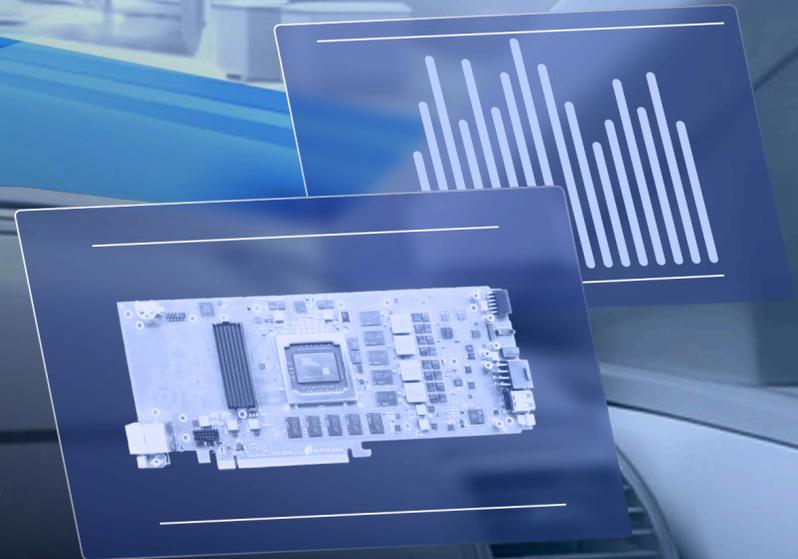




AUTOMOTIVE CASE STUDY

# Alpha Data's ADM-PA101 Accelerates Bosch's Automotive Platform

Off-the-shelf AMD Versal™ board and modified COTS solution enable rapid prototyping of a high-speed centralized communication unit (CCU) of an automotive Central Car Server (CeCaS).



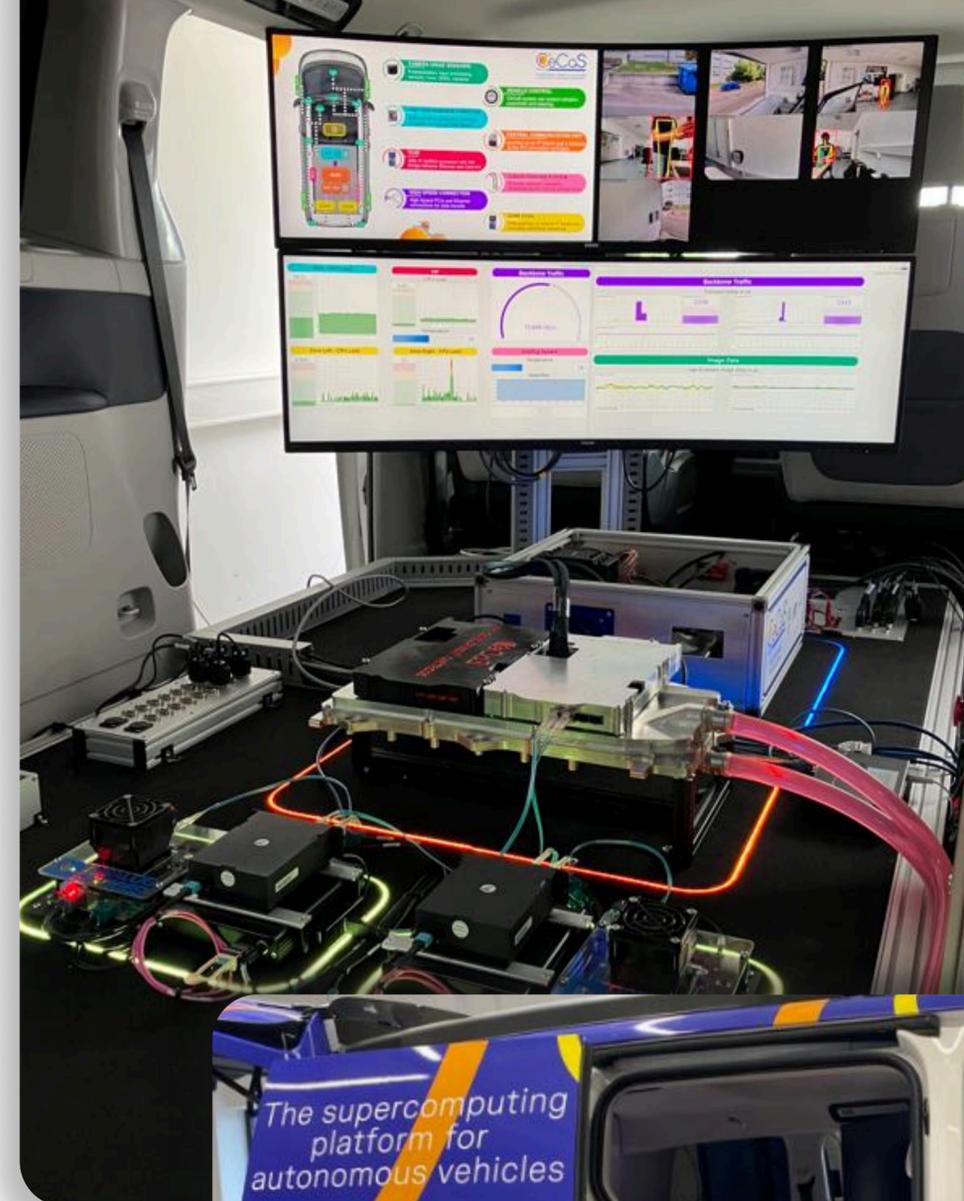
## Pioneering the Future of Software-Defined Vehicles

The MANNHEIM CeCaS (Central Car Server) project is Germany's national research initiative to create centralized automotive computing infrastructure capable of supporting Level 4+ autonomous driving. Missing Link Electronics (MLE), a specialist FPGA development company, partnered with Bosch to develop a critical component of this architecture: a centralized communication unit (CCU) that connects multiple zonal ECUs via high-speed TSN Ethernet, manages massive sensor data flows from cameras and ADAS systems, and interfaces with high-performance computing platforms - all while maintaining the flexibility needed for rapid prototyping in this pioneering automotive platform.

## Rapid Development Without Compromising Deployment Readiness

Missing Link Electronics (MLE) required a trusted partner to accelerate their CCU development for the CeCaS demonstration vehicles while maintaining a clear path to deployment-ready hardware. Key project demands included:

-  **Speed to prototype:** Immediate access to industry-leading hardware to begin firmware and software development without delays
-  **High-bandwidth connectivity:** Technical capabilities to connect with high-performance computers
-  **Physical integration:** Custom modifications to fit within Bosch's demonstration platform chassis with proper thermal management
-  **Deployment pathway:** A solution that could transition from development board to deployment-ready hardware without complete redesign



*As FPGAs become fundamental to autonomous driving, Alpha Data is committed to enabling this exciting transformation for the automotive industry. The project leveraged the Alpha Data blueprint, to provide its critical Central Control Unit component, taking an ADM-PA101 from stock, then adapting it through modified COTS.*

*The CeCaS "Lastwagen", is equipped with an ADM-PA101, providing enough power to enable the demonstration and robustness of its zonal architecture under high processing and network load.*

# The Alpha Data Solution

Missing Link Electronics (MLE) required a trusted partner to accelerate their CCU development for the CeCaS demonstration vehicles while maintaining a clear path to deployment-ready hardware. Key project demands included:

**Rapid Development Phase:** Alpha Data promptly supplied the ADM-PA101 off-the-shelf, enabling MLE to immediately begin firmware and software development for the Versal™ platform.

**Deployment Customization:** To meet the physical integration requirements for Bosch's demonstration platform, Alpha Data created a modified COTS version of the ADM-PA101. Through an engineering change note, selected components were removed, allowing MLE to fit custom heat sinks and achieve proper chassis integration.

Throughout the project, Alpha Data provided detailed mechanical information and technical support, demonstrating the flexibility of their modified COTS offering for deployment scenarios beyond standard development use.

The ADM-PA101, Alpha Data's AMD Versal™ development platform, provides essential capabilities without unnecessary complexity. As a proven “workhorse” board, it offers FPGA developers and systems integrators a reliable starting point for Versal™-based projects, with the confidence that Alpha Data can support rapid customization and deployment requirements as projects mature.

“Supporting MLE and the CeCaS project is a proud automotive milestone for Alpha Data. By leveraging our partnership with the AMD ecosystem, we provide a custom COTS version of our ADM-PA101 acceleration platform. This collaboration with MLE offers a prime example of how we provide flexible and precise adaptation, from prototyping to deployment-ready solutions.”



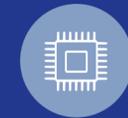
**David Miller**  
Managing Director, Alpha Data



Unprecedented on-board computing power  
Scalar, Intelligent and Adaptable engines



PCIe form factor and capable of  
stand-alone deployment



AMD Xilinx Versal™ VM1802 ACAP



FMC+ interface for a wide range off-chip  
FMC IO connection



GigE and four-land Firefly Interface

## From Concept to Demo Vehicle in Six Months

Alpha Data's rapid response and flexible approach enabled MLE to contribute to an impressive development timeline:

- 
**Immediate Development Access:** Off-the-shelf ADM-PA101 boards were delivered within one week, allowing MLE to begin firmware and software development without delay.
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**Seamless Deployment Transition:** The modified COTS approach provided a clear progression from development to deployment-ready hardware integrated within the CeCaS CCU cartridge unit - no redesign required.
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**Accelerated Project Timeline:** Contributing to the CeCaS project's achievement of moving from initial architecture concept (October 2024) to functional demonstration vehicles (April 2025) in approximately six months.
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**Repeatable Solution:** Established part number for the modified configuration enables future orders, supporting continued development and potential production scaling.

## Customer Perspective

“The MANNHEIM CeCaS project demanded absolutely dependable off-the-shelf FPGA boards to meet a very aggressive project timeline. Team Alpha-Data was chosen because you can always trust their hardware expertise. Their ADM-PA101 board delivered fantastic signal integrity for multiple 25 Gigabit Ethernet and for multiple PCIe 4.0 16 GT/sec x8 links – which was important as our signal path added several additional connectors”



**Endric Schubert**

Co-Founder Missing Link Electronics

## Partner with Alpha Data for Your Next FPGA Innovation

Alpha Data's proven COTS and modified COTS approach delivers the flexibility and technical support required to bring complex FPGA-based systems to market efficiently.

Whether you're developing automotive platforms, aerospace systems, financial services infrastructure, or other demanding applications, Alpha Data supports you throughout the entire product lifecycle—from rapid prototyping to deployment-ready solutions.



Learn how we can  
meet your challenges

[alpha-data.com](https://alpha-data.com)

