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IEEE Standard for Industrial Hard Real-Time Communication

IEEE Industrial Electronics Society

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IEEE Std 61158™-2017
(Adoption of EPSG DS 301)

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IEEE Industrial Electronics Society

Approved 18 May 2017

IEEE-SA Standards Board

Abstract: IEEE Std 61158™ is an adoption of the EPSG DS 301, Ethernet POWERLINK—Communication Profile Specification.

Ethernet POWERLINK is a communication profile for Real-Time Ethernet (RTE). It extends Ethernet according to IEEE Std 802.3™ with mechanisms to transfer data with predictable timing and precise synchronisation. The communication profile meets timing demands typical for high-performance automation and motion applications. It does not change basic principles of the Fast Ethernet Standard IEEE Std 802.3 but extends it towards RTE. Thus it is possible to leverage and continue to use any standard Ethernet silicon, infrastructure component, or test and measurement equipment like a network analyzer.

Keywords: adoption, EPSG, Ethernet POWERLINK, IEEE 61158™, Industrial Automation, Industrial Ethernet, Real-time Ethernet

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PDF: ISBN 978-1-5044-4114-8 STD22640
Print: ISBN 978-1-5044-4115-5 STDPD22640

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Acknowledgments

The Industrial Real-Time Communication Working Group of the Industrial Electronics Society acknowledges the permission granted by the Ethernet POWERLINK Standardization Group for the IEEE adoption of EPSG DS 301.

Introduction

This introduction is not part of IEEE Std 61158-2017, IEEE Standard for Industrial Hard Real-Time Communication.

Industrial automation in most cases relies on deterministic exchange of process data among various communication partners, e.g., PLCs, drives, and IOs. However, the industry currently suffers from a multitude of different communication technologies that implement the important OSI layers incompatibly in various manners featuring various key data.

This standard hence will generate a standard for industrial real-time communication that is restricted to mainly scheduling of frames on layer 2, the data link layer. Any media can be utilized as well as any existing application protocol, which makes it a universal solution across industries and technologies.

This is achieved by adopting the EPSG Standard DS 301.

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IEEE Standard for Industrial Hard Real-Time Communication

1. Scope

Ethernet POWERLINK is a communication profile for Real-Time Ethernet (RTE). It extends Ethernet according to IEEE Std 802.3™ with mechanisms to transfer data with predictable timing and precise synchronization.[1] The communication profile meets timing demands typical for high performance automation and motion applications. It does not change basic principles of IEEE Std 802.3 but extends it towards RTE. Thus it is possible to leverage and continue to use any standard Ethernet silicon, infrastructure component, or test and measurement equipment like a network analyzer.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

EPSG Draft Standard 301 (EPSG DS 301), Ethernet POWERLINK, Communication Profile Specification, Version 1.3.0, 2016.[2]

EPSG Draft Standard 302-A (EPSG DS 302-A), Ethernet POWERLINK, Part A: High Availability, Version 1.1.0, 2013.

EPSG Working Draft Proposal 302-B (EPSG WDP 302-B), Ethernet POWERLINK, Part B: Multiple-ASnd, Version 1.0.2, 2013.

EPSG Draft Standard 302-C (EPSG DS 302-C), Ethernet POWERLINK, Part C: PollResponse Chaining, Version 1.0.0, 2012.

EPSG Draft Standard 302-D (EPSG DS 302-D), Ethernet POWERLINK, Part D: Multiple PReq/PRes, Version 1.0.0, 2013.

EPSG Draft Standard 302-E (EPSG WDP 302-E), Ethernet POWERLINK, Part E: Dynamic Node Allocation, Version 1.0.0, 2013.

[1] Information on normative references can be found in Clause 2.
[2] EPSG publications are available from the Ethernet Powerlink Standardization Group (http://www.ethernet-powerlink.org/).