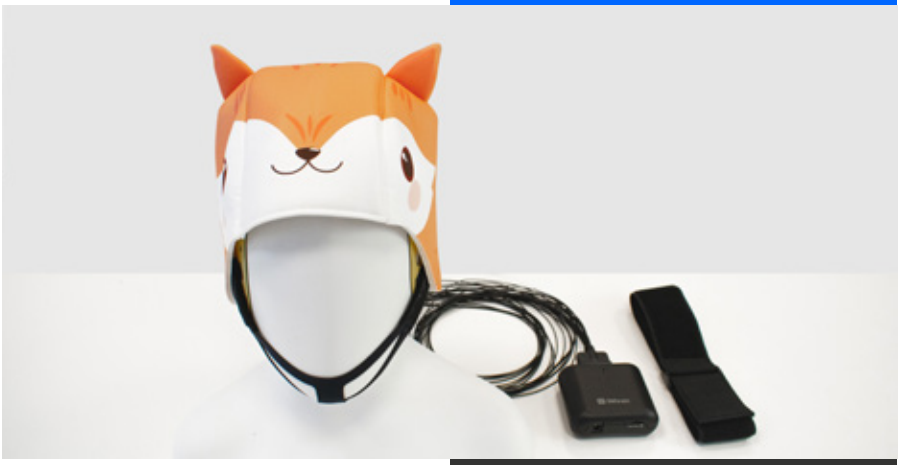
Bitbrain

Versatile Kids EEG 16

Model: E16.A1



User guide

English

This is the user guide for the *Versatile Kids EEG 16* device from Bitbrain.

This document will provide information for the proper setup and usage of the system.

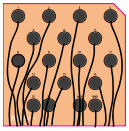
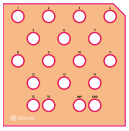
Bitbrain

Contents

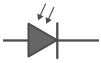
Contents

What is included?

This pack includes all the elements necessary for the operation of the 16-channel EEG system:

Item	Name / description	Amount
	**16-channel amplifier** • Powered by an internal battery.	1
	**16-channel EEG cap + chinstrap** • Holds the electrodes in place. • Based on the 10/10 international system.	3
	**Kids Cap** • Exterior kids cap that protects the sensors during use.	1
	**1 Set of EEG electrodes + connectors** • With a total of 16 channels + GND + REF	1
	**Sensor holder** • Organizes the sensors and cables when not in use, preventing damage.	1
	**Sensor sockets** • Enable placement of the sensors in specific positions on the cap.	3 x 18

What is included?

Item	Name / description	Amount
	**Wet sensors (sponges)** • When damp, enable contact between the sensor and the scalp.	1 bag
	**Cable fastening band** • Groups and organizes the cables during operation.	1
	**Measuring band** • Measures the perimeter of the user's head.	1
	**8GB Class-10 MicroSD Card with SD Adaptor**	1
	**Charger + adapters** • Charges the internal amplifier battery.	1
	**Photodiode EEG (optional)** • Connected to the auxiliary input, it measures changes in light intensity to synchronize data recording with on-screen stimuli.	
	**1 Button Box - 1-bit input trigger (optional)** • Connected to the auxiliary input, allows the user to record events.	

What is included?

Item	Name / description
	**Pedal - 1-bit input trigger (optional)** • Connected to the auxiliary input, allows the user to record events.
	**TTL *Trigger* BBT (optional)** • Connected to the auxiliary input, allows synchronization with Versatile BIO.
	**TTL *Trigger* EXT (optional)** • Connected to the auxiliary input, allows synchronization with external devices.
	**Pulse generator (optional)** • Synchronizes two Versatile Kids EEG systems.
	**Duplexer (optional)** • Connected to the auxiliary input, enables the conexion of one photodiode and one digital trigger (TTL, button, pedal or pulse generator) at the same time.
	**HTC Vive PRO attachment kit (optional)** • Integration with the HTC Vive Pro VR.

Safety information

Please read the safety information, conditions of use and instructions carefully before using the device. Failure to follow the instructions set out in these documents will lead to the nullification of the product warranty.

Careful usage and handling of the equipment

- Do not handle the device with damp hands, as this could cause a short-circuit.
- Do not use the device for other applications than its intended purpose.
- Do not hit, throw, bite, open or burn the device.
- Avoid falls or collision with other objects.
- Keep the device in a dry place, and do not expose to extreme temperatures.

Warnings about the equipment

- DO NOT use the device while it is charging.
- DO NOT open the device. If your device does not work properly, contact support@bitbrain.com..
- DO NOT place this device close to life support electronic and electrical equipment.
- If you notice that the device emits strange smells or noises, or that its temperature is excessive, leave it in a safe place and contact support@bitbrain.com.

Warnings about the battery

- Disconnect the charging cable once the battery is fully charged. Otherwise, the battery's life cycle could be reduced.
- If you are going to store the device for a long period (several weeks or months), it is recommended that the battery should not be 100% charged. This can degrade the battery and result in permanent capacity loss.
- Keep the device in a dry place, between the temperatures of 5ºC and 40ºC. Prolonged exposure to high temperatures can affect the stability of the battery.
- To charge the battery of the device, ONLY use the battery charger provided.(Limit of 1A).
- Using a higher amperage charger may seriously damage the equipment.

Safety information

Device disposal

Do not throw electrical and electronic devices in the trash! In accordance with European Directive 2012/19/UE on Waste Electrical and Electronic Equipment, they should be disposed of at suitable collection points for environmentally responsible recycling.

Before disposing of appliances at collection points, batteries should be removed and disposed of separately from the electronics to be treated appropriately.

In order to separate the battery from the electronics in preparation for disposal, open the amplifier using a Torx 6 screwdriver and carefully detach it.

Conformance and CE marking

This device complies with the EU safety requirements (UNE- EN 60950-1: 2007, EN55032 and EN55024). The CE mark indicates compliance with the corresponding directives of the EU Council, which includes EMC Directive 2004/108/EC.

CE

Important

Versatile Kids EEG 16 is a device designed by Bitbrain to measure biometric data for research purposes.

Conditions for use

- Read the device safety information carefully and keep this manual for future reference.
- Read the “General Terms and Conditions of Sale and Use for Bitbrain Products” carefully. You can find the document at www.bitbrain.com/en/tc.

Disclaimer

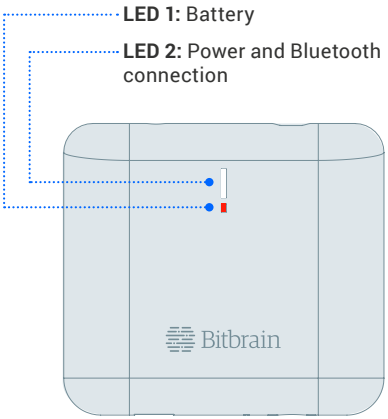
The Hardware equipment included in the Products (EEG, biosensors, indoor positioning systems, eye tracking) are not medical devices, have not been designed or manufactured to offer healthcare services, and are not sold for the purposes of diagnosis, treatment, palliation, medical advice or illness prevention, but for research purposes.

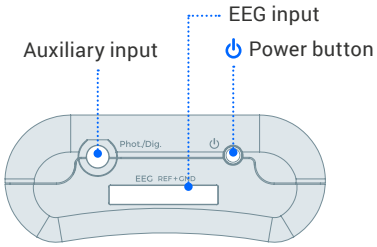
Read the “General Terms and Conditions of Sale and Use for Bitbrain products” before buying a product, in order to understand it fully. You can find the document at www.bitbrain.com/en/tc.

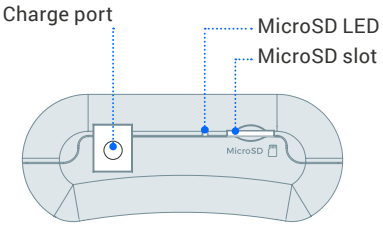
Bitbrain reserves the right to revise this user guide and make any changes to its content that it considers relevant, at any moment and without obligation to notify any person or entity of the changes made. Despite the best efforts made to ensure the accuracy of the information contained within, this should not be interpreted as a commitment from Bitbrain. To ensure that you have the latest version, please visit the Downloads section on the product page at www.bitbrain.com.

Versatile Kids EEG 16

Versatile Kids EEG 16 is an 16-channel mobile and portable semi-dry EEG device designed for real-world recording with kids. Its water-based EEG electrodes can be placed in any position within 10/20 and 10/10 international system.







LED 1 STATUS

- Charging battery
- Low battery
- Battery loaded

LED 2 STATUS

- Bluetooth conected
- Conecting bluetooth

Technical specifications

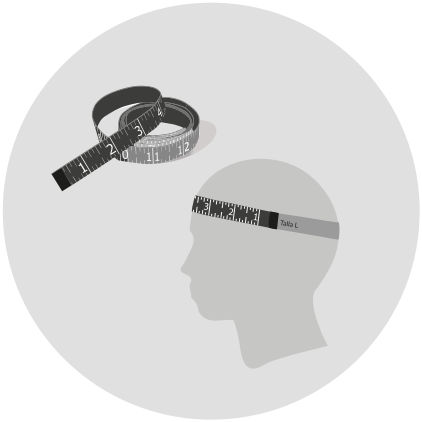
Nominal voltage	3.7V
Nominal power	555mW
Battery life	>8h
Charging time	≤3h
Sampling frequency	256Hz
Wireless technology	Bluetooth 2.1 + EDR
Data backup	Yes (Removable MicroSD memory card)
Dimensions	78x72x32 mm
Weight	125g
Charging connection	Barrel plug connector (Charger provided)
Certifications	EN 60950, EN 55032, EN 55024

Preparing the equipment

Follow the steps described below to select a cap, correctly insert the sensor sockets, and achieve the desired disposition of sensors.

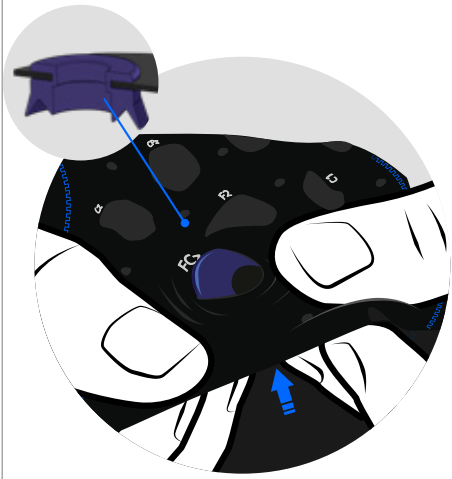
1

Measure the perimeter of the user's head and select the adequate cap size. If none of the sizes fit, please contact Bitbrain to acquire the correct size cap.



2

To place a socket in the cap, identify the corresponding location hole (small labeled holes) and slightly enlarge it with your finger. Insert the socket from the inside of the cap towards the outside, introducing it through the hole until the fabric is correctly placed in the slit, as shown in the picture.

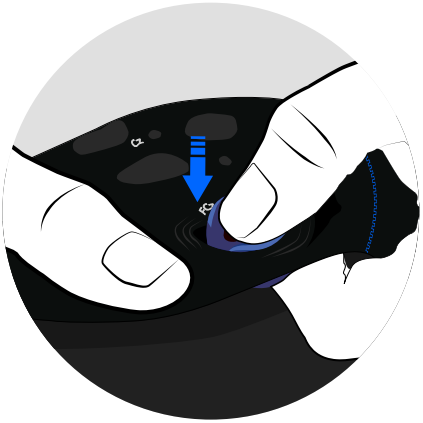


Preparing the equipment

3

To remove a socket, place your thumb on top of it and push towards the inside with both hands until it slides out of the fabric.*

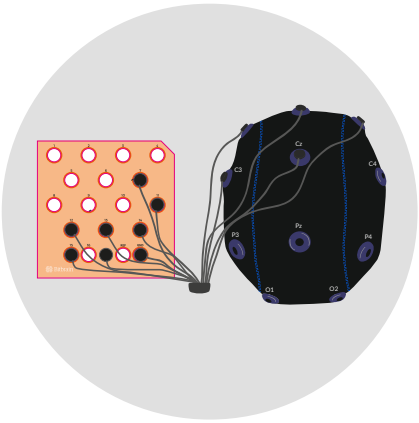
To place a socket in a different position, follow the instructions for **step 2.**



*Please note that the cap material will suffer a slight deformation when the sockets are introduced, and therefore frequent changing of positions could stretch the cap.

4

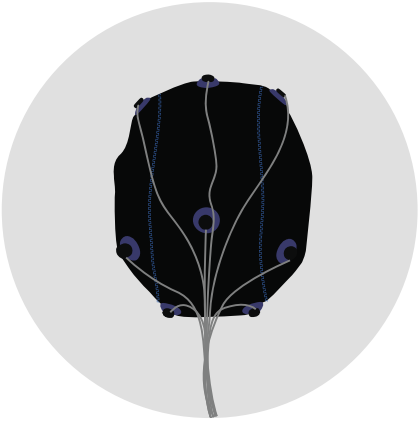
Before placing the cap on the head, insert the sensors. Press firmly on the silicone to insert each sensor into a socket. When placing the sensors on the cap, ensure that the cables are organized towards the back for easy placement on the head.



NOTE:
Please take note of the positions of the sensors (marked on the cap) and the number of each sensor. Data analysis requires this association.

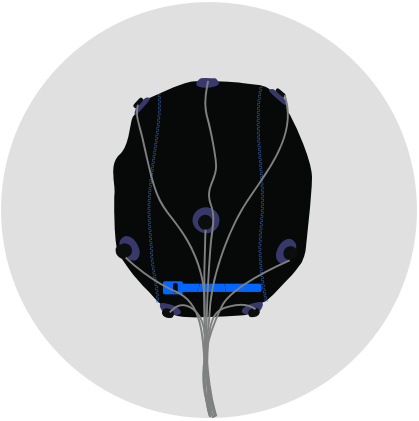
5

Organize the cables as shown in the picture (towards the back of the head).



6

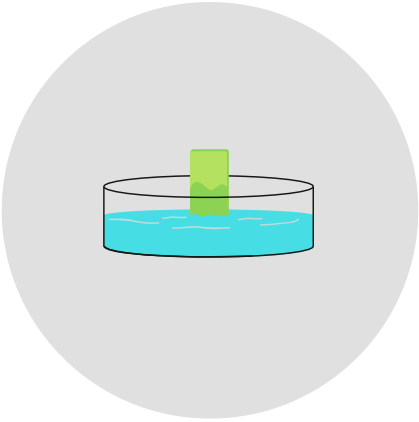
Utilize the fastening band to keep cables in the correct position and prevent them from shifting during operation of the device.



Preparing the equipment

7

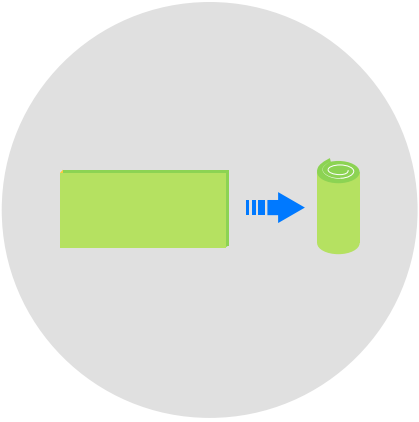
Prepare the necessary sponges for the 18 electrodes (16 channels + GND + REF) *.
Submerge the sponge in regular tap water until it is completely wet.



*If you need more sponges, contact the Bitbrain team.

8

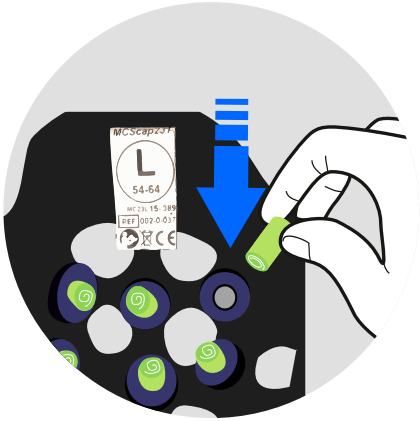
To use a sponge electrode, roll it into a cylinder, as shown in the picture.



Preparing the equipment

9

From the inside, introduce the damp sponges in the inner holder on each sensor on the cap.



Repeat steps 7 to 9 with the remaining sensors.

IMPORTANT:
Do not wet the EEG connector itself. This could damage the device

Preparing to record data

1

Turn on the amplifier by pressing the **power button** (⏻) until the light blinks. The wireless connection LED will flash until the connection is established with the software. The LED will then stay on. When the battery device is low, the battery indicator LED will turn on.

IMPORTANT:
Do not use the device while charging. A low battery can adversely affect the quality of the recorded signal and it is recommended to charge the system before starting a recording.

Preparing to record data

2

This equipment sends data using Bluetooth wireless technology.

The data can be saved on:

- **The computer with which the device is paired.** Note that if the device loses Bluetooth connection with the computer, this can lead to a loss of data.
- **MicroSD Card.** In this mode, the wireless signal will continue being sent, so data can still be seen and recorded in real time on the computer while simultaneously being saved on the memory card.

Pairing

Be sure the computer has a Bluetooth adapter version 2.1 or higher. The first time you use the device, you will need to pair it. This can be done from "Settings > Devices" on Windows.

The name of the device in the list of Bluetooth interfaces corresponds to the serial number (S/N), which you can find printed on the label on the amplifier.

Data backup with MicroSD

1. Insert the MicroSD card provided into the slot on the display.
2. Enable the "SD card record" option on the software to save data to the card.

The files saved are recorded in .sdf format. To convert them to .csv format, use the "Import record" function on the software.

IMPORTANT:

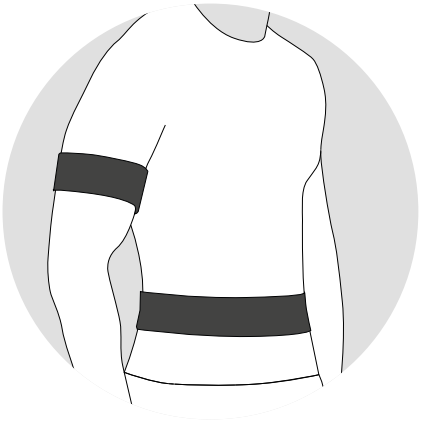
We recommend using a Class 10 or above Micro SD card with capacity of 8GB. Using another type of memory card that does not meet these specifications could cause loss of data.

Placement of the equipment

1

Place the elastic band wherever desired, for example, on the accompanying adult:

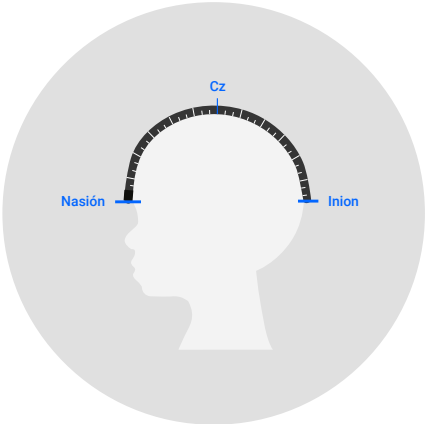
1. Fasten the elastic to the arm or waist:
   - Use the short or medium length to attach the band to the arm.
   - Use the long band to fasten it to the waist. The smaller bands can be used to extend the long band if needed.



Placement of the equipment

2

Measure the distance between the nasion and the inion (see image). You will need this measurement to position sensor Cz correctly, which should be situated exactly halfway between the nasion and inion.



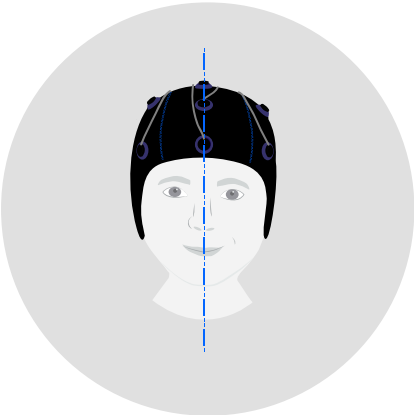
3

Start placing the cap from the forehead back and adjust the rest of the cap until it adapts completely to the head. Ensure that sensor Cz is correctly located by confirming its position with the measuring band.

Placement of the equipment

4

Ensure that the cap is centered on the head. The lateral sensors should be symmetrical to the central sensor line.



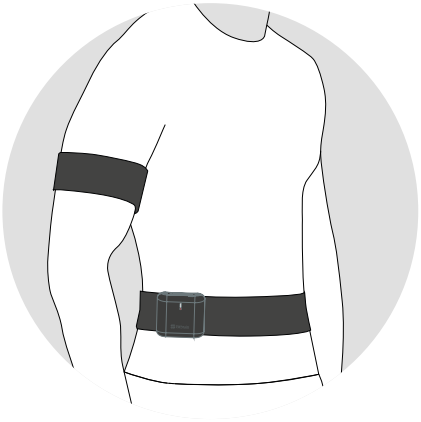
5

Attach the chinstrap. Ensure the cap is adjusted but not too tight.

Placement of the equipment

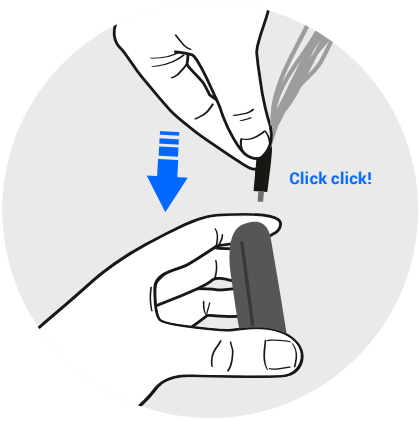
6

Attach the amplifier to the band via the Velcro patch.



7

Connect the set of sensors to the amplifier. To ensure good connection, introduce the connector until a “double click” is heard.

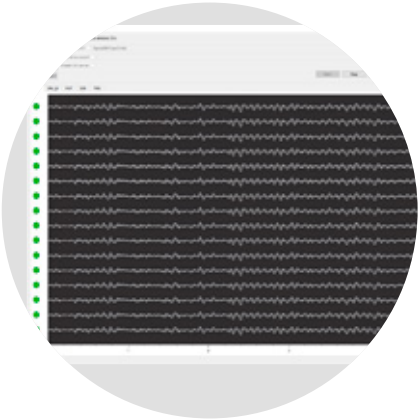


Obtaining a signal

1

The acquisition software shows the EEG signal captured by the device in real time.

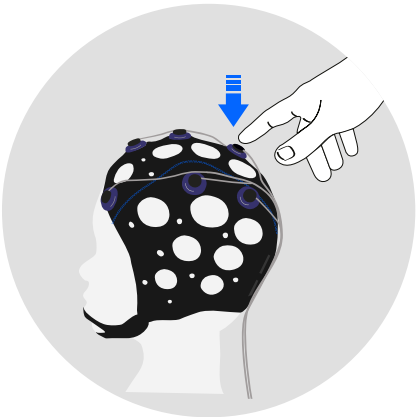
The color of the sensors indicates the impedance, or the quality of the contact with the skin. The final quality achieved depends on the correct placement of the electrode.



Obtaining a signal

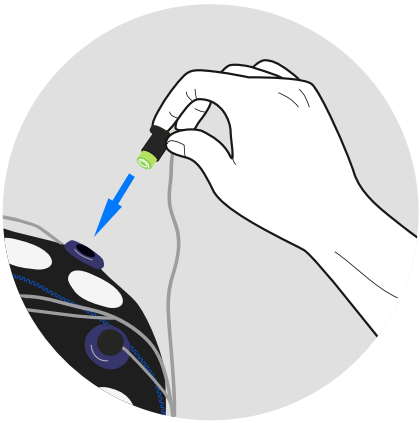
If some of the sensors do not show a quality signal

Gently push the sensor against the head, in a small circular motion, to improve contact with the scalp.



Wait for a few seconds until the signal stabilizes.

If the sensor still does not work, repeat this step once or twice.



If good signal is still not achieved, verify the humidity of the inner sponge by removing the electrode from the socket. If the sponge is dry or not sufficiently damp, repeat the dampening process.

Push the sensor gently against the head until the signal is acquired.

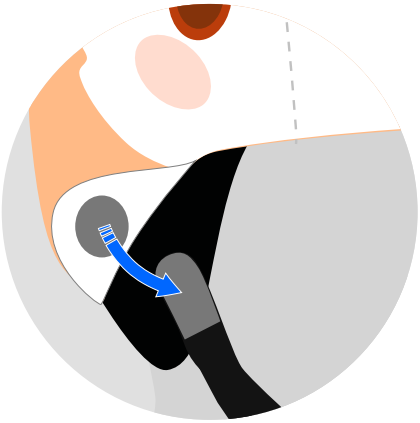
Placement of the kids cap

1

Place the kids cap over the cap with the sensors.

2

Attach the two velcros on the sides to the tips of the chinstrap.



Placement of the kids cap

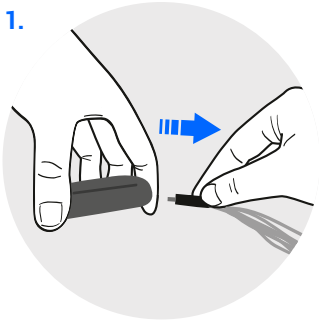
3

Mounting example.

Removing the technology

1. **Power off the amplifier and disconnect it.**
2. Remove the kids cap by peeling off the velcros on the sides.
3. Subsequently, remove the reference **clip** and the **chinstrap**.
4. Finally remove the cap, starting from the forehead and moving backwards.

1.



2.

3.

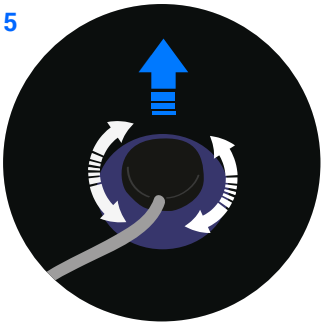
Removing the technology

5. Remove each of the electrodes one by one before cleaning the cap. Gently pull the electrode while rotating it. Do not attempt to remove the electrode by pulling from the cables (damage risk).

6. Remove the sponges. For hygiene reasons, we recommend discarding the sponges after each use.

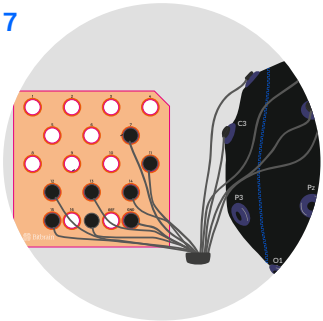
7. **Store the sensors in the square holder to ensure correct maintenance.**

5



6

7



Maintenance

Disinfecting and cleaning the cap

- Both processes, disinfecting and cleaning, can be done without removing the sensor sockets, but **always remove the actual electrodes** and wiring harness.

- To disinfect the cap, we recommend the use of a specific disinfecting solution, Bomix plus. Dilute 45 ml solution per liter of cold water, and submerge the cap (without the sensors, wiring and amplifier) for 30 minutes.

- Clean the cap after each use. Use warm water with a few drops of soft detergent (we recommend Ivory). Rinse with water and leave it to dry on a flat surface. Do not use aggressive cleaners or shampoo.

Limpieza del gorro Kids

- Hand wash in warm water with mild laundry soap.

Very important

- Do not use strong or abrasive disinfectants to clean the product.
- Carefully read the instructions on the use of disinfectant solution. When selecting a cleaning product, confirm its effectiveness and compatibility with the material.

Attention!

- Do not use hot sterilization methods (steam), at the risk of damaging cable insulation.

- When not in use, caps and electrodes should the kept in a dry place.

Storage

- Keep the product in its original packaging while not in use.

- If you are storing the device for long period of time (more than one week), it is recommended that the battery not be at 100% charge. This can degrade the battery and result in permanent. capacity loss.

Real-world research and applications

Bitbrain

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