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Gränssnitt för seriebuss för datakommunikation (USB) – Del 1-2: Gemensamma komponenter – Specifikation för strömförsörjning (USB PD)

*Universal serial bus interfaces for data and power –
Part 1-2: Common components –
USB Power Delivery specification*

Som svensk standard gäller europastandarden EN 62680-1-2:2017. Den svenska standarden innehåller den officiella engelska språkversionen av EN 62680-1-2:2017.

Nationellt förord

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Postadress: Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: www.elstandard.se

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Tel 08-444 14 00
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English Version

**Universal serial bus interfaces for data and power - Part 1-2:
Common components - USB Power Delivery specification
(IEC 62680-1-2:2016)**

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l'alimentation électrique - Partie 1-2 : Composants
communs - Spécification USB pour la fourniture de courant
(IEC 62680-1-2:2016)

Schnittstellen des Universellen Seriellen Busses für Daten
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Stromversorgungs-Spezifikation
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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 100/2728/CDV, future edition 1 of IEC 62680-1-2, prepared by IEC/TC 100 "Audio, video and multimedia systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62680-1-2:2017.

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UNIVERSAL SERIAL BUS INTERFACES FOR DATA AND POWER

Part 1-2: Common components – USB Power Delivery specification

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International Standard IEC 62680-1-2 has been prepared by technical area 14: Interfaces and methods of measurement for personal computing equipment, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

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.

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

CDV	Report on voting
100/2728/CDV	100/2729/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.

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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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The IEC 62680 series is based on a series of specifications that were originally developed by the USB Implementers Forum (USB-IF). These specifications were submitted to the IEC under the auspices of a special agreement between the IEC and the USB-IF.

This standard is the USB-IF publication USB Power Delivery Specification Revision 3.0 V.1.0.

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Universal Serial Bus Power Delivery Specification

Revision 3.0, V1.0. 11 December 2015

Editors

Bob Dunstan	Intel Corporation
Richard Petrie	DisplayLink

Contributors

Charles Wang	ACON, Advanced-Connectek, Inc.
Conrad Choy	ACON, Advanced-Connectek, Inc.
Steve Sedio	ACON, Advanced-Connectek, Inc.
Vicky Chuang	ACON, Advanced-Connectek, Inc.
Joseph Scanlon	Advanced Micro Devices
Howard Chang	Allion Labs, Inc.
Greg Stewart	Analogix Semiconductor, Inc.
Mehran Badii	Analogix Semiconductor, Inc.
Bill Cornelius	Apple
Colin Whitby-Strevens	Apple
Corey Axelowitz	Apple
Corey Lange	Apple
Dave Conroy	Apple
David Sekowski	Apple
Girault Jones	Apple
James Orr	Apple
Jason Chung	Apple
Jennifer Tsai	Apple
Karl Bowers	Apple
Keith Porthouse	Apple
Matt Mora	Apple
Paul Baker	Apple
Reese Schreiber	Apple
Sameer Kelkar	Apple
Sasha Tietz	Apple
Sree Raman	Apple
William Ferry	Apple
Zaki Moussaoui	Apple
Bernard Shyu	Bizlink Technology, Inc.
Eric Wu	Bizlink Technology, Inc.
Morphy Hsieh	Bizlink Technology, Inc.
Shawn Meng	Bizlink Technology Inc.
Tiffany Hsiao	Bizlink Technology, Inc.
Weichung Ooi	Bizlink Technology, Inc.
Michal Staworko	Cadence Design Systems, Inc.
Alessandro Ingrassia	Canova Tech
Andrea Colognese	Canova Tech
Davide Ghedin	Canova Tech
Matteo Casalin	Canova Tech
Nicola Scantamburlo	Canova Tech

Yi-Feng Lin	Canyon Semiconductor	
Anup Nayak	Cypress Semiconductor	
Jagadeesan Raj	Cypress Semiconductor	
Pradeep Bajpai	Cypress Semiconductor	
Rushil Kadakia	Cypress Semiconductor	
Steven Wong	Cypress Semiconductor	
Subu Sankaran	Cypress Semiconductor	
Sumeet Gupta	Cypress Semiconductor	
Adolfo Montero	Dell Inc.	
Bruce Montag	Dell Inc.	
Gary Verdun	Dell Inc.	
Merle Wood	Dell Inc.	
Mohammed Hijazi	Dell Inc.	
Siddhartha Reddy	Dell Inc.	
Dan Ellis	DisplayLink	
Jason Young	DisplayLink	
Peter Burgers	DisplayLink	
Richard Petrie	DisplayLink	PD Chair/Device Policy Lead
Abel Astley	Ellisys	
Chuck Trefts	Ellisys	
Emmanuel Durin	Ellisys	
Mario Pasquali	Ellisys	
Chien-Cheng Kuo	Etron Technology, Inc.	
Jack Yang	Etron Technology, Inc.	
Richard Crisp	Etron Technology, Inc.	
Shyanjia Chen	Etron Technology, Inc.	
TsungTa Lu	Etron Technology, Inc.	
Christian Klein	Fairchild Semiconductor	
Oscar Freitas	Fairchild Semiconductor	
Souhib Harb	Fairchild Semiconductor	
AJ Yang	Foxconn / Hon Hai	
Fred Fons	Foxconn / Hon Hai	
Steve Sedio	Foxconn / Hon Hai	
Terry Little	Foxconn / Hon Hai	
Bob McVay	Fresco Logic Inc.	
Christopher Meyers	Fresco Logic Inc.	
Tom Burton	Fresco Logic Inc.	
Dian Kurniawan	Fresco Logic Inc.	
Adam Rodriguez	Google Inc.	
Alec Berg	Google Inc.	
David Schneider	Google Inc.	
Jim Guerin	Google Inc.	
Juan Fantin	Google Inc.	
Ken Wu	Google Inc.	
Mark Hayter	Google Inc.	
Nithya Jagannathan	Google Inc.	

Todd Broch	Google Inc.	
Vincent Palatin	Google Inc.	
Mike Engbretson	Granite River Labs	
Rajaraman V	Granite River Labs	
Alan Berkema	Hewlett Packard	
Lee Atkinson	Hewlett Packard	
Rahul Lakdawala	Hewlett Packard	
Robin Castell	Hewlett Packard	
Roger Benson	Hewlett Packard	
Ron Schooley	Hewlett Packard	
Vaibhav Malik	Hewlett Packard	
Walter Fry	Hewlett Packard	
Bob Dunstan	Intel Corporation	PD Chair/Protocol WG Lead
Brad Saunders	Intel Corporation	
Chee Lim Nge	Intel Corporation	
Christine Krause	Intel Corporation	
Dan Froelich	Intel Corporation	
David Harriman	Intel Corporation	
David Hines	Intel Corporation	
David Thompson	Intel Corporation	
Guobin Liu	Intel Corporation	
Harry Skinner	Intel Corporation	
Henrik Leegaard	Intel Corporation	
Jervis Lin	Intel Corporation	
John Howard	Intel Corporation	
Karthi Vadivelu	Intel Corporation	
Leo Heiland	Intel Corporation	
Maarit Harkonen	Intel Corporation	
Nge Chee Lim	Intel Corporation	
Paul Durley	Intel Corporation	
Rahman Ismail	Intel Corporation	System Policy Lead
Ronald Swartz	Intel Corporation	
Sarah Sharp	Intel Corporation	
Scott Brenden	Intel Corporation	
Sridharan Ranganathan	Intel Corporation	
Steve McGowan	Intel Corporation	
Tim McKee	Intel Corporation	PD Chair/Compliance Lead
Toby Opferman	Intel Corporation	
Kenta Minejima	Japan Aviation Electronics Industry Ltd. (JAE)	
Mark Saubert	Japan Aviation Electronics Industry Ltd. (JAE)	
Toshio Shimoyama	Japan Aviation Electronics Industry Ltd. (JAE)	
Brian Fetz	Keysight Technologies Inc.	
Babu Mailachalam	Lattice Semiconductor Corp	
Gianluca Mariani	Lattice Semiconductor Corp	
Joel Coplen	Lattice Semiconductor Corp	

Thomas Watz	Lattice Semiconductor Corp
Vesa Lauri	Lattice Semiconductor Corp
Daniel H Jacobs	LeCroy Corporation
Jake Jacobs	LeCroy Corporation
Kimberley McKay	LeCroy Corporation
Mike Micheletti	LeCroy Corporation
Roy Chestnut	LeCroy Corporation
Phil Jakes	Lenovo
Dave Thompson	LSI Corporation
Alan Kinningham	Luxshare-ICT
Daniel Chen	Luxshare-ICT
Josue Castillo	Luxshare-ICT
Chris Yokum	MCCI Corporation
Geert Knapen	MCCI Corporation
Terry Moore	MCCI Corporation
Velmurugan Selvaraj	MCCI Corporation
Brian Marley	Microchip Technology Inc.
Dave Perchlik	Microchip Technology Inc.
Don Perkins	Microchip Technology Inc.
John Sisto	Microchip Technology Inc.
Josh Averyt	Microchip Technology Inc.
Kiet Tran	Microchip Technology Inc.
Mark Bohm	Microchip Technology Inc.
Matthew Kalibat	Microchip Technology Inc.
Mick Davis	Microchip Technology Inc.
Rich Wahler	Microchip Technology Inc.
Ronald Kunin	Microchip Technology Inc.
Shannon Cash	Microchip Technology Inc.
Anthony Chen	Microsoft Corporation
Dave Perchlik	Microsoft Corporation
David Voth	Microsoft Corporation
Geoff Shew	Microsoft Corporation
Jayson Kastens	Microsoft Corporation
Kai Inha	Microsoft Corporation
Marwan Kadado	Microsoft Corporation
Rahul Ramadas	Microsoft Corporation
Randy Aull	Microsoft Corporation
Shiu Ng	Microsoft Corporation
Timo Toivola	Microsoft Corporation
Toby Nixon	Microsoft Corporation
Vivek Gupta	Microsoft Corporation
Yang You	Microsoft Corporation
Dan Wagner	Motorola Mobility Inc.
Ben Crowe	MQP Electronics Ltd.
Pat Crowe	MQP Electronics Ltd.
Sten Carlsen	MQP Electronics Ltd.

Frank Borngläber	Nokia Corporation	
Kai Inha	Nokia Corporation	
Pekka Leinonen	Nokia Corporation	
Richard Petrie	Nokia Corporation	PD Vice-Chair/Device Policy Lead
Sten Carlsen	Nokia Corporation	Physical Layer WG Lead
Abhijeet Kulkarni	NXP Semiconductors	
Ahmad Yazdi	NXP Semiconductors	
Bart Vertenten	NXP Semiconductors	
Dong Nguyen	NXP Semiconductors	
Guru Prasad	NXP Semiconductors	
Ken Jaramillo	NXP Semiconductors	
Krishnan TN	NXP Semiconductors	
Michael Joehren	NXP Semiconductors	
Robert de Nie	NXP Semiconductors	
Rod Whitby	NXP Semiconductors	
Vijendra Kuroodi	NXP Semiconductors	
Robert Heaton	Obsidian Technology	
Bryan McCoy	ON Semiconductor	
Cor Voorwinden	ON Semiconductor	
Edward Berrios	ON Semiconductor	Power Supply WG Lead
Tom Duffy	ON Semiconductor	
Craig Wiley	Parade Technologies Inc.	
Ricardo Pregiteer	Power Integrations	
Chris Sporck	Qualcomm, Inc.	
Craig Aiken	Qualcomm, Inc.	
George Paparrizos	Qualcomm, Inc	
Giovanni Garcea	Qualcomm, Inc	
James Goel	Qualcomm, Inc	
Joshua Warner	Qualcomm, Inc	
Narendra Mehta	Qualcomm, Inc.	
Terry Remple	Qualcomm, Inc.	
Yoram Rimoni	Qualcomm, Inc.	
Atsushi Mitamura	Renesas Electronics Corp.	
Dan Aoki	Renesas Electronics Corp.	
Kiichi Muto	Renesas Electronics Corp.	
Masami Katagiri	Renesas Electronics Corp.	
Nobuo Furuya	Renesas Electronics Corp.	
Patrick Yu	Renesas Electronics Corp.	
Peter Teng	Renesas Electronics Corp.	
Philip Leung	Renesas Electronics Corp.	
Steve Roux	Renesas Electronics Corp.	
Tetsu Sato	Renesas Electronics Corp.	
Heinz Wei	Richtek Technology Corporation	
Tatsuya Irisawa	Ricoh Company Ltd.	
Akihiro Ono	Rohm Co. Ltd.	
Chris Lin	Rohm Co. Ltd.	

Hidenori Nishimoto	Rohm Co. Ltd.	
Kris Bahar	Rohm Co. Ltd.	
Manabu Miyata	Rohm Co. Ltd.	
Ruben Balbuena	Rohm Co. Ltd.	
Takashi Sato	Rohm Co. Ltd.	
Vijendra Kuroodi	Rohm Co. Ltd.	
Yusuke Kondo	Rohm Co. Ltd.	
Matti Kulmala	Salcomp Plc	
Toni Lehimo	Salcomp Plc	
Tong Kim	Samsung Electronics Co. Ltd.	
Alvin Cox	Seagate Technology LLC	Cab Con WG Lead
John Hein	Seagate Technology LLC	
Marc Noblitt	Seagate Technology LLC	
Ronald Rueckert	Seagate Technology LLC	
Tony Priborsky	Seagate Technology LLC	
John Sisto	SMSC	
Ken Gay	SMSC	
Mark Bohm	SMSC	
Richard Wahler	SMSC	
Shannon Cash	SMSC	
Tim Knowlton	SMSC	
William Chiechi	SMSC	
Fabien Friess	ST-Ericsson	
Giuseppe Platania	ST-Ericsson	
Jean-Francois Gatto	ST-Ericsson	
Milan Stamenkovic	ST-Ericsson	
Nicolas Florenchie	ST-Ericsson	
Patrizia Milazzo	ST-Ericsson	
Christophe Lorin	ST-Microelectronics	
John Bloomfield	ST-Microelectronics	
Massimo Panzica	ST-Microelectronics	
Meriem Mersel	ST-Microelectronics	
Nathalie Ballot	ST-Microelectronics	
Pascal Legrand	ST-Microelectronics	
Patrizia Milazzo	ST-Microelectronics	
Zongyao Wen	Synopsys, Inc.	
Joan Marrinan	Tektronix	
Kimberley McKay	Teledyne-LeCroy	
Matthew Dunn	Teledyne-LeCroy	
Tony Minchell	Teledyne-LeCroy	
Anand Dabak	Texas Instruments	
Bill Waters	Texas Instruments	
Deric Waters	Texas Instruments	Physical Layer WG Lead
Grant Ley	Texas Instruments	
Ingolf Frank	Texas Instruments	
Ivo Huber	Texas Instruments	

Javed Ahmad	Texas Instruments
Jean Picard	Texas Instruments
Martin Patoka	Texas Instruments
Scott Jackson	Texas Instruments
Srinath Hosur	Texas Instruments
Steven Tom	Texas Instruments
Dydron Lin	VIA Technologies, Inc.
Fong-Jim Wang	VIA Technologies, Inc.
Jay Tseng	VIA Technologies, Inc.
Rex Chang	VIA Technologies, Inc.
Terrance Shih	VIA Technologies, Inc.
Charles Neumann	Western Digital Technologies, Inc.
Curtis Stevens	Western Digital Technologies, Inc.
John Maroney	Western Digital Technologies, Inc.

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1 Introduction

USB has evolved from a data interface capable of supplying limited power to a primary provider of power with a data interface. Today many devices charge or get their power from USB ports contained in laptops, cars, aircraft or even wall sockets. USB has become a ubiquitous power socket for many small devices such as cell phones, MP3 players and other hand-held devices. Users need USB to fulfill their requirements not only in terms of data but also to provide power to, or charge, their devices simply, often without the need to load a driver, in order to carry out “traditional” USB functions.

There are however, still many devices which either require an additional power connection to the wall, or exceed the USB rated current in order to operate. Increasingly, international regulations require better energy management due to ecological and practical concerns relating to the availability of power. Regulations limit the amount of power available from the wall which has led to a pressing need to optimize power usage. The USB Power Delivery Specification has the potential to minimize waste as it becomes a standard for charging devices that are not satisfied by [\[USBBC 1.2\]](#).

Wider usage of wireless solutions is an attempt to remove data cabling but the need for “tethered” charging remains. In addition, industrial design requirements drive wired connectivity to do much more over the same connector.

USB Power Delivery is designed to enable the maximum functionality of USB by providing more flexible power delivery along with data over a single cable. Its aim is to operate with and build on the existing USB ecosystem; increasing power levels from existing USB standards, for example Battery Charging, enabling new higher power use cases such as USB powered Hard Disk Drives (HDDs) and printers.

With USB Power Delivery the power direction is no longer fixed. This enables the product with the power (Host or Peripheral) to provide the power. For example, a display with a supply from the wall can power, or charge, a laptop. Alternatively, USB power bricks or chargers are able to supply power to laptops and other battery powered devices through their, traditionally power providing, USB ports.

USB Power Delivery enables hubs to become the means to optimize power management across multiple peripherals by allowing each device to take only the power it requires, and to get more power when required for a given application. For example battery powered devices can get increased charging current and then give it back temporarily when the user’s HDD requires spinning up. **Optionally** the hubs can communicate with the PC to enable even more intelligent and flexible management of power either automatically or with some level of user intervention.

USB Power Delivery allows Low Power cases such as headsets to negotiate for only the power they require. This provides a simple solution that enables USB devices to operate at their optimal power levels.

The Power Delivery Specification, in addition to providing mechanisms to negotiate power also can be used as a side-band channel for standard and vendor defined messaging. Power Delivery enables alternative modes of operation by providing the mechanisms to discover, enter and exit Alternate Modes. The specification also enables discovery of cable capabilities such as supported speeds and current levels.

1.1 Overview

This specification defines how USB Devices may negotiate for more current and/or higher or lower voltages over the USB cable (using the USB Type-C CC wire as the communications

channel) than are defined in the [\[USB 2.0\]](#), [\[USB 3.1\]](#), [\[USB Type-C 1.2\]](#) or [\[USBBC 1.2\]](#) specifications. It allows Devices with greater power requirements than can be met with today's specification to get the power they require to operate from V_{BUS} and negotiate with external power sources (e.g. wall warts). In addition, it allows a Source and Sink to swap power roles such that a Device could supply power to the Host. For example, a display could supply power to a notebook to charge its battery.

The USB Power Delivery Specification is guided by the following principles:

- 1) Works seamlessly with legacy USB Devices
- 2) Compatible with existing spec-compliant USB cables
- 3) Minimizes potential damage from non-compliant cables (e.g. 'Y' cables etc.)
- 4) Optimized for low-cost implementations

This specification defines mechanisms to discover, enter and exit Modes defined either by a standard or by a particular vendor. These Modes can be supported either by the Port Partner or by a cable connecting the two Port Partners.

The specification defines mechanisms to discover the capabilities of cables which can communicate using Power Delivery.

This specification adds a mechanism to swap the data roles such that the upstream facing Port becomes the downstream facing Port and vice versa. It also enables a swap of the end supplying V_{CONN} to a powered cable.

1.2 Purpose

The USB Power Delivery specification defines a power delivery system covering all elements of a USB system including: Hosts, Devices, Hubs, Chargers and cable assemblies. This specification describes the architecture, protocols, power supply behavior, connectors and cabling necessary for managing power delivery over USB at up to 100W. This specification is intended to be fully compatible and extend the existing USB infrastructure. It is intended that this specification will allow system OEMs, power supply and peripheral developers adequate flexibility for product versatility and market differentiation without losing backwards compatibility.

USB Power Delivery is designed to operate independently of the existing USB bus defined mechanisms used to negotiate power which are:

- [\[USB 2.0\]](#), [\[USB 3.1\]](#) in band requests for high power interfaces.
- [\[USBBC 1.2\]](#) mechanisms for supplying higher power (not mandated by this specification).
- [\[USB Type-C 1.2\]](#) mechanisms for supplying higher power

Initial operating conditions remain the USB Default Operation as defined in [\[USB 2.0\]](#), [\[USB 3.1\]](#), [\[USB Type-C 1.2\]](#) or [\[USBBC 1.2\]](#).

- The DFP sources *vSafe5V* over V_{BUS} .
- The UFP consumes power from V_{BUS} .

1.3 Scope

This specification is intended as an extension to the existing [\[USB 2.0\]](#), [\[USB 3.1\]](#), [\[USB Type-C 1.2\]](#) and [\[USBBC 1.2\]](#) specifications. It addresses only the elements required to implement USB Power Delivery. It is targeted at power supply vendors, manufacturers of [\[USB 2.0\]](#), [\[USB 3.1\]](#), [\[USB Type-C 1.2\]](#) and [\[USBBC 1.2\]](#) Platforms, Devices and cable assemblies.

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