

brainchip™

AKD1500 Edge AI Co-Processor Product Brief

The AKD1500 is an Edge AI acceleration co-processor built on the Akida™ Neuromorphic processing engine.

It accelerates most available neural network models using a highly energy-efficient, event-based, and purely digital, neuromorphic processing architecture. It has built-in capabilities to learn on-device, enabling secure application personalization, without the need for a Cloud connection or retraining. BrainChip's unique MetaTFTM software flow enables developers to compile and optimize their chosen models for the AKD1500. The Intelligent Runtime software manages network processing to fully utilize available resources and automatically partitions execution into multiple passes if resources are insufficient. This enables today's implementations to accelerate tomorrow's models. The AKD1500 can be paired with any host CPU or MCU via PCIe or low-power SPI interfaces to create very compact, low-power, portable and intelligent devices for Internet of things (IoT), Industrial, Automotive, Healthcare, Consumer, Smart Home and Smart City applications. Furthermore, it has an ideal form-factor for MCU and MPU modules.

Key Benefits

- * **Designed for Low-Power AI NN Acceleration**
 - Unsurpassed images/second/watt
 - Maximum 800 Effective GOPS at <1mW/GOPS
- * **On-Chip Learning**
 - Personalized Edge AI systems
- * **Industry Standard Development Environment**
 - TensorFlow/Keras and Pytorch APIs
- * **Cost Effective**
 - 22 nm FD-SOI CMOS digital logic process
 - 7x7 mm MFCTFBGA169 package, 0.5 mm pitch

Example Applications Areas

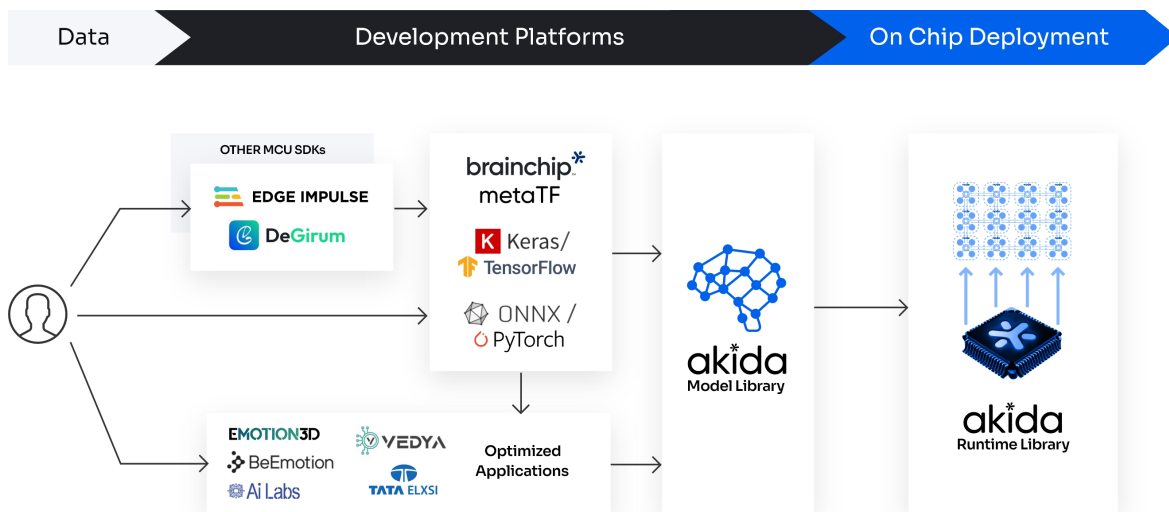
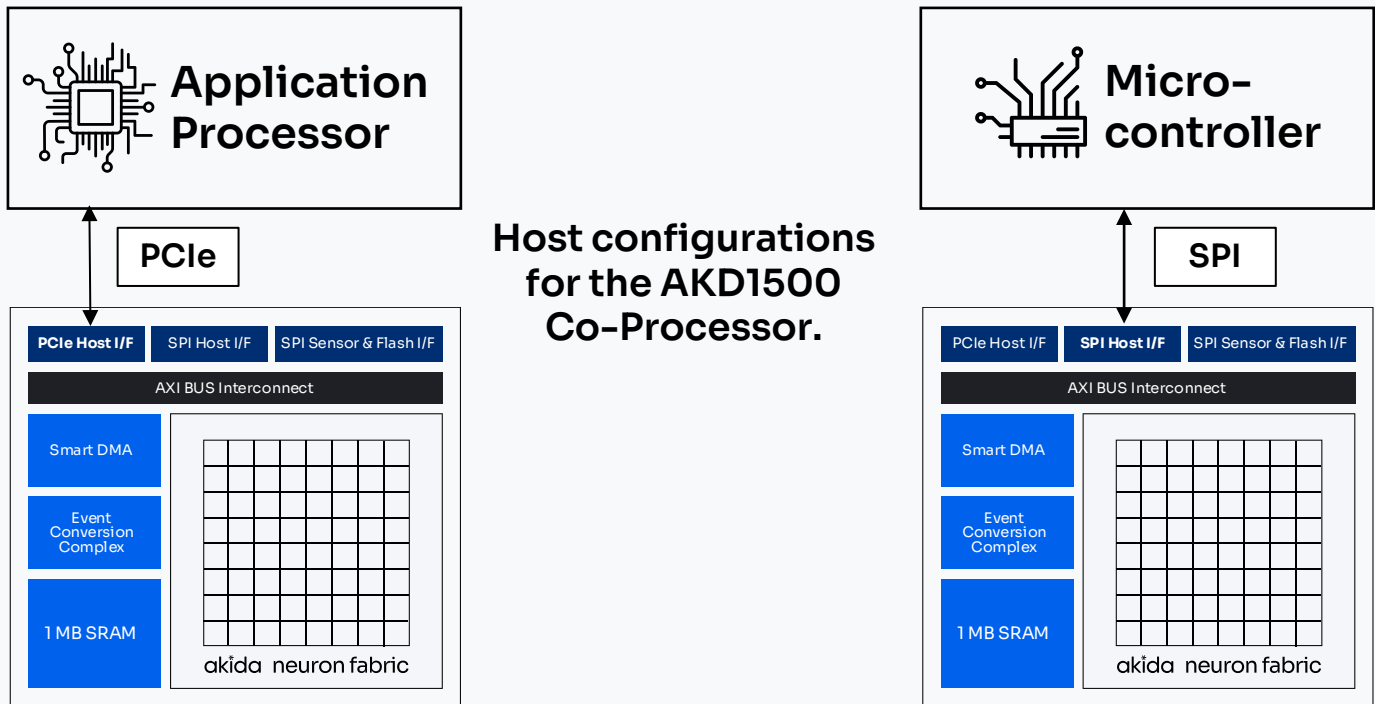
- * **Personalized Learning Edge AI systems**
- * **Edge AI Vision Systems**
 - ADAS/AV
 - Vision Guided Robotics
 - Drones
 - Video Surveillance
- * **Industrial Internet of Things**
 - Environmental monitoring/control
 - Predictive maintenance
- * **Smart Home**
 - Appliances
 - Speakers
 - Voice Control



Specifications

- * Akida Neuron Fabric
- * On-Chip Conversion Complex
- * 1MB On-Chip Local memory
- * PCIe Gen2 Endpoint Interface
- * SPI S/D/Q/O Peripheral Interface
- * SPI D/Q/O Memory Expansion Interface
- * Clock frequency range: 5 - 400MHz
- * Power dissipation: 250 mW typical at 400 MHz

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Model Development Methodology

The Akida Co-Processor offers support for complex neural processing with compelling performance-per-watt at the Edge. Akida is an event-based neural networks processor, it is therefore taking advantage of activation sparsity, further reducing power consumption. It supports today's models and networks and leverages the benefits of event-based processing. Entire neural networks can be placed into the fabric, removing or minimizing the need to swap weights in and out of DRAM, which reduces power and increases throughput.