Glenbrook Technologies Inc.
X-RAY TECHNOLOGY LIKE NO OTHER

X-ray Technology Ensures PCB Solder Integrity for Sports Technology System and EMS Manufacturer

By Kathryn Cramer

Based in Austin, Texas, East/West is a full-service EMS company specializing in high-performance PCB assembly for ShotTracker, a cloud-based sports technology system. Specifically, they manufacture Anchor, a key ShotTracker component that ensures accurate and reliable basketball shot tracking.

ShotTracker typically consists of sensors, cameras, or wearable devices that track shot attempts, makes, and misses, providing data on shooting accuracy, shot location, arc, and player movement. Shot trackers are used by players, coaches, and analysts to improve performance, refine shooting techniques, and develop game strategies.

Part of the ShotTracker system, this Anchor sensor is installed in the rafters of a basketball arena to track data.

For the teams and their coaches, the system known as ShotTracker provides even more valuable information on a daily basis. From a practice session, with the entire team out on the gym floor, all shooting baskets in rapid-fire succession to tracking individual actions of multiple players using basketballs across several hoops. ShotTracker provides all the data in real time.

It's statistics amplified," says Andy Salo, president and CEO of East/West Manufacturing, a full-service EMS company based in Austin, Texas. East/West assembles the PCBs embedded in Anchor, a critical component of the ShotTracker system.

The complex, double-sided PCB, which is densely populated with tiny QFNs and BGAs plays a crucial role in powering the ceiling-mounted Anchor system. These components, some so minuscule that they are nearly invisible to the naked eye, work together seamlessly to transmit real-time data from the basketball and the players directly to a cloud-based system.

For ShotTracker, East/West assembles two essential PCBs—one for the Anchor and another for the charger that powers the sensor chip embedded in the basketball. In addition to assembly, East/West handles the entire production process, including programming, testing, final assembly, and box build. Their meticulous attention to detail ensures that each PCB meets the highest standards of quality and performance. Once the products are fully assembled and tested, East/West ships the finished units directly to ShotTracker's distributors, ensuring a seamless supply chain that supports real-time basketball shot tracking with precision and reliability.

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The tools that East/West uses to support all its functions range from the latest quality designations to a variety of advanced equipment, including both 3D AOI and real-time X-ray inspection. The company has both ISO 9001:2015 and ISO 13485:2016 (for medical devices) certifications, and AS9100 certification for the aerospace industry is in progress. In addition, an in-house IPC-A-610-certified trainer and specialists ensure compliance with IPC 610 Class II and Class III manufacturing.

Maintaining and constantly improving the quality of its assembly process is key to East/West's ongoing success, and one of its key quality enhancers has been the use of real-time X-ray inspection, particularly for boards populated with QFNs and BGAs, which are becoming more compact devices with greater functionality. Salo sees the percentage of these chips increasing on the PCBs his company assembles.

For current and future generations of circuit boards, QFNs offer several benefits: they have small footprints, are easy to troubleshoot and, if needed, to rework. BGAs are similar, though issues such as incomplete solder pads cannot be identified without X-ray inspection. This makes X-ray technology essential for detecting hidden defects ensuring board reliability.

"Anything tiny is a challenge," says Salo. "As components get smaller, a microscope just doesn't show the solder pads. There's no alternative to X-ray for some devices."

East/West's operators use Glenbrook's JewelBox X-ray system to inspect the integrity of solder pads underneath components.

The real-time X-ray inspection system that East/West selected to check for shorts, voids, insufficient reflow, and other process issues is the JewelBox-70T manufactured by Glenbrook Technologies of Randolph, New Jersey. The system incorporates a patented XRTV X-ray camera and Crystal-X imaging, plus a 10 micron MicroTech™ X-ray source, providing magnification from 7 to 2,000X, with resolution of 100 line pairs/mm. Its five-axis positioner allows the operator to view a board from any angle and simultaneously produce accurate images quickly, using its pre-installed GTI-5000 image processing workstation.

When assembling PCBs for Shot-Tracker's Anchor, East/West operators use the JewelBox to inspect the integrity of the solder pads under the board's QFNs and BGAs, one of which is so small that it may be missed by a quick glance. A red indicator arrow affixed to the board brings it to the operator's attention. But with the high-resolution and magnification of the JewelBox, it takes just a few seconds to verify the integrity of the miniscule solder pads under each component on each board.

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Real-time X-ray inspection has also proved to be a valuable tool in the early stages of product development, where it can be used to identify issues that might lead designers to modify a solder profile or stencil aperture. At each stage, from prototyping to full production, Salo says, “X-ray inspection fits right into our continuous improvement profile.”

The primary reason for East/West’s choice of the Glenbrook JewelBox system was its price-to-performance ratio, according to Salo. “It’s very economical and provides a ton of value. The company was flawless at installation, set up and training, very hands on. People do business with people not companies, and they’re easy to do business with. They’ve got my back.”

To conclude, X-ray inspection plays a crucial role in ensuring the seamless operation of the ShotTracker system’s precisely engineered PCBs. By detecting defects early, it guarantees that the circuit boards deliver the high reliability and accuracy required for real-time data transmission. These defect-free PCBs support seamless communication between sensors and the cloud-based platform, ensuring the system consistently provides detailed, precise, and immediate insights. The accurate data, derived from player and ball tracking, enhances both player performance analysis and spectator engagement, making ShotTracker an essential tool for performance optimization.

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