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CASE STUDY | TECHNOLOGY

Streamlining Circuit Card Assembly Pre-Production with ScanCAD

ScanCAD INTERNATIONAL

PROBLEM

Challenges in Pre-Production Efficiency and Quality Control

Microboard, a leading Electronic Manufacturing Services (EMS) company, faced significant challenges in their pre-production phase. Traditionally, they relied on board shops to provide Gerber data for final inspections before production. However, this method proved unreliable. Delays in receiving data or limitations due to ITAR compliance (International Traffic in Arms Regulations) often hampered their ability to thoroughly assess board quality. This lack of information resulted in several issues:

- Rework and Scrap: The inability to verify Gerber data led to undetected problems like board stretch, over-etching and inconsistencies in array data. These issues manifested during production, causing rework and generating scrap. Microboard estimates that due to these issues previously cost them upwards of 10% in overall pre-production costs.
- Limitations of Manual Inspections: Manual inspection processes were time-consuming and prone to human error. They were particularly ineffective at identifying subtle defects like solder mask inefficiencies and minor etching variations.

SOLUTION

Implementing ScanCAD for Pre-Production Inspection

The inconsistency of Gerber data prompted Microboard to explore alternative solutions for pre-production inspections. ScanCAD emerged as a viable option, allowing them to perform inspections directly on the completed boards. This shift empowered them to gain independence from unreliable data sources and conduct more thorough quality checks.

The initial goals for ScanCAD were:

- Achieve Independence: Eliminate reliance on board shop data and conduct pre-production inspections in-house.
- Enhanced Inspection Accuracy: Utilize ScanCAD's capabilities to identify problems like board stretch, over-etching, and array data inconsistencies.
- Improved Communication: Facilitate early detection of design flaws and provide timely feedback to customers.
- Capabilities and Implementation: Microboard found ScanCAD's functionalities to be highly beneficial for their pre-production workflow.

Key features include:

- Automated Detection: The system automatically detects issues like board stretch and over-etching, ensuring dimensional accuracy.
- Array Data Verification: ScanCAD allows for precise verification of array data placement, eliminating potential inconsistencies.

SOLUTION

Implementing ScanCAD for Pre-Production Inspection

- Impact on Production Efficiency and Costs: The integration of ScanCAD has demonstrably improved Microboard's pre-production efficiency and reduced overall costs. The Executive Director of Technology estimates **at least a 30% reduction in error rates during initial prototype builds and repeat production runs**. This significant improvement can be attributed to several factors:
- Reduced Line Shutdowns: Early detection of defects like solder inefficiencies and board stretch prevents production line stoppages, leading to smoother production flow. **Microboard estimates that ScanCAD has reduced line shutdowns due to pre-production errors by 40% based off of product complexity.** Major issues typically found are: board stretch, over-etching, board array step and repeat variation from lot code to lot code. ScanCAD allows validation of stabilization when changing PCB board houses.
- Improve First-Pass Yield: By catching errors earlier, ScanCAD helps ensure parts are built correctly the first time, minimizing rework and scrap.

These improvements translate into tangible benefits for Microboard:

- Increased Efficiency: Faster production cycles and reduced rework lead to overall production efficiency gains. **Microboard reports a 40% reduction in pre-production cycle times since implementing ScanCAD**. As board technology and complexity increase in terms of smaller pad and part sizes (12mils pitch parts) QFNs, micro BGAs, and other bottom terminated components - ScanCAD allows for a greater increase to reduce solder-balling and shorts against this type of assembly. It also reveals variations in components smaller than 0201s, allowing to see pad size measurements and spacing.

SOLUTION

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- Enhanced Cost Control: Lower rework rates and reduced scrap contribute to significant cost savings. **Microboard estimates that ScanCAD has helped them achieve a cost reduction of over 20% in their pre-production process.**
- Traceability and Quality Control: ScanCAD plays a crucial role in ensuring parts are built correctly from the outset. It creates a digital record of pre-production inspections, including high-resolution images and detailed component measurements. This data serves multiple purposes:
    - Traceability: The digital record facilitates traceability, allowing Microboard to track every aspect of the pre-production process and identify any potential issues quickly.
    - Quality Assurance: The detailed data provides verifiable proof of compliance with industry standards, crucial for meeting regulatory requirements.
    - Faster Response: In case of quality control concerns, the data enables faster identification and resolution of problems.

Microboard recognizes the significant value ScanCAD offers and envisions further integration into their workflow. The Executive Director of Technology has expressed interest in functionalities like:

- Bare Board Inspection Integration: Microboard sees potential for using ScanCAD for inspecting bare boards before component placement, potentially catching defects even earlier in the process. This could lead to further efficiency gains and cost reductions.

CONCLUSION

A Necessity for High-Complexity Projects

Microboard's experience with ScanCAD exemplifies the technology's potential to transform pre-production processes for EMS companies. By enabling in-house inspections, improving quality control accuracy, and streamlining workflow, ScanCAD has demonstrably boosted efficiency and reduced costs.

"We wouldn't be able to run with the top two complexity customers we have today without ScanCAD," stated the Executive Director of Technology. **"For high-complexity projects, it's not an option anymore, it's a necessity."**

KEY TAKEAWAYS

- Reliance on unreliable Gerber data can lead to rework, scrap, and production delays.
- Manual inspections are time-consuming, prone to error, and may miss subtle defects.
- ScanCAD enables in-house pre-production inspections, improving accuracy and efficiency.
- Microboard has experienced a minimum 40% reduction in error rates, 40% reduction in line shutdowns due to pre-production errors, and a 20% cost reduction in the pre-production process.
- ScanCAD facilitates traceability, quality assurance, and faster response to quality control concerns.
- The technology is considered a necessity for working with high-complexity projects.

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Microboard is an electronics manufacturing services provider delivering circuit card assembly, system integration, and test services.

Microboard has a proven track record of solving critical electronics manufacturing challenges with leading-edge technologies producing repeatable results.

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