

# The New LPKF ProtoMat Circuit Board Plotters Enabling the Next Generation of In-House PCB Prototyping



**LPKF**  
Laser & Electronics

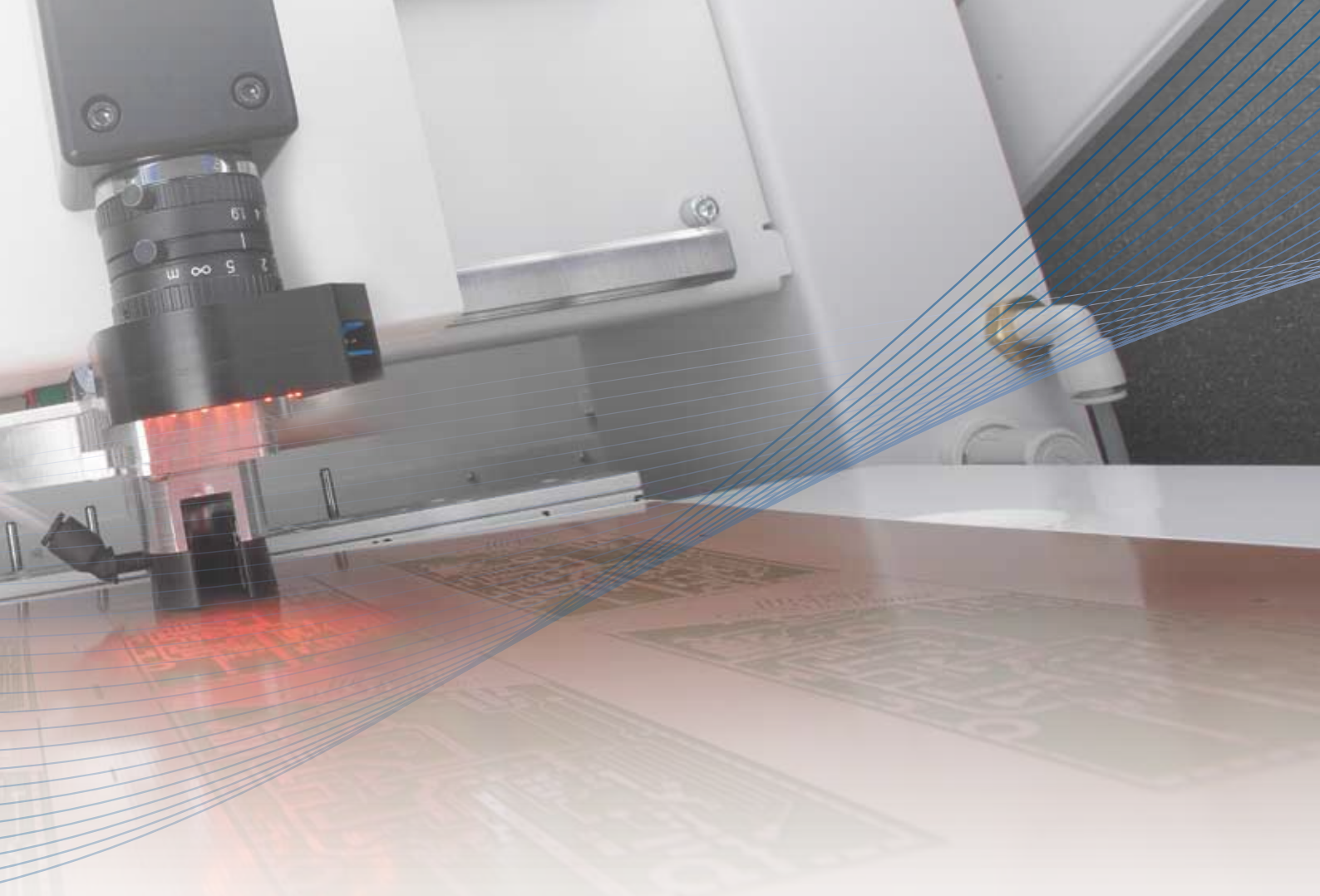


# Solutions that Evolve with Your Project Needs

Circuit board plotters from LPKF Laser & Electronics AG have delivered quick, accurate and easy to use prototyping solutions for more than 30 years. The latest generation product line features additional flexibility: all ProtoMat S series circuit board plotters can be upgraded as necessary to meet your project needs.

LPKF equipment offers cost-effective, environmentally friendly equipment for each stage of the prototyping process, from design verification to structuring and board assembly. It allows customers to produce fully functioning boards quickly and easily.

The ProtoMat S series features upgrade options to handle structuring, cutting, and many other prototyping tasks for both single layer and multilayer boards.



### Flexible Solutions

Optional features and upgrade kits increase the application range of LPKF ProtoMats, simplifying the prototyping process, expanding product functionality and opening the door to new forms of production. These features are already standard on some machines.

### Automatic Tool Change

Accommodates up to 15 tools and includes drill bit inspection and automatic milling width adjustment. Enables automated production without manual intervention. Standard on the S63 and S103.

### Milling Width Adjustment

Provides a pre-defined tool penetration depth and ensures a consistent milling track width. Standard on the S63 and S103.

### Optical Fiducial Recognition (camera)

Significantly faster and more accurate than the front-to-back system. Virtually indispensable in structuring multilayer boards and double-sided PCBs. Includes automatic drill break inspection and immediate measuring function. Standard on the S63 and S103.

### Powerful System Software Included

The new standard for PCB prototyping: LPKF CircuitPro lets you quickly implement complex layouts. A wide range of features, optimized milling times and intuitive operator guidance ensure rapid success.



## CircuitPro

### Vacuum Table

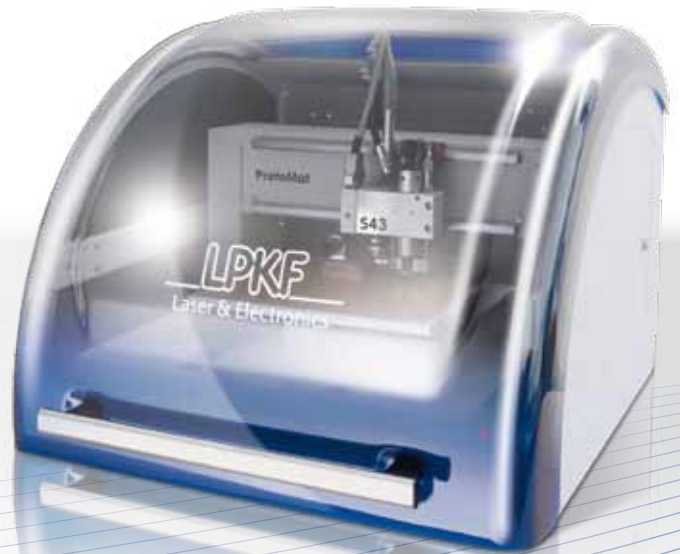
Secures the work piece flat across the entire work surface and eliminates substrate irregularities such as twisting and warping. Allows both flexible and rigid-flex PCBs to be machined with ease. Standard on the S103.

### Dispenser

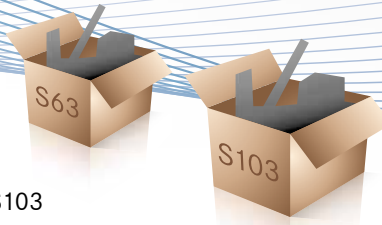
Accurately applies soldering paste onto structured PCBs with compressed air. Uses LPKF CircuitPro for data preparation. Standard on the S63 and S103. Upgrade on the S43.

# Prototyping for Every Level

For more than 30 years, LPKF circuit board plotters have provided reliable, quick and accurate in-house Rapid PCB Prototyping. Near-series prototypes are created within short periods, from simple circuit boards to eight-part multilayers. The ProtoMat S series signifies precision, performance and flexibility.



LPKF ProtoMat S43



Upgrade kits available:

- ProtoMat S43 to S63/S103
- ProtoMat S63 to S103

## LPKF ProtoMat S43: The Entry Level System

The entry-level LPKF ProtoMat S43 system ensures quick and easy production of PCB prototypes within hours and can easily handle multiple production cycles in one day. The perfect step into the world of professional Rapid PCB Prototyping, the S43 is especially well-suited for those with limited budget or who anticipate only occasional use.

Standard features on the ProtoMat S43 include:

- Speed (40,000 rpm), ultra-fine resolution (0.5  $\mu\text{m}$ ) and accuracy ( $\pm 0.02$  mm)
- Simple quick-release tool holder
- Acoustic cabinet for quiet operation
- Upgradeable to ProtoMat S63 and S103

## LPKF ProtoMat S63: The All-Around System

The LPKF ProtoMat S63 handles virtually any in-house prototyping application with ease. Its high speed capabilities accommodate structures as small as 100  $\mu\text{m}$ . The extensive features make the S63 the perfect addition to any development environment.

The ProtoMat S63 includes all of the features of the S43 plus:

- High speed spindle (60,000 rpm)
- Automatic tool change (15 tools)
- Automatic milling width adjustment
- Optical fiducial recognition (camera)
- Upgradeable to S103

### Other Accessories:

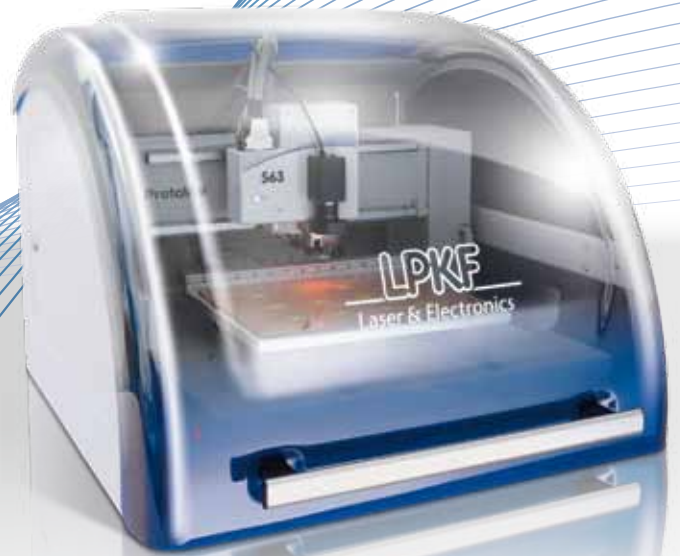
- Dust extraction
- Measuring microscope
- Compressor

Find additional information inside our free "In-House Rapid PCB Prototyping" product catalog.





LPKF ProtoMat S103



LPKF ProtoMat S63

### LPKF ProtoMat S103: The Premium System

The ProtoMat S103 is the most advanced model in the S series. The fully equipped system is suitable for all applications, including multilayer and RF boards. The non-contact pneumatic working depth limiter allows substrates with delicate surfaces to be machined. This reliable, easy to use system is all you need for cost-effective, high-quality prototype production.

The S103 has all the features of the ProtoMat S63 plus:

- Highest available speed (100,000 rpm)
- Pneumatic working depth limiter
- Vacuum table

**The S43 and S63 ProtoMats can be upgraded all the way to the top-of-the-line S103**

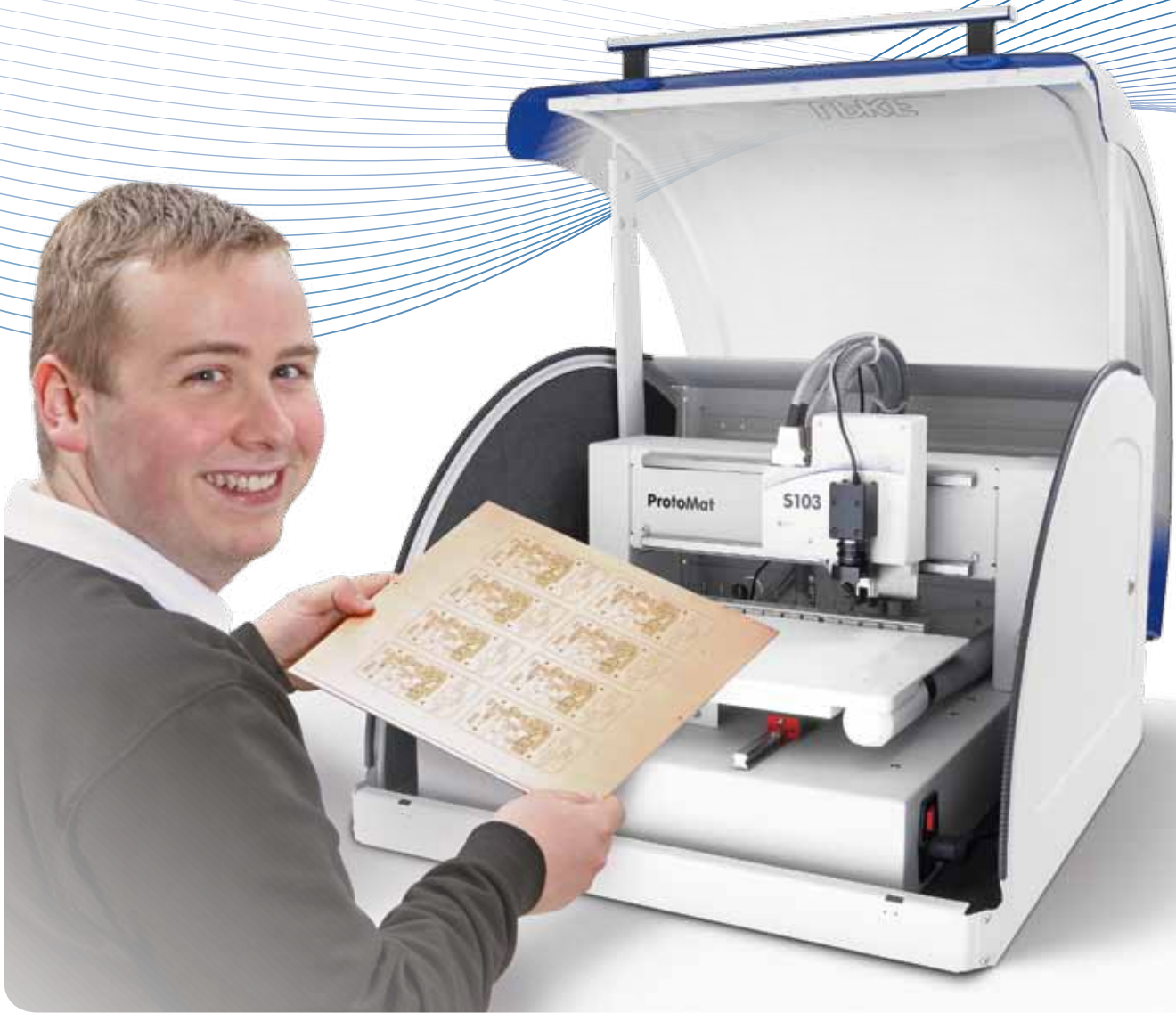


An upgrade kit quickly turns the ProtoMat S43 or S63 ...

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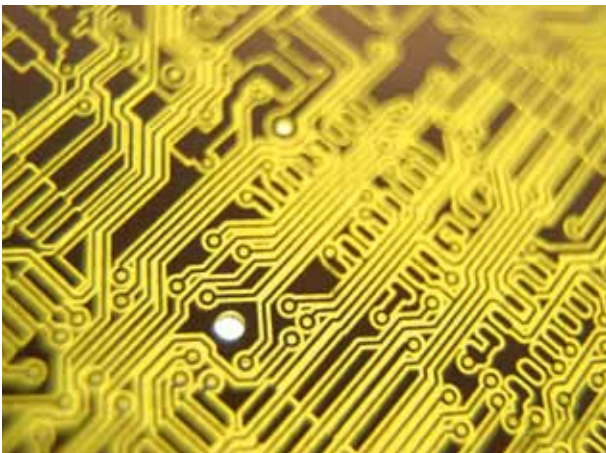


... into the ProtoMat S103!



## Applications

LPKF ProtoMats are essential tools for anyone developing and producing small batches of PCB prototypes. Moreover, ProtoMats can be used for a variety of applications besides “just” structuring circuit boards.



### Structuring Circuit Boards

LPKF ProtoMats mill the PCB structure in the fully coated substrate. High-speed spindles ranging from 40,000 to 100,000 rpm, a resolution as fine as 0.25  $\mu\text{m}$  (0.01 Mil) and extremely high repeatability ensure ultra-fine structures. In RF & microwave applications, the ProtoMat S103 showcases its high spindle speed to the fullest by achieving extremely clean structuring results.



### Working with Flex and Rigid-flex Circuit Boards

Flex and rigid-flex circuit boards are difficult to secure on the working surface. The vacuum table available for LPKF ProtoMat systems solves this problem. RF tools are excellent for machining relatively soft material.



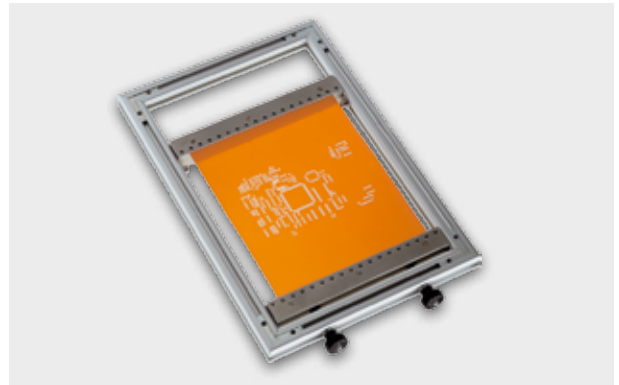
### Depaneling

When designing PCBs, multiple layouts can be arranged on a substrate. LPKF ProtoMats are great for cutting these circuit boards from the base material. On precut panels, the ProtoMats can be used to cut break-out tabs.



### Engraving/Cutting Plastics and Aluminum

All LPKF circuit board plotters are capable of structuring, drilling mounting holes, and engraving front panels. The S63 and S103 ProtoMats are also 2.5D capable, which allows slots or deeper recesses to be added to housing parts.

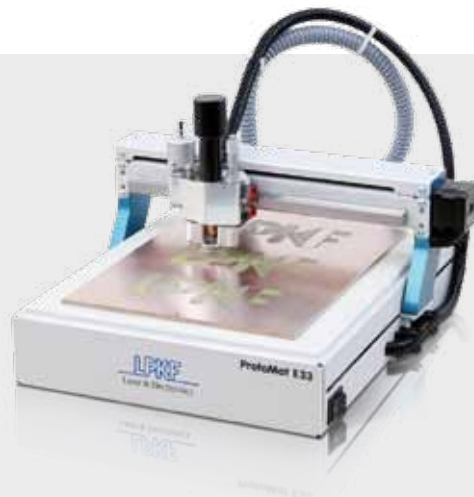


### Milling of Soldering Paste Stencils






In prototyping, milled polyimide stencils are a great alternative to steel stencils. They can be produced in-house within minutes. The milling data is designed in LPKF CircuitPro.

### An Ideal Training Solution


The new LPKF ProtoMat E33 is perfectly suited for milling and drilling circuit boards. This ProtoMat is especially designed for training purposes. It's about the size of an A3 (14.6" x 17.7") sheet of paper and has no upgrade options.



Technical Specifications	ProtoMat S43	ProtoMat S63	ProtoMat S103
<b>Part no.</b>	127686	127411	127410
<b>Max. material size and layout area (X/Y/Z)</b>	229 mm x 305 mm x 27 mm (9" x 12" x 1")	229 mm x 305 mm x 35/22 mm (9" x 12" x 1.4/0.9")*	229 mm x 305 mm x 35/22 mm (9" x 12" x 1.4/0.9")*
<b>Resolution (X/Y)</b>	0.5 µm (0.02 Mil)	0.5 µm (0.02 Mil)	0.5 µm (0.02 Mil)
<b>Repeatability</b>	± 0.001 mm (± 0.4 Mil)	± 0.001 mm (± 0.04 Mil)	± 0.001 mm (± 0.04 Mil)
<b>Precision of front-to-back alignment</b>	± 0.02 mm (± 0.8 Mil)	± 0.02 mm (± 0.8 Mil)	± 0.02 mm (± 0.8 Mil)
<b>Milling spindle</b>	Max. 40,000 rpm, software controlled	Max. 60,000 rpm, software controlled	Max. 100,000 rpm, software controlled
<b>Tool change</b>	Manual, quick-release holder	Automatic, 15 positions	Automatic, 15 positions
<b>Milling width adjustment</b>	Manual	Automatic	Automatic
<b>Tool holder</b>	3.175 mm (1/8")	3.175 mm (1/8")	3.175 mm (1/8")
<b>Drilling speed</b>	100 strokes/min	120 strokes/min	120 strokes/min
<b>Travel speed (X/Y)</b>	Max. 150 mm/s (6"/s)	Max. 150 mm/s (6"/s)	Max. 150 mm/s (6"/s)
<b>X/Y-drive</b>	3-phase stepper motor	3-phase stepper motor	3-phase stepper motor
<b>Z-drive</b>	2-phase stepper motor	2-phase stepper motor	2-phase stepper motor
<b>Dimensions (W x H x D)</b>	670 mm x 540 mm x 840 mm (26.4" x 21.3" x 33")	670 mm x 540 mm x 840 mm (26.4" x 21.3" x 33")	670 mm x 540 mm x 840 mm (26.4" x 21.3" x 33")
<b>Weight</b>	55 kg (121 lbs)	58 kg (128 lbs)	60 kg (132 lbs)
<b>Operating conditions</b>			
<b>Power supply</b>	90 – 240 V, 50 – 60 Hz, 450 W	90 – 240 V, 50 – 60 Hz, 450 W	90 – 240 V, 50 – 60 Hz, 450 W
<b>Compressed air supply</b>	-	**	6 bar (87 psi), 100 l/min (3.5 cfm)
<b>Required accessories</b>	Dust extraction	Dust extraction	Dust extraction

Upgrades ProtoMats	S43 to S63	S43 to S103	S63 to S103
<b>Milling spindle (rpm)</b>	60,000	100,000	100,000
<b>Automatic tool change</b>	✓ 	✓ 	✓
<b>2½D milling</b>	✓ 	✓ 	✓
<b>Fiducial recognition camera</b>	✓ 	✓ 	✓
<b>Vacuum table</b>	-	✓ 	✓ 
<b>Solder paste dispenser**</b>	✓ 	✓ 	✓
<b>Pneumatic non-contact working depth limiter</b>	-	✓ 	✓ 
<b>Software LPKF CircuitPro Full</b>	✓ 	✓ 	✓

✓ Included/with upgrade possible

 Included in upgrade kit

\* Value for Z without/with vacuum table  
Technical specifications subject to change.

\*\* For the use of the dispenser and the pneumatic non-contact working depth limiter, compressed air is required.

#### Worldwide (LPKF Headquarters)

LPKF Laser & Electronics AG Osteriede 7 30827 Garbsen Germany  
Phone +49 (5131) 7095-0 Fax +49 (5131) 7095-90 info@lpkf.com  
www.lpkf.com

#### North / Central America

LPKF Laser & Electronics North America  
Phone +1 (800) 345-LPKF Fax +1 (503) 682-7151 sales@lpkfusa.com  
www.lpkfusa.com

#### China

LPKF Tianjin Co., Ltd.  
Phone +86 (22) 2378-5318 Fax +86 (22) 2378-5398 sales@lpkf.cn  
www.lpkf.cn

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