A magazine from Mycronic

MYNews

2023.02

Escape Tracker and inspection programming

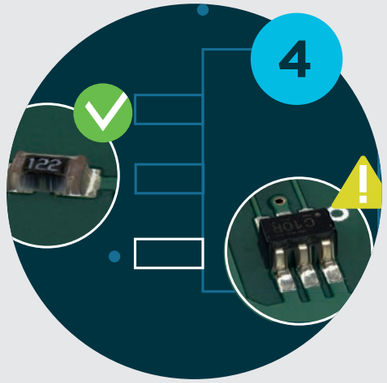
Moving to perfection

Expand the product mix

INNOVATION OVERDRIVE

Accelerate the design-to-manufacturing cycle

MORE GROWTH, LESS PAIN



Contents
2023.02

4 Escape Tracker — from ping-pong to perfection

9 Customer case:
Zhejian Taiyun Automotive Technology

14 Pick-and-place — feeders and accessories

20 Interview: Software Engineer Nicolas Guillot

22 Product news: MYPro I51 3D AOI

25 Customer case: NVZN Labs

30 Product news: MYCenter Analysis

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 Baldridge, David Gray, Mattias Jonsson, Liam Karlsson, Alexia Vey, Daniel Westin, Yan Manissadjian, Simon Sandgren **GRAPHIC DESIGN & LAYOUT:** EXPEDITION 46™ **PRINT:** TMG Sthlm, Sweden, 2023 **ISSN:** 1651-4882 P-001-0252/July 2023. This newsletter is produced with the intention of providing general information about Mycronic and our products.

As your ambitions grow, so do our efforts to improve your capabilities. From an expanding product portfolio to rising demand for storage and inspection systems, it has been extremely exciting to strengthen our full line offering to satisfy an even wider range of customer needs.

In the coming months, we will proudly announce the addition of a screen printer to our portfolio, a significant step towards supporting our customers with a comprehensive full line offering for PCB assembly. This addition makes it possible for us to offer solder paste application solutions for any customer and any application.

We have also been delighted to witness a steady rise in demand for our 3D SPI and AOI inspection system, a testament to the trust our customers place in our products. We continue to invest heavily in research and development — as can be seen in the recent launches of the new Iris 3D AOI vision system and improved programming interfaces — and we are determined to raise the bar even higher to provide the highest-performance inspection equipment available in the market.

Naturally, at the heart of our success lies our dedication to learning from our customers and continuously enhancing our products and services. During the past year, we have been actively devoted to improving our customer feedback loops through our customer relationship surveys. By leveraging this data, we gain valuable insights into what you value most as customers and can more rapidly resolve any potential issues.

To address your valuable feedback, we have built a robust process within our Net Promoter Score (NPS) program. When the feedback is actionable, it triggers an immediate response, allowing for direct contact with our account managers to swiftly find solutions. And whenever an issue arises, an account manager responds within 3 days, with the aim of closing all resolvable issues in fewer than 10 days.

Currently, we have an average resolution time of around 11 days. No case is left unattended, and those requiring further attention are reviewed in monthly meetings with our product leaders. We strive to ensure that your concerns are heard and addressed promptly.

In the second edition of the survey, which has already reached 75 percent of accounts, we have been pleased to see a steady improvement to an already strong Net Promoter Score, which measures overall customer satisfaction. Your answers and opinions in these surveys directly influence our roadmap and guide our future endeavors, so we are extremely grateful for all the feedback you have been able to provide.

As always, our efforts to improve every aspect of your experience with our solutions and services continue. In the coming months, we look forward to sharing the insights we've gained from you, as well as what they mean for our ongoing development, as we move ahead into a strong and exciting year for the electronics industry.

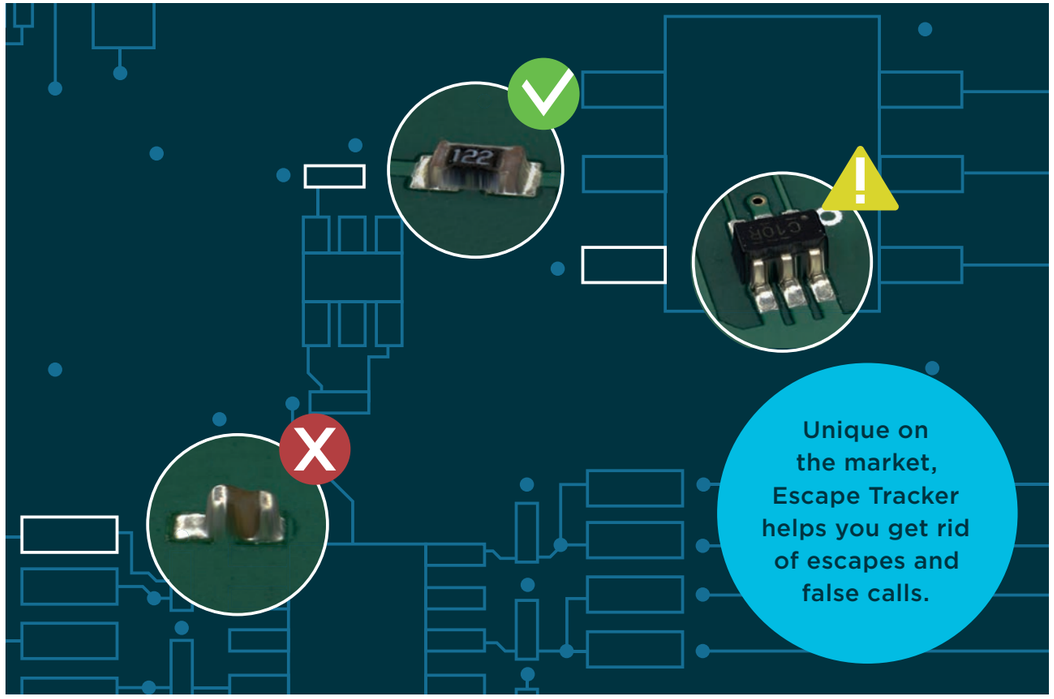
// Clemens Jargon
Senior Vice President, High Flex

From ping-pong to perfection

— enhancing the art of inspection programming with Escape Tracker

It's sometimes called the ping-pong effect: the back-and-forth task of adjusting 3D inspection models to eliminate false calls without increasing the risk of escapes. Thanks to a new automated programming assistant, all this work can now be put to better use. Every time you certify a real defect or false call, it remembers, constantly updating your inspection library based on real production data. The result is an inspection process that automatically moves closer to perfection every time it's in use, saving programmers time, effort — and their most valuable resource of all — concentration. The latest vision technology from Mycronic points toward a faster, sharper, and smarter path forward.

TEXT: GRANT BALDRIDGE **PHOTO:** MYCRONIC



An integral part of the MYWizard programming software, Escape Tracker is now available as standard on all Mycronic 3D AOI models.

In the pursuit of the perfect inspection model, program fine-tuning can often feel frustrating. Tighten tolerances too much, and the false calls proliferate. Open them up, and new escapes arise. Each modification and every review can have these spin-off effects — not exactly the best use of a programmer's time and attention.

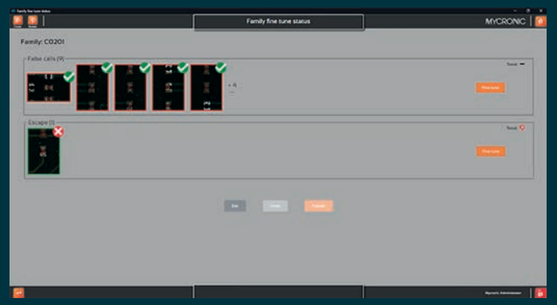
With Escape Tracker, now there's a way to improve inspection models over time with no added programming steps. During program fine-tuning, the software effectively runs a background check. Automatically collecting review images. Checking modified parameters against certified inspection data. Hundreds of times per second, it updates the baseline for your entire inspection library, bringing what began as an ideal inspection model closer and closer to the realities of previously manufactured and inspected components.

A MORE COMPREHENSIVE QUALITY CHECK

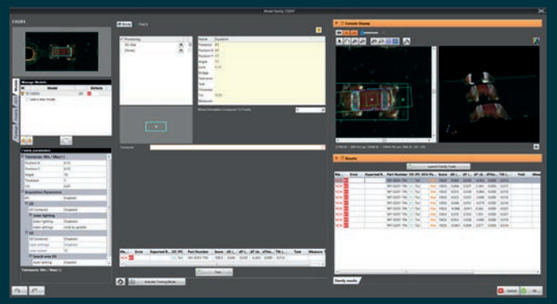
Escape Tracker represents the latest evolution of Mycronic's industry-leading Library Pro: a powerful inspection library that stores and optimizes a unified database of every inspected product. The major advance with Escape Tracker is its ability to continuously perform non-regression control of the central library's performance. This gives the software a comprehensive overview of previous production, making it possible to cross-check program settings across products, rather than solely against the current production batch as is common practice today.

BEYOND THE GOLDEN BOARD

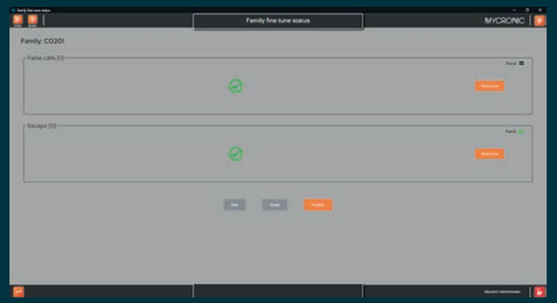
This ability to cross-check a program for a particular component against all historical inspection data marks a significant advance in 3D inspection. In the past, a so-called "golden board" — an ideal finished board — might be used to check the system's inspection settings. The only problem, of course, is that in the real world of product variations, changing component and PCB suppliers and physical limitations, the ideal mounted component never existed.



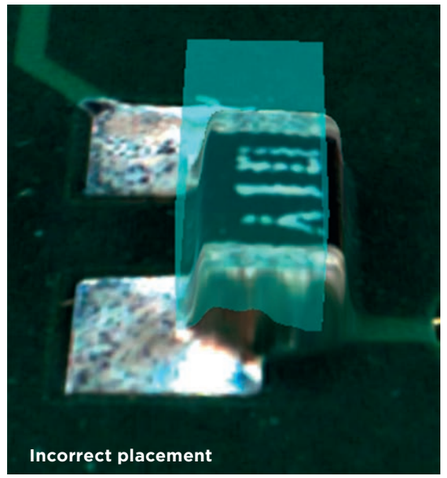
Step 1: Once the program has been created, Escape Tracker checks that the latest adjustments made to each inspection model for each type of component will still detect the previously known true defects and will not generate any false calls. In this example, it appears that one true defect is potentially undetected, and five false calls may appear during production.

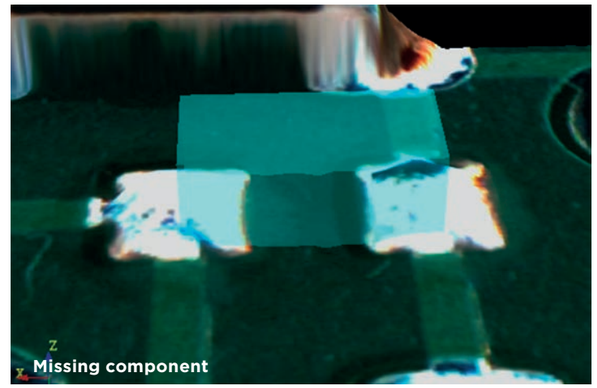


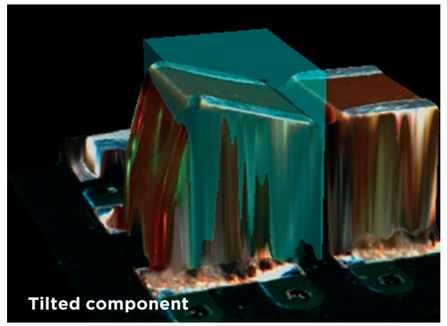
Step 2: Based on the information provided by Escape Tracker, the programmer makes the necessary corrections to the inspection model of the related component. Often it is a matter of adjusting tolerances.

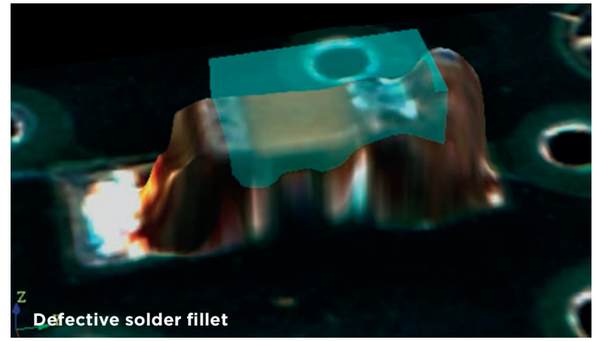


Step 3: Once the corrections are made, Escape Tracker performs a new efficiency check of the inspection model against known real defects and potential false calls. In this example, the green check marks indicate that all potential issues have been fixed for that component package.


Incorrect placement


Missing component


Tilted component


Defective solder fillet

Some examples of real defects stored in the system used by Escape Tracker to control the efficiency of a new program.

NO SILVER BULLET

To accommodate for production drift and other changes, many industries solved this problem with a “silver board”, a board with known defects used to periodically re-calibrate inspection settings. Over time, however, even these boards tend to gather dust, oxidation and increasing wear to grow less and less accurate with every use.

A NEW ERA OF SELF-REGULATED INSPECTION

Escape Tracker, together with the advanced software guidance of the MYWizard user interface, makes it possible to move 3D inspection beyond these limitations. By bringing the art of a programmers’ judgement together with the objective reality of every mounted and inspected component, the system automatically adapts to the natural variations of changing production conditions. Making inspection models more robust, programming more efficient and end products closer to perfection, every minute of every day.

Innovation overdrive

— accelerating R&D cycles and expanding product mix in China

Founded in 2018 as a fast-paced prototyping unit and R&D accelerator, the SMT department of one Chinese e-bike technology services company has placed the latest MYPro assembly solutions at the heart of its product diversification strategy.

TEXT: GRANT BALDRIDGE **PHOTO:** ZHEJIAN TAIYUN AUTOMOTIVE TECHNOLOGY

At Zhejian Taiyun Automotive Technology, every bit of excess production capacity is a new opportunity. And these days, thanks to a talented team and a remarkably efficient assembly process, the opportunities are everywhere.

LEAN AND READY FOR CHANGE

Part of the Zhejiang Taiyun Group, an innovative developer and manufacturer of electric control systems for e-bike motors, the SMT department's main objective is to transition the company's latest R&D into production as efficiently and flexibly as possible. "The only surprise with our Mycronic equipment," says Mr. Sun, Senior Engineer of SMT, "is how we can make this transition to production so fast that we have the luxury of actively hunting for new business for our SMT line!"

Mr. Sun, who is responsible for overseeing the company's production, staff training and equipment selection, has configured his production line with a MYPro MY700 Jet Printer, MY300 pick-and-place and a MYTower component storage system specifically with the needs of NPI and prototype production in mind. On average, this means producing roughly 4–5 new products per week, with some 50 boards per batch.

"Of course, we compared the equipment with other leading manufacturers and were drawn to Mycronic's high-mix, lower-volume production model with quick changeovers and flexible material handling," says Mr. Sun. "It has fully met all of our expectations, and now we believe we're well positioned to expand our customer base beyond e-bikes to include medical and other industries."

> On a single batch of 2,000 PCBs, we've achieved an FPY as high as 99.8%.

SPEED, ACCURACY AND 90% LOWER COSTS

In the evaluation phase, Mr. Sun was particularly excited by the degree to which jet printing could dramatically reduce operating costs. Compared head-to-head with stencil printing, the team's analysis found that the MY700 could reduce labor alone from two people on day and night shifts to a single part-time operator. On top of that, stencil cleaning and changeover costs could be eliminated, while rework costs could be reduced by up to 95 percent. "In total," he explains, "we estimated that the MY700 would be 90 percent more cost-effective to operate over a ten-year cycle. So, for our operations, the choice was obvious."

Naturally, cost wasn't the company's only consideration when making the leap from stencils to jet printing. The speed and quality of production have also increased considerably, says Mr. Sun. "Sometimes, the R&D team gets last-minute instructions to finish production within 30 minutes. With a stencil this would be impossible: it would take more than eight hours, and even then it wouldn't be able to achieve 100 percent of the process requirements. In contrast, the MY700 takes only 10 minutes, and its parameters can be adjusted, making it an ideal solution for R&D teams working on prototypes."

FLEXIBLE FEEDERS, ZERO MISTAKES

This highly flexible production philosophy was something he grew to appreciate years ago, at a previous job, when he first worked with Mycronic's pick-and-place equipment. Having mainly used other leading equipment brands, Mr. Sun found that the component feeders were typically too bulky and labor-intensive for a high-mix production environment. Not only did they demand excess storage space, as well as regular calibration and repair, but their fixed positions meant that a single feeder, placed incorrectly, could bring the entire production line grinding to a halt.

"Thanks to Mycronic solutions, we believe we're well positioned to expand our customer base beyond e-bikes to include medical and other industries."

"My first experience with Mycronic totally changed my mind about how things could be done. The ability to switch feeder positions, which are automatically linked to the part, eliminated the risk of placing components in the wrong positions."

When asked how his production line has impacted some of the department's key performance indicators, quality is one of the first things that comes to mind. "Our equipment has also resulted in higher first-pass yields (FPY) than other solutions," says Mr. Sun. "The data on this is variable, of course, but on a single batch of 2,000 PCBs, we've achieved an FPY as high as 99.8 percent."

With the MYTower component storage system, Taiyun's SMT department has also experienced significant improvements in their material handling process. Previously, everything was done manually, with traditional warehouse shelving and manual documentation. "Finding all components for some jobs could take 3–4 hours," says Mr. Sun. "Now, with the MYTower and MYCenter software, the process takes about 10 minutes and gives us 100 percent accuracy."

A NEW LAUNCHPAD FOR GLOBAL EXPANSION

Taken as a whole, Mr. Sun now sees his SMT department as a crucial stepping stone in the group's future strategy, which is focused on diversification and internalization of production to expand its global impact on the market. By increasing their NPI production capabilities to up to four to five per week, they have already accelerated their R&D innovation cycle and improved their competitive edge, recently taking on new orders from mid-volume customers for production runs of 2,000–3,000 boards per month for e-bike applications.

"We've found that our equipment not only reduces trial and error costs, making the transition from R&D to production more flexible and efficient, but it also helps us raise our quality and production standards," says Mr. Sun. "So, while some might see excess capacity as a problem, we couldn't be more excited about using it to explore new business opportunities."

Smart accessories

for the SMT assembly shop floor

Mycronic's Agilis™ feeder systems provide the most intelligent and agile component delivery solution on the market. Whether it's tape, stick or matrix tray feeders, or components of any shape and size, Mycronic's feeders are designed to deliver the utmost in reliability, performance and easy operation.

AGILIS 8 MM TAPE MAGAZINES AND FEEDERS

The ALM8 magazine and the Agilis 8 mm feeder is the backbone of the Agilis feeder system. The 8 mm tape feeder uses a unique cover tape separation method without take-up reels, making it fast and easy to load and unload. The ALM8 magazine can hold up to 16 different 8 mm tapes.

PART NUMBER	DESCRIPTION (typical package)
L-014-1561B	Agilis LM8 magazine with wide bin
L-014-1395	Agilis feeder 8 mm 3.7 green (01005, 0201)
L-014-1320	Agilis feeder 8 mm 4.0 white (0402, 0603)
L-014-1319	Agilis feeder 8 mm 4.7 yellow (0805, 1206, MELF-2012)
L-014-1321	Agilis feeder 8 mm 5.4 red (SOT-23, SOT-143, MELF-3514)
L-014-2119	Agilis feeder 8 mm ADJ 3.7–5.5 kit black

AGILIS 12/16 MM TAPE MAGAZINES AND FEEDERS

The Agilis 12/16 mm feeders use the same unique cover tape separation method without take-up reels as the 8 mm feeders. The ALM1216 magazine can hold up to 8 different 12 or 16 mm tapes.

PART NUMBER	DESCRIPTION
L-014-1562B	Agilis LM12/16 magazine with bin
L-014-1490	Agilis feeder 12, 8.5
L-014-1552	Agilis feeder 12, 7.5–9.5
L-014-1492	Agilis feeder 16, 12.5
L-014-1553	Agilis feeder 16, 11.0–13.0

AGILIS FLEX TAPE MAGAZINES AND FEEDERS

The Agilis Flex magazine offers you the possibility to handle any tape component, from 8 to 152 mm in width, with pocket depths that accommodate even the tallest components. Whatever tape components arrive on your production floor, Agilis Flex is built to handle them. The new Generation 2 design incorporates several design updates that improve reliability, durability and user friendliness.

PART NUMBER	DESCRIPTION
L-014-1933B	Agilis LM Flex magazine with bin
4052911	Agilis feeder 8 Flex Generation 2
4052912	Agilis feeder 12 Flex Generation 2
4052913	Agilis feeder 16 Flex Generation 2
4052914	Agilis feeder 24 Flex Generation 2
4052915	Agilis feeder 32 Flex Generation 2
4052916	Agilis feeder 44 Flex Generation 2
4052917	Agilis feeder 56 Flex Generation 2
4052918	Agilis feeder 72 Flex Generation 2
4052919	Agilis feeder 88 Flex Generation 2
4052920	Agilis feeder 104 Flex Generation 2
4052921	Agilis feeder 120 Flex Generation 2
4052922	Agilis feeder 136 Flex Generation 2
4052923	Agilis feeder 152 Flex Generation 2

IMPROVE AGILIS FLEX RELIABILITY WITH REEL HOLDERS

The reel holder is an accessory that improves the reliability and reduces the risk of stepping errors when using Agilis Flex feeders. The reel holder elevates the reel from the bin floor, and thereby reducing friction when rotating.

PART NUMBER	DESCRIPTION
4013516	Reel holder 8 mm
4011720	Reel holder 12 mm
4011721	Reel holder 16 mm
4011722	Reel holder 24 mm
4011723	Reel holder 32 mm
4011724	Reel holder 44 mm

AGILIS 4 MM FEEDER AND MAGAZINE

The ALM4 magazine and the Agilis 4 mm feeder is the ideal solution for 4 mm tape, which is primarily used for small chip components such as the 01005. The 4 mm tape feeder uses the same unique cover tape separation method as the well-known 8, 12, and 16 mm Agilis feeders, making it fast and easy to load and unload. The ALM4 magazine can hold up to 16 different 4 mm tapes, and is of course hot-swappable.

Technical requirements

- The ALM4 is compatible with MY100/200/300 machines and requires TPSys 5.1 or later.
- The ALM4 requires MCU with CMOT3. Replace MCU if older version. The CMOT3 was released in 2014.

PART NUMBER	DESCRIPTION
4049257	Agilis feeder 4, 2.0
L-014-2170	Agilis LM4 magazine with bin

AGILIS STICK MAGAZINE

The Agilis Stick Magazine (ASM) utilizes a high-precision, short-stroke linear drive with a servo-controlled, horizontal motion to effectively reduce operator assistance and component waste. Because the ASM handles a very wide range of SMT components, you will always be prepared for any job. Removable stick pallets with a built-in pallet ID and barcode system allow you to replenish and pre-load components before they are loaded into the magazine.

PART NUMBER	DESCRIPTION
L-014-1642	Agilis Stick Magazine
L-014-1687	Agilis Stick pallet 10 mm height
L-014-1688	Agilis Stick pallet 10/28 mm height

AGILIS TRAY MAGAZINE

The Agilis Tray Magazine ATM8 offers the possibility to handle up to eight JEDEC trays in a single magazine slot. Pallets are available in a range of different depths, accommodating different tray heights. If the tray height doesn't match any of the pallet heights, it can be handled by adding spacers below the tray.

Technical requirements

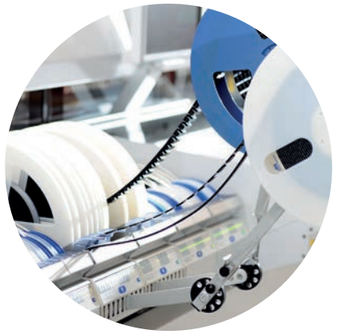
- TPSys 3.3 or later
- MTCB with CMOT5

PART NUMBER	DESCRIPTION
4002733	Agilis Tray Magazine ATM8
4002751	ATM pallet 1/4", 2 pcs
4002757	ATM pallet 1/2"
4002758	ATM pallet 3/4"
4002759	ATM pallet 1"
4002760	ATM pallet 1.7"
4002761	ATM pallet spacer 2 mm
4002762	ATM pallet spacer 5 mm
4002764	ATM pallet spacer 10 mm

REDUCE CHANGEOVER TIMES WITH AGILIS BINS

The Agilis Bin offers a convenient and cost effective way of preparing and storing component reels, with or without feeders, ready for your next changeover. The preloaded bin can be easily dropped into any free magazine, and the feeders are then snapped into place with very little effort.

PART NUMBER	DESCRIPTION
L-014-2146	Agilis Bin LM8 7" wide
L-014-1569C	Agilis Flex Bin 13" for LM1216 and Flex
L-014-2114	Agilis Flex Bin wall 13", 4 pcs



AGILIS LARGE REEL ATTACHMENT

The Agilis Large Reel Attachment (LRA) is used to handle reels that are too large to be placed inside the bin. The LRA can hold up to four reels at the same time, with individual braking force for each side. Compatible with ALM8, ALM1216 and ALM Flex magazines.

PART NUMBER	DESCRIPTION
4014720	Agilis Large Reel attachment

AGILIS FEEDER RACK

A feeder rack for convenient storage of Agilis feeders. The rack can hold 8, 12 and 16 mm Agilis feeders in any combination. Up to 16 feeders (8 mm) can be stored in the rack.

PART NUMBER	DESCRIPTION
L-014-1623	Agilis feeder rack

PAPERLESS GUIDANCE WITH AGILIS SMART BINS AND E-LABELS

The Agilis Smart Bin system provides paperless kitting guidance and changeover instructions, right in front of you. The e-labels show real-time information about material status and kitting progress, where you need it, when you need it. The system improves kitting efficiency by enabling operators to preload components in Agilis Bins for upcoming jobs, without losing track of material location.

Technical requirements

- TPSys 5.2 or later.
- Stand-alone data server.
- MYCenter Material Handling SW.

PART NUMBER	DESCRIPTION
L-010-0900	E-label start kit EU
L-010-0912	E-label start kit US

Simplicity is the ultimate sophistication

Leonardo Da Vinci never wrote code. But this statement, made over 500 years ago, serves as a guiding philosophy for Mycronic Software Engineer Nicolas Guillot and the international team when they are programming. Together they are designing groundbreaking software for tomorrow's zero-defects smart assembly plants.

TEXT: DAVID GRAY **PHOTO:** MYCRONIC

Writing code is like crafting an inspiring poem – it should be simple and beautiful." says Nicolas. "I'm not a poet, but when I see my code coming to life elegantly at a customer manufacturing site and really making a difference, it gives me a great sense of satisfaction.

JOINING AN INTERNATIONAL GROUP

Based outside Grenoble near the French Alps, Nicolas, age 43, veteran programmer of 16 years who joined Vi TECHNOLOGY in 2006 as a consultant and was employed by the company in 2010. The company was acquired by Mycronic in 2017 and over the years, he's had the opportunity to travel quite a lot, meeting customers and colleagues in Europe, the US, China and elsewhere.

DIVERSE, SMART AND INCLUSIVE

"I love the diversity, problem-solving spirit, and braininess of my Mycronic colleagues from around the world," says Nicolas, noting a healthy and inclusive mix of senior people working alongside younger recruits. "The technology here is simply world-class, and you can switch to different projects if you want," he says. "Personally, I've had the opportunity to work on 5-6 large projects from the ground up, which is something that's highly unusual for a programmer."

FLEXIBLE WORK SCHEDULE

On any given day, Nicolas can be found in Teams meetings with product and software developers from the head office in Sweden, coders from the Czech Republic or US colleagues. Or he might be sketching up the shape and geometry of components on whiteboards with colleagues at the Grenoble office. His schedule is busy but flexible and he's usually in the office at least three days a week.

"A GREAT FAMILY SPIRIT"

But when it comes to programming tasks that require focus, he says, these can best be done in a concentrated way at home where disruptions are minimal. To break things up at the office and offer a bit of work-life balance, there's often a lunchtime mountain biking outing, short hike in the Alps or various after-work activities. "We're really like a family here and the spirit is great," he says.

FINDING A CAREER PATH

Nicolas' career path is not uncommon. At an early age, he became interested in a logical-mathematical "way of thinking" and viewed programming with the eye of a philosopher: "Clear programming is a sign of good thinking," he says.

After graduating from top-rated Grenoble INP, he worked at different technical consultancy firms, including Capgemini, before doing work for Vi TECHNOLOGY, and later getting hired full time. His focus was on developing software for state-of-the-art Solder Paste Inspection (SPI) and Automated Optimal Inspection solutions (AOI) – something he's very proud of. "Some of the early interfaces we did are still super modern looking even today," he says.

"A CANDY STORE FOR ENGINEERS"

For Nicolas, the main attraction of Mycronic is the technology itself. By this, he doesn't just mean the software. "I'm talking about everything. Our machines are like advanced robots, involving everything from mechanical engineering to electronics, optics, software, component expertise, and AI. This is a candy store for engineers and sets us apart. To develop the software, you need to understand the hardware – they go hand in hand." Here he notes that Mycronic has worked very hard to upgrade its computer programming languages from a "monolithic" approach to accommodate a more distributed architecture.

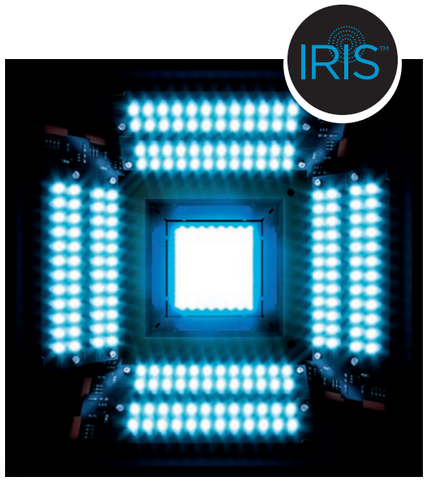
LIKE STREAMING 1,000 NETFLIX FILMS AT ONCE

As an example of cutting-edge technology, he mentions Mycronic's latest SPI system, which requires massive computing capacity and is equipped with a user interface that's as easy to use as a smartphone. "Just imagine... we're talking about a machine capable of processing 50,000 images per second at 20 micron resolution. That's the equivalent of streaming 1,000 4K Netflix films at the same time. The flow of data being taken up by the 3D sensors requires very smart and efficient software due to the complexity."

SOLVING PROBLEMS THAT MAKE A DIFFERENCE

For Nicolas, the best software development starts "upstream" in the technical design and is always rooted in a business context: why are we doing this? We want to solve a customer challenge or need, like boosting throughput times to reduce costs in a recession, or eliminating defects on boards for self-driving vehicles.

That leads him to Mycronic's mission of "bringing electronics to life", which really hit home on a trip to Mexico to solve a production challenge. He and a colleague worked weekend and night shifts to solve a traceability software glitch that allowed an automotive company to handle the recall of thousands of vehicles. "Not only was the customer super happy, but we safeguarded people's lives. Whether it's a car, pacemaker, satellite, or another device, what we do can make a difference."



TEXT: YAN MANISSADJIAN **PHOTO:** MYCRONIC

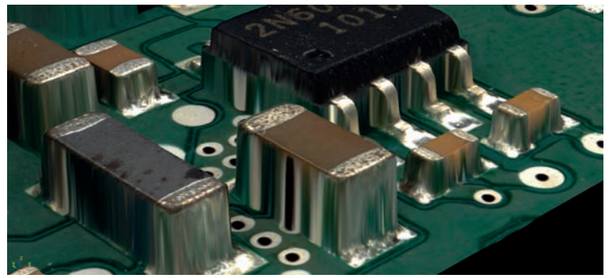
MYPro I51 3D AOI
— when ease of use and high performance go hand in hand

In today's high-paced production environment the best businesses are built to embrace change. To stay competitive, electronic manufacturers need to efficiently manage sudden changes to production schedules, handling varying batch sizes, and new product introductions—consistently pursuing the shortest takt times. Therefore, they have to solve the equation combining flexibility and scalability, with the highest level of user-friendliness.

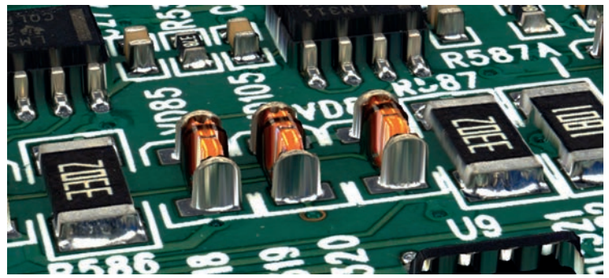
It is with the precise aim of providing a clear and coherent answer to this burning question that Mycronic is launching a major enhancement to its MYPro I series 3D AOI platform. By combining Iris, the latest 3D vision technology, with MYWizard, a unique AI-assisted programming software, the new MYPro I51 AOI offers enhanced inspection performance combined with groundbreaking user-friendliness.

Increasing production throughputs, just-in-time manufacturing with moving schedules, miniaturization and diversification of components, last-minute part-number modifications and rising manufacturing cost—the MYPro I51 is designed to help manufacturers cope with today's daily challenges and tomorrow's uncertainties while ensuring the highest levels of quality and reliability.

Speed and resolution with zero compromises
With the new Iris™ 3D AOI vision technology from Mycronic, it's now possible to achieve the industry's highest resolution 3D image capture at cycle times **up to 30 percent faster** than with previous inspection systems. "To be clear", explains Alexia Vey, Inspection Product Manager at Mycronic, "this is a speed increase of 30 percent for the full inspection cycle, from image acquisition to processing. Considering the system also handles nearly twice as many pixels, this is quite a remarkable performance improvement."



Enhanced review with high resolution and crisp images



Sharp images with all types of material

The next generation in 3D imaging
Key to enabling the Iris technology is a range of best-in-class laser scanners, image sensors, lighting and computing systems. When it comes to resolution, the Iris system includes a new image sensor capable of capturing pixel sizes of 13.7 µm, resulting in an astounding **3.45 µm XY measurement resolution** using sub-pixel technology. As a result, the new imaging technology is able to achieve both wider test coverage and enhanced review images for components as small as **008004/0201M**—all while significantly accelerating processing speed.

Together, these and other enhancements amount to a combination of speed, accuracy and test coverage that is unmatched by any other system on the market.

30 percent faster programming
A major highlight of the MYPro I51 is the MYWizard user interface, developed specifically to guide operators rapidly and efficiently through the programming phase. Utilizing advanced AI-based algorithms, the system automatically identifies a wide range of component characteristics and correlates each with a package type from the library, thus reducing programming times by up to 30 percent, compared with the previous K series 3D AOI.

Thanks to Escape Tracker, a real-time performance optimizer for the system's inspection library (see article on page 4), the MYPro I51 automatically ensures that no new false calls or escapes are introduced while fine-tuning the library to improve FPY.

Faster, sharper, the MYPro I51 is geared to confidently keep pace with the miniaturization trend and to comply with the most demanding line takt times. Smarter, MYWizard enables even the most inexperienced programmers to create highly efficient 3D inspection programs, while minimizing false calls and increasing first-pass yields.

Iris 3D vision technology and MYWizard programming interface are also available on the MYPro I81 model for dual-lane production lines, and on the MYPro I91 model for heavy-duty PCB assembly inspection.

More growth, less pain

— how one Silicon Valley company is accelerating the design-to-manufacturing cycle

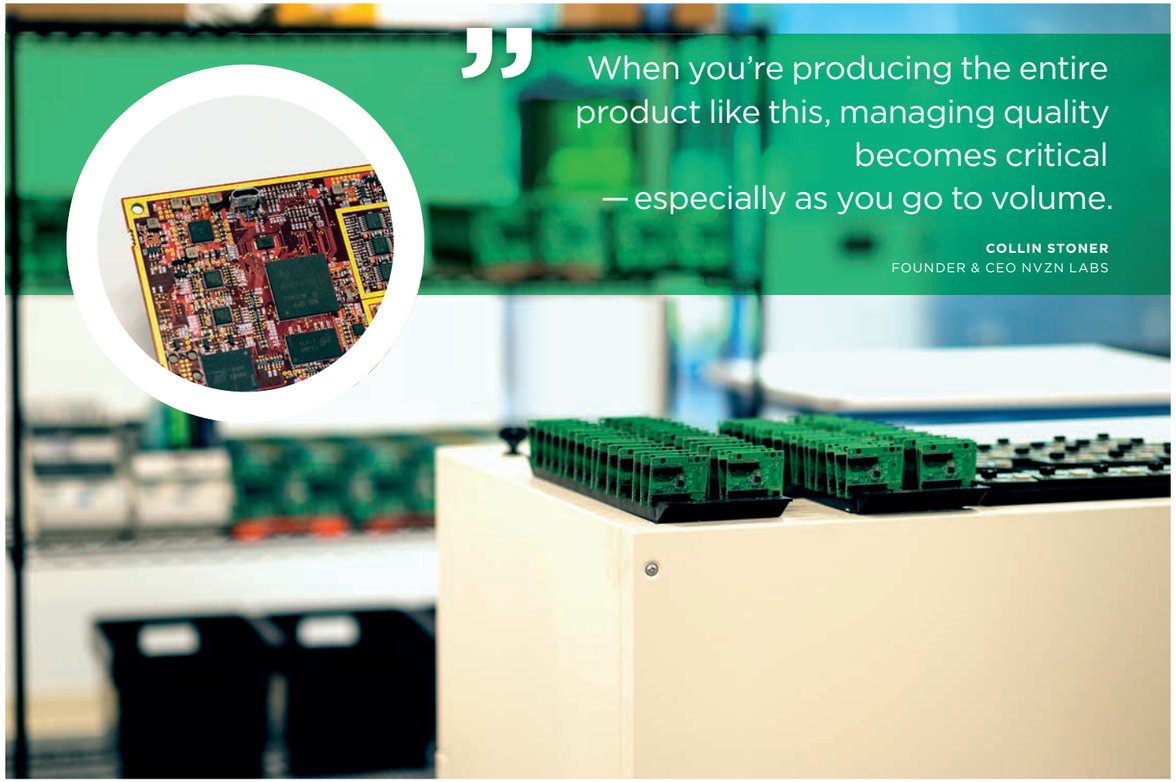
Founded 13 years ago in Silicon Valley as an engineering consulting firm, NVZN Labs has quickly evolved into a full-stack design and manufacturing company, specializing in industrial machines and cutting-edge technologies. As their client base and production volumes have expanded, Mycronic equipment has played a central role in the quality, flexibility and production scalability that the company is able to provide.

TEXT: GRANT BALDRIDGE **PHOTO:** NVZN LABS

A LAUNCHPAD FOR NEW PRODUCTS

If there's one thing that all NVZN Labs' customers have in common, it's an ambition to design, launch and deliver new products at scale. But when it comes to state-of-the-art electronics, this is much easier said than done.

"A good example is a customer that came to us about a year ago," says NVZN Labs founder and CEO Collin Stoner. "They needed a prototype run of 25 pieces, a demo product to sell into their management and strategic partners, and they needed it fast. So, we had to spin out



a functional product in a week and a half, including custom boards and housing. This kind of job would be impossible if you had to order parts, so we're really dedicated to streamlining everything in-house."

INVESTING IN AGILE MANUFACTURING

In its early years, NVZN Labs primarily focused on designing and consulting for clients, providing end-to-end solutions encompassing hardware, circuit boards, layout, programming and test verification. As demand for their services grew rapidly, the company invested in production equipment including advanced CNC machines, 3D printing equipment, a MY600 Jet Printer, MY300 pick-and-place machine and a MYPro I series 3D AOI system.

Today, they create a diverse array of products ranging from medical devices and night vision technologies to industrial instrumentation, aerospace flight computers, automotive manufacturing control systems and scientific instrumentation. And with every new client success comes a higher demand for manufacturing output.

"Nowadays, we're getting more and more customers who are just ready to go into production," explains Collin, "and they might need nine or ten thousand boards. In these cases, we do a lot of the parts of the product, including manufacturing, inspection and test for pretty much any board. Then there's CNC machining, 3D printing and so on for the mechanical enclosures. When you're producing the entire product like this, managing quality becomes critical — especially as you go to volume."

To integrate circuit board manufacturing into their product delivery services, NVZN Labs had evaluated various PCB assembly equipment options. Among the contenders, Mycronic stood out due to its flexibility in high-mix production. "I generally want to have the absolute best equipment for the job," says Collin. "For example, you can get by with a 3-axis CNC machine, but ours is 5-axis because it's just better. The same is true for our PCB assembly equipment."

FLEXIBLE JETTING AND COMPONENT PLACEMENT

Screen printing, although a reliable technique, was deemed to be simply too wasteful when working on projects involving a variety of board quantities. To address this challenge, NVZN Labs adopted the MYPro MY600 Jet Printer, which offered greater flexibility, accuracy and efficiency. The MY600 allowed them to minimize errors and make rapid solder paste adjustments when fine-tuning the designs of prototype boards.

"The Jet Printer has been great for us, since we seem to have a lot of weird parts that can be hard to catch the first time around," says Collin. "So, after the pick-and-place or after testing in reflow, we can go back, adjust the paste deposits and inspect it. We can change the paste settings in about five minutes, and we do it all the time."

Similarly, the choice of a MY300 pick-and-place solution was motivated by a need for fast, flexible changeovers in an environment with complex flows of high-value components. "When it comes to the pick-and-place process," adds Collin, "the Agilis feeders have added enormously to our flexibility. We integrated our ERP system straight into the MY300, so we know where every component is and can easily change jobs at any time."

SCALING UP PROCESS QUALITY

The most recent addition to the company's production line is the MYPro I series 3D AOI inspection system. Having previously relied on manual inspection, production staff began to encounter quality issues as they scaled up production into batch sizes numbering in the thousands. Coplanarity issues, misaligned placements and soldering problems, all of which were difficult to detect manually, resulted in the need for a comprehensive 3D AOI inspection system.

The implementation of the MYPro I series has had a transformative effect on the company's manufacturing quality and efficiency. By detecting defects earlier in the production process, they have achieved a substantial reduction in errors identified during final visual inspections. In addition, the ability to catch defects promptly and make necessary corrections inline has significantly streamlined the production team's daily workflow.

"It's drastically improved both our profitability and product quality," says Collin. "We've reduced errors found by visual inspection by more than 90 percent, and coplanarity errors caught by visual inspection have been completely eliminated."

In terms of cost savings, Collin estimates that the new AOI system has saved several hours per job in manual inspection and post-SMT repair alone. "A typical prototype run for us is 25–50 units of large, complex boards," he explains. "Even with programming time, we save hours on each job over manual inspection and repair after SMT versus immediate inline detection with the AOI and correction for the following boards. With our labor rate, this can be $200–250 per production run of opportunity costs saved, both in direct (manual) inspection time and repairing defects that weren't caught until after SMT is finished, because visual inspection happens too slowly to make inline corrections."

> Even with programming time, we save hours on each job over manual inspection and repair.

EASY PROGRAMMING, BETTER INSPECTION MODELS

As a new user of advanced 3D inspection systems, Collin was especially surprised by how quickly the new solution could be brought online. “We had an operator who was untrained on AOI,” he explains, “but he only needed about a week and a half of training. Now, he can generate programs in about an hour and a half to get us up and running very quickly. The speed of this training cycle was quite a bit faster than expected.”

Even more time has been saved, says Collin, thanks to Escape Tracker, an automated inspection library optimization function designed to reduce false calls with less operator intervention. Escape Tracker is used on every job that NVZN Labs runs through their system, consistently improving the inspection process and fine-tuning the inspection model with every board inspected.

“It not only saves us time sorting through false calls,” says Collin, “but it also gives us better insights into the state of the production process. Sometimes those items are okay and the system can be tuned to accept a different angle or light level. Other times the defect might be subtle, or just starting, and we can adjust our SMT process accordingly to mitigate the issue.”

LEVERAGING THE BENEFITS OF FLEXIBLE PRODUCTION

Measured in business terms alone, the company’s investment in flexible, integrated design and manufacturing is clearly paying dividends. In addition to designing and launching successful products for dozens of Silicon Valley’s most innovative clients, NVZN Labs is on track to achieve its third straight year of double-digit growth.

But in an unpredictable world, the benefits of flexibility have also emerged in other, more surprising ways. “Just look at the supply chain disruptions over the past few years,” reflects Collin. “If you had to rely on a certain component or a certain contract manufacturer, you could easily be waiting months to get your product out the door! Instead, we’ve focused on our in-house capabilities — simplifying designs, using interchangeable families of components and maintaining multiple footprints for added flexibility. So whether it’s a new prototype or a full manufacturing run, we’ve got the engineering capabilities to respond on-the-fly, and our Mycronic equipment has been a big part of this strategy.” ●

TEXT: YAN MANISSADJIAN **PHOTO:** MYCRONIC

MYCenter Analysis™
— now including enhanced component analytics

Adopted by a growing portion of Mycronic pick-and-place equipment users, MYCenter Analysis keeps innovating with the addition of component analytics.

The users are enjoying the added-value of this software tool in making the pick-and-place process more efficient. Electronics manufacturers handling small batches, diversified products and repeat orders appreciate the power of real-time production data analysis, offering them an extremely effective drill-down tool for root cause analysis and process improvement.

In the latest release , this logic has been taken a step further by applying it to the analysis of component rejects.

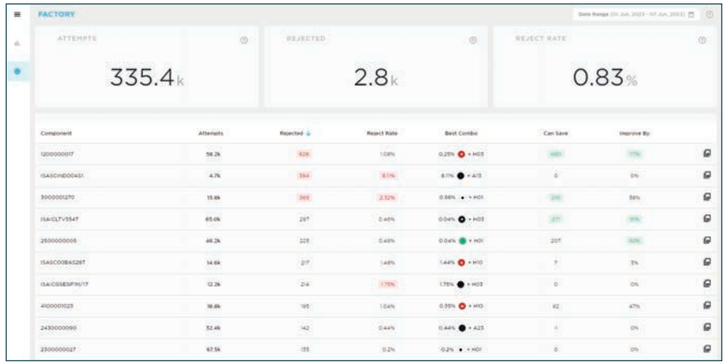
Cutting rejects with component analytics
Component analytics provides highly detailed information about the placement performance of each component reference and is highly effective in providing actionable information to help reduce the quantity of rejects, regardless of the components involved.

By collecting and processing placement data directly from production, it clearly shows which components cause the most rejects in terms of quantities, and which have the highest proportion of rejects. By revealing such information, this dashboard is a real eye-opener in itself to monitor pick-and-place performance, but its added value goes even further.

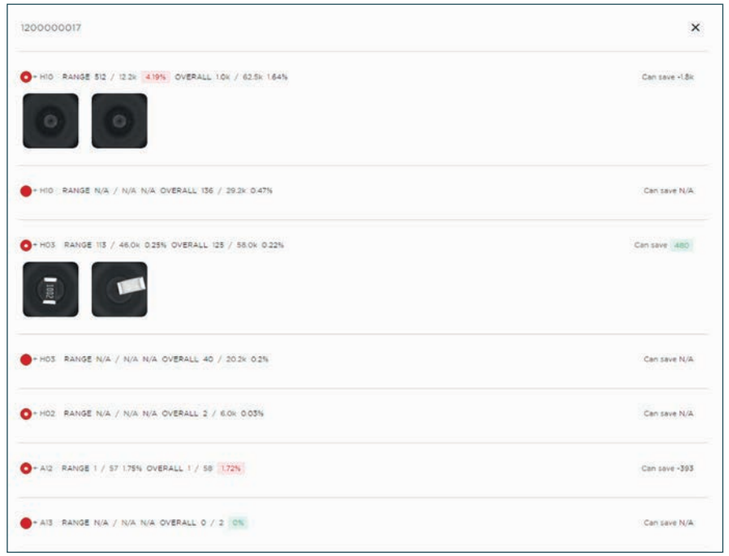
Beyond KPIs, a concrete guidance
Since the pick-and-place system knows, each time a component is placed, which combination of feeder and nozzle has been used, and what the rate of successful placement is, MYCenter Analysis has the ability to inform the user which combination of feeder and nozzle is the most efficient to use for each component reference. It is even able to estimate the quantity of rejected components that could have been placed, and thus saved, if that combination had been used.

Based on this concrete information, the users can then update MYCenter, Mycronic's application used to guide and optimize the kitting operations.

Drilling down
Following the guiding principle of MYCenter Analysis, component analytics helps to understand the root cause of rejects and mispicks, by providing images of nozzles recorded during production. The use of these images helps to understand what disrupted the picking phase, and how to act to resolve the problem. Component analytics is a powerful tool to improve the pick-and-place efficiency and the material consumption rate. Intelligent use of production data provides guidance to optimize the overall equipment performance and improves line profitability. In times when component supply is disrupted, and unit prices are more volatile, component analytics is an invaluable aid in optimizing the use of available components when every unit counts.



New component analysis dashboard: components are displayed by number of rejects or by reject rate.



Photos of nozzles reveal the source of the problem.

Change is coming.
Is your factory prepared?

More process data. Faster innovation cycles. Smarter factory systems. As the pace of change accelerates, we're convinced that tomorrow's PCB assembly environment should be a simpler place. A place where no build schedule is too complex. No defect goes unprevented. And no production is left standing still. From naked board to coated board — and everything in between.

Bring us your bottlenecks, your quality issues and your integration challenges. And put our process experts to the test. Together, we can build the future of electronics assembly.

MYCRONIC