

Standards and specifications



This section provides news from standardization bodies and nonprofit associations regarding CAN-related documents. Included are also recommended practices, application notes, implementation guidelines, and technical reports.

CAN transceiver terminology

The recently updated ISO 11898-2:2024 standard specifies CAN HS (high-speed) transceivers as well as CAN FD (flexible data rate) transceivers as in the ISO 11898-2:2016 standard. In general, there is no difference in these standards regarding these transceiver types. An exception is the definition for the dynamic symmetry parameters. Now these parameters are guaranteed for the complete bit-rate range, which is specified in the transceiver product datasheet. For example, a lot of so-called 5-Mbit/s CAN FD transceivers are used at 2 Mbit/s. The intention behind, that the so-called 5-Mbit/s transceiver behaves at 2 Mbit/s as specified at 5 Mbit/s, is not covered in the ISO 11898-2:2016 standard. This modification will be explained in the updated CiA 601-1 technical report about CAN FD node and system design recommendations (revision is in preparation and comes soon).

Additionally, ISO 11898-2:2024 specifies the CAN SIC (signal improvement capability) transceiver, originally described in the CiA 601-4 specification (document has been withdrawn after releasing the ISO standard), and CAN SIC XL (extended data-field length) transceivers, deriving from the CiA 610-3 specification (has been withdrawn, too).

In order to avoid confusions, the following terms should be used to typify CAN transceivers:

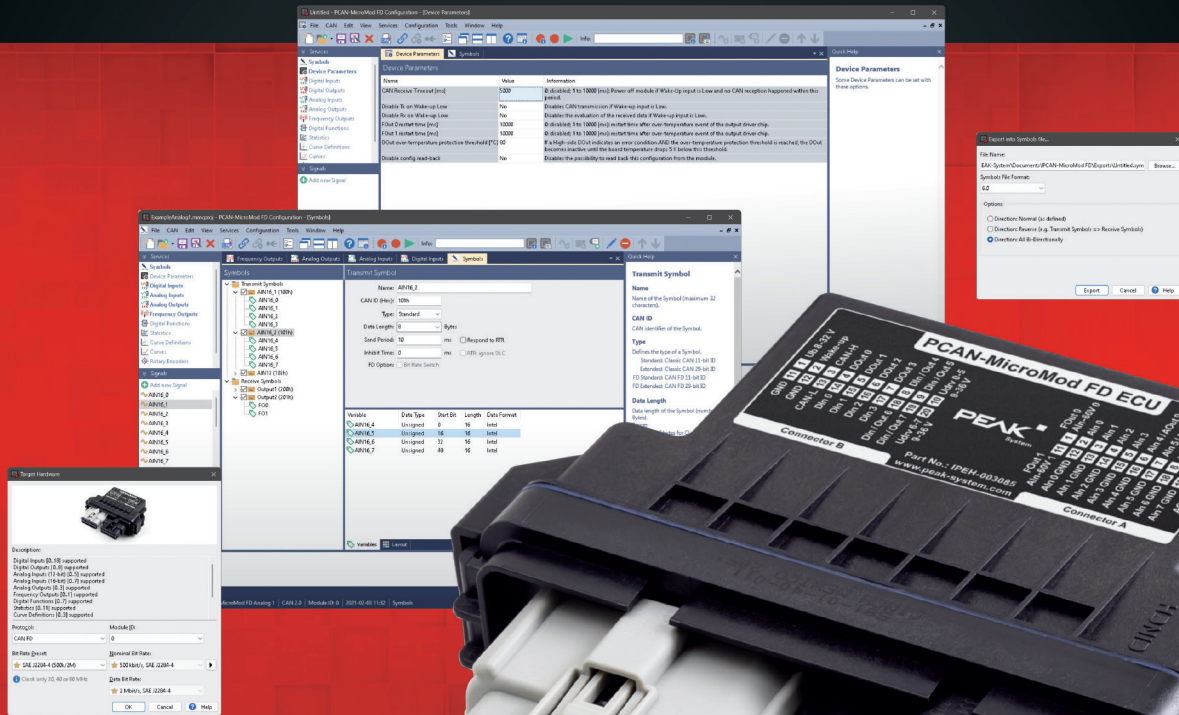
- ◆ CAN HS: legacy transceiver supporting bit rates up to 1 Mbit/s, with or without lower-power mode and/or selective wake-up capability.
- ◆ CAN FD: legacy transceiver supporting bit rates of 2 Mbit/s and more (e.g., when using a point-to-point topology), with or without lower-power mode and/or

selective wake-up capability (only when qualified for 5 Mbit/s).

- ◆ CAN SIC: new transceiver providing signal improvement capability and supporting bit rates up to 8 Mbit/s, with or without lower-power mode and/or selective wake-up capability (only when qualified for 5 Mbit/s; ISO 11898-2:2024 limits the bit rate to 5 Mbit/s).
- ◆ CAN SIC XL: new transceiver providing signal improvement capability and the FAST mode with error signaling disabled (up to 20 Mbit/s), with or without lower-power mode (selective wake-up capability is not possible).

There are also other CAN transceiver types specified in other documents, such as CAN LS (low-speed) transceivers with fault-tolerant functionality and low-power capability supporting bit rates up to 125 kbit/s (ISO 11898-3). There is an additional fault-tolerant transceiver standardized in ISO 11992-1 supporting a bit rate of 125 kbit/s for point-to-point links; it is used for connecting towing and towed heavy-duty road vehicles. The SWC (single-wire CAN) transceiver specified in the SAE J2411 document supports a nominal bit rate of 33,3 kbit/s. It is not recommended for new designs.

NOTE: Unfortunately, the published ISO 11898-2:2024 standard contains some misleading and partly wrong information. The CiA 140 document provides a corrigendum proposal; it can be requested free-of-charge from [CiA office](#). By the way, the next edition of ISO 11898-2 (overcoming these issues) is already in preparation. *hz*



Configurable I/O Module for Automotive Applications

■ PCAN-MicroMod FD ECU

With CAN FD, a mix of digital and analog I/Os, and its tough case, the PCAN-MicroMod FD ECU can be your solution for integrating custom accessories in utility and heavy duty vehicles operating under harsh conditions.

The PCAN-MicroMod FD ECU can be configured with a Windows software via CAN. Besides simply mapping its I/Os to CAN messages, several function blocks for processing the data are available as well.

Specifications

- High-speed CAN connection (ISO 11898-2)
 - Complies with CAN specifications 2.0 A/B and FD
 - CAN FD bit rates for the data field (64 bytes max.) from 40 kbit/s up to 10 Mbit/s
 - CAN bit rates from 40 kbit/s up to 1 Mbit/s
- Wake-up by CAN bus or by separate input
- 4 digital inputs
 - Pull-up or pull-down configurable
- 8 digital outputs with High-side switches
 - 2 outputs with 5 A and 6 outputs with 2 A
 - 4 alternatively usable as a digital input or additionally for reading back the output level

- 8 analog inputs
 - Resolution 16 bit
 - Measuring range adjustable: ± 2.5 V, ± 5 V, ± 10 V, ± 20 V
- 4 of the analog inputs alternatively usable as analog output
 - Resolution 12 bit
 - Voltage range adjustable: 0 to 5 V or 0 to 10 V
- 2 frequency outputs
 - Low-side switches (3 A)
 - Adjustable frequency range from 0 to 20 kHz
 - Alternatively usable as analog inputs with voltage range from 0 to 60 V
- Connections for CAN, I/O, and power supply via two 20-pole automotive connectors (Molex MX150)
- Plastic casing with increased Ingress Protection IP67 and flange
- Operating voltage 8 to 32 V; suitable for use in 12 and 24 V vehicle electrical systems
- Extended operating temperature range from -40 to $+85$ °C (-40 to $+185$ °F)
- E1 type approval



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New CAN protocol terms

The ISO 11898-1:2024 standard uses for the three CAN data link layer (DLL) and physical coding sublayer (PCS) approaches the following terms:

- ◆ CAN CC (classic);
- ◆ CAN FD (flexible data rate);
- ◆ CAN XL (extended data-field length).

The term CAN should be used, when you like to talk about all three CAN protocol generations. Similarly, the term CANopen indicates both higher-layer protocols: CANopen CC based on CAN CC (specified in CiA 301) as well as CANopen FD based on CAN FD (specified in CiA 1301). In SAE J1939, there are two specification names applied to distinguish between the legacy CAN CC based (SAE J1939-21) and the new CAN FD based (SAE J1939-22) application layer approaches. hz

Brief news

- ◆ **ISO 25200:** The submission of DIN 4630 (CAN-based commercial vehicle body application network) for international standardization has been accepted. It will be standardized in ISO 25200. This work item has been assigned to ISO/TC 22/SC 31/WG 4.
- ◆ **ISO 11992 series:** The ISO 11992-2 (parameters and parameter groups for the CAN-based link between towing and towed commercial vehicles) document is under revision. To involve as many stakeholders as possible, an ISO 11992 workshop is scheduled in Berlin (Germany) on September 16, 2024.
- ◆ **CiA 611-1 and CiA 611-2:** An updated version of CiA 611-1 (SDT specification for CAN XL) has been released as well as a first version of CiA 611-2 (Multi-PDU specification for CAN XL).
- ◆ **CiA 406 series:** The profile for encoders has been revised. The version 2.0.0 of Part B specifies the functional behavior and parameters including those for functional safety. Part C specifies the mapping to CANopen CC and CANopen Safety (EN 50325-5). Part F describes the mapping to CANopen FD and Part J to the J1939 higher-layer protocols.
- ◆ **SAE J1939DA:** The digital annex of the J1939 specification series is released quarterly. It contains among other items (suspect) parameter and Parameter Group (PG) specifications. The latest version has been published in June.
- ◆ **FMS specification:** ACEA, the European road-vehicle manufacturer association, has released version 5 of its fleet management specification (FMS) for commercial vehicles. It is based on J1939 and references parameters and Parameter Groups (PGs) specified in SAE J1939DA.

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