
Vmesniki univerzalnega serijskega vodila za prenos podatkov in napajanje - 1-3. del: Skupne komponente - Specifikacija za kable in priključke univerzalnega serijskega vodila tipa C(r) (IEC 62680-1-3:2026)

Universal Serial Bus interfaces for data and power - Part 1-3: Common components - USB Type-C(r) cable and connector specification (IEC 62680-1-3:2026)

Universelle Bus-Schnittstellen für Daten und Energie - Teil 1-3: Gemeinsame Komponenten - Festlegung für USB Type-C Kabel und Steckverbindung (IEC 62680-1-3:2026)

Interfaces de bus universel en série pour les données et l'alimentation électrique - Partie 1-3: Composants communs - Spécification des câbles et des connecteurs USB Type C(r) (IEC 62680-1-3:2026)

Ta slovenski standard je istoveten z: EN IEC 62680-1-3:2026

ICS:

35.200	Vmesniška in povezovalna oprema	Interface and interconnection equipment
--------	---------------------------------	---

SIST EN IEC 62680-1-3:2026

en,fr,de

Sample Document

get full document from standards.iteh.ai

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN IEC 62680-1-3

March 2026

ICS 33.120.20; 33.120.30; 35.200

Supersedes EN IEC 62680-1-3:2025

English Version

**Universal Serial Bus interfaces for data and power - Part 1-3:
Common components - USB Type-C(r) cable and connector
specification
(IEC 62680-1-3:2026)**

Interfaces de bus universel en série pour les données et
l'alimentation électrique - Partie 1-3: Composants communs
- Spécification des câbles et des connecteurs USB Type-
C(r)
(IEC 62680-1-3:2026)

Universelle Bus-Schnittstellen für Daten und Energie - Teil
1-3: Gemeinsame Komponenten - Festlegung für USB
Type-C Kabel und Steckverbindung
(IEC 62680-1-3:2026)

This European Standard was approved by CENELEC on 2026-03-18. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 62680-1-3:2026 (E)**European foreword**

The text of document 100/4332/CDV, future edition 7 of IEC 62680-1-3, prepared by TC 100/Technical Area 18 "(Disbanded) - Multimedia home systems and applications for end-user networks" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62680-1-3:2026.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2027-03-31 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2029-03-31 document have to be withdrawn

This document supersedes EN IEC 62680-1-3:2025 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 62680-1-3:2026 was approved by CENELEC as a European Standard without any modification.



IEC 62680-1-3

Edition 7.0 2026-02

INTERNATIONAL STANDARD

**Universal Serial Bus interfaces for data and power -
Part 1-3: Common components - USB Type-C® cable and connector
specification**

get full document from standards.iteh.ai

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Universal Serial Bus interfaces for data and power -
Part 1-3: Common components - USB Type-C® cable and connector
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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 62680-1-3 has been prepared by technical area 18: Multimedia home systems and applications for end-user networks, of IEC technical committee 100: Audio, video and multimedia systems and equipment. It is an International Standard.

The text of this standard was prepared by the USB Implementers Forum (USB-IF). The structure and editorial rules used in this publication reflect the practice of the organization which submitted it.

IEC 62680-1-3:2026 © USB-IF 2024

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

Draft	Report on voting
100/4332/CDV	100/4381/RVC

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

A list of all parts in the IEC 62680 series, published under the general title *Universal serial bus interfaces for data and power*, 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

Sample Document

get full document from standards.iteh.ai

Universal Serial Bus Type-C Cable and Connector Specification

Sample Document

**Release 2.4
October 2024**

get full document from standards.iteh.ai

IEC 62680-1-3:2026 © USB-IF 2024

Copyright © 2014-2024, USB 3.0 Promoter Group:**Apple Inc., HP Inc., Intel Corporation, Microsoft Corporation,
Renesas, STMicroelectronics, and Texas Instruments****All rights reserved.**

NOTE: Adopters may only use the USB Type-C® cable and connector to implement USB or third-party functionality as expressly described in this Specification; all other uses are prohibited.

LIMITED COPYRIGHT LICENSE: The USB 3.0 Promoters grant a conditional copyright license under the copyrights embodied in the USB Type-C Cable and Connector Specification to use and reproduce the Specification for the sole purpose of, and solely to the extent necessary for, evaluating whether to implement the Specification in products that would comply with the specification. Without limiting the foregoing, use of the Specification for the purpose of filing or modifying any patent application to target the Specification or USB compliant products is not authorized. Except for this express copyright license, no other rights or licenses are granted, including without limitation any patent licenses. In order to obtain any additional intellectual property licenses or licensing commitments associated with the Specification a party must execute the USB 3.0 Adopters Agreement. NOTE: By using the Specification, you accept these license terms on your own behalf and, in the case where you are doing this as an employee, on behalf of your employer.

INTELLECTUAL PROPERTY DISCLAIMER

THIS SPECIFICATION IS PROVIDED TO YOU "AS IS" WITH NO WARRANTIES WHATSOEVER, INCLUDING ANY WARRANTY OF MERCHANTABILITY, NON-INFRINGEMENT, OR FITNESS FOR ANY PARTICULAR PURPOSE. THE AUTHORS OF THIS SPECIFICATION DISCLAIM ALL LIABILITY, INCLUDING LIABILITY FOR INFRINGEMENT OF ANY PROPRIETARY RIGHTS, RELATING TO USE OR IMPLEMENTATION OF INFORMATION IN THIS SPECIFICATION. THE PROVISION OF THIS SPECIFICATION TO YOU DOES NOT PROVIDE YOU WITH ANY LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS.

All implementation examples and reference designs contained within this Specification are included as part of the limited patent license for those companies that execute the USB 3.0 Adopters Agreement.

USB Type-C®, USB-C® and USB4® are trademarks of the Universal Serial Bus Implementers Forum (USB-IF). DisplayPort™ is a trademark of VESA. All product names are trademarks, registered trademarks, or service marks of their respective owners.

Thunderbolt™ is a trademark of Intel Corporation. You may only use the Thunderbolt™ trademark or logo in conjunction with products designed to this specification that complete proper certification and executing a Thunderbolt™ trademark license – see <https://www.usb.org/compliance> for further information.

Contents

Specification Editor	20
Specification Work Group Contributors.....	20
Pre-Release Draft Industry Reviewing Companies That Provided Feedback.....	28
Revision History.....	29
1 Introduction.....	30
1.1 Purpose	30
1.2 Scope	30
1.3 Related Documents	30
1.4 Conventions.....	31
1.4.1 Precedence	31
1.4.2 Keywords	31
1.4.3 Numbering.....	32
1.5 Terms and Abbreviations	32
2 Overview	38
2.1 Introduction	38
2.2 USB Type-C Receptacles, Plugs and Cables	39
2.3 Configuration Process.....	40
2.3.1 Source-to-Sink Attach/Detach Detection.....	41
2.3.2 Plug Orientation/Cable Twist Detection.....	41
2.3.3 Initial Power (Source-to-Sink) Detection and Establishing the Data (Host-to-Device) Relationship	41
2.3.4 USB Type-C VBUS Current Detection and Usage.....	42
2.3.5 USB PD Communications.....	42
2.3.6 Functional Extensions	43
2.4 VBUS.....	43
2.5 VCONN.....	43
2.6 Hubs.....	44
3 Mechanical.....	45
3.1 Overview.....	45
3.1.1 Compliant Connectors	45
3.1.2 Compliant Cable Assemblies	45
3.1.3 Compliant USB Type-C to Legacy Cable Assemblies	46
3.1.4 Compliant USB Type-C to Legacy Adapter Assemblies.....	47
3.2 USB Type-C Connector Mating Interfaces	47
3.2.1 Interface Definition.....	47
3.2.2 Reference Designs	71

IEC 62680-1-3:2026 © USB-IF 2024

3.2.3	Pin Assignments and Descriptions	78
3.3	Cable Construction and Wire Assignments	79
3.3.1	Cable Construction (<i>Informative</i>)	79
3.3.2	Wire Assignments	81
3.3.3	Wire Gauges and Cable Diameters (<i>Informative</i>)	82
3.4	Standard USB Type-C Cable Assemblies	84
3.4.1	USB Full-Featured Type-C Cable Assembly	84
3.4.2	USB 2.0 Type-C Cable Assembly	86
3.4.3	USB Type-C Captive Cable Assembly	86
3.4.4	USB Type-C Thumb Drive Assembly	87
3.5	Legacy Cable Assemblies	87
3.5.1	USB Type-C to USB 3.1 Standard-A Cable Assembly	88
3.5.2	USB Type-C to USB 2.0 Standard-A Cable Assembly	89
3.5.3	USB Type-C to USB 3.1 Standard-B Cable Assembly	90
3.5.4	USB Type-C to USB 2.0 Standard-B Cable Assembly	91
3.5.5	USB Type-C to USB 2.0 Mini-B Cable Assembly	92
3.5.6	USB Type-C to USB 3.1 Micro-B Cable Assembly	93
3.5.7	USB Type-C to USB 2.0 Micro-B Cable Assembly	94
3.6	Legacy Adapter Assemblies	94
3.6.1	USB Type-C to USB 3.1 Standard-A Receptacle Adapter Assembly	94
3.6.2	USB Type-C to USB 2.0 Micro-B Receptacle Adapter Assembly	96
3.7	Electrical Characteristics	96
3.7.1	Raw Cable (<i>Informative</i>)	97
3.7.2	USB Type-C to USB Type-C Passive Cable Assemblies	98
3.7.3	Mated Connector (<i>Informative – USB 3.2 Gen2 and USB4 Gen2</i>)	120
3.7.4	Receptacle Connector SI Requirements and Testing (<i>Normative – USB4 Gen3/Gen4</i>)	124
3.7.5	USB Type-C to USB Legacy Cable Assemblies (<i>Normative</i>)	126
3.7.6	USB Type-C to USB Legacy Adapter Assemblies (<i>Normative</i>)	130
3.7.7	Shielding Effectiveness Requirements (<i>Normative</i>)	133
3.7.8	DC Electrical Requirements (<i>Normative</i>)	135
3.8	Mechanical and Environmental Requirements (<i>Normative</i>)	138
3.8.1	Mechanical Requirements	138
3.8.2	Environmental Requirements	143
3.9	Docking Applications (<i>Informative</i>)	144
3.10	Implementation Notes and Design Guides	145
3.10.1	EMC Management (<i>Informative</i>)	145

IEC 62680-1-3:2026 © USB-IF 2024

3.10.2	Stacked and Side-by-Side Connector Physical Spacing (<i>Informative</i>)	148
3.10.3	Cable Mating Considerations (<i>Informative</i>)	148
3.11	Extended Power Range (EPR) Cables	150
3.11.1	Electrical Requirements	150
3.11.2	EPR Cable Identification Requirements	150
4	Functional	151
4.1	Signal Summary	151
4.2	Signal Pin Descriptions	151
4.2.1	USB 3.2/USB4 Pins	151
4.2.2	USB 2.0 Pins	152
4.2.3	Auxiliary Signal Pins	152
4.2.4	Power and Ground Pins	152
4.2.5	Configuration Pins	152
4.3	Sideband Use (SBU)	152
4.4	Power and Ground	153
4.4.1	IR Drop	153
4.4.2	VBUS	154
4.4.3	VCONN	155
4.5	Configuration Channel (CC)	160
4.5.1	Architectural Overview	160
4.5.2	CC Functional and Behavioral Requirements	172
4.5.3	USB Port Interoperability Behavior	208
4.6	Power	226
4.6.1	Power Requirements during USB Suspend	227
4.6.2	VBUS Power Provided Over a USB Type-C Cable	228
4.7	USB Hubs	233
4.8	Power Sourcing and Charging	234
4.8.1	DFP as a Power Source	234
4.8.2	Non-USB Charging Methods	236
4.8.3	Sinking Host	237
4.8.4	Sourcing Device	237
4.8.5	Charging a System with a Dead Battery	237
4.8.6	USB Type-C Multi-Port Chargers	237
4.9	Electronically Marked Cables	241
4.9.1	Parameter Values	242
4.9.2	Active Cables	242

IEC 62680-1-3:2026 © USB-IF 2024

4.10	VCONN-Powered Accessories (VPAs) and VCONN-Powered USB Devices (VPDs).....	243
4.10.1	VCONN-Powered Accessories (VPAs).....	243
4.10.2	VCONN-Powered Devices (VPDs).....	243
4.11	Parameter Values	245
4.11.1	Termination Parameters	245
4.11.2	Timing Parameters.....	247
4.11.3	Voltage Parameters	251
5	<i>USB4</i> Discovery and Entry	258
5.1	Overview of the Discovery and Entry Process	258
5.2	<i>USB4</i> Functional Requirements.....	259
5.2.1	<i>USB4</i> Host Functional Requirements.....	259
5.2.2	USB Device Functional Requirements.....	259
5.2.3	<i>USB4</i> Alternate Mode Support.....	259
5.3	<i>USB4</i> Power Requirements.....	260
5.3.1	Source Power Requirements	260
5.3.2	Sink Power Requirements	260
5.3.3	Device Power Management Requirements	260
5.4	<i>USB4</i> Discovery and Entry Flow Requirements	261
5.4.1	USB Type-C Initial Connection	261
5.4.2	USB Power Delivery Contract.....	261
5.4.3	<i>USB4</i> Discovery and Entry Flow	261
5.4.4	<i>USB4</i> Post-Entry Operation.....	267
5.5	<i>USB4</i> Hub Connection Requirements.....	267
5.5.1	<i>USB4</i> Hub Port Initial Connection Requirements.....	267
5.5.2	<i>USB4</i> Hub UFP and Host Capabilities Discovery.....	267
5.5.3	Hub DFP Connection Requirements	268
5.5.4	Hub Ports Connection Behavior Flow Examples.....	269
5.5.5	Connecting to Downstream <i>USB4</i> Hubs	275
5.5.6	Fallback Functional Requirements for <i>USB4</i> Hubs	275
5.6	<i>USB4</i> Device Connection Requirements	276
5.6.1	Fallback Mapping of <i>USB4</i> Peripheral Functions of USB Device Class Types	276
5.7	Parameter Values	277
5.7.1	Timing Parameters	277
6	Active Cables.....	278
6.1	General Specifications for All Active Cables.....	278
6.1.1	Discovering Active Cable Characteristics.....	278

IEC 62680-1-3:2026 © USB-IF 2024

6.1.2	Electrical Requirements	280
6.1.3	Mechanical Requirements	312
6.2	Additional Specifications for Copper and Hybrid-Optical Active Cables.....	313
6.2.1	Active Cable Block Diagram	314
6.2.2	<i>USB4</i> Asymmetric Mode Support	314
6.2.3	Active Cable <i>USB PD</i> Requirements	314
6.2.4	Active Cable Behaviors in Response to <i>USB PD</i> Events.....	314
6.2.5	Active Cable Power Requirements	315
6.3	Additional Specifications for Optically Isolated Active Cables	315
6.3.1	OIAC Block Diagrams	316
6.3.2	OIAC Limitations and General Requirements	318
6.3.3	OIAC Cable Power Requirements	319
6.3.4	OIAC <i>USB PD</i> Requirements.....	319
6.3.5	OIAC Connection Flow and State Diagrams	329
6.3.6	Additional Electrical Requirements for OIAC	348
6.3.7	Additional Mechanical Requirements for OIAC	351
A	Liquid Corrosion Mitigation Mode.....	352
A.1	Overview	352
A.2	Detail	352
A.3	Liquid Detection Methods.....	354
A.3.1	Liquid Measurement Method	354
A.3.2	Pulsed Measurement Method.....	354
A.3.3	Impedance Measurement Method.....	355
A.4	Liquid Detection Pins in the Connector	358
B	Debug Accessory Mode	361
B.1	Overview.....	361
B.2	Functional	361
B.2.1	Signal Summary	361
B.2.2	Port Interoperability.....	362
B.2.3	Debug Accessory Mode Entry.....	362
B.2.4	Connection State Diagrams.....	362
B.2.5	DTS Port Interoperability Behaviors.....	371
B.2.6	Orientation Detection.....	380
B.3	Security/Privacy Requirements	380
C	USB Type-C Digital Audio.....	381
C.1	Overview	381

IEC 62680-1-3:2026 © USB-IF 2024

C.2	USB Type-C Digital Audio Specifications.....	381
D	Thermal Design Considerations for Active Cables.....	382
D.1	Introduction	382
D.2	Model.....	382
D.2.1	Assumptions.....	382
D.2.2	Model Architecture.....	383
D.2.3	Heat Sources.....	383
D.2.4	Heat Flow.....	384
D.3	USB 3.2 Single-Lane Active Cable.....	385
D.3.1	USB 3.2 Single-Lane Active Cable Design Considerations	385
D.4	Dual-Lane Active Cables.....	388
D.4.1	USB 3.2 Dual-Lane Active Cable Design Considerations	388
D.4.2	USB 3.2 Dual-Lane Active Cable in a Multiple Port Configuration	390
D.5	USB 3.2 Host and Device Design Considerations	391
D.5.1	Heat Spreading or Heat Sinking from Host or Device.....	391
D.5.2	Motherboard Temperature Control	392
D.5.3	Wider Port Spacing for Multi-Port Applications	392
D.5.4	Power Policies	392
E	Alternate Modes.....	393
E.1	Alternate Mode Architecture	393
E.2	Alternate Mode Requirements.....	393
E.2.1	Alternate Mode Pin Reassignment.....	394
E.2.2	Alternate Mode Electrical Requirements.....	394
E.3	Parameter Values	397
E.4	Example Alternate Mode – USB DisplayPort™ Dock	398
E.4.1	USB DisplayPort™ Dock Example.....	398
E.4.2	Functional Overview	398
E.4.3	Operational Summary	399
E.5	Example Alternate Mode Entry Flow with Cable Warnings.....	400
E.5.1	Operational Summary	401
F	Thunderbolt™ 3 Compatibility Discovery and Entry	402
F.1	TBT3 Compatibility Mode Functional Requirements	402
F.1.1	TBT3-Compatible Power Requirements.....	402
F.1.2	TBT3-Compatible Host Requirements	402
F.1.3	TBT3-Compatible Device Upstream Requirements.....	402
F.1.4	TBT3-Compatible Device Downstream Requirements.....	402