







#### WELCOME TO **SIGNUM**

Signum is building the future with Eco-Smart manufacturing. Signum is premier manufacturer of printed circuit boards for the wide range of electronics industries. Our vision is to be leader in the sustainable production of high technology PCB.

#### About Us

Founded in 2011, we are one of the leading world class PCB manufacturer with focus on high mix, high technology and high-quality circuit boards. We offer a wide array of PCB and capabilities including multi layer 4-6 layers, double side, single side and metal core. Signum specializes in helping our customers take complex design from prototype to volume production. Engineering group provides material suggestions and DFM guidance. We are eager to share our expertise with board designers to ensure they are optimized for manufacturability and cost.







#### What We Do:

Signum offers quick turn prototypes and production of PCBs in volume. Our goal is sustainable and "green" production of high technology products.

#### Why Signum:

Cutting-edge manufacturing power and Comprehensive Services.

Direct manufacturing products with multiple facilities, which means you have a direct relationship with a partner who listens and responds to your needs.





#### Wide Range of Capabilities:

Having a wide variety of PCB technologies and materials, Signum is the one shop solution to all your circuit board needs and we provide early design support, DFM and quick turn prototypes.

Relentless investment in innovation: To ensure we offer the best solution to our customer. We constantly invest in state-of-the-art equipment and latest process technologies.

Commitment to the environment and care for our customers: Signum is dedicated to responsible and sustainable manufacturing, and our goal is to be a world leader in PCB manufacturing.

Experienced and knowledgeable leadership: The staff and management team at Signum have extensive industry experience and they come from diverse international backgrounds.

Responsive customer support:

We have established a network of direct location and sales representatives to provide prompt technical support and customer service.

Services:

Prototype to production, quick term service, design support, All India services, Logistic solutions.



# SUCCESS Finance

# Our Vision

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• To be technologically competent, by partnering with customers in terms of quality, reliability, cost and quick time delivery.



# Our Mission

Signum aims at providing world class service to all the customers through strong commitment and customer-centric approach ensuring high quality and reliability, thereby strive to maintain the position at the forefront of latest global technology.

# QUALITY . COMMITMENTS

The key factor in our success is HIGH QUALITY PRODUCT. We are committed to maintain high quality standards during production process. All material and components are inspected at each stage of production with reference STDs, so that the quality of the final product follows international standards. This whole process is being handled by an expert quality team.



#### Our Accreditations





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Way of Life!	EUKI			MARU	ITI SUZL	JKI INDIA LIM	IITED			
Vendor Quality System Assessment Report - T					II	Issue Deptt.	SC-CGR4	Prepared	Verified	Approved
					er II	Date of Issue		Ravi Kumar	Nidhi	Rajinder Kumar
Copy t	Copy to Supplier name					26th Mar 2023 Ankit Jain			Ankush Bhasker	Sanjay Setia
SC	1				Sumplier Ottendent Name				Audit Date	
QA	1	M/s S	ignum Elect	ro Pvt. Ltd	District	Supplier Attendant Name			4th Max 2022	
Tier-1	1	Solan,Hi	imachal Pra	desh,173205	5 Mr. Akshat Jindal (Director)			4tri war 2023		
Tier-2	1					Mr. S. Sangwan, (Corporate GM) Mr. Naidu, (DGM-Quality)			Audit Person	
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		(Audit Score)				Mr. Kamal De	ep Singh (Mkt.			
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Part /						me:			Bare	PCB





#### Our Team

Highly experienced team with extensive knowledge in PCB Manufacturing.

Total Quality Management practices ensures quality product from each process.

Our cross functional teams works in tandem to achieve high quality as a Commitment.

#### **Our Milestones**

Excellence is the gradual result of always striving to do better.



2023-24

2022-23

**SAP Implementation** 

in Unit-1 & Unit-2

Achieved Maruti Green in SEL



#### Our Future Goals/Upcoming Investment in Signum Group

"Goals are the fuel in the furnace of achievement."

SAP implementation

ISO 14001:2015 & OHSAS certification – Mar'25 First Stage Audit

> Upcoming Multi layer in Jammu with minimum investment of 16 million USD



#### Sales Turnover (in Crores)



Expected Turnover in 2024-25 will be 310Cr.



#### Business Segment



#### Automotive Lighting Consumer Electronics Home Appliances Medical Equipments

#### PRODUCT PORTFOLIO





LIGHTING-4W MF SWITCH ECU/AMT/BCM/BMS STEERING MOUNT CONTROLS



SWITCH /USB/SENSOR REGULATORY RECTIFIER INSTRUMENT CLUSTER LIGHTING-2W



EV CHARGER BATTERY CHARGER



INVERTOR



SMART METER



CONSUMER LIGHTING



#### Our Capabilities

Laminates: FR-4, ALCCL, CuCCL, FR-1, CEM-1 (Make : Wazam (H130,140A), Leson (LS1141, LS1170) & Nanya Plastics (NP175))

•PCB Thickness: 0.8 mm to 3.2 mm

•Finished Cu Thickness: Up to 210 microns

•Maximum PCB Size: 1200 mm x 500 mm

•Minimum Track Width: 0.10 mm (4 mil)

•Minimum Track Spacing: 0.10 mm (4 mil)

•Minimum Hole Diameter: 0.15 mm

•Specification Standards: IPC-A-600, IPC-TM-650, IPC-SM-840, MIL-55110

•Surface Finish: Lead & Lead free HASL, OSP ,Lacquer, Immersion Tin, ENIG & Hard Gold

•Special Finishes: Carbon Contacts, Peelable Mask, Metal Caping etc.





#### Data Server Room

• We at Signum group believe that data is the core to all operation, and we consider customer data privacy as our utmost priority. Taking this into consideration we have installed state of the art 1000 TB inhouse data center powered by DELL Corporation.

• This system helps us operate SAP software to micromanage all our plants and operations.









#### **OEM's Facilitated**





#### **Key Operations**

- 1. RM Receipt Insp & Storage
- **2.** Blanking
- **3.** CNC Drilling
- 4. Deburring / Ultrasonic
- **5.** Direct Plating Process
- 6. Photo Printing
- 7. Electro Plating (Cu,Sn)
- 8. Micro Section

- 9. Dry Film Stripping
  10. Alkaline Etching
- **11.** Tin Stripping
- **12.** Masking
- **13. HAL/LFHAL**
- **14.** Legend Printing
- **15.** Drilling NPTH
- **16.** Routing

- **17.** V-Grooving
- **18.** ENIG
- **19.** Final Cleaning
- **20.** BBT
- **21.** OSP
- **22.** Final Quality Control
- **23.** Packaging & Dispatch

#### RM Receipt Insp & Storage

Inspection & storage : Here RM shall be received by stores & stored in defined area , Incoming quality control team will do inspection & ensures that received material are meeting required specification ,then it will be labelled, handled in a manner designed to prevent damage, mix-up, contamination, and other adverse effects & stored as per defined process.



# Blanking

It is a process in which we cut the laminate sheet into production panel as per cutting plan. After that corner rounding and edge grinding is done.



#### **CNC** Drilling

Drilling is a mechanical process in which the PCB gets drilled using a drill bit to achieve a specific hole size. We are using German Technology CNC machines.

Machine Spec :

Origin : Germany Max.RPM : 1.8 Lacs Min.Hole Dia. : 0.15mm



#### Drilling QC

• Automatic hole checking machine used to verify any drill issues, like half drill, broken drill bit, excess burr, high dust, hole blockage, missed hole etc. This machine is used to eliminate human error.





#### Deburring / Ultrasonic

• Drilled holes clean using ultrasonic process to remove the epoxy smear from holes and burr removed from surface.

## **Direct Plating Process**

Conductive deposition will be done using graphite content.



#### Photo Printing

- Photo polymer film laminated on the panels and aligned with diazo film with respect to the holes, then exposed using led light after that developed panels using conveyorized line.
- 100% inspection being done using AOI.
- Class 10,000 Clean Room.

#### Electro Plating (Cu,Sn)

- Cu layer is deposited on the printed circuit boards. On structured surfaces (resists) this is called Pattern Plating.
- Over this Tin plating shall be carried out to protect plated copper in further process.(SES / Etching process).
- Technology Partner : Atotech mks (MNC based in Germany)



#### Micro Section

 Micro-Section Analysis or Cross-Section analysis is one of several inspection processes to measure the quality of PTH. Micro-Section Analysis is an effective tool for failure analysis as well as in-process verification.

#### SES

• The panel will be passed through conveyorized line, which removes copper from the surface of the PCB in order to reveal the desired circuit pattern. During the PCB etching process, all copper is removed except the circuitry that is protected by tin plating.



#### Etching QC

• AOI is used after the etching process to check different defects like Line width violations, spacing violations, excess copper, short or open circuits, etc.



#### Masking

 First the copper surface is roughened for better printing during the masking process. This process is also known as brushing. Then panels are coated with solder resist ink using printing machine tack drying done for 30 mins. Then masking film aligned for exposing the panel through led light.

- Finally, the panels are passed through conveyorized developer
- Class 10,000 Clean Room.

#### HAL

 HASL or HAL (for hot air (solder) levelling) is a type of finish used on printed circuit boards (PCBs). The PCB is typically dipped into a bath of molten solder so that all exposed copper surfaces are covered by solder. Excess solder is removed by passing the PCB between hot air knives. Both Tin leaded (63/37) & Lead-Free solder is coated in this process as per customer need.



#### Legend Printing

- The legend printing process prints all the vital information on the board, as per customer requirement. Silkscreen or component identification are terms used for these text layers. We refer to them as the Legend layers of a PCB. They are available in various color as desired by customer.
- Inkjet printer is added to increase production as well as quality of the product.





#### Drilling NPTH

 NPTH (Non-Plating Through Hole) refers to a hole without copper in the borehole wall. It is generally used as the positioning hole and screw hole of PCB. The hole diameter is usually larger than PTH. In most of the cases this will be carried out in second stage drill after legend printing.



#### Routing

 In this process the production panel is being routed into customer required sizes and the dimensions will be as per the mechanical drawing.



#### V-Grooving

 V-grooving is also named as V-Scoring or Vcutting, it is a way to split circuit boards(De-Paneling). It is cutting a "v" groove on the top and bottom of a circuit board as per customer requirement, while leaving a minimum amount of material in place to hold the boards together.



#### Surface Finish (ENIG / IMMERSION TIN / OSP)

Electroless nickel immersion gold (ENIG) is a type of plating commonly used for printed circuit boards. Electroless nickel immersion gold plating consists of a layer of gold over a layer of nickel. One of the main reason for doing Gold is for its corrosion resistance and uniform plating deposit.

OSP is "organic solderability preservatives", and it's also called anti-tarnish. It refers to a layer of organic finish generated on clean and bare copper by adsorption. On the one hand, this organic finish can stop copper from being oxide, thermal shock or moisture.

Immersion Tin: The tin metal plating layer is chemically deposited on the copper surface.

#### **Final Cleaning**

• Here panels shall be cleaned with D.I. water to remove any dust & other contamination on the boards and prepared for final inspection.



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#### **Electrical Testing**

 Bare Board Testing or Electrical Testing of the non-populated circuits board is a test that ensures the working of the circuit of your PCB by testing it to the electrical footprint of customer design. Various technology like, Dedicated, Universal testing, Flying probe & 4Wire testing machine are used for testing PCBs.

#### Final Quality Control

- The final product quality control before packing, where products are wrong will be detected at this stage. **Final quality control** is to discover nonconforming products, then to find the unqualified conditions, and it may return to the process or semi-finished stage to repair. Finally, it needs to re-inspection, and to be detected once again through FQC.
- Inspection through AVI (Automatic Optical Inspection)
- Inspection through Hole Checker Machine





#### Product Testing Standard

The final product gone through below testing before packaging & Dispatch;

- Solderability Test
- Thermal Shock Test
- Peel Strength Test
- Surface Insulation Test
- Ionic Contamination Test
- Masking & Legend Adhesion Test
- Micro-section (PTH,Surface,Masking & Tin)
- Bow & Twist
- Dimensional & Profile with VMS

# Packaging & Dispatch

 OK Panels are packed using Vacuum packing machine, and as per agreed packing standards with customers.





## Packaging Standard

(A			PACKING ODERATION STANDARD									Doc No, Rev No: FM/ST/05, 04		
	SIENUM	PACKING OPERATION STANDARD								Date : 17.04.2022				
Sr. No.	Category/ Customer(s)	Butter Paper	Silica Gel pouch	Humidity Indicator Card	Packet Sticker (100*50 mm)	Printed Tape (2 inch)	Thermocole Sheet (Filler)	A Foam Sheet (Filler)	Strip Roll	Brown Box (With unprinted tape) (7 Ply)	Corrugated Box Printed (7 Ply)	Corrugated Box size (300*280*200, 390*360*110, 600*280*125 mm)	Sticker on corrugated box	
1	Products with White Mask Ink	~	~	1	1	~	~	~	~	5/	1	As per supply panel size	~	
2	Beam Infotech with white mask ink	~	~	~	~	~	~	1	~		~	As per supply panel size	~	
3	Other Automotive customers		~		~	~	~	~	~	14. A.	1	As per supply panel size	~	
4	SMD,CIRCUIT SOL. TISCON, DMS		~		1	and a	~	~	1	~		As per supply panel size	~	
5	Other Non Automotive customers		~	×	~	~	1	~	~		8	As per supply panel size	~	
	Prepared By:								Approved by:					



#### Inspection Lab Equipment

Fischer scope



40 X Digital Microscope





XRF – For Surface finish thickness (ENIG,Hard Gold, Copper, Tin,OSP) Wet Masking Thickness Gauge



**Oven Profiling Instrument** 





#### Inspection Lab Equipment

OSP Thickness Tester

Peel Strength Tester





Dust Monitoring





### Inspection Lab Equipment





Ionic Contamination Tester

XY Co-ordinate Machine

Surface Insulation Tester

#### UTILITY

#### Caterpillar DG

- 100% Power Backup
- Capacity : 500 KVA

#### Kaeser Compressor

• Capacity : 55 & 75 KW







#### Corporate Social Responsibility

Signum believes in its core in contributing towards the society and the community. We provide free admission to mediatorial student in Management funded trust namely New Horizon School. We also regularly initiate programs like :-

- Medical Camp
- Eye Check Up Camp
- Blood Donation Camp
- Tree Plantation Drive





#### ROAD MAP FOR SHOP FLOOR VISIT





#### SIGNUM ELECTRONICS LTD.

Plot no 86,HPSIDC, Industrial Area, Baddi Dist-Solan, Himachal Pradesh, India-173205 Mobile: +91 83 510 70100, 300

#### SIGNUM ELECTROWAVE PVT. LTD

Plot No.- 7 DIC Industrial Area, Baddi Distt.- Solan, Himachal Pradesh, India, 173205 Ph. +91 8351070100,200

### THANK YOU!!

Email : marketing1@signumelectro.com; sales@signumelectro.com

Visit : www.signumelectro.com