Supporting **Variable Demand:** Four Key Areas to Analyze

BY GARY BURNETT, JR.

As systems have created better real-time visibility in terms of end market demand trends, and raw material availability and production status in the supply chain, original equipment manufacturers (OEMs) have reduced finished goods inventory levels. The upside of reduced inventory is faster inventory turns and reduction of the non value-added costs associated with excess inventory. However, the downside is that a supply chain interruption or unanticipated spike in demand could result in empty shelves. One strategy to avoid that is simply to require the electronics manufacturing services (EMS) provider to carry a finished goods Kanban. However, pushing the costs of excess inventory safety stock down to the supplier doesn't truly eliminate the cost. A better strategy involves working with the EMS provider to create a system that provides the needed flexibility, but minimizes the non value-added costs associated with material or finished goods in an extended "wait state."

Burton Industries, a regional EMS provider with manufacturing operations in Ironwood, Michigan has a number of customers with highly variable demand. The four areas their team has focused on optimizing to support variability efficiently are:

- Design for procurement (DFP)
- Forecasting
- Stocking programs
- Production throughput.

Design for Procurement

It is well established that design without consideration for manufacturability or testability can add both hidden and actual cost to production and test. Consequently, implementing design for manufacturability and testability recommendations from the manufacturing team or a contract manufacturer is a common practice in product development. Design for procurement or DFP, is not as widely practiced. Benefits of DFP can include better pricing, reduced inventory line items and improved quality. At a product development level, DFP focus should include:

- Ensuring as much component commonality with related products as possible
- Specifying at least two sources for every line item on the bill of materials
- Avoiding "over-specifying" tolerances, values or finishes on parts where less precision could provide a greater range of available materials
- Limiting use of mixed technology parts or difficult to procure packages
- Evaluating stage of lifecycle for specified components to minimize use of components with high obsolescence risk
- Evaluating likely product lifecycle against the lifecycle of any "off-the-shelf" subassemblies designed into the product

Burton Industries engineering team analyzes products for manufacturability related issues, in addition to looking at design for procurement issues.

DFP can be more challenging in legacy products, where the cost to redesign may not be recoverable in a reasonable amount of time. That said, redesign provide cost benefits in the following areas:

- Improved component availability, if components causing availability issues are second sourced or designed out
- Lower inventory-related costs if the number of line items can be reduced
- Lower material costs with a switch to SMT from through-hole, or if unnecessary finishing costs can be reduced in custom parts
- Elimination of obsolescence issues, if older components are redesigned out
- Reduced manufacturing costs if redesign eliminates components that require manual placement or specialized processing.

In this contractor's model, DFM and supply chain management practices are very closely linked. For example, in custom part commodities such as printed circuit boards, metal fabricated parts and plastics, a core group of suppliers has been chosen based in part on their willingness to support DFP and DFM efforts with their engineering expertise.

Forecasting

While it is not unusual for larger OEMs to have very detailed forecasting

methodologies for outsourcing, smaller OEMs or those new to outsourcing often don't have a formal process. Expertise of contractor can be critical in these instances. In Burton Industries' case, the program management function addresses this as part of program setup, evaluating the customer's initial demand projections against historical trends and ordering patterns. The goal is to set a system that is as transparent as possible on both sides where variations in demand are quickly noticed and addressed.

Stocking Programs

Stocking programs are one way to provide reasonable flexibility at optimum cost. Stocking agreements at the raw material level are a good way to ensure sufficient stock is on hand to meet unanticipated production upsides. A key element of this strategy revolves around supply chain relationships. Supplier selection activities look closely at suppliers' willingness to be flexible in the way they support each program. While there is no question that EMS companies that spend billions of dollars have more leverage in material procurement over their regional EMS provider counterparts, the reality is that a regional EMS provider with strong supply chain relationships may have greater ability to support variable demand in their customers' programs because the bulk of their business involves variable demand in mid-range volumes.

For example, at this contractor, supplier alliances at the custom component level have been created that provide optimum minimum lot sizes for their typical customer program volumes. Relationships with distribution include pre-set bonds on high risk components. Finished goods Kanbans are also set up on an as needed basis provided a master ordering agreement is in place.

Production Throughput

The speed at which orders are processed through a factory also helps reduce lead-time in addressing variations in demand. Additionally, facilities driving high throughput through Lean manufacturing philosophy typically eliminate hidden costs and quality issues that can be driven by work-in-process in wait state. In this contractor's business model, production orders are targeted to be complete within two-to-three weeks of material availability, and typically are completed in less time than that. The ability to rapidly process orders within customer-defined lead-times enables configure-to-order product to be built out as ordered rather than stocked as a partial build to be completed based on actual demand. This eliminates the cost of stocking common subassemblies plus the risk that engineering change orders (ECOs) could drive rework of that inventory.

Achieving high throughput involves several areas of focus. In this example, the production team has been cross trained and can float among multiple operations based on demand requirements. Production lines have adopted a "pit crew" mentality to reduce changeover time, pulling in additional cross-trained set-up team members to speed changeovers. Two-to-three projects are kitted simultaneously and stocked at point-of-use so there is always a kit available to load. Equipment has been selected based on ease of changeover and programming simplicity. Production capacity is carefully evaluated and investments in additional capacity are made to ensure the flexibility is not impacted as the business grows.

Burton Industries' fast throughput ensures configure-to-order products are built as needed to eliminate the quality, inventory cost and configuration management issues that can arise with stocked subassemblies.

At the regional EMS level, achieving optimum flexibility at competitive cost requires a multi-point strategy and transparency among customers, the contractor and the supply chain. Key areas to analyze in selecting a contractor capable of supporting variable demand include engineering resources, program management competencies, production area efficiencies and supply chain relationships.

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Point of use stocking and equipment that is easy-to-program helps speed changeovers.