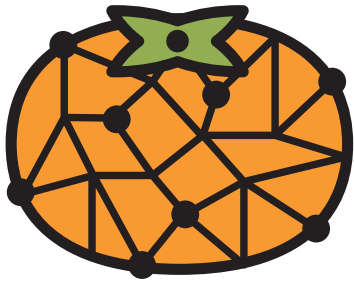
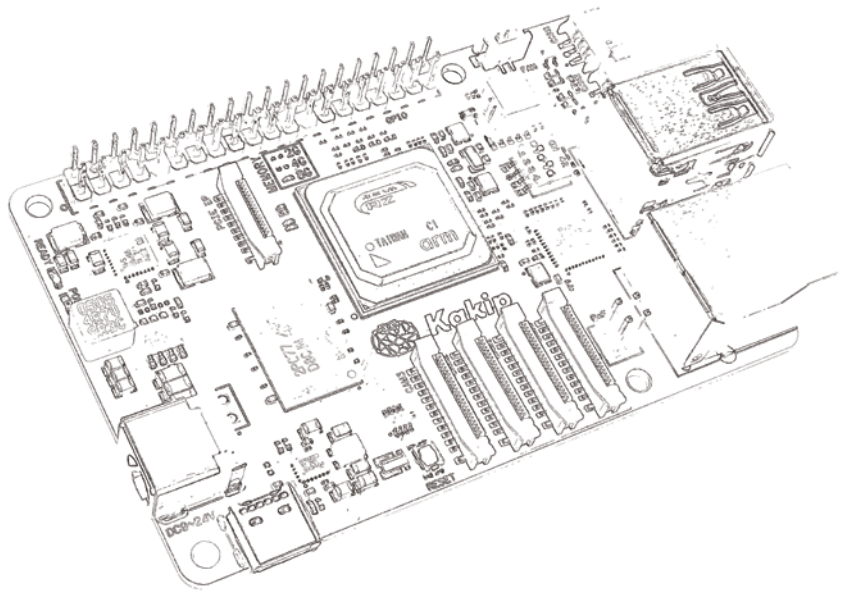


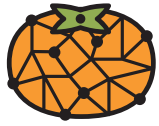
AI Single Board Computer



Kakip®



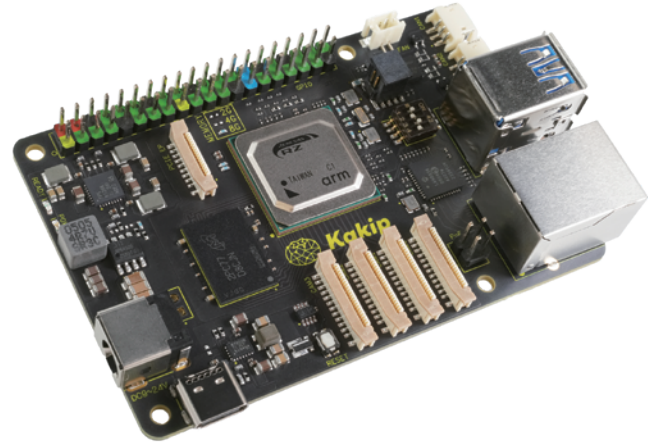
AI Single Board Computer



Kakip[®]



"Kakip" is an AI single-board computer with both brain and physical control, and is equipped with Renesas' AI-MPU "RZ/V2H" at its core. 3 CPUs can be controlled by multi-OS, for example, Linux can control applications including AI image processing, while RTOS can control external devices. The DRP-AI3 (*1) AI accelerator, which has excellent power performance (TOPS/W) of AI processing, enables high-speed AI image processing of 4-channel camera images, and rule-based image processing such as OpenCV can be efficiently distributed processing with DRP (*2). DRP enables efficient acceleration of OpenCV and other image processing. Despite its many interfaces, it is compacted to the card size, making it a very easy-to-handle. It can be used for research and development of various embedded applications including robotics, POC production, and education.



(*1)(*2)

DRP (Dynamically Reconfigurable Processor) is Renesas' proprietary hardware that executes applications while dynamically switching connections between arithmetic units.

Core Processor



AI-MPU: Renesas "RZ/V2H" (R9A09G057H48GBG)

CPU	Cortex-A55 Quad-Core 1.1GHz Cortex-R8 Dual-Core 800MHz Cortex-M33 200MHz
Accelerators	DRP-AI3 (INT8) / DRP (STP4)
Option Equipped	Mali-G31 GPU / Mali-C55 ISP Security IP

Applications

Multi-operation and process acceleration contribute to R&D and POC production in various applications.



Multi CPU

Cortex-A55
Linux
(Rich Application)

Cortex-R8
RTOS
(Real Time Application)

Cortex-M33
Arduino / RTOS
(Voice/Power/Wakeup)

Accelerators

DRP-AI3
(AI Accelerator)

DRP
(Vision Dynamics Accelerator)

For Robot Developer

- AMR (Autonomous Mobile Robot) や HSR (Human support Robot) : decentralization of processing
- On-board drone image processing and control
- Robot Competition and other hobby and technology verification

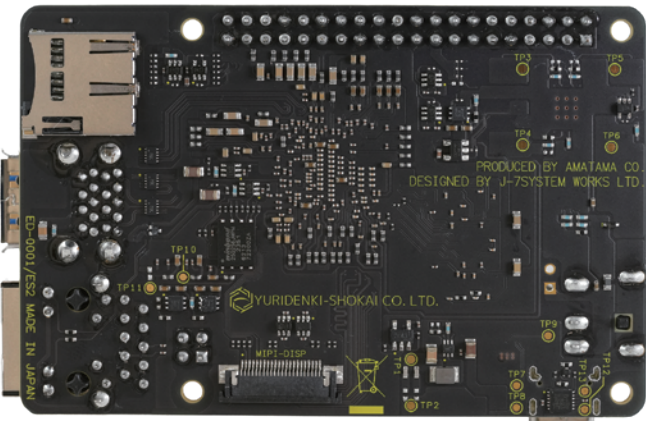
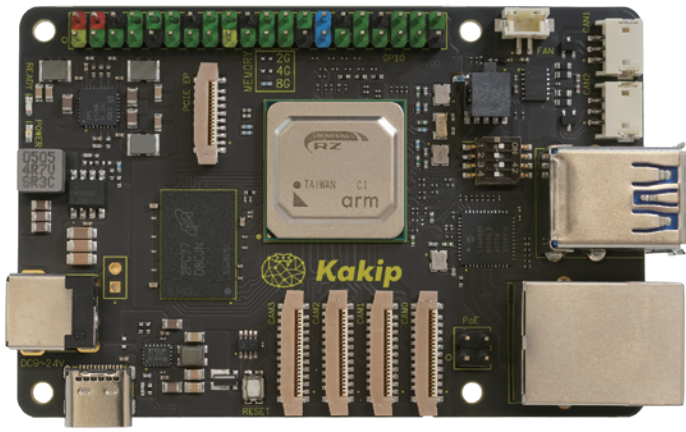
FA / Logistics

- Safety monitoring and unattended response control in manufacturing equipment
- Safety systems for construction equipment and forklifts

Others

- CCTV and Smart broadcasting

Hardware Specifications

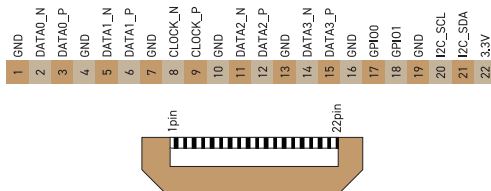
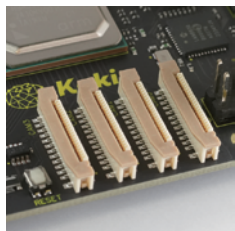


It is in the form of a single board computer that is easy to handle for many engineers. Although the size of a card, it is equipped with a high-performance core chip and many interfaces, providing high-speed AI processing of up to 80 TOPS, image processing such as OpenCV, and multi-OS control in a fanless environment. (Heat sinks are required)

Interfaces

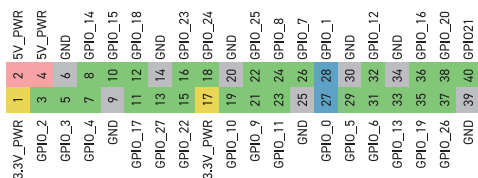
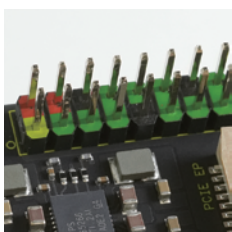
MIPI-CS12

4-channel video input is possible via 22-pin MIPI-CS12 connector.



GPIO

Kakip has standard GPIO



40pin (2x20) 2.54mm

AI-SBC "Kakip" Spec

Memory	LPDDR (2GB / 4GB / 8GB) *2GB / 4GB is not available as standard
Video In	MIPI-CS12 4Lane x4 (22pin)
Video Out	MIPI-DSI 4Lane x1 (22pin)
Ethernet	10 / 100 / 1000 Base-T (RJ45) Additional power supply is needed for PoE
USB	Type-A (USB3.2 Gen2) x2 Type-C (USB2.0 FS) x1 *Not for Power In
PCIe	PCIe Gen3 (x4) End Point x1
CAN FD	CAN FD x2
RTC	Equipped
SD Card	microSD (for Linux Boot / Application)
Power Supply	DC9-24V / 25W (Max) *12V Recommended (DC Jack Φ 5.5/2.1, Center +)
Storage Temp.	-15°C ~ 60°C
Operating Temp.	0°C ~ 40°C

Others

Unique interfaces such as CAN FD and PCIe EndPoint as well as standard interfaces are fully equipped.



MIPI-DSI



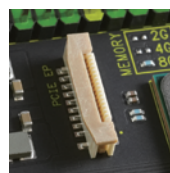
Ethernet / USB-A



PoE Power Input



USB Type-C



PCIe EndPoint



CAN FD



micro SD



Power Input



OS / Driver

- Ubuntu 24.04 (*Kernel Ver. 5.1)
- Drivers (DRP-AI3 / DRP / General Interfaces)
- FreeRTOS for Cortex-R8 (Release in Jan, 2025)
- FreeRTOS for Cortex-M33 (Release in Jan, 2025)

Development Tools

AI Image Processing

- Renesas RZ/V2H AI SDK v5.00

Multi OS (Based on OpenAMP)

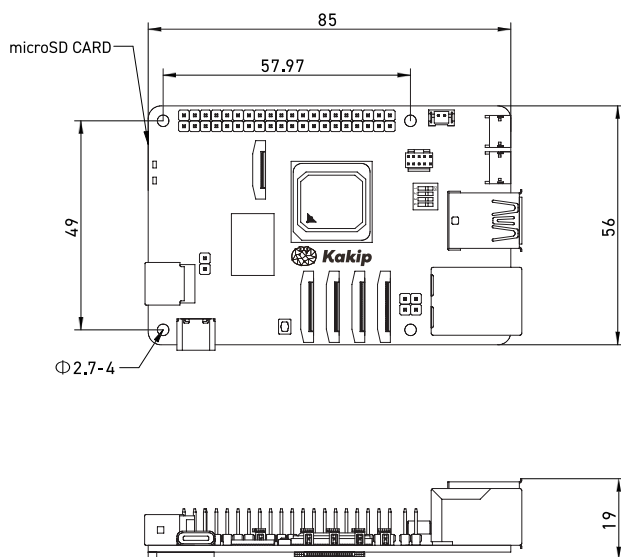
- RZ/V Multi OS Package (Support in Jan, 2025)

Video Codec対応 (H.264 / H.265)

Others

“ROS2”、“Rviz”、“Gazebo” supported

Dimensions



Product Information

Official Web Site

Official site of “Kakip” series. Public announcements of product information, information on exhibitions and press releases, etc., and distribution of BSP (OS image) are available.



Online Manual

Kakip's operation manual is available online and updated as needed.



GitHub

Kakip's development environment and demonstration applications, which are available as open source, are deployed on GitHub.



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