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Tractors and machinery for agriculture and forestry — Serial control and communications data network —

Part 5: Network management

Tracteurs et matériels agricoles et forestiers — Réseaux de commande et de communication de données en série —

Partie 5: Gestion du réseau

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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 voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 19, *Agricultural electronics*.

This third edition cancels and replaces the second edition (ISO 11783-5:2011), which has been technically revised.

The main changes compared to the previous edition are as follows.

— The physical requirements are moved to ISO 11783-2.

A list of all parts in the ISO 11783 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

ISO 11783-1 to ISO 11783-14 specify a communications system for agricultural equipment based on ISO 11898[4][5] protocol. SAE J 1939 documents, on which parts of ISO 11783 are based, were developed jointly for use in truck and bus applications and for construction and agricultural applications. Joint documents were completed to allow electronic units that meet the truck and bus SAE J 1939 specifications to be used by agricultural and forestry equipment with minimal changes. This document is harmonized with SAE J 1939/81[6]. General information on ISO 11783 can be found in ISO 11783-1.

The purpose of ISO 11783 is to provide an open, interconnected system for on-board electronic systems. It is intended to enable electronic control units (ECUs) to communicate with each other, providing a standardized system.

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Tractors and machinery for agriculture and forestry — Serial control and communications data network —

Part 5: Network management

1 Scope

This document describes the management of source addresses (SAs) for control functions (CFs) of electronic control units (ECUs), the association of addresses with the functional identification of a device and the detection and reporting of network-related errors. It also specifies procedures for initialization of network-connected ECUs.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11783-1, *Tractors and machinery for agriculture and forestry — Serial control and communications data network — Part 1: General standard for mobile data communication*

ISO 11783-2, *Tractors and machinery for agriculture and forestry — Serial control and communications data network — Part 2: Physical layer*

ISO 11783-3, *Tractors and machinery for agriculture and forestry — Serial control and communications data network — Part 3: Data link layer*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11783-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
current NAME
CF NAME that is transmitted in its address-claimed-message

3.2
NAME management
NM
method for changing the NAME of a CF at run time

3.3
pending NAME
NAME temporarily stored by a particular CF as the result of *NAME management* (3.2) messages received from a qualified source

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3.4
random transmit delay
RTxD
delay time calculated by multiplying a random number in the range 0 to 255 with 0,6 ms

Note 1 to entry: A seed to the random number generator can use the identity number in the NAME, or other unique information within the CF.

4 Technical requirements

4.1 General

The network management specified in this document provides the definitions and procedures necessary to uniquely identify CFs on the network, manages the assignment of addresses, and handles network errors.

A CF's ability to select an address depends on the CF's address configuration capabilities as described in 4.2.

Each CF shall be capable of providing its unique 64-bit NAME. The rules for creating this NAME, associating it with an address and the ability or non-ability to change that address are specified in 4.3.

CFs shall successfully claim an address according to the procedures detailed in 4.4 prior to sending any other messages on the network. Multiple CFs can work together to perform a function, provided each CF claims its own address following the rules in 4.4.2.3.

If a CF cannot successfully claim an address, it shall report this to the network as described in 4.4.2.4.

Network initialization sequences associated with the address claiming process are described in 4.5.

This document no longer contains physical requirements. These requirements are included in ISO 11783-2:2019.

4.2 Address configuration capabilities

4.2.1 General

Address configuration is the method by which a particular CF determines the SA, which it shall use for an address claim. For the purposes of the address claim process, there are two basic address configuration capabilities: non-configurable address and self-configurable address. These are distinguished by the value in the "self-configurable address" field in the most significant bit position in the CF's NAME.

CFs conforming to ISO 11783 shall be self-configurable address capable. Non-configurable address capable CFs shall be tolerated on the network to allow compatibility with CFs conforming to the first edition of this document (ISO 11783-5:2001) and CFs conforming to SAE J1939.

There are also two extended address configuration capabilities: command-configurable address and service-configurable address. A CF may implement one or more of the extended address configuration capabilities.

4.2.2 Non-configurable address

A non-configurable address CF cannot change its initial address during the address claim process. If multiple non-configurable address CFs are claiming the same address then only the CF with the highest priority NAME can obtain the address, the others shall announce their inability to claim an address.

The "self-configurable address" field is the most significant bit in the CF's NAME and therefore a non-configurable address CF always has higher priority than a self-configurable address CF. This implies that a non-configurable address CF forces a self-configurable address CF to claim another address.

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