

Modalix System on Module (SoM)



Overview

The SiMa.ai Modalix™ System-on-Module provides the proven performance of the Modalix MLSoC architecture in a compact, deployment-ready form factor, purpose-built to scale Physical AI applications.

The Modalix MLSoC system architecture seamlessly integrates multiple compute engines and peripherals, delivering **best-in-class performance per watt** for advanced workloads, including multimodal transformers, Large Language Models (LLMs), Large Multimodal Models (LMMs), and Generative AI (GenAI). It also supports legacy convolutional neural networks (CNNs) and traditional computer vision (CV) algorithms, ensuring compatibility across modern and established Machine Learning (ML) pipelines.

Accelerated Development

SiMa.ai's Palette™ Software Suite with the Palette Neat™ Agentic Development Environment accelerates the development and deployment of Physical AI applications. Developers can rapidly build, optimize, and deploy complete AI solutions using industry-standard models, frameworks, and software tools.

From computer vision and multimodal AI to robotics and autonomous systems, SiMa.ai provides a streamlined development experience for efficient on-device AI processing. Support for ONNX models and popular frameworks such as OpenCV enables developers to leverage existing software investments, while accelerating time-to-market.

Benefits

Easy System Integration

The Modalix SoM is pin-compatible with SoMs from the leading GPU provider, which enables **seamless replacement in existing carrier boards**, eliminating any new hardware design.

Best-in-Class Processing

Purpose-built Modalix MLSoC architecture is optimized for demanding Physical AI workloads, delivering 50 TOPS of compute.

Scalable Performance & Easy to Use

The Modalix SoM is available with 8GB, 16GB or 32GB LPDDR5 memory options, providing scalable performance and with no need for hardware design.

Reliable and Efficient

Available in industrial and commercial temperature grades with advanced thermal management and real-time performance monitoring, ensuring robust and reliable performance and power efficiency on device.

Example Applications

- Smart Vision
- Conversational Interface
- Drones
- Robotics
- Industry 4.0
- Automotive
- Smart Retail / Healthcare
- Aerospace & Defense



Modalix SoM - Feature Highlights

Machine Learning Accelerator (MLA)

- 50 TOPs (BF16, INT8, INT16)
- Support of LLMs, Neural networks, and GenAI

Application Compute Unit (ACU)

- 8x Arm Cortex-A65 @1.4 GHz
- 32k Dhrystone MIPS

Memory

- 32/16/8GB of on-board 128-bit LPDDR5 (6400 Mbps) system memory

Boot and Security Unit (BSU)

- Secure boot with boot code authentication & encryption
- Secure key storage & management
- Security engine for user code

Video Codec

- Decode H.264/H.265/AV1 4K60
- Encode H.264/H.265/ 4K60

Computer Vision Unit (CVU)

- 4-core Synopsys EV74 DSP @ 1 GHz
- 720 16-bit GOPS

Low-latency Image Signal Processor (ISP)

- Arm Mali-C-71AE @ 1.2 GHz

Display Connectivity

- HDMI 1.4 port with 4K resolution

Peripherals

- 4x2 MIPI CSI-2
- 4x PCIe Gen5 RC & EP
- 1 x 1Gb Ethernet PHY
- 3 x USB 3.0
- 4 x I2C + 3 x UART + 14x GPIO
- 2 x SPI

Storage

- External NVMe through PCIe x4
- External SSD through USB 3.0
- 16 GB eMMC flash
- 64 MB QSPI flash
- 128Kb EEPROM

Flexible Power Supply

- 5-20V power input

Compact Form Factor

- 69.6 mm x 45 mm
- 260-pin SO-DIMM Connector
- Wide Temperature Range support
- -40 to +85 °C

Software-First Development Environment

Developing Physical AI applications can be challenging, especially when AI models, sensors, media pipelines, and application software must be integrated into a complete solution. SiMa.ai’s software-first approach streamlines development across a broad range of AI applications, including support for ONNX models.

The Palette Software Suite and Palette Neat Agentic AI Development Environment accelerate application development and deployment. Running on both the MLSoC and Modalix MLSoC platforms, SiMa.ai’s optimized runtime software delivers industry-leading performance-per-watt while supporting a broad ecosystem of AI models, frameworks, and sensors.

Ordering Information

Product Description

Modalix SoM 8GB	Standard Product
Modalix SoM 16 GB w/wo HDMI	Standard Product
Modalix SoM 32GB w/wo HDMI	Special Order

Temperature Grade

Commercial & Industrial
Commercial & Industrial
Commercial & Industrial



About SiMa.ai

SiMa.ai is a leader in Physical AI, delivering a purpose-built, software-centric platform that brings best-in-class performance, power efficiency, and ease of use to Physical AI applications. The company is focused on scaling Physical AI across robotics, automotive, drones, industrial automation, aerospace and defense, smart vision, and healthcare. Learn more at www.sima.ai.

