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Edition 1.0 2022-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Universal Serial Bus interfaces for data and power – Part 4-1: Universal Serial Bus 4™ Specification

Interfaces de bus universel en série pour les données et l'alimentation électrique – Partie 4-1: Spécification du bus universel en série 4™

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UNIVERSAL SERIAL BUS INTERFACES FOR DATA AND POWER

Part 4-1: Universal Serial Bus 4™ Specification

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

Draft	Report on voting
100/3754/CDV	100/3813/RVC

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

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This standard is the USB-IF publication, USB4™ Specification, Version 1.0 with Errata and ECN through May 19, 2021.

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Version 1.0 with Errata and ECN through May 19, 2021

May 2021

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Version	Comments	Issue Date
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1.0 with Errata and ECN through October 15, 2020	Includes errata and ECN through October 15, 2020 as part of the specification text.	October 2020
1.0 with Errata and ECN through May 19, 2021	Includes errata and ECN through May 19, 2021 as part of the specification text.	May 2021

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1 Introduction

1.1 Scope of the Document

The specification is primarily targeted at peripheral developers and platform/adapter developers, but provides valuable information for platform operating system/BIOS/device driver, adapter independent hardware vendors/independent software vendors, and system OEMs. This specification can be used for developing new products and associated software.

1.2 USB Product Compliance

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1.3 Document Organization

Chapters 1 and 2 provide an overview for all readers, while Chapters 3 through 13 contain detailed technical information defining USB4.

1.4 Design Goals

USB 3.1 and USB 3.2 were evolutionary steps to increase bandwidth. The goal for USB4 remains the same with the added goal of helping to converge the USB Type-C® connector ecosystem and minimize end-user confusion. Several key design areas to meet this goal are listed below:

- Offer display, data, and load/store functionality over a single USB Type-C connector.
- Retain compatibility with existing ecosystem of USB and Thunderbolt™ products.
- Define Port Capabilities for predictable and consistent user experience.
- Provide increased host flexibility to configure bandwidth, power management, and other performance-related parameters for system needs.

1.5 Related Documents

Universal Serial Bus 3.2 Specification, Revision 1.0, September 22, 2017 (USB 3.2 Specification)

USB Type-C® Cable and Connector Specification, Release 2.0 (USB Type-C Specification)

USB 3.0 Jitter Budgeting white paper (USB Jitter Paper)

Universal Serial Bus Power Delivery Specification, Release 3.0, Version 2.0, August 2019 (USB PD Specification)

PCI Express® Base Specification, Revision 4, Version 1, September 27, 2017 (PCIe Specification)

VESA DisplayPort™ Standard, Revision 1.2a, May 2012 (DisplayPort 1.2a Specification)

VESA DisplayPort™ Standard, Revision 1.4a, April 19, 2018 (DisplayPort 1.4a Specification)

VESA DisplayPort™ 1.4a PHY Layer Compliance Test Specification, Revision 1.0, 27 July, 2018 (DisplayPort 1.4a PHY CTS)

VESA DisplayPort™ Alt Mode on USB Type-C Standard, Revision 1.0b, November 03, 2017 (DisplayPort Alt Mode Specification)