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Test early to keep quality in product designs

By Chris Rehl

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Designing and developing products has evolved into something more than a top manufacturing initiative — it's now a high-end business priority. Manufacturers are graded on how a product is received by a customer: Is the design user-friendly? Does the product work as expected? Is it more functional than the competition's offerings?

These and others are key questions that manufacturers can live and die by. Bringing low-cost, high-speed and quality products to market is no longer an option — it is a must.

Today's market trends, however, are complicating matters. Demand-driven volatility, shifting market trends, a rise in global outsourcing and shortened product life cycles have put many manufacturers in a compromising situation where most choose market speed and low costs over quality. But as the headlines continue to be inundated with issues of shoddy manufacturing performance, manufacturers can no longer take chances and must recognize the critical role quality plays.

New product design and development strategies that dive deep into manufacturing, test and process data must be tapped to ensure that the most functional products are brought to market the right way.

Design as QA tool

Product design needs to be treated as a strategic component of any manufacturing strategy and as the driving force in bringing a new product to market. Reliability and product performance starts right here.

Design must be treated as a continual improvement methodology stretching across the entire product delivery process. Potential quality issues must be flagged immediately, through test and measurement strategies, with the test results incorporated as feedback directly to the initial phases of design.

The initial design phase typically uses a series of electronic design automation tools such as computer-aided design and product life-cycle management applications and processes to develop the conceptual design, and capture all the pertinent data for designers. Component specification data is created and added to libraries for use by simulation applications, which test various parameters and tolerances of a conceptual design.

Once the initial design phase is completed, a limited number of physical prototypes are created to validate that the initial design is practical and can be realized. Prototypes are typically put into a design validation test cycle, which applies a variety of input stimuli to the product, with resulting behavior recorded and measured against expected results. They can point out obvious or potential product shortcomings, and can be used to apply redesign or tweaks to improve performance.

The production phase for electronic devices holds the key to bringing the original design concept to reality and products to market exactly as envisioned. The trigger for this resides within the mountains of data that can be gathered and analyzed across multiple processes, from globally remote contract manufacturers, to identify controllable sources of variance that eliminate waste, improve production yields and ensure production quality remains at peak levels.

Despite these massive opportunities, many organizations have no coherent access to this information. Large amounts of time and resources are spent developing custom solutions that are obsolete before even being deployed, as the data landscape is subject to frequently changing business and product demands.

Making the most of this data and turning it into actionable insight not only tears down the wall between design and implementation of devices, but also opens the floodgates to

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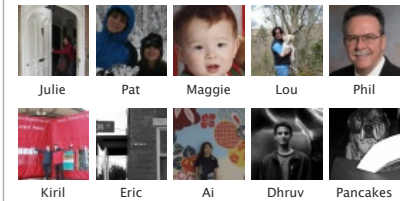
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