

Custom Built Switching Power Supplies

By Holger Krembel, MGV Power Supplies GmbH, Munich, Germany

MGV develops and builds new solutions for high-quality switching power supplies, created in close collaboration between the client and an experienced development and sales team. To achieve this, we have to be able to put the client's specifications into practice in the shortest possible time. And, particularly when the task involves adapting existing standard appliances, it is necessary to be able to give an almost "just-in-time" assessment of the possible solutions. For this reason, MGV decided around 5 years ago to introduce LPKF circuit board plotters for the production of its prototype circuit boards.



Fig. 1: Milled and Populated Prototype Board

This tool enables us to very quickly turn the solutions we develop into testable and installable hardware. Circuit designers thus have complete systems as well as partial circuits available within a very short period of time. One of the problems we encountered at the start was the lack of through-plates in plotted circuit boards. We did not want to install a solution in-house because of the relatively small number of prototypes involved, so we took LPKF's advice and contacted our circuit board manufacturer. Since then, prototype layouts with numerous through-plates are initially only drilled and then sent to the circuit board manufacturer for through hole plating. The result is then plotted. Easier handling of through-plated circuit boards

compensates for the extra time involved in sending the circuit boards back and forth. When additional specifications are laid down for existing circuits, the developed solutions are laid out with as few through-plates as possible. As a result, the circuit designer receives a usable plotted circuit board within a few hours to test the design.

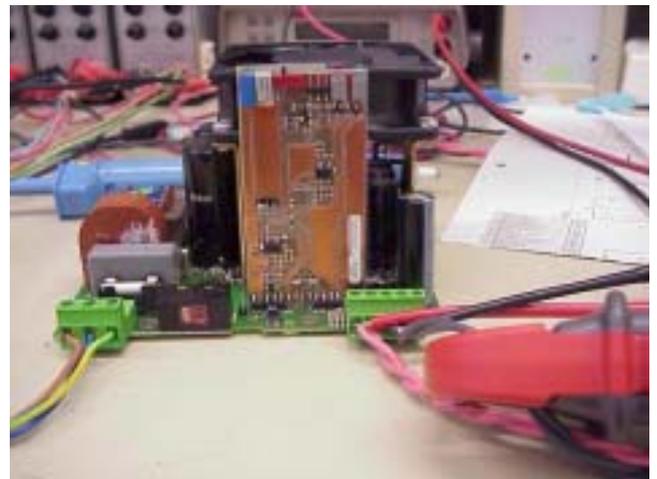


Fig. 2: Milled circuit board prototype in use

Formulating and processing the data for the circuit board plotter is very easy with the help of the standard software. The software is logical and easy to learn. The configuration of the two programs CircuitCAM and BoardMaster can be rapidly and easily adapted to one's own requirements and thus simplifies the standard work involved in data formulation.

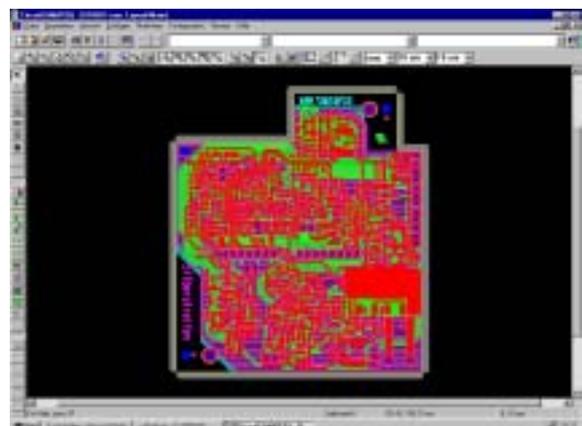


Fig. 3: Data Preparation in CircuitCAM

Case History

Another big advantage of manufacturing prototypes with the help of a circuit board plotter is the financial aspect. This approach dispenses with the relatively high costs of manufacturing circuit boards in batches of only one or two.

Using CircuitCAM also has another previously unforeseen advantage. Because our stencil manufacturer works with the same software, we are able to provide him with data, which he can use directly with virtually hardly any modification. MGV and the stencil manufacturer therefore gain financially and save time. Moreover, no problems are associated with data transfer or conversion.

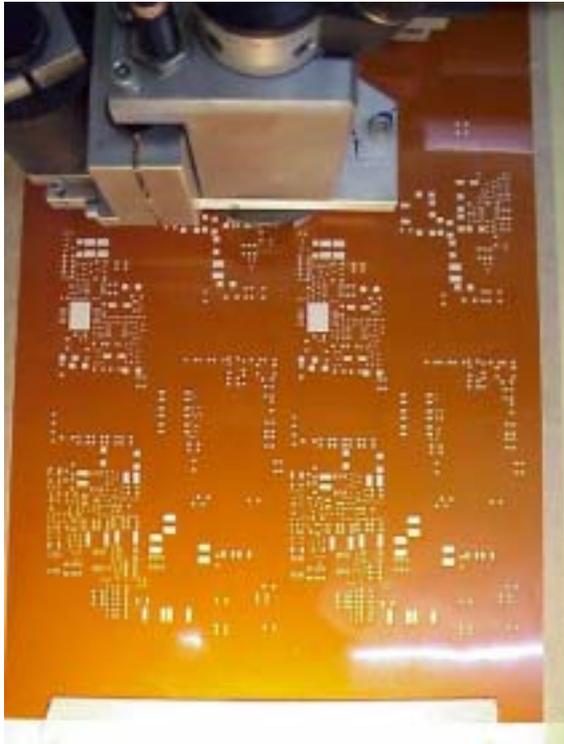


Fig. 4: Milling Stencil with ProtoMat

Initially, the SMD assembly of the plotted circuit boards was carried out manually. However, we quickly realized that this procedure was unacceptable because of the large amount of time required and the relatively high number of errors associated with manual assembly. We therefore soon also went over to mechanical SMD assembly for the production of prototype circuit boards. Although applying the solder by hand with the help of a dispenser is no problem for smaller

layouts and types up to 1206, for modules with numerous SMD components and with types smaller than 1206, we quickly realized that the time involved in applying the solder soon became unacceptably large. After contacting LPKF, they were again able to offer us a cost-effective, fast and easy-to-operate solution – cutting solder stencils in polyimide film with the help of a circuit board plotter.

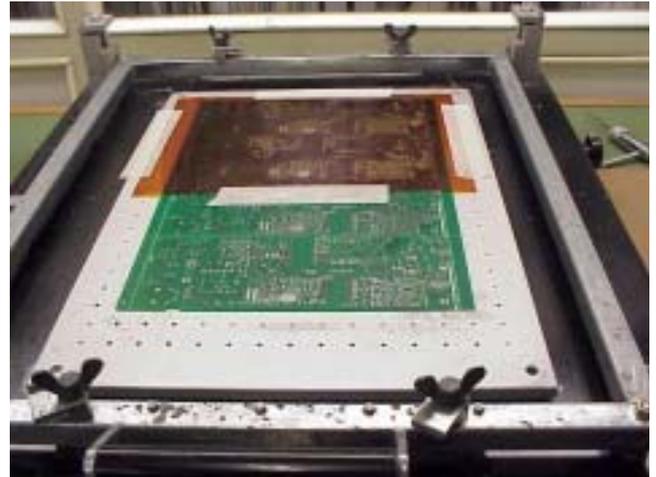


Fig. 5: Printing solder paste on a circuit board with a milled polyimide stencil

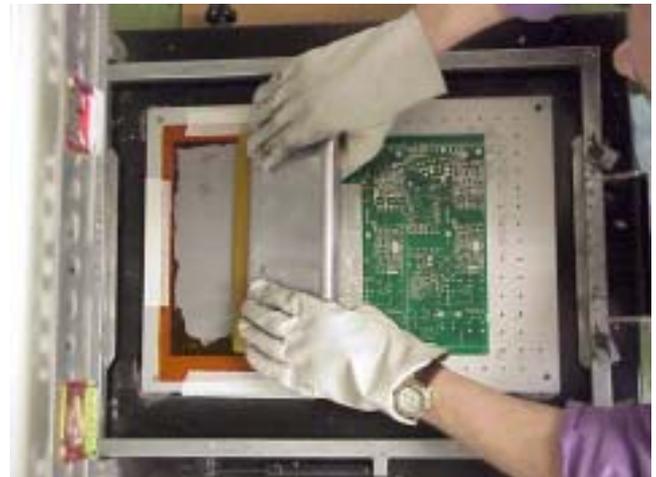


Fig. 6: Manual Solder Paste Printing

We now not only use the plotted stencils for plotted prototypes, but also for printing "original" circuit boards and applications in the development phase. Because this normally also involves layout modification, with associated changes in the stencils, using this procedure saves the expense involved in producing the metal stencils that would otherwise have been required.

Case History

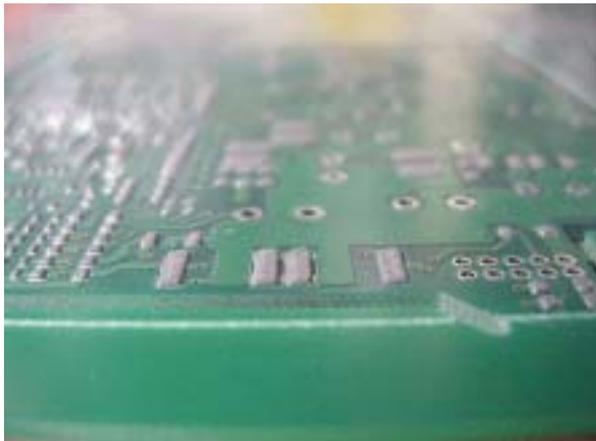


Fig. 7: Solder Pasted Print on Etched Board

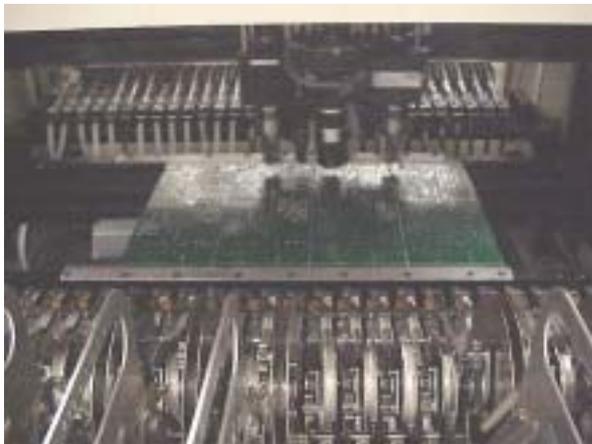


Fig. 8: Automated Pick and Place Process

By using the various options available in the LPKF Prototyping range, we were able to make big savings in time and costs. The rapid and professional help provided by LPKF when we encountered problems has also helped us on numerous occasions.

In conclusion, I can say that the introduction of the circuit board plotter and its wide range of applications has been a complete success.



MGV has specialized in the development and production of high-quality switched-mode power supplies since 1981. MGV's special skills and expertise benefit users worldwide. We ensure that customers receive the optimum power supply for their applications – whether standard power supply components, modifications or special custom developments.



The author Holger Krembel is Design Engineer at MGV Stromversorgungen GmbH in Munich, Germany.

Contact Holger Krembel:
Tel. +49/89/678090-22

Contact MGV on switching power supplies:
Tel. +49/89/678090-16/-17

Internet: www.mgv.de