

MOBILE DEVICE INDUSTRY

MACHINE VISION FOR ASSEMBLY AND IN PROCESS QUALITY CONTROL

The Situation

The assembly of a critical module required alignment of the precision components to micron level relative to the reference axis. Achieving this specification required pre-measurement of the parts, vision guided alignment, and post measurement for in process quality control (IPQC).

The Challenge

Achieving micron placement precision relative to the reference axis required careful analysis of tolerance stackup, reference edges, and measurement methodology. The

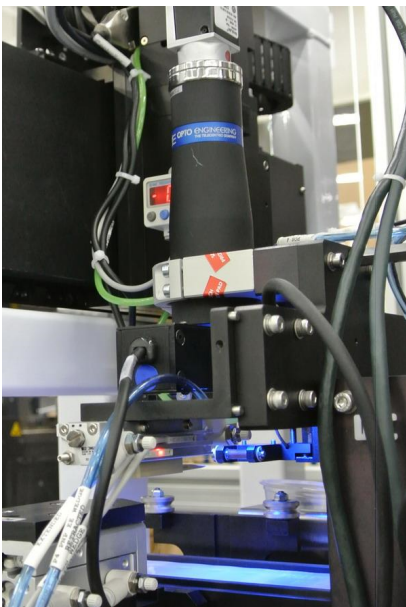
surfaces were difficult to reliably image, requiring specialized illumination design. IPQC was complicated due to alignment references being hidden as assembly sequence progressed.

The Solution

Owens Design collaborated with the product development team to integrate the assembly and alignment process with the necessary measurements. Once the



In Process Quality Control Measurement Station Incorporated Off-Axis Illumination



Precision Alignment Tolerances Met Using Camera Pairs Mounted to Precision Staging



process was defined, Owens designed the camera, lighting systems, part fixturing, and precise staging to achieve the required accuracy and precision. The challenges of imaging the components was solved with a combination of off-axis illumination and techniques that enhanced contrast. The micron level tolerance was met with careful attention to camera system resolution, tolerance analysis, and system calibration. The IPQC measurements were made available to the customer's operations team for real time feedback and saved to a database for later analysis.