Bitbrain

Versatile biosignal amplifier

Versatile and flexible amplifier for mobile physiological monitoring in human-behaviour research.

Bitbrain

About Bitbrain

We fusion neuroscience and engineering to develop the latest generation of practical neurotechnology integrated in solutions with high value for our society.

Bitbrain was founded in 2010 as a spin-off company of a research team from the University of Zaragoza (Spain), a pioneer in approaching brain-computer interface applications outside research labs. Its DNA holds all knowledge in neurotechnology, biomedical engineering, artificial intelligence and data science accumulated at the university since 1998.

Today, the company is a reference with over 600 individual institutions in more than 35 countries relying on our products to advance the penetration of neurotech research and development in our society.

Equipment

Innovative and practical EEG, biosignals, eye trackers and other complementary human monitoring technologies to approach real world research.

Bitbrain Viewer Software

Software for data acquisition and visualization, with large compatibility with real-time I/O and data processing third parties.

Bitbrain Software Development kit

Software kit consisting of different scripts that allow communication and control of the hardware used. It is a starting point for the development of brain-computer interface applications.

Human Behaviour Research Lab

Labs for experimental design and data collection with 30+ sensor modalities seamlessly synchronized, and data analysis including a wide range of emotional and cognitive biometrics.

Versatile biosignal amplifier

Mobile and versatile biosignal amplifier to monitor up to 35 physiological variables simultaneously with milli-second synchronization.

Versatile Bio is a mobile and practical real-time biosignal acquisition amplifier, which provides great **flexibility** to monitor a large number of simultaneous physiological variables together **allowing freedom of movement**. It can record for **8+ hours up to 35 simultaneous channels** of analogue biosignals (GSR, ExG, RESP, TEMP, etc.), movement activity and location (ExG, IMUs,etc.), behaviour inputs (pedals and push buttons), and communication inputs/outputs (LPT, digital, etc.).

Combine it **seamlessly synchronized** with biometric devices and scientific research software platforms for even deeper insights into human behaviour.

Products

Versatile Amplifier

Mobile and compact amplifier with up to 21ch (multiplexed to 35ch) for monitoring behavioural signals.

Amplifier inputs/outputs

- 9 bipolar analog inputs
- 7 unipolar analog inputs
- 2 digital COM inputs (extensible to 16)
- 1 digital Input
- 1 digital Output
- 1 internal IMU

Physiology Sensor Kit

- 9x ExG bipolar lead + GND lead
- 1x respiratory effort band
- 1x air flow sensor
- 1x GSR sensor
- 1x BVP sensor
- 1x temperature sensor
- 1x snore sensor
- 1x (3) buttons box
- 1x TTL cable
- 1x optical trigger (photodiode)

Motion Sensor Kit

- IMU units (x16)
- IMU multiplexer (x2)9x ExG

Customized Sensor Kit

Any combination of all the biosignals, movement, localization and behavioural sensors.

Key features

Flexible for all types of research

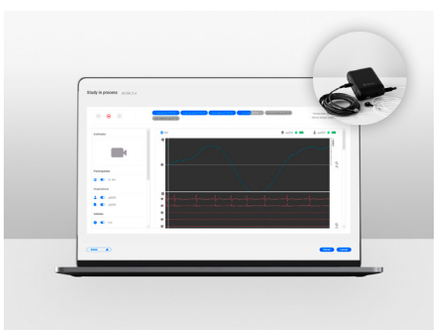
Mobile amplifier that provides maximum freedom of movement with remote/ local monitoring. Maximum flexibility and multiple combinations of sensor modalities.

35 biosignals simultaneously

Acquire simultaneously bipolar electrical biosignals (ExG), analogue biosignals (GSR, RESP, TEMP, etc.), movement and location (IMUs), behaviour inputs (push buttons), digital inputs / outputs (LPT, etc.).

Millisecond sync of all sensors

All the biosignals and inputs are digital at a 256 Hz sampling rate, so all the signals are synchronized with a precision under <4 milliseconds. Hardware sync also with other equipment thanks to the digital I/O.



Highest standard of data quality

High sensor quality in an innovative system with stable contacts to mitigate mechanical artifacts. Active shielded ExG to mitigate electromagnetic interferences and artifacts caused by movement.

Fast and intuitive set-up

The amplifier can be placed on the arm, waist or leg. The sensor setup follows standard procedures with an intuitive operation and minimal learning time.

Easy maintenance and storage

All sensors require low maintenance using off-the-shelf consumables, and are packed with the amplifier in a suitcase for easy storage and transportation.

Data stream and recording

Real-time streaming of raw data via Bluetooth and on-board SD card recording. Develop applications on Windows and Linux using the SDK, and export data to CSV.

Compatibility with scientific platforms

Compatible with Matlab (EEGLAB, BCILAB, etc), Python (MNE), LabStreamingLayer (BCI2000, OpenVibe, NeuroPype, etc), and Bitbrain Human Behaviour Lab.

Sync with other biometrics

Seamless integration with more than 30 complementary technologies such as EEG, eye trackers, indoor positioning systems, microphones and cameras, and many more.

Versatile Bio

Compact and mobile equipment to simultaneously monitor 21ch (extensible to 35ch) of physiological variables with outstanding signal quality and millisecond synchronization.

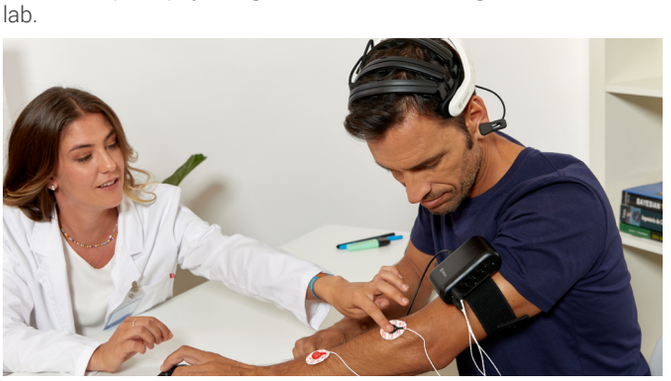
- **Mobile and compact**
  Multi-purpose technology that is easy to set up and wear.
- **21+ channels**
  That can monitor up to 35 physiological variables with millisecond sync.

- **Advanced electronics**
  Active shielding with optimized DRL to improve SNR and reduce artifacts.
- **Flexible position**
  The amplifier can be placed on the arm, waist or leg.
- **Connectivity and storage**
  Bluetooth real-time data streaming and local SD storage.
- **Battery**
  8+ hours in streaming and in local SD storage.

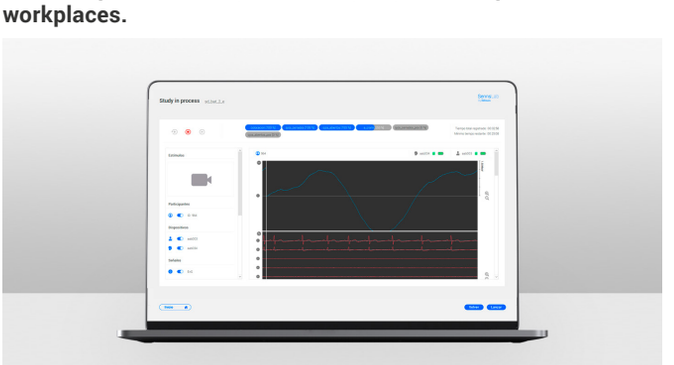
Some applications

Explore new research scenarios in **psychology and neuroscience** with a complete physiological human monitoring in or out-of-the lab.

Understand physiological correlates in real world applications such as **sports science, education, UX, or in the professional workplaces.**



Perform **clinical research**, new neurorehabilitation therapies, or assessment/interventions based on physiological responses.



Learn about the physiological correlates of human behaviour in combination **with EEG, biometrics, VR technologies, etc.**

Technical overview

Versatile technology to monitor up to 35 physiological variables simultaneously.

Wireless, mobile, compact and ultralight (172g). Very easy to use.

Reliable biosensing monitoring up to 256Hz and 24 bits during 8+ hours. Bluetooth streaming and/or on-board SD storage.

Minimal maintenance and easy to transport (everything fits in a suitcase).

Hardware specifications

Sensors	
Biosignal channels	9x bipolar ExG + GND 6x Auxiliary analog inputs (analog sensors like GSR, RESP, TEMP, BVP...) 2x Auxiliary digital inputs (sensors like IMU). • Streaming mode: Up to 2 HUB (1 on each input to multiplex up to 8 IMU on each input. • Backup mode: Only 1 HUB to multiplex up to 8 IMU in the selected input. 1x Digital input (3 bits) 1x Digital output (1 bit)
Wireless Amplifier	
Sampling rate	256 SPS at 24 bits
Bandwidth	DC – 100Hz (3º order LPF)
Integrated sensors	Integrated IMU (9 axis): accelerometer, gyroscope and magnetometer
Input range and noise	± 420 mV, < 4 µVRMS (0.5 – 30Hz) @256Hz (Bipolar ExG) ± 2.5 V, < 10 µVRMS (0.5 – 30Hz) @256Hz (Analog AUX)
CMRR / Input impedance	> 100 dB @50Hz, > 50 GΩ
Data streaming and storage	
Data transmission and range	Bluetooth 2.1 + EDR with 10 meters in direct sight.
Data backup / files	Yes (removable micro SD card) / CSV (max 8GB. Class ≥ 10)
Power	
Battery	Rechargeable lipo battery. Charging time <3h
Autonomy	> 8 h
General	
Weight	172gr.
Amplifier maintenance	Not required
Sensor maintenance	Off-the-shelf consumables
Warranty	2 years
Certifications	CE and CB, with EN 60950, EN 55032, EN 55024

Software specifications

Software compatibility (included with equipment)	
Bitbrain real-time SDK	In C/C++ for Windows and Linux.
Bitbrain data acquisition and visualization suite	Live visualization, streaming or SD recording, data export in CSV and raw data visualization.
Third parties real-time I/O	LabStreamingLayer LSL compatibility (Matlab, Python, BCI2000, OpenVibe, NeuroPype, etc).
Third parties data processing	Matlab (EEGLAB, FieldTrip, BCILAB, etc), Python (MNE, etc) and more.

Bitbrain software platforms (optional)	
Bitbrain Viewer Software	Software for data visualization and recording, with large compatibility with real-time I/O and data processing third parties.
Bitbrain Software Development Kit	Software kit consisting of different scripts that allow communication and control of the hardware used. It is a starting point for the development of brain-computer interface applications.
Bitbrain Human Behaviour Research Lab	Practical research platform for experiment design and data acquisition with 30+ sensor modalities seamlessly synchronized and analyzed with a wide range of emotional and cognitive biometrics available.

Bundle includes

- Amplifier
- Power supply
- Instructions
- Suitcase
- Arm and waist adjustable band
- Physiology Kit
- Motion Sensor Kit
- Bitbrain Software Kit

Additional services

Online training
Our team provides a training course that includes the installation of your system and software.

Real-world research and applications

Bitbrain

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