

Control Units

Technical Specification



The mobility sector is undergoing a fundamental shift, with software and hardware innovation becoming central to future transportation. The emergence of software-defined vehicles (SDVs), centralised computing, and intelligent control systems is reshaping how vehicles are both developed and experienced. In this new paradigm, software has become a core product in its own right.

In this evolving landscape, Dumarey Group is focused on creating the foundational technologies for this change. Building on our established expertise in propulsion and vehicle control systems, we are developing modular software platforms and next-generation control units. Our role is to provide the robust, sophisticated engineering that enables connected, efficient, and sustainable mobility for the future.



Our approach combines OEM-level technical excellence with a more agile and responsive partnership. This enables us to streamline development processes, reducing both time and cost to market.

We provide our partners with a comprehensive support, grounded in a disciplined approach:

- Guiding projects through the entire product
- Employing the Scaled Agile Framework (SAFe) to ensure disciplined and efficient development.
- Ensuring all designs are underpinned by robust Functional Safety and Cybersecurity principles.
- Building true collaborative partnerships, working alongside our customers to achieve their goals

PRODUCTS

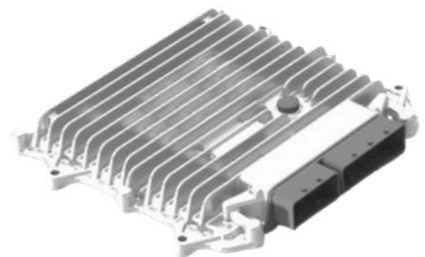
Fuel Cell Control Unit (FCCU)

The Fuel Cell Control Unit (FCCU) is a high-integrity control solution for transportation and energy applications. It is engineered to facilitate the seamless integration of customer-specific software through an Open Platform Toolkit, which supports rapid prototyping in the Simulink environment.

Developed to ISO 26262 and AUTOSAR standards and featuring a high-security EVITA-compliant Hardware Safety Module, the FCCU provides a robust foundation for safety, adaptability, and comprehensive fault detection in innovative, high-performance systems.

Key features:

- Infineon 32-bit multicore microcontroller (@300MHz), rated ASIL-D/SIL-3.
6MB flash memory, 1.1MB RAM.
- Extensive I/O capability: up to 47 inputs (analogue, resistive, digital) and 50 outputs (HS, LS, H-Bridge).
- Fully customisable hardware and software
- Robust communication interfaces: 6x CAN, 2x LIN, 8x SENT
- Operates in demanding environments:
–40 °C to +85 °C, IP6K9K rated
- Compliant with ISO 26262 and AUTOSAR standards



About Vehicle Control Unit

Reference Standards:

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

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

Vibration: ISO16750-3 / chassis installed.

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

Environmental

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

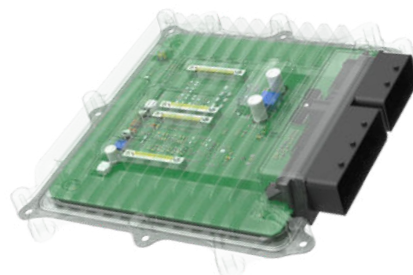
MCU: Infineon TC377 (3 cores, 2 cores lockstep, 300 MHz; 6MB Flash; 1.1MB RAM)

Housing dimension: 235 x 225 x 35 mm (connector header included)

Housing material: Die-Cast / Metal Sheet

Total weight: 1.2 kg

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

Buffered Sensor Supply Outputs

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

24x 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

High Side Outputs

3x Discrete Output (Load Current: 10A) with output readback

3x Discrete Output (Load Current: 5A. Digital Output for solenoid load) with output readback

2x Discrete Output (Load Current: 2.5A. Digital Output for solenoid 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

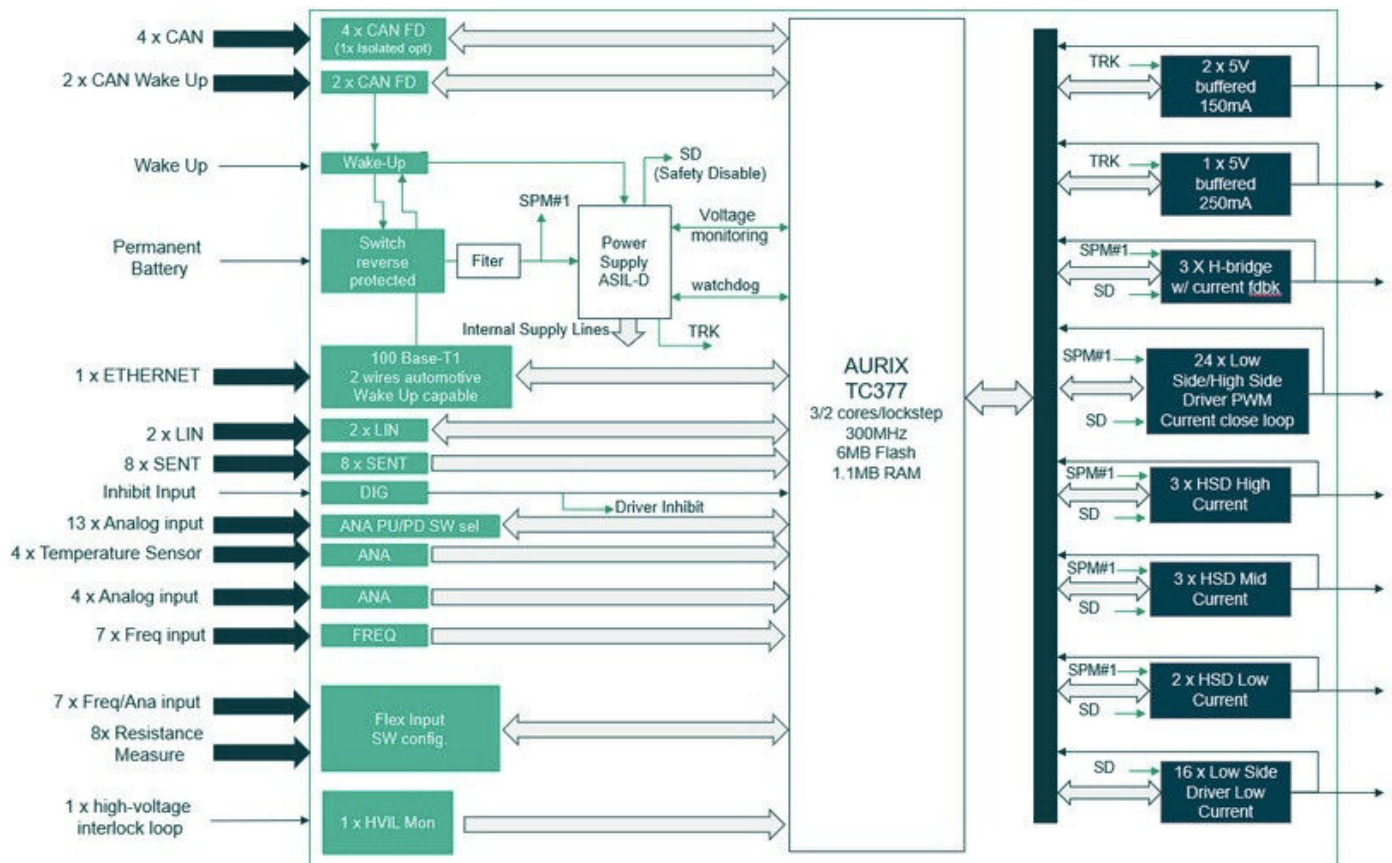
4x Temperature Sensor (internal pull-up to 5V. Intended to monitor NTC sensor)

4x Analog input (Pedal Position Input, brake pedal, ...)

Technical Specifications

Frequency Inputs
7x Frequency Input (Digital Sensor 0-5V with frequency up to 15kHz)
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
8x 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 (0-20mA current monitoring and 2-500Hz 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

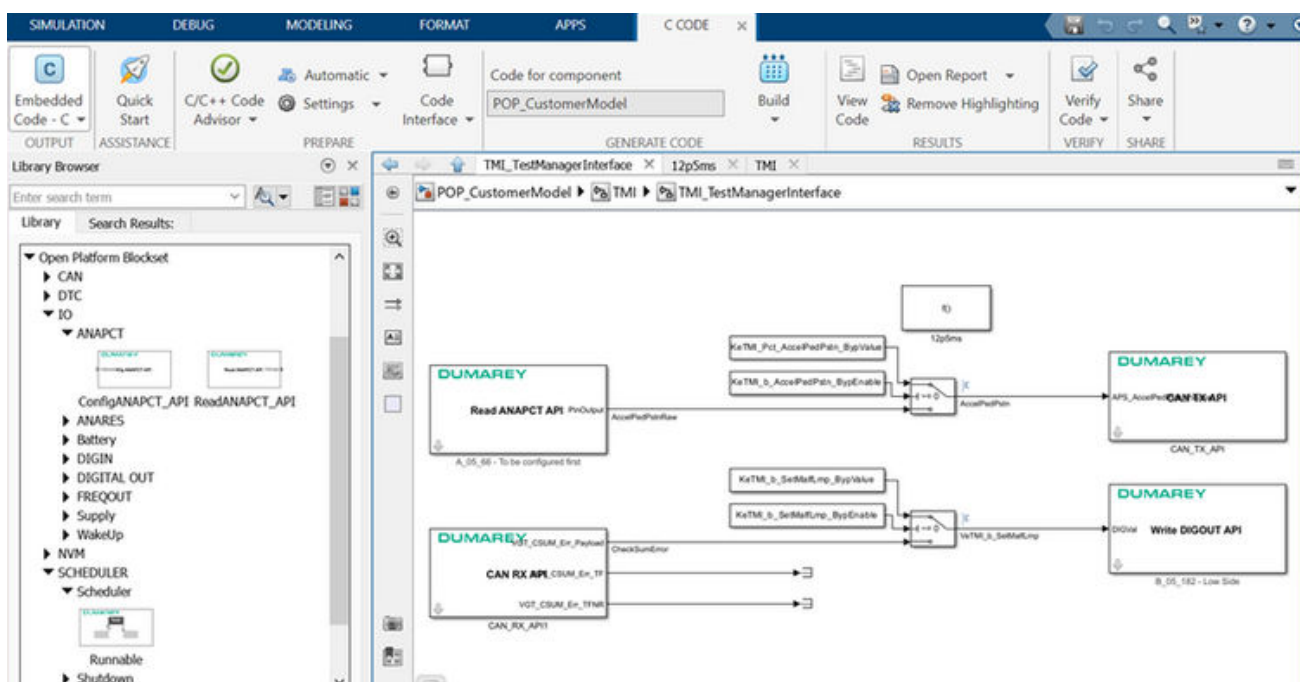


Software Features

- 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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