

# **PCB & MOUNTINGS**

## **1. INTRODUCTION:**

Printed circuit board (PCB) is base of any electronics/electrical equipment. A PCB provides the connectivity to the electronic component such as resistor, capacitor, coils, pots, diodes, FET, transistor, ICs, transformer etc. to form a complete electronic circuit. In the present scenario, the existence of electronics equipments cannot be imagined without a PCB. The PCBs are not only providing the connectivity among the electronic components but also reduces the size and increases the efficiency of the electronic equipment. Broadly the PCBs may be divided in two categories i.e. single layer PCBs and multi-layer PCBs. One can easily find the contribution of electronic industries in each and every field of our daily life i.e. entertainment, communication, education, R&D, Public Services, Defence, Transport, Agriculture, health care services etc. With the growing demand of electronic equipments/appliances in every sphere of human beings the electronic industry is growing up with a very fast rate. Similarly, the demand of micro servicing industries such as assembling/mounting of electronic component on PCBs to meet the requirement of the small/medium/large scale electronic industries is also increasing. This project profile is prepared for the leaded electronic components to be assembled on PCBs. The PCBs & components are provided by the customer.

## **2. PRODUCT & ITS APPLICATION:**

In electronics, printed circuit boards, or PCBs, are used to mechanically support electronic components which have their connection leads soldered onto copper pads in surface mount applications or through drilled holes in the board and copper pads for soldering the component leads in thru-hole applications. A board design may have all thru-hole components on the top or component side, a mix of thru-hole and surface mount on the top side only, a mix of thru-hole and surface mount components on the top side and surface mount components on the bottom or circuit side, or surface mount components on the top

and bottom sides of the board. The boards are also used to electrically connect the required leads for each component using conductive copper traces. The component pads and connection traces are etched from copper sheets laminated onto a non-conductive substrate. Printed circuit boards are designed as single sided with copper pads and traces on one side of the board only, double sided with copper pads and traces on the top and bottom sides of the board, or multilayer designs with copper pads and traces on top and bottom of board with a variable number of internal copper layers with traces and connections.

### **3. DESIRED QUALIFICATIONS FOR PROMOTER:**

Promoter for this project may have any graduation plus background of electronics or electrical maintenance knowledge or experience.

### **4. INDUSTRY LOOK OUT AND TRENDS**

Surface mount technology (SMT) started becoming widely used in the late 1980's with the increased global demand for electronic circuits in a number of applications across industries such as consumer electronics, telecommunication, automotive, aeronautics, and healthcare. The equipment used to implement the technology, comprising of an end-to-end assembly line that includes a surface mount technology equipment printer, place-and-pick machine, and reflow oven that places surface mount devices onto a printed circuit board, have replaced conventional electronic circuit production lines in electronics companies at a rapid pace ever since.

In the intensely competitive electronic circuit board manufacturing industry, companies have benefitted significantly from the easily modular, efficient, and adaptable SMT solutions in their way to becoming market leaders. The field of surface mount technology equipment has witnessed innovation at a rapid pace over the years, leading to the development of equipment with a high level of innovation, enabling vast sophistication in technology and reduced size of electronic gadgets. With the rising demand for complex printed circuit boards and assemblies, companies in the surface mount technologies are provided vast growth opportunities.

Furthermore, huge investment in consumer electronics segment across the globe, government initiatives and useful application across a number of end-use industries are projected to lead to promising growth opportunities for SMT equipment companies in the next few years as well. Transparency Market Research estimates that the market will exhibit a promising 4.4% CAGR from 2017 to 2025, rising from a valuation of US\$4845.7 mn in 2016 to US\$7075.8 mn by 2025.

## **5. MARKET POTENTIAL AND MARKETING ISSUES:**

Total Indian PCB Market Size is USD 920 Million. The Indian electronics market is one of the fastest growing in the world and is anticipated to reach US\$ 400 billion in 2022, with domestic manufacturing climbing to over US\$ 100 billion. This will create immense scope for the PCB market. According to an ELCINA study, domestic market demand for PCBs will grow at a CAGR of 20.56 per cent over the period 2015-2020, and will reach over US\$ 6 billion by 2020 from the current level of US\$ 2.38 billion (Figure 1). Currently, only 35 per cent of this demand is met by local manufacturers. And for the remaining 65 per cent, India is still dependent on imports. The current demand of US\$ 2.38 billion represents the demand for all types of PCBs, and includes both the bare board and the populated PCBs. The current market size for bare board PCBs is US\$ 1.2 billion, and only 30 per cent of this demand is being met by local PCB manufacturers. The remaining 70 per cent is imported. The Indian market is slightly different from the rest of the globe. Globally, the market for flexible circuits is expected to grow much faster than that for rigid PCBs, since the former can facilitate form factor reduction and eliminate connectors. However, Indian PCB manufacturers are mostly focused on single-sided, double-sided and multi-layered PCBs with a layer count of four to six, in most cases. A majority of the Indian manufacturers adopt the high-mix, medium-volume strategy where different types of PCBs are manufactured in low to medium volumes. There are around 200 PCB manufacturers in India — more than 60 per cent of them are very small and un-organized. PCBs are used in each and every electronic and most of the electrical equipments. The working of any electronic equipments such as home appliances, entertainment equipment, testing, medical equipments or even defence electronic equipment etc. cannot be imagined without a PCB. The small, medium and large scale units have Nos. of vendors to carry out the specific job. The mounting of electronic components on PCB is also a one of the ancillary job. The charges for this type of job

depend on the size and level of complexity of the PCB. The test equipments, raw material required to run this type of service unit are indigenously available. With proper marketing, high quality and competitive price this type of units have sufficient scope in the present scenario.

## **6. REQUIREMENTS – Material/Equipment:**

The consumables such as solder, flux, chemical, adhesive, PCB may be procured from the local market.

Machinery and equipment

Heat wave soldering machine, Oscilloscope (50 MHz) LCR - Q Meter Function Generator Power Supplies (0 - 30V, 3 Amp) Digit Digital Multimeter, Analogue Multimeter, Magnifying glass fitted with tube light, Temperature control soldering station, Soldering Iron 25 W, Soldering Iron 65 W, Variant Rheostat. The total cost of equipments would be Rs. 4.00 lakhs.

Land & Building:

Total Built up area required will be 150 Sq. Mtrs. out of which for Office, Stores 50 Sq. Mtrs. And for Assembly & Testing 100 Sq. Mtrs. Will be required. The same will be available on rent.

MOTIVE POWER:

The power requirement would be 10 KVA.

## **7. MANUFACTURING PROCESS:**

Assembling/Mounting Procedure: The incoming electronic components and PCBs are tested for the required specification. In the assembly line electronic components such as resistor, capacitor, coils, diodes, transistors, ICs, SCRs etc. are fitted on the PCB at their appropriate location at different stages. These PCBs then passed over the heat wave soldering bath for soldering of component to the PCB. In the next stage, unwanted leads of the components are removed and proper soldering of the components is checked with the help of magnifying glass fitted with tube light. Then the assembled PCB is tested for its specification with the help of appropriate test jigs before dispatch to the customer.

## 8. MANPOWER REQUIREMENT:

Sr. No.	Designation Of Employees	Salary Per Person	Monthly Salary ₹	Number of employees required				
				Year-1	Year-2	Year-3	Year-4	Year-5
1	Operators	12,000	12000.00	1	1	1	1	1
2	Helpers	10,000	10000.00	1	1	1	1	1
3	Admin Manager	12,000	12000.00	1	1	1	1	1
4	Office Boy	10,000	10000.00	1	1	1	1	1
	Total		44000.00	4	4	4	4	4

## 9. IMPLEMENTATION SCHEDULE:

The project can be implemented in 2 months' time as detailed below:

Sr. No.	Activity	Time Required
1	Acquisition of premises	1.00
2	Construction (if applicable)	1.00
3	Procurement & installation of Plant & Machinery	1.00
4	Arrangement of Finance	2.00
5	Recruitment of required manpower	1.00
	Total time required <i>(some activities shall run concurrently)</i>	2.00

## 10. COST OF PROJECT:

Sr. No.	Particulars	₹ in Lacs
1	Land	0.00
2	Building	0.00
3	Plant & Machinery	4.00
4	Furniture, Electrical Installations	1.00
5	Other Assets including Preliminary / Pre-operative expenses	0.40
6	Working Capital	4.32
	<b>Total</b>	<b>9.72</b>

## 11. MEANS OF FINANCE:

Bank term loans are assumed @ 75 % of fixed assets.

Sr. No.	Particulars	₹ in Lacs
1	Promoter's contribution	2.43
2	Bank Finance	7.29
	<b>Total</b>	<b>9.72</b>

## 12. WORKING CAPITAL CALCULATION:

The project requires working capital of lakhs as detailed below:

Sr. No.	Particulars	Gross Amt	Margin %	Margin Amt	Bank Finance
1	Inventories	2.16	0.25	0.54	1.62
2	Receivables	1.08	0.25	0.27	0.81
3	Overheads	1.08	100%	1.08	0.00
4	Creditors	-		0.00	0.00
	<b>Total</b>	4.32		1.89	2.43

## 13. LIST OF MACHINERY REQUIRED:

Sr. No.	Particulars	UOM	QUANTITY	Rate (₹)	Value (₹ in Lacs)
	<b>Plant &amp; Machinery / equipments</b>				
a)	Main Machinery				
1	Heat wave soldering machine	NOS.	1	60000	0.60
2	Oscilloscope (50 MHz) LCR - Q Meter	NOS.	1	65000	0.65
3	Digital Multimeter, Analogue Multimeter	NOS.	1	25000	0.25
4	Magnifying glass fitted with tube light	NOS.	1	40000	0.30
5	Temperature control soldering station,	NOS.	1	100000	1.00
6	Installation, Electrification, taxes and	NOS.	1	120000	1.20
	sub-total Plant & Machinery				4.00

	Furniture / Electrical installations				
a)	Office furniture	LS	1	50000	0.50
b)	Stores cupboard	LS	1	0	0.00
c)	Computer & Printer	L. S.	1	50000	0.50
	sub total				1.00
	Other Assets				
a)	preliminary and preoperative				0.40
	sub-total Other Assets				0.40
	Total				5.40

All the machines and equipment are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. It may be worthwhile to look at reconditioned imported machines, dies and tooling. Some of the machinery and dies and tooling suppliers are listed here below:

1. Hifine Machine

5, New India Estate, Inside Relief Hotel,  
Sanand Char Rasta, Sarkhej, Ahmedabad-382210, Gujarat  
Phone: 079 26891274, 079 26890274

2. Heena Machine Product

No. 1, Samrat Industrial Area,  
Near Ban Labs, Rajkot - 360004, Gujarat, India

3. Sagar Engineering Works

A-129, Road No. 9 D,  
V. K. I. Area, Jaipur - 302013,  
Rajasthan, India  
Phone: +91-9829024358, +91-141-4064876

4. Meter Centre

No. 1778/6, Ground Floor, Gandhi Main Road,  
Near HDFC Bank, Ahmedabad, Gujarat 380001

Phone: 098257 01297

5. Pulsar Electronics Private Limited

No. 127/128, Sonal Link Industrial Estate, No. 2,  
Link Road Opposite Movie Time Cinema,  
Malad West, Mumbai - 400064, Maharashtra, India  
Phone: +91-7021000597, +91-9867024141

6. Cosmic Devices

No. 1702/307, Srinath Building, 3rd Floor  
Bhagirath Palace, Chandni Chowk,  
Delhi - 110006, India  
Phone: +91-9810413218, +91-9313866166

**14. PROFITABILITY CALCULATIONS:**

Sr. No.	Particulars	UOM	Year-1	Year-2	Year-3	Year-4	Year-5
1	Capacity Utilization	%	60%	70%	80%	90%	100%
2	Sales	₹. In Lacs	12.96	15.12	17.28	19.44	21.60
3	Raw Materials & Other direct inputs	₹. In Lacs	4.25	4.96	5.67	6.38	7.09
4	Gross Margin	₹. In Lacs	8.71	10.16	11.61	13.06	14.51
5	Overheads except interest	₹. In Lacs	2.31	2.46	2.75	2.83	2.89
6	Interest	₹. In Lacs	0.73	0.73	0.49	0.36	0.29
7	Depreciation	₹. In Lacs	2.80	2.00	1.40	1.00	0.90
8	<b>Net Profit before tax</b>	₹. In Lacs	<b>2.86</b>	<b>4.97</b>	<b>6.98</b>	<b>8.86</b>	<b>10.43</b>

The basis of profitability calculation:

The growth of selling capacity will be increased 10% per year. (This is assumed by various analysis and study; it can be increased according to the selling strategy.)



Energy Costs are considered at Rs 7 per Kwh and fuel cost is considered at Rs. 65 per liter. The depreciation of plant is taken at 10-12 % and Interest costs are taken at 14 -15 % depending on type of industry.

#### **15. BREAKEVEN ANALYSIS:**

<b>Sr. No.</b>	<b>Particulars</b>	<b>UOM</b>	<b>Value</b>
1	Sales at full capacity	₹. In Lacs	21.60
2	Variable costs	₹. In Lacs	7.09
3	Fixed costs incl. interest	₹. In Lacs	3.18
4	$BEP = FC/(SR-VC) \times 100 =$	% of capacity	21.93%

#### **16. STATUTORY / GOVERNMENT APPROVALS**

As per the allocation of business rules under the Constitution, labour is in the concurrent list of subjects. It is dealt with by the MOLE at the Central and Departments of Labour under State Governments in respective States / UTs. The MOLE has enacted workplace safety and health statutes concerning workers in the manufacturing sector, mines, ports and docks and in construction sectors.

Further, other Ministries of the Government of India have also enacted certain statutes relating to safety aspects of substances, equipment, operations etc. Some of the statutes applicable in the manufacturing sector are discussed below:

##### **The Manufacture, Storage and Import of Hazardous Electronic Rules (MSIHC), 1989**

These MSIHC Rules are notified under the Environment (Protection) Act, 1986. These rules are aimed at regulating and handling of certain specified hazardous chemicals. The rules stipulate requirements regarding notification of site, identification of major hazards, taking necessary steps to control major accident, notification of major accident, preparation of safety report and on-site emergency plan; prevention and control of major accident, dissemination of information etc. These rules are notified by the Ministry of Environment and

Forests (MOEF) but enforced by the Inspectorates of Factories of respective States / UTs in the manufacturing sector.

Entrepreneur may contact State Pollution Control Board where ever it is applicable.

## **17. BACKWARD AND FORWARD INTEGRATIONS**

Both forward and backward integration for any Electrical Industry are strategies to gain better control over the supply chain, reduce dependency on the suppliers and increase their competitiveness. The two strategies can help companies reduce their dependency on suppliers and increase their influence over the customers. The benefits of these strategies can be big. Both impact the bottom line directly. Integration happens if a company moves upward or downward in its supply chain. Starting from the suppliers from whom the raw materials are obtained, the chain moves downstream towards the distributors and the retailers. If the suppliers' power is very high, it can create financial burdens for the company. Suppose the number of suppliers of a company is low, then the control in their hands would be low. The burden in that case will fall upon company's shoulders. Its expenditure on raw materials will be high.

## **18. TRAINING CENTERS AND COURSES**

There is no such training required to start this business but, basic Electrical or IC bachelor's degree is plus point for enterpriser. Promoter may train their employees in such specialized institutions to grow up the business. There are few specialized Institutes provide degree certification in chemical Technology, few most famous and authenticate Institutions are as follows:

1. Department of Electrical LD College of engineering  
No.120, Circular Road, University Area, Navrangpura,  
Opposite Gujarat University, Ahmedabad, Gujarat 380015

2. MIT College of Engineering, Pune  
Gate.No.140, Raj Baugh Educational Complex,  
Pune Solapur Highway,  
LoniKalbhor, Pune – 412201  
Maharashtra, India

Udyamimitraportal ( link : [www.udyamimitra.in](http://www.udyamimitra.in) ) can also be accessed for handholding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates all over India.

**Disclaimer:**

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.