ADVANTECH'S AIMB-523 INDUSTRIAL MOTHERBOARD MAXIMIZES COMPUTER VISION FUNCTIONALITY AND AGILITY WITH AMD RYZEN™ EMBEDDED 7000 SERIES PROCESSORS

CUSTOMER

ADVANTECH

INDUSTRY

Machine Vision

CHALLENGES

Real-time 3D visual inspection applications in industrial automation require high-performance processing and graphics, complemented by rich I/O connectivity to handle multi-input visual data with high-speed, high-precision responsiveness. Advantech sought to optimize a motherboard platform that achieved these benefits while enabling design agility and longevity.

SOLUTION

Advantech's AIMB-523 Micro-ATX motherboard, powered by AMD Ryzen™ Embedded 7000 Series processors, combines powerful CPU processing with integrated AMD Radeon™ graphics, while enabling 6 x 2.5GbE LAN ports and 8 x USB 3.2 ports for high-speed, high-resolution image-capturing devices.

RESULTS

The AIMB-523 Micro-ATX motherboard is optimized for demanding 3D automatic optical inspection applications and helps to achieve maximum throughput with minimal latency. The product delivers full functionality, precise graphics inference, and robust data processing capability.

AMD TECHNOLOGY AT A GLANCE

AMD Ryzen™ Embedded 7000 Series

Advantech's Micro-ATX Motherboard Solution Provides a Major Performance Boost, with Expansive I/O Connectivity and Longevity for Reliable Vision Inspection at the Edge

Advantech's innovation in industrial embedded platforms makes it a trusted provider of motherboard solutions to its customers around the world. The company's expertise in hardware design and integration is a vital resource to accelerate real-time 3D visual inspection systems in development and deployment.

With the introduction of its AIMB-523 Micro-ATX motherboard, powered by AMD Ryzen™ Embedded 7000 Series processors, Advantech has harnessed breakthrough processing performance and functionality for automatic optical inspection applications, bringing enhanced efficiency and productivity at the edge.

CHALLENGE

With the advent of AI, computer vision system designers can achieve new heights in system performance and agility for automated visual inspection applications. The ability to react in real-time to meaningful visual data is essential to high-quality inspection, and there's a growing opportunity to leverage AI acceleration to maximize intelligence at the data acquisition layer.

Performance and connectivity are essential to any computer vision system, particularly in the AI era. Additionally, customers place significant importance on system longevity. Both system providers and end customers require long product lifecycles for stability and support.

"Advanced functionality is also reflected in sustained innovation over time," said Irene Wu, product manager at Advantech. "AMD is a natural partner for powering the AIMB-523 and many other Advantech solutions because its sustained innovation in embedded processing has delivered breakthrough advancements in performance and design interfaces with each new AMD product generation."

These innovations are essential for equipping computer vision system designers with the CPU and graphics performance they need while still keeping a compact motherboard dimension to minimize efforts of system integration. Ample I/O connectivity is likewise vital for accommodating multiple high-resolution cameras and other digital devices with maximum throughput and minimal latency.

SOLUTION

Advantech's AIMB-523 Micro-ATX motherboard is optimized for 3D vision-guided inspection and is powered by AMD Ryzen Embedded 7000 Series processors featuring the "Zen 4" core architecture and 5nm technology.

With 12 cores and support for up to 128GB of DDR5 memory, AMD Ryzen Embedded 7000 Series processors deliver up to 49% more performance within the same power budget compared to the AMD Ryzen Embedded 5000 Series[1].

"AMD Ryzen Embedded 7000 Series processors deliver an outstanding performance improvement at consistent power and thermal profiles," Wu continued. "Power budget continuity across product generations helps simplify the overall design effort for Advantech and our customers in the evolution to next-generation AMD processing platforms."

The AIMB-523 harnesses the power of AMD Ryzen Embedded 7000 Series processors for outstanding compute efficiency even under heavy data workloads. With 4 DIMMs supporting up to 128GB of DDR5 memory, it delivers exceptional responsiveness for data-intensive applications managing simultaneous high-speed workflows. Extending its multi-tasking agility, the AIMB-523 motherboard is also equipped with an onboard M.2 M-Key with PCIe x4 links, compatible with high-speed NVMe SSDs for ample data storage.

The AIMB-523 motherboard features expansive connectivity options – 6 x 2.5GbE LAN ports and 8 x USB 3.2 ports – for connectivity to high-speed, high-resolution image capturing devices. The AIMB-523 also includes a steel-reinforced PCIe® x16 Gen5 slot that withstands a heavy weight AI acceleration card, plus an internal USB Type-A port for USB security dongles and license keys. These features make it an ideal solution for 3D automated optical inspection applications in industrial automation that require high definition image capturing, precise graphics inference, and super speed data processing capability.

RESULTS

The AIMB-523 enables major improvements in processing efficiency and speed when handling data-intensive workloads by leveraging the AVX-512 instruction set supported by AMD Ryzen™ Embedded 7000 Series processors to execute complex computational tasks. Its rich functionality allows for the direct connection of high-speed devices such as high-resolution digital cameras for processing large images in automated visual inspection. Designers can connect digital devices directly to the motherboard for their application needs.

While the AIMB-523 already offers fast transmission, the PCIe x16 slot enables the use of AI-accelerator cards to further enhance visual computing and analytic capabilities. This design makes the AIMB-523 ideal for scenarios demanding flexible functionality and superior AI computing capabilities, particularly in automated visual inspection.

AMD Ryzen Embedded 7000 Series processors support up to seven years of product lifecycle, helping engineers to future-proof their designs and introduce add-on features over time.

"Sustained innovation by AMD – exemplified in the AMD Ryzen Embedded 7000 Series processors – means that Advantech and its customers can take advantage of performance and power efficiency benefits across AMD product generations, and ultimately help unlock the full promise and value of tomorrow's computer vision designs," Wu added.

ABOUT ADVANTECH

Advantech's corporate vision is to enable an intelligent planet. The company is a global leader in the fields of IoT intelligent systems and embedded platforms. To embrace the trends of IoT, big data, and artificial intelligence, Advantech promotes IoT hardware and software solutions to assist business partners and clients in connecting their industrial chains. Advantech is also working with business partners to co-create business ecosystems that accelerate the goal of industrial intelligence. Visit their website here.

ABOUT AMD RYZEN™ EMBEDDED 7000 SERIES PROCESSORS

The AMD Ryzen™ Embedded 7000 series processors, a new performance benchmark for Ryzen Embedded family. Redefining performance standards. Offering powerful CPU processing, integrated AMD Radeon™ graphics, and extensive I/O connectivity in a socketed (AM5) solution. Click here to learn more.

ABOUT AMD

For more than 50 years, AMD has driven innovation in high-performance computing, graphics, and visualization technologies. Billions of people, leading Fortune 500 businesses, and cutting-edge scientific research institutions around the world rely on AMD technology daily to improve how they live, work, and play. AMD employees are focused on building leadership, high-performance, and adaptive products that push the boundaries of what is possible. For more information about how AMD is **enabling today and inspiring tomorrow, visit the** AMD (NASDAQ: AMD) website, blog, LinkedIn, **and** Twitter **pages**

[1]Testing as of 15 August, 2022, by AMD Performance Labs using the following hardware: AMD AM5 Reference Motherboard with AMD Ryzen™ 9 7950X with G.Skill DDR5-6000C30 (F5-6000J3038F16GX2-TZ5N) with AMD EXPO™ loaded, AMD AM4 Reference Motherboard with AMD Ryzen™ 9 5950X and DDR4-3600C16. ALL SYSTEMS configured with NXZT Kraken X63, open air test bench, Radeon™ RX 6950XT (driver 22.7.1 Optional), Windows® 11 22000.856, AMD Smart Access Memory/PCIe® Resizable Base Address Register ("ReBAR") ON, Virtualization-Based Security (VBS) OFF. Processor power measured at the package, performance measured in Cinebench R23 nT score. System configurations will vary, yielding different results. RPL-014.