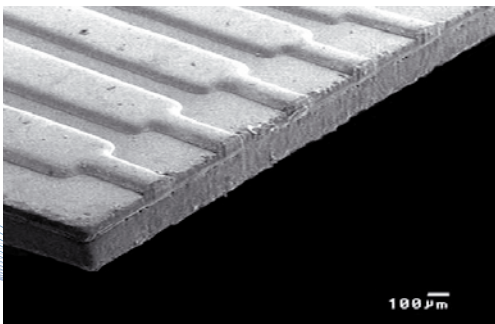
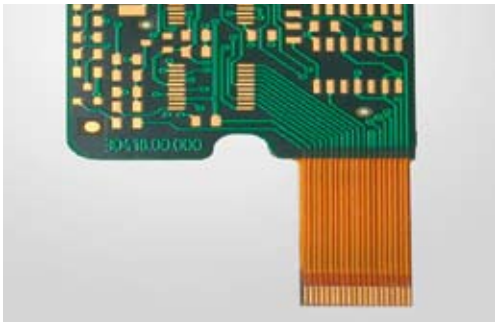
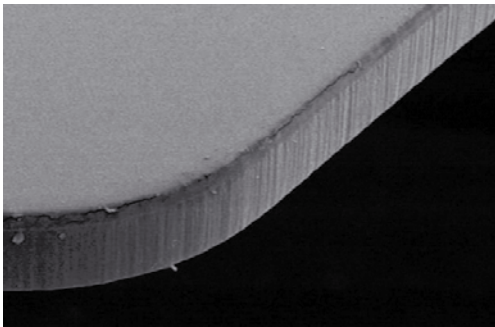


Application Report  
LPKF MicroLine UV Laser Systems  
Laser Cutting rigid-flex and thin  
rigid multilayer circuit boards



## High-precision laser cutting of rigid-flex and thin rigid multilayers

UV-laser processing enables cutting clean contours in all circuit board types and materials conventionally used for circuit board production. This includes:

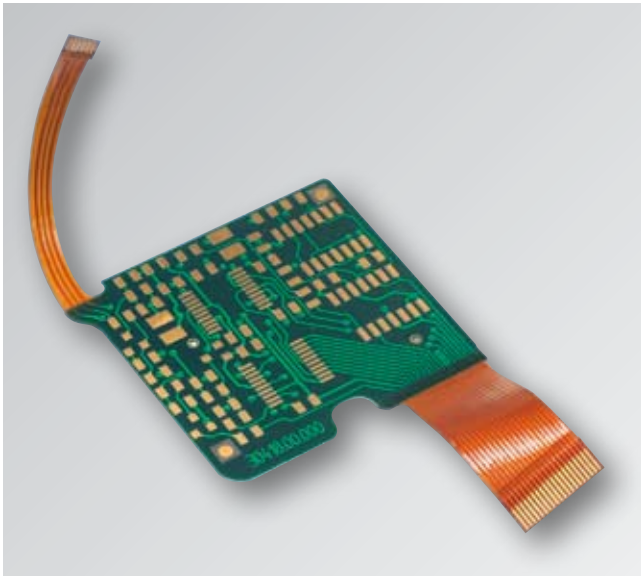
- FR4 multilayer,
- Rigid-flex circuit boards,
- Ceramics,
- LTCC (low temperature cofired ceramics),
- RF materials (Rogers®, Teflon®),
- Combinations thereof,

suitable for thicknesses of up to 1 mm. The focussed laser beam reliably cuts through all layers in one or a few steps.

Because of the contact-free material processing, there is no distortion even when thin materials are used, as it might be the case when milling or punching out. In combination with the fiducial registration and online scaling, pre-existing distortions can be compensated for and the cut contours positioned precisely within the layout.

Due to the direct material vaporization, the UV-laser minimizes the formation of molten material to prevent burring and delamination of compound materials.

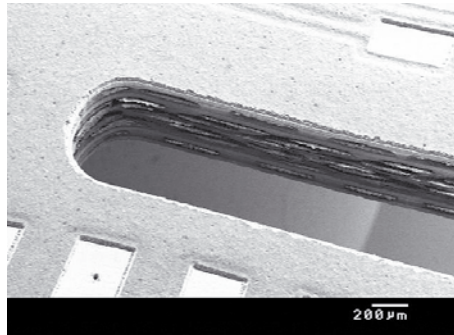
As a result, laser cutting creates precise, almost radius-free cut contours. The cut edges are smooth and vertical. This guarantees a maximum of dimensional integrity, edge quality and throughput.



Complete contour-cut of a rigid-flex circuit board

## Advantages of laser cutting with MicroLine UV Systems

- Clean cutting edges, no burring
- Cutting of extremely fine contours and virtually radius-free internal edges
- Minimal thermal stress, i.e. no delamination
- Cutting of various material thicknesses and combinations in one job
- Separation of assembled circuit boards
- Contact-free material processing to prevent material distortion
- No fixturing device or protective cover necessary
- High precision and positional accuracy of cutting edges through automatic fiducial registration



Internal contour-cut in an FR4 multilayer

## LPKF MicroLine UV Systems

- Frequency-tripled Nd:YAG-laser operating at 355 nm wavelength for the production of ultra-fine structures
- Substrate dimensions up to 18" x 24"
- Scanner system for highest structuring speeds
- Telecentric optics for vertical edges
- High-precision, highly dynamic x-y table
- Automatic substrate handling
- Automatic alignment: camera-based vision system for fiducial identification and online scaling
- Automatic system calibration
- Input data formats: Gerber, HP-GL™, Excellon, DXF, etc.
- Debris extraction during processing

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