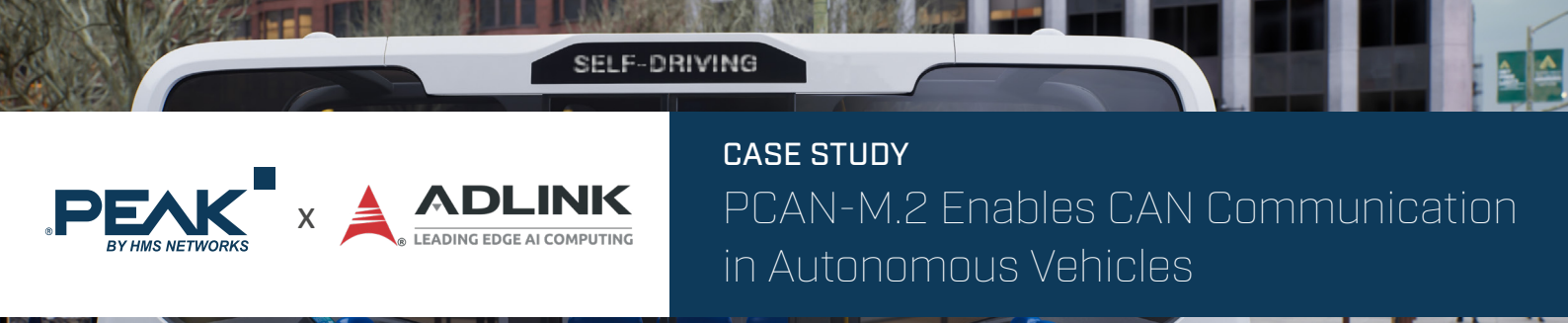


PEAK BY HMS NETWORKS x ADLINK LEADING EDGE AI COMPUTING

CASE STUDY

PCAN-M.2 Enables CAN Communication in Autonomous Vehicles



Customer: ADLINK with ADM-AL30

Solution: PCAN-M.2 interface

Country: Taiwan

Industry: Automotive / Autonomous Vehicles

Reliable CAN Communication for Autonomous Driving

Global edge computing leader ADLINK relies on PCAN-M.2 interfaces for shuttle buses

Level 4 autonomous driving requires high-performance, deterministic, and fault-tolerant data communication between numerous sensors and control units. In the autonomous shuttle buses of an Asian system integrator, the ADM-AL30, an AI-based decision-making ECU from ADLINK Technology, handles the central control and decision logic. At the core of the vehicle communication lies the PCAN-M.2 interface from PEAK-System, integrated into the ECU, ensuring data exchange over multiple CAN buses while meeting demanding requirements for bandwidth, real-time capability, and reliability. This case study explains the system architecture inside the autonomous shuttles and highlights the key factors for stable CAN communication.

RELIABLE COMMUNICATION, COMPACTNESS, AND ROBUSTNESS

During the development of its autonomous shuttles, the company faced several technical challenges. The systems must reliably merge sensor data from LiDAR, radar, and cameras in complex urban environments, make decisions in real time, and safely communicate with the vehicle control units for steering, braking, and propulsion. The central ECU (ADM-AL30) from ADLINK requires a robust, standards-compliant, and low-latency connection to the vehicle periphery via the CAN bus. While many industrial PCs provide sufficient computing power, they often lack direct support for automotive-grade communication protocols such as CAN 2.0 and CAN FD, as well as the necessary electromagnetic compatibility and mechanical robustness. In addition, certifications such as E-Mark (ECE R10) and ISO standards (ISO 7637-2, ISO 16750-2) govern operation within automotive environments. The communication interface also needed to be directly integrated into the ECU, requiring a compact form factor.

COMMUNICATION AT THE CORE: LINKING RADAR, LIDAR, CAMERAS, AND ACTUATORS

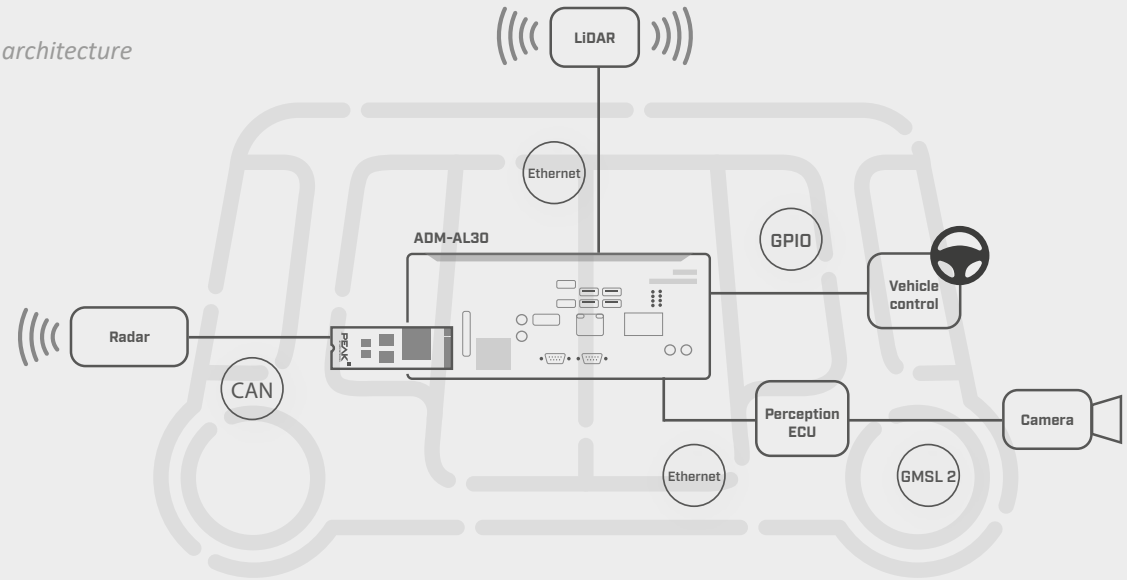
The leader for edge computing solutions ADLINK chose to integrate the four-channel PCAN-M.2 interface from PEAK into its ADM-AL30 ECU. This high-performance computing unit combines an Intel® Core™ i9/i7 (12th Gen) processor with a NVIDIA® RTX™ 4000 SFF GPU and runs on Ubuntu 22.04 using either ROS 2.0 or Autoware, two of the leading open-source frameworks for autonomous vehicles.

CUSTOMER BENEFITS

- Reliable vehicle communication with four channels: Stable CAN/CAN-FD data transfer between ECU and vehicle sensors.
- Seamless software integration: Direct connection via SocketCAN into Linux-based systems such as ROS 2.0 and Autoware.
- Automotive-grade design: Compact, robust M.2 form factor with high EMI resistance.
- High system efficiency: Parallel multi-channel communication enables precise sensor fusion and fast real-time decision-making.

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System architecture



Via the PCAN-M.2 card, the ADM-AL30 provides connectivity to up to four independent CAN bus channels, supporting both classic CAN 2.0A/B and high-speed CAN FD communication. Within the mainstream autonomous vehicle architecture, this setup connects radar sensors to vehicle actuators. LiDAR systems transmit their data via Ethernet to the ECU, while all camera data are sent separately via GMSL 2 (Gigabit Multimedia Serial Link 2)- at up to 8 Gbit/s- to a dedicated "Perception ECU," (e. g. ADLINK RQX-59 series) which processes the camera streams and returns them via Ethernet to the ADM-AL30. The resulting vehicle control commands for propulsion, braking, and steering are output through GPIO interfaces.

The PCAN-M.2 offers a compact design (80 × 22 × 10.2 mm) and M.2 PCIe connection for space-saving and vibration-resistant integration directly on the ECU's mainboard. Support for SocketCAN under Linux ensures seamless software integration into ROS 2-based systems and guarantees stable real-time communication. Together with the powerful CPU/GPU resources of the ADM-AL30, this architecture enables efficient sensor fusion- particularly the synchronous processing of LiDAR, radar, and camera data—and the safe transmission of control signals to the vehicle's actuation systems. With built-in safety mechanisms such as redundant power supply, safety MCU, and TPM 2.0, the ECU meets the strict requirements for functional safety and cybersecurity in autonomous vehicle operations.

FOUR CHANNELS, COMPACT FORM FACTOR, FULL PERFORMANCE

The PCAN-M.2 card from PEAK-System was developed specifically for compact embedded systems and provides four independent, galvanically isolated CAN/CAN FD channels with data rates up to 12 Mbit/s. Its M.2 (Key B, 2242) form factor enables a space-saving and vibration-proof installation directly on the ECU's mainboard, while SocketCAN compatibility under Linux allows seamless integration into ROS 2.0 or Autoware-based architectures. With optional galvanic isolation up to 500 V and an extended operating temperature range from –40 °C to +85 °C, the card is perfectly suited for automotive applications.



ADM-AL30
AI Decision Making ECU

ADLINK
LEADING EDGE AI COMPUTING

By combining Adlink's ADM-AL30 computing platform with the PCAN-M.2 interface from PEAK, the system integrator implemented a reliable and high-performance communication architecture for its autonomous shuttle buses. The solution provides the required computing power, safety, and robustness to handle complex sensor fusion and decision-making in real time. The PCAN-M.2 plays a crucial role in ensuring that vehicle control operates in a stable, deterministic, and standards-compliant manner- a key factor on the road to safe and production-ready Level 4 autonomous mobility.

FURTHER INFORMATION IS AVAILABLE AT
www.peak-system.com

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