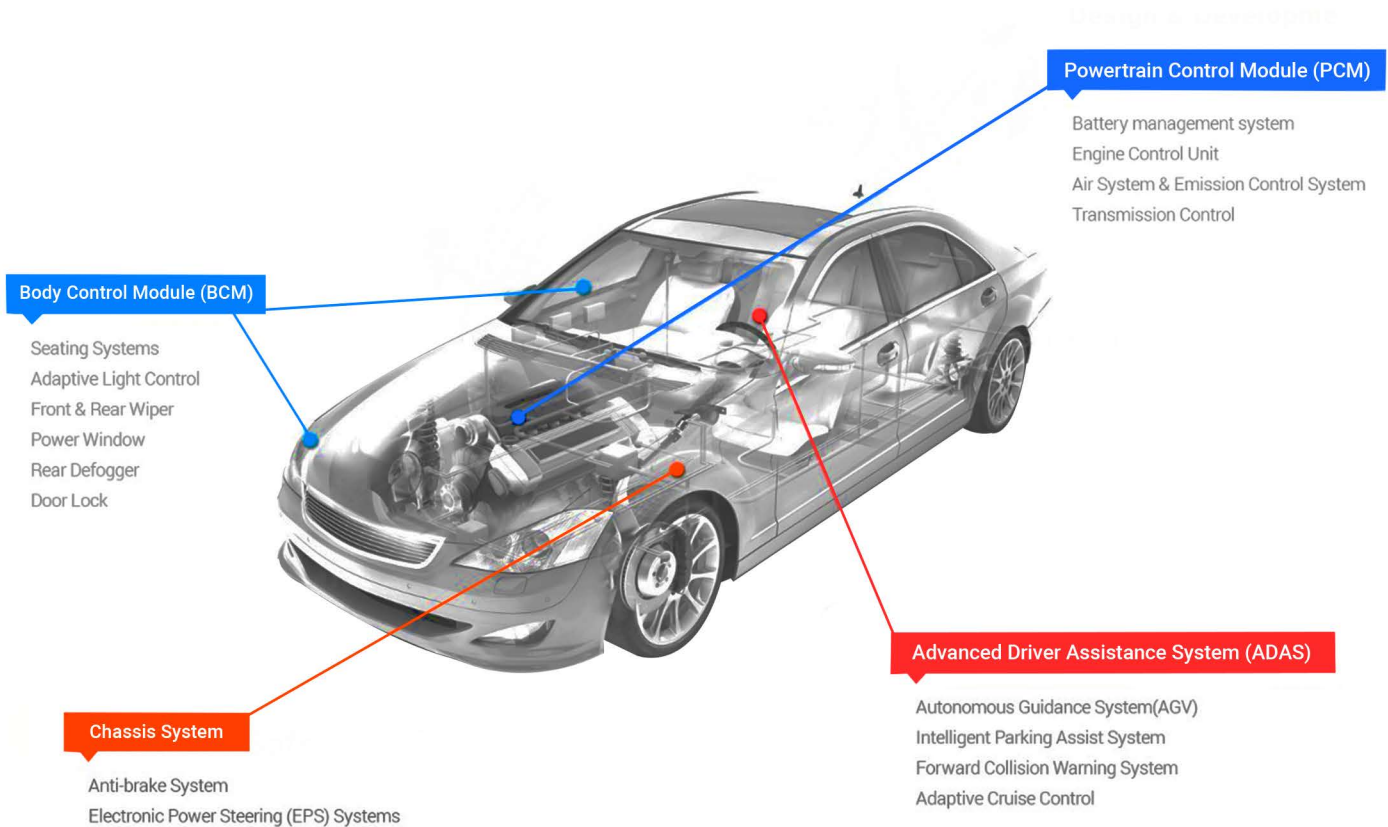


A Handbook of Automotive Electronic Control Units (ECU)

Your Go-to Guide Regarding our Control System Design and Development Services

Functional Safety (ISO 26262) | AUTOSAR | Model Based Development | Testing Tools



A bouquet of automotive software and logic burnt on an industry-grade microcontroller! This is essentially what we term as an Electronic Control Unit (ECU). And this of course, is easier said than done.

But do note that an Electronic Control Unit (ECU) is at the heart of Automotive Electronics. In the 1970's, Electronics in general made its present felt in our lives. And automotive industry was one of its early adopters and beneficiaries.

Back then, the first Automotive ECU was built to control the engine. It was called the **Engine Control Unit**.

Volkswagen, as many would guess, was the **first OEM** to deploy an ECU (Control Unit) in a vehicle.

Fast forward to 2019, **Electronic Control Modules** now control almost every aspect of a vehicle; viz; **Engine, Transmission, Braking, Body Control** and what not.

Our Expertise in Electronic Control Module Development

For more than a decade, our automotive experts have witnessed how an Electronic Control Unit has grown into a smart and complex system. They have also developed in-depth expertise in their ability to understand and achieve the necessary compliance with standards like **ISO 26262 (ASIL B/ ASIL C/ ASIL D), AUTOSAR, MISRA C and more.**

Our automotive control unit development services are therefore, aligned to such standards and growing needs of industry.

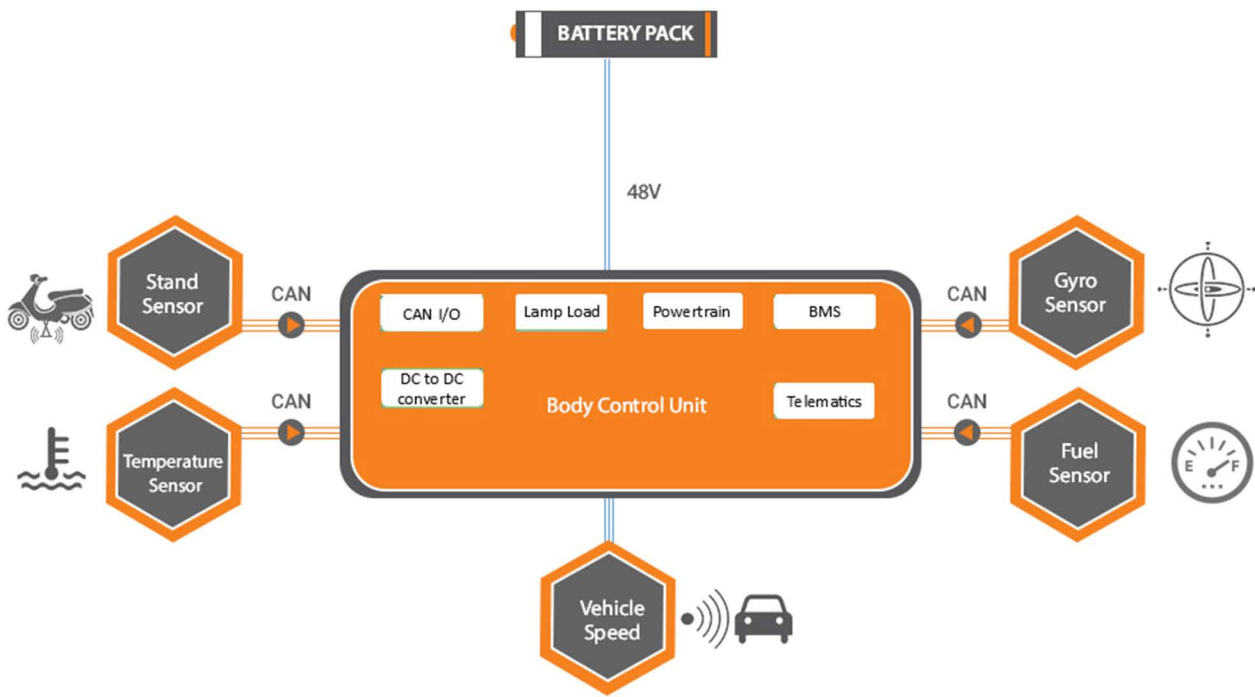
Delivering quality ECU software and hardware development services to customers, have led to our team's expertise in several ECU applications such as:

- Seating Control ECU
- Body Control Module
- Adaptive Lighting Control
- HVAC Systems
- Infotainment Systems and Instrument Clusters
- Electronic Power Steering
- Transmission Control Unit
- Powertrain Control Unit

We focus in delivering three major value-adds, while partnering with our customers for an ECU development project:

- **Cost-Effectiveness**- Achieved through reusable in-vehicle networking and vehicle diagnostics stacks such **CAN FD, UDS, DoIP, Bootloader, OBD-II, J1939 and others**
- **Compliance for ASIL B/ ASIL C/ ASIL D** as per the requirement- Achieved through in-house **Functional Safety Experts/Consultants** expertise in ISO 26262 certified tools like **CANTATA**
- **Reduced Time-to-market**- We follow the Model Based Development approach to auto-generate code from models. It reduces turn-around time and enhances accuracy of the application. The reusable stacks and expertise in various tools such as **CANTATA, RTRT, IAR Embedded WorkBench, Vflash, MATLAB/Simulink, ORCAD, Hyperlynx** and more

Block Diagram of an EV Body Control Module ECU



Automotive ECU Development Services

1. Automotive ECU Hardware & Firmware Development

- ISO 26262 compliant h/w and s/w development.
- Board Support Package design and development.
- Device driver development.
- In-vehicle networking protocol stacks, middleware and application development.
- BLDC and PMSM motors, sensors and actuator integration.

2. AUTOSAR 4.0 compliant ECU software development

- AUTOSAR RTE, BSW and COM stack configuration and integration .
- AUTOSAR MCAL development.
- Communication & I/O Drivers development.
- Tools expertise: Comasso, Vector , ECU Spectrum, KSAR AUTOSAR.
- DaVinci Developer tool for architecture design.

3. Model-based development of Automotive ECU product

- MATLAB/Simulink and auto code generation (Target Link and RTW).
- ECU Testing
- Unit, Integration and Functional testing services
- Model in loop (MIL testing)
- Hardware in Loop (HIL testing)

4. ISO 26262 Functional Safety Consulting

- ASIL B, ASIL C, and ASIL D compliant automotive control unit development
- Support for Hazard Analysis and Risk Assessment (HARA) and Failure Modes & Effect Analysis (FMEA)
- Gap Analysis, Safety Assessment and Functional Safety Workflow of existing ECU solutions
- Hardware Architectural Metrics (SPFM, LFM & PMHF) derivation using FMEDA method

5. In-Vehicle Networking & Vehicle Diagnostics Services

- Unit testing (white box), integration testing, functional testing, MIL and HIL testing
- Project experience in CAN (ISO 11898), LIN (SAE J2602), FlexRay, MOST
- Integration, configuration and customization of UDS (ISO 14229), J1939, KWP2000, ISOBUS, OBD2
- Integration of 3rd party automotive stacks

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