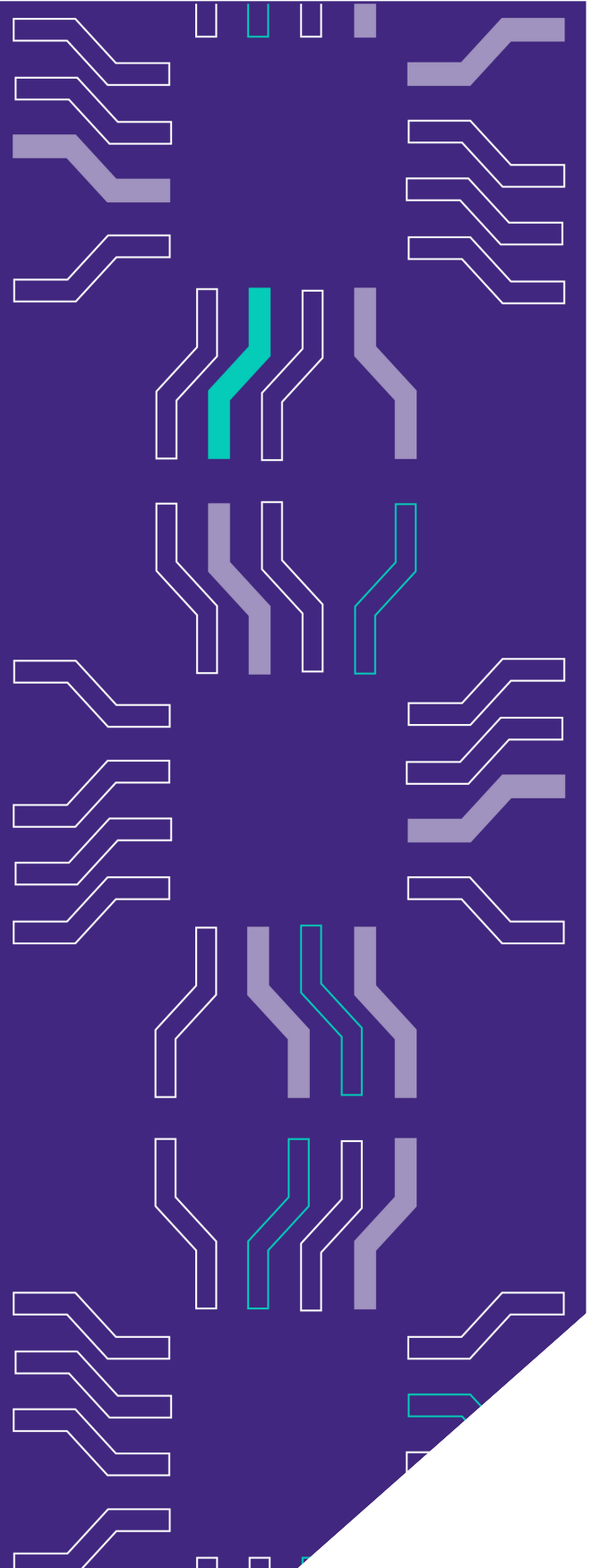


Vehicle Control Unit

Technical Specification

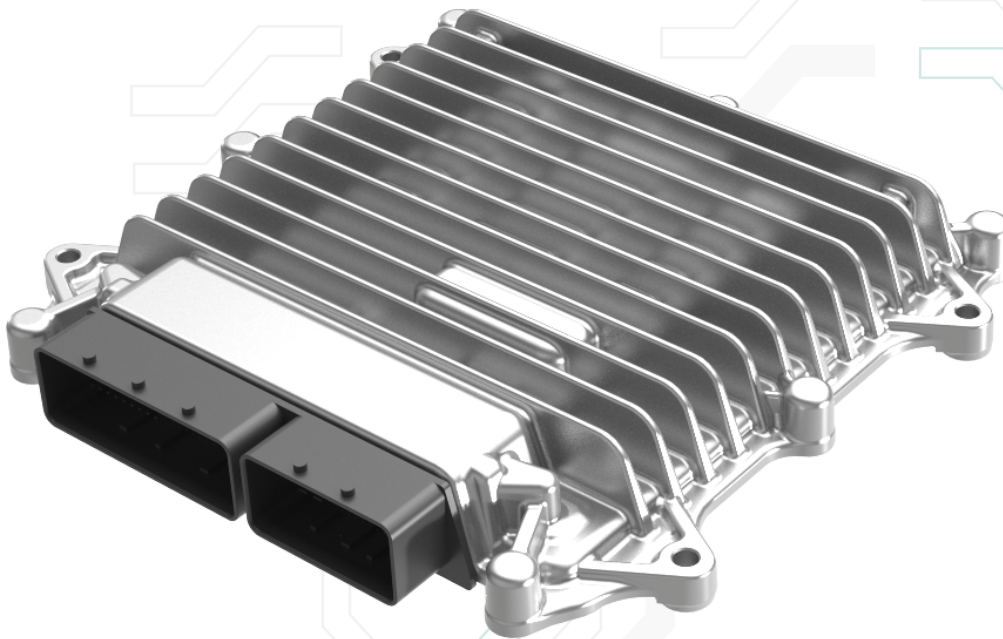
Control systems **you control**



About Vehicle Control Unit

Vehicle Control Unit is a 12V/24V electronic control unit intended for **on-road** and **off-road applications** with high integrated low side drivers, high side drivers, DC Motors controllers, Pulse-Width-Modulated (PWM) solenoid controllers, digital sensors signal acquisition, temperature sensor acquisition, CAN, LIN, ETHERNET and SENT communication.

- 32-bit multi-core processor with 300 MHz clock frequency and hardware safety module (HSM)
- Suitable for safety-relevant applications
- Inputs and outputs with fault detection



Referenced Standards:

Operating Voltage: ISO 16750-2 (12V/24V)

Vibration: ISO16750-3 / Chassis Installed

Operating Temperature: ISO 16750-4 G code (-40 +85 °C)

EMC: ISO 11452-4, IEC CISPR 25, ISO 10605, ISO 7637-2/3

About Vehicle Control Unit

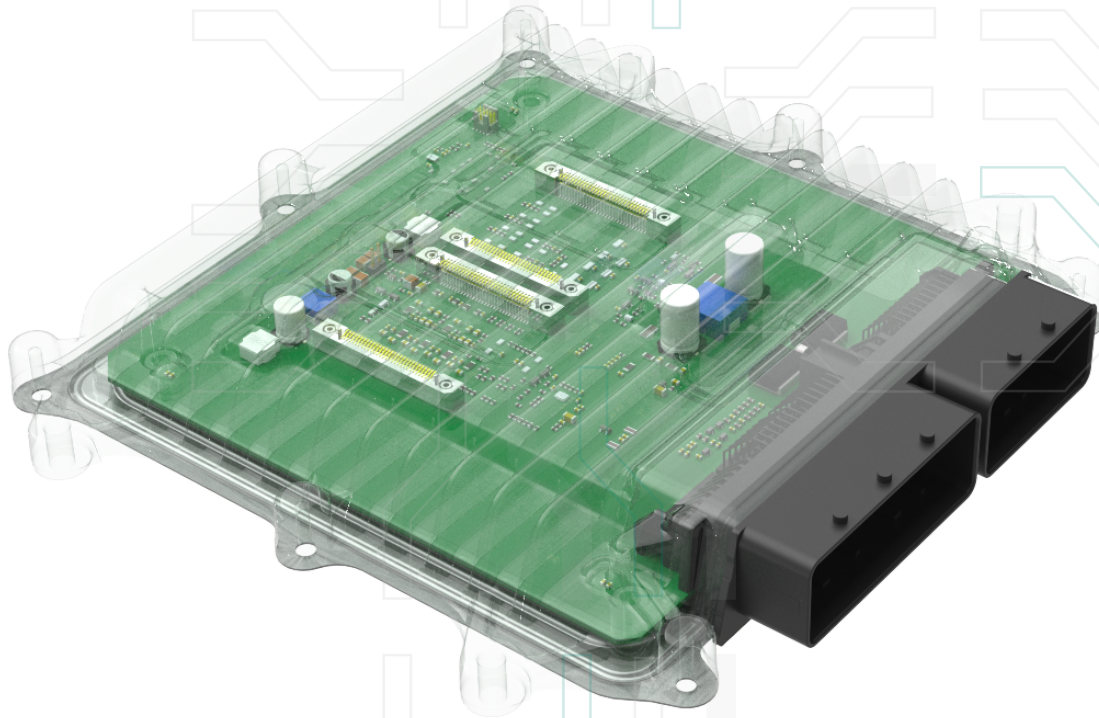
Enviromental:

Operating Voltage: 5V to 32V (36V, 1h)

Environmental Class: IP6K9K

Operating Temperature: -40°C to +85°C
(T Ambient)

Load Dump (max 350ms):
34V @12V system
58V @24V system



MCU: Infineon TC377 (3 cores, 2 cores lockstep, 300 MHz; 6MB Flash; 1.1MB RAM)

Housing Dimension: 235 x 215 x 35 mm (connector header included)

Housing Material: Die-Cast / Metal Sheet

Connection System: 186 pin Molex (Bay 1: 114ways, Bay 2: 72ways)

Technical Specifications

Buffered Sensor Supply Outputs

- 2x 5V, 150mA current load with voltage monitoring in tracking with ADC reference voltage
- 1x 5V, 250mA current load with voltage monitoring in tracking with ADC reference voltage

Low Side Outputs Open Collector

- 4x Discrete/PWM Output (Load Current: 0.4A. Digital Output for solenoid load. PWM output up to 500Hz for resistive load) with output readback
- 3x Discrete Output reverse battery protected (Load Current: 0.4A)
- 9x Discrete Output (Load Current: 0.4A. Digital Output for solenoid load)

Configurable High Side Low Side Outputs

- 6x PWM configurable HSD/LSD output with close loop current control (1.3A @ 2.5kHz, 50mA @ 20kHz) with output readback. Outputs can be connected in parallel to increase current capability up to 5.2A
- 18x PWM configurable HSD/LSD output with close loop current control (1.3A @ 2.5kHz). Outputs can be connected in parallel to increase current capability up to 5.2A

High Side Outputs

- 3x Discrete Output (Load Current: 10A) with output readback
- 2x Discrete/PWM Output (Load Current: 5A. Digital Output for solenoid load. PWM output up to 250Hz for resistive load) with output readback
- 1x Discrete/PWM Output (Load Current: 5A. Digital Output for solenoid load. PWM output up to 250Hz for resistive load) with output readback optional
- 2x Discrete/PWM Output (Load Current: 2.5A. Digital Output for solenoid load. PWM output up to 250Hz for resistive load) with output readback

Full H-Bridge

- 3x Full H-Bridge Outputs (Hold Current: 3A / Peak Current: 7A. @ 4kHz) – with Current Feedback

Analog Inputs

- 13x Analog Inputs (0-5V) or digital input (0-Batt) with selectable pull up/down
- 4x Temperature Sensor (internal pull-up to 5V. Intended to monitor NTC sensor)
- 4x Analog input (Pedal Position Input, brake pedal, ...)

Frequency Inputs

- 7x Frequency Input (Digital Sensor 0-5V with frequency up to 15kHz)

Technical Specifications

Flexible Inputs

- 7x fully configurable Digital-Frequency-Analog Input with SW configurable pull up/down value.
- 8x High accuracy resistance measure:

20Ω - 31Ω: 2.05%
 31Ω - 100Ω: 1.75%
 100Ω - 5kΩ: 1.45%
 5kΩ - 40kΩ: 1.55%
 40kΩ - 165kΩ: 2.85%
 165kΩ - 400kΩ: 8.00%

Internal Sensors

- 1x Microcontroller Temperature

Communication

- 6x CAN FD (2 CAN with wake-up capability, 1 isolated CAN optional)
- 2x LIN
- 4x SENT
- 1x ETHERNET optional (automotive 2 wires, 100 Mbit/s)

Digital Input

- 1x Wake-up
- 1x Inhibit input

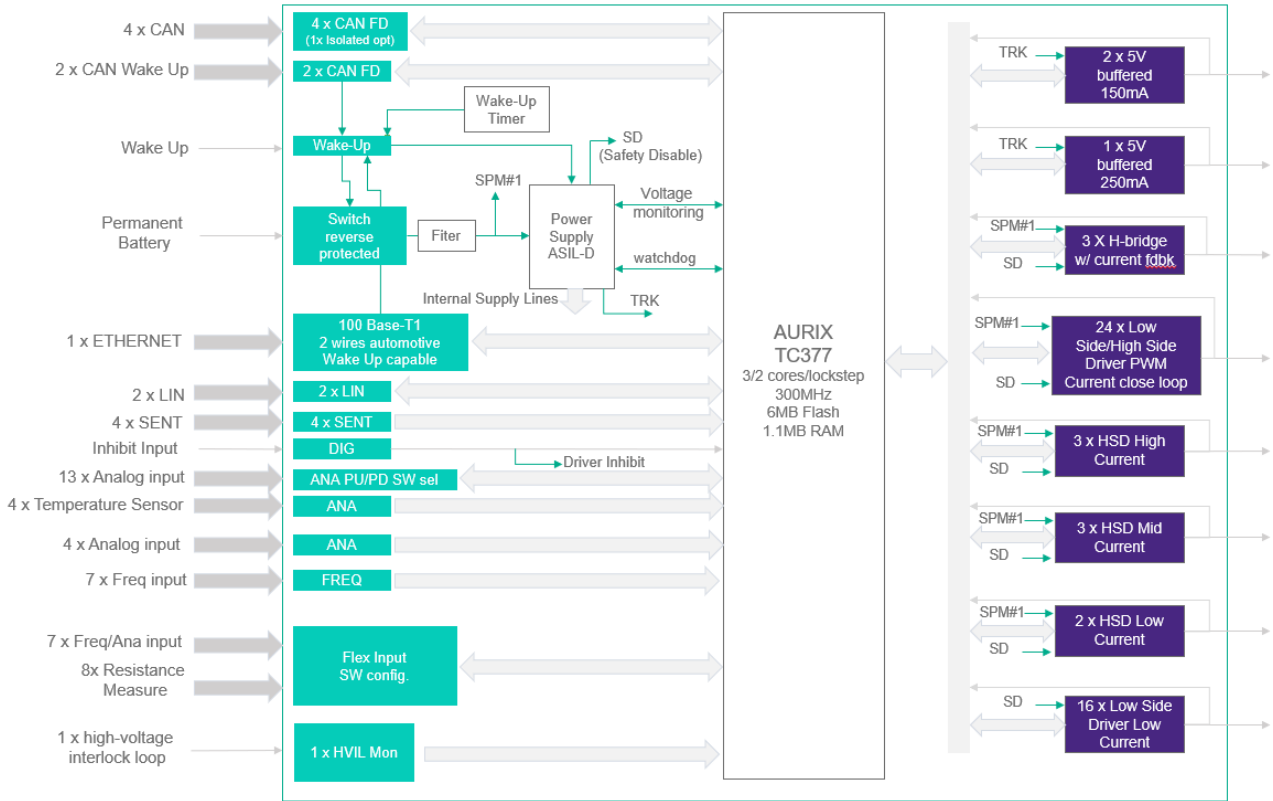
High Voltage Interlock monitor

- 1x High voltage interlock monitor (0-40mA current monitoring and 0-100Hz frequency monitoring)

Power Supply

- 1x Permanent Battery Supply (with reverse voltage protection and wake up switch to minimize quiescent current in sleep mode) with voltage monitoring

Block diagram



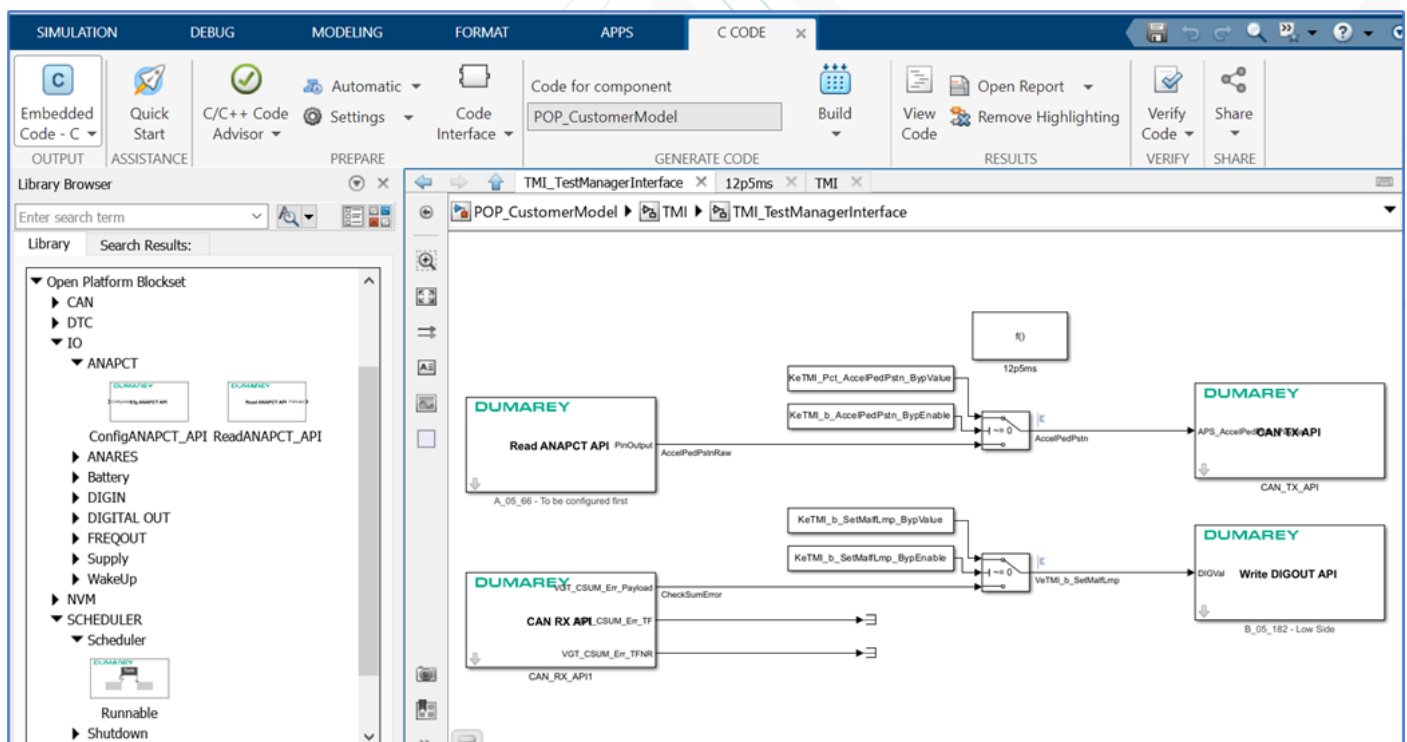
Software Features

The VCU is equipped with the following main software functionalities:

- **Real Time Operating System** with a set of pre-configured periodic tasks
- **Firmware** for I/O management
- **AUTOSAR-compliant BSW** (Basic Software) for management of pre-configured Communication and Diagnostics services (UDS, J1939)
- **Open Platform Software** layer to allow the customer to self-develop its own Application Software and to build the complete software package by means of the **Open Platform Toolkit**

The **Open Platform Toolkit** is a software development kit based on Matlab/Simulink which includes:

- A **customized Simulink Blockset** developed by Dumarey Softronix composed of blocks needed to connect the customer algorithm model with VCU tasks, IOs and BSW Services
- A **makefile** and a **linker** needed to compile the code generated from the customer Simulink model and to link it with Dumarey Softronix provided object code



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