

“We’ve joined the  
jet printing movement.  
Let us tell you  
why.”



**MYDATA**<sup>®</sup>

“Like many colleagues around the world, we realized that new challenges require new technology.”

When Swedish engineers came up with a high-speed method for applying solder paste to PCBs – with no stencils at all – many considered it far fetched. This type of software-driven paste application had never been done before. Today, jet printing is replacing conventional screen printing on factory floors all over the world. What started as an innovative idea has grown into “a jet printing movement that’s here to stay,” as one enthusiast put it.

So what’s all the fuss about? If you use more than 50 stencils a year with an average of 2-3 setups a day, you’ll understand. If you’re also tired of waiting for stencils to arrive, cleaning and storing them, you’ll understand even more.

In a nutshell, it comes down to how to better cope with unpredictable customer demands, shorter lead times and shrinking margins. Not to mention the pressure to deliver smaller and smaller batches of more and more complex boards – with higher quality than ever before.

Jet printing first took root a few years ago when a group of forward-thinking producers came to the same conclusion: most of their problems could be traced back to their screen printing process. They found it extremely challenging to handle the latest miniaturized packages and to deal with complex board designs with higher component density. It felt like current technology had come to a standstill. Instead of just complaining, they took a bold step and actually switched out their screen printers for a stencil-free machine called a jet printer.

Today jet printing is being used 24/7 in more than 20 countries – in North America, Europe, Asia and Africa – to solve a wide range of production challenges. It is also backed by several of the world’s largest solder paste manufacturers. On the following pages we ask SMT producers and experts across the world to share with us how they are using jet printing to profit and grow.



“Now I can take a customer’s order in the morning and deliver finished boards in the afternoon.”



“EMS companies are increasingly looking for flexible SMT equipment that’s capable of handling the constantly changing product mix.”

Helge Schimanski, Process specialist, Fraunhofer ISIT, Germany.

Time is of the essence – especially if you have a customer calling every five minutes asking for their boards. As batch sizes become increasingly shorter and tight delivery requirements add to the pressure, many SMT producers are looking into ways to achieve lean, just-in-time manufacturing.

“Jet printing is a perfect technology for customers who operate in a high-mix production environment. That’s why we developed an Alpha paste for jet printing,” says Mitch Holtzer, Global Product Manager Alpha, Cookson Electronics, USA.

#### Print a job in a few minutes

At the heart of the jet printing system is flexible software that streamlines production on a number of levels. Firstly, everything is prepared offline, so there is no interruption in ongoing production. You can literally prepare and print a new job in minutes instead of days, simply by using CAD or Gerber data. This is good news for producers like Belgium-based Page Electronics who report that: “Thanks to the faster responsiveness of jet printing, we’ve attracted several new customers.”

#### On-the-spot revisions

With a jet printer at hand, sudden design changes become easy. As one producer observed: “Just when my



With a software-driven solution, you can print a job in minutes instead of days.

line is ready to go, my customer calls me for last-minute revisions. Now this is not a problem.” That’s because jet printing enables on-the-spot revisions by simply editing the print program using the graphical deposit editor.

#### No more waiting for stencils

The beauty of this next generation technology is that it eliminates the need for stencils altogether. With a jet printer, you will never again have to wait for a stencil to arrive. As a result, you can always start a new job quickly. Moreover, you can stop wasting valuable time and money with cleaning, storing, retrieving, ordering and hunting them down.

# “With jet printing, you never compromise on solder joint quality.”

Too much paste. Too little paste. As a professional in the business, you’ll certainly recognize the trade-offs associated with using laser-cut stencils.

“The solder paste application process has always been the number one source of board defects,” says Lars Wallin, IPC Representative in Sweden. “That is where jet printing makes a difference.”

## No more trade-offs due to stencils

This bottleneck would not be so acute if your production requirements were simple. But they probably are not. Larger components require thick stencils to ensure adequate volume for a perfect electrical and mechanical interconnection. Small components require just a tiny amount of paste, meaning a thin stencil. To complicate

matters, all of these components must be mounted on increasingly dense boards. With a jet printer, you never have to compromise with just one, less-than-ideal, average paste thickness for all these applications.

## Perfect solder joints

But how do you tell companies who are building satellites, high-tech routers or military equipment that they’re using “compromized” boards? As many jet printer users explained to us, it was time to demand perfect solder joints – for each and every component. “Our latest product carries 69 components on a square centimeter – jet printing allows the kind of paste control that makes this possible,” explains Klaus Appel, owner of Appel-Elektronik GmbH in Germany.

## Complex boards require intelligent software

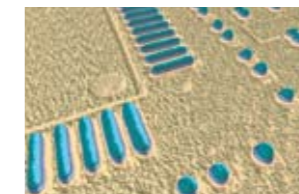
As board complexity increases, so do the manufacturing challenges. Whether you’re working with a thick, multi-layered board or a panel of thin flexcircuits, stretching is a common issue. Not any more. As a software-driven machine, the jet printer features software that automatically stretches and aligns to PCB fiducials. Board warpage is another common issue that has a major impact on the final quality of a board. As one user explained: “Because jet printing is a non-contact technology and uses a laser to measure and map the entire board, I can still achieve the same high level of quality with warped boards.”

## No risk for operator error

By working off-line while the machine is still running, you can fine-tune the volume, height and area coverage of solder paste required for each pad, component or package. Once at the machine, you simply start printing – the operator cannot affect the performance. As one producer put it: “My mother could run this machine and the quality would still be perfect – it’s all in the software.”

“I’ve never seen such accurate printing results with screen printing.”

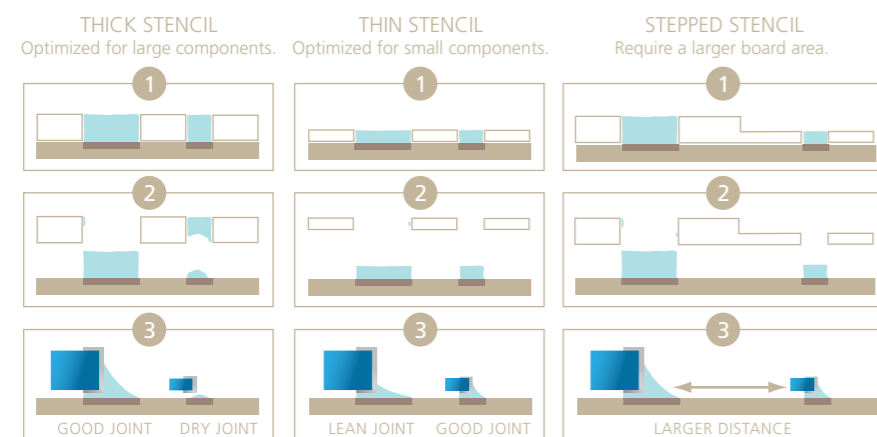
Chris Ward, Application Engineer at Cyberoptics.



Optimal solder paste deposits.



### COMMON ISSUES WITH SCREEN PRINTING

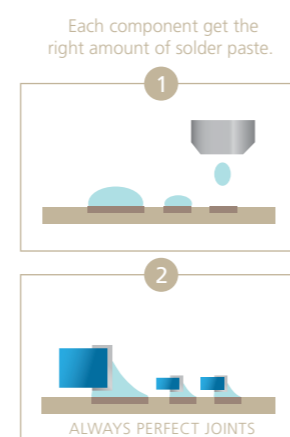


Thick stencils can lead to dry joints for small components.

Thin stencils leave too little paste for larger components.

Stepped stencils are expensive and still involve compromise.

### SOLVED WITH JET PRINTING



With jet printing, the paste volume and shape are set individually for every solder joint.

# “Jet printing is the ideal way to get solder paste into board cavities.”



“Screen printing is reaching its limits when it comes to mixing technologies on a board,” states the International Electronics Manufacturing Initiative (iNEMI), a non-biased industry organization, in its recent electronics manufacturing roadmap.

With jet printing, it's easy to handle complex and challenging boards. It also lets you achieve perfect results for new packages, such as QFNs, pin-in-paste and package-on-package (POP).

## Handling 3D electronics

One growing area of need is three-dimensional boards. To reduce the total height of the final assembly, it's common to place components in cavities on the printed circuit board. “Jet printing was the only way I could get solder paste onto my board, where one component was already mounted and coated,” says one major military manufacturer. Because jet printing makes use of a laser height sensor, height variations of up to a few millimeters can be handled with ease.

## Taming challenging packages

New packages such as QFNs are a popular way to reduce total costs and improve quality for leaded as well as lead-free applications. So far, however, they've also created headaches in terms of stencil and aperture design. Why? Because they require a delicate balance between more paste – to compensate for not having bumps for circuit connection – but not so much paste that the QFNs are floating. The jet printer avoids all of these problems by optimizing paste application for each joint.

## Meeting POP issues

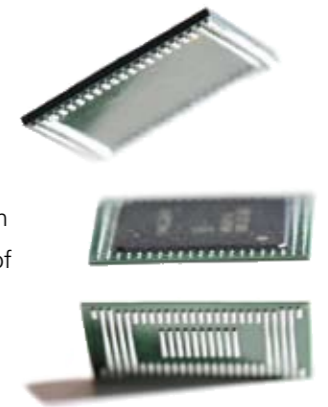
Another challenge is to achieve high-yield production levels when components are stacked on a board – POP (package on package). Dipping components into flux or paste is messy and requires a lot of operator attention to achieve favorable results. Jet printing offers a superior solution for handling POP in high volumes where the jet printer jets on top of the bottom component, as it

“Jet printing opens up many new design opportunities for customers.”

Andrew Clarke, European Business Manager at AIM, a leading global supplier of solder paste.

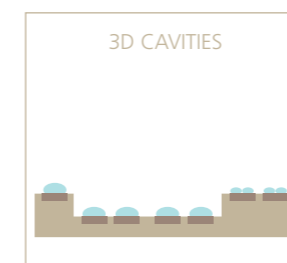
is mounted on the PCB.

Since it is easy to optimize height and volume for each solder joint, any warpage of the components can be compensated for.

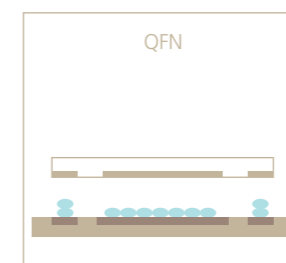


## Add-on jetting

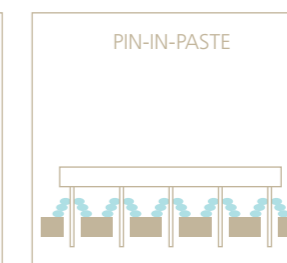
What's more, since jet printing is a non-contact technology, it can be used to add solder paste to previously screen printed boards. This may be desirable for a number of reasons. For instance, you may want to add solder paste to make sure the volume is sufficient to ensure a high-quality solder joint. Whatever the application, one thing is clear: Jet printing offers many solutions to the increasingly technical demands of electronics manufacturers. As one Russian customer told us: “We decided to go with jet printing because we wanted to invest in the most future-proof technology available.”



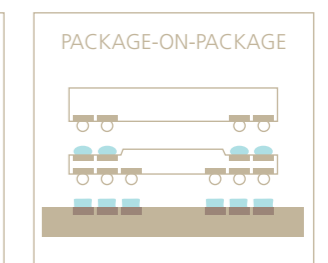
You can jet paste at different board levels or into cavities.



Floating QFNs are eliminated thanks to jet printing.

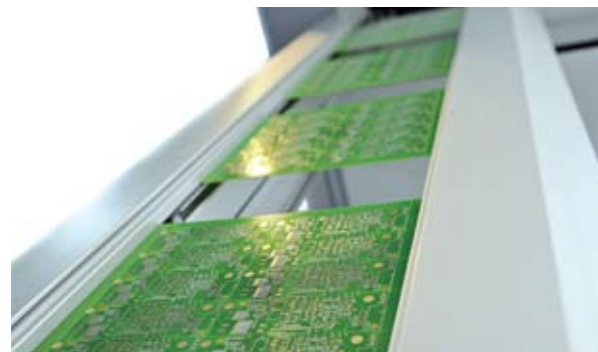


Jet printing optimizes paste volumes for pin-in-paste.



Avoid dipping with package-on-package (POP).

# “Add all the benefits of a jet printer to your bottom line.”



“A quick return on investment wasn’t my main reason for selecting a jet printer, but it’s great to know that it pays for itself in two years.”

Mikael Joki, CEO at EEPAB.

You might be wondering: “How fast can I see a return on my investment?” Let’s put it this way, if you do 2-3 changeovers a day or more and buy more than 50 stencils a year in a high-mix environment, you’ll start to see the benefits relatively soon. And how much is a happier customer worth?

## What no stencils means

Imagine for a moment running your current plant with no stencils. No more hassles with ordering. No more handling costs. No more operator costs (or at least lower). No more storage issues. No more messy solvents. No more expensive consumables. Add to this the impact of more satisfied customers and you’ll begin to understand the benefits.

## Never standing still

Even with a fast screen printer, it’s useless if your line optimization is not in balance. With a jet printer, larger

boards naturally have a longer cycle time, while smaller ones have a shorter time. The key to getting more boards produced by the end of the day is to never have any machine in the line standing still. With a jet printer, you’ll be amazed how many boards you can get out the door – every day.

## A complement to screen printing

Naturally, it’s also possible to use a jet printer as a complement to your existing screen printer. In fact, larger electronics producers are using the jet printer to handle special applications in their high-speed lines – applications that even their best screen printers are unable to do. Another manufacturer, tired of production interruptions, has gone a step further and is separating production into high-mix and low-mix, using the jet printer to off-load his high-speed lines. How might a jet printer best benefit your operations?



# Proudly presenting: the new MY500 Jet Printer!



You are looking at the new generation MY500 Jet Printer from MYDATA. Well proven on five continents, it shoots solder paste on the fly at split-second speeds while moving above the board. Like an ink jet printer, it is a completely non-contact technology and is fully software driven.

## Award-winning technology

Developed in close collaboration with some of the world's leading solder paste manufacturers, the MY500 Jet Printer is a breakthrough innovation. It has won numerous technology and design awards, including the Global Technology Award at Productronica in Munich in 2009 and the SMT Vision Award at NEPCON Shanghai.

## Capabilities & applications

The MY500 is designed to keep pace with a pick-and-place line rated at 30,000 cph. It is capable of applying a wide range of leaded and lead-free solder pastes as well as Surface Mount Adhesives (SMA).

## Fast set-ups and changeovers

The MY500 is the only truly software-driven machine on the market for applying solder paste. After preparing a new job off-line, you send it automatically to the machine. The operator can then easily run it from an attractive, user-friendly graphic interface.



To start printing, just select the print program and press start. Since jet printing is a non-contact technology, no support pins are needed. The print program automatically aligns and adjusts to the board stretch based on fiducials.

## Snap-to-machine loading

To maximize uptime, the MY500 solder paste cassette features the ease and speed of "snap-to-machine" loading. When loaded in the machine, an automatic cassette calibration and temperature control ensures that proper solder paste viscosity is maintained for perfect jetting performance.

## Easy refilling

No tools are required to refill solder paste or change the paste type. Simply release the snap lock, remove the old cartridge and insert a new one. The electronic ID of the cassette and the barcode label on the paste cartridge makes the machine settings automatic.



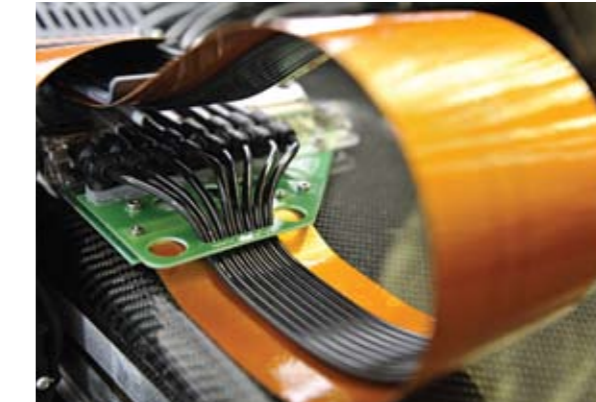
## Flowline system

Our Flowline system provides complete automation of the entire production line, allowing population of several board types simultaneously. The result is extremely high equipment utilization levels with a minimum of operator intervention.

## Get it right the first time

Thanks to our "what you see is what you get" graphical editor, our data preparation tool enables you to create jet-printing programs with zero errors. Programs are easily fine-tuned off-line, verified and ready to run – before the first board enters the line.

Once in the machine, the barcode on the solder paste cartridge and ID chip in the cassette ensure that the right type of paste, within its due date, is used for the right batch. The ability to inspect and repair the printing result if necessary reduces the risk of mistakes and the amount of rework.



## Robust, high-tech design

To meet rigorous speed and quality specifications, and to enhance operation at 3G accelerations, high-tech materials are used throughout the machine. The base machine is made of casted stone, equipped with a carbon-fibre beam driven by linear motors positioned by linear encoders. The heart of the jetting technology is the ejector. This unique, patented design is built from high-precision parts and is carefully tested and calibrated. An advanced control system ensures that the right paste volume is fed

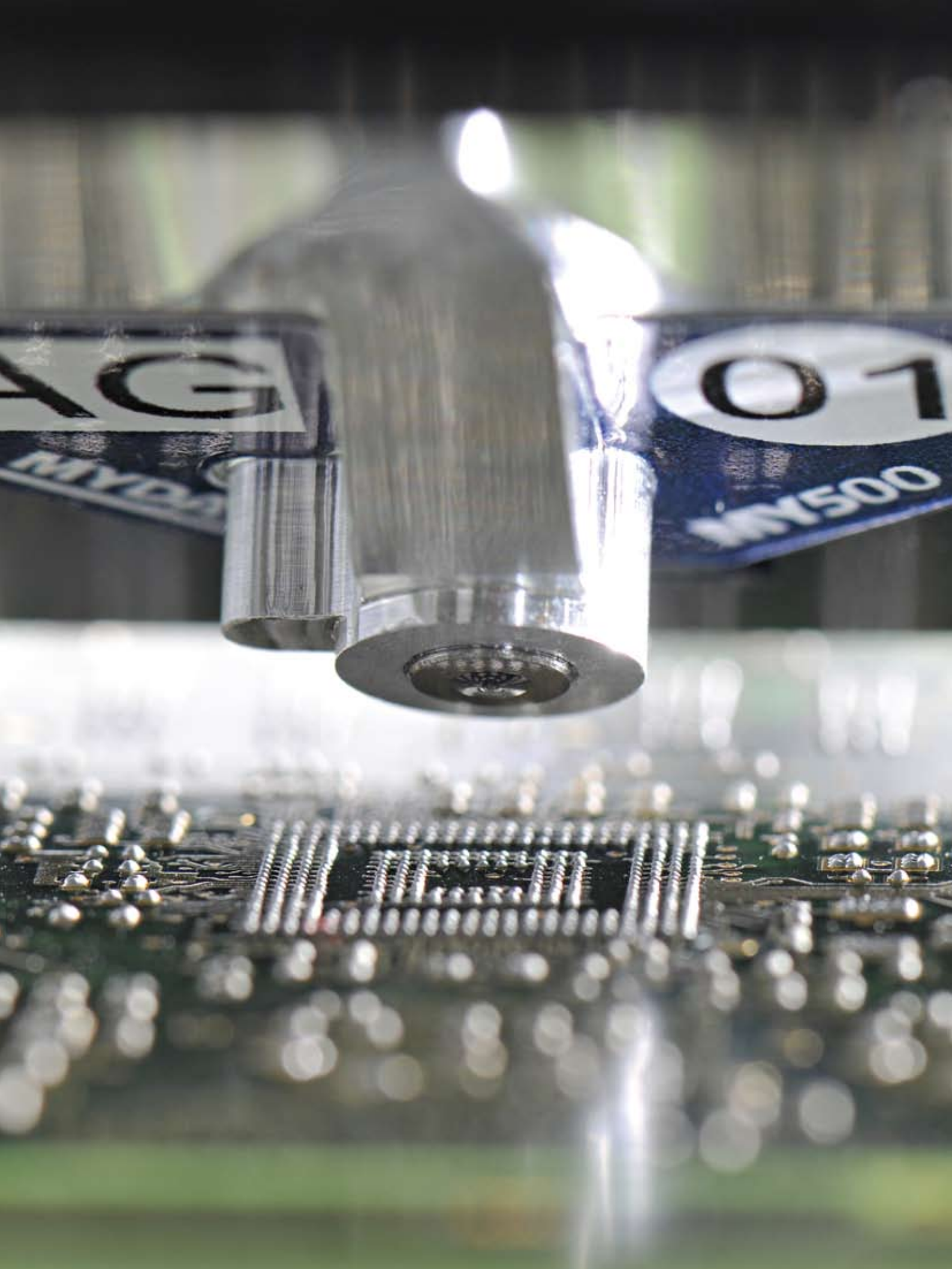
through the feeding mechanism, that the positioning accuracy is correct and that the dot sizes can be achieved at the very high pace of the piezo actuator.

## Environmentally compatible

Since the solder paste in the syringe is in a closed system, it means you will have very little waste. Also, with no need for stencils or the cleaning of stencils, there will be no use of hazardous solvents or cleaning chemicals. This makes the working environment healthier while reducing impact on the global environment.



The MY500 Jet Printer perfectly matches the MYDATA product line.



# “Are you ready to join the jet printing movement?”

Day in and day out, in more than 20 countries around the world, jet printers are helping SMT producers to apply solder paste on complex boards with challenging new technologies. QFNs and LGAs. Stacked POP components. Pin-in-paste applications. Rigid-flex boards. Boards built in 3D. The list goes on. In parallel to this, your customers are desperately waiting for their product to be delivered – and there's no time for waiting.

The ability to quickly handle setups with complex boards – at the highest quality levels – continues to excite many customers. “My jet printer enables me to reduce change-over times for paste printing to almost zero,” says Hans Simonse, Manager Production Engineering at Halin BV, a Netherlands-based EMS company. He adds: “At the end of the day I get more done.”

So jet printing is more than just talk. It's gaining momentum and is currently regarded as a new movement within the SMT industry, according to many experts. The question is: Will you be part of it?



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