

Solution Brief

Healthcare IoT
Embedded Computing

intel®

Advantech Boosts Confidence in Healthcare IoT with Flexible Motherboard Solutions

Advantech solutions with 13th Gen Intel® Core™ processors bring significant performance enhancements in graphics and AI to demanding healthcare applications at the edge.

ADVANTECH

“The collaboration between Intel and Advantech supports the unique demands of the healthcare industry. Intel empowers Advantech with a high-performance processor, and Advantech builds on these specifications to unleash the power of the hardware and create an innovative design that satisfies customer needs.”

—Jessie Chang, Product Manager at Advantech

Healthcare IoT plays a critical role in improving patient outcomes and clinical workflows. Patient monitoring and related high-end treatment devices help mitigate the nursing staff shortage, enabling clinicians to attend to more patients with fewer resources. High-resolution monitors allow specialists to read ultrasound and CT/MRI scans in greater detail and accuracy. AI-assisted diagnostics boost clinician efficiency by completing a large amount of data analysis and providing real-time prediction. Board designs that maximize CPU power to support these use cases are in urgent demand as healthcare needs increase globally.

Challenge: Balancing high performance and stable longevity

AI, compute performance, and graphics processing are all key to IoT use cases in healthcare, but these heavy workloads contribute to heat generation in small-footprint devices like ultrasound or patient monitoring. Physical space is already scarce for these deployments, and system performance is limited by the size of the cooling unit. Device failures, which can sometimes be caused by electrostatic discharge (ESD), are more critical in healthcare than in other industries because they directly impact patient safety. To help ensure safety, healthcare technology is regulated and requires lengthy certification processes of several years before actual deployment. A proper hardware design can efficiently speed up the process of verification as well as deployment.

Solution: Intel-powered Advantech motherboards for embedded applications in healthcare

To help meet the unique demands of healthcare IoT, Advantech offers a selection of embedded computing motherboards with 13th Gen Intel® Core™ processors. The Advantech AIMB-278, AIMB-288E, and AIMB-588 motherboards help meet customer needs with higher processor core counts, integrated Intel® UHD Graphics 770 driven by Intel® Xe architecture, and hardware-accelerated AI. Advantech provides a comprehensive set of offerings, including a high-performance-oriented platform in the AIMB-278, an all-in-one kit with a slim-designed proprietary cooler in the AIMB-288E, and a motherboard with plentiful expansion in the AIMB-588 that can satisfy diverse needs—from compute-intensive AI to medical imaging applications.



This slate of offerings also benefits from Intel® processors' long-life availability¹ and Advantech's excellent component life cycle management, increasing the interval between upgrades so hospitals can maximize the value of their investments. "The collaboration between Intel and Advantech supports the unique demands of the healthcare industry.

Intel empowers Advantech with a high-performance processor, and Advantech builds on these specifications to unleash the power of the hardware and create an innovative design that satisfies customer needs," says Jessie Chang, Product Manager at Advantech.



Achieve clinical excellence in healthcare IoT

Advantech AIMB-278, AIMB-288E, and AIMB-588 motherboards powered by 13th Gen Intel® Core™ processors are designed to meet the unique needs of healthcare deployments.

Meet healthcare IoT performance requirements

13th Gen Intel Core processors deliver up to 24 cores, integrated graphics, and hardware-accelerated AI.

Solve space-constrained cooling problems

Advantech slim-designed proprietary cooler maintains up to 100 percent performance within zero to 60 degrees Celsius ambient temperature.

Deliver consistent value after long certification cycles

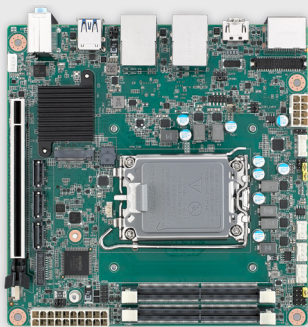
Intel® processors deliver long-life availability¹ and support up to 128 GB DDR5 5,600 MHz memory to enhance computing efficiency.

Comprehensive Intel-enabled Advantech board designs empower healthcare IoT builders

Advantech offers a portfolio of three embedded solutions powered by 13th Gen Intel Core processors to help meet the specific needs of healthcare technology providers. The AIMB-278 is a Mini-ITX board that delivers breakthrough performance alongside support for up to four 4K displays, ideal for practitioners who need high-resolution imagery to help improve diagnosis precision. The AIMB-288E is an exclusive Mini-ITX offering that's designed specifically for space-constrained areas but delivers performance at the same time. The AIMB-288E combines Advantech's slim-designed proprietary cooler and embedded MXM graphics processing unit (GPU) for a modular offering with a z-height of 42 mm. Lastly, the AIMB-588 prioritizes performance and expansion in a MicroATX form factor, with up to four PCIe expansion slots and DDR5 memory capacity up to 128 GB, to help meet the needs of the most-demanding healthcare applications.

Choosing from the Intel-powered Advantech portfolio

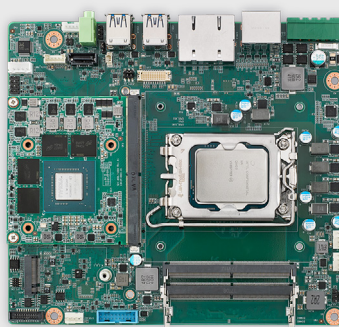
System builders can choose from an array of solutions that balance performance, expansion, and slim design.



170 x 170 mm

Advantech AIMB-278 with 13th Gen Intel® Core™ processor

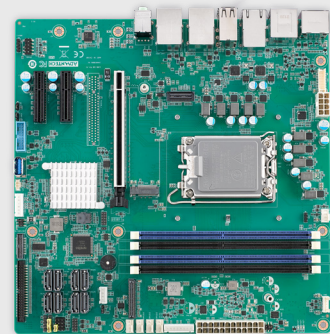
Mini-ITX board with up to 4x 4K displays



170 x 190 mm

Advantech AIMB-288E with 13th Gen Intel Core processor

Mini-ITX slim design with Advantech proprietary cooler and MXM GPU



244 x 244 mm

Advantech AIMB-588 with 13th Gen Intel Core processor

MicroATX board with up to four PCIe expansion slots and 128 GB DDR5 memory capacity

Break through compute barriers with performance hybrid architecture²

13th Gen Intel Core processors strive for extreme performance levels with up to 24 cores and 32 threads and more L2 and L3 cache than previous-generation processors, which helps satisfy the increasing demands of AI and graphics processing at the healthcare edge. Built with performance hybrid architecture,² this platform excels at multitasking by using a combination of multithread Performance-cores, or P-cores, for primary workloads with single-thread Efficient cores, or E-cores, for background tasks. System builders and end users can rely on the platform to deliver a fast and responsive experience even for resource-intensive medical imaging and diagnostics workloads.

Drive next-generation connectivity and transmission efficiency

The Intel-powered Advantech boards feature high-speed expansion interfaces with PCIe 5.0 slots and diverse ports to support add-in accelerator cards and USB 3.2, M.2, and 2.5GbE connectors, respectively, to achieve fast network speeds. The boards also support DDR5 memory modules in varying capacities of up to 64 GB for the Mini-ITX offerings and up to 128 GB for the MicroATX solution, at a memory bandwidth of up to 5,600 MHz. Each board's versatility gives solution and healthcare providers the customization potential to design and deploy the ideal system for their specific needs.

Enable finer details with integrated graphics and quad-display support

13th Gen Intel Core processors in the Advantech motherboards also feature Intel UHD Graphics 770 driven by Intel X^e architecture with up to 32 graphics execution units (EUs).⁴ Integrated graphics help reduce the reliance on discrete accelerators for visual processing workloads to support diagnostics, interfaces, and AI to help reduce system costs. The Advantech AIMB-288E Mini-ITX board comes with a horizontal MXM GPU for enhanced graphics capabilities in space-constrained deployments that lack the physical space for an external vertical accelerator to ease the integration process.

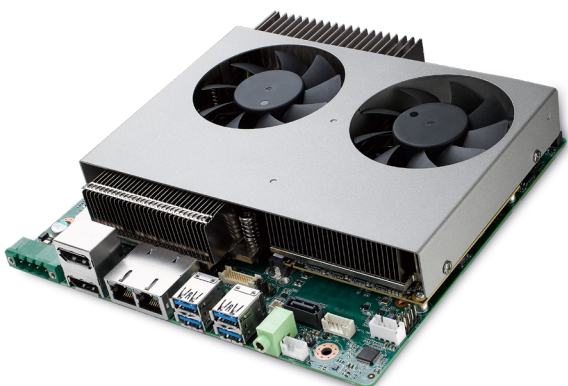


Figure 1: The Advantech AIMB-288E enabled by 13th Gen Intel Core™ processors, featuring a slim proprietary cooler.

13th Gen Intel® Core™ processors

Estimated performance compared to 12th Gen Intel® Core™ processors

Up to

1.04x

faster single-thread performance vs. 12th Gen Intel Core processors³

Up to

1.34x

faster multithread performance vs. 12th Gen Intel Core processors³

Up to

1.25x

faster CPU image classification inference performance vs. 12th Gen Intel Core processors³

3. Compared to 12th Gen Intel® Core™ processors for IoT. See backup for configuration details. Results may vary.

The Intel-powered Advantech boards also support up to four display pipes with 4K resolution output per pipe, allowing for multiple high-resolution displays in patient monitoring or diagnostics platforms. More pixels mean more-enhanced details to help practitioners interpret medical images like X-rays and ultrasounds.

Deliver fast AI-assisted diagnostics with hardware acceleration

The high number of graphics EUs also contributes to fast parallel processing for workloads that are key to object and pattern recognition in AI-assisted diagnostics workloads. The Intel processor delivers hardware-enabled acceleration for AI inference workloads through Intel® Deep Learning Boost (Intel® DL Boost) Vector Neural Network Instructions (VNNI). The platform also supports the Intel® Distribution of OpenVINO™ toolkit, which further optimizes AI performance on Intel-enabled systems. These innovations make it possible to run resource-intensive AI workloads and get fast results at the healthcare edge.

Lock down sensitive data with hardware-enabled security features

Hospital environments need to handle patient data with care, and these systems help provide fundamental, hardware-enabled security features to augment software-driven security processes. 13th Gen Intel Core processors support Intel® Total Memory Encryption (Intel® TME), Intel® Boot Guard, and Intel® Trusted Platform Module (Intel® TPM) 2.0 to help secure touchpoints in a hospital environment and help keep patient data safe.

While most data is already encrypted at rest, Intel TME goes a step further by encrypting in-flight data in memory for more-comprehensive protection. Intel Boot Guard helps enable below-the-OS protections by using hardware-based Intel TPM encryption keys to validate platforms during startup. This process measures and checks for anomalous behaviors to determine that the system boots in a trusted state. These features help secure patients' protected health information (PHI) by adding more layers of cybersecurity within the hospital perimeter.

Maximize return on investment (ROI) with long-life availability¹

The collaboration between Intel and Advantech brings a specialized understanding of the regulatory environment that hospitals face when deploying new technology. Years-long certification cycles for new deployments can consume a significant fraction of a product's life span, reducing the value that end users can get from their investments.

Intel processors for IoT feature long-life availability¹ to ensure extended product supply for repairs and replacements on certified systems, allowing hospitals to keep technology in place for longer stretches of time. Advantech also helps reduce the solution development period prior to certification, which speeds time to deployment, by prevalidating compatible system components such as MXM GPUs and SSDs. As a result, solution providers can get to market faster, and hospitals can drive more value from their investments with longer intervals between upgrades.

Conclusion: Deliver win-win solutions for healthcare providers with Intel-powered Advantech solutions

With more compute performance and hardware acceleration for high-end workloads, Intel-powered Advantech boards make it easier for hospitals to deploy AI-capable applications, support high-resolution displays, and maximize device functionality with diverse expansions. The Advantech portfolio gives solution architects several options to deploy the latest innovations that customers are asking for now while meeting the unique requirements of healthcare. As global healthcare demands increase, Advantech can equip providers and practitioners with advantageous solutions to help overcome future challenges.

Get started

Learn more about 13th Gen Intel Core mobile processors at intel.com/13thgencore-iot.

Explore the Advantech solutions featured in this brief:

[Advantech AIMB-278 Mini-ITX board >](#)

[Advantech AIMB-288E Mini-ITX board >](#)

[Advantech AIMB-588 MicroATX board >](#)

About Advantech

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advantech.com



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2. Performance hybrid architecture combines two new core microarchitectures, Performance-cores (P-cores) and Efficient-cores (E-cores), on a single processor die. Select 13th Gen Intel® Core™ processors (certain 13th Gen Intel® Core™ i3 processors and lower) do not have performance hybrid architecture, only P-cores.
3. Performance varies by use, configuration, and other factors. Learn more at edc.intel.com/content/www/us/en/products/performance/benchmarks/internet-of-things.
4. Available on select SKUs.

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