

Increase efficiency and quality for SMD PCBAs with modern AXI systems

Hekatron Manufacturing shows how it's done!

Electronics manufacturing has developed rapidly in recent decades. The miniaturisation of components, the increasing complexity of circuits and the higher performance demands on products have led to a situation where traditional optical inspection methods are no longer sufficient to guarantee the high quality of the manufactured PCBAs. In this context, automatic X-ray inspection (AXI) has established itself as an essential step in quality assurance. To successfully meet the requirements of modern electronics production, the company Hekatron Manufacturing GmbH and the inspection specialist GÖPEL electronic have joined forces.



Figure 1: Headquarters of Hekatron Manufacturing in Sulzburg (Source: Hekatron Manufacturing GmbH)

The focus here is on Hekatron Manufacturing, a leading EMS service provider based in Sulzburg in southern Baden. The company looks back on a 60-year history in electronics manufacturing and produces a wide range of electronic products, including security and fire alarm technology, mechanical engineering components, control devices and much more. With an impressive product range of up to 3,000 variants annually, Hekatron Manufacturing serves industries as diverse as health care, automotive and mechanical engineering. In-house contract manufacturing includes both assembled PCBA and finished products in batch sizes of 40,000 to 60,000 units.

Concealed solder joints and voids are the focus of quality checks

Today's electronics manufacturing is faced with a number of tasks that make careful quality checks indispensable. The ever-smaller design of components, the relocation of solder joints under the

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housing and the increasing demands on PCB assembly require new approaches to inspection technology. At Hekatron Manufacturing, concealed solder joints, THR barrel fills and voids are the focus of quality checks using X-ray. This applies in particular to components such as BGAs (Ball Grid Arrays) and QFNs (Quad Flat No-Lead), where the solder joints are located under the housing and conventional inspection methods reach their limits.



Figure 2: X-Line from GÖPEL electronic for X-ray inspection (Source: Hekatron Manufacturing GmbH)

In view of these circumstances, Hekatron Manufacturing has integrated the AXI system X-Line from GÖPEL electronic into the quality check to meet these challenges. AXI technology enables fully automated inspection of hidden solder joints and sensitive components. This is of significant importance as the trend for hidden solder joints is towards almost one hundred percent inspection coverage. The device features high resolution and inspection speed, so that even demanding PCBAs with high component density can be inspected in a short time.

Anticipatory testing against material shortages and misinterpretation

Hekatron Manufacturing chose the X-Line system from GÖPEL electronic because it best met the company's requirements. The cycle time and the user-friendly programming were decisive for the choice. The close relationship between AXI and AOI programming at GÖPEL electronic also enabled seamless integration into the EMS service provider's production process.

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Figure 3: Production hall with six SMT lines (Source: Hekatron Manufacturing GmbH)

Andreas Pracht, Head of SMD Manufacturing, emphasises: "This system for automatic X-ray inspection is used at Hekatron Manufacturing primarily for inspecting components such as BGA, QFN and shielded components - all components that have hidden solder joints. In addition, the system enables inspection of PCB-As that are obscured by placement aids at the time of inline AOI inspection." He emphasises "We also take a close look at the inner workings of the circuits. In times of material shortages and uncertain supply chains, it is of increasing importance to detect counterfeits at an early stage." Pracht also mentions another concrete application example: the inspection of solder joints on warning horns. Here, many solder joints are hidden under the component. While conventional AOI systems have difficulties inspecting due to component tolerances and numerous false rejects, the X-Line system can reliably detect hidden solder joints. This contributes significantly to quality assurance and minimises the false reject rate.

High-precision inspection with higher complexity and economy

The use of the X-Line X-ray system has led to improved economic efficiency at Hekatron Manufacturing. Complex PCBAs requiring high inspection effort and double-sided assemblies can now be inspected much more cost-effectively than using manual inspection. For the future, the company is planning the further integration of AXI systems into inline operation in order to be able to react flexibly to the increasing number of hidden solder joints and the growing demands on inspection coverage.

With the X-Line 3D, Hekatron Manufacturing sees itself well equipped for future developments in electronics manufacturing. With the AXI system, for example, it is possible to carry out high-resolution 3D inspections in short cycle times while maintaining a high level of user-friendliness. Additionally, the increasing networking of production and the consideration of artificial intelligence are further trends that will shape the future of AXI technology and must be taken into account.

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Conclusion

AXI technology has proven successful in electronics manufacturing by reliably inspecting hidden solder joints and challenging components. Companies like Hekatron Manufacturing rely on innovative systems like the X-Line from GÖPEL electronic to ensure the quality of their products. These devices continue to confidently meet the increased requirements despite the growing complexity and miniaturisation. Looking into the future, we see the trend towards intelligent networking, 3D inspection and flexible adaptation to new challenges. In this context, automatic X-ray inspection remains an indispensable tool that helps to minimise waste and raise quality standards to a higher level.

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