White Paper

Axiomtek's Embedded Boards and System-on-Modules

with 7th Generation Intel® Core™ (Kaby Lake)

Intel® has officially announced the full line-up of its 7th generation Intel® Core^TM processor family, which is designed for the immersive internet and built on a strong foundation of the 6th generation Core^TM (codename: Skylake) microarchitecture. The 7th generation Intel® Core^TM processors extend the benefits of Intel's industry leading 14nm process technology, delivering enhanced performance and high-end media capabilities with unprecedented hardware support, security, and management functions.

Benefits

- **Increased Performance and Reliability**

  Intel® Kaby Lake platform utilizes a power-efficient microarchitecture, advanced process technology and silicon optimizations to deliver a double-digit performance gains over the previous generation processors.

- **Stunning Visual Performance**

  Integrated with Intel® HD and intel® Iris Plus Graphics, the 7th Gen Intel® Core^TM processors come with incredible upgrades that transform the viewing experience with 4K UHD movies and TV shows. Meanwhile, with power-efficient VP9 and HEVC 10-bit hardware acceleration, 4K viewing experience is offered with an improved battery-life and lower power consumption.

- **Enhanced Security**

  The 7th Gen Intel® Core^TM processors deliver advanced security with two-factor authentication built in to the silicon.

- **Extended Battery Life**

  Dedicated hardware acceleration reduces power consumption dramatically, enabling a longer battery life.

For IoT designs demanding higher CPU and graphics performance - Kaby Lake S-Series (Desktop)

When paired with an Intel® 100 series chipset, the 7th generation Intel® Core™ and Celeron® families and Intel® Xeon® E3-1275 v6 processor enable more manufacturing flexibility to match performance, features, and price for IoT applications. In addition, these processors offer thermal design power (TDP) options of 65W and 35W to fit specific design configurations for performance and low-power requirements.

For space-constrained and high-performance IoT designs - Kaby Lake H-Series (Mobile)

When paired with an Intel® 100 series chipset or Intel® CM230 series chipset, the 7th generation Intel® Core™ mobile processor family and Intel® Xeon® processor E3-1500 v6 product family offer even greater CPU and graphics performance as compared to the previous generation. Furthermore, these processors offer TDP options of 45W, 35W and 25W for an exceptional balance between power and performance.

For space-constrained, high-performance and low-power IoT designs - Kaby Lake U-Series (Mobile)

The 7th generation Intel® Core™ and Intel® Celeron® processor families feature ultra-low-power and 64-bit multi-core processors built on Intel's optimized 14 nm technology. Designed for small form-factor applications, this multi-chip package (MCP) integrates a low-power CPU and platform controller hub (PCH) onto a common package substrate to offer TDP of 15W.

Related Products

- **CEM510**

The CEM510, an industrial grade COM Express Type 6 Compact module, is powered by the latest Intel® Xeon® and 7th generation Intel® Core™ processor with Intel® CM238 or 100 series chipset. The embedded module supports two DDR4-2133 SO-DIMM sockets with up to 32GB ECC or non-ECC system memory. It has a rugged design with an extended operating temperature range from -40°C to +85°C (-40°F to +185°F) to satisfy various harsh environment demands. The system on module also delivers outstanding computing, graphics and media performance with its Intel® Gen 9 graphics engine, DirectX 11/12, OCL 2.x, OGL4.3/4.4 features and 4K resolution support. Therefore, the power efficient CEM510 is designed for graphics-intensive applications over the Industrial IoT, including industrial control systems, medical imaging, digital signage, gaming machines, military, and networking.

CEM510

COM Express Type 6 Module with Intel® Xeon® and 7th Generation Intel® Core™ i7/i5/i3 Processors and Intel® CM238 or 100 series chipset

- **CEM511**

The CEM511, an industrial grade COM Express Type 6 Compact module, is powered by the latest 7th generation Intel® Core™ processor for high-performance applications. The module is packed with a variety of rich features including low power consumption, industrial wide operating temperatures and impressive graphic processing capabilities. The COM Express® Type 6 Compact module supports two DDR4-2133 SO-DIMM sockets with a maximum system memory capacity of up to 32GB. It has a rugged design with an extended operating temperature range from -40°C to +85°C (-40°F to +185°F) to satisfy various harsh environment demands. The system on module also delivers outstanding computing, graphics and media performance with its Intel® Gen 9 graphics engine, DirectX 12.0, OCL 2.0, OGL4.3 features and 4K resolution (4096 x 2160 @ 30 Hz) support. Therefore, the power efficient CEM511 is designed for graphics-intensive applications over the Industrial IoT, including industrial control systems, medical imaging, digital signage, gaming machines, military, and networking.

CEM511

COM Express Type 6 Module with 7th Generation Intel® Core™ i7/i5/i3 Processor

- **PICO512**

The PICO512, an ultra-compact pico-ITX embedded SBC, is designed to support the latest 7th generation Intel® Core™ processor and Intel® Celeron® processor 3965U. The pico-ITX motherboard comes with one 260-pin DDR4-2133 SO-DIMM socket supporting system memory up to 16GB. The tiny 2.5" pico-ITX embedded board utilizes Intel® HD graphics engine to support dual display outputs through an 18/24-bit single/dual channel LVDS and a HDMI, bringing true 4K high definition visual experience. In addition, the highly reliable industrial motherboard can withstand a wide operating temperature range from -20°C to +70°C (-4°F to +158°F) in various harsh environments.

PICO512

Pico-ITX motherboard with 7th Generation Intel® Core™ i7/i5/i3 & Celeron® Processor, HDMI/LVDS and Gigabit LAN

- **PICO511**

The PICO511, an extremely-compact pico-ITX motherboard, features the latest 7th generation Intel® Core™ processor or Celeron® processor 3965U. The pico-ITX SBC supports one 260-pin DDR4-2133 SO-DIMM with up to16 GB memory capacity. It has incorporated Intel® HD graphics engine to bring a great visual experience through an 18/24-bit single/dual channel LVDS. The feature-rich 2.5-inch embedded board is building flexible I/O interfaces through board to board connectors, with a wide operating temperature range in a small-form factor motherboard to fit different needs of many demanding applications in various industries.

PICO511

Pico-ITX motherboard with 7th Generation Intel® Core™ i7/i5/i3 and Celeron® Processor, LVDS and Gigabit LAN

- **MANO500**

The MANO500, a mini-ITX motherboard, is based on 14nm 7th generation Intel® Core™ and Pentium® processor in the LGA1151 socket with Intel® H110/Q170 chipset. It features up to 32GB of high-performance DDR4 RAM and offers three SATA connectors. Users can increase board functionality with one PCIe x16 slot and one PCI Express Mini Card slot. Additionally, the high quality MANO500 provides support for three independent displays using video outputs including HDMI, VGA, DisplayPort, and LVDS, making it an ideal solution for gaming, digital signage, medica,l and other industrial IoT applications.

MANO500

Mini-ITX SBC with LGA1151 Socket 7th Generation Intel® Core™ Processor, Intel® H110/Q170 Chipset, HDMI/DisplayPort/VGA/LVDS/eDP, Dual Gigabit LANs and USB 3.0

- **IMB502**

The IMB502, an ATX industrial motherboard, is powered by the LGA1151 socket 7th generation Intel® Core™, Pentium® and Celeron® processors with Intel® Q170 chipset. The industrial motherboard is equipped with four 288-pin DDR4-2133/1866 DIMM with system memory up to 32GB to meet the needs for high memory capacity and high data transfer speed. It supports triple-view display through VGA, DVI-D, and HDMI ports and comes with multiple high-speed I/O interfaces for a variety of applications including industrial automation, factory automation, advanced communication, gaming, entertainment, POS/kiosk, surveillance, medical, and so on.

IMB502

ATX Industrial Motherboard with LGA1151 Socket 6th/7th Gen Intel® Core™ Processor, Intel® Q170 Chipset, DDR4, USB 3.0, SATA 3.0, Dual Gigabit LANs, and VGA/DVI-D/HDMI

- **IMB500**

The IMB500, an industrial ATX motherboard, is powered by the 7th generation Intel® Core™, Pentium® and Celeron® processors in the LGA1151 socket with the Intel® Q170 chipset. The IMB500 supports four 288-pin DDR4-2133/1866 SO-DIMM sockets with a memory capacity of 64GB to enhance overall system performance. Designed especially for customization, the industrial-grade ATX motherboard comes with rich expandability options including one PCIe x16 slot, two PCIe x4 slots, four PCI slots, one PCI Express Mini Card slot and one SIM slot. Furthermore, the embedded board features triple-display capability through DisplayPort, HDMI and VGA interfaces. With these strong capabilities and features, the IMB500 is excellent for industrial automation, advanced communication, and gaming applications.

IMB500

ATX Industrial Motherboard with LGA1151 Socket 6th/7th Gen Intel® Core™ Processor, Intel® Q170 chipset, DDR4, USB 3.0, SATA 3.0, Dual Gigabit LANs, VGA/DisplayPort/HDMI, and mSATA

- **SHB140**

The SHB140, a PICMG 1.3 full-sized single board computer based on the 7th generation Intel® Core™ processor in the LGA1151 socket with the Intel® Q170 chipset, comes with two DDR4-2133 un-buffered DIMM sockets supporting up to 32 GB system memory. The high performance PICMG 1.3 SBC offers six SATA-600 ports supporting RAID 0/1/5/10. It also features Intel® AMT 11 and TPM 1.2 for higher security and easier maintenance. Combined high-bandwidth PCIe x16, PCIe x4, PCIe x1 and conventional PCI slots, the slot CPU card - SHB140 is an optimum solution for machine vision and smart factory automation applications.

SHB140

PICMG 1.3 Full-size CPU Card with LGA1151 7th Generation Intel® Core™ processor, Intel® Q170/H110, SATA3, USB 3.0, LAN, and DVI-I

Design Assistance and Engineering Services

Axiomtek's design assistance and value-added service teams have many years of successful experience assisting automation industry customers with their important project needs. They can provide overall project support or task-specific assistance during development, testing, deployment and post-deployment phases. Axiomtek's capable and experienced teams, which include hardware, software and application engineers, can deliver what is needed, when it is needed and with the highest quality available that is known to exceed customer expectations.

About Axiomtek Co., Ltd.

As one of the world's leading designers and manufacturers of PC-based industrial computer products, Axiomtek specializes in data acquisitions and control systems of rich diversity and modularization. With the upmost enthusiasm in serving their customers, Axiomtek has mirrored PC evolutions in various industries by shifting its focus toward the design and manufacture of PC-based industrial automation solutions, standing as a trustworthy long-term provider of industrial computers.

Established in 1990, Axiomtek has partnered with more than 60 distributors globally, offering more than 400 products through product lines of Industrial PCs (IPCs), Single Board Computers (SBCs), System on Modules (SoMs), Fanless and Rugged Embedded Systems (eBOX and rBOX), Intelligent Transportation Systems (tBOX), Industrial IoT Gateway, Industrial EtherCAT solution, Touch Panel Computers (TPCs), Medical Panel Computers (MPCs), Digital

Signage Solutions (DSSs), Network Appliances (NAs) and Industrial Ethernet products.

As an associate member of the Intel® Internet of Things Solutions Alliance, Axiomtek continuously develops and delivers cutting edge solutions based on the latest Intel® platforms.