Mechanical and Laser Machining in One System

LPKF ProtoMat D104

- UV laser tool for high-precision structuring
- Integrated measuring camera/vision system
- 100 000-RPM spindle, automatic tool change, vacuum table
- Mechanical milling/drilling and laser structuring

LPKF
Laser & Electronics

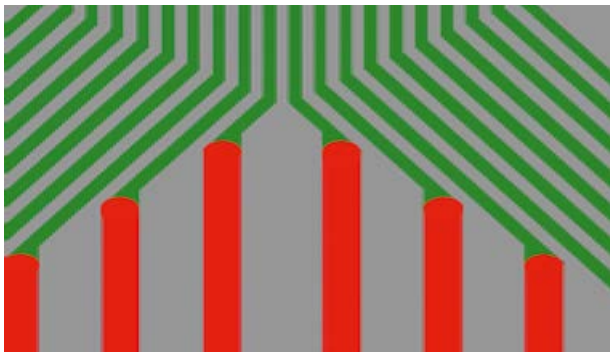
Fine Pitch and Maximum Precision

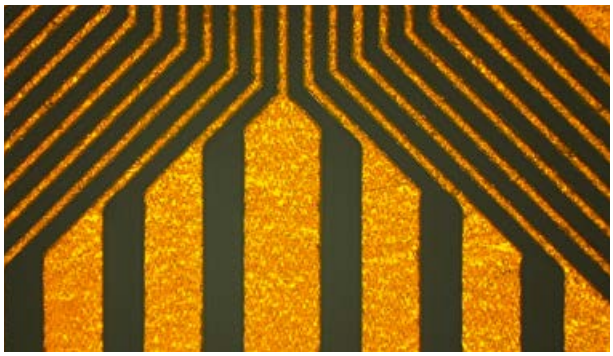
The LPKF ProtoMat D104 combines high precision milling with a laser tool. With a laser and mechanical milling tool, it can easily achieve a pitch of 150 µm on FR4 materials (18 µm Cu) – for particularly fine layout structures such as in the routing of a BGA or complex RF circuits.

The ProtoMat D104 works with a maximum spindle speed of 100 000 RPM, 15-position automatic tool change, and a repeatability of ± 1 µm.

The intuitive CircuitPro system software can even guide the user though complex circuit board stackups. The software decides when the faster tools or the precise laser (focus of just 15 µm) should be used. Thanks to the processing by laser, structures with a 50-µm trace and a 35-µm space can be produced on ceramic materials; the finest achievable cutting channel size is 15 µm.

The ProtoMat D104 includes a non-contact sensor for automated tool depth adjustment allowing for unattended operations. An integrated vacuum table holds the substrate firmly in place. A vision system can read in material positions and measure the structuring results.





Design and result: The red lines show the milling paths; the green lines represent laser tracks. Tool changeover is performed by the system software.

LPKF ProtoMat D104

Max. material size and layout area (X/Y/Z)	305 mm x 229 mm x 10 mm (12” x 9” x 0.4”)
Mechanical resolution (X/Y)	0.3 µm (0.01 mil)
Repeatability	± 1 µm (± 0.04 mil)
Milling spindle	Max. 100 000 RPM, software-controlled
Tool change	Automatic, 15 positions
Milling width adjustment	Automatic
Tool holder	3.175 mm (1/8”)
Drilling speed	120 strokes/min
Travel speed (X/Y)	Max. 100 mm/s (3.7”/s)
X/Y-drive, Z-drive	3-phase stepper motor
Solder paste dispense rate	2-phase stepper motor
Dimensions (W x H x D)	660 mm x 700 mm x 870 mm (26” x 27.6” x 34.3”)
Weight	99 kg (218.3 lbs)
Operating conditions	
Power supply	90 – 240 V, 50 – 60 Hz, 440 W
Compressed air supply	6 bar (87 psi), 100 L/min (3.5 cfm)
Options and accessories	Dust extraction unit, compressor, StatusLight, measuring microscope

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