

INTERNATIONAL STANDARD

**Multicore and symmetrical pair/quad cables for digital communications –
Part 6-1: Symmetrical pair/quad cables with transmission characteristics up to
1 000 MHz – Work area wiring – Blank detail specification**

IEC 61156-6-1:2009

<https://standards.iteh.ai/catalog/standards/sist/7e8f3608-bbbc-48b5-be19-1c948b246feb/iec-61156-6-1-2009>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2009 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

INTERNATIONAL STANDARD PREVIEW
(standards.iteh.ai)
IEC 61156-6-1:2009
<https://standards.iteh.ai/catalog/standards/sist/7e8f3608-bbbc-48b5-be19-799010000000/iec-61156-6-1-2009>

INTERNATIONAL STANDARD

**Multicore and symmetrical pair/quad cables for digital communications –
Part 6-1: Symmetrical pair/quad cables with transmission characteristics up to
1 000 MHz – Work area wiring – Blank detail specification**

[IEC 61156-6-1:2009](https://standards.iteh.ai/catalog/standards/sist/7e8f3608-bbbc-48b5-be19-1c948b246feb/iec-61156-6-1-2009)

[https://standards.iteh.ai/catalog/standards/sist/7e8f3608-bbbc-48b5-be19-
1c948b246feb/iec-61156-6-1-2009](https://standards.iteh.ai/catalog/standards/sist/7e8f3608-bbbc-48b5-be19-1c948b246feb/iec-61156-6-1-2009)

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

K

ICS 33.120.20

ISBN 978-2-88910-427-7

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES
FOR DIGITAL COMMUNICATIONS –****Part 6-1: Symmetrical pair/quad cables
with transmission characteristics up to 1 000 MHz –
Work area wiring – Blank detail specification**

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.

International Standard IEC 61156-6-1 has been prepared by subcommittee 46C: Wires and symmetric cables, of IEC technical committee 46: Cables, wires, waveguides, r.f. connectors, r.f. and microwave passive components and accessories.

This third edition cancels and replaces the second edition published in 2007. This edition constitutes a technical revision.

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

- a) new requirements for new cables Cat6_A and Cat7_A;
- b) revised requirements and tests for the cables.

The text of this standard is based on the second edition and on the following documents:

CDV	Report on voting
46C/863/CDV	46C/882/RVC

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

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

This specification is to be used in conjunction with IEC 61156-1 and IEC 61156-6.

A list of all parts of the IEC 61156 series, under the general title: *Multicore and symmetrical pair/quad cables for digital communications*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/7e8f3608-bbbc-48b5-be19-1c948b246feb/iec-61156-6-1-2009>

MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL COMMUNICATIONS –

Part 6-1: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Work area wiring – Blank detail specification

1 Scope

This part of IEC 61156 describes symmetrical pair/quad cables intended primarily for work area cabling as defined in ISO/IEC 11801 and ISO/IEC 24702.

NOTE Environmental classifications are presented in ISO/IEC 24702 with three levels of severity in four areas: mechanical, ingress, climatic, and electromagnetic: thus, in tabular form, they are referred to as the "MICE table".

This blank detail specification includes recommended environmental characteristics and severities which are derived from the environmental classifications that are specified for cabling for various environments.

The blank detail specification determines the layout and style for detail specifications describing symmetrical pair/quad cables with transmission characteristics up to the maximum frequency of the respective category for digital communications. Detail specifications, based on the blank detail specification, may be prepared by a national organization, a manufacturer or a user.

[IEC 61156-6-1:2009](https://standards.iteh.ai/catalog/standards/sist/7e8f3608-bbbc-48b5-be19-1c948b246feb/iec-61156-6-1-2009)

2 Normative references

<https://standards.iteh.ai/catalog/standards/sist/7e8f3608-bbbc-48b5-be19-1c948b246feb/iec-61156-6-1-2009>

The following referenced documents are indispensable for the application 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 61156-1, *Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification*

IEC 61156-6:----, *Multicore and symmetrical pair/quad cables for digital communications – Part 6: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Work area wiring – Sectional specification*¹

3 Guidance for preparation of detail specifications

It is necessary to keep the transmission characteristics indicated in the relevant sectional specification for the referenced category number, i.e. 5e, 6, 6_A, 7 or 7_A.

The detail specification shall be written in accordance with the layout of the blank detail specification, which forms part of this standard.

The numbers shown in brackets in this and the following pages correspond to the following items of required information, which shall be entered in the spaces provided.

[1] Name and address of the organization that has prepared the document.

¹ To be published.

- [2] IEC document number, issue number and date of issue.
- [3] Address of the organization from which the document is available.
- [4] Related documents.
- [5] Any other reference to the cable, national reference, trade name, etc.
- [6] A complete description of the cable which shall include
- a) type and number of elements;
 - b) nominal impedance;
 - c) screening;
 - d) application;
 - e) category;
 - f) other distinguishing performance characteristics:
- Example:* Four-pair, unshielded twisted pair cable for use in work area wiring, having a nominal impedance of 100 Ω , and meeting the transmission requirements of Category 6 and the coupling attenuation requirements of Type III.
- [7] Details of the cable material and construction.
- [8] Special requirements for bending radius or operating temperatures.
- [9] List of cable characteristics. These are separated into electrical, transmission, mechanical and environmental characteristics.
- [10] Appropriate subclause references in the sectional specification IEC 61156-6.
- [11] Requirements applicable to this cable. The values entered shall meet as a minimum the requirements of sectional specification IEC 61156-6. When applicable, reference is made to the MICE table of ISO/IEC 24702, for instance C1, C2, C3, M1, M2, M3..
- [12] Comments – Relevant remarks.

4 Blank detail specification for symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz for digital communications

[1] Prepared by:		[2] Document: Issue: Date:	
[3] Available from:		[4] Generic specification: IEC 61156-1 Sectional specification: IEC 61156-6 Blank detail specification: IEC 61156-6-1	
[5] Additional references:			
[6] Cable description: a) Type and number of elements: b) Nominal impedance: c) Screening: d) Application: e) Category: f) Other distinguishing performance characteristics:			
[7] Cable construction:	IEC 61156-6 subclause		Comments
	5.2.1	Conductor description:	
	5.2.2	Insulation description: Maximum diameter: Colour code of elements:	
	5.2.3	Number of elements (pair(s)/quad(s)):	
	5.2.3.1	Screening of the cable element: Tape material Drain wire Braid wire Braid material	
	5.2.4	Cross web, spacer or protective wrapping(s):	
	5.2.5	Screen of the cable core: Tape material Minimum overlap Drain wire Braid wire Braid material	
	5.2.6	Sheath Material Nominal thickness Colour Maximum overall Diameter Marking Ripcord	
5.2.7	Identification		
[8] Minimum bending radius for static bending: mm Minimum bending radius for dynamic bending: mm Temperature range for installation °C Operating temperature range under static conditions: –20 °C to +60 °C C ₁ –40 °C to +70 °C C ₂ and C ₃			

[9] Characteristics	[10] IEC 61156-6 subclause	[11]	Comments
Electrical characteristics	6.2		
Conductor resistance	6.2.1	$\leq \dots \Omega/\text{km}$	
Resistance unbalance	6.2.2		
Resistance unbalance within a pair	6.2.2.1	$\leq \dots \%$	
Resistance unbalance between pairs	6.2.2.2	$\leq \dots \%$	
Dielectric strength			
Conductor/conductor	6.2.3	$\dots \text{ kV/time}$	
Conductor/screen	6.2.3	$\dots \text{ kV/time}$	
Insulation resistance			
Conductor/conductor	6.2.4	$\geq \dots \text{ M}\Omega \cdot \text{km}$	
Conductor/screen	6.2.4	$\geq \dots \text{ M}\Omega \cdot \text{km}$	
Mutual capacitance	6.2.5	$\leq \dots \text{ pF/m}$	
Capacitance unbalance pair to ground	6.2.6	$\leq \dots \text{ pF/km}$	
Transfer impedance	6.2.7	$\dots \text{ m}\Omega/\text{m}$	Cable should be a grade 1 or 2
Coupling attenuation	6.2.8	$\dots \text{ dB}$ Cable type.....	Cable type should be I, II or III
Current-carrying capacity	6.2.9	$\dots \text{ mA}$	Under consideration
Transmission characteristics	6.3		
Velocity of propagation	6.3.1	$\dots \text{ m/s}$	
Delay	6.3.2	$\leq \dots \text{ ns/m}$	
Differential phase delay (skew)	6.3.2.1	$\leq \dots \text{ ns/m}$ $\leq \dots \text{ ns/m}$	
Attenuation	6.3.3		
General figures	6.3.3.1	$\leq \dots \text{ dB/100 m}$	
Environmental temperature effects	6.3.3.2	$\leq \dots \text{ \%}/^\circ\text{C}$	
Unbalance attenuation near end (<i>TCL</i>)	6.3.4	$\geq \dots \text{ dB}$	Cable level shall be identified
Unbalance attenuation far end (<i>EL TCL</i>)	6.3.4	$\geq \dots \text{ dB}$	
Near end crosstalk	6.3.5	$\geq \dots \text{ dB}$	