

SmartUSBHub Pro 4CH USB2.0

Technical Specifications

Applies to: HBP_USB2_4CH / HBP_USB2_4CH_PSU

Released v1.0

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Document item	Details
Applicable product	SmartUSBHub Pro 4CH USB2.0
Order codes	HBP_USB2_4CH, HBP_USB2_4CH_PSU
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1 Product Overview

SmartUSBHub Pro 4CH USB2.0 is a four-port programmable USB 2.0 High-Speed hub. It independently controls VBUS and USB 2.0 D+ / D- on every downstream port and measures each channel's VBUS voltage and output current. It is designed for R&D debugging, automated testing, production validation and remote USB device management.

1.1 Model Differences

Variant	Order code	Voltage/current measurement	Included power supply
Standard	HBP_USB2_4CH	Yes	Not included
Power-adaptor bundle	HBP_USB2_4CH_PSU	Yes	5 V / 2 A

1.2 Key Features

- Four USB-A downstream ports with independent VBUS and D+ / D- control.
- USB 2.0 High-Speed link rate up to 480 Mbps; compatible with Full-Speed, Low-Speed and USB 1.1 devices.
- MTT architecture with an independent transaction translator for each downstream port.
- Independent VBUS voltage and output-current measurement on every channel.
- USB BC 1.2 CDP support with up to 1.5 A charging current per port; QC, USB PD and other fast-charging protocols are not supported.
- Normal mode, interlock mode, configurable power-on defaults and state restoration after power loss.
- Four local channel-control buttons.

2 System Architecture

2.1 System Block Diagram

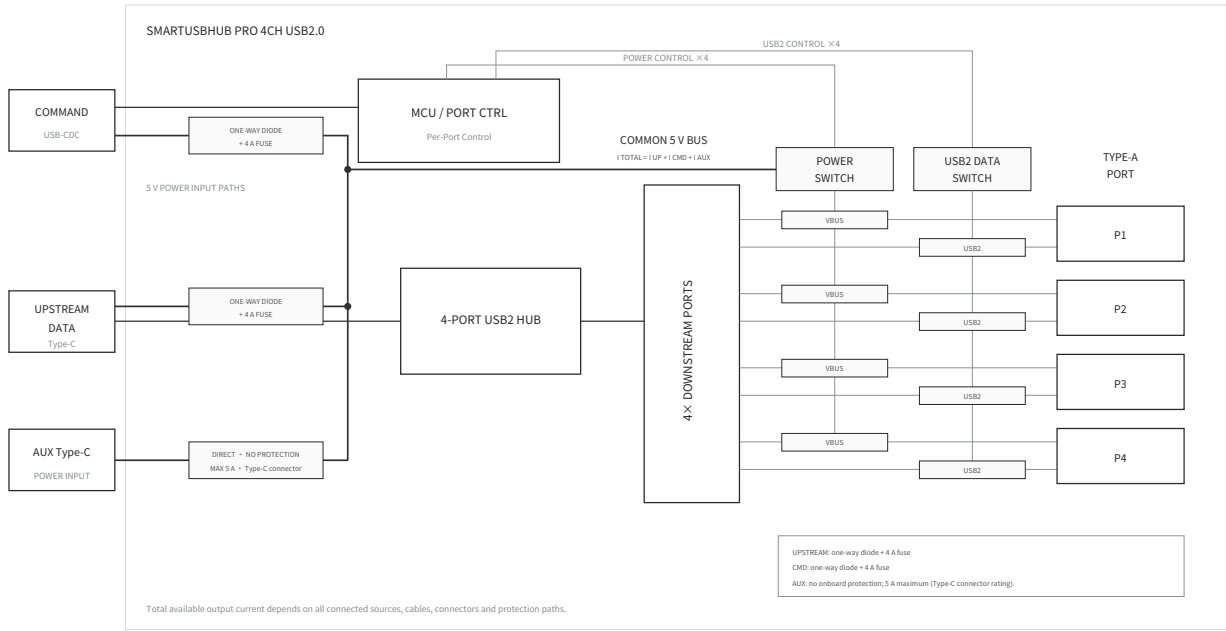


Figure 2-1 SmartUSBHub Pro 4CH USB2.0 system block diagram

The DATA port carries USB traffic between downstream devices and the host. The CMD port enumerates as a USB CDC serial interface and receives control commands. DATA, CMD and AUX POWER can all feed the internal 5 V rail.

2.2 Interfaces and Indicators

Interface or component	Quantity	Function
USB-C DATA	1	Connects to the USB host and carries downstream-device data
USB-C CMD	1	Connects to the control host and provides the USB CDC command interface
USB-C AUX POWER	1	Accepts a protected external 5 V DC supply
USB-A downstream ports	4	Connect controlled USB devices
Channel buttons	4	Control the corresponding channels
Status indicator	1	Indicates device operation and command processing
Channel indicators	4	Indicate the VBUS state of the corresponding channels

3 Functional Specifications

3.1 USB Data Path

Parameter	Specification
USB standard	USB 2.0 High-Speed
Maximum link rate	480 Mbps
Compatible speeds	Full-Speed 12 Mbps, Low-Speed 1.5 Mbps, USB 1.1
Upstream data port	1 × USB-C
Downstream ports	4 × USB-A
Hub architecture	MTT, independent TT for every downstream port

3.2 Channel Control

Parameter	Specification
Channel numbers	CH1–CH4
VBUS control	Independent on every downstream port
D+ / D- control	Independent on every downstream port
Power/data relationship	USB data can be disconnected while VBUS remains powered
Batch control	Supported
Normal mode	Supported
Interlock mode	Supported; only one channel can be enabled at a time
Power-on default state	Configurable
State restoration after power loss	Configurable

3.3 Charging and Output Path

Parameter	Specification
Charging protocol	USB BC 1.2 CDP
BC 1.2 charging current	Up to 1.5 A per port
Per-channel output-path capability	Up to 4 A; this is not a guaranteed charging current
Other fast-charging protocols	QC, USB PD and other fast-charging protocols are not supported

3.4 Voltage and Current Measurement

Measurement	Range	Resolution	Accuracy
VBUS voltage	0–5.5 V per channel	1.48 mV	$\pm(0.91\% \times \text{reading} + 36 \text{ mV})$
Output current	0–4.0 A per channel	1.15 mA	$\pm(2.5\% \times \text{reading} + 50 \text{ mA})$

4 Electrical Specifications



WARNING: Warning: input overvoltage can cause overheating or fire

Only connect a regulated 5 V DC supply to any power input. No input may exceed 5.5 V. Never use a PD trigger, boost cable or other method to apply 9 V, 12 V, 15 V or 20 V to AUX POWER.

Parameter	Minimum	Typical	Maximum	Unit	Notes
5 V input voltage	4.75	5.00	5.25	V	Recommended operating range
Absolute maximum input	0	-	5.5	V	Applies to all power inputs
Downstream-port VBUS	4.5	5.0	5.5	V	Without overload
Total input current	-	-	<10	A	Sum of DATA, CMD and AUX POWER currents
Per-channel output-path capability	-	-	4	A	Does not represent charging-protocol current
Included adapter output	-	2	-	A	Shared by all four ports


CAUTION: Important: size the power supply for the actual load

If four devices each draw the USB BC 1.2 CDP maximum of 1.5 A, the theoretical load is approximately 5 V / 6 A. The combined capacity of the three power inputs must cover the actual load, and total input current must remain below 10 A.

5 Protection and Safety Limits

Item	Specification
DATA and CMD power paths	Reverse-current, overvoltage and overcurrent protection
Downstream ports	Resettable fuse on every port
AUX POWER	No independent onboard overcurrent protection; the external supply must provide current limiting and short-circuit protection
Input voltage	Regulated 5 V DC only; 5.5 V absolute maximum

- The 4 A per-channel rating is the output-path capability, not a guaranteed charging current.
- USB BC 1.2 CDP charging current is limited to 1.5 A per port.
- Available output current depends on the supply, cables, connectors, ambient temperature and cooling.
- Turning off VBUS or D+ / D- is equivalent to unplugging a device. Stop file writes, firmware updates and other non-interruptible operations first.

6 Mechanical and Environmental Specifications

Parameter	Specification
Dimensions	106 mm × 46 mm × 18 mm
Device weight	52 g
Enclosure material	PMMA
Mounting	Supports stacked mounting with standoffs
Operating temperature	0–50 °C, non-condensing
Storage temperature	-10–85 °C, non-condensing

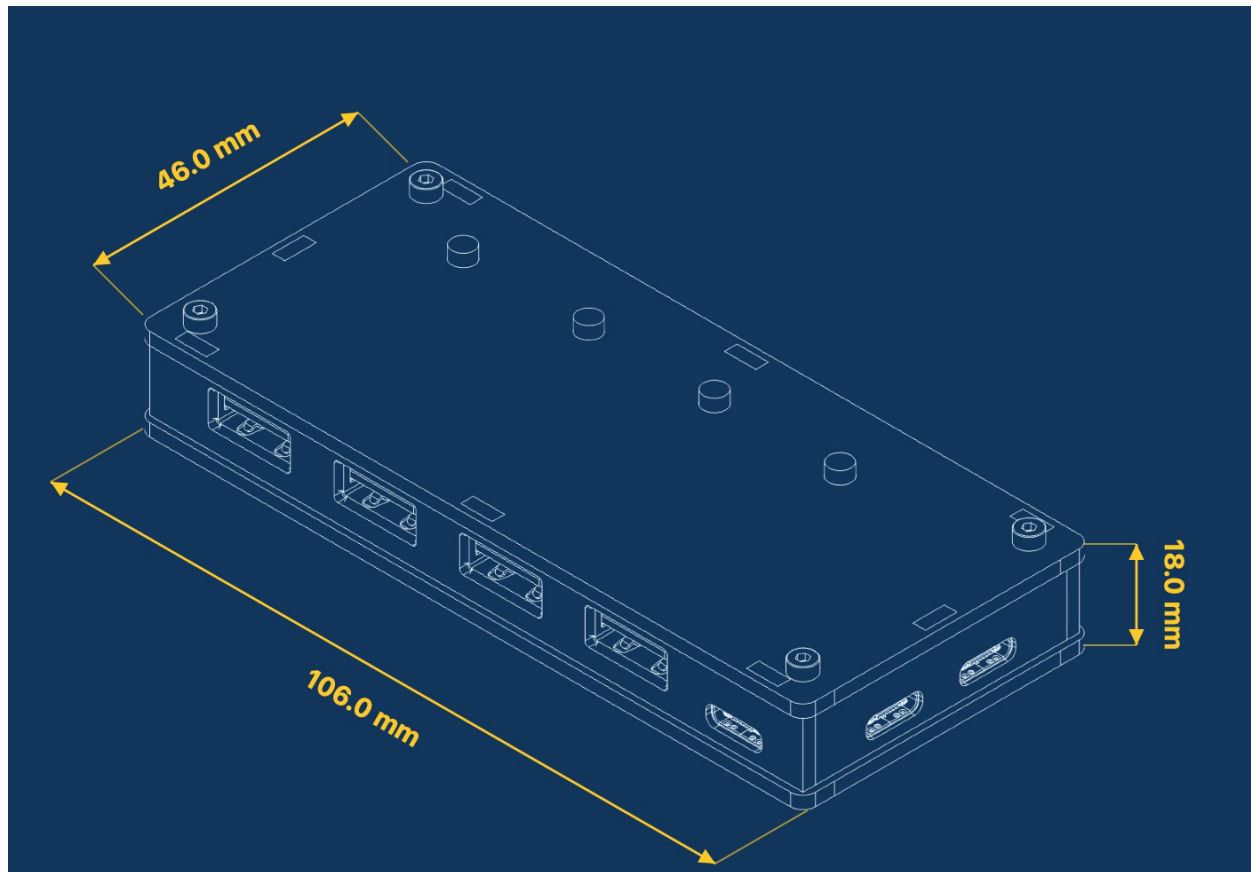


Figure 6-1 Product outline and dimensions

7 Related Documentation

Document	Link
SmartUSBHub Pro 4CH USB2.0 User Manual	View manual
SmartUSBHub communication protocol	View documentation
SmartUSBHub documentation center	View documentation
SmartUSBHub Python library guide	View documentation