Axiomtek Bay Trail Products

White Paper

Axiomtek's Single Board Computers Utilizing the Latest Intel® 22nm Multicore SoC (Codename: Bay Trail)

The Intel® Atom™ processor E3800 product family (codename: Bay Trail-I) and Intel® Celeron® processor-branded SoCs (codename: Bay Trail-M/D) are the first System-on-Chip (SoC) designed for intelligent systems, delivering outstanding computing, graphical, and media performance. These SoCs are based on the Silvermont microarchitecture, utilizing Intel's industry-leading 22nm process technology with 3D Tri-Gate transistors, which deliver significant improvements in computational performance and energy efficiency. Highlights of the product family include high I/O connectivity, integrated memory controller, virtualization, and built-in security capabilities within a thermal design power (TDP) range of 5W to 10W. They provide many of the same features and performance-per-watt benefits, making them ideal for PC-like designs, such as thin clients, retail transactional clients, and digital signs.

Moreover, besides the above features, the Intel® Atom™ processor E3800 product family offers error correcting code (ECC) and operates in an industrial operating temperature range. Advanced features include:

- Media: Scalable full HD video playback includes support for 10 or more simultaneous video streams.
- Graphics: 7th Generation Intel® Graphics Architecture enables enhanced visual processing.
- Power and Form Factor: SoC with smaller package size and industrial temperature range is ideal for thin, light, and environmentally adaptive entry retail devices.
- Computing: Quad-Core processing enables improved out-of-order computing performance for more responsive user experience.
- Security: Built-in hardware-assisted security enhancements include Intel® Advanced Encryption Standard New Instructions (Intel® AES NI) and Secure Boot. Intel® AES NI provides faster endpoint data encryption to protect transactional and personal data. Secure Boot enhances security to prevent unauthorized software from running during the boot sequence.
- Intel® Celeron® processor and Intel® Atom™ processor E3800 product families provide full HD simultaneous video decoding capability; delivering interactive 2D and 3D graphics with much improved playback and enabling immersive visual experiences.
- Graphics performance is based on Intel® HD graphics 4000 with support for 3D content through DirectX 11, Open GL 4.0, and OpenGL 1.2.
- The SoC provides support for HDMI 1.4a and DisplayPort 1.1 with maximum resolution of 2560x1600@60Hz and hardware-accelerated video decode for H.264, MVC, VPG8 JPEG/mJPEG, VC1/WMV9, and MPEG2 standards.
- Dedicated execution units, fixed-function and hardware decode engines provide enhanced graphics performance.

Axiomtek's Products with Intel® Bay Trail

COM Express™ is an open industry standard for Computer-on-Modules. It requires a carrier board to bring out I/Os and to power up. We would like to introduce you to some of our newest embedded motherboard products, which utilize the Mini, Basic and Compact form factors.
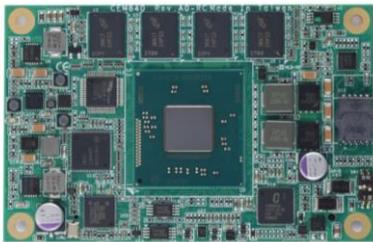
CEM840

COM Express™ Mini

The COM Express™ Mini, measuring only 84 x 55 mm, follows Type 10 pin-out. It offers all the standard x86 interfaces, including DDI (DP, HDMI/DVI), USB including USB 3.0, PCIe, Serial ATA, and Gigabit Ethernet as well as LVDS and serial interface (LPC). Moreover, it features a wide range power supply from 4.75 – 20V with a wide operating temperature range from -40°C to +85°C (-40°F to +185°F). It also has DDR3L chips onboard up to 4GB.

CEM841

COM Express™ Basic

The COM Express™ Basic follows Type 2 pin-out. It provides a smooth transition path from legacy parallel interfaces to LVDS/VGA interfaces. These include both the PCI bus parallel ATA and PCI Express and Serial ATA.

CEM842/843

COM Express™ Compact

The COM Express™ Compact follows Type 6 pin-out. With its double connector and 440 pins, it offers serial interface (LPC), six lanes of PCIe, two Serial ATA, one Gigabit Ethernet, eight USB 2.0 ports, one USB 3.0 port, and one VGA, LVDS and DDI which supports HDMI, DVI, and DisplayPort.

PICO840/842

PICO841/843

The Pico-ITX embedded motherboards, measuring 100 x 72 mm, implement powerful performance in a compact form factor to inspire innovative designs and to make x86 platforms accessible for a new generation of smaller computing and connecting devices.

CAPA841/842

CAPA840/843

Axiomtek 3.5" embedded boards (CAPA) are compact size and come with rich I/O options for high flexibility and easy expansion capabilities. They can work in multiple applications that demand reliable operation, industrial grade design, and high quality.

Our Intel® Bay Trail board products offer important and useful features that are highly desirable by most systems integrators. We understand that high quality, advanced board products are among the key factors to a project success. Nevertheless, even the most skilled engineering teams or systems integrators may require support to accomplish the goals set with efficiency, cost-wise and effort-wise. Axiomtek's Design-in Services are created to assist our customers as an extended part of their teams. Our pledge is to help make their lives easier, shorten their product's time-to-market and help them achieve higher return on investment.

Axiomtek's Board Design-in Services

The design process for mission critical projects can be time-consuming, tedious and cumbersome. Axiomtek understands the challenges and our customer's needs. Our teams of engineers and product managers can help provide design assistance from conception to deployment and help our customers meet all of their challenges at any stage of their development process.

Axiomtek's Design-in Services include the following:

a. **Design Assistance Service**

The Design Assistance Service starts from initial planning and continues through design, debug, and validation process to product shipment. Throughout the development process, Axiomtek provides customers with a full range of product solutions, consultation and implementation services from our team of experts with extensive experience with specialized projects.

Along with our professional Research & Development (R&D) team, and our high quality products offered with the latest technology, we can help our client eliminate headaches, wasted resources and the amount of time spent on the design and testing process. Our comprehensive services include assistance with project planning from initial concept to deployment; comprehensive testing with our advanced equipment including high-frequency signal measurements, temperature cycling, EMC lab, IR infrared thermal imager; performance and compatibility testing to reduce risks; solving any issues that may arise during the design stage, and ensuring that the end results will meet the required technical specifications. Furthermore, with Axiomtek's assistance with material backup planning, our clients can rest assured that they will achieve on-time delivery even in the circumstances of materials and parts end of life (EOL).

b. **Thermal Solution Service**

Axiomtek's Thermal Solution Service helps improve overall system reliability. The service offers three major features. First is our proven thermal module, which can operate smoothly under harsh temperatures. The next major feature is the FloTHERM Thermal Simulation, which can perform thermal analyses create virtual models, and test design modifications of electronic equipment before physical prototyping to reduce system errors. The last feature is the customized thermal solution, which is available for integrators looking for customized heatsink or coolers based on modularized thermal solution concepts.

c.   Embedded Software Service

The Embedded Software Service is designed to efficiently allocate system resources and reduce cost. Axiomtek created the comprehensive Embedded Software Service to cover all your requirements, including BIOS Customization, Embedded OS Development, Software API Utility, Protocol and Driver Services.

d.   Modularized Accessory Service

Modularized Accessory Service greatly increases the flexibility and scalability of the system by reducing design complexity and system assembly parts. Currently, we have nine modularized accessories which can help customers to minimize the total cost-of-ownership and product development time.

In the future, we will continue to innovate in design, development, and manufacture embedded system solutions for mission-critical applications. Based on our service, our customers can offer the best solutions for their vertical markets and bring intelligence, innovation, and sustainable development to the IoT world.

About Axiomtek Co., Ltd.

Axiomtek Co. Ltd. is one of the world's leading designers/manufacturers of PC-based industrial computer products. From our roots as a turnkey systems integrator specializing in data acquisition and control systems, Axiomtek has mirrored the PC evolution in various industries by shifting our focus toward the design and manufacture of PC-based industrial automation solutions.

Axiomtek Co., Ltd. established in 1990, has more than 60 distributor partners globally. Axiomtek offers Industrial PCs (IPC), Single Board Computers and System on Modules (slot CPU card, small form factor embedded boards & SoM), Fanless & Rugged Embedded System (eBOX, tBOX and rBOX), Industrial IoT Gateway & Firewall, Touch Panel Computers (TPC), Medical PCs (MPC), Human-Machine Interface (HMI), Digital Signage and Players (DS), Industrial Network and Network Communication Appliances (NA).

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.

To learn more about how our Design-in Services or motherboards can support your application needs, visit us at www.axiomtek.com, or email us at info@axiomtek.com.tw.