

## Clean: Microelectronics for medical technology

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### LPKF supports printed circuit board manufacturers with new Technology

The cleanliness of the components used plays an important role in medical technology. In recent years, it has been observed that when it comes to cleanliness, the focus is increasingly on overall production, not just components or individual process steps. The purer the production, the more efficient the process and the more reliable the end product. LPKF's CleanCut technology for PCB depaneling is a valuable aid for producers of microelectronics - and not just for medical technology.

The role of electronics in medical technology is becoming increasingly important, because electronics are part of everyday clinical life everywhere: It is just as indispensable in the large heart-lung machine as it is in the small cochlear implant. Circuit boards made of electrically insulating material carry the circuits and electronic assemblies, which thus form the nervous system of an electronic device.

In the production of printed circuit boards, the panel is usually equipped with several individual circuits. In order to avoid disturbances right from the start, it is important to work particularly clean. Contamination could impair both the function of the electrical assembly and the hygienic conditions. Laser technology is used increasingly to separate the individual circuit boards from their intended use. One of the clear advantages over other cutting systems: No dust is generated, as is the case with milling, and the air in the room as well as the assembled board remain clean. A further advantage of this technology is the protection of the material, because the separation by means of laser light creates only a very narrow cutting channel and has no mechanical influence on the surrounding material. This allows the PCB manufacturer to work without residues and at the same time to save material.

The LPKF CleanCut technology has further enhanced these advantages. The cutting edges of the printed circuit boards remain free of residue from thermal effects. They are as clean as the base material and the dielectric

properties of the material are retained. This means that there is no need for subsequent cleaning of the cutting edges, even in very sensitive areas of application. In addition, the laser used in the LPKF PicoLine systems enables fast processing and thus easily counters the former accusation that laser cutting is slower than other cutting, punching or milling techniques.

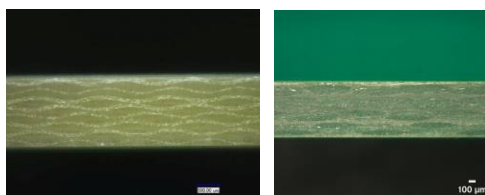
### **Ever smaller, ever more precise**

The miniaturization of modern medical technology is particularly important in the area of printed circuit boards, because if external dimensions are to be reduced, the internal electronics must become smaller first. According to Moore's law, the complexity of integrated circuits doubles every 12 to 24 months, depending on the design. Or, in other words, printed circuit boards are becoming ever more dense and smaller. Due to the continuing trend towards miniaturization and ever greater packing densities in the PCB sector, precise laser technology has become a standard technology for panel separation in recent years. Powerful short-pulse laser sources reduce the cutting time and contribute to high cycle times of production lines.

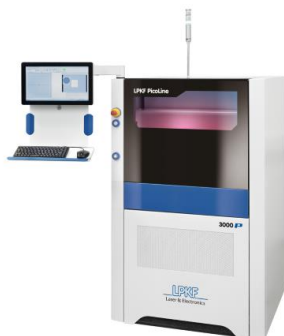
But that's not all: Thanks to the unique new laser process for clean cutting edges, layouts can be directly assembled and produced in full cut. Pre-milling of the printed circuit boards while retaining some bars, i.e. pre-routing, which causes larger separation channels and usually generates milling dust, is no longer needed. This makes it possible to realize up to 30% more individual circuits on the substrate. The user is saving material - and handling costs at the same time.

### **Conclusion**

Clean and fast laser cutting technology minimizes cleaning steps. It thus contributes to a new level of cleanliness. The use of state-of-the-art laser technology enables the construction of smaller components with higher functionality.



**Fig. 1** - alternatively 1a (left) or 1b (right): The cutting edge created with CleanCut technology - here from FR4 PCB material - is technically clean. It is even possible to clearly see the glass fibre fabric cut free of smoke and burrs.



**Fig. 2:** The LPKF PicoLine 3000 laser system achieves clean cutting edges on the printed circuit boards, thus enabling use in medical technology.

**About LPKF**

LPKF Laser & Electronics AG manufactures machines and laser systems used in electronics fabrication, medical technology, the automotive sector, and the production of solar cells. Around 20 percent of the workforce is engaged in research and development.