

## Benefits of Manual X-Ray Inspection for Medium-Sized EMS and OEM suppliers

Zero-defect strategies and increased demands on the production of assemblies are making quality assurance in electronics production increasingly important. Continuous miniaturization of components, ever higher packing densities and the associated hard-to-view assembly areas, as well as the increased use of components such as BGAs, QFNs and QFPs, pose a considerable challenge when it comes to high-precision quality control.

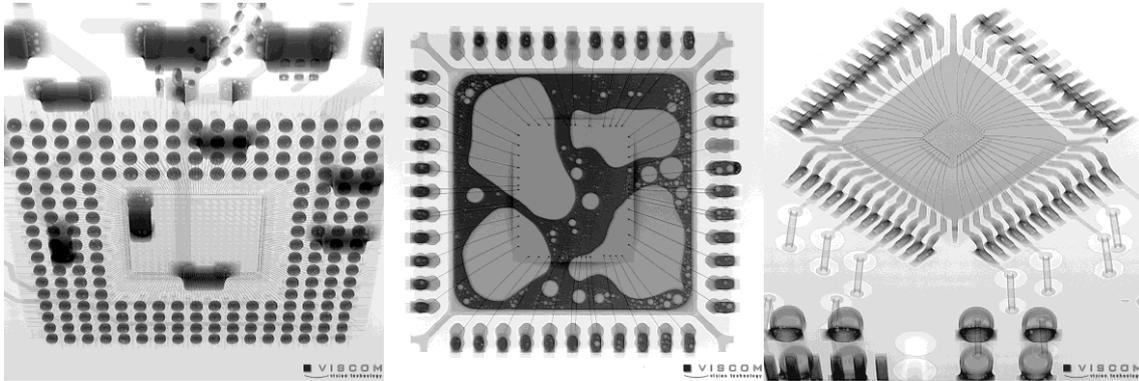


Under these inspection conditions AOI systems are pushed to their limits. X-ray systems represent a major but vital investment for small and medium-sized companies. They make particular sense when the systems can be integrated into a wide variety of processes. This is the reason why flexible, universal X-ray systems are becoming a necessity for many electronics manufacturers. These X-ray systems can be used in both manual (MXI) and fully automated (AXI) mode to perform non-destructive testing of printed circuit boards, components and assemblies. Being versatile they can achieve a higher utilization.

### Useful From a Batch Size of 1

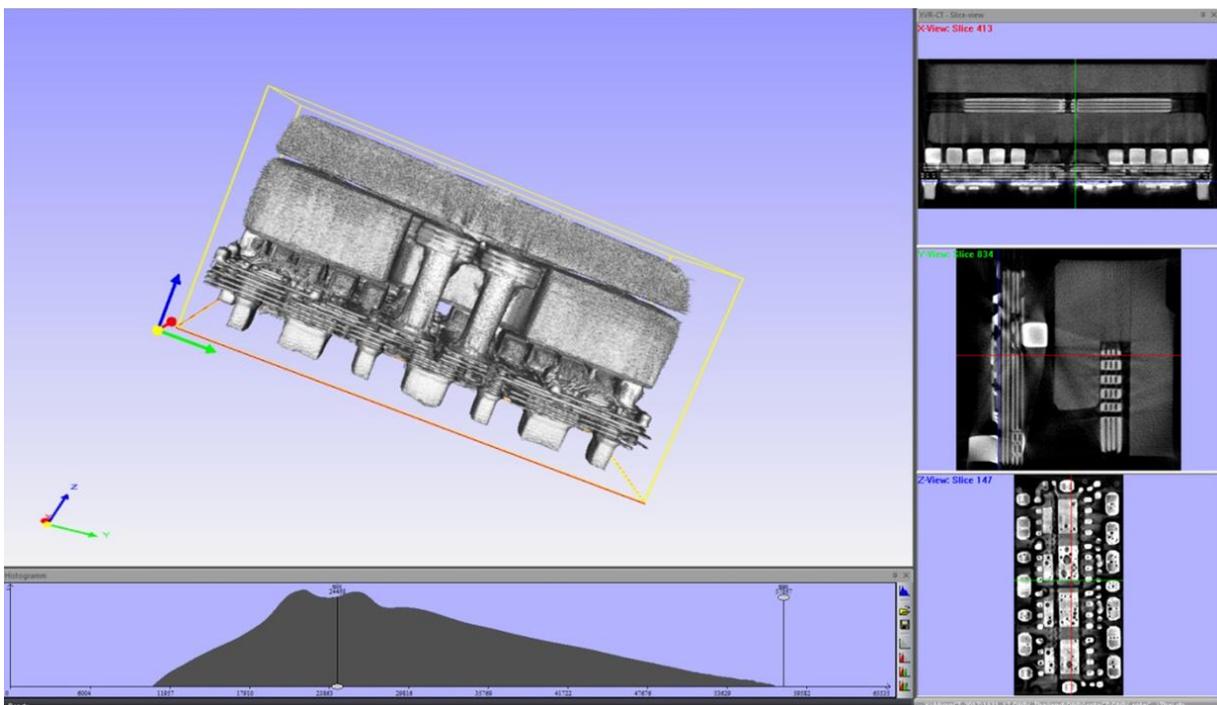
The range of applications for these X-ray systems includes not only inspection of serial assemblies, but also random sample inspection. Electronic manufacturers also find these systems very useful for evaluating field returns. X-ray systems can be used to test die bonds, BGAs and flip chips and voids in surface soldering. Misalignment of bonding wires within an encapsulated component, which can be caused by the intrusion of casting compound, can also be documented using X-ray inspection. X-ray systems can also inspect THT solder joints, positioning of wedge bonds as well as unpopulated, multilayer printed circuit boards. Ceramic substrates as well as classic FR4 printed circuit boards can also be subjected to X-ray quality control. The same applies to plastics, weld seams, composite

materials, etc. Final assembly inspection must not be overlooked, nor measurement of electrical and mechanical end components, such as circuit breakers for the automotive industry. In this case, distances, positions or dimensions can be analyzed and tracked.



### 3D Reconstructions Using CT

Viscom offers its X8011-II and X8068 systems for these versatile tasks. Electronics manufacturers can perform both manual and automated inspection processes with these X-ray systems. The X-ray machines can be used as an offline solution. Inspection results from manual mode are stored using the live tools. Availability of automatic X-ray analysis and manual or semi-automatic inspection means that the X8011-II PCB and X8068 offer operators a high degree of flexibility. Viscom software is specially developed for SMT production enabling fully automatic analysis as well as intuitive, comprehensive analysis function, which helps the operator to check inspection objects easily and precisely. 3D reconstruction is also possible with Viscom's proprietary XVR computer tomography (CT). This means defects can be detected, volumes reconstructed, and structures measured in real units of measurement. Thereby individual layered or sectional images can be created. The optional CT method is used in particular for prototype evaluation, reverse engineering and series production.



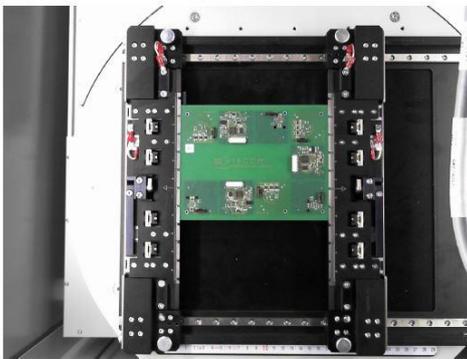
From manual inspection of individual components and assemblies through fully automatic inspection of large and heavy printed circuit boards with a diameter of 722 mm (28.4") and a weight of up to 15 kg (33 lbs), Viscom's X8068 system covers the entire inspection portfolio for electronics production. Excellent image results are particularly important here. This is made possible using open microfocus transmission tubes. Viscom develops and manufactures these in its own modern X-ray competence center.

High-resolution digital flat panel detectors are used for the highest magnifications and optimum image quality for evaluation of X-ray images. The modular Viscom system concept offers practically every individual user optimum inspection possibilities. The X8011-II PCB system by Viscom provides flexible exchangeable modules to inspect a wide variety of inspection objects. In addition to an object stage, Viscom offers a 360° rotation module and a motorized rotation and tilt axis. These tools enable the inspection object to be placed in various angular positions to gain a better insight into areas to be tested. The individual modules can be easily exchanged during operation and are pre-calibrated, which eliminates the need for time-consuming calibration after the exchange. The detector can be tilted up to 60 degrees.

### Test Results are Comprehensively Documented

**Automatic Inspection Report**  vision technology

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**Overall result: bad**

Test object			
Label	Viscom Board	Identifier	000000029
Inspection			
Start time	07.11.2019 08:27:28	End time	07.11.2019 08:27:57
Inspector	xmc		
Result statistic	1 good	0 neutral	2 bad
Machine information			
Machine type	X8011	Tube type	XT9160-TED
Serial number	102996	Target	AI
FPD type	IS9508-CO	Collimator	Slit collimator
FPD serial number	8#2505	Filter material	Cu 1.50 mm
XMC Version	4.07r3		

Inspection report created with Viscom ReportCreator 1.0.0.0 1 of 8

Documentation of the results is just as important as the actual inspection, especially if the inspection is undertaken as part of the investigation of a field return. The aim should be to quickly and automatically generate test reports for the customer in a format that presents the results to the customer quickly and easily. The test reports should also be easy to compare. This is particularly important in the development or prototyping phase, where inspections check individual development steps and influence subsequent implementations. Standardized reports are helpful when it comes to understanding results and the easy interpretation of new development steps. Viscom offers ReportCreator for fast and easy creation of these inspection reports. The operator defines the report settings, i.e. the display of inspection results, and saves them as a reusable template for their customers. Customer information such as logos and addresses can also be stored in addition to the test results.

The reports can consist of a cover sheet, the table of contents, overview screens with result markers, summaries of the test results in table form, and a detailed presentation of the results with analysis steps, image acquisition parameters and comments. The actual test results can be filtered by manual or automatic, good or bad results. Each inspection object can also be assigned to individual test items using barcodes or DMC. This means detailed documentation can be created for sampling and for field

returns describing in detail the current-status to the customer. ReportCreator's intuitive menu navigation is also helpful for creating reports, enabling the person responsible to generate reports quickly and easily on behalf of the customer.

A very valuable part of the report is the information about the radiation exposure of each individual region of the tested assembly. This information assures the user that even sensitive components have been tested within the maximum permissible radiation. In addition, the MXI systems from Viscom are intelligently designed so that inspection does not continue once a preset limit value is reached.

### **Conclusion**

A wide inspection spectrum combined with a simple report generation means that the X8011-II PCB and X8068 inspection systems are ideally suited for medium-sized companies with versatile inspection tasks. The machines are a result of years of experience on the part of Viscom's development department, both systems provide a stable, long-lasting machine design and intuitive operation, to fulfill the potential customer's multifunctional tasks.



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