

## Breaking the Limits

### LPKF's brand-new Tensor technology overcomes limitations in laser beam delivery

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**Laser micromachining has long since lost its image as a slow technology. Nevertheless, it has reached a point where the actual cutting speed is limited much more by the beam delivery technologies than by the available laser power. The new Tensor technology from LPKF solves this fundamental problem that has constrained the progress of laser micro-processing up to now.**

The answer to the problem is relatively straightforward, at least in theory: If the laser beam is moved more quickly, the energy of the laser is better distributed. Heat accumulation as well as process-related losses in quality are eliminated. It is possible to operate with much more power. But faster beam delivery is easier said than done, and standard galvanometer scanners have reached the end of their speed development.

#### **Ground-breaking solution: Tensor**

LPKF has developed a ground-breaking solution, not only in theory but also in practice: LPKF Tensor technology. Tensor is a patented ultrafast beam guidance technology which overcomes the technical limitations of conventional solutions. The combination of Tensor with a galvanometer scanner can achieve much higher beam delivery speeds. It provides maximum flexibility and operates with virtually no energy loss. The beam velocity has been improved many times over compared to that of a galvanometer scanner alone. With a transmission of more than 99%, the available energy of the laser can be used with as good as maximum efficiency.

This opens up new possibilities for laser micro-material processing. The innovation has the potential to revolutionize laser depaneling in the major segments, like, for example, rigid boards with standard thicknesses of up to 1.6 mm and more.

#### **Integration of Tensor in micro-material processing**

The Tensor module can generally be integrated into many different laser processing systems with almost no energy loss, even for ultrashort pulsed lasers. It can be used for a wide range of machining processes, including the depaneling, drilling, cutting, and active mold packaging systems in

LPKF's portfolio. Therefore, a multitude of applications and end products can benefit from the innovative beam guidance technology.

At productronica, LPKF will introduce the first ever laser tool with Tensor technology: the LPKF CuttingMaster 2240. The new and very compact laser depaneling system is equipped with Tensor technology and a powerful laser source. In comparison with previous models, the nominal laser power has been increased by 25% to 40 W. Operating in CleanCut mode, for example, the LPKF CuttingMaster 2240 achieves with Tensor an up to four times faster cutting speed compared to its predecessor. These features reduce the cycle time by up to 70%.

The cutting quality and productivity, even of thicker PCB materials, are significantly higher with Tensor technology.

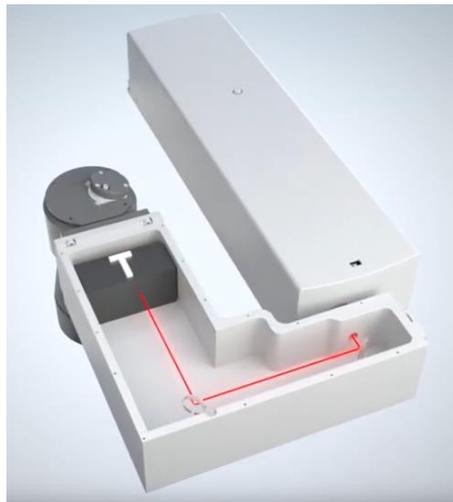
Thanks to the potential performance benefits and comparatively low investment costs, the Tensor module offers excellent cost efficiency. As a result, it offers significant value for the user and enables the company to stand out from the competition.

The laser system is available with an automation solution that enables the perfect handling of PCBs before and after cutting.

#### **Why laser depaneling at all?**

The technical superiority of laser-based routing compared to conventional mechanical cutting is undisputed. The cutting speed has increased significantly in recent years. And the cutting quality is unrivaled, especially when LPKF CleanCut technology is used. Over the last decade, LPKF has improved the price-performance ratio by a factor of 10. With Tensor technology, users of the new LPKF CuttingMaster 2240 can benefit from even more advantages. The increased processing performance enables customers to benefit from improved energy efficiency, helping them to reduce their carbon footprint. Consequently, cost efficiency always goes hand in hand with technological innovation.

More information at: [www.lpkf.com/tensor](http://www.lpkf.com/tensor)



**Fig. 1:** The Tensor “T” is a newly developed and highly innovative deflection module that makes it possible to set new standards in laser processing. It enables much higher processing speeds.



**Fig. 2:** LPKF’s newest depaneling system: LPKF CuttingMaster 2240

**About LPKF**

LPKF Laser & Electronics AG is a leading provider of laser-based solutions for the technology industry. Laser systems from LPKF are of central importance for the manufacturing of printed circuit boards, microchips, automotive parts, solar modules and many other components. Founded in 1976, the company has its headquarters in Garbsen near Hanover and operates worldwide through subsidiaries and agencies. Around 20 percent of the workforce is engaged in research and development.