkula . In the further year manufacturing of PCB has started.
- They provide Internship in following sectors:
 - Design
 - Basic Knowledge of Software
 - About Garg Electronic
 - Panelization

Introduction :-

- During this internship, I had the opportunity to work closely with experienced professionals in the industry and learn about various aspects of PCB manufacturing. Whether I am pursuing a career in engineering, electronics, or manufacturing, this internship will provided me with valuable skills and insights.
- As a PCB manufacturing intern, I was exposed to a range of tasks and responsibilities. I learned about the entire PCB production process, from design and layout to fabrication and assembly. I worked with cutting-edge technology and equipment, gaining practical experience in operating machinery, troubleshooting, and quality control.

Objectives :-

- To Gain practical skills and hands-on experience in various aspects of PCB manufacturing.
- To Learn about industry standards, best practices, and quality control processes.
- To Develop problem-solving and troubleshooting abilities in a manufacturing environment.
- To Collaborate with professionals and contribute to team projects.
- To Familiarize myself with advanced equipment and technologies used in PCB manufacturing.
- To Expand my professional network and gain insights from experienced professionals in the field.

PCB & Its Types :-

➤ What is PCB ?

A printed circuit board (PCB) mechanically supports and electrically connects electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate. Components (e.g. capacitors, resistors or active devices) are generally soldered on the PCB. Advanced PCBs may contain components embedded in the substrate.

➤ Types Of PCB :-

1. Single Sided
2. Double Sided
3. Multilayer PTH
4. Metal Clad PCB

Project Working Steps :-

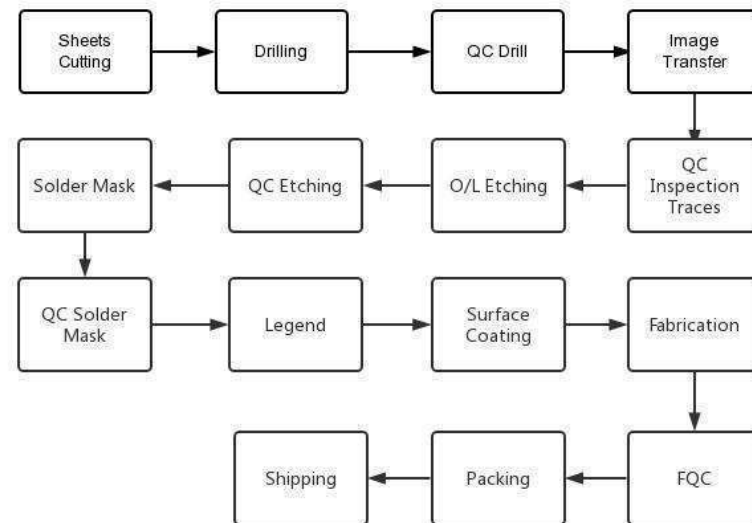
- ❑ Requirement and schematic design of PCB
- ❑ PCB layout design
- ❑ Design verification
- ❑ Fabrication of PCB
- ❑ Assembly and testing of PCB
- ❑ Documentation and Delivery

Software Used for Project :-

- CAM350 10.1
- AUTO CAD

Tasks Performed :-

Block diagram of PCB manufacturing processes:



Processes Done in PCB Manufacturing

1. **Fabrication:** During the fabrication process, I am involved in several critical steps:
 - a. Substrate Preparation: I assist in preparing the substrate material, such as cleaning the copper-clad laminate (CCL) and applying a protective layer to prevent oxidation.
 - b. Imaging and Photoresist Application: I help apply the photoresist to the substrate and transfer the PCB design onto the photoresist using imaging techniques.

Processes Done in PCB manufacturing

- a. Etching: I participate in the chemical etching process, where we remove the exposed areas of the photoresist and underlying copper to form the desired copper traces and pads.
 - b. Drilling: I assist in drilling holes for component mounting and interconnection, ensuring precise placement and cleanliness of the drilled holes.
 - c. Plating: I learn about through-hole plating or electroless plating processes, which involve depositing a thin layer of metal, usually copper, inside the drilled holes to ensure electrical continuity.
- Surface Finish: I help apply various surface finishes, such as HASL, ENIG, or OSP, to protect the exposed copper surfaces from oxidation and enhance solderability.

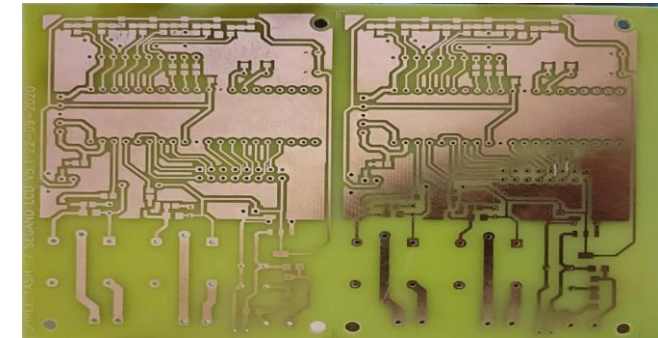
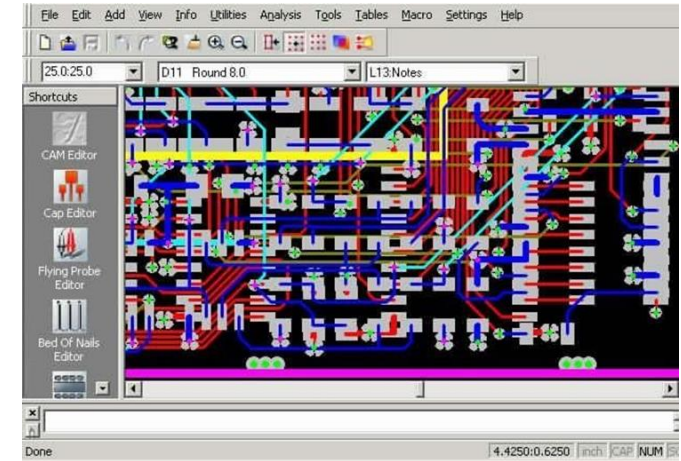
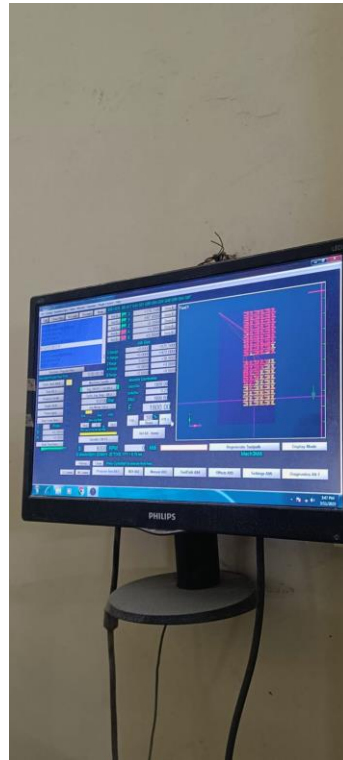
Processes Done in PCB manufacturing

1. **Assembly:** As an intern, I contribute to the assembly process, which includes:
 - a. **Component Placement:** I work alongside experienced technicians and engineers to accurately place surface-mount components (SMDs) on the PCB using automated pick-and-place machines or manual methods.
 - b. **Soldering:** I assist in soldering the components onto the PCB, whether it involves reflow soldering for SMDs or wave soldering and hand soldering for through-hole components.

Processes Done in PCB manufacturing

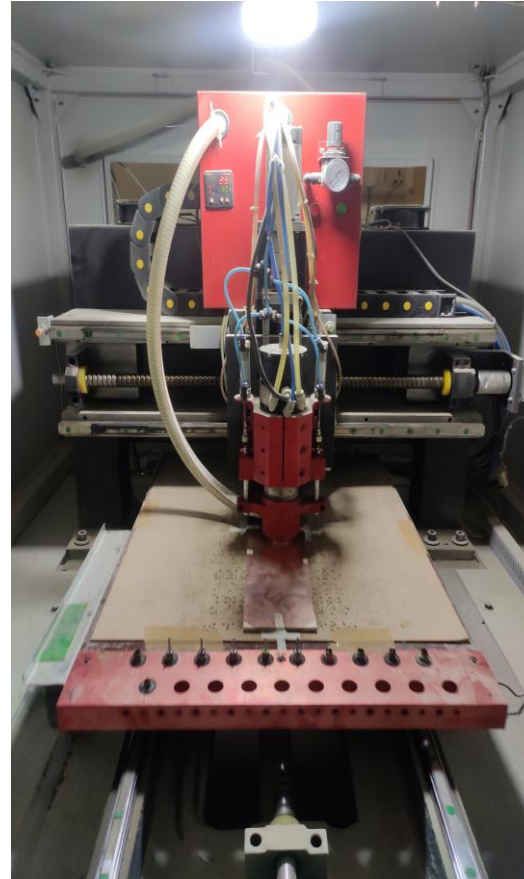
1. **Inspection and Testing:** I actively participate in the inspection and testing phase, which ensures the quality and functionality of the manufactured PCBs. This includes:
 - a. Visual Inspection: I carefully examine the PCBs to verify proper component placement and solder joint quality, identifying any visible defects.
 - b. Automated Optical Inspection (AOI): I assist in using AOI systems to scan the PCBs and detect any potential defects or anomalies in the solder joints or component placement.

Processes/product in PCB manufacturing:



Internship Gallery

- Performing quality check
- Observing circuit tracks
- Overlooking PCB Layout





RESULT :-

During my PCB manufacturing internship, I gained valuable experience in assembling and soldering electronic components onto printed circuit boards. I actively participated in testing and quality control processes, collaborated with different departments, and proposed process optimizations. The internship equipped me with technical skills, teamwork abilities, and a solid foundation for my future in electronics manufacturing.

Conclusion :-

- ▶ Since PCB are used in almost all of the electronic devices . A bad design of the PCB will lead to the destruction of the whole electronic component . If the PCB design of any electronic component does not perform accurately or slightly slow it can lead to change of whole electronic equipment or PCB board.
- ▶ In conclusion, I can say that the internship was great experience. Thanks to this project, I acquired deeper knowledge concerning my technical skills, Communication skill , Leader ship Qualities . Due to this internship I get the knowledge of other software like CAM350 10.1 , AUTOCAD . Also come to know different types of equipment that are used to manufacture PCB like wire cut machine , Milling machine , Surface grinder etc . For the equipment to work there are different rooms assign . Overall the experience of internship benefited me .

Reference :-

- <https://excellon-circuit.business.site/>
- <http://www.gargelectronics.com/machinery.html>
- www.asktraining.com