



## Workstation-Grade Industrial Machine Vision Computer Unleashing the Power of AI Computer Vision with the VCO Series

In the realm of modern technology, where machine vision and AI applications are at the forefront, there's a burgeoning need for robust and dynamic computing solutions. The industrial sector demands more than just handling immense data streams; it requires intelligent data interpretation and swift action based on insights.

Introducing the VCO-6000-RPL Industrial AI Vision Computer. Armed with cutting-edge Intel® 13<sup>th</sup> Gen Raptor Lake processors and scalable AI accelerators, this powerhouse doesn't just meet the demands—it defines the benchmark. Its rugged design ensures durability while delivering unparalleled performance, making it the choice for the next generation of AI, Machine Learning, and deep learning applications at the rugged edge. Dive into the future of intensive machine vision and AI applications with the VCO-6000-RPL.

### VCO-6000-RPL Features

- Intel® 13<sup>th</sup>/12<sup>th</sup> Gen RPL/ADL CPU
- DDR5 and PCIe Gen 4 Support
- High-Performance GPU Expansions
- Intel® LGA 1700 & R680 Chipset
- Triple Displays (5K up to 8K)
- Withstand Extreme Environments

### Key Markets and Applications



Deep  
Learning AI



Machine  
Vision &  
Inference



Industrial  
Automation



Metrology  
& Defect  
Detection



Security  
Surveillance



Smart Retail  
Solutions



Smart  
Energy Grid



## Leveraging Intel's Hybrid-Architecture

Deliver the optimal edge AI performance with the VCO-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 (13<sup>th</sup> Gen) and Intel® Alder Lake (12<sup>th</sup> Gen) processors. Intel's 13<sup>th</sup> Gen. and 12<sup>th</sup> Gen CPUs leverage the new Performance Cores (P-core) and Efficient Cores (E-core), delivering unprecedented performance with the new hybrid architecture.

## 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 VCO-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 13<sup>th</sup> 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 VCO-6000-RPL computer.



Intel® 12<sup>th</sup> and 13<sup>th</sup> Gen Processors

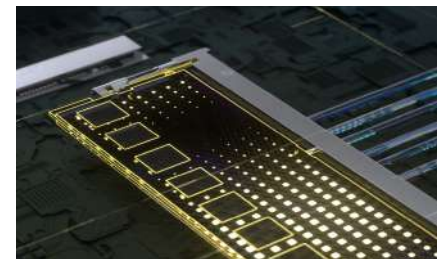


# Blazing Fast Speed and Efficiency with DDR5 Integration

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 VCO-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 13<sup>th</sup> 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: VCO-6000-RPL supports enhanced error correction for dependable data integrity.



The VCO-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 VCO-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 VCO-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 Displays

The VCO-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 VCO-6000-RPL.

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

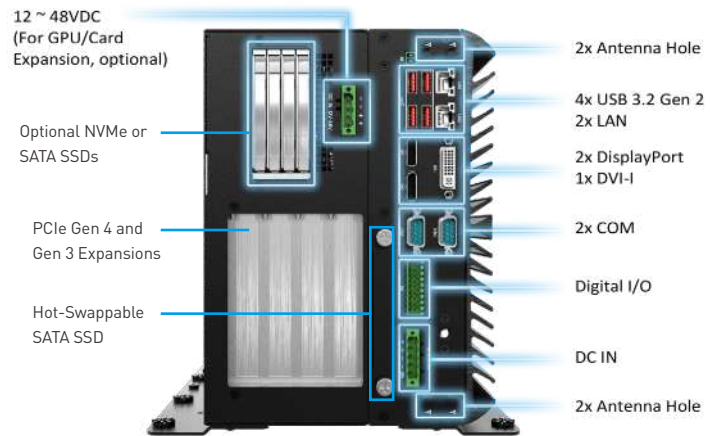


## Industrial AI Vision-Ready Powerhouse

Unlock the potential of Artificial Intelligence with the VCO-6000-RPL, designed for exceptional performance acceleration, ensuring seamless convergence of IT and OT in AI-centric workloads.

### Performance Versatility:

- Blazing-Fast PCIe Gen 4
- Scalable SATA and NVMe Storage
- Rich On-Board IoT-Centric I/O
- Supports x2 full-size High-Performance GPUs
- Powerful active cooling for performance acceleration



### Blazing-Fast PCIe Gen 4

The VCO-6000-RPL is at the forefront of technology with its ability to support the ultra-fast PCIe Gen 4 expansions. It offers flexibility with multiple configuration options, ensuring optimal performance. Each configuration is tailored to cater to varying needs while maintaining sleek card dimensions, ensuring it's both powerful and compact.



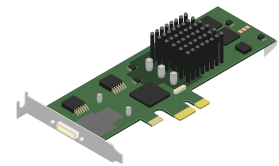
GPU Card PCIe x16



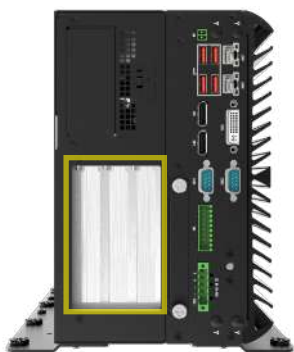
NVMe/SATA Storage



Hardware RAID Card



PCIe Gen 4



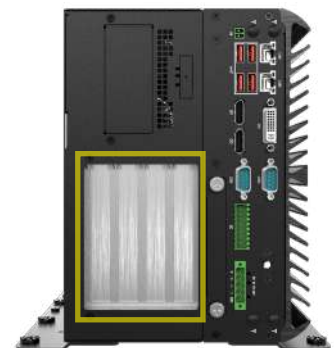
VCO-6000-RPL-3E  
(3-Slot)

### VCO-6000-RPL-3E with 3-Slot Configuration:

- 1x PCIe x16 (16Lane, Gen4)
- 2x PCIe x4 [Open] (Shared PCIe 1 Lane, Gen3)
- Card Dimensions: 310 (L) x 112 (H) mm

### VCO-6000-RPL-4E with 4-Slot Configuration:

- 2x PCIe x16 (8Lane each, Gen4)
- 1x PCIe x4 [Open] (1Lane, Gen3)
- Card Dimensions: 310 (L) x 112 (H) mm



VCO-6000-RPL-4E  
(4-Slot)



## High-Speed NVMe & High-Capacity SATA Storage

Experience unparalleled flexibility and efficiency with our scalable NVMe/SATA storage drives. Designed to adapt to your ever-evolving storage needs, these drives ensure seamless operations with their hot-swappable feature. Paired with robust RAID options, they offer optimized data redundancy and protection, enhancing the overall reliability and performance of your storage system. Dive into a world where storage meets adaptability and security.



4x 7mm SSDs Canister Brick



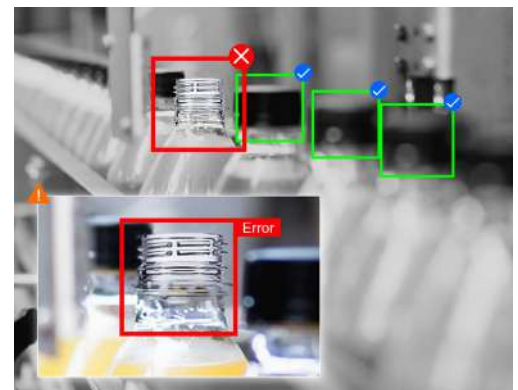
2x 15mm SSDs Canister Brick



- 4B7M: 4x 2.5" SATA SSD (7 mm) Hot-Swappable | RAID 0, 1, 5, 10
- 2B15M: 2x 2.5" SATA SSD (15 mm) Hot-Swappable | RAID 0, 1, 5, 10
- 2N15M: 2x 2.5" U.2 NVMe SSD (15 mm) Hot-Swappable | RAID 0, 1

## Scalable High-Performance GPU Support for Intensive AI Workloads

The VCO-6000-RPL provides a robust, modular solution optimized for high-performance computing at the challenging rugged edge. Seamlessly integrating PCIe Gen 4 speed into the machine vision computer, VCO-6000-RPL amplifies real-time AI processing capabilities. This scalable expansion option can support up to x2 powerful GPUs, high-speed NVMe, and even higher capacity SATA expansions, making them impeccably suited for intensive machine learning and edge AI applications.





## Optimized GPU Acceleration with Dual-GPU Integration

Unlock superior GPU performance with the VCO-6000-RPL, tailored for demanding parallel processing tasks in machine vision, cloud data management, and advanced AI. This system is engineered to support full-length, high-performance GPU cards, ensuring peak performance for real-time Edge AI and machine vision applications.

### Tested and Validated GPUs:

- NVIDIA T1000: 4G RAM | 896 CUDA Core | 50W | 4x mDP
- NVIDIA RTX A2000: 12G RAM | 3328 CUDA Core | 70W | 4x mDP
- NVIDIA RTX 4000 ADA (SFF): 20G RAM | 6144 CUDA Core | 70W | 4x mDP
- NVIDIA 4070 | 12G RAM | 5888 CUDA Core | 200W | 3x DP, 1x HDMI

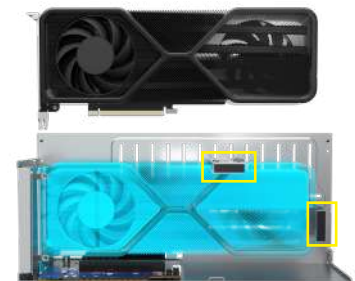


## Enhanced Power Supply for GPU Cards

The VCO-6000-RPL comes equipped with a supplementary power source tailored for GPU and NVMe enhancements. This auxiliary power unit efficiently delivers up to 300W, catering to both the GPU card and NVMe drives, and is supported by a versatile voltage range of 12~48VDC. This capability ensures that the machine vision computer can accommodate a variety of high-performance GPU cards, optimized for demanding real-time Edge AI tasks. By dedicating this secondary power supply to the GPU and NVMe performance accelerators, the computer's primary power system remains free to support its advanced CPU.

## Sturdy Industrial Locking Brackets for GPU Cards

The VCO-6000-RPL features durable, industrial-grade locking brackets within their PCIe expansion slots. These easily adjustable brackets offer reinforced security for the GPU card and other expansion components, ensuring they remain steadfast against external shocks and vibrations. Specifically designed to accommodate a PCIe x16 GPU card measuring up to 310 mm in length and 112 mm in width, the VCO-6000-RPL Series are versatile, supporting configurations from 3-slot to 4-slot heights. As a result, the VCO-6000-RPL is built to withstand up to 20G of shock and 3 Grms of vibration.



## Active Cooling Where It Counts

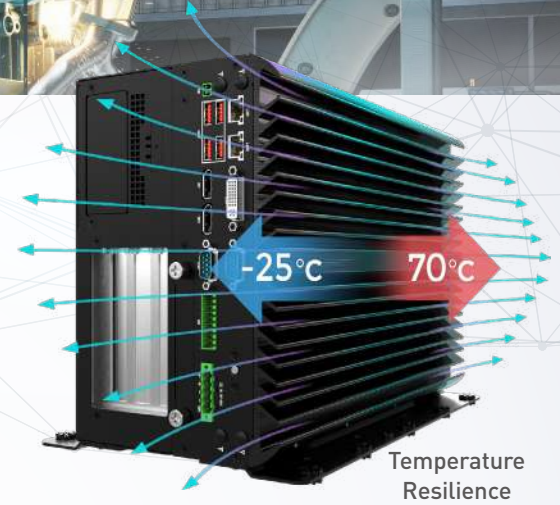
The VCO-6000-RPL provides thermal regulation with active cooling, vital for performance GPU and NVMe storage technologies. With its hot-swappable smart fan and an optional secondary fan, it delivers adaptive thermal management, enhancing both performance and hardware lifespan for industrial-grade reliability.





## Ruggedization: Built to Withstand the Extremes

The VCO-6000-RPL is designed for environmental reliability across a spectrum of extreme environments. With a wide operating temperature range, this machine vision computer is primed for extreme thermal settings at the rugged edge.

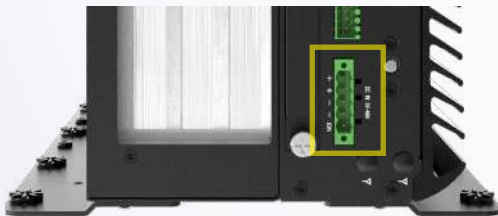


### Shock & Vibration Resistance

The VCO-6000-RPL industrial PC boasts exceptional resilience to challenging conditions. It can endure an average vibration intensity of 3 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 20 times the force of gravity, emphasizing its capability to handle substantial shocks or jolts.

- Vibration: 3 Grms, 5 – 500 Hz, with GPU
- Shock: 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

### World-Class Certifications

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

UL 62368-1 | FCC Class A | CE



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

NEW

## VCO-6000-RPL SERIES



VCO-6000-RPL-3E

VCO-6000-RPL-4E

Processor	Support 13 <sup>th</sup> /12 <sup>th</sup> 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  Optional: <ul style="list-style-type: none"> <li>• 4B7M: 4x 2.5" SATA HDD Bay (H=7mm, Hot-swappable) RAID 0, 1, 5, 10</li> <li>• 2B15M: 2x 2.5" SATA HDD Bay (H=15mm, Hot-swappable) RAID 0, 1, 5, 10</li> <li>• 2N15M: 2x 2.5" U.2 NVMe Bay (H=15mm, Hot-swappable) RAID 0, 1</li> </ul>	
Internal Expansion Slot	1x M.2 B Key, 2242/3042/3052 (PCIe x2, Support AI Module/NVMe Storage); (PCIe x1 & USB 3.2 Gen1, Support 4G/5G)	
I/O	4x USB 3.2 Gen 2 (10 Gbps), 5x USB 3.2 Gen 1 (Internal) 6x RS-232/422/485 (4x internal), 2x RJ45 8 in / 8 out (Isolated)	
Power	9 to 48 VDC, AT/ATX Select, 5-pin Terminal Block; 12 to 48 VDC (Optional, For GPU/Card Expansion)	
Operating Temperature	-25°C to 70°C	
PCIe	3-Slot 1x PCIe x16 (Gen4) 2x PCIe x1 (Gen3)	4-Slot 2x PCIe x16 Slot (x8 Lane, Gen 4) 1x PCIe x4 (x1 Lane, Gen 3)
Shock & Vibration	With SSD: 20G, half sine, 11ms With SSD: 3 Grms, 5- 500 Hz, 0.5 hr/axis	
Certification	UL, CE, FCC Class A	
Dimensions (W x D x H)	157 x 340 x 240 mm	177 x 340 x 240 mm