

MYNNews

A magazine from Mycronic

2019.01

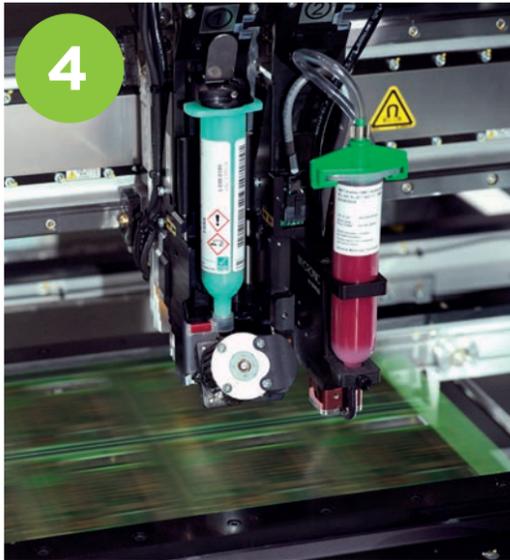
Taking productivity to new heights

GABLES ENGINEERING



GP ELEKTRONIK – a game changer
in high-speed jet printing

Deep learning: **GOING DEEPER WITH AI**



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WE ARE LIVING IN INTERESTING TIMES. The first flexible smartphones have been announced. Artificial intelligence is opening up new frontiers in factory automation. And changing geopolitics are leading many manufacturers to rethink the footprints of their global supply chains. Fortunately, Mycronic customers are in a strong position to take advantage of all of these developments.

Compared to just a few years ago, Mycronic is now a truly global company. Our installed base is much more evenly distributed across global markets, with a majority of systems now located in Asia. Seven global R&D and support centers, along with multiple new application centers for dispensing and coating, mean we can now provide extensive support to customers in more countries than ever before.

Most recently, we launched a joint research facility to leverage state-of-the-art advances in machine learning for customer applications. The Center for Deep Learning in electronics manufacturing (CDLe) in San Jose, California, will apply significant resources, expertise and computing power to tackling some of the greatest challenges in electronics assembly. Image processing, predictive analytics and yield optimization, for instance, are all likely to benefit from these techniques in the very near future. Our investment in the CDLe is part of a long-term commitment to accelerate the adoption of these capabilities in our products, and to offer new levels in precision, flexibility and real-time line optimization.

The advent of flexible smartphones, now being launched by leading manufacturers, will also be welcome news for those with solder paste jet printing capabilities. Flexible software-driven design, together with highly controlled solder paste deposits on the flex board's surface in more complex and dense applications, make jet printing ideally suited to capitalizing on this trend, which continues to push the physical limitations of screen printing.

Of course, although the features and performance of each piece of equipment remain important, the future will require a more integrated approach. Flexible full-line solutions that ensure the highest productivity and zero defects in challenging production environments will be part of the answer. The horizontal integration of data systems – whether it's machine-to-machine communication, more feedback loops or more closed-loop information cycles – together with vertical integration for line control and new management layers, will really define the next era in intelligent manufacturing. Mycronic is committed to developing the most advanced and operator-friendly solutions for electronics manufacturers worldwide.

Finally, as 2019 fast approaches, there is still plenty of promising news in store – with new innovations, new products and new possibilities to look forward to at Productronica 2019 in Munich, Germany. So keep your expectations high. It's going to be an exciting year.

// Thomas Stetter
Senior Vice President Assembly Solutions

Worldwide events 2019

NEPCON Japan

Tokyo, Japan
January 16-18, 2019

IPC APEX Expo

San Diego, USA
January 29-31, 2019

Southern Manufacturing & Electronics

Farnborough, UK
February 5-7, 2019

Productronica China

Shanghai, China
March 20-22, 2019

NEPCON Shanghai

Shanghai, China
April 24-26, 2019

SMTconnect

Nuremberg, Germany
May 7-9, 2019

NEPCON Asia

Shenzhen, China
August 28-30, 2019

Semicon Taiwan

Taipei, Taiwan
September 18-20, 2019

LEAP Expo

Shenzhen, China
October 10-12, 2019

MYCRONIC

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A game changer in high-speed jet printing

– how one long-time beta tester sees huge potential in the MY700 platform

TEXT: GRANT BALDRIDGE PHOTO: GP ELEKTRONIK MYCRONIC

As a second-generation General Manager and CEO, Anders Bo Pedersen thinks a lot about the future. It's a spirit that runs deep in the family company. In a recent interview, he explains how the MY700 is a perfect fit for the company's vision to combine the best in quality, flexibility and now higher volume production.

COMMITTED TO AUTOMATION. Founded by Pedersen's father nearly thirty years ago, GP Elektronik began in Odense, Denmark as a small CAD design bureau specializing in PCBs. The company grew to a dozen employees in just the first year, and has remained roughly the same size ever since. "Of course, the boards are much more advanced today and the volumes are much higher," says Pedersen, "but we've always relied heavily on automating things. Today we use two production lines, with one MY700 Jet Printer in each line, to serve a lot of customers in the robotics industry, food processing, industrial plant equipment and some consumer product manufacturing."

Key to the company's strategy has been a strong customer focus, together with a dedication to flexible, high-quality board design, build, test and development. "Our aim was never to become a huge company," he explains. "We focus on running a good business, making good products and having some fun with the best equipment along the way."

Evolving with new demands and simplicity

As an early adopter of jet printing technology, few contract manufacturers have experienced the evolution of solder paste jet printing quite like GP Elektronik. "It's interesting because I started at the family company right when we brought in the first MY500 about eleven years ago," reflects Pedersen. "I would say we're a very demanding customer. We were deeply involved with the MY500, did a lot of beta testing, a lot of tweaks with different solder pastes, depositing and other things, and then shifted up to the MY600 for a while. So I've really seen the potential and followed the automation trend throughout the years."

I've really seen the potential and followed the automation trend throughout the years.

ANDERS BO PEDERSEN, GM AND CEO
GP ELEKTRONIK

With the MY700, Pedersen is confident that the technology is ready for mainstream, higher volume production. In particular, its dual ejector heads, dual lanes and multiple ejector sizes have opened up opportunities to produce larger batches for a number of fast-growing customers. “We were in the lucky place that we didn’t have to upgrade since the MY600 was sufficient,” explains Pedersen, “but the speed increase with the MY700 gives us a lot more headroom to grow with our customers’ demands. There’s a lot of versatility with the small, medium and big dots with the three different ejectors. The largest gives you 100% more paste volume in one dot, so the biggest impact in our production capability in terms of speed has definitely been the large dot ejector.”

Rising batch sizes, rising throughput

This ability to scale production quickly and seamlessly is becoming increasingly important for GP Elektronik as the gap between the smallest and largest batches continues to grow. Just a few years ago, Pedersen explains, longer series production was relatively rare, “but now batches of 5,000 fairly complex boards are not uncommon. We’ve been very pleased with the MY700: the production is very stable and we have very few stoppages. It’s complex to calculate the actual figures, but by the end of the day the throughput increase is maybe 40%, depending on the application type and component mix. With a different mix you could easily raise that to 50-70%.”

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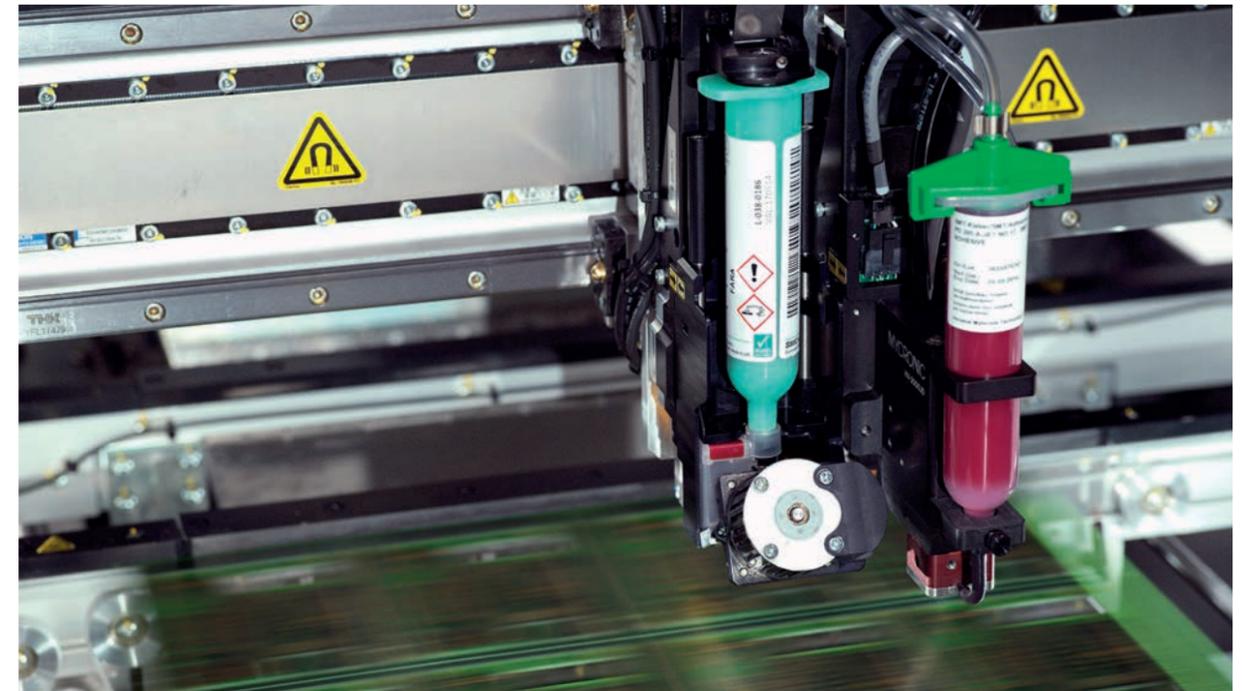
Complex designs with total freedom

For many manufacturers, the advent of high-speed solder paste jet printing opens up entirely new possibilities for replacing current stencil printing techniques with a more flexible, software-driven solution. “It all has to do with the speed of changeovers and the flexibility on the production floor,” says Pedersen. “The design freedom is completely different than with screen printing. We can make much more complex designs without making the production process more complex. This helps as we are seeing a growing mix of high-power boards, and fine-pitch BGAs and other small components. So you can design with 102 resistors close to a big D2 pack, high-power LEDs, or pin-in-paste components right next to 0004 LEDs.”

“I’ve been fortunate not to work too much with stencil printers,” he continues. “Of course I’ve been in the industry for a while and have been involved with them in some situations, but there’s really no comparison in my book. Stencil printing makes sense if you have 100,000-plus components per line, a really good stencil printer, a really good line and you’re not changing jobs a lot. But in western Europe, at least, I think jet printing is definitely something you should consider. Plus there’s no storage, no cleaning, no maintenance of squeegees and stencils, and no chemicals to wash away. It’s a better environment for operators. You just keep an ejector in the fridge, take it out, use it and put it back. It’s so simple.”

Now that the MY700 is a rock-solid hardware platform, the sky is the limit on what you can do with software updates.

ANDERS BO PEDERSEN



A mature technology with endless potential

In their current applications, GP Elektronik mainly relies on a single solder paste dot size for both ejector heads in their MY700s. Still, Pedersen remains excited about the ability to apply a range of other assembly fluids in the future. “We don’t do a lot of adhesives,” he says, “but it’s nice to know we can improve our production by applying adhesives with electrical conductivity, if the need arises.”

Multiple fluids. Multiple ejectors. Dual heads. Higher speeds. Put together, all of these enhancements mark the beginning of a new era for jet printing. Eleven years after running his first jet-printed PCB, Pedersen now looks forward to the next big shift in contract manufacturing, where software

automation will play an even greater role. “As a long-time beta tester,” he concludes, “we really saw the potential in having a stable hardware platform for jet printing. Of course there are cases where the difference between having a MY500 or MY700 doesn’t matter. But for some customers the MY700 would be the game changer in terms of speed, since the two ejectors open up the possibility for using jet printing at all. I would say there’s nothing that a potential customer could point to and say that this production solution isn’t mature. The hardware stability gives us so many possibilities to adapt new parameters to try new things. Now that the MY700 is a rock-solid hardware platform, the sky is the limit on what you can do with software updates.”



More adhesives. More throughput.
Twice the possibilities.



MY700 – Discover the industry’s fastest fluid dispensing system

The future of high-volume dispensing belongs to those who can accurately produce the most complex boards at the industry’s highest speeds. Low- and high-viscosity adhesives. Any deposit volume or board type. Selective coating, capillary underfill or encapsulation. Part of the new MYPro series, the MY700 Jet Dispenser handles it all at significantly higher speeds than any other dispensing system – all within a smaller footprint than previous generations, and with no need for operator intervention. Whatever your ambitions, the future is already here. In fact, it’s just in time.

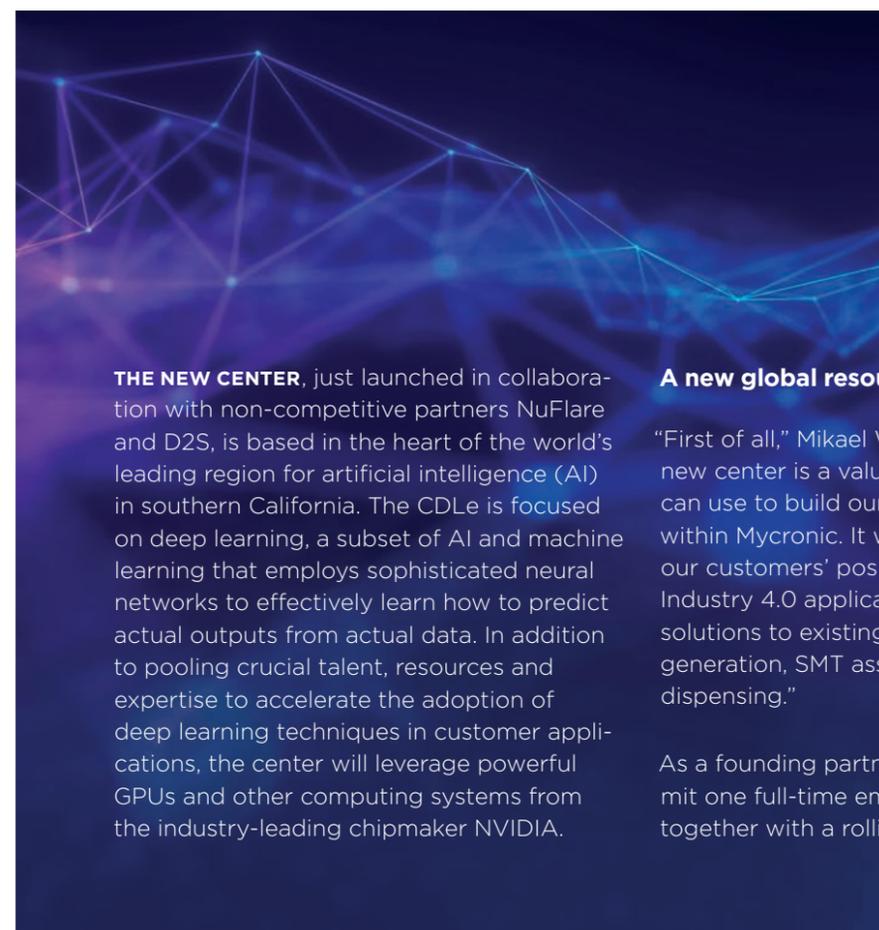


Going deeper with AI

– how Mycronic’s new collaborative deep learning center can help unlock the value of AI

TEXT: GRANT BALDRIDGE PHOTO: SHUTTERSTOCK MYCRONIC AB

Together with NuFlare Technology and D2S, with support from NVIDIA, Mycronic recently announced the establishment of the Center for Deep Learning in Electronics Manufacturing (CDLe) in San Jose, California. Mikael Wahlsten, Director and Product Area Manager for Photomask Generators at Mycronic, gives his insights into the idea behind the new collaboration and what it can mean for Mycronic customers in the near future.



THE NEW CENTER, just launched in collaboration with non-competitive partners NuFlare and D2S, is based in the heart of the world’s leading region for artificial intelligence (AI) in southern California. The CDLe is focused on deep learning, a subset of AI and machine learning that employs sophisticated neural networks to effectively learn how to predict actual outputs from actual data. In addition to pooling crucial talent, resources and expertise to accelerate the adoption of deep learning techniques in customer applications, the center will leverage powerful GPUs and other computing systems from the industry-leading chipmaker NVIDIA.

A new global resource

“First of all,” Mikael Wahlsten explains, “this new center is a valuable global resource we can use to build our deep learning expertise within Mycronic. It will serve to strengthen our customers’ positions within a range of Industry 4.0 applications, providing novel solutions to existing problems in pattern generation, SMT assembly, inspection and dispensing.”

As a founding partner, Mycronic will commit one full-time employee to the center, together with a rolling program of 3-month



→ The Mycronic team ready for the opening ceremony for the Center for Deep Learning in San Jose - Bijan Etemad, Mikaela Näslund, Romain Roux, Robert Eklund and Mikael Wahlsten.



residencies for other Mycronic staff. Staff members will be able to utilize the center's resources to test customer applications, to refine data and image classification systems and to create simulations for a range of new data-driven approaches as a complement to existing automation models. The result, says Wahlsten, will be a prioritized portfolio of Mycronic initiatives aimed at developing more adaptive solutions to current production challenges as well as new applications and services to help customers increase yield, productivity and performance,

The power of predictive algorithms

According to a recent study from McKinsey, deep learning methods have matured rapidly in recent years, particularly in industries with large volumes of real-world data such as insurance, retail and advanced manufacturing. The report estimates that within supply chain management and manufacturing, some of the highest business impact in the near term is likely to be experienced in predictive maintenance and yield optimization, followed by procurement analytics and inventory optimization.

"Predictive services are one of our initial objectives," explains Wahlsten. "Image classification, for example, has advanced significantly and has strong potential for improvement. In terms of image processing, we can definitely find novel ways to improve quality and enable the system to better adapt to its environment."

Big data means big potential

The quality of deep learning algorithms depends on huge data sets – in most cases requiring millions of labeled examples – in order to exceed human abilities and traditional analytical technologies. And real-world production data is something Mycronic systems have in abundance, thanks in part to the ongoing development of the Mycronic 4.0 intelligent factory. "All of our systems today are essentially software-driven and increasingly integrated with other factory systems," says Wahlsten, "The process data they create is hugely valuable as training data – which is used to train the algorithms. This holds a lot of potential when it comes to generating accurate simulations through deep learning.

Now that we have an integrated jet printing, pick-and-place and inspection line, for instance, we can build a feedback loop based on deep learning to predict and give feedback."

"Simulated environments," he continues, "are particularly useful for SMT customers who need to find new adaptive methods for automated production. The entire Mycronic 4.0 intelligent factory concept relies on factory-wide information flows – horizontal, vertical and into the cloud. This level of total automation involves so many systems, with so much complexity, which is exactly where these types of adaptive deep learning algorithms can add massive value, both within the production line and in other systems throughout the factory."

The digital transformation continues

Due to the rising complexity in electronics production, there appears to be no end in sight to the rising volumes of data generated by today's highly automated factories. In the cases of pattern generation and inspection, in fact, the volume of data produced by a

single system in a day can be comparable to the data generated by a small bank. With the help of deep learning, this "big data" is a valuable resource that can help manufacturers bring the next wave of digital transformation into the physical world.

"Our pattern generators are used to produce billions of displays used for smartphone screens, computer flatscreens and TV displays every year," says Wahlsten. "And with AEi, our systems manufacture a large share of all the camera modules which are critical to highly automated next-generation autonomous vehicles. So in many ways, our solutions are indispensable to some very vital global industries. Our responsibility at Mycronic is to identify where state-of-the-art technologies can create more value in our customers' production. The CDLe will help us fulfill that promise, to test new applications in the world's leading region for AI and deep learning, and to bring these improvements into our customers' environments as soon as they're both viable and reliable."

Taking productivity to new heights

– how one aerospace manufacturer saves time and boosts production volumes with SMD Towers

TEXT: GRANT BALDRIDGE PHOTO: SHUTTERSTOCK GABLES ENGINEERING

Debating whether to upgrade from racks and shelves to an intelligent material handling system? With the help of SMD Towers, one Florida-based electronics manufacturer shows how smarter material handling not only cuts kitting times and repetitive manual work – it can also significantly increase production volume.



Those towers are a lifesaver when it comes to inventory.

CLARENCE NICHOLS
GABLES ENGINEERING



GABLES ENGINEERING, founded in 1946, has a deep history in aviation electronics. An industry leader in avionics controls, with customers including Boeing and Airbus, the company's custom control panels can be found on virtually every major commercial aircraft model produced in the last 70 years.

Part of the secret of this success has been a commitment to a uniquely controlled manufacturing approach. Over the decades, the company has resisted global outsourcing trends and maintained a vertically integrated operation with all design, qualification and manufacturing under one roof. Products include everything from electronics assembly of traffic collision avoidance systems and radio control panels to the design and build of switches and LCD display modules.

Big inventory, big challenges

To promise customers short design-to-production cycles with such an expansive product mix, material handling was a constant challenge. "When we started SMT manufacturing at this site," says Clarence Nichols, SMT Supervisor at Gables Engineering, "we placed our parts on shelves and in drawers. It was really difficult to locate parts."

In addition to requiring a four-person kitting staff, the manual storage system gave little insight into the location, stock levels or traceability of parts. Manual documentation was time-consuming, and with such a large stock of parts, discrepancies in inventory counts were inevitable. Only an annual inventory audit would reveal eventual overstock and waste.

A successful trial

As part of a continuous effort to define future developments in the industry, the engineers at Gables would regularly visit the major SMT trade shows in search of evolving technologies. It was here they identified a promising alternative for their material handling issues. "One year we visited APEX and were introduced to the SMD Tower," says Nichols. The assembly team decided to give the new system a try.



→ “We started with one tower and saw immediately how it made our process more efficient,” says Clarence Nichols.

The future of intelligent productivity.



The industry's smartest high-mix line is now more versatile than ever

The future of high-mix production belongs to those who can mount any component on any board. Handle any batch or series with zero changeover times. And jet high-precision solder paste and adhesive deposits at record speeds. The new MYPro series combines two of the industry's most productive platforms – the MY300 and MY700 – giving you more capabilities than ever before within a 40% smaller footprint than previous generations. Simply put, it's the smartest way to boost quality and utilization across a vast range of challenging applications. Whatever your ambitions, the future is already here. In fact, it's just in time.

MYCRONIC
When passion meets innovation ●

As soon as the team began labeling reels, programming jobs and assembling kits, the benefits became obvious. “We started with one tower and saw immediately how it made our process more efficient,” says Nichols. Time spent locating parts and gathering kits dropped sharply, “so we began installing more of them. Today we have seven towers and are considering upgrading a few of them to the new SMD Tower 8000”, explains Nichols, referring to the latest SMD Tower model that stores up to 1,148 reels within just a 1.5-square-meter footprint.

Tracking parts like never before

In particular, Nichols explains, the system's software features have enabled an unprecedented level of stock accuracy. “The combination of the SMD Tower and the MYCenter software gives us real-time tracking of our inventory and the location of all our parts. So instead of doing annual inventory audits like before, we can just go into the system, print out the total number of parts left, and make adjustments. In general, I'm telling you: those towers are a lifesaver when it comes to inventory. You get live reports on your production at all times.”

Instant part location and traceability

Instead of handwritten documentation, the company moved over to the SMD Tower's printed, scannable barcodes, thus eliminating an additional layer of unnecessary manual work. "It's been a great time saver in terms of finding parts. Now we can get the right parts within minutes and save hours on putting a job together. We can also trace any part back to the date, the batch, the board, the manufacturer...and if there's an issue with a part, we have full traceability. Of course, we could trace everything before, but it was tedious when the records were handwritten."

Turning to more valuable work

For a company like Gables - whose diverse operations include not only PCB design and assembly, but also display fabrication, CNC machining, injection molding and

much more - the significant amount of time saved on component handling has opened up opportunities for better use of staff resources. "The system is so efficient that we were able to cut down on kitting staff," says Nichols. "If I had four people pulling parts before, now I've gotten it down to two. This means the other two can be doing something more valuable like putting kits together for MYPlan," Mycronic's optimization and planning software.

Bottom-line results

Although the time savings are clear, the real question confronting many manufacturers remains: How much can a component handling system really increase production? In short, how does it drive revenue growth? Posed with this question, Nichols concludes, "I would say it led to a significant increase in production capacity."

I would say it led to a significant increase in production capacity.

CLARENCE NICHOLS
GABLES ENGINEERING

Meet the new MYSmart series

If you
can create it,
We can coat it.

The MYC50 has you covered.

In a connected world, electronics everywhere demand protection. And with precise deposition of conformal coating materials, you can produce more rugged electronics while reducing material waste and operational costs. But are your production lines ready for the next challenge? The MYSmart series MYC50 is a high-performance conformal coating system that ensures non-stop throughput across a range of complex applications. Thanks to a robust frame, an advanced motion control system and a broad range of coating valves, we combine speed and precision to help you meet an endless variety of coating demands. Find out how you can prepare your electronics for tomorrow's challenges at mycronic.com



MYCRONIC
When passion meets innovation ●

Dispense, coat and create

– introducing Mycronic’s new application centers for dispensing and coating

TEXT: GRANT BALDRIDGE PHOTO: MYCRONIC

The MYSmart series and Mycronic’s jet printing technologies make it possible to solve any dispensing or conformal coating challenge. Now Mycronic is establishing multiple application centers worldwide to help customers make the most of them.



NEW APPLICATION CENTERS WORLDWIDE.

With a larger global installed base of MYSmart and MY700 jet printing and dispensing systems, Mycronic is taking the next step in bringing its hands-on expertise closer to customers by establishing multiple new application centers for dispensing and coating in the US, Europe and Asia. The first three European centers, located in Germany, Sweden and the Netherlands, have already been opened. The first US center, in Massachusetts, is already fully equipped to support jet printing and dispensing customers, and will add complete conformal coating capabilities in early 2019.

The centers offer customers a complete service offering, from prototyping and process development to automation and software integration. “Each of the centers has a specialized focus,” says Arjen Koppens, Director of Sales, Dispensing at Mycronic. “Sweden is leading the jet printing development, the Netherlands is concentrated on coating, and Germany is specialized in dispensing. But they all have the full product portfolio, and we hold regular cross-training sessions to ensure that the knowledge is evenly distributed throughout the organization.”

Rising demand for dispensing and coating

Mechanical integrity is increasingly crucial for today’s electronics. Whether it’s electric toothbrushes, car electronics or wearable devices, more and more devices are exposed to moisture, impact, thermal stress and other harsh environments. Dispensing and coating systems are therefore essential to ensuring longer lasting, high-quality products.

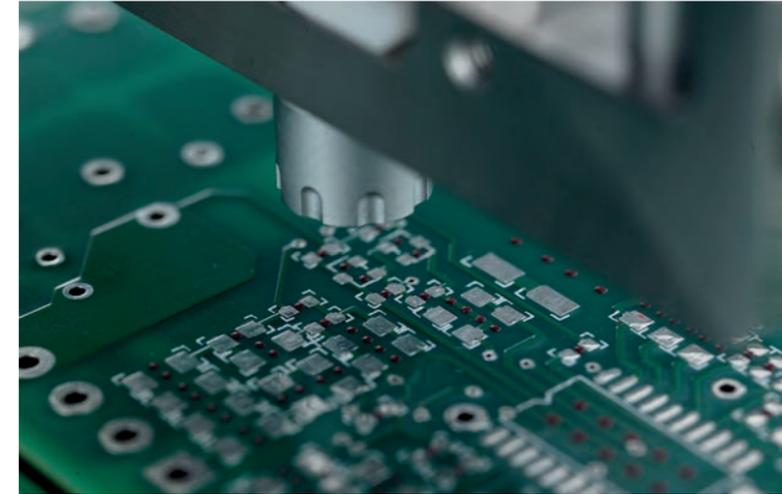
The need for precise and selective protective coating is quickly expanding into a wide range of board designs and manufacturing environments. “In Europe and the US, conformal coating is growing more important for all kinds of automotive, aerospace and medical electronics,” explains Koppens.

“In Asia we see a lot more focus on smartphones, cameras and other consumer electronics – typical high-volume applications.”

When it comes to dispensing, some of the growing challenges are driven by a wider mix of components, higher component density, and a general demand for more robust finished products. “Underfill, for example, is crucial for BGAs, since an epoxy underfill gives better strength, resistance to thermal stress, and protects against moisture and other contaminants,” says Koppens. “And powerboards, which tend to have a lot of large and tall components, usually need high-viscosity silicones to improve mechanical strength.” All of these applications require high-precision dispensing systems that can accommodate a variety of fluids while being flexible enough to integrate into existing production systems.

Solving solder defects

Solder paste deposits represent yet another rising quality challenge for electronics manufacturers. With Vi TECHNOLOGY inspection systems as part of the Mycronic family, it has now been verified that 70-75% of failures in electronics production are due to the stencil print process used by most facilities. These stencil processes are particularly limited when it comes to handling large variations in solder paste deposits.



With the dual-head MY700 Jet Printer and Jet Dispenser, the advantages of jet printing can be leveraged in production environments of any scale. Smaller high-mix manufacturers can achieve perfect quality solder deposits at high speeds, apply high-precision adhesive fluid deposits, or a combination of the two. Mid-volume producers can ramp up speeds by combining two MY700s, using a dual large-dot ejector for higher throughput together with a dual small-dot ejector for more challenging precision deposits. Even the highest-volume stencil printer lines can benefit from the MY700 as part of an add-on program, which makes it possible to solve quality issues in challenging processes while simplifying stencil designs.

The MYSmart series goes global

The introduction of the MYSmart series also marked a significant expansion of Mycronic customers’ capabilities into any type of electronics assembly processes, offering a complete portfolio of tabletop and inline dispense solutions, together with a versatile conformal coating system. First launched in 2017, the series incorporates a portfolio of core technologies used by leading global automotive, aerospace and consumer electronics, upgraded with high-end standardized features for the global market. Standard

features across the range include precision robotics, high-accuracy laser detection systems, automated calibration routines, high-speed jetting and more.

Extensive support services

At Mycronic's new application center in the Netherlands, a number of process improvements have already resulted from several customer collaborations. "One example is a pre-heat buffer conveyor," explains Koppens, "which we developed for a customer primarily to reduce energy consumption in the dispenser. By pre-heating the board up to ninety degrees, it also ensures a more stable process with a shorter cycle time."

Another service offering that has experienced strong customer demand is application development, where specialists from Mycronic help to optimize a particular board design for the dispense application, to reduce cycle times or to minimize production costs. The ability to program the entire process in advance, Koppens argues, is a key strength of the software-driven MYSmart production concept: "You can already prepare the next product offline with our software. You can sit at your desk and program the whole process. This isn't always common in the dispensing industry, since most other dispensing systems are done on the machine itself. So we have a really strong focus on this – on using automation to eliminate downtime in advance. Cost of ownership is something we work to optimize from the start."

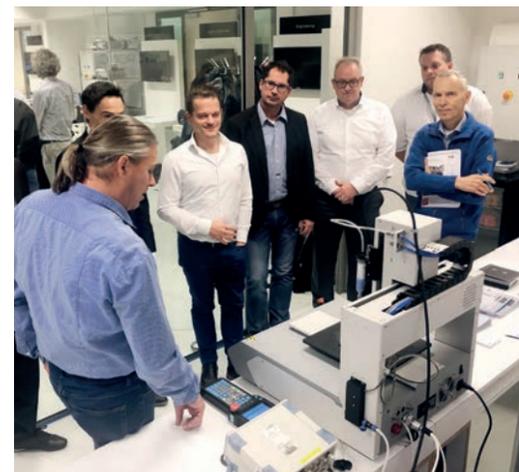
Creating tomorrow's opportunities

Mycronic's new application centers are designed to function as a practical interface between Mycronic and its customers, across industry sectors and among industry partners. "At a typical technical seminar for coating," says Koppens, "we bring together several leading manufacturers of coating and dispensing fluids and inspection systems to explore future demands in electronics protection. Our application centers are what make these types of knowledge sharing and technical experiences possible. To find new ways to help our customers get more from our systems, we really need to collaborate and stay at the forefront of new applications."

"Show us your application. We'll help solve it."

To date, the new centers have handled dozens of customer projects, with many more in the pipeline for 2019. From advanced process control and traceability systems for automotive electronics manufacturers to new adhesive fluid trials for consumer electronics, there is certainly no shortage of exciting new opportunities. "It's been quite an intensive program so far," says Koppens, "and I love it. We really have the chance to better understand our customers' production environments and set up the right process to get them off to the best possible start. So if you're looking into ways to improve your process, show us your application. We'll help you solve it."

→ Arjen Koppens giving a presentation about Conformal Coating during the "Protect your Electronics" Seminar in the application center in the Netherlands.



The square-meter camera factory

Why a single advanced assembly system is vital to today's automotive sensor industry

TEXT: GRANT BALDRIDGE PHOTO: SHUTTERSTOCK AEI

Boston-based Automated Engineering Inc. (AEi) may be a little-known part of Mycronic for most SMT customers, but for the fast-growing automotive electronics industry, AEi's compact solutions are critical to producing millions of advanced camera sensor modules per year.

THE RISE OF VEHICLE AUTOMATION. One look in the cab of any modern car will tell you where the industry is heading: from intelligent cruise control to lane assist and collision avoidance systems, automated controls are proliferating. The capabilities of these systems are increasing rapidly, and all are powered by advanced camera and sensor systems.

Unlike many of today's "vision cameras", which display images to support drivers' decisions, these new types of vehicle automation systems rely heavily on what are often called sensing cameras, which use sophisticated image-processing algorithms that are specifically designed to support the decision-making of the car's own software. Today these decisions involve relatively straightforward tasks such as collision warnings and active braking, but their capabilities are quickly evolving.



With the help of sensing camera modules, the industry is rapidly approaching next-generation driver assistance and driverless vehicle systems. This is where AEi's products play a critical role, enabling flexible mass production of camera modules with industry-leading Active Alignment Assembly and Test equipment and manufacturing solutions for its customers.

High-volume precision assembly

The technology behind active alignment may be complex, but the principle is fairly simple. To assemble a camera module, a sophisticated automated assembly process is needed to first activate the sensor, align and focus a lens to the sensor to measure optical characteristics through a series of images, and then lock the module into place with adhesives – all with extreme control and precision. A single speck of dust or misalignment of a few microns, and the vehicle's entire safety-critical system can be compromised.

The machine that enables this, the Camera Module Assembly and Test system, or CMAT, performs all of the multiple axis alignment process steps as well as component surface preparation, epoxy dispensing, pre-curing and test. All of this is performed within

the machine's compact 1x1.5-meter footprint. A Final Functional Test (FFT) system, a derivative of the CMAT that measures the optical performance of the fully cured camera module assembly, is also often included in a complete assembly line to ensure outgoing product quality.

"Our machines are essentially mini-factories," explains Steven Michaud, President at AEi. "There's a plasma surface-activation module, a dispense module, an align module, a test module and so on – with a total cycle time short enough for the demands of high-volume automotive production. The intelligence involved in coordinating and optimizing these processes is what really makes us unique. These are some very high-precision algorithms that enable everything from process design and alignment, to data optimization."

A lifetime of high performance

The result is a highly precise and robust camera or sensor that remains accurate despite the lifetime of environmental stresses a vehicle needs to withstand. "Our customers need to ensure that the quality of the camera can hold up to high and low temperature extremes and harsh road conditions," says Michaud. "So, material processing is key. Alignment is key. Cleanliness is key. Quality of assembly is key. They need to predict and ensure the same quality in all of the variables. Active alignment is critical to holding all this together."

Because the CMAT system is so central to automotive customers' success, the company's manufacturing solutions extend far beyond those of a technology equipment supplier. AEi's services – ranging from camera module design for manufacturing, rapid prototype development using 3D printing of custom tooling, to application enhancement and performance maximization – ensure the customer's production line is optimized.

"It all starts with our CMAT machine," says Michaud. "We have a dedicated machine for prototyping and performance analysis of

our customer's preliminary camera designs. We then support our customer over the 12-18-month ramp-up period from prototype to mass production. For every new camera we develop a process together with the customer, covering dispensing, alignment, anticipating adhesive shrinkage during curing, etc. We develop all of this and work through the entire mass production period. We like to think of ourselves as an extension of our customer's own design and process optimization capabilities."

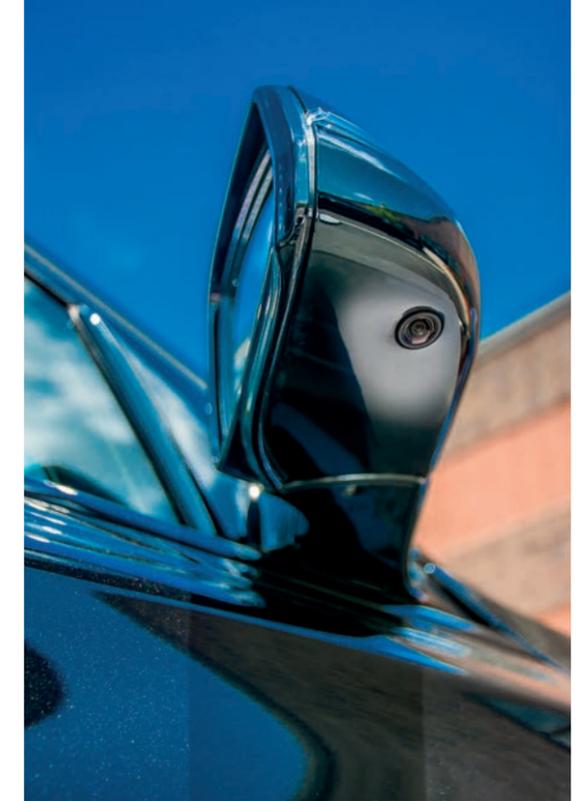
On the forefront of electronics assembly

AEi was acquired by Mycronic in 2016 as part of a strategic diversification program into an adjacent application in automotive electronics assembly. As a technology pioneer and the world's number-one supplier of high-performance camera assembly systems, AEi was already a well-positioned partner to most of the largest automotive electronics manufacturers. Today the company has a leading position in a fast-growing market driven by advanced driver assistance systems (ADAS) and autonomous driving (AD) penetration within the automotive industry.

"The AEi portfolio matches our own product portfolio and areas of expertise extremely well," says Thomas Stetter, Sr VP and General Manager of Assembly Solutions at Mycronic. "The CMAT strengthens our offering with a world-leading product in an industry with high demands for extreme precision and flexibility. It has also allowed us to combine our knowledge in advanced software control and automation. This benefits all of our customers, especially as we enter a new era of deep learning, software-based process optimization and the continuing evolution of the Mycronic 4.0 intelligent factory. All of these factors have made AEi a strong strategic complement to our other business areas."

Transforming the future of sensor systems

Automotive electronics manufacturers, meanwhile, will benefit from the expanded global presence and expertise of the



→ Network of Surrounded View Cameras provides 360 degrees near view for parking assistance.

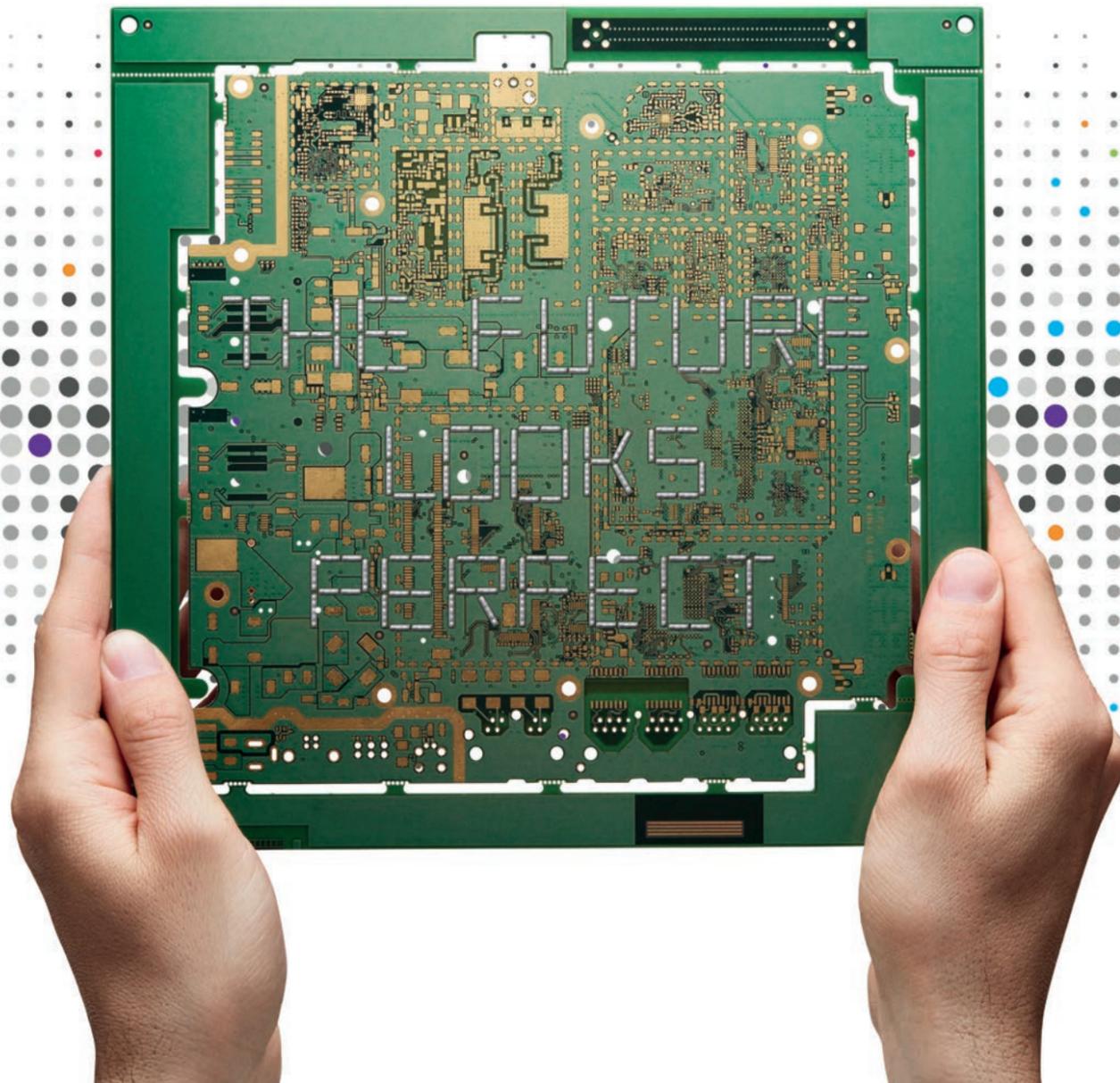
Mycronic Group. As vehicle ADAS expand beyond independent sensor and optical cameras into complex systems that integrate infrared, radar and lidar modules, the AEi team's deep experience and industry partnerships will continue to be key drivers in the evolution of ADAS and AD automotive electronics.

As Jean-Marc Peallat, VP Marketing and Sales at AEi, explains, "since the acquisition, Mycronic has really been an enabler for AEi in terms of our product design roadmap. Until recently, our product portfolio was driven by immediate customer demand, since the market for advanced driver assistance systems was, and still is, experiencing double-digit growth. Now, with Mycronic, we can get ahead of the curve by investing in technologies that anticipate market need, collaborating with the global Mycronic technical community, and by partnering with strategic industry leaders to jointly develop solutions for emerging manufacturing challenges. We look forward to taking an even stronger global role in enabling this market development together with our customers."



Welcome to a new era in 3D inspection

In tomorrow's intelligent factory, no inspection data is too big. And no defect is left unsolved. Mycronic's fleet of state-of-the-art inspection solutions are helping to make this vision a reality. Thanks to a combination of high-precision metrology and powerful process management tools, the actionable information you need to boost yield, quality and repeatability is never more than a few clicks away. It's all part of our effort to boost your factory's intelligence, and bring you one step closer to perfection. Discover the strengths of our fully integrated 3D SPI and AOI solutions at mycronic.com



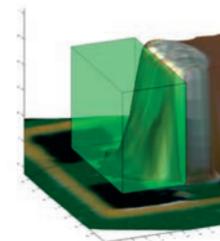
New productivity improvements for AOI K3D series

ALL K3D SERIES SYSTEMS are now delivered with a new high performance 3D sensor system that reduces the inspection time by as much as 35%. This is made possible with a new high-intensity laser system and high-speed angular camera sensors. The new higher speed K3D series delivers the same high-quality 3D image as before with a constant z-resolution of 1 micrometer.

The updated K3D series also brings further productivity improvements by dramatically reducing the board transfer time of the circuit boards on the I/O conveyors down to 3.5 seconds for boards up to 300 mm in size. The new sensor system in combination with the reduced board transfer times helps to greatly reduce the cycle time of the board inspection process, making sure the AOI never becomes the bottleneck in any production line.

The latest system update includes a new 3D profiler to accurately analyze solder joints in three dimensions according to IPC criteria for solder height, solder width and wettability. A new Blob 3D algorithm will significantly reduce programming time for chip components and at the same time reduce false calls and escape risks. The new algorithm uses the 3D information from the components and automatic settings to detect presence and position while not being sensitive to variations in the chip components' dimensions.

// Read more at mycronic.com



→ The 3D profiler analyzes the solder joint according to IPC criteria for solder height, solder width and wettability.



→ The new Blob 3D algorithm for inspecting chip components greatly reduces the programming time without losing accuracy in detecting faulty parts.

New functionality in MYCenter 4.2

THE LATEST MYCENTER 4.2 data preparation and material handling software includes several improvements that increase usability and productivity:

- Create carriers with external ID in bulk – a new dialog simplifies the creation of many carriers with pre-existing barcode labels
- Prevent carrier loading remotely – it's now possible for an external ERP or MES system to prevent a carrier from being loaded using the optional ERP interface
- Easy MSL check before kitting – a new column has been added to the Loading view which helps identifying carriers that are close to MSL expiration
- Improved Add Component Wizard – magazine and feeder data can now be defined in the Add Component Wizard
- PCB ID settings moved to layout level instead of global machine switch – no need for the operator to switch between batches
- Convert multi-PCB to panels – when using a board train, this new function will assist in converting legacy multi-PCB layouts into true panels
- Improved Gerber support - Gerber importer now supports flash features

All MY9-19E, MY100, MY200 and MY300 users can upgrade to version 4.2.



PHOTO: MAGNUS ELGQVIST

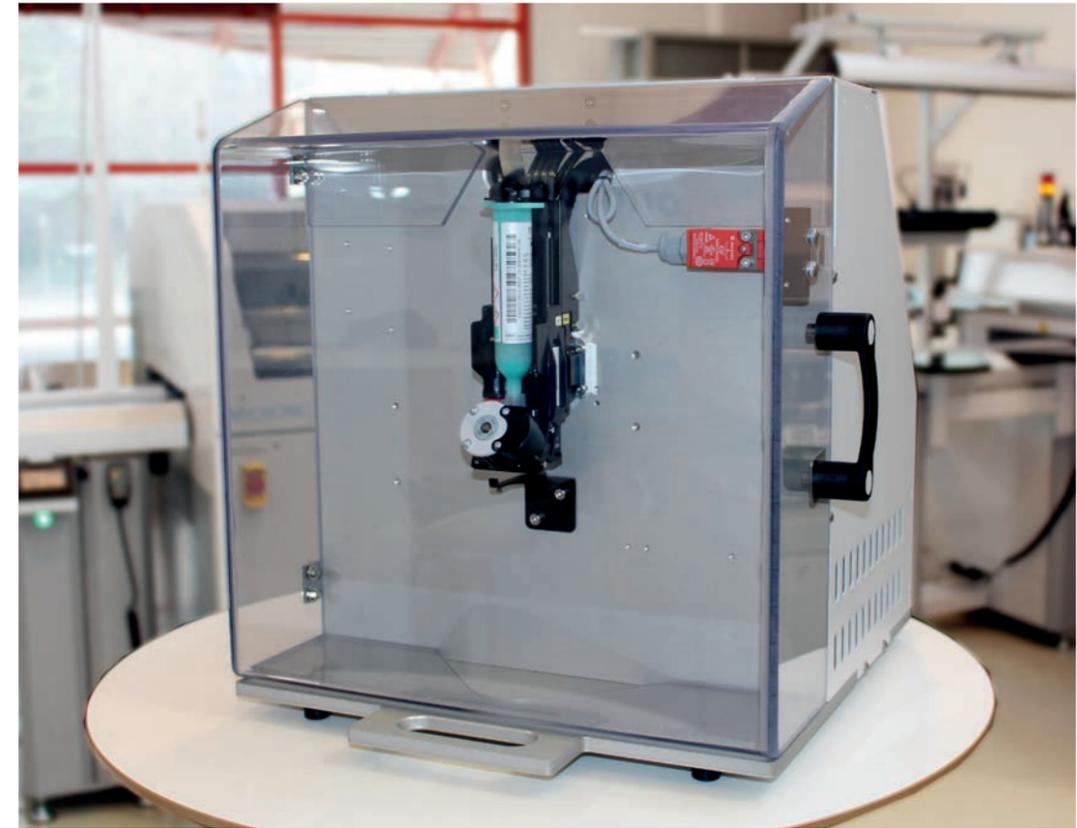


PHOTO: JENNY EK ADRELL

Mycronic releases a Cassette Purge Station for jettable solder paste

MYCRONIC HAS TAKEN ANOTHER STEP in making life easier for mid- to high-volume manufacturers by launching an external Cassette Purge Station for jettable solder paste.

Whether you are running high-volume production in a 24/7 environment or have a high mix of jobs throughout the working day, there is a need to eliminate the downtime between cassette replacements. If you need to replace the syringe of paste or switch to a different one, you need a solution to keep new cassettes ready for the next batch.

The new Cassette Purge Station enables you to prepare new cassettes without any downtime, removing the need for extended purges before you can continue with the production.

// Read more at mycronic.com



Introducing the new MYPro series

THE FUTURE
IS ALREADY
HERE.

IS YOUR
FACTORY
PREPARED?



The new MYPro series - the perfect fit for any intelligent factory

The future of high-mix production belongs to those who can mount any component on any board. Handle any batch or series with zero changeover times. And jet solder paste and adhesive deposits with high-precision at record speeds. The new MYPro series combines two of the industry's most productive platforms - the MY300 and MY700 - giving you more capabilities than ever before within a 40% smaller footprint than previous generations. Simply put, it's the smartest way to boost quality and utilization across a vast range of challenging applications.

Whatever your ambitions, the future is already here. In fact, it's just in time.

MYCRONIC

When passion meets innovation ●