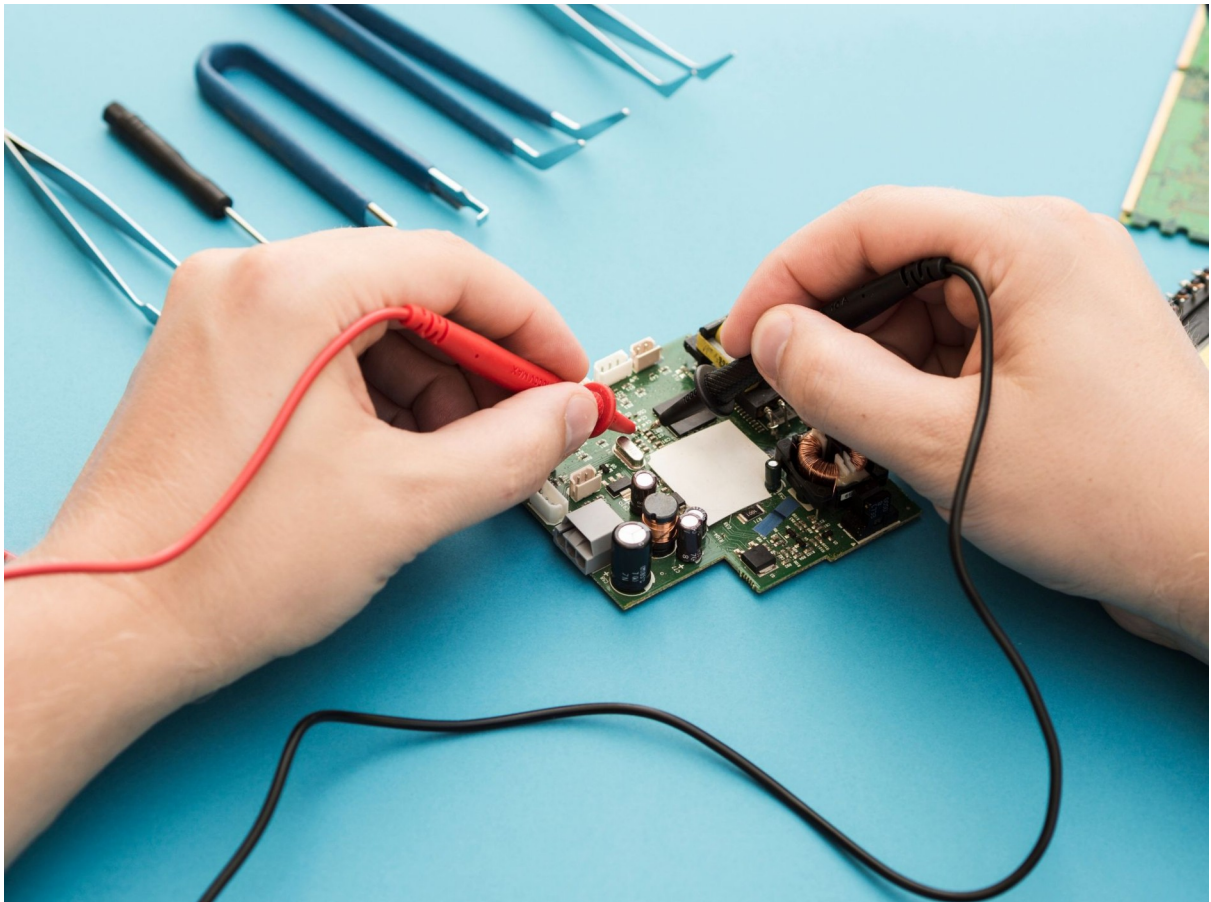


Case Study: Boosting PCBA Functional Testing Through Precision Alignment

Author: Mahommad Maheboob

May 23, 2025

This case study details how a targeted intervention significantly improved the Printed Circuit Board Assembly (PCBA) testing process for a customer in the renewable energy sector. The customer manufactures energy solution products that rely on high-quality and reliable PCBAs. **INDIC's** expertise was instrumental in identifying and resolving the challenges faced.



Challenges:

We encountered several key challenges during the PCBA functional testing:

- **Random Failures on PCBA:** Unpredictable failures during testing led to increased troubleshooting time and uncertainty in the production process.
- **Decreased First Pass Yield (FPY):** The percentage of boards passing the functional test on the first attempt significantly declined, indicating underlying issues in the assembly or testing process.
- **Reduced Throughput:** The overall number of successfully tested and completed PCBAs decreased due to the high failure rate and rework required.
- **Increased Production Hours / Decreased Efficiency:** More time and resources were being spent on testing, diagnosis, and rework, leading to lower overall production efficiency and higher costs.

Solutions:

To overcome these challenges, INDIC implemented the following solutions:

- **Pre-Centering Guide Implementation:** A pre-centering guide was introduced at the testing stage to ensure consistent initial alignment of the PCBAs.
- **Guide Pin Analysis and Correction:** Guide pins were implemented to ensure perfect alignment of the PCBA with the test fixture, this

step revealed a critical discrepancy-mismatch between the guide pin diameter and the actual board diameter.

- **Supplier Verification for Correct Guide Pins:** A thorough check was conducted with multiple suppliers to identify and procure the specific guide pins that precisely matched the required diameter for the PCBA.
- **Replacement of Incorrect Guide Pins:** The existing, mismatched guide pins in the test fixtures were replaced with the correctly sized pins.
- **Re-evaluation through PCBA Functional Testing:** After the guide pin replacement, a new round of [PCBA functional testing](#) was conducted to assess the impact of the change.

Impact:

The implementation of the correct guide pins and improved alignment procedures by INDIC resulted in significant positive impacts:

- **Improved FPY by 7%:** The First Pass Yield increased by 7%, indicating a substantial reduction in the number of boards failing the initial functional test.
- **Elimination of Random Failures:** No further random failures were experienced during the PCBA functional testing after INDIC's implemented solutions.
- **Increased Throughput by 8%:** With fewer failures and less rework, the overall throughput of successfully tested PCBAs increased by 8%.

- **Enhanced Customer Satisfaction:** The improved quality and reliability of the PCBAs, along with the increased efficiency in production, led to higher customer satisfaction.

Conclusion:

This case study, a testament to **INDIC's** problem-solving capabilities, highlights the critical role of precise mechanical alignment in PCBA functional testing. Identifying and rectifying a seemingly minor issue, such as a mismatch in guide pin dimensions, can lead to substantial improvements in key performance indicators like FPY and throughput. The successful resolution of this challenge underscores the importance of meticulous attention to detail in the manufacturing process and its direct impact on product quality and customer satisfaction within the renewable energy sector.

Learn more about boosting PCBA functional testing:

[Functional Testing](#)