

Automotive Hardware/Firmware Design and Implementation Services

Innovation, driverless technology, and sustainability have been evolving the automotive industry at lightning speed. The ever-increasing regulatory and consumer demands have given rise to complexity in the automotive infrastructure.

ACL Digital Value Offerings

From building autonomous vehicle technology for logistics & last-mile delivery to providing next-generation automotive passenger experience, the automotive industry players need to reimagine the digital dashboards with connected car ecosystem. Software is playing a crucial role in helping the automotive manufacturers to keep up with the latest technologies, accelerate operations and explore new business models to achieve growth and meet customer expectations. Digitization, analytics and vertical integration in strategic technologies will help automakers optimize their efforts and position themselves for the future automotive market in the best possible way.



Lower Level Firmware, Secure Boot, Operating System (QNX, Autosar)

- Board bring up
- Boot loader development and testing
- Device drivers
- Autosar MCAL
- Verification and validation
- IP/process variants



Connectivity for Autonomous/ADAS Applications

- Autosar Ethernet Stack offerings (DoIP, SoAD, TCP, UDP)
- Cybersecurity
- Vulnerability and TARA Analysis to identify risks for cyber attacks
- Understanding of cyber security risks to define secure architecture
- Development of secure update concept



Software Validation (experience with ISO 26262)

- Power Management
- Battery Management software testing
- Algorithm validation
- Test software for HW validation
- Fault injection testing



Battery Management System Expertise for Electric Vehicles

- Modeling and Simulation of Battery Management System
- Digital Twin to enable accurate estimation and prediction of battery state
- Functional safety application to derive safety architecture for a battery management system
- System validation on battery packs



Market segments we cater to

- Semiconductor Companies using TSMC foundry for their SoCs
- Applications relevant for Automotive
- Tier1 Automotive Companies and Automotive OEMs into ASICS evaluating TSMC as their foundry partner
- New Age Automotive/Car2Cloud companies
- EV Ecosystem

Business Benefits

- AUTOSAR Ethernet stack development and integration with new feature support like FOTA
- Understanding of different failure modes, system architecture, and algorithms
- OEM specific production process for a successful software release
- Optimized Boot Time
- Automation SW for Validation to reduce product validation cycle time
- Fault detection to achieve best in class coverage for EV battery management
- Analysis and management of cyber security risks and defined secure architectures for Connected Vehicles as per ISO 21434 and ISO 24089 standards
- Validation of analog mixed signal power management circuits using automated software
- Improved Time to Market and Product Quality

Success Stories

1. For a North American OEM

Overview:

The client was looking for integration of customer specific secure boot block.

Solution:

- Removal of existing code
- Integration of crypto libraries in boot block
- Implementation of special services in boot block
- Implementation of certificates checks
- Adapting flash programming services

Outcome:

- Successful software release
- Successful production/EOL programming
- Successful secure service flashing OTA

3. For a German Tier 1

Overview:

The Client was looking for a partner to help them with implementation of secure in-vehicle network as per OEM specification.

Solution:

- Autosar stack integration (incl Ethernet)
- Crypto library integration
- Send – Receiver frames encryption and decryption
- Frame configuration using Autosar tools
- SWC development using standard interfaces

Outcome:

- Successful integration
- 100% acceptance test for the implemented frames

2. For a German Tier 1

Overview:

The Client needed help with Isolation diagnosis and fault detection.

Solution:

- Implementation of complex driver, Power-stage diagnosis of contactor relays
- Optimum power management
- Algorithm implementation for detecting isolation fault
- Simulation of different diagnosis using Matlab/Simulink
- Providing interfaces for safe/secure operation functions

Outcome:

- 85% diagnosis coverage
- 100% passing safety test cases

4. For a Dutch Tier 1

Overview:

The Client was looking to do board bring-up and verification of drivers for NFC platform controller.

Solution:

- Data sheet analysis
- Porting Linux kernel
- Configuration of ports, IOs, Memory etc.
- Configuration of specific HW power-stage

Outcome:

- Successful board bring-up
- Optimized boot time (within spec)
- Complete automation of APIs testing

ACL Digital is a design-led Digital Experience, Product Innovation, Engineering and Enterprise IT offerings leader. From strategy, to design, implementation and management we help accelerate innovation and transform businesses. ACL Digital is a part of ALTEN group, a leader in technology consulting and engineering services.

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