The growing sophistication and utility of AI at the edge is giving rise to consistent growth across numerous industries, especially automation and healthcare. The global markets for industrial automation and IoT in healthcare are expected to reach valuations of USD 355.44B and USD 446.52B, respectively, by 2028.1,2 Evolving infrastructure, including the mainstreaming of 5G wireless deployments, is opening the door to new possibilities, new efficiencies, and better business outcomes.

Challenge: Specialization drives the need for performance and connectivity

To capitalize on emerging technologies that boost automation, enterprises need to be able to deploy edge solutions quickly while meeting the specific requirements of each use case. Some edge AI deployments prioritize more graphic computing performance to analyze video streams, increased memory to support more simultaneous applications, or more PCIe connectivity to support custom peripherals and accelerators. For example, defect detection appliances in manufacturing can require a combination of frame grabber cards to ingest video streams, AI acceleration for edge-level analysis, and motion control cards to direct robotic servos and motors. As the needs of the configuration grow, architects need to find a way to deliver more processing power in smaller footprints.

The SECO ORION COM-HPC Client Module Size A enabled by 12th Gen Intel® Core™ processors delivers outstanding graphics performance for automation and AI at the edge.

“12th Gen Intel® Core™ processors in the COM-HPC® ORION module help deliver a future-proof approach to embedded computing, helping overcome connectivity limitations. PCIe 4.0, USB4, and Thunderbolt™ allow businesses to integrate the newest technologies at higher and higher levels of data throughput.”
—Davide Catani, CTO at SECO

12th Gen Intel® Core™ mobile processors compared to 11th Gen Intel® Core™ processors³

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<th>Overclocked Feature</th>
<th>12th Gen Intel® Core™ Mobile Processors</th>
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<td>Faster Graphics Performance²</td>
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For workloads and configurations, visit intel.com/PerformanceIndex. Results may vary.
Solution: SECO ORION COM-HPC Client module Size A with 12th Gen Intel Core processors

The SECO ORION module is built on the COM-HPC standard and gives customers access to the revolutionary performance and connectivity improvements of 12th Gen Intel® Core™ processors. With this solution, IoT builders get a flexible platform with more processor cores and threads, DDR5 memory, and PCIe 4.0 connectivity to support a broad range of complex edge use cases. The focus on exceptional graphics performance also delivers more video streams and fast AI inference for machine vision-enabled deployments. Davide Catani, CTO at SECO, says, “12th Gen Intel Core processors in the COM-HPC ORION module help deliver a future-proof approach to embedded computing, helping overcome connectivity limitations. PCIe 4.0, USB4, and Thunderbolt™ allow businesses to integrate the newest technologies at higher and higher levels of data throughput.”

Target industries: SECO COM-HPC ORION enabled by 12th Gen Intel® Core™ processors

How it works

The SECO COM-HPC ORION module provides exceptional connectivity and flexibility to accommodate multiple accelerators and peripherals of the customer’s choosing. 12th Gen Intel Core processors bring up to 14 cores and 20 threads, more I/O throughput, and more memory capacity with up to DDR5-4800 to support more simultaneous applications. Catani says, “Demanding use cases benefit from PCIe 4.0 connectivity and the ability to add accelerators for workloads like AI and graphics processing. The COM-HPC standard is perfect for this, as many of our customers use customized peripherals. Healthcare is an example where applications like MRIs and medical imaging need to process data streams with higher-than-standard throughput.”

Key features:

- COM-HPC client module size A
- 12th Gen Intel Core processor
- Intel® Iris® X® Graphics with up to 96 graphics execution units (EUs)
- 2x 2.5GbE ports and optional Wi-Fi 6E
- 2x USB4 Gen 2x2, 4x USB2.0
- 1x PCIe Gen 4.0 lanes or 2x 4 PCIe Gen 4.0 lanes, 8x PCIe Gen 3.0 lanes
- 2x DDR5 SO-DIMM slots with support for DDR5-4800 memory
The largest leap in years for performance architecture

12th Gen Intel Core processors are the first Intel® Core™ processors to feature performance hybrid architecture,* a revolutionary chip design that combines Performance-cores, or P-cores, with Efficient-cores, or E-cores. The accompanying Intel® Thread Director technology intelligently directs the OS to assign workloads to the right core by allocating primary workloads to P-cores and background workloads to E-cores. This results in up to 1.07x faster single-thread performance and up to 1.29x faster multithread performance compared to 11th Gen Intel® Core™ processors. 3

Multiple video streams, multiple displays

The SECO COM-HPC ORION module takes advantage of the high-end graphics capabilities of 12th Gen Intel Core processors to support rich digital display interfaces. With Intel Iris Xe™ Graphics, the processors feature up to 96 graphics EUs, which deliver up to 2.47x faster graphics performance vs. 11th Gen Intel Core processors. 3 Up to four display pipes also allow for four concurrent 4K60 HDR displays or one 8K resolution display for digital signage or detailed interfaces. The video input/decode and AI capabilities can also enable systems to analyze high volumes of data from multiple cameras.

AI acceleration drives fast inference in edge devices

For many video-enabled edge AI implementations, video streams need to be analyzed in near-real time to support key applications such as defect detection on assembly lines or asset tracking for logistics. For healthcare use cases, fast deep learning inference is crucial to help assist pathologists in analyzing medical images for patient diagnoses.

The COM-HPC ORION module benefits from hardware-enabled AI acceleration in 12th Gen Intel Core processors to drive fast analytics in a small footprint. Intel® Deep Learning Boost (Intel® DL Boost) and Vector Neural Network Instructions (VNNI) contribute to accelerated AI inference, while the high number of graphics EUs allows for a high degree of parallelization for AI workloads. These technologies make it possible to perform inference within edge devices rather than pushing data to the cloud for AI analysis and back again.

Interoperability for seamless integration

SECO offers guidance and kits to help customers validate new COM-HPC offerings with their existing infrastructure. The SECO COM-HPC Client Dev Kit includes a board, cables, and adapters for customers to rapidly prototype and test I/O bandwidth and signal integrity prior to a full-scale deployment. As COM-HPC boards are designed to be interoperable across generations, customers can ensure that 12th Gen Intel Core processor-enabled boards will work with existing configurations and more readily experience the performance and graphics benefits of the latest processor.

Easy edge device management with Clea

Clea is SECO’s cloud-hosted device management platform for AI and IoT deployments. With this platform, customers can more easily manage and update fleets of 12th Gen Intel Core processor-enabled edge devices remotely, collect logs and telemetry data to drive optimization efforts, and utilize a SECO-supplied software dev kit (SDK) to build their own Clea-based applications. Clea currently supports a growing list of AI-enabled applications that include smart vending machines, dental X-ray cavity detection, vehicle driver concentration assessment, people counters and movement trackers for smart buildings, predictive maintenance for factories, and cybersecurity threat detection. This platform helps customers get to market fast while allowing for deeper customization for more-specialized use cases.

For workloads and configurations, visit intel.com/PerformanceIndex. Results may vary.
Conclusion: Striving for signal integrity

The innovative COM-HPC ORION module enables customers to derive high performance and value from the latest Intel® processors while delivering interoperability as a top priority. Catani states, “Our implementations are really targeting the best performance in terms of signal integrity. We adopt a robust design workflow for high-speed interfaces, so customers are assured they have the best conditions to leverage for carrier board design.” With this combined processor and board solution, AI and IoT architects have a solid and flexible foundation to jump-start their demanding performance- and graphics-intensive projects.

Learn more

Learn more about the SECO COM-HPC ORION at edge.seco.com/en/orion.html.

Explore the capabilities of 12th Gen Intel Core processors at intel.com/alderlake-p.

About SECO

With over 40 years in the high-tech market, SECO offers foundational experience and expertise in developing embedded microcomputers, integrated systems, and IoT solutions.

seco.com/en

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Intel® processors of the same SKU may vary in frequency or power as a result of natural variability in the production process. Not all features are available on all SKUs. Not all features are supported in every operating system. Intel may change availability of products and support at any time without notice. All product plans are subject to change without notice. Your costs and results may vary.

Intel® technologies may require enabled hardware, software, or service activation.

Performance hybrid architecture combines two new core microarchitectures, Performance-cores (P-cores) and Efficient-cores (E-cores), on a single processor die. Select 12th Gen Intel® Core™ processors (certain 12th Gen Intel® Core™ i5 processors and lower) do not have performance hybrid architecture, only P-cores.

Built into the hardware, Intel® Thread Director is provided only in performance hybrid architecture configurations of 12th Gen Intel® Core™ processors; OS enablement is required. Available features and functionality vary by OS.

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