

BrainChip's Akida M.2 Card, powered by AKD1000 Edge AI SoC

Akida M.2 AKD1000 Card accelerates CNN-based neural network models using BrainChip's ultra energy-efficient, and purely digital, event-based processing architecture. The Akida M.2 AKD1000 can be paired with Raspberry PI's, IoT SoC development boards and existing Single-Board Computers for on target model development, testing, prototyping and edge AI applications. The small form factor supports the creation of very compact, ultra-low-power, portable and intelligent devices for remote sensors and devices Healthcare, Consumer, Smart Home and AIoT applications.

Key Features

- Event-based computing leveraging inherent data and activation sparsity
- Fully configurable neural processing cores, supporting convolutional, separable-convolutional, pooling, and fully connected layers
- Incremental learning after off-line training
- On-chip few-shot training
- Configurable number of NPUs
- Programmable data to event converter
- Configurable on-chip SRAM memory
- Runs full neural networks in hardware
- On-chip communication via mesh network
- On-chip learning in event domain
- Process technology-independent platform
- Network size customizable to application needs
- Event-based NPU engines running on a single clock
- PCIe Install Drivers
- 28nm TSMC device
- **M.2 2260 B+M Key and E Key Form**

AKD1000 M.2 use cases include:

- * Industrial PCs
 - Vibration analysis
 - Anomaly Detection
 - Visual Detection
 - Visual Tracking/Counting
- * Edge AI Vision Systems
 - Object Detection
 - Object Recognition
 - Image Classification



AKD1000 M.2 Card

Applications

Smart Factories
Smart Retail
Smart Cities
Healthcare

Security & Surveillance
Smart Logistics
Automotive
Transportation

MetaTF is a complete Akida machine learning framework enabling the seamless creation, training, and testing of neural networks on the Akida AKD1000 M.2 Processor Card. With MetaTF's support for models created with TensorFlow/Keras, Users avoid the need to learn a new ML framework while rapidly developing and deploying AI Applications for the Edge. MetaTF supplies tools to convert a model with floating point weights and activations to a model with low bit-width weights and activations while maintaining model performance. These tools also convert quantized models trained using traditional deep learning methods to event-domain models for execution with low-latency and low-power on the Akida Processor.

MetaTF provides the platform-agnostic Akida Runtime with a Hardware Abstraction Layer (HAL) for execution of models on Akida hardware. The Akida runtime also contains a software simulator for model evaluation without Akida hardware.

The Akida Development Platform is the foundation supporting multiple AI Application development and deployment scenarios for users with different levels of AI expertise and network model customization needs. BrainChip supports a range of AI application development platforms - all of which ultimately deploy on the Akida event-based processing engine.

The QuantizeML & Compilation python packages provide tools to quantize Tensorflow/Pytorch models and convert models to the event domain for inference on the Akida Event-based Processor Platform.

Specifications

Form Factor	M.2 2260 B+M Key and E Key available
Host Interface	PCIe PHY 2-lane
Memory Interface	LPDDR4 via DMA
NPU	1 x Akida AKD1000
Peak INT4 GOPs	1.5 TOPs
On-Chip Memory	8MB high-speed near-compute SRAM.
Clock Frequency	300MHz
Operating Temperature	0 - 70° C
Thermal Solution	No fan required
Typical Application Power	1-3 Watts