

IEEE Standard for Industrial Hard Real-Time Communication

IEEE Industrial Electronics Society

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IEEE Standard for Industrial Hard Real-Time Communication

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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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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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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.

EPSP Draft Standard 301 (EPSP DS 301), Ethernet POWERLINK, Communication Profile Specification, Version 1.3.0, 2016.²

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

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

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

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

EPSP Draft Standard 302-E (EPSP 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 EPSP publications are available from the Ethernet Powerlink Standardization Group (<http://www.ethernet-powerlink.org/>).