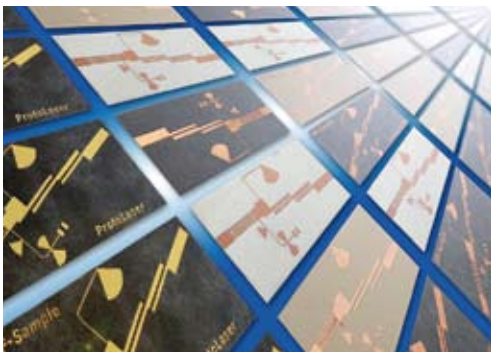
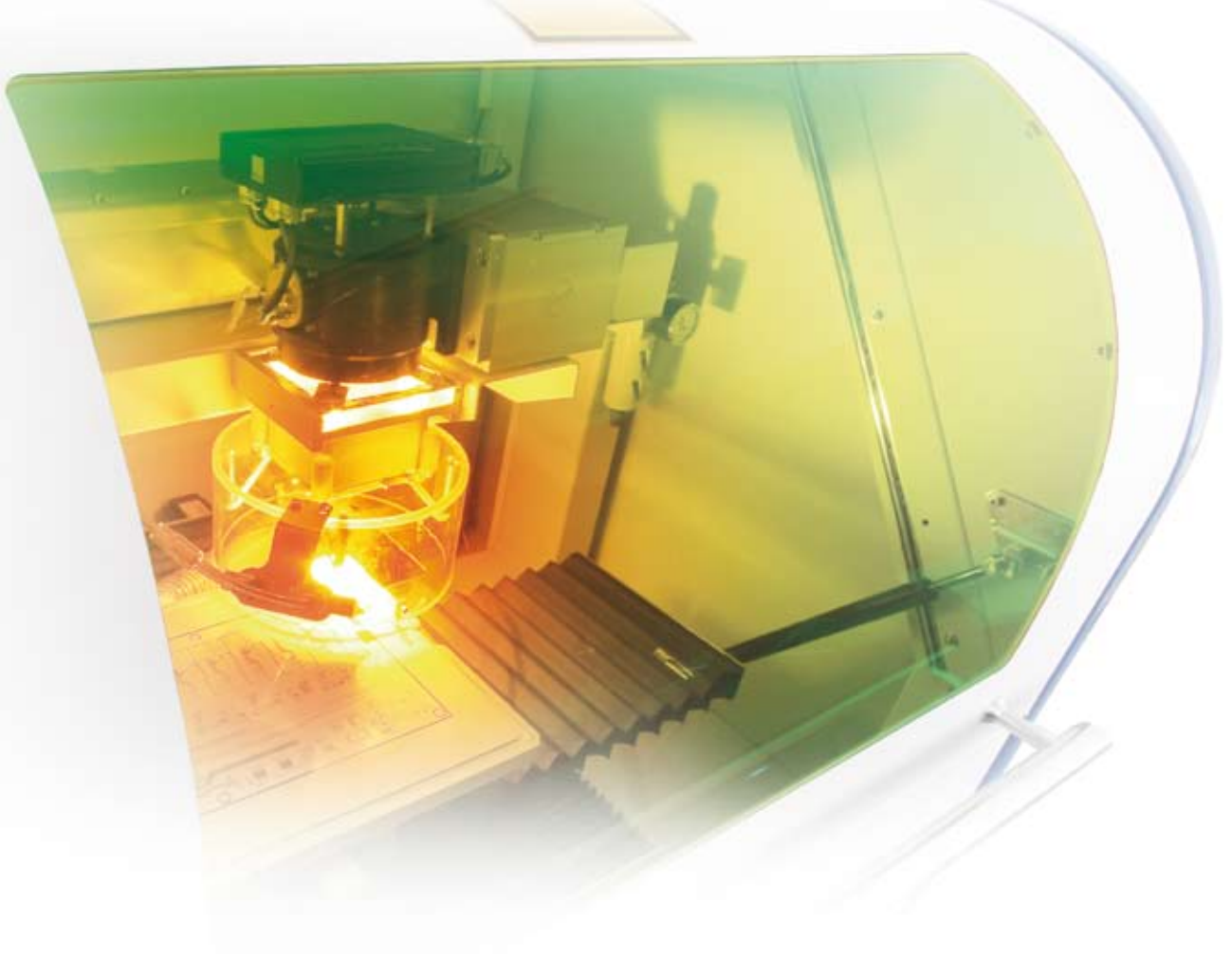


The next generation of inhouse prototyping  
LPKF ProtoLaser S





# PCBs at the press of a button

Getting your hands on prototype PCBs quickly is a crucial advantage in electronics development. This is what the new LPKF ProtoLaser S is all about. The laser system opens up a new dimension in in-house prototyping: it transfers the layout onto the PCB with unprecedented speed and precision – easily and with no chemicals.

## **Slashing development times**

At the same time as circuit layouts become increasingly complex, with the frequent involvement of numerous iteration steps and several prototypes, there is also increasing pressure to shorten development times. Companies gain a vital advantage here if they are able to make prototype PCBs themselves, so they don't have to wait on external service providers. In the same time it takes to prepare an order for external prototype PCB production, the ProtoLaser S can already transfer the complete layout onto the PCB. This slashes development times and cuts time in the production pipeline. The confidential data also stays in-house and away from prying eyes.

## **Produce small batches on demand**

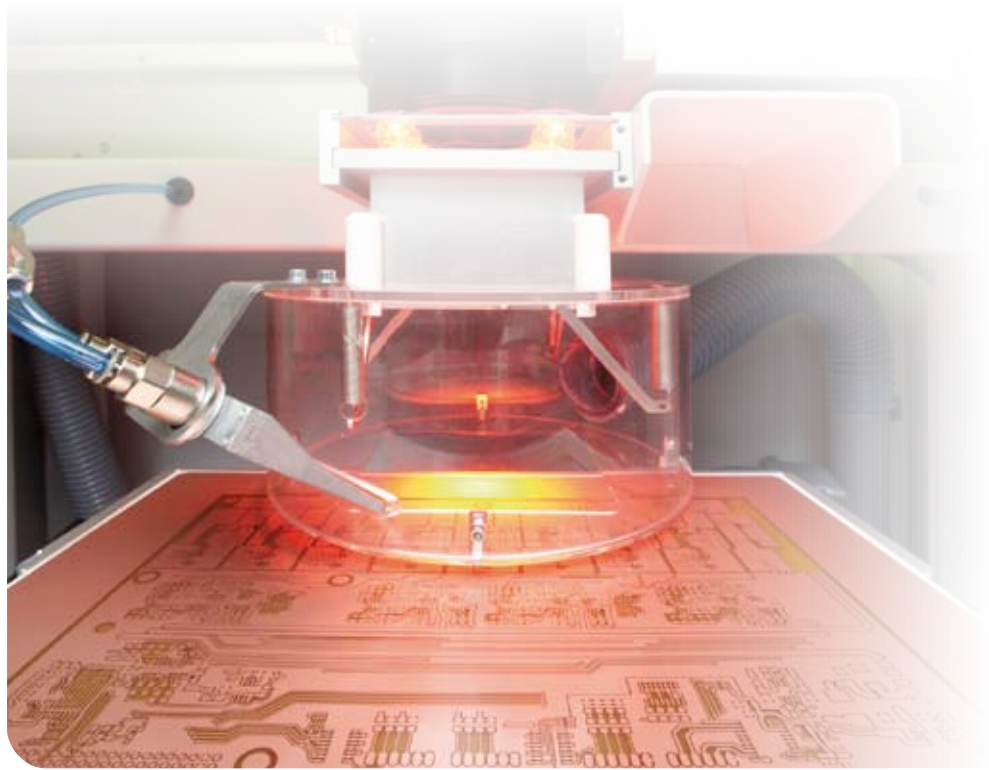
The high processing speed and the simple data handling also make it possible to produce customized small batches on demand. All of the usual PCB materials can be used.

## **Equipped for the future**

The revolutionary tool-less laser processing method can be used to produce lines and spaces, as well as corner radii, which far exceed today's ultrafine technology standards. Process parameters for new materials can be easily established.

# LPKF ProtoLaser S





- High speed laser structuring
- Easy operation
- Minimal line/space width of 50/25  $\mu\text{m}^*$

#### **Short tooling times**

PCBs are securely held on the integrated vacuum table – including thin and flexible substrates. The integrated software safely and simply converts the usual layout data formats into production data. Pre-set processing parameters for standard materials make operations even easier.

#### **Fully automatic production**

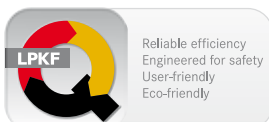
The optimal focus of the laser is adjusted automatically. No tool changes or other modifications are required during production. All that is required is loading new material or flipping the PCB material for double-sided projects. A camera uses fiducials to localize the position of the PCB and align the laser processing accordingly. Double-sided and multilayer PCBs can therefore be manufactured simply and precisely.

#### **Compact and safe**

The ProtoLaser S was specially developed for laboratory use. It is compact and easy to operate. The hood protects the users from noise emissions, and prevents any accidental interference in the operational process. The laser switches off immediately when the hood is opened. The system is classified as Laser Class 1 when in operation.

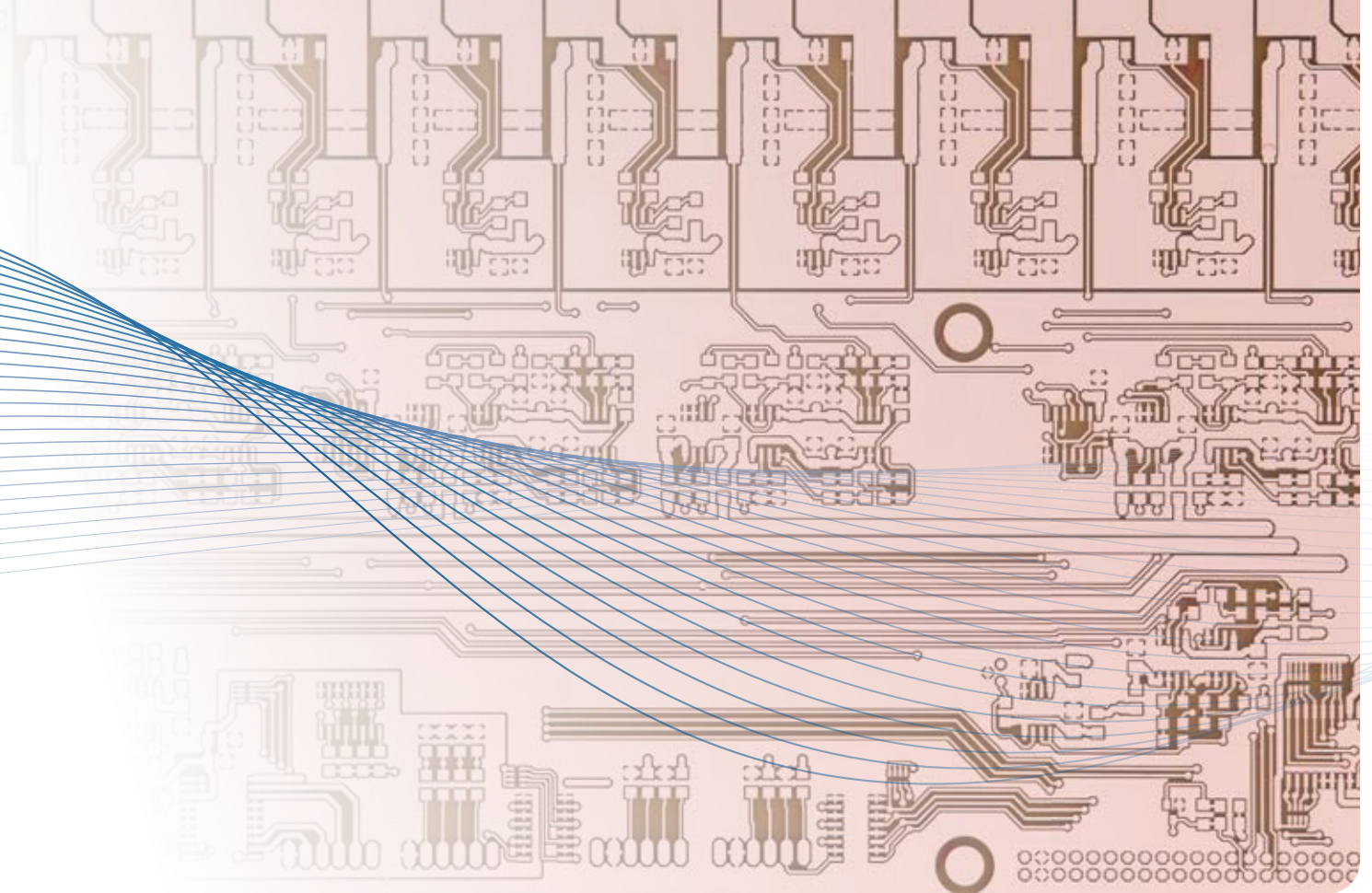
#### **Intuitive software operation**

The software is designed for easy operation of the machine and the smooth import of the usual data formats such as Gerber or DXF files. A whole range of applications can be handled using the pre-set and customized profiles. The software also enables communication with other LPKF systems such as LPKF circuit board plotters.

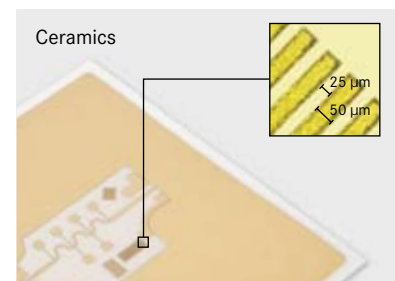


\* with ceramic substrates





## Works with all types of PCB materials



### Circuit layouts structured by laser

The LPKF ProtoLaser S selectively ablates the conductive layer, usually copper, from the substrate. This cuts the insulation channels to precisely create the planned tracks and pad surfaces.

### Areas of application

The ProtoLaser S is ideal for the efficient prototyping of complex digital and analogue circuits, and HF and microwave PCBs, up to 229 x 305 mm in size. The potential to produce highly precise geometries in almost any material makes the ProtoLaser S the perfect system for the production of antennas, filters, and numerous other applications which require precise, steep edge quality.

### High repetition accuracy

The repeatability of the results far exceeds the ability of mechanical or chemical methods, which are also negatively affected by wear and process fluctuations. The ProtoLaser S guarantees constant properties even where many iteration steps are required, and for complete small batches.

### PCB materials

The ProtoLaser S processes a whole range of different substrates, e.g. copper-coated FR4, aluminium-coated PET films, ceramics, TMM, Duroid or PTFE. The contact-free process demonstrates its special benefits when flexible and sensitive materials are involved – which it processes reliably and without causing any damage.

| Technical Data: LPKF ProtoLaser S           |                                                                  |
|---------------------------------------------|------------------------------------------------------------------|
| <b>Max. layout area</b>                     | 229 x 305 x 10 mm (9" x 12" x 0.4")                              |
| <b>Structuring speed</b>                    | Ø 6 cm <sup>2</sup> /min (1 inch <sup>2</sup> /min) <sup>a</sup> |
| <b>Beam diameter in focus</b>               | 25 µm (1 mil) <sup>a</sup>                                       |
| <b>Minimum track/gap</b>                    | 50 µm/25 µm (2 mil/1 mil) <sup>b</sup>                           |
| <b>Resolution scan field</b>                | 2 µm (0.08 mil)                                                  |
| <b>Repeatability</b>                        | ± 2 µm (± 0.08 mil) <sup>c</sup>                                 |
| <b>Laser pulse frequency</b>                | 10–100 kHz                                                       |
| <b>Machine dimensions (W x H x D)</b>       | 875 x 1,430 x 750 mm (34.5" x 56.3" x 29.5") <sup>d</sup>        |
| <b>Machine weight</b>                       | 260 kg (573 pounds)                                              |
| <b>Operation environment specifications</b> |                                                                  |
| <b>Electric supply</b>                      | 110/230 V, 50–60 Hz, 1.4 kW                                      |
| <b>Compressed air supply</b>                | 8 bar (116 psi), 160 l/min (3.5 cfm)                             |
| <b>Cooling</b>                              | Air-cooled (intern cooling circuit)                              |
| <b>Ambient temperature</b>                  | 22 ± 2 °C (68 °F ± 4 °F)                                         |
| <b>Required accessories</b>                 | Exhaust unit, air compressor                                     |

a Ø based on 18 µm Cu

b Note that the size of tracks and gaps depend on material and laser parameters

c This value reflects direct repeated movements of the laser beam

d Height with open working door 1,730 mm (68.1")



This machine is designed as a Class I Laser Product during normal operation.

In maintenance mode this system becomes a Class IV Laser Product.

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