SLVCU Safety Layer Vehicle Control Unit

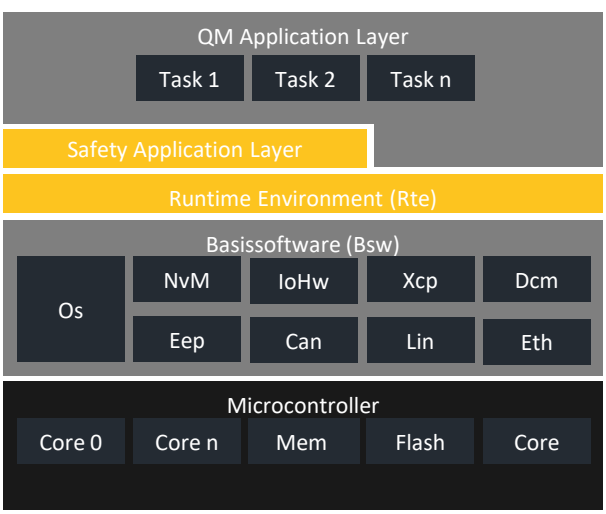
A Vehicle Control Unit (VCU) in an electric vehicle (EV) is a crucial component that is responsible for controlling and monitoring the different systems in the vehicle. It is essentially the brain of the EV, responsible for managing the powertrain, battery management system, regenerative braking system, and other critical components.

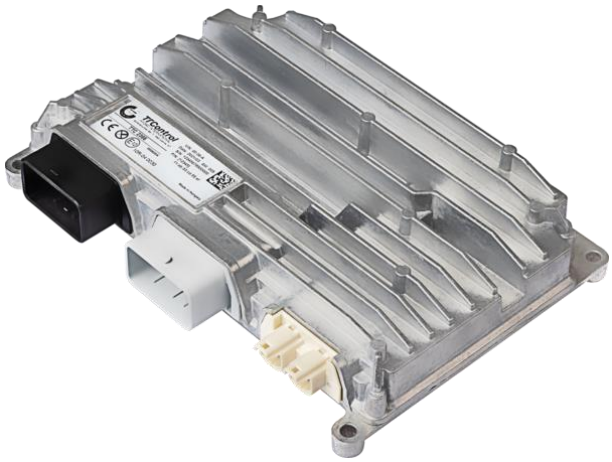
Challenges

The requirements for the safety of electric vehicles are increasing. For state-of-the-art developments, the **coverage of security standards and mechanisms** is indispensable. In this context, it is important to **verify** and **validate** systems. HIL tests, for example, serve this purpose. Vehicle distributors are liable for defects. Depending on the country and the law, this applies from senior management, to members of the development team.

SLVCU Benefits

- ✓ Cost reduction due to no recertification of safety functions needed when only the QM application layer is chanced.
- ✓ QM development standards at OEM sufficient, no need to implement expensive
- ✓ Shorter time to market due to automated code generation
- ✓ Independent development without having the need to recertificate the entire software
- ✓ Durot Electric takes over the responsibility for the safety of the whole VCU code





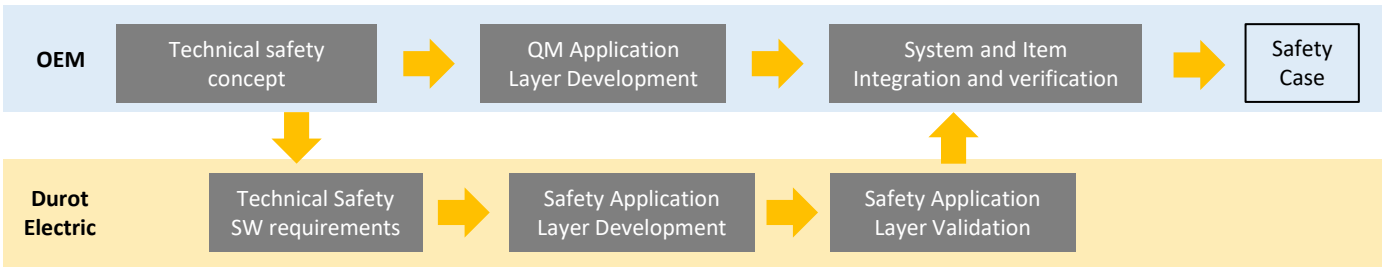
Overview

The VCU is the brain and thus the core of every vehicle. Based on the safety concept, the safety functions are implemented and validated in the safety application. Durot Electric assumes responsibility for the correct implementation of the safety functions. In turn, your QM application contains all non-safety relevant code components.

The safety application and the QM application can be developed, compiled and flashed to the ECU completely independently. Certification according to common safety standards only takes place at the safety application level. The QM application can be further developed independently after certification of the safety application. This does not require re-certification of the safety level. This saves several man-months per iteration.

The QM application and Safety application are separated into two levels. The OEM focuses on the application level and its value creation Design and coding of the QM application is done entirely by the OEM Durot Electric provides the foundation with the safety application. The VCU basic software includes the operating system as well as the services for the application. Allows developer support and joint developments.

Software Development Steps



Bsw Software Tools

NvM	NvM Service, Parametrisation
Dcm	Diagnose Service, UDS DTC or J1939 DFC
Xcp	Calibration and Measurement
IoHwAb	IO Hardware Abstraction
Can	CAN Bus & Message Service
Lin	Lin Bus & Message Service
Eth	Ethernet Service

Hardware Features

- Based on TTControl TTC2000 Family
- Future proof high-performance Infineon AURIX™ TriCore™ CPU 300 MHz, 6 cores (2 lockstep cores) and Hardware Security Module
- C-Programming with PXROS-HR multicore real-time operating system, Simulink blockset available
- IEC 61508:2010 SIL 2 / EN ISO 13849:2015 PL d / ISO 25119:2018 AgPL d / ISO 26262:2018 ASIL C / ISO 19014 MPL d

Interfaces

- 4 x CAN FD up to 2 Mbit/s (1 x CAN ISOBUS compliant; 1 x CAN wake-up capable)
- 2 x 100BASE-T1 / -TX Ethernet interfaces via dedicated 2-port HSD connector
- 1 x LIN serial interface
- 3 x status LEDs integrated into the housing

IO

- 4 x CAN FD up to 2 Mbit/s (1 x CAN ISOBUS compliant; 1 x CAN wake-up capable)
- 20 inputs / 40 outputs (18 x HS PWM; 4 x SENT)
- 4 x full H-bridge* interfaces for electric motor control
- 3 x sensor supplies 5 V / max. 500 mA

Technical Drawing