10% Increase in ADAS PCBA Testing Throughput

With the i3070 4-module Inline ICT and PathWave manufacturing analytics
The Impact of Autonomous Driving on the Automotive Electronics Manufacturing Industry

Since the gradual introduction of autonomous driving in CAVs (connected and automated vehicles), there has been a high demand in the automotive industry for electronic products used in modern vehicles. Advanced technology such as ADAS (advanced driver-assistance systems) was the heart of autonomous driving. It possesses all of the capabilities of a modern computer, including a high processing speed and a large amount of memory, which enables the system to process multiple data streams precisely and reliably. From lane departure warning to forward collision avoidance systems, the growing complexity of the ADAS ECU has also significantly raised the bar for automotive electronic test requirements.

The reliability of the mission-critical components in a vehicle is the utmost priority for the automotive maker; failure in any of these components could result in injuries or fatalities to end-users.
The Challenge: Meeting Higher Test Standard and Improving Process Efficiency

As ADAS technology continues to evolve, it presents a challenge with increasingly complex ADAS ECU circuitries that require a more sophisticated testing methodology. The automotive PCBA contract manufacturer desired a comprehensive solution that could enable them to effectively and efficiently address the challenges of testing today's ADAS boards. Furthermore, they desired to decrease the number of labor-intensive tasks at their test station, which accounted for 30% of their workforce.

The number of nodes in an automobile's electronics such as ECU generally falls around 1000 or more; therefore, testing with smaller configurations test systems that support lower node counts was effective in meeting these requirements. The number of nodes in electronic devices increases as we integrate more electronics and complex features into the vehicle. A board such as a modern-day ADAS ECU typically has more than 2500 nodes, and this has prompted the need for the manufacturer to upgrade their existing tester to meet the higher test standards of this line of product.

Also, on their list of priorities was finding ways to reduce the labor-intensive tasks. Certain manual and repetitive tasks, such as manually loading and unloading the DUTs (device under test), have consumed significant time and resources. The manufacturer desired to maximize the utilization of their existing workforce by allocating it to higher-value tasks.

Apart from scaling and upgrading their existing test system, the manufacturer was also looking for a way to analyze the data that had previously been collected from the system for traceability and archival purposes. They were hoping to turn this data into valuable insights, which they could then use to drive process improvement and increase the overall equipment effectiveness (OEE).
The Solutions: In-line 4-module ICT & PathWave Manufacturing Analytics

To overcome these obstacles, the automotive electronics manufacturer chose the Keysight E9986E In-Line 4-Module In-Circuit Test System due to its automated handler capabilities and ability to scale up to 5760 nodes. The E9986E enables the manufacturer to test heavier and larger boards with less human intervention. The fully automated in-line handler has also helped the team reduce labor-intensive tasks prone to human error and effectively lower the risk of inducing ESD damage. As a result, they can now redirect their workforce to more valuable tasks.

![Image of Keysight i3070 E9986E In-Line 4 module In-circuit Test System & Keysight PathWave Manufacturing Analytics Software](image-url)

Figure 2. Keysight i3070 E9986E In-Line 4 module In-circuit Test System & Keysight PathWave Manufacturing Analytics Software
Pairing the Keysight E9986E with the PathWave manufacturing Analytics maximizes the potential of the E9986E. The data collected from systems was stored for traceability and archiving in the past. The implementation of PMA has successfully transformed this data into valuable insights that the manufacturer can use to drive process improvement.

In one instance, the management team used the PMA to analyze the test time data from one of the test stations in order to identify processes that could improve. As a result, the management team was able to develop a more efficient board handling process, which resulted in a reduction in overall test cycle time.

**The Result: 10% Increase in Test Throughput and 20% Reduction in Labor-Intensive Tasks**

The E9986E has helped the customer achieve a 10% increase in test throughput and a 20% reduction in labor-intensive tasks after automating certain test processes. Early PMA results also indicate that after converting from an off-line to an EMU in-line (4 Mod) system, the team has successfully reduced the test cycle time from 155 to 137 seconds.

![Figure 3. Tester CT performance from PMA](image)

This solution has enabled the automotive electronics manufacturer to remain relevant, competitive, and successful in the ever-changing automotive electronics industry. Are you ready for the change?
Web Resources

- To learn more about Keysight i3070 E9986E In-Line 4 module In-circuit Test System, visit www.keysight.com/find/E9986E
- To learn how you can maximize the potential of your ICT with the PathWave Manufacturing Analytics, visit www.keysight.com/find/pathwaveanalytics
- To learn more about Keysight ICT products, visit www.keysight.com/find/ict