

# Get PCB Prototypes Sooner with In-House Rapid PCB Prototyping





**S103**

Status

**ProtoMat**

# Save Time with In-House Prototyping

In-house circuit board prototyping eliminates waiting for external suppliers. With LPKF systems and solutions, even complex PCB prototypes can be completed and tested in a single day. Extended delays in development are a thing of the past. Projects are completed sooner – reducing time to market.

The LPKF product line fully covers every step of the prototyping process, from structuring to SMD assembly. All methods are designed for ease of use so that even inexperienced users can quickly produce high quality prototypes. Depending on the components the entire process can be completed without chemicals.

Advantages of in-house Rapid PCB Prototyping:

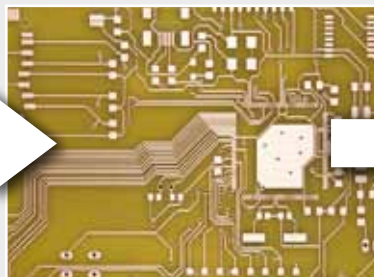
- Chemical-free production possible
- Development process without delays
- Quicker marketability
- Layout data remains in-house

## 1, 2, PCB

### Finished Prototypes in just a few Steps:



From idea, ...



... to structured panel, ...



.. to finished circuit board!

### Coordinated systems – rapid results

With LPKF equipment, prototype fabrication, from data preparation to assembly, takes only one day. LPKF systems can produce multilayers of up to eight layers in addition to single and double-sided circuit boards. They even handle RF and microwave circuit board manufacturing with ease.

All LPKF systems are perfectly coordinated to ensure the fastest possible production process: once the data has been imported an LPKF circuit board plotter will mill and drill. The structured circuit board is then used as a substrate that can be through-plated, laminated and populated. Complete sets for applying solder resist and screen printing complete the product line.

Find more information about applications, systems and methods in the current product catalog available at [www.lpkf.com](http://www.lpkf.com). Feel free to contact us with any questions: +49 (5131) 7095-0.

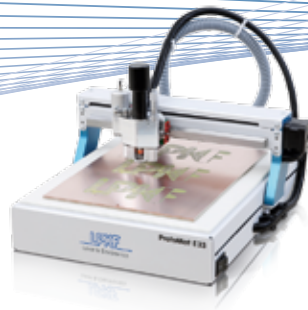
# A Complete Line for Rapid PCB Prototyping

## Structuring

LPKF circuit board plotters create conductive paths and pads by milling insulating paths. The insulating paths separate the electro-conductive copper surfaces, forming the network of conductive paths. Next, all the required holes are drilled. The LPKF ProtoLaser S implements conductive paths faster and more accurately than mechanical methods.



LPKF ProtoMat S103



LPKF ProtoMat E33



LPKF ProtoLaser S

### Milling and Drilling

#### LPKF ProtoMat S series

LPKF ProtoMat S series circuit board plotters are ideal for any prototyping or small batch application, including multilayer, RF, and microwave designs. The ProtoMat S series offers models with a variety of features to meet your needs. The ProtoMat S series is designed to expand as your needs evolve. The starter model S43 can be upgraded to the flagship S103. This protects your investment for future requirements. With features like equipped tool change, fiducial camera and vacuum table ... nothing stands in the way of fully automated machining.

#### LPKF ProtoMat H100

The top of the line model H100 is designed for large substrates and a high level of automation. Its 30-position tool change and high-speed spindle also make this circuit board plotter an excellent solution for sophisticated small batch production.

#### LPKF ProtoMat E33 – quality entry

The latest entry-level system is the LPKF ProtoMat E33. Perfectly suited for milling and drilling circuit boards this ProtoMat is specially designed for training. It's not much bigger than a size A3 sheet of paper and requires only a power connection and dust extractor to operate.

### Laser Structuring

#### LPKF ProtoLaser S

The LPKF ProtoLaser S laser system structures entire circuit boards in mere minutes. The short production times allow multiple iterations to be tested without delay. The ProtoLaser S produces high-quality prototypes and small batches on short notice as needed.

Laser structuring is significantly more accurate than mechanical systems, making it ideal for RF and microwave circuits in addition to digital and analog circuits. It places exact geometries on various substrates such as copper-clad FR4, aluminized PET film, ceramics, Duorid or PTFE.

## Through-Hole Plating

Through-hole plating is a basic requirement of double-sided or multilayer circuit boards. During this process the circuit board layers are connected by metalized drill holes.



LPKF ProConduct



LPKF Contac RS and LPKF MiniContac RS

### Non-Chemical Method

#### LPKF ProConduct

LPKF ProConduct through-plates double-sided and multilayer circuit boards with a conductive paste. The method is easy to use and requires no chemical baths. Its non-chemical through-hole plating takes a fraction of the time required for electroplating. Even RF applications can be through-plated using this equipment.

### Galvanic Method

#### LPKF Contac RS and LPKF MiniContac RS

The LPKF Contac RS and the MiniContac RS are compact desktop systems for voltaic through-hole plating of PCB prototypes and small batches. The chemical method is self-contained and virtually maintenance-free, allowing the systems to be operated with no special knowledge. Reverse Pulse Plating ensures reliable electroplating for fine-sized drill holes.

## Bonding Multilayers

Multilayers consist of multiple stacked circuit boards with four or more circuitry layers. The LPKF Multilayer press bonds the individual layers to form a multilayer.



LPKF MultiPress S

## Surface Finishing

LPKF ProMask solder resist masks prevent short circuits during soldering and protect the circuit board from outside influences. The ProLegend assembly print marks the location of components on the circuit boards and adds any markings.



LPKF ProMask

### Multilayer

#### LPKF MultiPress S

The LPKF MultiPress S is a desktop system for bonding multilayers. Its short cycle time, production reliability and ease of use make it an ideal tool for producing multilayer prototypes and small batches. The system will bond up to eight layers of rigid, rigid-flex or flexible circuit board materials. Special process profiles allow even RF materials to be bonded.

### Solder Resist Masks and Assembly Print

#### LPKF ProMask and LPKF ProLegend

LPKF ProMask quickly and easily adds solder resist masks to circuit boards. Solder resist masks enable safe soldering of SMD or conventional components. LPKF ProLegend works similarly using a simple assembly print method.

Both the ProMask and ProLegend methods are based on manual paint application and a simple photo-optical exposure process making them cost-effective solutions. There are no environmental specifications for the component disposal.

For an overview of all systems visit  
[www.lpkf.com](http://www.lpkf.com).

## SMD Assembly

Component assembly begins with an accurate application of soldering paste to any contact points. Once the components have been positioned, the soldering paste is cured inside the reflow oven. LPKF systems make the entire assembly process simple and reliable.



LPKF ProtoPrint S

LPKF ProtoPlace S

LPKF ProtoFlow S

### Soldering Paste Printing

#### LPKF ProtoPrint S

LPKF ProtoPrint S and ProtoPrint S RP are manual SMD fine-pitch stencil printers for accurately applying soldering paste onto circuit boards. The desktop systems provide high positioning accuracy, fine contact spacing, easy operation and the ability to use routed polyimide stencils.

Both systems are compatible with many different stencil frames. The LPKF ProtoPrint S RP can also directly tension size A4 polyimide stencils.

### Assembly

#### LPKF ProtoPlace S

The LPKF ProtoPlace S is a semi-automated Pick & Place system for professional SMD assembly of circuit board prototypes and small batches.

A fine adjustment using micrometer screws and the optional camera system allows multi-pole circuits to be positioned. The LPKF ProtoPlace S lowers components via pneumatics, resulting in highly accurate placement.

### Reflow Soldering

#### LPKF ProtoFlow S

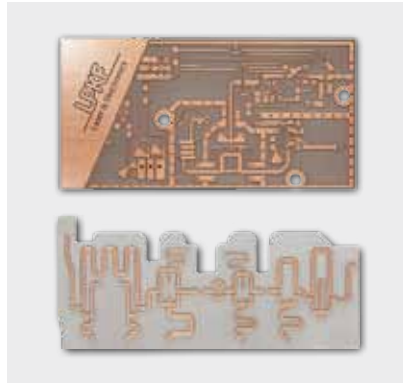
LPKF ProtoFlow S and ProtoFlow S/N2 reflow ovens can be used for SMD soldering with lead solder and lead-free, RoHS compliant solder. In addition, the systems cure the LPKF ProConduct conductive paste. Numerous preprogrammed process profiles with predefined and customizable temperature phases ensure reliable results.

The LPKF ProtoFlow S/N2 uses a nitrogen atmosphere during the soldering process to reduce oxidation, optimizing the soldered connections.

# Applications



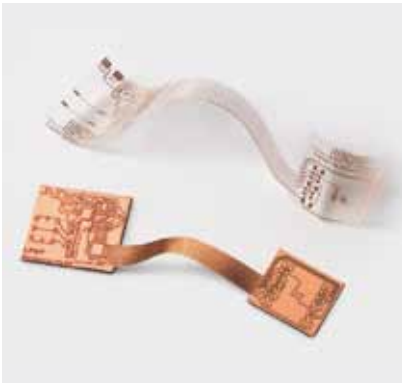
Single-sided, double-sided and multilayer circuit boards



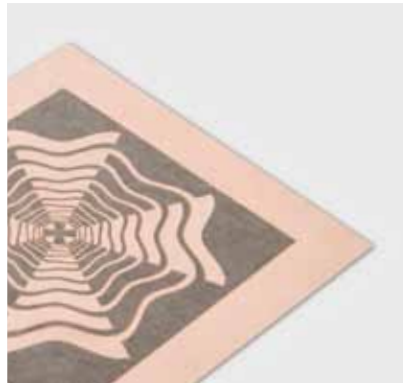
RF- and microwave circuit boards



Milling and engraving plastic and aluminum (2.5 D)



Flexible and rigid-flex circuit boards



Laser-structured ceramic and PTFE

For other applications visit [www.lpkf.com](http://www.lpkf.com)

## Worldwide (LPKF Headquarters)

LPKF Laser & Electronics AG Osteriede 7 30827 Garbsen Germany  
Phone +49 (5131) 7095-0 Fax +49 (5131) 7095-90 [info@lpkf.com](mailto:info@lpkf.com)  
[www.lpkf.com](http://www.lpkf.com)

## North / Central America

LPKF Laser & Electronics North America  
Phone +1 (800) 345-LPKF Fax +1 (503) 682-7151 [sales@lpkfusa.com](mailto:sales@lpkfusa.com)  
[www.lpkfusa.com](http://www.lpkfusa.com)

## China

LPKF Tianjin Co., Ltd.  
Phone +86 (22) 2378-5318 Fax +86 (22) 2378-5398 [sales@lpkf.cn](mailto:sales@lpkf.cn)  
[www.lpkf.cn](http://www.lpkf.cn)

LPKF Laser & Electronics AG sells and markets products and provides support in more than 50 countries. Find your local representative at [www.lpkf.com](http://www.lpkf.com).