

# How embedded system products define roughness in industrial computing

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*This article introduces the embedded computer product portfolios of a Taiwanese supplier, which cover nearly every aspect of industrial applications including Industry 4.0 and the Internet of Things.*



*Figure 1. BOXER-6639: a fanless embedded Box PC with Intel Gen6 Skylake socket type processor and Q170 chip set*

■ Embodying ruggedness and stylishness, all of Aaeon system products are crafted to introduce enhanced usability and aesthetics to a workspace. With features such as wide temperature support, extreme computing power and graphic display capability, IP-rated enclosures, multi-touch capability, and anti-scratch screens, the line of system products is suited for both industrial and infotainment purposes. The company also endeavors to bring new ideas to the panel PC market and conventional panel PCs with modular panel PCs as well as other new, exciting designs, raising the bar in the design of panel solutions and helping the user lower development and implementation costs.

One of the key missions is to lead the IoT (Internet of Things) in industrial automation which means to be able to connect machines to the cloud. However, each machine speaks its own language. As a leading developer and manufacturer of professional IoT solutions, Aaeon provides industrial box PCs and human-machine interfaces. By integrating HMS communication modules into the solutions it allows the products to control and communicate with the machines. The partnership with HMS - the leader in industrial communication - bridges the gap for both sides. The BOXER-6639 serves as a good example of the solutions offered. It is a fanless

embedded controller incorporating a high-value desktop processor, wide range operating temperature, and broad power input to offer high computation power for industrial environments. This newly released product comes with a long-term supported sixth Gen Intel Core Desktop Processor, and thanks to an innovative mechanical design it is extremely scalable by changing the CPU to fulfill customer needs. The embedded controller is designed to address specific vertical applications: 3 fully independent GB LAN ensure maximum bandwidth to sustain high resolution camera data flow, a paramount feature to carry on high precision vision applications. Visualization of high quality content is guaranteed by the outstanding dual HDMI output that achieves 4k resolution. With features supporting extended operating temperature from -20°C to 55°C and 9 ~ 36V wide range DC input, this Box PC offers continuous operation in any kind of environment, regardless of unstable voltage or extreme temperatures.

It incorporates a variety of serial I/O connectors, including 6 COM ports, 4 USB 3.0 and 32 channel DIO, and offers flexible configuration and expansion capability. Hence, customers can efficiently wire-up multiple systems to the central controller for various automation applications. The BOXER-6639, powered by a high-end Intel desktop processor and

integrated with rich I/O ports, helps users to achieve a delicate balance between cost and performance in the automated production business. This new generation industrial Box PC is conceived to fit specific markets in the automation area. Specific features like independent GBE LAN and wide range input make it suited for machine vision and factory automation applications amongst others.

For greater performance, the Embedded Box PC BOXER-6638U is an economical model designed to give you more bang for your buck. While performance is assured with the Intel Core i3-5010U driving the device, the U-series chip comes with greater power-savings and cost-efficiency. This enhanced processing power is used to power the many I/Os of the device, which include four COM ports for facilitating instant deployment for users in the industrial automation field. Compared with its predecessor, the AEC-6638, it features the smaller dimensions of 197x174x55mm, a 30% reduction. Its operating temperature and electrical support ranges are also extended to -20 ~ 60°C and 9 ~ 24V, respectively. Supporting these enhanced operational parameters are the construction and features of the device, which are designed with convenience in mind. Users wishing to access the device interior can do so effortlessly by removing screws at the base, with no specialized method or tools



Figure 2. BOXER-6638U: an economical model.



Figure 3. OMNI-Modular HMI Panel PC

required. Thanks to their superior performance and attractive pricing, the fifth generation chips are well suited to upgrade from the former embedded PC models. With the great performance and reduced energy requirements conferred by the new chips, as well as the more compact design and convenient selection of features, the BOXER-6638U is first to consider.

Featuring a modular design, the OMNI Series can be fitted with a number of modules to expand its base capabilities. This line belongs to expandable panel PCs with the pioneering model. While customizable panel PCs are nothing new, they often involve stripping the system device down to its individual components and reassembling it to its requested specifications. The OMNI shortens the lead time involved by adopting a modular design,

making the customization process as easy as building Lego toy bricks. To bridge the gap between industrial networks and IIoT, Aaeon cooperates with HMS IXXAT INpact solution to enhance the industrial Ethernet ability. IXXAT INpact allows you to connect a PC to any industrial network. It combines proven Anybus technology with years of know-how in the area of PC interfaces. Under the IXXAT INpact brand, HMS delivers communication solutions for machines, safety and automotive. IXXAT INpact solutions are especially tailored for communication within machines, safety systems and the automotive sector. This offering from HMS Industrial Networks includes the products and services needed to solve advanced communication issues. Powered by Intel Celeron, Atom and Core-i processor, the OMNI series deliver enhanced performance over its preceding models with

high display resolution, up to 32G memory support and VESA 100/panel mount design. Some of the most popular expansion interfaces and I/Os, such as USB type A x 1 for USB 3.0, USB type A x 3 for USB 2.0, HDMI x 1, and 3-pin terminal block x 1 for 9~30 V DC power input, are also featured in the device, making it suited for any industrial or HMI display applications.

The panel accomplishes this with a simple connector on the main CPU box, which houses the CPU as well as other essential components on the rear of the panel. Dubbed the OMNI-slot, each module is connected to the CPU box through this slot-like USB device. This plug and play approach not only makes customization and expansion much easier, it enables the device to be NRE free, hence driving the overall cost down. A total of eight modules are currently available: a USB/ COM/ LAN combo module, a dual LAN module, a Mini-Card and SIM card module, an RS-232/422/485 module, an isolated RS-232/422/485 module, a digital I/O module, a CAN Bus module, and an audio module.

The OMNI series offer multiple choices from 10.4" to 21" supporting 4:3 and 16:9 projective capacitive (P-CAP) and full-flat 5 wire resistive touch-screen (RTS) with a full aluminum chassis that offers wider operating temperature and superior cooling over other contemporaries out in the market. The everlasting popularity in toy bricks serves as the basis for this design concept. Through the use of modules, including/excluding certain features on the device can be done effortlessly, which is the direction AAEON is taking for future OMNI-products.

Aaeon has had outstanding achievements in delivering intelligent system products, such as rugged Panel PCs, expandable industrial computers, full-HD infotainment displays, rugged tablets, embedded computers and related accessories. These products can be applied today in all facets of digital signage, transportation, industrial automation, healthcare, hospitality, harbor/marine, military/government and energy sectors. The company offers fast customization services for its range of slim embedded computers and fanless embedded controllers (BOXER Easy program), and all other system products according to customer requirements and regulations. Having earned the highest degree of trust from tier-1 customers, it has furthered this service to end-to-end DMS services that can assist large customers with volume production, beginning with design to contract manufacturing. Quality assurance of our system products ensuring excellent product performance has been the key to our growing global customer base in all areas. ■