

## Case Study

### Baumer Applies a Two-Camera Solution to Inspect a Diversity of Electrical Connectors

*The Vision Design Center tackles the challenge of inspecting a diverse inventory of connectors with two cameras, Baumer's versatile vision software, and years of expertise.*

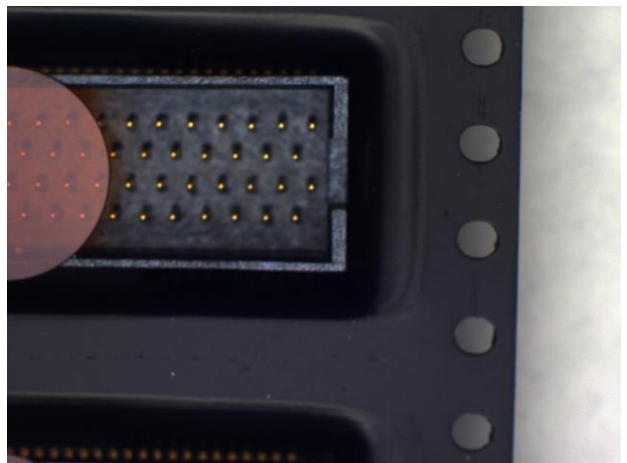
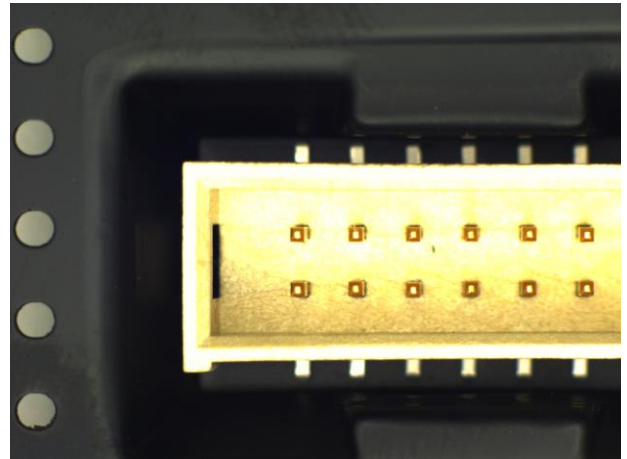
Hard drives, processors, and memory components may get all the attention when consumers consider buying a new PC. But a computer's performance and reliability depend on the hundreds of different connectors that link these and other internal parts together. The diversity of these parts makes inspection virtually impossible for a human operator to perform effectively. But it also raises challenges for machine vision systems, especially when it comes to navigating the multiple connector types and pin configurations, which can range from board-to-board, power-to-board, card-to-board, cable-to-board, and application-specific interconnects.

Nevertheless, developing a machine vision solution was the task one connector manufacturer presented to Baumer's Vision Design Center.

The task required Baumer's team to work within the constraints of the manufacturer's existing production line, in which a conveyor belt transported a mixed inventory of connectors in trays. The solution also had to ensure the correct connectors were properly seated in the tray and in the right order to allow a robotic arm to accurately pull them out for assembly.

#### Two Cameras, One Solution

The candidate machine vision solution also needed to inspect key features across multiple regions of interest on each connector. That required some balancing between the camera's resolution and field of view to avoid image distortion of the pins and holes farthest from the camera lens.



*Baumer's Design Team applied two distinctly different camera configurations to inspect the fine features of electrical connectors while also confirming they were oriented correctly in their trays as they traveled down a fast-moving production line.*

Baumer's team proposed a two-camera solution in which one imager, a VeriSens smart camera, would be positioned above the line facing down. Equipping the VeriSens camera with a telecentric lens focused on a 1 x 1-inch target would minimize distortion in the image. A second, similarly positioned camera provided image data with a broader field of view to guide the pick-and-place robot arm. Diffuse LED lighting was selected to evenly illuminate the scene.

The rest came down to Baumer's imaging software, which applied blob analysis and other tools to identify the dozens of different connectors by shape and pin count, confirm each connector was oriented correctly in the tray, and ensure there were no broken or missing parts.

**Baumer Group**

The Baumer Group is one of the worldwide leading manufacturers of sensors, encoders, measuring instruments and components for automated image processing. Baumer combines innovative technologies and customer-oriented service into intelligent solutions for factory and process automation and offers an unrivalled wide technology and product portfolio. With around 2,700 employees and 39 subsidiaries in 19 countries, the family-owned group of companies is always close to the customer. Baumer provides clients in most diverse industries with vital benefits and measurable added value by worldwide consistent high quality standards and outstanding innovative potential. Learn more at [www.baumer.com](http://www.baumer.com) on the internet.

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