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Taking the Sting Out of Warranty Costs

By Chris Rehl, Director of Marketing, Cimtek, Needham, MA

It's a big nightmare for electronics manufacturers: A sure-bet product — with years of development pumped in — is delivered with great fanfare and ringing cash registers. Two months later, a glitch affecting overall system performance is discovered in a few of these systems. The number grows and weeks later, thousands of products await repair or replacement.

The media will have a field day, making news about the shoddy state of manufacturing and calling the manufacturer to task for poor customer service. It's publicity for sure, and surely not the kind that most companies would want. The costs are spiraling out of control. Suddenly, the product that was supposed to make millions puts a big red mark on the balance sheet.

For years, warranty costs were electronics manufacturers' dirty little secret. But no more. The Securities and Exchange Commission (SEC) recently mandated that manufacturers accurately reserve and account for warranty reserves on the balance sheet. Conservative estimates put warranty costs at \$23 billion in 2007 for U.S. manufacturers; a generally accepted rule of thumb is two percent of total revenue.

With numbers like these, manufacturers are taking a closer look at how they can get ahead of the risk associated with warranties. What many forward-thinking companies are finding is that there's value found in an often overlooked place: the data collected



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during product test and repair.

Ending the Vicious Cycle

It may be oversimplifying, but warranty costs and product quality are inextricably linked. The key is to look for new ways to strike a better balance between cost and quality. And that's where the diligent use of test and repair data throughout the entire product lifecycle enters the equation.

In all fairness, this is easier said than done. Today's market conditions — the global state of outsourcing, more volatile customer demand and the pressure for continuous innovation — places a serious strain on continuous quality improvements. These challenges all too often result in quality issues that don't manifest themselves until the product is out the door and in the hands of the consumer, where the warranty risk rears its ugly head. Consider a typical scenario: New production lines are activated to meet anticipated demand for the hot new product. Problems arise and are addressed reactively to get as much product on the shelves as possible, as quickly as possible as the window for profit-taking shrinks to less than 90 days. By the time the cold hard reality of the product's failure meets the warranty requirements, the manufacturer takes the loss and moves on, pinning hope on the next new product and its ability to deliver enough revenue to lessen the pain. Unfortunately, the quality flaws may not have been completely analyzed and designed out, and so the cycle begins again. With a more sophisticated, analytical use of data gathered in product test and repair, electronics manufacturers — whether OEMs or EMS providers — can break this vicious circle driven by trade-offs between cost, quality and speed to market and have it all.

Using Test Data

The intelligence gained from product and functional test delivers immediate value on the warranty question in two ways. First, better quality products get to market in the first place driving immediate sales revenue, and more intangibly — customer loyalty to the brand. Second, with better intelligence about component, functional and overall product performance, manufacturers can design and implement product strategies that more closely align with the real-world use of products, reducing the overall risk of exposure. Critical data should include:

- Quality data from component manufacturers, ensuring that key performance and margin specifications are verified before production.
- Data from assembly test steps including Automated Optical Inspection (AOI), X-ray and In-Circuit Testing (ICT), which can identify process and mechanical design issues early in the production stage.
- Functional test data aggregated during assembly to ensuring proper operation of sub-assemblies before subsequent assembly steps.
- Final system testing data, verifying products designed are built and operated the way intended.
- Post-sales support and repair center operations data, enhancing the efficiency of customer interactions, increasing repair operations and providing a complete product genealogy linked back to the initial design phase.

The cost of poor quality is best thought of as the difference between the actual cost of a product and the perfect cost if each product produced were defect-free and met customer needs the first time.

When potential quality issues are flagged early in the product delivery process it's generally true that the cost of repairing is significantly less than when the quality issue is discovered in the aftermarket.

While calculating this cost is complex, enumerating all the functions touched by a product return can illustrate the scope of the time and resources required to recover. These include: **Post-sales**, including field failures, field service, returns, warranty charges, and customer complaints.

Internal, the costs of finding defects in the manufacturing process, such as process, finished goods, incoming inspection, documentation, scrap, rework, and failure analyses.

Evaluation, the costs related to the review of specifications, review and inspection of manufacturing processes, materials, maintaining accuracy and calibration of test equipment.

Preventive, the costs for initiatives to improve processes that are intended to reduce the costs of post-sales, internal and evaluation failures, such as training, supplier evaluations, process control, process planning, and audits. Managing test data

holistically — where information collected at any stage is fed back and forward along the product lifecycle — has a powerful impact on reducing the involvement of many of these stages and speeding the time to resolution for quality issues. Savvy electronics manufacturers increasingly find that creating a database to collect data from multiple operations gives them a new way to uncover quality issues in a timely and cost-effective manner. Even when operations are thousands of miles away and managed by third parties, this approach means that oversight and accountability are built into the management of product quality.

The information drives better decisions about sourcing components, product design and production strategies. Ultimately, it can be used by warranty management teams to drive improvements in customer relationships, reduce overall warranty costs and design warranty strategies that deliver the best of both worlds — truly satisfied customers and the lowest possible warranty liabilities.

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