BS EN 61158-4-13:2014

BSI Standards Publication

Industrial communication networks — Fieldbus specifications

Part 4-13: Data-link layer protocol specification — Type 13 elements

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The UK participation in its preparation was entrusted to Technical Committee AMT/7, Industrial communications: process measurement and control, including fieldbus.

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Foreword

The text of document 65C/762/FDIS, future edition 2 of IEC 61158-4-13, prepared by SC 65C “Industrial networks” of IEC/TC 65 “Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61158-4-13:2014.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2015-06-19
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2017-09-19

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In the official version, for bibliography, the following notes have to be added for the standards indicated:

IEC 61158-1:2014	NOTE	Harmonised as EN 61158-1:2014
IEC 61158-3-13:2014	NOTE	Harmonised as EN 61158-3-13:2014
IEC 61158-5-13:2014	NOTE	Harmonised as EN 61158-5-13:2014
IEC 61158-6-13:2014	NOTE	Harmonised as EN 61158-6-13:2014
IEC 61784-1	NOTE	Harmonised as EN 61784-1
IEC 61784-2	NOTE	Harmonised as EN 61784-2

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61588	-	Precision clock synchronization protocol for networked measurement and control systems	-	-
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 8802-3	2000	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications	-	-
ISO/IEC 10731	-	Information technology - Open Systems Interconnection - Basic Reference Model - Conventions for the definition of OSI services	-	-

CONTENTS

INTRODUCTION 7
1 Scope 8
1.1 General 8
1.2 Specifications 8
1.3 Procedures 8
1.4 Applicability 9
1.5 Conformance 9
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 11
3.3 Data-link service terms and definitions 12
3.4 Symbols and abbreviations 16
3.5 Common conventions 17
3.6 Additional conventions 18
4 Overview of the DL-protocol 18
4.1 Overview 18
4.2 General description 18
4.3 Service assumed from the PhL 21
4.4 DLL architecture 22
4.5 Local parameters and variables 23
5 General structure and encoding of PhPDUs and DLPDU and related elements of procedure 26
5.1 Overview 26
5.2 MA_PDU structure and encoding 26
5.3 Common MAC frame structure, encoding and elements of procedure 26
5.4 Invalid DLPDU 28
6 DLPDU-specific structure, encoding and elements of procedure 29
6.1 General 29
6.2 Overview 29
6.3 Start of synchronization (SoC) 29
6.4 PollRequest (PReq) 31
6.5 Poll response (PRes) 34
6.6 Start of asynchronous (SoA) 37
6.7 Asynchronous send (ASnd) 41
7 DLE elements of procedure 45
7.1 Overall structure 45
7.2 Cycle state machine (CSM) 45
7.3 Isochronous transmission TX/RX control (ITC) 64
7.4 Asynchronous transmission TX/RX control (ATC) 69
7.5 Asynchronous slot scheduler (ASS) 74
7.6 Exception signaling (ES) 75
7.7 NMT signaling (NS) 78
7.8 DLL management protocol 79
Bibliography 83

Figure 1 – Relationships of DLSAPs, DLSAP-addresses and group DL-addresses 14
Figure 2 – Slot communication network management 19
Figure 3 – Overall flow of data frames during one cycle 19
Figure 4 – Interaction of PhS primitives to DLE 21
Figure 5 – Data-link layer internal architecture 23
Figure 6 – Type 13 fieldbus DLPDU 26
Figure 7 – State transition diagram of the MNs CSM 51
Figure 8 – State transition diagram of MNs CSM at CSM_MS_NON_CYCLIC 53
Figure 9 – State transition diagram of MNs CSM at CSM_MS_CYCLIC 55
Figure 10 – State transition diagram of the CNs CSM 59
Figure 11 – State transition diagram of CNs CSM at CSM_CS_NON_CYCLIC 60
Figure 12 – State transition diagram of CNs CSM at CSM_CS_CYCLIC 61
Figure 13 – Multiple slot assignment example 65
Figure 14 – Time triggered PRes example 67
Figure 15 – State transition diagram of ITC 68
Figure 16 – State transition diagram of ATC 71
Figure 17 – State transition diagram of ASS 74
Figure 18 – State transition diagram of ES 77
Figure 19 – State transition diagram of NS 79
Figure 20 – State transition diagram of DLM 81

Table 1 – Data-link layer components 22
Table 2 – MAC multicast addresses 27
Table 3 – Message types 27
Table 4 – Node ID assignment 28
Table 5 – Structure of SoC DLPDU 30
Table 6 – Structure of SoC-Flag 30
Table 7 – Structure of PReq DLPDU 32
Table 8 – Structure of PReq-Flag 33
Table 9 – Structure of PRes DLPDU 34
Table 10 – Structure of PRes-Flag 35
Table 11 – Structure of SoA DLPDU 38
Table 12 – Structure of SoA-Flag 38
Table 13 – Definition of the RequestedServiceID in the SoA DLPDU 39
Table 14 – Structure of ASnd DLPDU 42
Table 15 – Definition of the ServiceID in the ASnd DLPDU 42
Table 16 – Structure of NMTRequest user data 43
Table 17 – Primitives exchanged between CSM and ITC 46
Table 18 – Parameters used with primitives exchanged between CSM and ITC 46
Table 19 – Primitives exchanged between CSM and ATC 47
Table 20 – Parameters used with primitives exchanged between CSM and ATC 47
Table 21 – Primitives exchanged between CSM and ASS 48

Table 22 – Parameters used with primitives exchanged between CSM and ASS 48
Table 23 – Primitives exchanged between CSM and ES 49
Table 24 – Parameters used with primitives exchanged between CSM and ES 49
Table 25 – Primitives exchanged between CSM and NS 49
Table 26 – Parameters used with primitives exchanged between CSM and NS 50
Table 27 – Primitives exchanged between CSM and DLM 50
Table 28 – Parameters used with primitives exchanged between CSM and DLM 50
Table 29 – Transitions of the MNs CSM 52
Table 30 – Transitions of MNs CSM at CSM_MS_NON_CYCLIC 53
Table 31 – Transitions of MNs CSM at CSM_MS_CYCLIC 56
Table 32 – Transitions of the CNs CSM 59
Table 33 – Transitions of CNs CSM at CSM_CS_NON_CYCLIC 60
Table 34 – Transitions of CNs CSM at CSM_CS_CYCLIC 61
Table 35 – CSM function table 63
Table 36 – Example of isochronous slot assignment 66
Table 37 – Primitives exchanged between ITC and DLS-user 67
Table 38 – Parameters used with primitives exchanged between ITC and DLS-user 68
Table 39 – Transitions of ITC 68
Table 40 – ITC function table 69
Table 41 – Primitives exchanged between ATC and DLS-user 69
Table 42 – Parameters used with primitives exchanged between ATC and DLS-user 70
Table 43 – Primitives exchanged between ATC and ES 71
Table 44 – Parameters used with primitives exchanged between ATC and ES 71
Table 45 – Transitions of ATC 72
Table 46 – ATC function table 74
Table 47 – Transitions of ASS 75
Table 48 – ASS function table 75
Table 49 – Primitives exchanged between ES and DLS-user 76
Table 50 – Parameters used with primitives exchanged between ES and DLS-user 76
Table 51 – Transitions of ES 77
Table 52 – Primitives exchanged between NS and DLS-user 78
Table 53 – Parameters used with primitives exchanged between NS and DLS-user 78
Table 54 – Transitions of NS 79
Table 55 – Primitives exchanged between DLM and DLS-user 79
Table 56 – Parameters used with primitives exchanged between DLM and DLS-user 80
Table 57 – Transitions of DLM 81
Table 58 – DLM function table 82

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.

The data-link protocol provides the data-link service by making use of the services available from the physical layer. The primary aim of this standard is to provide a set of rules for communication expressed in terms of the procedures to be carried out by peer data-link entities (DLEs) at the time of communication. These rules for communication are intended to provide a sound basis for development in order to serve a variety of purposes:

a) as a guide for implementors and designers;

b) for use in the testing and procurement of equipment;

c) as part of an agreement for the admittance of systems into the open systems environment;

d) as a refinement to the understanding of time-critical communications within OSI.

This standard is concerned, in particular, with the communication and interworking of sensors, effectors and other automation devices. By using this standard together with other standards positioned within the OSI or fieldbus reference models, otherwise incompatible systems may work together in any combination.

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 4-13: Data-link layer protocol specification – Type 13 elements

1 Scope

1.1 General

The data-link layer provides basic time-critical messaging communications between devices in an automation environment.

This protocol provides communication opportunities to all participating data-link entities

a) in a synchronously-starting cyclic manner, according to a pre-established schedule, and

b) in a cyclic or acyclic asynchronous manner, as requested each cycle by each of those data-link entities.

Thus this protocol can be characterized as one which provides cyclic and acyclic access asynchronously but with a synchronous restart of each cycle.

1.2 Specifications

This standard specifies

a) procedures for the timely transfer of data and control information from one data-link user entity to a peer user entity, and among the data-link entities forming the distributed data-link service provider;

b) procedures for giving communications opportunities to all participating DL-entities, sequentially and in a cyclic manner for deterministic and synchronized transfer at cyclic intervals up to one millisecond;

c) procedures for giving communication opportunities available for time-critical data transmission together with non-time-critical data transmission without prejudice to the time-critical data transmission;

d) procedures for giving cyclic and acyclic communication opportunities for time-critical data transmission with prioritized access;

e) procedures for giving communication opportunities based on ISO/IEC 8802-3 medium access control, with provisions for nodes to be added or removed during normal operation;

f) the structure of the fieldbus DLPDUs used for the transfer of data and control information by the protocol of this standard, and their representation as physical interface data units.

1.3 Procedures

The procedures are defined in terms of

a) the interactions between peer DL-entities (DLEs) through the exchange of fieldbus DLPDUs;

b) the interactions between a DL-service (DLS) provider and a DLS-user in the same system through the exchange of DLS primitives;

c) the interactions between a DLS-provider and a Ph-service provider in the same system through the exchange of Ph-service primitives.