

SUPERMICRO AND SIMA.AI MULTI-CHANNEL VIDEO ANALYTICS SOLUTION

Supermicro Edge Servers with SiMa.ai MLSoC™ Excel at High-Performance Vision Applications

Executive Summary

Supermicro, a global leader in high performance, high efficiency end-to-end green computing solutions, is collaborating with SiMa.ai, a leader in embedded edge machine learning (ML) platforms, to deliver effortless edge AI multi-channel video analytics solution for smart cities, smart retail, industrial and additional use cases.

The Supermicro SiMa.ai solution integrates SiMa.ai’s purpose-built ML System-on-a-Chip (MLSoC) into Supermicro’s SYS-E300-13AD embedded system, resulting in a high-performance compact edge ML server built to tackle multi-camera workloads at the edge.

Solution Highlights

- Powerful & versatile IoT/edge server powered by SiMa.ai MLSoC for AI/ML Inferencing and 13th Generation Intel® Core™ processor
- Compact physical footprint and quiet acoustics for a wide range of edge use cases
- SiMa.ai purpose-built MLSoC platform delivering high performance with the best FPS/W in its class
- Palette™, SiMa.ai’s Innovative edge ML software suite enabling full product life cycle development
- Support for BYOM (Bring Your Own Model), BYOP (Build Your Own Pipeline) with comprehensive model library and plug-ins
- Accelerated pre and post processing computer vision functions for various inference use cases
- Rich peripherals and support for multiple camera streams

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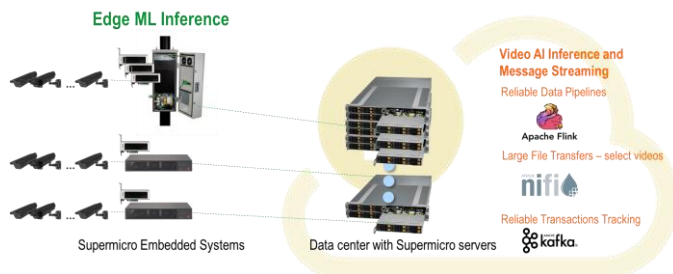


Figure 1: Solution high-level topology

Target Markets /Use cases

- Smart Transportation/Cities - Vehicle analytics
- Smart Retail – Unique people counting and tracking, Zone analytics, asset management
- Industry 4.0 - Inspection, logistics, maintenance

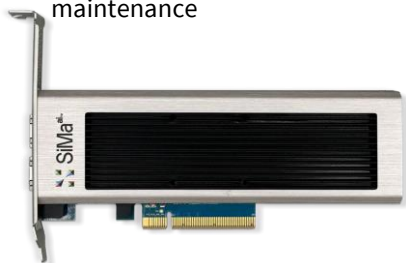


Figure 2: SiMa.ai MLSoC PCIe Half-height, Half-length (HHHL) card

Overview

Advancements in AI and deep learning technologies are revolutionizing the deployment of video analytics systems. As the need for accurate real-time data processing grows across sectors such as security, transportation, retail, smart cities, and more, both public and private organizations are increasingly seeking AI-ready platforms that can adapt to future needs.

The Supermicro and SiMa.ai video analytics solution is a multi-channel video analytics system designed for scalability, efficiency, and real-time decision-making. With support for multiple high-resolution cameras, higher frame rate processing, and push-button performance, this solution empowers organizations to make faster, data-driven decisions and implement changes that improve quality of life.

Supermicro delivers a broad range of optimized embedded and edge-building block platforms designed for various use cases and workloads. Additionally, Supermicro's embedded and edge platforms can be deployed across different environments, from the remote edge to the data center. Along with its broad ecosystem of software infrastructure providers, Supermicro brings the latest server technologies accessible to the market as soon as possible, enabling customers to roll out their services in a timely manner, leveraging the latest generation of high-powered systems, flexible I/O and expansion options, and long-life features.

SiMa.ai delivers ONE platform for all edge AI applications that scales with customers as their AI/ML journey evolves, from computer vision to transformers to multimodal generative AI. The SiMa.ai MLSoC, paired with its Palette software, enables multiple AI models to run simultaneously on a single camera stream with industry-leading latency and accuracy. This allows customers to scale compute capabilities to run multiple channels concurrently while maximizing efficiency, delivering the highest frames per second per watt (FPS/W).

Together, this integrated solution enables customers to deploy high-performance, scalable edge AI solutions across a variety of market segments. Local municipalities, for example, can enhance the performance and cost-effectiveness of applications such as object detection, anomaly detection, vehicle classification, and line crossing at the edge.

Solution Benefits

The integrated SiMa.ai and Supermicro Smart Cities solution offers a compact edge ML server that supports up to 8 full HD video cameras via Ethernet and wireless connections. Sensor/camera data is processed and analyzed locally on the device in real time, ensuring high-performance, secure, and reliable analytics directly on the device. This powerful solution also enables various other edge ML use cases, including retail and manufacturing. The edge ML server can also be augmented with remote and cloud-based compute resources, enabling intelligence across end-to-end deployments.

Key Features

- MLSoC based PCIe HHL card plugs into PCIe Slot on the Intel motherboard.
- Support GigE vision and RTSP cameras.
- Support H.264/H.265 Video codecs enable support for up to 8 Full HD cameras.



Figure 3: SYS-E300-13AD Front View

The Supermicro [SYS-E300-13AD](#) is a versatile high-performance IoT/edge server powered by 13th Generation Intel® Core™ processors. Its small physical footprint and quiet acoustics make it an ideal solution for a wide range of edge AI use cases such as smart vision applications like smart transportation, theft management, access control, employee safety, inventory management and more.



Figure 4: SYS-E300-13AD Back View

Specifications

Form Factor	Mini 1U Compact Edge System
Processor	13 th /12 th Generation Intel® Core™ i9/i7/i5/i3/Pentium/Celeron Processor (LGA-1700)
AI Co-Processor	50 TOPS Machine Learning SoC based on Quad Core A65, Computer Vision processor and Machine Learning accelerator
Memory Slot	2x DDR4-3200MHz SO-DIMM max 64 GB
Expansion Slot	Support M.2 M/E-Key Support 1x PCIe 5.0 x16 (optional) Supports up to 2x 2.5" drive bays (optional)
I/O Interface	Quad Independent Display by 2x HDMI and 2x DP 4x USB 3.2 Gen2 Type-A ports
Networking	1 RJ45 2.5 GbE LAN port (Intel I225-LM) 1 RJ45 1 GbE LAN Port (Intel I210-AT)
FAN	1 CPU heatsink with 80x15 fan 2x 4-PIN PWM 40x40x028 fans
Power Supply	180W Power supply
Environmental	Operating Temperature: 0°C ~ 40°C (32°F ~ 104°F) Non-operating Temperature: -40°C to 70°C (-40°F to 158°F)

Conclusion

The Supermicro and SiMa.ai approach delivers a scalable solution to tackle Edge AI workloads, from computer vision to transformers to multimodal generative AI across a wide variety of industry sectors.

Supermicro offers a broad portfolio of optimized edge platforms, ranging from compact fanless edge devices to powerful rackmount edge servers. It provides a proven, reliable, and right-sized computing backbone across multiple industries and workloads. This solution, coupled with SiMa.ai's MLSoC, enables customers to deploy AI inferencing at the edge readily. SiMa.ai's Palette software also equips customers with the tools to seamlessly deploy, run, and maintain their ML applications in just minutes. With flexible hardware and software solutions, alongside simplified model development and deployment, customers can quickly and efficiently scale their AI applications.

SUPERMICRO

As a global leader in high performance, high efficiency server technology and innovation, we develop and provide end-to-end green computing solutions to the data center, cloud computing, enterprise IT, big data, HPC, and embedded markets. Our Building Block Solutions® approach allows us to provide a broad range of SKUs and enables us to build and deliver application-optimized solutions based upon your requirements.

For more information: www.supermicro.com

SIMA.AI

SiMa.ai is the software-centric, embedded edge machine learning system-on-chip (MLSoC) company. SiMa.ai delivers ONE Platform for Edge AI that flexibly adjusts to any framework, network, model, sensor, or modality. Edge ML applications that run completely on the SiMa.ai MLSoC and Modalix product family see a tenfold increase in performance and energy efficiency, bringing higher fidelity intelligence to ML use cases spanning computer vision to generative AI, in minutes. With SiMa.ai, customers unlock new paths to revenue and significant cost savings to innovate at the edge across automotive, industrial manufacturing, retail, aerospace, defense, agriculture, and healthcare.

For more information: www.sima.ai