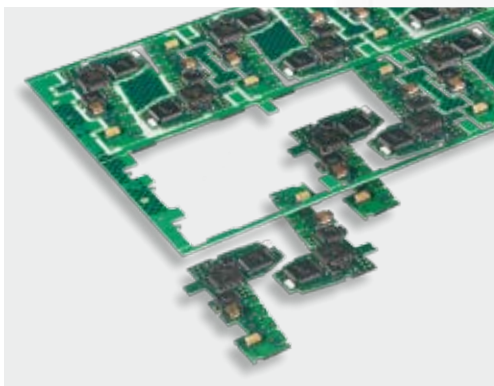


Stress-Free Depaneling of Assembled Boards

LPKF MicroLine 6000 S





Laser Depaneling – Closer to the Edge

The LPKF MicroLine 6000 S helps to significantly improve the process control in PCB depaneling operations: The laser process keeps delicate components, soldered connections and sensitive substrates free from any mechanical stress. At the same time the LPKF MicroLine 6000 S produces more value per panel by cutting with minimal spaces between the boards – components can be placed right next to the edge of the board to minimize size and weight.

Stress-Free Cutting of Populated Boards

The LPKF MicroLine 6000 S is ideal for clean and particulate-free separation of single boards from a larger panel of flexible, thin rigid and rigid-flexible materials. The need for accurate board outlines turns from a challenge into an advantage. The system features a clearance between the laser head and the working area surface of 30 mm, on a large area of 610 x 457 mm (24" x 18"). This allows for processing populated PCBs with surface mount devices (SMD) on both sides. The novel production-ready design provides simple integration into the production line.

Fast Return on Investment

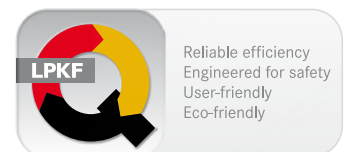
Tooling expenses and costly fixtures for die-cutting and other conventional methods can be eliminated as soon as production with the LPKF MicroLine 6000 S begins. Fast and simple set-up for a variety of products contributes

to reduced production expenses. Due to the non-contact process, standard SMT carriers can be used throughout the whole production process. Significant yield improvements also help to cut costs. The focus spot of the laser beam is ideal for very narrow channel cuts, and very small radii. This saves space and material. Smallest dimensions and tolerances open up new markets.

Worldwide Support

LPKF MicroLine users all over the world enjoy the quick link to our application centers in Germany, the United States and China. There they receive support for new projects, new processes, and applications based on LPKF's years of experience in laser material processing. Training for your operating staff and technical service completes the beneficial relationship with the world leader in PCB laser cutting.

LPKF MicroLine 6000 S





- Maximum throughput
- Easy operation
- High component clearance

Constant Scan Technology for Maximum Throughput

Cutting while moving the scanning head – the Constant Scan Technology eliminates unproductive time. Integrating a powerful UV laser source and a high speed linear positioning system the LPKF MicroLine 6000 S delivers unique throughput.

Production Ready Right Away

The MicroLine 6000 S features integrated feeders and SMEMA-compatible interfaces. The gantry architecture allows for transportation of the applications through the machine via conveyor handling or by operating a load/unload unit.

Clean Process

The material evaporated by the laser energy is efficiently removed by LPKF's special exhaust system to provide clean boards, and to avoid pollution in the work environment. Particles are kept clear of the system's optics to reduce the frequency of maintenance.

Easy Machine Control

The data handling is very convenient and reduces changeover time to a minimum. Parameters are easy to choose with intuitive menu driven software. All common data formats are supported.

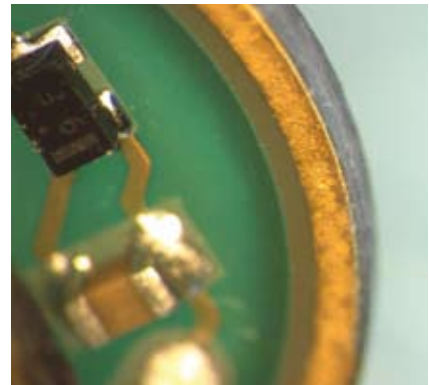
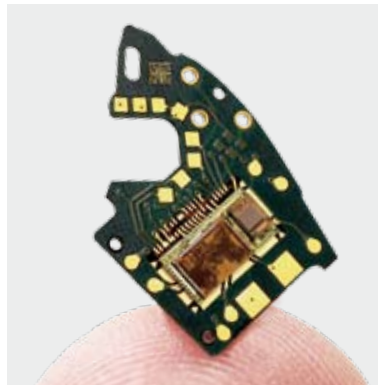
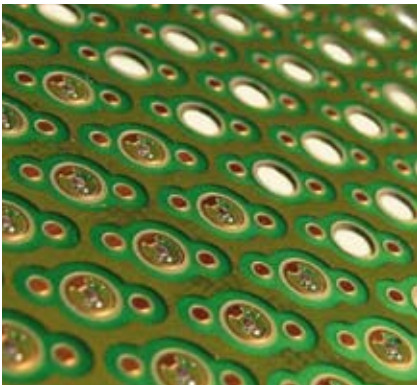
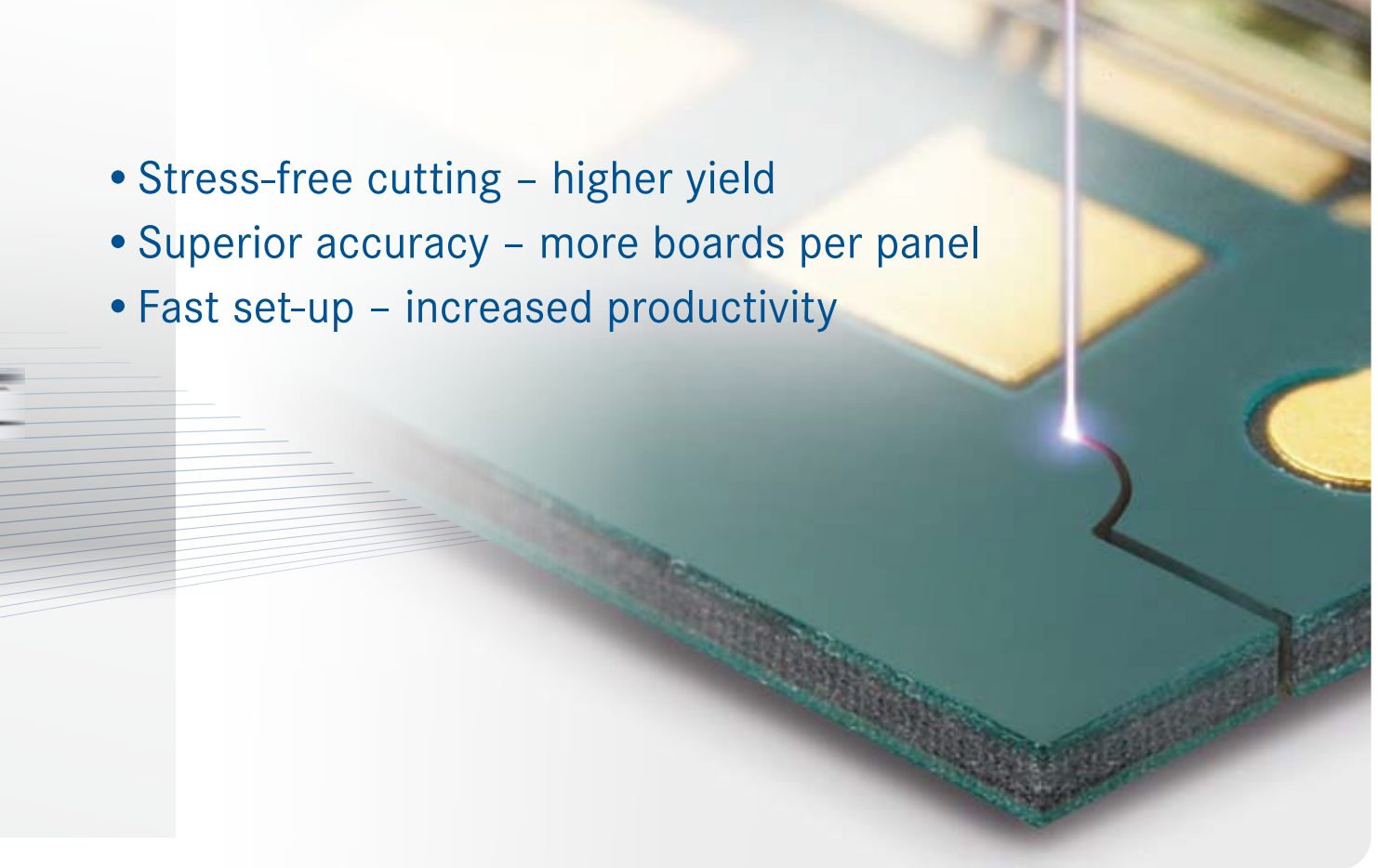
Process-Integrated Quality Assurance

A new drift compensated scanning head and an automatic power adjustment function ensure high process stability for the LPKF MicroLine 6000 S. Due to these robust features the system is capable of cutting at controlled depths – a special advantage when it comes to cutting board outlines beneath overhanging components.

Integration in Manufacturing Execution Systems (MES)

The LPKF MicroLine 6000 S includes interfaces for integration in an overall MES infrastructure. This supports the collection of operational data, machine assignment, tracking & tracing, as well as product-routing.

- Stress-free cutting – higher yield
- Superior accuracy – more boards per panel
- Fast set-up – increased productivity



Depaneling of Assembled Boards

The LPKF MicroLine 6000 S is perfect for cutting break-out tabs and complex contours in rigid, rigid-flex and flexible PCB substrates – thin and flexible materials in particular. The system provides clean cuts in PI, FR4, FR5, and CEM materials. Further materials include polyesters, ceramics and other RF-materials.

Sensitive, Accurate Process

The non-contact process prevents mechanical deformation – the laser beam singulates boards keeping delicate circuits safe. Micro cracks or delamination effects are no longer an issue; as well as dust/particles on the board or burr formations. The LPKF MicroLine 6000 S allows for optimum yield and helps to meet tight tolerances with perfect accuracy.

Arbitrary Shapes, Narrow Cuts

The laser cuts virtually any shape with minimal spaces between the single PCBs. Densely populated boards and closely arranged panels provide for an increased net usable surface. Special clamping or fixtures are not required because the only mechanical-dynamic forces acting on the boards are associated with the handling equipment. The LPKF MicroLine 6000 S is capable of processing boards with assembled components on both sides.

Efficient High Quality Production

Changeover times and time-to-market are no longer dependent on tools and complicated adapters; only the layout data has to be uploaded. The MicroLine 6000 S is especially suitable for small, sensitive PCBs with narrow spaces on the panel – for increased operational capacity at a better quality.

Technical Data: LPKF MicroLine 6000 S

Working area	610 mm x 457 mm x 50 mm (24" x 18" x 2")
Accuracy	±20 µm (0.8 mil)
Data input	Gerber, X-Gerber, DXF, HPGL, Sieb & Meier, Excellon, ODB++
Laser wavelength	355 nm, diode-pumped solid-state laser
Repetition rate	10-100 kHz
System dimensions (W x H x D)	1,800 mm x 1,770 mm x 1,440 mm (71" x 69" x 57")
Weight	approx. 1,900 kg (4,220 lb.)
Operating conditions	
Electricity	400 V, 3 phase, 1.5 kW
Ambient temperature	22° C ± 2° C (71.6° F ± 4° F)

Laser sources of different output power are available.

More applications for the LPKF MicroLine 6000 S

The UV laser system is ideal for micromachining metals, plastics, ceramic materials etc., and material combinations. Application examples are: drilling of microvias in HDI circuit boards, structuring of TCO/ITO, laser removal of tin-resist, drilling of flex material, opening of solder-resist, as well as laser repair and rework of bare and assembled PCBs.

Please contact LPKF for application reports and further information.

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