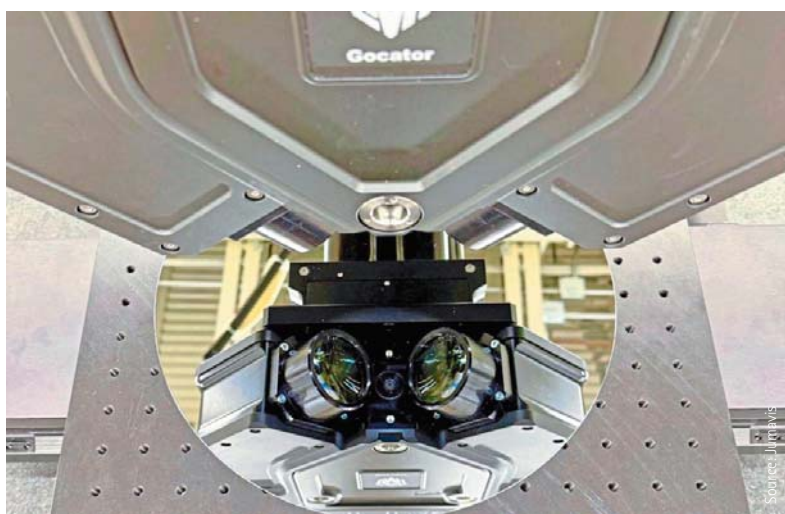


Key technologies for wafer inspection with nanometer precision

Line scanning, 3D profiling, and positioning

High-precision measurement methods are crucial in electronics production: Even the smallest wafer irregularities can jeopardize chip manufacturing. Precise 3D inspection also offers a clear competitive advantage in printed circuit board assembly. Jumavis relies on the synergy between hardware and sensor technology to achieve true precision.



The Gocator 5512 confocal line sensor supports a variety of measurement methods for high-precision quality control in production or in the laboratory.

In electronics manufacturing, high-precision measurement methods are essential for continuously ensuring that components meet quality requirements and performance standards. Even the smallest irregularity on the surface of a wafer can jeopardize the entire microchip production process. In areas of electronics manufacturing, such as printed circuit board assembly and the production of optical components, as well as in medical technology, precise 3D inspection is a decisive competitive advantage.

As a partner for high-end measurement technology, Jumavis knows that true precision is only possible through the synergy of hardware and sensor technology. That is why the company relies on the precision of the PEAK Metrology positioning system with the Gocator 5512 confocal line sensor for demanding applications. This combination ensures that quality control becomes not only more accurate but also more efficient.

The foundation for maximum precision

PEAK Metrology's positioning system enables submicrometer-level precision, which is essential for

achieving repeatable 3D measurements at the relevant test points. Environmental influences such as vibrations are effectively eliminated, as the measuring system's solid granite table ensures vibration-free measurement processes. The complete system solutions are designed to be operated in both manufacturing and laboratory environments.

The software and ultra-precise control mechanisms ensure error-free synchronization with the optical sensor, so that every measurement is performed under ideal conditions. A key advantage for manufacturers in the semiconductor industry is the combination of vibration-free, high-precision mechanics and advanced software technology. X-Y stitching scans multiple paths and combines them into a precise overall image, while Z-stitching combines different layer heights into a detailed 3D image. Continuous positioning in the submicrometer range ensures that all surface areas can be examined without distortion and that the object remains in the focus of the confocal line sensor at all times.

A closer look at surface quality

Confocal sensing and optical profiling are two of the most advanced technologies for surface analysis in wafer production. These techniques enable the creation of precise 3D models of surfaces for the detection of defects or irregularities at the microscopic level with nanometer-scale resolution. The intelligent sensors of the Gocator 5500 Series feature unique confocal imaging with LCI technology. The system generates 3D topographies, tomographies, and 2D intensity data in a single step.

LCI (Line Confocal Imaging) uses focused light to generate high-resolution images of surfaces at various depths. This identifies defects in the layers of a wafer that could affect the functionality of the finished microchip.

Optical profiling, on the other hand, utilizes the depth discrimination of focused light waves to re-

construct surfaces in 3D and visualize even the smallest structural anomalies in the micro- and nano-ranges, which are of great importance for the manufacturing process.

Advantages of the combination

Maximum precision: High-precision positioning makes it possible to accurately measure and precisely reproduce all relevant surface areas, enabling even the tiniest irregularities to be detected.

Prevention of measurement errors: The positioning system prevents distortions caused by misalignment, thereby minimizing sources of error during measurement.

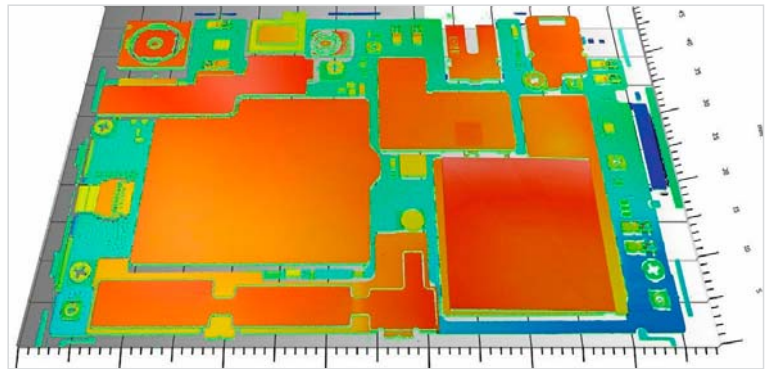
Optimization of production quality: Continuous monitoring of surface quality leads to higher product quality and reduces scrap.

Increased efficiency: Automated positioning saves time and improves the efficiency of the manufacturing process.

Versatility: The positioning system can be used not only in wafer production but also in other areas of electronics manufacturing, such as PCB assembly or the production of optical components.

Case studies

In the semiconductor industry, it has been shown that the precision of wafer production can be significantly improved through the use of such coordinated systems. In practice, surface defects that conventional systems would have overlooked due to a lack of stability or resolution were detected early and corrected. The result is a reduced defect rate coupled with a higher overall yield. Similar successes have also been achieved in general electronics manufacturing. When assembling complex printed circuit boards, this comprehensive system solution significantly improved measurement accuracy and eliminated potential sources of error during the assembly of microcircuits. This ensures the long-term reliability of



Source: JumaVis

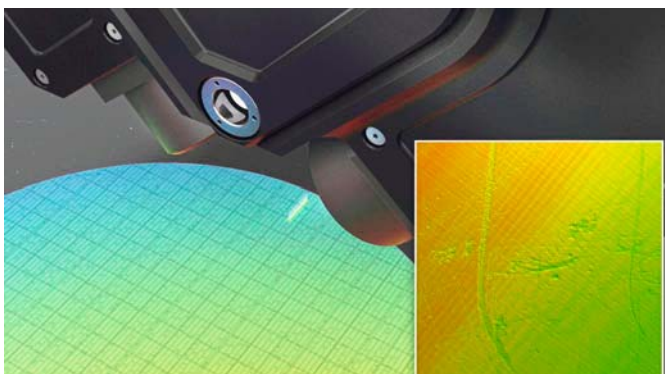
X, Y, and Z stitching combines numerous individual images to create a complete image of the PCB. Potential sources of error are reliably detected.

the end products and protects against costly customer complaints.

A new level of quality assurance

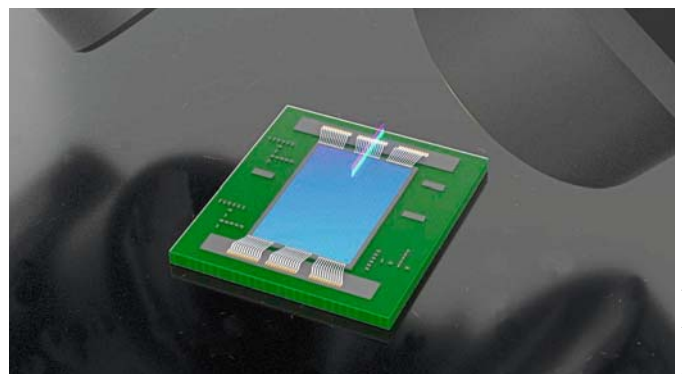
The combination of PEAK Metrology's extremely precision-controlled mechanics and LMI Technologies' sensor technology represents a key technology for modern electronics manufacturing. Stable positioning in the submicrometer range provides the necessary foundation for the precise operation of the Gocator 5512 confocal line sensor. The economic advantage is the short payback period.

The combination of confocal sensor technology and optical 3D profiling takes quality assurance to a new level. This provides companies with a tool to meet the highest quality standards, sustainably reduce scrap, and prevent production errors. This provides users with significant added value, as this comprehensive system solution offers a high degree of flexibility in quickly adapting processes to different product variants. Ultimately, this technological edge leads to a significant reduction in overall costs and greater competitiveness in a demanding market environment. Through its strategic partnerships, JumaVis offers users synergistic expertise for efficient quality assurance solutions.



Source: JumaVis

During material and surface inspection, sources of defects in the nanometer range must be reliably detected.



Source: JumaVis

Each individual microchip must be electrically and accurately connected to the housing or circuit board via wire bonding or flip-chip technology.