

## Supermicro and Intel Bring Flexibility, Efficiency, and Performance to Edge AI Inferencing

**Supermicro motherboard and complete PC solutions with 12th Gen Intel® Core™ processors deliver optimized performance for edge AI inferencing in retail, factory automation, and hospitality—without requiring a discrete GPU**



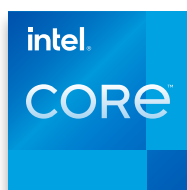
Enabling innovation at the edge is a critical priority for many organizations. In retail, businesses are looking to optimize and streamline their operations through touchless checkout, automated inventory tracking, loss prevention detection, and other connected capabilities. In the factory automation sector, organizations seek to deliver Industry 4.0 capabilities such as automated, machine vision-based quality control or equipment fault detection. Restaurants and other hospitality companies are employing edge compute to keep employees connected and streamline processes. Kiosks such as ATMs or other self-service offerings also rely on edge compute capabilities to fulfill their mission.

Across sectors, these new edge use cases demand more performance from the hardware that supports them. Because many critical new edge use cases depend on AI inferencing technology—where cameras and other sensors are used to understand environmental conditions in real time—today's edge hardware must be designed to support AI machine vision inferencing with optimal efficiency, performance, and flexibility.

### **Challenges: Delivering advanced edge AI use cases without discrete graphics**

With new use cases for edge computing come new challenges. Edge deployments move advanced capabilities from the data center or workstation to the factory floor, store, or restaurant. To accommodate this shift, edge hardware must provide reliability in a small, flexible form factor that can fit virtually anywhere and withstand challenging environmental conditions.

AI inferencing at the edge introduces an additional challenge. Traditionally, AI machine vision inferencing applications would demand the inclusion of a discrete graphics card into the underlying compute platform. But at the edge, this can be cost or space prohibitive. A discrete graphics unit increases the size of an edge device considerably and also drives up power consumption and production costs. Because of this, both end user organizations and system builders need small-form-factor hardware that can support inferencing workloads without relying on a discrete graphics accelerator.



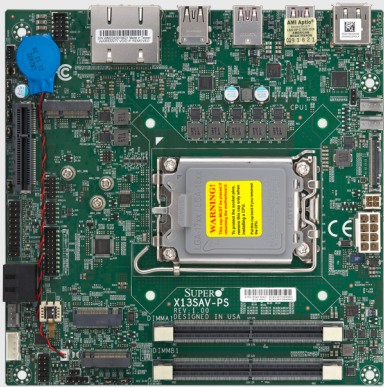
## Solution: Integrated AI inferencing support from Supermicro and Intel

Supermicro delivers Intel-enabled, edge-optimized solutions for AI applications in the form of both a motherboard and a complete fanless system for builders and end user organizations. Both of these offerings combine 12th Gen Intel® Core™ processors featuring integrated Intel® Iris® Xe graphics architecture with fully featured Supermicro mini-ITX motherboards to create an attractive platform for edge use cases in retail, industrial, hospitality, smart cities, and other areas.

Both the motherboard and small-form-factor device deliver advanced, integrated graphics capabilities via flexible, socketed designs. While this kind of built-in advanced graphics support has previously only been available through soldered-down processor options, this latest generation of Intel® Core™ processors incorporates the Intel Iris Xe graphics architecture to allow organizations to efficiently enable edge inferencing use cases while preserving future flexibility.

### Kick-start your AI inferencing efforts with Supermicro and Intel

**System builders, OEMs, and manufacturers**  
X13SAV-PS



Take advantage of our mini-ITX motherboard offering as a core building block for your edge solution.

**Retail, industrial, and hospitality organizations**  
SYS-E302-13AD



Quickly deploy edge capabilities via a small-form-factor, fanless edge PC with no moving parts.

### How it works

By combining 12th Gen Intel Core processors with Intel Iris Xe graphics and Supermicro motherboard and system offerings, system builders and edge users gain a powerful solution for enabling inference use cases. The powerful integrated capabilities of 12th Gen Intel Core processors make AI inferencing possible without the inclusion of a discrete GPU.

#### Mini-ITX motherboard: Rapidly bring inference-optimized edge AI solutions to market

The Supermicro mini-ITX motherboard with 12th Gen Intel Core processors and Intel Iris Xe graphics provides system builders and OEMs with an ideal foundation for edge AI solutions. Combining socketed design with powerful integrated graphics allows them to realize a compelling balance of price, size, and performance. Pair the Supermicro mini-ITX motherboard with the chassis and components of your choice to quickly bring an edge inference platform to market and capture emerging opportunities.

#### Complete system: Streamline edge AI inferencing deployments, even in challenging environments

Supermicro and Intel offer a small-form-factor, fanless solution that can be quickly deployed to enable inferencing use cases. With a minimal footprint, these devices can be deployed virtually anywhere. Because this system is fanless and designed with no moving parts, it can be used in hazardous environments such as the factory floor or restaurant kitchen. This complete system solution leverages the same mini-ITX motherboard as the motherboard component offering.

#### Meet edge AI inferencing needs with expansive I/O, memory, and storage

The Supermicro mini-ITX motherboard used in both offerings provides all the capabilities required to maximize performance, speed results, and ensure return on edge AI inferencing investments.

To provide end users and system builders with maximum configuration flexibility, the LGA1700 socket-based Supermicro mini-ITX motherboard offers robust memory, storage, display, and peripheral support.

#### Memory and storage capabilities

- DDR5 up to 4800 MHz/64 GB capacity non-ECC SODIMM in 2 slots
- 1 PCIe 4.0 x4 slot support
- 1 M.2 M key (2280) support NVMe (PCIex4 only)
- 1 M.2 E key (2230) support (USB 2.0/PCIex1)
- 1 M.2 B key (3052) w/ nano SIM support (USB 3.0/USB 2.0/PCIex2)

#### I/O connectors

- 1 DisplayPort 1.4 and 1 HDMI and eDP
- 2 TYPE C support DP/USB 3.2 Gen2
- 2x COM port (headers; RS232/422/485 BIOS selectable)
- Dual 2.5GbE LAN (Intel® LAN chip)
- 2x USB 3.2 Gen2, 1x USB 3.2 Gen1, 1x USB 2.0 (4 type A in rear)
- 4x USB 2.0 via headers
- 2x SATA 3.0 port

### Accelerate performance while maintaining future flexibility with 12th Gen Intel Core processors

12th Gen Intel Core processors feature performance hybrid architecture<sup>1</sup> with Intel® Thread Director<sup>2</sup> and an integrated PCH—all in a 12W to 65W processor assured power range and 15W to 45W base power range. Compared to 10th Gen Intel® Core™ desktop processors, the new generation of processors delivers up to 4x faster graphics and up to 6.6x faster AI inference performance.<sup>3</sup> Featured in both the mini-ITX motherboard and complete system offerings, 12th Gen Intel Core processors combine the performance profile and power ranges of 12th Gen Intel® Core™ mobile processors with the LGA-socket flexibility of 12th Gen Intel® Core™ desktop processors.

Using these processors, both end users and system builders gain the ability to deploy AI inferencing workloads without a discrete GPU. While this kind of capability was previously part of soldered-down processor offerings, the latest generation of 12th Gen Intel Core processors offers advanced integrated graphics in a socketed design. With 96 graphics execution units (EUs) included onboard, these processors deliver ample horsepower to accommodate edge inferencing workloads. Users can easily upgrade to more-powerful processors as their needs or use cases evolve, helping to ensure a longer life for their investment in edge hardware.

### Support advanced AI inferencing with Intel Iris Xe<sup>e</sup> graphics architecture

Up to 96 graphics EUs also enable a high degree of parallelization in AI workloads for Intel-enabled Supermicro solutions. Built-in AI acceleration on the CPU from Intel® Deep Learning Boost (Intel® DL Boost) provides additional inference processing power to ensure rapid response times and low-latency performance for mission-critical edge applications.

Further enhancing AI performance, Vector Neural Network Instructions (VNNI) contained within Intel DL Boost can accelerate loops in some convolutional neural networks (CNNs) that perform multiplication of two 8-bit (or 16-bit) integers and accumulate the results in a 32-bit integer variable. VNNI replaces a sequence of three instructions—from the Intel® AVX-512 fused multiply-add (FMA) extensions—with a single instruction that accelerates low-precision (int8) inference. Additionally, 12th Gen Intel Core processors fully support Intel® Distribution of OpenVINO™ toolkit optimizations.

### Take advantage of a wide range of connectivity options

12th Gen Intel Core processors support 2x 2.5GbE discrete LAN controllers, while the Supermicro motherboard offers both Wi-Fi and Bluetooth extension capabilities, with the option for additional LTE 5G connectivity. This allows end users and system builders to pick the right connectivity capabilities for their deployment or target use cases. For example, a system builder could create offerings that leverage high-bandwidth, low-latency 2.5GbE connectivity for Industry 4.0 applications or could opt for Bluetooth/Wi-Fi and LTE for retail deployments where wired connections aren't feasible or convenient.

### More easily manage edge deployments with the Intel vPro® platform

Select SKUs of 12th Gen Intel Core processors also support the Intel vPro platform, an integrated hardware-level management suite that makes it easier for IT teams to service, support, and troubleshoot distributed edge devices. Intel® Active Management Technology and Intel® Endpoint Management Assistant enable staff to discover, repair, and protect edge assets. Intel vPro also equips organizations with comprehensive, multilayer security through Intel® Hardware Shield, which includes below-the-OS security, application and data protection, and advanced threat detection.

## Conclusion: Capture your edge AI inferencing opportunity with Supermicro and Intel

As the world becomes more connected and automated, edge use cases such as AI inferencing are critical to continuing to unlock value, improve lives, and streamline processes. Using these purpose-built edge solutions from Supermicro and Intel, both end user organizations and system builders can deploy advanced edge AI capabilities without relying on a discrete graphics accelerator.

Both the complete system and motherboard building block offerings deliver an ideal way to support edge innovation within size, performance, and reliability constraints. As you seek to bring new levels of efficiency, automation, and consistency to retail, industrial, or hospitality use cases, you can rely on these offerings to solve critical edge compute challenges.

### About Supermicro

Supermicro is a global technology leader committed to delivering first-to-market innovations for enterprise, cloud, AI, and 5G telco/edge IT infrastructure.

[supermicro.com](https://www.supermicro.com)

## Learn more

### Mini-ITX motherboard with 12th Gen Intel Core processors

Quickly bring edge AI inferencing hardware solutions to market with optimal flexibility, performance, and cost.

[Learn more >](#)

### Complete small-form-factor, fanless system with 12th Gen Intel Core processors

Rapidly roll out edge AI inferencing capabilities in environments such as restaurants, factories, or retail stores.

[Learn more >](#)

### 12th Gen Intel Core processors

Deliver powerful edge compute, including optimized AI inferencing support, via a flexible socketed design.

[Learn more >](#)



1. Performance hybrid architecture combines two new core microarchitectures, Performance-cores (P-cores) and Efficient-cores (E-cores), on a single processor die. Select 12th Gen Intel® Core™ processors (certain 12th Gen Intel® Core™ i5 processors and lower) do not have performance hybrid architecture, only P-cores.
2. Built into the hardware, Intel® Thread Director is provided only in performance hybrid architecture configurations of 12th Gen Intel® Core™ processors; OS enablement is required. Available features and functionality vary by OS.
3. Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. For more complete information about performance and benchmark results, visit [intel.com/PerformanceIndex](https://www.intel.com/PerformanceIndex).

#### 12th Gen Intel® Core™ processor

Processor: Intel® Core™ i7-12800HL PL1=45W, (6P+8E) 14C20T turbo up to 4.8 GHz  
Graphics: Intel® Iris® X<sup>e</sup> graphics with up to 96 EUs  
Memory: DDR5-4800 64 GB  
Storage: Samsung SSD 970 EVO Plus 1 TB  
Intel® Alder Lake-PS DDR5 RVP  
OS: Windows 10 Enterprise LTSC 21H2  
BIOS: ADLFW11.R00.3137.B00.2203291427 03/29/2022  
CPUz microcode: 416h

#### 10th Gen Intel® Core™ processor

Processor: Intel® Core™ i7-10700 PL1=65W TDP, 8C16T turbo up to 4.8 GHz  
Graphics: Intel® UHD Graphics 630  
Memory: DDR4-2933 64 GB  
Storage: Samsung SSD 970 EVO Plus 1 TB  
ASRock IMB-1221-L Mini-ITX  
OS: Windows 10 Enterprise LTSC 21H2  
BIOS: AMI UEFI 03/23/2021  
CPUz microcode: CAh

#### Workloads

SPEC CPU2017 is a benchmark from the SPEC Consortium ([spec.org](https://www.spec.org)) that measures computer performance and throughput using compute-intensive application subtests.

3DMark Fire Strike measures DirectX 11 gaming performance for PCs and includes two graphics tests, a physics test, and a combined test that stresses the CPU and GPU.

MLPerf v1.1 Inference Edge/Mobile with Offline Scenario using OpenVINO™ 2021.4.1 framework is a benchmark suite for measuring how fast systems can process inputs and produce results using a trained model on Intel® UHD Graphics. Result not verified by MLPerf. MLPerf name and logo are trademarks. See [mlperf.org](https://mlperf.org) for more information.

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