Embedded Platforms for Intelligent Transportation Systems

ADLINK Technology, Inc.

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www.adlinktech.com
COM Express® PC/104 SMARC CompactPCI®

Embedded Platforms for Intelligent Transportation Systems

Transportation markets create a diverse and complex embedded design landscape, fragmented by the very nature of global transportation venues but unified in the need for flexible, reliable, long-term performance. Characterized by extreme conditions, non-stop operation and ever-increasing processing requirements, transportation deployments must manage tremendous performance standards while also delivering ideal passenger service, comfort and safety. Intelligent transportation systems (ITS) benefit travelers and providers alike, enabling better management decisions and improving the travel experience by making safer and smarter use of rugged networked technologies. ADLINK's rugged transportation products and platforms are optimized for the development of intelligent transportation systems, meeting space and performance demands, severe environmental restrictions and specialized industry certifications that ensure performance and reliability. With more than 25 years of Rugged by Design expertise, ADLINK enables safe, secure and connected travel – solving complex issues in high performance data processing, mobile connectivity and networked communications in the extreme rigors of transportation environments.

■ Rugged by Design Platforms Fuel Transportation Markets

Validated Rugged for Extreme ITS Applications

Rugged design expertise is ADLINK's strength, bolstered by our acquisition and integration of industry leader AMPRO Computer in 2008. ADLINK products are Rugged by Design, which validates performance to MIL-STD shock, vibration and temperature during the product development process, in contrast to requalifying rugged performance after the fact.

ADLINK's rugged and Extreme Rugged™ boards and systems meet or exceed MIL specifications, surpassing extreme railway and public transportation design standards. Component selection, circuit design, printed circuit board (PCB) layout and materials, thermal solutions, enclosure design and ISO- and TUV-certified development processes are carefully managed and proven by robust test methods including MIL-STD-810 or MIL-STD-202 shock and vibration testing, as well as Highly Accelerated Life Testing (HALT). Rugged product design is validated from the ground up to ensure long-term reliability, purpose-built to handle the shock, vibration and extended temperature environments found in public transportation applications.

■ Application Ready Intelligent Platforms Reduce Design Risk

Smart Design Principles Keep OEMs Focused on Application Development

ADLINK's boards, panels and modules are optimized for transportation applications – providing right-sized rugged performance whether the application is controlling operations or interfacing with passengers. ADLINK also offers fully formed Application Ready Intelligent Platforms (ARIPs) that combine hardware and software into a computing engine for end-user applications; developers gain a competitive advantage by maintaining focus on their core competencies in application development.

ADLINK's intelligent platforms validate capabilities using a range of I/O and performance options; systems are optimized for robustness, manageability and intelligence, including diagnostics and control, as well as advanced power management. Risk and development time are reduced, and systems get to market faster with standards-based, proven rugged performance. ADLINK's extensive range of technologies and platforms means transportation system developers have access to reliable, high availability performance, supported by ADLINK's in-house design and manufacturing.

■ Certified Platforms and Products Accelerate Time-to-Market

Transportation Industry Standards Drive Development, Safety and Performance

Transportation applications can be uniquely demanding for embedded designers, with extended deployments requiring always-on operation for up to 100,000 hours, even while performing outdoors or under conditions of high vibration. To manage these physical extremes, transportation systems and platforms must conform to stringent regulatory requirements. ADLINK's transportation systems are certified to industry standards including EN50155, and many others established by CENELAC, the European Committee for Electrotechnical Standardization, and AREMA, the American Railway Engineering and Maintenance-of-Way Association. These specifications define all characteristics of electronic equipment implemented on rolling stock and complement environmental regulations such as onboard fire and smoke protection.

ADLINK's industry-certified transportation products support fault-free performance under these conditions; certification assures passenger safety and enables developers to get to market quickly with robust, standards-compliant designs. ADLINK's certified transportation products and platforms answer global transportation industry requirements for onboard train management and wayside control systems, remote video surveillance and monitoring, broadband Internet access systems and a broad range of passenger information and entertainment systems.

Extending Deployments with Planned Product Lifecycles and Predictable Roadmaps

Industry Partnerships Enable Design Longevity

Transportation developers distinguish themselves with rapid product development that includes well-defined, extended product lifecycles – of particular importance in ultra-long term transportation deployments. ADLINK's in-house design and development capabilities expertly support developers in long-life solutions, including product planning and managing end-of-life (EOL) transitions.

Industry design expertise and knowledge are essential factors in achieving sustained market leadership in this challenging market, fueled by trusted engineering and design partnerships. ADLINK protects ideal product lifecycles with a trusted supply line based on the Intel® Embedded Platform Roadmap, assuring quality, performance, optimized time-to-market and longevity for development of next-generation designs. ADLINK works closely with Intel as a member of the Intel® Intelligent Systems Alliance, active in the ongoing development of products and platforms based on the latest high performance Intel® technologies and processors, including advanced 4th generation Intel® Core® processors.

Flexible, Robust Platforms Enhance ITS Development

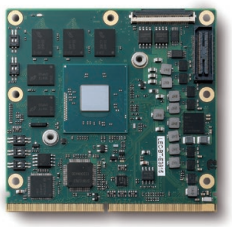
Enhancing Passenger and Freight Transit with Rugged, Connected Technologies

ADLINK's rugged technologies are optimized for mission-critical train control and operation, networked security and safety, and high performance passenger infotainment. Our extensive roster of Rugged by Design board-level, box-level and user interface solutions provide reliability and flexibility across the spectrum of intelligent transportation systems – enabling high performance, faster time-to-market and reduced development costs for transportation system developers.

3U CompactPCI Quad-Core Intel® Atom™ Processor Blade for low power fanless system: cPCI-3620

3U CompactPCI 4th Generation Intel® Core™ i7 Processor Blade with ECC for high performance PIS : cPCI-3510

ADLINK's intelligent transportation platforms are validated to meet or exceed rigorous transportation industry standards, ensuring non-stop performance under extreme environmental conditions. ADLINK's transportation platforms include CompactPCI (ideal for European and China markets), rugged single board computers (SBCs), Computer-on-Modules (COMs), Smart Panels and Matrix fanless embedded systems.



SMARC Full Size Module with Intel® Atom™ Processor E3800 series SoC: LEC-BT

ADLINK's rugged SBCs are designed and developed based on a variety of form factors, processors, clock speeds, memory configurations, I/O options and operating systems; form factors include PC/104, EBX, COMs and more, and each can function as a key performance enabler in a larger system. For example, ADLINK's Extreme Rugged™ EBX SBCs are certified to industry standard EN50155 for electromagnetic interface and compatibility; they can be deployed as standalone platforms or used as a base with stacked electronics for long lifecycle embedded applications. Performance is optimized for the broad spectrum of transportation deployments addressing networking, digital signal processing (DSP) and graphics-heavy applications; generous onboard I/O functions support everything from large data exchange to video.

Extreme Rugged PC/104-Plus SBC with Intel® Atom™ Processor E3800 series SoC: CM2-BT2

ADLINK's Smart Panel HMI platforms combine an LCD panel, CPU board and touch-screen in a single compact package that acts as the core building block in a display-integrated computing platform. Options for adding functional elements such as hard drives, SSDs, Wi-Fi, 3G and more, ensure simple customization for the end-use, further reducing the design burden and enabling faster response time to new market opportunities.

ADLINK's COM Express™ products enable ultra-rugged embedded transportation applications by featuring low power and complex processing functions in a very small footprint, incorporating 4th generation Intel® Core™ processors for advanced power capabilities and customized power-to-performance ratios. Application customization is built into the accompanying carrier board, and can be re-used when COMs are swapped out for next generation performance. As a result, ADLINK's COM Express™ modules are ideal for modular, long-life embedded applications with a critical development cycle, as well as more progressive transportation applications that require frequent processor upgrades without affecting other application design elements.

ADLINK's Matrix MXE-5400 series of rugged designed quad-core fanless computers feature the latest 4th generation Intel® Core™ i7-4700EQ processors, delivers outstanding performance with minimum power consumption, fanless embedded computing for dedicated high-performance embedded applications; and superior wireless capability empowering long- and short-range connectivity for value and simplicity in transmitting data. As an Intel® ISF-ready platform, the MXE-5400 series fully supports Intel® vPro™ technologies. Versatile I/O supports flexible connectivity in a compact enclosure, with proven ruggedization providing shock tolerance up to 50 G and an extended operating temperature range of -20°C to 60°C for safe, secure, and connected travel – solving complex issues in high performance data processing, mobile connectivity and networked communications under the extreme rigors of transportation environments.

Supporting the specific requirements of high expansion capability for ITS applications, the MXC-2300 series, also from ADLINK's Matrix line, features the latest Intel® Atom™ E3845 processor, delivers impressive performance with minimal power consumption, sports exceptional 3D graphics, and powerful media acceleration. Features include built-in dual-port isolated CAN bus, accelerating inter-device communication, easily regulated functionality across multiple modules, versatile expandability from three PCI/PCIe expansion slots accommodating a variety of I/O cards, and ruggedized architecture guaranteeing extended operating temperature range of -20 to 70°C and operating shock tolerance up to 50 G in a remarkably compact enclosure. Experience an intelligent computing platform with levels of reliability, flexibility, and cost-effectiveness ideal for intelligent transportation systems.

Intel® Atom™ processor E3845 Fanless Expandable Embedded Computer with PCI/PCIe Slots: MXC-2300

Powerful 4th Generation Intel® Core™ i7 Processor-Based Fanless Embedded Computer: MXE-5400

ADLINK's Rugged by Design transportation products address the full spectrum of high-end commercial and industrial supply principles, including design revision control, component referencing and the longevity of supply so essential to transportation deployments. Assuring rugged design while protecting development resources and time-to-market, ADLINK can expertly modify existing offerings or develop new solutions to defined specifications using our proven Rugged by Design methodologies and ISO quality assurance process. ADLINK's customers are further supported with ongoing access to our team of highly skilled customer hardware and software support engineers, expertly trained and knowledgeable in the applications and concerns facing transportation customers.

High Performance Processing Drives Locomotive DVR & Data Gateways

Onboard locomotive video/audio capture systems provide safety training to crews and aid in accident investigations by providing accurate incident reporting. In addition to video and audio capture, these intelligent systems also feature remote monitoring and control, real-time health monitoring and wireless video download of vital statistics related to vehicle operation and status.

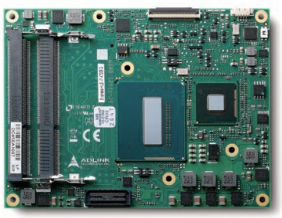
ADLINK's Extreme Rugged™ Embedded Board eXpandable (EBX) single board computer (SBC) products are optimized for the reliability, high performance processing and networking required by media-intensive transportation applications, incorporating only lower power, higher performance multicore CPUs. EBX balances size and functionality with a bolt-down SBC format in just 46 square inches of surface area (8" x 5.75"), and ADLINK's EBX products offer performance validated to extended operating temperatures from -40°C to +85°C.

ADLINK's series of Extreme Rugged™ EBX platforms use identical mechanical format, connector placement and pinout to manage functionality and rugged requirements of train systems, offering dual Ethernet, CRT and flat panel video, multiple serial and USB ports, rugged solid state drives (SSDs), SATA and IDE interfaces, high-definition audio and General Purpose Input/Output (GPIO) support.

Versatile Computer-on-Modules Enable Intelligent Bus Networks

ADLINK's COM Express™ products enable transit agencies to communicate with customers and dispatch, maintain fleets and collect and analyze operating data. Intelligent bus networks rely on smart COMs-based onboard systems, controlling vehicle run switches, front and rear doors, wheelchair ramps, stop requests, odometers, emergency alarms and more. Integrated GPS enables recording of driving data and supports both wireless and cellular transmission, and Class A-certified devices allow testing against SAE International standards.

Intelligent bus networks combine ADLINK's rugged COM Express™ module with a custom baseboard incorporating the Intel® Atom™ processor. The system is proven tolerant to higher levels of shock and vibration, and integrated mini PCI Express slots support 802.11 a/b/g/n and cellular modems for robust connectivity. ADLINK's COM Express™ products are further validated Extreme Rugged™, performing in an even greater range of operating temperatures from -40°C to +85°C. This product series is also available with advanced 4th generation Intel® Core™ processors to enable passive cooling with no venting or fans, and new low power states to extend battery time.



COM Express Basic Size Type 6 Module with Intel® Core™ i7/i5/i3 Processor with ECC: Express-HLE

Smart Touch Computers Enable Flexible Train Operator Control

Operator display systems provide an interface for conductors to monitor and manage train activity. However, to be deployable in transportation systems in multiple countries, systems must be flexible for size of installation area and I/O expansion for different requirements. ADLINK's smart touch computers enable in-vehicle operator display systems flexible enough for deployment anywhere.

The rugged STC-1005 smart touch computer based on flexible architecture with modular approach enables high computing performance, faster time-to-market and reduced development costs for transportation system developers. The STC-1005 series initially features a 10.4" TFT-LCD display, with future models supporting multiple display sizes, projective capacitive touchscreen or 5-wire resistive touchscreen, easily customizable I/O configuration, and superior connectivity options, including dual Ethernet, Wi-Fi and 3G/LTE. With rugged displays available in multiple sizes, the STC-1005's low power consumption allows a slim, fanless design and the ability to fit into tighter physical spaces.

Connected Systems Optimize In-vehicle Multimedia and Surveillance

Space-constrained, high performance connectivity presents significant challenges for transportation system designers. In-vehicle systems must provide multimedia content, meeting increased passenger expectations for a connected travel experience; this requires data acquisition from both inside and outside the vehicle, with transmission of the data to centralized control facilities. At the same time, systems must operate effectively under conditions unique to moving vehicles, including severe temperatures and high frequency of vibration and shock.

With sophisticated mechanical design and discreet circuit layout, ADLINK's Matrix series offers a rugged platform optimized for onboard wireless internet services and in-vehicle surveillance for safety and security. Implemented on buses or trains to enhance passenger safety, fleet management, and traffic monitoring, Matrix systems deliver real-time driving status to operators and system administrators. ADLINK's fanless high performance Matrix product family packs versatile I/O solutions into a small profile for minimal footprint, and offers a distinctive thermal design with zero cable management requirements.

Innovating with Transportation Design Expertise

Coupled with in-house design and manufacturing capabilities, ADLINK's rugged transportation design expertise spans the broad spectrum of rugged, high performance systems ideal for modern transportation venues. Customers have a competitive advantage with ready access to a range of industry-certified application ready platforms, as well as the elements to develop their own. Through proven embedded building blocks and Application Ready Intelligent Platforms (ARIPs), ADLINK continues to support and distinguish customers with fast time-to-market and new applications that enable safe, secure and connected travel.

ADLINK also owns and operates our own manufacturing facilities, offering the added flexibility of local warehouses and integration capabilities in all major geographic locations. Complete and comprehensive capabilities include our own schematics design and PCB layout teams, environmental and shock testing, as well as surface-mount technology (SMT) lines, systems integration and test capabilities. ADLINK controls the entire manufacturing process, from layout and design to prototyping, volume production and extended lifecycle management. ADLINK also understands that transportation applications have the potential for decades-long deployment and require according Longevity of Supply (LoS). We work closely with our key component manufacturers and suppliers, establishing predictable lifecycles, obtaining early notifications for end-of-life decisions, and requiring product life statements for critical components.

ADLINK further maintains a dynamic role in embedded standards development, ultimately creating modular, standards-based technologies that provide the foundation for high-value transportation platforms. ADLINK's long-held support of COTS (commercial off-the-shelf) technology and open systems enables flexible technologies and platforms that are scalable and rugged enough for extended deployment of diverse transportation management and passenger service applications. End-users reduce risk and total cost of ownership with the ideal combination of low power consumption, small footprint, optimized features and high reliability in a standards-based platform.

For developers of intelligent transportation systems, ADLINK is your complete supplier of Rugged by Design products, including systems that provide robust, fault-free connectivity, as well as the wide, high-speed I/O required to support the broad and growing spectrum of transportation systems and applications. Development time is reduced, and system manufacturers can focus on their core competencies in creating competitive, high performance transportation management and control applications.

ADLINK is an Associate member of the Intel® Intelligent Systems Alliance. From modular components to market-ready systems, Intel and the 250+ global member companies of the Alliance provide the performance, connectivity, manageability, and security developers need to create smart, connected systems. Learn more at: Intel.com/go/intelligentsystems/alliance.

About ADLINK Technology

ADLINK Technology is enabling the Internet of Things (IoT) with innovative embedded computing solutions for edge devices, intelligent gateways and cloud services. ADLINK's products are application-ready for industrial automation, communications, medical, defense, transportation, and infotainment industries. Our product range includes motherboards, blades, chassis, modules, and systems based on industry standard form factors, as well as an extensive line of test & measurement products and smart touch computers, displays and handhelds that support the global transition to always connected systems. Many products are Extreme Rugged™, supporting extended temperature ranges, shock and vibration.

ADLINK is a Premier Member of the Intel® Internet of Things Solutions Alliance and is active in several standards organizations, including PCI Industrial Computer Manufacturers Group (PICMG), PXI Systems Alliance (PXISA), and Standardization Group for Embedded Technologies (SGeT).

ADLINK is a global company with headquarters in Taiwan and manufacturing in Taiwan and China; 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 and is publicly traded on the TAIEX Taiwan Stock Exchange (stock code: 6166).

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