



SURFACE VEHICLE STANDARD

J1939™-17

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CAN FD Physical Layer, 500 kbps/2 Mbps

RATIONALE

This document is developed to support the use of SAE J1939 networks utilizing CAN FD with a base baud rate of 500 kbps and a flexible data rate of 2 Mbps. This is done to increase bandwidth and the data transfer rate.

FOREWORD

The set of SAE J1939 Recommended Practice documents define a high speed ISO 11898 CAN protocol based communications network that can support real-time closed loop control functions, simple information exchanges, and diagnostic data exchanges between Electronic Control Units (ECUs) physically distributed throughout the vehicle.

The SAE J1939 communications network is developed for use in heavy-duty environments and suitable for use in horizontally integrated vehicle industries. The physical layer aspects of SAE J1939 reflect its design goal for use in heavy-duty environments. Horizontally integrated vehicles involve the integration of different combinations of loose package components, such as engines and transmissions, which are sourced from many different component suppliers. The SAE J1939 common communication architecture strives to offer an open interconnect system that allows the ECUs associated with different component manufacturers to communicate with each other.

This set of SAE Recommended Practices has been developed by the SAE Truck and Bus Control and Communications Network Committee of the SAE Truck and Bus Electrical and Electronics Steering Committee. The SAE J1939 communications network is defined using a collection of individual SAE J1939 documents based upon the layers of the Open System Interconnect (OSI) model for computer communications architecture. These SAE J1939 documents are intended as a guide toward standard practice and are subject to change to keep pace with experience and technical advances.

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Full document details: SAE J1939-17_202012

For more information on this standard, visit
https://www.sae.org/standards/content/J1939-17_202012

Documents

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1. SCOPE

This document defines a physical layer having a high bandwidth capacity utilizing the Flexible Data Rate Frame Format as defined in ISO 11898-1:2015. CAN controllers which support this format and compatible high speed transceivers are required for use on SAE J1939-17 networks.

This SAE Recommended Practice is intended for light- and heavy-duty vehicles on- or off-road as well as appropriate stationary applications which use vehicle derived components (e.g., generator sets). Vehicles of interest include but are not limited to: on- and off-highway trucks and their trailers; construction equipment; and agricultural equipment and implements.

1.1 Purpose

Implementing a robust CAN network involves many tradeoffs affecting both the network layout and ECU design. This document presents a standard by which ECUs, tools, and vehicle networks from different sources may be compatible. The document is intended to stand alone, yet borrows from the many existing standards and papers for its methodology.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.2 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J1128 Low Voltage Primary Cable

SAE J1939-11 Physical Layer, 250 Kbps, Twisted Shielded Pair

SAE J1939-15 Physical Layer, 250 Kbps, Un-Shielded Twisted Pair (UTP)

SAE J2030 Heavy-Duty Electrical Connector Performance Standard

2.3 ISO Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 11898-1:2015 Road vehicles - Controller area network (CAN) - Part 1: Data link layer and physical signalling

ISO 11898-2:2016 Road vehicles - Controller area network (CAN) - Part 2: High-speed medium access unit

2.4 CAN in Automation (CiA) Publications

Copies of these documents are available online at <https://www.can-cia.org>.

CiA 601-4 (version 2.0.0) CAN FD Node and system design – Part 4: Signal Improvement Capability

CiA 601-6 (version 1.0.0) CAN FD Node and system design – Part 6: CAN FD Cable

3. DEFINITIONS

Many of the definitions in this document can also be found in SAE J1939-11, and are given here for convenience. The normative references are ISO 11898-2 and ISO 11898-1.