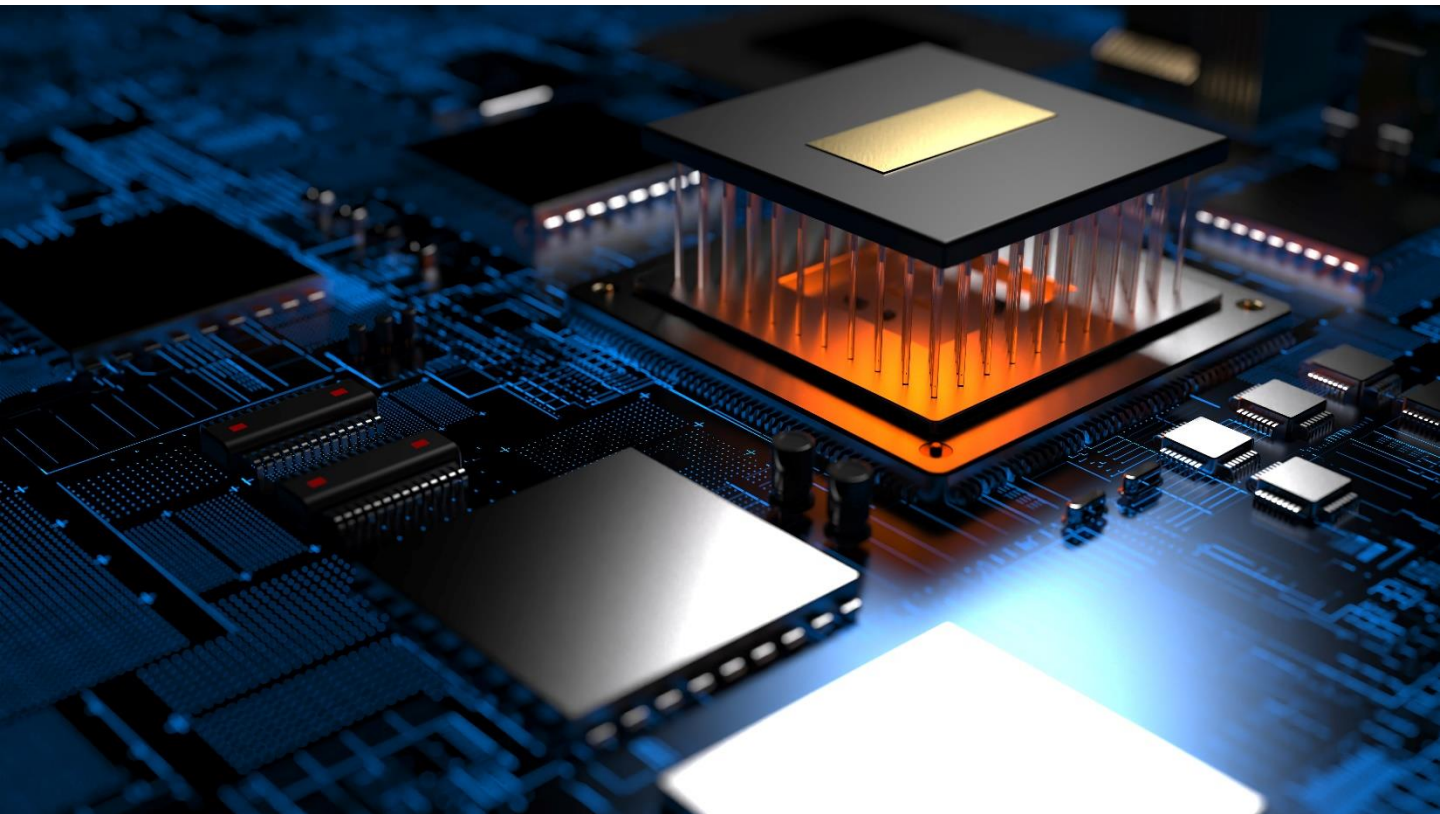




Advantech Wafer Inspection Solution for Semiconductor Factory

Project Introduction

Location: Singapore

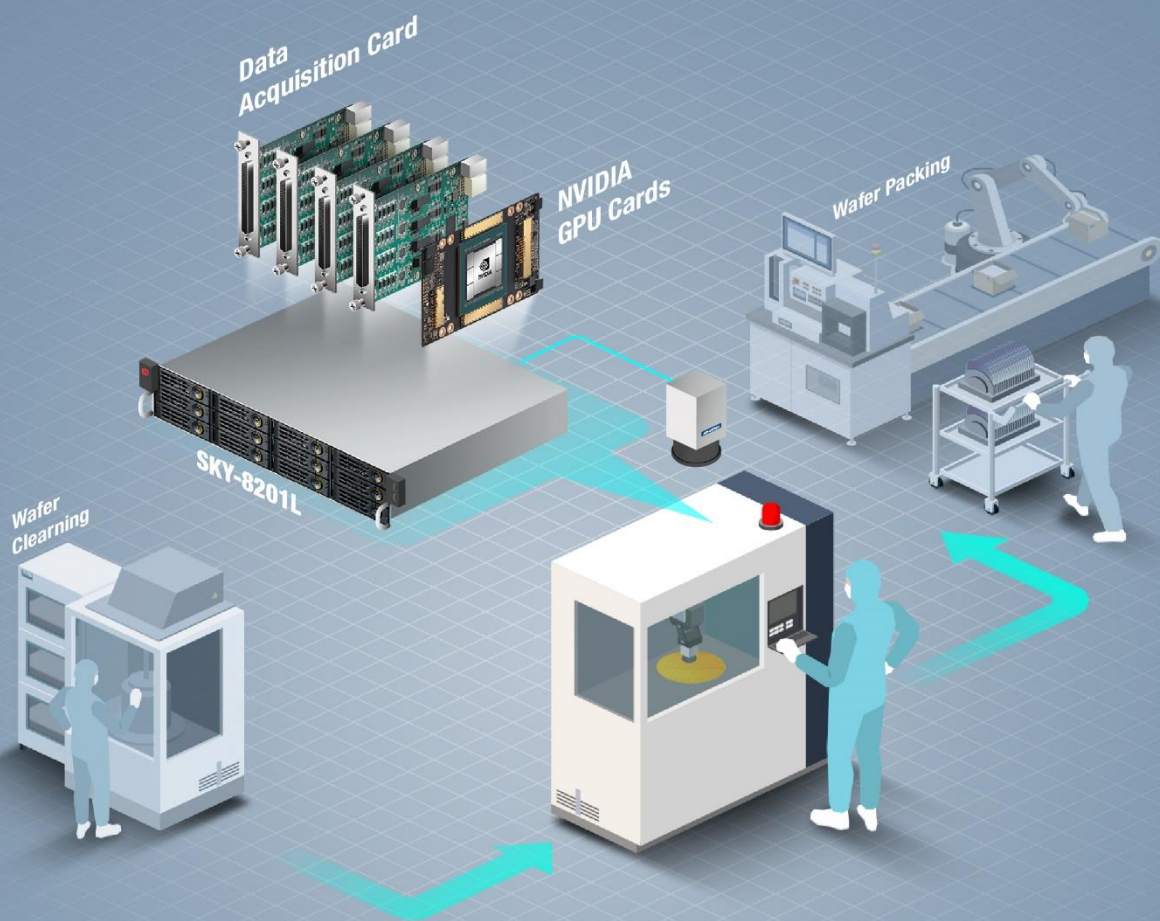
The impact of digital transformation on our lives and businesses has accelerated and semiconductor markets have boomed with sales growing by more than 20 percent to about US\$600 billion in 2021. McKinsey analysis, based on a range of macroeconomic assumptions, suggests the industry's aggregate annual growth could average from 6 to 8 percent a year up to 2030.

A global semiconductor company that has been providing advanced surface defects inspection systems such as wafer inspection, optical surface analyzers, and HDD defect detection, needed to upgrade its operating systems as well as its hardware for new more advanced projects.

System Requirement

Semiconductor equipment has a lot of moving parts. From the equipment to the people managing it, a lot of things need to happen correctly for it to operate effectively. Because of space constraints and harsh environments, this customer was looking for a short depth server that can not only provide high performance, but also operate in wide temperature environments. Moreover, with wireless connected solutions and high-speed computers all demanding faster processing, enabling high-performance (faster decision-making) features for semiconductor manufacturing solutions is a vital requirement. While not all silicon products are produced by faster processing, there are several application areas where a quick decision making is still a most basic requirement. Lastly, as huge amounts of data also need to be processed, more PCIe slots are required for data acquisition and other types of cards. To sum up, what they needed was a high performance and flexible solution.

System Diagram



System Description

SKY-8201L is a highly configurable, high performance server designed to balance the best in x86 server-class processing with maximum storage, I/O, and offload density in a 2U 27.5" deep chassis. It is specifically designed for high density PCIe card payloads where maximum I/O connectivity is needed or the integration of offload and acceleration technology is essential. The power and cooling options along with the streamlined mechanical design make SKY-8201L ideal for demanding applications needing acceleration technologies such as those provided by GPU, DSP, and FPGA cards. Surface defect inspection systems are commonly used in semiconductor production lines, especially for wafer defect inspection. They are able to detect defects on opaque, translucent, and transparent compound semiconductor materials up to 200mm in diameter. The system scans partial wafers with a wide range of wafer thicknesses and detects defects such as particles, scratches, pits, bumps, and stains. Due to the large volume of data needed for processing, the new solution comes with four data acquisition cards and an NVIDIA GPU card to achieve the best data processing performance. Advantech SKY-8201L pairs its Intel Xeon Scalable processor with 64GB Micron DDR4 ECC RDIMMs clocked at 2933 MHz. For storage, the Advantech SKY-8201L supports SATA SSDs such as the Micron 1300 in either 2.5" or M.2 form factors. These SSDs use reliable 96-layer TLC NAND technology achieving 530 MB/s read performance with reduced power consumption.

Benefits

- ✓ Advantech SKY-8201L is a 2U high performance server with high density and rich PCIe extension slots, which can accommodate up to 8 x PCIe cards.
- ✓ Four rear PCIe x8 (FH/FL) + 2 x rear PCIe x8 (FH/HL) + 2 x rear PCIe x8 (low profile) for an Advantech personalization card.
- ✓ Window Server 2019

Why Advantech

Because the surface defect inspection system solution required four data acquisition cards, a GPU card and a RAID card, the multiple PCIe slots of SKY-8201L was easily able to tick these boxes. SKY-8201L accommodates multiple high-density PCIe slots and up to 8 x PCIe cards including four rear PCIe x8 (FH/FL) + 2 x rear PCIe x8 (FH/HL) + 2 x rear PCIe x8 (low profile) cards. SKY-8201L is specifically designed for applications requiring higher capacity, front loading, and hot-swappable storage with RAID support. It also offers up to twelve 3.5" removable drive bays at the front, eight/twenty of which support SATA/SAS connectivity and each can be connected to a PCIe Gen3 x4 Intel OcuLink bus. With support for Intel VROC hybrid NVMe and SATA RAID, the server is ideal for video caching and edge transcoding, data acquisition, storage and processing as well as accelerated edge processing and analytics. The SKY-8201L meets a variety of acquisition, preprocessing and high performance needs and can operate in environments with limited space, higher ambient temperature, and low noise level constraints.

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Enabling an Intelligent Planet



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