



Embedding AI at the Edge

Intel® Core™ Ultra processor-based motherboards address machine vision and deep learning capabilities for smart cities, industrial robots, and smart retail.

AI in the Physical World

The rapid evolution of AI technology is propelling a new era of unprecedented innovation, with applications extending across numerous industries. Even today, AI-powered processes have revolutionized backend operations, leveraging sophisticated algorithms to analyze vast datasets, empowering businesses to streamline operations, pinpoint optimization opportunities, and make data-driven decisions with greater confidence.

Now, that data-processing prowess is leading to the use of AI to analyze our physical world. The ability of the machine to “see” objects, known as machine vision, enables the ingestion of visual information, the interpretation of that input, and taking action accordingly. These smart capabilities lead to self-sufficient devices that can make complex decisions autonomously according to current conditions.

Much effort has been put into the development of algorithms, with powerful GPUs doing much of the heavy lifting needed for AI deep learning on massive image datasets. Despite the power-hungry nature of algorithm development, unbridled positivity around AI’s potential has led to many real-world use cases. A glimpse into the current applications of this technology reveals a future brimming with innovation.

Current Smart Applications

Smart applications use machine vision to interpret the physical environment and are usually very specific. Most implementations combine machine vision with sensors for additional input, connections to other devices, and network connections to backend systems. Below is a sampling of those technologies currently in use.

Smart City

AI holds significant potential to transform smart city applications, offering numerous benefits. AI-powered charging stations optimize efficiency by analyzing real-time data to dynamically adjust charging rates and prioritize vehicles, maximizing utilization and minimizing wait times. Predictive maintenance ensures reliability by monitoring machines and scheduling maintenance proactively. Driverless cars enhance safety by rapidly processing data from sensors, reducing accident risks. They also improve traffic flow and accessibility for individuals with disabilities.

AI improves medical imaging analysis in healthcare, enabling earlier disease detection and personalized treatment plans. Wearable devices monitor vital signs and alert healthcare providers for timely interventions. Beyond these, AI optimizes energy usage, reduces carbon emissions, and enhances public safety through advanced surveillance systems.

Industrial Robotics

Integrating AI into industrial robots and AMRs has great potential to transform manufacturing. AI-powered robots enhance precision and accuracy, resulting in higher product quality and

fewer defects. They can adapt to changing conditions and learn from experiences, improving efficiency and versatility. This adaptability allows for a broader range of tasks and better responses to unexpected situations, increasing productivity. Additionally, AI-enabled robots can operate continuously, maximizing production while reducing downtime.

However, the limited space for computing hardware poses a challenge. AI algorithms require substantial computational power, which can be hard to fit into compact designs. Engineers must balance performance and size when selecting components. The two-pronged approach to this challenge is developing energy-efficient AI algorithms and utilizing best-in-class modern computing hardware to lower power consumption and heat output, easing integration challenges.

Smart Retail

AI is revolutionizing the retail industry by enhancing customer experiences and streamlining operations. By analyzing vast amounts of data, AI systems can personalize product recommendations, optimize pricing strategies, and improve inventory management. AI also boosts operational efficiency by analyzing historical sales data, market trends, and external factors to predict future demand, allowing retailers to optimize inventory and reduce stockouts.

AI can optimize supply chain operations by identifying inefficiencies, improving logistics, and reducing transportation costs. For example, AI can optimize delivery routes, improve warehouse management, and reduce shipping times, leading to cost savings and improved customer satisfaction.

AI: Built-in by Default

Traditionally, the heavy lifting for AI computing has happened on dedicated GPUs. As the compute moves closer to the edge, the space limitations and heat dissipation challenges of edge AI implementations in complex systems, such as kiosks, charging piles, and smart medicine dispensers, make the use of power-hungry GPUs more difficult, if not impossible.

Intel® Core™ Ultra processors help solve this challenge by including a specialized AI processing unit alongside supercharged performance to support innovative use cases and demanding applications. These processors provide more AI processing power than any of their predecessors and enable the specification of systems where the discrete graphics card

becomes optional. Select models have a built-in Intel® Arc™ GPU for even better performance.

3D Performance Hybrid Architecture

With the latest Intel® 4 process technology, the processor now has performance cores and two different kinds of efficient cores that work together, delivering exceptional performance for demanding tasks while optimizing power consumption.

Advanced AI Capabilities

The processors are equipped with advanced AI features, including Intel® Deep Learning Boost and Intel® Neural Network Acceleration, to accelerate AI workloads and enhance AI-powered applications.

Integrated Intel® Arc™ GPU (Optional)

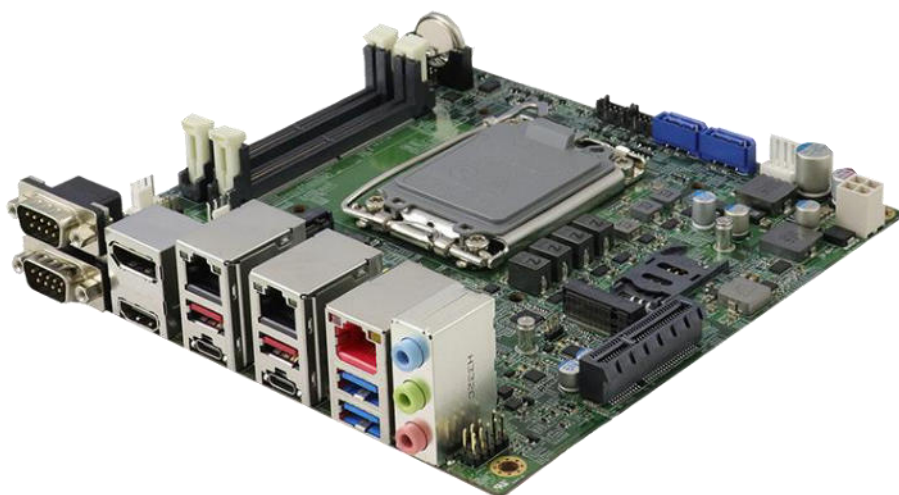
Many models of the Intel Core Ultra Processor feature integrated Intel® Arc™ GPUs, providing high-performance AI inference without the need for a dedicated graphics card. This allows for more computing power to be packed into the space-constrained designs of smart medical devices, industrial robots, and other applications.

IBASE Products

IBASE strives to put the power of the latest technologies in the hands of our customers so they can confidently develop their groundbreaking AI applications, knowing that we have the hardware they need to bring them to fruition.

■ Mini-ITX Motherboard

The IBASE MI1002 Mini-ITX motherboard has an LGA1851 socket that supports Intel® Core™ Ultra processors Series 1 (Meteor Lake-PS platform) processors. It offers advanced AI capabilities and enhanced graphics with remarkable energy efficiency. It can handle complex tasks effortlessly, whether deploying AI applications, managing edge computing, or driving IoT solutions.

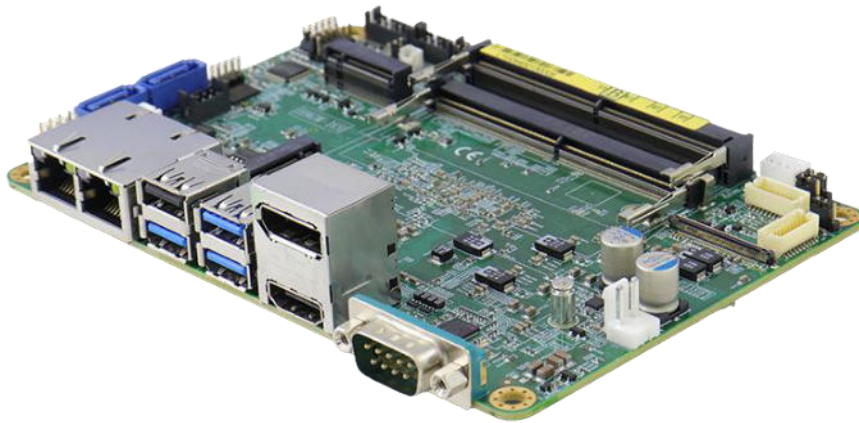


Features of MI1002 Mini-ITX Motherboard:

- Intel® Core Ultra 100 series DT processors (Meteor Lake-PS)
- 2x DDR5 SO-DIMM, Max. 64GB
- Supports HDMI, DisplayPort(DP++), 2x Type-C
- 1x Intel® I226LM 2.5G LAN, 2x Intel® I226V 2.5G LAN
- 4x USB 3.2, 2x USB Type-C, 4x USB 2.0, 4x COM, 2x SATA III
- 1x PCI-E (x4), 3x M.2 (M-Key + E-Key + B-Key)
- Supports 5G & watchdog timer, Digital I/O, iAMT (18.0), TPM (2.0)
- 12V~24V DC input

■ 3.5-inch SBC

The IBASE IB962 3.5-inch single board computer (SBC) has four processor options from the Intel® Core™ Ultra 7/5 100 Series processors (formerly Meteor Lake U/H): Intel® Core™ Ultra 7 165H and 165U, and Intel® Core™ Ultra 5 135H and 135U. These processors feature 3D performance with a hybrid architecture and advanced AI capabilities. The 165H and 135H feature the Intel Arc™ GPU for optimal balance of performance and power efficiency and help unlock the power of AI to create immersive graphics experiences.



Features of IB962 3.5-inch Single Board Computer:

- Onboard Intel® Core™ Ultra 7/5 100 Series processors
- 2x DDR5 SO-DIMM, Max. 64GB
- Supports HDMI, DP++, LVDS and eDP
- 1x Intel® I226LM 2.5G LAN, 1x Intel® I226V 2.5G LAN
- 3x USB 3.2, 3x USB 2.0, 2x COM, 2x SATA III
- 3x M.2 slots (M-Key + E-Key + B-Key)
- Supports 5G, digital I/O (4-in/4-out), TPM & watchdog timer

AI Optimized

With machine vision and deep learning capabilities powered by Intel® Core™ Ultra Processor-based edge AI solutions, companies can intelligently monitor quality on an assembly line, predict equipment failures, or perform other intelligent tasks. IBASE harnesses the power of Intel® Core™ Ultra in two new form factors to enable the effortless implementation of leading AI processing capabilities into smart cities, industrial robots, smart medical, and a plethora of new and innovative AI applications.

About IBASE

IBASE Technology (TPEX: 8050) specializes in the design and manufacture of robust industrial PC products, delivering high-quality products and excellent service since its establishment in 2000. We carry out manufacturing and quality control at our own facilities in Taiwan that are ISO 9001, ISO 13485, ISO 14001, and ISO 27001 certified. Current

product offerings comprise x86- and RISC-based industrial motherboards, embedded systems, edge AI computers, panel PCs, digital signage players, and network appliances for applications in the AIoT, automation, smart retail, transportation, networking, and medical sectors. We also offer ODM customization services, tailoring products to meet customers' specific requirements. For more information, please visit www.ibase.com.tw.

IBASE is a Titanium member of the [Intel® Partner Alliance](#) that offers exclusive resources for AI, cloud, high performance computing, and other solution areas to help plan, build, and deliver more customer value. As an Intel-recognized top-tier partner, IBASE works together with Intel and the ecosystem to deliver the most advanced products and solutions to our customers.



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