

TECHNICAL REPORT



**Field device tool (FDT) interface specification –
Part 51-31: Communication implementation for common object model –
IEC 61784 CP 3/1 and CP 3/2**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.040.40; 35.110.05; 35.110

ISBN 978-2-8322-4324-4

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms, definitions, symbols, abbreviated terms and conventions	7
3.1 Terms and definitions.....	7
3.2 Symbols and abbreviated terms	8
3.3 Conventions.....	8
3.3.1 Data type names and references to data types	8
3.3.2 Vocabulary for requirements	8
4 Bus category	8
5 Access to instance and device data	8
6 Protocol specific behaviour.....	8
6.1 General.....	8
6.2 Representing modularity	9
6.2.1 Monolithic DTMs.....	9
6.2.2 Composite Device DTMs	10
6.3 Interfaces and information related to Bus Master Configuration.....	13
6.4 Configuration changes in a device	13
6.5 Error behaviour: DTM refuses new BMCP	14
7 Protocol specific usage of general data types	15
8 Network management data types.....	15
8.1 General.....	15
8.2 PROFIBUS device address	15
8.3 Master-bus parameter set	15
8.4 Slave bus parameter set	15
8.5 Module and channel data	15
9 Communication data types.....	17
9.1 General.....	17
9.2 DPV0 communication – FDTProfibusDPV0CommunicationSchema	18
9.3 DPV1 communication – FDTProfibusDPV1CommunicationSchema	19
10 Channel parameter data types.....	22
11 Device identification	23
11.1 Device type identification data types – FDTProfibusIdentSchema	23
11.2 Topology scan data types – DTMProfibusDeviceSchema	24
11.3 Scan identification data types – FDTProfibusScanIdentSchema	25
11.4 Device type identification data types – FDTProfibusDeviceIdentSchema	27
11.5 XSLT Transformation	29
Annex A (informative) Example documents for a DTM representing a remote I/O	40
Bibliography.....	43
Figure 1 – Part 51-31 of the IEC 62453 series	6
Figure 2 – Device DTM	9
Figure 3 – Gateway DTM	10
Figure 4 – Composite Device DTM.....	11

Figure 5 – Modular Gateway DTM..... 12

Figure 6 – Interfaces and information related to bus master configuration 13

Figure 7 – Changes by the user to the configuration of a device in the DTM user interface 14

Figure 8 – Error case – DTM refuses the new BMCP from the Frame Application..... 14

Table 1 – Protocol specific usage of general data types 15

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 51-31: Communication implementation for common object model – IEC 61784 CP 3/1 and CP 3/2

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC TR 62453-51-31, which is a technical report, has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process management, control and automation.

This document cancels and replaces IEC TR 62453-503-1 published in 2009. This edition constitutes a technical revision. The main changes consist of updates in accordance with IEC 62453-2 in regard to the description of “Composite Device DTM”.

Each part of the IEC 62453-51-xy series is intended to be read in conjunction with its corresponding part in the IEC 62453-3xy series. This document corresponds to IEC 62453-303-1.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
65E/440/DTR	65E/514/RVC

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

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

The list of all parts of the IEC 62453 series, under the general title *Field device tool (FDT) interface specification*, can be found on the IEC website.

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

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

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This part of IEC 62453 is an interface specification for developers of Field Device Tool (FDT) components for function control and data access within a client/server architecture. The specification is a result of an analysis and design process to develop standard interfaces to facilitate the development of servers and clients by multiple vendors that need to interoperate seamlessly.

With the integration of fieldbuses into control systems, there are a few other tasks which need to be performed. In addition to fieldbus- and device-specific tools, there is a need to integrate these tools into higher-level system-wide planning or engineering tools. In particular, for use in extensive and heterogeneous control systems, typically in the area of the process industry, the unambiguous definition of engineering interfaces that are easy to use for all those involved is of great importance.

A device-specific software component, called Device Type Manager (DTM), is supplied by the field device manufacturer with its device. The DTM is integrated into engineering tools via the FDT interfaces defined in this specification. The approach to integration is in general open for all kind of fieldbuses and thus meets the requirements for integrating different kinds of devices into heterogeneous control systems.

Figure 1 shows how this part of IEC 62453-51-xy series is aligned in the structure of the IEC 62453 series.

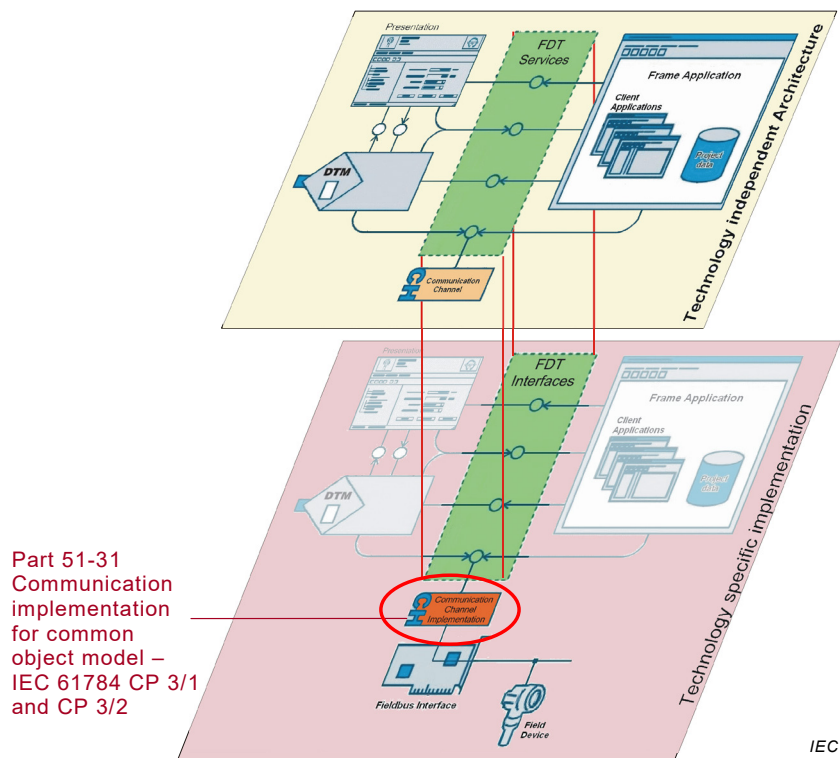


Figure 1 – Part 51-31 of the IEC 62453 series

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 51-31: Communication implementation for common object model – IEC 61784 CP 3/1 and CP 3/2

1 Scope

This part of the IEC 62435-51-xy series, which is a Technical Report, provides information for integrating the PROFIBUS¹ protocol into the COM-based implementation of FDT interface specification (IEC TR 62453-41).

This part of IEC 62453 specifies implementation of communication and other services based on IEC 62453-303-1.

This document neither contains the FDT specification nor modifies it.

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.

IEC 61158 (all parts), *Industrial communication networks – Fieldbus specifications*

IEC 61784-1:2014, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles*

IEC 62453-1:2016, *Field device tool (FDT) interface specification – Part 1: Overview and guidance*

IEC 62453-2:2016, *Field device tool (FDT) interface specification – Part 2: Concepts and detailed description*

IEC TR 62453-41:2016, *Field device tool (FDT) interface specification – Part 41: Object model integration profile – Common object model*

IEC 62453-303-1:2009, *Field device tool (FDT) interface specification – Part 303-1: Communication profile integration – IEC 61784 CP 3/1 and CP 3/2*
IEC 62453-303-1:2009/AMD1:2016

¹ PROFIBUS™ is a trade name of the non-profit organization PROFIBUS Nutzerorganisation e.V. (PNO). This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this profile does not require use of the registered logos for PROFIBUS™. Use of the registered logos for PROFIBUS™ requires permission of PNO.