

ADLINK is dedicated to helping the railway industry accelerate digital transformation and AI-enabled implementation to drive safer, smarter and more reliable railway operations

ADLINK Railway Solutions Forward Into The Future

Product Brochure

Accelerating Railway Digitalization with AI

Railway transportation has long been thought of as conservative or “old school,” but current trends are rapidly pushing the rail industry to digitalize and embrace cutting-edge technologies. From an environmental standpoint, rail emits over [6x less CO2](#) per passenger than air travel, making rail clearly preferable for those wanting to combat climate change. Meanwhile, the world’s growing population continues to [urbanize](#), putting more pressure on railways to help move more people more efficiently, and over-congested [global supply chains](#) need every possible bit of added transportation productivity to help alleviate ongoing shortages.

Railway efficiency is not bounded by gauge or speed. Rather, AI deployed on railway computing infrastructure, especially at the network edge, has tremendous potential to improve operations and bottom lines. When implemented in trucks, a 2020 [study](#) found that driverless vehicles realized 29% to 45% cost savings compared to those driven manually, and total cost of vehicle ownership dropped by over 15%. Analogous improvements can be found in rail transportation. AI effectively eliminates the delays and errors caused by humans in everyday operation, and automated driving negates the need for engineers to operate trains.

AI opens possibilities for a host of other railway applications and improvements, including:

- Biometric ticketing, which uses AI to streamline the handling of passenger fares by using body scans (e.g., face, fingerprint, or retina) linked to passenger payment accounts.
- Crowd monitoring, to help assess terminal congestion and ensure patrons don’t evade paying fares.

- Delay-time prediction, which involves AI assessing current train statuses against a wealth of historical data to make informed estimates on train delay developments and remediation times.
- Fuel management, to generate fewer emissions while idling by putting the engine into a low-power state.
- Infrastructure monitoring, wherein AI analyzes real-time camera feeds from locations ranging from train axles to wayside stations to watch for obstructions, damage, or other anomalies.
- Standalone switching, in which AI systems and machine-to-machine (M2M) communications optimize train schedules and paths.
- System-wide analytics based on metrics such as network velocity, aggregate customer satisfaction, labor utilization, and productivity, all of which help inform ROI measurements and long-term planning.

ADLINK now offers a range of solutions for onboard and wayside applications, all of which are based on open standards-based computing hardware. Each solution is optimized for different workloads and environments. Most are designed with specific advantages for AI-enhanced applications, such as hardware-based algorithm acceleration built into the CPU or extensibility to add greater AI acceleration with GPU and/or FPGA resources. In all cases, ADLINK engineers these solutions to deliver an optimal blend of performance, low-power operation, and ruggedness, allowing them to survive many years in harsh railway environments. ADLINK prepares railway clients to seize AI’s benefits today and make sure those benefits deliver increasing value into the future.

Building AI's Pervasiveness throughout Rail with AI-enabled Video Analytics Platforms



A line of EN 50155 compliant AI-enabled platforms offer rail solution providers with a high level of flexibility to select the configuration best suited to their use cases, and help them achieve railway digital transformation

AVA-5500

Rugged, fanless AIoT platform with NVIDIA Quadro GPU embedded for real-time video/graphics analytics



AVA-5600

19" 2U rackmount rugged, fanless AIoT platform with high performance GPU for compute-intensive applications



AVA-RAGX

Compact, fanless AIoT video analytics platform with NVIDIA Jetson AGX Xavier for SWaP-constrained deployments



CompactPCI Platforms

Complete solutions consisting of high performance CPCI-S.0 processor/carrier blades, NVIDIA MXM GPU modules and CompactPCI systems



CompactPCI Serial Processor Blades

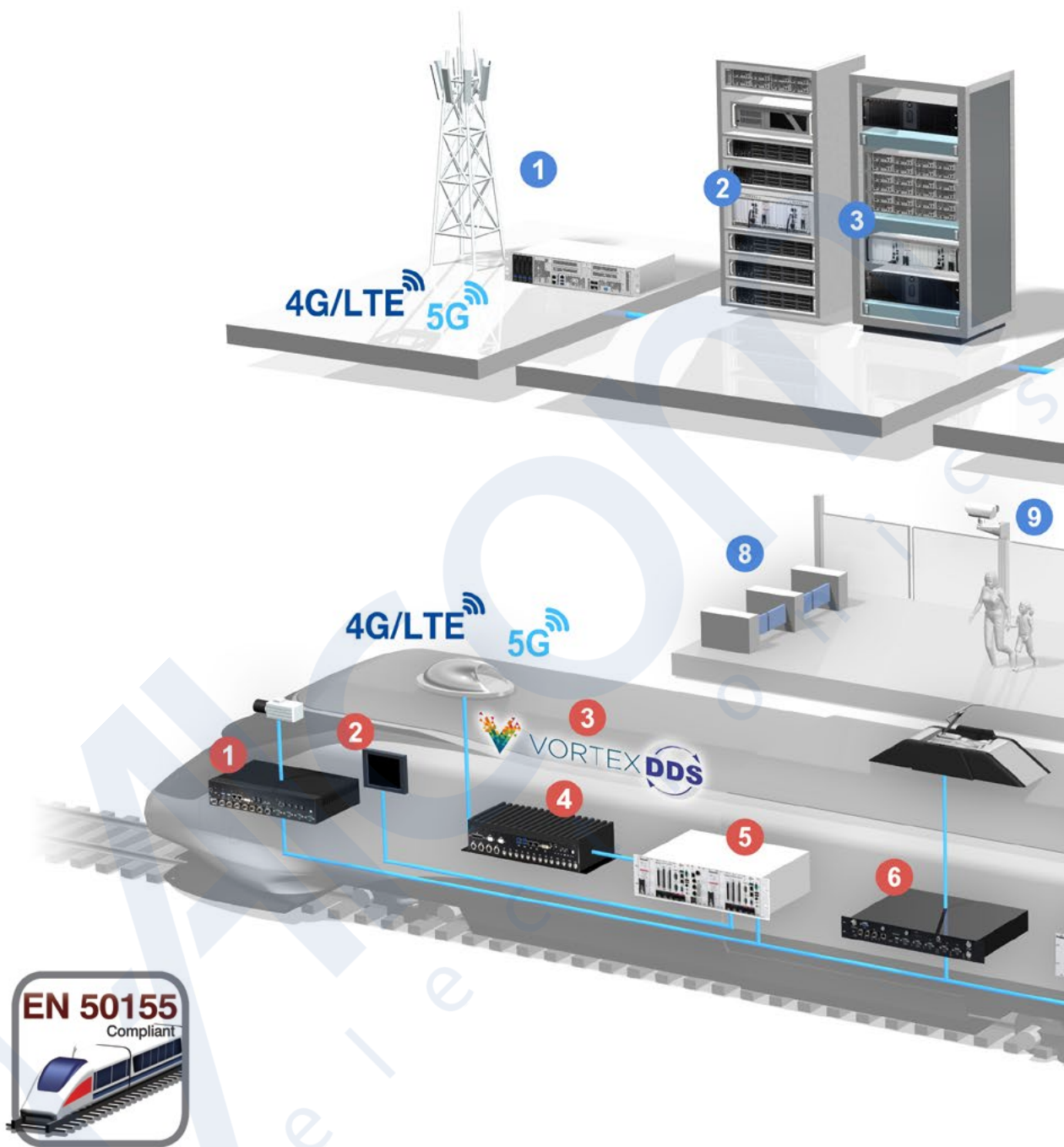


MXM GPU Modules



CompactPCI Systems

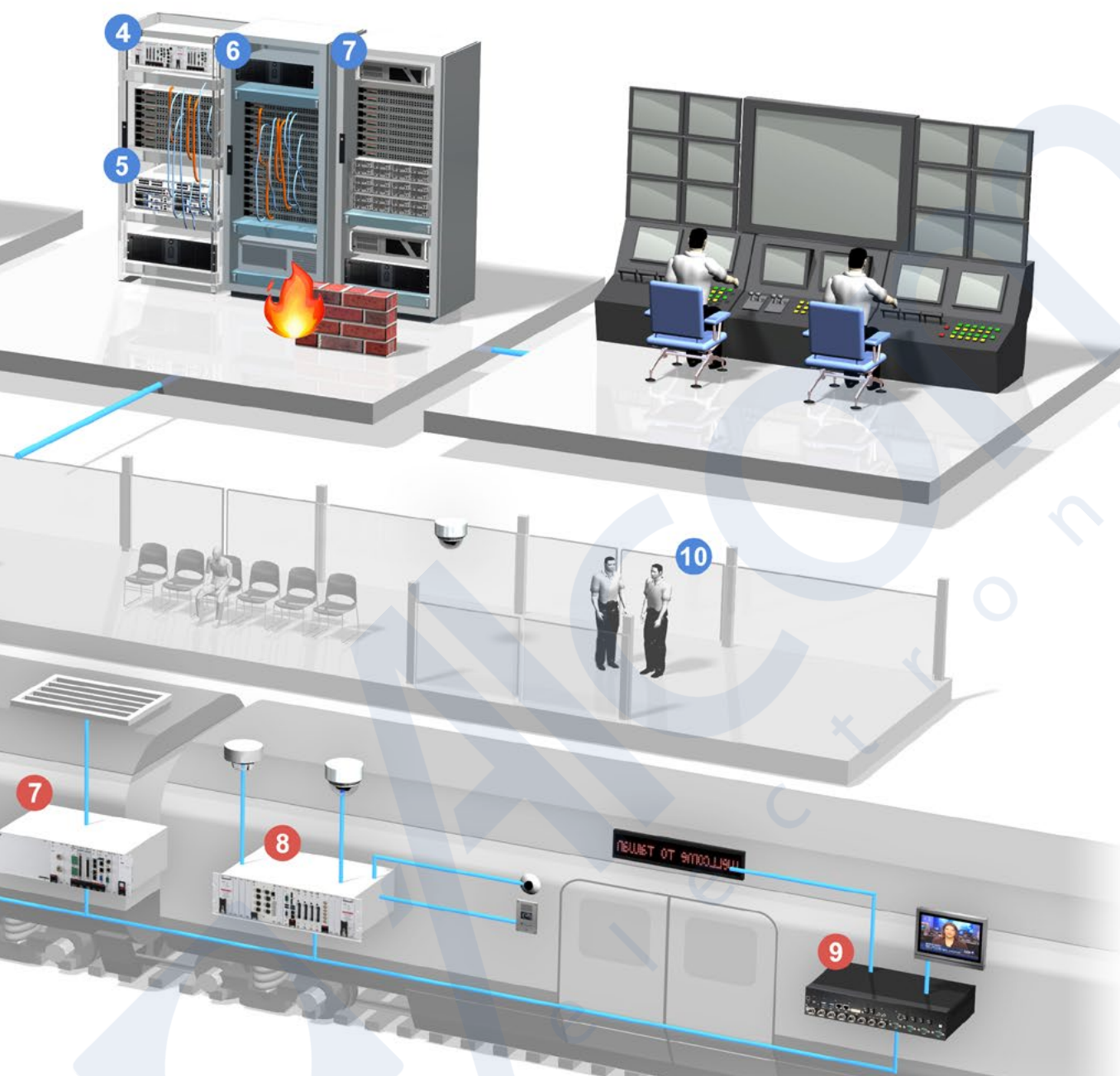
Leading COTS/ODM Solutions for Train Control,



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) | |

Rail Signaling, Automation and Digitalization



Wayside Applications

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

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 Series

The ADLINK AVA Series represents a comprehensive and versatile set of EN 50155-compliant solutions that bring AI and the IoT to the railway industry. Designed for the AIoT (AI and IoT), this AI-enabled video analytics platform is one of the company's most versatile offerings.



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

ADLINK's Embedded MXM GPU modules, based on NVIDIA® Quadro® GPUs, give AVA systems real-time video/graphics analytics capabilities suitable for a range of applications. Depending on their needs, rail systems integrators can deploy rugged AVA systems in applications such as railroad hazard detection, rail inspection, surveillance and intrusion detection, and passenger information systems. 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, AVA-5500 and -5600 models can process images of vital wayside equipment while travelling at speeds up to 120 km/h. The AVA system then alerts maintenance crews to perform preemptive repairs as identified. Elsewhere, train terminal security personnel have used AVAs for real-time video analysis of camera footage, where algorithms can spot suspicious activity. Other AI-driven applications include highly accurate arrival/departure predictions, real-time diagnostics, and emergency response.

The AVA-5500 comes in a compact 360mm x 225mm footprint and features a choice of Intel® Core™ i7-7820EQ (3.0 GHz) or Intel® 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. Additionally, the AVA-5500 provides numerous SATA, M.2, Mini PCIe, and CFAST options for expansion, customization, and scalability. 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.

The AVA-5600 varies from the AVA-5500 in that it uses a 2U, 19" form factor for easy rack mounting and integrates upgradeability to NVIDIA Quadro RTX 5000 MXM graphics. Moreover, the system's front panel features two 40W 12V power outputs, a 300W 3-pin power inlet, and reserved I/O for running Train Real-time Data Protocol (TRDP) over CAN bus.

The AVA-RAGX specifically targets space-restricted environments with its 288 x 190 x 72 mm dimensions, making it ideal for edge-type applications with small solution enclosures. The AVA-RAGX provides a full complement of I/O ports for railway application needs, including four M12 Gigabit Ethernet ports and wireless connectivity as well as four digital inputs and four digital outputs (24VDC-110VDC, 1.5kV isolation). This expandability stands atop an NVIDIA-based foundation of the Jetson AGX Xavier industrial module containing an 8-core NVIDIA Carmel CPU and 512-core NVIDIA Volta GPU. The industrial version of the Jetson platform emphasizes low power consumption with high performance specifically for compact, edge applications under harsh operating conditions.

Across all models, ADLINK's AVA Series targets high compute density with I/O flexibility suited to demanding railway deployments. These are the systems railways need to realize AI's advantages throughout their edge infrastructure.



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 defense, 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 EN 50155 class OT3-compliant, and its numerous input voltages (24VDC, 36VDC, 72VDC, 110VDC) are also EN 50155-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 EN 50155-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 EN 50155 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 Systems: DCS-211 & DCS-RAPL

Edge networks equipped with a range of IoT devices can experience ongoing, potentially heavy data loads. When data collection flows smoothly, the railway operates efficiently. If data collection fails, the results can be significant delays or potentially hazardous outcomes. The ADLINK DCS family brings high-performance capability to process large volumes of data in real time with the reliability railways need to maintain peak operations.

The 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: 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.



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

The DCS-211 uses an Intel Atom® x5-E3930 processor paired with 4GB DDR3L-1600MHz memory (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 USB Type A 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 slot each. One of the USIM slots is onboard, and two are externally accessible from the front panel and protected by 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.

For even more compact deployments with lower I/O connectivity needs, ADLINK provides the DCS-RAPL. Based on the same compute and memory foundation as the DCS-211, the DCS-RAPL downsizes to a 230.4 x 190.7 x 44.20 mm form factor designed for wall mounting and consumes a maximum of 50W. The system offers three M12 Gigabit Ethernet ports, an M8 connector USB 2.0 port, one USB 3.0 port with a dust cover, and a range of external serial and internal eMMC and CFast ports.

Rugged 3U CompactPCI Processor 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.

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.



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

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 EN 50155-compliant 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: Communications Gateway for Reliable Train to Ground Connectivity

In an always-on era, organizations, along with public and private service providers, must keep pace by offering connectivity to customers and guests. This is especially evident in the transportation industry, where passengers routinely travel for several hours without access to typical internet services. For example, rail service providers can significantly increase business passengers' quality of life by providing fast, stable connectivity that lets them maintain productivity.

An international railway technology provider recently sought out ADLINK to develop a communications gateway that could be deployed in an environment that challenges typical hardware. Taking into account all of the critical parameters such as shock, vibration, operating temperature for demanding onboard deployment, ADLINK started with a couple of proof of concept (PoC) proposals, and developed an EN50155-compliant embedded fanless platform as an ideal communication control unit (CCU) for the technology provider's needs. Using a 6th Generation Intel® Core™ processor, the CCU is equipped to provide WLAN/3G/4G LTE/5G connectivity, and supports each cellular module with dual QMA antenna connectors. The CCU's external Ethernet and serial ports both have 2000 Vrms isolation, which ensures the communications gateway is a comprehensive, rugged solution that meets performance needs.

Beginning its railway solution qualification process with the EN50155 standard for rolling stock, ADLINK provides railway service providers with turnkey systems that will meet compliance requirements. With highly responsive request for information (RFI) and request for quote (RFQ) processes, ADLINK can engage prospective clients from the initial project stages, assisting with design, and continue to provide expertise all the way through manufacturing. The company can quickly determine how to meet requested specifications in the most cost-effective manner possible. By working closely with customers during prototyping and production phases, ADLINK can employ its in-house manufacturing and assembly capabilities to stay on schedule and meet project deadlines.



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 a 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.

Rugged Fanless Railway Platforms

AVA-5500



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; 4x isolated DI and 4x isolated DO
- 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
- Nominal power input voltage: 24VDC, 36VDC, 72VDC and 110VDC (EN 50155 compliant)
- -25°C to +70°C wide operating temperature range (EN 50155 class OT3)

AVA-5600

New



19" Rackmount Rugged, Fanless AIoT Platform for Real-time Video/Graphics Analytics

- Intel® Core™ i7-7820EQ Processor and Mobile Intel® CM236 Chipset
- NVIDIA Quadro® GPU MXM 3.1 Type A/B module on PCIe x16
- 4x M12 GbE with PoE, 4x USB 3.0
- Rich 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 by Mini PCIe add-on module (BOM option)
- Nominal Voltage: 110VDC (EN 50155 compliant)

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
- Nominal power input voltage: 24VDC, 36VDC, 72VDC and 110VDC (EN 50155 compliant)
- -40°C to +70°C wide operating temperature range (EN 50155 TX)

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 power input voltage: 24VDC, 36VDC, 72VDC and 110VDC (EN 50155 compliant)
- -40°C to +70°C wide operating temperature range (EN 50155 TX)

DMI-1210 / DMI-1040



Driver HMI with Intel Atom® x5-E3930 Processor

- Intel Atom® x5-E3930 processor, up to 1.8GHz
- 12.1"/10.4" color display: 4:3, 1024x768 pixels, 5-wire resistive touch
- Up to 8GB DDR3L memory; up to 64GB eMMC storage
- MVB/CAN bus support by PC/104 or mPCIe add-on modules
- DMI-1210: built in GNSS and two mPCIe card slots for cellular modem with USIM
- DMI-1210: isolated 2x M12 GbE, 2x DB-9 serial and 1x M8 USB 1.1 ports
- DMI-1040: isolated 3x M12 GbE, 2x DB-9 serial and 1x M8 USB 2.0 ports
- IP65 front and IP20 rear ingress ratings
- Nominal power input voltage: 24VDC, 36VDC, 72VDC and 110VDC (EN 50155 compliant)
- -25°C to +70°C wide operating temperature range (EN 50155 class OT3)

AVA-RAGX

New



Fanless AIoT Video Analytics Platform with NVIDIA Jetson AGX Xavier

- NVIDIA Jetson AGX Xavier with 32 TOPs AI performance
- 4x M12 GbE with PoE, 1x lockable HDMI output, 4x USB 3.0
- 1x M.2 B-key for LTE/5G; 1x M.2 A/E key 2230 for Wi-Fi
- 2x CAN DB-9 CAN-FD from AGX module, with isolation
- Power with ignition control
- Nominal power input voltage: 24VDC, 36VDC, 72VDC and 110VDC (EN 50155 compliant)
- -25°C to +70°C wide operating temperature range (EN 50155 class OT3)

DCS-RAPL

New



Fanless Railway Onboard Data Collection System

- Intel Atom® x5-E3930 processor, up to 1.8GHz
- 4GB DDR3L memory (up to 8GB optional)
- 3x M12 GbE, 3x DB-9 Serial ports, 2x USB and one lockable HDMI port
- Storage: eMMC 5.0, 1x external accessible CFast slot
- Nominal power input voltage: 24VDC, 36VDC, 72VDC and 110VDC (EN 50155 compliant)
- -25°C to 70°C wide operating temperature range (EN 50155 class OT3)

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
- EN 50121-compliant, -20°C to +70°C wide operating temperature range

CompactPCI Serial (CPCI-S.0) Platforms & Peripherals

cPCI-A3535

New



3U CompactPCI Serial Intel® Xeon® W-11000 Processor Blade with ECC

- Intel® Xeon® W-11555MLE 6-Core 1.9GHz Processor
- Max. 64GB DDR4-3200 by 2x SODIMMs
- 80GB 3D Nand Flash SSD in SLC mode
- USB 3.2, USB-C and RJ-45 iAMT front panel service ports
- 2x M12 2.5GbE / 10GbE front panel ports for on train use
- 2x 1GbE, 10x USB 2.0/3.0 and 5x SATA (RAID) to rear

cPCI-A3525

New



3U CompactPCI Serial 9th Gen Intel® Xeon®, Core™ i7 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-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

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

CompactPCI Platforms

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-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 EN 50155 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

CompactPCI Peripherals

cPCI-3E20

New



3U CompactPCI 4-Port M12 Gigabit Ethernet Card

- PICMG 2.0 R3.0 compliant
- Supports 32bit/33MHz CompactPCI bus
- Four M12 10/100/1000BASE-T ports on faceplate with isolation 1500V AC
- Four independent Intel® i210IT Gigabit Ethernet controllers
- Operating temperature: -40°C ~ +85°C
- OS support: Windows®10
- EN 50155 compliance
- Safety: UL 94V-0 and EN45545

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-3W20-HW

New



3U CompactPCI Mini PCIe carrier card

- PICMG 2.0 R3.0 compliant
- Supports 32bit/33MHz CompactPCI bus
- Support one Mini PCIe slot for LTE module (HUAWEI LTE module)
- Two SMA antenna connectors on front panel
- One DB-9 connector on front panel for PA control
- Operating Temperature: -40°C ~ +85°C
- EN 50155 compliance

cPCI-3C10-MVB

New



3U CompactPCI Mini PCIe carrier card for MVB

- PICMG 2.0 R3.0 compliant
- Supports 32bit/33MHz CompactPCI bus
- Support one Mini PCIe slot for Duagan MVB module D017M
- Two DB-9 connectors on front panel
- Operating Temperature: -40°C ~ +85°C
- EMC: EN 55022, IEC1000-4-2, IEC1000-4-4

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

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