

MILWAUKEE ELECTRONICS NEWS

Q3 2020

About Milwaukee Electronics

Milwaukee Electronics designs and manufactures custom circuit board assemblies for the medical, transportation, military, logistics and a variety of other industries. The company has ISO-13485 medical manufacturing capability in its Portland plant.

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 PCB layout and DFM services through its San Diego PCB Design business unit and quick-turn prototyping and on-demand assembly through its Screaming Circuits business unit.

Tecate Facility Adds SMT Line

Milwaukee Electronics' Tecate, Mexico facility has added another SMT line to support anticipated growth.

"A next generation version of one of our higher volume products has a significant increase in component count and we are also ramping other new projects so we added another SMT line as part of our 2020 capital expenditure planning," said Ricardo Del Castillo, Manufacturing Operations Manager.

Milwaukee Electronics adopted a standardized equipment platform among its facilities two years ago, so the equipment mirrors its existing lines. The new line includes an EKRA Serio 4000 solder paste printer, Parmi Sigma X solder paste inspection (SPI), a Pana-



Above, the new line undergoes testing.

sonic NPN high speed chip shooter, a Panasonic NPM high speed chip shooter/pick & place unit and a Vitronics 10-zone reflow oven.

The equipment is currently in its installation and test phase and will be fully operational in October.

Message from Rick

Meeting the Challenges of 2020

I always like to look on the bright side of any challenging situation. For our team at Milwaukee Electronics, the bright side is that the time



Rick McClain

we've spent on strategic planning and the resultant investments in infrastructure have translated to a previously unimaginable level of resilience.

Our latest 2020 "test", came with the recent fires near our Portland, Oregon facility. We

did shut down the facility for three days, when the fires came uncomfortably close to our area and air quality deteriorated. Our team executed our continuity plan flawlessly, ensuring all the Screaming Circuits kits in progress were moved out of the area and the facility was securely shut-down. When the fire danger had passed, we brought in a smoke remediation company and an environmental consultant to get the facility's air quality to acceptable levels. And, then our team restarted production, working through the weekend to bring everything back online. I think it is important to note that in addition to ensuring we executed our business continuity plan, some of our team members were also having to evacuate their homes or help their friends and family with evacua-

tions. We truly appreciate the support we got from everyone on our team during this stressful time. Our Portland facility is back at full capacity, our employees are all safe and we are fortunate that none of our employees lost their homes. Much needed rain has eliminated our fire danger.

In considering the challenges of 2020 and our business resilience, I think it is also important to highlight the role that customers have played in our strategy development. As I write this, our annual customer satisfaction survey has just launched. Our strategic decisions and investments have always been customer-driven. Our annual customer survey is the

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Mitigating Supply Chain Disruption Through Transfer of Work

Regional shutdowns due to COVID-19 mitigation efforts created unprecedented supply chain disruption earlier this year. Milwaukee Electronics faced this challenge when its Mexico facility was impacted by the State of Baja California's COVID-19 restrictions. It was able to support customers impacted by these restrictions by transferring projects to other facilities, as result of a much earlier focus on creating a seamless transfer of work process designed to make it easy for its customers to migrate among facilities as project requirements changed over time. While the examples provided here are COVID-driven, this ability to smoothly transfer work among facilities is also available to better support changing project requirements.

Milwaukee Electronics began standardizing systems and production platforms several years ago. Solder paste deposition, SMT placement equipment, automated optical inspection (AOI), x-ray inspection and a portion of the test equipment is standardized across all three facilities. This enables stencils, tooling and programming to be easily transferred. The FactoryLogix manufacturing execution system (MES) simplifies transfer of digital documentation and programming data among facilities. The Company's ERP system provides visibility of material status across all facilities, which helps when inventory is being transferred or redirected. In most cases, this standardization has made the transfer process so seamless, that non-recurring engineering (NRE) and tooling is not charged unless there is volume or project scope change that requires additional equipment or tooling.

Additionally, there is a robust internal transfer of work process in place across all facilities. A detailed checklist ensures that actions related to administration, engineering, program management, materials, operations, quality



Standardized equipment platforms help minimize NRE costs during project transfer.

and accounting are assigned and tracked during the transitions. There is a kickoff call that involves the project team at both plants, the program manager, the manufacturing engineer, the receiving plant's manufacturing manager and the customer's team. Prior to COVID-19, the customer would typically send an audit team to qualify the receiving facility and often be present for the first article build. Again, pre-COVID-19, it was also standard practice for the receiving facility to send a team to observe the sending facility's production operations to ensure work cells were replicated and some cases send a team from the sending facility to the receiving facility to ensure the production setup had been appropriately replicated.

The COVID-19 related transfers fell into two categories: projects transferred to a new facility to ensure production continuity during regulatory constraints and projects transferred to a new facility because their current requirements were a better fit in a different facility.

For example, a project that involved a credit card processing system used in gas stations had started at the Portland facili-

ty. The combination of increasing volume and a desire to mitigate China tariffs on material resulted in the project moving to Tecate in multiple phases during 2019. The transfer was completed in September 2019. The equipment didn't fit Mexico's definition of essential product so the project was transferred back to Portland in April 2020. In-plant material inventory and work-in-process was transferred to Portland and inbound material was redirected to Portland. Only a single shipment to the customer was missed during the transfer and the customer had sufficient inventory to keep its production lines going even with the missed shipment. The project is current with quarterly production goals.

In another case, a motor control printed circuit board assembly (PCBA) used in material handling applications was temporarily transferred to the Milwaukee facility. While this PCBA fit Mexico's definition of essential production, the restrictions on headcount in Mexico combined with a spike in demand as shipping organizations enlarged their material handling conveyor systems made it advantageous to transfer

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Transfer of Work

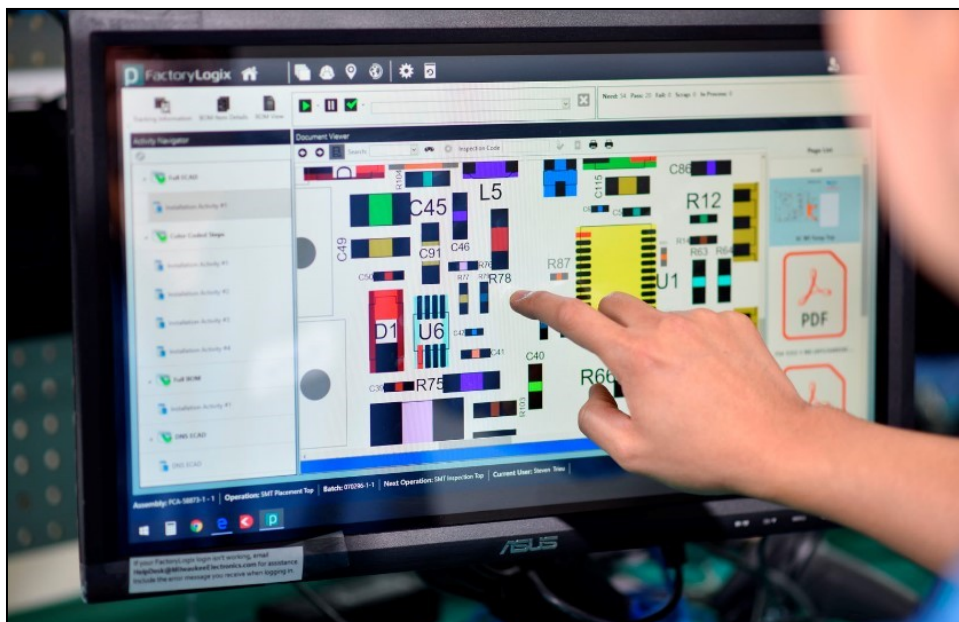
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this PCBA to free up capacity in Mexico for increased demand in related products.

In another case, a water heater control unit was transferred permanently from Tecate to Milwaukee because the product was near end of life and had lower volumes. A new model is in product development to replace it and the customer found the Milwaukee location to be more advantageous because design engineering and production are co-located. This is a project that likely would have moved even without COVID-19.

All that said, even with equipment and process standardization, transfer of work is a non-trivial process. From an ongoing materials standpoint, changing location often means changing distributor offices and having those “sales” count in a different part of that organization. Consequently, clear communication with the supply chain on upcoming projects as well as transfers is important.

In situations where repair depot operations are performed, the receiving facility needs to handle returned material authorizations (RMAs) involving products previously built at the sending facility as efficiently as they handle RMAs related to products they’ve built. To address this issue, Milwaukee Elec-



FactoryLogix helps simplify documentation transfer.

tronics’ team has developed a proprietary program that tracks and reconciles these situations within the RMA system.

A final issue is regulatory. Regulatory approval agencies such as UL like to have prompt notification when there is a change manufacturing location even when they have audited all facilities previously. So, it important to ensure that those record changes are made.

A robust transfer of work process combined with production equipment and system standardization enables customers to stay with the same contract manufacturer,

even when project requirements dictate a move to a different region. And, as this year has shown, the ability to do rapid, seamless transfers is also helpful in avoiding unanticipated facility shutdowns or capacity constraints. Once the situation in Tecate returns to normal, the transfer of work on projects deemed a best fit for that region will begin again. In the meantime, Milwaukee Electronics’ standardization strategy has enabled the Company to continue to serve both existing and new customers with a near perfect on-time delivery record throughout the pandemic.

Message from Rick

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primary tool for soliciting customer feedback on performance-related issues and likely service needs. The current survey includes a section evaluating the impact our COVID-19 mitigation measures have had on our performance. If you have received a survey, I hope you will take the time to fill it out.

It only takes a few minutes and we do use it to guide decision making.

On a positive note, 2021 initial forecasts are shaping up to be a year of solid growth. We’ve added another SMT line to our facility in Tecate, Mexico to support new projects there, and we are seeing growth across all three production facilities.

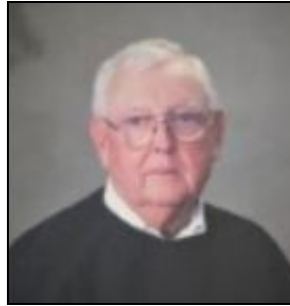
So, while 2020 keeps testing our resiliency, we continue to see that our team, our suppliers and our customers have our backs. Thanks to all for the support you’ve shown. In one way or another, you have helped make us the growing company we are today.

Rick McClain
President

Remembering Art Cannon

It is with great sadness that we note the passing of Arthur W. Cannon on August 7, 2020. We felt it was important to take this opportunity to honor Art's contributions in a relationship that began in 1994.

Art Cannon was the Founder of Milwaukee Electronics' longest and highest performing manufacturer's sales representative firm, Cannon Associates. Art was a visionary that built his company to what it is today, with the same team he put into place more than



Art Cannon

25 years ago. Art and our Founder & CEO, Mike Stoehr, built a significant book of business. Many of the relationships that resulted from those efforts are still in place today.

Art's legacy isn't simply the business he helped us win. We thank him for creating a partnership that will last long into the future. We also value the role he played in setting the standard for what we look for in good sales rep relationships.

Design in Action

The Top Five Design Problems that Make Layout Difficult

Milwaukee Electronics' San Diego PCB Design Division likes to help its customers minimize design spins wherever possible. One way to take at least one spin out of the mix is to ensure the most common errors are addressed prior to PCB layout.

Our latest blog post looks the five most common errors:

- Netlist errors
- Deciding on a PCB fabrication vendor and/or assembly house late in the game

- Mechanical packaging issues
- Failure to define "keep out" zones
- Stack-up failures.

Read our full post [here](#).

Did You Know?

Milwaukee Electronics Has a Long History of Innovative Solutions

If you take a look at our corporate website (milwaukeeelectronics.com), you'll see the headline: "Integrated Design & Manufacturing Since 1954" front and center. We've been at this since 1954. That's a longer track record of manufacturing than just about anyone in the business. In fact, it's longer by more than a decade than any of the largest 20 electronics manufacturers in the world today!

But, did you know that in addition to that legacy, Milwaukee Electronics is also one of the most forward-thinking in the industry? In 2003, we created an internal start-up, called Screaming Circuits, to embrace the Internet as a new way of doing busi-

ness. Screaming Circuits was started as a way to make quick-turn prototypes more accessible to the design engineer through the use of e-commerce.

In 2003, e-commerce was still an exciting new thing for consumer products, but it was simply unheard of for a complex service business like manufacturing. The rest of the world said that manufacturing was just too complicated for e-commerce. Screaming Circuits defied that way of thinking and put a complete quote and online ordering system on the web, allowing design engineers to get prototypes built faster than ever before.

Today, Screaming Circuits is the market leader in online quick-turn prototypes and on-demand manufacturing. Engineers in all 50 states and more than a dozen countries world-wide go to ScreamingCircuits.com to quote and order prototypes and small lots of production assemblies, any time of the day or night. Screaming Circuits prototypes are built in our Canby, Oregon facility and are available to all Milwaukee Electronics customers as a part of our integrated design and manufacturing suite of services. Talk to your program manager for details.

Newsletter Contact

Jered Stoehr, VP Sales and Marketing

Email: jstoehr@milwaukeeelectronics.com

www.milwaukeeelectronics.com

Sales inquiries: sales@milwaukeeelectronics.com

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5855 N. Glen Park Road
Milwaukee, WI 53209
Tel: 877.960.2134