

MYNews

A magazine from Mycronic

2024.01

DeepReview™

The false call killer

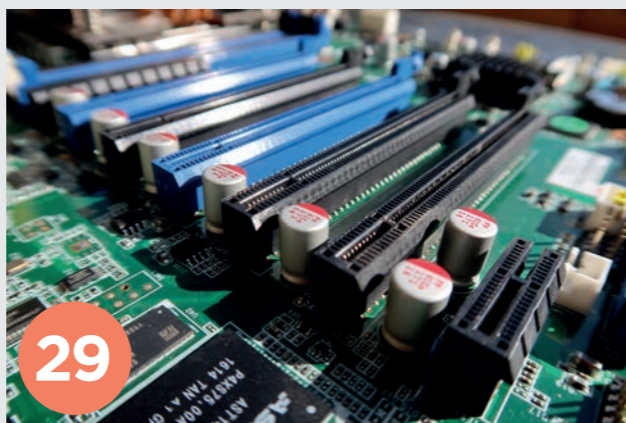
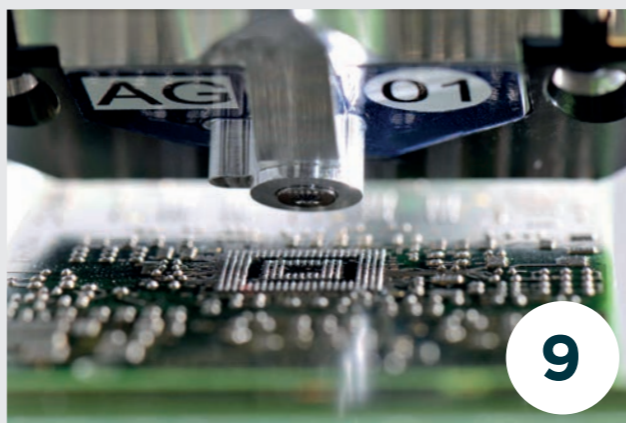
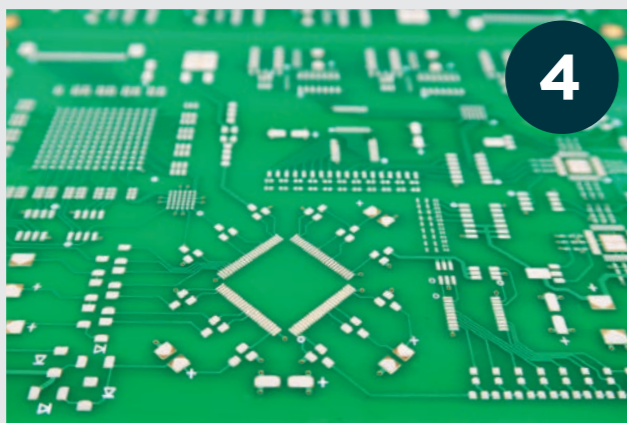
MYPro S™ series

**BRINGING HIGH-VOLUME IN
HIGH-FLEX MANUFACTURING**

MYPro Create™

**ONE DATASET, ONE PROGRAM
AND ONE WORKFLOW**





Contents 2024.01

- 4** MYPro S series: User-driven design bringing high-volume performance to high-flex manufacturing
- 8** ESCATEC + MY700: Design freedom at jet speed
- 13** DeepReview: The power of AI-driven inspection
- 18** Mycronic High-Flex division: Innovation for more than 50 years
- 22** MYPro Create: The Power of One
- 29** AOI: cutting-edge solution for THT component inspection

MYCRONIC

ADDRESS: Mycronic AB, Nytorpsvägen 9, PO Box 3141, SE-183 03 Täby, Sweden TEL: +46 8 638 52 00
INTERNET: www.mycronic.com

PUBLISHER: Simon Sandgren, responsible under Swedish law EDITOR: Jenny Ek Adrell CONTRIBUTING WRITERS: Grant Baldrige, Mark Flaskett, David Gray, Liam Karlsson, Yan Manissadjian, Daniel Westin GRAPHIC DESIGN & LAYOUT: EXPEDITION 46™ PRINT: TMG Sthlm, Sweden, 2024 ISSN: 1651-4882 P-001-0252/December 2024. This newsletter is produced with the intention of providing general information about Mycronic and our products.

Specifications are subject to change without notice. Mycronic, MYDATA, MYDATA automation and MY; Mycronic 4.0; MYNews; MYCare; MYSynergy; MYTrilogy; MYPro, MYPro Line; MY100, MY100e, MY200, MY300, MY300DX, MY300EX, MY300HX, MY300LX, MY300SX, MY500, MY600, MY700, MY700JD, MY700JP, MY700JX; MYPro A40, A40DX, A40SX, A40LX; MYPro S20, MYPro S30; MYPro i50, i51, i80, i81, i90, i91; MYSmart, MYC10, MYC50, MYC60, MYD10, MYD50, MYT10, MYT50; Mycronic SMD Tower; MYTower 5, 6, 6+, 7+, 5x, 6x; Vi TECHNOLOGY; VIT, 5K, 5K3D, 8K, 8K3D, 9K, 9K3D; Pi, Pi Pico, Pi Primo; SIGMA Link; MX7, HYDRA, Midas, ISiC; Agilis, Agilis Linear Magazine (ALM), Agilis Linear Magazine Flex (ALM FLEX), Agilis Stick Magazine (ASM), Agilis Tray Magazine (ATM); Mycronic Tray Exchanger (TEX), Mycronic Tray Wagon Magazine (TWM); Mycronic Dip Unit (DPU); Mycronic Linescan Vision System (LVS); Mycronic Assembly Process Management (APM) including: JPSys, STSys, TPSys, MYCam, MYCenter, MYCenter Analysis, MYLabel, MYPlan, MYPro Connect, MYPro Create, MYPro Link, MYTrace and FlowLine are registered trademarks or trademarks of Mycronic AB. Mycronic AB is ISO 9001:2015 and ISO 14001:2015 certified.



As our customers grow, so do their demands. Faster production speeds. More diverse components. Higher quality standards. Simpler programming. Today I can confidently say that our full line solutions answer these demands more comprehensively, for an even wider spectrum of customers, than ever before.

The launch of the MYPro A40 series pick-and-place machines marks a significant milestone in the journey toward high-throughput flexible production. The A40DX, the first to leverage the new high-speed MX7 mount-head, set a new standard for speed and precision. Now, the A40LX and SX models introduce even more versatility in terms of both component size and feeder capacity. This completely new pick-and-place platform is both a rarity in our industry and proof that higher placement speeds and a wider component range can, in fact, go hand in hand.

At the same time, we know that speed and versatility are nothing without the highest yields. The introduction of DeepReview, a new AI-driven automatic defect classification system, brings new levels of reliability and efficiency to 3D AOI. By significantly reducing the time operators spend reviewing defects and false calls, and by applying customer's actual production data and quality standards, it shows that customer-centric AI is now ready to deliver value on the factory floor.

Another major time saver is MYPro Create, a new job creation software that streamlines the process of creating jobs for both solder paste jet printing and inspection machines. With just one set of data, one interface and one workflow, it substantially reduces repetitive tasks to make multi-machine programming simpler, faster and more error-proof.

Finally, I'm delighted to see continued customer demand for the MYTower series X, the industry's most compact, high-capacity automated component storage system. This is a strong testament to the fact that efficient material handling can have a substantial impact on profitability, especially as the volume and diversity of components continues to expand.

Each of these advances is significant in itself. But put them together, and it's clear that Mycronic customers are now equipped with a comprehensive range of new capabilities. Thanks to faster throughput, smarter software and the most advanced solder paste, placement, inspection and storage solutions, our full line solutions have grown far beyond prototyping setups to include everything needed for even the most demanding mid-volume EMS.

Of course, continuous renewal is never easy. And it's a process that's never complete. Through close collaboration, we're determined to let your demands lead the way as we continue to adapt, evolve and find new ways to grow together.

// Clemens Jargons
Senior Vice President, High Flex

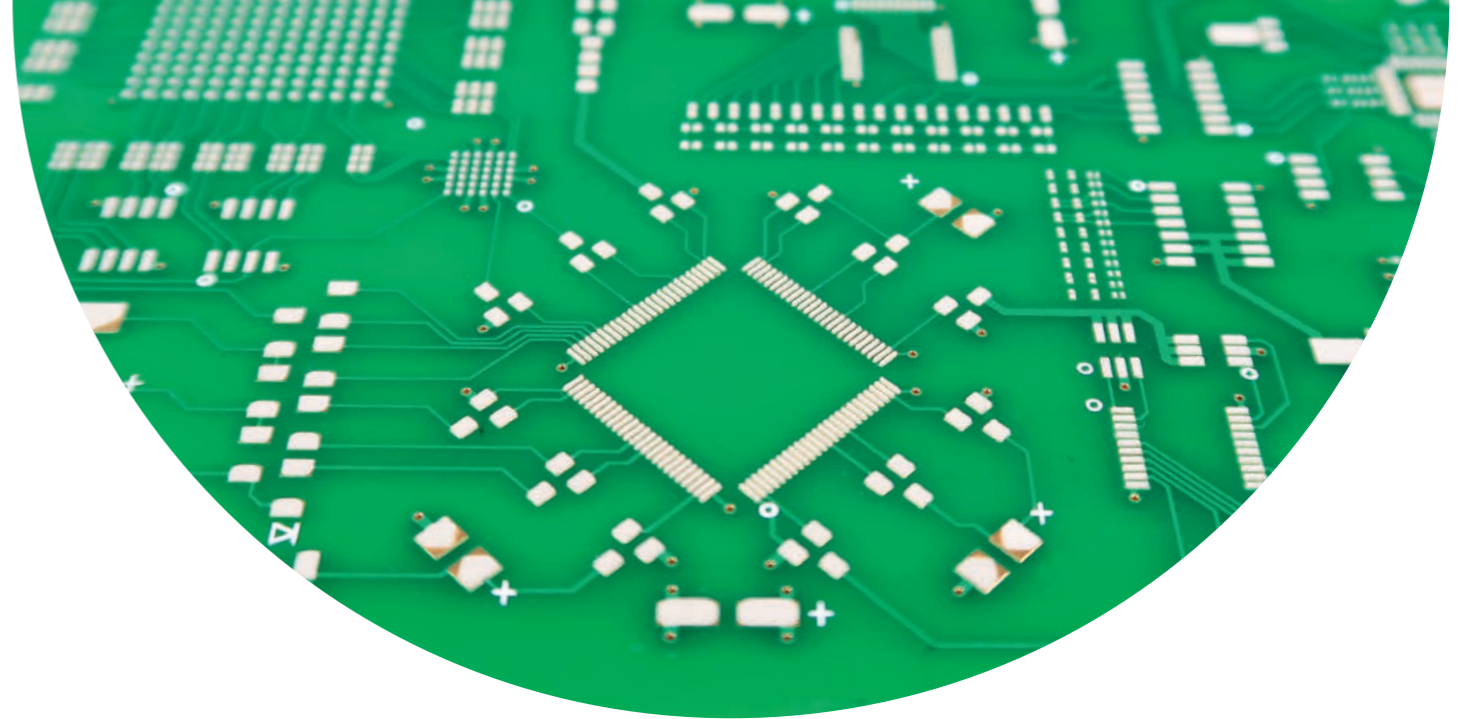
User-driven design

— how the new MYPro S series brings high-volume performance to high-flex manufacturing



“Our customers are growing. But they should never outgrow their investment,” says Mark Flaskett, Product Manager Printing, of the latest launch of the MYPro S series stencil printers. “In recent years, we’ve already significantly boosted speeds in inspection and pick-and-place. And we see stencil printing as a natural part of this development — raising the ceiling once again in terms of throughput and cycle times.”

TEXT: GRANT BALDRIDGE PHOTO: MYCRONIC



Strong foundation in stencils. Flexible producers around the world might not have known it, but behind the scenes, Mycronic’s Center of Excellence in stencil printing in Shenzhen, China has quietly built a strong reputation among the world’s leading manufacturers of consumer and industrial electronics. The team, known in China under the brand HCX, have supplied more than 3,500 machines to many of the world’s largest producers of electronics for smartphones, EVs, LCD displays and more.

“In China, we’re among the top 5 stencil printer suppliers, with more than 300 customers,” says Jimmy Xiang, Overseas Sales Director, Stencil Printing. “And we’ve sold hundreds of machines across Southeast Asia, Europe and North America. So, when it comes to volume manufacturing, our technologies are well proven in the most demanding production environments.”

THE NUMBERS DO THE TALKING

In the new MYPro S20 and S30, this deep experience is evident in the underlying numbers. “As an engineer myself, I’m always focused on supplying the best technical solutions: How do you keep costs down, prevent process drift and ensure the highest yield?” says Mark Flaskett. “With a 14-second takt time and 8 micrometer repeat accuracy, the MYPro S series speaks for itself. It’s up there with the best machines in the business.”

Naturally, what works for a high-volume manufacturer with zero changeovers isn’t always suitable for smaller-batch producers. This is why the development of the MYPro S series included substantial testing and refinements together with automotive and other flexible manufacturers. Among the adaptations made are an all-new graphic user interface (GUI) that provides intuitive guidance for customers with more frequent changeovers, as well as a range of standardized connectivity and automation features.

MODULAR FLEXIBILITY

In flexible production, adaptability is everything. And the MYPro S20 and S30 have been engineered accordingly. The platform can be customized to expand the print format for larger board dimensions. Supporting pins can be adjusted to accommodate various materials and designs. And a broad selection of other options, such as solder paste replenishment, can easily be upgraded in the field. “These modular options have been developed in close collaboration with customers in the US and Europe,” explains Jimmy. “Their technical demands can vary widely and even change over time, so we’re constantly adding new optional capabilities. We invest a lot of R&D into ensuring that the MYPro S series continues to evolve and grow with our customers’ businesses.”



These modular options have been developed in close collaboration with customers in the US and Europe.

JIMMY XIANG
OVERSEAS SALES DIRECTOR, STENCIL PRINTING

A BULLET-PROOF PROCESS

The first installations in North America show strong demand for cost-effective stencil printing solutions with high precision, repeatability and automation. "New customers know our reputation for quality equipment and excellent customer service and support," says Jay Gauthier, General Manager Mycronic, Americas. "So although we're a newcomer to stencil printing, the initial sales show they see the value, quality and reliability that comes with the Mycronic brand."

"And when it comes to existing customers," he continues, "it's about achieving complete control over the printing process, often together with a jet printer. In fact, one customer told me: 'We're adding the MYPro S30 to bullet-proof our process. We want our customers to know that whatever productions they entrust to us, in terms of technical sophistication or batch size, we can deal with them with consistent quality and responsiveness'. This perfectly aligns with our ambition at Mycronic to give every customer greater end-to-end control over their assembly line, with a single partner."

A FULL SPECTRUM OF PRECISION PRINTING SOLUTIONS

The new line of stencil printers further expands upon Mycronic's unique portfolio of jet printing and SPI solutions. A single printing solution that can now cover large series production, high-value single-board batches and full-coverage solder paste inspection to ensure 100% yield across a vast array of production conditions.

"From the million-dollar board to the million-board batch, we can now supply precision printing solutions for a vast range of market needs," concludes Mark Flasket. "Jet printing delivers the ultimate in product reliability and design freedom. The S series brings the highest throughput and repeat accuracy. And, for good measure, the PI series SPI secures quality and continuously improves process control. So, in terms of solder paste application, where our studies show that the majority of defects tend to originate, Mycronic now offers everything you need to secure the highest yield, accuracy and repeatability." ●

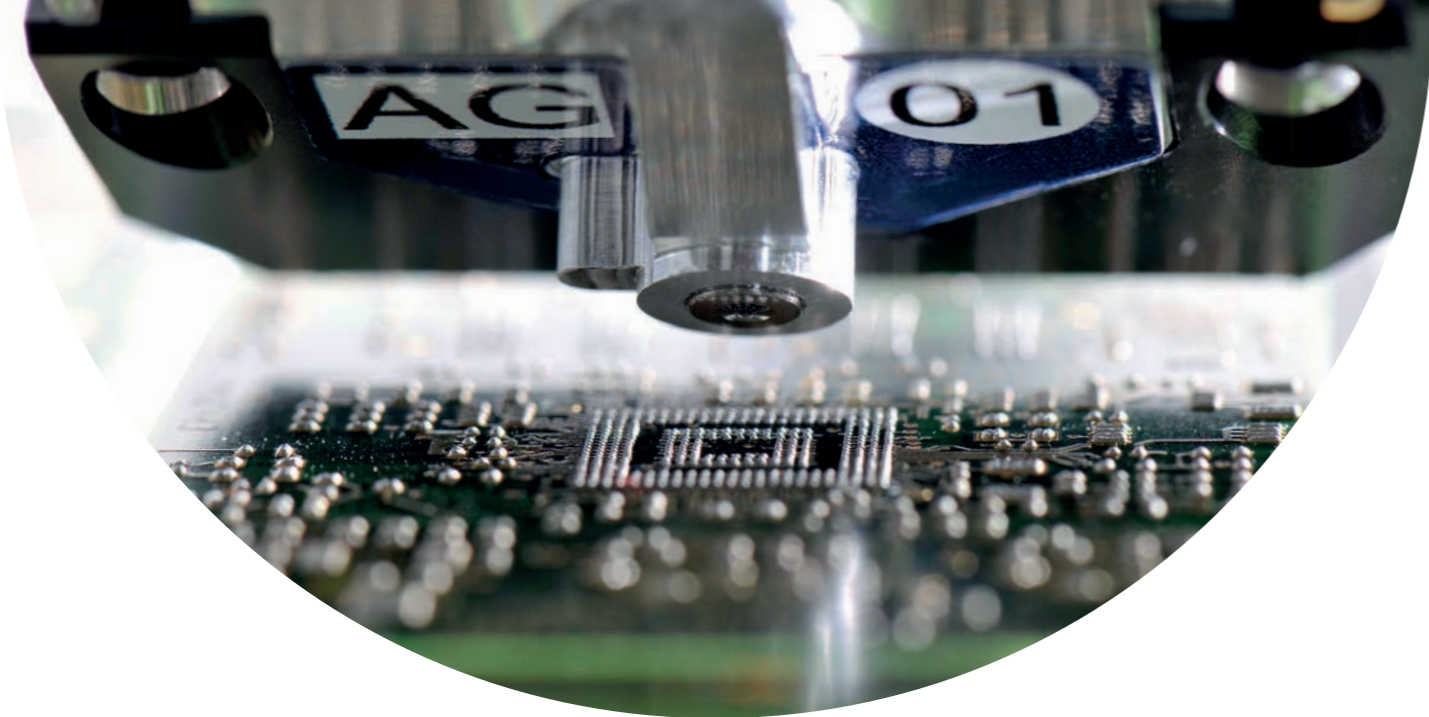
Precision printing at any volume

Introducing MYPro S series stencil printers

The precision you expect from Mycronic. The performance you expect from best-in-class stencil printing. Robust, accurate and easy to operate, the MYPro S series is a reliable, worry-free workhorse for volume production down to 14-second cycle times. Combining high rigidity, long-term repeat accuracy of 8µm and advanced vision and 2D inspection systems, it brings together all the best of precision printing in a platform you can build your future on. Discover the MYPro S series at mycronic.com.



MYCRONIC



In just this one case, it [Jet Printing] could have saved us weeks, or even months.

MARTIN MÜNDLEIN
PRODUCTION AND ENGINEERING MANAGER
ESCATEC SWITZERLAND

Design freedom at jet speed

— how ESCATEC accelerates new product cycles and boosts yields with the MY700

At the ESCATEC facility in Switzerland, new products are being designed, prototyped and ramped up for full-scale manufacturing. Every day, two production lines churn out advanced electronics for high-power LED modules, LiDAR products, Time-of-Flight (TOF) modules and specialized camera systems. Once optimized for large-scale production, many are destined for commercial production at one of ESCATEC's high-volume production sites in Bulgaria or Malaysia.

TEXT: GRANT BALDRIDGE **PHOTO:** MYCRONIC, ESCATEC

The springboard to full-scale manufacturing.

ESCATEC's production requires many highly technical iterations to develop processes for advanced solutions like chip-on-board technology, encapsulation and active alignment, demanding extreme levels of flexibility and process control. "We do a lot of design engineering and Design for Manufacturing (DFM) analysis here," says Martin Mündlein, Production and Engineering Manager at ESCATEC Switzerland. "About 20% of our capacity is for NPIs, which aren't just first

runs but also products that need a few rounds to stabilize. They typically consist of 50 to 500 boards. The rest of our capacity is for series production of, say, 1,000 to 100,000 boards per year."

To facilitate these rapid production ramp-ups, the Swiss facility has long relied on stencil printing of solder paste—the industry standard for high-volume production. But when it comes to fast-paced design changes and more complex assemblies, stencils alone can have their drawbacks.

A STEP TOO FAR FOR STENCILS

"For industrial electronics," he explains, "you might have a lot of 0201 components and metal shielding (a stamped or embossed piece of metal). And then you need to add more solder paste to bridge the gaps, or add small dots of paste. We also do quite a few IoT and wearable devices, which have very small components placed with very high density on a combined flex/rigid board. Sometimes the chips are as small as 01005! And even with stepped stencils, all of these are incredibly tricky to produce."

THE NIGHTMARE BOARD ARRIVES

As an example, Martin mentions a particularly difficult PCBA for one of the company's biggest customers. "It was an important, high-pressure project. There were 2,000 pieces in the first order, and we needed to use all the parts."

The problem was not just that the PCBA had an especially complex design, but that paste needed to be applied both in a top layer and a cavity. "It was a very fine-pitch board with fine-pitch connectors. This meant that some solder deposits needed to be less than 200 microns in size. In theory, you could step down to a few hundred microns on a stepped stencil, but it was a nightmare with the layout and format of this board."

Nearly one year later, after several iterations, more than three stepped stencil designs, poor solder joint yield and a high scrap rate, Martin and his team

realized there had to be a better way. In 2023, they decided to install a MY700 Jet Printer as an add-on process step, following the screen printer, for some of the most difficult applications.

WEEKS OF TIME SAVINGS

This problematic board was one of the first tests to be run through the line. "We tested it on the Jet Printer and immediately saw the advantages of being able to print on two layers and quickly adapt the designs," says Martin. "It has opened up a lot of design freedom that we didn't have before. So now, if a stepped stencil is involved in a new product, it's much easier to go straight to the Jet Printer. Then, if it makes sense from a maturity or cost perspective, we'll switch it over to the stepped stencil."

"Best of all," he adds, "the iterations are all on-line, so in just this one case it could have saved us weeks, or even months!"

These time savings, says Martin, might just be the biggest advantage of jet printing in general. "Lead times can really benefit a lot," he says. "Because a new stencil takes two or three days to arrive, and then another couple of weeks to adjust the process and get it running in the line. This can have major cost implications as well. Sure, the stencil maybe costs 200 euros, but then you have to wait a few days for the line to become available between batches, adjust, experiment and wait again. And that can add up to a lot of lost productivity."



Now our scrap rate is close to 0%.

ESCATEC in brief

Locations: Malaysia (Group HQ), Switzerland, United Kingdom, Czech Republic, Bulgaria
Services: EMS Design & manufacturing including embedded software, hardware design, DfX, microelectronics, PCBA, box build, mechatronics and more.
Group employees: 2,000+
Total SMT lines: 15
Core markets: Transportation, industrial and medical electronics.



REDUCING WASTE

In the early phases of prototyping, every iteration also contributes to significant material waste. “We have a huge scrap metal bin,” says Martin. “We’re talking about hundreds of single-use stencils from the prototypes. And now, with the Jet Printer, I can definitely say that this pile is much smaller.”

Even more valuable, of course, are the boards and components themselves. Asked whether the Jet Printer has influenced these scrap rates, Martin responds: “In the case of that cavity board I mentioned earlier? For sure. With the stepped stencils we had to scrap around 10% of boards. Now our scrap rate is close to 0%.”

Martin is careful to mention that this is far from a general rule, however. “Keep in mind that this was a really tricky board,” he explains. “In most cases, about 80–90% of the time, we hit the mark with a stencil the first time.”

TURNING UP THE DIAL

Naturally, for ESCATEC, jet printing will never fully replace stencil printing. In a company where ultimate flexibility is required by customers to support prototype builds through to mass production, with potential volumes reaching millions of boards per year in multiple locations, the speed of screen printing is still essential.

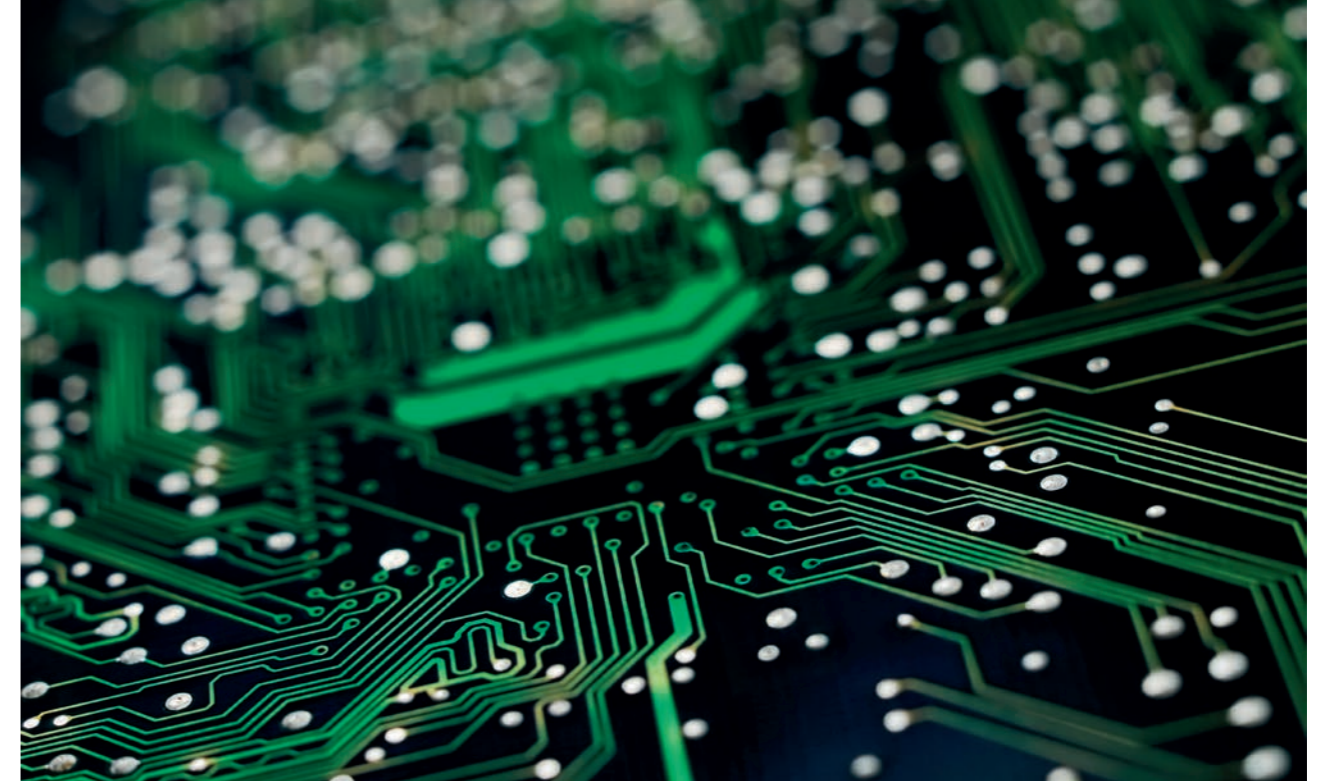
But from where Martin stands, overseeing a highly design-driven R&D and manufacturing environment, the MY700 represents a versatile new tool in his SMT toolkit. “Our manufacturing team loves the machine,” he says. “They’re constantly faced with customers who have a functional principle and say: ‘Can you make a product out of this and manufacture it?’ Or they have to optimize a semi-finished product from functional samples. In both cases, they need to quickly adapt and optimize a product, and the MY700 is perfect for this.”

“At the end of the day,” he continues, “the more screws we can turn to fine-tune the process, the faster we can respond with better yield, consistency and quality. And jet printing really helps us turn it up a notch.” ●

False defects are time killers. Now you can eliminate them.

DeepReview™ — Automatic Defect Classification for the age of AI

Accelerate review times. Eliminate the majority of false calls. And improve your defect classification models over time. DeepReview, a new AI-based Automatic Defect Classification system for 3D AOI, makes it possible to apply full test coverage to any product mix without fear of false calls. Thanks to advanced neural networks, it eliminates the vast majority of false calls for eligible components, giving review operators more time and focus to stop the real defects that matter. Join the deep learning journey at pcba.mycronic.com.



The false call killer

— a Q&A with Romain Roux and Nicolas Guillot on DeepReview and the power of AI-driven inspection

Some call it the “false call killer”: a new Automatic Defect Classification system that leverages deep learning to dramatically reduce false call rates while improving first-pass yield in 3D Automated Optical Inspection (AOI). The recent release of DeepReview comes as welcome news for manufacturers applying full test coverage, where any variation in material, component type or board design can unleash new streams of tedious false calls.

To learn more about DeepReview and the benefits of deep learning in the daily lives of review operators, we spoke to two of the system’s key developers: Romain Roux, R&D Director for AI, and Nicolas Guillot, Software Systems Architect.

TEXT: GRANT BALDRIDGE PHOTO: MYCRONIC

Where did the idea for DeepReview come from?

Romain: The concept came from a collaboration with a customer who shared some AOI images and corresponding certifications with us. At the time, I was at the Center for Deep Learning in Electronics Manufacturing (CDLe), a five-year joint industry initiative in San Jose, California. I was surrounded

by some of the best experts in the field, and we wanted to see what kind of customer value could be generated by applying deep learning to the massive amounts of high-quality inspection data that all our customers are sitting on. Since image classification is one of the most mature applications within deep learning, it didn’t take long to build a good neural network.



Romain Roux R&D Director for AI, (left).
Nicolas Guillot Software Systems Architect, (right).



So, was this a model that could be applied directly in production?

Romain: Maybe for this customer, but it wouldn't have worked for anyone else. There are so many variables like the design, color and type of component, which all complicate classification. Even between customers, tolerances differ. Some would want to repair a particular issue. Others wouldn't. And this is the core challenge: A generic model is extremely difficult to create. Every customer has their own standards, their own supply chain and process variations, and only they are completely familiar with what quality standards are acceptable.

Have you met customers who've tried to develop their own AI classification systems? If every neural network needs to be customized, why don't they just build their own from scratch?

Romain: Sure, there are standard algorithms out there. But the ramp-up is daunting. You have to develop the tool, label the data, learn how to use the library, connect to the AOI system, etc. It could easily be a half-million-dollar project, and even then you'd have to be a data scientist to use it. Instead, we've built the brain and an interface that speaks inspection language, rather than specialized image processing language. So customers can just do a little labeling, which they already do when reviewing AOI defects, and focus on what they're best at: stopping real defects.

Nicolas: This is really the key point. Our customers already have everything they need to use DeepReview. They've got years of actual production data. They're already labeling, classifying and performing sanctions on false calls and true defects. We've focused our efforts on building a deep learning system that learns from what they're already doing, so a person doesn't have to keep doing the repetitive jobs that a machine can do. They shouldn't have to babysit a machine and constantly sanction



50-90% fewer false calls is a realistic expectation.

NICOLAS GUILLOT

false calls, and they definitely shouldn't need a PhD in image processing or AI. They should be out there kitting, dekitting and doing repair, where their expertise is needed most!

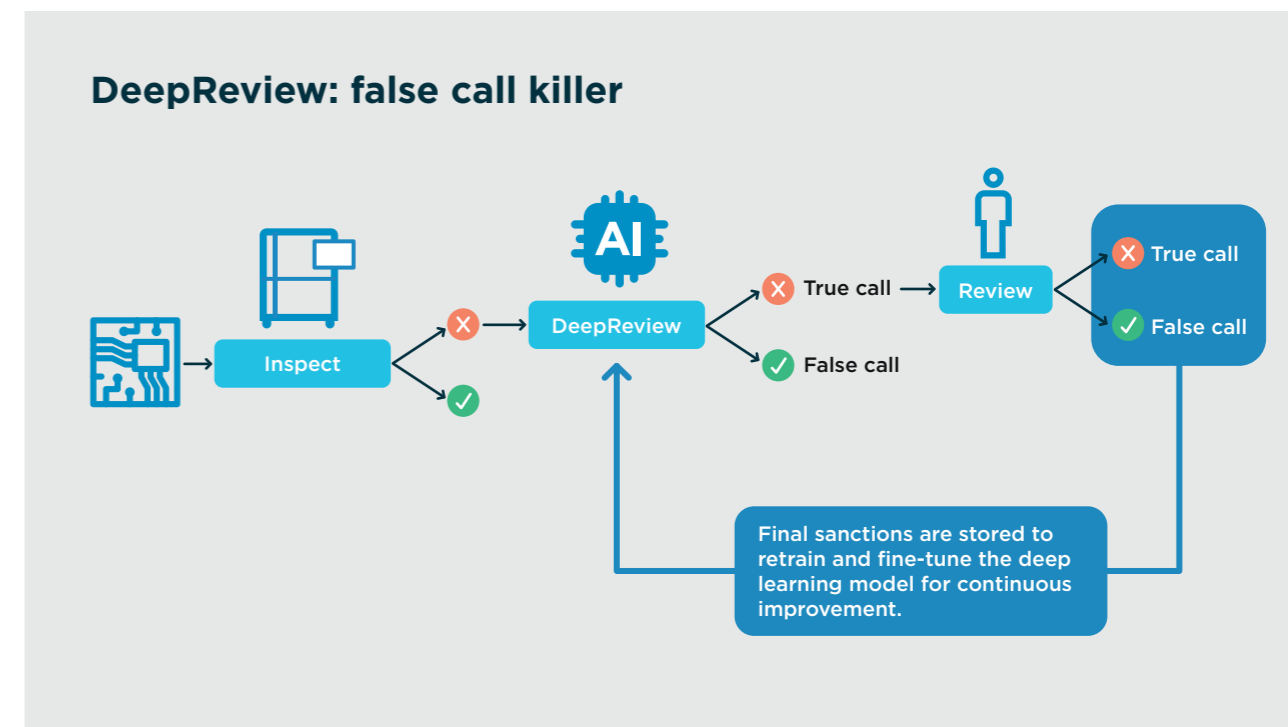
So, what kind of time savings are we talking about? How many false calls can customers expect to cut out of their daily work?

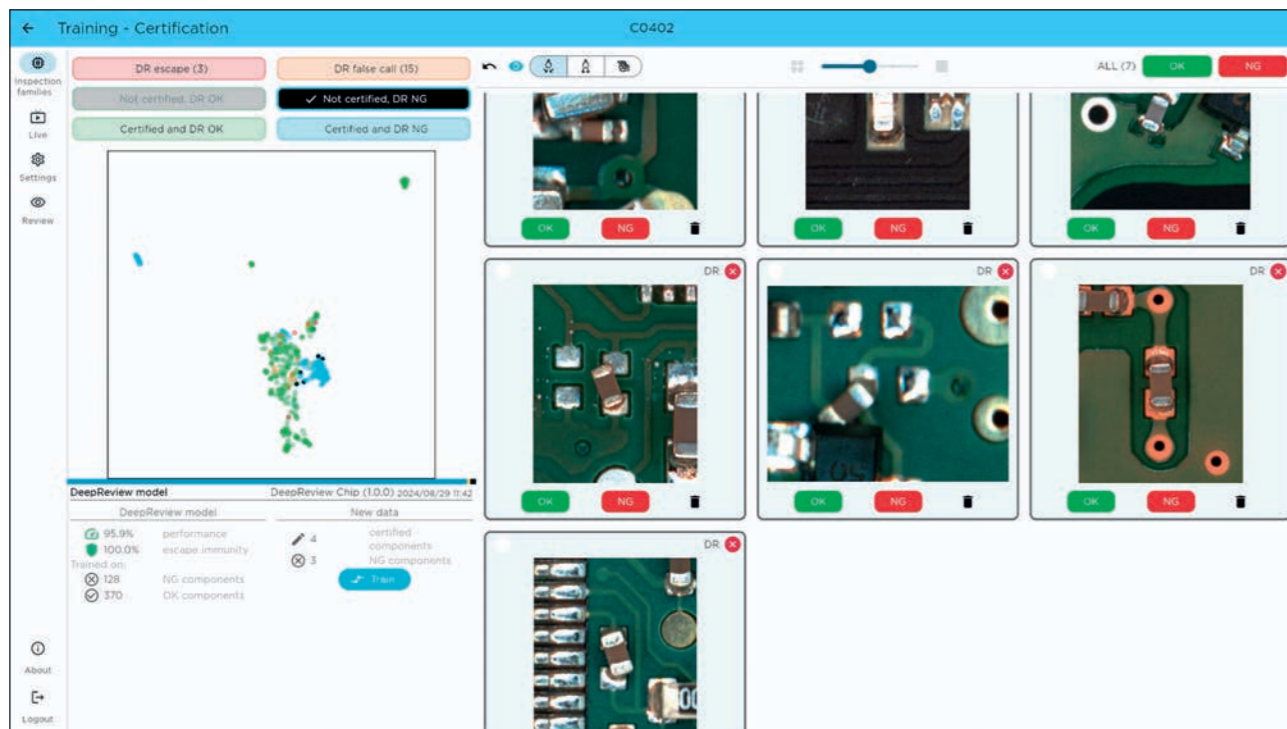
Nicolas: It really depends on the variety and types of components, but 50-90% fewer false calls is a realistic expectation. With DeepReview, an operator can definitely feel confident that they're more productive, with less risk for errors. But there's more to it than that, since the system continually improves the inspection process. If before you had, say, 10 AOI defects including 8 false calls and 2 real defects, the system might automatically reduce that to just 2 defects for review. So, as it works in the background, it's improving the robustness of the inspection model itself.

It's great that a customer doesn't need to learn data science to understand how deep learning does its job, but how do they know they can trust it to make the right calls?

Nicolas: This is a super important point, and there are mainly two answers to that. The first is that the system is trained on the customer's own historical production data, their own images and their own sanctions. So, it's only the manufacturer's own tolerances that enter into the system, meaning there's no risk of introducing new escapes. The second is that the annotation and neural network training steps are designed to give users an understanding of the impact of their inspection model—it's like peeking inside the box. The interface is super simple to use, it lets you easily group similar images to find any problems and validate all the others in one click. A half-hour of training is enough, and then everything else—the data storage, importing, converting, etc.—are all automated.

AOI inspection process with DeepReview.





DeepReview AI-guided labelling and training interface.

And what about data security? This is pretty sensitive information to put into the hands of an AI...

Romain: Since the server is on-premises, running in a closed system on the customer's own sub-network, all data collection, storage, training and processing are done locally. The customer controls everything. It's their own neural network, their own AI server.

Finally, for those who've heard a lot of promises about AI recently, exactly what kinds of features can DeepReview recognize? And what are its limitations?

Romain: I totally agree that it's important to separate the reality from all the hype that's out there around AI. It's crucial to stay realistic. With DeepReview today, everything that can be seen in 2D color imaging on smaller components – damaged, rotated, tilted or misaligned components, or bad solder joints, for example – can all be processed. And additional capabilities – like the ability to analyze each lead of a QFP or bigger component – are coming soon.

Nicolas: The limitations have more to do with the limits of image classification in general – the fact that even the most advanced AI models in the world struggle with classifying complex patterns in 3D – rather than the limits of our particular system. But AI is evolving so fast that even this will change. And that's one of the advantages of the annotation process within DeepReview: Everything a customer does is effectively tagging the images in a way that's designed for the AOI to understand. So there are a lot of potential benefits even for the pick-and-place, solder paste Jet Printer and SPI in the future. This means that when new tasks arise, our customers will be ready. And everything will be so much easier with a complete library, fully annotated and sanctioned by the people who know best: the PCB manufacturers themselves. ●

Discover the shortest path to a smarter future

Cut through complexity with the MYPro Line™

Wherever the future might take you, don't let change stand in your way. With the MYPro Line, you can jet print perfect solder joints at the highest speeds. Ensure non-stop production with intelligent storage and proactive replenishment. And eliminate defects with 3D inspection systems that monitor and improve your process over time. It's the best of Mycronic in a single integrated manufacturing solution for the most demanding build schedules, enabling maximum utilization for even the fastest-changing product mix. Whatever complexities tomorrow may bring, now there's a shorter path to a smarter future.





50 years in the mix

— simplifying high-mix manufacturing for more than 50 years

If there's one constant in PCB assembly, it's change itself. Whether it's fast-changing product mixes, components or material flows, Mycronic customers have led the way, bringing complexity under control for more than 50 years.

TEXT: DAVID GRAY PHOTO: MYCRONIC

A technology shift is born. Until the early 1980s, through-hole components were the standard in PCB manufacturing. But as demand grew for smaller, more compact electronic devices, surface mount technologies created new opportunities for higher component density and improved performance.

Into this gap stepped a small company from Sweden. Its first systems, which applied a rapidly moving beam of light to show the operator where to mount components, made it possible for advanced

manufacturers to manually assemble circuit boards with greater accuracy and flexibility. It would be the starting point for a long line of industry-shaping innovations ranging from flexible pick-and-place systems and solder paste jet printing to fully automated production lines.

AGILE ASSEMBLY AT ITS MOST COMPLEX

"The transition from through-hole to surface-mount opened the door for us in the beginning," says Robert Helleday, Head of Research and Development



Bobbi Ferm Chief Engineer and Systems Architect
Robert Helleday Head of Research and Development



at Mycronic. "Of course we weren't alone, but our focus was unique. Whereas most of our competitors sprang out of the big players' in-house production, we came from the small-scale production field and everything we did was focused on these customers. They were short-series producers building advanced computers. They were the big French and American aerospace developers. In most cases their production was extremely advanced, and their components were very expensive."

These producers relied heavily on rapid prototyping cycles and complex, high-density assemblies. As Mycronic's core pick-and-place technologies evolved, fast changeovers and powerful process control systems were therefore essential. "We more or less grew up together with these customers," says Robert. "So as our solutions became faster, more automated and software-driven, we stayed in tune with their day-to-day needs."

CHANGING THE GAME

For high-mix manufacturers in the late 90s and early 2000s, the cost and complexity of job changeovers was a major barrier to profitability. Most component feeders on the market were heavy, bulky and required regular maintenance. Their feeder positions were fixed. And most required full component reels, leading to significant waste of unused component strips.

JUST-IN-TIME THINKING

Mycronic's solution was the Agilis™ feeder system: a compact, interchangeable, zero-maintenance feeder concept. It represented the best of Mycronic's thinking, setting a new standard for fast and flexible kitting and loading. "This principle is really central to everything we do," says Robert, explaining how 'bi-directional material flows' suffused all the company's innovations in material handling and automated storage.

"You can't just keep feeding your machines because you don't always exhaust your whole reel," he explains. "You bring things in and out of storage and the timing, tracking and tracing of all these flows is a huge contributor to profitable, agile manufacturing. It's an integrated workflow that's crucial for just-in-time production. You need to be able to call up the material and get it onto a board or back into storage with as little human intervention as possible."

The Agilis feeder system was an instant success, becoming a trademark symbol for agile assembly. Over time, other process steps would go through the same fundamental rethinking. And solder paste printing was just such an application that was ripe for innovation. "It's an interesting story," says Robert, "and once again, it was totally driven by customer demands."



”
When all our machines work better together within a single workflow, and when they all learn from and improve each other, that’s exciting!

PRECISION PRINTING AT JET SPEED

The idea for solder paste jet printing emerged when a long-time French customer approached Mycronic with a seemingly insurmountable task. “They told us: ‘We’ve always had this great pick-and-place machine, but it would be amazing if my printing could be this flexible,’” says Robert. “The thing is, everyone thought it would be impossible. I mean, how do you go from a squeegee running across a sheet of metal to a fully software-controlled, high-speed jetting system with nanoliter accuracy? It took a real long-term R&D initiative, but we managed to create the first jet printer. Even now, 20 years and several machine generations later, no one has emerged with any technology that’s even similar.”

CHALLENGING CONVENTIONS

According to Bobbi Ferm, Chief Engineer and Systems Architect at Mycronic, the introduction of jet printing is emblematic of the Mycronic culture. “We’ve always been a bit of a challenger,” he says. “When someone tells us it’s impossible, that just pushes us to think bigger. You can see this with our pattern generators as well as with our assembly solutions. We’ve identified clear opportunities, however challenging they might be to solve. We’ve made the right big bets. And they’ve really paid off for our customers.”

SHORTER SERIES, BIGGER PROFITS

Today, Mycronic has grown together with its customer base, providing solutions for every process step from bare board to finished, inspected and coated PCB. These automated full-line solutions make it possible for smaller producers, contract manufacturers and in-house production teams to rapidly iterate new products and deliver value that can’t be achieved by high-volume manufacturers overseas.

“It wasn’t always obvious that advanced automation would be the way to go for these high-flexibility producers,” says Robert. “About 15 years ago, everything was supposed to move to Asia. But for those who stayed despite higher labor costs, we’ve stuck with them and effectively become an extension of their businesses. We’ve been great at supporting these customers and keeping them profitable with short-series production.”

DATA-DRIVEN ASSEMBLY

If, twenty years ago, hardware was a major obstacle to rapid job changeovers, today it’s often software. Which is why Mycronic has focused in recent years on simplifying everything from program creation and fine-tuning to inspection review. With the help of advanced machine learning and deep learning systems, manufacturers can now automate a range of repetitive programming and fine-tuning tasks.

“We’ve come a long way in connecting the software in the pick-and-place to the whole line,” says Robert. “When all our machines work better together within a single workflow, and when they all learn from and improve each other, that’s exciting! Today it’s the person telling the machine what to make. Tomorrow it should be the product telling the machines what it wants to be.”

In solder paste printing, this level of machine-to-machine automation is already here. By combining jet printing, screen printing and solder paste inspection, Mycronic now enables zero-defect printing — an industry first — in which the inspection system serves as a virtual auto-correct for any missing deposits. “It’s getting to the point where customers shouldn’t even notice the hardware,” says Bobbi. “It’s mainly the software they interact with, so we’re gradually bringing the entire production line into a single, intuitive operating system.”

TURNING UP THE VOLUME

Despite all the advances in software, Bobbi remains proud of the engineering behind every new machine. “The absolute best moments in my career have been at 9 am in a trade show, when the PA announces the opening of the event. After years of hard work, it’s a proud moment when you show a new machine to the world,” he says. “Just last year we released a new high-speed mounthead technology, the MX7,

at Productronica. Everyone I met was thrilled about the possibilities it opens up for high-throughput, longer series production.”

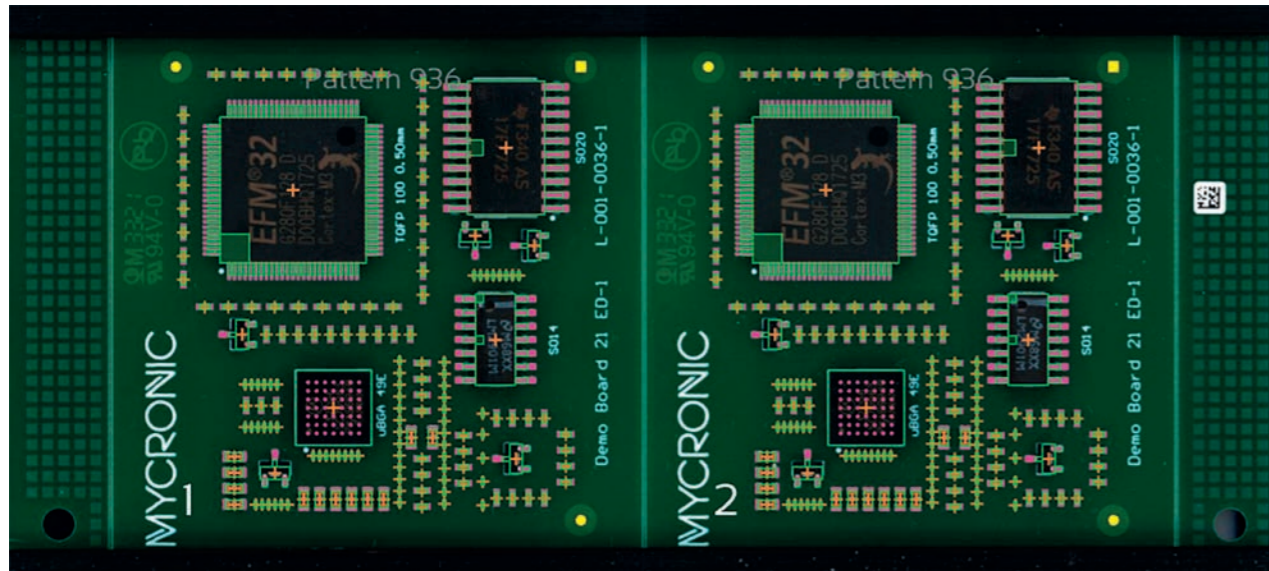
THE CIRCLE CONTINUES

It is, after all, pick-and-place equipment that remains firmly at the heart of many customers’ production strategies. And Bobbi is confident that Mycronic machines are uniquely equipped for whatever changes the future might bring. “The pick-and-place machine is like a puzzle: you can build and integrate it how you want. If new technologies emerge, we make it easy to integrate a new magazine, a new nozzle, or the latest software. I just recently met a customer with a machine we introduced in 1999, and 23 years later it could still run the latest software. Maybe we had to change out a camera module, but this is still a much longer lifespan than almost any other machine in the industry.”

“This is true modular thinking,” he concludes. “It’s circular thinking. And this, I think, is one of the keys to our longevity. We all know high-mix will continue to grow. And innovation cycles will continue to accelerate. But we keep helping our customers adapt and evolve with the lowest cost and least possible effort. It’s a constant creative process together with some of the world’s most advanced manufacturers — and that’s the real motivation at the end of the day.” ●

Mycronic High Flex division in brief

- Installed base in more than 50 countries
- Manufacturer of full-line PCB assembly solutions including stencil printing, jet printing, component placement, inspection and component storage solutions
- Inventor of the zero-maintenance Agilis feeder technology
- Inventor of jet printing technology for high-speed solder paste jetting



The Power of One

— empowering multi-machine programming with one dataset, one program and one workflow

For years, Mycronic inspection customers have benefitted from a single web-based interface for unified SPI and AOI data. The latest MYPro Create™ software brings the same seamless integration to jet printing, making job creation faster, more intuitive and more stable than ever before.

TEXT: GRANT BALDRIDGE PHOTO: MYCRONIC

With this new release, MYPro Create brings a single, intuitive workflow to job creation for Mycronic jet printing, SPI and AOI systems. Future releases will extend these capabilities to pick-and-place machines, resulting in a complete program creation software for all Mycronic machines. To learn more about how the new unified programming software contributes to customers' productivity, we spoke with Software Architect Milos Homola.

ONE DATASET FOR ALL MACHINE PROGRAMS

Current jet printer users will experience the simplicity of MYPro Create from the very first step: data input. Unlike with previous applications, Gerber or ODB++ files need to be imported just once for programming all Mycronic AOI, SPI and jet printing machines in

the line or in the factory. "All the common data, including panel layout definition and PCB definition, is published from a central database to the different machines," explains Milos. "This means that what you see in the software is what you publish for production, which amounts to a simple and straightforward user experience." In addition to significantly reducing the time required for data preparation, the new data import workflow reduces the room for human error while still producing programs recognized by each of the individual machines.

FASTER COMPILATION, BETTER QUALITY

Data compilation is another significant factor when creating print and inspection programs for complex products. In short, faster compilation means faster

availability of data for the machines in production. "Having one single software eliminates the hurdle of time-consuming multiple compilations," says Milos. "For bigger jobs, it can also be scaled up to 10 instances, meaning that multiple projects can be compiled simultaneously. This further increases the data throughput of the whole software system. Whether you have multiple users and no longer have to wait for compilation, or you're a high-mix producer with frequent changeovers, or a mid-volume producer with large volumes of data to manage, the new software both saves time and ensures better print quality. And for the creation of jet printing programs, MYPro Create is significantly faster than its predecessor.

BETTER DEPOSIT CONTROL AND DESIGN FREEDOM

Compared to previous software, MYPro Create makes jet deposits easier to search and modify. Simply search for part numbers, adjust paste volumes for different package types and freely adjust deposit properties as needed. "Now there's total freedom to adjust the volume or shape of a single deposit," says Milos. "Operators have precise control over each deposit's

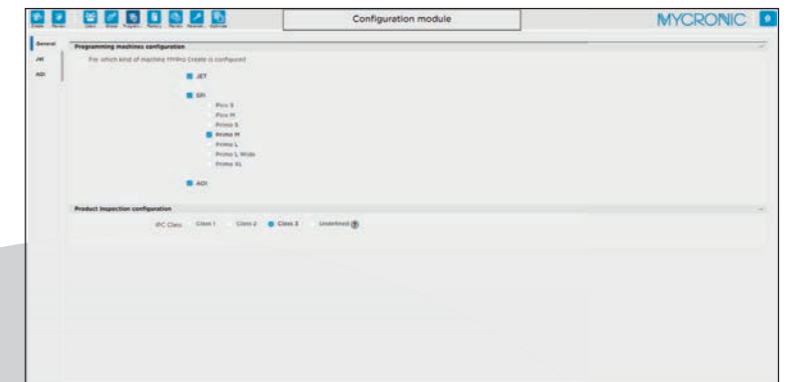
size, form and position directly through the user interface. It's just a matter of changing the deposit onscreen with your mouse or keyboard, and you'll see it change live in the compiled preview. The result is more granular control of deposit properties, leading to better quality solder joints, post-reflow."

IMPROVED VISUALIZATION LAYERS

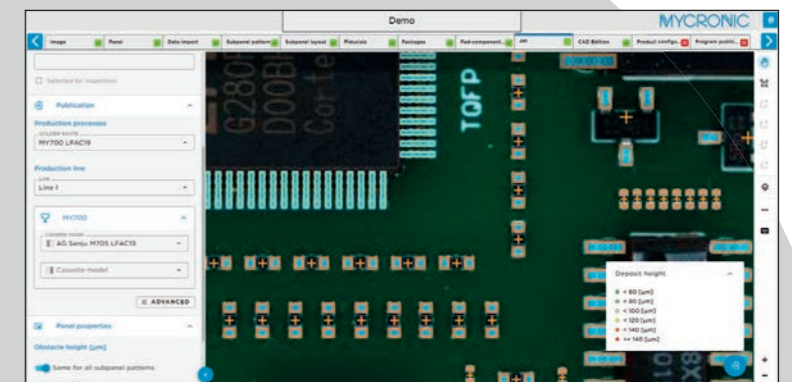
For MYPro I series 3D AOI or PI series 3D SPI users, MYPro Create allows for importation of board scans from SPI or AOI directly into the job creation program. Jet printing programs can be seen as they are created, in their actual context, giving operators better visual control over the full production process. "If you have the board scan — bare board or PCBA — available, the process is even more intuitive," says Milos. "Rather than basing your inputs on source file data, which can differ from real-world conditions, you just align your program with the underlying image. So instead of inputting individual dimensions, you're aligning all the machines' job programs around the actual location of every part on the board, which is much better from a quality perspective."



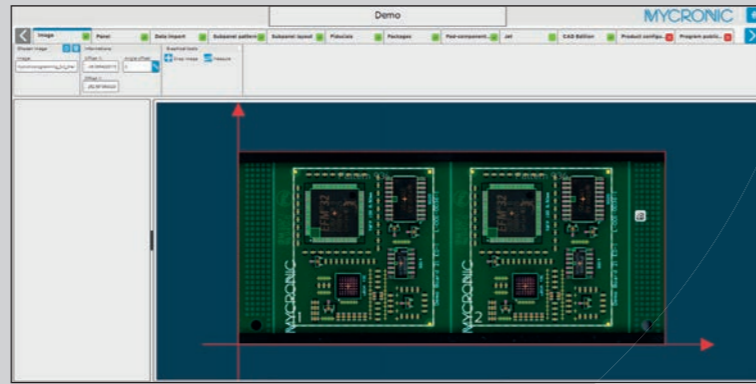
Configure new programs for any or all Mycronic jet printing, SPI and AOI equipment.



Advanced deposit editing including deposit size, shape and position with compilation preview.



Import PCBA scan from AOI for visual alignment with SPI and Jet printer program data.



Operators have precise control over each deposit's size, shape and position directly through the user interface.

STEP-BY-STEP GUIDANCE

In today's software landscape, a clean and intuitive user interface is far more than a design feature: it's essential to a productive, error-free user experience. With its logical and self-explanatory visual guidance, and a right-to-left tab structure that follows the assembly process, MYPro Create makes easy work of even the most complex job creation tasks. It visually indicates completed steps, incomplete actions and errors, helping even novice programmers learn as they go.

"SPI and AOI users will probably recognize the visual guidance language from MYWizard," says Milos. "We've applied the same philosophy in MYPro Create, with clear, color-coded visual signals showing what actions need to be made, and in what order. We know our users are handling a lot of complexity in their day-to-day operations, so we try to keep it as simple - yet helpful - as possible to maintain their focus and avoid information overload."

WORKING TOGETHER

As Milos is quick to emphasize, the new MYPro Create is a significant step forward for jet printing and inspection customers—but it is just one part in a long-term effort to create a unified, full-line programming software experience. "This is just the beginning of a long journey," he says. "And it wouldn't be possible without continuous customer feedback. Because all the development is in our hands we can iterate more quickly, address issues, add features and release more frequent updates. Our users have already told us the experience is more stable, more reliable and easier to follow than any jet printing software they've used before."

Based on initial customer feedback, Milos is confident that the journey is headed in the right direction. "Just the other day a jet printing customer told us he's considering changing his inspection equipment to an I series AOI," he says. "He's been beta testing MYPro Create for his MY700 and sees a lot of value in our common programming interface, and in being an active partner in the development process. This tells me we're on the right track as we pursue the ultimate goal of a single line programming software for all Mycronic machines, together with our customers." ●

One dataset.
One program.
One workflow.



Multi-machine programming just got a lot smoother

The days of repetitive data entry and multiple software programs are over. Now you can create new jobs for all your Mycronic jet printing and inspection machines with one dataset, one program and one workflow. MYPro Create™ saves operators time and effort by bringing all job creation tasks into a single unified interface. It's one seamless part of the MYPro Line™ user experience, and one giant leap toward full line programming.

Mycronic's cutting-edge solution for of the icons of agility

Experience the evolution

Discover the next-generation technologies that continue to push the limits of flexible assembly, making MYPro Line™ assembly solutions the industry's most productive just-in-time production environment.

Zero defect printing

Introducing the ultimate closed-loop solder paste platform. Combine the speed of stencil printing with the flexibility of jet printing and the process control of PI series SPI.

Factory connectivity

Implement the IPC-CFX standard effortlessly with MYPro Connect™, or deploy the Hermes M2M communication protocol across your Mycronic line.

Process optimization

MYCenter Analysis is a powerful process control software to monitor, analyze and improve assembly performance.

MYPro A40DX™ pick-and-place

High speed meets high flexibility. Mount a far wider range of components 48% faster than previous generations.

New graphical user interface

An all-new touchscreen graphical user interface (GUI) makes vital process data more visible and intuitive.

Automated material handling

Experience the industry benchmark for speed of material handling, ease of use and storage capacity: MYTower storage systems and supporting software solutions.

Iris™ 3D AOI vision technology

30% faster processing. Twice the pixel resolution. Accelerate cycle times and improve inspection accuracy.

Escape Tracker

Eliminate escapes. Reduce false calls. And automatically add new levels of speed and reliability to inspection programming.

MX7™ high-speed mounthead

7 independent placement nozzles. 14 Z and theta motors. The new high-speed mounthead places components up to six times larger than its predecessor.

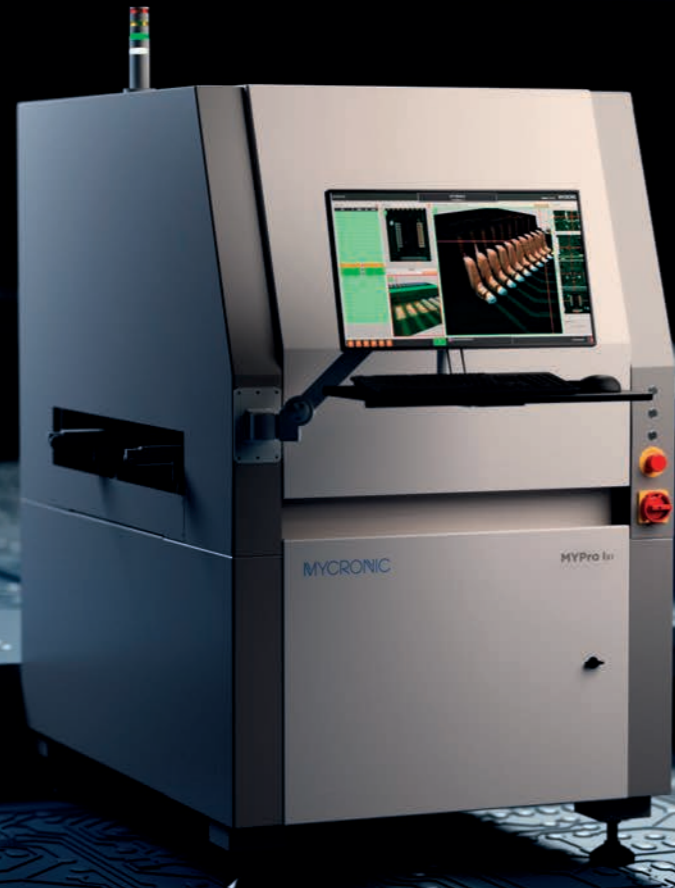
Agilis™ feeder system

A redesigned 8mm feeder. A more user-friendly "all-reel-size" Agilis Flex feeder. And a new Agilis bin for 15" reels. Expand your capabilities for fast and reliable kitting regardless of component origin.

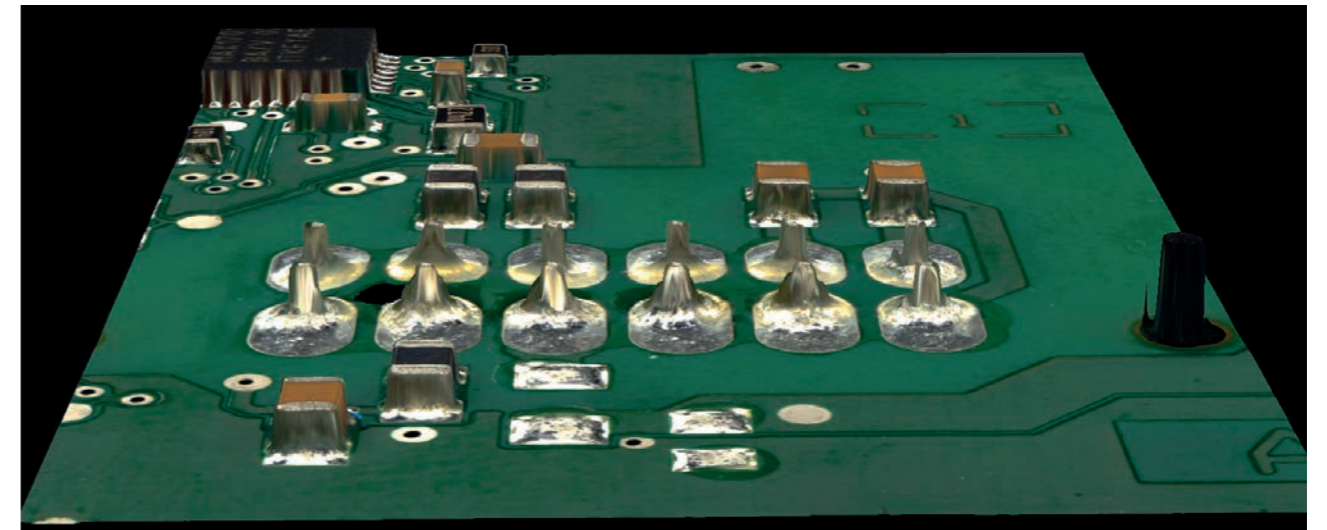
Put your inspection on autopilot

MYPro I™ series 3D AOI—High-performance inspection for any mix

Boost product quality. Improve first-pass yield. And give your operators the highest levels of automated assistance. With the I series 3D AOI, high-performance inspection has never been simpler. Equipped with the latest Iris™ 3D AOI vision technology, the I series captures every detail in unprecedented resolution—even at the most demanding takt times. And thanks to advanced deep learning systems, it continuously improves program settings, operator guidance and defect classification models to reduce programming and review times to a bare minimum. Learn how the I series can enable high-performance 3D AOI for any production mix or class at pcba.mycronic.com.



MYCRONIC

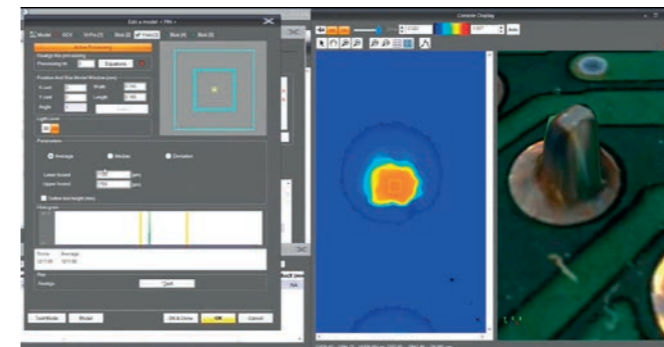


Mycronic's cutting-edge solution for THT component inspection

In a significant advancement for electronics manufacturing, the MYPro I series 3D Automated Optical Inspection (AOI) is a comprehensive solution designed to ensure the quality, reliability, and performance of assembled PCBs.

When it comes to through-hole (THT) component inspection, the MYPro I series stands out with its ability to detect defects related to component location, positioning, or soldering, which are common challenges with this assembly method.

TEXT: YAN MANISSADJIAN PHOTO: MYCRONIC

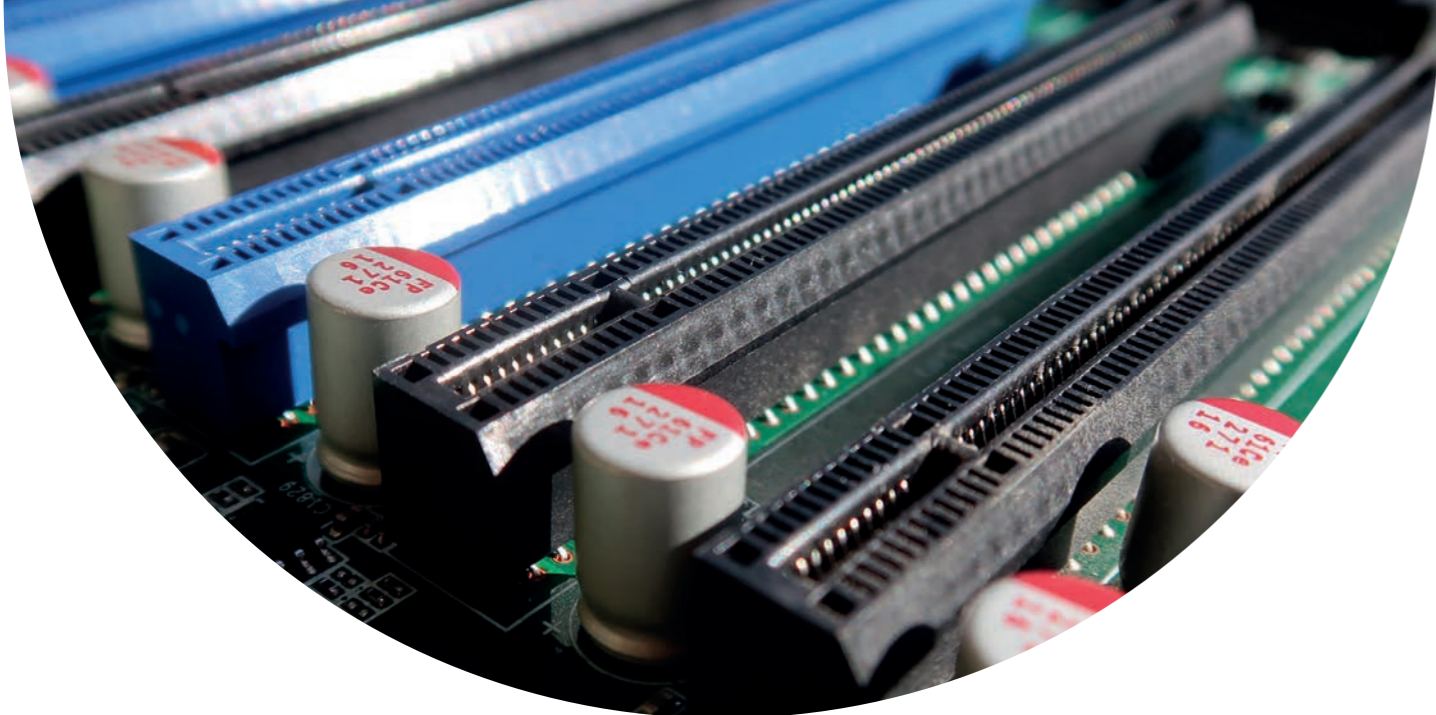


Now powered by AI-assisted software and featuring next-generation 3D vision technology, the MYPro I series enables faster and sharper processing, making it an indispensable tool for modern electronics manufacturing.

All pin geometrical tests are available: position, height, bending.

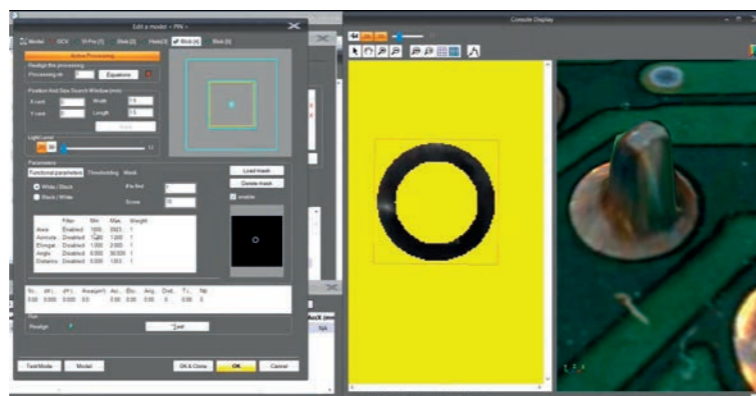
With the MYPro I series, manufacturers can inspect the bottom side THT pins using our standard toolbox, which includes detection of the pad, location of the pin's top, identification of its surface and positioning, and reconstruction of its shape.

ALEXIA VEY
PRODUCT MANAGER INSPECTION

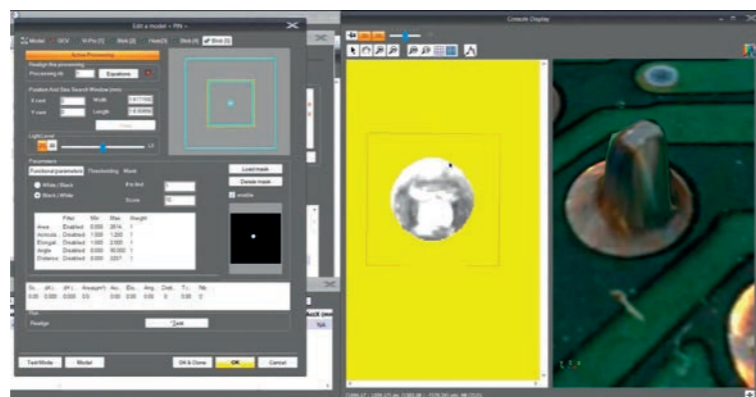


Inspecting THT lead integrity

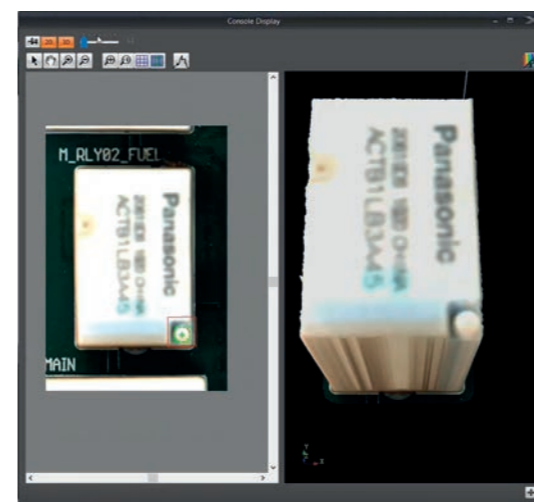
Solder joint integrity is another critical aspect of THT components, and the MYPro I series excels in this area as well. The system employs digital masks to inspect solder joints 360° around the base of the pin, ensuring pad surface coverage in accordance with IPC-A-610 standards. This feature is vital for detecting common soldering defects such as insufficient solder, cold joints, solder bridging, and incomplete soldering.



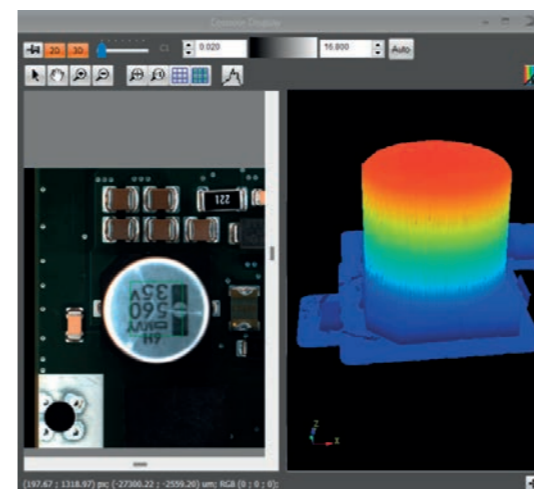
Setting up THT solder joint inspection: Check for correct pad coverage.



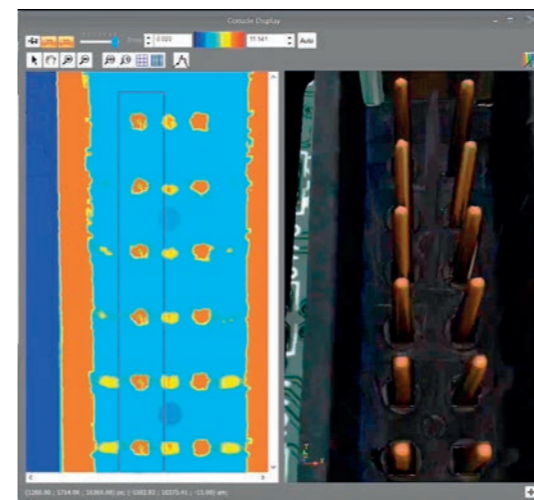
Setting up THT solder joint inspection: Check for holes and cracks in solder fillet.



Inspection of a relay (height: 14mm) — polarity detection



Inspection of a capacitor (height: 14mm) - coplanarity measurement.



Presence and position tests are created for a single pin and then extended to a group of pins. The number of detected pins is also checked by the AOI.

Top-side inspection of THT components is also a breeze with the MYPro I series. The system can inspect components up to 20mm in height, such as resistors, capacitors, relays, diodes, transistors — just to name a few. “Our 3D AOI system checks for the presence, position, coplanarity, and polarity of the component body, ensuring a thorough inspection regardless of the component’s physical height,” added Alexia. Under certain conditions, components up to 25mm high can be inspected.

Mycronic’s commitment to innovation is further demonstrated by the MYPro I series’ ability to handle the unique inspection challenges presented by THT connectors. The system’s accuracy allows for the inspection of connector pins even in deep and narrow housings, and its 3D vision and analysis system can stitch images and data acquired at different locations to accurately reconstruct connectors longer than the field-of-view of the 3D scan system.

The introduction of the MYPro I series 3D AOI is a game-changer for electronics manufacturers, offering unparalleled inspection capabilities and ensuring higher levels of quality and reliability in electronic devices.

All MYPro I series 3D AOIs are engineered to inspect any THT components or connectors, standard or custom, with the same accuracy and repeatability as for SMT components. With probably the most comprehensive toolbox on the market, the MYPro I series offers EMSs and OEMs greater inspection capabilities without operator dependency. They increase their product quality and reliability, while keeping production costs under control. ●

3D AOI:

DeepReview™ now compatible with Vision3D



ILLUSTRATION: OPEN COMMUNICATIONS

DeepReview can now be ordered as an option by all AOI customers using MYWizard or the Vision3D operating software.

DeepReview is Mycronic's deep learning solution for eliminating false calls: for eligible component packages, each defect detected by the AOI is submitted to DeepReview's automatic defect classification neural network to further eliminate false calls and present only true calls to the AOI review operator. Beyond a significant reduction of the time spent on reviewing, DeepReview improves the efficiency of the review process and the overall reliability of the SMT production process.

This first version of DeepReview addresses chip-type components and small ICs (SOT). More packages will be supported with future versions.

KEY NEW FEATURES

DeepReview V2.0.1 is compatible with the following AOI models:

- 5K3D
- 9K3D
- MYPro I50
- MYPro I90
- MYPro I51
- MYPro I91
- 5K/7K/8K/9K Spectro

SW REQUIREMENTS:

DeepReview is compatible with MYWizard and Vision3D CR8.3 or later.

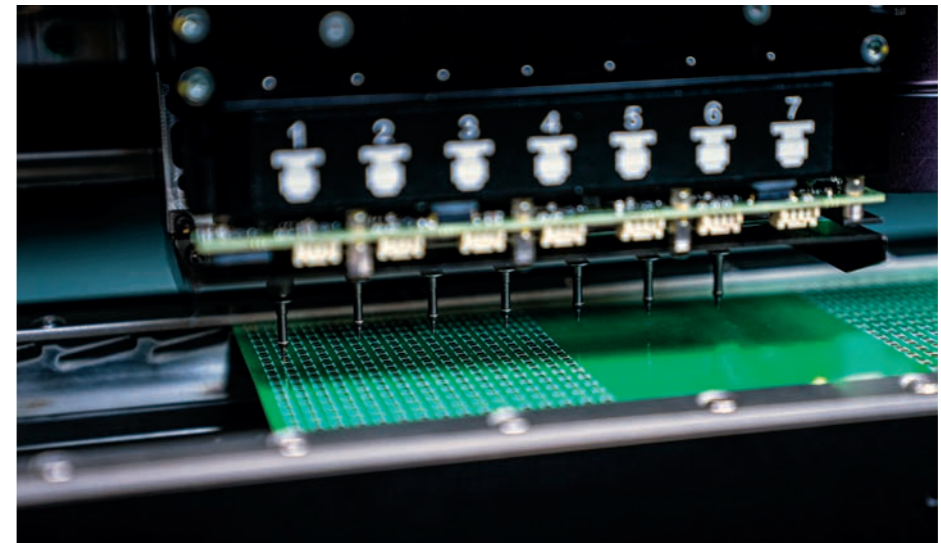


PHOTO: OPEN COMMUNICATIONS

PLACEMENT:

MYPro A40SX™ and LX™ release

Mycronic introduces the latest placement models in the MYPro A40 series: the MYPro A40SX and MYPro A40LX

Both models of pick-and-place machines are equipped with the all new high-speed MX7. The new mount head enables greater rated speed for both the SX and LX models, of 29,000CPH and 18,000CPH respectively. Compared to their predecessors, the real speed of both SX and LX models is also higher due to the wider component range picking capabilities (01005" up to 45x45x15mm or 150x40x15mm).

As well as being a faster solution, the MYPro A40SX and LX machines also offer a higher level of flexibility, with 16% more feeder capacity in the same footprint. This improvement enables kitting more jobs on a single machine, ultimately simplifying the changeover process and minimizing the time between jobs even further.

Combine the MYPro A40SX and MYPro A40LX with the Mycronic software suite and Agilis feeder technology to experience the most versatile and flexible pick-and-place solution on the market.



BOARD HANDLING: New conveyor models

The new conveyors are available in three different lengths: 600mm, 1,200mm and 1,800mm. Conveyor belts on the fixed and moving sides are driven by the same motor, ensuring straight board feed-in and feed-out, and minimizing wear on belts and conveyor rails.

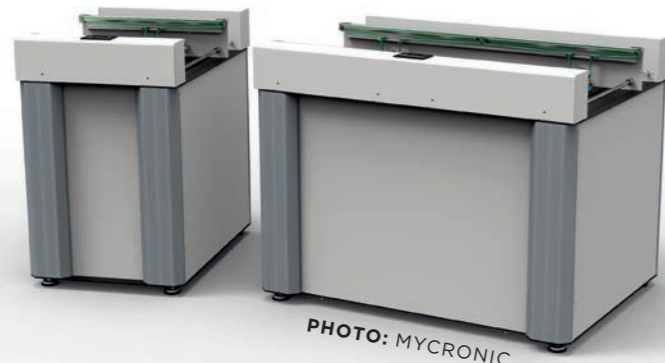


PHOTO: MYCRONIC

All settings/functions are controlled via the intuitive touch screen. Communication with preceding and following units is done via the standard SMEMA interface, which makes the conveyor easy to install. Conveyor width adjustment is motorized as standard.

All of these new models are capable of handling PCBs from 50 to 515mm (2 to 20.3") wide, for a maximum weight of 4kg (8.8lbs). Depending on the model, PCBs from 70mm up to 580mm (2.8 to 22.8") long can be transported.

PLACEMENT:

Upgrade your TPSys™ GUI



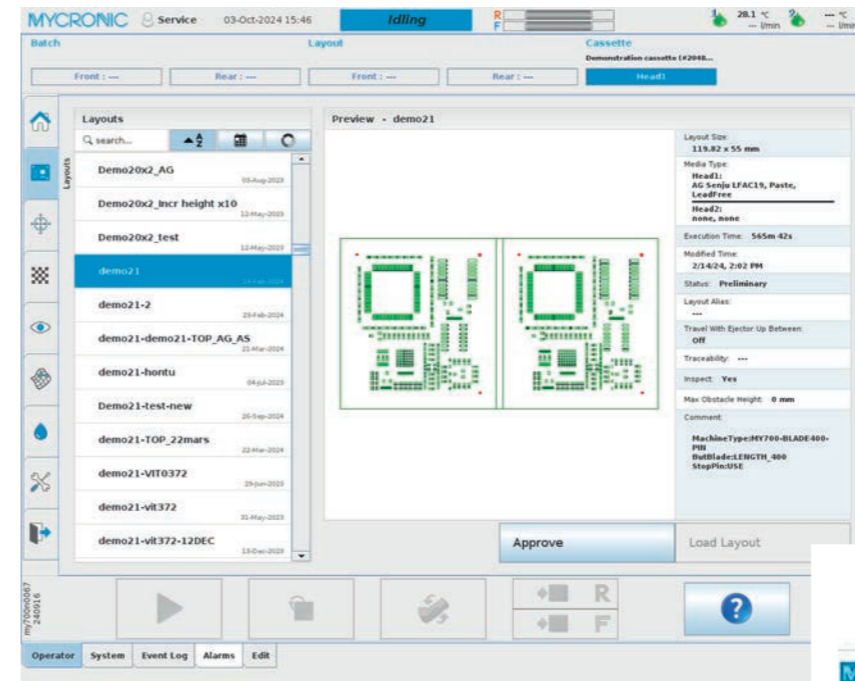
PHOTO: OPEN COMMUNICATIONS

Upgrade to the all-new Mycronic pick-and-place Graphical User Interface (GUI) and simplify your production workflow.

First introduced at Productronica 2023, our new pick-and-place GUI has been developed with customers, for customers, with one key goal in mind: improving ease-of-use and streamlining customers' production workflows.

The new GUI enables operators, regardless of skill level, to be able to efficiently and simply operate their Mycronic pick-and-place machines. With a simplified and self-explanatory screen design, long hours of training in order to operate a pick-and-place machine are a thing of the past, with operators becoming self-sufficient in little to no time.

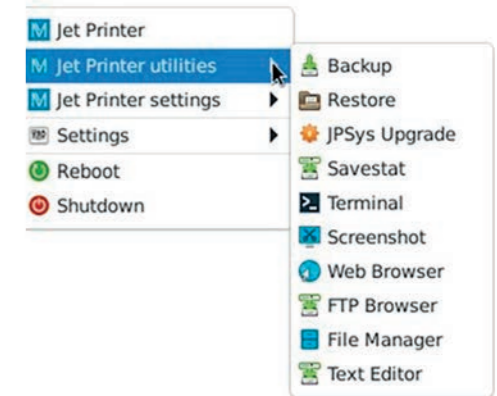
The GUI upgrade kit is available for all MYPro A40 machine models, and available for any MY300 model running TPSys 6.1 or later.



⌚ With a clearer, more hierarchical layout of functions, the new graphical interface allows for faster operation.

☑ Access to all your Jet Printer's parameters and features with a right-click.

Right-click menu:



JET PRINTING:

New software version for MY700™ Jet Printer

We are thrilled to announce that JET3.0 software is now available for customer orders and will be standard on all new MY700 machines. The latest software brings significant improvements in performance and usability, aimed at enhancing productivity for users.

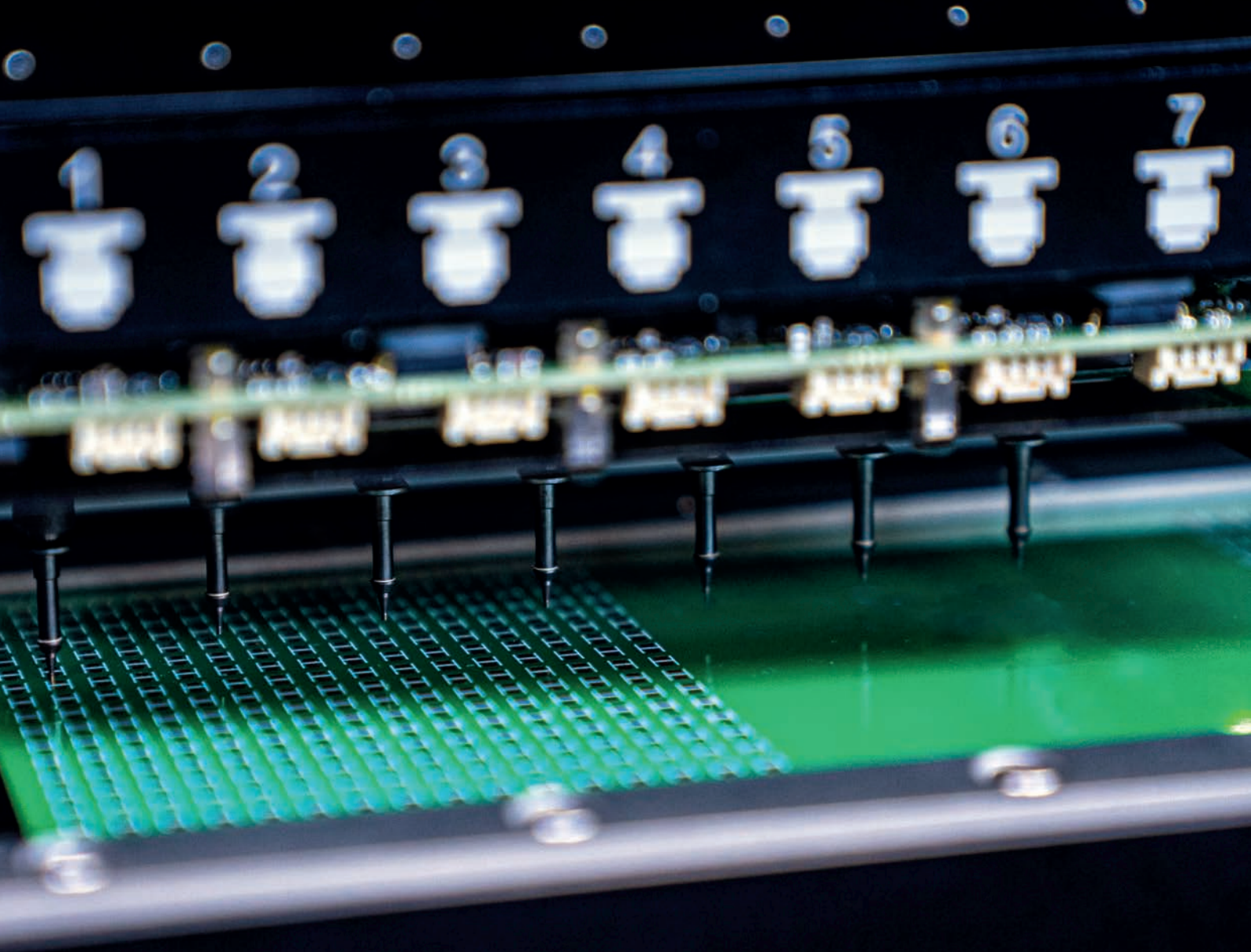
KEY NEW FEATURES

- **First dot optimization:** New cassette models are being developed to improve yield, especially with AR ejectors using Senju solder paste.
- **Ejector tuning:** Enhances accuracy with paste temperature adjustments for different solder paste batches.

- **Enhanced user interface:** A redesigned interface simplifies access to Jet printer applications, settings, and utilities.
- **OS upgrade to Debian 11:** Delivers stronger IT security and system stability.

Upgrade options. JET3.0 can be installed on older MY700 machines, though the CMOT5 head control unit is required to implement first dot optimization.

FAQ. Customers with multiple MY700 machines will need consistent upgrades across devices. The software improves yield, optimizes dot sizes, and enhances security. IT departments will appreciate the robust security enhancements.



Discover 7 new ways to thrive on change

Introducing the new MX7™ mounthead technology

Seven independent mountheads, 14 high-precision motors. And an entirely new level of high-speed flexible assembly. With the all-new MX7™ mounthead technology, you can place a far wider range of components at up to 48% higher top speeds. The fast-beating heart of the new high-speed MYPro A40™ pick-and-place platform, the MX7™ opens up entirely new ways to expand your product mix and accelerate your throughput. Learn how the next-generation MX7™ can boost your productivity and help you thrive on change at pcba.mycronic.com.

MYCRONIC