

## Calculating the Savings Potential for De-paneling

**With the Panel Layout Optimization Tool (PLOT), LPKF offers a tool for calculating the materials savings that can be achieved with laser cutting**

**In printed circuit board depaneling, laser technology users can achieve significant materials savings and thus considerably lower their costs with full-section cuts through the panels. This can be calculated with the new Panel Layout Optimization Tool (PLOT) from LPKF.**

Promises of cost savings abound, but the extent to which they materialize is not always clear in advance – unless it is calculated using specific data. To make this possible, LPKF has developed a calculation tool that analyses the minimum material requirements for PCBs with laser full-section cutting and compares the results to those achieved with mechanical milling. It can be used on the [company homepage](#) simply and without any obligations. The user uploads the desired PCB layout and specifies the panel design. From these data, the PLOT calculates the materials savings and displays the result directly and clearly. An analysis document in PDF form is then made available to the user. The calculation runs via a secure server and meets the latest data protection standards.

### Why calculate?

Background for the development of the Panel Layout Optimization Tool: The right design for a panel is an extremely important factor in ensuring cost-efficient and low-error manufacturing of PCBs. If the panel area is used optimally, then more PCBs can be placed on one panel. This is advantageous with respect to both material usage and manufacturing efficiency.

However, the design process is subject to important guidelines and limitations, which are clearly presented on the LPKF [website](#) and in a whitepaper available there. Challenges lie in the different geometries and component densities as well as in the need for technical cleanliness.

As guidelines, the size and shape of the panel play a role, whereby, for example, a process-dependent edge for handling is indispensable in

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some cases. These factors must be specified in the PLOT calculation tool from LPKF and are also used as the calculation basis. The calculation thus delivers a well-founded comparison of the utilization of panel sizes for milling and laser cutting.

### **Laser Technology has an advantage here**

Because the spacings between the PCBs and the cutting edge widths can be considerably smaller with a laser process than with mechanical depaneling processes, the material savings potential resulting from laser full-section cutting is very high. Premilled, relatively wide (2–3 mm) channels that are provided in mechanical depaneling processes and in routing for later cutting of tabs can be omitted in the panel design. Because laser processing provides a maximum amount of freedom in terms of geometry, the individual PCBs can be optimally placed and aligned on the panel. Overall materials savings of more than 30% on average, and even higher in some cases, can be achieved.

The maximized panel utilization also provides synergies in downstream process steps in PCB manufacturing because it significantly reduces handling requirements. The bigger the increase in panel utilization, the more significant the cost depression effects, especially for high lot volumes.

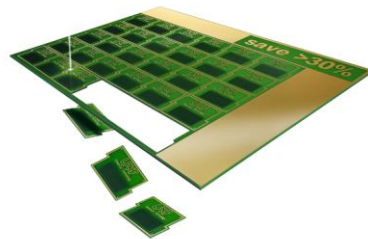
The next point chalked up on the laser side is the technical cleanliness, which leads to high-quality and reliable printed circuit boards. Milling dust is not an issue with laser cutting, and with LPKF CleanCut, there is no carbonization of the cut edges. Additionally, with laser cutting, mounting close to the cut edges is possible because there are virtually no mechanical stresses generated in the material in the regions around the cut edges. As a result, PCBs can be implemented more compactly – that's another positive effect of using laser technology. In the end, there are a few arguments besides the lowered costs that speak in favor of the laser as the tool of choice for depaneling.

### **Related links:**

- PLOT comparison tool:  
<https://www.lpkf.com/en/panel-layout-optimization-tool>
- PCB design guidelines:  
<https://www.lpkf.com/en/pcb-design-guidelines>



**Fig. 1:** Result of sample calculation of materials savings that can be achieved with laser cutting for a standard trade show sample. Although the PCBs already make optimum use of the panel space for the milling process (right), a material saving of 25% is possible for the entire panel with the laser full-section cut (left).



**Fig. 2:** Savings potential for a sample panel

### About LPKF

LPKF Laser & Electronics AG is a leading provider of laser-based solutions for the technology industry. Laser systems from LPKF are key elements in the manufacturing of printed circuit boards, microchips, automotive parts, solar modules, and many other components. Founded in 1976, the company is headquartered in Garbsen, near Hannover, Germany, and has subsidiaries and representative offices throughout the world. Around 20 percent of the workforce is engaged in research and development.