

APPLICATION EXAMPLE

Apex 3-CMOS R-G-B area scan cameras for MLCC and PCB inspection

As industry's and consumer's demand for sophisticated, high-performance electronic products grows continually, Printed Circuit Boards (PCBs) are shrinking in size while accommodating more components. To keep pace with this trend, vision systems must resolve increasingly finer details to detect potential defects without compromising manufacturing throughput. JAI's 3-CMOS Apex cameras are designed to meet this challenge and are an excellent fit for a wide range of automated optical inspection (AOI) applications, including PCB and Multilayer Ceramic Capacitor (MLCC) inspection.



MLCC Inspection

MLCCs are among the most critical components on PCBs. They are small, fragile, and highly susceptible to mechanical and thermal stress. For this reason, they undergo thorough inspection before being mounted on the PCB. Even a tiny surface crack can propagate and lead to short circuits during service.

Bare Board Inspection

This 2D inspection process targets unpopulated PCB boards. It verifies drill hole positions, detects missing holes, evaluates line spacing and width, identifies excess copper, and checks for short circuits and open circuits, among other criteria.

Gold Finger Inspection

After plating, connector fingers on PCBs undergo inspection to ensure that a sufficient layer of gold has been applied to these critical contact areas.

Component Placement Inspection

Once surface-mount components are placed on the bare board, quality inspection is essential. This step verifies solder joints (checking for insufficient solder or solder bridges), identifies missing or misplaced components, ensures correct placement of labels and identifiers

The Apex Area Scan Cameras

With 3-CMOS prism technology, Apex cameras deliver significantly higher color fidelity and spatial precision compared to conventional Bayer mosaic-based color cameras. Offering up to 5.1-megapixel resolution, they are ideally suited for inspection systems in PCB and MLCC manufacturing identifying tiny production flaws, providing a valuable contribution to improved automated optical quality verification.

AP-5100T models:

- 3 x 5.1 megapixels. (2472 x 2064 pixels).
- 3 x IMX548 Pregius S (backside illuminated).
- Up to 75 FPS full resolution.
- 2.74 μm x 2.74 μm pixels.
- CoaXPress v2.0, 5GigE Vision and Camera Link.

AP-3200T models:

- 3 x 3.2 megapixels. (2064 x 1544 pixels).
- 3 x IMX265 and 3 x IMX252 Pregius.
- Up to 106 FPS in full resolution.
- 3.45 μm x 3.45 μm pixels.
- 10GigE Vision, USB3 Vision and Camera Link.

AP-1600T models:

- 3 x 1.6 megapixels. (1456 x 1088 pixels).
- 3 x IMX273 Pregius.
- Up to 126 FPS in full resolution.
- 3.45 μm x 3.45 μm pixels.
- Interfaces: GigE vision, USB3 Vision and Camera Link.

More information:

For more information on the Apex 3-CMOS prism-based camera models please visit:

<https://www.jai.com/products/product-lines/apex-series-3-sensor-area-scan>

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