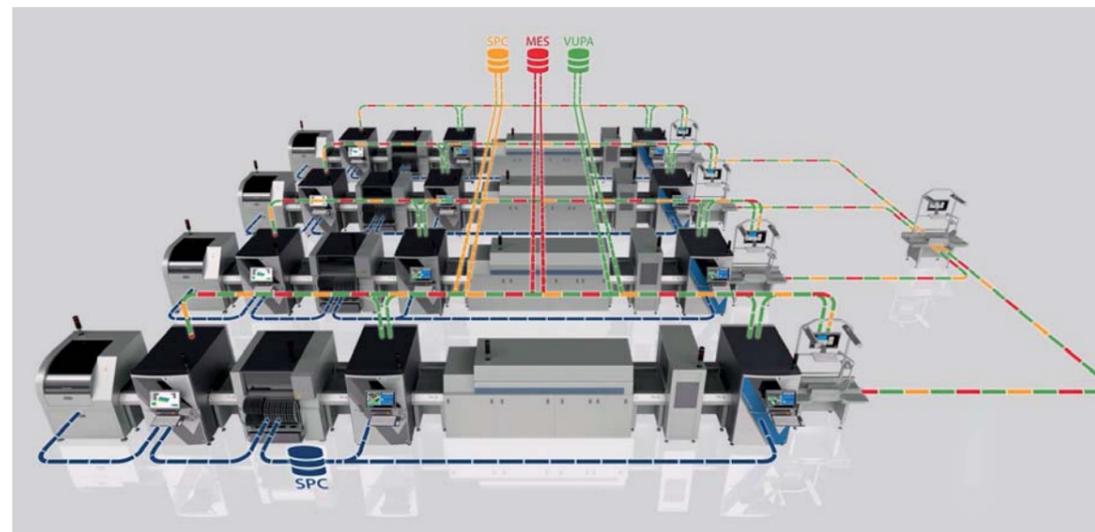


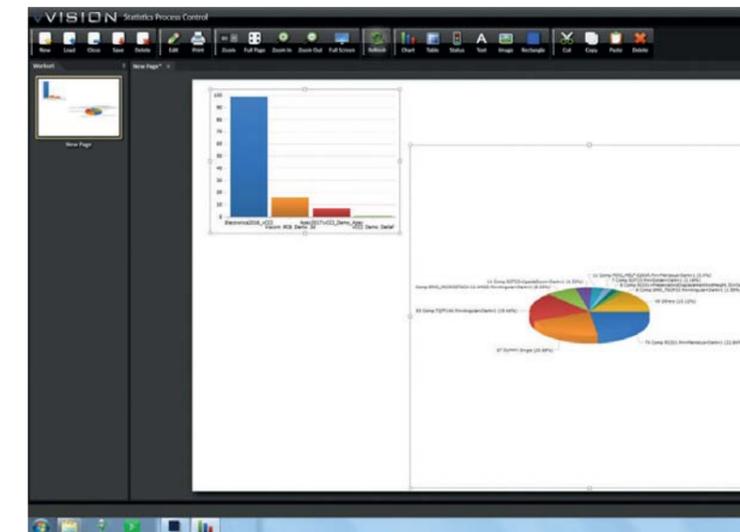
Valuable data and images for attaining a stable process

Total control with automatic in-line inspection

Highly efficient defect detection is not the only capability that makes automatic inspection systems an indispensable element in electronics production. The information they deliver also helps optimize production processes.



Defect verification for several production lines can be centrally bundled to reach maximum efficiency in process control.



Statistical process control with the Viscom vSPC software: Inspection results are presented in clearly structured diagrams that can be directly exported, e.g., for reports.

For electronics manufacturing companies, the generation, structured storage and systematic evaluation of huge data amounts have already been standard practice for several decades. One driving force for this is the traceability requirement that product liability concerns bring to bear – the mandate to be able to trace defective assemblies back to their manufacturer and, if need be, even to extend the search all the way back to the raw material supplier. Today, identifying and assigning liability to a culpable party is no longer of primary importance; instead, tracking down causes of defects and defining reliable measures to prevent their recurrence now take priority.

Inspection data from the various inspection stages makes it possible to exactly retrace a production process – even down to each individual step – while the associated statistical process control is decisive in pointing out where in production specified limits have been exceeded. Moreover, indications can be derived from this information to provide the basis for improving the

production process. For example, the PPM rate (parts per million), DPMO rate (defects per million opportunities) or first-pass yield assist in evaluating process quality. Big data, including inspection results, component names and other details, are merged with information from other machines in comprehensive databases and evaluations via extremely powerful interfaces.

Paste print has an early and decisive influence on quality throughout the entire production process. The solder paste inspection system (SPI) measures the geometric properties of printed solder paste (surface, height variation, volume) and generates a machine-readable protocol that can be sent to the paste printer and/or the following placer as well as a higher-level Manufacturing Execution System (MES). The printer needs this protocol information to derive measures for controlling quality (e.g., stencil offset correction or cleaning the stencil). The placer can use the information regarding actual position and height of the solder paste to adjust the component setting position and height. Viscom uses a proprietary interface, the Viscom Quality Uplink, to transmit images and data from the SPI system to other Viscom systems in the line and to the defect verification station at the end.

This demonstrates that today, machines constantly communicate with each other, detect process fluctuations in real time and automatically initiate appropriate countermeasures by applying control algorithms. Theoretically, it is possible to check placement by integrating an automatic optical inspection system (AOI) into the line after component placement and before the reflow oven; in this configuration, an additional search for missing components is only started when directed by the placer. In most cases, however, AOI systems are



Viscom's high-end 3D AOI system S3088 ultra gold

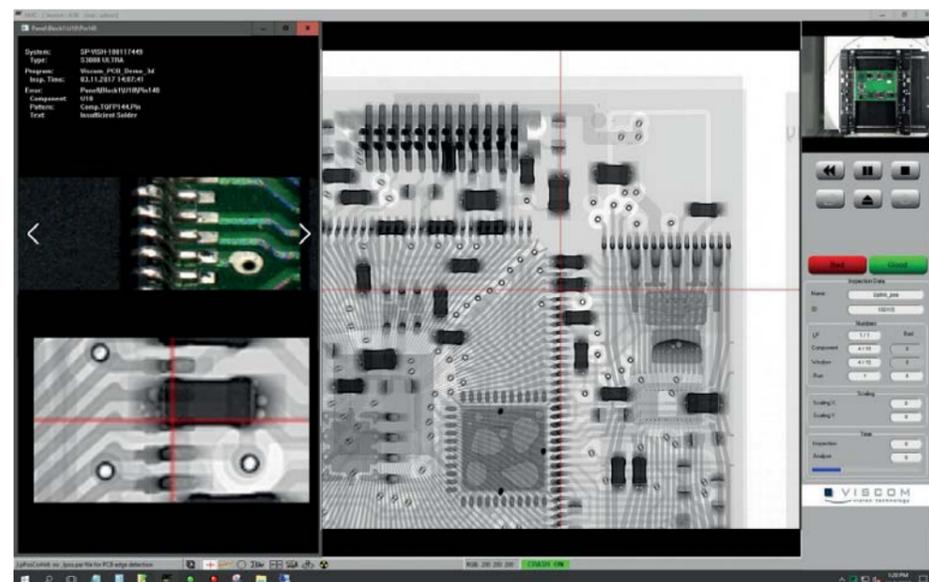
only deployed after soldering in the reflow oven, primarily to inspect solder joints. Placement is also checked in this step. High-quality 3D AOI image acquisitions and other resources can be drawn on during defect verification.

In any case, event logs should contain the identification number (ID) of the electronic assembly. The ID can be affixed either as machine-readable barcode, DMC code or RFID. If, e.g., an inspection system reports a critical defect, the corresponding assembly can be automatically blocked from all further production steps. Accidental reintroduction to the process is no longer possible.

Depending on the complexity of the assembly and the end customer's requirements, AOI or in-line X-ray inspection systems (AXI) alone, or a combination of the two (AOI/AXI), can be deployed after reflow. If the 3D X-ray inspection discovers, e.g., gas inclusions (voids), adding in the SPI results can make a decisive contribution to improving the production process. The Viscom Quality Uplink offers the possibility of consolidating the data for each detected defect from all Viscom inspection systems integrated in the line into a VUPA protocol (Viscom Uplink Process Analyzer). Both the quality data determined in

the individual inspection stages as well as the collected image material are compiled into one report.

In conclusion, this article has described existing data interfaces and automatisms which today are already used effectively to optimize processes. Anyone who uses inspection systems only to find defects is completely missing the bigger picture. Inspection systems must be used to identify defect causes, to prevent defects from emerging in the first place. Progressive advancements in miniaturization force the electronics manufacturer to achieve stable processes with consistently high first-pass yield through automated processes and efficient communication between machines.



To improve evaluation of critical points, e.g., additional AOI results can also be reviewed on a manual X-ray system.

Profile



The Viscom AG is one of the world's leading providers of automatic inspection systems for electronic assemblies. The model range reaches from high-performance 3D AOI systems for inspecting solder paste, placement and solder joints, to inspection systems for MID, wire bond and conformal coating inspections. The X-ray inspection area covers the complete bandwidth from microfocus X-ray tubes through offline inspection islands with μ CT function, up to fully automated 3D in-line X-ray inspection. Viscom systems are technologically cutting-edge products and have been successfully applied around the world by well-known companies in the most widely varying branches – reaching from the automotive and electronics industries through aerospace technology, and up to the medical technology and semiconductor industries. With branch offices in Europe, Asia and the USA, as well as a tight network of representatives, Viscom is present around the globe.

