
**Road vehicles — Controller area
network (CAN) —**

**Part 1:
Data link layer and physical signalling**

*Véhicules routiers — Gestionnaire de réseau de communication
(CAN) —*

Partie 1: Couche liaison de données et signalisation physique





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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword	vi
Introduction	vii
1 Scope	1
2 Conformance	1
3 Normative references	2
4 Terms and definitions	2
5 Symbols and abbreviated terms	5
6 Basic concepts of CAN	7
6.1 CAN properties	7
6.2 Frames	8
6.3 Bus access method	8
6.4 Information routing	8
6.5 Network flexibility	8
6.6 Data consistency	8
6.7 Remote data request	8
6.8 Error detection	9
6.9 Error signalling and recovery time	9
6.10 ACK	9
6.11 Automatic retransmission	9
6.12 Fault confinement	9
6.13 Error-active	9
6.14 Error-passive	9
6.15 Bus-off	10
7 Layered architecture of CAN	10
7.1 Reference to OSI model	10
7.2 Protocol specification	11
7.3 Format description of services	11
7.3.1 Format description of service primitives	11
7.3.2 Types of service primitives	12
7.4 LLC interface	12
8 Description of LLC sub-layer	12
8.1 General	12
8.2 Services of LLC sub-layer	13
8.2.1 Types of connectionless-mode transmission services	13
8.2.2 Service primitive specification	13
8.3 Functions of LLC sub-layer	18
8.3.1 General	18
8.3.2 Frame acceptance filtering	18
8.3.3 Overload notification	18
8.3.4 Recovery management	19
8.4 Structure of LLC frames	19
8.4.1 General	19
8.4.2 Specification of LLC DF	19
8.4.3 Specification of LLC RF	20
8.5 Limited LLC frames	21
9 Interface between LLC and MAC	21
9.1 Services	21
9.2 Time and time triggering	21
9.2.1 Description	21
9.2.2 Time base	21
9.2.3 Time reference point	21

9.2.4	Event generation.....	22
9.3	Disabling automatic retransmission.....	22
9.3.1	Retransmission of frames.....	22
9.4	Message time stamping.....	22
10	Description of MAC sub-layer.....	22
10.1	General.....	22
10.2	Services of MAC sub-layer.....	22
10.2.1	Service description.....	22
10.2.2	Service primitives specification.....	23
10.3	Functional model of MAC sub-layer architecture.....	27
10.3.1	Capability.....	27
10.3.2	Frame transmission.....	27
10.3.3	Frame reception.....	28
10.4	Structure of MAC frames.....	29
10.4.1	Description.....	29
10.4.2	Specification of MAC DF.....	29
10.4.3	Specification of MAC RF.....	34
10.4.4	Specification of EF.....	34
10.4.5	Specification of OF.....	35
10.4.6	Specification of inter-frame space.....	36
10.5	Frame coding.....	37
10.6	Frame acknowledgement.....	37
10.7	Frame validation.....	37
10.8	Order of bit transmission.....	38
10.9	Medium access method.....	39
10.9.1	General.....	39
10.9.2	Multi-master.....	39
10.9.3	Bus access.....	40
10.9.4	Bus integration state.....	40
10.9.5	Protocol exception event.....	40
10.9.6	Transmission of MAC frames.....	40
10.9.7	Content-based arbitration.....	40
10.9.8	Frame priority.....	41
10.9.9	Collision resolution.....	41
10.9.10	Disabling of frame formats.....	41
10.10	MAC data consistency.....	41
10.11	Error detection.....	41
10.12	Error signalling.....	42
10.13	Overload signalling.....	43
10.14	Bus monitoring.....	44
10.15	Restricted operation.....	44
11	PL specification.....	44
11.1	General and functional modelling.....	44
11.2	Services of PL.....	44
11.2.1	Description.....	44
11.2.2	PCS_Data.Request.....	45
11.2.3	PCS_Data.Indicate.....	45
11.2.4	PCS_Status.Transmitter.....	45
11.2.5	PCS_Status.Receiver.....	45
11.3	PCS specification.....	45
11.3.1	Bit encoding/decoding.....	45
11.3.2	Synchronization.....	50
11.3.3	Transmitter delay compensation.....	52
11.4	AUI specification.....	54
11.4.1	General.....	54
11.4.2	PCS to PMA messages.....	55
11.4.3	PMA to PCS message.....	55

12	Description of supervisor FCE	55
12.1	Fault confinement	55
12.1.1	Objectives	55
12.1.2	Strategies	55
12.1.3	Fault confinement interface specification	56
12.1.4	Rules of fault confinement	58
12.1.5	Network start-up	60
12.2	Bus failure management	60
Annex A	(informative) Additional Information	61
Bibliography		65

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword — Supplementary information](#).

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*.

This second edition cancels and replaces the first edition (ISO 11898-1:2003), which has been technically revised. It also incorporates the Corrigendum ISO 11898-1:2003/Cor 1:2006.

ISO 11898 consists of the following parts, under the general title *Road vehicles — Controller area network (CAN)*:

- *Part 1: Data link layer and physical signalling*
- *Part 2: High-speed medium access unit* ¹⁾
- *Part 3: Low-speed, fault-tolerant, medium-dependent interface*
- *Part 4: Time-triggered communication*
- *Part 5: High-speed medium access unit with low-power mode* ¹⁾
- *Part 6: High-speed medium access unit with selective wake-up functionality* ¹⁾

1) Parts 2, 5, and 6 are being revised. They will be merged under a new edition of Part 2.

Introduction

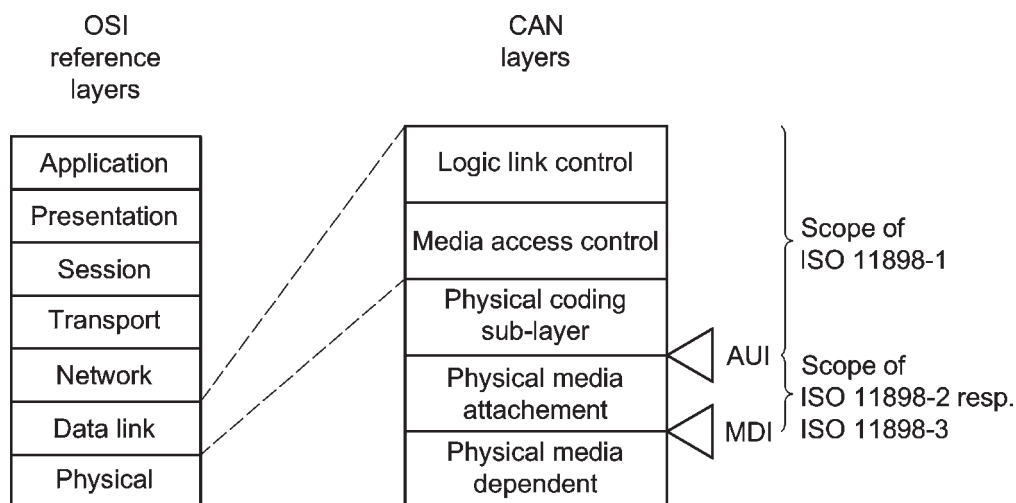
ISO 11898 was first published as one document in 1993. It covered the CAN data link layer, as well as the high-speed physical layer.

In the reviewed and restructured ISO 11898 series:

- Part 1 defines the data link layer including the logical link control (LLC) sub-layer and the medium access control (MAC) sub-layer, as well as the physical signalling (PHS) sub-layer;
- Part 2 defines the high-speed physical medium attachment (PMA);
- Part 3 defines the low-speed fault-tolerant physical medium attachment (PMA);
- Part 4 defines the time-triggered communication;
- Part 5 defines the power modes of the high-speed physical medium attachment (PMA);
- Part 6 defines the selective wake-up functionality of the high-speed physical medium attachment (PMA).

NOTE ISO 11898-2 is updated in parallel to the update of this part of ISO 11898 to combine the functions described in ISO 11898-2, ISO 11898-5 and ISO 11898-6. (The future edition of ISO 11898-2 will cancel and replace the current ISO 11898-2:2003, ISO 11898-5:2007 and ISO 11898-6:2013)

[Figure 1](#) shows the relations between the OSI reference layers and the parts of the ISO 11898 series.



NOTE ISO 11898-2 refers to the future edition that will cancel and replace the current ISO 11898-2:2003, ISO 11898-5:2007 and ISO 11898-6:2013.

Figure 1 — CAN data link and physical sub-layers relation to the OSI model

Road vehicles — Controller area network (CAN) —

Part 1: Data link layer and physical signalling

1 Scope

This part of ISO 11898 specifies the characteristics of setting up an interchange of digital information between modules implementing the CAN data link layer. Controller area network is a serial communication protocol, which supports distributed real-time control and multiplexing for use within road vehicles and other control applications.

This part of ISO 11898 specifies the Classical CAN frame format and the newly introduced CAN Flexible Data Rate Frame format. The Classical CAN frame format allows bit rates up to 1 Mbit/s and payloads up to 8 byte per frame. The Flexible Data Rate frame format allows bit rates higher than 1 Mbit/s and payloads longer than 8 byte per frame.

This part of ISO 11898 describes the general architecture of CAN in terms of hierarchical layers according to the ISO reference model for open systems interconnection (OSI) according to ISO/IEC 7498-1. The CAN data link layer is specified according to ISO/IEC 8802-2 and ISO/IEC 8802-3.

This part of ISO 11898 contains detailed specifications of the following (see [Figure 2](#)):

- logical link control sub-layer;
- medium access control sub-layer;
- physical coding sub-layer.

There are three implementation options. They are the following:

- support of the Classical CAN frame format only, not tolerating the Flexible Data Rate frame format;
- support of the Classical CAN frame format and tolerating the Flexible Data Rate frame format;
- support of the Classical CAN frame format and the Flexible Data Rate frame format.

The last option is recommended to be implemented for new designs.

NOTE Implementations of the first option can communicate with implementations of the third option only as long as the Flexible Data Rate frame format is not used; otherwise, Error Frames are generated. There are opportunities to run implementations of the first option also in CAN networks using the Flexible Data Rate frame format, but these are not in the scope of this part of ISO 11898.

2 Conformance

The data link layer conformance test plan is not in the scope of this part of ISO 11898. For an implementation to be compliant with this part of ISO 11898, the logical link control sub-layer and the medium access control sub-layer shall comply with all mandatory specifications and values given in this part of ISO 11898. If optional specifications and values are implemented, they shall comply, too.