

Getting to know CAN FD

Hanser's Automotive Networks conference in Stuttgart concentrated on Ethernet, but left some room for CAN FD. Security in car networks emerged as an underrated topic that is becoming more and more important.

THE EVENT STARTED WITH A DINNER SPEECH on security in car networks by Andreas Tomek from SBA Research. Car makers are slowly coming to realize that car networks might be vulnerable and that steps have to be taken to make them more secure. The Thursday started out with presentations on CAN FD in the morning, and then concentrated on Ethernet in the afternoon.

Dr. Marcel Wille from Volkswagen came first with a talk on "Automotive Ethernet and CAN FD - An overview of standardization in Autosar". Referring to Andreas Tomek's presentation, he explained that Autosar will set up a work package focusing on security soon. He pointed out that the modular structure of Autosar enables a fast support of CAN FD. Release 4.2.1 already supports the transmission and reception of CAN FD frames with up to 64 byte. With this release, switching of the bit-rate does not require resetting the CAN controller. It also includes an E2E profile that supports extended payloads.

Dr. Arthur Mutter from Bosch gave a presentation on "From Classic CAN to CAN FD - Impacts on bit timing configuration, bus topology, and software". He gave an introduction to CAN FD, talked about difficulties when using Classic CAN frames and CAN FD frames in one network, and described the bus topology considerations. Mentioned use cases for CAN FD were faster software downloads (flashing), benefits from larger payloads, accelerated communication on long bus lines in industrial applications, and higher bit-rates. He stressed that in order to successfully configure bit-timing in CAN FD, it is important to follow the recommendations by Bosch and CiA. He also gave the practical tip that the bit-rate in CAN FD strongly depends on the quality of the physical layer.

In her presentation on "CAN FD - Advantages and challenges", Ursula Kelling from Infineon mentioned three challenges: the propagation delay symmetry of the physical layer, the recent change in the ISO specification, and the 64-bytes message length. She proposed a solution for the first problem. Depending on the bit-rate, the propagation delay asymmetry creates a high phase shift. The solution introduces a new parameter: the propagation delay symmetry is specified as the bit-time of the recessive bit after five dominant bits. This is the most critical situation for the transceiver. If a transceiver has a very asymmetric delay, the recessive bit is shortened or extended. This new parameter is already included in a proposal for ISO 11898-2.

Presentations were also held by speakers from BMW, Continental, Daimler, Elektrobit Austria, Tektronix, TTTech Computertechnik, and Vector. The conference aims to provide specialized knowledge and offers an overview of the latest discussion on Ethernet and CAN FD with application-based and solution-oriented presentations. It took place from November 12 to 13 in Stuttgart.



Continental and Audi showed an "Ethernet Concept Car" with tunneling of CAN traffic - partial networking with Ethernet can optimize energy efficiency (Photo: CiA)