Solution Brief

Embedded Computing
COM-HPC® Edge Servers
Intel® Xeon® D Processors

The Intel® Xeon® D Processor Powers High-Performance Kontron COM-HPC® for Edge Servers

Kontron's new computer-on-module for high performance computing (COM-HPC®) provides power and connectivity for edge servers. The Kontron COMh-sdID, an Intel® Xeon® D-2700 processor-based module, features high core counts combined with PCIe Gen 4 and 100GbE network connectivity for demanding embedded solutions.

"With the Intel® Xeon® D-2700 processor, the Kontron COMh-sdID provides next-gen performance, connectivity, and security to support our customers' long-term needs."

—Peter Müller, VP of productline modules, Kontron

Computer-on-module (COM) products are prized for their flexibility by original equipment manufacturers (OEMs) and system integrators. COMs are available in standard sizes so the modules can be installed and easily replaced in proprietary carrier boards within a larger system to add power to existing applications as well as new designs.

The introduction of the Intel® Xeon® D processor enables COM manufacturers to deliver high performance computing (HPC) power in a small form factor. These new COM-HPC® products bring server-class performance and flexible configuration options to run real-time applications in manufacturing, to perform testing and measurement, and to manage virtualized telecom networks.

Challenge: Advanced edge systems require scalable, reliable performance

OEMs often require server-level performance for advanced solutions, from in-line visual inspection and testing in factory automation to the virtualization of telecom networks and beyond. The latest COM-HPC modules provide the power, connectivity, and memory capacity needed to perform the massive calculations that run these modern artificial intelligence (AI) programs in near-real time.

Solution: High-performance COM-HPC module for industrial edge servers

The Kontron COMh-sdID is a size D module that provides the power of a high-performance server for industrial environments at the edge. Kontron's COMh-sdID is available in a ruggedized configuration to handle real-time workloads reliably, even when operated continuously in harsh environments. A COMh-sdID can be integrated easily into an outdoor setting or factory with extremely high or low temperatures and humidity. The durable, reliable module can be expected to last for up to 10 years of continuous operation.

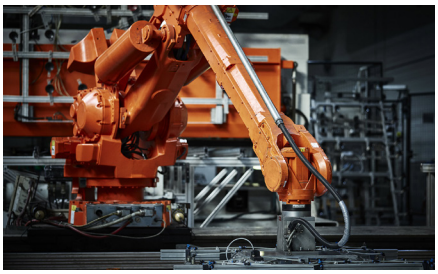
Based on the Intel Xeon D processor, the Kontron COMh-sdID includes up to 20 cores, up to 512 GB of RAM, and 48 PCIe lanes, including 32 PCIe Gen 4 lanes and 16 Gen 3 lanes. The module provides a powerful Ethernet implementation supporting various LAN configurations from 8x 10GbE to 1x 100GbE.

Kontron expects the COMh-sdID to be deployed in a range of solutions, including testing, measurement, automation, and telecom. With its high-performance processor and components, the Kontron COMh-sdID supports the real-time responsiveness that is required in many industrial applications.

"All COM-HPC modules are standardized and scalable. Kontron's unique approach is to offer a high level of customization to design boards that fit each customer's specific use case. With our engineering experience in a range of industries, Kontron can deliver full solutions to accelerate the time to market for our customers."

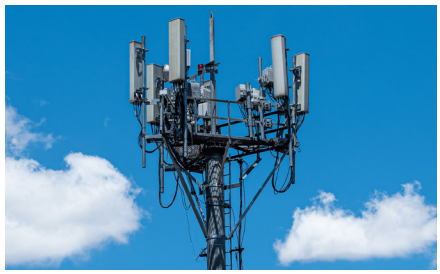
—Peter Müller, VP of productline modules, Kontron

Use cases for Intel® Xeon® D processor-enabled COM-HPC modules



Workload consolidation

Workload consolidation for automation, robotics, and medical imaging



Ruggedization for outdoor use

Outdoor servers for critical infrastructure, including smart grids for utilities, transportation, and communications

AI and machine vision

Vision-enabled applications such as autonomous vehicles and video surveillance infrastructures

How it works

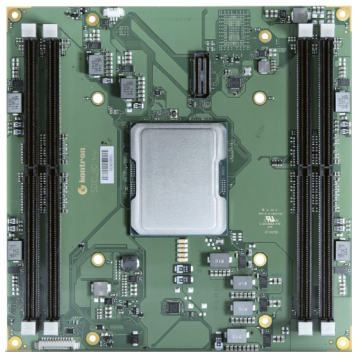
The Kontron COMh-sdID is designed to bring high performance computing to edge industrial solutions in a broad range of operating environments. The COMh-sdID can be configured with four to 20 cores, and a selection of SKUs accommodate extended temperature ranges and long-term reliability with up to 10 years of continuous operation.

The module accommodates four DIMM sockets for a maximum of 512 GB DDR4 memory at 2,933 MT/s. For additional storage, the module can be configured with an optional soldered NVMe SSD with capacity up to 1 TB.

With 48x PCIe lanes—32x PCIe Gen 4 lanes and 16x PCIe Gen 3 lanes—and two quad LAN interfaces for up to 100 Gb Ethernet, the COMh-sdID provides high I/O and networking throughput for demanding applications.

Server-level performance for ruggedized system design

Kontron chose the Intel Xeon D processor to achieve server-class computing and accelerated AI with the COMh-sdID module. The Intel Xeon D processor is designed for embedded and rugged edge computing. Select SKUs of the Intel® Xeon® D-2700 processor accommodate always-on, high-performance, ruggedized equipment and sealed, fanless devices. Intel Xeon D processors are available in a variety of SKUs and configurations to bring the power of a data center server to a broad range of embedded solutions.



Kontron COMh-sdID server modules are based on the Intel® Xeon® D-2700 processor. These modules can be configured with high core counts, fast I/O, and expanded storage and can be built for continuous operation in harsh environments.

Kontron COMh-sdID module

- Size D form factor – 160 x 160 mm
- Intel Xeon D-2700 processor
- Up to 20 cores, processor TDP up to 125W
- 32x PCIe Gen 4 lanes + 16x PCIe Gen 3 lanes
- 8x LAN ports for up to 100GbE
- 1x 1/2.5 GBASE-T Intel® I226-LM/IT Ethernet controller with TSN support
- Memory: Max 512 GB DDR4 with 4x DIMM sockets
- Optional onboard NVMe storage
- Industrial temperature versions
- Embedded management controller

Robust support for AI

Intel Xeon D processors deliver integrated capabilities to provide a flexible, adaptable platform for innovative, AI-enabled system design. Built-in accelerators include Intel® Deep Learning Boost (Intel® DL Boost) and Intel® Advanced Vector Extensions 512 (Intel® AVX-512) Vector Neural Network Instructions (VNNI) to accelerate AI deep learning inference processing within the CPU cores. Developers can convert trained models from most popular frameworks to optimize inference and run it on any mix of Intel® architectures using the Intel® Distribution of OpenVINO™ toolkit.

Per-core performance and high core counts, combined with integrated acceleration, help improve edge AI, analytics, and edge-to-cloud workload convergence. For example, the Intel® Xeon® D-2796TE processor is up to 2.97x faster and improves AI inferencing by up to 7.40x compared to the previous generation.

Built-in security capabilities for the edge

To help prevent cyberattacks, Intel Xeon D processors include hardware-based security features. These unique capabilities can help reduce the system's potential attack surface and help prevent threats to data at rest, in transit, and in use in edge deployments.

- **Intel® Boot Guard** helps to prevent unauthorized software and malware takeovers of boot blocks that are critical to a system's function.
- **Intel® Total Memory Encryption** (Intel® TME) helps to shield data that resides in physical memory, enhancing protection against attacks on the hardware.
- **Intel® Software Guard Extensions** (Intel® SGX) isolates applications in trusted enclaves during runtime.

Support for high-bandwidth networks and peripherals

Intel Xeon D-2700 processors bring true server-class connectivity to the edge with up to 100 Gb wired Ethernet and up to 56x high-speed PCIe lanes (32x PCIe Gen 4 and 24x configurable HSIO lanes). The PCIe Gen 4 lanes can support large video camera systems, robot manufacturing lines, and high-speed local storage. On the COMh-sdID, the 24x HSIO lanes are configured into 16x PCIe Gen 3 lanes, 4x USB ports, and 2x SATA ports, with the remaining lanes used as PCIe Gen 3 for the onboard Intel® Ethernet Controller I226 Series and optional NVMe storage.

Remote management capabilities

The COMh-sdID supports remote management implementations, based on a board management controller (BMC) that is typically an essential part of server-style applications but is seldom found in previous COM architectures. The embedded controller—named KSC20 on the Kontron COMh-sdID—can communicate with a corresponding BMC on the base or carrier board.

Kontron's support and service accelerate time to market

Kontron supports OEMs throughout the development process with training, documentation, evaluation boards, design reviews, and software development or migration assistance. The company's comprehensive services help OEMs to advance quickly and efficiently from design to large-scale production.

Kontron OEM services include:

1. Standard or custom board designs, configurations, and guidance
2. Thermal design to optimize the cooling concept, including the RAM and other hot spots
3. Comprehensive design training, design reviews, and testing
4. Debugging and compliance services for high-speed interfaces
5. Implementation support for Trusted Platform Module and chip licensing

COM basics

Computer-on-module (COM) products play a key role in the design and implementation of embedded systems and solutions for modern medicine, manufacturing, communications, and transportation, among other applications. COMs are designed as small circuit boards that include the processor. The COM plugs into standard connectors on a carrier board that is embedded in a larger, application-specific system. Because the COM conforms to size and connectivity standards, a new module can be swapped into an existing system for a smooth upgrade of the CPU, memory, or other components. Unique, application-specific circuits are usually incorporated into the carrier board itself. COM Express and COM-HPC standards are defined by PCI Industrial Computer Manufacturers Group (PICMG), a standards development organization that focuses on embedded computing.

Summary: Kontron and Intel drive customized edge solutions

Kontron's Intel Xeon D-2700 processor-based COM-HPC delivers performance and scalability that were not previously available in a small form factor. The Kontron COMh-sdID module is highly customizable and can be adapted to accommodate extreme demands, including harsh environments and continuous operation, for added flexibility. Kontron also offers comprehensive training, documentation, and engineering support to help OEMs bring innovative solutions to market faster and more efficiently.

Learn more

Intel Xeon D processors ›

Kontron COMh-sdID ›

About Intel® Xeon® D processors

Intel Xeon D processors deliver workload-optimized performance in space- and power-constrained environments, from the data center to the intelligent edge. These innovative system-on-chip processors support high-density, single-socket network, storage, and cloud edge computing solutions with a range of integrated security and network acceleration capabilities.

intel.com/xeond

About Kontron

Kontron is a global leader in Internet of Things (IoT) embedded computing technology. As part of the S&T Group, Kontron offers individual IoT solutions through a combined portfolio of hardware, software, and services. With its standard and customized products based on highly reliable state-of-the-art technologies, Kontron provides secure and innovative applications for a wide variety of industries. Kontron customers benefit from accelerated time to market, lower total cost of ownership, and extended product life cycles.

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intel + kontron

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