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SECO pushes performance boundaries with new standards and the latest-gen platform

The SECO CHPC-C77-CSA module, featuring 11th Gen Intel® Core™ processors, is designed for the COM-HPC® standard

As connectivity and flexibility requirements continue to drive performance demands in embedded edge computers and servers, industries are poised to take advantage. Factories and logistics firms are streamlining their production lines with greater precision using robotics. Hospitals are accelerating medical imaging appliances like ultrasound with AI capabilities. Public sector and aerospace are also ramping up AI image recognition, event analysis, and security use cases to come up with exciting new efficiency models to improve quality of life in cities. Performance is driving a new wave of creativity and innovation, and both computing modules and processors need to keep pace through enhanced flexibility.

"The platform's combination of speed, high-powered Intel® Iris® Xe Graphics and AI acceleration, and hardware support for real-time computing makes it ideal for critical applications that demand vision, voice, or text recognition alongside processing power."

— Michael Duhamel, SECO VP of sales for North America

Opportunity: Building to meet a new standard

A new update to the COM-HPC standard—to be released by PICMG® in the fourth quarter of 2020—will drive new requirements for embedded computing modules. Until recently, headless servers used in distributed systems did not have the performance required to execute analysis or high-level graphics computing at the edge. For example, in a transportation use case, headless traffic control servers would aggregate video streams from multiple traffic cameras and send the data upstream to a central cloud or data center for video processing. This resulted in high network resource usage and infrastructure costs. However, new use cases are emerging that allow for the edge-level server to execute the AI inference on video streams and send the results upstream, which requires far less network infrastructure and support. The new COM-HPC standard will provide greater connectivity with PCIe 4.0 and USB 4.0 for embedded applications. All that remains is for the market to produce boards and modules that live up to this new standard.

The new COM-HPC standard for embedded computing will require support for:[1]

- Up to 100GbE connectivity
- Up to 32 GB/s PCIe 4.0 and 5.0
- Up to 8 DIMM sockets
- High-speed processors with >200W power
- Up to 800 pins vs. 440 pins in COM Express

Solution: CHPC-C77-CSA modules with 11th Gen Intel Core processors

SECO, a major player in the embedded computing industry, is offering brand-new solutions based on the COM-HPC standards. The SECO CHPC-C77-CSA module, enabled by 11th Gen Intel Core processors, will leverage scalability and improvements in performance and graphics to accelerate AI/DL workloads in embedded use cases. In a statement by Michael Duhamel, VP of sales for North America at SECO, "The platform's combination of speed, high-powered Intel® Iris® Xᵉ Graphics and AI acceleration, and hardware support for real-time computing makes it ideal for critical applications that demand vision, voice, or text recognition alongside processing power." As a competitive advantage, SECO provides the support needed to get the most out of the new COM-HPC standard's capabilities and deploy seamlessly to existing IT environments. With this offering, industries can start benefiting from PCIe 4.0 and USB 4.0 connectivity and the exceptional CPU and graphics performance of 11th Gen Intel Core processors right away.

How it works

The CHPC-C77-CSA modular computing solution is deployed through an application-specific carrier board in an embedded system, customized and adapted to a business's specific application. SECO offers carrier board customization support, as well as different entry points and help to certify potential deployments based on known successful use cases. As an added benefit, SECO will provide BIOS tuning and an asset API that grants access to a specific bus or interface to help customers test and optimize for their specific application deployment.

End users and system integrators can also integrate the CHPC-C77-CSA module into larger networks, for instance by connecting embedded appliances to cloud infrastructure to support remote manageability or upstream analytics. Compared to previous-generation SECO modular solutions, the new CHPC-C77-CSA module lineup will also support Wi-Fi connectivity. According to Davide Catani, CTO at SECO, "Given the demand for wireless connectivity keeps growing, the CHPC-C77-CSA comes with integrated Wi-Fi and Bluetooth connectivity." This capability will also make it easier to deploy the module with more location flexibility, so some end users won't need to run cable over their entire shop floors.

Key features of the CHPC-C77-CSA:

- 11th Gen Intel Core processor
- Integrated video interfaces 3x DDI, eDP, and 2x MIPI-CSI
- 4x USB 4.0/USB 3.2; 4x USB 2.0
- 4x PCIe 4.0; 8x PCIe 3.0
- Up to 2x 2.5GbE NICs
- Up to 2x DDR4-3200 with in-band ECC support
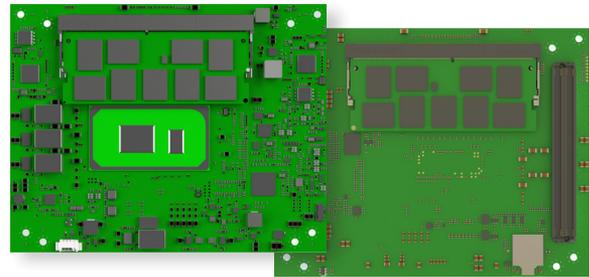
Figure 1. The SECO CHPC-C77-CSA allows customers to benefit from new COM-HPC connectivity standards for demanding IoT applications.

Performance and graphics in the 11th Gen Intel Core processor

Why did SECO choose the 11th Gen Intel Core processor to be at the heart of their new COM-HPC client module? In addition to the platform's speed and computational improvements, Intel Iris Xᵉ graphics helped the engineering team make their decision. SECO recognized the need to empower customers with AI/DL workloads for emerging use cases and potentially in video processing, analysis, and object recognition.

Catani states, "It was mainly about helping customers with their AI implementations. Having VNNI and DP4A instruction sets supported on the integrated graphics engine in this CPU family is a benefit. Object detection, image classification, and other required frameworks can be developed and deployed using the Intel® Distribution of OpenVINO™ toolkit, which leverages the processor hardware capabilities with optimized software to achieve performance efficiency. We are providing the infrastructure to leverage AI-specific features of 11th Gen Intel Core processors at the edge."

Figure 2. The 11th Gen Intel® Core™ platform is designed for demanding IoT applications like robotics and transportation control.

Key features of the 11th Gen Intel® Core™ platform:

- Up to four processing cores, up to 96 graphics execution units
- Hardware-based acceleration and virtualization keep performance stable as workloads grow
- Intel® Deep Learning Boost (Intel® DL Boost) improves INT8 inference performance using VNNI and DP4A instruction set support

A small footprint supports several high-res displays

Built with Intel 10nm SuperFin Technology, 11th Gen Intel Core processors deliver up to 23 percent faster single-thread compute performance gen over gen.[2] And, up to 96 graphics execution units and dual video decode boxes can support up to 60 simultaneous 1080p streams at 30 frames per second. These improvements, combined with the CHPC-C77-CSA's integrated video interfaces, enable a single module to manage up to four separate 4K displays and/or cameras, or up to two 8K displays and/or cameras.

11th Gen Intel Core processors with Intel Iris Xe graphics deliver a powerful combination that can handle multiple IoT-specific tasks. This efficiency drives real-time performance for multiple workloads and helps SECO maintain a small footprint in their carrier board design.

COM-HPC pushes boundaries, broadens horizons

SECO is an active contributor to the PICMG consortium that develops the COM-HPC standard. The intent behind developing a new standard for embedded computing in the IoT space was clear—specifically, the need to handle bigger workloads with higher performance demands. In describing the COM-HPC standard, the PICMG website states, "To serve the new class of embedded edge servers, scalability must be limitless."[1] As PCIe 4.0 and USB 4.0 have gained traction in the market, these updated interfaces are ripe for implementation in the computer-on-module space.

The CHPC-C77-CSA COM-HPC client module provided by SECO, and possible future modules based on the 11th Gen Intel Core processor family, are designed to meet new standards while exploring new functionalities. For example, SECO is planning to leverage more of the new technologies available in the latest processor platform, such as Intel® Time Coordinated Computing (Intel® TCC). "More and more, the IoT space requires devices to interoperate, sharing a common time reference, and to perform functions with a deterministic approach," Catani says.

Intel TCC helps ensure real-time-critical and non-real-time workloads can run simultaneously without competing for compute resources. This results in low latency that can help networked embedded computers function with more precise coordination. Although not currently a part of the CHPC-C77-CSA offering, SECO may feature this technology in future offerings.

An outstanding partner experience

As an active member of the Intel® IoT Solutions Alliance, SECO has enjoyed a long-term partnership with Intel. SECO has benefited from early-access programs and exposure to Intel® software and connections that make it easier to develop and market key solutions. In particular, SECO makes use of online resources to better understand and prepare for different application scenarios for its carrier board offerings. Catani states, "As an ODM, we are trying to make technology solutions available to a wide arena of applications. For example, the CHPC-C77-CSA module will be used in many different segments. Intel helps us understand the challenges of those segments. It's a great plus."

Embedded performance for the fast (PCIe) lane

With the CHPC-C77-CSA module, customers can get a powerful solution that leverages next-generation interfaces that they can deploy fast. Enabled by 11th Gen Intel Core processors, the module also delivers the latest-generation CPU performance and graphics capabilities to support AI/DL workloads in embedded edge appliances. And because these modules are designed to meet the COM-HPC standard, customers will enjoy all the benefits of PCIe 4.0 and USB 4.0 connectivity to accelerate advanced AI, robotics, and other industrial use cases.

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>
> — Davide Catani, CTO at SECO

Learn more

SECO CHPC-C77-CSA module

Built with 11th Gen Intel Core processors and designed to meet COM-HPC standards, this carrier board delivers PCIe 4.0 and USB 4.0 interfaces to embedded PC applications.

Learn more ›

11th Gen Intel Core processors

11th Gen Intel Core processors deliver a balance of performance and responsiveness in a low-power platform built on Intel 10nm SuperFin Technology.

Learn more ›

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

1. "COM-HPC Overview." PICMG.org website, 2020. https://www.picmg.org/com-hpc-overview/.

2. Source: Intel. Performance claim based on SPEC CPU 2017 metrics estimated by measurements on Intel internal reference platforms.
Processor: Intel® TGL-UP3 i7-1185G7E PL1=15W TDP, 4C8T turbo up to 4.4 GHz
Intel® Graphics Gen 12
Memory: 16 GB DDR4-3200
Storage: Intel® SSDPEKKW512GB (512 GB, PCIe 3.0 x4)
OS: Windows 10 Pro (x64) Build 19041.331 (2004/ May 2020 Update). Power policy set to AC/Balanced mode for all benchmarks. All benchmarks run in Admin mode and Tamper Protection Disabled/Defender Disabled.
BIOS: Intel Corporation TGLSFWI1.R00.3333.A00.2008122042
OneBKC: tgl_b2b0_up3_pv_up4_qs_ifwi_2020_ww32_4_01

Processor: Intel® WHL i7-8665UE 15W PL1=15W TDP, 4C8T turbo up to 4.4 GHz
Intel® Graphics Gen 9
Memory: 16 GB DDR4-2400
Storage: Intel® SSD 545S (512 GB)
OS: Windows 10 Enterprise (x64) Build 18362.175 (1903/ May 2019 Update). Power policy set to AC/Balanced mode for all benchmarks. All benchmarks run in Admin mode and Tamper Protection Disabled/Defender Disabled.
BIOS: CNLSFWR1.R00.X208.B00.1905301319