Cambrionix
CHARGE • CONNECT • MANAGE

SuperSync15
USER GUIDE

[**Charge**] [**Connect**] [**Manage**]

Contents

1 SuperSync15 at a glance

15 PORTS

5 Gbps USB 3.0

10 Watts (2.1 A) per port

SW Control & Monitoring

The SuperSync15 has been designed primarily for desktop use, being highly compact and quiet. It provides 10 Watts of charging power to each of its 15 5 Gbps USB3.0 ports, allowing mobile devices to be charged quickly, safely and reliably. All ports can be controlled using Cambrionix software to allow charging and/or data transfer while monitoring important port and device information.

The SuperSync15 can charge attached USB devices without using a local computer and our intelligent charging algorithm allows almost any device to be charged at its optimum rate (up to 2.1A per port). The firmware can be up-dated to allow new charging profiles to be added, ensuring the SuperSync can charge the latest devices. The SuperSync 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.

Device charging and synchronisation can be monitored through Cambrionix's LiveViewer App, the Application Programming Interface (API) or Command Line Interface (CLI). Cambrionix's free monitoring and control software can be downloaded from (**https://www.cambrionix.com/software**).

The SuperSync15 is fully compliant with SuperSpeed USB3.0, allowing data transfer at up to 5 Gbps when connected to a local computer. Multiple SuperSync can be connected to a single host computer to allow more than 15 USB3.0-compliant devices to be charged and synced simultaneously.

What's included

These items are required to use your SuperSync15 and are included in the box:

- **The SuperSync15 unit (see Figure 1 below)**
- **A 180W Power Supply Unit (PSU)**
- **A mains cable appropriate for the country of use**

Optional High-Speed Type-A to Type-A USB3.0 cables are available to purchase separately.

15 x USB 3.2 ports
Host Port
Power Switch
Power Input Connector
Power Indicator LED
73mm
198.4mm
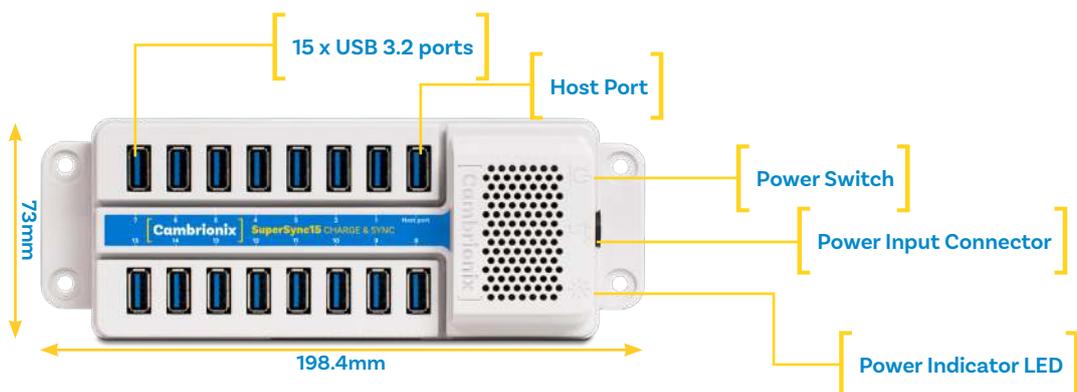
Figure 1
SuperSync15 connections

2 Getting Started

2.1 Getting Started

Everything you need to get your USB hub up and running can be found on our website.
Visit **https://www.cambrionix.com/help** for all the getting started information you need including our software, user guides or raise a support ticket

2.2 Connecting to the mains

Connect the Power Supply Unit (PSU) to the SuperSync15 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 SuperSync15 on using the small power switch located adjacent to the power input connector on the SuperSync15. When the device is switched on, a red LED will be illuminated. The SuperSync15 is now ready to charge attached devices.

2.3 Previous versions of Windows

If you are using a version of Microsoft Windows prior to Windows 10 you will need to install Cambrionix CDC drivers for enabling the full functionality of the SuperSync15.

To install the drivers please detach the SuperSync15 from the PC before executing the downloaded installer. The installer will prompt you for permission to install drivers signed by Cambrionix, please agree to this.

Once the installer has completed the installation of the drivers you may attach your SuperSync15. Download the file at: **http://bit.ly/SS15sWin**

3 Charging without connecting to a host computer

When the SuperSync15 is switched on and is not connected to a local host computer it is automatically configured to charge devices using its intelligent charging algorithm. Simply connect the devices to be charged to any of the available 15 ports (not the Host Port) using USB3.0-compliant cables.

Once the devices are connected, the algorithm will detect the highest charge rate allowable for each attached device. Charging at the optimum rate (up to 2.1 A) specified by the manufacturer will commence once profiling is complete. Depending on the state of charge of the device attached, this may take tens of seconds.

4 Using when connected to a host computer

4.1 Charging

When the SuperSync15 Host Port is connected to a local computer, the SuperSync15 defaults to Sync mode and charge currents are determined according to USB Implementers Forum (USB-IF) Super-Speed USB3.0 specifications. If the attached device complies with USB-IF Battery Charging specification BC1.2 and supports Charging Downstream Port (CDP), the SuperSync15 can provide high-speed charging at up to 1.5 A. If the connected device does not comply with BC1.2, the charge current will be limited to 500 mA in compliance with USB specifications.

If a higher charge rate (2.1 A) is required to sync Apple products (only), the NVRAM settings of the SuperSync15 must be changed.

Please contact support@cambrionix.com for information and advice on how to do this

4.2 Data Transfer

If you wish to transfer data, change applications, restore or update your mobile device, a data connection to a local host computer is required. The SuperSync15 works independently to the Operating System (OS) and data transfer can be performed to all common mobile operating systems, such as iOS, Android, Chromebook and

Microsoft. In order to transfer data, connect the host port to your local (host) computer using a Type-A to Type-A USB3.0 compliant cable. Any devices connected to the SuperSync15 will now appear as if they were connected to the host computer's USB port. The SuperSync15 is fully compliant with Super-Speed USB3.0 and supports data transfer at speeds up to 5Gbps. The red power LED may flicker when the SuperSync15 is syncing to indicate internal processor activity.

You can now use the programme of your choice to transfer data to and from your device. If the attached device has a BC1.2 compliant CDP port, the device can draw up to 1.5A while transferring data.

### 4.3 Scalability – Syncing more than 15 devices

If you wish to synchronise more than 15 devices, multiple SuperSync15 can be connected together (either in a star topology or daisy-chained) to allow more devices to be managed from a single host computer simultaneously.

Each SuperSync15 needs to be connected to mains power individually and the first SuperSync15 in the chain should be connected to the local computer through the SuperSync15's host port.

Five additional SuperSync15 can be attached to the downstream USB ports of the first SuperSync15 by their host ports as shown in the graphic across.

This star topology allows you to connect up to 85 devices for charging and syncing from a single computer.

Alternatively, a simpler daisy-chain arrangement can be used for connecting five SuperSync15 hubs, allowing 71 devices to be managed from a single host computer.

Each unit
15
PORTS

Sync up to
85
DEVICES
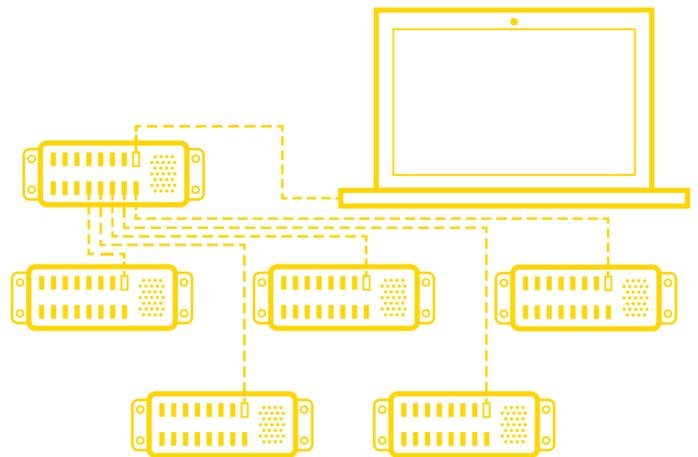
Star topology
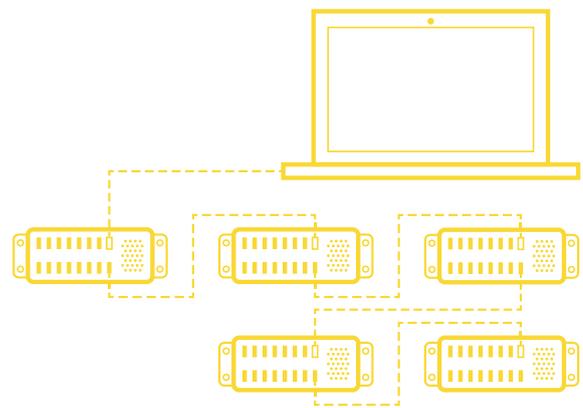
Daisy-chain

4.4 Endpoint limitations to scalability

Although multiple SuperSync15s can be connected to a single host computer to allow many devices to be managed simultaneously, the number of USB3.X devices that can be addressed when communicating using USB3 is usually limited by the host computer USB3 eXtensible Host Controller Interface (xHCI).

Host controllers used in most USB3-compliant computers:
- Detect the attachment and removal of devices
- Manage the flow of data from the host, translating data sent by the PC to the Host Controller into a USB-readable format and queuing data requests appropriately
- Manage and control the Root Hub
- Provide and manage power supply
- Monitor bus activity

Integral to the Host Controller is a Root hub that:
- Manages USB hubs and their ports
- Enumerates devices and additional hubs attached to their downstream ports
- Creates Physical Device Objects (PDOs) for the enumerated devices and hubs

USB communications can be considered as messages sent along discrete channels that connect the Host Controller to an addressable buffer – called an endpoint. The endpoint stores data received from the host and holds data ready for transmission to the host. Most USB devices have multiple endpoints and each endpoint has a separate channel.

When a USB device is first connected to a host, an enumeration process is initiated. During enumeration the host controller assigns the device an address, the device assigns and sends the ndpoint address to the Host, descriptors (which provide information about the device) are read by the Host and a device driver is assigned and loaded. Data transfer can only begin when enumeration is complete.

When data is about to be sent from one device to another, the device address and endpoint number are sent by the Host as a "token packet". This token packet forms part of the data string (or message) and because USB3.0 devices are allocated both USB2 (EHCI) and USB3 (xHCI) endpoints each USB3.0 device consumes three times as much memory as a USB2.0 device. Consequently, the maximum number of USB3 devices that can be enumerated tends to be limited by system memory in the host computer. Typically, most USB3.0, 3.1 xHCI controllers are limited to 96 endpoints, which determines the maximum number of devices that can be enumerated by the xHCI controller.

For USB2.0 the situation is different. In this case the address field used to identify devices attached to the USB root hub is 7 bits long and therefore allows 127 different addresses to be recognised. Each device connected to the root hub is given this address by the host computer and up to 127 USB2.0 devices can therefore be addressed by a USB2.0 root hub. Some of these addresses are used potentially within the host computer and some are used by the Cambrionix hubs, so the maximum number of devices that can be enumerated is typically around 120 devices.

4.41 Endpoint limit fix

Cambrionix provides a USB Limit Fix for MacOS devices only. This fix, which can be downloaded from **https://hub.cambrionix.com**, disables the xHCI controller and confines communications to the USB 2.0 port at 480 Mbps. By disabling the USB 3.0 controller, a total of 127 devices can be connected to the port.

5   Manage Ports, devices, and updating your USB hub

More productivity, saving you time.

Cambrionix provides three interfaces to monitor and manage your hub:

- **LiveViewer**
- **Cambrionix API**
- **Command Line Instructions**

5.1 LiveViewer

LiveViewer is a simple app-based management of your devices and USB hub. It's available to download free from our website:

 https://www.cambrionix.com/liveviewer.

It enables you to monitor and manage ports and all the devices individually or together:

Device and Port Control

Control and monitor power and data to every downstream port. Easily switch between modes (Charge/Sync/Off).

Charging Profiles

Adapt and change charging profiles per port or the whole USB hub.

Battery Health

Check battery health and device charging performance.

Battery Capacity

Check devices battery capacity to receive and hold a charge.

Monitor

Monitor speed of control and easily switch between charge and sync.

Numbers

Check mobile devices IMEI, OS version, manufacturer and more.

Charge Information

Duration. How long the device has been attache

End time. Time the battery reaches a threshold (full) level

Current. Instantaneous charge current in mA)

Energy. Present energy rate in Wh)

Hub health information

In addition to individual port information and control, LiveViewer displays the TS3-16 rail voltages, time since switched on, total instantaneous current and power, and temperature.

Updating your USB hub

Firmware and software updates - automatically.

As part of delivering an easy user experience our LiveViewer application is now a set-and-forget solution.

The LiveViewer application will find out what software your USB hub has and present an update for you, ready to just hit install.

This now makes keeping your USB up-to-date even easier.

5.2 Command Line Instructions (CLI)

Command Line Instructions can also be used to control and monitor the functions of the PowerPad15S 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. An example selection is shown below, with more commands available on our website.

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 the terminal window every "X" seconds, which can then be copied into another file if required. To return to the prompt at any time, please type "q".

5.3 Cambrionix API

The new API has been built from the ground up and is fully JSON-RPC compliant. It's been designed to perform and provides a solid platform for future application development and has these features.

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://www.cambrionix.com/api** and installed on the host machine.

Port information and control can be provided through the API. Use Node.JS or any other web technology to access information from the API using WebSockets.

Object Notation (JSON) Remote Procedure Calls (RPC) over TCP. JSON-RPC calls send a request to the API to "Get" port, device or hub information, or "Set" port functions (such as mode).

A library of sample Python code is supplied to help you integrate many of these functions into your process workflow alongside the full Reference User Guide available.

6   Specifications

SuperSync15

Input Voltage:	12VDC
Input Current:	15A
Input Connection:	4-pin DIN
Output Voltage:	5.2V
Output Current:	2.1A Max per Port
Output Power:	10W Max per Port
Output Power (Total):	163.8W Maximum

Input/Output Connectors:	16 x USB Type-A, 1 x 4-pin DIN
Ambient Operating Temperature Range:	0 ~ 35°C
Relative humidity:	5% to 95% non-condensing
Dimensions (approx.):	198.4 long x 73 wide x 40 high mm
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:	12VDC
Output Current:	15A
Output Power:	180W
Output Connector:	4-pin DIN
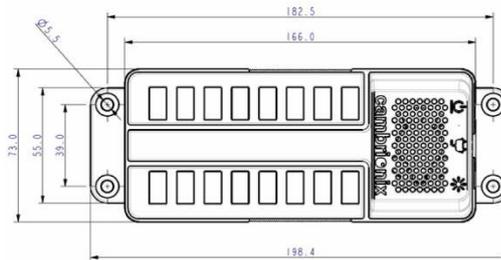
7   Certifications

- **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**
- **Complies with the latest EN62368 safety requirements for ITE**
- **Housed within a UL94-V0 specification fire enclosure**

8   Safety Guidelines and Precautions

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

The SuperSync15 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 hub, 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.

Cambrionix

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