

Edition 1.0 2016-11

## INTERNATIONAL STANDARD





### THIS PUBLICATION IS COPYRIGHT PROTECTED Copyright © 2015 USB-IF

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 IEC, or USB-IF at the respective address given below. Any questions about USB-IF copyright should be addressed to the USB-IF. Enquiries about obtaining additional rights to this publication and other information requests should be addressed to the IEC or your local IEC member National Committee.

IEC Secretariat 3, rue de Varembé CH-1211 Geneva 20 Switzerland Tel. +41 22 919 02 11

info@iec.ch www.iec.ch USB Implementers Forum, Inc. 3855 S.W. 153rd Drive Beaverton, OR 97003 United States of America Tel. +1 503-619-0426 Admin@usb.org

#### 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.

www.usb.org

#### 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 corrigendum or an amendment might have been published.

#### IEC publications search - webstore.iec.ch/advsearchform

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 It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the customer Service Centre: sales@iec.ch.

#### IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

#### Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online

NC \26\0-1-2:2016

https://standards.iteh.ai/\/\dJ\_g\stand&ds/Nc/6\s6d48b-64c4-43/0-a609-a/bbfb/a8bf9/iec-62680-1-2-2016



Edition 1.0 2016-11

## INTERNATIONAL STANDARD



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

E(\(\frac{1}{26}\))-1-2:2016
s://standards.iteh.ai/\(\frac{1}{2}\))-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:2016
// (26)-1-2:20

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 29.220; 33.120; 35.200

ISBN 978-2-8322-3710-6

Warning! Make sure that you obtained this publication from an authorized distributor.

#### INTERNATIONAL ELECTROTECHNICAL COMMISSION

#### UNIVERSAL SERIAL BUS INTERFACES FOR DATA AND POWER

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

iTex Syndaxos
(https://stanoxydx.iteh.ai)
Dycurven: Preview

https://standards.iteh.auxydyxtandxds/hz/o-6d48b-64c4-4370-a609-a7bbfb7a8bf9/iec-62680-1-2-2016

#### INTRODUCTION

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.

The USB Implementers Forum, Inc.(USB-IF) is a non-profit corporation founded by the group of companies that developed the Universal Serial Bus specification. The USB-IF was formed to provide a support organization and forum for the advancement and adoption of Universal Serial Bus technology. The Forum facilitates the development of high-quality compatible USB peripherals (devices), and promotes the benefits of USB and the quality of products that have passed compliance testing.

ANY USB SPECIFICATIONS ARE PROVIDED TO YOU "AS IS, "WITH NO WARRANTIES WHATSOEVER, INCLUDING ANY WARRANTY OF MERCHANTABILITY, NON-INFRINGEMENT, OR FITNESS FOR ANY PARTICULAR PURPOSE. THE USB IMPLEMENTERS FORUM AND THE AUTHORS OF ANY USB SPECIFICATIONS DISCLAIM ALL LIABILITY, INCLUDING LIABILITY FOR INFRINGEMENT OF ANY PROPRIETARY RIGHTS, RELATING TO USE OR IMPLEMENTATION OR INFORMATION IN THIS SPECIFICATION.

THE PROVISION OF ANY USB SPECIFICATIONS TO YOU DOES NOT PROVIDE YOU WITH ANY LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS.

Entering into USB Adopters Agreements may, however, allow a signing company to participate in a reciprocal RAND-Z licensing arrangement for compliant products. For more information, please see:

http://www.usb.org/developers/docs/

http://www.usb.org/developers/develass/docs#approved

IEC DOES NOT TAKE ANY POSITION AS TO WHETHER IT IS ADVISABLE FOR YOU TO ENTER INTO ANY USB ADOPTERS AGREEMENTS OR TO PARTICIPATE IN THE USB IMPLEMENTERS FORUM."

# Universal Serial Bus Power Delivery Specification

iTex Syntaxos https://stapoxyos.iteh.ai)

Revision 3.0, V1.0. 11 December 2015

https://standards.iteh.ai/ a/al/extanda/ds/1c/6X6d48b-64c4-4370-a609-a7bbfb7a8bf9/iec-62680-1-2-2016

#### **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. ACON, Advanced-Connectek, Inc. Vicky Chuang 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

Ellisys Abel Astley **Chuck Trefts** Ellisys

**Emmanuel Durin** Ellisys

Mario Pasquali Ellisys

Etron Technology, Inc. Chien-Cheng Kuo

Jack Yang Etron Technology, Inc.

Richard Crisp Etron Technology, Inc.

Etron Technology, Inc. Shyanjia Chen

TsungTa Lu Etron Technology, Inc.

Fairchild Semiconductor Christian Klein

Fairchild Semiconductor Oscar Freitas

Souhib Harb Fairchild Semiconductor

Foxconn / Hon Hai AJ Yang

Fred Fons Foxconn / Hon Hai

Steve Sedio Foxconn / Hon Hai

Terry Little Foxconn / Hon Hai

Fresco Logic Inc. **Christopher Meyers** Fresco Logic Inc.

Tom Burton Fresco Logic Inc.

Dian Kurniawan Fresco Logic Inc.

Adam Rodriguez Google Inc.

Bob McVay

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. PD Chair/Device Policy Lead

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 Hewlett Packard** Roger Benson Ron Schooley **Hewlett Packard** Vaibhav Malik **Hewlett Packard** Walter Fry **Hewlett Packard Bob Dunstan** Intel Corporation Intel Corporation

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
Ronald Swartz Intel Corporation

Sarah Sharp Intel Corporation
Scott Brenden Intel Corporation
Sridharan Ranganathan Intel Corporation
Steve McGowan Intel Corporation
Tim McKee Intel Corporation

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

PD Chair/Protocol WG Lead

System Policy Lead

PD Chair/Compliance Lead

© USB-IF:2015

Thomas Watza 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.

Microchip Technology Inc.

Rich Wahler Microchip Technology Inc.

Ronald Kunin Microchip Technology Inc.

Shannon Cash

Anthony Chen

Dave Perchlik

David Voth

Geoff Shew

Jayson Kastens

Microsoft Corporation

Microsoft Corporation

Microsoft Corporation

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 Borngräber **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 NXP Semiconductors** Dong Nguyen 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

Tom Duffy ON Semiconductor

Craig Wiley Parade Technologies Inc.

Qualcomm, Inc.

Ricardo Pregiteer Power Integrations

Chris Sporck Qualcomm, Inc.

Craig Aiken Qualcomm, Inc.

George Paparrizos

Giovanni Garcea Qualcomm, Inc

James Goel Qualcomm, Inc

Joshua Warner Qualcomm, Inc

Narendra Mehta Qualcomm, Inc.

Qualcomm, Inc. Terry Remple

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

Rohm Co. Ltd.

Tatsuya Irisawa Ricoh Company Ltd.

Chris Lin Rohm Co. Ltd.

Akihiro Ono

Power Supply WG Lead

Cab Con WG Lead

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

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-Erigsson

Patrizia Milazzo ST-Ericsson

Christophe Lorin

ST-Microelectronics

John Bloomfield

ST-Microelectronics

Massimo Panzica ST-Microelectronics

Meriem Mersel ST-Microelectronics

Nathalie Ballot ST-Microelectronics

Nathalie Ballot

Pascal Legrand

ST-Microelectronics

ST-Microelectronics

ST-Microelectronics

Zongyao Wen Synopsys, Inc.

Joan Marrinan Tektronix

Kimberley McKay

Matthew Dunn

Teledyne-LeCroy

Tony Minchell

Anand Dabak

Bill Waters

Texas Instruments

Texas Instruments

Texas Instruments

Texas Instruments

Grant Ley Texas Instruments
Ingolf Frank Texas Instruments
Ivo Huber Texas Instruments

Physical Layer WG Lead

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.



Revision	Version	Comments	Issue Date
1.0	1.0	Initial release Revision 1.0	5 July, 2012
1.0	1.1	Including errata through 31-October-2012	31 October 2012
1.0	1.2	Including errata through 26-June-2013	26 June, 2013
1.0	1.3	Including errata through 11-March-2014	11 March 2014
2.0	1.0	Initial release Revision 2.0	11 August 2014
2.0	1.1	Including errata through 7-May 2015	7 May 2015
3.0	1.0	Initial release Revision 3.0	11 December 2015

#### INTELLECTUAL PROPERTY DISCLAIMER

THIS SPECIFICATION IS PROVIDED TO YOU "AS IS" WITH NO WARRANTIES WARRANTY WHATSOEVER, INCLUDING ANY OF MERCHANTABILITY, INFRINGEMENT, OR FITNESS FOR ANY PARTICULAR PURPOSE. THE AUTHORS OF SPECIFICATION DISCLAIM ALL LIABILITY, INCLUDING LIABILITY INFRINGEMENT OF  $\sqrt{A}NY$ **PROPRIETARY** RIGHTS. RELATING TO 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.

Please send comments via electronic mail to techsup@usb.org

For industry information, refer to the USB Implementers Forum web page at http://www.usb.org

All product names are trademarks, registered trademarks, or service marks of their respective owners.

Copyright © 2010-2015 Hewlett-Packard Company, Intel Corporation, LSI Corporation, Microsoft Corporation, Renesas, STMicroelectronics, and Texas Instruments

All rights reserved.