



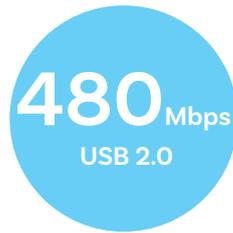
PD-Sync4

USER GUIDE

Contents

1	PD-Sync4 at a glance	3
2	Getting Started	4
2.1	Registration	4
2.2	Connecting to the mains	4
3	Charging without connecting to a host computer	4
4	Using when connected to a host computer	4
4.1	Charging	4
4.2	Data Transfer	4
4.3	Scalability - Syncing more than 15 devices	5
5	Manage Ports & Devices using Cambrionix Software	6
5.1	LiveViewer	6
5.2	Command Line Instructions (CLI)	7
5.3	Cambrionix API	8
6	Advanced Usage	8
6.1	Updating the PD-Sync4 firmware	8
6.1.1	Update procedure for MacOS	8
6.1.2	Update procedure for Windows	8
6.1.3	Running Updater Instructions	8
7	Specifications	9
8	Certifications	9
9	Safety Guidelines and Precautions	9

1 PDSync-4 at a glance



The PDSync-4 has been designed primarily for desktop use, being highly compact and quiet. It provides up to 60 Watts of charging power to each of its USB2.0 ports, allowing phones, tablets and laptops to be charged safely and reliably. Using Cambrionix software all ports can be controlled to allow charging and/or data transfer while monitoring important port and device information.

The PDSync-4 complies with USB-IF PD2.0 specifications and can charge Type-C USB devices at up to 60 Watts per port. Supplied with a standard 200 Watt power supply, the PDSync-4 can charge four downstream ports and one upstream (host) port (the latter of which supports power role reversal). The PDSync-4 also supports Battery Charging specification BC1.2 and Charging Downstream Port, allowing legacy Type-A devices to be charged simultaneously using cable convertors. The firmware can be updated to allow new charging profiles to be added, ensuring the PDSync-4 can charge the latest devices.

The PDSync-4 is supplied with an external power supply to minimize its desktop footprint. It is ready to charge out-of-the-box and to sync devices when attached to a host computer.

When a local (host) computer is attached, the host can control operation of the ports using freely available software. Devices can be charged, synchronised and monitored through Cambrionix's LiveViewer App, the Application Programming Interface (API) or Command Line Instructions. Cambrionix's free monitoring and control software can be downloaded from our website (<https://cambrionix.com>).

The PDSync-4 is fully compliant with High Speed USB2.0, allowing data transfer at up to 480Mbps when connected to a local computer. Multiple PDSync-4 can be connected to a single host computer to allow up to 85 USB2.0-compliant devices to be charged and synced simultaneously.

What's included

These items are required to use your PDSync-4 and are included in the box:

- The PDSync-4 unit (see Figure 1 below)
- A 200W Power Supply Unit (PSU)
- A mains cable appropriate for the country of use

Optional High-Speed Type-A to Type-A USB2.0 cables are available to purchase separately.

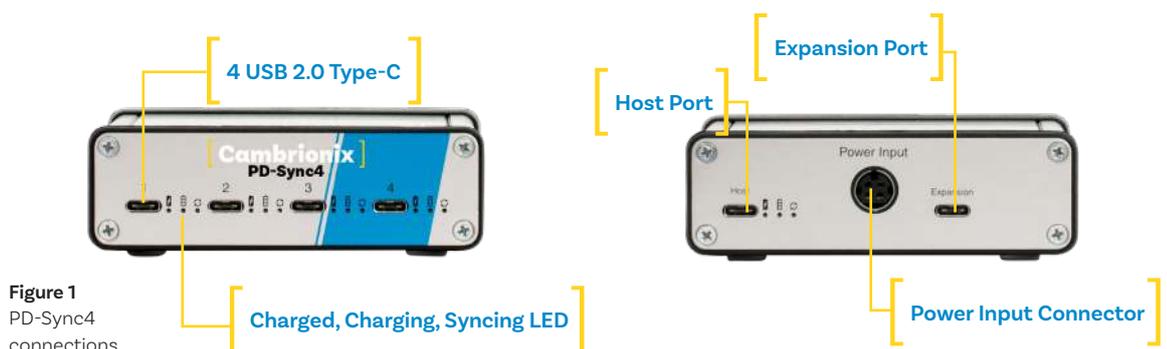


Figure 1
PD-Sync4
connections

2 Getting Started

2.1 Registration

You may register you and your product at <https://cambrionix.com> to download LiveViewer, our API and firmware updates.

2.2 Connecting to the mains

Connect the Power Supply Unit (PSU) to the PD-Sync4 using the 4-pin DIN plug. Connect the mains cable to the PSU. Making sure you adhere to local

safety regulations, connect the mains cable to the 100 – 250 Vac mains power outlet and switch the PD-Sync4 on using the small power switch located adjacent to the power input connector on the PD-Sync4. When the device is powered, all the LEDs will illuminate momentarily. When the lights are extinguished, the PDSync-4 is ready to charge attached devices

3 Charging without connecting to a host computer

When the device is powered and not connected to a local host computer it is automatically configured to charge downstream devices using its intelligent charging algorithm. Simply connect the devices to be charged to any of the available 4 downstream ports (not the Host Port) using USB2.0-compliant Type-C cables. Once the devices are connected, the algorithm will negotiate the highest charge rate allowable for each attached device.

Charging at the optimum rate (up to 60 Watts) will commence once negotiation is complete.

As the standard power supply is limited to 200 Watts, our algorithm either provides as much power as requested by the attached devices, or, if demand exceeds the 200 Watt limit, distributes the power uniformly across the downstream ports.

4 Using when connected to a host computer

4.1 Charging

When the PDSync-4 Host Port is connected to a local computer, the charge delivered to downstream devices will depend on the specification of the device attached. If the attached device does not comply with PD2.0 but complies with USB-IF Battery Charging specification BC1.2 and supports Charging Downstream Port (CDP), the PDSync-4 can provide high-speed charging at up to 1.5 A. If the connected device does not comply with PD2.0 or BC1.2, the charge current will be limited to 500 mA in compliance with USB specifications.

If the attached device supports Power Delivery PD2.0, the power delivery negotiation will take place as described in 4.1 above and devices will either receive the maximum power they request or be limited by the available power during data transfer. By default, the PDSync-4 provides 500 mA charge current at 5.2 Vdc through the host port to ensure data transfer is uninterrupted. However, the power provided to the host computer can be set using our software controls. As the total power available is limited to 200 Watts, any power used to charge the host diminishes the power available to charge downstream devices.

4.2 Data Transfer

If you wish to transfer data, change applications, restore or up-date your mobile device, a data connection to a local host computer is required. The PDSync-4 works independently to the Operating System (OS) and data transfer can be performed on all common operating systems, such as iOS, Android, Chromebook and Microsoft. Many versions of Linux are also supported.

In order to transfer data, connect your local (host) computer to the host port using a Type-C to Type-C USB2.0 compliant cable. Any devices connected to the PDSync-4 will now appear as if they were connected to the host computer's USB port. You can now use the programme of your choice to transfer data to and from your device. The PDSync-4 is fully compliant with High Speed USB2.0 and supports data transfer at speeds up to 480 Mbps. The orange LED will illuminate when the PDSync-4 is syncing.

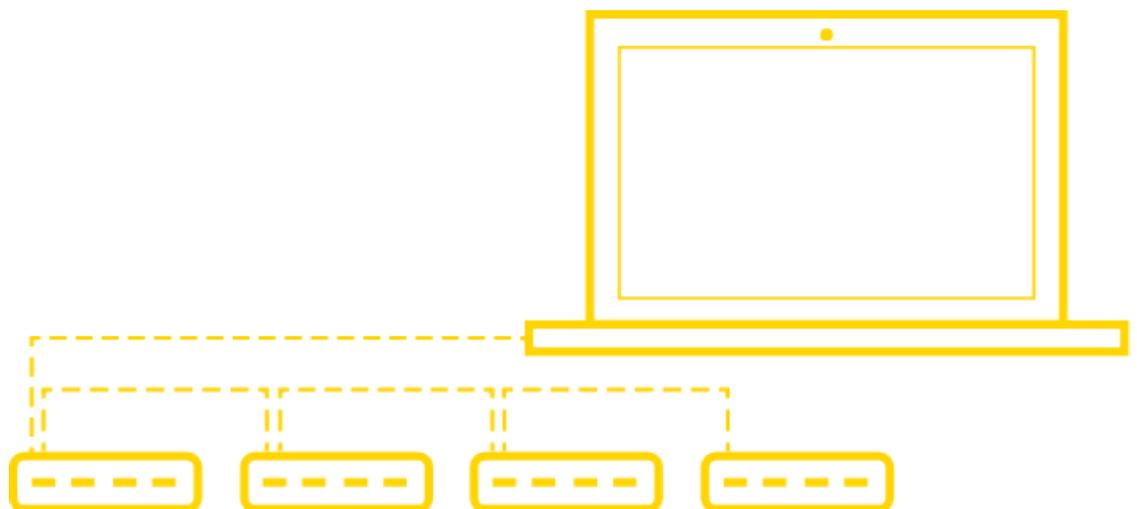
4.3 Scalability - Syncing more than 4 devices

If you wish to synchronise more than 4 devices, up to four PDSync-4s can be connected together (in a daisy-chain) to allow up to 16 devices to be managed from a single host computer simultaneously.

In order to daisy-chain multiple PDSync-4, each PDSync-4 needs to be connected to its power supply individually and the first PDSync-4 in the chain should be connected to the local computer through its host port. The host port of subsequent PDSync-4s in the daisy-chain must be connected to the expansion port of the previous PDSync-4.

Using this daisy-chain approach, a maximum of four PDSync-4s can be connected to a single host computer.

PD-Sync4 by their host ports as shown below.



Daisy-chain

5 Manage Ports & Devices using Cambrionix Software

More productivity, saving you time.

Cambrionix provides three interfaces by which the PD-Sync4 can be monitored and managed:

- [LiveViewer](#)
- [Cambrionix API](#)
- [Command Line Instructions](#)

5.1 LiveViewer

LiveViewer is an App that can be downloaded from <https://cambrionix.com>. Once downloaded and installed on the host computer, LiveViewer allows you to switch the ports on and off, set the port to charge only, or to sync mode.

LiveViewer's home page shows the following information about all the ports:

- **Status (attached/disconnected)**
- **Mode (Charge/Sync/Off)**
- **Profile (Charging profile)**
- **Duration (how long the device has been attached)**
- **End time (time the battery reaches a threshold (full) level)**
- **Current (instantaneous charge current in mA)**
- **Energy (present energy rate in Wh)**

Tick boxes adjacent to each port symbol allow that port mode to be changed. When the port is in Sync mode, only instantaneous current can be monitored through LiveViewer. When the port is in Charge mode, the charge profile, instantaneous current, energy rate, duration of charge and end time are displayed.

In addition to individual port information and control, LiveViewer displays the PD-Sync4 rail voltages, time since switched on, total instantaneous current and power, and temperature.

[Full instructions on LiveViewer are available on our website.](#)

5.2 Command Line Instructions (CLI)

Command Line Instructions can also be used to control and monitor the functions of the PD-Sync4 and attached devices over a VCP (Virtual COM Port). In order to use the command line interface a serial terminal emulator must be installed on the host computer.

Examples include Serial, ZTerm, PuTTY, and Minicom. Once you have installed your preferred terminal emulator, please connect to the device COM port using 115,200 baud, 8 data bits, No Parity, 1 Stop Bit. Once you get a command prompt, type “help” for a list of commands and their usage, as shown below:

Command	Action
mode <m> [p]	Set mode <m> for port [p] or all ports
mode c <p> [cp]	Set charge mode for a port <p> with optional profile [cp] to enter immediately
state [p]	Show state for port [p] or all ports
system	Show hardware and firmware information
health	Show voltages, temperature, errors and boot flag
cef	Clear error flags
sef [flags]...	Set error flags
crf	Clear rebooted flag
limits	Show voltage and temperature limits
list_profiles	List all profiles on system
en_profile <i> <1 0>	Enable (1) or disable (0) profile <i>
set_profiles <p> [l]	Set profiles <l> associated with port <p>
get_profiles <p>	List profiles associated with port <p>
sec [arm disarm]	Set or reveal security mode
host [auto manual]	Show if USB host is present, and set mode change
id	Show id string
bd	Board description
logc <s>	Report mA for each port every <s> seconds
loge [s]	Report state for all ports every [s] seconds and events as they occur
l	Live view (periodically updated screen showing system state)
remote [exit kexit]	Enter or exit mode where console is controlled by terminal
ledb <p> <row> <ptn>	Set individual LED on row <row>, port <p> to flash bit pattern <ptn>
leds <row> [ptnstr]	Set flash pattern of a string of LEDs on row <row> to string <ptnstr>
keys	Read key click event flags
lcd <row> <col> <str>	Write string <s> to LCD at row <row>, column <col>
clcd	Clear LCD
beep [ms]	Make console beep for [ms] milliseconds
cls	Clear terminal screen
reboot [watchdog]	Reboot (optionally by using watchdog timeout)
serial_speed [test fast slow]	Change serial interface speed
set_delays	Change internal delays
host [auto/manual/charge/sync/off]	Show if USB host is present, and set mode change

NOTES:	
[p] is port number.	Range 1..16. Omit for 'all'
<m> is port mode:	c=Charge, s=Sync, o=Off, b=Biassed
<l> is a list of profile IDs.	Blank to use all profiles.
<i> is a single profile ID.	
Parameters:	Optional parameters are shown in []. Compulsory in < >.
Tab key	Re-runs previous command.
Cursor up	recalls last command.

Typing “l” will give equivalent information to LiveViewer and, using the command “logc X”, will output the data to a log file every “X” seconds. This allows live data to be captured in an Excel file for storage.

To return to the prompt at any time, please type “q”. For further advice on using CLI to control your PD-Sync4, please contact **support@cambrionix.com**.

5.3 Cambrionix API

Cambrionix API allows you to monitor and control each port in more detail and to integrate these functions into your own workflow processes. The API comprises a daemon that can be downloaded from <https://cambrionix.com> and installed on the host machine. Port information and control can be provided through the API using JavaScript

Object Notation (JSON) Remote Procedure Calls (RPC) over TCP. JSON-RPC calls send a request to the API to “Get” port, device or PD-Sync4 information, or “Set” port functions (such as mode). A library of sample Python code can be obtained from <https://cambrionix.com> to help you integrate many of these functions into your process workflow alongside the full User Guide.

6 Advanced Usage

6.1 Updating the PD-Sync4 firmware

From time to time Cambrionix updates the PD-Sync4 firmware to ensure the device incorporates the latest features. In order to update the firmware on your PD-Sync4, please download the Cambrionix Updater and latest firmware file version appropriate for your host computer Operating System from <https://cambrionix.com>.

Please follow these instructions to ensure your PD-Sync4 has the latest version of the firmware installed.

6.1.1 Update procedure for MacOS

Locate and double-click the Cambrionix Updater application file (which has a .dmg file extension) downloaded from <https://cambrionix.com>. Then follow the instructions in 6.1.3 below:

6.1.2 Update procedure for Windows

Locate and double-click the Cambrionix Updater application file (which has a .zip file extension) downloaded from <https://cambrionix.com>. Right-click the .zip file and choose ‘Open with ‘Windows Explorer’ to show the contents of the compressed file. Double-click the .exe file within the compressed file to run the application and follow the below instructions:

MacOS: Double-click the Cambrionix Updater file and drag into your applications folder.

Windows: Double-click the Cambrionix Updater.

This will open the Cambrionix Updater window.

Click ‘Scan’ to list the Cambrionix products connected to your computer.

Click ‘File...’ to open a Finder/Explore window to allow you to navigate to and select the firmware file (which has a .enfir extension) previously downloaded.

The Cambrionix Updater window will now show one or more Cambrionix products as well as the firmware file selected to update the product(s). Please ensure each Update box is ticked for all products requiring updates.

Press ‘Go’ once all the products to update have been selected.

Please Note: The ‘Reboot’ checkbox should remain checked. This will reboot the Cambrionix product once the programming is successful.

6.1.3 Running Updater Instructions

7 Specifications

PD-Sync4

Input Voltage:	24Vdc
Input Current:	15A
Input Connection:	4-pin DIN
Output Voltage:	3V to 21V
Output Current:	Up to 3A per port
Output Power:	Up to 60W per port
Output Power (Total):	Up to 200W max

Input/Output Connectors:	1 x USB-C (host connector) 1 x USB-C (expansion connector) 4 x USB-C (downstream connectors for devices) 1 x 4-pin DIN
Ambient Operating Temperature Range:	0 ~ 35°C
Relative humidity:	5% to 95% non-condensing
Dimensions (approx.):	132mm long x 106mm wide x 34mm high
Approximate weight:	1.6 kg (inc PSU)

Power Supply

Input Voltage:	100-250Vdc
Input Current:	2.5A @ 115 Vac
Input Frequency:	50-60Hz
Input Connector:	C14
Output Voltage:	24V
Output Current:	8.5A
Output Power:	200W
Output Connector:	4-pin DIN

8 Certifications

- Independently safety tested by the Underwriters Laboratory (UL) under file #E346549
- CE Tested and marked
- CB Certificate
- FCC Part 15 Tested and marked
- RoHS Compliant
- China CCC certification
- Japanese PSE certification (pending)
- Complies with the latest EN60950 safety requirements for ITE
- Housed within a UL94-V0 specification fire enclosure

9 Safety Guidelines and Precautions

Please read and understand these guidelines prior to installation or use.

The PD-Sync4 has ESD, over-voltage, over-current and over-temperature protection. However, to use the equipment safely you should follow all local regulations relating to the use of electrical equipment and note that:

- Failure to install and operate the equipment in accordance with all local and these safety guidelines may result in unit failure, electrical shock and personal injury.
- The plug on the power cord is considered the “disconnect device” and consequently the mains outlet should be located near the TS2-16, easily accessible in case the power supply needs to be isolated from the mains power.
- If there is a liquid spillage over a ventilation slot, external data/power connector or product aperture, remove power from the unit without contacting the liquid immediately.

Important Electrical and Safety Messages

Safety warning	Potential consequence if ignored
Do not modify the product in any way.	Fire, electric shock or personal injury may occur.
Do not dismantle the product.	Fire, electric shock or personal injury may occur.
Do not bend, compress or drill into any part of the product.	Damage, electric shock or personal injury may occur.
Parts of Cambrionix products may become hot during operation. Do not obstruct air vents on the product or operate the product in an environment where the ambient temperature is outside the recommended operating temperature region.	An increased internal temperature may cause a fire.
Cambrionix products are not reverse-polarity protected. The power connections MUST be connected correctly. If in doubt, please contact Cambrionix.	Damage to your Cambrionix product may occur. A fire or electric shock may result.
Do not short circuit the Power Supply Unit (PSU) supplied with your Cambrionix product.	Sparks, fire or electric shock may result.
Ensure dust does not collect around the power plug pins or power socket, or in or around the air vents to the extent it causes a reduction in air circulation.	A fire may result if there is combustible material within the power socket or around the power plug, or if the internal temperature increases due to lack of air circulation.
Do not allow liquids to come into contact with the unit or power supply.	Fire, electric shock or personal injury may occur.
Keep the mains power socket (where the power cord is connected) unobstructed.	The power cord must be disconnected to cut off power to the product when an issue occurs. Note that the product may not be completely powered down by only using the power switch on the product.
Do not use a damaged power cord or plug, or a loose power socket.	An electric shock or fire may result.
Do not power multiple products from a single power socket.	Overheated power sockets may cause a fire.
Do not touch the power plug with wet hands.	An electric shock may result.
Insert the power plug all the way into the socket so that it is not loose.	An unsecured connection may cause a fire.
Connect the power plug to an earthed socket.	Failure to connect use an earthed socket may result in an electric shock or injury.
Do not bend or pull the power cord with force. Be careful not to leave the power cord underneath a heavy object.	Damage to the power cord may result in fire or electric shock.
Do not place the power cord near heat sources.	A fire or electric shock may result.
Only use the power cord provided (if applicable).	A fire or electric shock may result.
Only use the power supply provided with the product (if applicable).	A fire or electric shock may result.
Do not disconnect the power cord while the product is being used.	The product may become damaged by electric shock.
Cambrionix OEM modules are susceptible to Electrostatic Discharge (ESD). OEM modules should be handled in an ESD safe area.	Damage to your Cambrionix OEM module may occur.
There are sharp edges, corners and components. Suitable protective equipment must be worn during handling of Cambrionix OEM modules.	Personal injury may occur.
No power supply is shipped with a Cambrionix OEM module. Please contact your power supply manufacturer directly for safety related information.	Fire, electric shock or personal injury may occur. Please see the installation instructions for your Cambrionix product for correct wiring requirements.
When mounting a Cambrionix OEM module, all mounting holes should be used with appropriate spacers, screws and a torque level of 1.1Nm.	Damage or personal injury may occur.



This product can expose you to chemicals, including Nickel, which is known to the State of California to cause cancer or birth defects or other reproductive harm. For more information, go to www.p65Warnings.ca.gov

If in any doubt about how to correctly operate or maintain your Cambrionix system product or OEM module, or if any part of this safety document is unclear or confusing, please do not use your product and contact Cambrionix before proceeding further.



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