8-Channel biosignalsplux Hub Datasheet

8CH HUB 19022021

SPECIFICATIONS

> **Analog Ports: 8**
> **Auxiliary Ports:** 1 common ground + 1 digital I/O for accessories (e.g. trigger button)
> **Sampling Rate:** up to 3kHz per channel[1]
> **Sampling Resolution:** 8-bit or 16-bit per channel
> **Internal memory:** none; 16GB optionally available
> **Communication:** Bluetooth Class II (range up to ~10m in line of sight); USB[2]
> **Battery:** 700mAh 3.7V LiPo rechargeable (~10h streaming; ~24h logging)

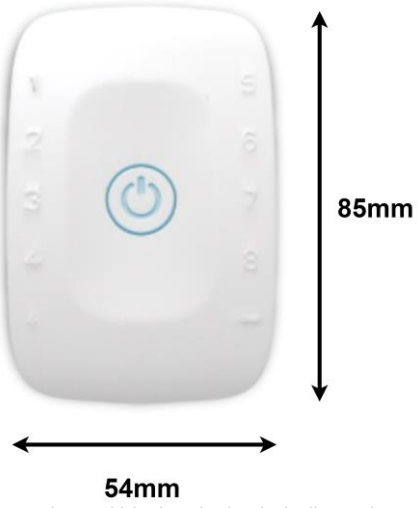

Fig. 1. 8-Channel biosignalsplux hub dimensions.

FEATURES

> 8-channel data acquisition
> Sampling rate & resolution can be set independently for each channel via API
> Raw data acquisition from all inputs
> Fast download of recorded data via USB adapter [2]
> Data logging & offline acquisition scheduling possible with optional internal memory
> Wireless firmware updates

APPLICATIONS

> Life sciences studies
> Biomedical research
> Human-Computer-Interaction
> Robotics & Cybernetics
> Physiology studies
> Biomechanics
> Ergonomics

GENERAL DESCRIPTION

Our flagship biosignalsplux hub gathers 10+ years of field-proven expertise, offering reliable high-performance raw data acquisition, both in real-time wireless streaming and local recording modes, from a wide range of sensors. It is an easy-to-use, versatile, reliable and portable platform for physiological data acquisition.

[1] More information about the sampling rate limitations is presented on page 2
[2] Requires the use of additional accessories (Fast USB Data Transfer Cable); real-time acquisition via USB only supported using the PLUX API(s)

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REV C

WARNING

Use only **ACCESSORIES APPROVED AND VALIDATED** for biosignalsplux.

SUPPORTED SAMPLING RATES

The maximum supported sampling rate depends on the number of simultaneously acquiring channels. The following results were identified from tests conducted under the following conditions:

- Tested under Windows 10
- Tested by conducting 5-minute acquisitions
- Maximum supported sampling rate identified as the highest stable sampling rate in which no frames were lost
- Bluetooth communication using Bluetooth v.2.1 dongle which comes with biosignalsplux kits
- Distance between Bluetooth dongle & PC: 20cm
- Test conducted in environment with Wi-Fi, Bluetooth, and other potential noise sources

API (C++)	
# of Channels	**Maximum Sampling Rate**
1	8000 Hz
2	5000 Hz
3	4000 Hz
4	3000 Hz
5	3000 Hz
6	2000 Hz
7	2000 Hz
8	2000 Hz

OpenSignals (r)evolution	
# of Channels	**Maximum Sampling Rate**
1	4000 Hz
2	4000 Hz
3	4000 Hz
4	3000 Hz
5	3000 Hz
6	2000 Hz
7	2000 Hz
8	2000 Hz

Note: The maximum selectable sampling resolution of the OpenSignals (r)evolution is set to 4000Hz.

RADIO CHARACTERISTICS

Operating frequency range	2400 – 2483.5 MHz ISM Band
Modulation method	GFSK (1 Mbps) P/4 DQPSK (2Mbps)
Hopping	1600 hops/s, 1 MHz channel space
Transmission power	Min: -11 dBm Max: +3 dBm
Antenna peak gain (XZ-V)	0.5dBi typical
Average antenna gain (XZ-V)	-0.5 dBi typical
Antenna VSWR	2 max
Certifications	Bluetooth, CE, FCC, IC, Japan and South Korea

BUTTON ACTIONS

Hub state before button press	Hub state after button press
Off	Standby
Standby or Streaming	Off
Logging (Bluetooth on)	Logging (Bluetooth off)
Logging (Bluetooth off)	Logging (Bluetooth on)

LED STATUS

Standby	
None	Off
1 green blink	Bluetooth on
1 red blink	Low battery and Bluetooth on
1 black blink in green background	Charging and Bluetooth on
1 orange blink	Waiting for external trigger to start internal acquisition and Bluetooth off
1 orange blink alternating with 1 red blink	Waiting for external trigger to start internal acquisition, Low battery and Bluetooth off

Real-time Bluetooth Acquisition	
2 red blinks	Low battery
2 black blinks in green background	Charging
2 green blinks	Otherwise

Internal Acquisition	
2 orange blinks	Bluetooth off
orange and red alternating blinks	Low battery and Bluetooth off
2 orange blinks in green background	Charging and Bluetooth off
orange and green alternating blinks	Bluetooth on
green and red alternating blinks	Low battery and Bluetooth on
orange and black in green background alternating blinks	Charging and Bluetooth on

CONSUMPTION

The consumption of the biosignalsplux hub depends on multiple factors, mainly the number of channels being acquired, the types of sensors connected to the hub during the acquisition, and the sampling rate of the acquisition. The information presented below has been compiled under the following conditions:

- This test was conducted using a battery powered (720mAh LiPo battery, 3.7V) 8-channel hub
- The consumption has been measured with a calibrated digital multimeter (Agilenet U1241B)
- No sensor was connected to the hub (for sensor consumption information, please check the sensor datasheet)
- Acquisition has been conducted in Bluetooth mode
- Distance between the hub and the computer running the acquisition software (OpenSignals): 1.2m

Hub State: Off				
Sampling Frequency [Hz]*	**# of Channels**	**Minimum Consumption [uA]**	**Maximum Consumption [uA]**	**Typical Consumption [uA]**
-	-	154	154.2	154.1

Hub State: Idle				
Sampling Frequency [Hz]*	**# of Channels**	**Minimum Consumption [mA]**	**Maximum Consumption [mA]**	**Typical Consumption [mA]**
-	-	15.12	20	-

Note: Oscillation between measured minimum and maximum values due to the blinking of the status LED (at 1Hz, see status LED information in this manual), reason for which these values should be considered as the typical consumption reference.

Hub State: Bluetooth Acquisition Mode				
Sampling Frequency [Hz]*	**# of Channels**	**Minimum Consumption [mA]**	**Maximum Consumption [mA]**	**Typical Consumption [mA]**
10	8	27	32	29.5
20	8	27	34	30.5
50	8	32	36	34
100	8	33	37	35
200	8	35	40	37.5
300	8	36	41	38.5
400	8	37	42	40
500	8	38	45	42
600	8	39	48	44.5
700	8	41	49	45
800	8	41	53	47.5
900	8	42	52	47.5
1000	8	43	56	48
2000	4	46	60	53
3000	4	53	65	59
4000	2	46	64	55

*per channel

PHYSICAL CHARACTERISTICS

> **W x L x H:** 85x54x10mm
> **Weight:** 45g
> **Color:** White

ORDERING GUIDE

Package Description	
High-performance wireless data acquisition unit with 8 generic analog inputs	
SKU: CMP-8CHUB-1	**PLUX Code:** 820201702