CAN Newsletter Online

MCUS FOR EV PLATFORMS

CAN XL for model year 2024 vehicles

STMicroelectronics has unveiled the micro-controller units (MCUs) Stellar P6 for EV (electric vehicle) platform system integration. The automotive MCUs are qualifiable components for 2024 model year vehicles that incorporate the CAN XL on-board communication standard.

Stellar P6 MCUs enable electrified drivetrains (Source: STMicroelectronics)

The MCUs target the coming electrified drivetrains and domain-oriented, over-the-air updateable systems that are the foundation of the next generation of EVs, explained the company. As the vehicles generate, process, and transfer large data flows, especially to support EVs, ST's automotive MCU series integrate the CAN XL communication standard for model year 2024 vehicles. This enables the vehicle platforms to handle growing data flows so the car can operate at peak performance.

"The real-time, power-efficient Stellar P6 automotive micro-controllers combine advanced integration of motion-control and energy-management domains with actuation capabilities, ensuring a smooth shift from traditional ICEs/EVs to new drive-traction architectural patterns of software-defined vehicles," said Luca Rodeschini, Automotive and Discrete Vice President, Strategic Business Development and Automotive Processing and RF General Manager, STMicroelectronics. "As the automotive industry begins work on new vehicle platforms for model year 2024, ST is ready with the micro-controllers to support development and ease the transition to vehicle production."

The company's Stellar family of automotive MCUs has been designed to support carmakers and Tier1s as they transition toward software-defined vehicles. Stellar now includes multiple series: The Stellar E series assures fast real-time control and system miniaturization in power-conversion applications, maximizing the benefits of SiC and GaN power technology in EVs' on-board charging, DC-DC converters, and traction inverters, among other applications, explained the company. The Stellar G series MCUs act as a secure data HUB and real-time, safe aggregator of functions within the body domain primarily for zonal architectures, they added. This series implements OTA updates, low-power modes, and data routing over a set of in-car communication protocols.

The latest introduced Stellar P series of automotive MCUs offers devices that combine actuation capabilities with function integration. Stellar P devices target the drivetrain trends for electric vehicles and domain-oriented architectures, for real-time performance and energy management, the company concluded. Samples of Stellar P6 are available now for model year 2024 vehicles.

In the official press release, the company also provided additional information: Carmakers are transitioning to software-defined vehicles for their next-generation vehicle platforms to manage the complexity and performance of the features they are adding to vehicles (electrification, advanced safety, assisted and automated driving). This transition requires top to bottom revamping of the car platform's architecture. The key changes include moving from many electrical control units (ECUs) that each manage a small subsystem to domain or zone controllers that combine multiple functions. These controllers must also manage the consolidation of software from across a range of vehicle systems. MCUs like Stellar enable processing performance and integration of key functionalities. In software-defined vehicles fully driven by electronics systems, the MCU delivers synchronized operations and secure over-the-air software upgrades of all systems for both maintenance and continued performance improvement, the company further explained.

Technical information

Stellar P6 embeds up to 20 Mbit/s of Phase Change (non-volatile) Memory (PCM). Developed and tested according to stringent automotive requirements for high-temperature operation, radiation hardening, and data retention, ST's PCM also delivers faster access time through single-bit overwrite, a feature unavailable in Flash, explained the company. In addition, the company said, over-the-air updates with no downtime leverage a game-changing mechanism that saves memory by dynamically allocating memory space to the new downloaded software image until it is validated. This happens while the rest of the memory continues to execute the running application in real-time.

The P6 MCUs contain up to six Arm Cortex R52 processor cores, some operating in lockstep and some in split-lock mode to provide failsafe redundancy. These enable the devices to deliver performance, real-time determinism, and upgradeability for automotive drivetrains, electrification solutions, and domain-oriented systems. Stellar P6 manages hardware virtualization (sandboxing) using the Cortex-R52 features and firewalls to resource access. This enables the development and integration of multiple-source software on the same chip while providing isolation and performance.

The implementation of ISO 26262 ASIL-D functions provides safety measures of the architecture. In addition, the FD-SOI technology offers a quasi-immunity to radiation and provides protection against system unavailability while ensuring compliance with safety standards, the company continued.

A hardware security module, extended with cryptographic engines operating in lockstep, supports secure ASIL D functions and enables EVITA security capability. It also provides high-speed security cryptographic services and safe network authentication to further protect manufacturer firmware as well as end-users' data, the company concluded.

CiA 610-1

The CiA 610-1 CAN XL specifications and test plans - Part 1: Data link layer and physical coding sub-layer requirements has been specified and released by CAN in Automation (CiA). It is available on the CiA website and free of charge for members. This document specifies the CAN XL data link layer (DLL) and the physical coding sub-layer (PCS). The CAN XL DLL features data fields of up to 2 KiB (2048 byte). It is backwards compatible with CAN FD and implicitly with Classical CAN. Therefore, this document provides references to ISO 11898-1:2015, where appropriate. This includes references to the attachment unit interface (AUI). The optional PWM encoding is specified in this document, too. This document divides the CAN XL data link layer (DLL) into the logical link control (LLC) and the medium access control (MAC) sub-layers. The DLL's service data unit (SDU), which interfaces the LLC and the MAC, is implemented by means of the LLC frame. The LLC frame features also the service data unit type (SDT) and the virtual CAN identifier (VCID), which provide higher-layer protocol configuration and identification information. CiA has also submitted CiA 610-1 to be integrated into next editions of the ISO 11898-1 (CAN data link layer and physical signaling sub-layer) standard.

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