



ELECTRONIC MFG. SERVICES (EMS)

Saki: True 3D Makes the Difference

By Quintin Armstrong and Satoshi Otake, Saki Corporation

In today's litigious world, 3D automated X-ray inspection has become a necessity, especially in the automotive, medical, and aerospace industries. When boards are exposed to high heat, voids can result in explosions and electrical failures. Head-in-pillow and non-wetting solder joints are especially difficult to detect. The problem with X-ray inspection has been that manufacturers have had to design their inspection systems to remove the images from the underside of the board, so instead of being a true 3D system, they are actually more like 2.5D. Their systems take a maximum of 5 slices through the board, often missing a defect.

Saki's 3D AXI system is a true 3D system, using high resolution planar computed tomography to completely separate the top and bottom of the board. The system takes up to 200 slices through the board, solder joints, and components and inspects and measures them, with on-the-fly reconstruction and volume measurements for every solder joint, creating 3D data for the entire sample. Defects are identified and classified — including 100 percent of head-in-pillow defects, voids, and dry joints. This results in best-in-class Cpk and gage repeatability and reproducibility.

Third Generation

In April, the Saki Corporation marked its 22nd anniversary and the Saki team, customers, and friends celebrated with a roll-out of the company's 3rd generation 3D automated optical inspection and measurement system at IPC APEX 2016 in Las Vegas, NV. Today's advances in the printed circuit board industry have benefitted from Saki's innovative solder paste inspection (SPI), automated optical inspection (AOI), and automated X-ray inspection (AXI) technologies.

"The name Saki has two meanings, blooming flower and going forward, and Saki Corporation is the blooming flower of technology that's continually looking forward," explains Sakie

(Jodie) Akiyama, CEO and co-founder. "Saki has so many technology firsts, beginning with the development of our original line-scan technology, which was the first to rapidly capture the board in one pass. At APEX there has been lots of excitement about our many innovations. We introduced our latest 3D systems and demonstrated the off-line capabilities of our software which lets you completely program, debug, edit, and verify the inspection process on-the-fly and in real time without the need to reinsert the board for verification. The positive feedback from show attendees added to the significance of our anniversary milestone."

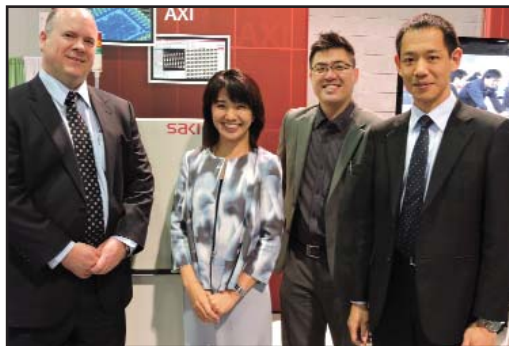
Saki products are built on the principles of quality, reliability, consistency, and ease of use. They start with a robust and stable platform to ensure accurate measurements.

Commonality is built into the software of the complete 3D lineup of SPI, AOI, and AXI systems to facilitate operation and programming for the user.

Common Platform

The SPI and AOI systems have common platforms and both incorporate Saki's unique Phase Measurement Profilometry (i.e. Moiré) technology. The 3D systems are based on years of experience with 2D technology, which is also used in Saki's 3D systems for 2D inspection and measurement and to read and recognize barcodes and markings on the components. With the additional option of the company's newly developed 4-phase side-angle camera, you get complete optical inspection to accurately detect J-leads, QFN packages, and connector components.

Saki's knowledge of 2D and 3D technology and systems has been applied in partnership with screen printers and other systems in the SMT line. Recently, the company entered into a partnership with Fuji Machine Manufacturing's "FUJI Smart Factory with Nexim" initiative. Saki's inspection and measurement systems will connect with Fuji's pick-and-place machines for a high productivity manufacturing process.



*At IPC APEX booth, (left to right):
Quintin Armstrong, General Manager
North America Sales and Service, Saki
America, Sakie (Jodie) Akiyama, CEO,
Saki Corp., Satoshi Otake,
General Manager Saki America, and
Norihiro Koike, COO, Saki Corp.*

Critical Inspections

Saki's systems are designed for versatility. They can be used in critical inspection and measurement environments — the high reliability and mission critical applications (like medical, automotive, military, and aerospace) — where failure is not an option; yet, they also fit the simpler “golden board” environments. The intuitive programming software of the algorithm-based system lets the operator zero in on the areas that need a closer look and perform many of the functions of a programmer, even without being one. Saki's software packages offer extensive peripherals for repair, remote monitoring, and SPC. This gives the flexibility to just do a simple inspection of a golden board or the option to use the algorithms to delve much deeper into the actual measurements of the solder paste or component, or explore a particular area.

Saki's inspection and measurement systems will connect with Fuji's pick-and-place machines for a high productivity manufacturing process.

“Our systems don't just inspect, they also measure and provide traceability,” says Norihiro Koike, Saki's COO. “Saki's 3D AOI inspection height capability ranges from true 0 to 20 mm, with 1 μ m resolution and a false call rate of less than 100 ppm with zero escapes.”

When Saki attended productronica in Munich, Germany, last November, the company had its 3rd generation 3D AOI system hidden in a back room for special viewing. At IPC APEX, results of its capabilities were front and center. With a new posi-

tioning system that's 50 percent faster, cycle time has increased by 15 percent. A new optical head and 4-stage ring lighting better illuminate short and tall components, side cameras provide new vision angles, and circular lighting gives more consistent illumination throughout the field of view.

The system captures extremely clear, detailed images with no shadowing for inspection of the most difficult defects, such as lifted leads, tombstones, reverses, and height variations, and it accommodates dual lanes and XXL sizes.

In 22 years, Saki has grown into a worldwide organization. At the headquarters in Tokyo, Japan, the company has an engineering center led by specialists from throughout the world. In Europe, Saki has an R&D and design center in the Czech Republic and distributors located in 23 countries. Saki China has a software design team in Shanghai along with sales and engineering in Shanghai and Shenzhen and distributors throughout the country. Saki maintains offices and distributors in Korea, Taiwan, Singapore and Thailand and distributors in Australia, India, Malaysia, the Philippines, and Vietnam. IPC APEX was also a celebration of the growth of Saki America. Besides new facilities in Fremont, California, five representatives were added in the U.S. Saki America also has representatives in Mexico and South America.

“I can only imagine what the industry will be like 22 years from now,” says Akiyama, “but I know it will include many more technology breakthroughs from Saki. We are looking forward to returning to IPC APEX next year.”

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