The Mycronic Solution
Creating tomorrow's intelligent factory.

Take your productivity to new heights

The SMT industry has never been more complex. With more NPIs, more product variants and more changeovers than ever before. The result is record low productivity for many operations – often as little as 20%. Our answer to the industry's need for higher productivity is Mycronic 4.0 - a complete, agile manufacturing solution that masters the complexity of modern electronics production.

Mycronic 4.0

TOMORROW'S INTELLIGENT FACTORY, TODAY
From fast-changing production schedules to increasing numbers of jobs, today's SMT manufacturers face challenges at every turn. On top of this, customers demand instant response, even as production levels peak. To seize new opportunities in this competitive environment, you need a solution that's not only fast, but agile. Our answer to this need is Mycronic 4.0 – an intelligent factory enabling full visibility planning, complete material tracking, efficient changeovers, automated replenishment and intelligent storage solutions.

From our one-of-a-kind jet printing technology, to our award-winning intelligent feeder systems, we've proven time and time again that productivity is

about more than just speed. It's about using smarter material handling and information management to eliminate the bottlenecks of the future. By combining deeper knowledge of your production challenges with the integrated solutions needed to solve them, we make it possible to double or triple your utilization without adding additional staff.

So why wait for Industry 4.0 or Smart Factory to achieve the factory-wide productivity of tomorrow? As a business partner to many of the world's most advanced electronics manufacturers, we've been systematically solving these challenges for more than 30 years. With Mycronic 4.0, we're bringing together our unmatched experience and solutions to transform your business, and our industry, today.

Key benefits

- Full visibility planning
- Complete material tracking
- Efficient changeovers
- Automated replenishment
- Intelligent storage solutions

A solution for every need

Smaller devices. Smarter interfaces. An endless array of product variants. In a world powered by fast-changing technologies, Mycronic's electronics assembly solutions make manufacturers more flexible than ever before. Our passion is to create the cutting-edge manufacturing solutions that turn countless innovations into reality every day.

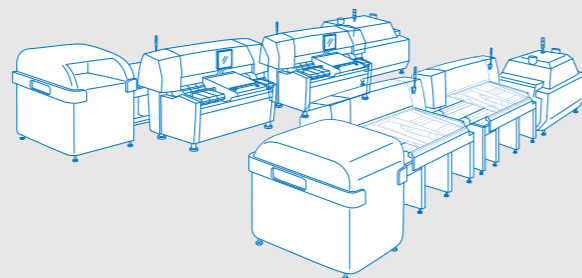## HIGH CAPACITY AND HIGH MIX – WITHOUT COMPROMISE

Combine two MY200HX/MY200DX lines in a single workcell, and you have a full 180,000 cph placement capacity at your control. For continuous high-speed production this means a proactive, fully automated material flow, run by fewer operators. Better yet, Mycronic makes it easy to transition from high volume to one-off spare parts or prototypes, and back to larger batches again. No re-programming,

no re-tooling and no reconfiguring of vision camera parameters. Simply a seamless workflow from NPI to volume production.

And with all of this in a single vendor, it's also possible to reduce training and maintenance costs while allowing for higher degrees of freedom in staffing and planning decisions.

KEY BENEFITS

- 180,000 cph within one workcell
- On-the-fly changeovers
- Near-production storage and automated replenishment
- On-the-fly verification of resistors, capacitors, diodes and transistors
- Full traceability

High capacity workcell. Two MY200HX, DX lines including the SMD Tower for automated near-production buffer storage.

FULLY AUTOMATED SHORT SERIES PRODUCTION

As batch sizes decrease, uptime doesn't have to suffer. By combining software-driven solder paste application with high feeder capacity and the unique FlowLine concept, continuous operation is both easy and economical – down to small batch sizes, or even single boards.
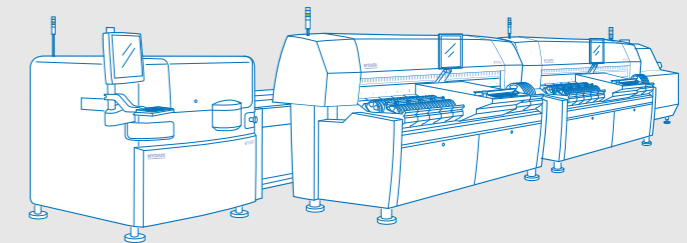
Mycronic's planning software makes it possible to analyze hundreds of work orders and organize them into family kits, perfectly sized to ensure hours of

non-stop production. With the help of proactive replenishment notifications, you'll finally be able to close the efficiency gap between high-volume and short-series production.

With changeovers this easy, any job is possible. Batch sizes can be optimized for downstream operations including inspection, testing and box build. And instead of building stock inventory, you can build-to-order, thereby reducing working capital while removing the risk of old-revision products.

KEY BENEFITS

- Zero changeover time with no operator intervention
- Stencil-free, software-driven printing
- Feeder capacity enough for family kitting and on-the-fly changeovers
- On-the-fly verification of resistors, capacitors, diodes and transistors

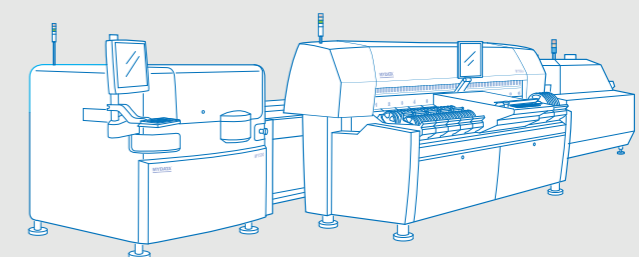Fully automated short series production. MY600 in-line with a MY200SX-14 Synergy line.

THE ALL-IN-ONE SOLUTION

Combine a MY600 Jet Printer with a MY200SX pick-and-place machine, and you'll never have to say no to another customer. Instead, you'll be able to handle any package and place it on nearly any surface – for the entire lifespan of your machines. Although technologies may change, as a start-up contract manufacturer you'll always be able to adapt.

Whether your components arrive in short tape strips, matrix trays or just a plastic bag, the flexible control software of the MY200 turns nearly anything into a component feeder. And with the stencil-free printing of the MY600, even last-second customer changes can be done on the spot, whatever technology this is a pair of machines that grows with your business.

KEY BENEFITS

- Full component range in one machine
- Fastest changeovers in the industry
- Capable of pin-in-paste, PoP, QFN, board cavities and more
- Stencil-free software-driven printing
- On-the-spot board revisions
- Handle short tape strips and non-standard carriers

All-in-one solution. MY600 in-line with a MY200SX.
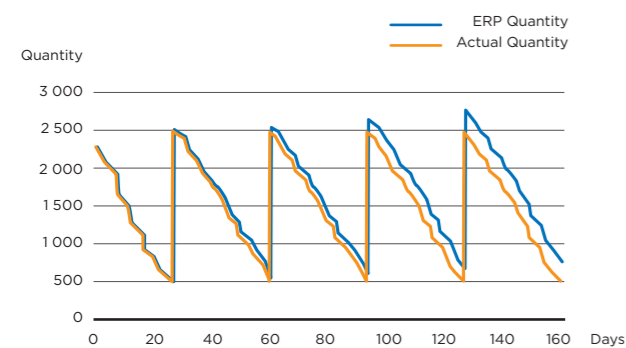
Material handling made easy

When it comes to component tracking and stock accuracy, Mycronic solutions offer the industry's most precise and error-free systems. From barcode scanning with e-label instructions, to compact, automated storage units, material handling has never been this simple and error-free.

ACCURATE INVENTORY MANAGEMENT
Mycronic's material handling systems ensure fast, accurate feeder loading and give you unparalleled stock accuracy. With just two barcode scans you can load a reel, stick or tray into a magazine and all part information is automatically transferred to the machine. By tracking the quantity on each individual carrier, the system eliminates the quantity divergence associated with traditional stock systems that count only nominal consumption. In many cases the yearly stock take can be completely eliminated.

AUTOMATIC REPLENISHMENT
Mycronic's MYCenter PRM (Proactive Replenishment Monitor) both improves uptime and ensures correct material delivery to your SMT assembly line. Together with the SMD Tower storage solution, the replenishment process becomes completely automated. Using a robotic arm to deliver component reels to operators, this solution almost completely eliminates the risk of incorrect material delivery.
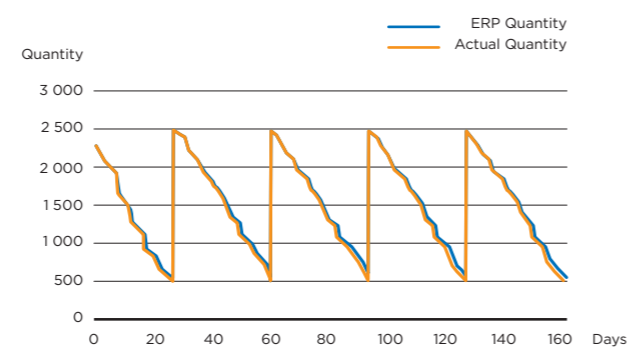
FASTER CHANGEOVERS
Using barcodes to track components, MYCenter reduces the risk of errors and speeds up setup and changeover times. It keeps track of quantity, batch code, current location and floor life – for each and every component. And the new Agilis Smart Bin system gives you intuitive paperless kitting guidance - right in front of you.

AUTOMATED MSD-COMPLIANT STORAGE
The SMD Tower is a highly flexible, automated and expandable buffer storage unit designed for near-production deployment. It ensures that the correct component remains stored in the correct place and in a controlled atmosphere, ready for a quick and smooth changeover of your SMT line.

Picture 1. Stock accuracy when counting nominal consumption + average waste.

Picture 2. Stock accuracy with MYCenter.

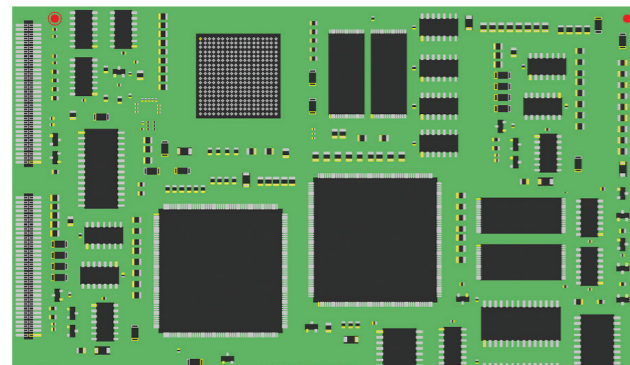| Task	Mycronic machine with Agilis feeders, MYCenter and SMD Tower	Traditional NC-controlled machine	Time savings
Pick material from stock	8 min	35 min	27 min
Load feeders, insert in correct position	22 min	70 min	48 min
Verify feederbank prior to first run	0 min	18 min	18 min
Unload feeders	12 min	25 min	13 min
Return material to stock	9 min	18 min	9 min
			Total 115 min*

* Estimates based on total time savings when a traditional NC-controlled placement machine served by a manual warehouse is replaced by a Mycronic machine combined with an integrated material handling system consisting of Agilis feeders, SMD Tower and MYCenter software.

NO MORE MIX-UPS

Regardless of whether you request a single reel or tray, or automatically process a complete kitting list, the system records every movement and keeps track of all stored reels and component quantities. A unique identification code ensures that the correct article is always provided or stored, making mix-ups impossible. Return-to-storage is just as quick and convenient.

COMPACT NEAR-PRODUCTION STORAGE

The SMD Tower closes a gap in flexible SMD manu-facturing, where up until now reels have had to be hunted for, one at a time, from space consuming and inflexible storage systems. The SMD Tower needs just one square meter of floor space to store up to 546 reels and can be integrated into existing material handling systems.
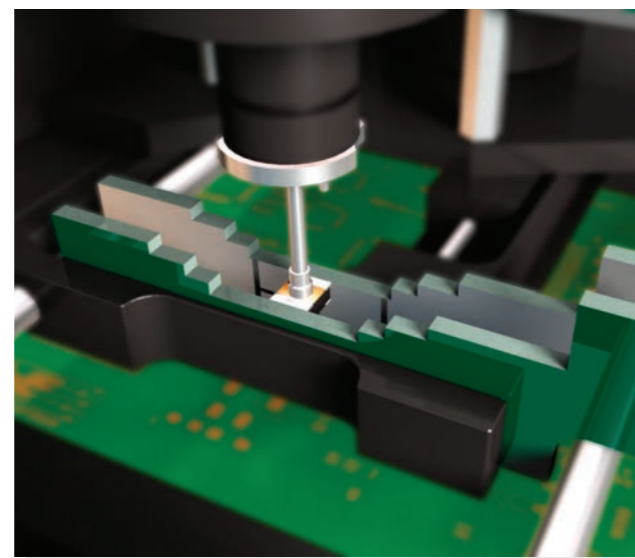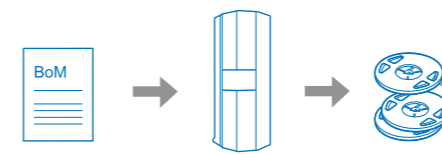
SAY GOODBYE TO BOTTLENECKS

Because they're tailored for high-mix production, Mycronic solutions offer hours of time savings with every changeover. At the end of the day, this means more jobs delivered, better responsiveness and happier customers.

Reference board for changeover study:
• Industrial electronics
• 400 mount positions
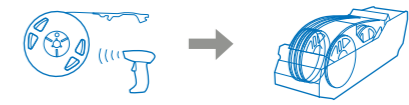• 68 unique articles

Reduce rework by verifying the electrical properties of resistors, capacitors, diodes and transistors on-the-fly. For active polarized components, the orientation is also checked.
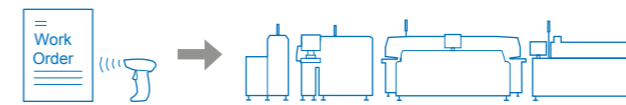
Speed up changeovers in five simple steps

STEP 1 – PLANNING

Optimize your job sequence and changeover strategy for incoming orders. The resulting Bill of Materials is then sent directly to the SMD Tower for automatic delivery in correct kitting order.
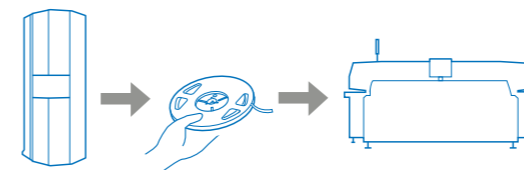
STEP 2 – KITTING

Load the feeders without the need for manual data entry – just two bar code scans are required. Material outside the SMD Tower is quickly located through a tracking system based on location labels.
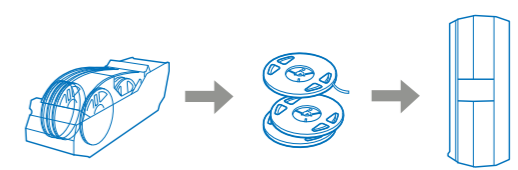
STEP 3 – ASSEMBLY

With the FlowLine system, machine programs are selected automatically, as are conveyor width and loader/unloader settings. As soon as the line is up and running, you're free to start kitting for the next job.

STEP 4 – REPLENISHMENT

Components that are about to run out are displayed well in advance by the PRM software. Simply click the "provide" button, and the SMD Tower will imme-diately deliver a new reel.

STEP 5 – DEKITTING

Dekitting a Mycronic line couldn't be simpler. Just unload the feeders and place the reels back into any of your SMD Towers. Since each reel has its own unique identifier, mix-ups are virtually impossible.
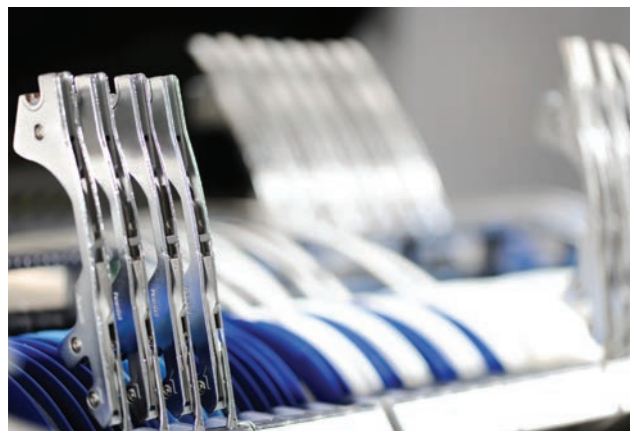
Award-winning intelligent feeder systems

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. All to give you the most intelligent and agile component delivery solution on the market.

While the word "intelligent" has become somewhat of a buzzword today, we at Mycronic call our feeders intelligent because all our magazines and feeders have their own unique identity. This enables the machine software, TPSys, to automatically recognize the presence, absence and location of components. As a result, you never have to program pick positions and can easily replenish feeders while the machine is mounting. If a feeder runs out of components, production doesn't stop. Instead, the machine alerts the operator, re-optimizes and continues mounting other components.

FULLY TRACEABLE WITH SOFTWARE INTEGRATION

With a barcode reader, component reels can be easily connected to a specific feeder, ensuring fast handling and traceability. The system provides easy tracking of component and inventory data, such as batch ID numbers and quantity levels. The machine also detects each feeder's unique identity and location, making it easy to rearrange and place them in any position – even during operation.

The Agilis Stick Magazine feeds the components smoothly into the pick-up position using a high precision, servo-controlled linear movement.

QUICK CHANGEOVERS

Because barcode scanning eliminates manual entry during loading and unloading, setups and changeovers are faster than ever. Whatever your production size, job setups and changeovers are fast and simple with Mycronic's intelligent feeder systems. An Agilis tape feeder, for instance, can be loaded in less than ten seconds. And all our feeder solutions enable multiple changes at once, thus reducing loading and unloading time to a minimum – regardless of whether you're using tapes, sticks or trays.

POWERFUL, PRECISE STICK FEEDERS

With the Agilis Stick Magazine (ASM), all the accuracy, speed and flexibility of our award-winning Agilis feeder system is at your control. Unlike traditional stick feeders that rapidly vibrate up and down to feed components, the ASM utilizes a high-precision linear drive with servo-controlled, horizontal motion. The result is a feeding process that's not only more reliable, but also saves time and money by significantly reducing operator assistance and component waste.
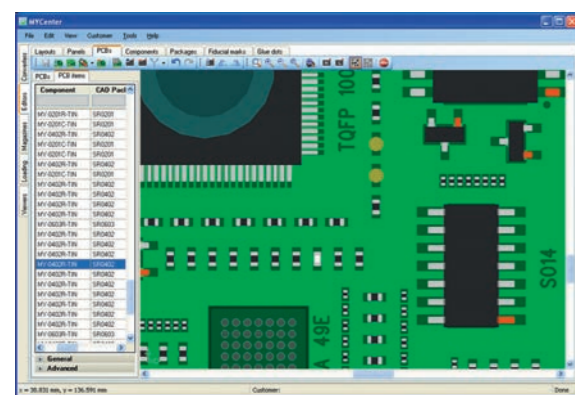
COMPONENT AND INVENTORY TRACKING

With award-winning tape feeders like Agilis, you can cut loading and unloading times to a fraction of those of conventional feeders. Our entire feeder system is so flexible that you can mix and match single feeders, or replace all your feeders at once. It's up to you. Whichever you choose, you can count on intelligent functions that continually ensure quality and enhance productivity.

Smarter software for better business

As the SMT production environment becomes more complex and fast-paced, comprehensive software solutions have quickly become a necessity. After all, improved utilization, efficiency and customer responsiveness all depend on a single set of reliable data. For these reasons, Mycronic is proud to offer the richest software suite in the industry, with integrated applications covering the entire chain of SMT assembly.

Our machine operating software includes smart features such as early low-feeder warning, package autoteach and power failure recovery.

ERROR-FREE DATA PREPARATION

Within minutes, Mycronic's MYCenter software converts Gerber, ASCII centroid and Bill-of-Materials information into ready-to-run machine programs. Once imported, a graphic rendering of the PCB, overlaying a Gerber background, is checked for errors and can be edited as required. Any changes to the program will generate immediate visual feedback. MYCenter's intuitive "what you see is what you get" interface makes it easy to add new shapes and component handling rules to the machine library.

A true "what you see is what you get" interface makes it easy to program new boards.

HANDLING OF ALTERNATIVE COMPONENT

Our software fully supports Bill-of-Materials that include alternative components for a single mount position. Each alternative can be given a strict priority and an expiration date. Once defined, the pick-and-place machine will automatically mount the correct alternative part, as specified and approved by the production engineer.

STORE DATA SAFELY FOR DECADES

MYTrace is a Windows-based traceability software, developed for secure, long-term storage of traceability data, and at the same time making the data available for easy searching and reporting. Information about each component placement is safely stored, and a web-based search tool makes it possible to identify all PCBs that are affected by factors such as faulty component batches.

EXTRACT TRACEABILITY DATA IN SECONDS

This fully automatic system allows electronics manufacturers to quickly and easily trace mounted components on printed circuit boards, saving both time and resources. MYTrace is future-proof and modular, and stores data in an application-independent format that does not rely on the existence of any particular database technology. This makes this traceability software unique – it gives the customer an unprecedented and unparalleled level of data security.
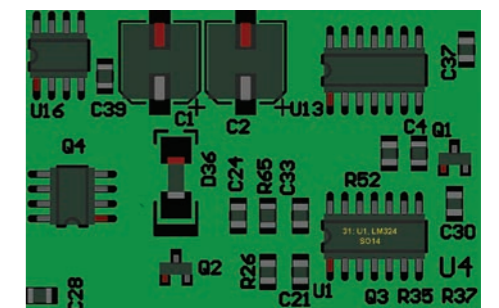
EFFICIENT HANDLING OF ANY BATCH SIZE

Our advanced software solutions let you easily perform job scheduling, feeder optimization and line balancing for your entire facility. You can prioritize minimal changeover time, maximum throughput, or a balance between the two as the software quickly calculates and predicts the assembly time, kitting and changeover procedures. By selecting the best changeover strategy based on part commonality and batch size, the MYPlan software can help to increase actual throughput by up to 30%, all while providing full visibility of material status. Never again will you start a job that can't be completed due to missing components.

PAPERLESS GUIDANCE AND PERFORMANCE TRACKING

After optimization, MYPlan generates a comprehensive set of kitting instructions that provide operators with simple, step-by-step tasks to keep production running efficiently. You can also send the result electronically to the SMD Tower for automatic component delivery and paperless guidance. Performance tracking is easy thanks to TPSys' comprehensive reporting tools. You can generate customized reports on machine speed, production runs, error identification and utilization. View data from the factory floor during production, integrate it with your factory-wide tracking system or export to a spreadsheet program for further processing.

The gerber background functionality makes it easy to verify component rotation and package definition.
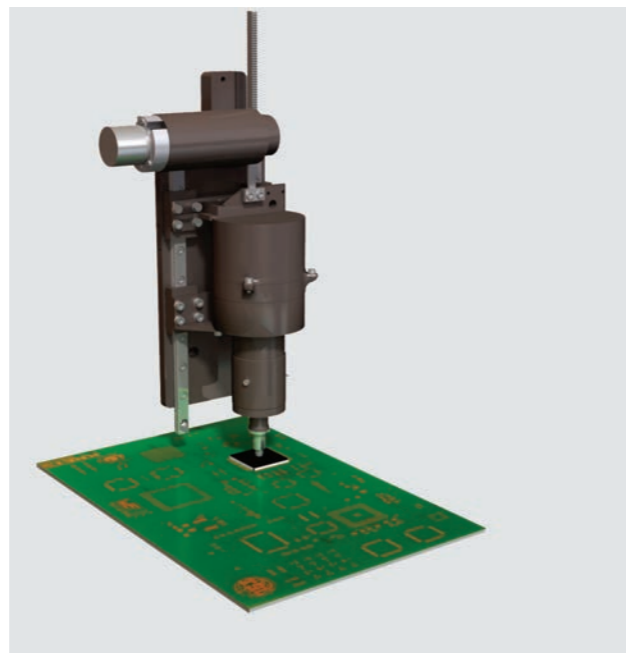
Handle any job
– in record time

In an average day, you may be expected to mount everything from 01005s and flip chips to large connectors and complex BGAs. Naturally, the greater the variety of components your machine can place, the more you can use it.
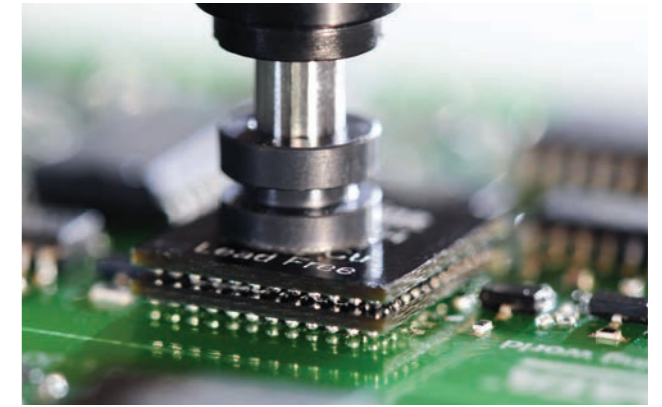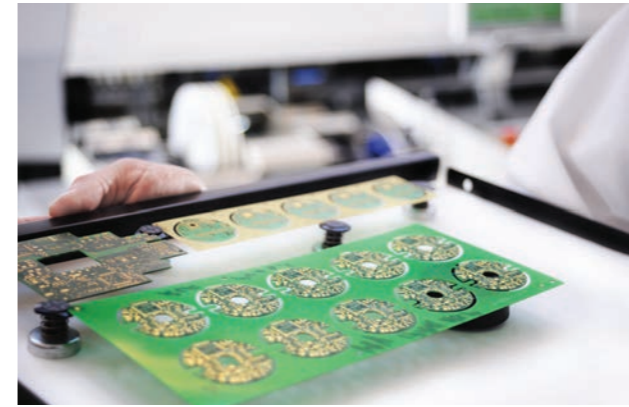
MOUNT ANY COMPONENT ON ANY BOARD

When it comes to component handling, Mycronic machines can take on everything from 01005, flip chips and CSPs, to large QFPs and BGAs. Even tall, odd-shaped and through-hole components can be mounted with ease. Since older models can be upgraded with the latest vision system and software, one Mycronic machine can handle the components of today and tomorrow. When all your placement needs can be handled by one system, your staff only has to learn how to operate one type of machine. Plus, when feeders represent a large part of your equipment investment, it's much more economical to have a unified, modular feeder system that enables you to share feeders among multiple machines.

HIGH ACCURACY

When it comes to placing fine-pitch components, our Midas mounthead is designed for ultra-sharp precision. It's linked to a number of sensors to ensure that complex components like flip chips are placed with a great deal of sensitivity and accuracy. With its z-axis resolution of two micrometers, it works together with our Intelligent Surface Impact Control (ISIC) function to ensure that even the most delicate of components are handled with the correct mount force. This sophisticated servo system for z-axis movement prevents high-impact force and insufficient mounting pressure – even on warped boards. ISIC also helps avoid microcracks on sensitive components.

Our Intelligent Surface Impact Control (ISIC) feature handles even the most delicate components with complete safety.
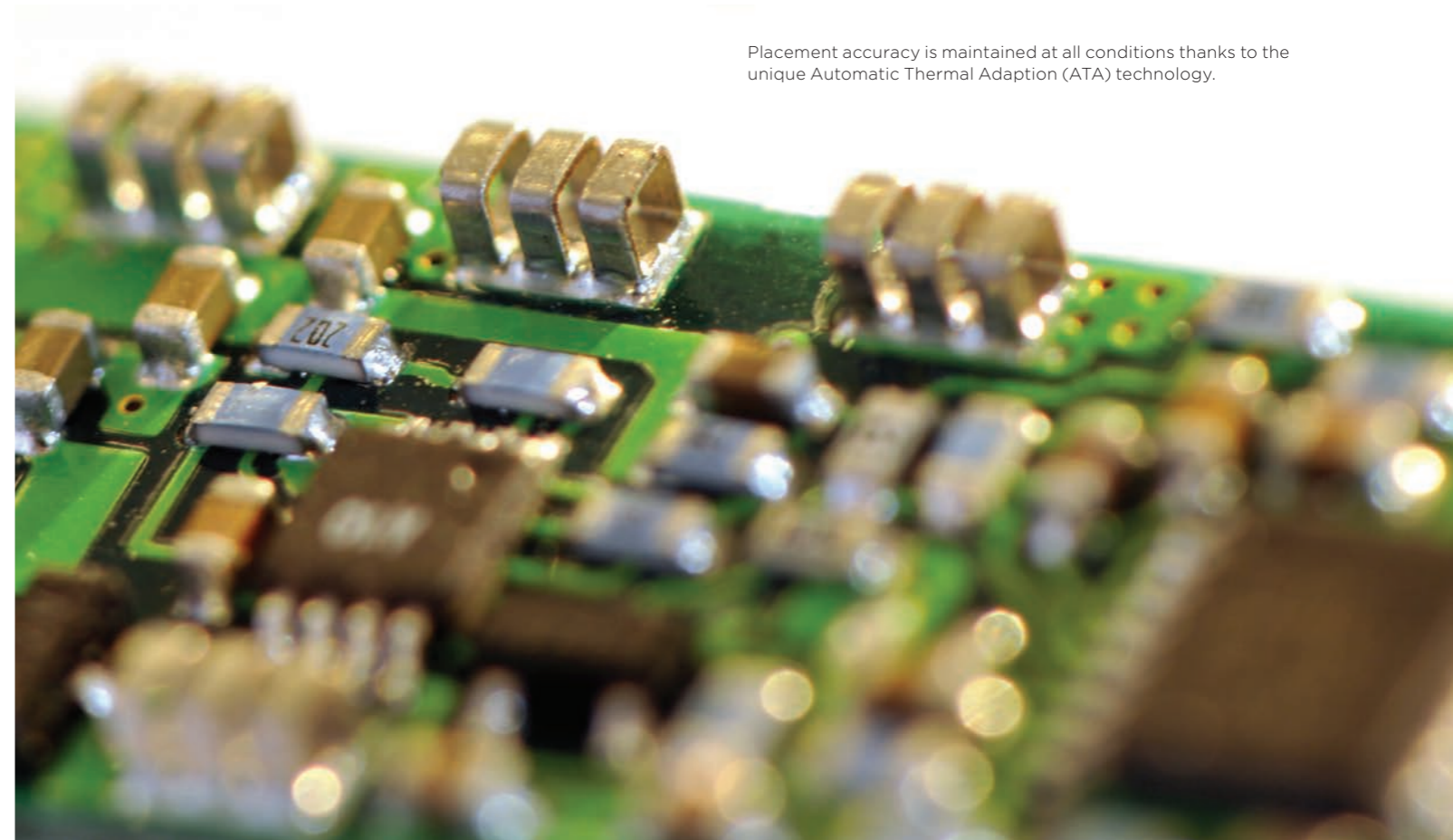
BETTER LIGHTING, HIGH RESOLUTION

When it comes to new packaging technologies, superior lighting is a key aspect of our vision systems. By using a programmable lighting module, where light can be adjusted to front, side or ambient lighting – depending on the package's type and material – our machines can handle virtually all new packages. And with the Autoteach functionality, optimal light settings adjust automatically.

HANDLE A GREATER MIX OF BOARDS

Increasing demands in terms of board size and number of layers require a machine that can handle boards that are large and small, thick and thin. That's why our machines are designed to handle a greater board mix than our competitors. We can take on boards as small as 70 x 50 mm (2.7″ x 2.0″), or as large as 914 x 609 mm (36″ x 24″), as thick as 12.5 mm as well as odd-shaped boards. And with ISIC (Intelligent Surface Impact Control), even placement on thin panels and warped boards is not a problem.

Placement accuracy is maintained at all conditions thanks to the unique Automatic Thermal Adaption (ATA) technology.

MY600
The ultimate in agile production

No more waiting for stencils. With a software-driven solution, you can print a job in minutes instead of days.

Waiting for stencils is a thing of the past. With jet printing, it's possible to prepare jobs in minutes instead of days. For customers handling two or three setups a day and 50 or more new stencils every year, it's an investment that pays for itself even more quickly. But improved productivity is only part of the story of the MY600. Thanks to perfect solder joints and less rework, you can also rely on more satisfied customers.
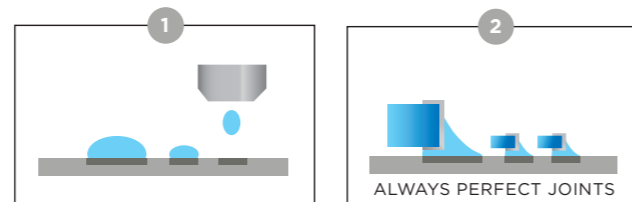
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Completely software-driven, the MY600 Jet Printer can easily apply precisely controlled solder paste volumes or SMA onto complex boards for perfect solder joints, every time. It offers ideal results for QFNs, pin-in-paste, package-on-package and other new applications such as jetting into board cavities. And because the limitations and trade-offs of stencil printing are eliminated, you're always in ultimate control of each solder application.

Now used in more than 35 countries worldwide, the MY600 Jet Printer is quickly changing the competitive landscape of the electronics industry.

PRINT A JOB IN MINUTES
At the heart of the jet printing system is a flexible software solution that streamlines SMT production. Every job is prepared offline, thus eliminating interruptions in ongoing production. Using CAD or Gerber data, you can prepare and print a new job in minutes, making the MY600 the most flexible and unique solution in the industry.

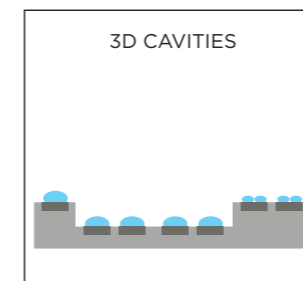With jet printing, the paste volume and shape are set individually for every solder joint.
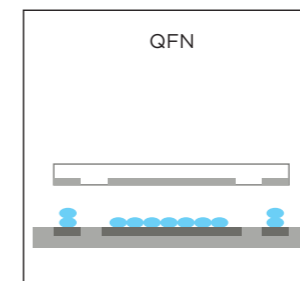
STOP WAITING FOR STENCILS
Because it eliminates the need for stencils altogether, jet printing represents a growing next-generation technology – and new way of doing business. Instead of waiting for stencils to arrive, you can focus on incoming customer orders, changes and revisions, with faster turnovers than ever before. Rather than wasting valuable time cleaning, storing, retrieving and ordering stencils, you can program and optimize each job without interrupting your production line. Put simply, it lets you take a customer's order in the morning and deliver finished boards in the afternoon.
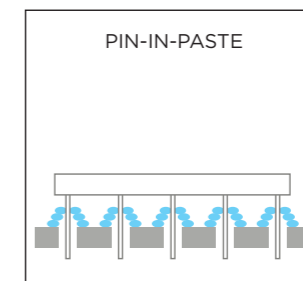
ACHIEVE PERFECT SOLDER JOINTS
When it comes to solder joints, the limits of stencils are more than apparent: larger components demand thick stencils, small components need thin stencils, and the result is a less-than-ideal compromise for almost every component. And to further complicate matters, all of these components must be mounted on increasingly dense boards, making high-precision joints more crucial than ever. With a MY600 Jet Printer, there's no need to compromise on quality. As Klaus Appel, owner of Appel-Elektronik GmbH in Germany, explains: "Our latest product carries 69 components on a square centimeter. Jet printing allow the kind of paste control that makes this possible."
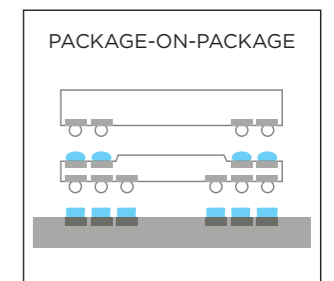

You can jet paste at different board levels or into cavities.

Floating QFNs are eliminated thanks to jet printing.

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

Jet printing is ideal for package-on-package (PoP).

Mycronic Support and Service
Always a leap ahead

At Mycronic, we don't just promise the most agile SMT solution on the market – we have a highly experienced support team to back it up. Whether you're looking for ways to increase productivity or to customize your machine for a specific component or board type, we're always available to answer to your needs. And thanks to our local and global support networks, we're on call to assist you around the clock. After all, your ability to respond to customer demands is about more than just owning the optimal SMT solution – you also need to make the most of it, every day.

● Mycronic locations ● Market presence

Keeping in close contact with your business is essential to maintaining the trust you've placed in Mycronic. That's why we're located near you.

UPGRADES AND CUSTOMIZATIONS
Our aim is to provide you with an investment that lasts. The top priority within our R&D division is to ensure the upgradeability and compatibility of all our software, feeder and vision systems. It's all based on a modular platform design, meaning improvements can be made quickly, easily and flexibly. Whenever possible, this means that upgrades and customizations are done via software, meaning you can add new features with minimal downtime.

CUSTOMER TRAINING
Because all Mycronic solutions operate on a single, intelligent platform, our operator training courses are highly efficient and adaptable. Since user needs vary widely, our education program can be individually tailored to address your operation's specific manufacturing situations. Participants receive complete operator, programming and maintenance training.

TECHNICAL SUPPORT, LIVE OR ONLINE
Mycronic's support staff is well versed in machine parameters and other concerns about component placement. Whether service is provided over the phone, online, at one of our worldwide Application Centers or at a Mycronic agent or distributor, you'll receive prompt and useful advice from highly trained service engineers. To ensure the most knowledgeable service possible, each of our engineers is equipped with a full database of information regarding your machine's configuration, history and previous queries.

Over the years, we've designed customized nozzles for everything from magnetic components to dip switches, sockets, coils, springs and connectors.

Mycronic service is actively here to support you – on the phone, via the internet or in person.

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