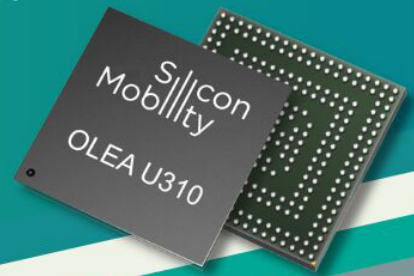


# Single-chip powertrain controller supports CAN XL

Silicon Mobility, an Intel daughter company, has announced the OLEA U310 field programmable control unit (FPCU). The single system-on-chip (SoC) is able to replace up to six micro-controllers. It can manage simultaneously real-time control tasks and power as well as energy management functions in combination with functional safety and cybersecurity.



(Source: Silicon Mobility)

The design allows original equipment manufacturers (OEMs) to break free from the conventions of EV (electric vehicle) domain controls and move to a highly integrated X-in-1 powertrain that delivers unmatched system performance. It helps to make EVs more energy efficient, lighter, and more cost-effective. The traditional embedded electric architecture is being reinvented to support a software-driven approach. This "software-defined vehicle" concept promises a more sustainable model for car development and a constantly updatable and evolving user experience. However, it requires powerful computational and control solutions that seamlessly integrate hardware and software.

The OLEA U310 is engineered to match the need for powertrain domain control in electrical architectures with distributed software. Built with a hybrid and heterogenous architecture, it surpasses the capabilities of traditional micro-controllers. Up to six micro-controllers can be replaced

by a single OLEA U310 in a system combination, where the FPCU is controlling in parallel an inverter, a motor, a gearbox, a DC-DC converter, and an on-board-charger. The SoC embeds multiple software and hardware programmable processing and control units while seamlessly integrating functional safety and cybersecurity into its core design.

The OLEA U310 can control up to four traction inverters and their motor in parallel at a speed of 1000 kHz field-oriented control loop with high PWM (pulse-width modulation) precision of hundreds of picoseconds. In addition to the BoM (bill of materials) reduction, early figures show up to five percent energy-efficiency improvement, 25 percent motor downsizing for the same power, 35 percent less cooling need, and up to 30 times passive component downsizing.

The SoC comprising three Cortex-R52 cores supports the following functions:

- ◆ AxEC 2.0: The Advanced execution and Events Control is a data processing and real-time control unit based on programmable hardware and configurable peripherals supporting multiple parallel applications.
- ◆ SILant 2.0: The Safety Integrity Level (SIL) agent is a set of units and functionalities dedicated to the FPCU and the system functional safety ensuring ISO 26262 ASIL-D compliancy.
- ◆ FHSM: The Flexible Hardware Security Module is a sub-system dedicated to the cybersecurity of the FPCU integrating encryption/decryption accelerators and is compliant to EVITA Full and ISO 21434. It is combined with a hardware programmable cluster to support unidentified threats and strengthen security.

The chip features CAN connectivity. It implements four CAN FD controllers and one CAN XL controller as well as one Ethernet port. Additionally, it provides four LIN 2.3 interfaces as well as four SPI ports.

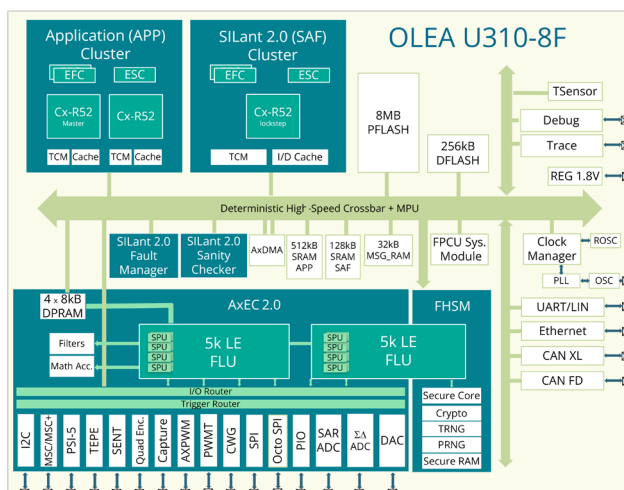


Figure 1: The SoC comes with four CAN FD and one CAN XL interfaces (Source: Silicon Mobility)

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