

MILWAUKEE ELECTRONICS NEWS

Q3 2019

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.

Tecate Technology Investment and Capacity Increases

Milwaukee Electronics' facility in Tecate, Mexico continues to see business growth. To support that, the Company is both adding capacity and enhancing its manufacturing technology.

"We studied our capacity needs and looked at the assembly technology requirements of our business. We have some mixed technology printed circuit board assemblies (PCBAs) with over 200 through-hole solder points that are non-wettable. We felt adding selective solder equipment was the best way to automate that process. At the same time, our automotive-related customer base is growing as well. The complexity of those SMT PCBAs re-



Above, an inline 3D solder paste inspection station.

quires inline 3D solder paste inspection (SPI). So, our equipment additions are helping to enhance quality and productivity.

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Message from Mike

Annual Customer Survey Helps Guide Our Investments

October is the month that we conduct our annual Customer Survey. This is our opportunity to listen, and our customers' opportunity to share with us how well



Mike Stoehr

we are accommodating their needs. As in the past, this survey is done via a third-party firm to preserve respondent anonymity. If you receive a survey, I encourage you to fill it out as honestly as possible. Most of the

investments and internal improvements we have made over the last few years are a direct result of the feedback we've received via our survey. Customer feedback has also helped us identify support gaps in our business model or opportunities to make business easier for our valued customers. Our goal is to delight our customers, and continue to focus on addressing underserved outsourcing needs. We welcome your thoughts on those opportunities and I thank you in advance for participating in our survey.

While this survey serves as a "flashlight" directing us, we are also busy responding to the current needs of the business. Due to the continued robust economy, and the political atmosphere created by the tariffs,

we are overwhelmed with new opportunities for quoting our services. While we welcome this challenge, the sheer volume of requests has required us to modify our quotation process in order to avoid extended response times. As with any process that undergoes change, there are adjustments that need to be made during the implementation process. I ask your indulgence for a bit of patience as we apply these process changes to our quotation process. We want to respond to all the needs of our current and future customers in a timely way to ensure their business needs are successfully met.

In addition to the onslaught of additional

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Engineering in Action

Tecate's Test Engineering Team Optimizes Functional Test

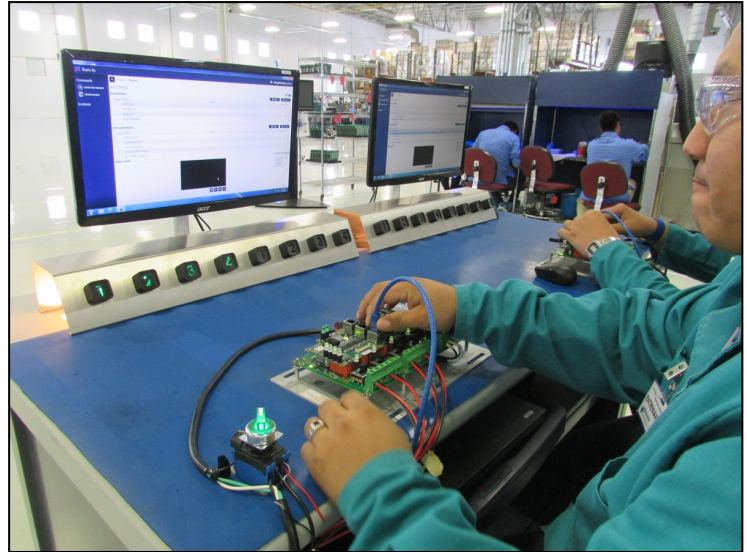
One of Milwaukee Electronics' customers had a problem. Demand for their traffic camera products has been more than double their original forecast. As a result, the original functional test and burn-in setup had become a bottleneck

in the production process.

The Tecate test and manufacturing engineering teams collaborated in developing a solution that reduced the size of the test platform while increasing tester throughput.

"The customer has six different printed circuit board assemblies (PCBAs) undergoing this test and burn-in process. There were variations among the assembly types that necessitated the creation of three different platform modifications," said Ricardo Del Castillo, Tecate's Manufacturing Operations Manager.

The original test design used a benchtop



The redesign on this benchtop test unit increased throughput to two units simultaneously.



The redesign on this test unit quadrupled units under test and reduced the test station footprint from 72 sf to 6 sf.

setup that required two people to test each unit and tested one unit at time. Tecate requested additional fixtures from the customer and then redesigned the fixtures to accommodate multiple units.

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Tecate

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ty, as well as increase capacity, said Ricardo del Castillo, Tecate Manufacturing Operations Manager.

The facility is adding a wave solder machine followed by the selective solder machine to one of its mixed technology PCBA assembly lines. An engineer is being sent to Milwaukee Electronics' Portland, OR facility to train on the selective solder machine already installed there.

"Approximately 85% of our PCBA products will benefit from the addition of selective solder. We plan to install this configuration on one line and then will decide if we need to add selective solder to a second line in Q1 or Q2 next year. Our capacity studies suggest we

will need to add a second machine next year, but we want to observe actual throughput before taking that step," added Ricardo.

The Tecate facility is evaluating 3D SPI equipment from two different manufacturers.

"Quality starts with solder paste deposition and it is the biggest 'component' on the board. We are seeing more advanced technology PCBAs with BGAs that require a much higher level of statistical process control (SPC) on the solder parameters and want to upgrade our SPI equipment to ensure we can provide the level of data collection our customers require. We are evaluating Parmi and Koh Young equipment to determine which platform best fits our needs," said Ricardo.

The Parmi Sigmax system features their patented laser inspection system. Koh Young uses an optical inspection system. The Parmi evaluation was finished in August and the Koh Young unit will be evaluated in September. Both units work well with the Panasonic SMT placement equipment platforms that Milwaukee Electronics standardized several years ago.

"Our goal is to utilize automation wherever throughput or quality considerations suggest that is the best option. These equipment additions will help us improve quality through better process control and minimized variation, while increasing throughput significantly," said Ricardo.

Test Optimization

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The production floor footprint for the test has been reduced from 72 square feet to six square feet. The redesigned configuration for the first fixture enables one person to test four units simultaneously. The team used a 3D printer to print customized tooling and optimize the fixtures for efficient load and unload, changing a 3-5 minute cable plug-in process to a single snap into the fixture. Two additional fixtures for different PCBA types have been modified to test eight units simultaneously. A final fixture for a more complex PCBA can now test two boards simultaneously. While the test cycle time has not been shortened, throughput has increased substantially across all products.

“The customer is very happy with our redesign effort. They provided the cabinet containing their finished product which interfaces with the units under test. Our team developed the optimized fixtures, test software and designed the test process,” added Ricardo.

The team now plans to review functional test stations in other facilities to determine if the test strategy they have developed for this project can optimize other projects.



The redesigned burn-in cabinet can now test eight units simultaneously.

Message from Mike

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quoting opportunities, we have anticipated the need for additional manufacturing space. About 18 months ago we initiated, and now have completed the expansion of our Tecate factory, dou-

bling its size. We began some manufacturing in the new space in August. I invite you to consider a visit to this factory now that the construction is complete, to see our most technically advanced

and space accommodating factory location.

P. Michael Stoehr
CEO

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