

A nighttime cityscape with a digital overlay of binary code (0s and 1s) and glowing blue lines. The city lights are reflected in a dark surface below. In the foreground, there are stylized blue and black geometric shapes.

intel.
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IoT
Solutions

AAEON[®]
an ASUS[®] assoc. co.

The Genesis of AAEON's Solutions Powered by
12th Generation Intel[®] Core[™], Pentium[®], and
Celeron[®] Processors (formerly Alder Lake)

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Overview

The launch of the 12th Generation Intel® Core™, Pentium®, and Celeron® Processor SOCs (formerly Alder Lake) came with advancements in performance and efficiency through its unique hybrid architecture, producing a more efficient allocation of CPU resources. With this boost in CPU performance also came a greater system memory capacity, moving from DDR4 to DDR5, doubling bandwidth and memory capacity. Additionally, the inclusion of Intel® Iris® Xe Graphics provides enhanced graphics, compute, media, and display capabilities.



Hybrid Processor Architecture

The hybrid architecture of the 12th Generation Intel® Core™ SOCs provide a new and exciting mode of boosting both performance and efficiency. This is via the utilization of Golden Cove performance cores and Gracemont efficient cores, which allows for application-specific distribution of core usage to execute complex tasks while allocating less power-consuming operations to the CPU's efficiency cores. This is compounded by Intel 7 lithography, which offers a 10%~15% performance-per-watt increase over the previous 11th Generation of Intel® Core™ processors (formerly Tiger Lake).



DDR5 System Memory

The 12th Generation Intel® Core™, Pentium®, and Celeron® Processor SOCs come with substantial memory bandwidth and storage advancements, with the support of DDR5 system memory at 4800 MT/s. This major advancement offers a 50% increase in bandwidth, significantly increasing data rate transfer speed when compared to DDR4. It also brings with it a new, more efficient power management structure. AAEON has adopted this technology to harness the benefits of high-speed connectivity and elevate the performance of embedded applications.



Intel® Iris® Xe Graphics

With the introduction of Intel® Iris® Xe Graphics, 12th Generation Intel® Core™ processors improve upon the Intel® UHD Graphics in frequency, number of execution units, and memory bandwidth for up to 4096 x 2160@60Hz resolution for HDMI and 7680 x 4320@60Hz for DP Interface displays. AAEON has utilized these improvements, along with the Intel® Iris® Xe's 2.47 x increase in graphics speed across a number of its new product lines to make multiple simultaneous 4K displays possible across vertical market applications.

GENE-ADP6

The GENE-ADP6 is powered by 12th Generation Intel® Core™ i7/i5/i3/Celeron® processors, and features substantial upgrades in expandability over previous offerings from the GENE product line. With M.2 2280, M.2 3052/3042, and M.2 2230 module support alongside an FPC expansion slot, the GENE-ADP6 can harness 5G, 4G and PCIe Gen 4 for edge computing applications. Additionally, the GENE-ADP6 accommodates four simultaneous displays via a varied interface featuring HDMI 2.1 (8K x 4K@60Hz), DP1.4a (7680 x 4320@60Hz), eDP1.4b (3840 x 2160), and dual-channel LVDS (1920 x 1080). Fully utilizing this display interface, along with Intel® Iris® Xe graphics makes the GENE-ADP6 an elite digital signage and machine vision solution.



BOXER-6645-ADS

The BOXER-6645-ADS is a powerful embedded fanless Box PC powered by 12th Generation Intel® Core™ i3/i5/i7/i9 Desktop Processors. Designed to be a universal solution capable of exceptional performance in any industrial setting, the BOXER-6645-ADS has a wide operating temperature of -4°F~140°F (-20°C~60°C), alongside reverse power protection, over/under-voltage and current protection.

For industrial automation applications, the BOXER-6645-ADS is equipped with four LAN ports, enabling PLC, controller, camera, and sensor connectivity, while also being the only PC of its kind to house M.2 E, B, and M Key slots, allowing users to unlock WiFi, 4G, 5G, and NVME. This combination of high-performance attributes means the BOXER-6645-ADS can monitor multiple different application data outputs simultaneously, and convey them to four independent display screens.



BOXER-6646-ADP

AAEON's newest fanless embedded computer, the BOXER-6646-ADP, is an exceptionally versatile, compact, and sophisticated all-purpose solution powered by 12th Generation Intel® Core™ i3/ i5/i7 Processor SoCs. Able to handle high-speed industry workloads while maintaining low power consumption, the BOXER-6646-ADP matches the utility of the BOXER-6645-ADS, but in a more compact 8.66" x 6.06" x 2.42" (220 mm x 154 mm x 61.6 mm) chassis.

In addition to supporting 64GB of DDR5 system memory, the BOXER-6646-ADP has a removable 2.5" SATA drive bay for additional storage coupled with a bottom-side service window for 5G, Wi-Fi, and NVMe module installation, provided by M.2 3052 B-Key, M.2 2230 E-Key, and M.2 2280 M-Key slots. With such a design, the BOXER-6646-ADP can serve in more compact applications, such as AMR, AI-IoT Gateway, and in-vehicle solutions.



UP Element i12 EDGE

With an I/O precisely designed to channel the power of 12th Generation Intel® Core™ i3/ i5/i7 processors to boost camera and sensor connectivity, the new UP Element i12 EDGE is an industrial-grade system built for the autonomous mobile robot (AMR) and industrial automation markets.

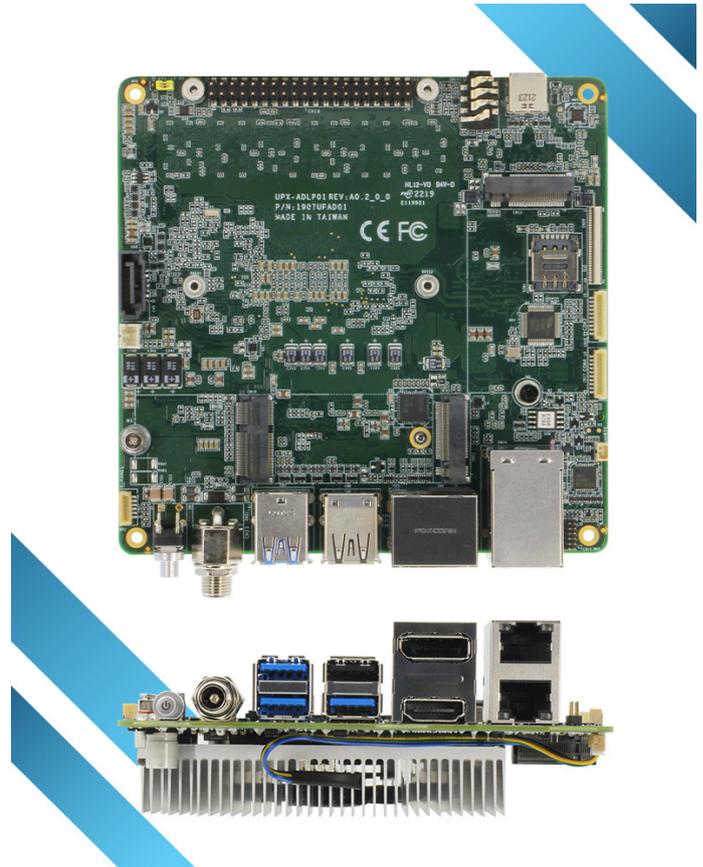
A dual COM port hosts an RS-232/422/485 pin header, enabling LiDAR and IMU sensor utility for enhanced object detection, with an isolated GPIO interface to protect against sensor voltage surges. The UP Element i12 EDGE is built with the Intel® NUC 12 Compute Element, which makes use of several peripheral technologies such as Intel® Iris® Xe providing faster graphic processing, 32GB of onboard LPDDR5 system memory, and Intel vPro®, enabling OS-independent out-of-bound management for remote debugging.



UP Xtreme i12

Successor to the UP Xtreme i11 developer board, the UP Xtreme i12 contains 20% greater CPU performance when compared to the previous Tiger Lake-powered generation, with the 12th Generation Intel® Core™ Processor architecture making the developer board more energy-efficient, despite having double the thread count. The UP Xtreme i12 contains 32GB of onboard LPDDR5 system memory to promote accelerated data processing for its USB 4.0 and 2.5GbE ports. Further, the 2.47 x increase in graphics speed provided by Intel® Iris® Xe graphics gives users the option of four simultaneous 4K displays, offering deployment options in the smart retail space.

Targeting IoT and robotics projects, the UP Xtreme i12 hosts two M.2 2280 M-Keys for PCIe 4.0 storage and AI module support. The board's AI performance is further augmented by Intel® DL Boost and the Intel® distribution of OpenVINO™ toolkit, which yields up to 2.81 x the GPU image classification inferencing performance of the previous generation.



ATX-Q670A

The ATX-Q670A is AAEON's newest industrial motherboard on the ATX form factor. Powered by the 12th Generation Intel® Core™ LGA1700 Socket Processor, the ATX-Q670A contains a number of attributes to make it suitable for AI, IoT, and video capture applications. In addition to supporting up to 128GB of DDR5 system memory, the ATX-Q670A hosts eight SATA ports for enhanced storage.

Alongside its memory and storage capacity is the ATX-Q670A's unique expansion architecture, which is comprised of two graphic card-supporting PCIe [x16] slots, which facilitate video capture and AI calculation, alongside one PCIe [x4], one PCIe [x1], and three PCI slots.

A full I/O with five USB 3.2 ports, three GbE LAN ports, and five RS-232 serial port headers allow for exceptionally fast and dense data transmittance. Consequently, the ATX-Q670A is equipped with greater security features in the form of a bootable USB feature. This, coupled with onboard TPM 2.0 ensures stringent security while deployed in any capacity.





Conclusion

To maintain AAEON's commitment to innovation in the embedded computing sphere, it is vital to utilize the newest and most sophisticated technological architecture. By integrating the most advanced generations of Intel® processors, AAEON aims to provide its customers with market-leading embedded solutions for applications across vertical markets.

About AAEON

Established in 1992, AAEON is one of the leading designers and manufacturers of professional intelligent IoT solutions and advanced industrial computing platforms today. Committed to innovative engineering, AAEON provides integrated solutions including industrial motherboards and systems, industrial displays, rugged tablets, embedded controllers, network appliances and related accessories. We also work with premier OEM/ODMs and system integrators around the world. Offering x86-based platforms from Intel® Atom® all the way to Intel® Xeon® processors, and in desktop, 1U and 2U form factors, AAEON's team of experienced engineers has helped dozens of companies around the globe deploy reliable appliances with faster times to market and lower development costs based on state-of-the-art hardware platforms, unmatched service quality and long-term support.

As a Titanium Member of the Intel® Internet of Things Solutions Alliance, AAEON offers customized end-to-end services from initial product conceptualization and board product development to mass manufacturing and after-sales service programs.

For an introduction to AAEON's expansive line of products and services, visit www.aaeon.com.