

MILWAUKEE ELECTRONICS NEWS

Q3 2017

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

Portland Facility Receives ISO 9001:2015 Certification

Milwaukee Electronics' Portland, OR facility has become one of the first companies in the electronics manufacturing services industry to be certified to ISO 9001:2015.

"The ISO 9001 standard is continuing to evolve, placing more emphasis on leadership responsibility.

The changes are focused on risk-based thinking at all levels of the organization to analyze performance trends and correct issues that would otherwise impact performance objectives." said Paul Satryb, the Portland facility's Quality Manager.



Milwaukee Electronics
Portland, OR Facility
Certified to ISO 9001:2015

In preparation to achieve ISO 9001:2015 certification, the Portland facility's Quality Team conducted a gap analysis beginning in January 2017. The gap analysis included a paragraph audit and consequently, an action item. This provided the direction needed to upgrade the Quality Management System (QMS) to comply with the ISO 9001:2015 standard.

ISO 13485:2003 was revised to version 2016. The facility's QMS will undergo an audit to achieve certification to ISO 13485:2016 in August 2018.

Message from Mike

Milwaukee Electronics continues to evolve in ways that better support the needs of our customers. The ever tightening labor market has caused many companies to look for outsource partners who can fill in the gaps in engineering, layout services, prototyping speed, in addition to providing assembly services once these projects reach full volume. With our state of the art Divisions of San Diego PCB and Screaming Circuits we are seeing increasing demand for service needs where world



class capabilities are required. The personalized service level that is a cultural commitment at Milwaukee Electronics sets us apart from other Tier One EMS providers.

With this strong demand for these critical product development support services, we are working on strengthening our strategic relationships in printed circuit board fabrication and material distribution to ensure our customers have a one-stop solution. Our supply chain management team is carefully watching the segments of market and specific components where lead-times are lengthening and working with our distribution partners to minimize impact of ongoing projects.

We are also seeing growth in our EMS business and will be announcing equipment addi-

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Medical Prototyping Business Increases

Milwaukee Electronics' Screaming Circuits business unit is becoming the prototype source of choice for three new Midwest-based medical customers.

"Over the last year, we've been highlighting ways our strong frontend mix of services can be beneficial to product development teams with repetitive needs for services such as layout and prototyping. In some cases, this may lead to follow-on production business, but it is also helping us go from being a transactional resource for layout or prototyping for a specific program to a designated source for these services at a division level," said Scott Pohlmann, Senior Director of Business Development.

In one case, a company doing prototyping asked for a referral to a layout service bureau and was introduced to the San Diego PCB team. Now, that customer buys combined layout and prototyping services as a one-stop process



Screaming Circuits is becoming the prototype source of choice for several medical customers.

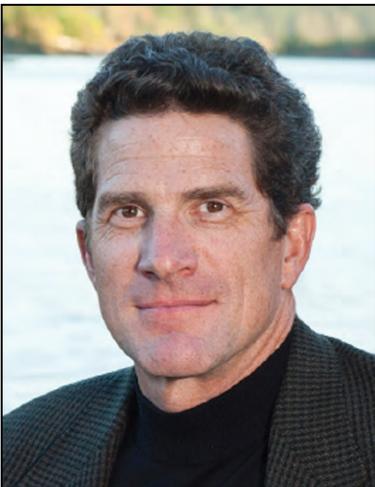
through Screaming Circuits.

In another case, a medical device manufacturer tried several local job shops without desired results and has now decided to use Screaming Circuits for 18-20 prototype runs a year.

Yet another medical device manufacturer qualified Screaming Circuits as a select premier supplier after using them for a prototype run.

"Our certification to ISO 13485 combined with our ability to provide a responsive mix of services to their product development teams makes us an attractive option to medical device manufacturers. They are getting the systems and infrastructure present in a regional EMS company with the speed and personalized service found in smaller operations. Plus, we can seamlessly scale to production volumes as these projects grow," Scott added.

Satryb Named Portland Facility Quality Manager



Paul Satryb

Paul Satryb has joined Milwaukee Electronics' Portland, OR facility as Quality Manager. Previously, he served as Quality Manager at Celestica. He was earlier associated with

Hydra-Power Systems, Inc. in quality, engineering and operations management positions. He also served in the U.S. Marine Corps.

"Paul has over 30 years of quality, engineering and operations experience encompassing positions at OEMs and EMS providers. This enables him to view our processes from both the perspective of our customers and from an understanding of best practices within the EMS industry," said Rick McClain, Milwaukee Electronics' COO.

"My goal is to strengthen the Milwaukee Electronics' Quality foundation through training and reinforcement. I've already begun training various members of our team in problem solving quality tools designed to help them understand the root cause of issues and solve them. I plan to integrate some of ASQ's educational resources in this effort. I also want to make

sure we build on the foundation already present, such as our 6S program, but more strongly reinforce those principles through regular internal audits," Paul said.

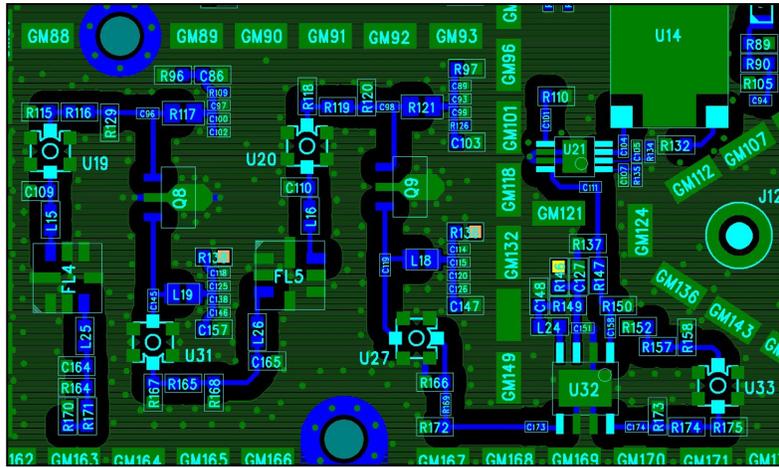
Additionally, he is working to harmonize job titles, job descriptions and training requirements among the three production facilities. As a phase two activity he will be harmonizing the top level of quality procedures.

Paul received a Bachelor of Science degree in business administration and a Master of Science degree in sustainable business from Walden University. He is a Certified Quality Engineer, and Certified Manager of Quality and Organizational Excellence through the American Society for Quality (ASQ). He is also a Certified Fluid Power Specialist through the International Fluid Power Society.

Engineering in Action

San Diego PCB's Expertise Helps Solve Cellular RF

A manufacturer of cellular RF-related products needed a layout team experienced with cellular RF products capable of addressing both business and technical challenges. On the business side, there was a desire to keep products as low cost as possible and the prototype cycle was typically six weeks long. However, the technical challenges tend to drive up development costs so the company had initially selected an offshore layout firm.



In RF design, the relational aspects of RF and High Speed Digital Circuitry must be carefully managed.

Every micron of metal in an RF circuit has the potential to enhance or degrade transmission lines in the circuit. Most of the printed circuit board assemblies (PCBAs) have high speed digital circuitry adjacent to RF circuitry, creating the need to carefully manage the relational aspects of these two distinct types of circuitry to ensure highest performance. An additional challenge, that was exacerbated by the short prototype cycle, is that cellular RF operates on many bandwidths with multiple frequencies. This element of nuance-control, makes it

critical to work iteratively with the RF engineer. While working offshore was one-third the cost of an onshore solution, language issues and technical misunderstandings were making the layout process take three times as long.

The Process

San Diego PCB's team had experience with cellular RF and understood the need to become the hands of the engineer in terms of translating the functionality he/

she is designing into a workable layout. San Diego PCB's understanding of electromagnetic interference (EMI) theory helped make that level of coordination possible.

The team changed the strategy from a serial design process to a concurrent engineering, gated development process that compartmentalized digital and RF elements to allow for a parallel development. The team also worked with the customer's manufacturer to ensure manufacturability considerations were incorporated in the layout process.

The Result

The customer established a long term relationship with San Diego PCB and as the teams established a close working relationship, the process became extremely efficient. Today, the team delivers layout in a third of time the offshore team took and is near the offshore team's original projected cost.

A Unique Sales Approach is Increasing Engineering Business

As Technical Sales - Manager of Special Accounts, Larry Holten is doing a fairly unique job within the electronics manufacturing services (EMS) industry. He is applying his knowledge of Milwaukee Electronics' engineering capabilities to help both the Company's existing customers and new prospects identify areas where the Design Engineering team, San Diego PCB and in some cases, Screaming Circuits, can help fill gaps.



Milwaukee Electronics' array of product development support options helps to fill gaps in OEM engineering teams.

"In many cases, the engineering opportunities identified would never have been outsourced. They become

opportunities because a customer's in-house team is short on time or the particu-

lar mix of skills needed for project. We are finding that often those teams never realized that our team could seamlessly fill their resource gaps," Larry said.

Over the last few months, Larry has been visiting customers and new prospects with program managers and sales to present the range of capabilities the engineering team can support. The end result has been a flow of new projects for printed circuit board (PCB) layouts, test fixtures, product design and firmware development.

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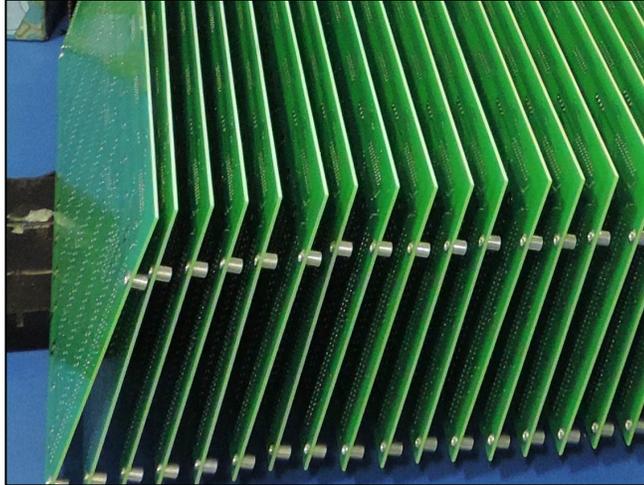
PCB Pricing: How Low is Too Low?

One of the benefits of having an International Purchasing Office (IPO) in Singapore is the ability to identify and thoroughly audit a range of suppliers throughout Asia. Since 2011, the team has developed many strong supplier relationships and continuously looks for new sources. The majority of Milwaukee Electronics' supply base resides in China currently.

Before engaging with a factory in China, the Singapore IPO performs factory audits. If a new vendor is approved, samples are provided and a request is made to the customer to have that supplier added to their approved vendor list (AVL). Typically, the change includes cost savings for that customer.

One of the trends the team has noticed is that the PCB fabrication supply base in China is in the middle of a period of consolidation. Additionally, the Chinese government's incentives for electric car manufacturing are causing raw material prices,

especially copper, to rise. As a result, the team is looking to broaden its PCB fabrication supplier base. Earlier this year, the



Milwaukee Electronics won't trade quality for lower price.

IPO team audited a PCB fabrication house that appeared to have extremely attractive pricing that was being used by an existing customer.

During the visit, the IPO team found that

the reason the fabricator was able to offer lower pricing than many of its competitors was due to their choice of laminate materials, which typically is a major cost driver. They offered a range of choices including one option for products not likely to last beyond eight-to-ten years.

This is a great example of where Milwaukee Electronics draws the line when it comes to cost savings. Even if a customer's product lifespan where less than five years, this is a risk the team at Milwaukee Electronics considers unacceptable.

In the Milwaukee Electronics' sourcing process, cost is important in the initial stage. Once pricing is determined to be competitive, stability and transparency become the

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Milwaukee Electronics Addresses Material Lead-Time



John Fleischman

Material lead-time on a variety of components is being pushed out from eight weeks to 26 weeks. Milwaukee Electronics' combination of strong systems

and strong supply chain relationships has enabled it to continue to meet its customer's requirements for increased production demand.

"Our strong relationships with key distribution channels gives us visibility into availability trends. Our MRP Share/Bonded Program with our key distributors allows us to see current demand through six months of

demand. Our team is continuing to look at options to ensure that changing component availability does not impact our customers' product requirements," said John Fleischman, Corporate Supply Chain Director.

Message from Mike

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tions in Q4 for both our Milwaukee and Tecate facilities.

Our annual customer satisfaction surveys went out Sept 19. While respondents

remain anonymous, we use the consolidated data provided to make decisions on investments, process improvements and the services we offer. If you received a survey and have not yet returned it, I en-

courage you to fill it out. Listening to our customers is our best source of business intelligence.

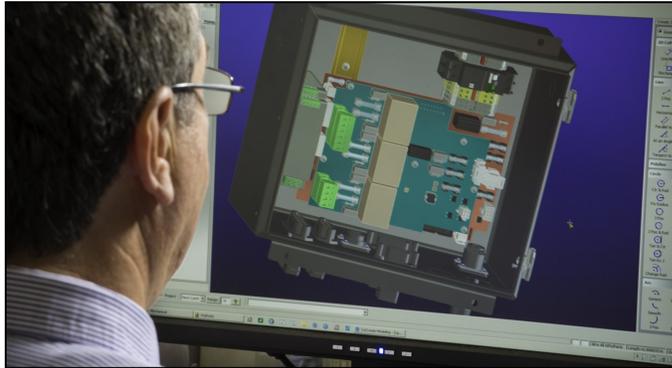
P. Michael Stoehr
President & CEO

Engineering Business

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For example, one customer who supplies communications systems fiber optics for naval vessels, has outsourced a project for mechanical and hardware design for an upgraded product. When that design effort went well, the firmware development effort was also awarded. Production is scheduled to begin in late 2018.

In another case, the engineering team helped a customer with young design staff redesign an industrial temperature control product, handling both the hardware design and



Milwaukee Electronics' Design Engineering team has the skills and tools to support a wide range of design efforts.

software development efforts.

On the new business side, Larry has identi-

fied four new PCB layout opportunities along with a prototyping opportunity, in one case in collaboration with Senior Director of Business Development Scott Pohlmann.

"We are selling both transactional and continuous support services that aren't widely sold by EMS companies. As a result, we have to educate the market on how we can align our engineering and product development support options with their requirements. Once we have that conversation, we find a lot of companies are very interested in having that support," added Larry.

How Low is Too Low?

(Continued from page 4)

primary considerations and are developed as a strong relationship is formed. Milwaukee Electronics has built a strong

and capable supply base in Asia, we will continue to do so in a way that adds value to customers. At the same time, the Company will continue to avoid situations where ag-

gressive cost reductions translate to reduction in quality or component reliability.

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