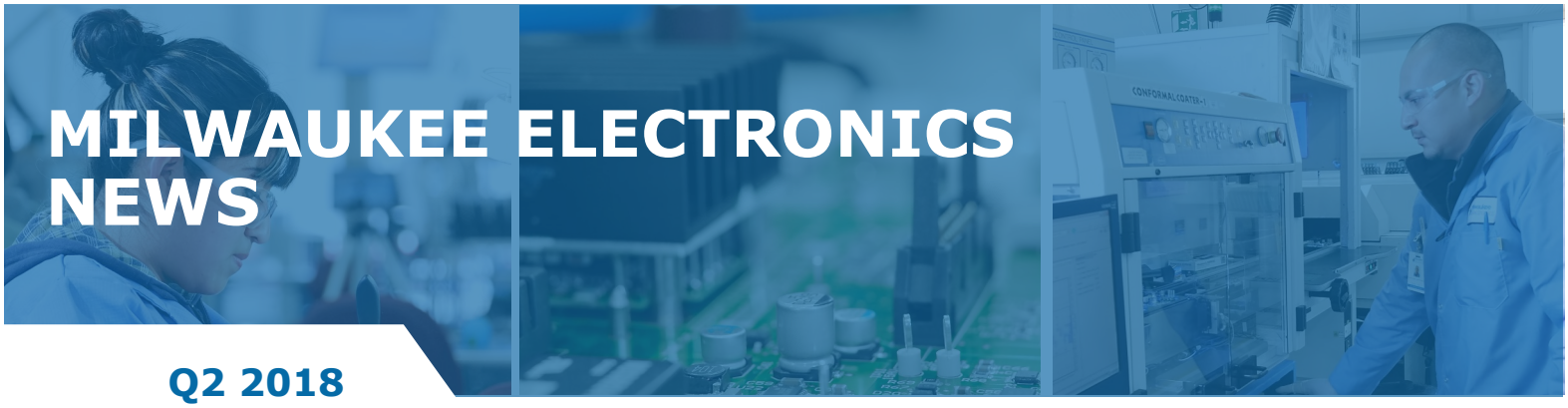


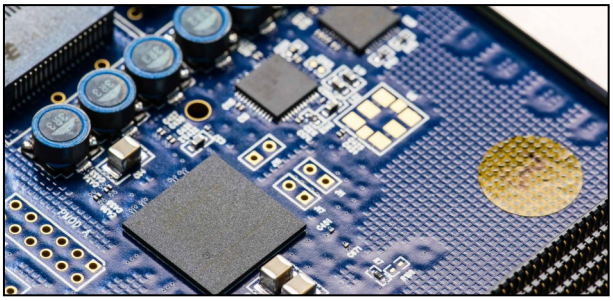
MILWAUKEE ELECTRONICS NEWS

Q2 2018

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 PCB layout services through its San Diego PCB business unit and quick-turn prototyping through its Screaming Circuits business unit.

How Milwaukee Electronics Eliminates Risks in a Highly Constrained Market



Lead-times are lengthening in nearly every commodity.

Most in the industry are aware of the worldwide constraints for electronic components. Material shortages are placing both customer satisfaction and company revenues at risk. These constraints look to continue well into 2019.

Constraints in the past have normally been less than 12 months and involved specific component types. This constraint is much more widespread and is affecting nearly every commodity. In addition to this, the US government import duties are causing cost increases for aluminum and steel raw materials. This has also caused increased costs and lead-times in those markets, as well.

Based on industry trend analysis, Milwaukee Electronics' supply chain management team expects many of the constrained commodities to ease over the next two to

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Message from Mike: New Challenges in 2018

As the first half of 2018 comes to a close, I am reminded of the Chinese proverb: "May you live in interesting times." How else would one describe the pleasure of enjoying a robust economic period driving new and increased business, while struggling to schedule materials acquisition from sources lacking the capacity to support such volumes? Unfortunately, terms such as, "it's on allocation," "push outs," "extended lead times," and "no longer available," are a daily and regular part of communication from historic supply sources. Rest assured that despite these obstacles, our company is doing all it can to satisfy our customer needs for meeting their requested delivery dates. We've strengthened our supply chain management team and are taking steps to increase customer visibility into this challenging market. To that end, we will be publishing a monthly ***Materials and Supply Chain Bulletin***, that outlines the trends our team is seeing and our recommended strategies. Our engineering team is available to assist with alternate parts identification or help with PCB layout or design changes. Our supply chain team is also identifying reputable, alternate suppliers for critical components.

Internally, we continue to utilize systems investments made in recent years to improve our flow through processing speed, better measure trends and monitor production status in real-time. Our Tecate, Mexico facility has now achieved the latest revision of ISO 9001 certification: ISO 9001:2015.

As I write this, trade tariffs for a wide range of products manufactured outside the U.S. have been announced. On the positive side, we offer an excellent North American manufacturing solution for companies wishing to regionalize manufacturing to support end markets in the U.S. and Mexico. Our two U.S. and one Mexico facilities offer logistically well positioned options to that end. We also recognize that since many electronic components are manufactured with Asia, that tariffs will have some impact regardless of where the product is manufactured. Rest assured, our team is monitoring the situation and looking for ways to minimize tariff impact wherever possible.

Referring once again to the Chinese proverb I spoke of at the beginning of

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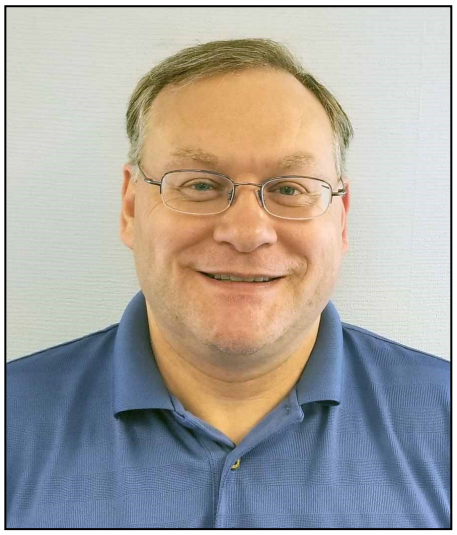


Gary DeGrave

DeGrave Named Corp. Materials Director

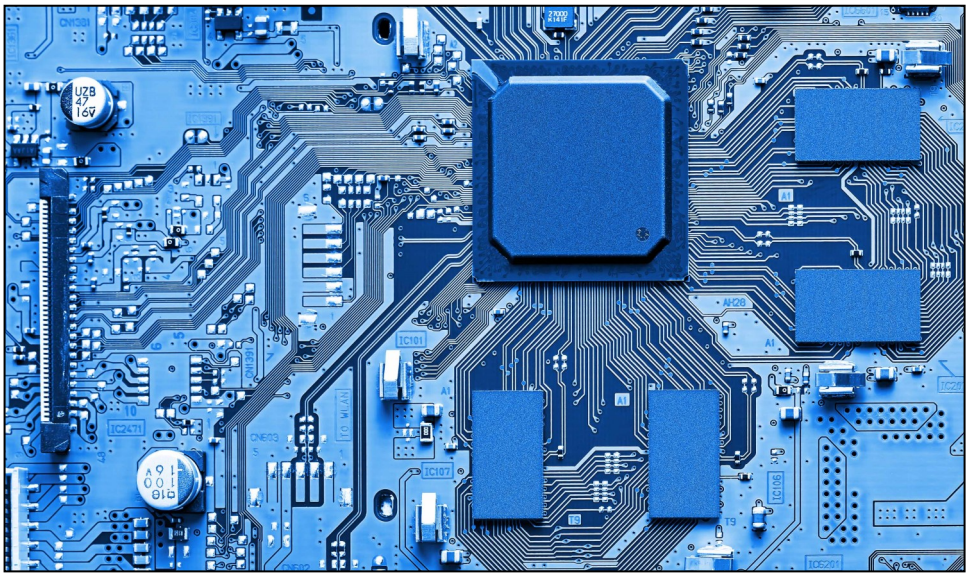
Gary DeGrave, Jr. has joined Milwaukee Electronics as Corporate Materials Director. Previously, he was Director of Purchasing at GMI Solutions. He was earlier associated with Micro Dynamics Corporation, Avnet Electronics Marketing, Kent Electronics and Advacom, Inc. in a variety of supply chain management, operations, quality and product management positions.

"Gary's nearly 30 years of experience in the electronics manufacturing supply chain encompasses EMS, OEM and distribution operations. He understands distribution business models, large-scale OEM sourcing practices and the challenges inherent in the EMS environment. That combination of knowledge is critical in effectively navigating today's challenging material market. I feel he is a huge asset to our team," said Rick McClain, Milwaukee Electronics' President.

DeGrave received a Bachelor of Science degree in mathematics from Carroll College.

Engineering in Action

Dense High Speed Digital Circuitry



Above, a dense high speed digital printed circuit board assembly (PCBA).

Milwaukee Electronics' San Diego PCB team tackles a wide of range of challenges in the realm of dense high speed digital circuitry. In one case, you could say the challenges were out of this world.

A developer of space flight printed circuit board assemblies (PCBAs) which were Class IIIA products and had to meet NASA requirements, had a circuit packaging challenge. Class IIIA PCBAs must have designed feature sizes that meet defined manufacturing processes. The circuit density created power distribution challenges. The operating environment also created thermal issues. Several layout firms had attempted to develop a packaging solution that solved the packaging challenges using smaller feature sizes. Unfortunately, this compromised the Class IIIA manufacturability requirements.

The Process

The design team at San Diego PCB as IPC CID+ designers understand correct-by-construction parameters with Class IIIA requirements and immediately established a solution that meets manufacturing, performance and solved this dense layout.

The Solution

The team was able to design the PCBA layout in compliance with the Class IIIA manufacturability requirements. They guaranteed electrical integrity by ensuring an uninterrupted ground path to every signal and power rail. To aid in power integrity and enhance power delivery, a space-approved DuPont buried capacitance layer was added high in the stackup. This was verified by means of Hyperlynx simulation. The final product was approved and is working in space today.

Tecate Facility ISO 9001:2015 Certified; Adds Equipment

Milwaukee Electronics' Tecate facility continues to upgrade capabilities and capacity.


bsi.

By Royal Charter

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Milwaukee Electronics
S. de R.L. de C.V.
Blvd. Encino # 30012-B
Parque Industrial Tecate
Tecate
Baja California
21430
Mexico

Holds Certificate No: FM 508999

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

Electronic and Contract Manufacturing Services of Electronic and Mechanical Assemblies, controls, testing and Wire Harness products.

For and on behalf of BSI:

Carlos Pitanga, SVP, System Certification and Compliance

Original Registration Date: 2006-09-11
Latest Revision Date: 2018-04-16
Effective Date: 2015-09-11
Expiry Date: 2018-09-10
Page: 1 of 1

...making excellence a habit.

The facility completed its ISO 9001:2015 audit in April and is now registered to the latest revision of that standard. Its registrar is BSI.

The facility has also continued to add automated assembly capacity. It has purchased an Autosplice Multisert Xs machine capable of inserting knife terminals for automotive fuse boxes. Manual assembly processes do not provide insertion accuracy repeatability that is good enough to support automotive industry specifications. The new machine remedies that. Machine features include:

- Insertion rates up to 3 per second on 0.2" (5.08 mm) pitch
- 18" x 18" Insertion area (457 mm x 457 mm)
- Accuracy +/- 0.0001"
- Vision system for PCB error correction
- Ability to add an additional placement head.

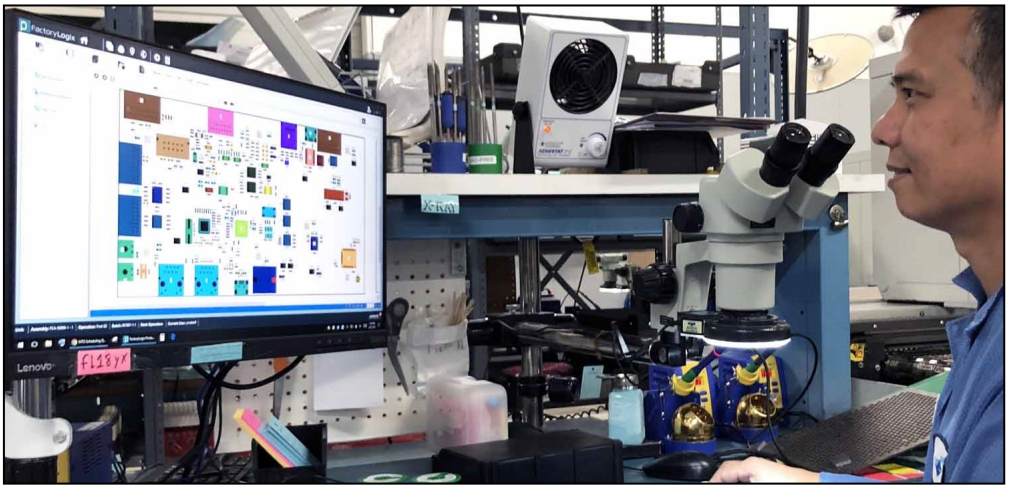
The new machine increases placement speed and accuracy, and can operate inline or as a separate work cell.

Milwaukee Electronics Streamlining Digital Documentation Process

Milwaukee Electronics is expanding its deployment of Aegis' FactoryLogix manufacturing execution software (MES). The software was selected in 2017 for its ability to drive faster new product introduction (NPI) activities and initially deployed in Screaming Circuits. By the end of June, all facilities will be using the software for their New Product Introduction (NPI) process and the teams should be ready for further integration by the end of the year.

"All initial build documentation for new products is now being constructed in FactoryLogix. The key benefit in this phase of the deployment is that we are creating a common documentation structure across all facilities. This will allow us to share NPI resources across the entire organization," said Kyle Frank, Corporate Compliance Specialist, who has been leading the deployment effort.

For example, once all facilities are live, if a team in the Tecate facility is overloaded with NPI work, a team in Canby, OR, Milwaukee, WI or India could take over some of that workload and assist remotely. This added flexibility enhances both customer responsiveness and facility efficiency.



All initial build documentation is being created in FactoryLogix.

The time savings is significant. A manually-created job book often requires 8 hours of labor. Utilizing FactoryLogix, the same set of documentation can be created in 1 hour. The software also helps identify discrepancies in customer-supplied documentation such as differences in revision levels among drawings and ODB data.

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FactoryLogix

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Screaming Circuits is now working on Phase II of its deployment: better use of the MES' tracking capabilities. All boards are serialized, which allows processing time to be tracked in real time and gives management greater control of the process. Workstations have live entry capability and operators will be doing defect data collection. When fully implemented, spikes in defect data will launch alerts to Engineering and Quality for immediate resolution. The data collection also will support device history recordkeeping and customer traceability requirements. Once fully implemented in Screaming Circuits, this phase will deploy in the EMS facilities.

"We are probably looking at the end of 2019 before all these Phase II capabilities are in place company-wide, because there are additional capital improvement expenditures required and no MES is entirely plug-and-play. It is also important that we do this in a way that ensures our teams understand what the software does well and where there is human oversight needed. That said, with each milestone achieved, we are significantly improving operational efficiency and our ability to more responsively address customer requirements," added Kyle.

Supply Chain

(Continued from page 1)

three quarters. The exception to this is the supply of multi-layer chip capacitors (MLCC). Industry experts suggest that the MLCC market will continue to be constrained for much longer.

"Our ability to support our customers is of utmost importance to us. Our teams are working proactively to ensure our supply chain is prepared to react to demand changes and help our customers succeed," said Gary DeGrave, Jr., Milwaukee Electronics' Corporate Materials Director.

Some of the proactive supply chain measures Milwaukee Electronics is currently taking include:

- Working through our strong supply chain partnerships to elevate the level of communication and information needed to assist in securing ongoing component needs
- Looking at options for broadening approved sources of supply on parts with critical availability
- Supplying strategic supply chain MRP Share partners with six month forecast windows to allow for a more robust pipeline of material
- Strategically increasing inventory levels on constrained components.

"The current materials marketplace is very dynamic and needs a high level of care and planning to best maintain the supply of critical components. We continue to work with our customers and supply chain partners to mitigate every identified constraint. Our Design Engineering Group and San Diego PCB team can also assist in redesign efforts related to severely constrained parts," added DeGrave.

Strong focus is also being placed on new products.

"Allocation is happening by order of demand and past usage. Obviously, new products have no past usage history, so we try to establish forecasted demand as early as possible to get a jump on order of demand. We are also willing to work with customers who have products in the development stage to recommend alternate part solutions that may be more readily available. Milwaukee Electronics is committed to being an integral part of our customer's supply chain and success," said DeGrave.

Beginning in July, Milwaukee Electronics will be sending a monthly Materials and Supply Chain Update Bulletin to all recipients of its newsletter.

Message from Mike

(Continued from page 1)

this message, it seems as if those interesting times have arrived, presenting both great opportunities and significant challenges. At Milwaukee Electronics, we are committed to helping our customers capitalize on the opportunities created by a strong economy while minimizing the disruptive challenges that accompany shifts in demand and trade policy.

P. Michael Stoehr

CEO

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