BrainFlow Documentation

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BrainFlow is a library intended to obtain, parse and analyze EEG, EMG, ECG and other kinds of data from biosensors.

It provides a **uniform data acquisition API for all supported boards**, it means that you can switch boards without any changes in code and applications on top of BrainFlow are board agnostic. Also there is **powerful API to perform signal processing** which you can use even without BCI headset. Both of these two APIs are the same across bindings.

Table 1: Required inputs

Board	Board Id	BrainFlowInputParams.serial_port	BrainFlowInputParams.mac_address	BrainFlowInputParams.ip_address	BrainFlowInputParams.ip_port	BrainFlowInputParams.ip_address_port	BrainFlowInputParams.other_info	BrainFlowInputParams.timeout
Streaming Board	BoardIds.STREAMING_BOARD (-2)	•	•	multicast IP address	port	•	Board Id of master board	•
Synthetic Board	BoardIds.SYNTHETIC_BOARD (-1)	•	•	•	•	•	•	•
Cyton	BoardIds.CYTON_BOARD (0)	dongle serial port(COM3, /dev/ttyUSB0, /dev/cu.usbserial-xxxxxx...)	•	•	•	•	•	•
Ganglion	BoardIds.GANGLION_BOARD (1)	dongle serial port(COM3, /dev/ttyUSB0, ...)	Optional: Ganglion's MAC address	•	•	•	•	Timeout for device discovery(default 15sec)
Cyton Daisy	BoardIds.CYTON_DAISY_BOARD (2)	dongle serial port(COM3, /dev/ttyUSB0, /dev/cu.usbserial-xxxxxx...)	•	•	•	•	•	•
Ganglion Wifi	BoardIds.GANGLION_WIFI_BOARD (4)	•	•	Wifi Shield IP(default 192.168.4.1)	any local port which is free	•	•	•
Cyton Wifi	BoardIds.CYTON_WIFI_BOARD (5)	•	•	Wifi Shield IP(default 192.168.4.1)	any local port which is free	•	•	•
Cyton Daisy Wifi	BoardIds.CYTON_DAISY_WIFI_BOARD (6)	•	•	Wifi Shield IP(default 192.168.4.1)	any local port which is free	•	•	•
BrainBit	BoardIds.BRAINBIT_BOARD (7)	•	•	•	•	•	Serial Number of BrainBit device	Timeout for device discovery(default 15sec)

1.1 Streaming Board

BrainFlow's boards can stream data to different destinations like file, socket and so on. This board acts like a consumer for data streamed from the main process.

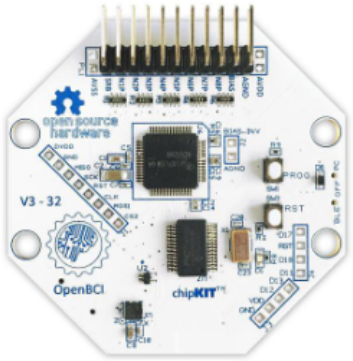
To use it in the first process you should call:

```
# choose any valid multicast address(from "224.0.0.0" to "239.255.255.255") and port
start_stream (450000, 'streaming_board://225.1.1.1:6677')
```

- communication: None

1.3 OpenBCI

1.3.1 Cyton



Cyton Getting Started Guide from OpenBCI.

To choose this board in BoardShim constructor please specify:

- board_id: 0
- serial_port field of BrainFlowInputParams structure

Supported platforms:

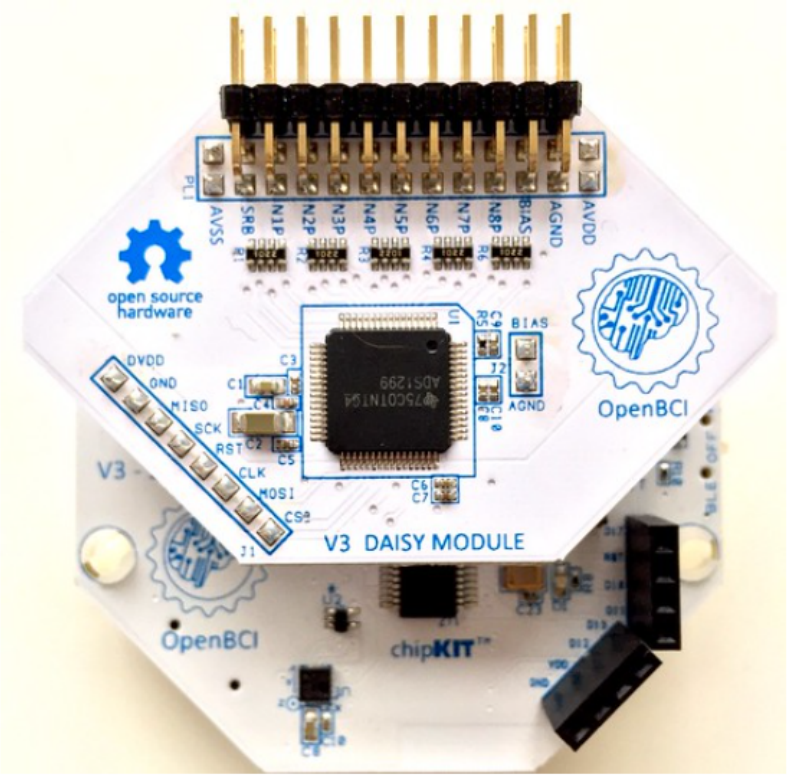
- Windows >= 8.1
- Linux
- MacOS

On MacOS there are two serial ports for each device: /dev/tty.... and /dev/cu.... You HAVE to specify /dev/cu....

Board Spec:

- num eeg(emg,...) channels: 8
- num acceleration channels: 3
- sampling rate: 250
- communication: serial port
- signal gain: 24

1.3.3 Cyton Daisy



CytonDaisy Getting Started Guide from OpenBCI.

To choose this board in BoardShim constructor please specify:

- board_id: 2
- serial_port field of BrainFlowInputParams structure

Supported platforms:

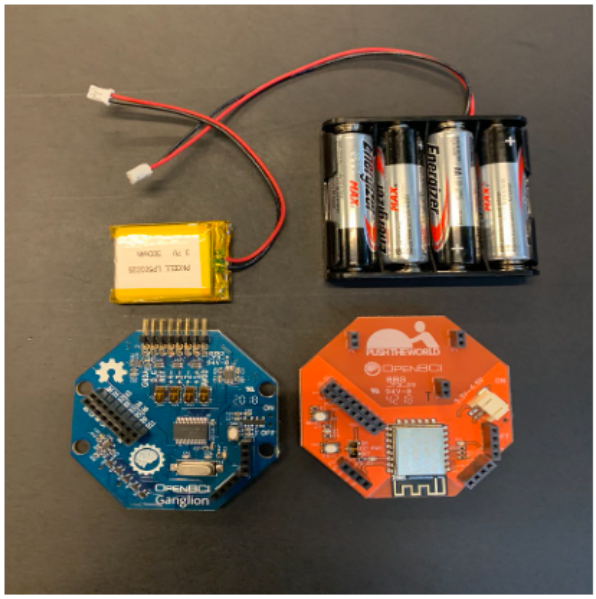
- Windows >= 8.1
- Linux
- MacOS

On MacOS there are two serial ports for each device: /dev/tty..... and /dev/cu..... You HAVE to specify /dev/cu.....

Board Spec:

- num eeg(emg,...) channels: 16
- num acceleration channels: 3
- sampling rate: 125
- communication: serial port
- signal gain: 24

1.3.4 Ganglion with WiFi Shield



WiFi Shield Getting Started Guide from OpenBCI.

WiFi Shield Programming Guide from OpenBCI.

To choose this board in BoardShim constructor please specify:

- board_id: 4
- ip_address field of BrainFlowInputParams structure should contain WiFi Shield Ip address(in direct mode its 192.168.4.1)
- ip_port field of BrainFlowInputParams structure should be any local port which is free right now

Supported platforms:

- Windows >= 8.1
- Linux
- MacOS

Board Spec:

- num eeg(emg,...) channels: 4
- num acceleration channels: 3
- sampling rate: 1600
- communication: TCP socket to read data and HTTP to send commands

1.4 NeuroMD

1.4.1 BrainBit

BrainBit website.

To choose this board in BoardShim constructor please specify:

- board_id: 7
- other_info field of BrainFlowInputParams structure should contain Serial Number of BrainBit device
- optional: timeout field of BrainFlowInputParams structure, default is 15sec

Supported platforms:

- Windows >= 10
- MacOS

Board Spec:

- num eeg channels: 4
- num acceleration channels: None
- sampling rate: 250
- communication: Bluetooth Low Energy