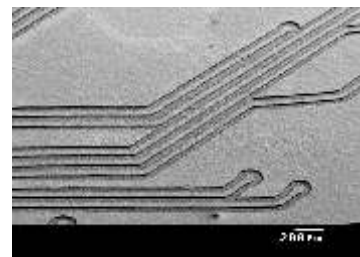
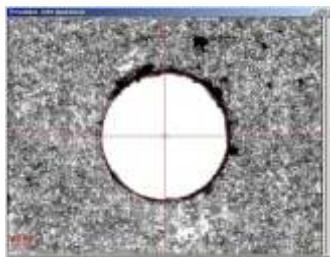
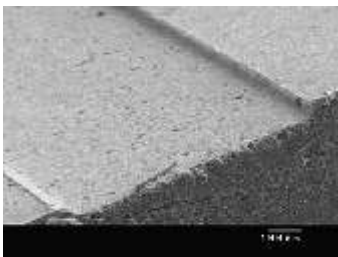




LPKF ProtoMat® H100

- Greater speed and accuracy than other top-of-the-line plotters
- Greater resolution for producing high-quality multilayer PCBs
- Automatic front-to-back and multilayer alignment
- Automatic tool change and calibration
- Integrated vacuum table top



The LPKF ProtoMat® H100 is the best PCB prototyping solution

The LPKF ProtoMat H100 is an advanced PCB prototyping plotter that includes many new features derived from high-volume production systems. The ProtoMat H100 provides the maximum capability for completing complex prototyping jobs on time and within budget. Whether your project is a two-sided board, a complex multilayer board, or involves thin or flexible substrate milling, the ProtoMat H100 is an indispensable prototyping tool that delivers a finished product of the highest quality.

Prototypes are completed much quicker than before because of the superior milling speed and resolution of the ProtoMat H100, and with a degree of excellence that virtually eliminates board rework. No rework means lower production costs by reducing the time required to produce the prototypes, and by reducing machine wear, milling tool wear, and material consumption.

The speed and resolution enhancements come from the combination of a 100,000 rpm milling motor along with a precise board positioning system and X-Y motion controller. Resolution is also increased by a camera vision system that accurately positions the milling head by locating board alignment fiducials. A result of this superior resolution is high artwork definition, which improves multilayer milling.

Another time-saving feature for the H100 is a 30-position milling tool changer that automatically switches tools during the board routing process. Complementing the tool changer is a scanning sensor that calibrates each tool for proper depth adjustment before proceeding, so each tool produces the highest quality milling, cutting, or drilling results. These automated features remove the need to manually change and adjust each new milling tool, which can be time-consuming and subject to setup errors.

The integrated vacuum table top for the H100 maintains perfect flatness for thin or flexible substrates during the milling process, which factors out milling errors that can occur due to surface unevenness. This increases flexible material milling quality and reduces prototype rework.

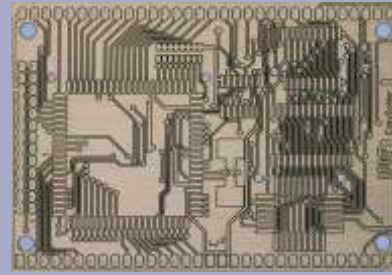
With these capabilities, two-sided or multilayer prototype PCBs can be produced in-house in a single day. This eradicates production turnaround problems that can occur when an outside vendor is employed to produce prototype boards. Keeping board production in-house ensures that tight production schedules are not compromised by unforeseen circumstances with outside vendors.

In conclusion, the ProtoMat H100 further improves the capabilities for quality in-house prototyping while offering many time-saving and money-saving features. The LPKF ProtoMat H100 is a must-have tool for professionals who want a complete solution for their prototyping design needs.



Greater speed

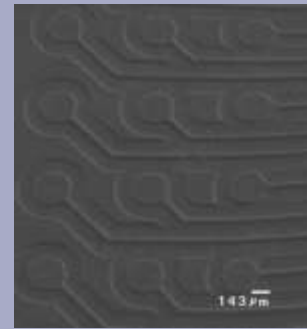
The top milling speed for the ProtoMat H100 is two to four times greater than the maximum speed for other top-of-the-line plotters. As a result, the H100 milling speed can reach up to 4 inches (100 mm) per second. The typical average speed is two times greater than other systems, which means the H100 can produce demanding prototype PCBs in less time.



Milled circuit board

Greater resolution

Resolution for the ProtoMat H100 is increased to 1µm (0.04 mils) because of its precise positioning system and advanced X-Y motion controller. Combined with a 100,000 rpm milling motor, the plotter can create 3 mil tracks with 4 mil spacing. This level of resolution accommodates all state-of-the-art packages, including BGA and µBGA®.

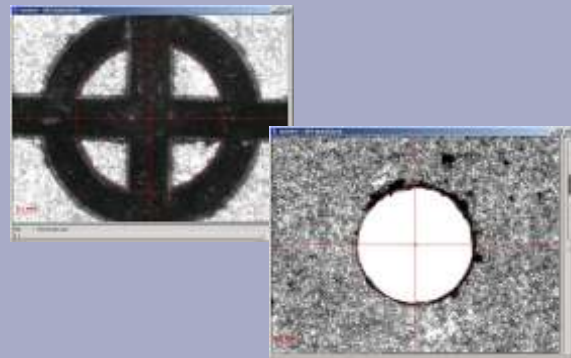


3 mil tracks with 4 mil spacing

Automatic front-to-back and multilayer alignment

A camera vision system attached to the ProtoMat H100 milling head recognizes alignment fiducials embedded in the board layers. Once the fiducials are located, the board can be removed, remounted, or flipped and it's always properly aligned.

Fiducial recognition ensures accurate through-hole drilling and artwork alignment for multilayer boards, and it prevents errors like milling the wrong side of the board stack after placing the board back on the machine upside down, or misaligning the board by 180°.



Located and drilled fiducial

Automatic tool change and calibration

The ProtoMat H100 automatically changes milling tools, and calibration for changed tools is also completely automated. The H100 uses a sensor located in the plotter table top to automatically set the bit milling depth, and the software-controlled adjustment has an accuracy of 5 µm (0.2 mils).

The automation of these alignment and calibration tasks eliminates frequent operator interaction, so the board milling operation can run unattended for long periods.



Automatic tool change

Integrated vacuum table top

The ProtoMat H100 includes an integrated vacuum table top, so thin and flexible substrates can be securely mounted on the plotter and remain perfectly flat during the milling process. This eliminates any milling depth deviations that might occur due to substrate unevenness.



Integrated vacuum table top

Standard accessories

• *CircuitCAM PCB software*

The interface to the CAD/EDA system. Processes Gerber and NC Drill files, then generates the final layout data for the prototype plotter.

• *Mobile sound enclosure*

Reduces noise and dust emissions for comfortable plotter operation in electronic design labs or CAD offices.

• *Head illumination*

An LED ring that encloses the milling tool and supplies shade-free illumination of the work area, providing better visibility for direct drilling and milling control.

• *Dust extraction unit with integrated AutoSwitch*

Efficiently removes milling dust and optimizes equipment life by switching on and off in synchronization with the milling motor.

• *3-phase milling motor, 10,000 to 100,000 rpm*

High-speed motor increases the milling tool life, and its smart warmup phase doubles the motor life.

• *Pneumatic Z-stroke with hydraulic damper*

Accelerates the non-contact lowering speed of the milling tool to increase high-speed, high-throughput performance while remaining gentle with the tools and material.

• *Pneumatic non-contact air bearing*

A contactless depth limiter that is ideal for use on flexible or gold-plated circuits.

• *CircuitView camera system*

Visually positions the milling head to provide superior resolution for drilling and alignment accuracy.

Optional accessories

• *Tooling starter kit*

Contains a set of high-quality board milling, drilling, and cutting tools, plus a collection of board materials.

• *Measuring microscope*

Provides 50X magnification and a metric scale to measure insulation gap sizes and ensure accurate circuit widths.



CircuitCAM PCB software



Mobile sound enclosure



Head illumination



Dust extraction unit with integrated AutoSwitch



3-phase milling motor, 10,000 to 100,000 rpm



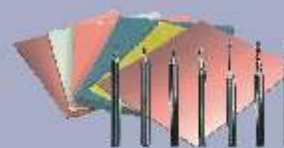
Pneumatic Z-stroke with hydraulic damper



Pneumatic non-contact air bearing



CircuitView camera system



Tooling starter kit (Optional)



Measuring microscope (Optional)

System advantages

Is it possible to produce a high-quality multilayer PCB in a single day? Since the plating and laminating processes for multilayer boards usually require fixed amounts of time that cannot be shortened, the superior speed of the ProtoMat H100 makes it possible by significantly reducing the PCB milling time. Multilayer boards can be comfortably completed in-house in a single day when the ProtoMat H100 is combined with the layer bonding ability of the LPKF MultiPress II and the through-hole plating capability of the LPKF Contac III/MiniContac III.



ProtoMat H100 with MultiPress II and Contac III

Specifications

Minimum track width	4 mil (0.1 mm); 3 mil (0.08 mm) partially
Minimum insulation width	4 mil (0.1 mm)
Minimum drill hole size	6 mil (0.15 mm)
Working area	16.5" x 14.90" (420 mm x 380 mm)
Resolution	0.04 mil (0.001 mm, or 1 µm)
Repeatability	± 0.04 mil (1 µm)
Precision of front-to-back alignment	± 0.5 mil (12.7 µm) with camera system
Milling motor	3 phase-motor, 10,000-100,000 rpm, software controlled
Tool change	automatic, 30 positions
Tool collet	1/8" pneumatic quick-release collet
Drilling speed	120 holes per minute
Travel speed (max)	4" per second (100 mm per second)
Milling depth sensing	non-contact air bearing; automatic setting
X/Y positioning system	stepper motors; precision ball screw assemblies with internal ball recirculating system
X/Y linear system	ball rail system (X) and precision linear shafts (Y)
Z drive	pneumatic, 0.55" (14 mm) movement
Machine table base	cast aluminum, 3" (75 mm) thickness with integrated vacuum table
Dimensions (W / H / D)	25.6" x 16.9" x 29.5" (650 x 430 x 750 mm)
Weight	110 lb (50 kg) without acoustic cabinet
Power supply	120/240V, 50 - 60 Hz/240 VA
Compressed air supply	6 bar (87 psi), 100 l/min (3.528 cfm)

Specifications are subject to change without notice

Applications

1- and 2-sided circuit boards	Yes
FR3, FR4, FR5, G10	Yes
Flexible substrates	Yes
RF & microwave substrates	Yes
Front panel & sign engraving	Yes
Machining cut-outs in front panels	Yes
Contour routing of circuit boards	Yes
Multilayer PCBs up to 4 layers*	Yes
Multilayer PCBs up to 8 layers*	Yes
Test adapter drilling	Yes
Milling film artwork	Yes
Solder masks	Yes
SMD solder stencil cutting	Yes
Rigid-flex circuit milling	Yes
Depanelization and rework of bare and populated boards	Yes
Solder frames for circuit board assembly	Yes
Housing production	Yes
Inspection templates	Yes

* Combined with a LPKF MultiPress board lamination system and a LPKF Contac or MiniContac through-hole plating system

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