

# BeagleY-AI Edge Compute Board

The **BeagleY-AI Edge Compute Board** is a powerful and versatile single-board computer (SBC) engineered to deliver advanced **artificial intelligence (AI) capabilities** at the edge. Built on robust hardware and supported by open-source software, it is the perfect solution for developers, engineers, and businesses seeking to integrate **AI-driven applications** into robotics, automation, healthcare, and intelligent vision systems.

## High-Performance Processing Power

At its core, the BeagleY-AI is powered by a **quad-core 64-bit Arm Cortex-A53 processor running at 1.4GHz**, providing a reliable foundation for demanding workloads. Complementing the CPU are **dual C7x DSPs with a Matrix Multiply Accelerator**, delivering **up to 4 TOPS (Tera Operations Per Second)** of AI performance. This combination ensures that the board can handle real-time **image classification, object detection, sensor fusion, and intelligent decision-making** without relying on cloud processing, making it an ideal platform for edge computing.

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Board[/caption]

BeagleY-AI Edge Compute

## Optimized AI and Machine Learning Capabilities

Designed specifically for **AI acceleration**, the BeagleY-AI allows developers to deploy **machine learning models, neural networks, and computer vision frameworks** directly on the device. Popular AI toolkits such as **TensorFlow Lite, PyTorch Mobile, and OpenCV** can be optimized to take full advantage of the onboard accelerators. This enables fast inference times, low latency, and efficient power consumption, making it suitable for real-world applications such as:

- **Robotics and autonomous navigation**
- **Industrial automation and quality control**
- **Medical imaging and diagnostic devices**
- **Smart cameras and intelligent surveillance systems**
- **Retail analytics and customer insights**
- **Environmental monitoring and IoT edge solutions**

## Memory and Connectivity

The BeagleY-AI comes with **4GB LPDDR4 memory**, ensuring seamless multitasking and smooth execution of AI workloads. For connectivity, it supports **Wi-Fi 6 and Bluetooth 5.4** for

wireless applications, along with **Gigabit Ethernet** for wired networking. With an optional **PoE+ (Power over Ethernet) add-on**, the board can be deployed in environments where stable power and network delivery are essential.

## Multi-Display Support

Unlike many SBCs, the BeagleY-AI offers **multi-display capabilities**, supporting up to **three simultaneous outputs**. With **microHDMI, OLDI, and MIPI-DSI interfaces**, developers can design advanced visualization dashboards, interactive user interfaces, or monitoring stations. This makes it especially valuable in fields like **factory control, robotics monitoring, and medical imaging**, where multiple visual outputs are required.

## Versatile I/O for Expansion

Developers and system integrators will appreciate the extensive I/O options, including:

- **PCIe Gen3 expansion** for hardware accelerators and add-on modules
- **4× USB 3.0 ports** for high-speed peripherals
- **USB-C for modern connectivity and power delivery**
- **2× MIPI CSI camera ports** for computer vision and stereo imaging applications

The dual camera ports are particularly useful for **depth sensing, 3D vision, and AI-powered image recognition**, enabling advanced robotics and machine learning solutions.

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BeagleY-AI Edge

Compute BoardBeagleY-AI Edge Compute Board[/caption]

## Software and OS Support

The BeagleY-AI is backed by a **custom Debian Linux image from BeagleBoard**, ensuring a stable, developer-friendly platform with long-term community support. Being based on Debian, it gives developers access to thousands of open-source packages, libraries, and drivers. The operating system is optimized for AI workloads, enabling developers to integrate **Python, C++, and AI frameworks** with ease.

## Real-World Applications

The versatility of the BeagleY-AI makes it suitable for a wide range of industries:

- **Robotics:** Serve as the brain of autonomous robots, drones, and collaborative machines.
- **Factory Automation:** Monitor production lines, detect anomalies, and enable predictive maintenance.
- **Healthcare:** Support edge-based diagnostics and medical imaging analysis.
- **Smart Vision Systems:** Power cameras for security, retail, and intelligent analytics.
- **IoT Edge Devices:** Enable low-latency decision-making in smart cities and industrial IoT deployments.

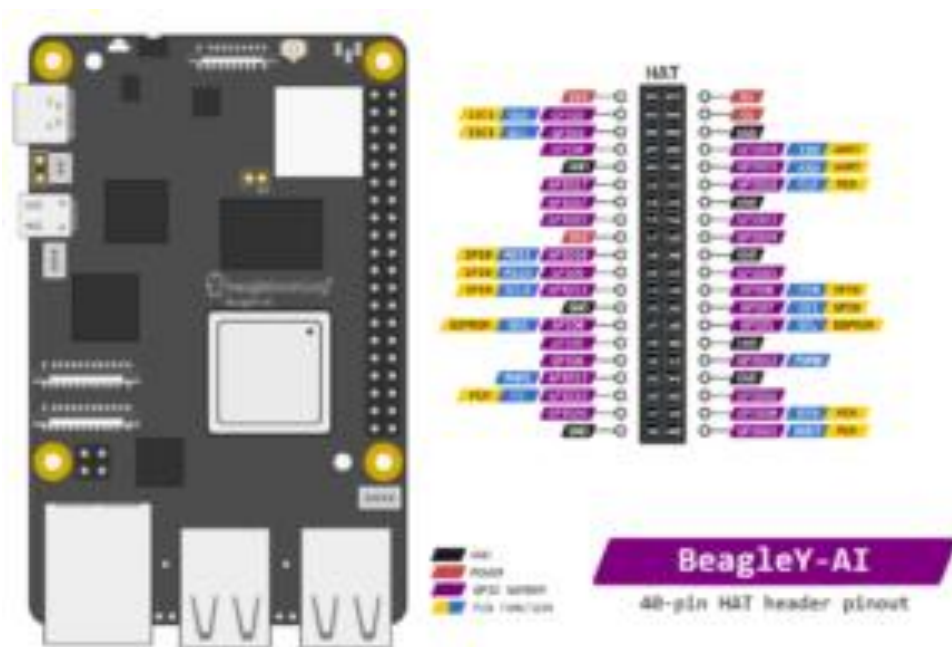
[caption id="attachment\_108032" align="aligncenter" width="575"]

BeagleY-AI Edge Compute Board[/caption]

## Key Features of BeagleY-AI Edge Compute Board

- **High-Performance Processor** – Quad-core 64-bit Arm Cortex-A53 @ 1.4GHz for reliable computing power.

- **AI Acceleration** – Dual C7x DSPs with Matrix Multiply Accelerator delivering up to **4 TOPS** AI performance.
- **Ample Memory** – Equipped with **4GB LPDDR4 RAM** for smooth multitasking and AI workloads.
- **Advanced Connectivity** – Supports **Wi-Fi 6, Bluetooth 5.4, and Gigabit Ethernet** with optional **PoE+** add-on.
- **Multi-Display Support** – Drive up to **3 simultaneous displays** via microHDMI, OLDI, and MIPI-DSI.
- **Versatile I/O Expansion** – Includes **PCIe Gen3, 4× USB 3.0 ports, USB-C, and dual MIPI CSI camera ports**.
- **AI & Vision Ready** – Dual camera interfaces for stereo vision, depth mapping, and intelligent vision projects.
- **Optimized OS Support** – Runs a **custom Debian Linux image** from BeagleBoard with access to open-source AI frameworks.
- **Developer-Friendly** – Seamless integration with **TensorFlow Lite, PyTorch Mobile, OpenCV**, and other machine learning tools.
- **Wide Applications** – Perfect for **robotics, factory automation, medical devices, intelligent cameras, and IoT edge solutions**.



## Why Choose BeagleY-AI?

The **BeagleY-AI Edge Compute Board** offers the perfect balance of **processing power, AI acceleration, connectivity, and expandability**, making it one of the most advanced SBCs for edge AI development. Unlike cloud-dependent solutions, it ensures **data privacy, low latency, and real-time performance**. Its developer-focused ecosystem and strong community support make it ideal for **research, prototyping, and production-ready solutions**.

