



Explore

Quick Start Guide

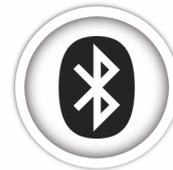
Overview

Thank you for purchasing a Mentalab **Explore** device.

Mentalab Explore is a versatile, high-end solution for biomedical recordings that provides research-grade precision in a mobile format.



Enjoy a 12h battery life, 1kHz sampling rate, 24 bit resolution, and 9-axis motion data.



Stream data to Bluetooth for real-time analysis at over 10 meters.



Record to internal memory and work offline using our extensive open-source software.

Getting started

This guide contains basic information to start streaming and recording data with your Mentalab Explore device.

For more extensive information regarding safety and usage, please refer to the user manual. Further guidelines and instructional videos can be found at mentalab.com.

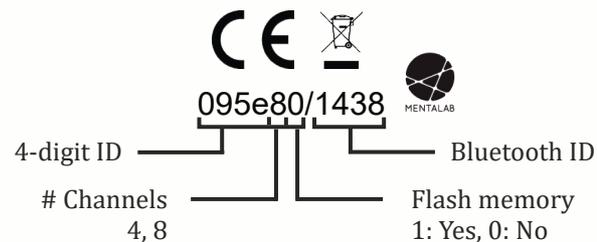
Package contents

- Mentalab Explore device in shockproof case.
- USB 2.0A to micro-USB cable.
- Electrode sets and caps of your choice.
- Electrode gel and cleaning solution (optional).

Device configuration

Your Explore device's configuration is encoded on the device label on the back of the device.

An 8-channel device without flash memory and Bluetooth name "Explore_1438" would appear as follows:



Getting started

Technical specifications

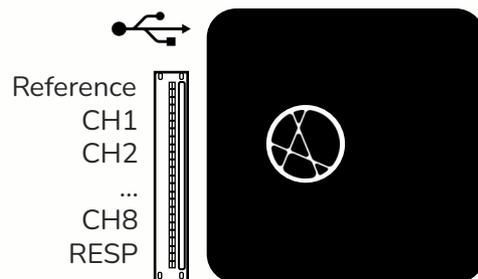
| | |
|--------------------------|---|
| No. channels | 4, 8 |
| Sampling rates | 250 (default), 500, 1000 Hz |
| Dimensions | 41 x 42 x 17 mm |
| Battery life | Up to 8 hr online, 12 hr offline |
| Differential input range | ± 400 mV |
| Input impedance | 1 GΩ |
| Resolution | 24 bit resolution, 0.4 μVrms noise |
| USB output interface | USB 2.0 |
| Additional sensors | Gyro-, accelero- and magnetometer: 20 Hz Device temperature, battery: 1 Hz |
| Flash memory size | 512 MB |
| Bluetooth range | Approximately 10 m |

Collecting data

1. Charge the device via USB. A green LED indicates sufficient battery. Disconnect from the power source prior to use.
2. Connect the cable set to the device and place the electrodes on the body. Each channel records against a unipolar reference electrode. The order of the electrodes is shown below. Use the Velcro strap to secure the device to an EEG cap.
3. Push the power button to start the device. It will now record data to internal memory, if present.

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- Two blue blinks per second indicate that the device is visible via Bluetooth. The device's Bluetooth name is Explore_XXXX. The last four digits on the device's label are its Bluetooth ID.
- Once a Bluetooth connection to the host machine has been established (see Section: API), the Explore device will start transferring data via Bluetooth. Use Explore's open-source APIs to access impedance values, visualize the signal stream, change device settings, and more.
- Press the device button once to set a mark during the recording. A pink LED signal indicates that a marker has been set.
- Turn off the device after use. To do so, hold the power button for three seconds until the LED blinks red three times. Always shut down the device before connecting it to USB.



Instructions

This table describes Explore's LED light codes:

| LED color | Blinking pattern | Indicates |
|------------------------|-----------------------------------|--|
| Red Yellow Green | At device startup, about 3 sec | Startup in progress. The color indicates the battery level (green > 60%, yellow > 30%) |
| Blue | Blinking 2x / sec | Bluetooth visible and advertising |
| Blue | Blinking 1x / sec | Bluetooth visible and connected to host machine. Online mode in progress |
| Green | Blinking 1x / 3 sec | Bluetooth is inactive. Offline mode in progress |
| Pink | Blinking 1x / sec | Not enough space in memory. Press the button twice to free up space |
| Light pink | One time flash | Button has been pressed: a marker with the timestamp corresponding to the button event is stored and transmitted |
| Red | Flash 3x | Device shutting down |

Connection

To pair your Explore device with a mobile or computer, use the standard Bluetooth menu. Explore uses a Serial Profile Protocol (SPP) to transfer raw data as soon as a Bluetooth connection is established.

If the connection is lost, the device will revert to Bluetooth-visible mode, which means it is ready to reconnect. Explore remains in this state for four minutes. After this, it moves to offline mode if the device has internal memory, or else shuts down.

Instructions

Data

Explore samples ExG data at 250 Hz (default) with a 24-bit resolution. The device also records and transmits accelerometer, gyroscope, and magnetometer data. This means you can derive the absolute orientation of your device at all times. The device also communicates its temperature and battery voltage continuously.

Data are stored in a binary file (.BIN suffix) in flash memory. To retrieve data from the device, connect Explore to a computer via USB. Files cannot be deleted via USB, instead they must be overwritten. To format the memory (and delete all previous data), use our open-source APIs. Please refer to the user manual or website for more details.

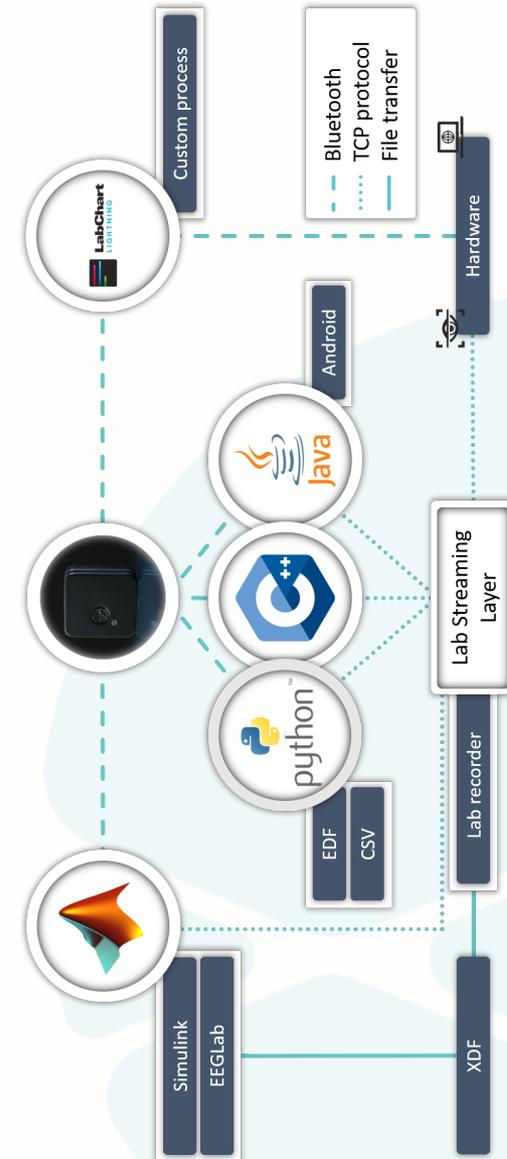
Software

Capture and visualize data using Explore's APIs written in Python, C++, Java, and MATLAB. Everything is open-source. To contribute, please open a pull request at: <https://github.com/Mentalab-Hub>.

`exp1orepy`, written in Python, is our most mature API. It provides an extensive set of tools that allow you to build customized biosignal applications. For detailed instructions on how to install and use `exp1orepy`, please visit: <https://explorepy.readthedocs.io>.

Explore Desktop is our newest software. It provides a graphical user interface to `exp1orepy`, allowing you to measure impedances, visualize data, push to LSL, and set event markers using graphical buttons, rather than a command-line.

API diagram



Contact

Mentalab is a biomedical technology company from Munich, Germany.

Mentalab Explore is a high-end, mobile measurement device for biosignal applications.

Mentalab Explore is used by researchers and scientists around the world in applications ranging from brain-computer interfaces to sleep and neuropsychology research.

Our team is always happy to support you in developing your own innovative solutions.



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<https://mentalab.com>



<https://github.com/Mentalab-Hub>



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