



Palm-Sized Fanless Mini PC for Industrial Edge IoT

BCO-1000-EHL Series with Intel Atom® x6425E Processors (Elkhart Lake)

More than ever, the amount of data generated at the industrial edge is at its highest and continues to grow rapidly. With the explosion of smart sensors and IIoT devices, there is large-volume demand for a new type of industrial-grade hardware to accommodate a diverse set of requirements for work consolidation at the rugged edge. Numerous enterprises are investing in processing data-driven AI algorithms at the source of data generation rather than in a data center. Processing data remotely introduces latency and is unreliable in mission-critical applications. As a result, enterprises can gain a competitive advantage by gathering data and implementing AI/machine learning next to the data source.

Edge AI enables enterprises to quickly analyze valuable insights while delivering more efficient and reliable operations, especially for latency-sensitive or mission-critical IIoT applications. In order to achieve this level of computing, hardware manufacturers need to overcome the harsh environmental challenges at the rugged edge, including with temperature, shock, vibration, limited space, and remote location. C&T addresses these challenges by introducing the latest fanless mini computer, the BCO-1000-EHL Series.

The BCO-1000-EHL Series is an industrial-grade palm-sized fanless mini computer powered by Intel Atom® x6425E SoC that delivers unmatched durability and edge computing performance, specifically built for the industrial IoT.

Key Markets and Applications



Industrial
Automation



Robotics
and Motion
Control



Intelligent
Gateways



Kiosk
and Retail



Remote
Monitoring



Fleet
Management



Smart
Agriculture



Built Ready for Industrial Edge IoT

The BCO-1000-EHL Series supports Intel Atom® x6425E Series (also known as Elkhart Lake) and is Intel's first enhanced platform for IIoT as a response to meet the demands of intelligent IIoT at the edge. With heavier workloads, harsher environments, and more complex data to analyze, integrating Intel Atom® x6425E into the BCO-1000-EHL provides considerable performance improvements by leveraging its SoC design with a 10nm compute die and 14nm PCH in a single chipset.



BCO-1000-EHL Supported Processors:

- Intel® Celeron® J6413 (Edge Embedded Series)
- Intel Atom® x6425E (Embedded Series)

Processor	Cores	Max TDP	CPU High Frequency Mode	CPU Burst (Turbo) Mode	Graphics High Frequency Mode	Graphics Burst (Turbo) Mode	Intel® UHD Graphic	In-Band ECC
Intel® Celeron® J6413	4	10W	1.8 GHz	3.0 GHz	400 MHz	800 MHz	16 EUs	No
Intel Atom® x6425E	4	12W	2.0 GHz	3.0 GHz	500 MHz	750 MHz	32 EUs	Yes

BCO-1000-EHL Generational Performance Boost

<p>Up to 70% Performance Increase (over BCO-1000-J1900)</p>	<p>10nm Efficient Power (10W-12W TDP)</p>	<p>Up to 4x Memory Boost (DDR4 32GB) (over BCO-1000-J1900)</p>
<p>Up to 2.3x Faster Single & Multi Thread (over Intel® Bay Trail J1900)</p>	<p>Up to 15x Faster Graphics with Intel® Graphics 10th Gen</p>	<p>15 Years IOTG Product Lifecycle Support</p>



Up to 70% Overall Performance Boost

The latest BCO-1000-EHL Series delivers up to a 70% increase in overall performance over the previous generation BCO-1000-J1900 Series. However, despite the enhanced processing power, the BCO-1000-EHL remains extremely power efficient with a minimal TDP of 10W-12W in a 10nm lithography, essential for low-power IIoT solutions.



Up to 2.3x Single & Multi Thread Boost

To provide next-generation compute performance, the Intel Atom® Elkhart Lake x6425E delivers up to 2.3x increase in a single thread and multi-thread performance over its previous generation Intel® Apollo Lake processors. Faster thread performances are critical for optimizing complex software applications.



Up to 2.7x Graphics Performance Boost

With integrated Intel® UHD Graphics, the Intel Atom® Elkhart Lake x6425E has improved up to 15x in graphics performance over the previous Intel® Bay Trail® J1900 SoC. The x6425E processor can handle more data-intensive calculations and operate up to 640 GFLOPS on an FP32 (Single Precision) data type compared to the J1900 with only 41 GFLOPS. This enables the BCO-1000-EHL to support 4K 60fps resolution and up to three independent displays for various highresolution multimedia applications at the edge.



Up to 4x More Memory with In-Band ECC

Intel® Elkhart Lake offers significant memory improvements over the previous 8GB RAM from BCO-1000-J1900, supporting up to 32GB DDR4 memory for even greater computing edge AI and IIoT performance. In addition, the Intel Atom® Elkhart Lake is embedded with an In-Band Error Correcting Code (IBECC) for LPDDR/DDR memory to improve safety and reliability. The In-Band ECC mitigate downtime by detecting and correcting binary errors that commonly cause computing error or even corrupted memory.



Embedded 15 Years Lifecycle

All of the robust IoT features that Intel Atom® Elkhart Lake offers are covered within Intel® IoT Group (IOTG) long-lifecycle product availability. The 15-year product lifecycle provides the customer with fifteen years of IOTG hardware and software technical support, a great value proposition for long-term industrial applications.



Workload Consolidation at The Rugged Edge

- **High-Speed I/O:**
4K Displays and 10Gbps USB Ports
- **Scalable Custom I/O:**
DP/HDMI/DIO/USB/COM
- **Power Ignition Module (Optional)**
- **Wireless Technologies:**
4G/LTE/Wi-Fi 6/Bluetooth 5
- **On-Board Embedded CAN Bus Protocol and I/O**
- **Discrete Hardware Security:** TPM 2.0

High-Speed I/O Ports and Expansions

The base model of the BCO-1000-EHL now supports 1x 2.5Gb Ethernet, 3x USB 3.2 Gen 2 (10Gbps), 2x COM (RS-232/422/485), and up to 3x True 4K independent displays, delivering high-speed edge performance for more demanding IIoT applications. Moreover, the BCO-1000-EHL allows internal storage expansions through its, 1x Full-Size mPCIe (with mSATA) and 1x 2.5" SATA SSD/HDD Bay, providing the ultimate package for next-gen IIoT solutions.



Scalable and Customizable EDGEBoost I/O

One of the advantages of the BCO-1000-EHL Series is its customizable and scalable EDGEBoost I/O modules through C&T's proprietary 50x-pin PCIe 3.0 pins design. The system can be configured with up to 4x USB, 4x COM, 1x DIO (4-in, 4-out), and even a 1x 4K DP/HDMI port. The scalable EDGEBoost I/O brackets allow the BCO-1000-EHL Series to support more I/O ports than most of the competitors in the market, a true competitive advantage at the rugged edge.



Stackable EDGEBoost I/O modules through 50x-pin PCIe 3.0 for scalable designs.

EDGEBoost I/O Advantages:

- Fast Delivery Time to Market
- Lower BOM
- Flexible and Scalable
- Long Product Lifecycle
- Quick Maintenance/Upgrades

Universal I/O Configurations





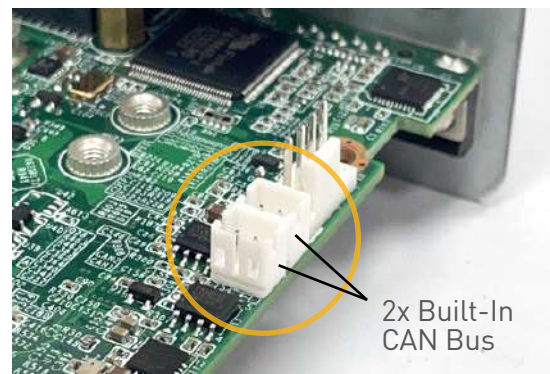
Robust Wireless Technology for Remote IoT

Industrial edge IoT applications often require deployments in mobile or remote locations. The BCO-1000-EHL Series' robust wireless technologies enable seamless wireless connectivity for mobile and remote IIoT solutions. The system features a SIM socket, providing 4G/LTE cellular connectivity through a modular add-in card. In addition, the BCO-1000-EHL also supports Wi-Fi 6 and Bluetooth 5 to connect to various wireless sensors and IoT devices.



Embedded CAN Bus for In-Vehicle Communication

The on-board embedded CAN bus (Controller Area Network) allows the BCO-1000-EHL to communicate directly with other machines and network devices, reducing the need for a host computer and simplifying cable routing. With a two-channel, two-pin Can Bus I/O and protocol built-in to the BCO-1000-EHL's motherboard, the system can leverage vehicle telematics data and provide real-time in-vehicle analytics. Most fanless mini PCs in the market don't have a built-in CAN bus. However, the built-in CAN bus provides the BCO-1000-EHL Series with a fully robust, efficient, and flexible feature for harsh environment applications.



Power Ignition Management

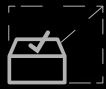
The BCO-1000-EHL Series has an optional power ignition module for ignition sensing and management. Power ignition management is a configurable component that sets a predetermined time interval for the BCO-1000-EHL to boot or shutdown. This system is programmable with six different configurations on how the computer should behave when the engine turns On/Off. Compatible for both 12V and 24V systems, this feature ensures that applications are saved and closed properly, avoiding data loss and corruption.



Discrete Hardware Security with TPM 2.0

Providing hardware-level data security is crucial for edge IoT applications. The BCO-1000-EHL has a discrete TPM 2.0 chip that safely encrypts essential data. In addition, the integrated trust platform module's root keys enable password protection, device authentication, and future-ready cybersecurity, defending the device's data and transmission against malicious attacks.

Ultra-Compact. Ultra-Rugged.



Ultra-Compact

Palm-Sized Form Factor



Fanless

Passive Cooling



Durable

Industrial-Grade Materials



-20°C to 50°C

Extreme Temperature



50G | 5Grms

Shock & Vibration Resistance



Flexible

Wall Mount/
Din-Rail



Ultra-Small Form Factor with Palm-Sized Fanless Design

The ultra-compact form factor of the BCO-1000-EHL base model measures in at (WxDxH) 142mm x 101mm x 42mm for base model, one of the smallest industrial fanless mini computers on the market. This mini size is achieved thanks to its fanless design that utilizes passive cooling instead of using air cooling fans. Furthermore, the system implements ultra-conductive materials such as aluminum and copper heat pipes as its heatsinks for optimal heat dissipation.

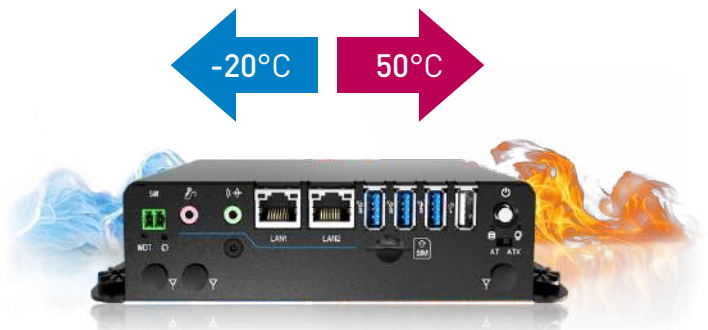
Everything combined from fanless technology, scalable I/O ports, and various features built-in features on the motherboard level allows the BCO-1000-EHL Series to be the leader for powerful, industrial-grade mini computers on the market with around 40% smaller size compared to the industry average.



Robust Industrial Performance

The BCO-1000-EHL Series is tested and validated to its limit at C&T's in-house testing lab for best-in-class industrial durability. It has the durability to withstand harsh industrial environments while maintaining reliable performance at the rugged edge.

- Wide Temperature Range: -20°C to 50°C
- 50G Shock & 5Grms Vibration (MIL-STD-810G Compliance)
- Wide Voltage Input: 9VDC-36VDC Input
- Over Current & Over Voltage Protection



Flexible Mounting

Deploy the BCO-1000-EHL anywhere through its flexible mounting options. The BCO-1000-EHL supports multiple mounting configurations, including a wall mount and an optional DIN-Rail mount. The fanless design, ultra-compact form factor, and flexible mounting options enable the latest BCO-1000-EHL Series to be ready for industrial IoT deployments anywhere.



Wall Mount



DIN-Rail Mount

We Create World-Class Edge Computers For Your Industry-Leading Solutions

NEW

BCO-1000-EHL SERIES



BCO-1000-EHL-10



BCO-1000-EHL-20



BCO-1000-EHL-30

With 1x EDGEBoost I/O

With 2x EDGEBoost I/O

With 3x EDGEBoost I/O

Processor	Support Intel® EHL (Up to 12W TDP) Atom® x6425E / Celeron® J6413 Processor		
Memory	1x 260-Pin DDR4 2400/2667/3200MT/s SODIMM. Max. up to 32GB		
Display	Dual Display, 2x DisplayPort 1.4, DP++ (4096 x 2160@60Hz)		
Storage	1x M.2 (B Key, 2242/3042/3052, PCIe 1 + USB 3.2 Gen2, Support 4G/LTE) 1x mSATA (shared by 1x Mini PCI Express) 1x External SIM socket 1x Internal 2.5" SATA HDD Bay (support H=9.5 mm)		
Expansion	1x M.2 (B Key, 2242/3042/3052, PCIe 1 + USB 3.2 Gen2, Support 4G/LTE) 1x External SIM socket		
Internal Expansion Slot	1x Full-size Mini PCIe		
I/O	3x USB 3.2 Gen 2 (10 Gbps) 1x USB 2.0, 2x RS-232/422/485, 2x RJ45 (2.5 & 1 GbE)		
Power	9 to 36 VDC, AT/ATX Select, 3-pin Terminal Block		
Operating Temperature	-20°C to 50°C		
Certification	UL Certification, CE, FCC Class A		
Dimensions (W x D x H)	142 x 101.2 x 42 mm	142 x 101 x 58 mm	142 x 101 x 75 mm