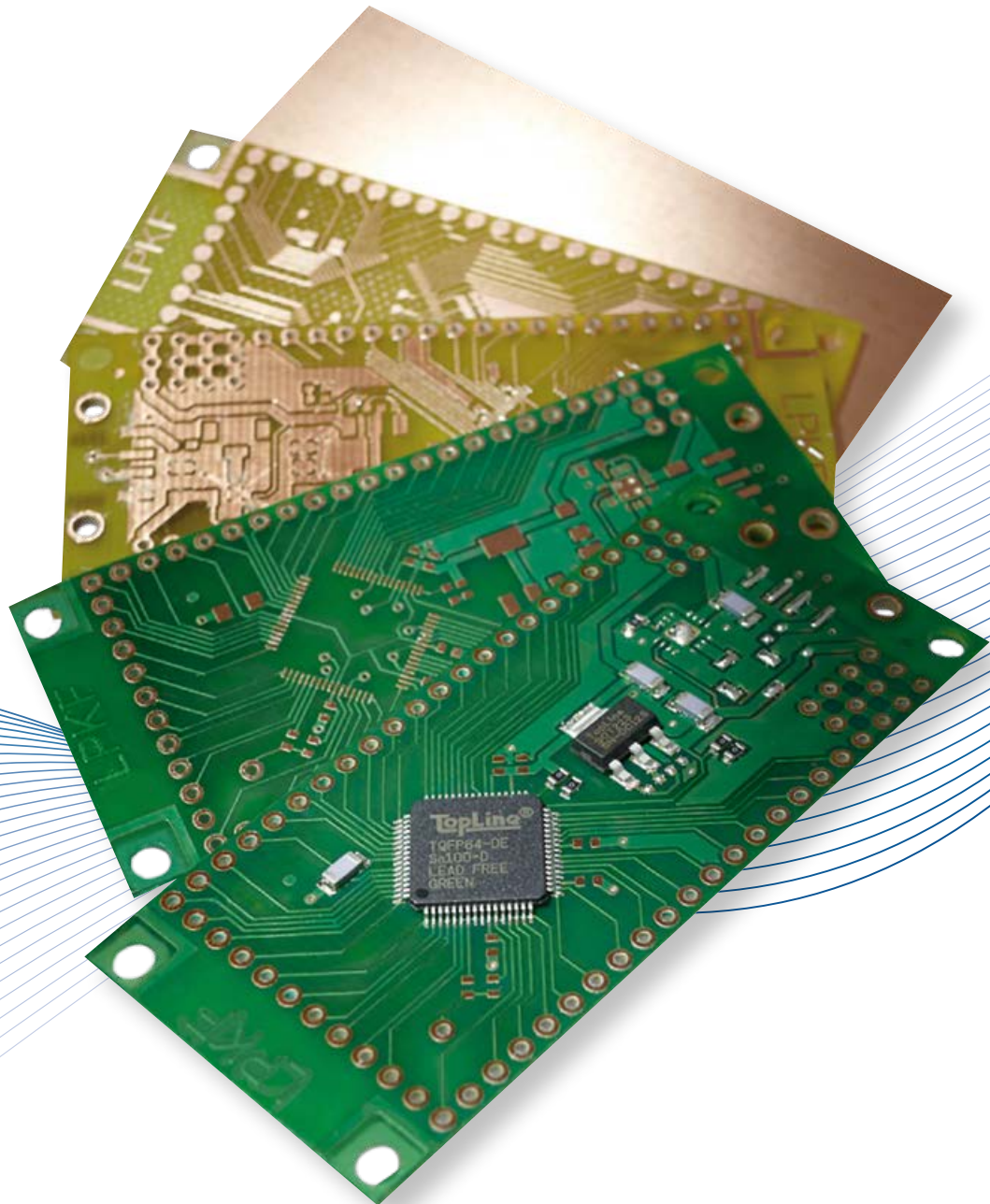


# Get PCB Prototypes Sooner with In-House Rapid PCB Prototyping



# 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. Projects are completed sooner – reducing time to market.

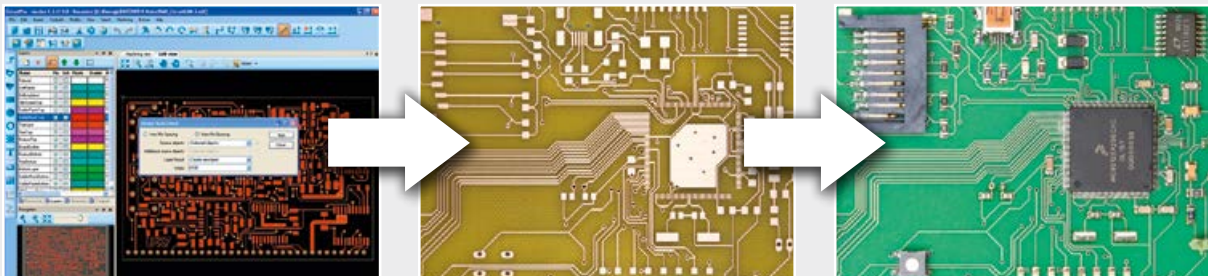
The LPKF product line fully covers every step of the prototyping process, from structuring to SMD assembly. All methods are designed for ease of use so that even inexperienced users can quickly produce high quality prototypes.

## 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, a LPKF circuit board plotter or ProtoLaser will start processing. The structured circuit board is then used as a substrate that can be through-plated, laminated and populated. Processes for applying solder resist and screen printing complete the product line.

You can find more information on applications, systems and methods in our product catalog, available at [www.lpkf.com](http://www.lpkf.com). Please feel free to contact us: +49 (5131) 7095-0.

# A Complete Line for Rapid PCB Prototyping



LPKF ProtoMat S Series



LPKF ProtoMat D104



LPKF ProtoLaser S4 / U4

## Structuring

### Mechanical Milling of PCBs

LPKF circuit board plotters create conductive tracks and pads by milling insulating paths. The insulating paths separate the electro-conductive copper surfaces, forming the network of conductive tracks. Next, all the required holes are drilled.

### LPKF ProtoMat S Series

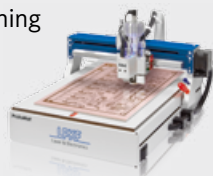
The S series comes, depending on the specific model, with automated tool exchange, fiducial-camera and a vacuum table. So everything is prepared for automated operation.

### LPKF ProtoMat D104

The top-of-the-line model of the ProtoMat series uses the faster mechanical tools on large areas and chooses the UV laser tool for extremely fine structures.

### LPKF ProtoMat E34/E44

The entry-level systems E34/E44 are designed especially for training and for the manufacturing of PCB prototypes from time to time.



### Laser Structuring

Laser structuring implements conductive paths faster and more accurately than mechanical methods. It places exact geometries on various substrates such as copper-clad FR4, aluminized PET film, ceramics, Duorid or PTFE.

The LPKF ProtoLasers can be utilized for manufacturing single prototypes as well as for small batch production. The systems are ideal for RF- and microwave applications.

### LPKF ProtoLaser S4

The specialist for machining laminated materials structures PCBs in minutes. Demanding applications which require exact geometries profit from an optimized laser source.

### LPKF ProtoLaser U4

By implementing a UV laser the ProtoLaser becomes even more flexible and is capable of machining e. g. ceramic material, LTCC and transparent conductive oxides (TCO). Multifunctional and fast – the Swiss army knife for the electronics lab.



LPKF ProConduct



LPKF Contac S4

## Through-Hole Plating

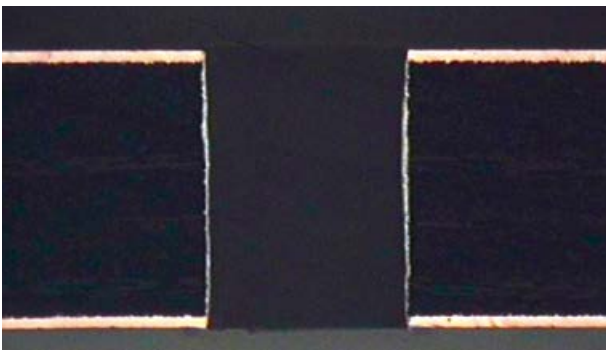
Through-hole plating is a basic requirement of double-sided or multilayer circuit boards. During this process the circuit board layers are connected by metalized drill holes.

### LPKF ProConduct

LPKF 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 or ceramic substrates can be through-plated using this equipment.

### LPKF Contac S4

The LPKF Contac S4 is a compact desktop system for homogeneous 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.



Drill hole diameter: 1 mm. Aspect ratio: minimum 1 : 4 (substrate thickness 0.4 mm x 1.6 mm). 35 microns copper layer. Through-hole plating 20 – 70 microns.



LPKF MultiPress S

## Laminating Multilayers

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



LPKF ProMask

## 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 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 restrictions for the component disposal.

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



LPKF ProtoPrint S

LPKF ProtoPlace S

LPKF ProtoFlow S

## 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 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.

### 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.

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.

### LPKF ProtoFlow S

LPKF 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.

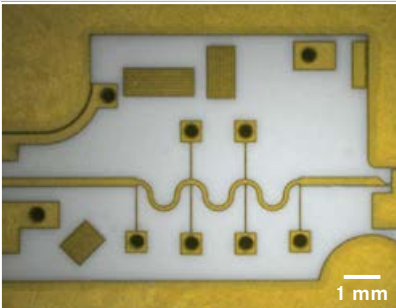
The LPKF ProtoFlow S/N2 uses a nitrogen atmosphere during the soldering process to reduce oxidation, optimizing the soldered connections.

# Pushing the Limits of What is Possible

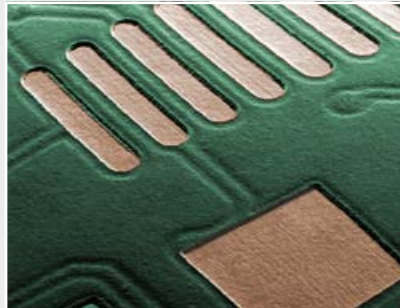
To meet future requirements in the area of fine and micro structuring, growing numbers of researchers and engineers are choosing the LPKF ProtoLaser U. This system has been developed especially for use in electronic labs. Its UV laser source with a 355 nm wave length also processes unusual substrates and material combinations.

The new LPKF ProtoLaser U4 handles the micromaterial tasks with even more detail and precision, especially in the low energy range for particularly sensitive materials. Demanding layouts can be achieved very efficiently thanks to a new process tracking module and vision system.

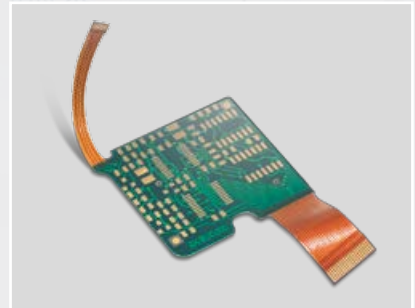
The LPKF ProtoLasers can be rolled through any standard lab door. So your ideas are in good hands – yours.



Structuring, drilling, cutting and carving of ceramic materials



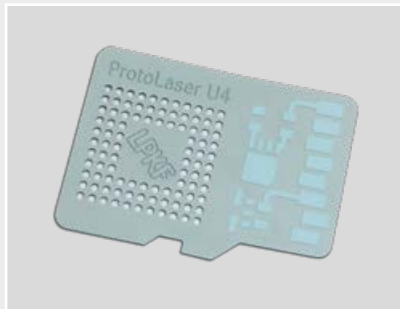
Ablating solder resist and cover layers, creating pockets and blind vias



Cutting and drilling rigid and rigid-flex PCBs



Direct light exposure of photoresists e.g. chemical tin for ultra fine structures

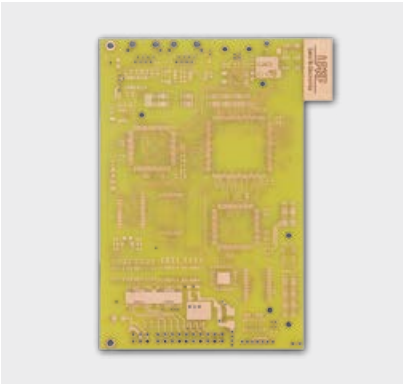


Structuring, drilling and cutting of LTCC

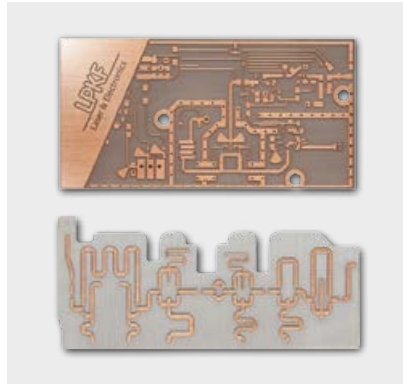


TCO/ITO structuring

# Applications



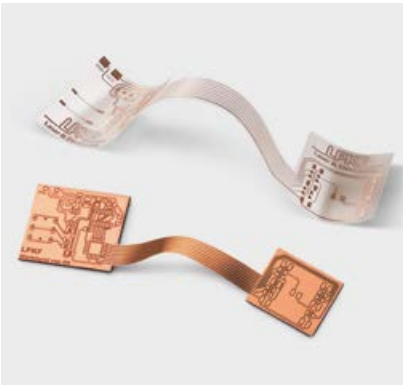
Single-sided, double-sided and multilayer circuit boards



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 [info@lpkf.com](mailto:info@lpkf.com) [www.lpkf.com](http://www.lpkf.com)

### North / Central America

LPKF Laser & Electronics North America  
Phone +1 (503) 454-4200 [sales@lpkfusa.com](mailto:sales@lpkfusa.com) [www.lpkfusa.com](http://www.lpkfusa.com)

### China

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

### Hong Kong

LPKF Laser & Electronics (Hong Kong) Ltd.  
Phone +852-2545-4005 [hongkong@lpkf.com](mailto:hongkong@lpkf.com) [www.lpkf.com](http://www.lpkf.com)

### Japan

LPKF Laser & Electronics K.K. Japan  
Phone +81 (0) 3 5439 5906 [info.japan@lpkf.com](mailto:info.japan@lpkf.com) [www.lpkf.com](http://www.lpkf.com)

### South Korea

LPKF Laser & Electronics Korea Ltd.  
Phone +82 (31) 689 3660 [info.korea@lpkf.com](mailto:info.korea@lpkf.com) [www.lpkf.com](http://www.lpkf.com)

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