

CiA 610-1

## CAN XL data link layer and physical coding sub-layer

The nonprofit CiA (CAN in Automation) association has released the CiA 610-1 document as Draft Specification Proposal (DSP). This document specifies the CAN XL data link layer (DLL) and the physical coding sub-layer (PCS).



*CiA has released CiA 610-1: CAN XL specifications and test plans - Part 1: Data link layer and physical coding sub-layer requirements (Source: Adobe Stock)*

The third generation of CAN protocols provides a data field length of 1 to 2048 byte. It is intended as backbone or sub-backbone network, which can be integrated into TCP/IP environments. The CAN XL protocol features a true Hamming distance of 6 meaning five randomly distributed bit-errors can be detected. This is achieved by means of two CRC fields in the protocol data unit (PDU).

New is the separation of the 11-bit priority field and the 32-bit acceptance field. In Classical CAN and CAN FD, the 11-bit or 29-bit identifier field has two functions: unique priority to access the network and indication of the data field content. CAN XL provides several embedded higher-layer configuration information: the SDU (service data unit) type allows to run heterogenous higher-layer protocols and the VCID (virtual CAN network ID) supports to instance higher-layer protocols. These features are similar to Ethernet-based functions, explained CiA.

The physical coding sub-layer provides an optional PWM (pulse-width modulation) coding allowing bit-rates of higher than 10 Mbit/s. The error signaling can be switched off. In this case, higher layers should signal not correctly received XL frames. An optional frame fragmentation is under development as well as a frame security (CADsec).

“CAN XL is a reliable and robust lower-layer approach at very reasonable costs,” said Holger Zeltwanger, CiA Managing Director. “The seamless integration into TCP/IP network systems makes CAN XL very suitable for high-volume sub-networks in passenger cars as well as other application fields.”

CiA also specifies the tunneling of Ethernet frames via CAN XL frames. The second plugfest was postponed due to the current fourth Covid-19 wave in Germany. [The first one took place](#) in summer testing the interoperability of different implementations. All tests were passed successfully, said CiA. In the next plugfest, errors will be injected and the correct behavior will be tested. “CAN XL is made for price-sensitive applications, which require a reliable and robust communication as needed not only in road vehicles,” stated Zeltwanger. “We will submit the CAN XL specification to ISO for integration into the ISO 11898-1 standard, which is under revision.”

[CW](#)