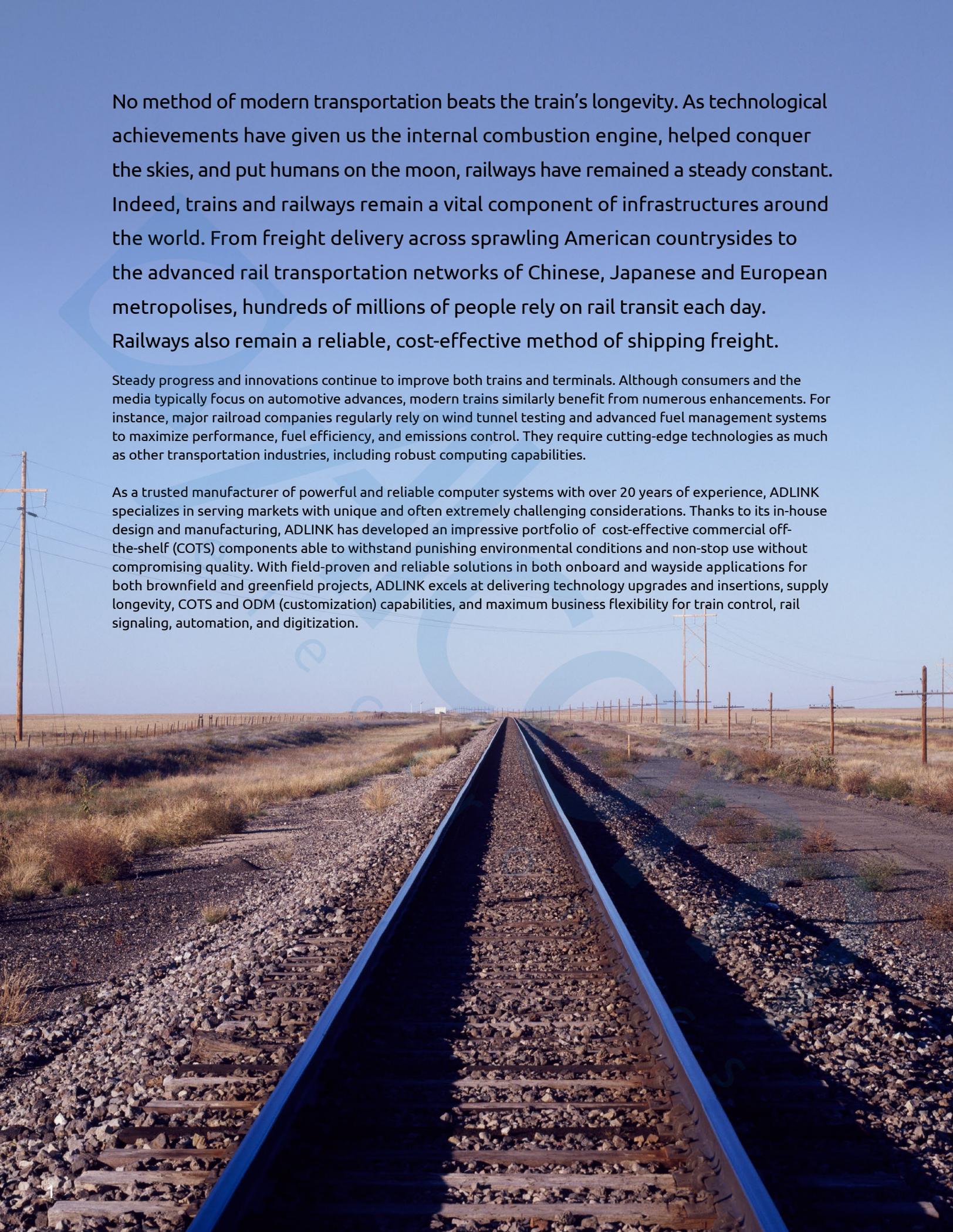


Forward Into The Future

ADLINK Railway Solutions



ADLINK delivers a comprehensive portfolio of groundbreaking modules and systems optimized for the railway transportation industry to deliver extreme performance, unfailing reliability, and ironclad ruggedness



No method of modern transportation beats the train's longevity. As technological achievements have given us the internal combustion engine, helped conquer the skies, and put humans on the moon, railways have remained a steady constant. Indeed, trains and railways remain a vital component of infrastructures around the world. From freight delivery across sprawling American countrysides to the advanced rail transportation networks of Chinese, Japanese and European metropolises, hundreds of millions of people rely on rail transit each day. Railways also remain a reliable, cost-effective method of shipping freight.

Steady progress and innovations continue to improve both trains and terminals. Although consumers and the media typically focus on automotive advances, modern trains similarly benefit from numerous enhancements. For instance, major railroad companies regularly rely on wind tunnel testing and advanced fuel management systems to maximize performance, fuel efficiency, and emissions control. They require cutting-edge technologies as much as other transportation industries, including robust computing capabilities.

As a trusted manufacturer of powerful and reliable computer systems with over 20 years of experience, ADLINK specializes in serving markets with unique and often extremely challenging considerations. Thanks to its in-house design and manufacturing, ADLINK has developed an impressive portfolio of cost-effective commercial off-the-shelf (COTS) components able to withstand punishing environmental conditions and non-stop use without compromising quality. With field-proven and reliable solutions in both onboard and wayside applications for both brownfield and greenfield projects, ADLINK excels at delivering technology upgrades and insertions, supply longevity, COTS and ODM (customization) capabilities, and maximum business flexibility for train control, rail signaling, automation, and digitization.

Embracing Current Standards & New Technologies

In order to survive the rigors of railway transportation, electronics and computing devices require engineering considerations and rugged construction that go beyond consumer equivalents. Brutal conditions can include unexpected shocks, high vibration, humidity, and temperatures beyond what standard components can tolerate. Rail transit service providers, freight shipping companies, and other related businesses might deploy conventional, non-rugged computing solutions to improve the efficiencies and effectiveness of their operations, but device failure can have disastrous consequences.

ADLINK understands that railway customers need to know that hostile environmental conditions can't compromise essential computing components. Our engineering and development teams are dedicated to ensuring that our railway products adhere to the important EN50155 "Railways Applications Electronic Equipment Used on Rolling Stock" standard. These stringent requirements stipulate thresholds and ranges for a variety of factors, including humidity, vibration, shock, and temperature. ADLINK components, panel computers, and other EN50155-certified computing systems are ready for deployment in railcars, passenger terminals, and many other transportation settings. ADLINK is committed to enabling customers to focus their development efforts on differentiating their end applications, mitigate budget constraints, shorten design cycles, and speed time-to-market.

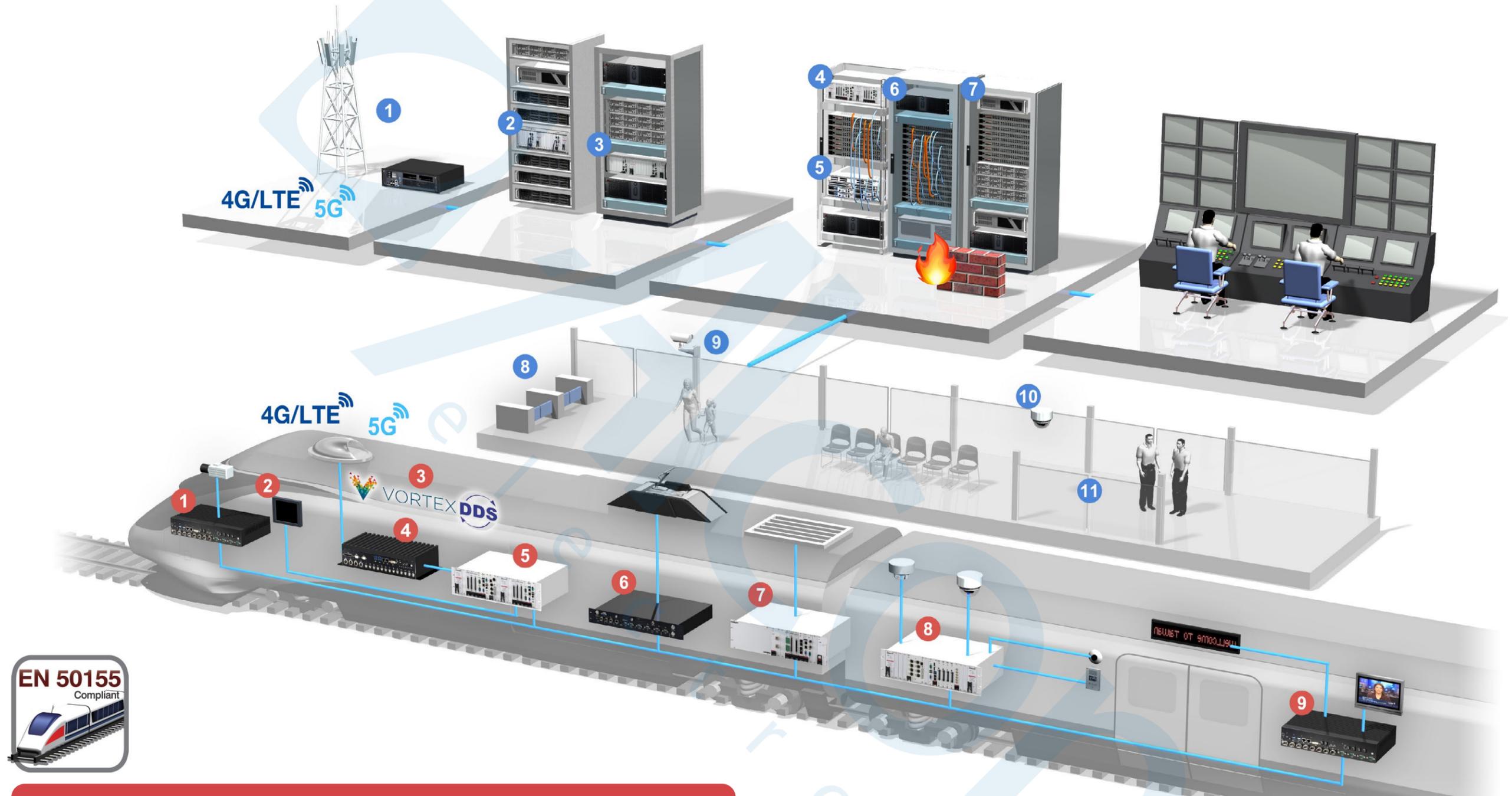
Several of ADLINK's railway products go even further by meeting or exceeding several military standard specifications. Operating in virtually every environmental condition on the planet, military relies on electronics meeting the most stringent requirements that function reliably in extreme heat or cold, high dust, and high moisture conditions. With leading technical know-how in designing military-standard compliant embedded computing boards and systems for mission-critical applications, ADLINK harnesses its field-proven reliability and ruggedness that is deeply rooted in the company's core values, and delivers components that provide exceptional performance wherever the rails lead.

The company's strong position and extensive experience in the CompactPCI market gives it unmatched expertise in developing and manufacturing CompactPCI solutions for a wide range of demanding industries and advanced technologies. As these sectors increasingly turn to artificial intelligence (AI), the Internet of Things (IoT), and edge computing, ADLINK is able to provide these markets with powerful offerings that sustain legacy technologies while spearheading new innovations.

ADLINK's Rugged by Design hardware survives where other manufacturers fall short, but ADLINK focuses on more than resilience. As a Premier member of the Intel® Internet of Things Solutions Alliance and an NVIDIA Quadro Embedded Partner, OEM Preferred Partner and Jetson Elite Partner, ADLINK leverages a unique access to the latest CPU and GPU technologies as well as the highest levels of technical support from Intel and NVIDIA. As a result, ADLINK has designed railway solutions with small form factors to ensure powerful systems in deployments throughout trains and terminals, making them ideally suited for AI, IoT or edge computing applications, thus continuing the company's mission to drive smarter, safer, and more reliable rail operations.



Leading Solutions for Train Control, Rail Signaling, Automation and Digitalization



Onboard Applications

- | | |
|---|--|
| 1 AI-enabled Video Analytics for Railroad Hazard/Intrusion Detection | 6 Locomotive Data Recorder |
| 2 Driver Machine Interface (DMI) | 7 Train Control & Monitoring System (TCMS) |
| 3 Data Distribution Service (DDS) | 8 Rugged Storage Systems for Video Surveillance |
| 4 Train-to-Ground Communications Control Unit (CCU) | 9 Passenger Information System (PIS) |
| 5 Automatic Train Operation (ATO) | |

Wayside Applications

- | | |
|--|--|
| 1 Multi-access Edge Computing (MEC) | 7 Video Processing Server |
| 2 Radio Block Center (RBC) | 8 Automated Fare Collection (AFC) |
| 3 Computer-based Interlocking (CBI) | 9 Facial Recognition |
| 4 Centralized Traffic Control (CTC) | 10 Platform Video Surveillance |
| 5 Network Security Server | 11 Platform Screen Doors (PSD) |
| 6 Automatic Train Supervision (ATS) | |



ADLINK Railway Solutions

As a new decade begins, public and private rail transit providers can invest in a variety of computing equipment for deployment in railcars, terminals, and other areas critical to railway operations. ADLINK has decades of experience developing hardware that's Rugged by Design and thus ideally configured for the frequently punishing operating conditions railway environments can present. The resulting product stack features best-in-class components backed by ADLINK's industry-leading customer service. ADLINK also regularly works with its customers to build customized solutions tailored to their exact needs. With a deep understanding of how important supply longevity is to the rail industry, ADLINK ensures best practices in product obsolescence and lifecycle management by fully leveraging its long-standing strategic partnerships with major hardware component and software vendors.

AI-enabled Video Analytics Platform: AVA-5500 Series

The ADLINK AVA-5500 represents a comprehensive and versatile solution that brings AI and the IoT to the railway industry. Designed for the AIoT (AI and IoT), ADLINK's AVA-5500 Series AI-enabled video analytics platform is one of the company's most versatile offerings.

ADLINK's Embedded MXM GPU modules, based on NVIDIA® Quadro® GPUs, give the AVA-5500 real-time video/graphics analytics capabilities suitable for a range of applications. Depending on their needs, rail systems integrators can deploy AVA-5500 rugged computers in applications such as railroad hazard detection/rail inspection, surveillance and intrusion detection, and passenger information systems. For example, the Quadro GPU's massively parallel computing architecture makes it an ideal choice for deep learning algorithms that can automatically detect equipment faults. When installed in a specialized inspection railcar, the AVA-5500 can process images of vital wayside equipment while travelling at speeds up to 120 km/h. The system then alerts maintenance crews to perform preemptive repairs as identified. Elsewhere, train terminal security personnel have used the AVA-5500 for real-time video analysis of camera footage, where similar algorithms can spot suspicious activity. Other AI-driven applications include highly accurate arrival/departure predictions, real-time diagnostics, and emergency response.

AVA-5500 Series customers can choose between Intel® Core™ i7-7820EQ (3.0 GHz) or Core™ i7-6830EQ (2.8 GHz) processors, both quad-core with Intel® Hyper Threading. With two SODIMM sockets, the AVA-5520 supports up to 32 GB of DDR4-2133 dual-channel memory. Combined with the NVIDIA® Quadro® GPU, the AVA-5500 offers six DisplayPort connections (two via integrated Intel graphics, four with lockable connectors via NVIDIA GPU MXM module) as well as a DVI-I display output for legacy screens.

The AVA-5500 also provides numerous slots for expansion, customization, and scalability. For storage, there are two 2.5" SATA drive bays, one M.2 2280 (SATA) slot, and an externally available CFast slot. The AVA-5500 also features two full-size Mini PCIe slots, two USIM slots, a Type A/B MXM slot (supporting EGX-MXM-P1000/P2000/P3000/P5000), and a USB 2.0 wafer connector. The AVA-5500 also provides four USB 3.0 Type A ports and four DB-9 RS-232/422/485 serial ports with 2KVrms isolation.



Harness AI technologies and deploy smart, rugged, real-time graphics/video applications vital to today's increasingly complex railway operations



For data transmission, ADLINK's AVA-5500 gives systems integrators numerous options to suit their existing infrastructure. The system's 10 Ethernet ports are comprised of two RJ-45 1000BASE-T, four M12 X-code 1000BASE-T with PoE Class 2 (7W) and 1.5kV isolation, and four M12 A-code 1000BASE-T with 1.5kV isolation. Using the built-in Mini PCIe slots, wireless connectivity can be added to the AVA-5500 with a cellular modem (3G/4G) or WLAN module, and there are four cutouts reserved for RP-SMA antennae. With this feature set, the AVA-5500 is also well equipped for applications in other industries, including military/aerospace, energy, and industrial/automation.

Driver Machine Interface: DMI-1040 & DMI-1210

The DMI-1040 is one of two human machine interface (HMI) panel computers from ADLINK that give human operators the tools they need to do their jobs. Inside, an Intel Atom® x5-E3930 processor runs at up to 1.8 GHz (1.3 GHz base frequency) and is matched with 2GB of DDR3L low-voltage memory (up to 8GB optional). The DMI-1040 has 64GB of eMMC storage as well as one CFast slot for expansion. Users have access to additional expansion via one full-size Mini PCIe slot and two SIM card slots. This system also has three M12 A-coded 10/100/1000BASE-T Ethernet ports supporting 2KVrms isolation.

A large, 10.4" (4:3) TFT display provides 1,000 cd/m² luminance, a contrast ratio of 1000:1, and a 1024 x 768 resolution. It also features a 5-wire resistive touchscreen and auto dimming. ADLINK encases these components in a highly resilient chassis. An operating temperature range of -25°C to +70°C makes the DMI-1040 EN50155 class OT3-compliant, and its numerous input voltages (24VDC, 36VDC, 72VDC, 110VDC) are also EN50155-compliant. The DMI-1040 has IP65 front and IP20 rear ingress ratings.

For rail signaling and train control, ADLINK's new DMI-1210 offers many advantages. This powerful, rugged panel computer is EN50155-compliant and also utilizes the Intel Atom® x5-E3930 processor. The DMI-1210 comes standard with 4GB of DDR3L-1600MHz and can accommodate an additional 4GB. The panel computer also offers exceptional I/O flexibility. There are two M12 GbE ports, two DB-9 RS-232/422/485 serial ports, and one M8 USB 1.1 port. The DMI-1210 has an integrated 72-channel high-sensitivity GNSS receiver, and users can supplement the system with MVB and CAN bus support via add-on modules. For additional expansion options, the DMI-1210 includes two full-size Mini PCIe slots, two micro-SIM slots, an onboard USB 2.0 wafer connector, one PC/104 slot, and both an M.2 slot and CFast slot to expand the system's storage.

ADLINK matches the DMI-1210's high-performance internal components with a 12.1" (4:3) TFT LCD 5-wire resistive touchscreen with 1024 x 768 resolution, a contrast ratio of 700:1, and a 600 cd/m² luminance rating. On the front bezel, a light sensor detects ambient lighting conditions and ties into an auto-dimming application. The DMI-1210's range of nominal input voltage—24VDC, 36VDC, 72VDC, and 110VDC—ensures EN50155 compliance.



Reliably deliver critical train information for drivers to monitor operations, conduct diagnostics, manage broadcasting, and control subsystems in real time, no matter how challenging the operating environment

Data Collection System: DCS-211

The ADLINK 19" DCS-211 data collection system is compatible with a 1U or 1.5U form factor for fast deployment in existing racks. It features eight isolated digital input (DI) channels with 2.5KVrms optical isolation and input voltage up to 137.5V (nominal voltages of 24V/36V/72V/110V). There are six digital output (DO) channels spread over four DO channels without isolation in a D-sub connector and two isolated DO channels with independently controlled internal integrated relays in a separate D-sub connector.

The DCS-211 uses an Intel Atom® x5-E3930 processor and paired with 4GB DDR3L-1600MHz (upgradable to 8GB). It also has four GbE ports (1x RJ-45, 3x M12 with 2KVrms isolation), two programmable RS-232/422/485 serial ports via front panel DB-9 connectors, two Type A USB connectors (1x 3.0, 1x 2.0), 32GB of built-in eMMC 5.0 storage (64GB optional), one M.2 2280 slot for "M key" SATA SSDs, and space on the front panel for a hot swappable 2.5" SSD or CFast slot.

Rail systems integrators can take advantage of the DCS-211's three Mini PCIe slots (2x PCIe + USB 2.0, 1x USB 3.0), which support full or half size modules with one USIM for each slot. One of the USIM slots is onboard, and two are externally accessible from the front panel beneath a cover. Using the Mini PCIe slots, the DCS-211 can be configured for 3G/4G/GPS/CAN/MVB as well as GNSS. There are four reserved antenna connector cutouts supporting three RP-SMA connectors for cellular and Wi-Fi, and an optional SMA connector for GNSS.



Collect and store critical data securely to facilitate train operation monitoring, driver performance evaluation, and post-event investigation; reliable data management can yield improved operational efficiency and safety

High Performance Extreme Rugged Computer: HPERC-KBL-MC

The new HPERC-KBL-MC is built to withstand some of the harshest conditions on the planet. This Extreme Rugged small form factor computer features an Intel® Xeon® E3-1505M v6 3.0GHz quad-core processor and Intel® CM238 chipset. Customers can supplement this with an NVIDIA® Quadro® series MXM graphics module for AI, deep learning, IoT, and other applications that require massively parallel computing resources. For added durability, the HPERC-KBL-MC features 16GB of soldered onboard DDR4-2400MHz ECC SDRAM (optionally 32GB).



Outperform the competition with an ultra-compact and Extreme Rugged design for high-performance computing and GPGPU capabilities in the most demanding environments

The HPERC-KBL-MC's standard available I/O exemplifies its versatility. With three video outputs (2x DVI, 1x VGA), the system can drive three displays simultaneously. Four 10/100/1000 Mbps Ethernet ports are available via Intel® Ethernet Controllers I210, as well as six USB 2.0 and seven RS-232/422 serial ports. Up to two 2.5" 6 Gb/s SATA SSDs can be installed, and the HPERC-KBL-MC also supports RAID 0/1. A single SDHC slot recognizes cards up to 64GB. PCI/104 Express and PCI Express Mini Card slots (both PCIe Gen2) further extend the system's expandability.

Although ADLINK built the HPERC-KBL-MC to meet demanding MIL standards utilizing elements such as environmental sealing and MIL-DTL-38999 connectors, this system also has the resilience necessary to survive the rigors of railway transportation in virtually any environmental setting. The system meets various certifications and standards for immersion, salt spray, altitude, humidity, shock and vibration, EMI/EMC, power, and operating temperature. The HPERC-KBL-MC is also built to meet the VITA 75 cold plate mounting specification for exceptional durability.

Ultra-compact IoT Platform: MXE-210 Series

Identifying the need for compact, IoT appliances that can serve several industries, ADLINK designed the MXE-210 Series ultra-compact embedded platform. Depending on SKU, the MXE-210 Series offers either an Intel Atom® x7-3950 1.6 GHz (2.0 GHz burst) or Intel Atom® x5-3930 1.3 GHz (1.8 GHz burst) processor. All systems feature 2 GB of RAM that can be upgraded up to 8GB.

The MXE-210 Series' I/O and slot selection meet a wide range of expansion needs, including a DisplayPort, two USB 2.0 and two USB 3.0 ports, two Gigabit Ethernet ports, and two COM ports (RS-232/422/485). Internally, a pair of Mini PCIe slots, one USIM slot, one mSATA, and a Micro SD slot make the MXE-210 Series highly configurable and, via USIM, let integrators supplement their systems with Wi-Fi, Bluetooth, 3G, LoRa (SX1276), and 4G LTE. Optionally, the MXE-210 Series can accommodate a 2.5" SATA SSD storage kit or isolated 8x DI/8x DO.

Featuring the ultra-rugged construction of ADLINK's Matrix line, ADLINK's MXE-210 Series not only meets the EN50121 railway standard but also protects the system against extreme conditions. It has a shock tolerance of 100 G and boasts an extended operating temperature range of -40°C to 85°C. Out of the box, MXE-210 Series systems offer DIN rail mounting support, and customers can add optional wall mount support. ADLINK also includes its SEMA solution for embedded management.



Drive smart, safe train monitoring and control by centralizing the management of ever-increasing numbers of sensors and devices; management becomes efficient and scalable through high system configurability and deployment flexibility



Hybrid Architecture CompactPCI System: TRC-3000

Innovative hybrid architecture protects customers' investments in existing infrastructure while boosting system performance via a seamless technology upgrade and insertion

Performance-centric CompactPCI solutions often struggle to accommodate high-power CPU, GPU, and switch components within a compact, passively cooled enclosure. The TRC-3000 is a 2U/3U 19" rackmount fanless system that supports a range of plug-in I/O modules. Specifically, most of the chassis interior belongs to two high-power board/peripheral slots, with two more vertical slots for low-power peripherals and two additional 6HP slots. The TRC-3000 provides superior thermal performance for demanding CPU/GPU heterogeneous computing applications that complement railway needs while maintaining the ruggedness demanded in such environments.

Rugged 3U CompactPCI Process Blade cPCI-3630 Series

Recognizing the increasing need for powerful yet extremely tough systems configured for rapid deployment, ADLINK continues to expand its range of CompactPCI processor blades. The cPCI-3630 Series flagship is a 3U, Rugged by Design, Intel Atom®-based blade built to operate in the challenging environmental conditions many railway operators face. All SKUs are EN 50155-compliant. Customers have the option of a quad-core Intel Atom® x7-5950 (1.6 GHz) or a dual-core Intel Atom® x5-3930 (1.3 GHz). The cPCI-3630 Series can support up to 8 GB of soldered onboard dual-channel DDR3L 1600 MHz memory.

The cPCI-3630 Series processor blades offer a wide range of connectivity, graphics, and storage options, giving systems integrators the opportunity to select a blade according to specific application needs. For example, most SKUs include two 10/100/1000BASE-T ports and a VGA connector, but models with two additional M12 MIL-STD GbE connectors or two DisplayPort connectors that support up to 4096x2160p are also available. Some dual-slot SKUs feature a serial port for additional customization. Multiple storage options exist, as well.



Enable a wide variety of railway applications with an extensive, cost-effective portfolio featuring optimum performance, reliability, flexibility, sustainability, and supply longevity

As Rugged by Design units, cPCI-3630 Series CompactPCI blades meet numerous mechanical and environmental standards. They are EN 50155 Tx-compliant for operating temperature, functioning in a temperature range of -40°C to 70°C (fanless) or -40°C to 85°C (forced air cooling). ADLINK cPCI-3630 Series systems also meet EN 50155 requirements for shock and vibration, plus MIL-STD-810G for altitude.

Use Case: Powerful AI-enabled Railway Obstacle Detection

Although the world's rail systems safely transport millions of passengers to their destinations every day, real risks remain, and the consequences can be serious. Derailment accidents, terrorist attacks, and other dangers are unfortunate occurrences that railways systems and operators must anticipate and prepare to mitigate. Modern security requires an advanced, multi-pronged approach, where AI, machine learning, edge analytics, IoT, predictive and reactive analytics, and wireless communications seamlessly come together to give professionals a comprehensive understanding of potential vulnerabilities.

ADLINK is at the forefront of bringing robust, military-grade hardware to rail systems integrators around the world. With extensive experience in developing Extreme Rugged computing platforms for defense, industrial, and other verticals, ADLINK provides essential components that meet performance requirements for real-time, multi-stream video analytics that are able to operate in environments where shock and vibration, electromagnetic interference, extreme temperatures, and other conditions are common.

Recently, ADLINK's expertise proved to be an ideal match for a European railway customer that had developed a railway obstacle recognition system. The customer's requirements were substantial. Their system relied on a combination of optical radar, digital cameras, and a host of sensors to identify railway failures or other obstacles by leveraging AI-based processing algorithms. The graphics processing load for this application was immense.

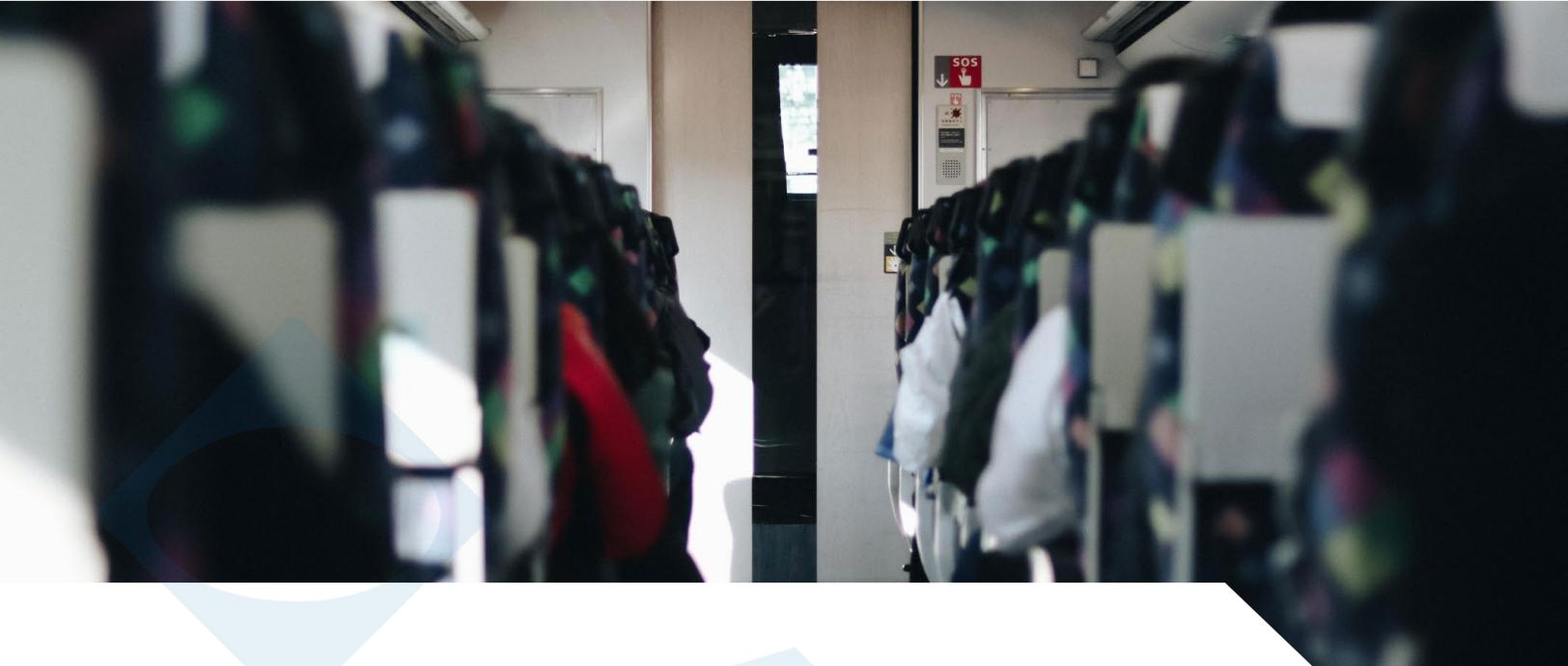
ADLINK's cutting-edge AVA-5500 AI-enabled Video Analytics (AVA) platform met the challenge. The system's powerful GPGPU-assisted AI processing and software support helped the railway customer optimize their applications according to their needs. Thanks to the AVA-5500's EN50155-certified Extreme Rugged construction, it was also ready for immediate deployment where the railway obstacle recognition system would operate.

The AVA-5500 platform's success in real-time rail obstacle detection makes it equally suitable for a similar role in a railway terminal or deployed in other specialized rail inspection cars. Featuring quad-core Intel processors (Core™ i7-6820EQ or Core™ i7-7820EQ) and an NVIDIA® Quadro® GPU, the AVA-5500 is equipped for modern, demanding video processing work of all kinds. It has a host of storage and connectivity options, all housed in a rugged, fanless chassis that protects its internal components from damaging environments. ADLINK works closely with its other customers in the transportation industry to configure and deliver AVA-5500 platforms to meet specific and unique needs.



Video: ADLINK's AI-enabled Video Analytics Platform Driving Safer and Smarter Rail Operations





Use Case: Seamless Transition to Next-Generation LDARS

Event recording continues to be a critical aspect to railways and other transportation systems. It also continues to present operators with different demands. For example, the 2014 disappearance of Malaysia Airlines MH370 prompted a world-renowned Locomotive Data Acquisition Recording System (LDARS) solution provider to reassess its approach to event recording.

Rather than rely on the traditional “black box” approach of recording and storing event data locally, and then retrieving it in a lab as part of an after-event investigation, the U.S.-based company sought to develop a live event recording system capable of streaming data to the cloud. From there, credentialed personnel can access and analyze data in real time for any railcar, locomotive, or train that has the LDARS system installed.

However, the company’s improved LDARS system clearly required more CPU resources than its legacy LDARS PC/104 computing platform could provide. They had developed their LDARS solution around a small form factor built for fanless operation, stackable modular flexibility, low power consumption, and rugged durability — all good attributes, but ones that had been implemented in a way that limited performance. Their next generation, real-time stream event recording system couldn’t expand beyond the form factor’s restrictions.

Moreover, the LDARS system constituted only a fraction of the train’s complete onboard Positive Train Control (PTC) system, and the next generation solution couldn’t expand beyond the legacy system’s total footprint. In short, the company needed higher performance while maintaining a fanless design (for dust resistance) without exceeding thermal and power thresholds.

ADLINK provided the initial solution for the new LDARS system and also supplied its eventual successor. At first, the company selected ADLINK’s CoreModule-920, which featured an 3rd Gen Intel® Core™ or Xeon® processor and fast I/O connections, but then the LDARS company migrated to ADLINK’s CM4-SL2 PCI/104-Express single board computer. Boasting a 6th Gen Intel® Core™ processor, ADLINK’s offering also uses latching-type connectors for enhanced security, convenience and time-to-market benefits. Without latching connectors, cable connections require hot glue to maintain ruggedness, which is far from ideal.

As part of the PC/104 Consortium, ADLINK remains at the forefront of the form factor and has an extensive portfolio of COTS products designed to PC/104 standards. Customers can easily select an existing product and drastically reduce their time to market. In the event customers have special considerations, ADLINK’s in-house engineers and designers are able to use an existing product and tailor it to new purposes or requirements.



Use Case: ProRail and ADLINK Vortex OpenSplice

ADLINK has established a reputation as a leading component manufacturer across multiple industries thanks to consistent excellence over the last decades. However, the company has also invested considerable resources in software development for these same industries. One such example is ADLINK's Vortex Data Distribution Service (DDS) data sharing software framework, which can serve many vertical markets, including transportation.

Dutch organization ProRail relies on ADLINK Vortex OpenSplice for important information management of its railway systems. Reliable and fault-tolerant, ADLINK Vortex OpenSplice data-sharing platform helps ProRail juggle the 6,000 trains carrying 1.2 million passengers every day, the Netherlands' railways being among the busiest in Europe. "Vortex OpenSplice provides the real-time functionality and mission-critical performance we need," said Henk Bothof, CIO at ProRail. "It also delivers that important capability to maintain non-volatile information for late-joiners in a fault-tolerant way."

The traffic control security systems ProRail relies on pass through the ASTRIS system, the overall management tool for mission-critical rail infrastructure. ADLINK's Vortex OpenSplice operates within this system, and it handles seamless data sharing across sensors, components, applications, and systems that ProRail has deployed across its railways.

ADLINK Vortex OpenSplice stands above other commercial offerings that use the open-source implementation of the Object Management Group's (OMG) DDS standard. ADLINK has developed Vortex OpenSplice to share and integrate data across a wide range of operating systems and platforms, as well as industries. ADLINK's software is compliant with OMG DDS v1.4 and OMG-DDSI/ RTPS v2.2 wire-protocol standards. The DDS implementation is intended for both server-class platforms and specialized embedded environments and is a crucial element of ADLINK's Vortex family of Industrial Internet of Things (IIoT)-enabling technologies.

Rugged Fanless Railway Platforms

AVA-5500 New



Rugged, Fanless AI-enabled Video Analytics Platform with NVIDIA® Quadro® GPU

- 6th/7th Gen Intel® Core™ i7 processors
- NVIDIA® Quadro® GPU MXM 3.1 Type A/B module on PCIe x16 Gen 3
- 8x M12 GbE (4x PoE), 4x RS-422, 4x USB 3.0, 1x DVI-I, 4x DisplayPort with lockable connectors
- Multiple storage options: 2x 2.5" SATA 6.0 Gb/s drive bays, 1x M.2 2280 slot, 1x CFast socket
- GNSS/3G/4G/WLAN support via 2x mPCIe slots and 2x USIM slots
- MVB/CAN bus support through mPCIe add-on modules
- Wide range DC input: 24VDC, 36VDC, 72VDC and 110VDC
- EN50155-compliant, -25°C to +70°C wide operating temperature range

AVA-5600 New



High Performance Fanless Platform with Intel® Core™ i7-7820EQ Processor

- 4x M12 GbE with PoE, 4x lockable DisplayPort outputs from independent GPU, 4x USB 3.0
- Multiple storage options: 2.5" SATA 6.0 Gb/s drive bay, 1x M.2 2280 slot, 1x CFast socket
- GNSS/3G/4G/WLAN support via 2x Mini PCIe slots and 2x USIM slots
- MVB/CAN bus support through mPCIe add-on module
- Nominal voltage: 24VDC, 36VDC, 72VDC and 110VDC
- EN50155-compliant, -25°C to +70°C wide operating temperature range

DCS-211 New



1.5U 19" Rackmount Data Collection System

- Intel Atom® E3930 processor
- 8x Digital I/O with 2kVrms isolation, 4x 2A relays in DO
- 3x M12 GbE, 1x RJ-45 GbE, 2x isolated RS232/422/485, 2x USB and one lockable HDMI port
- Two DB-9 connector cutouts reserved for MVB or CAN modules
- Up to 3x mPCIe slots with one USIM card slot each
- Storage: up to 64GB eMMC 5.0, 1x 2.5" SATA drive bay (CFast optional) and onboard M.2 slot
- EN50155-compliant, -40°C to +70°C wide operating temperature range

CCU-5500



High-Performance Fanless Onboard Wi-Fi Communication Control Unit

- 6th/7th Gen Intel® Core™ i7 quad-core processors
- Up to six mPCIe slots for cellular modules and dual SIM slots for each module
- QMA antenna connectors supported
- 2x M12 GbE, 2x M8 USB 2.0, 8x Digital I/O and 2x serial ports
- Storage: 2.5" SATA drive bay, externally accessible CFAST slot, and onboard M.2 slot
- Nominal voltage: 24VDC, 36VDC, 72VDC and 110VDC
- EN50155-compliant, -40°C to +70°C wide operating temperature range

DMI-1210 New



12.1" Driver HMI with Intel Atom® x5-E3930 Processor

- Intel Atom® x5-E3930 processor, up to 1.8GHz
- 12.1" color display: 4:3, 1024x768 pixels, 600cd/m2, 5-wire resistive touch
- Up to 8GB DDR3L memory, 32GB eMMC storage (64GB optional)
- Software-controlled backlight
- MVB/CAN bus support by PC/104 or mPCIe add-on modules
- Built in GNSS and two mPCIe card slots for cellular modem with USIM
- Nominal voltage: 24VDC, 36VDC, 72VDC and 110VDC
- EN50155-compliant, -25°C to +70°C wide operating temperature range
- IP65 front and IP20 rear ingress protection ratings

DMI-1040 New



10.4" Driver HMI with Intel Atom® x5-E3930 Processor

- Intel Atom® x5-E3930 processor, up to 1.8GHz
- 10.4" color display: 4:3, 1024 x 768 pixels, high brightness 1000cd/m2, 5-wire resistive touch, auto dimming
- 2GB DDR3L memory (up to 8GB optional)
- 64GB eMMC storage
- Power input voltage: 24VDC, 36VDC, 72VDC and 110VDC
- EN50155-compliant, -25°C to +70°C wide operating temperature range
- IP65 front and IP20 rear ingress protection ratings

HPERC-KBL-M Series New



Ultra-compact Rugged Platform with NVIDIA® Quadro® GPU

- SWaP-optimized VITA 75 small form factor platform
- Intel® Xeon® Processor E3-1505M v6 quad-core processor
- NVIDIA® Quadro® GPU MXM 3.1 Type A/B module on PCIe x16 Gen3
- Soldered DDR4-2400 16GB ECC RAM
- Quad Gigabit Ethernet, and 6x USB ports
- 3 independent displays (DVI/VGA)
- Extended operating temperature: -40°C to +75°C; -40°C to +85°C (coldplate)
- OS support: Windows 10, RHEL 7.3

MXE-210/MXE-210i Series



Ultra-compact IoT Platform with Intel Atom® E3900 Processor

- Equipped with Intel Atom® x7-E3950/x5-E3930 processors
- Compact fanless design: 140(W) x 110(D) x 58(H) mm
- Rich I/O & expansion: 1x DisplayPort, 2x USB 2.0, 2x USB 3.0, 2x GbE, 2x COM ports; 2x mPCIe slots, USIM slot, mSATA, Micro SD slot
- Optional 2.5" SATA SSD by storage kit, and eSIM support
- Built-in ADLINK SEMA management solution
- EN50121-compliant, -20°C to +70°C wide operating temperature range

CompactPCI Platforms & Peripherals

cPCI-3630



3U CompactPCI Quad-Core Intel Atom® Processor X Series Blade

- Up to 8GB DDR3L-1600 ECC soldered memory and onboard up to 128GB SSD support
- Smart Embedded Management Agent (SEMA) for system health monitoring
- Optional GbE ports with MIL-STD M12 connectors
- EN 50155 compliant for railway safety-critical applications
- -40°C to +70°C fanless operation (up to +85°C with airflow)
- Minimum 10 years product life support

cPCI-3620



3U CompactPCI Quad-Core Intel Atom® Processor E3800 SoC Blade with ECC

- Outstanding performance and energy efficiency
- -40°C to +70°C fanless operation (up to +85°C with airflow)
- Optional GbE ports with MIL-STD M12 connectors
- VxWorks 5.5.1 support

cPCI-A3525

New



3U CompactPCI Serial 8th/9th Gen Intel® Xeon®, Core™ i7, Celeron® Processor Blade with ECC

- PICMG® CPCI-S.0 CompactPCI® Serial Processor Blade
- 14nm up to 6 core 9th Gen Intel® processor, (formerly Coffee Lake Refresh)
- Max. 64GB DDR4-2666 by 2x SODIMMs
- Supports 2x PCIe x8 Gen 3 and 2x PCIe x4 Gen 3
- Up to 10x USB 2.0/3.0, up to 7x SATA to rear

cPCI-A3515



3U CompactPCI Serial 4th/5th Gen Intel® Core™ i7 Processor Blade with ECC

- PICMG CPCI-S.0 CompactPCI Serial Processor Blade
- Up to 16GB DDR3L ECC soldered memory with ECC support
- Up to three independent displays
- Hybrid design bridges serial interfaces with existing PICMG 2.0 I/O cards

cPCI-3520

New



3U CompactPCI 8th/9th Gen Intel® Xeon®, Core™, Celeron® Processor Blade with ECC

- Up to 32GB DDR4-2666 soldered memory
- Supports three independent displays
- System/Peripheral slot operation
- Up to -40°C to +85°C operation
- Multi options storage interfaces incl. cFAST, SSD, mSATA, 2.5" SATA drive
- Flexible IO interfaces by mezzanine card selections
- Design for EN50155 compliance

cPCI-6540

New



6U CompactPCI 9th Gen Intel® Xeon®, Core™ Processor Blade with two PMC/XMC sites

- Dual channel DDR4-2666 memory, soldered and SO-CDIMM, up to 32GB
- Supports three independent displays
- Remote management and TPM support
- Extended temperature supported

cPCI-3E10/3E12



3U CompactPCI 2/4-Port Gigabit Ethernet Card

- 32-bit/33MHz, 66-bit/64MHz CompactPCI bus
- Two or four RJ-45 10/100/1000BASE-T ports on front panel
- Two LAN ports switchable to rear
- Optional LAN port via D-Sub connector

cPCI-3EW20-MVB

New



3U CompactPCI Mini PCIe MVB Carrier Card

- PICMG 2.0 R3.0 compliance
- Two DB-9 connectors on faceplate
- MVB version with Duagon MVB module
- Operating Temperature: -40°C to +85°C
- EN50155 compliance

cPCI-3EW20-M12

New



3U CompactPCI M12 Ethernet Card

- PICMG 2.0 R3.0 compliance
- Four independent Ethernet controller Intel i210
- Four M12 Ethernet ports on faceplate
- 1500V AC isolated
- Operating Temperature: -40°C to +85°C
- EN50155 compliance

cPCI-3EW20-LTE

New



3U CompactPCI Mini PCIe LTE Card

- PICMG 2.0 R3.0 compliance
- Support one Mini PCIe LTE module
- Two SMA connectors and one DB-9 for PA control on front panel
- 1500V AC isolated
- Operating Temperature: -40°C to +85°C
- EN50155 compliance

cPCI-3548

New



8-Port RS-232/422/485 Isolated Serial Communications Card

- 32-bit CompactPCI®, PICMG® 2.0 Rev 3.0
- Plug-and-play, IRQ & I/O address automatically assigned by PCI BIOS
- Eight asynchronous communications ports with intelligent buffer
- Eight RS-232/422/485 ports
- 2500 VDC signal to ground isolation voltage
- Supports multiple OS
- Surge protectors
- Rugged DB37 connector

cPCI-3544



4-Port RS-422/485 Isolated Serial Communications Card

- Plug-and-play, IRQ & I/O address automatically assigned by PCI BIOS
- Four asynchronous communications ports with intelligent buffer
- Four RS-422/485 ports
- 2500 VRMS isolation voltage

cPCI-7432/7433/7434

64-CH Isolated Digital I/O Modules

- 5000VRMS isolation voltage
- Sink current up to 500mA on each isolated output
- Rear I/O available on cPCI-7432R, 7433R, 7434R



cPCI-7841

Dual-port Isolated CAN Interface Cards

- Two independent CAN network operation
- 2500 VRMS isolation protection
- Direct memory mapping to the CAN controllers
- PCI bus plug-and-play



cPCI-A3X10

New



3U CompactPCI Serial XMC Module Carrier

- 3U 4HP CPCI-S.0 peripheral
- One XMC slot
- Operating temperature: -40°C to 85°C with qualified component

cPCI-A3H10

New



3U CompactPCI Serial 2.5" SATA Storage Carrier

- 3U 4HP CPCI-S.0 peripheral
- One 2.5" SATA 6Gb/s drive slot
- Status LEDs on faceplate: drive activity, hot-swap status, user-configurable
- Hot swap support
- Operating temperature: -40°C to 85°C with qualified component

CPGS-9120-M12-A / CPGS-9160-M12-A

EN 50155 12/16-port managed Gigabit Ethernet switch

- 4 or 8 Gigabit Ethernet ports on front in M12 connectors and 8 ports on rear
- O-Ring fast recovery technology
- Open-Ring / O-Chain network redundancy technology
- Configuration via web-based interface, CLI, and SNMP



ORing

Power Supplies

cPS-H325/WDC



3U CompactPCI 8HP Wide Input Range Power Module

- Input voltage range from 16.6 to 160VDC
- -40°C to +85°C operating temperature
- Hot-swap support for N + 1 redundancy
- Output power 120W (fanless) or 300W (forced air)
- Remote signal and degradation signal support

cPS-H325/AC



3U CompactPCI 8HP 250W AC Power Module

- Input voltage range from 90 to 264VAC
- 250W nominal output power
- Operating temperature -40°C to +70°C
- Internal ORing diodes for N + 1 redundancy
- Hot swappable
- Active current sharing

Systems

cPCIS-ET1100



3U 84HP CompactPCI Fanless Enclosure with 32-bit Backplane and Redundant Power Supply

- 19" 3U rack mount housing with 7 peripheral slots
- Comprehensive EMC shielding
- Equipped with wide temperature range CompactPCI redundant power supply (Max. output 500 W)
- Optional dual system segments, each with one system slot and five peripheral slots

cPCIS-3048



3U 48HP CompactPCI Fanless Enclosure with 6-slot Backplane and Redundant Power Modules

- 3U CompactPCI backplane with one system slot and five peripheral slots
- Suitable for rackmount applications
- 3U 48HP fanless enclosure
- Optional redundant CompactPCI power modules

Benefits of ADLINK Manufacturing

Smart Teams Revolutionize Design and Manufacturing

The genius behind ADLINK's ability to deliver best-in-class, affordable products while minimizing time to market is our Design and Manufacturing Services team. Our DMS group brings years of experience with fast prototyping and highly effective R&D so that efficiency and quality are consistent throughout our product range. The team's efforts have earned ADLINK the prestigious ISO-9001 certification.

ADLINK's Asia headquarters also has in-house PCB layout teams, SMT lines, system integration, and test capabilities. Our tight control over every phase of manufacture lets our customers minimize total cost of ownership (TCO) while simultaneously giving them extensive customization and system integration advantages.

Finally, by having total control over our manufacturing facilities, ADLINK can boast end-to-end security, from design to production, making our hardware immune to outside tampering.

Customer-Focused Service—Local and Online

ADLINK's customers are our top priority, and we maintain a tireless dedication to all of our customers' needs. Over the years, we've built a strategic global footprint to facilitate customer proximity, a valuable advantage for high-touch-type customers and programs. In addition to local service, ADLINK provides the following online services on demand:

eRMA. ADLINK's eRMA system allows customers to begin the RMA process quickly. They can obtain an RMA number and track RMA status online at any time.

Partner Center. ADLINK distributes all product and marketing information on new solutions as soon as they're available at our global headquarters. Global sales representatives and distributors have instant access to the ADLINK Partner Center.

With strategically located design resource and manufacturing capability in every major geographic region, ADLINK is able to work closely with customers to better understand their specific need, and provide optimum solutions with short lead-time to help them address today's new challenges in the rail industry.



Why ADLINK?

By leveraging more than 20 years of expertise in developing highly reliable and available embedded computing systems, ADLINK is a premier supplier to the rail industry that offers not only an extensive, cost-effective, and standards-based COTS portfolio, but also a wide range of rugged fanless embedded computers and custom solutions enabled by its best-in-class ODM capabilities. ADLINK is committed to helping rail integrators and application developers focus on differentiating and transforming their end applications in train control, rail signaling, automation and digitalization. Moreover, ADLINK can help facilitate deployments for onboard and wayside applications as well as greenfield and brownfield projects, ultimately driving safer, smarter, and more reliable railway operations.



Technology Leadership

As a long-standing pioneer in embedded technologies, ADLINK drives industry standards and technology advancements with leading bodies, including the PCI Industrial Computer Manufacturers Group (PICMG), the PC/104 Consortium, and the VMEbus International Trade Association (VITA). ADLINK now brings its expertise in edge computing, IoT, AI, and machine learning technologies to enable a variety of new rail applications.



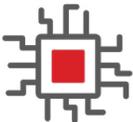
Extensive Portfolio

ADLINK is dedicated to continued development of its extensive, highly cost-effective, EN 50155-compliant COTS product portfolio. ADLINK's complementary product lines enable customers to deliver low total cost of ownership (TCO) with great flexibility in solution selection while addressing today's increasingly complex rail operations.



Strategic Partnership

As a Premier member of the Intel® Internet of Things Solutions Alliance and an NVIDIA Quadro Embedded Partner, OEM Preferred Partner and Jetson Elite Partner, ADLINK leverages a unique access to the latest CPU and GPU technologies as well as the highest levels of technical support from Intel and NVIDIA.



Quality and Integrity

With world-class in-house manufacturing facilities, established quality management systems, and supply chain management (ISO-9000 and TL9000 certified), ADLINK ensures uncompromised military-grade quality, and equally importantly, fully controls product integrity and security, and is thus immune to any outside tampering.



Supply Longevity

ADLINK ensures best practices in working through product obsolescence and lifecycle management. We leverage strategic partnerships with key component and software vendors, delivering supply longevity to the support traditionally long lifecycle programs of the rail industry. ADLINK is a leading global supplier of field-proven CompactPCI solutions and actively invests in sustaining the technology to help rail integrators undertake system upgrades and technology insertions.



Business Flexibility

As an ODM powerhouse with a flexible and agile organization, ADLINK can effectively and efficiently address rebranding, customization, and joint development smoothly and promptly. ADLINK makes ease of doing business one of our top priorities and focuses on helping customers speed time-to-market for long-term mutual success.



Global Support

As a global enterprise with a strategic footprint in design, manufacturing, and service worldwide, ADLINK leverages customer proximity to effectively deliver products to regional market specifications and requirements. This high-touch business model, which hinges on local technical and business services, is key to most rail programs.



IoT Solutions Alliance
Premier



PREFERRED PARTNER



ELITE PARTNER



NVIDIA QUADRO CERTIFIED
EMBEDDED

CompactPCI®

PC/104
Embedded PC Modules



COM Express

VITA
Open Standards, Open Markets

VPX™