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**Road vehicles — Interchange of digital
information — Controller area network
(CAN) for high-speed communication**

AMENDMENT 1

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*Véhicules routiers — Échange d'information numérique — Gestionnaire de
réseau de communication à vitesse élevée (CAN)*

ISO 11898:1993/Amd 1:1995

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Reference number
ISO 11898:1993/Amd.1:1995(E)

Foreword

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Road vehicles — Interchange of digital information — Controller area network (CAN) for high-speed communication

AMENDMENT 1

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Page iv

Insert new page v and the following Introduction:

<https://standards.iteh.ai/catalog/standards/sist/ec80a97c-e911-4be7-b79e-39c27b6c66bc/iso-11898-1993-amd-1-1995>

Introduction

The acceptance and introduction of serial data communication to more and more applications has led to requirements that the assignment of message identifiers to communication functions be standardized for certain applications. These applications can be realized with CAN more comfortably, if the address range that has been defined in ISO 11898 by 11 identifiers bits is enlarged.

Therefore a second message format ("extended format") is introduced that provides a larger address range defined by 29 bits. This will relieve the system designer from compromises with respect to defining well-structured naming schemes. Users of CAN who do not need the identifier range offered by the extended format can rely on the conventional 11 bit identifier range ("standard format") further on.

In order to distinguish standard and extended format, the first reserved bit of the CAN message format, as defined in ISO 11898, is used. This is done in such a way that the message format in ISO 11898 is equivalent to the standard format and therefore is still valid. Furthermore, the extended format has been defined so that messages in standard format and extended format can coexist within the same network.

Amendment 1 to ISO 11898 details the necessary changes to the 1993 Standard to include both formats.

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Replace the wording below item b) of 6.1.1 by the following.

According to the two different LLC services there are two types of frames from or to the user:

- LLC Data Frame,
- LLC Remote Frame.

There are two formats for both Data Frames and Remote Frames which differ in the length of the identifier (see 6.1.2): Frames with an 11 bit IDENTIFIER are denoted STANDARD LLC Frames, and Frames containing a 29 bit IDENTIFIER are denoted Extended LLC Frames.

Replace table 3 in 6.1.2 by the following.

Table 3 — List of LLC service primitive parameters

LLC Service Primitive Parameters	
IDE	identifies the IDENTIFIER's length
IDENTIFIER	identifies the data and its priority
DLC	Data Length Code
DATA	data the user wants to transmit
TRANSFER_STATUS	confirmation parameter

Replace item b) of 6.1.2.1 by the following.

b) Semantics of the L_DATA.request primitive

The primitive shall provide parameters as follows.

```
L_DATA.request (
```

```
    IDE
```

```
    IDENTIFIER
```

```
    DLC
```

```
    DATA
```

```
)
```

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The parameter DATA is insignificant if the associated LLC Data Frame is of data length zero.

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Replace item b) of 6.1.2.2 by the following [9c27b6c66bc/iso-11898-1993-amd-1-1995](https://standards.iteh.ai/catalog/standards/sist/ec80a97c-e911-4be7-b79e-9c27b6c66bc/iso-11898-1993-amd-1-1995)

b) Semantics of the L_DATA.indication primitive

The primitive shall provide parameters as follows.

```
L_DATA.indication (
```

```
    IDE
```

```
    IDENTIFIER
```

```
    DLC
```

```
    DATA
```

```
)
```

The parameter DATA is insignificant if the associated LLC data frame is of data length zero.

Replace item b) of 6.1.2.3 by the following.

b) Semantics of the L_DATA.confirm primitive

The primitive shall provide parameters as follows.

```
L_DATA.confirm (
```

```
    IDE
```

```
    IDENTIFIER
```

```
    TRANSFER_STATUS
```

```
)
```

The TRANSFER_STATUS is used to indicate the completion of the transaction initiated by the previous L_DATA.request primitive.

```
TRANSFER_STATUS: [COMPLETE, NOT_COMPLETE]
```

Replace item b) of 6.1.2.4 by the following.

b) Semantics of the L_REMOTE.request primitive

The primitive shall provide parameters as follows.

```
L_REMOTE.request (
    IDE
    IDENTIFIER
    DLC
)
```

The value of DLC equals the length of the data field of the requested data frame.

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Replace item b) of 6.1.2.5 by the following.

b) Semantics of the L_REMOTE.indication primitive

The primitive shall provide parameters as follows.

```
L_REMOTE.indication (
    IDE
    IDENTIFIER
    DLC
)
```

The IDENTIFIER identifies the LSDU to be sent. The value of DLC equals the length of the data field of the requested data frame.

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Replace item b) of 6.1.2.6 by the following.

b) Semantics of the L_REMOTE.confirm primitive

The primitive shall provide parameters as follows.

```
L_REMOTE.confirm(
    IDE
    IDENTIFIER
    TRANSFER_STATUS
)
```

The TRANSFER_STATUS is used to indicate the completion of the transaction initiated by the previous L_REMOTE.request primitive.

TRANSFER_STATUS: [COMPLETE, NOT_COMPLETE]

Replace 6.2 by the following.

LLC frames are the protocol data units that are exchanged between peer LLC entities (LPDUs). The structure and format of the LLC Data and Remote Frame are specified subsequently.

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Amend clause 6.2.1 to read as follows.

A LLC data frame is composed of four bit fields (see figure 4):

- IDE bit,
- Identifier Field,
- Data Length Code (DLC) Field,
- LLC Data Field.

Replace figure 4 by the following.

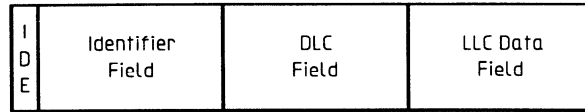


Figure 4 — LLC Data Frame

Below figure 4, add the following

IDE bit

Standard LLC Data Frames and Extended LLC Data Frames are distinguished by the IDE bit: IDE = '0' indicates the Standard Frame Format, and IDE = '1' indicates the Extended Frame Format.

Replace the Identifier Field specification of 6.2.1 to read as follows.

Identifier Field

Depending on the IDE bit, the identifier is either 11 bit long (Standard Frame Format), or 29 bit long (Extended Frame Format). In case of the Standard Frame Format the 7 most significant bits (ID-10 to ID-4) must not be all '1'.

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Replace 6.2.2 by the following.

A LLC remote frame is composed of three bit fields:

- IDE bit,
- Identifier field,
- DLC field.

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The structures of the bit fields IDE, Identifier Field, and DLC Field are equivalent to the structures of the corresponding bit fields of a LLC Data Frame (see 6.2.1). The only difference between a LLC Remote Frame and a LLC Data Frame is that there is no Data Field in a Remote Frame, independent of the value of the Data Length Code. This value is the Data Length Code of the corresponding Data Frame.

Replace figure 5 by the following.

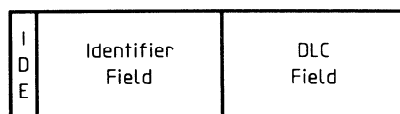


Figure 5 — LLC remote frame

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Add at the end of 8.2 the following new wording.

According to the two different MAC data transfer services there are two types of frames from or to the user:

- MAC Data Frame,
- MAC Remote Frame.

There are two different formats for both Data Frames and Remote Frames which differ in the length of the IDENTIFIER:

- Frames with an 11 bit IDENTIFIER are denoted Standard MAC Frames, and
- Frames containing 29 bit IDENTIFIER are denoted Extended MAC Frames.

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Amend item b) of 8.2.1 to read as follows.

b) Semantics of the MA_DATA.request primitive

The primitive shall provide parameters as follows.

```
MA_DATA.request (
    IDE
    IDENTIFIER
    DLC
    DATA
)
```

The parameter DATA is insignificant for MAC data frames of data length zero.

Amend item c) of 8.2.1 to read as follows.

c) Effect on receipt

Receipt of this primitive causes the MAC sublayer to prepare a Protocol Data Unit by adding all MAC specific control information (SOF, RTR bit, reserved bit r0, CRC, 'recessive' bit during ACK Slot, EOF in case of MAC Standard Frame Format, and SOF, SRR bit, RTR bit, reserved bit r1, CRC, 'recessive' bit during ACK Slot, EOF in case of MAC Extended Frame Format) to the MSDU coming from the LLC sublayer. The MAC PDU will be serialized and passed bit by bit as a service data unit to the physical layer for transfer to the peer MAC sublayer entity or entities.

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Amend item b) of 8.2.2 to read as follows.

b) Semantics of the MA_DATA.indication primitive

The primitive shall provide parameters as follows.

```
MA_DATA.indication (
    IDE
    IDENTIFIER
    DLC
    DATA
)
```

The parameter DATA is insignificant if the associated MAC data frame is of data length zero. The arrival of a MSDU is indicated to the LLC sublayer only if it has been received correctly.

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Amend item b) of 8.2.3 to read as follows.

b) Semantics of the MA_DATA.confirm primitive

The primitive shall provide parameters as follows.

```
MA_DATA.confirm (
    IDE
    IDENTIFIER
    TRANSMISSION_STATUS
)
```

The TRANSMISSION_STATUS is used to indicate the success or failure of the previous MA_DATA.request primitive.

TRANSMISSION_STATUS : [SUCCESS, NO_SUCCESS]

Failures are either errors which occurred during transmission or the loss of arbitration.

Amend items b) and c) of 8.2.4 to read as follows.

b) Semantics of the MA_REMOTE.request primitive

The primitive shall provide parameters as follows.

```
MA_REMOTE.request (
    IDE
    IDENTIFIER
    DLC
)
```

The Identifier identifies the MSDU to be sent. The value of DLC equals the length of the data of the requested MSDU.

c) Effect on receipt

Receipt of this primitive causes the MAC sublayer to prepare a Protocol Data Unit by adding all MAC specific control information (SOF, RTR bit, reserved bit r0, CRC, 'recessive' bit during ACK Slot, EOF in case of MAC Standard Frame Format, and SOF, SRR bit, RTR bit, reserved bits r1 and r0, CRC, 'recessive' bit during ACK Slot, EOF in case of MAC Extended Frame Format). The MAC PDU will be serialized and passed bit by bit as service data unit to the physical layer for transfer to the peer MAC sublayer entity or entities.

Amend item b) of 8.2.5 to read as follows

b) Semantics of the MA_REMOTE.indication primitive

The primitive shall provide parameters as follows

```
MA_REMOTE.indication (
    IDE
    IDENTIFIER
    DLC
)
```

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The arrival of a MSDU transmission request is indicated to the LLC sublayer only if it has been received correctly.

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Amend item b) of 8.2.6 to read as follows.

b) Semantics of the MA_REMOTE.confirm primitive

The primitive shall provide parameters as follows.

```
MA_REMOTE.confirm (
    IDE
    IDENTIFIER
    TRANSMISSION_STATUS
)
```

The TRANSMISSION_STATUS is used to indicate the success or failure of the previous MA_REMOTE.request primitive.

```
TRANSMISSION_STATUS : [SUCCESS, NO_SUCCESS]
```

Failures are either errors which occurred during transmission or the loss of arbitration.

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Amend the function of the Frame transmission, Transmit data encapsulation in 8.3 to read as follows.

Frame transmission

- a) Transmit data encapsulation.
 - 1) Acceptance of LLC frames and interface control information.
 - 2) CRC sequence calculation.
- 3a) Standard Frame Format: Construction of a Standard MAC Frame by adding SOF, RTR bit, reserve bit r0 CRC, ACK, and EOF to the LLC frame.
- 3b) Extended Frame Format: Construction of an Extended MAC Frame by adding SOF, SRR bit, RTR bit, reserve bits r0 and r1, CRC, ACK, and EOF to the LLC frame.

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Add to the functions of the Frame reception, Receive media access management in 8.3 the following.

- 9) *Distinction between Standard and Extended Frame Format.*

Amend 8.4.1 to read as follows.

A MAC data frame is composed of seven different bit fields:

- Start of Frame (SOF),
- Arbitration field,
- Control field,
- Data field,
- CRC field,
- ACK field,
- End of Frame (EOF).

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Amend clause 8.4.1 as follows.

Start of Frame (SOF)

marks the beginning of data and remote frames. It consists of a single 'dominant' bit.

A node is only allowed to start transmission when the bus is idle (see bus idle in 8.4.5). All nodes have to synchronize to the leading edge caused by Start of Frame of the node starting transmission first.

Arbitration field

The format of the Arbitration field is different for Standard Format and Extended Format Frames, (see figures 7a and 7b):

- In Standard Format the Arbitration Field consists of the 11 bit IDENTIFIER, passed from the LLC sublayer, and the RTR (Remote Transmission Request) bit. The value of the RTR bit in a MAC Data Frame is '0'.
- In Extended Format the Arbitration Field consists of the 29 bit IDENTIFIER, passed from the LLC sublayer, the SRR (Substitute Remote Request) bit, the IDE (Identifier Extension) and the RTR (Remote Transmission Request) bit.

In the Extended Frame Format the 29 bit IDENTIFIER consists of two sections:

- Base ID with 11 bits, that corresponds to the 11 bit ID in the Standard Format Frame,
- ID Extension with 18 bits.