Product Brief

MX3 Edge AI Accelerator

The MemryX MX3 Edge AI Accelerator is architected for simplicity and scalability, and an ideal solution for efficiently running AI models in a variety of application environments including industrial, automotive, and IoT.

MemryX uses an innovative pure dataflow architecture, with programmable hardware that best mirrors the data-driven design of AI algorithms. Dataflow architecture is designed for streaming inputs from cameras or other sensors. MemryX's proprietary 1-click compilation and mapping software optimizes the performance of any AI model(s) on MX3 without requiring any retraining or software tuning. Such ease-of-use greatly accelerates development cycles and offers seamless upgradability for Edge AI.

Supplementing or offloading AI inference processing from an Application Processor to a dedicated AI accelerator maximizes system efficiencies while minimizing costs. Using seamless chip-to-chip connectivity, multi-MX3 chiplet configurations enable scalability to any desired level of AI performance and/or model size. MX3 supports all major AI frameworks, and full interoperability across application processors and host operating systems.

Innovative Edge AI Architecture

At-memory computing for the highest throughput and lowest energy. Pure Dataflow architecture optimized for streaming inputs from cameras or other sensors.

Simplicity

1-click performance and power optimization of trained models with no retraining, hand-tuning, or quantization necessary. And with just one click, the majority of models execute with >50% chip utilization.

Scalability

The exact same software is used for multiple small AI networks in one MX3 chiplet or large model(s) across multiple chiplets. Any number of MX3 chiplets can be used to scale to the desired level of performance, latency, and/or model size(s).

Deterministic

Low Latency (Batch=1) pipelined dataflow design with no internal control planes or control logic to limit input data streaming. All memory is included on the chiplet, fully mitigating any system bottlenecks and placing no processing requirements on the host. With no bottlenecks, AI performance is highly consistent/deterministic.

Broad Support

Supports all popular AI software frameworks (e.g. PyTorch, ONNX, Tensorflow, Tensorflow-Lite, Keras), Application Processors (Arm, x86, Risc-V), and operating systems (Ubuntu, Ycoto, Android, Windows, etc.). Connects to USB or PCI-E I/O ports.

Markets

Industrial 4.0 & Robotics

Automotive

IoT

Metaverse

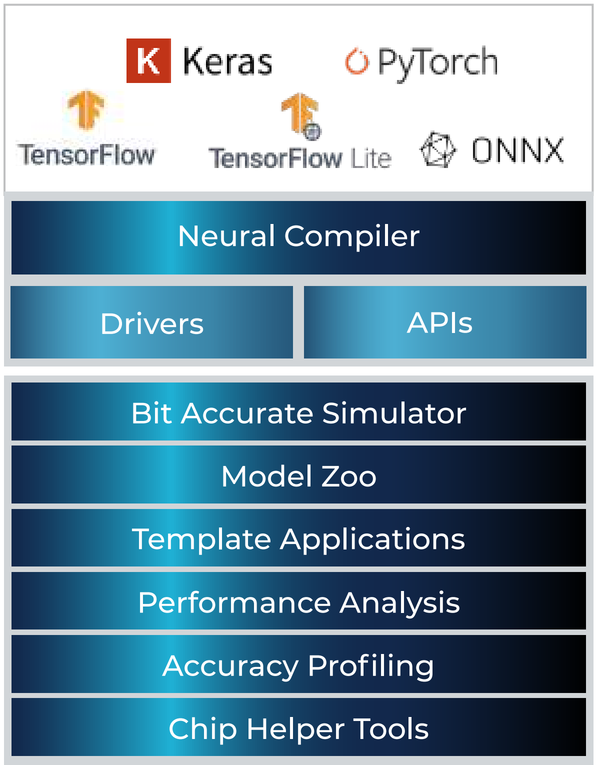
Smart Vision Systems

Computing Devices

The MemryX Software Development Kit (SDK) is a comprehensive software solution including a 1-click compiler, bit-accurate simulator, and a suite of utility and runtime tools to ease development. MemryX's compiler has been tested on hundreds of standard and custom AI models for computer vision and sensor processing in a variety of applications (classification, object detection, segmentation, pose & depth estimation, OCR, GAN, etc.)

SDK Benefits

- Supports all common frameworks
- Support for multiple HW and OS platforms
- Bit Accuracy that aligns with the deterministic HW platform performance
- Scalable for any # of models across any number of MX3 chips
- Available code samples, tutorials, user guides, and Model Zoo



Neural Compiler

Drivers | APIs

Bit Accurate Simulator

Model Zoo

Template Applications

Performance Analysis

Accuracy Profiling

Chip Helper Tools

MX3 Accelerator IC Specifications

	Pre-production Samples *(available now)*	Production *(available 1H'23)*
Performance TOPS	>3 TFLOPs / chip (>50% utilization)	>5 TFLOPs / chip (>50% utilization)
Model size	10M parameters (8-bit) / chip	
Performance (Batch=1) *Out-of-the Box Standard Model**	SSDMobilenet (300x300): >400 fps (x1) BlazePose 3D (256x256): >230 fps (x2) SqueezeNet (1248x384): >120fps (x4) YOLO v4 (416x416): >80fps (x8)	SSDMobilenet (300x300): >675 fps (x1) BlazePose 3D (256x256): >380 fps (x2) SqueezeNet (1248x384): >200 fps (x4) YOLO v4 (416x416): >130 fps (x8)
Operations	Activations: 16-bit floating point (default); Weights: 4/8/16-bit (default = 8 bit)	
Framework Support	TensorFlow, Tensorflow-lite, PyTorch, ONNX, Keras	
Operating System Support	Linux (Ubuntu, Yocto, etc.), Android, Windows	
Interface	USB 3.2 Gen1 x1 (5 Gbps)	USB 3.2 Gen1 x1 (5 Gbps) PCIe Gen3 x2
Power Consumption	1W Avg, 1.5w Peak	1W Avg, 1.5w Peak
Temperature	0C – 70C	-40C – 105C
Package Size	10mm x 10mm FCCSP	8mm x 8mm FCCSP

** Model as publicly available with no pruning, compression, or re-training. Performance is AI core and can vary based on host interface.*

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MemryX, Inc. is an AI semiconductor startup headquartered in Ann Arbor, MI USA with branches in Taipei and Hsinchu, Taiwan. We develop a highly scalable and innovated AI accelerator that offers high performance, low power, and customer ease of implementation for embedded Edge AI vision-based applications and real-time processing.

www.MemryX.com

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