

brainchip™ AKD1500 PCIe Development Card Product Brief

The **AKD1500 PCIe Development Card** is an Edge AI acceleration development card built on the **Akida™ 1.0 AKD1500 Co-Processor**, utilizing **BrainChip's advanced neuromorphic computing technology**. This digital, event-based architecture mimics the brain's efficiency to accelerate standard neural network models with ultra-low power consumption. A standout feature is its built-in capacity for on-device learning, which allows for secure application personalization without needing a cloud connection or extensive retraining.

Developers can easily compile and optimize models using the **MetaTF™ software** flow, and the card's standard PCIe form factor ensures seamless pairing with existing Single-Board Computers. This makes it an ideal choice for prototyping and deploying intelligent, portable devices across Industrial, Automotive, Healthcare, and Smart Home applications.

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 AKD1500 Chip**
 - 22 nm FD-SOI CMOS digital logic process
 - 7x7 mm MFCTFBGA169 package, 0.5 mm pitch

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



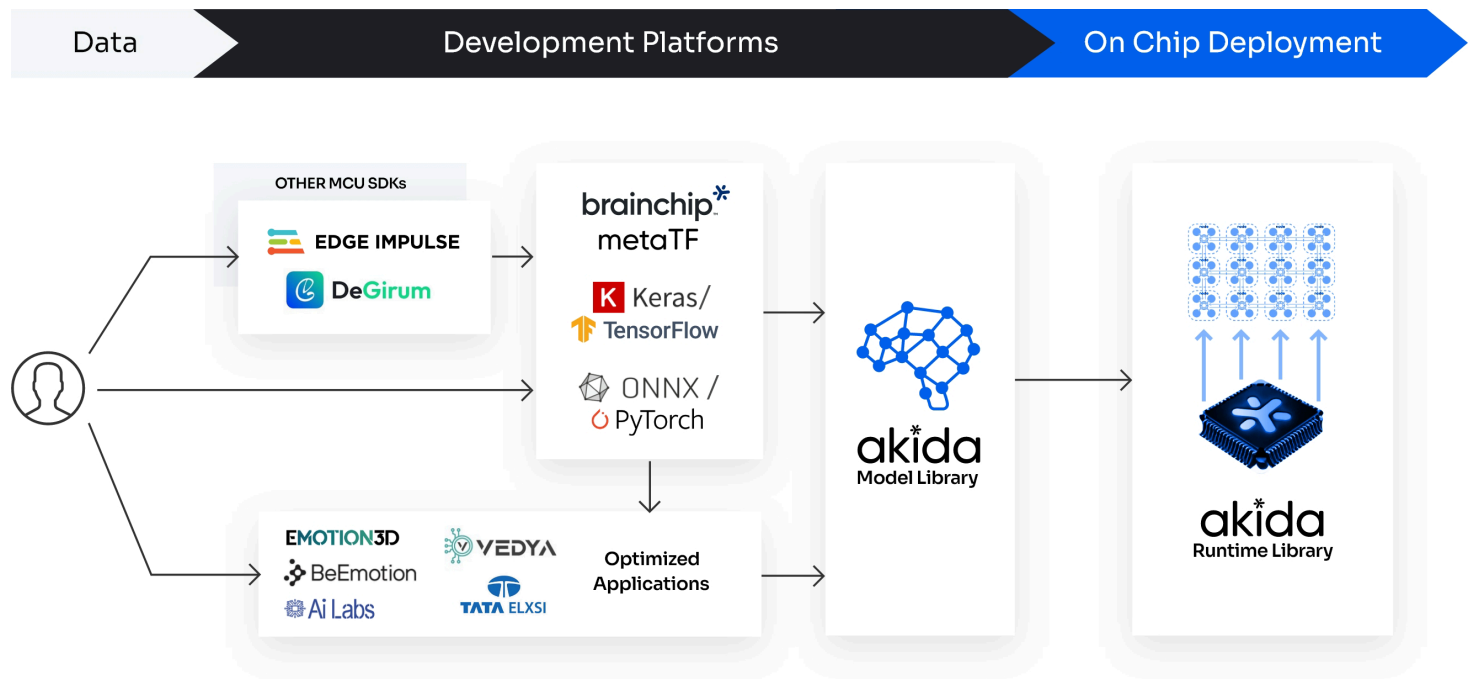
Specifications

- * Akida Neuron Fabric
- * 32 Neural Processor Units (NPUs)
- * On-Chip Conversion Complex
- * 1MB On-Chip Local memory
- * 100K SRAM Per NPU
- * 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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Specifications

Form Factor	PCIe Short Card
Host Interface	PCIe PHY 2-lane
On-Board Co-Processor	1x Akida AKD1500
Peak INT4 GOPs	800 GOPs
On-Chip Memory	1MB of dual-port memory
Clock Frequency	400 MHz
Operating Temperature	0 - 70° C
Thermal Solution	No fan required
Typical Application Power	250 mW typical at 400 MHz



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.