

INTERNATIONAL STANDARD

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

**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®**



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Draft	Report on voting
100/4139/CDV	100/4177/RVC

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Universal Serial Bus Type-C Cable and Connector Specification

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Pre-Release Draft Industry Reviewing Companies That Provided Feedback

Aces	JST Mfg. Co., Ltd.	Pericom
Fairchild Semiconductor	Korea Electric Terminal	Semtech Corporation
Fujitsu Ltd.	Marvell Semiconductor	Silicon Image
Industrial Technology Research Institute (ITRI)	Motorola Mobility LLC	SMK Corporation
Joinsoon Electronics Mfg. Co. Ltd.	PalCONN/PalNova (Palpilot International Corp.)	Toshiba Corporation

Revision History

Release	Date	Description
1.0	August 11, 2014	Initial Release
1.1	April 3, 2015	Reprint release including incorporation of all approved ECNs as of the revision date plus editorial clean-up.
1.2	March 25, 2016	Reprint release including incorporation of all approved ECNs as of the revision date plus editorial clean-up.
1.3	July 14, 2017	Reprint release including incorporation of all approved ECNs as of the revision date plus editorial clean-up.
1.4	March 29, 2019	Reprint release including incorporation of all approved ECNs as of the revision date plus editorial clean-up.
2.0	August 2019	New release primarily for enabling USB4 over USB Type-C connectors and cables. Also includes incorporation of all approved ECNs as of the revision date plus editorial clean-up.
2.1	May 2021	New release primarily for enabling Extended Power Range (EPR) and defining EPR cables aligning with USB Power Delivery Specification R3.1 V1.0. Also includes incorporation of all approved ECNs as the revision date plus editorial clean-up.
2.2	October 2022	New release primarily for enabling USB4 Version 2.0 (80 Gbps) over USB Type-C connectors and cables. Also includes incorporation of all approved ECNs as of the revision date plus editorial clean-up.
2.3	October 2023	New release primarily for <i>deprecating</i> the Audio Adapter Accessory Mode and <i>replacing it with</i> the Liquid Corrosion Mitigation Mode , and for updating the Multi-port Charger Shared Capacity definition and behaviors. Also includes incorporation of all approved ECNs as of the revision date. Note: this release was created using a newly developed document template that includes some style adjustments and editorial clean-up.

1 Introduction

With the continued success of the USB interface, there exists a need to adapt USB technology to serve newer computing platforms and devices as they trend toward smaller, thinner, and lighter form-factors. Many of these newer platforms and devices are reaching a point where existing USB receptacles and plugs are inhibiting innovation, especially given the relatively large size and internal volume constraints of the Standard-A and Standard-B versions of USB connectors. Additionally, as platform usage models have evolved, usability and robustness requirements have advanced, and the existing set of USB connectors were not originally designed for some of these newer requirements. This specification establishes a new USB connector ecosystem that addresses the evolving needs of platforms and devices while retaining all the functional benefits of USB that form the basis for this most popular of computing device interconnects.

1.1 Purpose

This specification defines the USB Type-C® receptacles, plug and cables.

The USB Type-C Cable and Connector Specification is guided by the following principles:

- Enable new and exciting host and device form-factors where size, industrial design and style are important parameters
- Work seamlessly with existing USB host and device silicon solutions
- Enhance ease of use for connecting USB devices with a focus on minimizing user confusion for plug and cable orientation

The USB Type-C Cable and Connector Specification defines a receptacle, plug, cable, and detection mechanisms that are compatible with existing USB interface electrical and functional specifications. This specification covers the following aspects that are needed to produce and use this new USB cable/connector solution in newer platforms and devices, and that interoperate with existing platforms and devices:

- USB Type-C receptacles, including electro-mechanical definition and performance requirements
- USB Type-C plugs and cable assemblies, including electro-mechanical definition and performance requirements
- USB Type-C to legacy cable assemblies and adapters
- USB Type-C-based device detection and interface configuration, including support for legacy connections
- **USB Power Delivery** optimized for the USB Type-C connector

The USB Type-C Cable and Connector Specification defines a standardized mechanism that supports **Alternate Modes**, such as repurposing the connector for docking-specific applications.

1.2 Scope

This specification is intended as a supplement to the existing **USB 2.0**, **USB 3.2**, **USB4®** and **USB Power Delivery** specifications. It addresses only the elements required to implement and support the USB Type-C receptacles, plugs and cables.

Normative information is provided to allow interoperability of components designed to this specification. **Informative** information, when provided, may illustrate possible design implementations.

1.3 Related Documents

USB 2.0 Universal Serial Bus Revision 2.0 Specification

This includes the entire document release package.

USB 3.2 Universal Serial Bus Revision 3.2 Specification

This includes the entire document release package.
USB 3.1 Legacy Cable and Connector Specification, Revision 1.0

USB4 USB4 Specification, Version 2.0, October 2022

(including posted errata and ECNs)

TBT3 Chapter 13 of USB4 Specification, Version 2.0, October 2022

USB PD USB Power Delivery Specification, Revision 2.0, Version 1.3, January 12, 2017

USB Power Delivery Specification, Revision 3.2, Version 1.0, October 2023

(including posted errata and ECNs)

USB BB USB Billboard Device Class Specification, Revision 1.2.2, January 29, 2021

USB BC Battery Charging Specification, Revision 1.2, March 15, 2012

(including posted errata and ECNs)

DP AM DisplayPort™ Alt Mode on USB Type-C Standard, Version 2.1, October 2022

All USB-specific documents are available for download at <http://www.usb.org/documents>.

The **DisplayPort Alt Mode** specification is available from VESA (<http://www.vesa.org>).

1.4 Conventions

1.4.1 Precedence

If there is a conflict between text, figures, and tables, the precedence **shall** be tables, figures, and then text.

1.4.2 Keywords

The following keywords differentiate between the levels of requirements and options.

1.4.2.1 Informative

Informative is a keyword that describes information with this specification that intends to discuss and clarify requirements and features as opposed to mandating them.

1.4.2.2 May

May is a keyword that indicates a choice with no implied preference.

1.4.2.3 May Not

May not is a keyword that is the inverse of **May**. Indicates a choice to not implement a given feature with no implied preference.

1.4.2.4 N/A

N/A is a keyword that indicates that a field or value is not applicable and has no defined value and **shall not** be checked or used by the recipient.

1.4.2.5 Normative

Normative is a keyword that describes features that are mandated by this specification.

1.4.2.6 Optional and Optionally

Optional and **Optionally** are equivalent keywords that describe features not mandated by this specification. However, if an **optional** feature is implemented, the feature **shall** be implemented as defined by this specification (**optional normative**).

1.4.2.7 Reserved

Reserved is a keyword indicating reserved bits, bytes, words, fields, and code values that are set-aside for future standardization. Their use and interpretation may be specified by future extensions to this specification and, unless otherwise stated, **shall not** be utilized, or adapted by vendor implementation. A reserved bit, byte, word, or field **shall** be set to zero by the sender and **shall** be ignored by the receiver. **Reserved** field values **shall not** be sent by the sender and, if received, **shall** be ignored by the receiver.

1.4.2.8 Shall

Shall is a keyword indicating a mandatory (**normative**) requirement. Designers are mandated to implement all such requirements to ensure interoperability with other compliant Devices.

1.4.2.9 Shall Not

Shall not is a keyword that is the inverse of **Shall** indicating non-compliant operation.

1.4.2.10 Should

Should is a keyword indicating flexibility of choice with a preferred alternative. Equivalent to the phrase “it is recommended that ...”.

1.4.2.11 Should Not

Should not is a keyword that is the inverse of **Should**. Equivalent to the phrase “it is recommended that implementations do not ...”.

1.4.3 Numbering

Numbers that are immediately followed by a lowercase “b” (e.g., 01b) are binary values. Numbers that are immediately followed by an uppercase “B” are byte values. Numbers that are immediately followed by a lowercase “h” (e.g., 3Ah) are hexadecimal values. Numbers not immediately followed by either a “b”, “B”, or “h” are decimal values.

1.5 Terms and Abbreviations

Term	Description
Accessory Mode	A reconfiguration of the connector based on the presence of Rd/Rd on CC1/CC2, respectively.
Active cable	Active cables are USB Full-Featured Type-C Cables that incorporate repeaters in the USB 3.2 data path. All active cables, regardless of length, are expected to comply with this specification, the USB 3.2 Appendix E, and the USB 3.2 active cable CTS. Active cables may incorporate repeaters in both ends of the cable, one end, or anywhere in the cable. See Chapter 6.
Alternate Mode	Operation defined by a vendor or standards organization that is associated with a SVID assigned by the USB-IF . Entry and exit into and from an Alternate Mode is controlled by the USB PD Structured VDM Enter Mode and Exit Mode commands. See Appendix E.
Alternate Mode Adapter (AMA)	A USB PD Device which supports Alternate Modes and acts as a UFP.