SiMa.ai Modalix SoM

Overview

The **MLSoC Modalix System-on-Module (SoM)** provides the proven performance of the Modalix MLSoC architecture in a compact, deployment-ready form factor, purpose-built to accelerate Edge AI applications. SiMa.ai created uniquely high-performance hardware and recognized the need for an equally unique and highly efficient software stack to unlock its full potential. To achieve this, Sima.ai partnered with **HTEC**, whose deep expertise in AI/ML engineering and embedded edge systems makes them an ideal strategic collaborator. Together, this synergy of advanced hardware and optimized software delivers a seamlessly integrated system architecture with a rich set of compute engines and peripherals, offering best-in-class performance per watt for advanced workloads—including multimodal Transformers, Large Language Models (LLMs), Large Multimodal Models (LMMs), and Generative AI (GenAI). At the same time, the platform maintains full support for legacy convolutional neural networks (CNNs) and traditional computer vision algorithms, ensuring broad compatibility across both modern and established ML pipelines.

Benefits

Easy System Integration

The MLSoC Modalix SoM is pin-compatible with NVIDIA's Jetson Orin NX and Jetson Orin Nano SOMs, allowing a seamless connection to existing carrier boards, eliminating any new hardware design.

Best-in-Class Processing

Modalix purpose-built MLSoC architecture is optimized for demanding edge AI workloads, delivering 50 TOPS of computing power.

Scalable Performance & Easy to Use

The MLSoC Modalix SoM is available with 8GB and 32GB LPDDR5 memory options, providing scalable performance and eliminating any hardware design.

Reliable and Efficient

Available in industrial temperature grades with advanced thermal management and real-time performance monitoring, ensuring robust and reliable performance and power efficiency at the edge.

Accelerated Development

SiMa.ai's **ONE Platform™** enables fast AI development and deployment at the edge. With its user-friendly **Palette™ software suite and Edgematic**, users enjoy efficient, streamlined workflows. Bring your ONYX model, tune it with SiMa's Model SDK, and develop applications using popular frameworks like OpenCV. Developers can iterate quickly and flexibly across various AI applications.

Target Applications

Smart Vision · Drones · Robotics · Industry 4.0 · Automotive · Smart Retail · Healthcare · Military & Defense · Smart City

MLSoC Modalix SoM Feature Highlights

Machine Learning Accelerator (MLA)

· 50 TOPS (BF16, INT8, INT16)
· Supports LLMs, neural networks, and GenAI

Application Compute Unit (ACU)

· 8× ARM Cortex-A65 @ 1.4 GHz
· 32k Dhrystone MIPS

Memory

· 32GB or 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-1 @ 1.2 GHz

Display Connectivity

· HDMI 1.4 port with 4K resolution

Peripherals

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

Storage

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

Flexible Power Supply

· 5–20V power input

Compact Form Factor

· 69.6 mm × 45 mm
· 260-pin SO-DIMM Connector
· Wide Temperature Range support: –40°C to +85°C

Software-First Development Environment

Compiling an ML-trained model for specific hardware can be challenging, especially when the software toolchain and hardware are not co-designed. SiMa.ai's software-first approach provides a software architecture that supports a broad range of ML models through the ONNX framework. To create an equally unique, highly efficient software stack Sim.ai partnered with **HTEC — whose strong background in AI/ML engineering and embedded edge systems makes them an ideal strategic collaborator.**

SiMa.ai's Palette™ software runs effortlessly on both the MLSoC and the MLSoC Modalix. With over 650 precompiled models, the software ensures a seamless user experience and delivers industry-leading performance-per-watt. SiMa's effortless ML software framework supports any framework, network, mode, or sensor, enabling Edge AI applications to run entirely on a single device and supporting a broad range of use cases.

Ordering Information

Product Name Description
Modalix SoM 8GB
Modalix SoM32 GB
Modalix SoM 32GBwith HDMI

OPN
Modalix-Pro-8GB-210-ADA
Modalix-SoM-Pro-32GB-210-ADA
Modalix-SoM-ES0-32GB-211-ADA

Note: The Modalix SOM provides limited PCIe (Gen4 only) and Ethernet (1G only) functionality due to the limitations of the Carrier board capabilities.

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. Focused on scaling Physical AI across robotics, automotive, industrial automation, aerospace & defense, smart vision, and healthcare, SiMa.ai is led by seasoned technologists and backed by top-tier investors. Headquartered in San Jose, California. Learn more at www.SiMa.ai.

About HTEC

HTEC Group Inc. is a global AI-first provider of strategic software and hardware embedded design and engineering services, specializing in Advanced Technologies, Financial Services, MedTech, Automotive, Telco, and Enterprise Software & Platforms. HTEC has a proven track record of helping Fortune 500 and hyper-growth companies solve complex engineering challenges, drive efficiency, reduce risks, and accelerate time to market. HTEC prides itself on attracting top talent and has strategically chosen the locations of its 20+ excellence centers to enable this. Learn more at www.htec.com.