CAN Newsletter Online

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CAN XL and higher-layer protocols

The new year will bring CAN XL to practice. Prototype implementations will be launched. Additionally, CAN in Automation (CiA) will provide higher-layer protocol (HLP) specifications for CAN XL.

CAN XL and standardized higher-layer protocols are as strong as tigers; according to the Chinese zodiac 2022 is the year of the tiger (Source: Stock/Adobe)

From the beginning, CAN XL, the 3rd CAN protocol generation, was developed to be integrated easily and smoothly into TCP/IP environments. The CAN XL protocol provides layer management service access point (SAP) to support mixing of higher-layer protocols. The 8-bit SDU (service data unit) field indicates, which higher-layer protocol the publisher has used. So, the subscriber knows from this embedded layer management information, how to interpret the received payload. In order to support multiple instances of the same higher-layer protocol, CAN XL features the 8-bit CAN network ID (identifier) field. This enables the system designer to run up to 256 applications on the same cable.

This is the return of CAN technology. Originally invented for simple network architectures, the 3 rd CAN protocol supports the complete functionality of the OSI (open system interconnection) technology. CiA is going to specify the SDU types and other higher-layer functions for CAN XL. This includes implementation and design guidelines for CAN XL components and physical networks. This year, additional CAN XL related documents will be released by CiA. Furthermore, CiA will develop the CAN XL frame fragmentation and the CAN XL data link layer cybersecurity functions.

When the first CAN XL silicon is available, CiA will extend the CANopen FD application layer to support also the CAN XL lower layers. This gives the system designer the most freedom. The scalability of CAN physical layers and CAN protocols makes this possible. From Classical CAN with 1-Mbit/s transceiver to CAN XL with 10-Mbit/s SIC XL transceivers is not such a big step. And, there are many steps in between, which could be suitable for dedicated applications.

CAN technology is often underestimated and denoted as old technology invented 36 years ago. But with the introduction of CAN XL and its scalability, there is the return of the reliable and robust CAN communication for future zonal network architectures using heterogeneous OSI layers. The nonprofit CiA association developing CAN XL specification is a little younger than CAN. In 2022, the international CAN users' and manufacturers' group celebrates its 30th anniversary. The birthday party will take place in June. This two-day event is intended as a get together of the CiA community exchanging knowledge and experiences.

Several chipmakers will provide CAN XL micro-controller units and CAN SIC XL transceiver prototypes. Protocol stack vendors have higher layer protocol stacks for CAN XL networks in the pipeline. At the end of the tiger year, many of the additional CAN XL specifications will be released. In January, ISO starts to integrate CAN XL into the ISO 11898 series. CiA has already submitted its related documents to the international standardization body.

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