

Sanmina Achieves 10-Day Lead Times for Industrial Systems OEM



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Published in May 2018 on <https://content.yudu.com/web/1pyxz/0A1q3le/USTECH-MAY2018/html/index.html?page=20&origin=reader>

A global industrial systems company was struggling to meet customer demand for its family of complex electromechanical controls. Supply chain challenges included long component lead times and management of several system variants. Sanmina redesigned the company's global supply chain to consistently achieve a 10-day system delivery.

Lot Size of One

The tier-one industrial controls OEM needed its complex systems built to order in lot sizes of one and consistently delivered within a 10-day lead time. The existing solution resulted in a significant backlog of past due orders and on-time delivery issues. The supply chain was complex with over 1,200 components, more than 130 suppliers and cumulative lead times of 34 weeks.

Multiple technologies, including electronics, hydraulics, motors, pumps, and valves were connected with more than 100 cables per assembly and tested using three-phase power at up to 600V in systems weighing over 1,000 lb (453.6 kg). The supply chain, manufacturing and test process needed to be redesigned to achieve lead time objectives while meeting stringent safety and quality requirements.

With a mix of technology, including electronics, hydraulics, motors, pumps, and valves, and a finished system that weighs half a ton. Sanmina developed a process to turn out a unique product in less than 10 days for each.

During visits to Sanmina manufacturing facilities, the customer immediately recognized the company's expertise with manufacturing in industries where safety and reliability are critically important. Sanmina's PCB assembly, cables, enclosures and system integration



Sanmina uses projected forecasts and actual shipments to predict the availability of discrete components.

capabilities would greatly simplify supply chain complexity. Sanmina's proposed approach was compelling.

Four-Part Solution

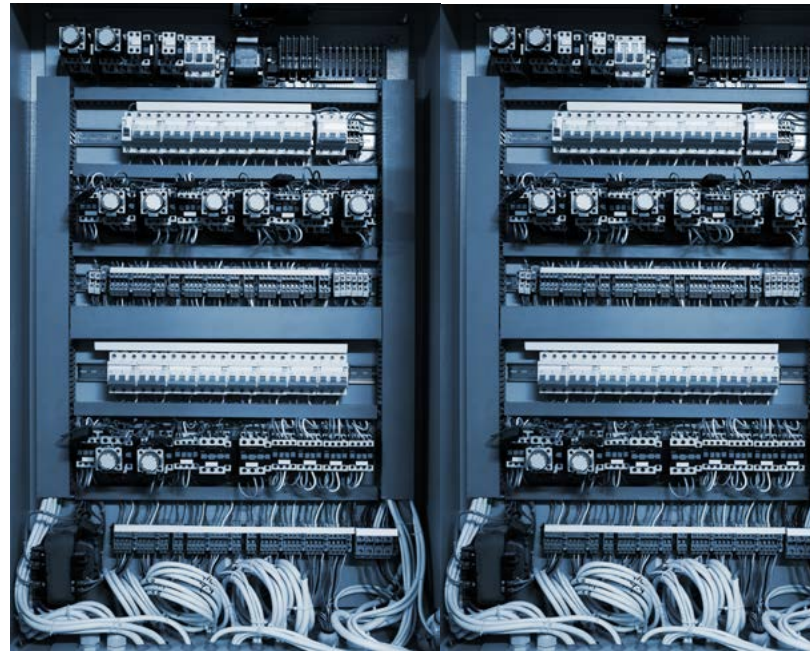
Sanmina established a cross-functional customer focus team, including program management, order management, materials, manufacturing process engineering, product engineering, quality engineering, and test engineering. The company solved the overall delivery and lead time problems with a four-part solution:

Supply Chain Redesign. Projected forecasts and actual shipments were used to develop an accurate forecast for all discrete components. Availability of components to support the 10-day lead time was achieved by implementing a safety stock program, based on the forecast analysis and historic component usage data. Enclosure fabrication, cable subassemblies, OCB assembly manufacturing, and test were transferred to Sanmina facilities and local suppliers.

Custom Order Management. Each order is unique. The Sanmina order management team provides new customer orders to the customer focus team. The manufacturing process engineer validates that the configuration can be built and works with the customer to resolve any issues. The product engineer develops all necessary documentation. Test engineers validate the custom test software for use during production.

Configure-to-Order Manufacturing System. Originally, each system was built to order with all components issued to the kit, without pre-assembly. Each component was installed one by one, every cable was routed and each pin connection individually terminated. This process was time-consuming and made diagnostics and repair complex. A lean manufacturing configure-to-order approach uses subassemblies that correspond to feature options that are pre-built and tested on a dedicated production line. On receipt of an order, the material is individually kitted with the exact configuration. A base option is populated with pre-tested sub-assemblies. This flow reduces manufacturing cycle time and greatly simplifies test diagnostics.

Complex Testing. Three-phase power and voltages as high as 600V are used during the functional test process. Certain control units are calibrated using valve adjustment to control speed and acceleration using stringent customer specifications. Functional tests are conducted using test programs provided by the customer. These tests simulate the field application work environments and the test technicians are trained to calibrate the systems in specific configurations. The company also developed a fault tree analysis tool



Industrial Control Systems

to streamline failure diagnostics. Results include: 99 percent on-time delivery with 10-day lead times; new supply chain and configure-to-order process enabling demand flexibility in excess of 20 percent; and a sub-assembly approach that greatly simplifies system test and diagnostics.

Sanmina makes some of the most complex optical, electronic and mechanical products in the world. The company provides end-to-end design, manufacturing and logistics solutions, delivering excellent quality and support to OEMs, primarily in the communications networks, computing and storage, medical, defense and aerospace, industrial and semiconductor, multi-media, and automotive sectors.