Application	ProtoMat			Application Tips
	E44	S64	S104	
Milling/drilling of single- and double-sided PCBs	•	•	•	
Milling/drilling of RF and microwave substrates	-	•	•	LPKF recommends the S104 for RF/microwave layouts as the main applications
Milling/drilling of multilayers with up to eight layers	-	•	•	LPKF recommends the S64 and S104 due to the high rotation speed of the milling motor
Milling of flexible and rigid-flex PCBs	-	•	•	Flexible substrates necessitate a vacuum table, standard feature for the S64, and the S104
Contour routing of PCBs	•	•	•	
Engraving of front panels and labels	•	•	•	
Routing of cut-outs in front panels	-	•	•	LPKF recommends the S104, or the S64 for milling of aluminum front panels
Processing of housings	-	•	•	LPKF recommends the S64 and the S104 for the Z-axis control required for plastic and aluminum housings
Milling of plastics	•	•	•	
Milling of SMT solder paste stencils	*	•	•	Flexible substrates necessitate a vacuum table, standard feature for the S64 and the S104
Milling of solder frames	-	•	•	LPKF recommends the S64 and the S104 due to the stepper motor-controlled milling width adjustment
Reworking of PCBs	-	•	•	LPKF recommends the S64, and the S104 due to the optical position detection feature and the vacuum table
Drilling of test adapters	-	•	•	LPKF recommends the S64 or the S104 due to the stepper motor-controlled Z-axis.
Inspection templates	-	•	•	
Depaneling of assembled boards	-	•	•	LPKF recommends the S64 or the S104 due to the Z-axis control.
Dispensing	-	•	•	

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The camera system is standard equipment on all LPKF $\ensuremath{\mathsf{ProtoMats}}$

* possible with special process

Comparison of LPKF Circuit Board Plotters

Performance and Features

Property	ProtoMat E44	S64	S104
Max. layout area (X/Y/Z)	229 mm x 305 mm x 5 mm (9" x 12" x 0.2")	305 mm x 229 mm x 8 mm (12" x 9" x 0.3")	305 mm x 229 mm x 8 mm (12" x 9" x 0.3")
Mechanical resolution (X/Y)	0.8 µm (0.04 mil)	0.47 µm (0.02 mil)	0.47 µm (0.02 mil)
Travel speed (X/Y)	Max. 100 mm/s (4"/s)	150 mm/s (6"/s)	150 mm/s (6"/s)
Repeatability	± 5 µm (± 0,2 mil)	± 5 µm (± 0,2 mil)	± 5 µm (± 0,2 mil)
Max. material size (X/Y/Z)	230 mm x 310 mm x 10 mm (9" x 12" x 0.4")	330.5 mm x 249 mm x 26 mm (13" x 9.8" x 1")	330.5 mm x 249 mm x 26 mm (13" x 9.8" x 1")
Mechanical resolution (Z)	0.85 µm (0.033 mil)	0.2 µm (0.008 mil)	0.2 μm (0.008 mil)
Travel speed (Z)	20 mm/s	25 mm/s	25 mm/s
Spindle speed	40 000 RPM	60 000 RPM	100 000 RPM
Drilling speed	100 strokes/min	100 strokes/min	100 strokes/min
Temperature sensor	-	•	•
Dispensing optionally prepared	-	•	•
Software LPKF CircuitPro	Basic (Advanced optional)	Basic (Advanced optional)	Advanced
Automatic tool change	-	15 + 5 optional	20
Vacuum table	-	•	•
Optical fiducial recognition	•	•	•
Protective housing	Optional	•	•
Automatic milling width adjustment	-	•	•
Sensor-controlled milling width adjustment	-	•	•
Working depth limiter	Mechanical, manual	Mechanical, software-controlled	Mechanical, software-controlled
Status light	-	Optional	Optional
Ports	2 x USB	2 x USB	2 x USB
Footprint (W x D)	370 mm x 450 mm (14.6" x 17.7")	680 mm x 840 mm (26.8" x 33")	680 mm x 840 mm (26.8" x 33")
Weight	15 kg (33 lbs)	95 kg (210 lbs)	95 kg (210 lbs)
Compressed air supply required?	Not required	Min. 6 bar 35 I/min (min. 90 PSI; 35 I/min)	Min. 6 bar 35 I/min (min. 90 PSI; 35 I/min)

- = Not available

• = Standard

Optional = Optionally available as upgrade or accessory

