

Solution Brief

Edge Video, AI, and IoT
Embedded Compute Modules



Deliver Superior Performance, Security, and Connectivity at the Edge

Engineered with 11th Gen Intel® Core™ vPro®, Intel® Xeon® W-11000E Series, and Intel® Celeron® processors, the SECO CHPC-D57-CSA COM-HPC® Client module Size A helps ensure secure, high-performance computing and interoperability for AI, video, and other data-intensive applications at the edge.



"Use cases like AI at the edge, machine vision, and the increasing cooperation between humans and machines are demanding higher performance overall: to power onboard processing, extend interfacing capabilities, and enable high-end graphics, for example. Built on 11th Gen Intel® Core™ vPro®, Intel® Xeon® W-11000E Series, and Intel® Celeron® processors, SECO's CHPC-D57-CSA provides a ready-to-use solution to fulfill this need."

—Davide Catani, chief technology officer for SECO

Today's digital-first businesses and consumers are generating unprecedented volumes of data from devices and systems unimaginable just a decade ago—and this data needs to be captured and leveraged in real time for a growing array of use cases emerging at the edge. Take, for example, medical imaging data requiring real-time processing and display to aid in patient care and machine vision applications whereby high-resolution smart cameras must transfer data immediately to drive manufacturing robotics. Also consider the vast amounts of data generated by public sector systems located in avionics, on submarines, or at field bases that require real-time analysis for decision-making.

For OEMs and their customers, there is a strong need for high-performance edge computing solutions to drive a new class of complex, data-intensive applications. Powered by 11th Gen Intel® Core™ vPro®, Intel® Xeon® W-11000E Series, and Intel® Celeron® processors, the SECO CHPC-D57-CSA COM-HPC® Client module Size A helps accelerate processing for data-rich applications while supporting security and reliability in the harshest, most remote environments.

Challenges: New performance demands for devices at the edge

Across industries and geographies, the amount of data generated by devices continues to increase. Also, IoT devices used for applications like robotics, warehouse automation, medical imaging, and safety/mission control need to perform reliably even in extreme temperatures and under the most unforgiving environmental conditions. The use of graphics and video in applications is fast growing as well, placing even greater performance demands on edge computing solutions.

Today's competitive landscape requires OEMs and their customers to bring products to market faster than ever before. Accordingly, Computer on Modules (COMs) speed the product development cycle by providing an embedded computing platform with the processing element already included in a standard form factor. As a result, OEMs and their customers can quickly customize the system with an application-specific companion board. COMs today must be highly flexible in their design to ensure the interoperability needed for fast integration with new systems, applications, and devices. And because cyberthreats are increasing in prevalence and complexity, it is more challenging than ever to secure edge computing systems and data.

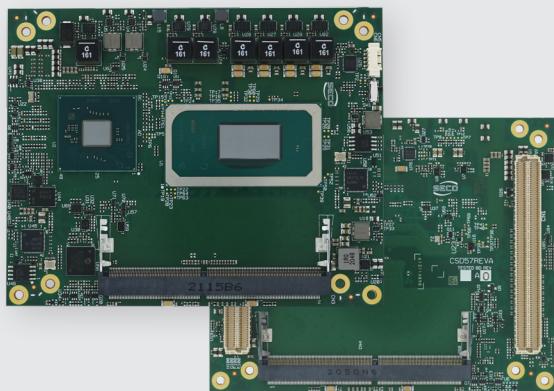
Solution: SECO's CHPC-D57-CSA COM-HPC® Client module Size A, powered by 11th Gen Intel Core, Intel Xeon W-11000E Series, and Intel Celeron processors

Built on the 11th Gen Intel Core vPro, Intel Xeon W-11000E Series, and Intel Celeron processors, SECO's CHPC-D57-CSA COM-HPC® Client module Size A (95 x 120 mm) is the latest standard for high-end embedded computing, delivering all the performance, security, and interoperability required to deploy modern applications at the edge. Intel® processors enable near-real-time processing of today's high data rates while ensuring the reliable uptime and rugged durability to power heavy-workload applications, such as:

- Avionics
- Automation
- Public sector processes
- Robotics
- Industrial control
- Machine vision
- Transportation
- Digital signage
- Gaming
- Biomedicine

How it works

Engineered to process heavy workloads at the edge, the SECO CHPC-D57-CSA accelerates data processing with up to eight cores and up to 32 graphics execution units. Four 4Kp60 display pipes or one 8Kp60 in high-dynamic-range (HDR) industrial-grade SKUs are included to provide high-end graphics processing. Total memory encryption provides a security layer that can help thwart attacks. Designed and verified for optimized signal integrity including high-speed, off-board interfaces, the module ensures interoperability with carrier boards and third-party devices.



SECO's CHPC-D57-CSA includes these features:

- **20x PCIe Gen 4 lanes**, directly managed by the processor core
- Up to **24x PCIe Gen 3 lanes**
- **2x DDR4-3200 SODIMM slots** with ECC (up to 64 GB)
- Up to **2x NBASE-T Ethernet ports** with support for time-sensitive networking (TSN)
- **2x USB 4.0/USB 3.2/8x USB 2.0**

Functional Safety standard compliance support

For systems and applications that must comply with Functional Safety (FuSa) standards, the SECO CHPC-D57-CSA uses the Intel® Functional Safety Essential Design Package (Intel® FSED), which provides the technical documentation needed to support and speed up the development and certification of functional safety applications. Documentation also aids in facilitating the device usage in applications requiring compliance with Functional Safety standards, such as IEC 61508.



Intel processors deliver new levels of performance and interoperability at the edge

The SECO CHPC-D57-CSA modules feature 11th Gen Intel Core processors, which deliver significant generation-over-generation performance gains, including up to a 32 percent performance gain in single-thread performance,¹ up to a 65 percent performance gain in multithread performance,² and up to 70 percent faster graphics performance.³ These gains, and especially the boost in multithread performance, significantly accelerate processing for AI, graphics, and other data-intensive applications.

11th Gen Intel® Core™ processors vs. prior-gen processors

Up to
32%
higher
single-thread
performance¹

Up to
65%
higher
multi-thread
performance²

Up to
70%
faster
graphics
performance³

See backup for configuration details. For more complete information about performance and benchmark results, visit intel.com/benchmarks.

Support for high-throughput applications, rugged environments

11th Gen Intel Core vPro, Intel Xeon W-11000E Series, and Intel Celeron processors support up to 20 PCIe Gen 4 lanes, two USB 4 ports, and 2x 2.5GbE interfaces with TSN capabilities to deliver the superior connectivity required for high-throughput applications. With 11th Gen Intel Core vPro, Intel Xeon W-11000E Series, and Intel Celeron processors, OEMs and their customers can engineer the reliable infrastructure needed to manage even the highest-speed interfaces, such as those used in autonomous robots that must process data in real time when interacting with other devices and humans.

These processors empower ruggedized systems to deliver reliable performance in the harshest of environments, withstanding elements such as wind, dust, corrosion, vibration, impact, and extreme temperatures, ranging from -40° to 85°C ambient. As a result, they are ideally suited for AI and IoT applications deployed both indoors and outdoors, ranging from digital signage and infotainment displays to smart cameras, factory automation systems, avionics, and more.

Real-time processing made possible by Intel® Time-Coordinated Computing (Intel® TCC)

Select SKUs of 11th Gen Intel Core vPro, Intel Xeon W-11000E Series, and Intel Celeron processors help enable near-real-time workloads and TSN for the SECO CHPC-D57-CSA by synchronizing data and execution across the network. Intel provides tools, libraries, and APIs that simplify real-time tuning for proprietary and open source systems. Supported real-time hypervisors and operating systems include ACRN, Wind River VxWorks, and Real Time Systems.

Advanced features accelerate AI processing

Intel® Advanced Vector Extensions 512 (Intel® AVX-512), exclusive to Intel processors, accelerates AI workloads for image analysis, audio/video processing, and cryptography. Intel® Deep Learning Boost (Intel® DL Boost) further extends Intel AVX-512 with a new instruction set that increases inference performance on lower-precision data types, such as those used in workloads for image classification, speech recognition, and object detection.

Expansive application support, high-fidelity graphics

The computing performance delivered by the 11th Gen Intel® processors powers a myriad of use cases where data needs to be transferred to the CPU in near-real time, including industrial edge servers, multidevice, real-time control systems, multicamera computer vision, and deep learning inference systems.

Key features offered by the 11th Gen Intel processors include:

- Third-generation, Intel® 10nm SuperFin technology, up to 8 CPU cores, and up to 4.7 GHz frequency
- Intel® UHD Graphics with up to 32 execution units (EUs), 4x 4K or 1x 8K display(s), and up to 2 VDBOXES
- Intel® TCC and TSN capabilities for real-time computing
- Intel FSEDP to facilitate platform certification
- Embedded and extended temperature industrial-rated SKUs
- Integrated Thunderbolt™ 4/USB4, 20 lanes of PCIe Gen 4, discrete Intel® Wi-Fi 6E, and Bluetooth 5.2
- Hardware-based security with Intel® Total Memory Encryption (Intel® TME), and device management with the Intel vPro® platform
- Supported by Intel® oneAPI toolkits and the Intel® Distribution of OpenVINO™ toolkit
- Support for both commercial and open source operating systems (OSs), real-time OSs, and hypervisors

"The increased number of simultaneous displays supported at higher resolutions, up to 8K, can enable scenarios not possible with previous generations in verticals and segments such as medical imaging and digital signage, for example. Industrial use cases receive a huge boost as well for demanding applications designed to perform under extreme environmental conditions."

—David Catani, chief technology officer for SECO

Advanced security helps protect sensitive data

With so many new IoT devices deployed today, the amount of sensitive consumer, business, and public sector data is increasing exponentially at the edge, and this data must be secured according to stringent global security protocols and regulations. Select SKUs of 11th Gen Intel Core vPro, Intel Xeon W-11000E Series, and Intel Celeron processors deliver advanced hardware-enabled security to help protect data:

- **Intel TME** enables full physical memory encryption. This helps defend against hardware-level attacks such as cold boot, freeze spray, and DIMM removal.
- **Intel® Boot Guard and Intel® Trusted Execution Technology (Intel® TXT)** help establish a secure boot and provide the foundation for safe computing.
- **Intel® Key Locker** helps protect encrypted keys and decrypt/encrypt operations.

SECO development kit helps deliver fast time to market

SECO's CHPC-D57-CSA quickly and easily integrates 11th Gen Intel Core vPro, Intel Xeon W-11000E Series, and Intel Celeron processors in virtually any application domain, providing reliable and interoperable solutions. SECO also provides development kits for OEMs and customers that expedite the design and implementation processes and enable quick system-level testing of every module feature leveraging these processors.

Supported by CLEA, a cloud-based remote management and data orchestration platform

The SECO CHPC-D57-CSA is also supported by CLEA, SECO's advanced IoT suite solution for the remote management of edge devices, data aggregation and data orchestration for cloud-based analytics and AI.

Conclusion: Intel and SECO bring performance to the edge for a world awash with data

IoT deployments are rapidly growing both in size and complexity, and data is proliferating at the edge like never before. Intel and SECO are helping OEMs and their customers unleash the power of data wherever it resides by delivering the security, connectivity, performance, reliability, and flexibility that modern data-intensive applications require to perform optimally anywhere they are deployed.

Built on 11th Gen Intel Core vPro, Intel Xeon W-11000E Series, and Intel Celeron processors, the SECO CHPC-D57-CSA powers AI, graphics, video, robotics, and other data-rich applications with edge performance, security, and durability. Its modular design allows the SECO CHPC-D57-CSA to be customized in a breadth of configurations to support a new generation of applications that are fast advancing. Together, these technologies are enabling near-real-time computing in the most unconventional locales and settings, driving innovation and productivity everywhere, and transforming applications, industries, and experiences as a result.

About SECO

Listed on Borsa Italiana's Mercato Telematico Azionario (STAR segment), SECO (IOT.MI) is a center of excellence in the field of innovation and technological integration. The company has been operating in the high-tech market for over 40 years, designing, developing, and manufacturing cutting-edge proprietary technological solutions for industrial clients.

seco.com/en

"Intel is a reliable partner both in terms of product design and business continuity. Being part of Intel Early Access Programs allows us vitally important access to early information on upcoming technologies, a key enabling factor. We appreciate Intel's robust support services as well."

—Davide Catani, chief technology officer for SECO

Learn more

[Explore the feature-rich capabilities of the SECO CHPC-D57-CSA >](#)

[Discover the value of 11th Gen Intel Core vPro, Intel Xeon W-11000E Series, and Intel Celeron processors >](#)



1. Up to 32 percent single thread performance gains as measured by SPECCrate2017_int_base (1-copy)|C19_0u4 (est.).
2. Up to 65 percent multithread gain as measured by SPECCrate2017_int_base (n-copy)|C19_0u4 (est.).
3. Up to 70 percent graphics performance gains as measured by 3DMark_v2.11 - Win10 v2009 - Fire Strike - graphics score.

Intel configurations

Performance results are based on Intel measurements as of May 25, 2021.

Processor: Intel® Core™ i7-11850HE (TGL-H) PL1=45W TDP, 8C16T turbo up to 4.7 GHz

Graphics: Intel® Graphics Gen 12 GFX

Memory: 32 GB DDR4-3200

Storage: Intel® SSD 545S (512 GB)

OS: Windows 10 Pro 20H2

Bios: TGLSFW1.R00.4151.A01.2104060640 (Release date: 04/06/2021)

CPUz microcode: 28h

Processor: Intel® Core™ i7-9850HE (CFL-H) PL1=45W TDP, 4C8T turbo up to 4.4 GHz

Graphics: Intel® Graphics Gen 9 GFX

Memory: 32 GB DDR4-2666

Storage: Intel SSD 545S (512 GB)

OS: Windows 10 Pro 20H2

Bios: CNLFSWR1.R00.X216.B01.2006110406 (release date: 06/11/2020)

CPUz Microcode: D6h

For more complete information about performance and benchmark results, visit intel.com/benchmarks.

Notices and disclaimers

Intel® Advanced Vector Extensions (Intel® AVX) provides higher throughput to certain processor operations. Due to varying processor power characteristics, utilizing AVX instructions may cause, a) some parts to operate at less than the rated frequency and, b) some parts with Intel® Turbo Boost Technology 2.0 to not achieve any or maximum turbo frequencies. Performance varies depending on hardware, software, and system configuration, and you can learn more at intel.com/go/turbo.

Performance varies by use, configuration and other factors. Learn more at www.intel.com/PerformanceIndex.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure.

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