

# Keysight Technologies

## Mini ICT with VTEP Accurately Detects Solder Failure on SMT Connector Despite No Probe Access

Case Study

Consumer Electronics Manufacturer reports reduction in bone  
pile and significant savings on scrap cost

## Business Need

Advancements in semiconductor and electronic component technology have enabled increasingly smaller consumer electronics devices. While this is great news for end users, smaller PCBA boards are a challenge when it comes to failure analysis. Smaller PCBA boards have less test access nodes compared to larger boards and this directly impacts the manufacturer's ability to pinpoint the exact failing node.

In the case of our customer, boards kept failing on their Manufacturing Defect Analyzers (MDA) and Functional Testers (FCT). Existing testers could only detect open failures on the PCI connector, but there was no way to tell which pin was failing (problem is illustrated in Figure 1). An option to gain greater insight would be to run X-ray tests on the failed boards, however this was too costly and not sustainable in the long term. Consequently, the customer had resorted to the painfully expensive path of scrapping the PCBA bone pile instead of repairing the failed boards, and fixing the root cause to prevent future defects.



U9403A Mini ICT with VTEP effectively pinpoints solder failure on SMT connector

## Solution

To help the customer address their challenges, Keysight Technologies, Inc., worked closely with the customer to understand their unique problem on the failing boards. After much deliberation, Keysight proposed the **U9403A Mini In-Circuit Test System with VTEP**, the industry's leading edge vectorless test innovation. Keysight also worked with the fixture vendor to customize the right fixture as part of the solution. Figure 2 illustrates how the Mini ICT with VTEP solution was used to detect the open solder joint despite the "no probe access" limitation.

Evaluation was carried out on good boards, resulting in the board performance shown in Figure 3. In comparison, this evaluation was subsequently carried out on a board with designated open failures to see if the Mini ICT and VTEP solution could detect the failing nodes. Results were promising, as shown in Figure 4.

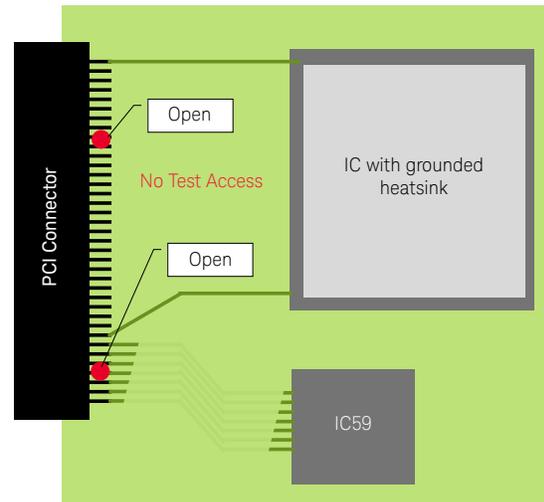


Figure 1. "No test access" or "No probe access" issue faced by the customer makes it difficult for them to pinpoint which SMT connector pin was failing.

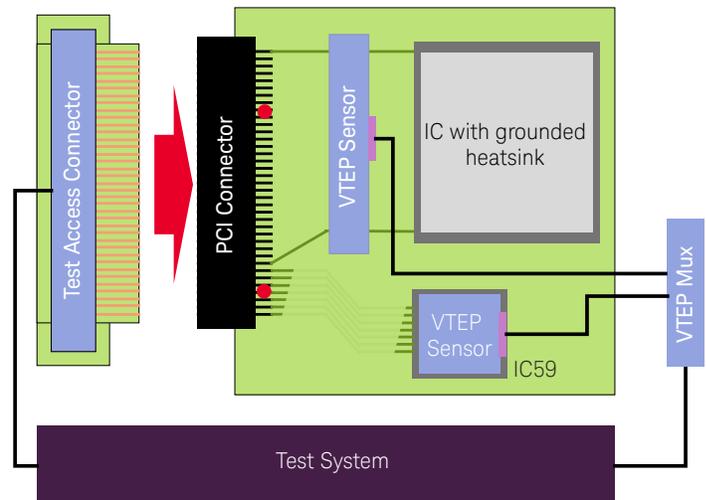


Figure 2. Keysight Mini ICT + VTEP solution effectively detects the open solder joint on the PCI connector despite "no probe access" issue. Test points were moved out of the DUT, and VTEP sensors were moved out of the PCI.

With that, the customer proceeded to test the actual failing boards from the bone pile with the Mini ICT and VTEP solution. Keysight’s proposed solution and innovation accurately revealed the open solder joints on the SMT connector despite the “no probe access” challenge faced with their existing testers.

## Benefits

The swift path to resolution as well as the Mini ICT’s affordability were strong factors to the customer’s purchase decision from Keysight. Since 2016, the customer has purchased 6 Keysight Mini ICT systems. The insight made possible by the Mini ICT helped the customer with effective fault isolation, leading to the implementation of fixes that increased throughput.

## Summary

The Keysight Mini In-Circuit Test System with VTEP has successfully proven itself as an excellent board test solution for ever-shrinking PCBA boards with minimal test access points. This case study records the customer’s satisfaction with the Mini ICT in the following areas:

- Sufficient channels for test at an affordable price
- Accurate detection of repetitive solder failure on boards
- Reduction in future board failures by the same root cause
- Significant savings resulting from a reduction in bone pile and a decrease in scrap cost
- Increase functional test yield

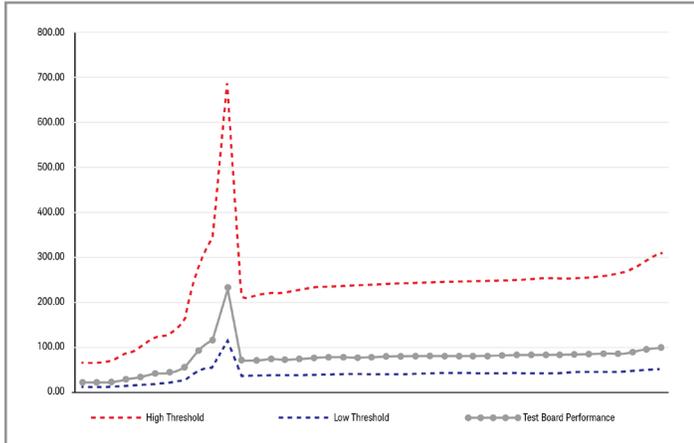


Figure 3. Evaluation result of a good board.

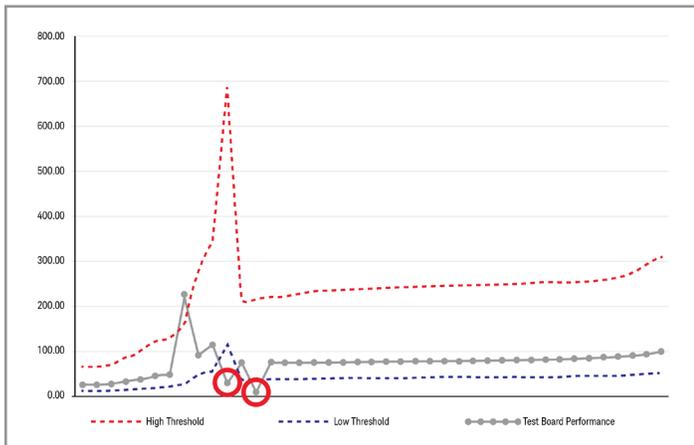
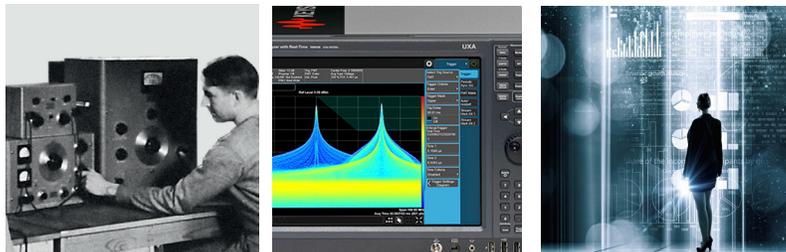


Figure 4. Evaluation result of a ‘defect’ board.

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