

Case Study

High-speed temperature verification ensures PCB quality and safety

Company

Elite Interfaces Ltd

Industry

Electronics testing and
PCB test fixture design

Products

Exergen Micro IRt/c infrared
temperature sensors

Printed circuit boards form the electronic backbone of countless devices, from smartphones to automotive safety systems. The global PCB market exceeded \$75 billion in 2021, with automotive applications among the fastest expanding segments. Elite Interfaces, a UK-based specialist in PCB test fixture design, creates comprehensive testing systems that verify every component before shipment. For an automotive PCB manufacturer, Elite Interfaces needed a solution to verify built-in temperature sensors at production speed, ensuring safety-critical boards would perform reliably.

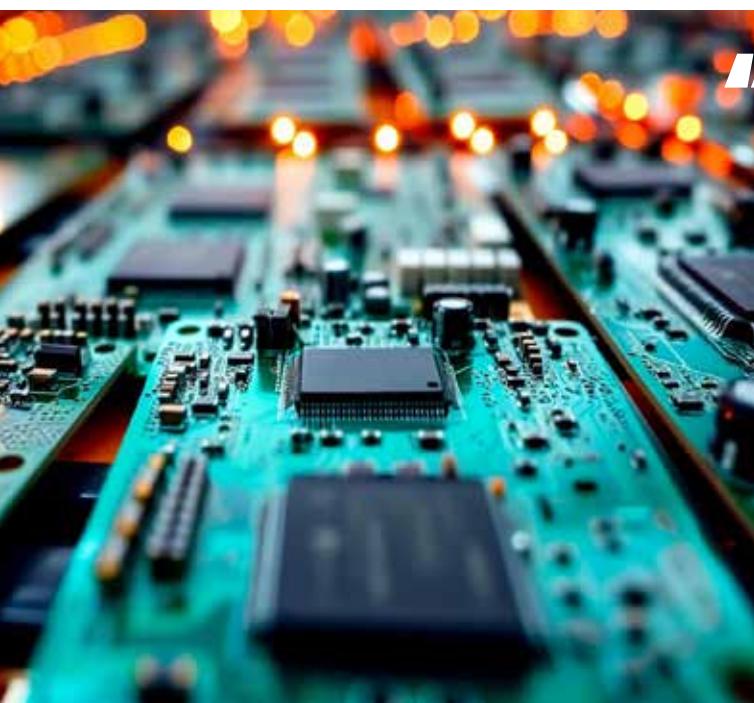


Challenges

The automotive PCB contained a built-in diode serving as a temperature sensor and safety device to trigger alarms if operating temperatures exceeded safe limits. During functional testing, this diode's accuracy had to be verified by comparing its reading against a reference temperature measurement. Every individual board required 100 percent testing before approval. High production throughput demanded extremely short test cycles, making contact temperature probes impractical due to connection time and acclimation delays that would create bottlenecks.

Solutions

Elite Interfaces integrated Exergen Micro IRt/c sensors from CleverIR into their test fixture design. The non-contact infrared sensor measures diode temperature during operational test cycles and compares this reading to the diode's own output. Only when readings match does the PCB pass functional testing, confirming specifications are met. The sensor's compact size allowed easy integration, while its 50-millisecond response time enabled instantaneous readings with each test cycle. Non-contact design eliminated physical connection time, dramatically accelerating throughput.



Results

Elite Interfaces successfully deployed test fixtures that verify diode accuracy on every automotive PCB at full production speed. The system tests complete board functionality, electrically probing all capacitors, conductors, ICs, and the critical temperature-sensing diode. Automated temperature comparison confirms each board's safety monitoring system operates correctly before leaving the facility. This comprehensive testing prevents temperature-related defects from reaching the field, where they could potentially cause safety issues. High throughput capability ensures quality without creating production bottlenecks.

Benefits

The Exergen sensor solution delivers multiple advantages for high-volume PCB testing. Non-contact operation enables rapid temperature measurement without time-consuming physical connections, making 100 percent board testing economically viable at production speeds. The 50-millisecond response time keeps pace with automated test sequences. Compact dimensions facilitate integration into space-constrained test fixtures. Long-term stability eliminates field calibration requirements, reducing maintenance costs and ensuring consistent accuracy. Cost-effectiveness makes the solution practical for high-volume manufacturing environments where equipment ROI is critical.

Fast response and non-contact operation make infrared sensors the only practical solution for 100 percent PCB testing at production speeds.

Conclusion

Elite Interfaces' integration of Exergen sensors demonstrates how advanced temperature measurement technology enables comprehensive quality assurance in electronics manufacturing. The Micro IRt/c sensor solved critical speed and reliability challenges that made contact-based verification impractical for high-volume production. Temperature monitoring plays a vital role in PCB reliability and safety, particularly for automotive applications where component failure could have serious consequences. This testing approach reduces waste, lowers labor costs, and ensures every board meets performance specifications before reaching customers.

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