



Cutting Time in Product Development: Four Areas Where Your Contract Manufacturer Can Help

Helping Your Bottom Line Series

Cutting Time in Product Development: Four Areas Where Your Contract Manufacturer Can Help

By Gary Burnett, Jr.

Nowhere is the phrase “time is money” more accurate than in product development. A slow product development cycle can increase engineering costs, material costs and marketing costs. When design and manufacturing are outsourced, some original equipment manufacturers (OEMs) see design and manufacturing as distinctly different areas. The reality is that close collaboration among the customer’s design team and contract manufacturer can reduce time and minimize the potential for costly errors.

Design teams focus on product form, fit and function. However, that focus is often on the customer’s requirements for form, fit and function, rather than best manufacturing choices for delivering the desired form, fit and function. The result is often a more costly manufacturing process or a need for an additional design spin to eliminate constraints or quality issues that aren’t identified until the qualification production run.

The team at Burton Industries sees four areas where their expertise and analysis tools can improve the product development process:

- Design for manufacturability (DFM)
- Design for test (DFT) and identification of optimum test options
- Component selection
- Cost reduction

DFM

A design team that isn’t familiar with manufacturing practices may design a printed circuit board assembly (PCBA) that looks great but is difficult to manufacture. Following good design guidelines not only controls cost, but also ensures good quality. From a manufacturing perspective there are normally two levels to design guidelines. The first are industry-specific guidelines such as those developed by IPC committees that are based on overall best practices. Those provide guidelines on proper spacing for routing traces, placement of vias and pads, and placing components. However, most contract manufacturers also have an internal set of guidelines that addresses equipment and process constraints, ensuring there is adequate clearance for tooling, preferred panel widths to minimize process variation and setup time, and preferences related to tooling hole and fiducial placement. There may also be recommendations on optimized panelization to minimize wasted PCB material, reduce process time or minimize stress on solder joints when PCBAs are separated at the end of the process.

Burton Industries’ team feels that a robust DFM process is critical in mitigating defect opportunities. The more manufacturable a product is, the more assembly processes can be automated. As PCBAs continue to shrink in size, automation is critical to maintaining high quality.

Incorporating these guidelines early in the design process often eliminates a design respin after PCB layout.

The Test Equation

DFT is another key area where early teaming among design and test personnel can save time and money. Process control requires a mechanism to monitor the process. Electrical test can serve as that mechanism. Providing at least one testable-sized via for each net in a design is good practice. Other good practices include keeping the test pad (which can be a via) at least 35 mils diameter size and minimum 75 mils diagonal spacing to adjacent test pads. Test pads should also be kept a minimum of 75 mils from body of component and 25 mils from a component lead. Following these two design guidelines will allow for good test coverage utilizing a lesser cost fixture.

Burton Industries' test engineering team has other options for reducing the cost of test as well. A recent whitepaper: *Is JTAG Testing Right for Your Product?* outlines a low cost and often fixtureless solution for many low-to-medium volume products.

Component Selection

Component lifecycle analysis should be a key part of every product development effort. In performing the analysis and developing a bill of materials (BOM) and approved vendor list (AVL), the team at Burton Industries considers a number of factors including:

- Obsolescence risk based on the stage of each component's lifecycle
- Best packaging styles for availability within the current market constraints
- Availability of alternate components
- Most cost effective options
- Product family component commonality considerations
- Quality/delivery track record of specified suppliers.

The team also looks at the anticipated volumes and likely demand patterns because that can influence component selection as well. While design for manufacturability or testability (DFM/DFT) analysis is regularly performed by contract manufacturers, that analysis process doesn't analyze whether or not the approved vendor list (AVL) and component specifications are optimized for variable demand. That analysis is best done through a design for procurement (DFP) process. DFP focuses on minimizing the number of unique parts required, minimizing the amount of customization required and broadening the range of supplier choices. The end result is fewer inventory line items to manage, reduced costs and better component availability.

The team's DFP process includes:

- Reviewing the bill of material to ensure choices that provide as much component commonality with related products as possible
- Specifying at least two sources for every line item on the bill of materials
- A focus on minimizing "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 aligns DFM and DFP very closely, and its supply chain supports that practice. 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.

Cost Reduction

The product development process is also the best time for a manufacturing team to look for opportunities for cost reduction. DFM, test strategy and DFP often generate cost saving recommendations. However, additional savings may be generated as manufacturing processing options are evaluated. Secondary processes such as soldering of odd-form parts, encapsulation and higher level assembly can often be optimized to a higher degree if discussions of options start early in the design phase.

In short, ensuring a manufacturing expert is part of the product development process ensures that input on critical decisions happens before the design is finalized. That translates to fewer design iterations, few or no surprises in pre-production and a shorter design cycle.

Contact a member of our team at (906) 932-5970 to learn more about ways Burton Industries’ team can support your product development efforts.

Gary Burnett, Jr. is vice president of operations at Burton Industries. He can be reached at gburnettjr@burtonindustries.com.

About Burton

For 40 years, Burton Industries, Inc. has had a tradition of providing customized manufacturing solutions to OEMs in the medical, industrial, motor control, specialized consumer, security, building controls, defense and professional tool markets. We support the full product lifecycle from product development through end market support services.

We've built our business by listening to customer needs and efficiently supporting high mix, variable demand projects at both PCBA and higher level assembly (HLA) stages. Our manufacturing strategy includes:

- *Extraordinary communication with customers*
- *Teaming with suppliers*
- *Optimizing test*



- *Eliminating hidden cost drivers.*

Our primary manufacturing location is in Ironwood, MI and additional HLA manufacturing capability is located in Hazelhurst, Wisconsin.

For more information visit: www.burtonindustries.com.