



Unleashing the Power of Scalable AI Accelerators for Edge Intelligence

Workstation-Grade Fanless Industrial Computer

In today's rapidly advancing technological landscape, the demand for intelligent automation reaches unprecedented heights. As global interconnectivity deepens, the necessity to harness data from innumerable sensors becomes paramount. Engineers face a twofold challenge: infusing systems with enhanced AI features while efficiently navigating a flood of data. It's imperative for these systems not only to meticulously analyze this vast data pool but also to make intelligent, timely decisions.

Enter the RCO-6000-RPL AI Edge Inference Computer. Equipped with state-of-the-art Intel® 13th Gen Raptor Lake processors, scalable AI accelerators, and extreme industrial versatility, this robust fanless industrial computer stands poised for power the next wave of AI, Machine Learning, and edge-centric automation initiatives. With the capabilities of the RCO-6000-RPL, the future of powerful processing for intelligent automation isn't just on the horizon – it's here and now.

RCO-6000-RPL Features

- Intel® 13th/12th Gen RPL/ADL CPU
- DDR5 and PCIe Gen 4 Support
- Support EDGEBoost Technologies
- Intel® LGA 1700 & R680 Chipset
- Triple Displays (5K up to 8K)
- Withstand Extreme Environments

Key Markets and Applications



Deep Learning AI



Machine Vision & Detection



Industrial Automation



Telematics & Transportation



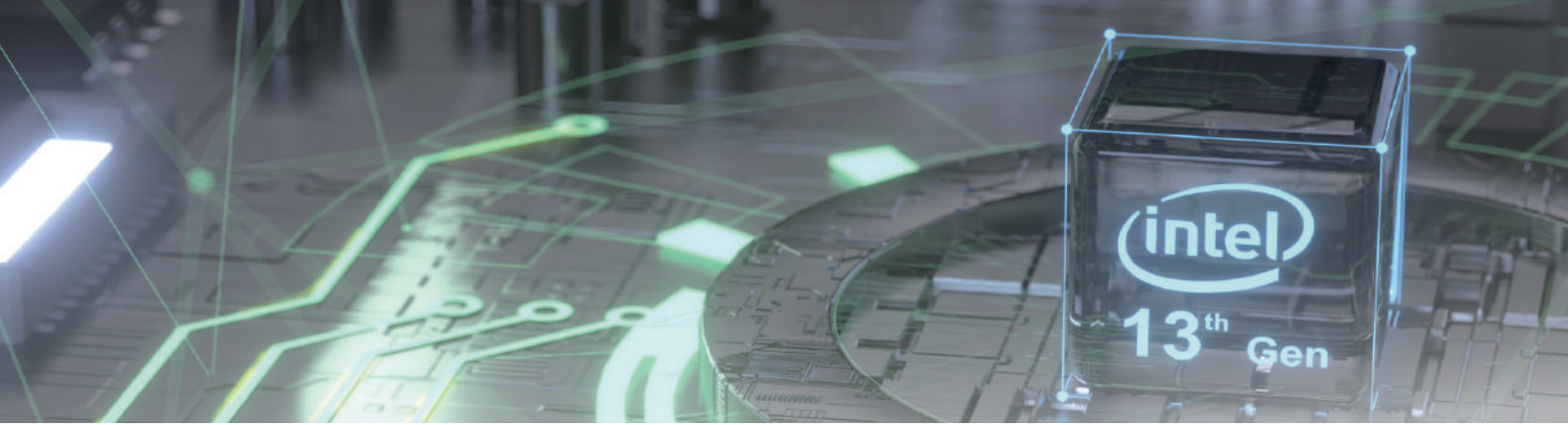
Security Surveillance



ADAS and AGV

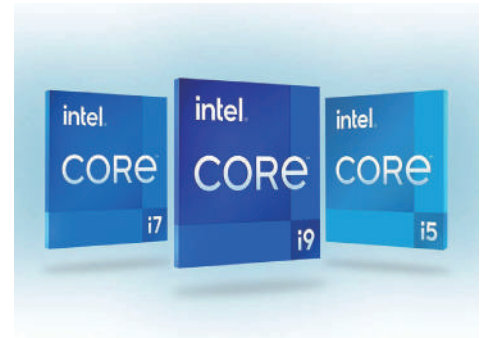


Autonomous Vehicle Data Capture & Storage



Leveraging Intel’s Hybrid-Architecture

Deliver the optimal edge AI performance with the RCO-6000-RPL Series, featuring the advanced LGA 1700 socket. This zero-insertion force, flip-chip land grid array (FCLGA/LGA) socket with 1700 contact points takes center stage, enabling seamless compatibility for Intel® Raptor Lake (13th Gen) and Intel® Alder Lake (12th Gen) processors. Intel’s 13th Gen. and 12th Gen CPUs leverage the new Performance Cores (P-core) and Efficient Cores (E-core), delivering unprecedented performance with the new hybrid architecture.



Intel® 12th and 13th Gen Processors

Intel® P&E Cores Technology

Meeting Edge Processing Performance & Power Efficiency Needs

At the heart of these processors lies the groundbreaking P&E cores technology. This innovative hybrid design adopts a two-core strategy. The larger, performance-driven cores (P-core) handle compute-intensive and AI workloads, while the smaller, energy-efficient cores take care of high-density and scale-out workloads in the background. Designed to strike the perfect balance between high performance and energy efficiency, the RCO-6000-RPL excels across various industrial applications.

Key Advantages :

- Intel Thread Director: Optimizes OS workload to cores distribution
- Up to 24 Cores: 8 Performance-cores, 16 Efficient-cores
- Up to 32 Threads: P-cores up to 5.8 GHz
- Increased L2 & L3 Cache: compared to the previous generation



Harnessing the Full Power of P&E Cores with Windows 11

Intel’s 13th Gen Core features a unique dual-core design, featuring P-cores, E-cores, and hyper-threads on P-cores, which introduces a new dimension in multi-core optimization. In response, Intel collaborated with Microsoft to introduce a hybrid-aware scheduler in Windows 11. This allows the operating system (OS) to prioritize fresh cores before tapping into hyper-threads. At the heart of this breakthrough is Intel’s Thread Director, a microcontroller within the CPU. It uses machine learning to optimally schedule tasks on the right core at the right time. This allows us to ensure that P-core and E-core are working in synergy. With Windows 11, users can further enhance the performance and efficiency of the RCO-6000-RPL fanless computer.

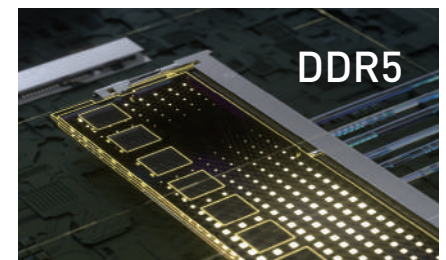


Blazing Fast Speed and Efficiency with DDR5 Integration

Stepping into the future, DDR5 represents the latest evolution in RAM technology, delivering unprecedented speed and efficiency over its predecessor, DDR4. With a robust 64GB capacity, the RCO-6000-RPL is primed to address the demands of modern AI applications. DDR5 support offers remarkable data transfer rates and speeds, making it especially adept at handling intensive AI tasks at the edge.



- Elevated Bandwidth: DDR5 reads more bits/cycle due to doubled burst length.
- Faster Speeds: Intel® 13th Gen CPU supports DDR5 speeds up to 5,600 MT/s, surpassing DDR4's 3,200 MT/s.
- Improved Memory Banks: DDR5 has doubled the memory bank groups with quicker refreshes.
- ECC Support: RCO-6000-RPL supports enhanced error correction for dependable data integrity.



The RCO-6000-RPL is engineered to support dual DDR5 SODIMMs at frequencies of 4800/5600 MHz, with a total capacity reaching up to 64GB and ECC/non-ECC memory support. The RCO-6000-RPL's memory flexibility empowers users to choose the memory configuration that best suits their needs.

ECC: Ensuring Reliable Data Integrity

The DDR5 support in the RCO-6000-RPL not only ensures rapid performance but also supports enhanced Error Correction Code (ECC) to guard against data corruption. This feature is crucial in environments where even minor inaccuracies can lead to significant challenges. With this combination of speed and security, users can confidently rely on both the performance and the integrity of their data.



Triple Independent Displays

Immersive 8K Resolutions

The RCO-6000-RPL supports three independent displays, featuring two DisplayPorts with 5K capabilities and a versatile DVI-I display with optional VGA configuration at WUXGA resolution. Powered by Intel® UHD Graphics on Xe Architecture, this computer can deliver up to 8K HDR video, ensuring vibrant, high-quality visuals for AI edge applications. Dive into an unmatched visual experience with RCO-6000-RPL.

- 2x 5K DisplayPort (up to 8K)
- 1x WUXGA DVI-I (optional VGA with split cable)



Scalable Performance Accelerators for AI-Powered Workloads

Harnessing the power of AI requires specialized hardware and the RCO-6000-RPL is equipped to deliver. The RCO-6000-RPL scalable, performance-driven building blocks are tailored for powerful hardware acceleration to facilitate the convergence of IT and OT with powerful AI workloads.

Three Key Technologies:



1. Scalable M.2 Accelerators



2. EDGEBoost I/O Modules



3. EDGEBoost Nodes

Scalable M.2 Accelerators

Precision-Engineered for AI, NVMe, and 5G Connectivity

The RCO-6000-RPL is engineered with scalability and power in AI-driven tasks, high-speed storages and robust connectivity. Equipped with M.2 expansion slots, the RCO-6000-RPL can support up to 4x M.2 B-Key slots for scalable M.2 accelerator modules. Built to last, the RCO-6000-RPL M.2 modules are capable of withstanding rugged edge deployments. The M.2 modules are equipped with dedicated heatsinks that dissipate to the cooling chassis to ensure the computer performs optimally while still being fanless.



Highlighting AI at the center of edge innovation, the RCO-6000-RPL boasts up to 104 tera operations per second (TOPS) through its M.2 AI modules supported by Hailo-8 Modules. By integrating the Hailo-8™ processor, each M.2 module delivers 26 TOPS while consuming under 2.5 watts of power. Paired with the RCO-6000-RPL AI Edge Inference computer, it excels in real-time inference analysis and object detection tasks.

- Totaling up to 4x M.2 Slots
- Scalable through EBIO: Up to 3x M.2 B-Key
- Support M.2 B-Key or M-Key
- Internal: 1x M.2 B-Key






Support EDGEBoost I/O Series

Versatile I/O Modules for Workload Consolidation

EDGEBoost I/O (EBIO) Series are C&T's proprietary technologies that address the unique challenges of industrial computing solutions' rugged customizability. Leveraging PCIe Gen 4 technologies on the RCO-6000-RPL, the EBIO Series provides modular and scalable I/O ports, connectivity, storage, and even AI performance. With myriad kinds of edge applications, the EBIO Series allows users to customize the modules based on their specific requirements.



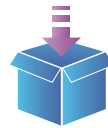
 AI, NVMe, 5G

 M12 and PoE Ports

EBIO Advantages:



Cost Effective Solutions



Single Order Customization



Seamless Integration



Fast Delivery Time



Broad I/O and Accelerator Support



Ruggedized and Certified

Diverse EBIO Module Options

AI/Storage/5G

	EBIO-M2BK	Dual-SIM 5G
	EBIO-2M2BK	5G/AI/NVMe
	EBIO-M2MK	AI/NVMe

I/O and Connectivity

	EBIO-4ETH	4x RJ45 1GbE LAN Ports (Optional PoE)
	EBIO-4ETH-M12	4x M12 1GbE LAN Ports (Optional PoE)
	EBIO-D10G	Dual RJ45 10GbE
	EBIO-4U3	4x USB 3.0



Support EDGEBoost Nodes Series

Powerhouse Scalability for Intensive AI Workloads

EDGEBoost Nodes provide a robust, modular solution optimized for high-performance computing in challenging rugged edge environments. By seamlessly integrating PCIe Gen 4 speed into the RCO-6000-RPL fanless computer, EDGEBoost Nodes enhance real-time AI processing capabilities. With powerful GPUs, high-speed NVMe, and higher-capacity SATA expansions, they are impeccably suited for intensive machine learning and edge AI applications.

Performance Accelerators Provided by the EDGEBoost Nodes:



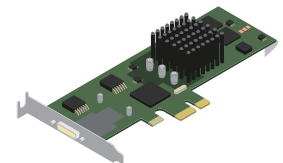
GPU Card PCIe x16



NVMe/SATA Storage



Hardware RAID Card



PCIe Gen 4 & Gen 3

Diverse Options with EdgeBoost Nodes:

- **Hot-swappable NVMe Storages:** 2.5" SATA/NVMe SSDs with 7mm/15mm configuration.
- **PCIe x16 GPU:** Additional 280W power supply for high-performance GPU expansion.
- **Mix & Match:** Combine NVMe SSDs and GPU for enhanced AI performance.
- **Additional PCIe Expansions:** 1x PCIe x16 or 2x PCIe x16 (8-Lanes)
- **Hardware RAID Card:** Provide data redundancy with additional RAID 6



4x 7mm SSDs Canister Brick



2x 15mm SSDs Canister Brick

GPU Integration for Enhanced Processing

Dive deep into GPU performance acceleration, essential for parallel processing tasks like cloud data management, machine learning, and artificial intelligence. The system is compatible with a range of robust GPU cards designed for intensive real-time Edge AI workloads.

Here are some of the standout options:

- NVIDIA T1000: 4G RAM | 896 CUDA Core | 50W | 4x mDP
- NVIDIA RTX A2000: 12G RAM | 3328 CUDA Core | 70W | 4x mDP
- NVIDIA RTX 4000 (SFF): 20G RAM | 6144 CUDA Core | 70W | 4x mDP



"With the EDGEBoost I/O and EDGEBoost Nodes technologies, the RCO-6000-RPL is not just a computer; it's a modular powerhouse ready for the challenges of the modern edge."



Ruggedization: Built to Withstand the Extremes

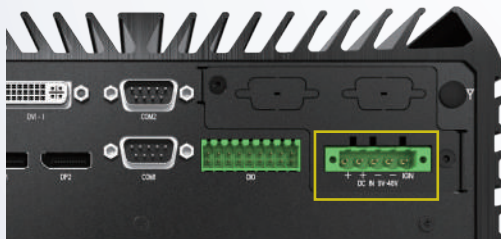
The RCO-6000-RPL is designed for adaptability across a spectrum of extreme environments. With a wide operating temperature range, this fanless computer is primed for extreme thermal scenarios at the rugged edge.



Shock & Vibration Resistance

The RCO-6000-RPL fanless industrial PC boasts exceptional resilience to challenging conditions. It can endure an average vibration intensity of 5 G across frequencies from 5 Hz to 500 Hz for 30 minutes in each axis (X, Y, and Z), showcasing its durability in vibration-prone environments. Additionally, the device can withstand a sudden and intense impact equivalent to 50 times the force of gravity, emphasizing its capability to handle substantial shocks or jolts. The tough shock and vibration resistance allows the RCO-6000-RPL to comply with the strict MIL-STD-810G military standards.

- Vibration: 5 Grms, 5 – 500 Hz (3 Grms with GPU)
- Shock: 50G, half sine, 11ms (20G with GPU)



DC IN 9V ~ 48V

Wide Voltage Input

The system efficiently operates across a 9 to 48VDC voltage range, with over voltage and current protection against power fluctuations. Its wide voltage input ensures compatibility with multiple power sources and supports both AT and ATX modes, accommodating varied deployment scenarios.

- Over Voltage Protection (OVP)
- Over Current Protection (OCP)
- 9 to 48 VDC
- Reverse Protection

Fully Certified for Safety and Reliability

The RCO-6000-RPL is not only rugged but also certification-ready, meeting various industry safety standards and swiftly adapting to regulations across different regions.

UL 62368-1 | FCC Class A | CE



We Create World-Class Edge Computers For Your Industry-Leading Solutions

NEW

RCO-6000-RPL SERIES



Processor	Support 13 th /12 th Gen Intel® RPL & ADL Processor (LGA 1700)
Memory	2x 262-Pin DDR5 4800/5600MHz SODIMM. Max. up to 64GB (ECC and Non-ECC)
Display	Triple Independent Display 2x DisplayPort (5120 x 3200; Up to 7680 x 4320), 1x DVI-I (or optional VGA; 1920 x 1200)
Storage	1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm) 1x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable), Support RAID 0, 1
Internal Expansion Slot	1x M.2 B Key, 2242/3042/3052 (Support AI/NVMe/4G/5G Module), 1x M.2 E Key 2230 (PCIe x1, USB 2.0, CNVi)
I/O	8x USB 3.2 Gen 2 (10 Gbps), 1x USB 3.2 Gen 1 (5 Gbps, 1x Internal), 2x USB 2.0 (internal) 8x RS-232/422/485 (6x internal), 2x RJ45
Power	9 to 48 VDC, AT/ATX Select, 5-pin Terminal Block
Operating Temperature	-25°C to 70°C
Shock & Vibration	With SSD: 50G, half sine, 11ms With SSD: 5 Grms, 5- 500 Hz, 0.5 hr/axis
Certification	UL 62368 Ed. 3 (In-Progress), CE, FCC Class A
Dimensions (W x D x H)	240 x 261 x 79 mm

Mix & Match EDGEBoost Nodes Guide

Configure the RCO-6000-RPL Series with customizable EDGEBoost Nodes tailored for diverse industrial Edge AI deployments. These nodes offer combinations of SATA Storage, NVMe Storage, GPU Card, PCIe/PCI expansions, and Hardware RAID cards. Here's a brief guide based on performance accelerators and features.

Top - Compatible



RCO-6000-RPL

Intel® 13th/12th Gen RPL/ADL CPU

Bottom - EDGEBoost Nodes

> PCIe Gen 4 Series



EBND-2-EXP-G4

- 1x PCIe x16 (Gen 4), 1x PCIe x1 (Gen 3) or 2x PCIe x8 (Gen 4)

> GPU Gen 4 Series



EBND-2-PWR-G4

- 1x PCIe x16 (Gen 4), 1x PCIe x1 (Gen 3) or 2x PCIe x8 (Gen 4)
- 12-48VDC Power Supply (280W)

> NVMe Series



EBND-2-2NVME-G4

- 2x Hot-Swap 2.5" NVMe SSD Bay (15mm)
- PCIe Gen 4 Expansion



EBND-8NVME-S

- 8x Hot-Swap 2.5" U.2 NVMe Drives (7mm)
- RAID 0, 1



EBND-4NVME-S

- 4x Hot-Swap 2.5" U.2 NVMe Drives (15mm)
- RAID 0, 1



EBND-4NVME-H

- 8x Hot-Swap 2.5" U.2 NVMe Drives (7mm)
- Hardware RAID 0, 1, 5, 6, 10

> SATA Storage Series



EBND-2-2SATA-G4

- 2x Hot-Swap 2.5" SATA Drives (15mm)
- RAID 0, 1, 5, 10
- PCIe Gen 4 Expansion



EBND-2-4SATA-G4

- 4x Hot-Swap 2.5" SATA Drives (7mm)
- RAID 0, 1, 5, 10
- PCIe Gen 4 Expansion

> NVMe and GPU Series



EBND-4NVME-GPU

- 1x GPU Expansion
- 4x Hot-Swap 2.5" U.2 NVMe Drives (7mm)



EBND-2NVME-GPU

- 1x GPU Expansion
- 2x Hot-Swap 2.5" U.2 NVMe Drives (15mm)



EBND-4NH-1E

- 1x PCIe x8 Slot
- Hardware RAID 0, 1, 5, 6, 10
- 4x Hot-Swap 2.5" U.2 NVMe Drives (7mm)