BRAINACCESS® HALO

developed by ***NEUROtechnology***

Extended Manual

Version 2.0

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Find the latest product information on our website

Welcome to the user manual for the **BrainAccess HALO device**. BrainAccess is a line of products developed by **Neurotechnology**, designed to make brainwave recording and analysis simple, accessible, and reliable.

In this manual, you will find detailed information about the device, its components, setup instructions, and guidance on how to start recording EEG data.

For further questions not covered in this guide, please contact us at *brainaccess@neurotechnology.com*.

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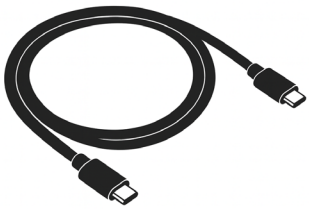
Package Contents

BrainAccess HALO is a fully integrated EEG system, delivered with everything you need to start your research right away.

Item	Description	Quantity
	BrainAccess HALO (EEG headband)	1
	USB Bluetooth adapter *	1
	USB-C charger cable **	1

* *The USB Bluetooth adapter enables wireless communication and data streaming between the BrainAccess HALO and the computer. A compatible built-in Bluetooth module may also be used instead.*

** *Power adapter is NOT included.*

Safety Notice

Please read these safety instructions and conditions of use carefully before operating your **BrainAccess HALO** device. Failure to follow these guidelines may result in malfunction, injury, or the voiding of the product warranty.

Proper Use and Handling

- Do **not** handle the device with wet or damp hands, this may cause a short circuit.
- Use the device **only** for its intended purpose of recording EEG signals.
- Do **not** use the device while it is charging.
- Avoid dropping, throwing, or applying excessive force to the device.
- Keep the device in a **dry**, **cool place** and avoid extreme temperatures.
- Do **not** place the device near life-support or other sensitive electronic equipment.
- This equipment is **not intended for use by children** unless supervised by an adult.
- Do **not** open, disassemble, or modify the device. If it does not operate properly, contact *brainaccess@neurotechnology.com*.

Battery Safety

- Keep the device between 5 °C and 40 °C. Prolonged exposure to heat may damage the battery.
- The device charges at approximately 500 mA. A charger capable of supplying at least 800 mA is sufficient, although using a standard 5 V USB-C charger rated **1000 mA (1 A) or higher is recommended** for optimal charging efficiency and battery performance.

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Device Disposal

Do not dispose of electrical or electronic devices in regular waste.

This product must not be disposed of with household waste. In accordance with the **European Directive 2012/19/EU (WEEE**), return the device to an authorized collection facility for environmentally responsible recycling of electronic components and batteries.

Before disposal, remove the battery and dispose of it separately according to local regulations.

At end of life, to detach the battery, open the device carefully using a screwdriver and disconnect it from the mainboard.

Conformance and Regulatory Compliance

BrainAccess HALO complies with the essential requirements and other relevant provisions of the following **European Union directives**:

- **2014/53/EU** — Radio Equipment Directive (RED)
- **2011/65/EU and 2015/863** — Restriction of Hazardous Substances (RoHS 2 & 3)

The integrated Bluetooth module and PCB assembly comply with these standards and must be operated in accordance with the manufacturer's specifications.

Important Notice

BrainAccess HALO is **not a medical device** and is intended for **research, scientific, educational, general wellness**, or **non-clinical development purposes**.

Terms and Conditions for Use

Please read the safety instructions in this manual carefully and keep it for future reference.

The **Neurotechnology Terms and Conditions of Sale and Use** for BrainAccess products are available at *https://www.brainaccess.ai/terms-of-use/*.

Please, review the terms before operating the device.

Legal Notice

BrainAccess devices are intended **solely for research, educational, and development purposes**. They are **not medical devices** and are **not designed, tested, or certified** for medical diagnosis, treatment, therapy, or disease prevention.

Before purchasing or using a BrainAccess product, please review the **Neurotechnology Terms and Conditions of Sale and Use**.

Neurotechnology UAB reserves the right to update this manual and modify its content at any time, without prior notice.

While every effort has been made to ensure the accuracy of the information contained herein, it does not constitute a legal or contractual commitment by Neurotechnology.

To make sure you are using the most recent version of this guide, please refer to the official BrainAccess website at *www.brainaccess.ai.*

Device Overview

BrainAccess HALO is a fully integrated EEG headband featuring dry-contact electrodes and Bluetooth connectivity.

It is a 4-channel EEG acquisition system with a common reference channel, designed for quick setup and comfortable, mobile EEG recording.

Physical Description

The device consists of a **single flexible strap** that integrates a **printed circuit board (PCB)** onto which all electrodes and electronic components are mounted.

- The **frontal electrodes** are **gold-plated flat pads** designed to ensure optimal contact with the skin on the forehead.
- The **rear electrodes are gold-plated spring pins** that adapt to the shape of the head and gently penetrate the hair to maintain consistent contact with the scalp.
- The **battery** and **amplifier modules** are housed in the two **symmetrical lateral boxes**, providing balanced weight distribution for enhanced comfort during use.
- The minimalistic user interface is located on the left box and comprises a **power button**, a **LED indicator**, and a **charging port**.
- The **flexible strap** features an adjustable buckle mechanism on the right side, allowing the band to be easily resized for a comfortable and secure fit.
- The device **serial number** is printed on the back of the device, behind the rear channels.

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Figure 1. Device Overview

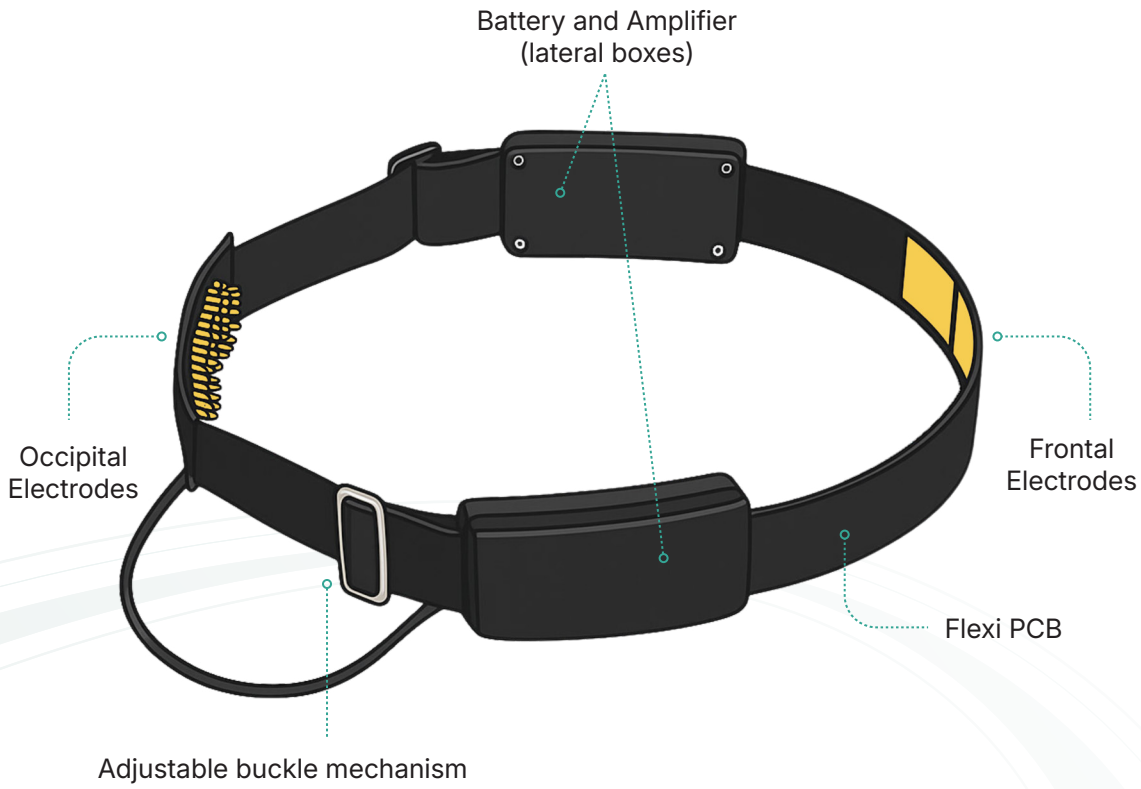

Figure 2. Electrode Configuration on Flexi PCB

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Electrode Placement on the Device

The HALO headband includes the following electrodes:

4 EEG channels positioned according to the EEG 10–20 international system:

- Fp1 and Fp2 (frontal)
- O1 and O2 (occipital)

Reference electrode:

Positioned at the center of the frontal part of the band. All EEG measurements are made with respect to this electrode.

Bias electrode:

The two pads adjacent to the reference electrode function as bias electrodes. They deliver an actively driven common-mode signal derived from bias feedback channels, which can be configured in the software (default: all channels).

Controls and Indicators

The user interface is minimalistic and located on the left side box of the headband. It includes:

Power Button

- Press and hold for 2-3 s to **turn the device on or off**.
- The device will **vibrate** to confirm the action.
- When powered on, the **blue LED** begins to **breathe slowly**.

LED Indicator

The LED provides feedback about the current status of the device:

- **Breathing blue:** Device is turned on.
- **Solid blue:** Bluetooth connection established.
- **Fast-blinking red:** Battery level below 15%.
- **Breathing red:** Device is charging.
- **Red light turns off while connected to charger** = Fully charged.

Charging Port

- The device's battery can be charged via the **USB-C port** using standard **5 V chargers** (such as mobile phone chargers).
- The charger should provide **at least 800 mA (ideally 1 A)**.
  A compatible charging cable is included.

Note: *The device cannot be used while charging.*

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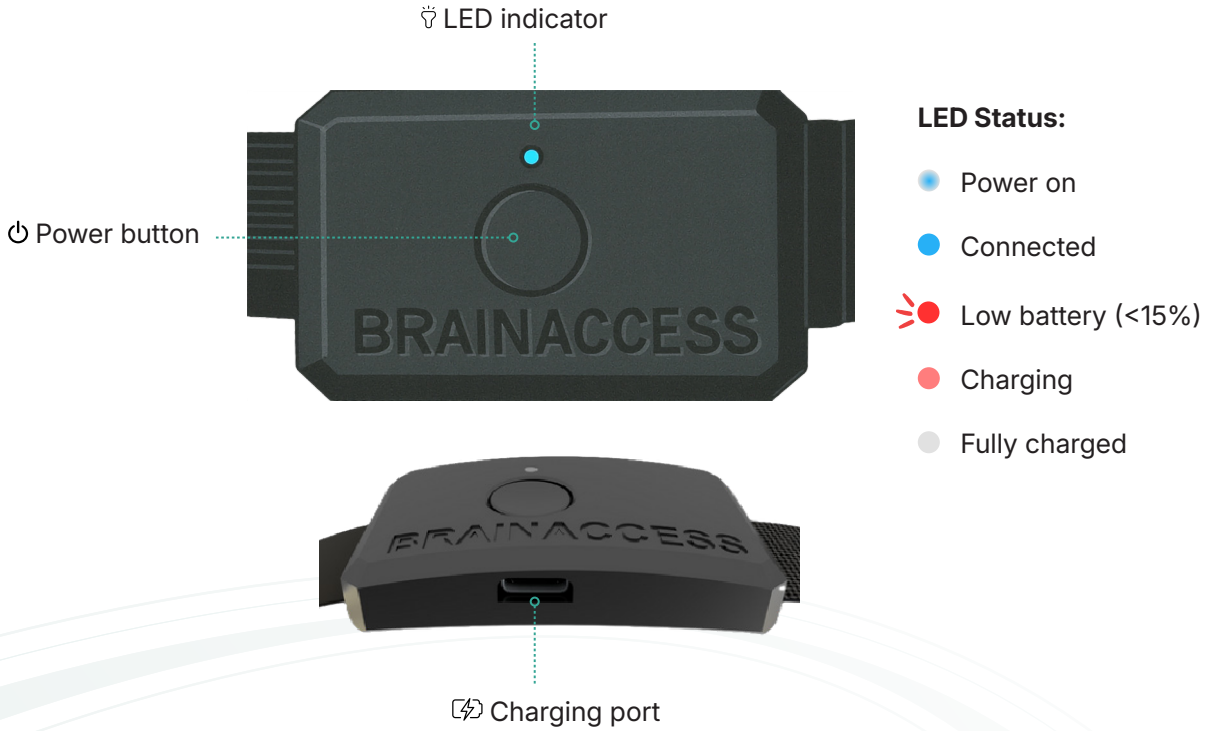
Figure 3. Controls and Indicators



Technical Specification

Connectivity	
Type	Bluetooth 4.2 (BLE)
Range	Up to 15 m with our Bluetooth adapter
EEG data	
Number of channels	4 (with a common reference channel)
Sampling frequency	250, 500 Hz
Input resolution	24 bit
Analog gain values	1, 2, 4, 6, 8, 12
Input voltage range	4500 mV / gain value (w.r.t. reference channel)
Battery	
Type	Li-Po
Capacity	400 mAh
Operating time	Up to 7 hours at 250 Hz and 5 hours at 500 Hz *
Charging time	2 hours
Charger input	5 V, 1 A recommended (800 mA min)
Charger connector	USB-C
Mechanical	
Mass	70 g
Perimeter	53-58 cm (adjustable)
Regulatory	
Usage	Research and education only
CN code	9031.80.80.00

* *Battery life is estimated during uninterrupted EEG data streaming.*

Troubleshooting

1. **The device does not turn on.**

   If the LED does not light up and the device does not vibrate, the battery is likely **fully discharged**.

   Charge the device for at least two hours using a standard USB charger capable of **supplying at least 1000 mA (1 A)**. Most modern smartphone chargers meet this requirement, while some laptop USB ports may not provide sufficient power for charging.

2. **Cannot connect to the device.**

   Do not pair the BrainAccess HALO manually through your computer's Bluetooth settings. The BrainAccess Board software establishes the connection automatically. If you have previously paired the device via the system's Bluetooth menu, remove or unpair it before connecting through the software.

3. **Device not detected.**

   If the BrainAccess Board application cannot locate the device, ensure it is powered on and within Bluetooth range. For best performance, use the included USB Bluetooth adapter, which has been tested and verified for compatibility.

Note: *Some integrated Bluetooth adapters may not fully support the data streaming requirements of the device.*

How to Wear the Device

Follow the steps below to correctly position and wear your **BrainAccess HALO**:

1. **Turn on the device** by pressing and holding the power button for 2-3 s. If the red LED blinks rapidly and the device does not power on, the battery is low. Please **charge the device** before use.

2. **Place the device around your head**. Make sure the power button is on the left side. Adjust the size of the band using the **adjustable buckle mechanism** until it fits comfortably yet firmly. The fit should be snug enough to ensure **good electrode-skin contact**, but not painful.

3. **Position the frontal electrodes.**

   a. Make sure they sit **in the center of your forehead (vertically)**.

   b. The **reference electrode** should be centred on the **midline of the forehead**.

4. **Adjust the rear electrodes.**

   a. Locate the **inion point** at the back of your head (the small bony bump).

   b. Place the band between **0.5-1 cm above the inion** and slide the rear electrodes horizontally until they are centered.

5. **Improve contact at the rear electrodes.**

   - Keeping the electrodes in place, gently move them left and right to part the hair until the pins reach the scalp and stable contact is achieved.

Note: *After fitting the device, allow a few minutes for the EEG signal to stabilize before starting the recording. The frontal electrodes achieve optimal contact once they warm slightly from skin temperature, improving signal quality.*

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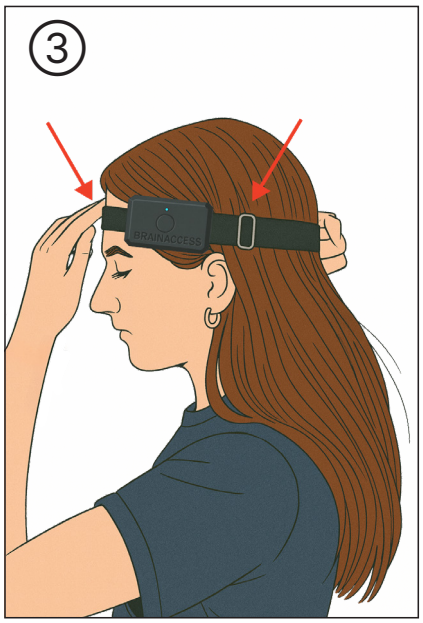
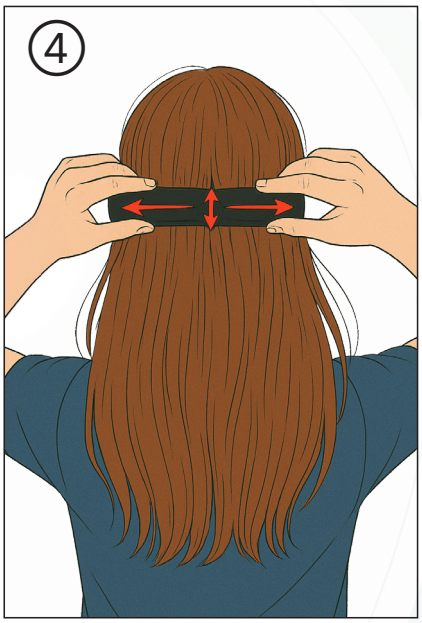
Step 1. Press and hold the Power button until the device vibrates. If the LED is blue, the device is on and ready to connect. If the LED is red, charge the device.

Step 2. Place the device around your head. Make sure it is oriented correctly, the power button must be on the left side of your head.



Step 3. Adjust the fit using the buckle mechanism until the device sits comfortably. The reference electrode should be aligned with the center of your forehead.



Step 4. Adjust the height and position of the rear electrodes. Gently shift them side to side until you feel the pins make contact with the scalp through the hair.

How to Connect and Record EEG Signal

For Beginners

Connect via PC

1. **Plug in the Bluetooth adapter.**

   Insert the provided **USB Bluetooth adapter** into your computer. The required drivers should install automatically.

   If your computer already has a built-in or other compatible Bluetooth adapter, you can skip this step.

2. **Download the BrainAccess Board application.**

   If you haven't done so already, download the free BrainAccess Board software from our website: *https://www.brainaccess.ai/download*.

3. **Launch BrainAccess Board.**

   Once opened, the application will automatically **scan for nearby devices**.

   If your device is powered on, it will appear in the list, identified by its **serial number** (printed on the back of the device, behind the rear channels).

4. **Connect to the device.**

   Select your device and click **Connect**. You will then be able to **stream, visualize, and record EEG data** directly through the application.

5. **Learn more.**

   For a full tutorial on how to use BrainAccess Board and explore all available features, visit: *https://www.brainaccess.ai/software/brainaccess-board/*.

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Connect via Mobile App

The **BrainAccess Mobile App** allows you to collect EEG data directly from your BrainAccess device using an Android smartphone or tablet.

The app can stream data over Wi-Fi to other applications or store it locally on your mobile device for later analysis.

1. **Download the app.**

   Install the **BrainAccess Mobile App** from the **Google Play Store** (Android 9.0 or higher required).

2. **Turn on your device.**

   Power on the **BrainAccess HALO** and wait a few seconds for it to become discoverable.

3. **Select your device.**

   Open the mobile app and choose your device from the **drop-down list**.

4. **Connect and start streaming.**

   Tap **Connect** to begin streaming EEG data. You can choose to either **record locally** or **re-stream** the data via Wi-Fi.

5. **Learn more.**

   Explore additional instructions here: *https://www.brainaccess.ai/software/brainaccess-mobile-app/*.

For Advanced Users

The **BrainAccess SDK** allows full control of BrainAccess devices and direct access to EEG data without using the graphical interface. It is intended for developers and researchers who wish to integrate BrainAccess hardware into custom applications or processing pipelines.

BrainAccess SDK Overview

The SDK is a collection of libraries for device control, data streaming, and EEG preprocessing. It can be accessed through C or Python APIs, enabling flexible integration into your own software environment.

Core Library

The **BrainAccess Core** library provides a low-level interface to BrainAccess electroencephalographs.

It allows you to:

- Configure recording channels and device parameters
- Monitor device status in real time
- Stream EEG and auxiliary data using a callback-driven acquisition model
- Manage multiple devices simultaneously through a single Bluetooth adapter

C and Python API

The SDK supports both **C** and **Python** programming environments.

Comprehensive API documentation, example scripts, and integration guidelines are available on our website: *https://www.brainaccess.ai/software/brainaccess-sdk/*.

Cleaning and Maintenance

For hygiene reasons, clean the sensors after each use using **alcohol-free disinfectant wipes** suitable for electronic equipment.

⚠ Using alcohol-based solutions may damage the dark coating on the flexible PCB.

Turn off the device before cleaning and gently wipe all sensor surfaces, especially the areas that come into contact with the skin.

To clean the rear electrodes, use a small brush slightly moistened with alcohol-free disinfectant solution.

Avoid excessive liquid and make sure no moisture reaches the amplifier or battery compartment.

When not in use, store the device in its **original packaging** in a dry and cool place. If the device will not be used for an extended period, keep the battery **partially charged (around 50–70%)** to help preserve its lifespan.

Warranty

Neurotechnology UAB warrants the **BrainAccess HALO EEG headband** against defects in materials and workmanship for a period of one (1) year from the date of purchase, under normal consumer use conditions.

If the product fails during normal and proper use within the warranty period, **Neurotechnology** will, at its discretion, **repair or replace** the product. The company's liability under this warranty does **not cover any incidental or consequential damages**.

This warranty does **not apply** in cases of:

- Improper setup, operation, or maintenance
- Accidents, physical damage, or misuse
- Modifications or repairs not authorized by Neurotechnology
- Normal wear and tear
- Any events or circumstances beyond Neurotechnology's control

The warranty is **void** if the product's **serial number has been altered or removed**, or if the **casing has been opened, tampered with, or repaired by unauthorized personnel**.

Support

If you experience any issues or have questions about your **BrainAccess** product, please contact **Neurotechnology** for assistance.

Technical support related to hardware or connectivity problems — such as device malfunction, charging issues, power or Bluetooth connection failures — is provided free of charge.

Requests for consulting, experimental setup, data analysis, or custom application development may be subject to additional service fees.

BRAINACCESS®
developed by ***NEUROtechnology***

Other EEG Systems

BrainAccess MINI

BrainAccess MIDI

BrainAccess MAXI

Neurotechnology UAB

Laisvės pr. 125A, Vilnius, LT-06118, Lithuania

+370 5 252 2400

brainaccess@neurotechnology.com

www.brainaccess.ai

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