ADLINK TECHNOLOGY INC.

White Paper

Meeting the Internet of Things with Low Power Embedded Designs

Development Options Flex and Evolve with Intel® Processor Advances in Performance-Per-Watt

ADLINK Technology, Inc.

The Internet of Things (IoT) is fueling change by transforming isolated systems into smart, connected networks. Low power performance is essential to this equation, enabling compact, sophisticated devices with outstanding thermal characteristics. Improvements in power consumption are expanding possibilities, and developers now have access to a credible option for low power Intel® processor-based designs in a very small footprint. The latest Intel® Atom™ processor E3800 product family and Intel® Celeron® N2930 and J1900 processors, formerly known as Bay Trail, bridge a performance-power-cost gap in the Intel® processor families and open a range of new embedded design strategies. This white paper offers a closer look at Intel® Atom™ processor E3800 processor family features and technology, highlighting power-to-performance ratio; rugged design for passive cooled/light solutions; and scalability to Intel® Core® processors. Specific application references illustrate the design value of the Intel® Atom™ processor E3800 processor family, supported by selected ADLINK products capitalizing on this new low power solution.

Redefining the Low Power Landscape

Embedded platforms are transforming, evolving quickly from standalone compute systems to become part of the smarter, more connected Internet of Things. More than just Internet-enabled, these intelligent systems are networked and communicating, gathering and sharing information that enables insight and solves problems. Improving healthcare, enabling intelligent transportation systems and modernizing manufacturing – these benefits demonstrate the diversity and value of connected, intelligent computing.

To capitalize on this promise, innovative embedded designs must not only be high performance but also power-sensitive, assuring they can be deployed in the broadest spectrum of computing environments. Low power computing is at the heart of this requirement, enabling small, high performance systems that inherently require more stringent thermal characteristics. Where low power architectures for smartphones and tablets have increased visibility of energy-efficient consumer devices, a similar shift is evident in connected embedded arenas. Intel's evolution continues, answering low power needs with smaller, more efficient Intel® Atom™ processors. The Intel® Atom™ processor E3800 product family is the first system-on-chip (SoC) developed for intelligent systems – embedded systems that are designed to be smarter, securely collecting and sharing sensor data to enable new applications or user experiences.

These SoCs are optimized for systems that require efficient imaging workflows, delivery of secure content and interactive, real-time processes – supporting OEMs and developers as connected embedded applications grow in demand and functionality.

Introducing Low Power x86

(Intel® Atom™ E3800 processor)

The new Intel® Atom™ processor E3800 product family enables low and ultra low power designs in an Intel® processor platform, offering high performance options in a sub 10 Watt TDP SoC solution. Minimal power consumption makes these SoCs effective for edge devices as well as larger systems, allowing designers to capitalize on energy-efficient Intel® technology to extend design options for high performance, connected devices.

Formerly known as Bay Trail-I, the Intel® Atom™ processor E3800 product family is Intel's embedded-specific product line based on the 22nm Silvermont microarchitecture, which delivers numerous enhancements over earlier generation Intel Atom™ processors.

The Intel® Atom™ processor E3800 product family includes Intel's first Tri-Gate 3-D quad core SoC – integrating next generation Intel® processor core, graphics, memory and I/O interfaces into one solution supported on its long-term embedded roadmap. The Intel® processor Atom™ E3800 product family is also the first Intel Atom™ processor to feature an integrated memory controller with error-correcting code (ECC), which detects multiple-bit memory errors and detects and corrects single-bit errors. ECC maintains system uptime and autonomous operation without requiring system reset – an advantage for designers of connected embedded systems that must run non-stop, such as automated factory systems that operate 24/7.

Two Intel® Celeron® processors, also based on Silvermont microarchitecture, are offered alongside the Intel Atom™ processor E3800 product family on Intel's embedded roadmap. While they do not offer an industrial temperature range or ECC, they provide many of the same features and performance-per-watt benefits, making them ideal for PC-like embedded designs, such as thin clients, retail transactional clients and digital signage.

■ Differentiating the Intel® Atom™ Processor E3800 Product Family

Silvermont microarchitecture represents the first top-to-bottom redesign of low-power Intel® Atom™ processors, slated first in a family of cores that Intel states will be refreshed every year for the next few years. Where the previous 32nm microarchitecture was a derivative of 45nm process technology, Silvermont microarchitecture represents an entirely new design re-architected from the ground up. Designed and co-optimized with Intel's 22nm process technology and the shift to the use of 3-D Tri-Gate transistors, Silvermont microarchitecture capitalizes on Intel's strength in microarchitecture development, and enables a significant performance increase and improved energy efficiency.

Advancements include a new out-of-order execution engine for superior compute performance, and a new multi-core and system fabric architecture scalable up to eight cores. An out-of-order pipeline allows instructions to be executed as soon as data arrives for processing, rather than in the exact order laid out by a software program. The resulting improved instruction latencies and throughput enable greater performance without sacrificing power efficiency. Silvermont microarchitecture also features more efficient branch processing, more accurate branch predictors, and faster recovery from pipeline crashes or collisions. Access to memory is faster and more efficient, based on out-of-order memory transactions, low latency, high bandwidth caches and multiple advanced hardware prefetchers. These attributes create a balanced core and memory subsystem – significantly improving overall system responsiveness and low power performance.

As a result, the Intel Atom™ processor E3800 product family series offers three times peak performance improvement over previous generation Intel Atom™ processors, or the same performance at five times less power draw.

■ Scalable Low Power Performance

The Intel® Atom™ processor E3800 product family closes a gap in power and performance – offering more horsepower than earlier Intel® Atom™ processors - and touching the performance of entry-level Intel® Core™ processors. Efficiency is improved over earlier generations of Intel ®Atom™ processors, and Thermal Design Power (TDP) and footprint are smaller than Intel Core processors. In addition to featuring 22nm technology and more efficient cores, these small, efficient Intel® Atom™ processors integrate faster graphics and a built-in security engine on a chip that draws less than 10 watts of power; the resulting low-power profile is ideal for the non-stop performance demands of intelligent systems.

Product Family	Brand	Processor No	TDP (W)	Junction Temp range (°C)
Bay Trail-I	Intel® Atom™	E3845	10	-40 to 110
		E3827	8	-40 to 110
		E3826	7	-40 to 110
		E3825	6	-40 to 110
		E3815	5	-40 to 110
Bay Trail-M	Intel® Pentium®	N3520	7.5	0 to 105
		N2920	7.5	0 to 105
		N2820	7.5	0 to 105
		N2806	4.5	0 to 105
		N2815	7.5	0 to 105
Bay Trail-D	Intel® Pentium®	J2900	10	0 to 105
	Intel® Celeron®	J1900	10	0 to 105
		J1800	10	0 to 105

Intel® Atom™ Processor E3800 ProductFamily of SoCs TDP performance. Source: Intel®

For example, the Intel® Atom™ processor E3800 product family's quad-core processor has raw processor speed almost as powerful as the lowest end Intel® CoreTM i3 processor, which now provides options for low and ultra low power applications. Low power value adds design value for battery-operated devices, yet is even more relevant to enabling passively cooled systems with no forced airflow, deployable in the broadest range of rigorous embedded arenas.

The Intel® Atom™ processor E3800 product family series features multiple SKUs with pin-compatible single, dual and quad-core offerings. These SoCs can handle both single-threaded and multi-threaded processing when more complex computing tasks are required. In addition to being capable of handling larger and more demanding processing jobs via multi-threading, good scaling speed improves processing efficiency; this is essential for the range of real-time data streams coming from sensors, communications or video applications common to connected embedded applications. When applications are ready for next-generation, low-power performance, Intel® Atom™ processor E3800 product family-based designs are easily scalable to Intel® Core® processors within the same architecture.

Fine-Grained Power Management

Intel® Atom™ processor E3800 product family incorporates sophisticated power management capabilities, such as very low standby power in the milli-watt range. This enables very low power consumption for embedded systems that spend significant time in sleep states, such as printers or ATMs. The Intel® Atom™ processor E3800 product family assigns the total SoC energy budget dynamically according to application needs; this supports dynamic power sharing between the CPU and graphics, which allows for higher peak frequencies.

Intel® Burst Technology 2.0 support for single and multi-core also offers a high degree of responsiveness scaled for power efficiency. With intelligent burst technology, the system can tap an extra core when necessary, which allows CPU-intensive applications to run faster and smoother. What's more, 2MB of L2 cache assures the device operates faster and more responsively when running multiple applications and services to run at the same time.

Industry Impact of Low Power Improvements

Understanding Intel Atom™ processor E3800 product family's power efficiencies is essential to understanding the IoT opportunity. The shift from isolated systems to connected intelligent platforms requires not only performance and connectivity, but also the creative design of smaller, rugged edge devices. Characteristics of the Intel® Atom™ processor E3800 product family are specifically suited to these demands, and the series is purpose-built to enable design innovation in high-performance, small form factor (SFF) intelligent systems.

In this new era of connected computing technology, intelligent systems add global value as standalone systems evolve from their foundation in machine-to-machine (M2M) concepts to network and communicate with each other and the cloud. OEMs and developers can anticipate a convergence of increasingly connected devices, answering demand for real-time data gathering and sharing, nonstop communication, new services, enhanced productivity and more. Systems will solve business problems by being smart and connected, which is becoming a priority, y adding business value such as cloud economics for compute and data operations. A recent Juniper Research report forecasts that M2M service revenues will reach $20 billion globally in 2015, fueled by manufacturers and developers simplifying the process of rolling out M2M strategies for the end-user.

As M2M strategies unfold – for example in healthcare, smart metering, POS and retail banking, factory floor systems and connected buildings – the business case for intelligent services increases. Minimal power consumption is a primary driver in this renaissance. Low power designs using the Intel Atom™ processors E3800 product family support mobile or portable devices, but more importantly capitalize on thermal characteristics to manage fully enclosed, passively cooled designs as the key to enabling connectivity anywhere.

Applying Intel® Atom™ Processor E3800 Product Family Improvements to Connected Embedded

Intel® Atom™ processor E3800 product family's SoC design reduces Bill of Materials (BOM), offering a cost advantage in tandem with power and performance gains. In addition to BOM savings, a one-chip solution allows for smaller form factor solutions over earlier generation, two-chip offerings. In certain cases, such as multifunction printers or ultrasound machines, the SoC even eliminates the need for development of custom ASICs/FPGAs to perform imaging functions. Further, a single die on a single package delivers the high levels of integration needed for intelligent system designs, such as efficient and dedicated image signal processing.

The Intel Atom™ processor E3800 product family's integration of I/O interfaces is outstanding – supporting display interfaces with graphics processing, camera interfaces with image processing, audio with Digital Signal Processing (DSP), multiple storage types and legacy embedded I/O. Expansion capabilities are readily available through industry-standard high-bandwidth interfaces such as PCI Express Gen 2.0, Hi-Speed USB 2.0 and USB 3.0 connectivity.

Intel® Atom™ processor E3800 product family also performs to within industrial temperature extremes, with a Tjunction range from -40° C to 110° C. This feature allows for passively cooled, light solutions that must exist in extreme environments, such as either hot or cold.

Security and Graphics Improvements Add Design Value

The Intel® Atom™ processor E3800 product family's advancements in visual processing capabilities are relative to previous generation Intel® Atom™ processors, and enable faster media conversions, stereoscopic 3D, immersive web browsing, and enhanced HD video transcoding with Gen 7 graphics and highly efficient image processing. For example, the Intel® Atom™ processor E3800 product family series graphics are strong enough to accommodate a modern OS with a graphical user interface for Blu-ray playback, as well as throughput appropriate for demanding applications such as complex 3D drawings and gaming.

Security is also of essential importance in connected embedded designs, and the Intel® Atom™ processor E3800 product family's built-in security features can be considered a competitive factor in these applications. For security enhancement and content protection, the Intel® Atom™ processor E3800 product family incorporates Intel® Advanced Encryption Standard New Instruction (Intel® AES-NI), hardware-assisted encryption instructions to enable faster data encryption and decryption. Secure endpoints protect sensitive content and allow only chosen software to run on the device. Data is secured as it moves through the network, and is encrypted up to four times faster than earlier generations. Overall, encryption and decryption performance improves when executed in hardware, in contrast to using software algorithms which can be costly in terms of cycling and power consumption.

Design Choices in Context

In the embedded realm, determining a design path requires consideration of a broad range of values. Designing with Intel® processors has developers evaluating price, processor performance and power, but also software development and IO requirements, ecosystem constraints and overall ease of development.

Software is often the most challenging part of system design. Familiar Intel® processors environments are supported by development tools that help to implement, debug and fine tune software. Performance is assured while time-to-market is reduced. Pinouts and I/O interfaces are also well established for Intel® processors, as Intel® has been instrumental in defining not just the core microprocessor and instruction-set architecture, but also the architecture of peripherals. Embedded computing products based on Intel® processors have capitalized on that chip-level expertise by providing either proprietary or open-standard products using common I/O interfaces. Common connector pinouts enable the widest range of hardware- and software-compatible peripherals for use in customizing end-user products.

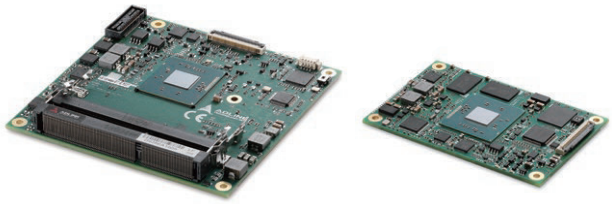
The ARM environment is more complex and differentiated, with a singular focus on products typically optimized for a particular application. With less historical focus on building standard I/O definitions, each SoC would be used on a custom board design; also, depending on the target market, I/O options do not emphasize standard buses such as PCI Express. The resulting ARM marketplace includes a number of proprietary form factors and connector definitions that may lock designs to a single vendor that may not support more than a single generation of silicon even as designs move to more advanced SoCs.

Designing with Low Power

By incorporating both Intel® Atom™ and Celeron processors, ADLINK's products offer a compelling power-to-performance ratio and are optimized for the growing realm of connected embedded applications. ADLINK's new low power offerings feature a significant performance per watt improvement over previous generations, high integration of both low speed and high speed I/Os, an advanced graphics engine and virtualization support — all on a sub-10-watt TDP SoC that enables small, light and reliable embedded designs. These new products run on a single, dual- or quad-core Intel® Atom™ processor E3800 product family or Intel Celeron processor N2930/J1900, with clock rates ranging from 1.33GHz to 2.0GHz and TDP envelopes from 4.5 to 10 watts.

Capitalizing on Intel processor improvements in low power performance in a range of products and intelligent platforms, ADLINK enables developers to break new ground in intelligent system design across the spectrum of embedded arenas. Further, Intel's TDP for the Intel® Atom™ processor E3800 product family represents a conservative, maximum use case; ADLINK's real-world design scenarios are likely to see greater improvements in power based on actual application usage.

● Medical Innovation with Low Power COM Express® Computer-on-Modules

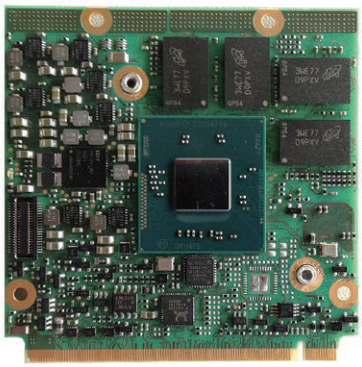


ADLINK Computer-on-Modules: cExpress-BT and nanoX-BT

ADLINK's rugged COM Express® COMs capitalize on Intel® Atom™ processor E3800 product family's energy efficiency to help drive the creative, compact solutions that enable healthcare anywhere. Offerings include the cExpress-BT2, cExpress-BT, and nanoX-BT — PICMG COM.0 Rev.2.1 Type 2, Type 6 and Type 10 form factors, respectively — with I/O features typical of Intel® processor solutions: up to 3 PCIe, 2 SATA, and 8 USB ports are provided for scalability in application system layouts. ADLINK COMs allow system developers to focus on their core competencies, innovating application-specific functions in a custom carrier board and relying on an off-the-shelf core module for all generic PC functions. Risk and time-to-market are reduced, and longevity is assured as COMs can be upgraded for performance without impacting the existing carrier board.

ADLINK's rugged COM Express COMs are proven in diverse and demanding medical markets, characterized today by real-time data processing and sharing, and high definition imaging and visual displays. These small footprint platforms blend ideal performance and energy efficiency, enabling secure, intelligent healthcare by connecting medical providers with systems and patient data. Connected care ensures faster, more accurate diagnosis and treatment, and includes the high resolution medical imaging systems that are moving to smaller devices such as cart-based mobile stations or portable handheld devices. To ensure reliability and stability of these sophisticated medical systems, ADLINK's low power COM Express module families are verified with international standards for shock and vibration and validated Extreme Rugged™ for performance in a greater range of operating temperatures from -40 to +85°C.

● Small Profile Designs with Low Power Qseven Computer-on-Modules

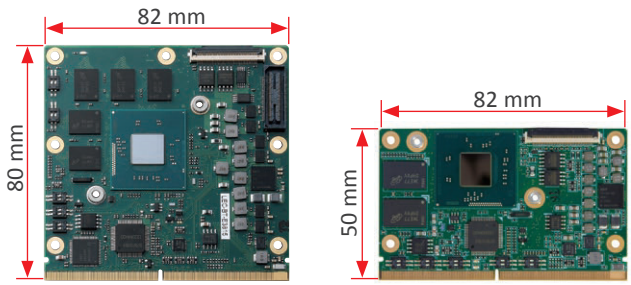


ADLINK Qseven Module: Q7-BT

ADLINK's small profile Qseven Q7-BT COM integrates single, dual or quad-core SKUs of the Intel® Atom™ processor E3800 product family, and is optimized for power-efficient mobile applications . Based on SGET's Qseven standard for small sized and highly integrated systems, ADLINK's Q7-BT is an off-the-shelf module for OEMs and developers, reducing development time and resources with outsourced custom core logic and embedded software. Qseven modules integrate all core PC components and are mounted onto an application specific carrier board. ADLINK provides an evaluation carrier board, Q7-BASE, and board support packages for Linux, Windows, VxWorks and Android for quickstart application development. The platform does not require costly board-to-board connectors but relies instead on a single ruggedized MXM connector. Affordable and proven, this high-speed 230-pin MXM connector provides the carrier board interface carrying all the I/O signals to and from the Qseven module. No legacy I/O is supported by Qseven and it instead focuses on modern high-speed serial I/Os such as PCI Express and digital display interfaces.

Measuring just 70x70mm, smaller than COM Express, ETX or XTX, ADLINK's Qseven COM supports low power mobile applications and small, low cost systems with a maximum TDP of 12 Watts. This low TDP adds significant value to ultra-portable designs, for example handheld medical devices used by first responders in the field. Fueled by Intel® Atom™ processor E3800 product family's improved performance-to-power ratio, these mobile healthcare devices can capitalize on connectivity and high resolution imaging to enable better real-time analysis and diagnosis in emergency medical situations.

● SMARC™ Computer-on-Modules Enable Ultra Low Power Solutions



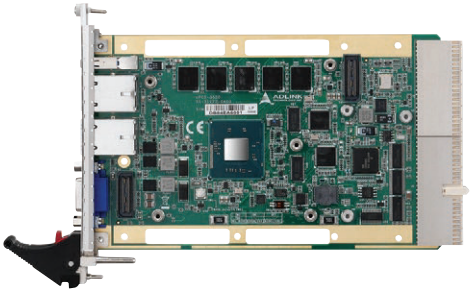
ADLINK SMARC modules: LEC-BT and LEC-BTS

ADLINK's Low Energy Computer-on-Module (LEC) product series is based on the versatile SMARC™ standard. Originally intended for ARM-based processors, SMARC also supports new low power SoCs from Intel®, including single, dual or quad core SKUs of the Intel® Atom™ processor E3800 product family. SMARC defines two module footprints; ADLINK's ultra low power SMARC-based modules include the full-sized LEC-BT at 82x80mm and the short-sized LEC-BTS at 82x50mm. Both modules provide legacy PC interfaces such as PCIe, SATA and HDMI as well as modern ARM interfaces such as serial and parallel camera interfaces, SPI and I2C; this hybrid mix is designed to usher in more creative and diversified applications across the spectrum of embedded arenas. ADLINK's SMARC modules are also validated Extreme Rugged for extended operating temperatures from -40°C to 85°C; this is a feature essential to IoT deployments, enabling connectivity and data sharing in non-traditional environmental settings.

With a power envelope typically under 6 Watts, ADLINK's small profile SMARC modules are ideal building blocks for both fixed and portable embedded systems; they offer particular value in ultra low power applications for small, thin form factor mobile or stationary devices, such as instrumentation, emergency medical devices, industrial tablets, and Human Machine Interfaces (HMIs). Like other COM standards, SMARC contains core computing functions on the module and works in conjunction with an application-specific carrier board to

implement custom features such as touch controllers or wireless modems. This modular approach assures scalability and fast time-to-market while maintaining low cost and low power in a very small footprint. For instance, ADLINK's SMARC modules are making a difference in tablet-based connected healthcare applications; medical practitioners have access to patient data and hospital systems in any healthcare setting, from patient bedside to nursing station to operating room. Similar connected devices are enabling intelligent home-based medical applications, increasing the focus on preventive medicine and early diagnosis by enabling individuals to track at-home care.

● Enabling Intelligent Transportation with Fanless Systems and Rugged Displays



ADLINK 3U CompactPCI Blade: cPCI:3620

ADLINK extends Intel® processor advancements in low power to its CompactPCI products, enabling its cPCI-3620 3U CPCI processor blade with the Intel® Atom™ processor E3845 1.91GHz performance and four cores. This fanless design incorporates an industrial grade Intel® Atom™ processor with -40 to +110 °C Tjunction for added reliability at extreme temperatures. Optimized for railway applications, the cPCI-3620 has reinforced anti-vibration and anti-electromagnetic features, wide temperature range support, and has been designed within the requirements of EN50155, the European standard for electronic equipment used on rolling stock.

ADLINK's rugged cPCI-3620 is designed for mission-critical train control and operation, networked security and safety, and high performance passenger infotainment. By tapping the Intel® Atom™ processor E3800 product family's advancements in visual processing capabilities over previous-generation Intel® Atom™ processors, cPCI-3620 efficiently handles the video code and decode required in applications ranging from high-definition train operator displays to onboard digital signage to individual passenger entertainment systems. Coupled with ADLINK's low power Smart Touch Computer STC-1005 rugged touchscreen computers, this system based on SMARC architecture with modular approach enables high performance, faster time-to-market and reduced development costs for transportation system developers. STC-1005 touchscreen computers are designed to support mission-critical applications operating in harsh environments, and enable in-vehicle operator display systems flexible enough for deployment in rail networks anywhere. The STC-1005 series initially features a 10.4" TFT-LCD display and -5-wire resistive touchscreen; it will extend into multiple display sizes, projective capacitive touchscreen, easily customizable I/O configuration, and superior connectivity options, including dual Ethernet, Wi-Fi, 3G/LTE, and near field communication (NFC). With rugged displays available in multiple sizes, STC-1005's low power consumption allows a slim, fanless design and the ability to fit into tighter physical spaces. This broad range of options makes the low power STC series an ideal fit for connected embedded settings such as intelligent healthcare and factory automation as well as transportation applications.

ADLINK Smart Touchscreen Computer: STC-1005

● Fanless Platforms

Featuring the latest Intel® Atom™ processor E3845 (Bay Trail-I Premium), ADLINK's Matrix MXC-2300 product series provides minimal power consumption and configurable PCI/PCIe slots in a rugged and fanless I/O platform. Fanless performance makes the most of low power, high performance capabilities to minimize maintenance costs for the long-term.

ADLINK Fanless Embedded Computer: MXC-2300

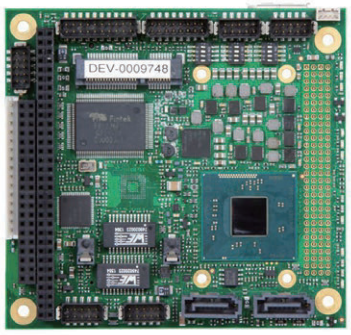
Matrix MXC-2300 delivers a leading improvement in performance and cost-efficiency over any previous generation Intel® Atom™ processor-based system; coupled with exceptional 3D graphics and powerful media acceleration, this system is ideal for a range of connected embedded applications such as industrial control, machine vision and maritime automation. Its versatile I/O function enables integration of off-the-shelf PCI/PCIe cards such as ADLINK's full spectrum of frame grabbers, motion controllers and I/O cards. In addition, dual-port isolated CAN bus was built-in to facilitate communication

between micro-controllers and devices; this flexibility easily creates systems that handle a range of complex and specific I/O functions such as data acquisition, DIO, motion and vision technologies.

Matrix' thermal characteristics are optimized for heavy-duty industrial computing. All heat-generating components – such as the CPU, chipset, clock generator, MDSFET, power choke and more – are located on the top of the PCB to maximize their distance from the system's aluminum case. The shortest path of heat conduction and lowest thermal resistance ensure its thermal stability at a 70 °C (158 °F) ambient temperature. Its components and connectors are directly mounted on its PCB via SMT and DIP processes, in contrast to using cable connections. Not only is the system is strong and durable for harsh environments, its flexibility ensures user-friendly system installation. To install PCI/PCIe cards for expansion, the chassis can be opened with the turn of a single screw; the hard drive can be accessed by loosening four screws.

The Matrix MXC-2300 series' flexibility and combined features make a compelling system for connected embedded applications in rugged settings. For instance, Matrix can optimize inspection strategies in machine automation applications or increase precision of automated maritime navigation controls.

● Rugged, Fanless Performance with PC/104-Based Systems



ADLINK PC/104-Plus Single Board Computers: CM2-BT2

ADLINK's rugged single board computers (SBCs) are recognized as some of the most rugged in the industry – designed and developed to encompass a variety of form factors, processors, clock speeds, memory configurations, I/O options and operating systems. Incorporating Intel® processor improvements in performance-per-watt adds even more merit to this flexible line up, extending design value deeper into the realm of connected embedded applications. ADLINK's versatile CM2-BT2 , part of the Extreme Rugged CoreModule® series, is a PC/104-Plus single board computer (SBC) incorporating the Intel® Atom™ processor E3845 featuring four cores. CM2-BT2 is ideal as a key enabler in a larger system, providing high performance fanless operation over temperature extremes, resistance to shock and vibration, conformal coating, embedded BIOS and long product life.

Low power CoreModule products also include CM1-BT1, ADLINK's PC/104 variant for ISA bus-only support, as well as CM3-BT1 and CM3-BT4-8G, PCI-104 variants for PCI bus-only support. These rugged, low power options service diverse design and budget requirements, bringing field-proven reliability, durability and performance to connected, intelligent platforms. For example, in applications such as factory automation and machine vision, PCI-bus supports high speed block data transfers (e.g. video, networking, disk storage) while ISA bus supports byte-oriented transfers (e.g. real-world data acquisition and control). CoreModule products provide a range of low power options in embedded vision systems, capitalizing on a dual-core CPU for applications requiring high computing power and multi-camera imaging such as 3-D vision and robotics guidance.

● Motherboards

ADLINK's IMB-T11 mini-ITX industrial motherboard capitalizes on the Intel® Atom™ processor E3800 product family's low power features to offer a flexible, cost-efficient option for connected embedded systems. As part of ADLINK's extensive roster of rugged, low power design options, IMB-T11 offers VGA, HDMI, and LVDS display output; PCI for flying cable/riser cards; a mini-PCIe/mSATA card slot; and 10x COM ports. IMB-T11 enables flexible design and development for the spectrum of complex industrial automation environments, such as process and discrete manufacturing, materials handling, machine vision and pick and place applications.

■ Remote Management & Cloud Services

Like all of ADLINK's compute boards not already supported by an industry-standard interface (e.g., IPMI in CompactPCI® or AdvancedTCA® platforms), the IMB-T11 integrates ADLINK's proprietary Smart Embedded Management Agent (SEMA) intelligent middleware, developed to address the need for better housekeeping tasks in the context of systems based on complex processors and chipsets. SEMA is a sophisticated preventive maintenance feature – adding significant value for industrial customers, and enabling advanced functionality in contrast to typical third-party toolkits or utilities. Systems can monitor the most complex sequences, storing important data such as up times and maximum temperatures, can call for help when needed, and can be easily managed and monitored in real-time from a cloud-based interface.

ADLINK SEMA (Smart Embedded Management Agent) Cloud

Extending remote management technologies to include secure cloud access makes good business sense for system administrators. Cloud-based remote management enables always-available system data that can be used to increase system uptime by predicting and reacting to system failures or abnormalities without the time and cost associated with on-site maintenance of one or many distributed devices. As the Internet of Things proliferates, competition will increase – providers need real system intelligence that enables flexibility and a deeper understanding of system behavior under a variety of different processing loads and environments. This knowledge provides a competitive edge, keeping costs down, increasing system uptime, and enabling smarter deployments in a greater range of creative new applications.

ADLINK's SEMA Cloud services take SEMA intelligent middleware a step further than previous generations of remote management technology. By employing a cloud server architecture and an M2M stack on top of the intelligent middleware, embedded ADLINK devices can connect to SEMA Cloud without additional design requirements. Pushing data to the cloud enables operators to verify, monitor and manage system performance from a single, central location – improving reliability and reducing management costs.

Low Power Enables Embedded Innovation

Embedded evolution marches on, and developers now have access to a credible option for low power Intel® processor designs in a very small footprint. Intel® Atom™ processor E3800 product family can help designers balance power and performance, while still developing the high-compute solutions for which Intel® processor are known. Developed to enable high performance, small form factor intelligent systems, the Intel® Atom™ processor E3800 product family addresses a specific power-performance need – blending media and compute performance, low TDP and reduced BOM in a low power SoC. OEMs and developers are capitalizing on these characteristics to advance the Internet of Things; embedded connected solutions now encompass lightweight, passively cooled solutions supported by a known and trusted software toolchain and next-generation scalability to Intel Core processors.

The Intel® Atom™ processor E3800 product family offers more computational power than its predecessor, and is able to fit the thermal envelope required for applications with temperature and airflow constraints, for example, passive cooling with no forced airflow and +80°C ambient air. As connected embedded requirements continue to expand - for instance onboard train management and wayside control systems, remote video surveillance and monitoring, factory automation such as pick and place and 3D robotics – designers have a greater range of Intel® processor options to develop competitive designs that quickly get to market.

ADLINK is a Premier member of the Intel® Internet of Things Solutions Alliance. From modular components to market-ready systems, Intel® and the 250+ global member companies of the Intel® Internet of Things Solutions Alliance provide scalable, interoperable solutions that accelerate deployment of intelligent devices and end-to-end analytics. Learn more at: intel.com/IoTSolutionsAlliance.

About ADLINK Technology

ADLINK Technology provides a wide range of embedded computing products and services to the test & measurement, automation & process control, gaming, communications, medical, network security, and transportation industries. ADLINK products include PCI Express-based data acquisition and I/O; vision and motion control; and AdvancedTCA, CompactPCI, and computer-on-modules (COMs) for industrial computing. With the acquisition of Ampro Computers, Inc. and LiPPERT Embedded Computers GmbH, ADLINK also provides a wide range of rugged by design Extreme Rugged™ and Rugged product lines including single board computers, COMs and systems.

ADLINK strives to minimize the total cost of ownership (TCO) of its customers by providing customization and system integration services, maintaining low manufacturing costs, and extending the lifecycle of its products. ADLINK is a global company with headquarters and manufacturing in Taiwan; R&D and integration in Taiwan, China, the US, and Germany; and an extensive network of worldwide sales and support offices.

ADLINK is ISO-9001, ISO-14001, ISO-13485 and TL9000 certified, is an Associate Member of the Intel® Intelligent System Alliance, an Executive Member of PICMG, a Sponsor Member of the PXI Systems Alliance, an Executive Member of PC/104 Consortium, and a Strategic Member of the AXIe Consortium, a member of VMEbus International Trade Association (VITA). ADLINK is a publicly traded company listed on the TAIEX Taiwan Stock Exchange (stock code: 6166).

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