VCO-6000-CFL
Machine Vision Computer Series

Sharper Vision at the Rugged Edge

More versatile compute hardware is driving automation at the heart of Industry 4.0's reformations. Purpose-built ruggedized hardware is safely carrying powerful machine vision computing intelligence into more challenging, dynamic environments. The hardened IoT solutions provide real-time insights, low-latency responsiveness, workload consolidation and nimble automation capabilities close to the data sources.

The VCO-6000-CFL Machine Vision Computer Series bring vigorous performance to rigorous settings. These embedded computers are engineered to apply Intel®'s 9th Gen (codename: Coffee Lake Refresh) and Q370 chipset PCH advanced processing to responsive visual analysis in volatile, demanding and mobile deployments. The VCO-6000-CFL Machine Vision Computer Series support rich processing, future-ready storage technologies, and rapid connectivity for more reliable, efficient processing at the rugged edge.

Inference Analysis at the Rugged Edge

The VCO-6000-CFL Machine Vision Computer Series support powerful GPUs, processing volumes of complex data to drive AI functions. The Machine Vision Computer is deployed in either controlled or dynamic environments to capture data to train neural networks. The computers process countless inputs to prompt the neural network to arrive at the desired result. The

neural network is exhaustively adjusted until it displays a cognitive understanding of the input to accurately perform the process independent of human involvement.

Once a neural network is trained, its refined algorithms are deployed at the rugged edge to conduct inference analysis. The speed and accuracy of a properly informed algorithm greatly exceed those of human counterparts. Industrial and critical infrastructure sectors are awakening to the fresh insights and optimization potential for safer, more resource- and cost-efficient automation.

The VCO-6000-CFL Machine Vision Computer Series' rapid NVMe storage support and high-speed I/O expandability drive efficient data collection and processing for training neural networks, quickly offloading essential data to cloud archives for more advanced IoT management. Powerful GPU expandability applies the informed algorithms toward inference analysis tasks at key edge network positions in real-time. Ruggedized hardware architecture safeguards the Machine Vision Computer in harsh environments, while seamless connectivity ensures reliable communication from remote and mobile settings.

Key Applications

| Industrial Automation | Metrology and Defect Detection | Surveillance | Smart Retail |

Computing for the Evolving Edge

8th/9th Gen Intel® Processor and Q370 chipset

The VCO-6000-CFL Machine Vision Computer Series leverage rich performance enhancements supplied by 8th / 9th Gen. Intel® CFL-R S Processors and Q370 chipset support. The Intel® technology enables up to 16-way multi-tasking through hyperthreading its maximum eight cores. The processor supports DDR4 RAM for up to 64 GB of memory and 2666 MT/s transfer speeds, while UHD graphics offer rich visual output for many applications using optical data.

The socket design is combined with Intel®'s Q370 chipset to deliver augmented peripheral performance for low-latency edge responsiveness. Gigabit wireless speeds, PCIe 3.0 lanes, SATA ports and rapid USB 3.2 Gen 2 grant the VCO-6000-CFL Machine Vision Computer Series exceptional I/O integration options for transmitting data to and from the device.

Dedicated GPU Support

The 8th/9th Gen Intel® Core™ Processor provides a mix of processing power for a variety of workloads at the edge. This Machine Vision Computer offers multi-level processing and real-time intelligence by balancing workloads between CPU and GPU performance cores. The front sided PCIe expansion slots for the inference computer can be populated with GPU performance accelerators up to 75W in a Full-Length, Full Height form factor. Graphics accelerators like GPUs allow intelligent devices to run machine learning algorithms for inference analysis of data from a variety of IoT sensors.

# High-Speed Storage Primed for Edge Intelligence

The VCO-6000-CFL Machine Vision Computer Series support storage technologies accommodating any embedded automation application. Two internal SATA SSD/HDD drives are joined by two additional external SATA SSD/HDD bays as a scalable RAID solution satisfying data storage needs for many harsh deployments.

The VCO-6000-CFL Machine Vision Computer Series also enable high-speed NVMe storage for greatly accelerated data leverage. Support for an onboard M.2 NVMe drive with PCIe 3.0 x4 performance efficiently feeds integrated CPUs and GPUs volumes of data for complex data cache applications. Rapid data speeds enable more reflexive inference analysis at the edge.

VCO-6000-CFL Machine Vision Computer Series efficiently feed integrated CPUs and GPUs volumes of data for complex vision-based applications. Rapid data speeds enable more reflexive inference analysis at the edge.

NVMe. Informing the Rugged Edge.

Several optimized technologies have converged to promote real-time, in-depth responsiveness at the edge. Multi-core CPUs and advanced GPUs stand ready to perform numerous parallel processes, while 5G, 10GbE and speedier I/O technologies wait to receive and offload volumes of rich data. Solid state drive (SSD) storage offers a vastly quicker and structurally more rugged data repository than its hard disk drive (HDD) cousin. The main hindrance to immediate intelligence at the edge, however, has been the chosen storage technology's inability to efficiently read and write

HDD vs. SATA vs. NVMe — Maximum Theoretical Speeds
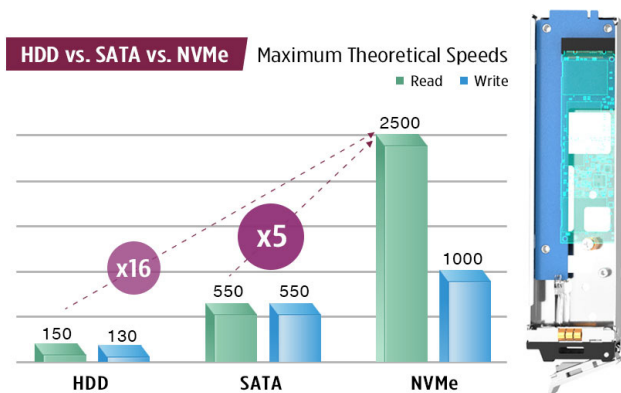
data beyond the limitations inherent in the connective architecture. This is where NVMe carries the day over more traditional data transfer protocols in legacy products

NVMe, or Non-Volatile Memory Express, is an SSD protocol conceived with focused efficiency in mind. As an SSD, it relies on semiconductor chips without moving parts to store and access data. NVMe's delivery system, however, is via direct contact with PCIe 3.0 lanes. This streamlined interface alleviates a great amount of the data bottlenecking that can occur with other SSD technologies.

NVMe's theoretical data read speeds of 2,500 MB/s are practically quintuple those of SATA. SATA, the other predominant SSD protocol, boasts write speeds of about half NVMe's, topping around 550 MB/s. As far as HDD competition, NVMe delivers 16 times the read speed.

By deploying a rapid-fire storage media and setting a clear path for its transmission to PC components, NVMe provides the operative immediacy that responsive edge intelligence demands. Applications leveraging inference analysis can access stored algorithms and mission-critical data at speeds exceeding human cognition.

Connecting from the Rugged Edge

Steady Wireless Connectivity

The VCO-6000-CFL Machine Vision Computer Series enable seamless wireless connectivity for remote and mobile edge deployments. Wi-Fi 6 and Bluetooth 5 technologies reliably connect to sensors and network systems through a wireless IoT enterprise. Dual SIM sockets provide continuous 4G/LTE cellular connectivity at remote of mobile edge deployments. The VCO-6000-CFL Machine Vision Computer Series are also 5G-ready through a modular add-in card, providing edge deployments vastly greater cellular speeds and more granular network slicing options.

10GbE I/O Ready

The Machine Vision Computer supports two 10GbE ports through its add-on daughterboard. The high-speed connections enable low-latency data transmission for advanced vision and industrial inference analysis applications leveraging faster network speeds like 10GbE.

LAN/PoE Options

The VCO-6000-CFL Machine Vision Computer Series may be configured with up to eight additional LAN ports for standard IoT network connectivity. PoE ports are also available to supply electricity to power-constrained peripheral devices like cameras and IoT sensors.

Versatile Expansion Slots for Performance Acceleration

A variety of form factors grants the VCO-6000-CFL Machine Vision Computer Series exceptional expandability to support performance accelerating GPUs as well as additional frame grabber capture cards. The series grant unmatched scalability to vision-dependent IoT deployments with up to five expansion slots in flexible combinations to support both PCIe gen 3 and legacy PCI signals.

Built Rugged. Built Ready.

Wide Operating Temperature

The VCO-6000-CFL Machine Vision Computer Series' wide -25 to 70° C operating temperature accommodates a vast range of challenging thermal conditions. Blistering steel foundries and ice-encrusted arctic minesites can easily dispatch the Machine Vision Computer for deep data inference analyses at the rugged edge.

Wide Voltage Input

A 9 to 48VDC input latitude accepts a wide range of available power voltages and provides a level of surge mitigation. The Machine Vision Computer supports AT/ATX power modes according to deployment requirements.

Shock and Vibration Tolerance
(50G shock / 5 Grms Vibration)

The VCO-6000-CFL Machine Vision Computer Series are hardened to withstand environmental impacts and vibrations characteristic of the rugged edge. The Machine Vision

Computer can be safely deployed in vehicles to instantly collect and process torrents of sensor data to train neural networks, leverage telematics for intelligent fleet management or perform predictive analytics to alert of impending traffic hazards. Heavy industrial sectors can dispatch the VCO-6000-CFL Machine Vision Computer Series to rough, volatile settings to conduct inference analysis on visual and situational input.

Power Ignition Management

Intelligent transportation deployments can harness the power of inference analytics safely through the VCO-6000-CFL Machine Vision Computer Series' power ignition management feature. The Machine Vision Computer safely powers down after engine shutoff following a predetermined interval. The feature ensures applications close properly and data is neither lost nor corrupted.

TPM 2.0 Security

An integrated trusted platform module applies TPM 2.0 standards to safeguard the VCO-6000-CFL Machine Vision Computer Series. The microprocessor's root keys enable password protection, device authentication and future-ready cybersecurity. The TPM defends the device, data and transmissions against malicious actors.
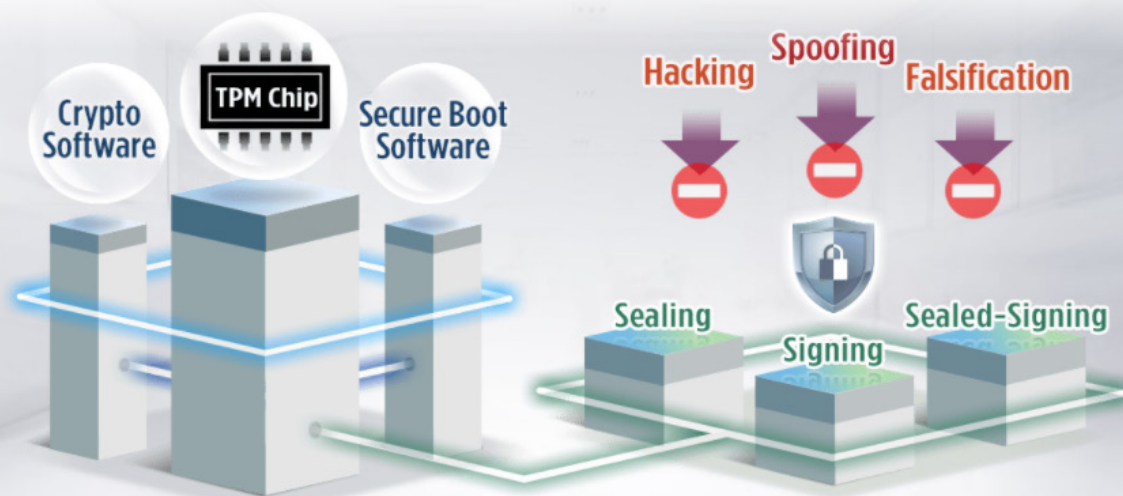
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NEW

VCO-6000-CFL SERIES

	VCO-6000-CFL-1	VCO-6000-CFL-2	VCO-6000-CFL-3	VCO-6000-CFL-4	VCO-6000-CFL-5
Processor	Support 8th / 9th Gen. Intel® CFL-R S Processor (LGA 1151, 65W/35W TDP)				
Memory	2x 260-Pin DDR4 2400/2666MHz SODIMM. Max. up to 64GB (Un-buffered and Non-ECC)				
Display	Triple Independent Display by 1x DVI-I and 2x DisplayPort				
Storage	2x Internal 2.5" SATA HDD Bay (support H=9mm) ; 2x Removable 2.5" SATA HDD Bay 1x mSATA (Shared by 1x Mini PCI Express) ; 1x M.2 (M Key, NVMe PCIe x4, 2280) 1x M.2 (E Key, PCIe x2, USB 2.0, 2230) ; 2x External SIM socket				
Internal Expansion Slot	2x Full-size Mini PCIe (1x shared by 1x mSATA)				
	1x PCIe X16	2x PCIe x16 (8-Lane)	2x PCIe x4 (1-lane), 1x PCIe x16	2x PCIe x4, 1x PCIe x16 (8-lane), 1x PCI	2x PCIe x4, 1x PCIe x16 (8-Lane), 2x PCI
I/O	2x RS-232/422/485, 4x RS-232/422/485 (internal), 4x USB 3.2 Gen 2, 4x USB 3.2 Gen 1 (internal), 8 in / 8 out (Isolated), 2x Intel® GbE Supporting Wake-on-LAN and PXE				
Power	9 to 48VDC Wide Range Power Input Supporting AT/ATX Mode				
Operating Temp.	-25°C to 70°C				