Overview

The M1076 is the second product in the M1000 Series of Mythic Analog Matrix Processors (Mythic AMP™) architected for high-performance AI inference at the edge. The M1076 follows the industry's first M1108 Mythic AMP with lower power consumption and smaller footprint. The M1076 is a dataflow processor configured as an array of tiles each powered by a Mythic Analog Compute Engine (Mythic ACE™) to deliver the AI compute performance of a desktop GPU at 10x lower power – all in a single chip. It is ideal for processing complex deep neural networks (DNNs) for applications with power, form factor, and thermal constraints.

The M1076 is available as a chip or M.2 PCIe card. M1076 hardware comes with pre-qualified DNNs that bring a new level of performance and power efficiency to visual perception AI applications.

Mythic ACE

The Mythic Analog Compute Engine is the core that drives every M1076 AMP tile. Each Mythic ACE integrates a large flash memory array and analog circuits that store DNN weight parameters and perform low-power, high-performance matrix multiplication without the need for external DRAM.

Mythic AMP Tile

The Mythic Analog Compute Engine is enhanced by a digital processing system that includes a 32-bit RISC-V nano-processor, a 16-bit SIMD vector processor, dedicated SRAM, and a network-on-chip router that forms the Mythic AMP tile. The result is an AI processor with a powerful array of tiles that delivers power-efficient inference solution with up to 25 TOPS.

Product Features

o   76 Mythic AMP tiles
o   Capacity for up to 80M DNN weight parameters
o   4-lane PCIe 2.1 high-speed serial interface with 4Gb/s/lane or up to 2GB/s of bandwidth
o   Available I/Os – GPIOs, QSPI, I^{2}C, and UART
o   -40°C to 85°C operating temperature (junction)
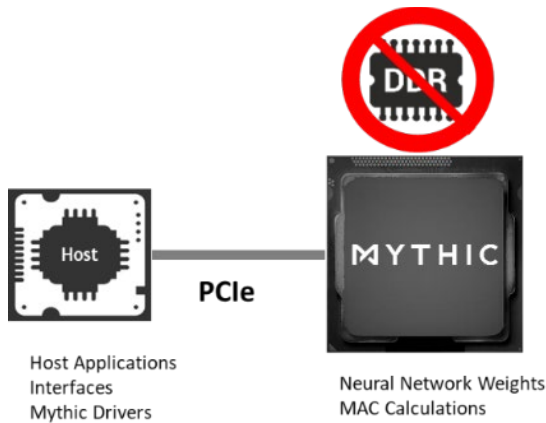
Key Benefits

Performance and Power Efficiency

o Single-chip provides up to 25 TOPS of compute resources
o Power of 3~4W when running typical complex models
o 10x lower power than comparable digital solutions

Single-Chip DNN Execution

o   Model parameters are stored and executed entirely on-chip. No external DRAM is required
o   Multiple DNNs can be executed concurrently
o   Large, complex DNNs run at higher resolution, lower latency, for better results
o   Efficient dataflow architecture provides predictable and deterministic execution of DNN workloads

Target Applications

o   Security/Surveillance
o   Industrial Machine Vision
o   Consumer Electronics
o   Smart Home
o   UAV/Drone
o   Edge Server

Host Applications
Interfaces
Mythic Drivers

PCIe

Neural Network Weights
MAC Calculations

Support for Complex DNNs on M1076

The M1076 AMP is designed to run standard, complex DNNs, including pre-qualified models for classification (ex: ResNet-50), object detection (ex: YOLOv3), human pose estimation (ex: OpenPose Body25), depth estimation, and image segmentation, and others.

Utilizing the Mythic AI Software Workflow, pre-trained DNNs generated by standard AI frameworks such as Pytorch, Tensorflow, and ONNX are optimized for the Mythic AMP, binaries are compiled, and runtime libraries are generated for deployment in a host processor platform. A wide variety of host processors are supported, including Intel x86, NXP iMX8, Nvidia Jetson, and Qualcomm RB5.

Part Number Information

Form Factor	Part Number	Description
Mythic AMP	M1076	FCBGA - 19mm x 15.5mm x 2.17mm
M.2 (M Key)	MM1076	M.2 M key card with one Mythic AMP
M.2 (A+E Key)	ME1076	M.2 A+E key card with one Mythic AMP

ABOUT MYTHIC

Mythic has developed a unified hardware and software platform featuring its unique Mythic Analog Compute Engine (Mythic ACE™) to deliver revolutionary power, cost, and performance that shatters digital barriers preventing AI innovation at the edge. The Mythic Analog Matrix Processor (Mythic AMP™) makes it much easier and more affordable to deploy powerful AI solutions, from the data center to the edge device. The company has raised over $165.2 million to-date and has offices in Redwood City, CA and Austin, TX.

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