A high-tech future down under

Building a smarter platform for innovation in Australia

TEXT: GRANT BALDRIDGE **PHOTO:** ELEXON ELECTRONICS

At its headquarters in a high-tech industry hub in Brisbane, Australia, Elexon Electronics is investing in the future of advanced local manufacturing. For CEO Frank Faller, this means finding new solutions to turn ideas into products faster, smarter and with very high quality.

Made in Queensland

Made in Queensland supports small to medium manufacturers to increase international competitiveness, productivity and innovation via the adoption of new technologies.

To date, through Rounds 1 and 2, the MiQ program has supported 75 advanced manufacturing projects across the State, generating 930 new jobs over the next five years and approximately AU$92 million in private sector investment.

Building some of the most challenging electronic products in Australia

Elexon has engineered and manufactured a diverse array of sophisticated products since the company's founding in 2006. Together with its sister companies, it has carved out successful niches in advanced monitoring systems for mines, water quality instrumentation and devices for monitoring the ultrasonic echolocation calls of bats, along with a wide range of products developed for direct customers.

"We're a high-mix, low- to mid-volume company with around a hundred active products", says Frank. "We strive to be the best manufacturer for our sister companies, and for other businesses around the world."

Continuous improvement

In-house engineering and manufacturing have long been a key competitive advantage for Elexon. With a team of inhouse design engineers, each new product is the result of a tight feedback loop geared toward continuous improvement. This also ensures faster prototype turnaround and faster time-to-market than with alternative offshore production strategies.

To keep business thriving in Queensland, Elexon needs its equipment to remain at the leading edge. "As part of our ambitious growth plan, we decided to invest heavily in the latest technologies from Mycronic," Frank explains. "To double our output and reduce our transition to manufacturing time and costs by 30 percent — all of this requires state-of-the-art intelligent factory solutions."

Frank and his team greatly appreciate the funding assistance from the Queensland Government through the Made in Queensland (MiQ) grant program that has allowed them to buy some of the best equipment available in the world: a MY700 jet printer with two MY300 pick-and-place machines, SMD Tower storage solutions, a vapor phase vacuum reflow oven, X-ray inspection system and a set of highly automated conveyors as part of an integrated Mycronic 4.0 solution.

A major leap forward

Remarkably, most of the company's business goals have been achieved after fewer than six months of the new equipment being in operation. "One of our primary goals was to double our output by the end of 2019, and we've achieved this," says Frank. "And in the last three months our delivery has been perfect, with 100 percent of our boards delivered in full and on time. The key to achieving this productivity leap was to reduce machine downtime by 60 percent by using MYPlan's optimization tools and smart setup solutions, combined with the increased feeder capacity on the machines and the easy-to-use Agilis feeders."

Perfecting quality management

Elexon's management team was especially keen on ensuring that the new line enabled the highest standards in quality management. "My background is from Siemens and Bosch," says Frank, "and our managing director is a former Boeing Chief Engineer, so we're very familiar with quality management systems. Every product we manufacture here has to pass specific quality gates in its process flow, and now we can collect more refined quality data, improve our monthly reviews and address any issues. On one of our recent production runs, a complex CPU board that has been in production for over seven years had a first-pass yield of 100 percent — something we have never been able to achieve before."

According to Frank, the major key to this improvement comes down to the MY700 jet printer. "The optimized size, shape and repeatability of the solder deposits is crucial," he explains. "Getting the solder paste right is the difference between okay quality and excellent quality. The jet printer has been a game changer. It's a quantum leap for us."

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CEO, ELEXON ELECTRONICS

Real-time stock accuracy

When it comes to stock accuracy, the new SMD Tower setup has already improved reliability and reduced downtime. "We have an ERP system that gives real-time information on inventory holding of components, but sometimes they would be wrong or reels would be misplaced. A single missing reel or component can stop everything, which is a disaster. Now, if the SMD Tower says it's there, it's there. It's a more reliable real-time component count, so we can schedule everything accordingly. Unique carrier IDs of each individual component reel, combined with the PCB ID-number, gives us component-level traceability, which is very important to defense and medical customers."

Enhanced capabilities

In addition to improvements in New Product Introduction (NPI) turnaround times, Ball Grid Array (BGA) capabilities and production planning, what Frank is most thrilled about is the extensive possibilities enabled by the new production line.

A prototype build can now be set up and run in parallel to normal production. The jet printer eliminates the need for stencils and enables pin-in-paste assemblies, which before had to be manually soldered. Elexon can now offer more high-value design-for-manufacturing services for complex assemblies with fast turnarounds. Customers appreciate the fact that the

pick-and-place machines' built-in verifier adds another safety layer to the assembly process. While the smart feeders avoid the wrong reel being loaded into the feeder, the verifier can measure the electrical value of the components. To take advantage of all these advances, assemblers are currently being upskilled to program the line as part of their daily operation.

The complete package

"The most exciting thing is that we really have the complete package, not just a lot of islands and machines," Frank explains. "It's a complete solution where everything fits together — the communication between the towers, the proactive replenishments, the scheduling. You can scan the product's bar code and it loads the program for the whole line without risk for human error. We can even run two or three products simultaneously on the line, down to batch size of one — it's not common now, but before this would have been impossible!"

For Frank, these capabilities represent a new era in advanced manufacturing. In addition to improving quality and productivity, enhanced in-house manufacturing helps to strengthen the link between design engineers, manufacturing and evolving customer demands. "One of our aims is to help reverse the trend of manufacturing being outsourced to overseas countries and to grow the manufacturing industry in Australia. We employ outstanding people who are keen to learn and be a part of the future of manufacturing. All these innovations are really appreciated by the engineers who are there when the board is being manufactured and by the operators who've worked on SMD lines all their lives."

Data-driven innovation

Thanks to the latest intelligent factory solutions, Frank feels the company is now better equipped than ever to bring unique value to local and export-based customers throughout Australia. "The world is becoming more data-driven," he concludes, "and that's the beauty with this system. We can convert CAD data straight into solder paste and pick-and-place programs. Through the web interface, anyone in the business can get access to quality and performance data. There is much more data available to refine the performance of the machines and to visualize and share the increases in productivity with the production team. This whole environment with design engineers, skilled operators and the right data all working together — it really makes a difference when it comes to accelerating our customer's innovation cycles and time-to-market.