



EMPOWER AUTOMATED OPTICAL INSPECTION FOR AUTOMOBILE FACTORY

Compact Computer enhances performance gains for PoE visual inspection system in Auto Manufacturer

Introduction

Enhancing the quality of production lines is vital in the Industry 4.0 era. Automated Optical Inspection (AOI) systems are becoming the quality control method of choice to replace manual checks. AOI enables fast and accurate inspection of electronic assemblies to ensure that the quality of products leaving the production line is high and green-lighted without faults. Although AOI systems are capable of swift and accurate handling basic visual checks, the most data-intensive machine vision systems have been designed to inspect the objects in fixed positions. This lack of flexibility narrows down the scope of the inspection. In order to increase inspection

complexity without an impact to efficiency, a high-performance, highly-expandable compact industrial computer must be employed for the control.

Requirements

Fast, high-resolution digital image capturing, ample PC processing power, and sufficiently capable image handling software all had to be combined to achieve the ideal system. Additionally, multi-axis AOI movement is essential in today's automobile assembly lines. The customer required an inspection solution that combined the strengths of multi-axis robots and machine vision. And

one that not only enabled industrial cameras to move easily and capture the object from many angles, but also provided a stable and reliable computing platform. Finding a suitable x86 platform with rugged environmental tolerance would further meet the customer's mandate to further shorten the time required for image recognition and enhance overall productivity.

System Implementation

To provide the automobile manufacturer with a multi-axis AOI within the requirements, Advantech, as a leading industrial automation solution provider, was able to recommend a solution from a variety of systems for automotive quality inspection. In order to meet the extreme performance and stability requirements, the customer chose the [ARK-3520L embedded computer](#) equipped with the latest Intel® platform and unique modular design. With its fanless, cable-less design, this high-performance automation computer is a more robust device than traditional computers in challenging industrial environments and is designed to withstand extremes of temperature, vibration and dust. To provide flexible support for different camera and peripheral inputs, multiple I/O slots are available and more I/O expansion is available through [iDoor](#) and [ARK-Plus](#), the modular expansion layer of the system. These I/O “building-block” options allow customers to choose flexible and stable modular I/Os without concern for compatibility, customization time, NRE, and costs.

Since the project required high resolution inspection items to be analyzed at high speed, Advantech recommended the [PCIE-1674E](#) and [PCIE-1672E](#) communication cards outfitted with power-over-ethernet

(PoE) to connect industrial cameras to quickly and synchronously capture images. With the PoE feature, communication cards can supply power to the cameras mounted on robots, thus eliminating the need for routing power cables. Also, the solution included embedded software support. Advantech [WebAccess/SCADA](#) software enables real-time factory monitoring, production information in cloud and data integration from sensors, HMI to controllers. Advantech [WISE-PaaS/RMM](#) software was leveraged for data management and AOI system management services. With [WISE-PaaS/RMM](#), the system was interoperable with the plant's current IIoT plan, including services for advanced data analytics and data prediction applications.



Conclusion

Advantech's rugged industrial and compact computer designs make a flexible and reliable platform for today's complex AOI and machine vision requirements. Utilizing the newest multi-core x86 architecture provides the most open platform for the AOI challenge of multi-tasking both processing data and

conducting image analysis. To further reinsure a long compatibility roadmap, system integrators should take the step to select systems with robust I/O flexibility. For AOI, leveraging the modular options of the [ARK-3520L embedded PC](#), will unlock diverse I/O interface combinations, which can be swapped on the plant floor with ease. The [ARK-3520L embedded computer](#) also offers slot expansion for various PCIe expansion card types, including control data acquisition and video.

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