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# **USB-grænseflader for data og energi – Del 1-2: Fælles komponenter – USB-strømforsyningspecifikation**

Universal Serial Bus interfaces for data and power –  
Part 1-2: Common components – USB Power  
Delivery specification



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March 2026

ICS 29.220; 33.120; 35.200

Supersedes EN IEC 62680-1-2:2025

English Version

Universal Serial Bus interfaces for data and power - Part 1-2:  
Common components - USB Power Delivery specification  
(IEC 62680-1-2:2026)

Interfaces de bus universel en série pour les données et  
l'alimentation électrique - Partie 1-2: Composants communs  
- Spécification de l'alimentation électrique par port USB  
(IEC 62680-1-2:2026)

Schnittstellen des Universellen Seriellen Busses für Daten  
und Energie - Teil 1-2: Gemeinsame Komponenten - USB  
Stromversorgungs-Spezifikation (IEC 62680-1-2:2026)

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## **European foreword**

The text of document 100/4327/CDV, future edition 8 of IEC 62680-1-2, 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 62680-1-2:2026.

The following dates are fixed:

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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2029-03-31

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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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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 International Standard is based on the following documents:

Draft	Report on voting
100/4327/CDV	100/4380/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](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

# *Universal Serial Bus*

## *Power Delivery Specification*

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<i>Revision:</i>	<b>3.2</b>
<i>Version:</i>	<b>1.1</b>
<i>Release Date:</i>	<b>2024-10</b>

REVISION HISTORY

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
2.0	1.2	Including errata through 25-March-2016	25 March 2016
2.0	1.3	Including errata through 11-January-2017	11 January 2017
3.0	1.0	Initial release Revision 3.0	11 December 2015
3.0	1.0a	Including errata through 25-March-2016	25 March 2016
3.0	1.1	Including errata through 12-January-2017	12 January 2017
3.0	1.2	Including errata through 21-June-2018	21 June 2018
3.0	2.0	Including errata through 29-August-2019	29 August 2019
3.1	1.0	Including errata through May 2021	May 2021
3.1	1.1	Including errata through July 2021  This version incorporates the following ECNs: <ul style="list-style-type: none"> <li>• EPR Clarifications</li> <li>• Define AMS starting point</li> </ul>	July 2021
3.1	1.2	Including errata through October 2021  This version incorporates the following ECNs: <ul style="list-style-type: none"> <li>• Clarify use of Retries</li> <li>• Battery Capabilities</li> <li>• FRS timing problem</li> <li>• PPS power rule clarifications</li> <li>• Peak current support for EPR AVS APDO</li> </ul>	October 2021
3.1	1.3	This version incorporates the following ECNs: <ul style="list-style-type: none"> <li>• Robust EPR Source Operation</li> <li>• EPR Source Caps Editorial</li> <li>• SRC PPS behavior in low current request</li> <li>• Enter USB</li> </ul>	January 2022
3.1	1.4	Editorial changes  This version incorporates the following ECNs: <ul style="list-style-type: none"> <li>• Capabilities Mismatch Update</li> <li>• Chunking Timing Issue</li> <li>• OT Mitigation</li> </ul>	April 2022

Revision	Version	Comments	Issue Date
3.1	1.5	Editorial changes This version incorporates the following ECNs: <ul style="list-style-type: none"> <li>• Timer Description Corrections</li> <li>• Change Source_Info Requirements</li> <li>• AMS Update</li> </ul>	July 2022
3.1	1.6	Editorial changes This version incorporates the following ECNs: <ul style="list-style-type: none"> <li>• USB4@ V2 Updates</li> <li>• Data Reset Issues</li> <li>• Increase tSenderResponse</li> <li>• PPS Power Limit Bit Update</li> <li>• Support for Asymmetric Mode</li> <li>• Timer Description Corrections Revisited</li> </ul>	October 2022
3.1	1.7	Editorial Changes This version incorporates the following ECNs: <ul style="list-style-type: none"> <li>• Data Reset Invalid Reject Handling</li> <li>• Source request</li> <li>• Source Transition</li> <li>• EPR Entry</li> </ul>	January 2023
3.1	1.8	Editorial Changes This version incorporates the following ECNs: <ul style="list-style-type: none"> <li>• Slew rate exemption for Power Role Swap.</li> <li>• EUDO cable speed clarification.</li> <li>• Update to PPS Requirements.</li> <li>• Deprecate Interruptibility.</li> <li>• Section 7.3 restructure and update.</li> </ul>	April 2023
3.1	1.9	Editorial Changes	July 2023

Revision	Version	Comments	Issue Date
3.2	1.0	<p>This version incorporates the following ECNs:</p> <ul style="list-style-type: none"> <li>• VDM-use Conditions.</li> <li>• tTypeCSinkWaitCap.</li> <li>• tFirstSourceCap Clarification</li> <li>• Hard Reset Clarification.</li> <li>• Unrecognized Country Code</li> <li>• EPR Entry Process-1</li> <li>• SPR AVS Definition</li> <li>• EPR Power Rules Clarifications</li> </ul>	October 2023
3.2	1.1	<p>This version incorporates the following ECNs:</p> <ul style="list-style-type: none"> <li>• Power Transition time from EPR to PR_Swap</li> <li>• Capabilities Mismatch Update</li> <li>• Deprecate GotoMin and GiveBack Features and Update Power Reserve</li> <li>• EPR Entry requirements Clarification</li> <li>• EPRMDO and Entry Clarification.</li> <li>• Remove 10.2.4 power sharing between ports</li> <li>• Source PDP rating field clarifications</li> <li>• Source Power Rules update.</li> <li>• Source_Info Message Clarifications.</li> <li>• Correction to BMC description.</li> <li>• EPR Source cap clarification.</li> <li>• Delaying of VCONN Swap.</li> <li>• EPR_Request in SPR Mode.</li> <li>• Generic transition diagram.</li> <li>• Removing the usage of Ping message</li> <li>• Sink Standby</li> <li>• Source Info Support</li> </ul>	October 2024

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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 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 default 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 [\[USBBC 1.2\]](#) or [\[USB Type-C 2.4\]](#).

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 [\[USBBC 1.2\]](#), enabling new higher power use cases such as USB powered Hard Disk Drives (HDDs), laptops and monitors.

With USB Power Delivery the power direction is no longer fixed. This enables the product with the power (USB 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 Chargers are able to supply power to laptops and other Battery powered devices through their, traditional power providing, USB Ports.

USB Power Delivery enables Hubs (including Hubs embedded in other devices such as docks or monitors) 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. **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. The specification enables discovery of cable Capabilities such as supported speeds and current levels. Power Delivery enables alternative modes of operation by providing the mechanisms to discover, enter and exit Modes such as EPR Mode, USB4<sup>®</sup> Mode or Alternate Modes.

## 1.1 Overview

This specification defines how USB Devices can Negotiate for more current and/or higher or lower voltages over the USB cable (using the USB Type-C<sup>®</sup> CC wire as the communications channel) than are defined in the [\[USB 2.0\]](#), [\[USB 3.2\]](#), [\[USB4\]](#), [\[USB Type-C 2.4\]](#) 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<sub>BUS</sub>* and Negotiate with external power sources (e.g., Chargers).

In addition, it allows a Source and Sink to swap Power Roles such that a USB Device could supply power to the USB Host. For example, a display could supply power to a laptop to operate or charge its Battery. This specification also 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<sub>CONN</sub>* to a powered cable.

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

- Works seamlessly with legacy USB Devices.

- Minimizes potential damage from non-compliant cables (e.g., ‘Y’ cables etc.).
- Optimized for low-cost implementations.

This specification defines mechanisms to discover, enter and exit Alternate Modes defined either by a standard or by a particular vendor. These Alternate 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.

To facilitate optimum charging, the specification defines two mechanisms a USB Charger can Advertise for the device to use:

- 1) A list of Fixed Supply voltages each with a maximum current. The device selects a voltage and current from the list. This is the traditional model used by devices that use internal electronics to manage the charging of their Battery including modifying the voltage and current actually supplied to the Battery. The side-effect of this model is that the charging circuitry generates heat that can be problematic for small form factor devices.
- 2) A list of programmable voltage ranges, in SPR PPS Mode, each with a maximum current. The device requests a voltage (in 20mV increments) that is within the Advertised range and a maximum current. The USB PPS Charger delivers the requested voltage until the maximum current is reached at which time the USB PPS Charger reduces its output voltage so as not to supply more than the requested maximum current. During the high current portion of the charge cycle, the USB PPS Charger can be directly connected (through an appropriate safety device) to the Battery. This model is used by devices that want to minimize the thermal impact of their internal charging circuitry.
- 3) A list of adjustable voltage ranges, in SPR AVS Mode or EPR AVS Mode, each with a maximum current. The device requests a voltage (in 100mV increments) that is within the Advertised range and a maximum current. The USB AVS Charger delivers the requested voltage.

## 1.2 Purpose

The USB Power Delivery specification defines a power delivery system covering all elements of a USB system including USB Hosts, USB 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 in SPR Mode and 240W in EPR Mode. This specification is intended to be fully compatible with 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:

- [\[USB 2.0\]](#), [\[USB 3.2\]](#) in band requests for high power interfaces.
- [\[USBBC 1.2\]](#) mechanisms for supplying higher power (not mandated by this specification).
- [\[USB Type-C 2.4\]](#) mechanisms for supplying higher power.

Initial operating conditions remain the USB Default Operation as defined in [\[USB 2.0\]](#), [\[USB 3.2\]](#), [\[USB Type-C 2.4\]](#) or [\[USBBC 1.2\]](#).

- The DFP sources *vSafe5V* over *VBUS*.
- The UFP consumes power from *VBUS*.

This specification is intended as an extension to the existing [\[USB 2.0\]](#), [\[USB 3.2\]](#), [\[USB Type-C 2.4\]](#) 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 [\[USB 2.0\]](#), [\[USB 3.2\]](#), [\[USB Type-C 2.4\]](#) 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, illustrates possible design implementation.

## 1.3 Section Overview

This specification contains the following sections:

**Table 1.1 Section Overview**

Section	Description
<a href="#">Section 1, "Introduction"</a>	Introduction, conventions used in the document, list of terms and abbreviations, references, and details of parameter usage.
<a href="#">Section 2, "Overview"</a>	Overview of the document including a description of the operation of <i>PD</i> and the architecture.
<a href="#">Section 3, "USB Type-A and USB Type-B Cable Assemblies and Connectors"</a>	Mechanical and electrical characteristics of the cables and connectors used by <i>PD</i> . Section <b>Deprecated</b> . See <a href="#">[USBPD 2.0]</a> for legacy <i>PD</i> connector specification.
<a href="#">Section 4, "Electrical Requirements"</a>	Electrical requirements for <i>Dead Battery</i> operation and cable detection.
<a href="#">Section 5, "Physical Layer"</a>	Details of the <i>PD PHY Layer</i> requirements
<a href="#">Section 6, "Protocol Layer"</a>	<i>Protocol Layer</i> requirements including the <i>Messages</i> , timers, counters, and state operation.
<a href="#">Section 7, "Power Supply"</a>	Power supply requirements for both <i>Providers</i> and <i>Consumers</i> .
<a href="#">Section 8, "Device Policy"</a>	<i>Device Policy Manager</i> requirements. <i>Policy Engine Atomic Message Sequence (AMS)</i> diagrams and state diagrams
<a href="#">Section 9, "States and Status Reporting"</a>	<i>PDUSB Device</i> requirements including mapping of <i>VBUS</i> to USB states. <i>System Policy Manager</i> requirements including descriptors, events, and requests.
<a href="#">Section 10, "Power Rules"</a>	<i>PDP Rating</i> definitions for <i>PD</i> .
<a href="#">Section A, "CRC calculation"</a>	Example <i>CRC</i> calculations.
<a href="#">Section B, "Message Sequence Examples (Deprecated)"</a>	Scenarios illustrating <i>Device Policy Manager</i> operation. <b>Deprecated</b>
<a href="#">Section C, "VDM Command Examples"</a>	Examples of <i>Structured VDM</i> usage. Section <b>Deprecated</b> .
<a href="#">Section D, "BMC Receiver Design Examples"</a>	<i>BMC Receiver Design</i> Examples.
<a href="#">Section E, "FRS System Level Example"</a>	<i>FRS System Level</i> Example.

## 1.4.1 Precedence

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

In there is a conflict between a generic statement and a more specific statement, the more specific statement **Shall** apply.

## 1.4.2 Keywords

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

Table 1.2 Keywords

Keyword	Definition
<b>Conditional Normative</b>	<b>Conditional Normative</b> is a keyword used to indicate a feature that is mandatory when another related feature has been implemented. Designers are mandated to implement all such requirements, when the dependent features have been implemented, to ensure interoperability with other compliant devices.
<b>Deprecated</b>	<b>Deprecated</b> is a keyword used to indicate a feature, supported in previous releases of the specification, which is no longer supported.
<b>Discard</b>	See <b>Discarded</b> .
<b>Discarded</b>	<b>Discard</b> , <b>Discards</b> and <b>Discarded</b> are equivalent keywords indicating that a <i>Packet</i> when received <b>Shall</b> be thrown away by the <i>PHY Layer</i> and not passed to the <i>Protocol Layer</i> for processing. No <b>GoodCRC Message</b> <b>Shall</b> be sent in response to the <i>Packet</i> .
<b>Discards</b>	See <b>Discarded</b> .
<b>Ignore</b>	See <b>Ignored</b> .
<b>Ignored</b>	<b>Ignore</b> , <b>Ignores</b> and <b>Ignored</b> are equivalent keywords indicating <i>Messages</i> or <i>Message</i> fields which, when received, <b>Shall</b> result in no special action by the receiver. An <b>Ignored Message</b> <b>Shall</b> only result in returning a <b>GoodCRC Message</b> to acknowledge <i>Message</i> receipt. A <i>Message</i> with an <b>Ignored</b> field <b>Shall</b> be processed normally except for any actions relating to the <b>Ignored</b> field.
<b>Ignores</b>	See <b>Ignored</b> .
<b>Informative</b>	<b>Informative</b> is a keyword indicating text with no specific requirements, provided only to improve understanding.
<b>Invalid</b>	<b>Invalid</b> is a keyword when used in relation to a <i>Packet</i> indicates that the <i>Packet's</i> usage or fields fall outside of the defined specification usage. When <b>Invalid</b> is used in relation to an <i>Explicit Contract</i> it indicates that a previously established <i>Explicit Contract</i> which can no longer be maintained by the <i>Source</i> . When <b>Invalid</b> is used in relation to individual <i>K-codes</i> or <i>K-code</i> sequences indicates that the received <i>Signaling</i> falls outside of the defined specification.
<b>May</b>	<b>May</b> is a keyword that indicates a choice with no implied preference.
<b>May Not</b>	<b>May Not</b> is a keyword that is the inverse of <b>May</b> . Indicates a choice to not implement a given feature with no implied preference.
<b>N/A</b>	<b>N/A</b> is a keyword that indicates that a field or value is not applicable and has no defined value and <b>Shall Not</b> be checked or used by the recipient.
<b>Normative</b>	See <b>Shall</b> .
<b>Optional</b>	<b>Optional</b> , <b>Optionally</b> and <b>Optional Normative</b> are equivalent keywords that describe features not mandated by this specification. However, if an <b>Optional</b> feature is implemented, the feature <b>Shall</b> be implemented as defined by this specification.
<b>Optional Normative</b>	See <b>Optional</b> .
<b>Optionally</b>	See <b>Optional</b> .

Keyword	Definition
<b>Reserved</b>	<b>Reserved</b> is a keyword indicating bits, bytes, words, fields, and code values that are set-aside for future standardization. Their use and interpretation <b>May</b> be specified by future extensions to this specification and <b>Shall Not</b> be utilized or adapted by vendor implementation. A <b>Reserved</b> bit, byte, word, or field <b>Shall</b> be set to zero by the sender and <b>Shall</b> be <b>Ignored</b> by the receiver. <b>Reserved</b> field values <b>Shall Not</b> be sent by the sender and <b>Shall</b> be <b>Ignored</b> by the receiver.
<b>Shall</b>	<b>Shall</b> and <b>Normative</b> are equivalent keywords indicating a mandatory requirement. Designers are mandated to implement all such requirements to ensure interoperability with other compliant devices.
<b>Shall Not</b>	<b>Shall Not</b> is a keyword that is the inverse of <b>Shall</b> indicating non-compliant operation.
<b>Should</b>	<b>Should</b> is a keyword indicating flexibility of choice with a preferred alternative; equivalent to the phrase “it is recommended that...”.
<b>Should Not</b>	<b>Should Not</b> is a keyword is the inverse of <b>Should</b> ; equivalent to the phrase “it is recommended that implementations do not...”.
<b>Static</b>	<b>Static</b> is a keyword indicating that a field that never changes.
<b>Valid</b>	<b>Valid</b> is a keyword that is the inverse of <b>Invalid</b> indicating either a Packet or <i>Signaling</i> that fall within the defined specification or an <i>Explicit Contract</i> that can be maintained by the <i>Source</i> .

### 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) or are preceded by “0x” (e.g., 0xFF00) are hexadecimal values. Numbers not immediately followed by either a “b”, “B”, or “h” are decimal values.

Document references listed in [Table 1.3, "Document References"](#) are inclusive of all approved and published ECNs and Errata.

**Table 1.3 Document References**

Bookmark Reference	Title
[DP2C.2.1]	DisplayPort™ Alt Mode on USB Type-C Standard <a href="http://www.vesa.org">www.vesa.org</a> .
[IEC 60950-1]	IEC 60950-1:2005 Information technology equipment – Safety – Part 1: General requirements: Amendment 1:2009, Amendment 2:2013. <a href="http://www.iec.ch">www.iec.ch</a> .
[IEC 60958-1]	IEC 60958-1:2021 Digital Audio Interface Part:1 General. <a href="http://www.iec.ch">www.iec.ch</a> .
[IEC 62368-1]	IEC 62368-1:2018 Audio/Video, information, and communication technology equipment – Part 1: Safety requirements. <a href="http://www.iec.ch">www.iec.ch</a> .
[IEC 62368-3]	IEC 62368-3:2017 Audio/video, information, and communication technology equipment - Part 3: Safety aspects for DC power transfer through communication cables and ports <a href="http://www.iec.ch">www.iec.ch</a> .
[IEC 63002]	IEC 63002:2021 Interoperability specifications and communication method for external power supplies used with computing and consumer electronics devices <a href="http://www.iec.ch">www.iec.ch</a> .
[ISO 3166]	ISO 3166 international Standard for country codes and codes for their subdivisions. <a href="http://www.iso.org/iso/home/standards/country_codes.htm">http://www.iso.org/iso/home/standards/country_codes.htm</a> .
[TBT3]	see [USB4] Chapter 13 for Thunderbolt™ 3 device operation.
[UCSI]	USB Type-C Connector System Software Interface (UCSI) Specification <a href="https://www.usb.org/documents">https://www.usb.org/documents</a> .
[USB 2.0]	Universal Serial Bus 2.0 Specification, <a href="https://www.usb.org/documents">https://www.usb.org/documents</a> .
[USB 3.2]	Universal Serial Bus 3.2 Specification <a href="https://www.usb.org/documents">https://www.usb.org/documents</a> .
[USB Type-C 2.4]	Universal Serial Bus Type-C Cable and Connector Specification, <a href="https://www.usb.org/documents">https://www.usb.org/documents</a> .
[USB4]	Universal Serial Bus 4 Specification (USB4®), <a href="https://www.usb.org/documents">https://www.usb.org/documents</a> .
[USBBC 1.2]	Universal Serial Bus Battery Charging Specification plus Errata (referred to in this document as the Battery Charging specification). <a href="https://www.usb.org/documents">https://www.usb.org/documents</a> .
[USBPD 2.0]	Universal Serial Bus Power Delivery Specification, <a href="https://www.usb.org/documents">https://www.usb.org/documents</a> .
[USBPDCompliance]	USB Power Delivery Compliance Test Specification, <a href="https://www.usb.org/documents">https://www.usb.org/documents</a> .
[USBPDFirmwareUpdate 1.0]	Universal Serial Bus Power Delivery Firmware Update Specification, <a href="https://www.usb.org/documents">https://www.usb.org/documents</a> .
[USBTypeCAuthentication 1.0]	Universal Serial Bus Type-C Authentication Specification, <a href="https://www.usb.org/documents">https://www.usb.org/documents</a> .
[USBTypeCBridge 1.1]	Universal Serial Bus Type-C Bridge Specification, <a href="https://www.usb.org/documents">https://www.usb.org/documents</a> .

This section defines terms used throughout this document. For additional terms that pertain to the Universal Serial Bus, see Chapter 2, “Terms and Abbreviations,” in [USB 2.0], [USB 3.2], [USB Type-C 2.4] and [USBBC 1.2].

**Table 1.4 Terms and Abbreviations**

Term	Description
(A)PDO	Refers to both the <i>PDO</i> and <i>APDO</i> collectively.
AC Supply AC Supplied	Refers to the main AC power source typically provided to the wall AKA “mains”.
Active Cable	A cable with a <i>USB Type-C</i> plug on each end that incorporates data bus signal conditioning circuits. The cable supports the Structured VDM <i>Discover Identity Command</i> to expose its characteristics in addition to other Structured VDM <i>Commands</i> (Electronically Marked Cable see [USB Type-C 2.4]).
Active Cable VDO	VDO defining the Capabilities of an Active Cable.
Active Mode	A <i>Mode</i> which has been through the <i>Mode Entry</i> process but not the <i>Mode Exit</i> process.
Adjustable Voltage Supply	A power supply whose output voltage can be adjusted to an operating voltage within its Advertised range. These <i>Capabilities</i> are exposed by the <i>Adjustable Voltage Supply (AVS) APDO</i> (see Section 6.4.1.2.4, “Augmented Power Data Object (APDO)”). <b>Note:</b> Unlike the <i>SPR PPS</i> , the <i>SPR AVS</i> and <i>EPR AVS</i> do not support current limit.
Advertise	An offer made by a <i>Source</i> in the <i>Source_Capabilities/EPR_Source_Capabilities Message</i> (e.g., an <i>APDO</i> or <i>PDO</i> ).
Alternate Mode	Operation defined by a Vendor or Standard’s organization, which is associated with a <i>SVID</i> . The definition of <i>Alternate Modes</i> is outside the scope of USB-IF specifications. Entry to and exit from the <i>Alternate Mode</i> uses the <i>Mode Entry</i> and <i>Mode Exit</i> processes. As defined in [USB Type-C 2.4].
Alternate Mode Adapter	A <i>PDUSB Device</i> which supports <i>Alternate Modes</i> as defined in [USB Type-C 2.4]. <b>Note:</b> Since an <i>AMA</i> is a <i>PDUSB Device</i> , it has a single <i>UFP</i> that is only addressable by <i>SOP Packets</i> .
Alternate Mode Controller	A <i>DFP</i> that supports connection to <i>AMAs</i> as defined in [USB Type-C 2.4]. A <i>DFP</i> that is an <i>AMC</i> can also be a <i>PDUSB Host</i> .
AMA	See <i>Alternate Mode Adapter</i> .
AMC	See <i>Alternate Mode Controller</i> .
AMS	See <i>Atomic Message Sequence</i> .
APDO	See <i>Augmented Power Data Object</i> .
Assured Capacity Charger	As defined in [USB Type-C 2.4]. This maps to a <i>Charger</i> with one or more <i>Guaranteed Capability Ports</i> .
Assured Capacity Group	As defined in [USB Type-C 2.4]. This maps to a group of <i>Guaranteed Capability Ports</i> .
Atomic Message Sequence	A fixed sequence of <i>Messages</i> as defined in Section 8.3.2, “Atomic Message Sequence Diagrams” typically starting and ending in one of the following states: <i>PE_SRC_Ready</i> , <i>PE_SNK_Ready</i> or <i>PE_CBL_Ready</i> . An <i>AMS</i> is <i>Non-interruptible</i> .
Attach	Mechanical joining of the <i>Port Pair</i> by a cable.
Attached	USB Power Delivery <i>Ports</i> which are mechanically joined with USB cable.
Attachment	See <i>Attach</i> .
Augmented Power Data Object	<i>Data Object</i> used to expose a <i>Source Port's</i> or <i>Sink Port's</i> power <i>Capabilities</i> as part of a <i>Source_Capabilities/EPR_Source_Capabilities</i> or <i>Sink_Capabilities/EPR_Sink_Capabilities Message</i> respectively. An <i>SPR PPS Data Object</i> , <i>SPR AVS Data Object</i> and <i>EPR AVS Data Object</i> are defined.
AVS	See <i>Adjustable Voltage Supply</i> .
AVS Mode	A power supply, currently operating as an <i>AVS</i> , is said to be operating in <i>AVS Mode</i> .
Battery	A power storage device residing behind a <i>Port</i> that can either be a <i>Source</i> or <i>Sink</i> of power.

Term	Description
<i>Battery Slot</i>	A physical location where a <i>Hot Swappable Battery</i> can be installed. A <i>Battery Slot</i> might or might not have a <i>Hot Swappable Battery</i> present in a <i>Battery Slot</i> at any given time.
<i>Battery Supply</i>	A power supply that directly applies the output of a <i>Battery</i> to <i>VBUS</i> . This is exposed by the <i>Battery Supply PDO</i> (see <a href="#">Section 6.4.1.2.3, "Battery Supply Power Data Object"</a> ).
<i>BDO</i>	See <i>BIST Data Object</i> .
<i>BFSK</i>	See <i>Binary Frequency Shift Keying</i> .
<i>Bi-phase Mark Coding</i>	Modification of Manchester coding where each zero has one transition and a one has two transitions (see <a href="#">[IEC 60958-1]</a> ).
<i>Binary Frequency Shift Keying</i>	A <i>Signaling Scheme</i> now <b>Deprecated</b> in this specification. <i>BFSK</i> used a pair of discrete frequencies to transmit binary (0s and 1s) information over <i>VBUS</i> . See <a href="#">[USBPD 2.0]</a> for further details.
<i>BIST</i>	Built-In Self-Test - Power Delivery testing mechanism for the <i>PHY Layer</i> .
<i>BIST Data Object</i>	<i>Data Object</i> used by <i>BIST Messages</i> .
<i>BIST Mode</i>	A <i>BIST</i> receiver or transmitter test mode enabled by a <i>BIST Message</i> .
<i>BIST Carrier Mode</i>	A <i>BIST Mode</i> in which the <i>PHY Layer</i> sends out a <i>BMC</i> encoded continuous string of alternating "1"s and "0"s.
<i>BIST Test Data Mode</i>	A <i>BIST Mode</i> in which the <i>PHY Layer</i> sends out a <i>GoodCRC Message</i> and then enters a test mode where it sends no further <i>Messages</i> , except <i>GoodCRC Messages</i> , in response to received <i>Messages</i> .
<i>BIST Shared Capacity Test Mode</i>	A <i>BIST Mode</i> applicable only to a <i>Shared Capacity Group</i> of <i>Ports</i> where the maximum <i>Source Capabilities</i> are always offered on every <i>Port</i> , regardless of the availability of shared power i.e., all shared power management is disabled.
<i>BMC</i>	See <i>Bi-phase Mark Coding</i> .
<i>Cable Capabilities</i>	<i>Capabilities</i> offered by a <i>Cable Plug</i> .
<i>Cable Discovered</i>	USB Power Delivery <i>Ports</i> that have exchanged a <i>Message</i> and a <i>GoodCRC Message</i> response with a <i>Cable Plug</i> or a <i>VPD</i> using the USB Power Delivery protocol so that both the <i>Port</i> and the <i>Cable Plug</i> know that each is <i>PD Capable</i> and which <i>Revision</i> they each support.
<i>Cable Discovery</i>	See <i>Cable Discovered</i> .
<i>Cable Plug</i>	Term used to describe a <i>PD Capable</i> element in a <i>Multi-Drop</i> system addressed by <i>SOP' Packets</i> / <i>SOP" Packets</i> . Logically the <i>Cable Plug</i> is associated with a <i>USB Type-C</i> plug at one end of the cable. In a practical implementation, the electronics might reside anywhere in the cable.
<i>Cable Reset</i>	This is initiated by <i>Cable Reset Signaling</i> from the <i>DFFP</i> . It restores the <i>Cable Plugs</i> to their default, power up condition and resets the <i>PD</i> communications engine in the cable to its default state. It does not reset the <i>Port Partners</i> but does restore <i>VCONN</i> to its <i>Attachment</i> state.
<i>Cable VDO</i>	<i>VDO</i> returned by the <i>Cable Plug</i> containing <i>Cable Capabilities</i> .
<i>Capabilities</i>	Features supported by a product. These can include, for example, power levels supplied/needed, cable type, <i>Battery</i> support or <a href="#">[USB4]</a> support.
<i>Capabilities Mismatch</i>	Indication from the <i>Sink</i> that the <i>Source's Advertised Capabilities</i> don't match the <i>Sink's</i> needs.
<i>CC</i>	See <i>Configuration Channel</i> .
<i>Cert Stat VDO</i>	The <i>Cert Stat VDO</i> contains the <i>XID</i> assigned by USB-IF to the product before certification in binary format.
<i>Charge Through</i>	A mechanism for a <i>VCONN Powered USB Device (VPD)</i> to pass power and <i>CC</i> communication from one <i>Port</i> to the other without any interference or re-regulation.
<i>Charge Through Port</i>	The <i>USB Type-C</i> receptacle on a <i>USB Device</i> that is designed to allow a <i>Source</i> to be connected through the <i>USB Device</i> to charge a system to which it is <i>Attached</i> . Most common use is to allow a single <i>Port USB Host</i> to support a <i>USB Device</i> while being charged.
<i>Charger</i>	<i>Provider</i> whose primary purpose is to supply power to a <i>Consumer</i> or <i>Consumers</i> in order to charge their <i>Battery</i> .
<i>Chunk</i>	A <i>MaxExtendedMsgChunkLen</i> (26 byte) or less portion of a <i>Data Block</i> . <i>Data Blocks</i> can be sent either as a single <i>Message</i> or as a series of <i>Chunks</i> .

Term	Description
<i>Chunked</i>	See <i>Chunking</i> .
<i>Chunked Extended Message</i>	<i>Extended Message</i> which has been broken up into <i>Chunks</i> .
<i>Chunking</i>	The process of breaking up a <i>Data Block</i> larger than <i>MaxExtendedMsgLegacyLen</i> (26-bytes) into two or more <i>Chunks</i> .
<i>Chunking Layer</i>	Part of the <i>Protocol Layer</i> responsible for <i>Chunking</i> .
<i>CL</i>	See <i>Current Limit</i> .
<i>Cold Socket</i>	A <i>Port</i> that does not apply <i>vSafe5V</i> on <i>VBUS</i> until a <i>Sink</i> is <i>Attached</i> .
<i>Collision Avoidance</i>	Mechanisms to prevent simultaneous communication by the <i>Source</i> , <i>Sink</i> and <i>Cable Plug</i> on <i>CC</i> .
<i>Command</i>	Request and response pair defined as part of a <i>Structured Vendor Defined Message</i> (see <a href="#">Section 6.4.4.2, "Structured VDM"</a> ).
<i>Configuration Channel</i>	Single wire used by the <i>BMC PHY Layer Signaling Scheme</i> (see <a href="#">[USB Type-C 2.4]</a> ).
<i>Connect</i>	See <i>Connected</i> .
<i>Connected</i>	USB Power Delivery ports that have exchanged a <i>Message</i> and a <i>GoodCRC</i> <i>Message</i> response using the USB Power Delivery protocol so that both <i>Port Partners</i> know that each is <i>PD Capable</i> .
<i>Constant Voltage</i>	A constant voltage feature of an <i>SPR PPS Source</i> . The <i>SPR PPS Source</i> output voltage remains constant as the load changes up to its <i>Current Limit</i> .
<i>Consumer</i>	The capability of a <i>PD Port</i> (typically a <i>Device's UFP</i> ) to sink power from the power conductor (e.g., <i>VBUS</i> ). This corresponds to a <i>USB Type-C Port</i> with $R_d$ asserted on its <i>CC</i> wire.
<i>Consumer/Provider</i>	A <i>Consumer</i> with the additional capability to function as a <i>Provider</i> . This corresponds to a <i>Dual-Role Power Port</i> with $R_d$ asserted on its <i>CC</i> wire.
<i>Continuous BIST Mode</i>	The <i>BIST Mode</i> where the <i>Port</i> or <i>Cable Plug</i> being tested sends a continuous stream of test data.
<i>Contract</i>	An agreement on both power level and direction is reached between a <i>Port Pair</i> . A <i>Contract</i> could be explicitly <i>Negotiated</i> between the <i>Port Pair</i> or could be an implicit power level defined by the current <i>State</i> . While operating in Power Delivery mode there will always be either an <i>Explicit Contract</i> or <i>Implicit Contract</i> in place. The <i>Contract</i> can only be altered in the case of a <i>Negotiation/Re-negotiation</i> , <i>Power Role Swap</i> , <i>Fast Role Swap</i> , <i>Hard Reset</i> , <i>Error Recovery</i> or failure of the <i>Source</i> .
<i>Control Message</i>	A <i>Control Message</i> is defined as a <i>Message</i> with the <i>Number of Data Objects</i> field in the <i>Message Header</i> is set to zero. The <i>Control Message</i> consists only of a <i>Message Header</i> and a <i>CRC</i> .
<i>CRC</i>	<i>CRC</i> stands for Cyclic Redundancy Check. It is an error-detecting code used to determine if a block of data has been corrupted.
<i>CT-VPD</i>	See <i>VCONN Powered USB Charge Through Device</i> .
<i>Current Limit</i>	A current limiting feature of an <i>SPR PPS Source</i> . When a <i>Sink</i> operating in <i>SPR PPS</i> mode attempts to draw more current from the <i>Source</i> than the requested <i>Current Limit</i> value, the <i>Source</i> reduces its output voltage so the current it supplies remains at or below the requested value. <b>Note:</b> <i>Current Limit</i> is not supported by <i>SPR AVS</i> and <i>EPR AVS Sources</i> .
<i>CV</i>	See <i>Constant Voltage</i> .
<i>Data Block</i>	An <i>Extended Message Payload</i> data unit. The size of each type of <i>Data Block</i> is specified as a series of bytes up to <i>MaxExtendedMsgLen</i> bytes in length. This is distinct from a <i>Data Object</i> used by a <i>Data Message</i> which is always a 32-bit object.
<i>Data Message</i>	A <i>Data Message</i> consists of a <i>Message Header</i> followed by one or more <i>Data Objects</i> . <i>Data Messages</i> are easily identifiable because the <i>Number of Data Objects</i> field in the <i>Message Header</i> is always a non-zero value.
<i>Data Object</i>	A <i>Data Message Payload</i> data unit. This 32-bit object contains information specific to different types of <i>Data Message</i> . For example <i>Power</i> , <i>Request</i> , <i>BIST</i> , and <i>Vendor Data Objects</i> are defined.
<i>Data Reset</i>	Process which resets USB Communication.
<i>Data Role</i>	A <i>Port Partner</i> will be in one of two <i>Data Roles</i> ; either <i>DFP (USB Host)</i> or <i>UFP (USB Device)</i> .
<i>Data Role Swap</i>	Process of exchanging the <i>Data Roles</i> between <i>Port Partners</i> .
<i>Dead Battery</i>	A device has a <i>Dead Battery</i> when the <i>Battery</i> in a device is unable to power its functions.

Term	Description
<i>Default Contract</i>	An agreement on current at 5V is reached between a <i>Port Pair</i> based on <i>USB Type-C</i> current ( <a href="#">[USB Type-C 2.4]</a> ).
<i>Detach</i>	Mechanical unjoining of the <i>Port Pair</i> by removal of the cable.
<i>Detached</i>	USB Power Delivery <i>Ports</i> which are no longer mechanically joined with USB cable.
<i>Detaches</i>	See <i>Detach</i> .
<i>Device</i>	When lower cased (device), it refers to any USB product, either <i>USB Device</i> or <i>USB Host</i> . When in upper case refers to a <i>USB Device (Peripheral or Hub)</i> .
<i>Device Policy</i>	Policy applied across multiple <i>Ports</i> in a <i>Source</i> or <i>Sink</i> .
<i>Device Policy Manager</i>	Module running in a <i>Source</i> or <i>Sink</i> that applies <i>Device Policy</i> to each <i>Port</i> in the device, as <i>Local Policy</i> , via the <i>Policy Engine</i> .
<i>DFP</i>	See <i>Downstream Facing Port</i> .
<i>DFP VDO</i>	<i>VDO</i> returned by the <i>DFP</i> containing <i>Capabilities</i> .
<i>Differential Non-Linearity</i>	The difference between an ideal <i>LSB</i> step, and the real observable <i>LSB</i> step when the Power <i>Source</i> is operating in either <i>PPS</i> or <i>AVS</i> mode. A <i>DNL</i> of 0 indicates that the step is ideal. If <i>DNL</i> is positive the step is larger than the ideal <i>LSB</i> , and if it is negative then the step is smaller than ideal.
<i>Discovery Process</i>	<i>Command</i> sequence using <i>Structured Vendor Defined Messages</i> resulting in identification of the <i>Port Partner</i> and <i>Cable Plug</i> , and their supported <i>SVIDs</i> and <i>Alternate Modes</i> .
<b>DNL</b>	See <i>Differential Non-Linearity</i> .
<i>Downstream Facing Port</i>	Indicates the <i>Port's</i> position in the USB topology which typically corresponds to a <i>USB Host</i> root <i>Port</i> or <i>Hub</i> downstream <i>Port</i> as defined in <a href="#">[USB Type-C 2.4]</a> . At connection, the <i>Port</i> defaults to operation as the <i>Source</i> and as a <i>USB Host</i> (when <i>USB Communication</i> is supported).
<i>DPM</i>	See <i>Device Policy Manager</i> .
<i>DRD</i>	See <i>Dual-Role Data</i> .
<i>DRP</i>	See <i>Dual-Role Power</i> .
<i>Dual-Role Data</i>	Capability of operating as either a <i>DFP</i> or <i>UFP</i> .
<i>Dual-Role Data Port</i>	A <i>Port</i> capable of operating as <i>DRD</i> .
<i>Dual-Role Power</i>	Capability of operating as either a <i>Source</i> or <i>Sink</i> .
<i>Dual-Role Power Device</i>	A product containing one or more <i>Dual-Role Power Ports</i> that can operate as either a <i>Source</i> or a <i>Sink</i> .
<i>Dual-Role Power Port</i>	A <i>Port</i> capable of operating as a <i>DRP</i> .
<i>EM</i>	See <i>Extended Message</i> .
<i>End of Packet</i>	<i>K-code</i> marker used to delineate the end of a <i>Packet</i> .
<i>EOP</i>	See <i>End of Packet</i> .
<i>EPR</i>	See <i>Extended Power Range</i> .
<i>EPR AVS</i>	A power supply operating in <i>EPR Mode</i> whose output voltage can be adjusted to an operating voltage within its <i>Advertised</i> range. Unlike <i>SPR PPS</i> it does not support current limit. The <i>AVS Capabilities</i> are exposed by the <i>Adjustable Voltage Supply APDO</i> (see <a href="#">Section 6.4.1.2.4, "Augmented Power Data Object (APDO)"</a> ).
<i>EPR AVS Mode</i>	A <i>EPR Source</i> , currently operating in an <i>EPR AVS Contract</i> , is said to be operating in <i>EPR AVS Mode</i> .
<i>EPR Cable</i>	A cable which is rated to operate in both <i>SPR Mode</i> and <i>EPR Mode</i> .
<i>EPR Capabilities</i>	The <i>EPR Capabilities Messages</i> ( <a href="#">EPR_Source_Capabilities</a> and <a href="#">EPR_Sink_Capabilities</a> ) are <i>Extended Messages</i> with the first seven positions filled with the same <i>SPR (A)PDOs</i> returned by the <i>SPR Capabilities Messages</i> ( <a href="#">Source_Capabilities</a> and <a href="#">Sink_Capabilities</a> ) followed by the <i>EPR (A)PDOs</i> starting in the eighth position.
<i>EPR Capable</i>	A product which has the ability to operate in <i>EPR Mode</i> .

Term	Description
<i>EPR Mode</i>	A Power Delivery mode of operation where maximum allowable voltage is 48V. The <i>Sink</i> complies to the requirements of <a href="#">[IEC 62368-1]</a> for operation with a PS3 <i>Source</i> . The <i>Source</i> complies to the requirements of <a href="#">[IEC 62368-1]</a> for operation with a PS3 <i>Sink</i> . The cable complies with <a href="#">[IEC 62368-1]</a> . Entry into the <i>EPR Mode</i> requires that an <i>EPR Source</i> is <i>Attached</i> to an <i>EPR Sink</i> with an <i>EPR Cable</i> . The <i>EPR Source</i> will only enter the <i>EPR Mode</i> when requested to do so by the <i>Sink</i> and it has determined it is <i>Attached</i> to an <i>EPR Sink</i> with an <i>EPR Capable</i> cable. Only the <i>EPR_Source_Capabilities</i> and the <i>EPR_Request</i> Messages are allowed to <i>Negotiate EPR Explicit Contracts</i> . The <i>SPR Mode Messages</i> ( <i>Source_Capabilities</i> and <i>Request</i> ) are not allowed to be used while in <i>EPR Mode</i> .
<i>EPR (A)PDO</i>	<i>Fixed Supply PDO</i> that offers either 28V, 36V or 48V. <i>Adjustable Voltage Supply (AVS) APDO</i> whose Maximum voltage is the highest <i>Fixed Supply PDO</i> voltage in the <i>EPR_Source_Capabilities</i> Message and no more than 240W.
<i>EPR Sink</i>	A <i>Sink</i> that supports both <i>SPR Mode</i> and <i>EPR Mode</i> .
<i>EPR Sink Port</i>	A <i>Port</i> exposed on an <i>EPR Sink</i> .
<i>EPR Source</i>	A <i>Source</i> that supports both <i>SPR Mode</i> and <i>EPR Mode</i> .
<i>EPR Source Port</i>	A <i>Port</i> exposed on an <i>EPR Source</i> .
<i>Error Recovery</i>	<i>Port</i> enters the <i>ErrorRecovery</i> State as defined in <a href="#">[USB Type-C 2.4]</a> .
<i>Explicit Contract</i>	An agreement reached between a <i>Port Pair</i> as a result of the <i>Power Delivery Negotiation</i> process. An <i>Explicit Contract</i> is established (or continued) when a <i>Source</i> sends an <i>Accept</i> Message in response to a <i>Request</i> Message sent by a <i>Sink</i> followed by a <i>PS_RDY</i> Message sent by the <i>Source</i> to indicate that the power supply is ready. This corresponds to the <i>PE_SRC_Ready</i> State for a <i>Source Policy Engine</i> and the <i>PE_SNK_Ready</i> State for a <i>Source Policy Engine</i> . The <i>Explicit Contract</i> can be altered through the <i>Re-negotiation</i> process.
<i>Extended Capabilities</i>	An <i>Extended Message</i> containing <i>Capabilities</i> information.
<i>Extended Control Message</i>	An <i>Extended Message</i> containing control information only.
<i>Extended Message</i>	A <i>Message</i> containing <i>Data Blocks</i> . The <i>Extended Message</i> is defined by the <i>Extended</i> field in the <i>Message Header</i> being set to one and contains an <i>Extended Message Header</i> immediately following the <i>Message Header</i> .
<i>Extended Message Header</i>	Every <i>Extended Message</i> contains a 16-bit <i>Extended Message Header</i> immediately following the <i>Message Header</i> containing information about the <i>Data Block</i> and any <i>Chunking</i> being applied.
<i>Extended Power Range</i>	Extends the power range from a maximum of 100W ( <i>SPR</i> ) to a maximum of 240W ( <i>EPR</i> ). When operating in the <i>EPR Mode</i> , only <i>EPR</i> specific Messages (the <i>EPR_Source_Capabilities</i> Message and the <i>EPR_Request</i> Message) are used to <i>Negotiate Explicit Contracts</i> .
<i>External Supply</i>	Power supply external to the device. This could be powered from the wall or from any other power source.
<i>Fast Role Swap</i>	Process of exchanging the <i>Source</i> and <i>Sink Power Roles</i> between <i>Port Partners</i> rapidly due to the disconnection of an external power supply.
<i>Fast Role Swap Request</i>	An indication from an <i>Initial Source</i> to the <i>Initial Sink</i> that a <i>Fast Role Swap</i> is needed. The <i>Fast Role Swap Request</i> is indicated by driving the <i>CC</i> line to ground for a short period; it is not a <i>Message</i> or <i>Signaling</i> .
<i>First Explicit Contract</i>	The <i>Explicit Contract</i> that immediately follows an <i>Attach</i> , power on <i>Hard Reset</i> , <i>Power Role Swap</i> or <i>Fast Role Swap</i> event.
<i>Fixed Battery</i> <i>Fixed Batteries</i>	A <i>Battery</i> that is not easily removed or replaced by an end user e.g., requires a special tool to access or is soldered in.
<i>Fixed Supply</i>	A well-regulated fixed voltage power supply. This is exposed by the <i>Fixed Supply PDO</i> (see <a href="#">Section 6.4.1.2.1, "Fixed Supply Power Data Object"</a> )
<i>Frame</i>	Generic term referring to an atomic communication transmitted by <i>PD</i> such as a <i>Packet</i> , <i>Test Frame</i> or <i>Signaling</i> .
<i>FRS</i>	See <i>Fast Role Swap</i> .

Term	Description
<i>Guaranteed Capability Port</i>	A <i>Guaranteed Capability Port</i> is always capable of delivering its <b>Port Maximum PDP</b> and indicates this by setting its <b>Port Present PDP</b> to be the same as its <b>Port Maximum PDP</b> except when limited by the cable's <i>Capabilities</i> . This is a <b>Static</b> capability.
<i>Hard Reset</i>	This is initiated by <b>Hard Reset Signaling</b> from either <i>Port Partner</i> . It restores <i>VBUS</i> to <i>USB Default Operation</i> and resets the <i>PD</i> communications engine to its default <i>State</i> in both <i>Port Partners</i> as well as in any <i>Attached Cable Plugs</i> . It restores both <i>Port Partners</i> to their default <i>Data Roles</i> and returns the <i>VCONN Source</i> to the <i>Source Port</i> . A <i>DRP Source Port</i> operating as a <i>Source</i> will continue to operate as a <i>Source</i> .
<i>Host</i>	See <i>USB Host</i> .
<i>Hot Swappable Battery</i>	A <i>Battery</i> that is easily accessible for a user to remove or change for another <i>Battery</i> .
<i>Hub</i>	A <i>USB Device</i> that provides additional connections to the <i>USB</i> .
<i>ID Header VDO</i>	The <i>VDO</i> in a <b>Discover Identity Command</b> immediately following the <i>VDM Header</i> . The <i>ID Header VDO</i> contains information corresponding to the <i>Power Delivery Product</i> .
<i>Idle</i>	Condition on <i>CC</i> where there are no signal transitions within a given time window. See <a href="#">Section 5.8.6.1, "Definition of Idle"</a> .
<i>Implicit Contract</i>	An agreement on power levels between a <i>Port Pair</i> which occurs, not because of the <i>Power Delivery Negotiation</i> process, but because of a <i>Power Role Swap</i> or <i>Fast Role Swap</i> . <i>Implicit Contracts</i> are transitory since the <i>Port Pair</i> is required to immediately <i>Negotiate an Explicit Contract</i> after the <i>Power Role Swap</i> . An <i>Implicit Contract</i> <b>shall</b> be limited to <i>USB Type-C</i> current (see <a href="#">[USB Type-C 2.4]</a> ).
<i>Initial Sink</i>	<i>Sink</i> at the start of a <i>Power Role Swap</i> or <i>Fast Role Swap</i> which transitions to being the <i>New Source</i> .
<i>Initial Source</i>	<i>Source</i> at the start of a <i>Power Role Swap</i> or <i>Fast Role Swap</i> which transitions to being the <i>New Sink</i> .
<i>Initiator</i>	The initial sender of a <i>Command</i> request in the form of a query.
<i>Invariant PDOs</i>	A <i>Source Port</i> that offers <i>Invariant PDOs</i> will always <i>Advertise</i> the same <i>PDOs</i> except when limited by the cable.
<i>IoC</i>	The <i>Negotiated</i> current value as defined in <a href="#">[IEC 63002]</a> .
<i>IR Drop</i>	The voltage drop across the cable and connectors between the <i>Source</i> and the <i>Sink</i> as defined in <a href="#">[USB Type-C 2.4]</a> . It is a function of the resistance of the ground and power wire in the cable plus the contact resistance in the connectors times the current flowing over the path.
<i>K-code</i>	Special symbols provided by the 4b5b coding scheme. <i>K-codes</i> are used to signal <i>Hard Reset</i> and <i>Cable Reset</i> and delineate <i>Packet</i> boundaries.
<i>Local Policy</i>	Every <i>PD Capable</i> device has its own <i>Policy</i> , called the <i>Local Policy</i> that is executed by its <i>Policy Engine</i> to control its power delivery behavior. The <i>Local Policy</i> at any given time might be the default policy, hard coded or modified by changes in operating parameters or one provided by the system <i>USB Host</i> or some combination of these. The <i>Local Policy</i> <b>Optionally</b> can be changed by a <i>System Policy Manager</i> .
<i>LPS</i>	Limited Power Supply as defined in <a href="#">[IEC 62368-1]</a> .
<i>LSB</i>	An abbreviation for Least Significant Bit.
<i>Managed Capability Port</i>	A <i>Managed Capability Port</i> can have its <b>Port Present PDP</b> set to a different value than its <b>Port Maximum PDP</b> . Its <b>Port Present PDP</b> value can be dynamic and change during normal operation.
<i>Message</i>	The <i>Packet Payload</i> consisting of a <i>Message Header</i> for <i>Control Messages</i> and a <i>Message Header</i> and data for <i>Data Messages</i> and <i>Extended Messages</i> as defined in <a href="#">Section 6.2, "Messages"</a> .
<i>Message Header</i>	Every <i>Message</i> starts with a 16-bit <i>Message Header</i> containing basic information about the <i>Message</i> and the <i>PD Port's Capabilities</i> .
<i>Messaging</i>	Communication in the form of <i>Messages</i> as defined in <a href="#">Section 6, "Protocol Layer"</a> .
<i>Modal Operation</i>	Operation where there are one or more <i>Active Modes</i> . <i>Modal Operation</i> ends when there are no longer any <i>Active Modes</i> .
<i>Mode</i>	<i>Mode</i> is a general term used to describe a particular type of operation of a given device. Examples of modes are: <i>Alternate Mode</i> , <i>EPR Mode</i> , <i>SPR Mode</i> .

Term	Description
<i>Mode Entry</i>	Process to start operation in a particular <i>Mode</i> .
<i>Mode Exit</i>	Process to end operation in a particular <i>Mode</i> .
<i>Multi-Drop</i>	PD is a <i>Multi-Drop</i> system sharing the Power Delivery communication channel between the <i>Port Partners</i> and the cable.
<i>Negotiate</i>	See <i>Negotiation</i> .
<i>Negotiated</i>	See <i>Negotiation</i> .
<i>Negotiation</i>	This is the PD process whereby: <ol style="list-style-type: none"> <li>1) The <i>Source</i> Advertises its <i>Capabilities</i>.</li> <li>2) The <i>Sink</i> requests one of the <i>Advertised Capabilities</i>.</li> <li>3) The <i>Source</i> acknowledges the request, alters its output to satisfy the request and informs the <i>Sink</i>.</li> </ol> The result of the <i>Negotiation</i> is a <i>Contract</i> for power delivery/consumption between the <i>Port Pair</i> .
<i>New Sink</i>	<i>Sink</i> at the end of a <i>Power Role Swap</i> or <i>Fast Role Swap</i> which has transition from being the <i>Initial Source</i> .
<i>New Source</i>	<i>Source</i> at the end of a <i>Power Role Swap</i> or <i>Fast Role Swap</i> which has transition from being the <i>Initial Sink</i> .
<i>Non-interruptible</i>	There cannot be any unexpected <i>Messages</i> during an <i>AMS</i> ; it is therefore <i>Non-interruptible</i> . An <i>AMS</i> starts when the first <i>Message</i> in the <i>AMS</i> has been sent (i.e., a <i>GoodCRC</i> <i>Message</i> has been received acknowledging the <i>Message</i> ). See <a href="#">Section 8.3.2.1.3, "Atomic Message Sequences"</a> .
<i>OCP</i>	Over-Current Protection.
<i>OTP</i>	Over-Temperature Protection.
<i>OVP</i>	Over-Voltage Protection.
<i>Packet</i>	One entire unit of PD communication including a <i>Preamble</i> , <i>SOP*</i> , <i>Payload</i> , <i>CRC</i> and <i>EOP</i> as defined in <a href="#">Section 5.6, "Packet Format"</a> .
<i>Passive Cable</i>	Cable with a USB plug on each end at least one of which is a <i>Cable Plug</i> supporting <i>SOP'</i> that does not incorporate data bus signal conditioning circuits. Supports the <i>Structured VDM Discover Identity</i> to determine its characteristics (Electronically Marked Cable see <a href="#">[USB Type-C 2.4]</a> ). <b>Note:</b> This specification does not discuss <i>Passive Cables</i> that are not Electronically Marked.
<i>Passive Cable VDO</i>	VDO defining the <i>Capabilities</i> of a <i>Passive Cable</i> .
<i>Payload</i>	Data content of a <i>Packet</i> , provided to/from the <i>Protocol Layer</i> .
<i>PD</i>	USB Power Delivery
<i>PD Capable</i>	A <i>Port</i> that supports USB Power Delivery.
<i>PD Connection</i>	See <i>Connected</i> .
<i>PD Power</i>	The output power, in Watts, of a <i>Source</i> , as specified by the manufacturer and expressed in <i>Fixed Supply PDOs</i> as defined in <a href="#">Section 10, "Power Rules"</a> .
<i>PD SID</i>	See <i>USB-IF PD SID</i> .
<i>PDO</i>	See <i>Power Data Object</i> .
<i>PDP</i>	See <i>PD Power</i> .
<i>PDP Rating</i>	The <i>PDP Rating</i> is the same as the Manufacturer declared <i>PDP</i> for a <i>Source Port</i> except where there is a fractional value, in which case the <i>PDP Rating</i> corresponds to the integer part of the Manufacturer declared <i>PDP Rating</i> (see <a href="#">Section 6.4.11.2, "Port Maximum PDP Field"</a> ).
<i>PDUSB</i>	<i>USB Device Port</i> or <i>USB Host Port</i> that is both <i>PD Capable</i> and capable of <i>USB Communication</i> . See also <i>PDUSB Host</i> , <i>PDUSB Device</i> and <i>PDUSB Hub</i> .
<i>PDUSB Device</i>	A <i>USB Device</i> with a <i>PD Capable UFP</i> . A <i>PDUSB Device</i> is only addressed by <i>SOP Packets</i> .
<i>PDUSB Host</i>	A <i>USB Host</i> which is <i>PD Capable</i> on at least one of its <i>DFFPs</i> . A <i>PDUSB Host</i> is only addressed by <i>SOP Packets</i> .

Term	Description
<i>PDUSB Hub</i>	A port expander <i>USB Device</i> with a <i>UFP</i> and one or more <i>DFPs</i> which is <i>PD Capable</i> on at least one of its <i>Ports</i> . A <i>PDUSB Hub</i> is only addressed by <i>SOP Packets</i> . A self-powered <i>PDUSB Hub</i> is treated as a <i>USB Type-C Multi-Port Charger</i> .
<i>PDUSB Peripheral</i>	A <i>USB Device</i> with a <i>PD Capable UFP</i> which is not a <i>PDUSB Hub</i> . A <i>PDUSB Peripheral</i> is only addressed by <i>SOP Packets</i> .
<i>PE</i>	See <i>Policy Engine</i> .
<i>Peripheral</i>	A physical entity that is <i>Attached</i> to a USB cable and is currently operating as a <i>USB Device</i> .
<i>PHY Layer</i>	The Physical Layer responsible for sending and receiving <i>Messages</i> across the <i>USB Type-C CC</i> wire between a <i>Port Pair</i> .
<i>Policy</i>	<i>Policy</i> defines the behavior of <i>PD Capable</i> parts of the system and defines the <i>Capabilities</i> it <i>Advertises</i> , requests made to (re) <i>Negotiate</i> power and the responses made to requests received.
<i>Policy Engine</i>	The <i>Policy Engine</i> interprets the <i>Device Policy Manager's</i> input to implement <i>Policy</i> for a given <i>Port</i> and directs the <i>Protocol Layer</i> to send appropriate <i>Messages</i> .
<i>Port</i>	An interface typically exposed through a receptacle, or via a plug on the end of a hard-wired captive cable. USB Power Delivery defines the interaction between a <i>Port Pair</i> .
<i>Port Pair</i>	Two <i>Attached PD Capable Ports</i> .
<i>Port Partner</i>	A <i>Contract</i> is <i>Negotiated</i> between a <i>Port Pair</i> connected by a USB cable. These ports are known as <i>Port Partners</i> .
<i>Power Conductor</i>	The wire that delivers power from the <i>Source</i> to <i>Sink</i> . For example, USB's <i>VBUS</i> .
<i>Power Consumer</i>	See <i>Consumer</i> .
<i>Power Data Object</i>	<i>Data Object</i> used to expose a <i>Source Port's</i> or <i>Sink Port's</i> power <i>Capabilities</i> as part of a <i>Source_Capabilities</i> / <i>EPR_Source_Capabilities</i> or <i>Sink_Capabilities</i> / <i>EPR_Sink_Capabilities</i> <i>Message</i> respectively. <i>Fixed Supply</i> , <i>Variable Supply</i> and <i>Battery Supply Power Data Objects</i> are defined; <i>SPR Mode</i> uses all four while <i>EPR Mode</i> uses only <i>Fixed Supply</i> and <i>AVS PDOs</i> .
<i>Power Delivery Mode</i>	Operation after a <i>Contract</i> has initially been established between a <i>Port Pair</i> . This <i>Mode</i> persists during normal Power Delivery operation, including after a <i>Power Delivery Mode</i> . <i>Power Delivery Mode</i> can only be exited by <i>Detaching</i> the <i>Ports</i> , applying a <i>Hard Reset</i> or by the <i>Source</i> removing power (except when the <i>Initial Source</i> removes power from <i>VBUS</i> during the <i>Power Role Swap</i> procedure).
<i>Power Provider</i>	See <i>Provider</i> .
<i>Power Role</i>	A <i>Port Partner</i> will be in one of two <i>Power Roles</i> ; either <i>Source</i> or <i>Sink</i> .
<i>Power Role Swap</i>	Process of exchanging the <i>Source</i> and <i>Sink Power Roles</i> between <i>Port Partners</i> .
<i>Power Rules</i>	Define voltages and current ranges that are offered by compliant USB Power Delivery <i>Sources</i> and used by a USB Power Delivery <i>Sink</i> for a given value of PDP Rating. See <a href="#">Section 10, "Power Rules"</a> .
<i>PPS</i>	See <i>Programmable Power Supply</i> .
<i>PPS Mode</i>	An <i>SPR Source</i> , currently operating as an <i>PPS</i> , is said to be operating in <i>PPS Mode</i> .
<i>Preamble</i>	Start of a transmission which is used to enable the receiver to lock onto the carrier. The <i>Preamble</i> consists of a 64-bit sequence of alternating 0s and 1s starting with a "0" and ending with a "1" which is not 4b5b encoded.
<i>Product Type</i>	Product categorization returned as part of the <i>Discover Identity Command</i> .
<i>Product Type VDO</i>	<i>VDO</i> identifying a certain <i>Product Type</i> in the <i>ID Header VDO</i> of a <i>Discover Identity Command</i> .
<i>Product VDO</i>	The <i>Product VDO</i> contains identity information relating to the product.
<i>Programmable Power Supply</i>	A power supply, operating in <i>SPR Mode</i> , whose output voltage can be programmatically adjusted in small increments over its <i>Advertised</i> range and has a programmable output current fold back (note that the <i>SPR AVS</i> and <i>EPR AVS</i> does not). The <i>Capabilities</i> are exposed by the <i>SPR Programmable Power Supply APDO</i> (see <a href="#">Section 6.4.1.2.4, "Augmented Power Data Object (APDO)"</a> ).
<i>Protocol Error</i>	An unexpected <i>Message</i> during an <i>Atomic Message Sequence</i> . A <i>Protocol Error</i> during an <i>AMS</i> will result in either a <i>Soft Reset</i> or a <i>Hard Reset</i> .

Term	Description
<i>Protocol Layer</i>	The entity that forms the <i>Messages</i> used to communicate information between <i>Port Partners</i> .
<i>Provider</i>	A <i>PD Port</i> (typically a <i>USB Host</i> , <i>Hub</i> , or <i>Charger DFP</i> ) that can source power over the power conductor (e.g., <i>VBUS</i> ). This corresponds to a <i>USB Type-C Port</i> with $R_p$ asserted on its <i>CC</i> wire.
<i>Provider/Consumer</i>	A <i>Provider</i> with the additional capability to act as a <i>Consumer</i> . This corresponds to a <i>Dual-Role Power Port</i> with $R_p$ asserted on its <i>CC</i> wire.
<i>PS1</i> <i>PS2</i> <i>PS3</i>	Classification of electrical power as defined in <a href="#">[IEC 62368-1]</a> .
<i>PSD</i>	
<i>R<sub>a</sub></i>	
<i>R<sub>d</sub></i>	Prior to application of <i>VCONN</i> , a powered cable applies a pull-down resistor $R_a$ on its <i>VCONN</i> pin.
<i>R<sub>d</sub></i>	Pull-down resistor on the <i>USB Type-C CC</i> wire used to indicate that the <i>Port</i> is a <i>Sink</i> (see <a href="#">[USB Type-C 2.4]</a> ).
<i>RDO</i>	See <i>Request Data Object</i> .
<i>Re-attach</i>	<i>Attach</i> of the <i>Port Pair</i> by a cable after a previous <i>Detach</i> .
<i>Re-negotiate</i>	See <i>Re-negotiation</i> .
<i>Re-negotiated</i>	See <i>Re-negotiation</i> .
<i>Re-negotiation</i>	A process wherein one of the <i>Port Partners</i> wants to alter the <i>Negotiated Contract</i> .
<i>Request</i>	<i>Message</i> used by a <i>Sink Port</i> to <i>Negotiate</i> a <i>Contract</i> ; refers to either a <a href="#">Request/EPR_Request Message</a> .
<i>Request Data Object</i>	<i>Data Object</i> used by a <i>Sink Port</i> to <i>Negotiate</i> a <i>Contract</i> as a part of a <a href="#">Request/EPR_Request Message</a> .
<i>Responder</i>	The receiver of a <i>Command</i> request sent by an <i>Initiator</i> that replies with a <i>Command</i> response.
<i>Revision</i>	Major release of the USB Power Delivery specification. Each <i>Revision</i> will have various <i>Versions</i> associated with it.
<i>Revision 1.0</i>	<b>Deprecated</b> major <i>Revision</i> of the USB Power Delivery Specification.
<i>Revision 2.0</i>	Superseded major <i>Revision</i> of the USB Power Delivery Specification as defined in <a href="#">[USBPD 2.0]</a> , with which this specification is compatible.
<i>Revision 3.x</i>	Current major <i>Revisions</i> of the USB Power Delivery Specification.
$R_p$	Pull-up resistor on the <i>USB Type-C CC</i> wire used to indicate that the <i>Port</i> is a <i>Source</i> (see <a href="#">[USB Type-C 2.4]</a> ).
<i>Safe Operation</i>	<i>Sources</i> must have the ability to tolerate <b>vSafe5V</b> applied by both <i>Port Partners</i> .
<i>Shared Capacity Charger</i>	As defined in <a href="#">[USB Type-C 2.4]</a> . This maps to a <i>Charger</i> with multiple <i>Managed Capability Ports</i> .
<i>Shared Capacity Group</i>	As defined in <a href="#">[USB Type-C 2.4]</a> . This maps to a group with <i>Managed Capability Ports</i> .
<i>SID</i>	See <i>Standard ID</i> .
<i>Signaling</i>	A Preamble followed by an ordered set of four <i>K-codes</i> used to indicate a particular line symbol e.g., <i>Hard Reset</i> as defined in <a href="#">Section 5.4, "Ordered Sets"</a> .
<i>Signaling Scheme</i>	Physical mechanism used to transmit bits. Only the <i>BMC Signaling Scheme</i> is defined in this specification. <b>Note:</b> The <i>BFSK Signaling Scheme</i> supported in <i>Revision 1.0</i> of this specification has been <b>Deprecated</b> .
<i>Single-Role Port</i>	A <i>Port</i> that is only capable of operating either as a <i>Source</i> or <i>Sink</i> , but not both. E.g., the port is not a <i>DRP</i> .
<i>Sink</i>	The <i>Port</i> consuming power from <i>VBUS</i> ; most commonly a <i>USB Device</i> .
<i>Sink Capabilities</i>	<i>Capabilities</i> wanted by a <i>Sink</i> .
<i>Sink Directed Charge</i>	A charging scheme whereby the <i>Sink</i> connects the <i>Source</i> to its <i>Battery</i> through safety and other circuitry. When the <i>SPR PPS Current Limit</i> feature is activated, the <i>Source</i> automatically controls its output current by adjusting its output voltage.

Term	Description
<i>Sink Port</i>	<i>Port</i> operating as a <i>Sink</i> .
<i>Sink Standby</i>	During <i>Sink Standby</i> the <i>Sink</i> reduces its current draw to <i>iSnkStdby</i>
<i>Soft Reset</i>	A process that resets the <i>PD</i> communications engine to its default state.
<i>SOP</i>	<i>K-code</i> marker used for communication between <i>Port Partners</i> . See also <i>Start of Packet</i> .
<i>SOP Communication</i>	Communication using <i>SOP Packets</i> also implies that an <i>AMS</i> is being followed.
<i>SOP Packet</i>	Any Power Delivery <i>Packet</i> which starts with an <i>SOP</i> .
<i>SOP' Communication</i>	Communication with a <i>Cable Plug</i> using <i>SOP' Packets</i> , also implies that an <i>AMS</i> is being followed.
<i>SOP' Packet</i>	Any Power Delivery <i>Packet</i> which starts with an <i>SOP'</i> used to communicate with a <i>Cable Plug</i> .
<i>SOP'' Communication</i>	Communication with a <i>Cable Plug</i> using <i>SOP'' Packets</i> , also implies that an <i>AMS</i> is being followed.
<i>SOP'' Packet</i>	Any Power Delivery <i>Packet</i> which starts with an <i>SOP''</i> used to communicate with a <i>Cable Plug</i> when <i>SOP' Packets</i> are being used to communicate with the other <i>Cable Plug</i> .
<i>SOP'</i> <i>SOP''</i>	<i>K-code</i> marker used for communication between a <i>Port</i> and a <i>Cable Plug</i> . See also <i>Start of Packet</i> .
<i>SOP*</i>	Used to generically refer to <i>K-code</i> markers: <i>SOP</i> , <i>SOP'</i> and <i>SOP''</i> . See also <i>Start of Packet</i> .
<i>SOP* Communication</i>	Communication using <i>SOP* Packets</i> , also implies an <i>AMS</i> is being followed.
<i>SOP* Packet</i>	A term referring to any Power Delivery <i>Packet</i> starting with either <i>SOP</i> , <i>SOP'</i> , or <i>SOP''</i> .
<i>Source</i>	The <i>Power Role</i> a <i>Port</i> is operating in to supply power over <i>VBUS</i> ; most commonly a <i>USB Host</i> or <i>Hub</i> downstream port.
<i>Source Capabilities</i>	<i>Capabilities</i> offered by a <i>Source</i> .
<i>Source Port</i>	<i>Port</i> operating as a <i>Source</i> .
<i>Specification Revision</i>	See <i>Revision</i> .
<i>SPM</i>	See <i>System Policy Manager</i> .
<i>SPR</i>	See <i>Standard Power Range</i> .
<i>SPR AVS</i>	An <i>SPR Source</i> whose output voltage can be adjusted to an operating voltage within its <i>Advertised</i> range. Unlike <i>SPR PPS</i> , it does not support current limit. The <i>SPR AVS Capabilities</i> are exposed by the <i>SPR AVS APDO</i> (see <a href="#">Section 6.4.1.2.4.2, "SPR Adjustable Voltage Supply APDO"</a> ).
<i>SPR AVS Mode</i>	A <i>SPR Source</i> , currently operating in an <i>SPR AVS Contract</i> , is said to be operating in <i>SPR AVS Mode</i> .
<i>SPR Capabilities</i>	An <i>SPR Capabilities Message</i> ( <i>Source Capabilities Message</i> or <i>Sink Capabilities Message</i> ) has at least one <i>Power Data Object</i> for <i>vSafe5V</i> followed by up to 6 additional <i>Power Data Objects</i> .
<i>SPR Contract</i>	<i>Explicit Contract Negotiated</i> , in <i>SPR Mode</i> , based on <i>SPR (A)PDOs</i> .
<i>SPR Mode</i>	The classic mode of <i>PD</i> operation where <i>Explicit Contracts</i> are <i>Negotiated</i> using <i>SPR (A)PDOs</i> .
<i>SPR (A)PDO</i>	<i>Fixed Supply PDO</i> that offers up to 20V and no more than 100W. <i>Variable Supply PDO</i> whose Maximum voltage offers up to 21V and no more than 100W. <i>Battery Supply PDO</i> whose Maximum voltage offers up to 21V and no more than 100W. <i>Adjustable Voltage Supply (AVS) APDO</i> whose Maximum voltage is up to 20V and no more than 100W. <i>Programmable Power Supply (PPS) APDO</i> whose Maximum voltage is up to 21V and no more than 100W.
<i>SPR PPS</i>	A power supply whose output voltage and output current can be programmatically adjusted in small increments over its <i>Advertised</i> range. It supports current limit unlike <i>SPR AVS</i> and <i>EPR AVS</i> . The <i>Capabilities</i> are exposed by the <i>Programmable Power Supply APDOs</i> (see <a href="#">Section 6.4.1.2.4, "Augmented Power Data Object (APDO)"</a> ).
<i>SPR PPS Mode</i>	A power supply, currently operating in an <i>SPR PPS Contract</i> , is said to be operating in <i>SPR PPS Mode</i> .
<i>SPR Sink</i>	A <i>Sink</i> which only supports <i>SPR Mode</i> and does not support <i>EPR Mode</i> .
<i>SPR Sink Port</i>	A <i>Port</i> exposed on an <i>SPR Sink</i> .
<i>SPR Source</i>	A <i>Source</i> which only supports <i>SPR Mode</i> and does not support <i>EPR Mode</i> .

Term	Description
<i>SPR Source Port</i>	A <i>Port</i> exposed on an <i>SPR Source</i> .
<i>Standard ID</i>	16-bit unsigned value assigned by the USB-IF to a given industry standards organization's specification.
<i>Standard or Vendor ID</i>	Generic term referring to either a <i>VID</i> or a <i>SID</i> . <i>SVID</i> is used in place of the phrase "Standard or Vendor ID."
<i>Standard Power Range</i>	Only the <b>Source Capabilities</b> and the <b>Request Messages</b> are allowed to <i>Negotiate SPR Explicit Contracts</i> . The <b>EPR Messages</b> (the <b>EPR Source Capabilities Message</b> and the <b>EPR Request Message</b> ) are not allowed to be used while in <i>SPR Mode</i> .
<i>Start of Packet</i>	<i>K-code</i> marker used to delineate the start of a <i>Packet</i> .
<i>State</i>	<i>PD</i> state machine state as defined in <a href="#">Section 6.12, "State behavior"</a> and <a href="#">Section 8.3.3, "State Diagrams"</a> state machines.
<i>Structured VDM</i>	See <i>Structured Vendor Defined Message</i> .
<i>Structured VDM Header</i>	The <i>VDM Header</i> for a <i>Structured Vendor Defined Message</i> .
<i>Structured Vendor Defined Message</i>	A <i>Vendor Defined Message</i> where the contents and usage of bits 14...0 of the <i>VDM Header</i> are defined by this specification.
<i>SVDM</i>	See <i>Structured Vendor Defined Message</i> .
<i>SVID</i>	See <i>Standard or Vendor ID</i> .
<i>Swap Standby</i>	During <i>Swap Standby</i> the <i>Source</i> does not drive <i>VBUS</i> and the <i>Sink's</i> current draw does not exceed <b>iSnkSwapStdby</b> .
<i>System Policy</i>	Overall system <i>Policy</i> generated by the system, broken up into the policies required by each <i>Port Pair</i> to affect the <i>System Policy</i> . It is programmatically fed to the individual devices for consumption by their <i>Policy Engines</i> .
<i>System Policy Manager</i>	Module running on the <i>USB Host</i> . It applies the <i>System Policy</i> through communication with <i>PD Capable Consumers</i> and <i>Providers</i> that are also connected to the <i>USB Host</i> via USB.
<i>Test Frame</i>	<i>Frame</i> consisting of a <i>Preamble</i> , <i>SOP*</i> , followed by test data (See <a href="#">Section 5.9, "Built in Self-Test (BIST)"</a> ).
<i>Test Pattern</i>	Continuous stream of test data in a given sequence (See <a href="#">Section 5.9, "Built in Self-Test (BIST)"</a> ).
<i>Tester</i>	The <i>Tester</i> is assumed to be a piece of test equipment that manages the <i>BIST</i> testing process of a <i>PD UUT</i> .
<i>UFP</i>	See <i>Upstream Facing Port</i> .
<i>UFP VDO</i>	<i>VDO</i> returned by the <i>UFP</i> containing <i>Capabilities</i> .
<i>UI</i>	See <i>Unit Interval</i> .
<i>Unchunked</i>	See <i>Unchunked Extended Message</i> .
<i>Unchunked Extended Message</i>	<i>Extended Message</i> that has been transmitted whole without using <i>Chunking</i> .
<i>Unexpected Message</i>	<i>Message</i> that a <i>Port</i> supports but has been received in an incorrect <i>State</i> .
<i>Unit Interval</i>	The time to transmit a single data bit on the wire.
<i>Unit Under Test</i>	The <i>PD</i> device that is being tested by the <i>Tester</i> and responds to the initiation of a particular <i>BIST</i> test sequence.
<i>Unrecognized Message</i>	<i>Message</i> that a <i>Port</i> does not understand e.g., a <i>Message</i> using a <b>Reserved Message</b> type, a <i>Message</i> defined by a higher specification <i>Revision</i> than the <i>Revision</i> this <i>Port</i> supports, or an <i>Unstructured Vendor Defined Message</i> for which the <i>VID</i> is not recognized.
<i>Unstructured VDM</i>	See <i>Unstructured Vendor Defined Message</i> .
<i>Unstructured VDM Header</i>	The <i>VDM Header</i> for an <i>Unstructured Vendor Defined Message</i> .
<i>Unstructured Vendor Defined Message</i>	A <i>Vendor Defined Message</i> where the contents of bits 14...0 of the <i>VDM Header</i> are undefined.
<i>Unsupported Message</i>	<i>Message</i> that a <i>Port</i> recognizes but does not support. This is a <i>Message</i> defined by the specification, but which is not supported by this <i>Port</i> .

Term	Description
<i>Upstream Facing Port</i>	Indicates the <i>Port's</i> position in the USB topology typically a <i>Port</i> on a <i>Device</i> as defined in <a href="#">[USB Type-C 2.4]</a> . At connection, the <i>Port</i> defaults to operation as a <i>USB Device</i> (when <i>USB Communication</i> is supported) and <i>Sink</i> .
<i>USB Attached State</i>	Synonymous with the <a href="#">[USB 2.0]</a> and <a href="#">[USB 3.2]</a> definition of the <i>Attached</i> state
<i>USB Communication</i>	Transfer of USB data <i>Packets</i> as defined in <a href="#">[USB 2.0]</a> and <a href="#">[USB 3.2]</a> .
<i>USB Default Operation</i>	Operation of a <i>Port</i> at <i>Attach</i> or after a <i>Hard Reset</i> where the <i>DFP Source</i> applies <i>vSafe5V</i> on <i>VBUS</i> and the <i>UFP Sink</i> is operating at <i>vSafe5V</i> as defined in <a href="#">[USB 2.0]</a> , <a href="#">[USB 3.2]</a> , <a href="#">[USB Type-C 2.4]</a> or <a href="#">[USBBC 1.2]</a> .
<i>USB Device</i>	Either a <i>Hub</i> or a <i>Peripheral</i> device as defined in <a href="#">[USB 2.0]</a> , <a href="#">[USB 3.2]</a> and <a href="#">[USB4]</a> .
<i>USB Host</i>	The computer system where the <i>USB Host</i> controller is installed as defined in <a href="#">[USB 2.0]</a> , <a href="#">[USB 3.2]</a> and <a href="#">[USB4]</a> .
<i>USB Hub</i>	See <i>Hub</i> .
<i>USB Powered State</i>	Synonymous with the <a href="#">[USB 2.0]</a> and <a href="#">[USB 3.2]</a> definition of the powered state.
<i>USB Safe State</i>	State of the <i>USB Type-C</i> connector when there are pins to be re-purposed (see <a href="#">[USB Type-C 2.4]</a> ) so they are not damaged by and do not cause damage to their <i>Port Partner</i> .
<i>USB Type-A</i>	Term used to refer to any A plug or receptacle including USB Micro-A plugs and USB Standard-A plugs and receptacles. USB Micro-AB receptacles are assumed to be a combination of <i>USB Type-A</i> and <i>USB Type-B</i> .
<i>USB Type-B</i>	Terms used to refer to any B-plug or receptacle including USB Micro-B plugs and USB Standard-B plugs and receptacles, including the PD and non-PD versions. USB Micro-AB receptacles are assumed to be a combination of <i>USB Type-A</i> and <i>USB Type-B</i> .
<i>USB Type-C</i>	Term used to refer to the <i>USB Type-C</i> connector plug, or receptacle as defined in <a href="#">[USB Type-C 2.4]</a> .
<i>USB Type-C Multi-Port Charger</i>	A product that exposes multiple <i>USB Type-C Source Ports</i> for the purpose of charging multiple connected <i>USB Devices</i> as defined in <a href="#">[USB Type-C 2.4]</a> .
<i>USB-C<sup>®</sup> Port Control</i>	Module in a <i>PD Capable</i> device which controls <i>Attach/Detach</i> and either detects or sets the $R_p$ value.
<i>USB-IF PD SID</i>	Standard ID allocated to this specification by the USB Implementer's Forum.
<i>USB4<sup>®</sup> Mode</i>	Device is operating in a <i>Mode</i> as defined in <a href="#">[USB4]</a> .
<i>UUT</i>	See <i>Unit Under Test</i> .
<i>Variable Supply</i>	A poorly regulated power supply that is not a <i>Battery</i> . This is exposed by the <i>Variable Supply PDO</i> (see <a href="#">Section 6.4.2, "Request Message"</a> ).
<i>VBUS</i>	The <i>VBUS</i> wire delivers power from a <i>Source</i> to a <i>Sink</i> .
<i>VCONN</i>	Once the connection between <i>USB Host</i> and device is established, the <i>CC</i> pin (CC1 or CC2) in the receptacle that is not connected via the <i>CC</i> wire through the standard cable is re-purposed to source <i>VCONN</i> to power circuits in a <i>Cable Plug</i> , <i>VCONN Powered Accessory</i> or <i>VCONN Powered USB Device</i> (see <a href="#">[USB Type-C 2.4]</a> ).
<i>VCONN Powered Accessory</i>	An accessory that is powered from <i>VCONN</i> to operate in an <i>Alternate Mode</i> (see <a href="#">[USB Type-C 2.4]</a> ).
<i>VCONN Powered USB Charge Through Device</i>	A <i>CT-VPD</i> is a <i>VPD</i> with an additional port for connecting a <i>Source</i> (e.g., a <i>Charger</i> ) as defined in <a href="#">[USB Type-C 2.4]</a> . When no <i>Charger</i> is connected, a <i>CT-VPD</i> behaves as a <i>VPD</i> . When a <i>Charger</i> is connected, no <i>PD</i> communication to the <i>CT-VPD</i> itself is possible as <i>CC</i> is connected to the <i>Charger</i> port. Hence all <i>PD</i> communication then is with the <i>Charger</i> and the cable with which it is connected.

Term	Description
<i>VCONN Powered USB Device</i>	A captive cable <i>USB Device</i> that can be powered by either <i>VCONN</i> or <i>VBUS</i> as defined in <a href="#">[USB Type-C 2.4]</a> . A <i>VPD</i> is a captive cable <i>USB Device</i> that can be powered by either <i>VCONN</i> or <i>VBUS</i> and only responds to <i>SOP' Communication</i> as defined in the Tables in <a href="#">Section 6.12, "State behavior"</a> . It only responds to <i>Messages</i> sent with a <i>Specification Revision</i> of at least <i>Revision 3.x</i> . A <i>VPD</i> is not allowed to support <i>Alternate Modes</i> . The term <i>VPD</i> refers to either a <i>VPD</i> or a <i>CT-VPD</i> with no <i>Charger</i> connected.
<i>VCONN Source</i>	The <i>USB Type-C Port</i> responsible for sourcing <i>VCONN</i> .
<i>VCONN Swap</i>	Process of exchanging the <i>VCONN Source</i> between <i>Port Partners</i> .
<i>VDEM</i>	See <i>Vendor Defined Extended Message</i> .
<i>VDM</i>	See <i>Vendor Defined Message</i> .
<i>VDM Header</i>	The first <i>Data Object</i> following the <i>Message Header</i> in a <i>Vendor Defined Message</i> . The <i>VDM Header</i> contains the <i>SVID</i> relating to the <i>VDM</i> being sent and provides information relating to the <i>Command</i> in the case of a <i>Structured VDM</i> (see <a href="#">Section 6.4.4, "Vendor Defined Message"</a> ).
<i>VDO</i>	See <i>Vendor Data Object</i> .
<i>Vendor Data Object</i>	<i>Data Object</i> used to send <i>Vendor specific information</i> as part of a <i>Message</i> .
<i>Vendor Defined Extended Message</i>	<i>PD Extended Message</i> defined for <i>vendor/standards usage</i> . A <i>VDEM</i> does not define any structure and <i>Messages</i> can be created in any manner that the <i>vendor</i> chooses.
<i>Vendor Defined Message</i>	<i>PD Data Message</i> defined for <i>vendor/standards usage</i> . These are further partitioned into <i>Structured Vendor Defined Messages</i> , where <i>Commands</i> are defined in this specification, and <i>Unstructured Vendor Defined Messages</i> which are entirely <i>vendor defined</i> (see <a href="#">Section 6.4.4, "Vendor Defined Message"</a> ).
<i>Vendor ID</i>	16-bit unsigned value assigned by the <i>USB-IF</i> to a given <i>Vendor</i> .
<i>Version</i>	A minor release of the <i>USB Power Delivery specification</i> associated with a particular <i>Revision</i> . <i>Version</i> numbers are also defined in <i>VDMs</i> .
<i>VI</i>	Same as <i>power</i> (i.e., $\text{voltage} * \text{current} = \text{power}$ )
<i>VID</i>	See <i>Vendor ID</i> .
<i>VPD</i>	See <i>VCONN Powered USB Device</i> .

## 1.7 Parameter Values

The parameters in this specification are expressed in terms of absolute values. For details of how each parameter is measured in compliance please see [\[USBPDCompliance\]](#).

## 1.8 Changes from Revision 3.0

Extended Power Range (EPR) including Adjustable Voltage Supply (AVS) has been added.

## 1.9 Compatibility with Revision 2.0

This Revision of the *USB Power Delivery specification* is designed to be fully inter-operable with [\[USBPD 2.0\]](#) systems using *BMC Signaling* over the [\[USB Type-C 2.4\]](#) connector and to be compatible with *Revision 2.0 hardware*.

Please see [Section 2.3, "USB Power Delivery Capable Devices"](#) for more details of the mechanisms defined to enable compatibility.