

SEM Improves ROI for PCB Assembly with Valor Process Preparation

Shahab Jafri, President of Streamline Electronics Manufacturing (SEM), and his team work under high pressure and at a breakneck pace—this is the environment that a company endures when processing multiple new product introductions (NPIs) every day. SEM is a strategic manufacturing partner of Harbor Electronics who contracts with semiconductor companies to build load boards that are designed and used to test chips on automated testing equipment (ATE). Each load board is unique to the particular chip being tested—a new product every time—and the chip engineers want the boards ready to go, with 100% yield and no “dead-on-arrivals,” in just a few days. The time spent using equipment to test the chips is expensive, and ATEs are in high demand.

SEM faced multiple challenges in their quest to deliver high-quality, zero-defect load boards with this short turn-around time. Shahab’s team runs multiple NPI projects daily. Beginning with the raw

PCB data from their customer, SEM engineers must perform a thorough design for assembly (DFA), program the SMT lines, including assembly, test, and inspection and then ship the finished high quality product to the customer in just two to three days.

Because SEM’s customers need such a quick turnaround with high yield for their test boards, early detection of issues is the only way to prevent costly delays. Previously, with limited early detection, assembly issues caused by designs that did not take the manufacturing process into account were found and resolved while the boards were in the process of being built, adding to the cost of the board and impacting delivery schedules. Design of the load boards is a complex process in which scope of the design is comprehensive but with many process limitations. Design engineers often compromise DFA rules for both PCB fabrication and assembly processes to achieve their desired design requirements. Because of the lack of proper design-for-assembly (DFA) analysis during the design process, manufacturing issues commonly crop up during the assembly process.

Additionally, the SEM team receives CAD and BOM data from their customers in a multitude of formats. They then use the data they received from their customers to perform DFA, write programs for the SMT, inspection, and test equipment, create electronic work instructions, and produce stencils. All of these processes have their own file formats and programming methods, so the process of going from

ABOUT SEM

Founded in 1994 and headquartered in Fremont, California, Streamline Electronics Manufacturing, Inc. (SEM) is a full-service product development and contract manufacturing provider. The company focuses on maximizing core technologies to deliver breakthrough designs and innovative products to today’s ATE and other leading technology companies. SEM has experience in producing a broad range of products in the electronics industry, serving customers in various business segments, including ATE, medical, industrial automation, automotive, memory-related products, recreational, and unconventional products.

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“Communication, quick response, high quality, and support of our customers is critical to our business. The Valor solution has allowed us to become more responsive to our customers’ needs as well as to increase the quality of the product we deliver, driving toward the ultimate goal of zero-defects, ever. Valor’s solution has helped us to work smarter, quicker, more efficiently, and with greater control by automating and consolidating a multitude of processes that were previously managed with less efficiency. The result of all this effort with Valor is time saved, money saved, quality improved, and ultimately a much more satisfied customer.”

— SHAHAB JAFRI,
PRESIDENT OF SEM, INC.



multiple data input formats to multiple data output formats was daunting. In addition, the process of managing engineering change orders (ECOs) was a challenge because the SEM team had to constantly double-check that all changes on the input correctly propagated downstream to all the various output systems and formats.

The SEM team realized they needed a better solution. They evaluated various solutions, but it was only until they evaluated the Valor Process Preparation suite for PCB assembly that they found a complete solution. The Valor Process Preparation solution allowed SEM to implement a single process for customer data consolidation and validation, DFA analysis, SMT/inspection/test programming, electronic work instruction generation, stencil design, and ECO management, all within a single environment.

Within a short time of installing and using the Valor Process Preparation solution, SEM realized a significant return on their investment in not only tangible cost savings but also with the intangible increase in quality and confidence in delivering a superior product to their customers. With Valor's Process Preparation solution, the SEM team is able to receive any data format regardless of the CAD tool used for design. With Valor's DFA tool, they are able to catch potential assembly problems before even starting the assembly process. In two instances, SEM found and remedied major assembly issues that would have been detected two weeks down the road. This saved both SEM and their customer a substantial amount of time and money and avoided product delays. Previously, the only way to find these issues would have been to build the boards and find the errors through testing and/or failure in the field.

The Valor Process Preparation suite also allows SEM to use one software solution to program all of their SMT, inspection,

and test equipment—reducing the number of separate third-party applications from four to one. The realized benefit is a reduction in SMT line programming and elimination of errors caused by the synching of revised program generation from multiple systems for ECO changes. Also, using the Process Preparation solution, in conjunction with the Valor Parts Library (VPL), allows SEM to automatically generate new shapes for their SMT equipment for new parts they receive in NPI's saving hours of hand creation per NPI.

All in all, SEM has been able to drastically reduce the time required starting from receiving customer data all the way to starting the assembly process. This is a substantial saving in time and effort previously experienced by SEM before implementing the Valor solution.

The input to Valor Process Preparation includes most commercially offered CAD formats as well as Gerber, IPC2581, and ODB++. The ability to bring in any CAD format and automatically generate ODB++ is a plus for SEM and the fabrication team; the test platform they use prefers the ODB++ format and this helps to normalize the process with other entities, reducing time and eliminating errors.

SEM was able to replace multiple systems for programming SMT, inspection, test, creating work instructions, and stencil management with one system that has a simple user interface and flow. This not only allows for a significant reduction in time spent on these tasks

but also ensures that all processes can be performed by multiple people.

Previously, specific personnel were assigned to the specific programming or data generation tasks in the process. If a person was out sick or, worse, if there was attrition in the company, then that left a big gap in their ability to move a customer's product through the assembly-line. Now, SEM has all of the team members trained on one simple environment with Valor Process Preparation. This ensures that, no matter who is available for the shift, all elements of the line programming and delivery are adequately covered.

After a month and a half of implementing Valor Process Preparation, the SEM team was able to quickly review upcoming assemblies and detect possible issues ahead of time, which is absolutely critical for their fast turn-around NPI environment. Managing data through one tool makes it not only easier and faster to process assemblies but also enables more effective management of ECOs throughout the process.

SEM has also modified their workflow with their customers to receive data one to two weeks ahead of time so that the team can perform a more detailed DFA analysis and allow the customer to make the required changes to the design with no delay in the NPI process. SEM is now able to implement central data generation through Valor, from solder paste inspection to surface mount technology (SMT) assembly to automated X-ray and optical inspection and to test, as well as work instructions and stencil.

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