



X-RAY FURTHER INCREASES PRODUCT QUALITY AT MENTZER ELECTRONICS

Quality control at Mentzer Electronics in Burlingame, California, includes tracing electronics assembly issues using a Metris XT V real-time X-ray inspection system. This electronics X-ray inspection system allows quality engineers to intuitively navigate through the internal structure of assembled PCBs. In the rapidly evolving electronics industry, Mentzer Electronics uses the acquired insight to speed up and fine tune manufacturing processes. Real-time X-ray guarantees that no hidden defects remain in products when turning them out to customers nationwide.

FROM A TABLETOP X-RAY SYSTEM TO METRIS XT V

An open or short is sufficient to fail even the most complex electronics systems. Subtle defects such as metallic dendrites, voids and improper solder flow may not cause instant system breakdown during electronic testing. X-ray inspection is no luxury, it is really necessary to verify electronic connections, which are mostly invisible from the outside. Mentzer started X-ray inspection with a tabletop system that soon showed limitations in terms of image quality and specimen size.

“Three years ago, we opted for a dedicated electronics X-ray system from Metris, which outperforms the tabletop system in every performance aspect,” says Ed Mentzer, Founder and CEO of Mentzer Electronics. “Metris XT V helped us trace tricky defects that we would otherwise never have found.”

VERIFICATION, TROUBLESHOOTING AND REPAIR

“Mentzer and Metris has been a good marriage,” says Mentzer. “We use the micro-focus X-ray system for quality verification, troubleshooting and repair of printed circuit boards (PCBs), cable connectors and wire harnesses. Using real-time X-ray, we intuitively navigate inside a PCB and zoom in on anything suspicious that catches our attention. Impressive image resolution and magnification enable us to clearly visualize a wire bond flaw in integrated electronic circuits, or trace incomplete vias causing electronic

disconnection between PCB layers. By tilting the PCB manipulator tray, we obtain angled viewpoints that make it easier to investigate BGA connectivity, multi-layer boards and solder joints.”

Over the years, Mentzer Electronics gradually extended its in-house production capability in order to deal with larger and more complex electronics manufacturing services. Today, the company’s electronics engineering laboratory is equipped with component place machines, soldering machines, in-line cleaners, surface mount reflow ovens, lead-forming machines, wire cut & strip machine and PCB stencil printers.

TRACING AND RESOLVING ELECTRONIC ISSUES

Mentzer mentions that his assembly engineers use the Metris XT V system to trace problems quickly, analyze them thoroughly, and define the most appropriate countermeasures. Concerning a PCB batch that they recently manufactured to go into scientific instruments,

X-RAY INSPECTION @ MENTZER ELECTRONICS

XT V X-ray inspection machine supports electronics manufacturing services.

- ✓ Tracing defects in electronic PCBs, devices, cabling, etc.
- ✓ Investigating the source of defects and the best solution to the problem
- ✓ Gaining better insight to improve product and process quality



The micro-focus X-ray system is used for quality verification, troubleshooting and repair.

X-ray revealed an internal bridge. After detailed analysis, they decided to resolve the bridge by applying a very fine drill cut into the board and manually removing the bridge. As it turned out to be a repetitive manufacturing error, this countermeasure was copied on all PCBs of the batch. "This successful intervention saved us many thousands of dollars on material cost and staff expenses, and secured timely product delivery to the customer," says Mentzer.

According to Mentzer, BGA inspection was the original aim of the X-ray system purchase. He explains that angled views really help quickly and confidently spot connectivity issues caused by smaller or irregular BGA balls. "For a semicon chip company, we performed X-ray quality checks and troubleshooting on IC test boards that included small chip scale BGAs. Currently, we X-ray many different types of electronic devices. Radiography excellently supports us when processing DFN, QFN (dual and quad flatpack, no leads) and other leadless packages. X-ray assists us with manufacturing and assembling fiber-optics modem receiver boards that contain many small-size leadless packages. And inside such packages, we occasionally trace the presence of voids."

BROAD APPLICATION REACH AND TIGHT REGULATIONS

Electronic PCBs, racks and cabling are built into end products that serve different purposes. For a medical firm, Mentzer manufactured control electronics for a spine surgeon table. Engineers performed X-ray quality verification at different stages in PCB manufacturing and assembly and also monitored wiring harness production. A new tendency at Mentzer is that it receives more and more services orders from firms involved in ecologic projects, including solar and wind power generation. Activities for such projects include electronics manufacturing of charging batteries for solar controllers and electronic controls for wind turbines.

Mentzer also takes systematic action with regards to compliancy with ever-tighter regulations. One example is

the use of lead-free solder material, which is imposed by European Union hazard regulation. "The use of lead-free solder sets specific challenges, as this type of solder flows quite differently than regular thin lead solder," explains Mentzer. "Solder-related lessons learned through X-ray

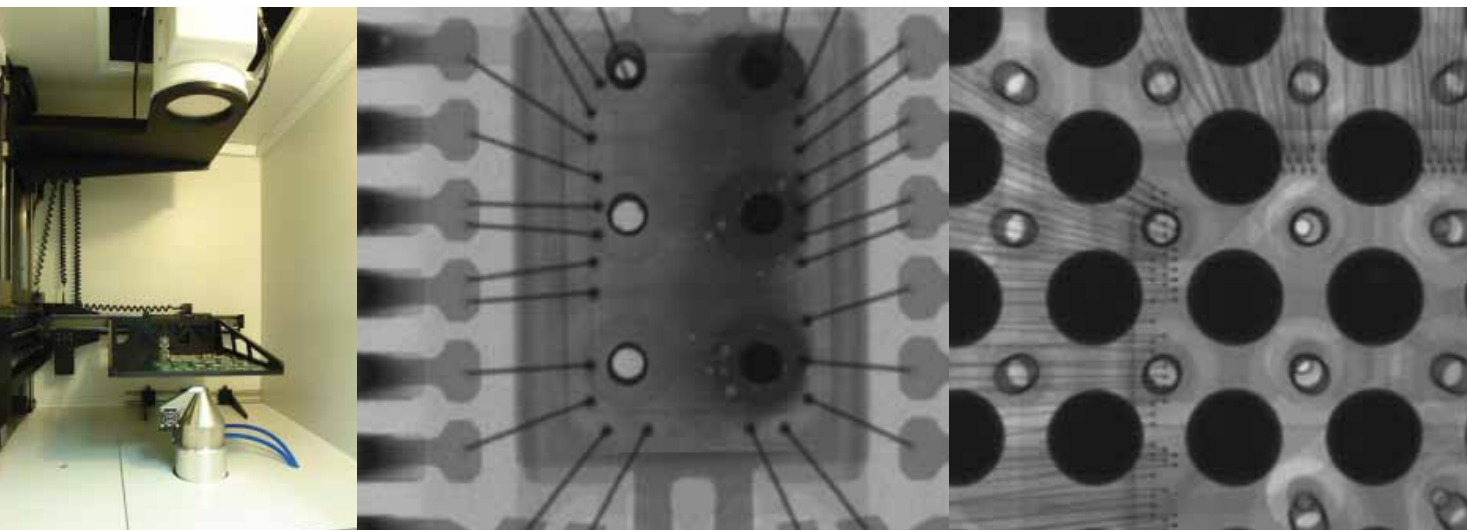


Mentzer is an electronics manufacturing services provider of PCBs, cable connectors and wire harnesses.

enable us to optimize the operation of our soldering machines and surface mount reflow ovens. Although many processing steps are automated, the quality of the end product often depends on details that need to be just right."

HIGHER PRODUCT QUALITY AND IMPROVED PRACTICES

"The bottom line is that with Metris XT V, we are able to quickly trace internal errors that otherwise remain hidden in the product," summarizes Mentzer. "This immediately impacts product quality, and indirectly, we use the acquired insight to further improve and speed up our manufacturing practices. Key is this strategy is that the system is self explanatory and provides high image quality and sharpness. Maintenance is low in cost because the system contains an open-tube source, which allows us to quickly exchange the filament ourselves. Another advantage is that we can easily shift the small-footprint machine to another location in our facility without having to worry about a high-voltage power connection or special floor conditions."



Real-time X-ray allows operators to navigate inside an assembled PCB and zoom in on any suspicious detail, such as voids and via defects that are visible on the middle graphic.