

From mini-LED to SMT – 3D high-speed reconstruction of chip components

Since the start of the SMT world, we register that the components are getting a bit smaller every year. The reasons lie with the component manufacturers and their main customers in consumer electronics. The result is a shift in component supply and the smaller fabs also have to face the processing of the smaller components.

Overview of the Koh Young KSMART Solution with the links in the placement process.

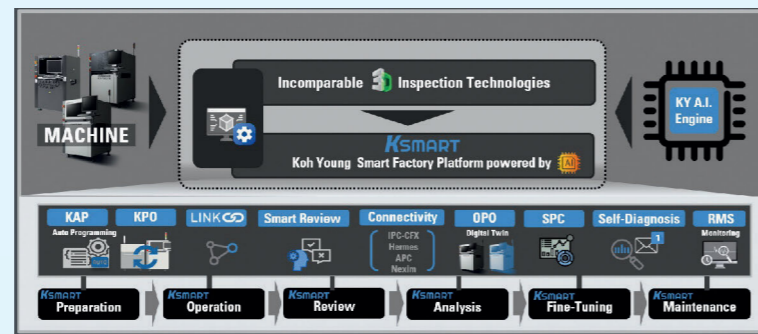


Image credit: Koh Young



The revolutionary Meister S from Koh Young

Electronics manufacturing in Europe is becoming increasingly demanding and each PCB has its own challenges. The key to a high quality and reliable product is a solid automatic inspection in 3D. In addition to automatic inspection, it is becoming increasingly important to analyze these measurement results in “real” time and actively work to avoid any placement errors.

This analysis to avoid quality issues is made possible today by Smart Factory solutions (Industry 4.0). This allows measured values and images from every process step in manufacturing to be merged. This makes it easier to identify the process responsible for the potential failures. Of course, this requires all inspection/measurement systems in the assembly chain to provide this information by connecting to the smart factory solutions.

If we now look at the portfolio of components that are to be placed on electronic assemblies, they range from large “chunks” (coils, Elco’s, connectors) that are much larger than 10x10mm to small chip components down to size 01005 (0.4x0.2mm) and 008004 (0.2x0.1mm).

For these chip sizes with very small packages, it is important to adapt the measurement equipment to them.

In the LED field, where traditional LED sizes range from 3x3mm to a minimum 0402 chip size (1x0.5mm), the requirements for the placement process are similar to those for normal components. However, the LED industry has already gone further (smaller) with the component size (mini-LEDs).

In many applications, RGB LEDs that are smaller than the smallest passive chip components (008004) are already used in mass production.

With such small components and contact pads, a printing or placement error, even in the small micrometer range, already has a serious effect. Here it is obvious that there with the classical 2D inspections the recognition of errors is no longer given and a “good-bad” comparison is no longer up-to-date.

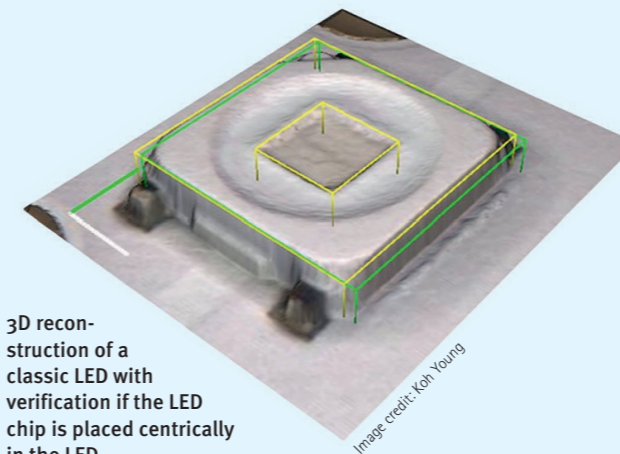
By the 3D High Speed measurement brought by Koh Young into the mass market, a 3rd dimension is added to each pixel of the camera, a height.

Through this information, the traditional gray scale comparison of 2D systems becomes a nominal measurement value of the height. It is then possible to detect even the smallest deviations accurately and repeatedly.

Thus, it can be said that today’s SPI/AOI systems have evolved into a quality sensor in every process step, allowing even the smallest deviations in the process to be detected.

With the application of smart software solutions in the background, these systems can even readjust deviations within the possible tolerances and thus prevent possible placement errors.

In this presentation, we will cover a wide range of applications, from traditional LED placement to mini-LED placement. In doing so, we will shed light on the requirements for inspection/measurement systems to reliably map the production of these assemblies in “real time”, also with regard to Smart Factory (Industry 4.0), and to identify potential defects.



3D reconstruction of a classic LED with verification if the LED chip is placed centrally in the LED.

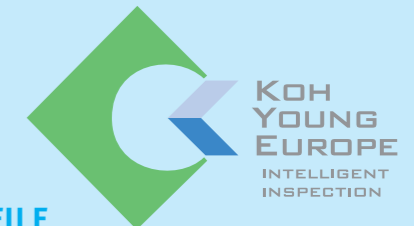
Image credit: Koh Young



CONTACT

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COMPANY PROFILE

Koh Young Technology Inc. is one of the leading suppliers of 3D measurement and inspection equipment systems, which can be found in the production facilities of leading industrial companies in the printed circuit board and semiconductor industries. For example, in the automotive electronics, telecommunications, military, medical, and semiconductor industries.

Koh Young Technology Inc. has been supporting users in the evaluation of complex measurement data for many years. The international company is headquartered in Seoul, Korea. The German base is located in Alzenau with Koh Young Europe. Additional sales and support centers are in the USA, Japan, Singapore, China and Korea. SmartRep is responsible for selling the systems in German-speaking countries. Based in Hanau, near Frankfurt, SmartRep (www.smartrep.de) is the contact for sales and service of Koh Young systems.

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