

Laser with Real Time Check Increases Output

Manufacturer of SMD stencils uses high-precision laser technology from LPKF

Defects in solder-paste printing are responsible for at least 65 per cent of all electronic faults. Clean-cut edges of SMD stencils are therefore crucial for reliable application of highly sensitive components onto circuit boards. If the openings are not cut out with precision, solder paste can escape, which may lead to bridging and thus short circuits. That is why photocad GmbH & Co. KG, a leading specialist in the production of SMT stencils, relies on the latest laser cutting technology, having invested 300,000 euro in a high-speed system from LPKF. The StencilLaser G 6080 is specifically designed to produce high-precision openings, while at the same time also speeding up the operating procedure. Hence the new system is equipped with the patented Real-Time Process Control System, which checks each cut in real time. This allows production time to be significantly reduced and output to be increased by 20 per cent.

Solder-paste printing being not only effective but also very involved, printing faults are usually quite costly. Carefully cut SMD stencils made of stainless steel are required to apply solder paste on the circuit board in the exact position and in the right amount. Accuracy is essential here, with any qualitative defects in stencils leading to errors in the printing process. Edges that are not clean-cut can, for example, result in paste escaping, leading to bridging, which in turn causes short circuits that make the entire circuit board unusable in some circumstances. The bonding layers in such a case would have to be laboriously removed by hand – an effort that is only worthwhile for particularly expensive circuit boards. If, on the other hand, too little paste is applied, the component will not adhere and will become detached. Rough edges on stencil openings result in paste sticking to the material, which can also cause faults on circuit boards.

Laser cutting has proven successful for the highest precision. That is why photocad makes use of technology from LPKF, a leading developer and manufacturer of laser systems for circuit board production, recently having invested in a latest-generation laser system. “To keep pace with ever growing demands in the market, it is crucial to always keep your system technology up to date,” Ulf Jepsen, managing director of photocad justified the purchase of the new LPKF laser system.

Most compelling was its innovative control system, which immediately checks each stencil opening cut and compares it with production data. Instances of non-compliance are shown graphically on a display screen, and the cutting parameters are automatically adjusted if necessary – with no outage time. This allows sources of errors to be immediately detected and defects avoided. In addition, due to the real-time analysis, absolutely no production interruptions occur. “Compared to the conventional scanning method after the cutting process, this method is substantially more effective and many times faster,” said Jepsen. Whereas previously about 75 stencils were manufac-

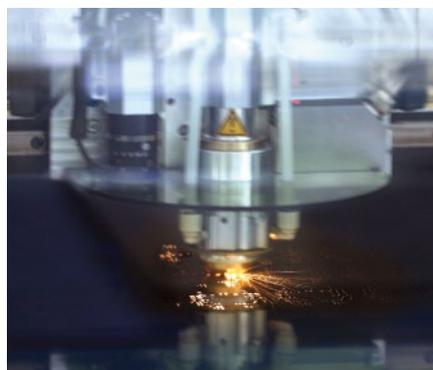


FIGURE 1: Laser cutting has proven successful for the production of SMD stencils. It produces high-precision stencil openings in very short times. (Source: photocad GmbH & Co. KG)

THE AUTHOR

MELANIE MÖRTLBAUER

Melanie Mörtlbauer studied at the Friedrich-Alexander-Universität Erlangen-Nürnberg. She did language studies in France and Spain. During her university studies she gathered experience as a freelance journalist for some German daily newspapers. Since 2010 she has been working as an editor in Munich, focussing on the field of mechanical engineering.



Pressebüro Gebhardt-Seele
Leonrodstraße 68
80636 München, Germany
Tel.: +49 89 500315-0
E-mail: melanie.moertlbauer@gebhardt-seele.de

THE COMPANY

photocad GmbH & Co. KG
Berlin, Germany

photocad GmbH & Co. KG was founded in 1969 as a production company for contour-etched parts and circuit boards. Since 1995 the business has specialised in laser-cut SMD stencils, which since 2008 it has also manufactured with nano finishing. The company caters for nearly 400 customers in the electronics and mechanical engineering fields. With annual turnover of 1.5 million euro, the Berlin-based company is one of Germany's leading manufacturers of SMD stencils.

www.photocad.de



FIGURE 2: Having invested 300,000 euro in a high-speed system from LPKF, photocad relies on the latest laser cutting technology for its SMD stencils. The system is specifically designed to produce high-precision openings, while at the same time also speeding up the operating procedure. (Source: photocad GmbH & Co. KG)

tured per day, now more than a hundred per day can be produced at the Berlin production plant. Each year the company produces about 15,000 SMD stencils.

With the Stencillaser G 6080, both compressed air and oxygen can be used as the cutting medium. In automatic operation, both gases can be used in parallel. The selection of gas, pressure adjustment and process monitoring are all carried out automatically. Repeatable accuracy of ± 2 microns guarantees high-precision machining of stencils both for one-off pieces and for mass production. Thermal stress on the material adjacent to the cut is extremely low, making for sharp, burr-free edges. Only in this way can solder paste be applied precisely, without the paste running and escaping out of the stencil opening. This has made it possible to fur-

ther reduce the rejects and post-processing rate. "Our complaint rate is less than one per cent," Jepsen reports.

Savings potential – special devices make frame adapters and cooling equipment redundant

Specially developed software makes operating the system very simple. Shapes and sizes of openings are freely selectable and can be entered on a customised basis and modified as desired at any time. In addition, special programs are also available for special-purpose solutions. Automatic frame adjustment makes stencil adapters superfluous. One simply selects the desired frame, and then in less than ten seconds the holding device adapts to the desired shape. Using this func-



FIGURE 3: The new laser cutting system is equipped with a special control system that scans the stencil openings in real time and changes the parameters if necessary – without shutting down. (Source: photocad GmbH & Co. KG)

tion, both framed and loose stencil panels can be machined, with no special adjustments to the hardware being required, such that absolutely no interruptions of the production process occur. Plates can be cut with thicknesses of 20 μm to 1,000 μm .

A comparatively large working area of 600 mm \times 800 mm makes it possible to machine two stencils simultaneously, which also saves time. Operation of the system having been designed to be as simple as possible also allows the production process to be further accelerated: For orders placed up to 12 o'clock noon, goods are shipped the same day before 6 p.m.

Beyond that, the system is equipped with air-cooling, and so an external cooling system can be dispensed with. This has the advantage that outage time for maintenance work on external equipment is no longer required, and energy consumption can be reduced by 30 per cent.