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CONTENTS

FOREWORD 5
INTRODUCTION 7
1 Scope 8
1.1 General 8
1.2 Specifications 8
1.3 Conformance 8
2 Normative references 9
3 Terms, definitions, symbols, abbreviations and conventions 9
3.1 Reference model terms and definitions 9
3.2 Service convention terms and definitions 10
3.3 Data-link service terms and definitions 11
3.4 Symbols and abbreviations 14
3.5 Common conventions 16
4 Data-link layer services and concepts 17
4.1 Operating principle 17
4.2 Topology 17
4.3 Data-link layer overview 18
4.4 Error detection overview 19
4.5 Parameter and process data handling introduction 19
4.6 Node reference model 19
4.6.1 Mapping onto OSI Basic Reference Model 19
4.6.2 Data-link layer features 20
4.7 Operation overview 20
4.7.1 Relation to ISO/IEC/IEEE 8802-3 20
4.7.2 Type 12 modes 20
4.7.3 Logical topology 21
4.8 Addressing 22
4.8.1 Addressing overview 22
4.8.2 Segment addressing 22
4.8.3 Device addressing 22
4.8.4 Logical addressing 23
4.8.5 FMMU introduction 23
4.8.6 Sync manager introduction 24
4.9 Slave classification 24
4.9.1 Full slave 24
4.9.2 Basic slave 24
4.10 Structure of the communication layer in the slave 24
5 Communication services 26
5.1 Overview 26
5.2 Read services 26
5.2.1 Overview 26
5.2.2 Positional physical read (APRD) 26
5.2.3 Configured-address physical read (FPRD) 27
5.2.4 Broadcast read (BRD) 28
5.2.5 Logical read (LRD) 28
5.3 Write services 29

5.3.1 Overview 29
5.3.2 Positional physical write (APWR) 29
5.3.3 Configured-address physical write (FPWR) 30
5.3.4 Broadcast write (BWR) 30
5.3.5 Logical write (LWR) 31
5.4 Combined read/write services 32
5.4.1 Overview 32
5.4.2 Positional physical read/write (APRW) 32
5.4.3 Configured-address physical read/write (FPRW) 32
5.4.4 Broadcast read/write (BRW) 33
5.4.5 Logical read/write (LRW) 34
5.4.6 Positional physical read / multiple write (ARMW) 34
5.4.7 Configured-address physical read / multiple write (FRMW) 35
5.5 Network services 35
5.5.1 Overview 35
5.5.2 Publish network variables (PNV) 36
5.6 Mailbox 36
5.6.1 Overview 36
5.6.2 Mailbox data transmission services 38
6 Local interactions 41
6.1 Read local 41
6.2 Write local 41
6.3 Event local 42
Bibliography 43

Figure 1 – Mapping of logical data in an Ethernet frame consisting of a single Type 12 DLPDU 18
Figure 2 – Type 12 data-link reference model 20
Figure 3 – Type 12 segments in open mode 21
Figure 4 – Type 12 segment in direct mode 21
Figure 5 – Addressing mode overview 22
Figure 6 – Fieldbus memory management unit overview 23
Figure 7 – Layering of communication 25
Figure 8 – Flow of Type 12 service primitives 26
Figure 9 – Successful mailbox write sequence 37
Figure 10 – Successful mailbox read sequence 38

Table 1 – Auto-increment physical read (APRD) 27
Table 2 – Configured-address physical read (FPRD) 27
Table 3 – Broadcast read (BRD) 28
Table 4 – Logical read (LRD) 29
Table 5 – Auto-increment physical write (APWR) 29
Table 6 – Configured-address physical write (FPWR) 30
Table 7 – Broadcast write (BWR) 31
Table 8 – Logical write (LWR) 31
Table 9 – Auto-increment physical read/write (APRW) 32

Table 10 – Configured-address physical read/write (FPRW) 33
Table 11 – Broadcast read/write (BRW) 33
Table 12 – Logical read/write (LRW) 34
Table 13 – Auto-increment physical read / multiple write (ARMW) 34
Table 14 – Configured-address physical read / multiple write (FRMW) 35
Table 15 – Publisher network variable (PNV) 36
Table 16 – Mailbox write 38
Table 17 – Mailbox read update 39
Table 18 – Mailbox read 40
Table 19 – Read local 41
Table 20 – Write local 41
Table 21 – Event local 42

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INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 3-12: Data-link layer service definition – Type 12 elements

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NOTE Combinations of protocol types are specified in IEC 61784-1 and IEC 61784-2.

International Standard IEC 61158-3-12 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This fourth edition cancels and replaces the third edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

– technical corrections in the communication services;

– editorial improvements for clarification.

The text of this International standard is based on the following documents:

FDIS	Report on voting
65C/945/FDIS	65C/954/RVD

Full information on the voting for the approval of this International standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with ISO/IEC Directives, Part 2.

A list of all parts of the IEC 61158 series, published under the general title *Industrial communication networks – Fieldbus specifications*, can be found on the IEC web site.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

This part of IEC 61158 is one of a series produced to facilitate the interconnection of automation system components. It is related to other standards in the set as defined by the “three-layer” fieldbus reference model described in IEC 61158-1.

Throughout the set of fieldbus standards, the term “service” refers to the abstract capability provided by one layer of the OSI Basic Reference Model to the layer immediately above. Thus, the data-link layer service defined in this standard is a conceptual architectural service, independent of administrative and implementation divisions.

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 3-12: Data-link layer service definition – Type 12 elements

1 Scope

1.1 General

This part of IEC 61158 provides common elements for basic time-critical messaging communications between devices in an automation environment. The term “time-critical” is used to represent the presence of a time-window, within which one or more specified actions are required to be completed with some defined level of certainty. Failure to complete specified actions within the time window risks failure of the applications requesting the actions, with attendant risk to equipment, plant and possibly human life.

This International standard defines in an abstract way the externally visible service provided by the Type 12 fieldbus data-link layer in terms of

a) the primitive actions and events of the service;

b) the parameters associated with each primitive action and event, and the form which they take;

c) the interrelationship between these actions and events, and their valid sequences.

The purpose of this document is to define the services provided to

- the Type 12 fieldbus application layer at the boundary between the application and data-link layers of the fieldbus reference model;
- systems management at the boundary between the data-link layer and systems management of the fieldbus reference model.

1.2 Specifications

The principal objective of this document is to specify the characteristics of conceptual data-link layer services suitable for time-critical communications, and thus supplement the OSI Basic Reference Model in guiding the development of data-link protocols for time-critical communications. A secondary objective is to provide migration paths from previously-existing industrial communications protocols.

This specification may be used as the basis for formal DL-Programming-Interfaces. Nevertheless, it is not a formal programming interface, and any such interface will need to address implementation issues not covered by this specification, including

a) the sizes and octet ordering of various multi-octet service parameters, and

b) the correlation of paired request and confirm, or indication and response, primitives.

1.3 Conformance

This document does not specify individual implementations or products, nor does it constrain the implementations of data-link entities within industrial automation systems.

There is no conformance of equipment to this data-link layer service definition standard. Instead, conformance is achieved through implementation of the corresponding data-link protocol that fulfils the Type 12 data-link layer services defined in this document.

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.

NOTE All parts of the IEC 61158 series, as well as IEC 61784-1 and IEC 61784-2 are maintained simultaneously. Cross-references to these documents within the text therefore refer to the editions as dated in this list of normative references.

ISO/IEC 7498-1, *Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model*

ISO/IEC 7498-3, *Information technology – Open Systems Interconnection – Basic Reference Model: Naming and addressing*

ISO/IEC/IEEE 8802-3, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Standard for Ethernet*

ISO/IEC 10731*, Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the definition of OSI services*

IEEE Std 802.1D, *IEEE Standard for Local and metropolitan area networks – Media Access Control (MAC) Bridges;* available at http://www.ieee.org [viewed 2018-09-11]