PRODUCT BRIEF

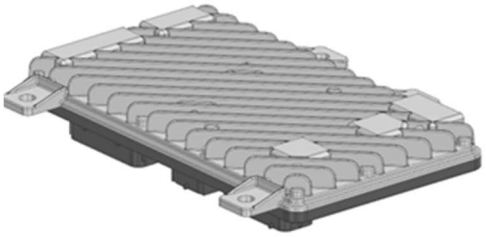
# Flex Zone Controller Platform

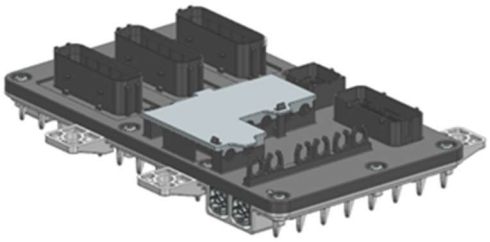
**A scalable and innovative Zone Controller for Software-Defined Vehicles**

## Overview

Comprised of the power distribution (PD) system and the in-vehicle network (IVN), legacy E/E architectures are organized in domains connected via gateways. However, the software-defined vehicle (SDV) trend and wire harness optimization are driving a shift towards zonal architectures with central computing.

The Flex Zone Controller platform is a game-changing solution that enables OEMs to rapidly implement and optimize their Zone Controller solutions. Built on common building blocks and featuring a modular MCU architecture, this platform provides a flexible and scalable solution for zone control unit implementation.

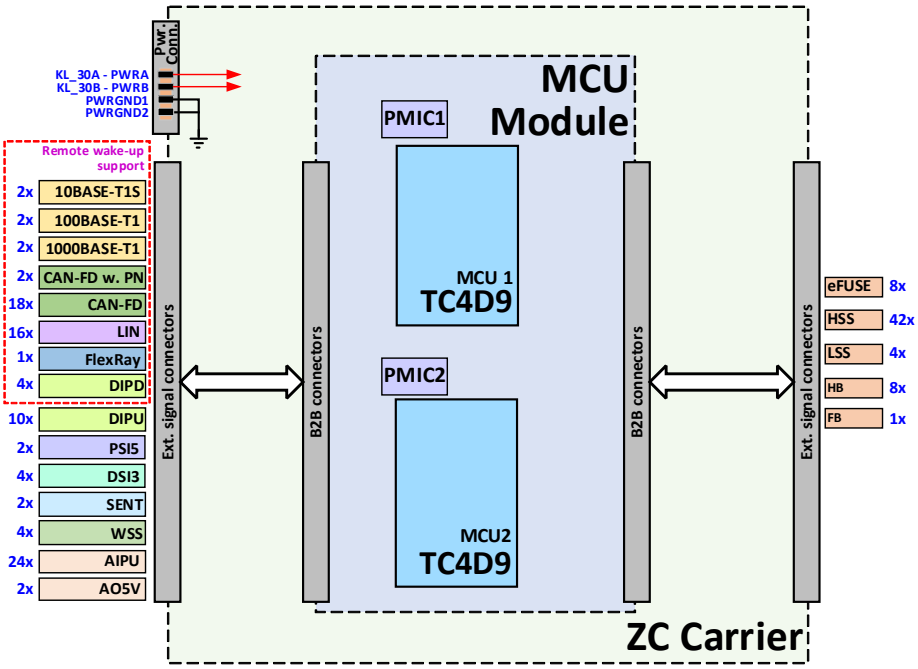




The Flex Zone Controller platform is a scalable and innovative Zone Controller reference design for SDVs. A Zone Controller typically covers a range of functions, including:

- Power distribution and management
- Sensor data aggregation, processing and analysis
- Actuation and control of various vehicle systems
- Communication with central computing, and other zone controllers or ECUs
- Diagnostic and fault detection capabilities

## Block Diagram and Modular Build



## Key Features

| Features | Benefits |
|---|---|
| **Redundant power supply** | If one of the battery supply fails, the Zone Controller is still powered, increasing overall safety. |
| **Dual MCU solution** | Besides fail-safe mode, fail-operational mode can also be supported with proper configuration. |
| **High performance MCUs** | Up to 2x6.81k DMIPS real-time CPU performance. |
| **Large SRAM and NVM** | Up to 2x10MB SRAM + 2x21MB NVM memory in the MCUs. |
| **Very low power mode** | The overall quiescent current can be as low as 5mA typ. w. functional degradation. |
| **2x 1000BASE-T1** (1.) | Can be connected to the HPC and one of the ZC at the same time.<br>One of the interfaces can be upgraded to 2500BASE-T1, if required. |
| **2x 100BASE-T1** (1.) | Can be connected to other Zone Controllers that require high bandwidth. |
| **2x 10BASE-T1S** (1.) | Can be connected directly to new sensors supporting this interface. |
| **2x CAN-FD with partial networking** (2.) | Allowing for selective wake-up of specific ECUs on the network while others remain in a low-power state (reducing the overall power consumption) w. data rates up to 5 Mbit/s. |
| **18x CAN-FD** (2.) | A wide range of ECUs can be connected to the ZC w. data rates up to 5 Mbit/s. |
| **16x LIN** (2.) | Allows low-cost connections to dozens of cheap ECUs. |
| **1x Flex Ray** (2.) | Allows up to 10Mbit/s communication w. a deterministic and fault tolerant bus. |
| **2x PSI5** | Allows bidirectional communication up to 125 kbps. |
| **4x DSI3** | Allows up to +12 ultrasonic sensors (w. +3 sensors per input). |
| **2x SENT** | Can be upgraded to SPC protocol w. master trigger pulse to have synchronized sensor readings for redundant sensors. |
| **4x WSS** | Three-wired wheel speed sensor (can be upgraded to two-wire speed sensor) |
| **4x DIPD** (2.) | Digital Input with pull-down impedance |
| **10x DIPU** | Digital Input with pull-up impedance. |
| **24x AIPU** | Analog Input with pull-up impedance. |
| **2x AO5V** | 5V analog output (tracking ADC VREF) w. max. 2x 300mA load current support for analog sensors and analog input pull-up impedances. |
| **8x eFUSE** | Allows I2t protection in real-time in HW; short-to-battery, and short-to-ground fault detection; load current feedback w. overcurrent protection |
| **42x HSS** | High-Side Switch w. short-to-battery, and short-to-ground fault detection; load current feedback w. overcurrent protection |
| **4x LSS** | Low-Side Switch w. status feedback |
| **8x HB** | Half-Bridge suitable for driving motors w. short-to-battery and short-to-ground fault detection; load current feedback w. overcurrent protection. |
| **1x FB** | Full-Bridge for BDC motors w. short-to-battery and short-to-ground fault detection; load current feedback w. overcurrent protection. |

*(1.) Ethernet interfaces support Open Alliance TC10 specification for low power mode with remote wake-up, respective IEEE 802.1AE: MACsec, and IEEE 802.1AS: Timing and Synchronization specifications.*

*(2.) Supports remote wake-up of the Zone Controller from a very low power mode.*

## Target Applications

- Automotive Zone Controller
- Automotive Gateway
- Advanced Driver Assistance Systems