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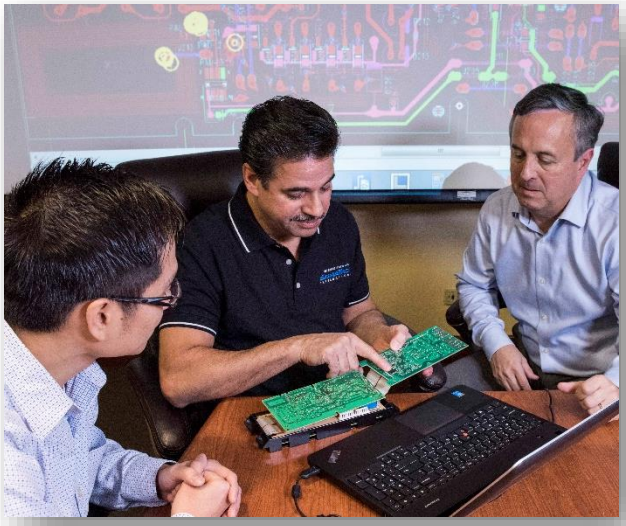

Supporting Legacy Industrial Products: Four Critical Contract Manufacturer Capabilities

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Supporting Legacy Industrial Products: Four Critical Contract Manufacturer Capabilities

By Curtis Campbell

The industrial product sector incorporates products which may have extremely long lifecycles and/or older technology designs. Reasons include cost of products, limited ability to change the infrastructure in which they must operate, market unwillingness to upgrade and legacy product lines whose volumes don't justify a redesign to new technologies that must be continued to support a large installed user base.

From an outsourcing perspective, this drives the need to find suppliers able to cost effectively manufacture superior quality products whose bills of material (BOM), manufacturing technology and test processes require higher levels of support. Documentation may be limited and there may be a need to combine depot repair or refurbishment services with production.

SigmaTron International offers its customers a full service solution that includes support for legacy products. This whitepaper looks at four areas that are critical to supporting these products:

- New product introduction (NPI) support
- Ability to manufacture in lower cost regions
- Strong supply chain management (SCM) organization
- Ability to structure a complete solution.

NPI Support

Project transfer of legacy products requires a well-defined process. Documentation can represent one of the biggest challenges in transferring legacy industrial projects. In some cases, projects have been built by a team that may not accurately be capturing process or assembly changes through engineering change orders. When this condition exists, the contract manufacturer receiving the new program may need to send a team to assess the existing process and fill in gaps in the documentation. Inventory can be another challenge. In some cases, lifetime buys have been added to inventory as parts have become obsolete. In this situation, the receiving contract manufacturer will need to assess existing inventory to determine quality and storage conditions, so that any issues can be identified and addressed with the customer prior to transferring the material. Some industrial product categories also have highly specialized test requirements and that is another area where the receiving contract manufacturer must assess requirements more comprehensively than typically done with less specialized functional testing.

At SigmaTron, the NPI process starts with the receipt of CAD files from the customer, along with the BOM and approved materials list (AML). If DFM and product lifecycle management (PLM) activities have not been performed earlier in the process, they are performed during NPI.

Other issues that can potentially impact production cost are also evaluated as the process flow is designed. This focus on developing the most efficient process flow is particularly beneficial for highly

regulated products, where there may be limitations on process changes once the product is in production.

Once the process flow is approved, SigmaTron's use of leading edge software enables machine programming to be done using the CAD data. This cuts time and ensures accuracy.

Product and process validation is done based on customer requirements. Any issues discovered during NPI and pre-production runs are documented and provided to the customer. The result is that defect opportunities are eliminated wherever possible, improving first pass yields and eliminating non-value added activity. Equally important, the process is designed to convey information back to the customer in an easy-to-analyze and make decisions upon format. This two-way communication helps eliminate any issues found during pre-production as well as convey lessons learned that may be applicable to related products or future product iterations. This level of communication also helps act as a check-and-balance in cases where original process documentation was limited.

Ability to Manufacture in Lower Cost Regions

Legacy industrial products may have significant manual labor content, particularly if through-hole technology is utilized. Building products in lower cost labor regions is one way to reduce that cost.

SigmaTron is able provide a tailored solution for its customers that can be as limited as PCBA manufacturing and as complex as system integration, fulfillment to end market and repair depot support. The Company also has engineering resources able to support redesign or obsolescence management activities.

SigmaTron utilizes a scalable solution approach offers customers the ability to build different product lines in different facilities when their requirements don't fit a single facility option. Forecasting and production layout is optimized for those projects. This can be particularly beneficial for legacy products. For example, SigmaTron's facility in Elk Grove Village, IL has a box build area that has been optimized for smaller volume box build production enabling unrelated products to share the efficiencies and economies of scale of a standardized work cell arrangement, even though project volumes don't justify a dedicated work cell. Workstations are designed for easy changeover and a dedicated team supports the area, ensuring correct materials are stocked point of use as needed and everything is in place to support the products being built that day. Conversely, SigmaTron's facilities in China and Vietnam have been optimized for high volume production. Its facilities in Mexico support both medium and high volume production. U.S. facilities support a range of project volumes, as well.

SigmaTron's support resources can be flexed among facilities, so choosing a facility in a lower cost region with minimal overhead does not translate to a loss of expertise. For example, a complex test requirement in Vietnam may be supported by a test engineering team in China or the US that has encountered similar challenges. This leveraging of expertise helps keep staff overhead at reasonable levels while ensuring that customers have access to the right level of expertise, regardless of the facility they choose.

SigmaTron's team has also optimized resources for older technology products. For example, its facility in Acuna, Mexico designed an inline automated optical inspection (AOI) system to inspect odd-form

through-hole part placement. Developing the systems in-house provided a cost effective solution for ensuring superior quality in a predominately manual operation.

Strong SCM Organization

Materials often represent 60-75% percent of total product cost. While an OEM designer may understand the technical specifications of the components selected for the approved material list (AML), a contract manufacturer's team is considering issues such as supplier quality trends, availability, component commonality with other frequently purchased parts, lifecycle stage and pricing trends. This expertise is especially critical with legacy products where there is higher risk of obsolescence at both the component and off-the-shelf subassembly level.

SigmaTron's supply chain management team utilizes a combination of global procurement expertise, strong systems support and optimized purchasing practices to identify competitively-priced suppliers and eliminate unnecessary cost. SigmaTron's team also collaborates with customers to optimize forecasting, so that non-value added costs such as expedites or excess material can be minimized. Lean manufacturing philosophy and Six Sigma core tools are used to improve throughput and quality in production.

SigmaTron's supply chain model utilizes centralized supply chain management coordinated with its IPO in Taiwan. There is centralized management of key commodity segments such as printed circuit boards, semiconductors (ICs and linear logic), power products, connectors, electronic components (relays, electrolytic, ceramic and film capacitors), plastics and metals. Consequently, regardless of market conditions, the team is focused on identifying best sources and monitoring trends in each commodity.

SigmaTron's proprietary iScore system links all its facilities globally to provide company-wide visibility into inventory levels and materials status. The same suite of supply chain management tools is also linked to customers and program managers.

A clear communication process on anticipated changes maximizes the efficiency of these tools. Additionally, these tools can help with frontend "what if" analysis on engineering changes where cost impact may be influencing whether or when the engineering change is made.

Collectively, this provides significant visibility in helping customers understand options and costs as product requirements, demand or part availability changes over time.

Ability to Structure a Total Solution

One of the challenges with outsourcing legacy products is that their requirements can evolve over time and if a contract manufacturer has limited services, changing requirements can translate to a need to change contract manufacturers. Common issues that drive this include:

- Volumes drop and the product is no longer attractive to the current contract manufacturer
- Maintaining competitiveness, obsolescence or component availability issues may drive the need for engineering support beyond the contract manufacturer's resources
- There may be a need for the contract manufacturer to provide increased value-added post-manufacturing services that go beyond its standard capabilities
- Margin pressure may drive the need for a lower cost manufacturing process.

While these are all legitimate reasons to change contract manufacturing partners, the reality is that the volumes associated with a legacy product that needs a new solution may not generate enough savings to pay back the cost of transferring it in a reasonable amount of time. Consequently, it is important to analyze the likely ways project volumes and scope might change over time and determine if the contract manufacturers under consideration will be able to evolve with those changes. There can also be value in selecting a contract manufacturer capable of supporting both new production and legacy product, so that total account value compensates for drops in volume when legacy projects near end of life.

As mentioned, SigmaTron has the ability to support changing volumes and margin sensitivity over time. The combination of its world class supply chain management and engineering teams are a powerful resource in addressing obsolescence and component availability issues, plus supporting needs for redesign for increased functionality should competitive pressures drive that need. Its team in Union City, CA even gives old products new life through their BGA reballing/rework capabilities. In addition, its manufacturing and test engineering teams have a track record of identifying cost reduction opportunities through process redesign, custom automation or improved test strategies. Post manufacturing, strong systems support SigmaTron's ability to provide depot repair and fulfillment services when needed and they have successfully supported unique industrial configure-to-order/variable demand models worldwide. In short, SigmaTron's solutions can evolve as project needs evolve. Its business model supports both legacy and leading edge manufacturing technologies.

When a contract manufacturer capable of supporting the full spectrum of likely product needs is selected, legacy industrial products can be as efficiently outsourced as newer product generations. Utilizing a contract manufacturer capable of supporting both legacy industrial products as well as subsequent newer generations can further increase that efficiency. The key is selecting a supplier able to evolve to support the changing dynamics associated with supporting longer product lifecycles.

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