

LPKF ProtoMat S100

High-performance for RF and microwave applications

Item	LPKF ProtoMat S100
Part #	116664
Order info	Inside front cover

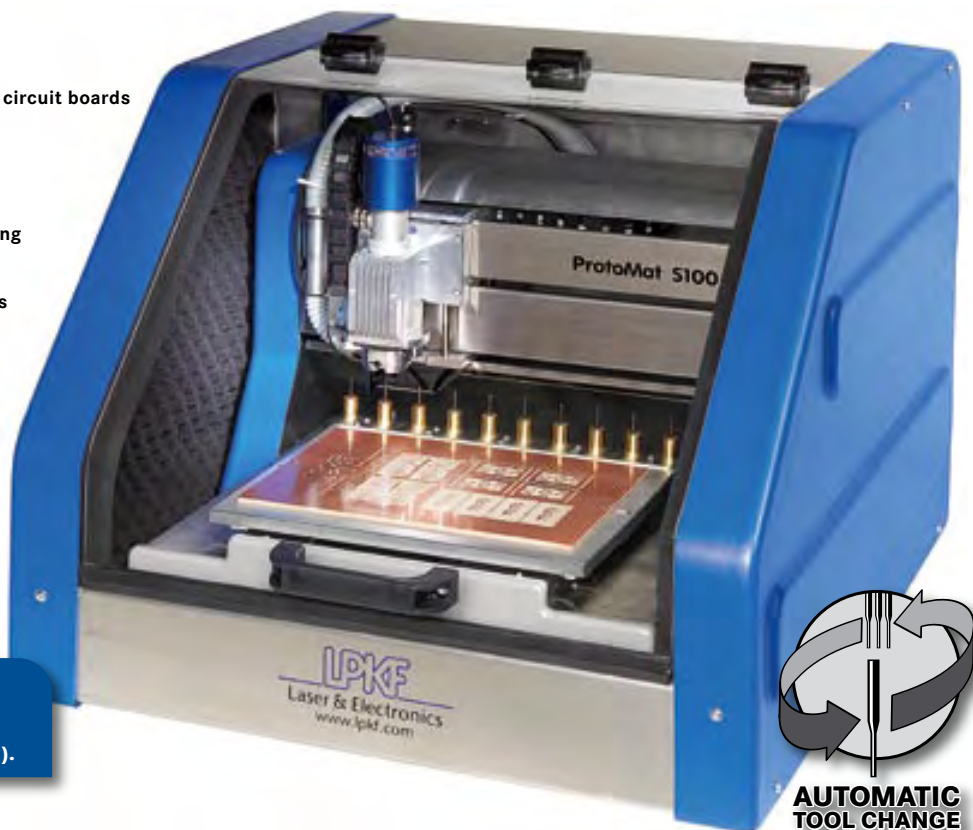


Ideal for these applications

- Milling and drilling 1- and 2-sided circuit boards
- RF & microwave circuits
- Multilayer PCBs up to 6 layers
- Contour routing of circuit boards
- Flexible and rigid-flex circuit milling
- Front panels/sign engraving
- Machining cut-outs in front panels
- SMD stencil cutting
- Housing production
- Wave solder pallets
- Depanelization and rework
- Test adapter drilling
- Inspection templates

High travel speed

with max 150 mm/sec (6"/sec)
and resolution of 0.25 μ m (0.01 mil).



Plotters

Laser

Plating

Multilayer

SMT/Finishing

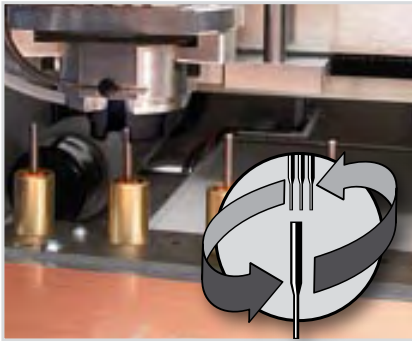
Tech Guide

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The ProtoMat S100 is one of LPKF's top-of-the-line circuit board plotters, ideal for all in-house prototyping applications, including multilayer and RF applications. The ProtoMat S100 features the highest spindle speed possible – resulting in the precision circuit geometries today's high-frequency and microwave applications demand – and a pneumatic working depth limiter, for the most surface-sensitive substrates. The ProtoMat S100 is an indispensable component of any development group where speed, precision, and simplicity are absolutely required.

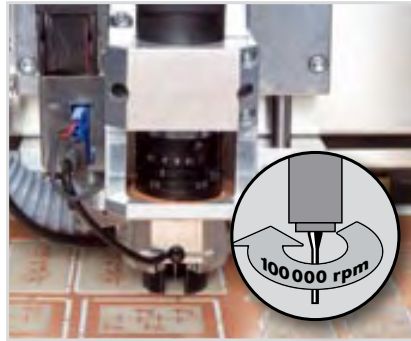
- **Ideal for RF and microwave circuitry on all substrates**
- **Superior milling speed, resolution, and accuracy**
- **Automatic tool change for unmatched ease-of-use and unattended operation**
- **Integrated acoustic cabinet for quiet operation**
- **Vacuum table and fiducial recognition available**

The LPKF ProtoMat S100 circuit board plotter features:



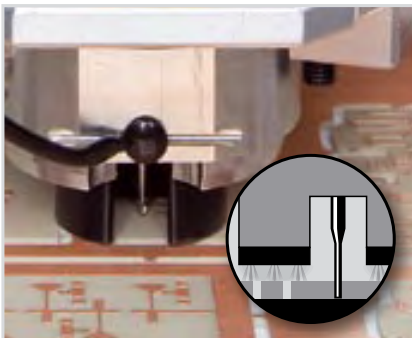
Automatic tool change

Advanced features include a 10-position tool changer that automatically replaces milling and drilling tools while the board is being produced. This significantly reduces setup time, and allows for unattended operation.



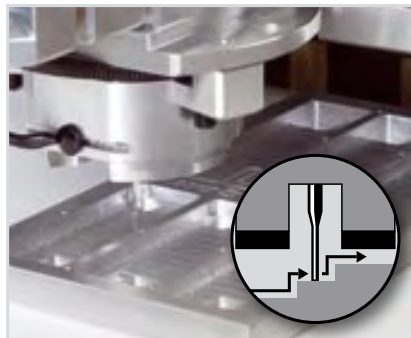
100,000 rpm spindle motor for precision

The ProtoMat S100 delivers unmatched precision with system resolution as fine as $0.25\ \mu\text{m}$ (0.01 mils). Each system is carefully calibrated at the factory for unsurpassed overall accuracy. As a result, the plotter mills and drills all types of PCBs with extremely fine traces, specializing in the precision trace geometries required by RF and microwave boards. Its milling head travel speed of 150 mm (6") per second and high-performance 100,000 rpm spindle motor make it a premiere high-speed performer.



Non-contact working depth limiter for delicate substrates

The ProtoMat S100 features a fully pneumatic working depth limiter. This allows the S100 to mill, drill, and depanel an entire circuit with nothing but the tools touching the work surface. The pneumatic working depth limiter is recommended for the delicate or surface-sensitive substrates found in many RF applications.



2 1/2-dimensional operation with Z-axis drive

With its unique motorized Z-axis drive, the ProtoMat S100 is ideal for machining instrument front panels and housings, as well as pockets in microwave boards. It can also mill around mounted PCB components, simplifying board rework and depanelization jobs.

And many more, such as:

Convenience and easy handling

The ProtoMat S100's rich featureset and simple, automatic operation are quick and easy to master. Board production begins within minutes of switching on the machine. A standard USB or RS-232 cable connects the ProtoMat S100 to any Windows-compatible computer.

Integrated head lighting

Shadow-free illumination of the milling area from integrated head lighting makes direct quality control faster and easier.

Acoustic cabinet

An integrated acoustic cabinet reduces system sounds and acts as a protective cover. The circuit board plotter can safely operate in any work environment.

CAM software included

Each plotter comes with comprehensive LPKF CircuitCAM and BoardMaster software for importing PCB data from any CAD package and for controlling the operation of the circuit board plotter. This easy-to-use software, developed by LPKF, processes the same data that would be sent to a PCB manufacturer.

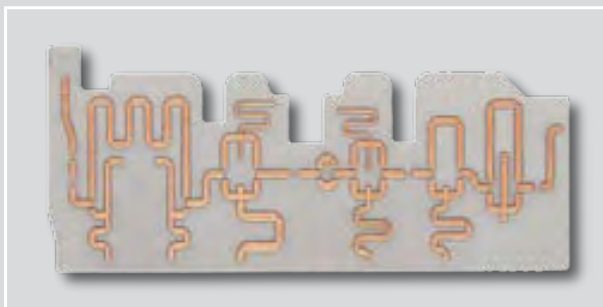


The ProtoMat S100 ships with a Multimedia Training CD!



Applications

The LPKF ProtoMat S100 is ideal for the following applications:

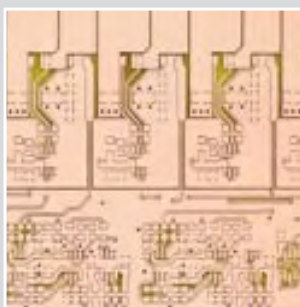


RF and microwave circuits

The ProtoMat S100 is ideal for reproducing the precision geometry required by RF and microwave prototyping. Custom-designed carbide tools create straight sidewalls and reduce penetration into the substrate by the tool.

High quality printed circuit boards

The ProtoMat S100 is also useful for producing high quality professional printed circuit boards from two- to six-layer prototypes.
















Housings

In addition to flat circuit boards and signs, LPKF ProtoMat circuit board plotters are useful in a prototyping laboratory when routing out and machining three-dimensional objects, such as housings and pockets in such material as aluminum or plastic.



Additional application for the ProtoMat S100:

			Application Notes
	Milling and drilling 1- & 2-sided circuit boards	✓	
	RF and microwave circuits	✓	
	Multilayer PCBs up to 6 layers	✓	LPKF recommends the optional Fiducial Recognition Camera.
	Contour routing of circuit boards	✓	
	Flexible and rigid-flex circuit milling	✓	This application requires the optional vacuum table.
	Front panels/sign engraving	✓	
	Machining cut-outs in front panels	✓	
	SMD stencil cutting	✓	
	Housing production	✓	
	Wave solder pallets	✓	
	Depanelization and rework	✓	
	Test adapter drilling	✓	
	Inspection templates	✓	

Options

More information on options on page 31.

Fiducial recognition camera

Use the fiducial recognition camera to align a board for double or multilayer production quickly and accurately. Requires USB 2.0.



Vacuum tabletop

The vacuum tabletop holds the work piece tightly against the work surface, eliminating any substrate irregularities such as twisting or warpage.



Accessories, software, tools and consumables



Accessories

More details on page

Dust extraction	33
Keeps the work area free of debris of all sizes.	
Compressor	34
A clean source of compressed air.	
Measuring microscope	33
60x magnification for proper alignment.	
StatusLight	34
Indicates the status of the machine.	
Brush head	33
Removes debris from the work area when working in 2 1/2-dimensional mode.	



Software (included)

More details on page

LPKF CircuitCAM PCB	44
A complete workstation for the ProtoMat S100.	
LPKF BoardMaster	45
Versatile control software for all ProtoMat models.	



Tools

More details on page

Conical milling tools	36
Sturdy tooling for all purposes.	
Cylindrical milling tools	36
Ideal for RF structuring.	
Drilling/routing tools	37
Drilling and depaneling bits.	



Consumables

More details on page

Starter Set	40
Contains high-quality tools and consumable material.	
Multilayer Start-Set	41
Everything needed to start making multilayer boards.	
Base materials	42
A collection of copper clad FR4 substrates.	

Specification table

LPKF ProtoMat S100	
Part #	116664
Working area (X/Y/Z)	229 x 305 x 38 mm (9" x 12" x 1.5")
Working area with vacuum table (X/Y/Z)	229 x 305 x 25 mm (9" x 12" x 1")
Resolution (X/Y)	0.25 µm (0.01 mil)
Repeatability	±0.001 mm (±0.04 mil)
Precision of front-to-back alignment	±0.02 mm (±0.8 mil)
Milling motor	Max. 100,000 rpm, software controlled
Tool change	Automatic, 10 positions
Tool collet	3.175 mm (1/8"), pneumatic release collet
Drilling speed	150 strokes/min
Travel speed (max)	Max. 150 mm/sec (6"/sec)
X/Y positioning system	3-phase stepper motors
Z drive	Stepper motor
Dimensions (W/H/D)	670 x 540 x 760 mm (26.4" x 21.3" x 29.9")
Weight	55 kg (121 lbs)
Power supply	115/230 V, 50–60 Hz, 200 W
Compressed air supply	6 bar (87 psi), 100 l/min (3.528 cfm)
Specifications subject to change.	

Size of tracks and gaps depends on materials and tools. 100 µm tracks and gaps possible with LPKF MicroCutter on FR4 18/18 µm Cu. More information on materials page 93 and tools page 35.