

MILWAUKEE ELECTRONICS NEWS



Q1 2016

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About Milwaukee Electronics

Milwaukee Electronics designs and manufactures custom circuit board assemblies for the medical, transportation, military, HVAC and a variety of other industries. The Company operates over 135,000 square feet of manufacturing in Portland, Oregon; Milwaukee, Wisconsin; and Tecate, Mexico. In addition to EMS and product design and engineering services, it offers quick-turn prototyping through its Screaming Circuits business unit.



In the offline setup process, reel bar code data is scanned as components are loaded.

Two New SMT Lines Installed

New Panasonic SMT lines were installed in Milwaukee Electronics' Portland facility in January and in the Tecate facility in February and both teams are leveraging the abilities of the new technology.

"We've had excellent support from Panasonic. The installation and production ramp process has been almost like a partnership,"

said Ricardo Del Castillo, the Tecate facility's Manufacturing Operations Manager.

Ricardo estimated that the new line represented a 60+ percent improvement in SMT throughput, giving the facility a significant increase in SMT capacity.

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Letter from Mike

As At Milwaukee Electronics, we recognize we are in a service business. Our "competitive advantage" is completely driven by our ability to listen to customers and evolve our business in ways that support evolving customer needs.



One of the messages we have gotten loud and clear is that speed matters. That drove our investment in two new Panasonic SMT lines last year that were installed this quarter. This quarter's newsletter includes an article that outlines just how this state-of-the-art investment is helping us increase throughput via a combination of improved automation technology and application of Lean manufacturing principles. In short, our ability to provide superior responsiveness to shorter lead-times is substantially improved.

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Rochholz is Named Screaming Circuits Mfg. Manager



Ashley Rochholz

Ashley Rochholz has worn many hats in her five years at Milwaukee Electronics. She was recently promoted to Manufacturing Manager for the Screaming Circuits business unit. She previously served in an interim role in that position while also serving as Continuous Improvements Manager

for Milwaukee Electronics at a corporate level, but will now focus entirely on her Screaming Circuits position. Earlier, she was a Project Manager supporting the Tecate, Mexico facility’s implementation of the new ERP system and was part of the team that first tested and implemented that system in the Portland facility. She researched, tested and implemented ERP scheduling and capacity planning tools optimized for Screaming Circuits’ prototype operations. She also helped establish the communication and data transfer processes used with the Business Process Office (BPO) in India.

“Ashley has the ability to add value to whatever she does. She has a strong understanding of our systems and processes, as well as formal training in operations management. In addition to her normal production management duties, she is making enhancements to our production training activities within Screaming Circuits to improve employee

focus on building quality into every product. She applies initiative and expertise to every management assignment she is given,” said Rick McClain, Milwaukee Electronics Operations Manager.

Previously, Ashley was associated with Toyota Financial Services in contract administration and project coordination positions.

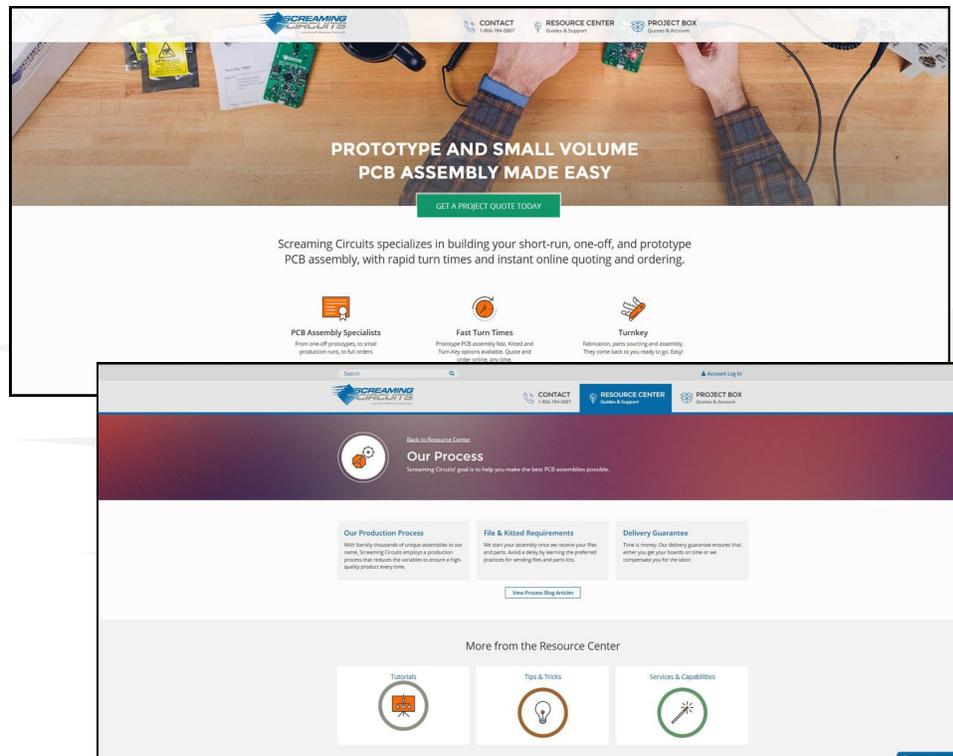
She received a Bachelor of Business Administration degree with a dual major in Spanish and Global Business with a focus on Operations Technology Management from the University of Portland. She is strongly focused on volunteer activities serving as VP of Marketing & Communications for the International Institute of Business Analysis (IIBA) in Portland, a judge and inspector for FIRST Robotics, a mock interviewer for the Pamplin School of Business at the University of Portland, and a dog walker for the Oregon Humane Society.

Screaming Circuits Website Redesigned

As part of Milwaukee Electronics’ continual quest to improve its service to customers both the Screaming Circuits and Milwaukee Electronics websites have gone through a redesign process.

The redesigned Screaming Circuits website is now live and features more user-friendly navigation and expanded informational resources. Visit it at www.screamingcircuits.com.

“Screaming Circuits revolutionized online ordering in the prototype industry and we don’t want to rest on our laurels. We recognize some of our clients aren’t experts at ordering prototypes and our new site makes it even easier for them to understand our process and information needs,” said Jered Stoehr, Milwaukee Electronics’ VP of Sales & Marketing.



SMT Lines

(Continued from page 1)

The team has been able to reduce setup time almost 85 percent to approximately 12-17 minutes. The Panasonic line uses a cart system. The machine verification (MV) feature in the PanaCIM software automatically checks the feeders in each cart to validate the right parts are present. It also sounds an alarm if a feeder is running low so that operators have time to splice in a new feeder before parts run out. Part reloading includes a handheld scan so the MV software can verify the right parts are loaded.

The Company purchased extra carts, for both the Tecate and Portland operations, to enable additional jobs to be set up offline and immediately loaded as the jobs on the machine finish.

The DGS Data Creation System in combination with PanaCIM software is enabling the team to optimize all elements of SMT production. The PanaCIM software can show real-time information on production cycle time, machine performance, operation ratio, placement quantity and production quantity, or be customized to show any information desired. The DGS system can recommend optimum feeder loading sequences and the best nozzle sizes to minimize placement time. Production operators are being trained in its use and the process for changing nozzles.

The Portland facility saw a 45 percent increase in throughput and a significant drop in quality defects, compared with the existing Fuji lines. More importantly, they had improvement in the range of components that could be placed as well as accuracy on BGAs, 0402s and smaller parts. There has been a significant decrease in skewed and rotated components, as well as a drop in attrition due machine rejection of good parts. The line scan camera and 3D inspection allow 100 percent inspection and verification of BGA ball grids and co-planarity of leaded SMT parts.

“Some parts such as switches and QFPs



The new SMT line use carts to speed changeover.

are prone to co-planarity issues. The Panasonic accurately weeds out bad parts. Comparably, we saw a much higher defect rate with the Fuji, as it used 2D presence detection only,” said Dan Yantz, the Portland facility’s NPI/Engineering Manager.

The Portland facility also saw significant improvement in setup time, but deals with a higher mix production situation than the Tecate facility. The Fuji setup times ran anywhere from 1-to 4 hours depending on the project. The Panasonic line takes 15-30 minutes in offline setup. One of the reasons for the longer setup time with the Fuji line was feeder availability since line changeover involved a feeder teardown at the end of some jobs. The Portland facility also has couple of extra carts for rapid changeover allowing a drastically reduced machine changeover time in the range of 5-10 minutes, depending on program debugging.

The Portland team is taking advantage of a feature in the PanaCIM software that allows multiple jobs to be loaded as a project with a single pick list. This results

in zero setup and teardown time with the grouped projects.

In April and May, the Portland team will be doing material verification and performance monitoring on the new machines, monitoring every job on a board-by-board, project-by-project basis. The goal is to establish takt time on the boards going through the line, plus complete internal studies on the benefits of the new equipment and further optimize processes to that.

There have already been some lessons learned in the setup process.

“Originally the SMT placement equipment was our bottleneck. We replaced that but kept other equipment that had adequate throughput on our old line. One issue we’ve identified is that the new placement equipment is so efficient that it is difficult for our screen printer to keep up with it and we are now looking at printers. We are also finding the reflow oven is a potential bottleneck. However, overall we are pleased with the throughput improvements this change has given us,” Dan added.

Engineering in Action

Supporting IoT New Product Development

As the Internet of Things (IoT) grows with innovative products, so does the need for contract engineering and manufacturing support. In this case, the product was an LED Lighting Control that uses Power-Over-Ethernet (POE) technology. The Lighting Control module is mounted into the LED lighting ceiling fixtures and wired back to an Ethernet gateway junction using standard CAT5e Ethernet cable and provides for environmental control of room lighting.

This customer's previous supplier was having difficulty providing working prototypes and they were looking for a supplier with a co-located engineering and manufacturing capability to handle re-layout of the product's three printed circuit board assembly (PCBA) set based on their schematics, review the current bill of materials (BOM) for obsolescence risk and cost reduction, recommend any changes and build the pilot production run.

Following the project launch session, Milwaukee Electronics started reviewing the first board schematic design and bill of materials for cost reduction. The project engineer identified areas of design improvement in the first PCBA and suggest-

ed changes to circuit designs in the first two PCBAs that would result in cost reduction while maintaining or improving the circuit functionality. On the third PCBA, the Milwaukee Electronics' team recommended a completely different circuit topology that

three-board set design upgrades and cost reductions. To help reduce time since the first two PCBAs were very similar, prototypes were built and tested only for the first and third PCBAs in the set. The second PCBA was built as part of a 100-piece run of pilot units. Elimination of the almost identical prototype phase for the second PCBA reduced prototype tooling requirements and build cost.

The customer is presently testing and evaluating the Milwaukee Electronics provided units. Because the customer was responsible for all firmware requirements for this three-board set, Milwaukee Electronics set up an on-site test area where the customer's project engineer could work directly with Milwaukee Electronics' staff. The result was the elimination of weeks of test time.

Milwaukee Electronics also provided the design and development of the plastic enclosure for the unit. The production launch dates for this product family is scheduled for early Q3 of 2016.



The power-over-ethernet interface printed circuit board assembly.

provided improved functionality which reduced the firmware requirements, provided significant component cost reductions and reduced the PCBA footprint enabling the modular assembly to fit into the final enclosure.

The customer approved the changes and the expanded scope of work quote. Milwaukee Electronics proceeded with the

Letter from Mike

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Another message we have gotten is that our service model has a small gap in support. We have a strong engineering solution, an innovative prototype capability and a very scalable volume manufacturing capability. However, there is still room for improvement in supporting companies with volumes that exceed typical prototype or short run quantities, but are be-

low the volumes typically found in our standard EMS model. We are looking at ways we can apply our expertise to cost effectively address that challenge. We understand how important it is to have a full service supplier, who actually can serve as a one-stop shop.

While perfect product is always our pri-

mary goal at Milwaukee Electronics, we also are continuing our tradition of finding new ways to offer innovative solutions that address challenges others in our industry fail to see. I value any feedback or suggestions you may have.

P. Michael Stoehr
President & CEO

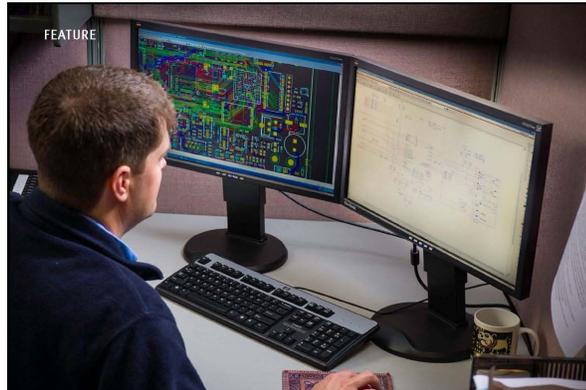
Milwaukee Electronics Featured in SMT Magazine

Milwaukee Electronics' combined engineering and manufacturing solutions were discussed in the March issue of SMT Magazine.

The article looks at the benefits accrued when engineering and manufacturing services are combined, using actual case study examples. Some of these advantages include:

- Close coordination between product development and manufacturing teams
- A holistic Dfx approach
- Better ability to align resources to fill gaps in the customer's engineering team
- Ability to work with the same engineering team over the long-term.

Read more [here](#).



The Appeal of a Combined Engineering and Manufacturing Solution

by **Jered Stoehr**
MILWAUKEE ELECTRONICS

Most EMS providers have some ability to provide design for manufacturability and testability (DFM/DFT) support to their customers. Some even offer layout services. However, the ability to offer product development engineering support at the conceptual level is rarely found outside of tier one EMS providers. This can be an underserved niche since projects that start as outsourced design projects can take one to two years to ramp to full volumes and even then the volumes may not reach the scale attractive to a global EMS provider. Often the solution is a design firm and job shop followed by transition to larger EMS provider once the job shop is outgrown. This can be inherently inefficient since the OEM may be outsourcing de-

sign and subsequent manufacturing to multiple suppliers, resulting in multiple project transfer costs and concomitant inefficiencies.

Why wouldn't more EMS companies fill this niche? One reason is that it can be challenging to keep the right mix of design engineers working at capacity in an EMS-only environment. There are basically two ways to address this challenge: form strategic alliances with independent design firms or develop an in-house capability that stays at capacity through a combination of independent design projects and EMS-related projects. One company that is effectively utilizing this model is Milwaukee Electronics. Its Design Engineering Services group follows a simple "fit what customers need" model. The group is designed to integrate with customer engineering teams and fill the gaps. They can support standalone product development efforts with-

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