

Camstar Electronics Suite

Providing best-in-class MES capabilities to PCB and box-build manufacturers in one solution

Benefits

- Provide best-in-class MES capabilities in one solution
- Provide faster and streamlined new product introductions
- Facilitate full production control, visibility and traceability
- Proactively build quality into manufacturing execution
- Provide direct connectivity to SMT lines and manufacturing equipment
- Enable advanced material management

Summary

The pressure to rapidly deliver a broad variety of high-quality products to market, along with the shift from mass production to mass customization, affects the ability of electronics companies to satisfy their customers' needs while improving business performance.

Using digitalization for modern manufacturing execution technologies helps printed circuit board (PCB) and box-build manufacturers to change and reconfigure production and quality processes at the speed required, while meeting increased customer demand, strict quality requirements and profitability constraints. They can contemporaneously realize faster time-to-market and improve their ability to compete in a rapidly changing, consumer-driven marketplace.

Solution overview

Camstar™ Electronics Suite software provides the foundation for many top-tier electronics manufacturers and product innovators that want to adopt smart manufacturing and Industry 4.0 strategies. It expands a true digital thread from design and engineering into manufacturing operations, and supports the entire product lifecycle from managing production workflows and providing operator guidance, advanced electronic work instructions (EWIs) and quality inspection tools to complete traceability of operations and material.

Built on the Camstar Enterprise Platform, Camstar Electronics Suite is an easy-to-use and digital-enterprise-ready manufacturing execution system (MES) that provides stellar scalability, performance and configurability for global PCB and box-build operations, as well as enhanced integration with enterprise resource planning (ERP), product lifecycle management (PLM), manufacturing operations management (MOM) and automation technologies.

Camstar Electronics Suite

The screenshot displays the Camstar Electronics Suite interface. At the top, there is a toolbar with icons for 'New', 'New Rev', 'Copy', 'Copy Rev', 'Messages', 'Delete All', 'Audit Trail', 'Hierarchy', 'Where Used', 'Reset', and 'Save'. Below the toolbar, the 'View objects by' dropdown is set to 'Workflow'. The main area is divided into several sections:

- Objects:** A list of objects including 'Change Mgt Workflow', 'Local Rework Reason', 'Local Rework Reason Group', 'Rework Reason', 'Rework Reason Group', 'Work Center', and 'Workflow' (which is selected).
- Instances:** A list of instances for various workflows, such as 'Parallel SMT ROR: 1', 'Sampling Workflow ROR: 1', 'SMT Assembly Workflow R...', 'SMT Test ROR: 1', 'SMT Workflow ROR: 1', 'SMT-1 ROR: A', 'SMT-2 ROR: A', 'SMTA PCB Workflow ROR: 1', and 'SMTA PCB Workflow 2 ROR: 1'.
- General:** Fields for 'Engineering Change Order' and 'ERP Route'.
- Workflow Diagram:** A central area showing a flowchart with nodes like 'Labeling-1', 'SMT Assembly', 'SMT Inspection', 'SMT Repair', 'SMT Inventory-1', and 'Depanel'. The diagram is zoomed to 100%.
- Specs:** A list of specifications including 'ChipShooter-1', 'Component Inventory', 'Depanel', 'ICPlace-1', 'Labeling-1', 'Manual Assembly', 'Manual Assembly-2', 'Manual Inspection', and 'Manual Inspection-2'.

Build products right the first time

With a seamless integration with PLM solutions like Valor Process Preparation software, Camstar Electronics Suite accelerates new product introduction (NPI) and change management activities, while ensuring as-designed manufacturing processes with paperless operations. Each potential design or engineering issue identified on the shop floor is efficiently managed with closed-loop feedbacks to the PLM system. With the integrated Camstar Electronics Suite, PCB and box-build manufacturers implement streamlined NPI processes and establish flexible operations to

support product changes and early improvements. This includes:

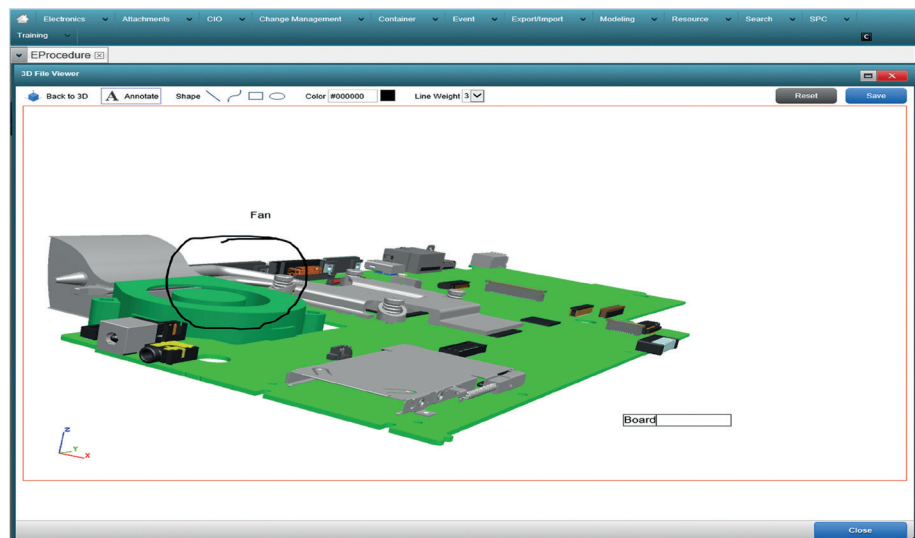
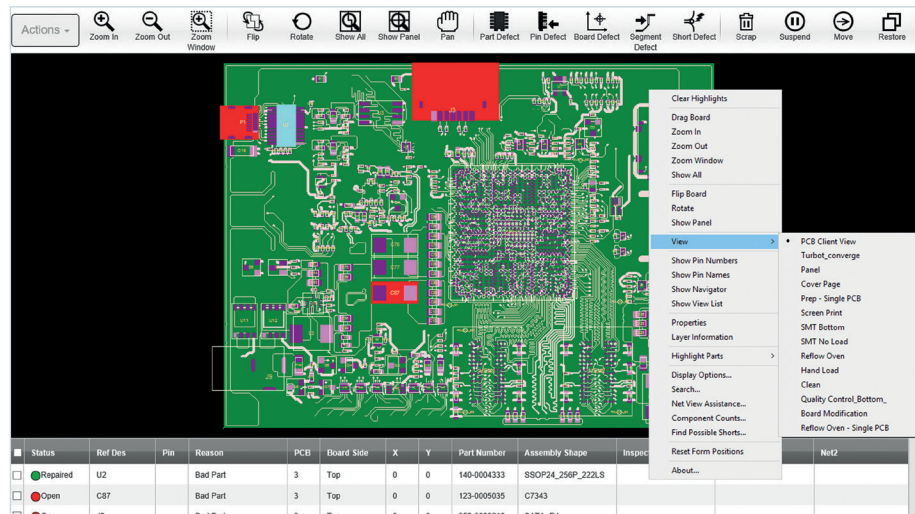
- Intelligent NPI data import from Valor Process Preparation and out-of-the-box (OOTB) manufacturing workflows management
- Serial number management for PCB and panels
- Integration with labeling machines and label printers
- Manufacturing dispatching and visibility

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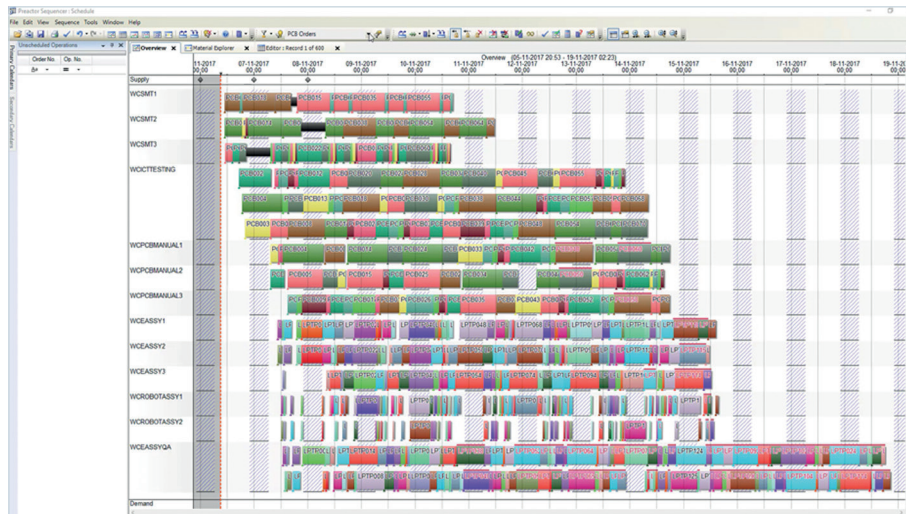
Manage shop floor complexity and improve efficiency

Camstar Electronics Suite combines best-in-class and OOTB manufacturing execution capabilities for PCB and box-build processes in just one solution. The standardized, high-performance and user-friendly functionalities in Camstar Electronics Suite enable material, equipment, processes and operators to be used as defined by the engineering department, and provides full traceability and easy access to as-built data. Electronics manufacturers can benefit from improved management of shop floor complexity, while enhancing efficiency levels and reducing trainings and maintenance costs, including:

- Shop floor documentation and EWI
- Statistical process control (SPC) and pass/fail in-quality tests
- Automated optical inspections (AOI) with graphical defect logging
- Guided repair actions and repair support
- Smart scanning, auto recognition
- Efficient shop floor data collection and automation layer control
- Genealogy recording and complete manufacturing traceability
- OOTB and custom operational reports: work-in-process (WIP), defects and production quality, component traceability and serial number genealogy



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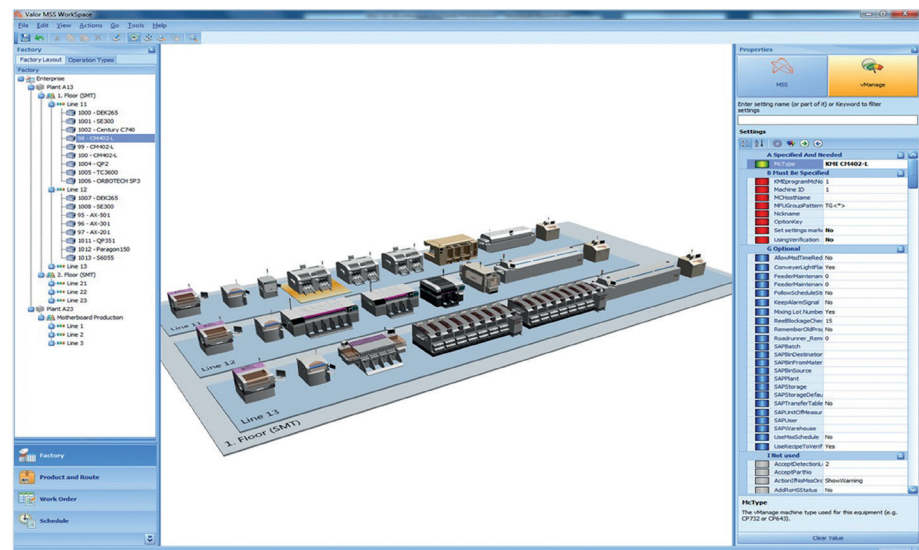
Optimize production capacity with intelligent plans and schedules

Camstar Scheduling software provides an OOTB, advanced planning and scheduling (APS) solution that integrates Camstar Electronics Suite with the Preactor APS and Valor Production Plan. With Camstar Scheduling, PCB and box-build manufacturers generate optimized and detailed production plans and schedules to efficiently balance demand and capacity across surface-mount technology (SMT), mechanical and assembly lines in just one solution. This seamless integration enables electronics manufacturers to implement efficient, responsive and flexible factories to respond to the ever changing customer demand:

- Visualization of the current production capacity load and potential problems
- What-if analysis and scenarios to analyze the impact of production changes and unexpected events
- Generation of detailed plans or a group of plans
- Distribution of the work orders across the different production lines

Consistent and flexible material flow

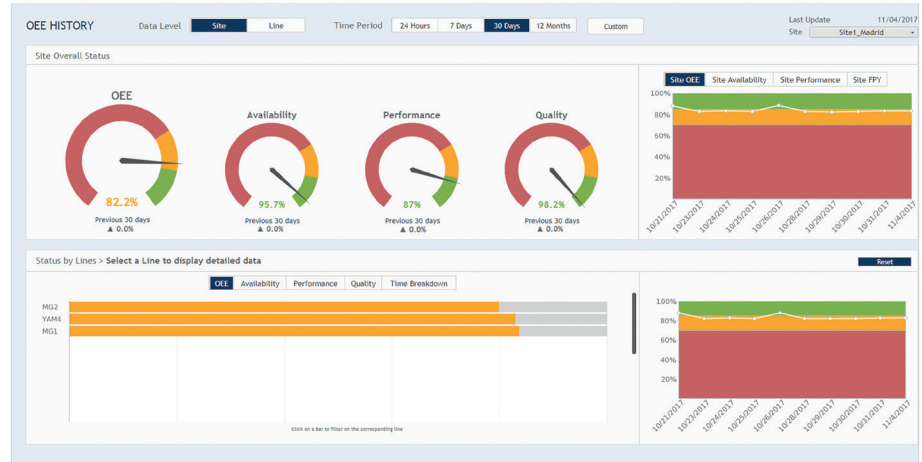
Material management inside the factory occurs in various places and levels, requiring different types of support in order to efficiently keep track of inventory levels. Camstar Electronics Suite,



integrated with Valor Material Management, addresses this need, offering just-in-time (JIT) technology to provide a consistent material flow to the production lines based on demand. The solution provides electronics manufacturers with a flexible solution to address every specific production need, helping them to significantly reduce inventory, provide a smooth manufacturing flow, and eliminate bottlenecks and unexpected delays, including:

- Tight machine integration and precise inventory management to eliminate buffer stocks and guesswork
- Accurate and up-to-date information on the number of parts consumed, wasted and remaining on every carrier
- Advanced JIT technology to anticipate order completion and feed exhaust points, upcoming changeovers and operational constraints

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Direct connectivity to the shop floor
Valor IoT Manufacturing, integrated with Camstar Electronics Suite, enables detailed manufacturing insights by providing access to data from all the machines and processes on the shop floor. Using a single and standardized specification, the Open Manufacturing Language (OML), this edge device provides a heterogenic connectivity to all electronics machines as well as other forms of assembly and processes, and transforms raw production data into valuable key performance indicators (KPIs) for effective decision making and manufacturing intelligence:

- Plug-and-play interfaces for SMT, test and inspection machines
- Online process control and interlocking
- Data normalization to OML
- OOTB performance-focused dashboards: a full data flow from automation to MOM

Online manufacturing visibility and big data intelligence

By connecting Valor Manufacturing Analytics, an enterprise manufacturing intelligence (EMI) solution specifically designed for electronics manufacturers, with Camstar Electronics Suite, provides executives, line managers and engineers with online visibility, identification of production issues and trends, and other crucial information to deliver high-quality products on time, as well as reduce waste and improve asset utilization:

- Fully configurable analytics and reports for electronics
- Utilization, quality, traceability and materials out-of-the-box reports
- Overall equipment efficiency (OEE), statistical process control (SPC), trends and alarms
- Advanced correlation analysis and reports
- Online, multi-site visibility

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