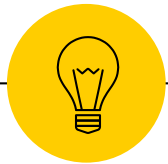
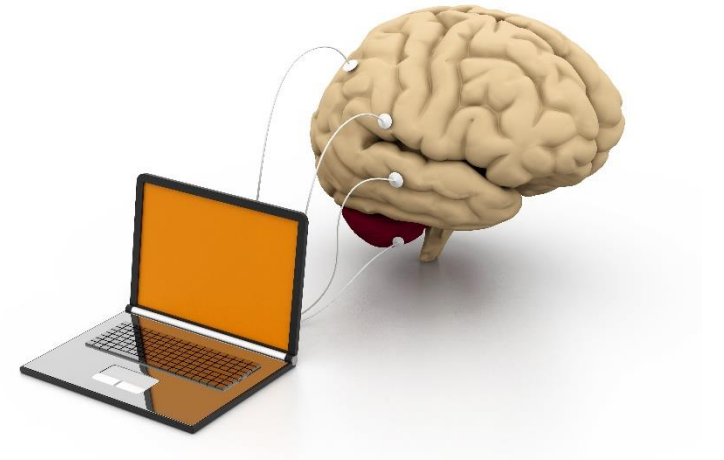




English guide to record bio signals  
neurofeedback, and biofeedback

[www.ScienceBeam.com](http://www.ScienceBeam.com)



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# eProbe



Acquisition & analysis software



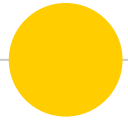
## About eProbe software

- eProbe is a specialized software in C and C# language, which is constantly updated by Science Beam's software development team.
- The latest version of the software is downloadable from Science Beam's website.
- Using this software requires an online activation upon obtaining the activation code.
- This software is customized to display and analyze various biological signals.
- This software is modular so that the user can easily design its page based on his/her need.
- This software is very simple, functional, and user-friendly.
- eProbe provides users with the ability to sync online with different special analysis software.



## Compatible Devices

- EProbe software is applicable to the following devices that are made by Science Beam company:
  - eWave
  - eWave
  - +eLab
  - eLab +
  - Biosense
- This software is also used to take Hospital-EEG. eWave is also used to record and analyze neurofeedback and biofeedback data.



## eWave Device



- Science Beam's eWave device is designed, produced, and optimized for recording and analyzing neurofeedback data.
- eProbe software is designed to work with the previously mentioned devices. By using this software, you will be able to record and display brain waves, design and carry out neurofeedback treatment protocols and perform relevant analysis.
- This software can only be installed on “Windows 10” operating systems.



eWave+  
24

eWave  
2/4/6/8



# eWave



## Specifications:

Sampling rate: 1000 samples per second (can be increased up to 15000 samples if using a USB cable)

8 Channel EXG recording

Digital input /output

Bluetooth/USB

24-bit resolution

Embedded Rechargeable Battery

Weight: 144 gr





# eWave Setup and Operation

Launch button:

Status LED :

Press once to turn the ON

To turn the device off, press and hold if for 3 seconds.

**Red light**

Flashing (first 15 seconds) is for device Preparation time

Flashing constancy indicates low battery

**green light**

Rapid Flashing shows the device is properly connected to the computer and is recording signals.

**Slow Flashing** every 2 seconds, explains the device is ON, but it is not recording.

**Blue Light**

This means the connection is through the USB cable and the device is ready to use



# eWave Setup and Operation

## Port A / B

- The EXG signal recording cable can be connected to both ports A or B.
- Port A is the only active port on 2 and 4 channel devices.
- Port B is only active on 8-channel ( and up) devices (channel 5 to 8 is for recording signal from port B).

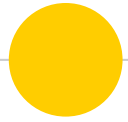
## Charger/ USB

- Charge the device using USB cable type B.
- USB port is also to connect the device to a computer.

## Digital Input / Output

- This port is assigned to digital inputs & outputs and the manufacturer's settings (calibration).
- Do not use this port to record EXG signals





# eWave+ Setup and Operation

## Launch button:

Status LED :

Press once to turn the ON

To turn the device off, press and hold if for 3 seconds.

## Red light

Flashing (first 15 seconds) is for device Preparation time

Flashing constancy indicates low battery

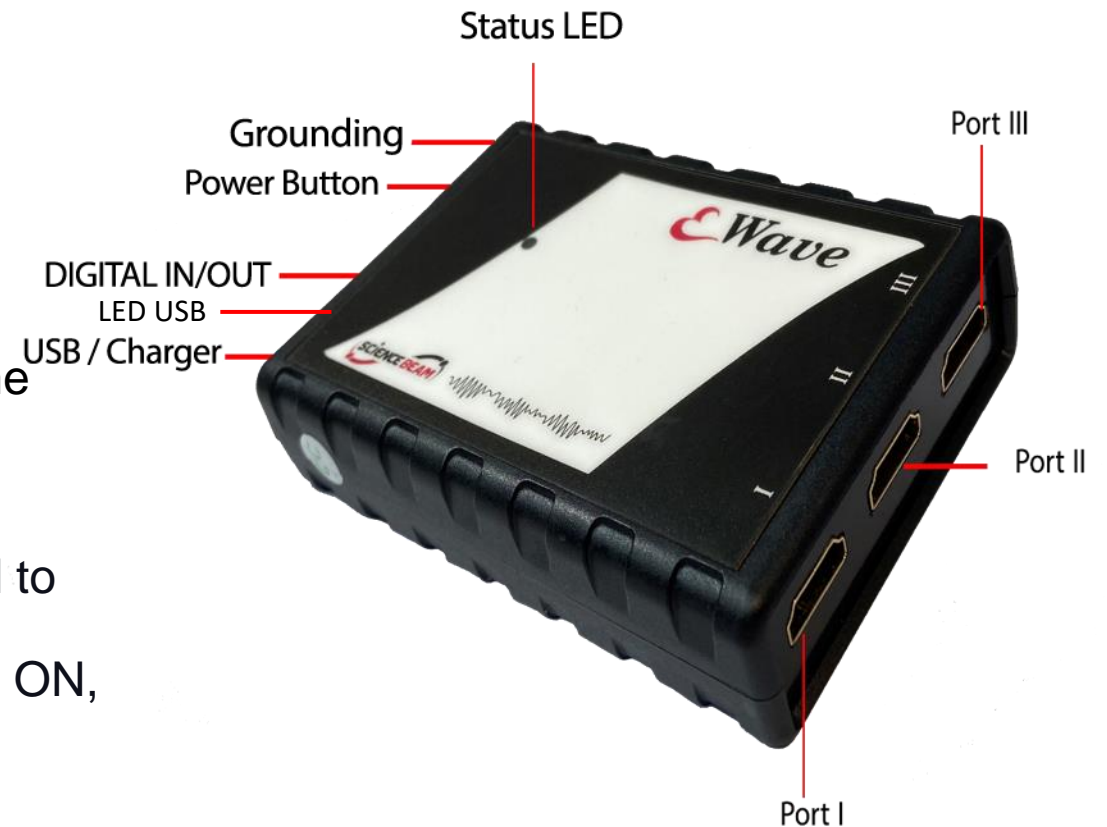
## green light

Rapid Flashing shows the device is properly connected to the computer and is recording signals.

**Slow Flashing** every 2 seconds, explains the device is ON, but it is not recording.

## Blue Light

This means the connection is through the USB cable and the device is ready to use



# eWave+ Setup and Operation

## Port I/II/III

- EEG signal recording cables are connected to the following ports:
- Cable 1 connects to port I, cable 2 to port II and cable 3 to port III.

## Charger /USB

- Charge the device via USB-B.
- Use this USB port to connect the device to a computer.

## Digital input / output

- This port is assigned to the digital inputs and outputs and the manufacturer's settings for calibration.
- **Do not use this port to record EXG signals**



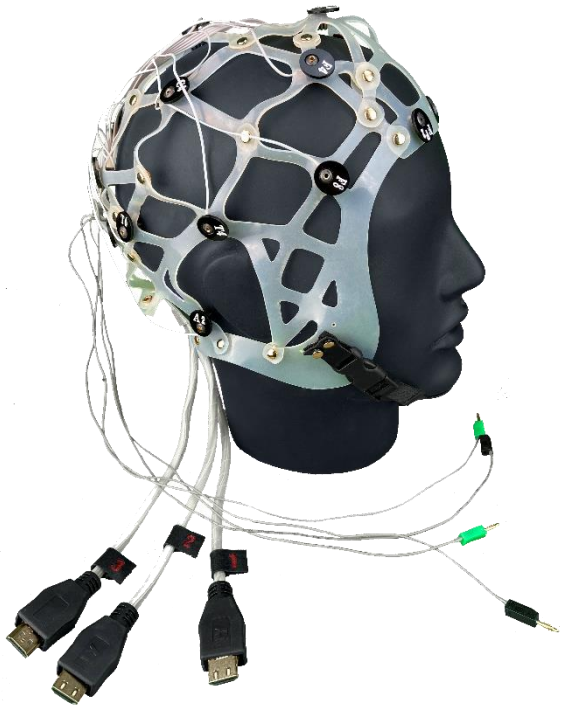
# Biosense Device (biofeedback)



- **Temperature sensor:** Measures body temperature instantaneously.
- **GSR sensor:** This sensor measures skin resistance and perspiration rate.
- **EXG sensor:** This sensor measures the brain, heart and muscle signals.
- **Respiratory sensor:** This sensor measures the rate ,and depth of respiration.



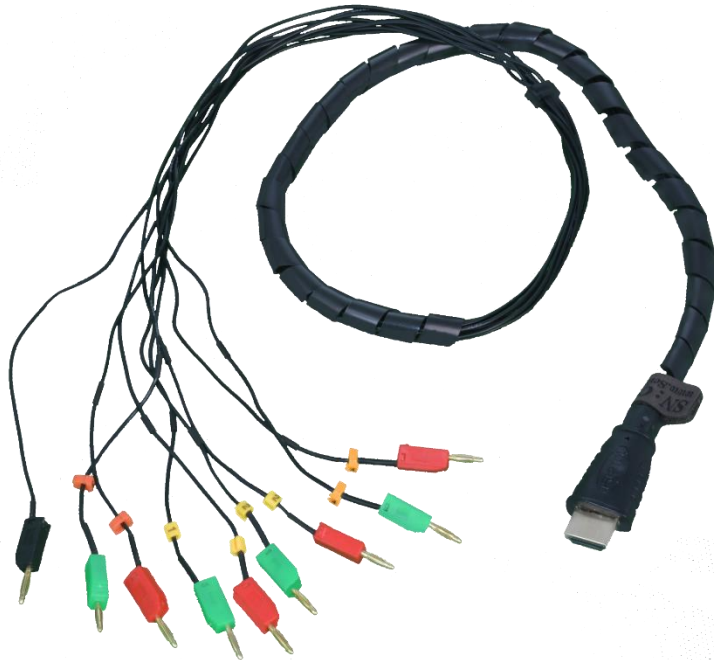
## Cables and Accessories



- 2/4/8 channel cables
- Lead
- Disk electrode
- Ear clips
- Earth (grounding) Cable
- Neurofeedback and QEEG caps
- USB cable
- Syringe
- Gel
- Chest Leads



## 2/4/8 Channel Cable



4 channel cable

☉ 3 sets of color coded wires:

**Red**: Active (positive) wire

**Green**: Reference (negative) wire

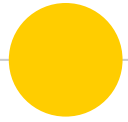
**Black**: Ground wire

## Chest lead, Lead and Disk electrode

- Leads are designed to attach to the chest leads this method allows taking recording without the need to use a cap or to cover the points that are not covered by a cap
- The reference and the ground wires can be attached to the back of the ear using a lead.
- Make sure to apply EEG paste while using the disc electrode



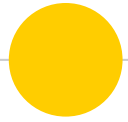




## Ear Clips



- Using ear clips provides a higher quality recording with less noise.
- Ear clips are used to connect the reference and ground wires to the ear.
- Apply a small amount of EEG paste to attach the clips to the ear
- Make sure to clean the ear clips after each use



## USB Cable and Ground Connection

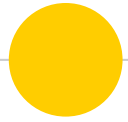
- Use the Ground wire for noise reduction.
- To avoid excessive noise in the signals, do not attach the Ground wire to a painted or coated surface
- For wired recording as well as charging the device, use USB cable.



Grounding wire



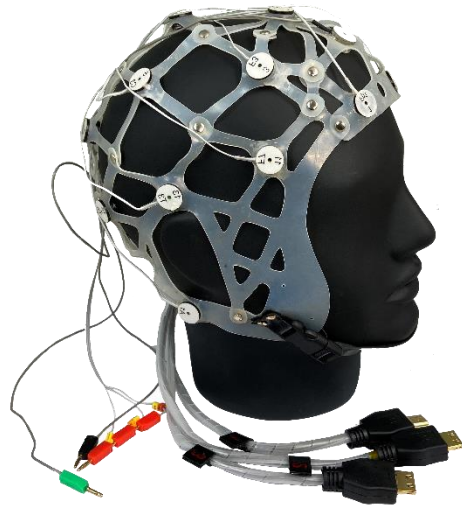
USB cable



## Neurofeedback and QEEG Cap



Neurofeedback Cap



QEEG Cap

- Using the QEEG cap does not require a connection to the Active wires. You need to make sure it connected the Reference and Ground wires.
- An adequate amount of gel must be injected to obtain an accurate recording
- The fixed points on the cap are set in compliance with "10-20" standard system.
- Caps are available in three sizes; small, medium, and large.



- Excessive use of the gel results in reduced quality recording.
- The application of the syringe is only used to apply some gel on the skin surface therefore it is not invasive
- Ear clamp must be cleaned with alcohol after each application.

---

1

# eProbe Software Installation

Let's begin

---



## eProbe Software Installation

- Download the Setup.exe file from Science Beam's website
- You can also use the following link to download the program; <https://sciencebeam.com/download/eProbe.zip>
- After installation, run eProbe.exe shortcut file from your desktop.



setup.exe



eProbe 8.1



Product Selection

Which eProbe product you want to install?

Neurofeedback/Biofeedback

Neuroscience Research

Install Flash Player

Flash Player should be installed. Do you want to install it now?

YES

Install Flash Player

Flash Player should be installed. Do you want to install it now?

YES

Select Installation Folder

The installer will install eProbe 7.0.1 to the following folder.

To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse"

Folder:

Install eProbe 7.0.1 for yourself, or for anyone who uses this computer:

Everyone

Just me

Select neurofeedback / biofeedback product

Check YES to install Flash Player

\*\*\*Select to install USB driver

If you want the program to be installed in a specific location, enter its path. Otherwise the program will be installed at the default installation location

Application shortcut on the desktop

eProbe 8.1



Installation Complete

eProbe 7.0.1 has been successfully installed.

Click "Close" to exit.

Please use Windows Update to check for any critical updates to the .NET Framework.

Installation Complete

Adobe Flash Player 14.0 Installer

ADOBE FLASH PLAYER 14.0

I have read and agree to the terms of the Flash Player License Agreement.

Read the license here.

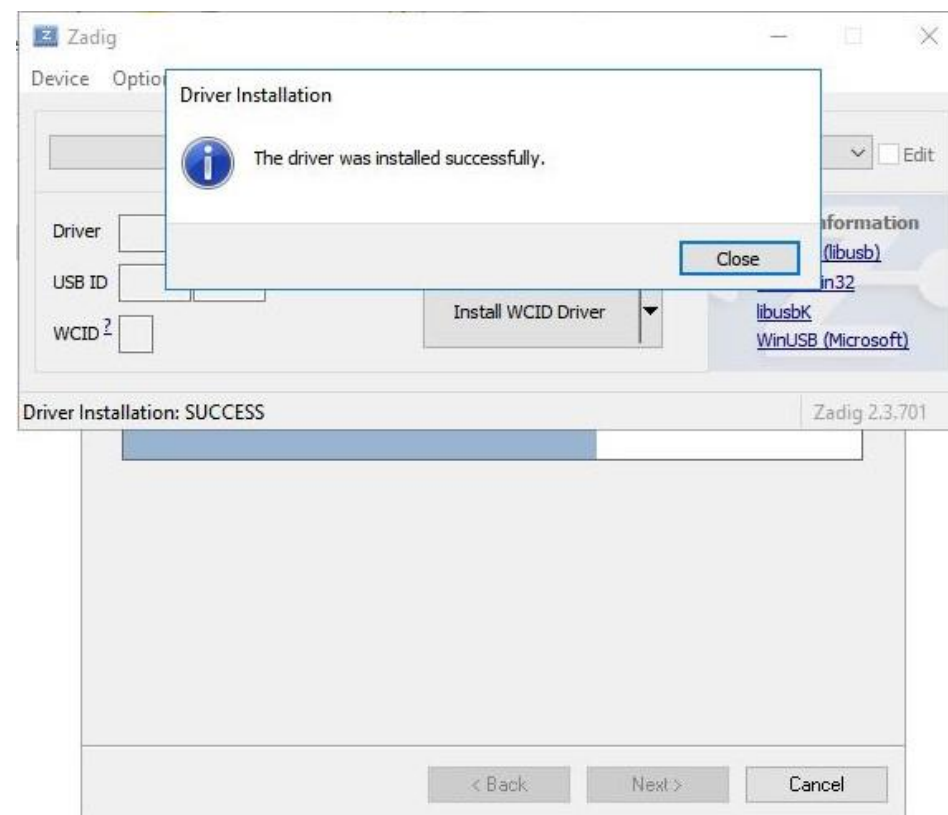
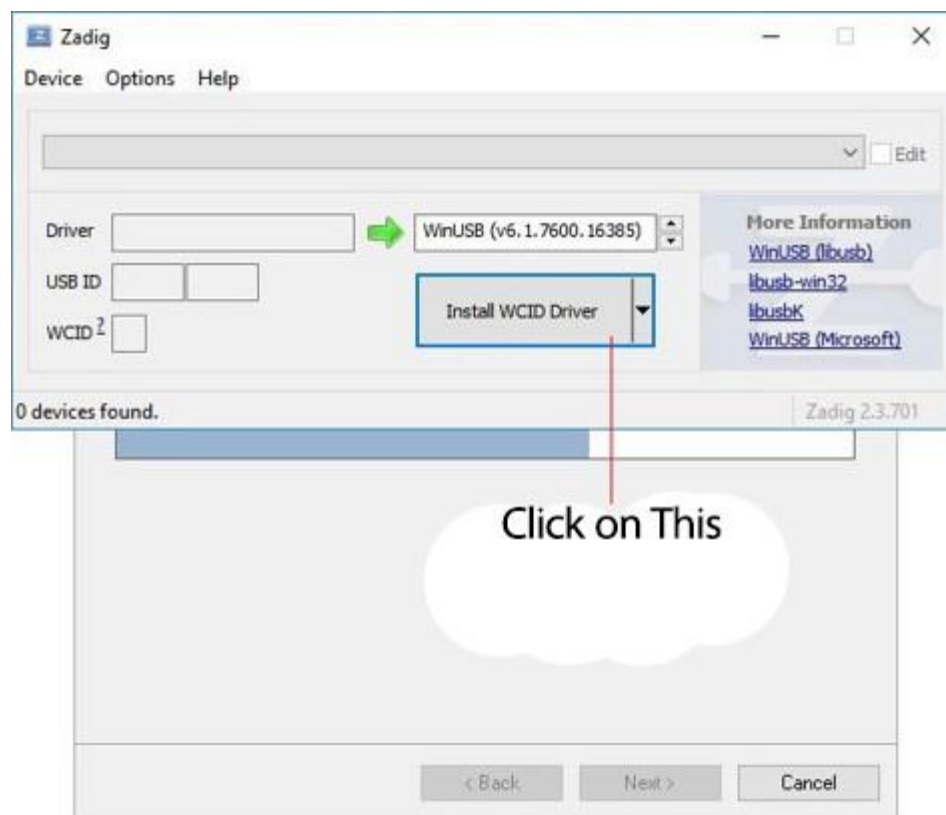
QUIT INSTALL

Flash Player Installation



# USB driver installation

☉ Click “install WCID driver” to install this driver





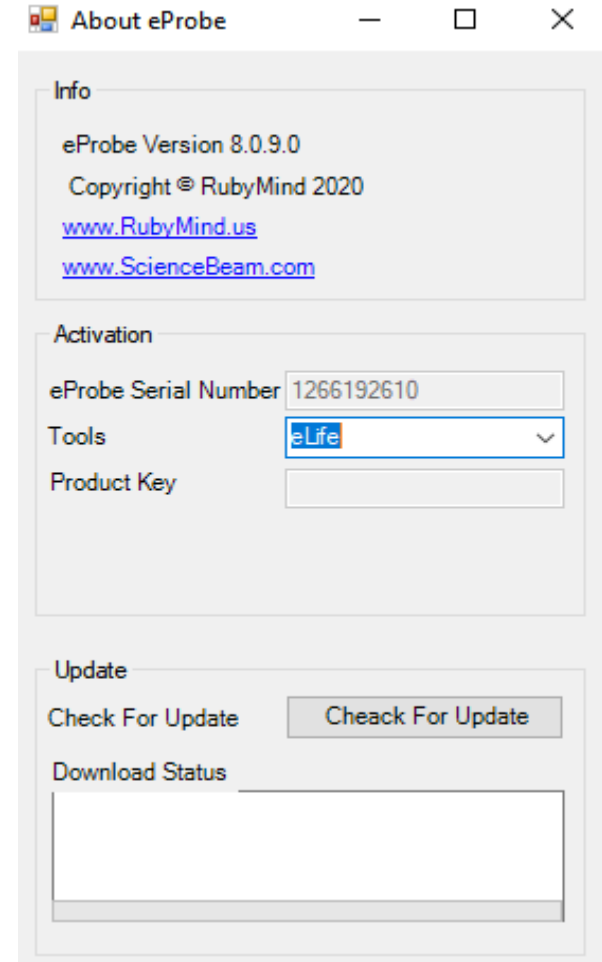
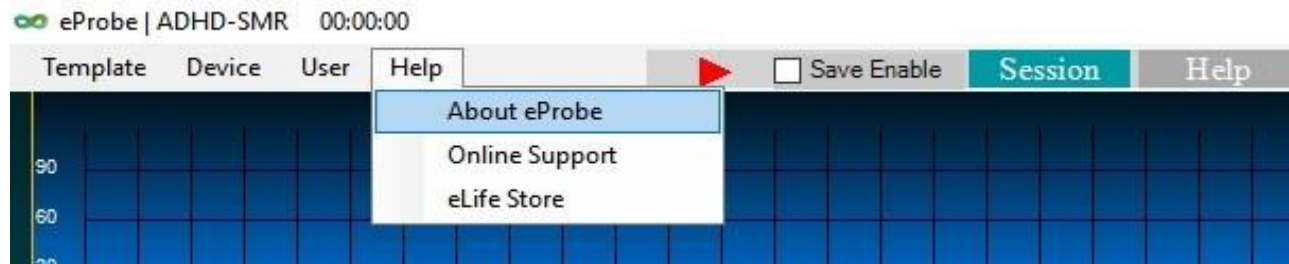


# eProbe Software Activation



eprobe 8.1

- Run the eProbe.exe shortcut file from your desktop.
- "eProbe is not activated" error message means that the application is not activated
- **Program registration:**
- **Help menu >About eProbe >Copy eProbe serial number**
- **Contact Science Beam Company to receive your activation code and enter the code in the Product Key field to activate the software**



These folders are located where the software is installed :

**Database, Protocol, Recorded Files**

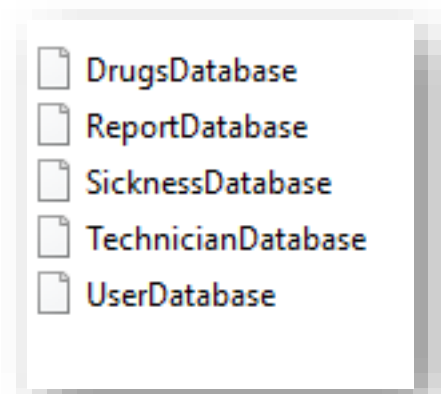
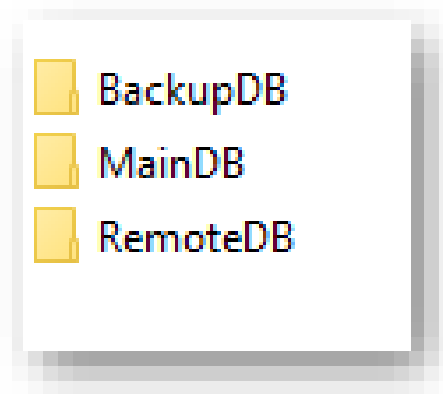


“



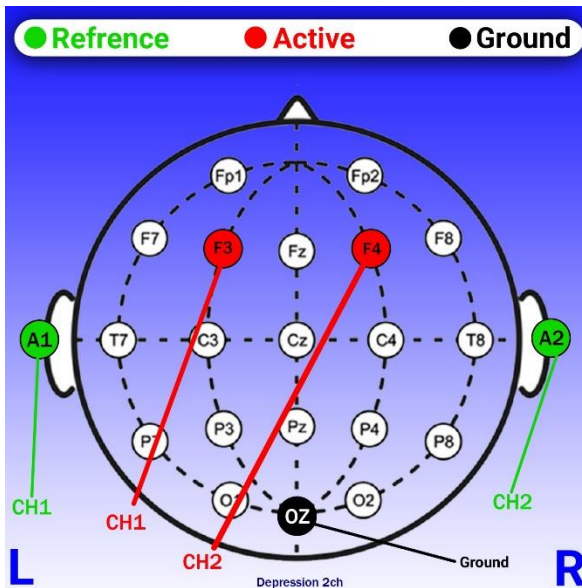
## Database Folder

- This folder contains patients' information; such as technicians' names, registration reports, disease, and medication history. This folder is necessary for opening each recorded file.
- Please back up your databases regularly to protect your patients' data.

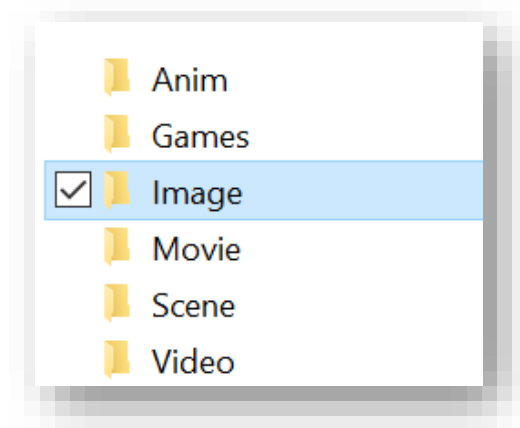




# Protocol Folder



- You can download your favorite files such as Music, Movie and Video (except for Flash games), and put them in the following path to run in the software, for example:
- Drive C → Rubymind → eProbe → Protocol
- Then place each file in its related folder

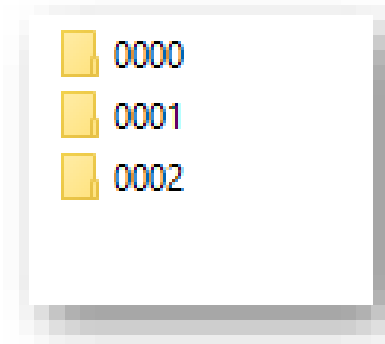




## Recorded Files Folder

- Each reference has an encrypted folder.
- Clients' recorded files are encrypted and stored in the patient's folder.
- Saved files cannot be traced without a database.
- For transferring data to another system, in addition to the saved files, the database must be also transferred. For event included recordings (e.g. blindfolded), both recorded and event file are saved.

Name	Type	Size
0042	File	375 KB
0054	File	1,649 KB
0054.Event	EVENT File	1 KB
0056	File	225 KB



2

# Running the Program

Let's run



# Running eProbe

- Run eProbe.exe file.
- eProbe environment consists of four menus:

## ➤ Template

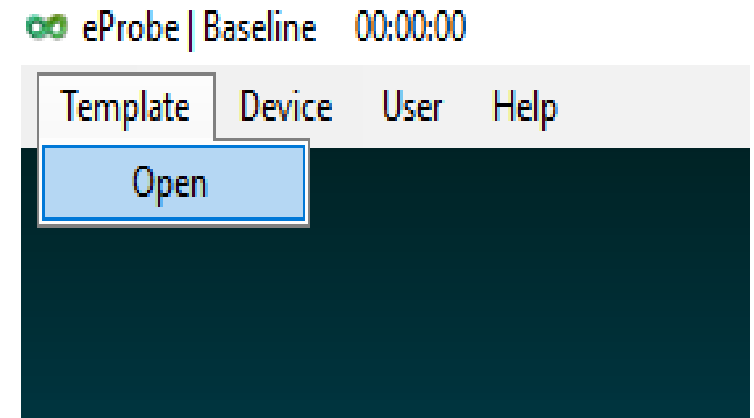
- Open

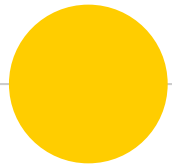
## ➤ Device

## ➤ User

## ➤ Help

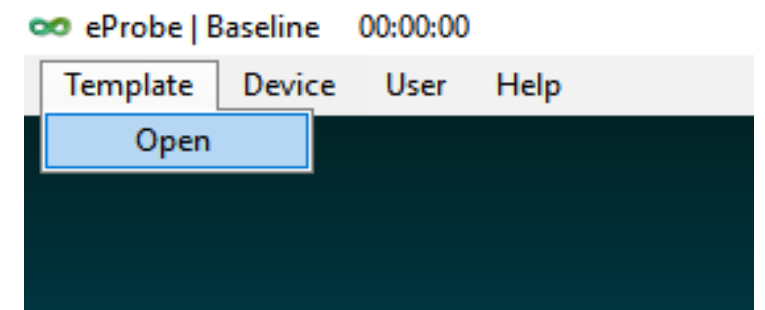
- About eProbe
- Online support
- elife store





# Template Menu

Open

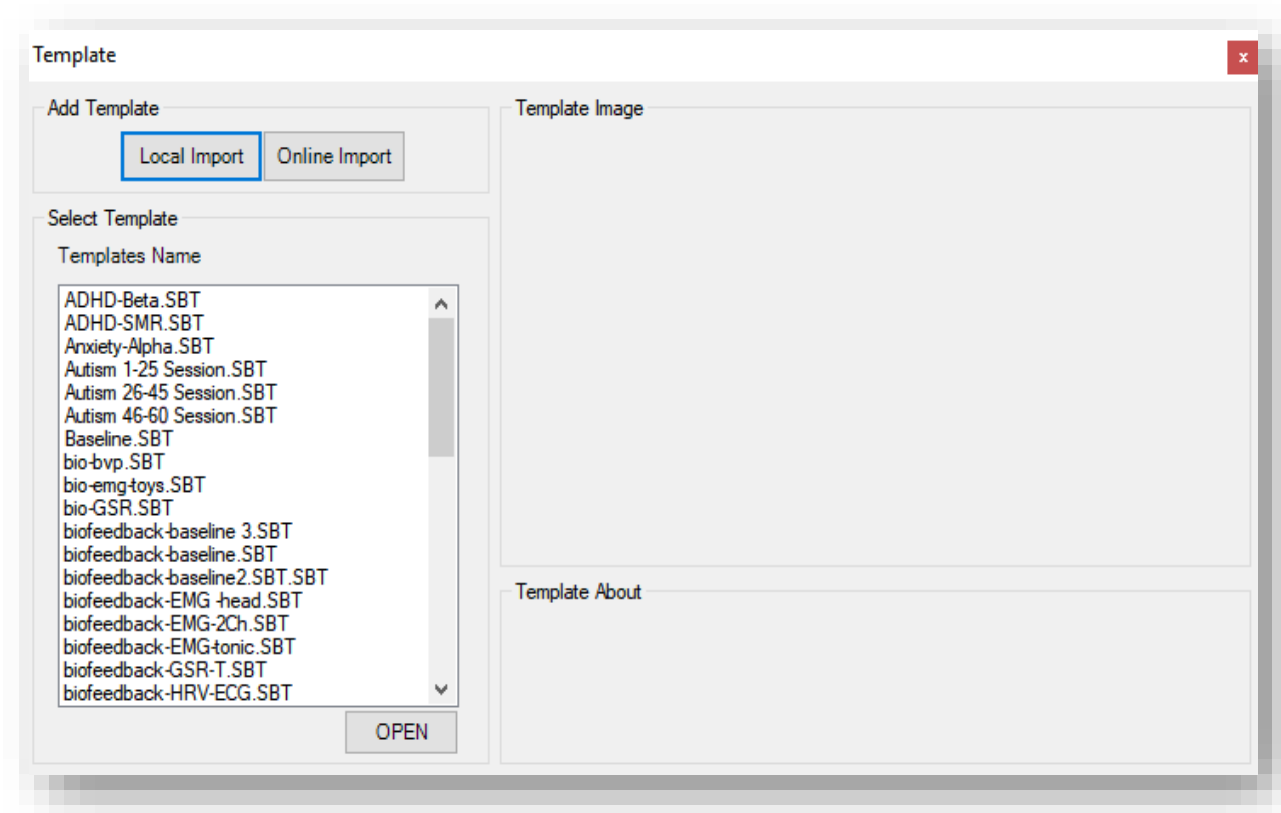






## Template Menu

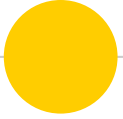
- It is used to access assessment and/or treatment protocols in the protocol folder. The protocol files are in SBT format.
- In order to access each of the protocol files, select one and then click open .





## Local and Online Import

- ⦿ Local import is used to locate protocols from the hard disk. If a protocol is available on your system, but is not visible in the application, use this option to replace it.
- ⦿ Online import: With this option you are able to download the protocols you need. First you must select the protocol you want, then click on “start download and import”. The file will be added to the protocols section automatically.

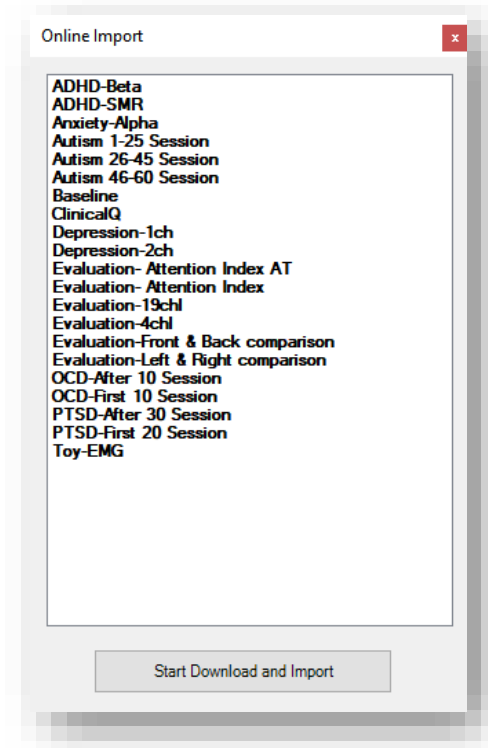
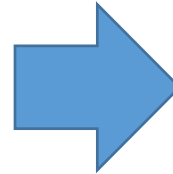
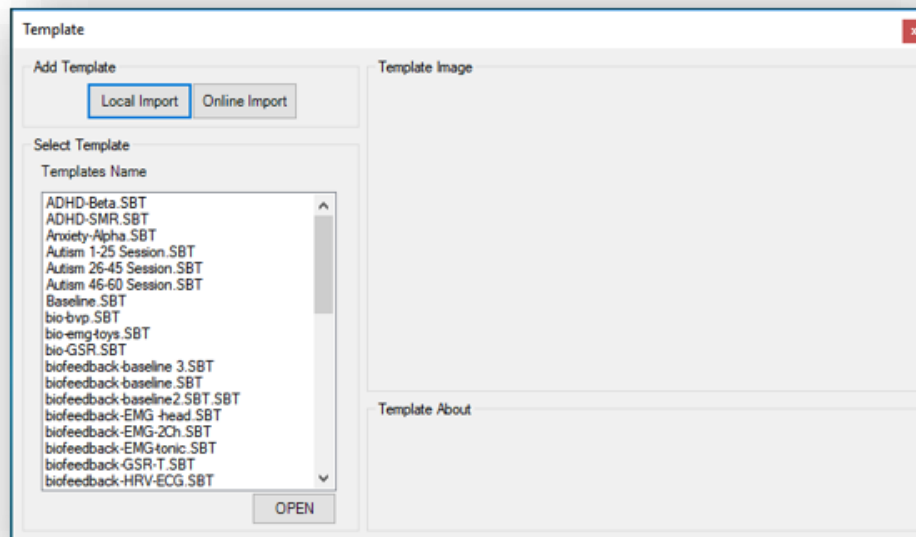


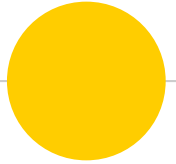
# Online Import of protocols

☉ In the template menu you are able to download neurofeedback protocols.

☉ Steps:

Template import → Open → Online import → Start download and





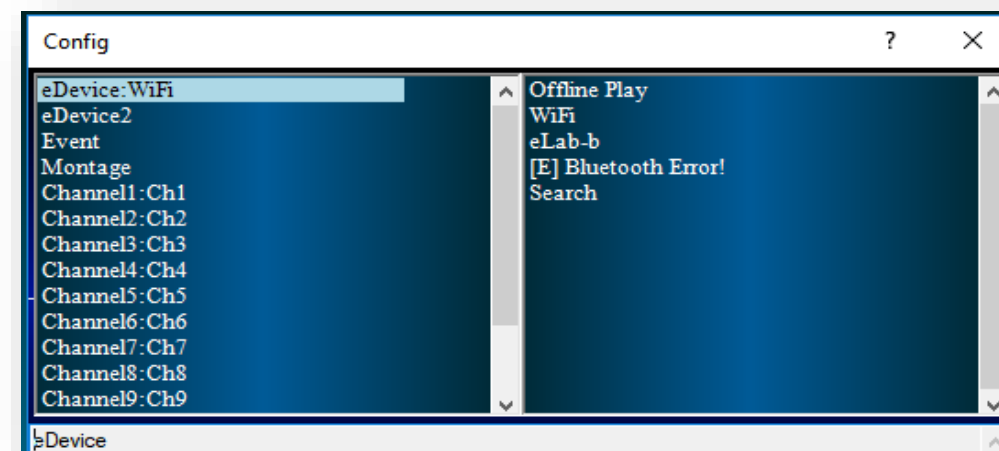
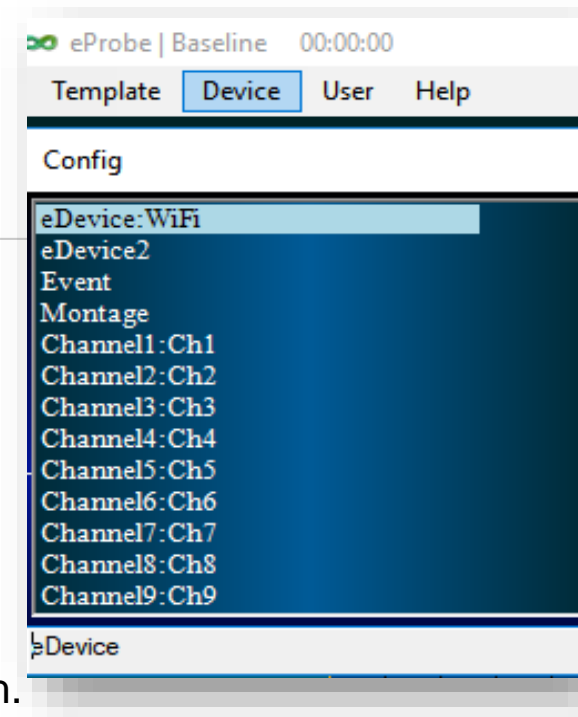
Device settings

# Device Menu



## Device settings menu

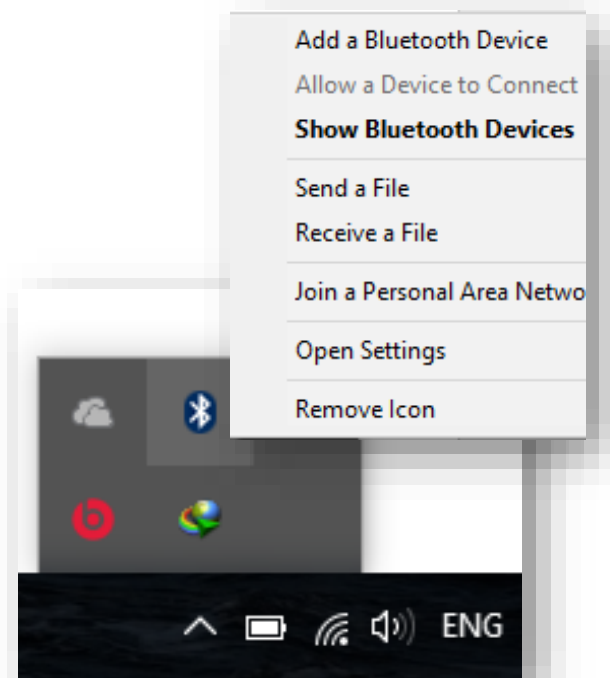
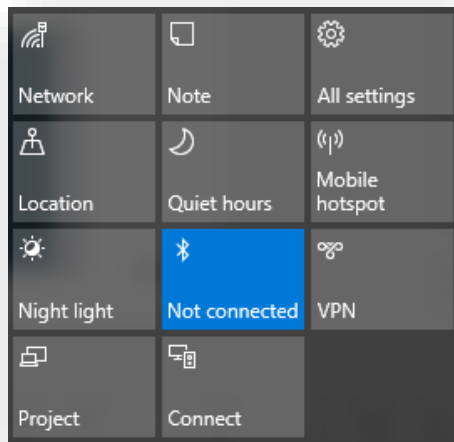
- Device settings window includes:
- eDevice: Searches and specifies the device's connection mode to the computer.
- Offline Play: in order to work with pre-saved data (from the “User” menu) without any connection to a device.
- Search option: It is used to find a device that is connected to the computer via Bluetooth.
- If it is connected through a USB cable, the “USB @ eWave8D \*\*\*\*\* - \*\*\*\*\*” option is displayed automatically.
- The “eLab-b” option has other applications which do
- not apply to neurofeedback or biofeedback.





# Bluetooth Connection

- If your system lacks a built-in Bluetooth adapter, you must use a Bluetooth dongle.
- Connect the Bluetooth dongle to the computer and install the driver from CD and make sure your Windows Bluetooth connection is enabled.
- in Windows 10 right-click on the Bluetooth icon in the taskbar and select “Add a Bluetooth Device”.

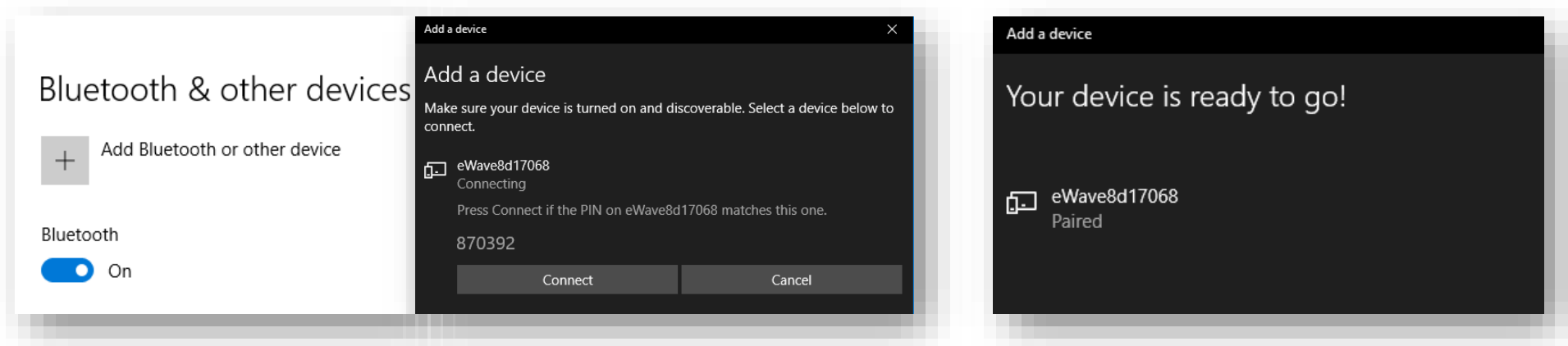


**Bluetooth Dongle**



## Bluetooth Connection

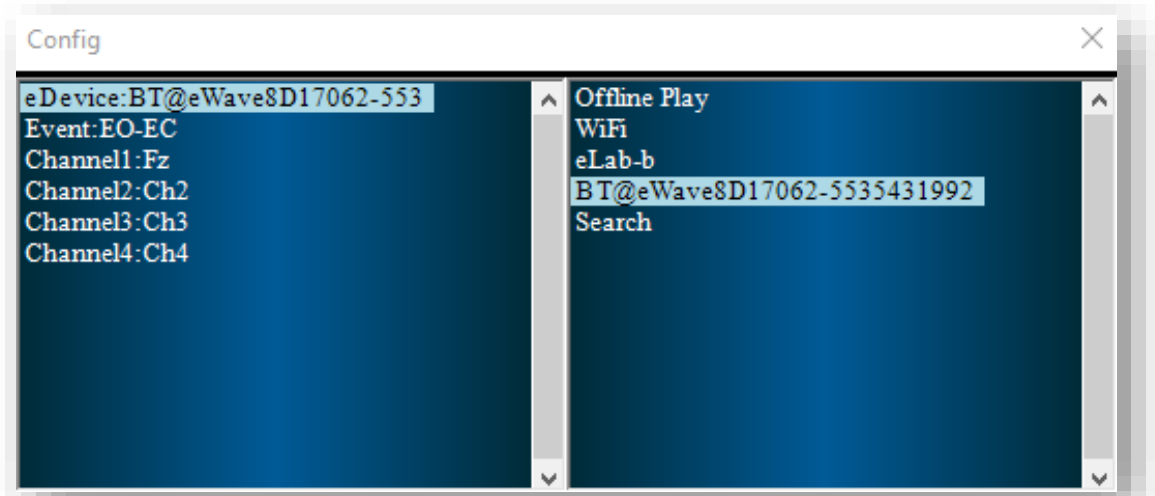
- In the opened page, select “Add Bluetooth or other device” and in “Add a device” window, select the name of your device and then click Connect (eWave device must be turned on). If the device connects successfully, a message will appear stating that the device is ready to use.





## Device settings menu - Bluetooth connection

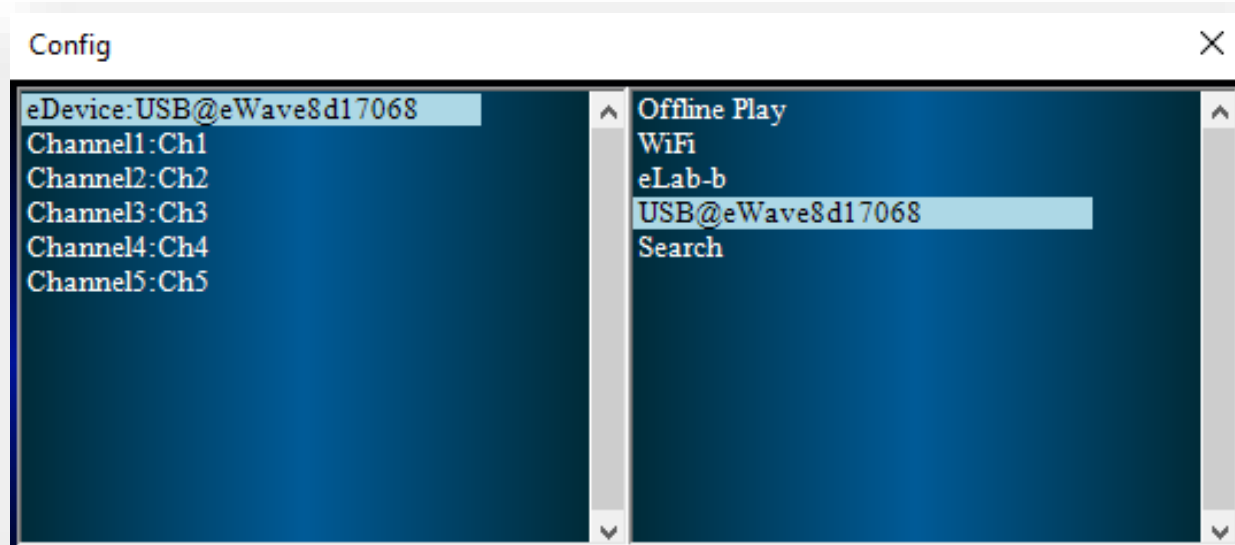
- To use the device via Bluetooth, connect the Bluetooth dongle to your computer and make sure your computer's Bluetooth is enabled. Then turn the device ON and click on the Search option in the opened window. Wait for the device to be recognized by your computer.
- The device is identified as "BT@eWave8D\*\*\*\*\* - \*\*\*\*\*" The 5-digit code shown after "eWave8D" must match the code on the back of your device. Click on the name of the device and close the settings window.





## Device settings menu - USB connection

- In order to use the device via a USB cable, connect one end of the USB cable to the device and the other end to a computer. Then turn the device on and click on “Search” option in the window that opens and wait for the device to be recognized by the computer.
- The device is identified as “USB@eWave8d \*\*\*\*\*” , the 5-digit code after “eWave8d” must match the code on the back of your device. Click on the device name and close the settings window.

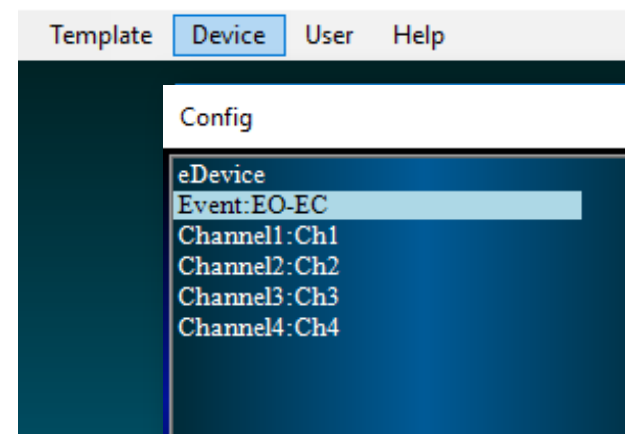
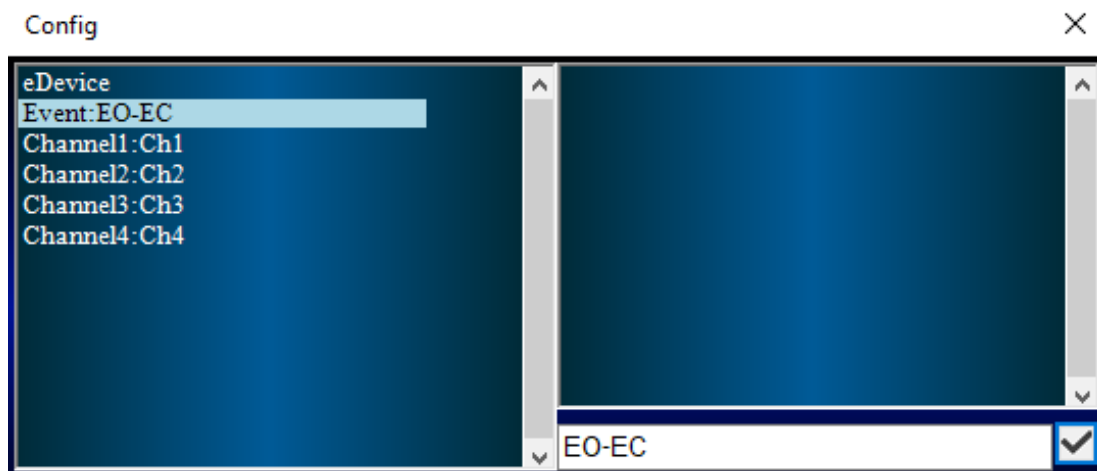




## Device settings menu



- Device settings window consists of the following:
- **Event:** Used to specify the chronological order of events in the recording. For example, to distinguish between eyes-open EEG (abbreviated as EO) and eyes-closed EEG (abbreviated EC), we define two events called EO and EC.
- Each event is separated from the next one by a dash. For example, EO-EC
- The maximum number of defined events is 5, each of them can be used more than once.



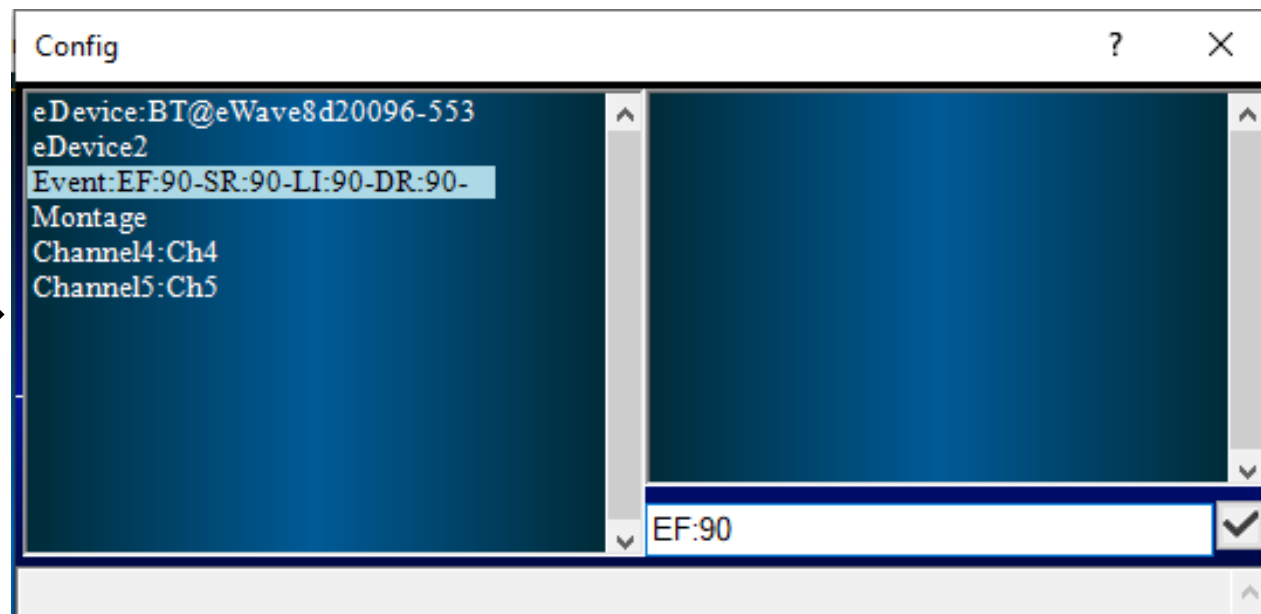
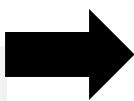


## Setting a Timed Event

- To set the time for an event, first refer to “Device” option, then in the “event” menu, you can set your preferred time for each event.

eProbe | Evaluation-Attention Index AT 00:00:00

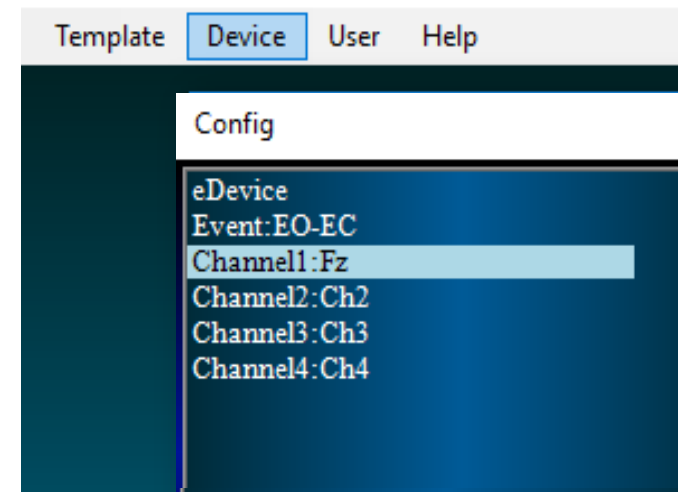
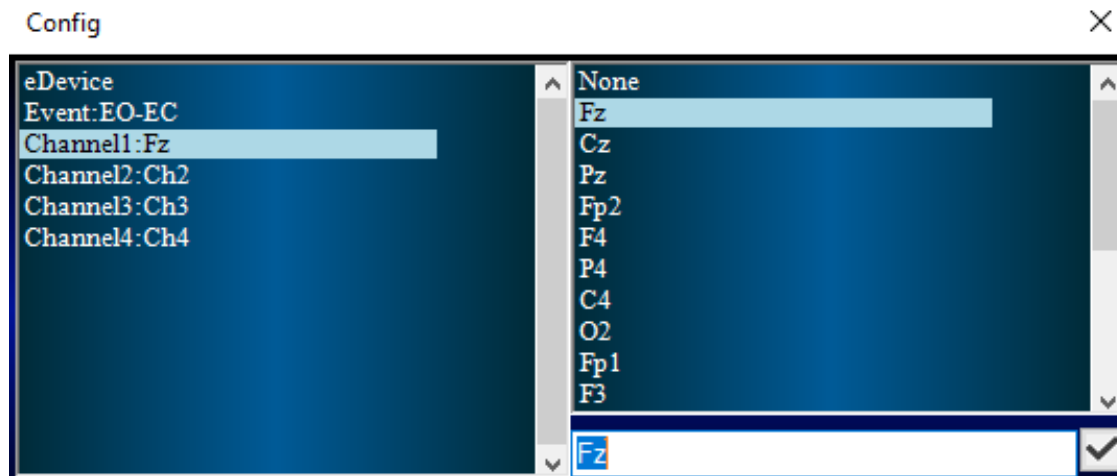
Template **Device** User Help





## Device settings menu

- Device settings window consists of the following:
- Channel: by using this option, you can define a name for each channel.
- For example channel 1 is put on Fz area. By selecting Fz from the window in front of Channel1, this value is assigned to channel 1. For other channels, select the name of the area connected to the head in the same way.



After setting the device and before recording,  
clients information must be added to the  
Database via “User” menu.



“



# User Menu

- ⦿ This menu is used to add technician and patients' data and creating a database.
- ⦿ To record data, first a patient file must be defined and then the record must be made.
- ⦿ Before adding patients, the technician must be added or selected from the existing list.
- ⦿ It is required to enter the 10-digit identification number in order to add the patient.

The screenshot shows a software window titled "Add User" with two main panels: "Add/Edit user" and "Select user".

**Add/Edit user panel:**

- Technician Information:** Includes a text input field labeled "Add New Technician\*" and an "Add" button.
- Client Information:** Includes a "Technician\*" dropdown menu, a "Personal ID\* (10 Digits)" text input field, "First Name" and "LastName" text input fields, an "Age" text input field, "Gender" radio buttons (Male, Female), "Handedness" radio buttons (Righth, Left), a "Phone" text input field, and a "Histoty" text area.
- An "Add Client" button is located at the bottom of this panel.

**Select user panel:**

- Technician Information:** Includes a "Set Technician" dropdown menu.
- Client Information:** Includes a "Search Client" text input field and a "Select Client" list box showing "0-Test User-1111111111".
- Client Recordings:** Includes a large empty list box.
- Comment:** Includes a text area.
- An "OK" button is located at the bottom of this panel.



## Add or Select a Technician

Add/Edit user

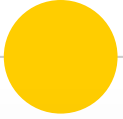
Technician Information

Add New Technician\*

Client Information

Technician\*

- Use “Add New Technician” option to add the name of a new technician or therapist.
- If you have already added the name of the technician or therapist before, you can use the Technician\* option to select the name of previous technician and enter information of the new client below it.



## Add New Client

Personal ID\* (10 Digits)

First Name

LastName

Age

Gender  
 Male  Female

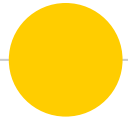
Handedness  
 Righth  Left

Phone

Histoty

- By adding client's 10-digit national identification code in the "Personal ID" field, you are able to define new clients.
- In the following fields, enter client's information including first and last name, age, gender, dominant hand (right-handed or left-handed).
- The "History" section is dedicated to the medical history of the clients and it is recommended that a history of drug use, previous treatments and a summary of mental health examination be included in this section.
- After entering all the required information, by clicking on the "Add Client" button, new client file will be added.





## Selecting previous patients' records

- If client file have been already entered, you can access the information of the client's previous sessions (records taken in previous sessions) from "Select User" option by selecting name of the therapist (technician) and searching for the client's name.
- If you intend to make further record for one client (for example, after a few sessions, to evaluate the treatment process), you can enter new information in the comment section after selecting client's name, and then click ok.
- **Note:** usually, the records of therapy sessions (using treatment protocols) are not saved.

Select user

Technician Information

Set Technician

Client Information

Search Client:

Select Client

0-Test User-1111111111

Client Recordings

Comment

OK



# User Menu

1- Add or select the technician

2- Add or edit the client

Add User

Add/Edit user

Technician Information

Add New Technician\*

Client Information

Technician\*

Personal ID\* (10 Digits)

First Name

LastName

Age

Gender  Male  Female

Handedness  Righth  Left

Phone

Histoty

Select user

Technician Information

Set Technician

Client Information

Search Client

Select Client

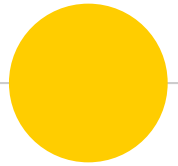
Client Recordings

Comment

3- Select the technician

4- Select the client to record/view

5- Select recording to view



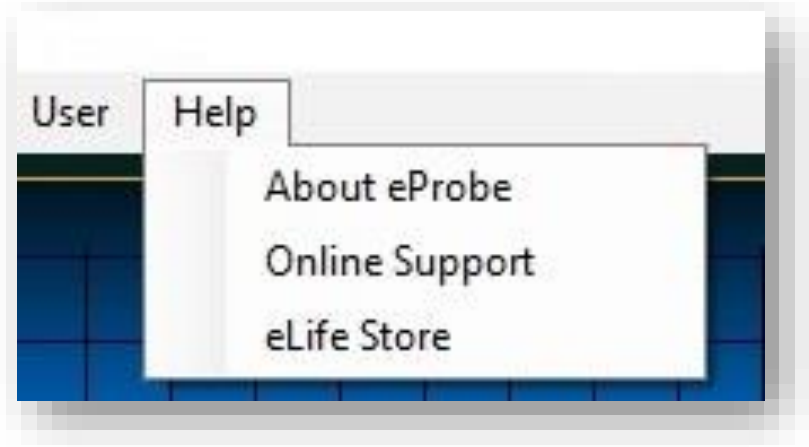
Help

# Help Menu



## Help Menu

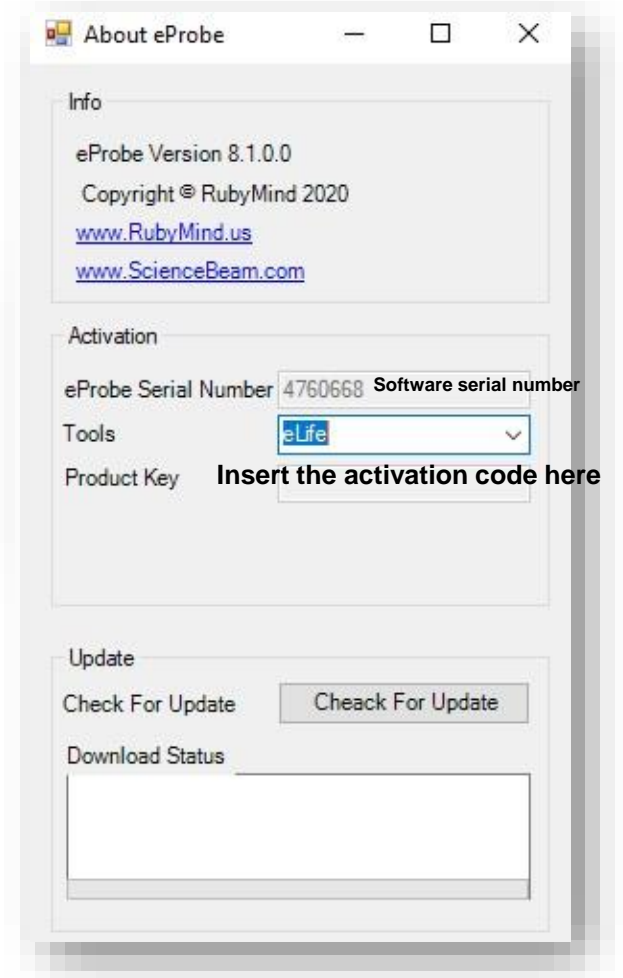
- The Help menu is used to activate the software, online support and to download feedback media (games, music ,videos, etc.).

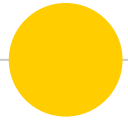




## Help - About eProbe

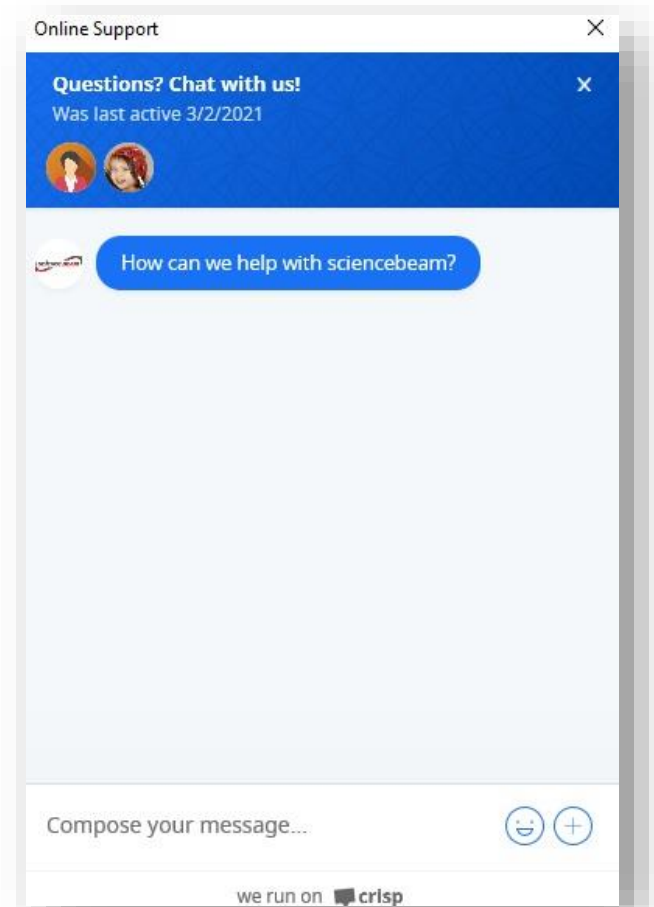
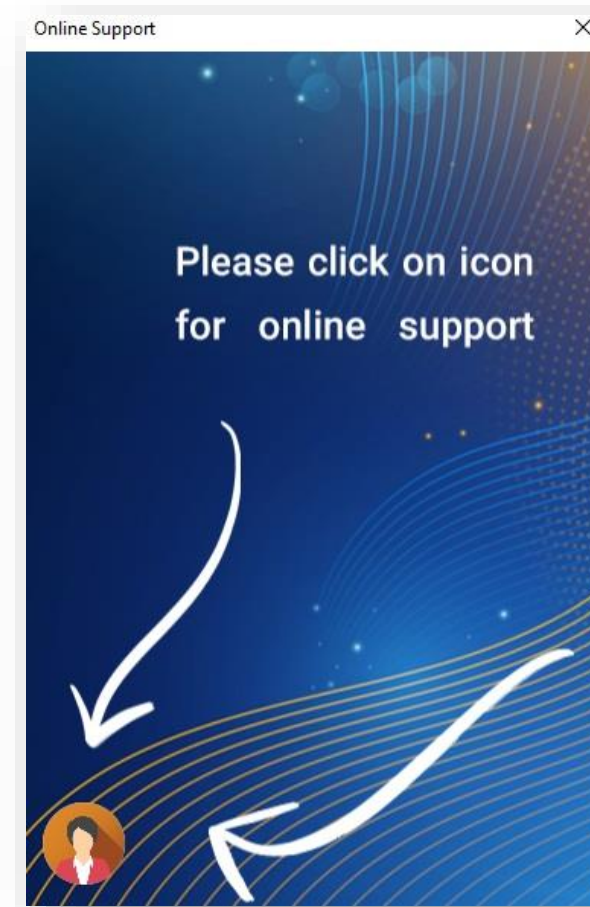
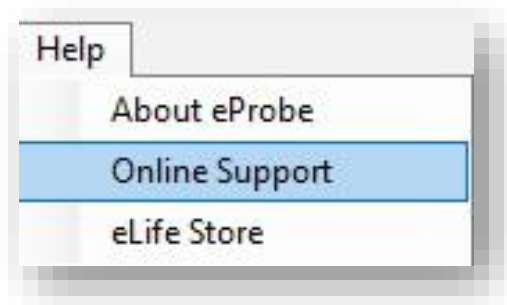
- After installing the software, contact the ScienceBeam support line and announce the serial number of the software.
- In order to activate the software, enter the activation code provided by the company's support in the "Product Key" field.
- By clicking the "Apply" button your application will be activated.

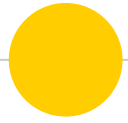




# Help – Online Support

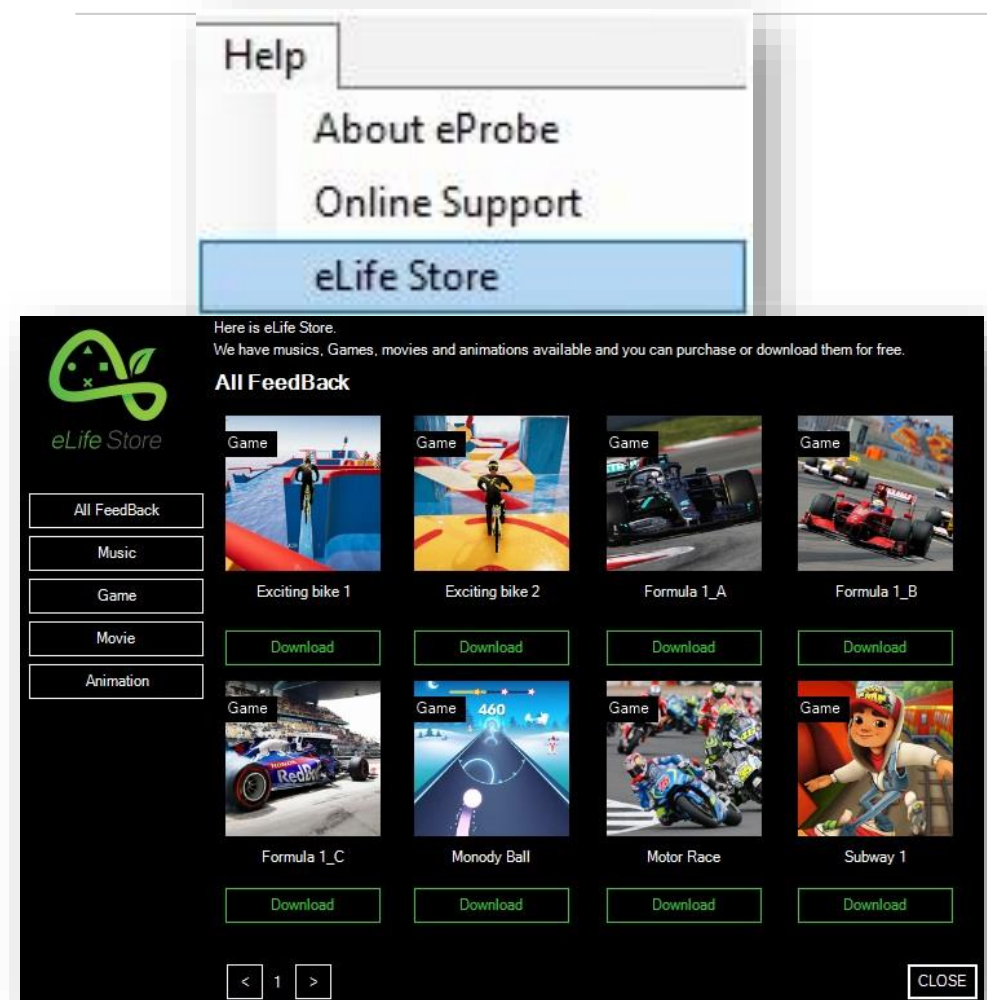
- If you face a problem while using the software, you can use “Help> Online Support” to discuss your problem with the support team.





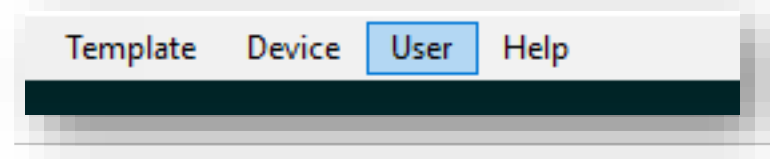
## Help – eLife Store

- To download games, movies, music, etc., you can use the “Help> eLife Store” menu.
- By downloading any of the available feedbacks (games, videos, music, etc.), downloaded file will be automatically placed in its specific folder and you can view it in the software environment immediately.





# Start recording



Add User

Add/Edit Patient

Technician Information

Technician\*  Add New Technician\*

Patient Information

Personal ID\* (10 Digits)

First Name

LastName


Age

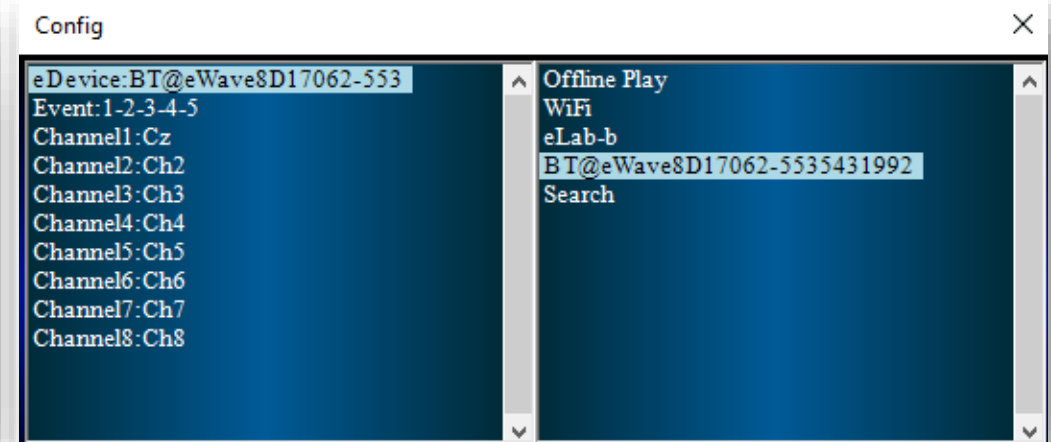
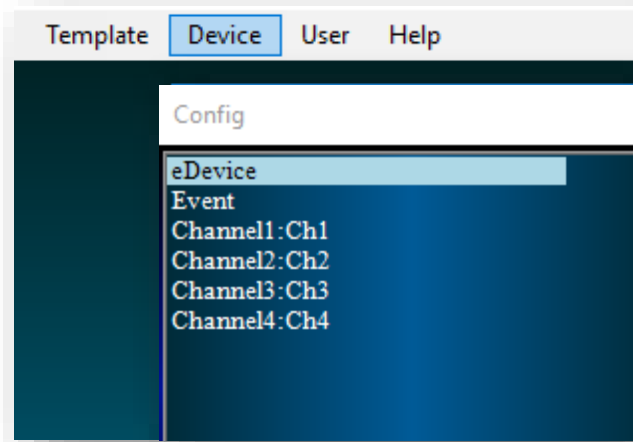
Gender  
 Male  Female

Phone

Handedness  
 Righth  Left

Histoty

- After setting the device from “Device” menu, adding the technician and client details and then selecting the technician and client from the “User” menu, the software is ready to record data.
- To record data, just check  Save Enable and click the  button.
- If you do not check  Save Enable, you will see the file but no data will be saved.







## Receiving the First Signal



- Important notes during recording the signal:

- Make sure that the cap is properly placed on the client's head and note that the points on the cap (as measured with 10-20 system) match exactly on the head. Inject gel in the intended points and connect the electrodes in accordance with the software guide illustration.

1. In order to reduce noise and improve signal reception, connect the device to the computer via Bluetooth.
2. Client is sitting, and completely relaxed. For the convenience of the client and reduction of the noise in the recordings, use a standard chair so that the legs of the client rest on the ground.

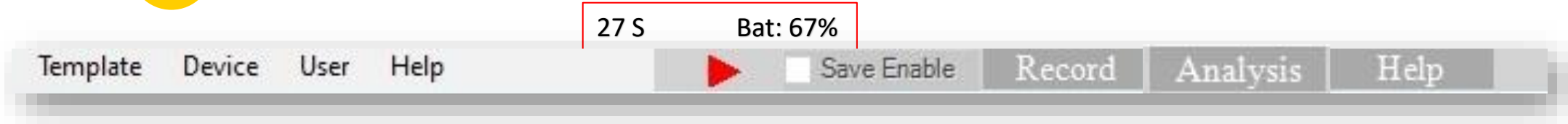



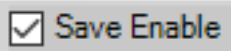
## Receiving the First Signal

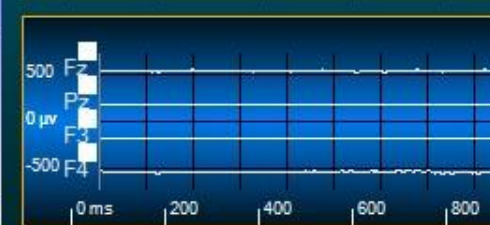
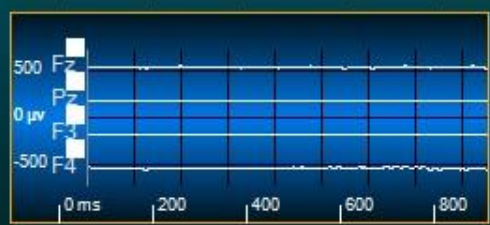
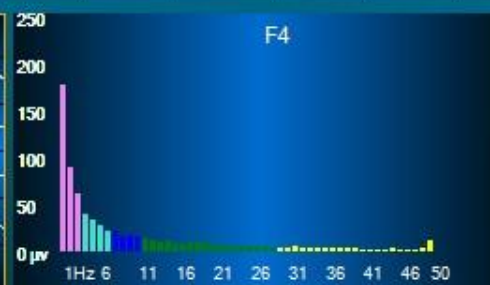
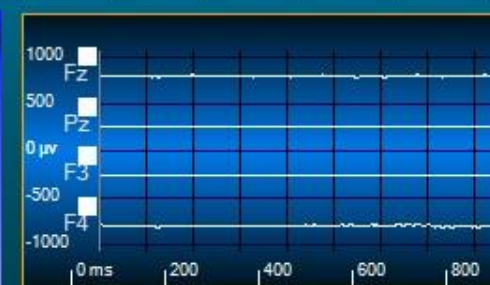
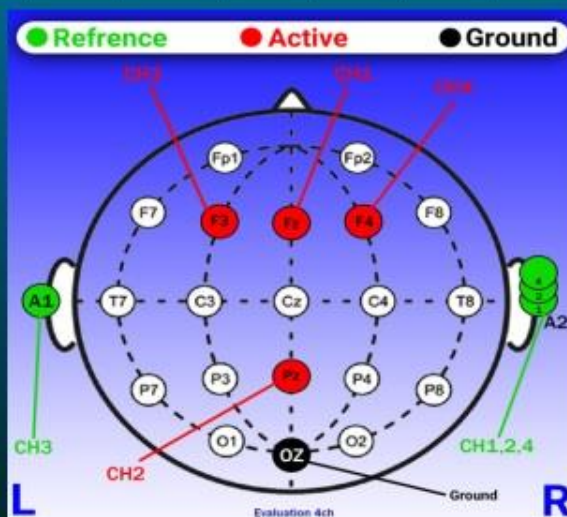
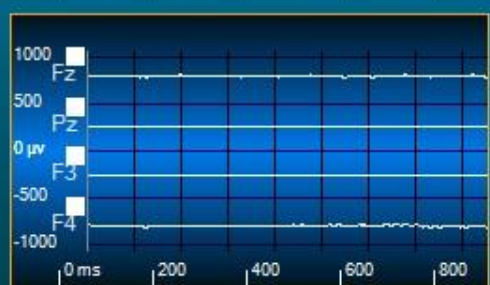
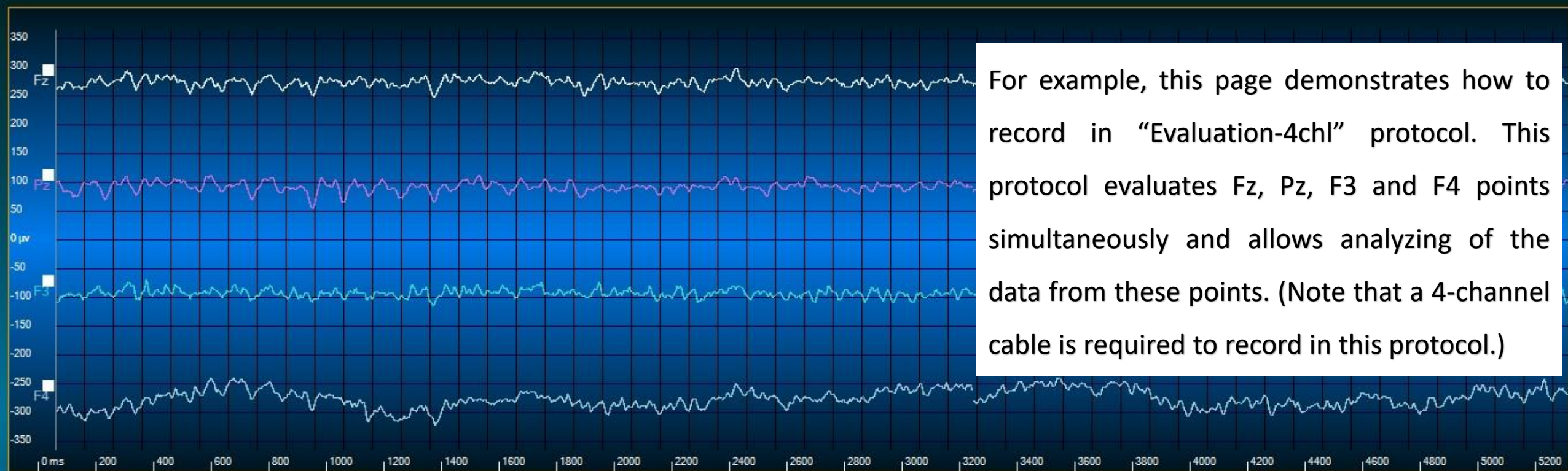
- ⦿ Run the software and connect eWave device to the software (from “Device” menu) according to the previous instructions.
- ⦿ After new clients added or previous clients selected, in order to receive a new signal open one of the evaluation protocols (in addition to ClinicalQ, other evaluation protocols are specified with the word “Evaluation”) from the “User” menu,.

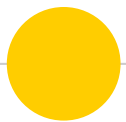


## Signal recording settings



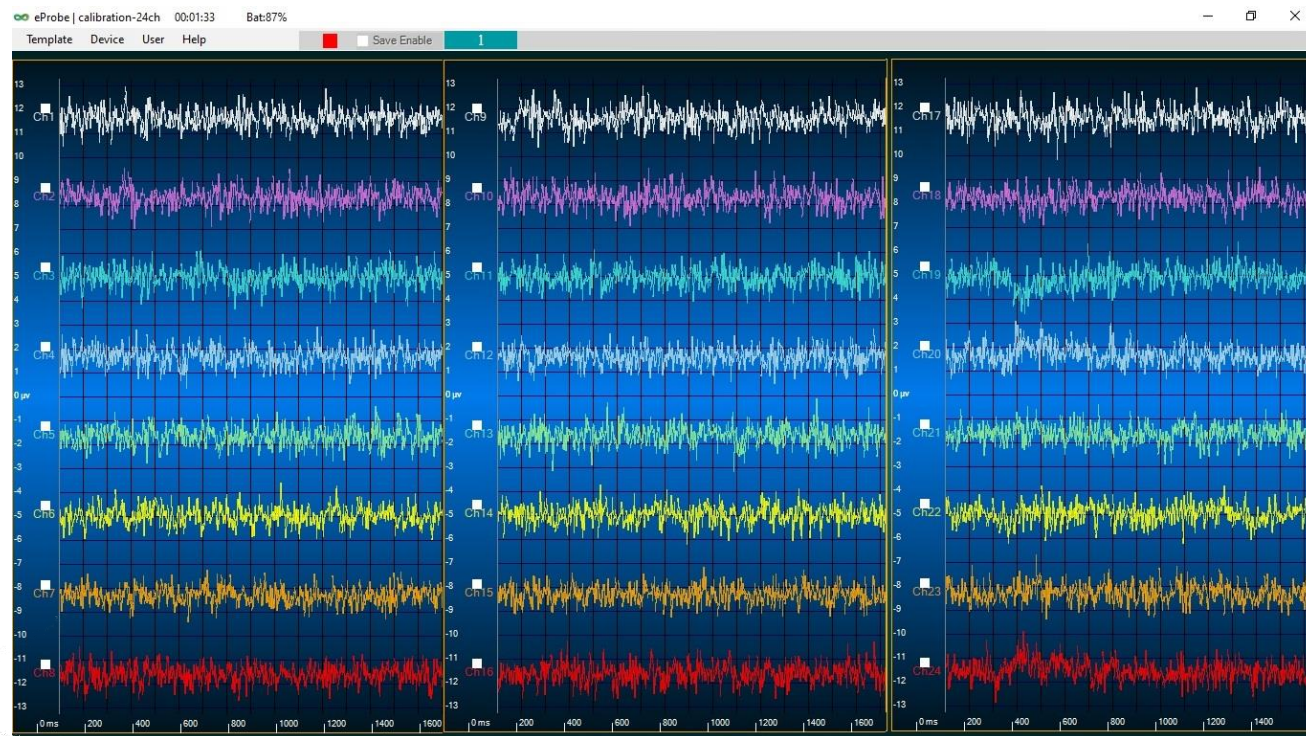
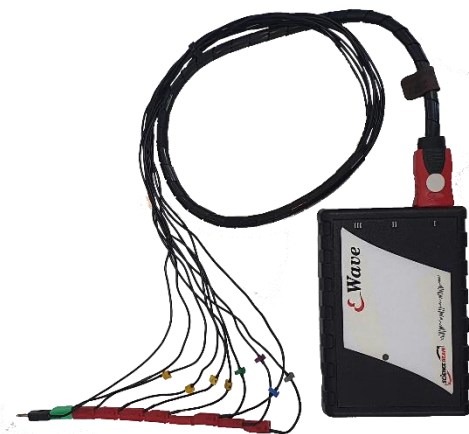
- To initiate the recording, select **Record** option and the  click . If  **Save Enable** is checked, your record will be saved, otherwise you can only observe the signals at the time of recording and they will not be accessible and analyzed later.
- After the end of the registration, by selecting **Analysis** option, you can see the finished recording and analyze it. The software automatically analyzes the signal information and shows the result in the form of a table.
- By clicking on **Help** option, you can see the proper methods of montage (electrode placement) in the chosen protocol.
- The recording time and battery charge percentage are displayed at the top of start button.



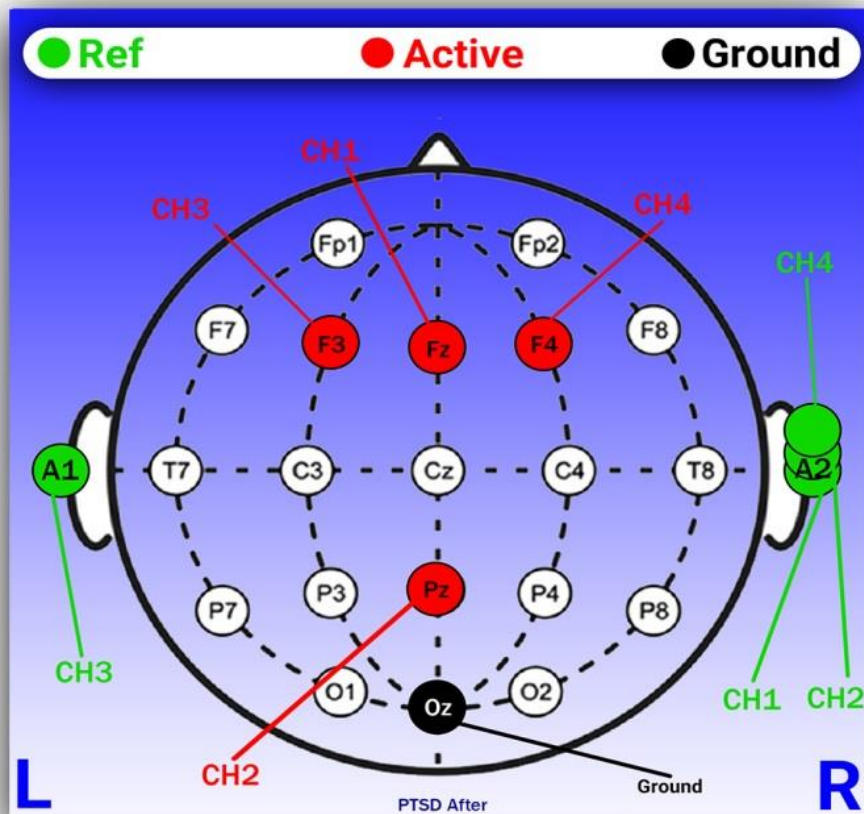


## Background Noise Acquisition (24 channels) (Calibration)

- To ensure proper setup of the device and correct connection of cables, you can use the “calibration” protocol to receive signal.
- To receive signal from 24 channels, three 8-channel cables must be connected to the device ports, and after connecting the electrodes to each other, receiving the signal is started .
- Channels 1-8 correspond to port I, 9-16 to port II, and 17-24 to port III, each of which is received separately by 8-channel cables.



# “Help” Option in Signal Recording



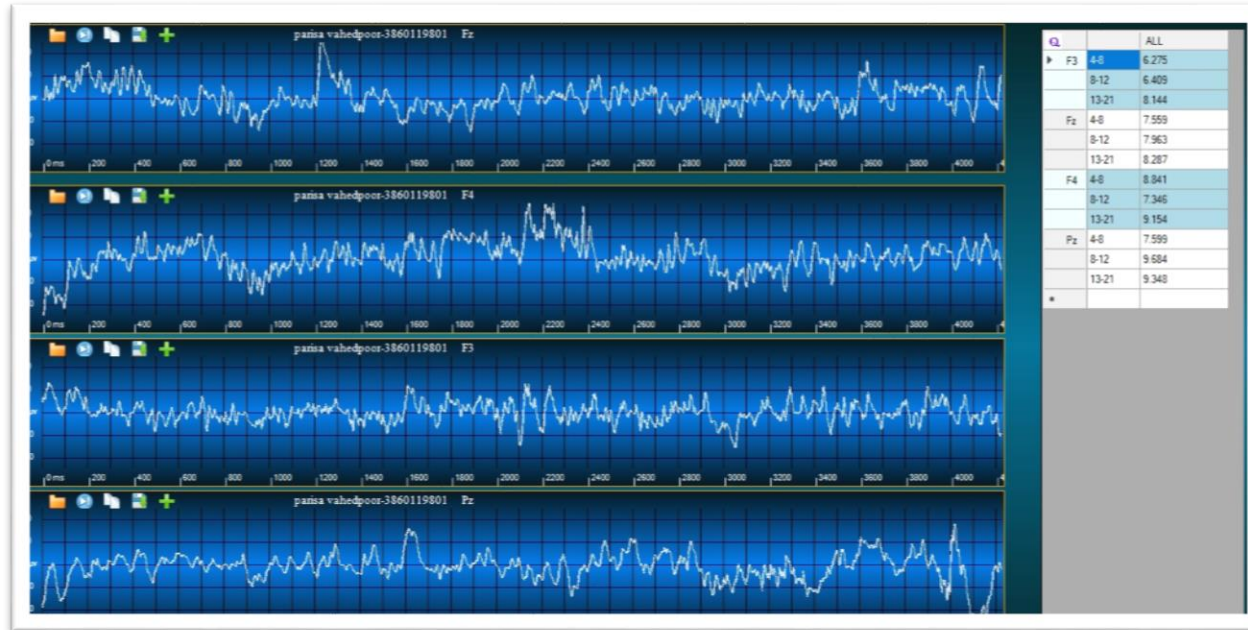
## 4 Channels

- Active CH1 → Fz
- Active CH2 → Pz
- Active CH3 → F3
- Active CH4 → F4
- Ref CH1,2,4 → A2
- Ref CH3 → A1
- Ground → Oz

By clicking on



option, you can see the proper methods of montage (electrode placement) in the protocol of your choice.



# Scope Analysis Panel / Analysis



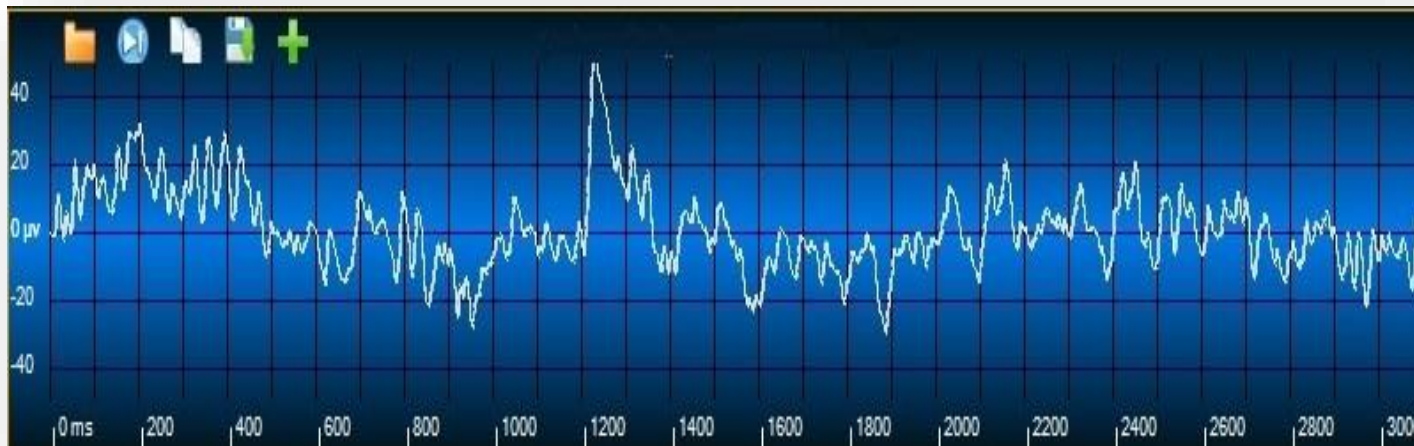






# Scope Analysis / Analysis

- 📁 Button is used to open saved files from databases.
- 🔍 Button is used to open the last saved file.
- 📄 Button is used to copy the results to the clipboard for transfer to a Word or Excel file (must open the Word or Excel file and then paste the results)
- 💾 Button is used to save the scope image.
- ➕ Button is used to add scope data to a table for further analysis

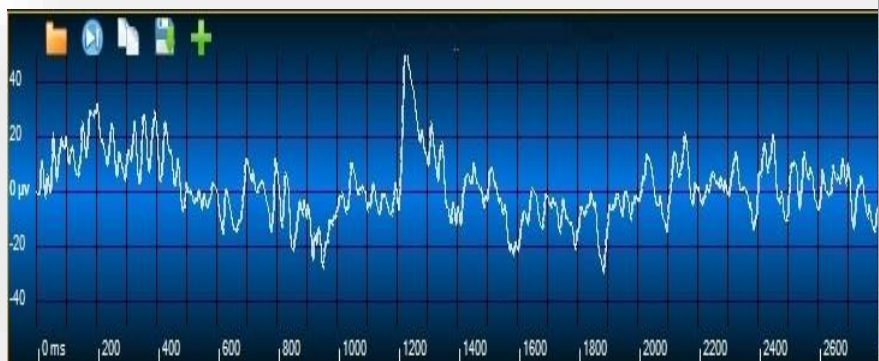


		ALL
F3	4-8	6.275
	8-12	6.409
	13-21	8.144

- Delta: 1 – 4Hz
- Theta: 4 – 8Hz
- Thalpa: 6 – 10Hz
- Alpha: 8 – 12Hz
- LowAlpha: 8 – 10Hz
- HighAlpha: 10 – 12Hz
- Mu: 8 – 13Hz
- SMR: 12 – 15Hz
- Beta: 12 – 35Hz
- Beta1: 15 – 18Hz
- Beta2: 18 – 22Hz
- Beta3: 22 – 26Hz
- Beta4: 26 – 30Hz
- Beta5: 30 – 35Hz
- Gama: 35 – 100Hz
- LowArtifact: 43 – 59Hz
- HighArtifact: 1 – 2Hz



# Scope Analysis Settings



		ALL
▶ F3	4-8	6.275
	8-12	6.409
	13-21	8.144
*		

Scope8

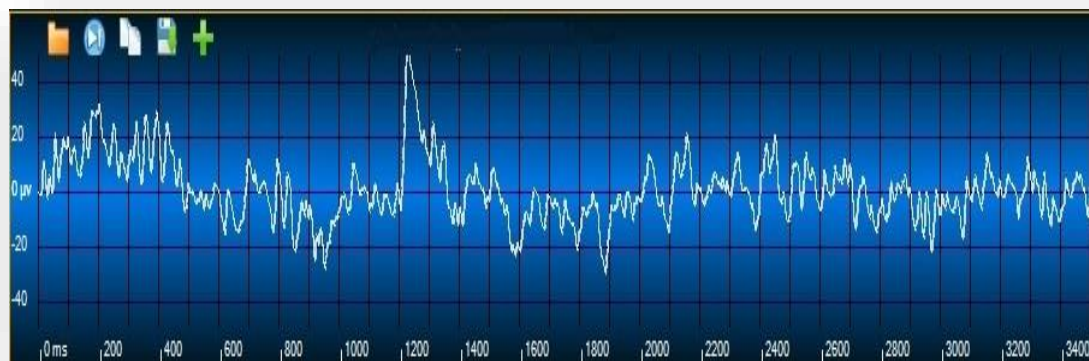
- DataStream:Fz
- V/D:20μV
- T/D:100mS
- Signal:EEG
- Band:Theta(4-8),Alpha(8-12),Low
- Invert:No
- Artifact:100μ
- Scope Type:Biofeedback

- By right-clicking on scope analysis, its settings are accessible.
- **DataStream:** Selection of the recorded channel, for example **F3**.
- **V/D and T/D:** for optimization of signal display on both axes of voltage and time.
- **Signal:** To analyze brain waves, select **EEG**.
- **Band:** Spectrum of brain waves, low / high artifact.
- you can select more than one band (e.g. alpha, mu, SMR, and beta) in order to display its amplitude on the results page by clicking on the specified bands in the offline scope. you can select the range of frequencies using a dash between frequencies,, for example: 16-21 Hz, displays the frequency range between 16 and 21 Hz on the results page.
- **Band settings are only available in the offline scope panel.**

<b>Delta:</b> 1 – 4Hz
<b>Theta:</b> 4 – 8Hz
<b>Thalpa:</b> 6 – 10Hz
<b>Alpha:</b> 8 – 12Hz
<b>LowAlpha:</b> 8 – 10Hz
<b>HighAlpha:</b> 10 – 12Hz
<b>Mu:</b> 8 – 13Hz
<b>SMR:</b> 12 – 15Hz
<b>Beta:</b> 12 – 35Hz
<b>Beta1:</b> 15 – 18Hz
<b>Beta2:</b> 18 – 22Hz
<b>Beta3:</b> 22 – 26Hz
<b>Beta4:</b> 26 – 30Hz
<b>Beta5:</b> 30 – 35Hz
<b>Gama:</b> 35 – 100Hz
<b>LowArtifact:</b> 43 – 59Hz
<b>HighArtifact:</b> 1 – 2Hz

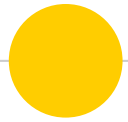


## Scope Analysis Settings

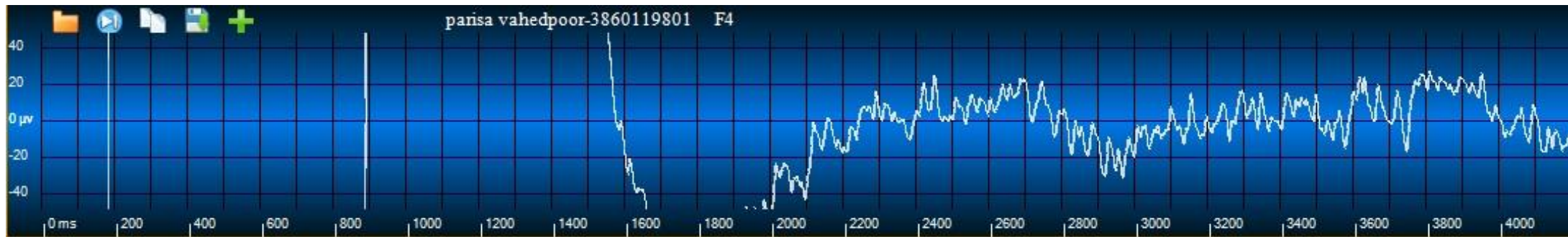


```
DataStream:Fz
V/D:20µV
T/D:100mS
Signal:EEG
Band:Theta(4-8),Alpha(8-12),Low
Invert:No
Artifact:100µ
ScopeType:Biofeedback
```

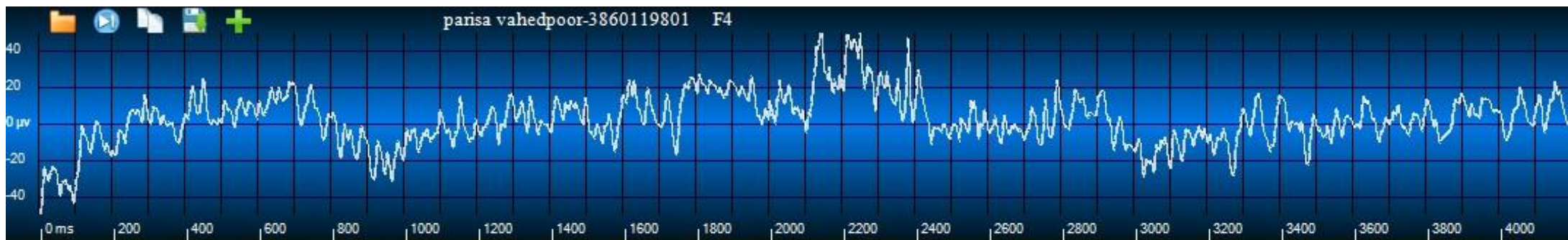
- **HPF and LPF:** to regulate high-pass and low-pass filters
- **Invert:** is used to invert the signals on ECG. (Normally must be in **No** mode)
- **Artifact:** To remove troublesome artifacts .
- In “Remove Off” mode, no artifact is removed. By selecting “50 or 100 microvolts”, values above these voltages are deleted. (The brain voltage range is often below these values.)
- Note that by removing artifacts the location of event markers and the value of the results will change .



## Scope Analysis Settings - Artifact



Changes of the scope analysis after adjusting the artifact to 100  $\mu\text{V}$



# Analysis Table

- By clicking on the Q in the corner of the analysis table, this page is displayed. This page contains an analysis of the received information from the recordings, which facilitates the diagnosis for the therapist.

**Client's Name:**..... **Age:**.....  
**Evaluator's name:**..... **Date of Visit:**.....

**Left/Right Hemisphere Comparisons**

Frequency Band	F3	F4
Theta	6.28	8.84
Alpha	6.41	7.35
Beta(13-21hZ)	8.14	9.15

RH Theta  $\geq$  LH Theta ===== *problem in equation*  $\rightarrow$  Different disorders  
 RH Alpha  $\geq$  LH Alpha ===== *problem in equation*  $\rightarrow$  Depression  
 LH Beta  $\geq$  RH Beta ===== *problem in equation*  $\rightarrow$  Anxiety & Anxiety mixed with depression

RH Theta  $\geq$  LH Theta ===== *problem in equation*  $\rightarrow$  Different disorders  
 RH Alpha  $\geq$  LH Alpha ===== *problem in equation*  $\rightarrow$  Depression  
 LH Beta  $\geq$  RH Beta ===== *problem in equation*  $\rightarrow$  Anxiety & Anxiety mixed with depression

**Front/Back Comparisons**

Frequency Band	Fz	Pz
Theta	7.56	7.60
Alpha	7.96	9.68
Beta (13-21Hz)	8.29	9.35

Anterior Theta > Posterior Theta == *problem in equation*  $\rightarrow$  ?  
 Posterior Alpha > Anterior Alpha == *problem in equation*  $\rightarrow$  Depression, ADD  
 Anterior Beta > Posterior Beta == *problem in equation*  $\rightarrow$  Insomnia, anxiety, hyperactivity

	Q	ALL
F3	4-8	6.275
	8-12	6.409
	13-21	8.144
Fz	4-8	7.559
	8-12	7.963
	13-21	8.287
F4	4-8	8.841
	8-12	7.346
	13-21	9.154
Pz	4-8	7.599
	8-12	9.684
	13-21	9.348
*		



## Viewing offline recordings

Template Device **User** Help

Select Patient

Technician Information  
Set Technician  
[Dropdown]

Patient Information  
Search Patient  
[Text Box]

Select Patient

- 2-patient3 -2223334440  
3-987654321-
- 4-patient4 -4444444444
- 5-patient5 -9999999999
- 6-test -4154947515
- 7-zohreh -4592120841
- 8-zahra -4592120840**

Patient Recordings

- 63-1396/8/21 15:48:34,
- 59-1396/8/21 15:22:30**
- 58-1396/8/21 14:24:45,

Comment  
[Text Area]

OK

● Select the intended client from “User” menu and click on the recorded file and click “Ok”, then select “Offline Play” option from “Device” menu.

● You will see that  Save Enable option is disabled. By clicking on  the intended file is displayed.

Template **Device** User Help

Config

- eDevice**
- Event
- Channel1: Ch1
- Channel2: Ch2
- Channel3: Ch3
- Channel4: Ch4

Config

- e Device:Offline Play@C:\Science**
- Event:1-2-3-4-5
- Channel1: Cz
- Channel2: Ch2
- Channel3: Ch3
- Channel4: Ch4
- Channel5: Ch5
- Channel6: Ch6
- Channel7: Ch7
- Channel8: Ch8

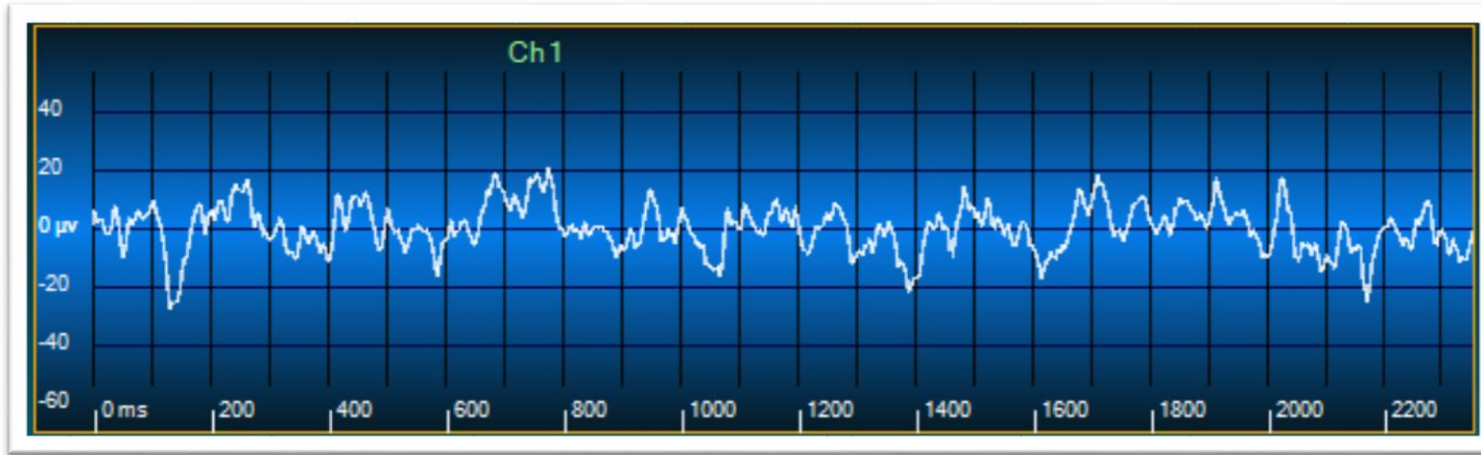
Offline Play

- WiFi
- eLab-b
- BT@eWave8D17062-5535431992
- Search

After evaluation and analysis of the recorded data, suitable treatment protocol for the clients must be implemented. Treatment protocols are available in the protocol folder.

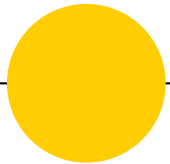


“



Scope Panel/Scope

---

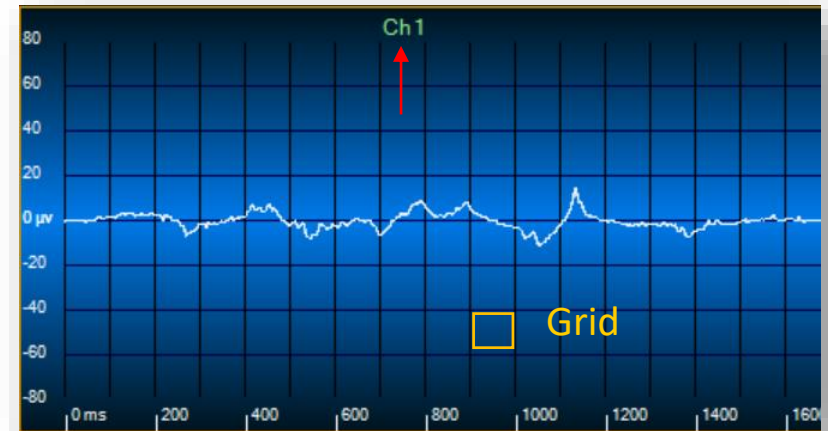







## Scope (Oscilloscope)

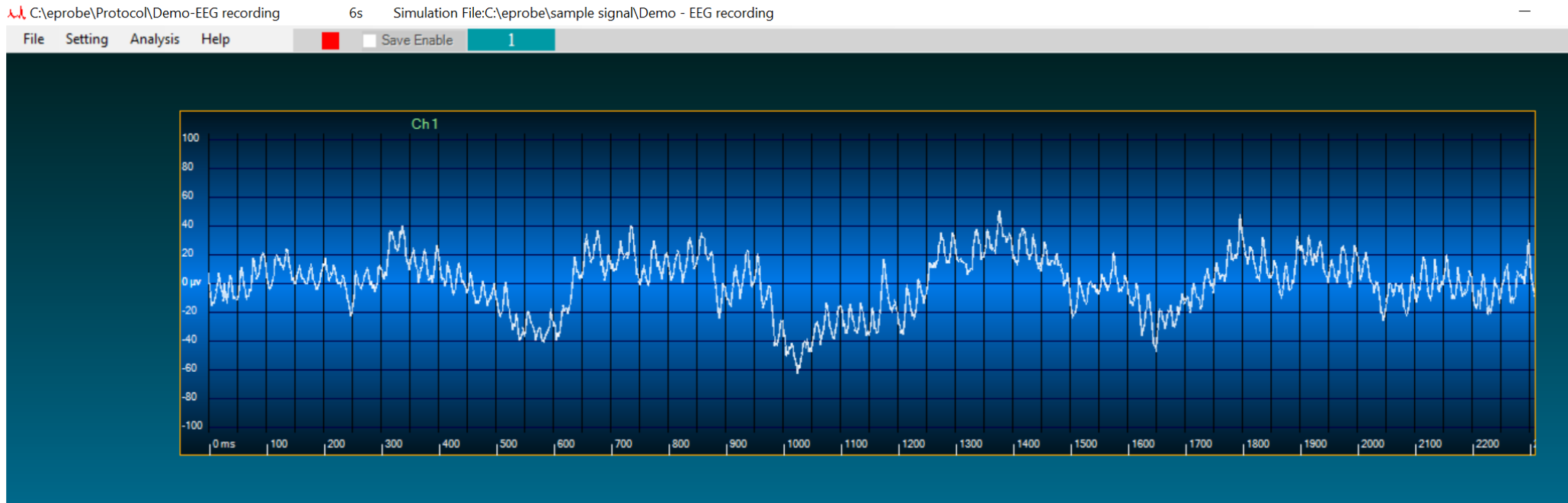
- scope is able to demonstrate signals in two axes of time (ms) and amplitude ( $\mu\text{V}$ ).
- a scope will be required to display and analyze EEG data.
- Notes:
- name of the channel or channels (multi-channel recording) from which data is transmitted is displayed next to each signal in the scope (e.g. Ch1 in here)
- If a name is assigned to the channel in device settings (e.g. a specific location on the head), its name is displayed instead of the channel number, for example Cz.





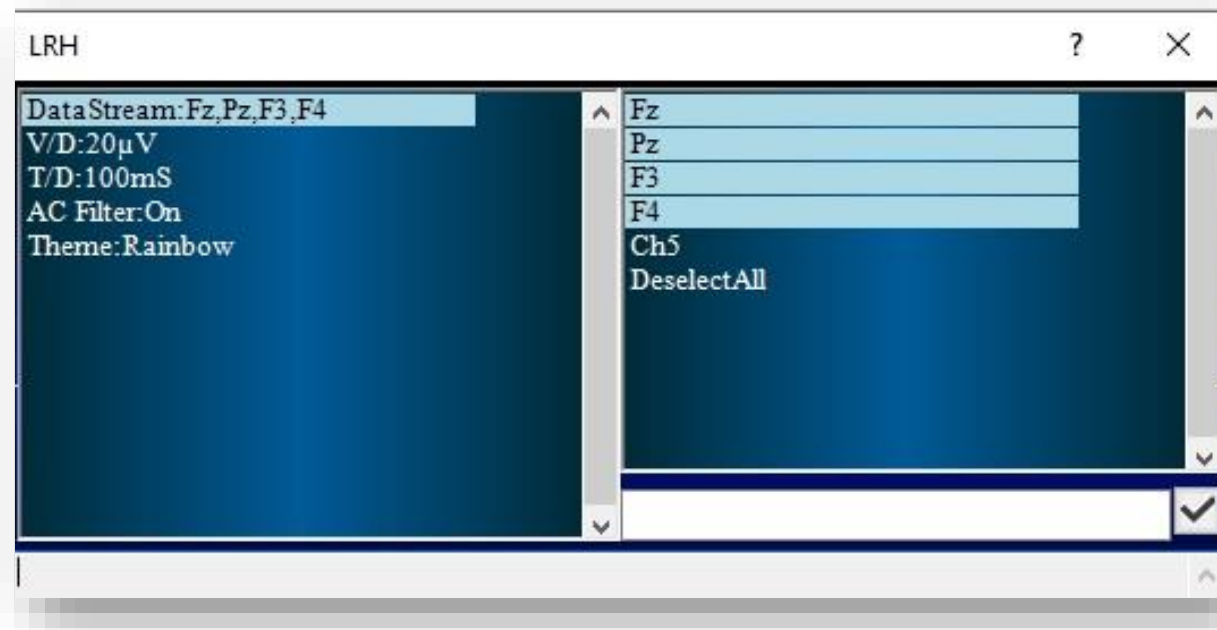
# Using Oscilloscope / Scope

- Subsequent to connecting eWave device to the computer, selecting the connection type (USB for example) and creating a scope, you will observe that the brain waves are being recorded. Just click the red start button  at the top of the page besides the menu bar to see the signals being recorded in the scope.



## Scope Settings - Data Stream (By Right-clicking On The Scope)

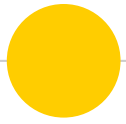
- **Data Stream: channel or ports which data is transmitted through them .**
- more than one channel can be selected depending on the number of channels on the device.  
You can select your desired number of channels, just click on their name to select and deselect by clicking again.



## Scope Settings - Data Stream (By Right-clicking On The Scope)

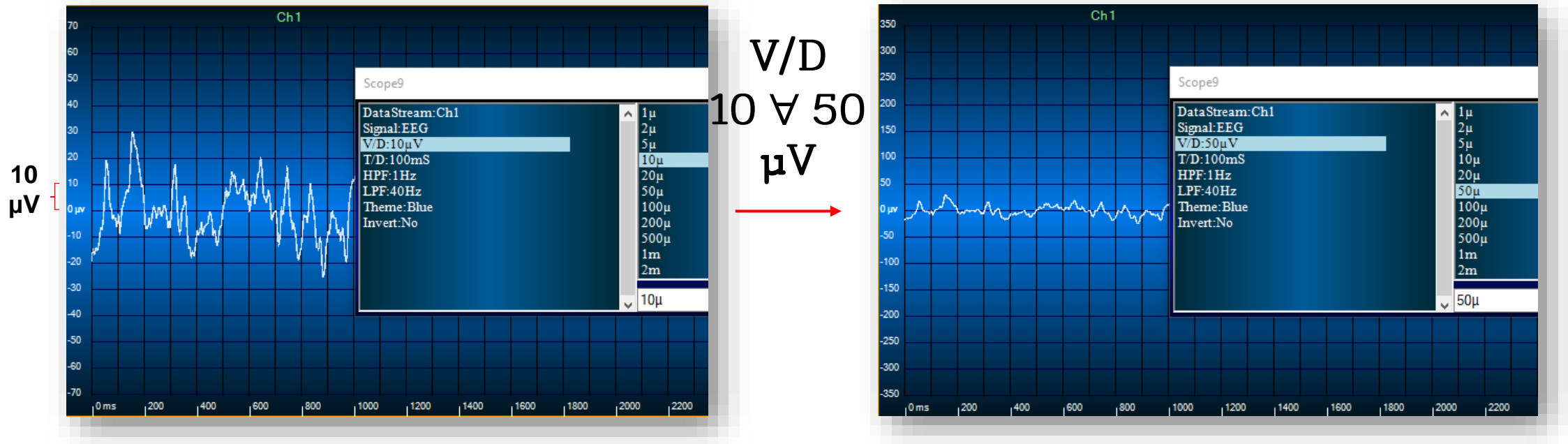
- ◎ **DataStream:** is used to select the recording channel.
- ◎ in the device settings, if the channel name has been assigned to a specific location on the head, instead of the channel number, its name is displayed, for example; Fz.
- ◎ Each scope has the capability to select multiple channels at the same time. To use this option click on the channels and select them and click again to deselect.





## Scope Settings – Optimizing Signal Display

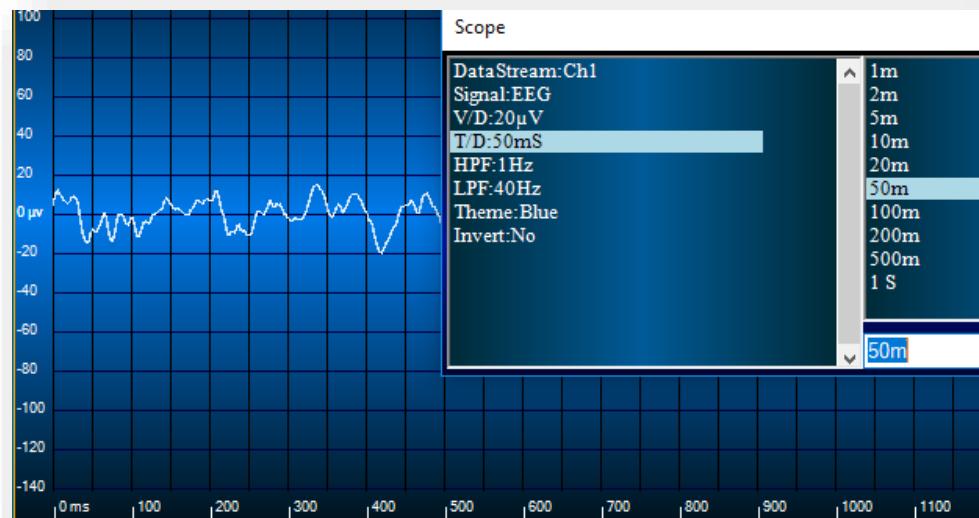
- V/D: changes the amplitude axis scaling for optimization of the wave diagram - Determines the size of each vertical axis unit in microvolts.
- As the V/D grows, the displayed signal is smaller in the scope, and vice versa.





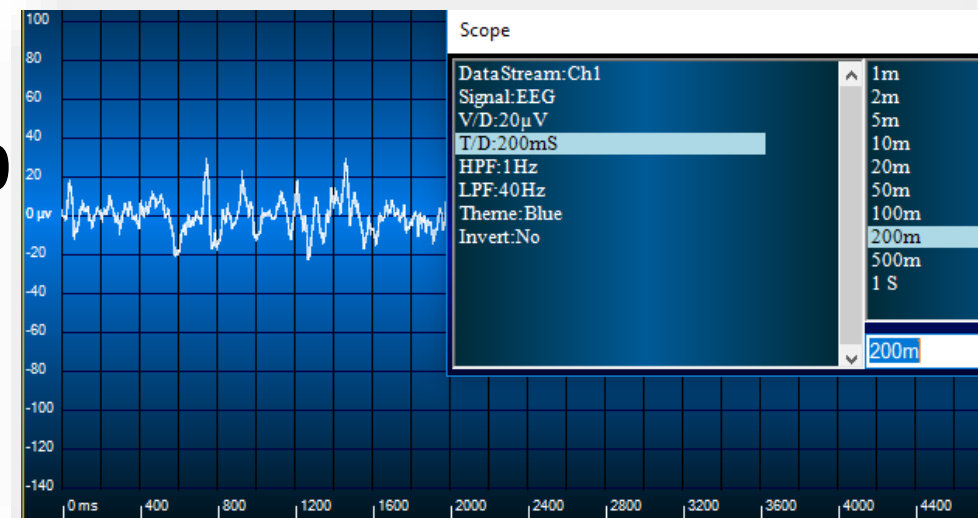
## Scope Settings – Optimizing Signal Display

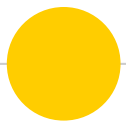
- T/D: changes time axis scaling for optimization of the wave diagram - Determines the size of each horizontal axis unit in milliseconds.
- As the T/D grows, the displayed signal is more compact on the time axis, and vice versa.



50 ms

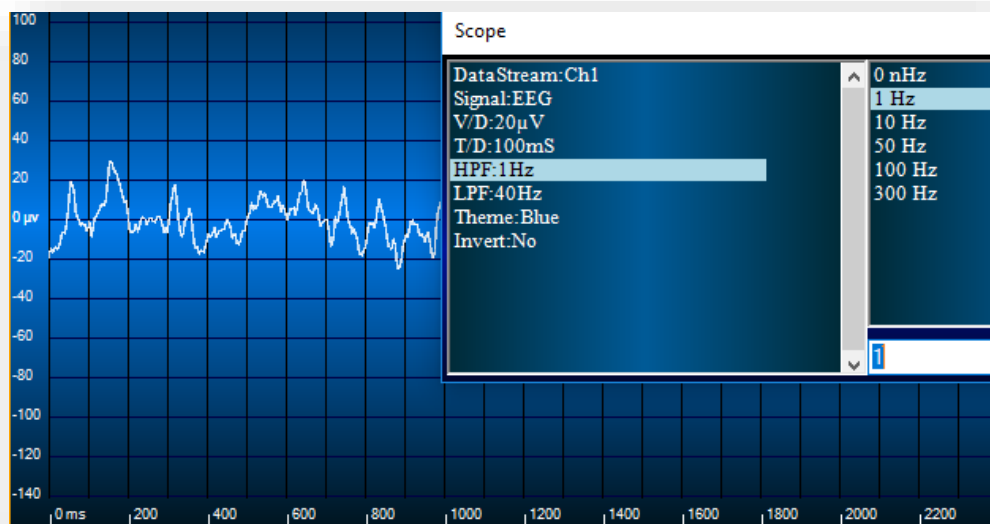
T/D  
50  $\nabla$  200  
ms



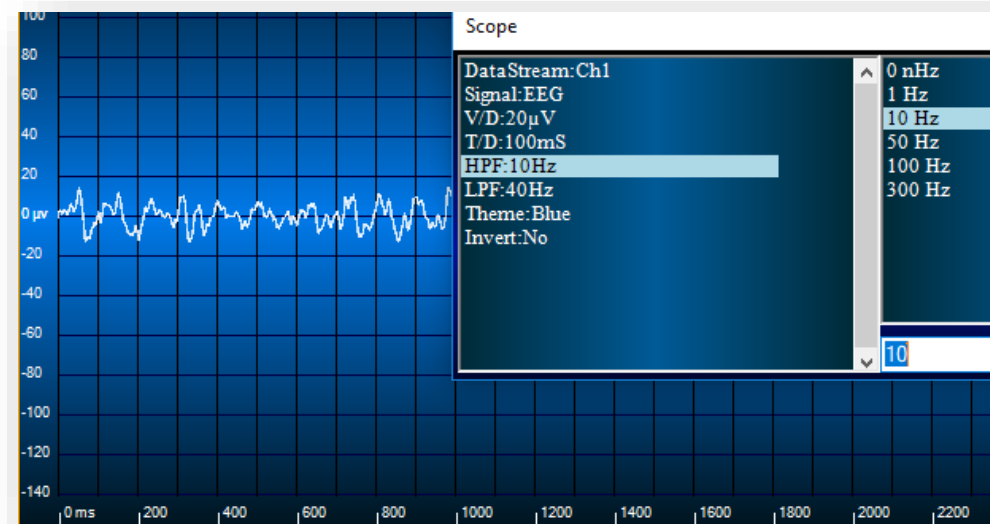


## Scope Settings - Filter

- HPF (High Pass Filter): Filters signal with a lower frequency than a specified limit (allows high frequency signals to pass) in order to delete low frequency noises such as breathing.



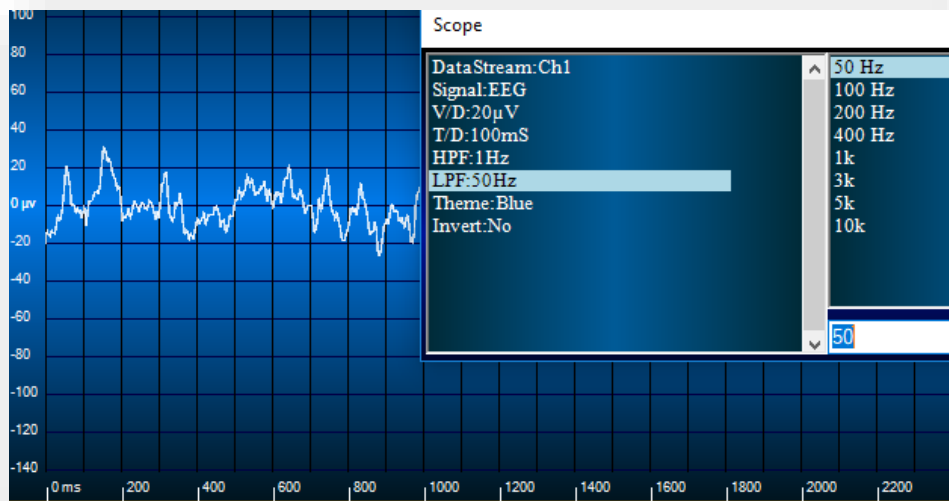
HPF  
1  $\nabla$  10  
Hz



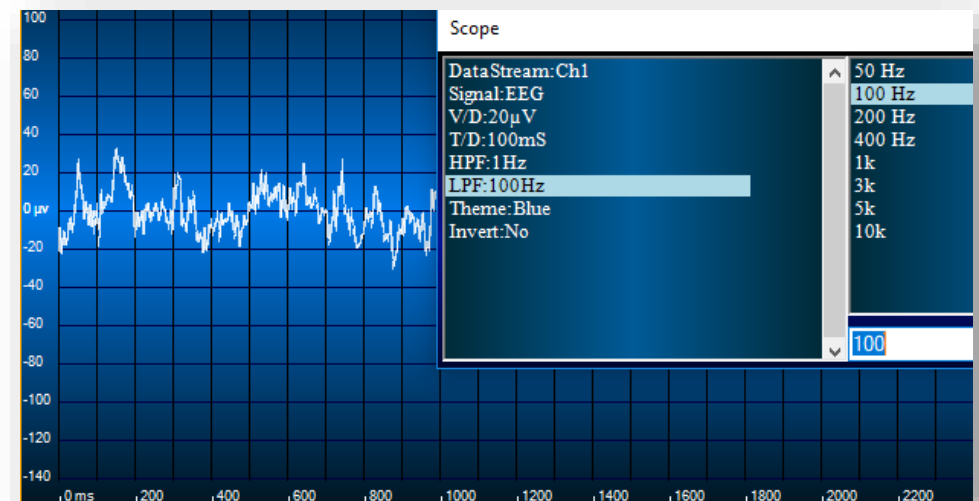


## Scope Settings - Filter

- LPF (Low Pass Filter): Filters signals with a higher frequency than a specified limit (allows low frequency signals to pass) in order to delete high frequency noises such as electricity input noise and large movement of the muscles.



LPF  
50  $\nabla$  100  
Hz

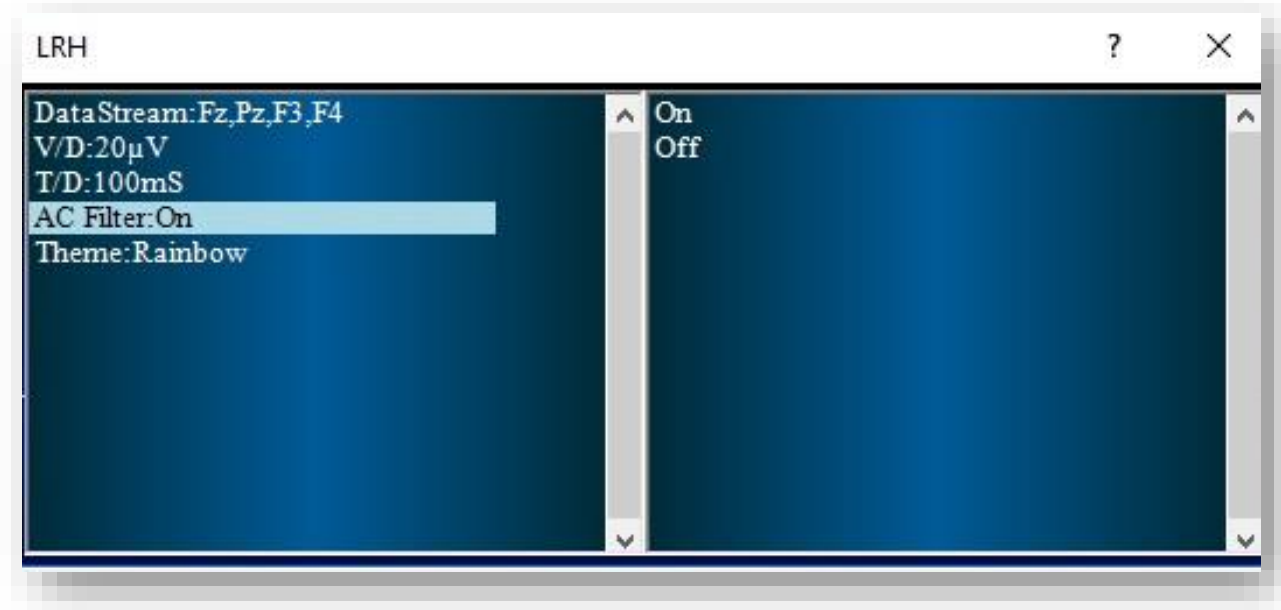


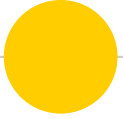




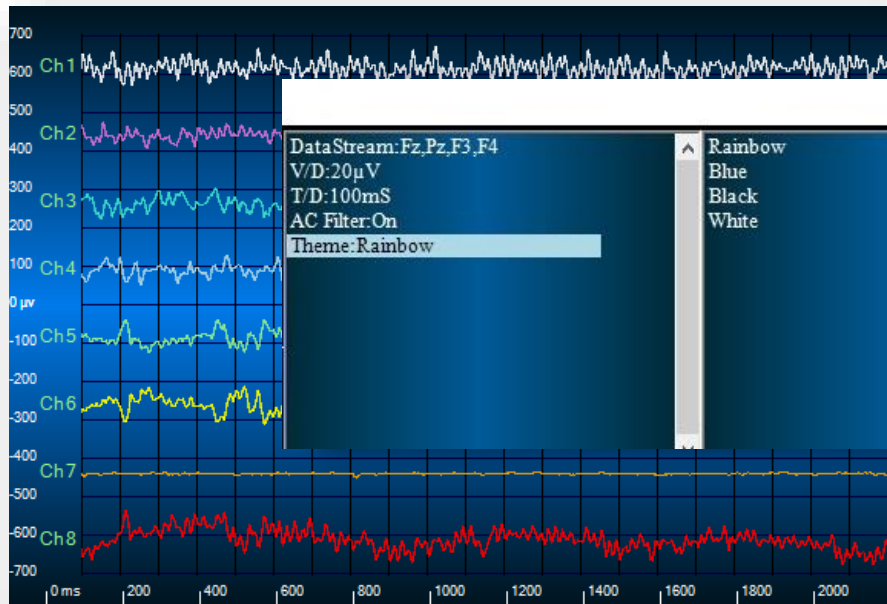
## Scope Settings - AC Filter (Electricity Noise Filter)

- **AC filter: is used to eliminate electricity noise.**
- **Note that this option must always be on.**

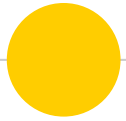




## Scope Settings - Color



- **Theme** : Changes the background and the color of the waves in scope.
- **Rainbow** : If multiple channels are selected, the signal of each channel is in a color of the rainbow spectrum.
- **Blue** : The background of the scope will be dark blue and the signal is light blue.
- **Black** : The background is black and the signal is green.
- **White** : The background is white and the signal is black.

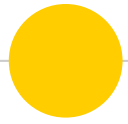


## Treatment and Evaluation Protocols/Template

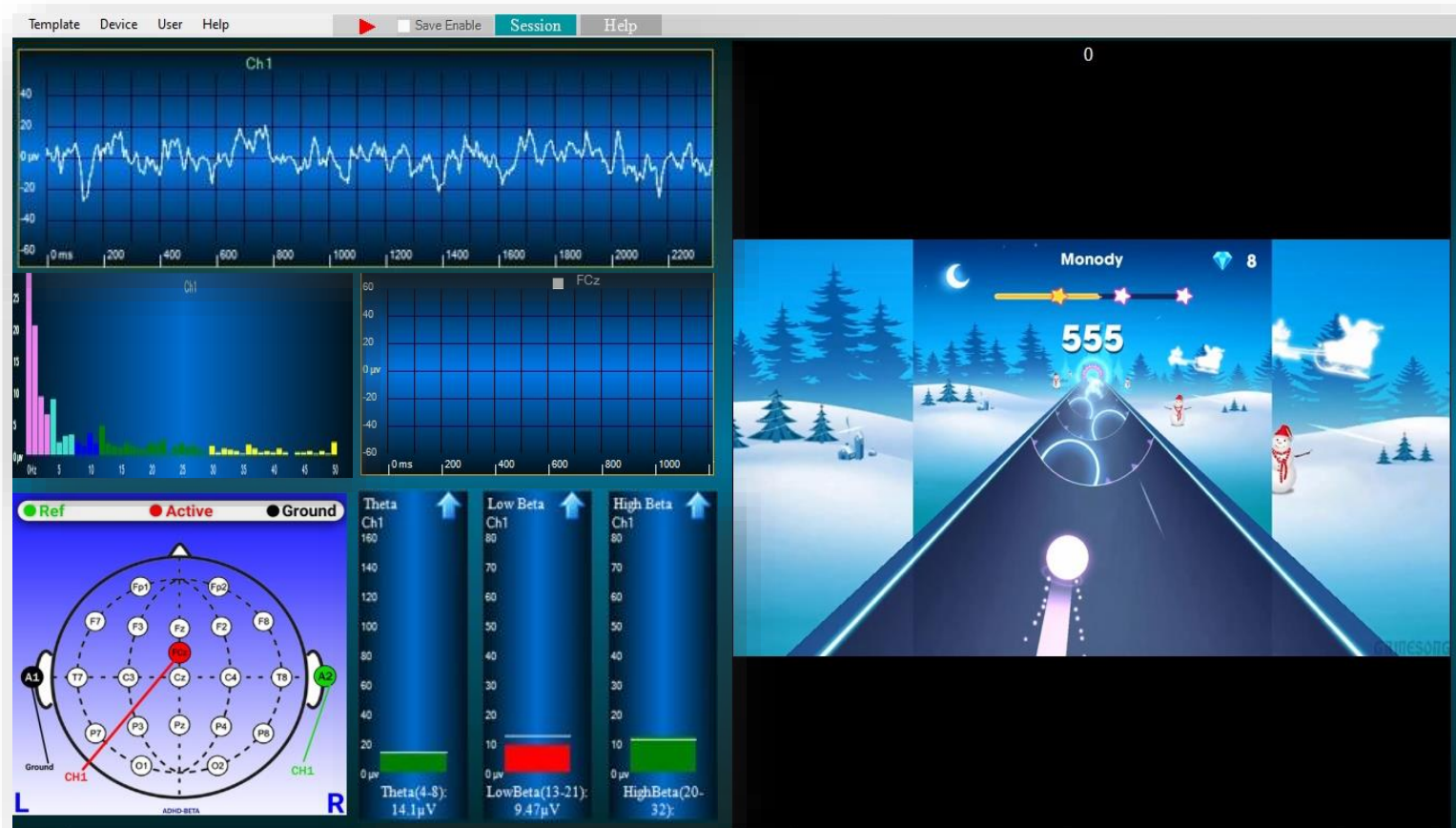
- eProbe software provides various treatment protocols for ADHD, OCD, autism, depression, anxiety, PTSD, etc.
- Evaluation protocols marked with the phrase “Evaluation” are available in the “Template” menu.

### Template

The screenshot shows a dialog box titled "Template". It is divided into two main sections. The top section, "Add Template", contains two buttons: "Local Import" (highlighted with a blue border) and "Online Import". The bottom section, "Select Template", features a list box titled "Templates Name" containing the following items: ADHD-Beta.SBT, ADHD-SMR.SBT, Anxiety-Alpha.SBT, Autism 1-25 Session.SBT, Autism 26-45 Session.SBT, Autism 46-60 Session.SBT, Baseline.SBT, ClinicalQ.SBT, Depression-1ch.SBT, Depression-2ch.SBT, Evaluation- 19chl .SBT, Evaluation-19chl.SBT, Evaluation-4chl.SBT, Evaluation-Attention Index AT.SBT, Evaluation-Attention Index.SBT, Evaluation-Front & Back comparison.SBT, Evaluation-Left & Right comparison.SBT, and OCD-After 10 Session.SBT. A vertical scrollbar is on the right side of the list. At the bottom right of the dialog is an "OPEN" button.



# Neurofeedback Treatment Protocols - Examples

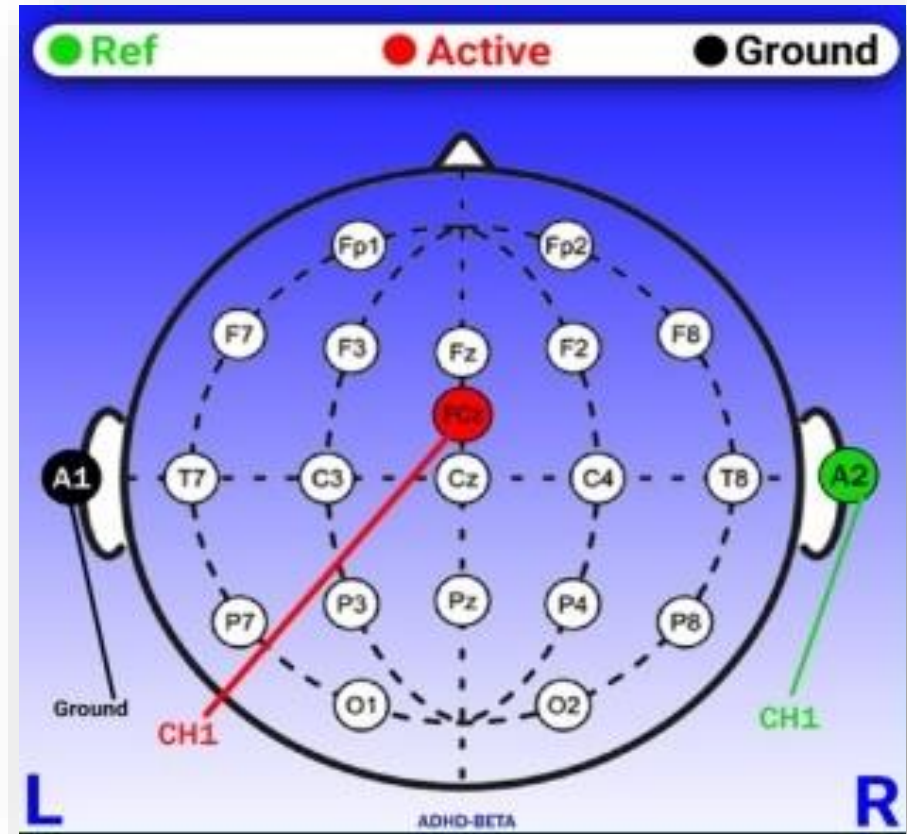


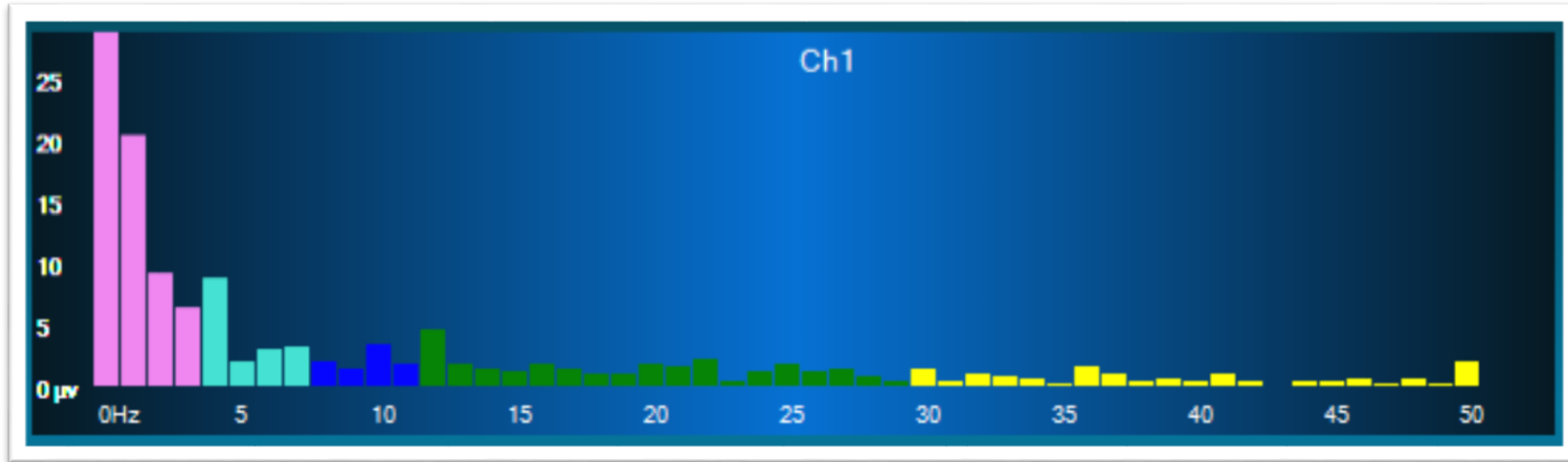
- From “Template” menu, open the intended treatment protocol in the protocol folder at the program installation location.
- As an example, ADHD-Beta treatment protocol is shown here.



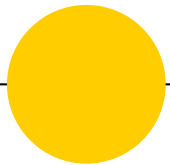
# Image Panel

- Image panel is used to display images such as montage images (Placement of electrodes) in different protocols.





FFT Panel





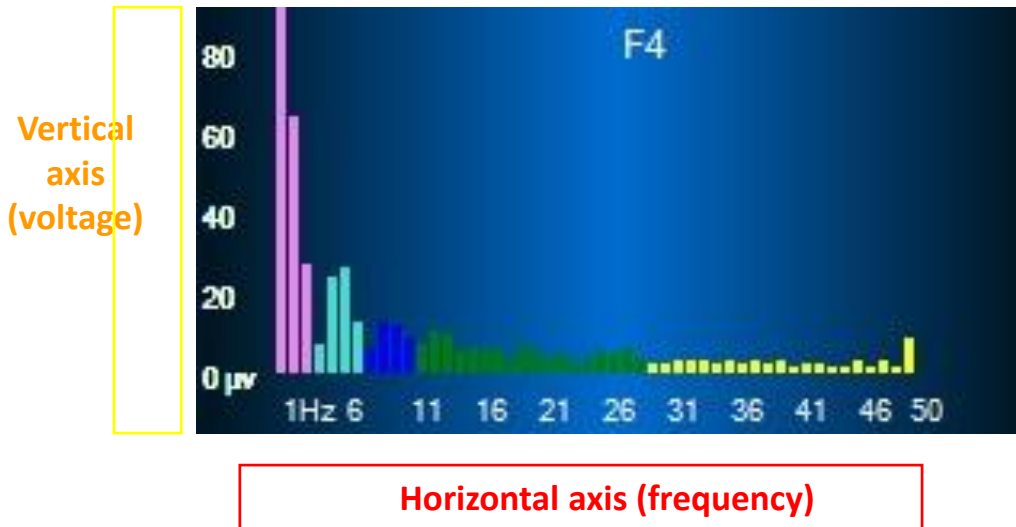
# Fast Fourier Transform - FFT

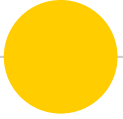
- In FFT panel, frequency analysis of the desired bands can be viewed. This panel receives raw signals and displays amplitude value of each frequency present in the signal in a specific time window (1 second).

○ Each band of brain waves is distinguished by a different color:

- Pink, Representative of the delta band
- Indigo, Representative of the Theta Band
- Blue Representative of the alpha band
- Green Representative of the beta band
- Yellow Representative of the gamma band

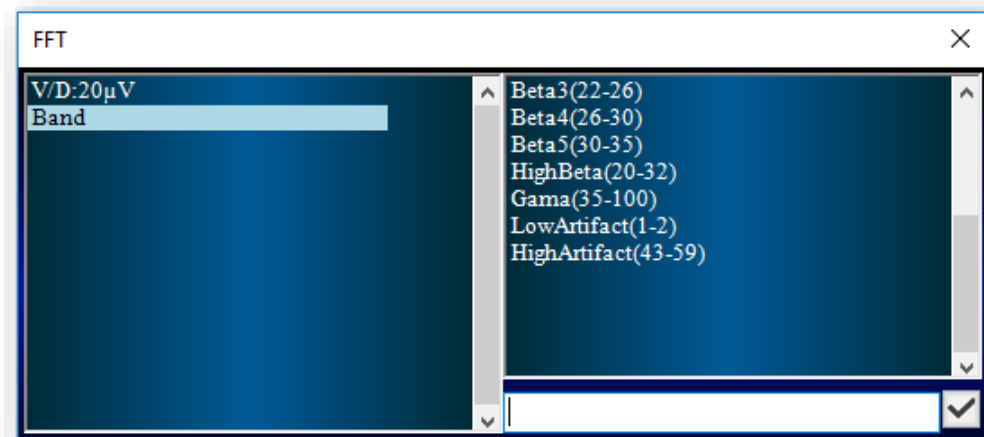
○ Note: An increase in frequency bar by 50 Hz might be a reflection of the electricity noise.





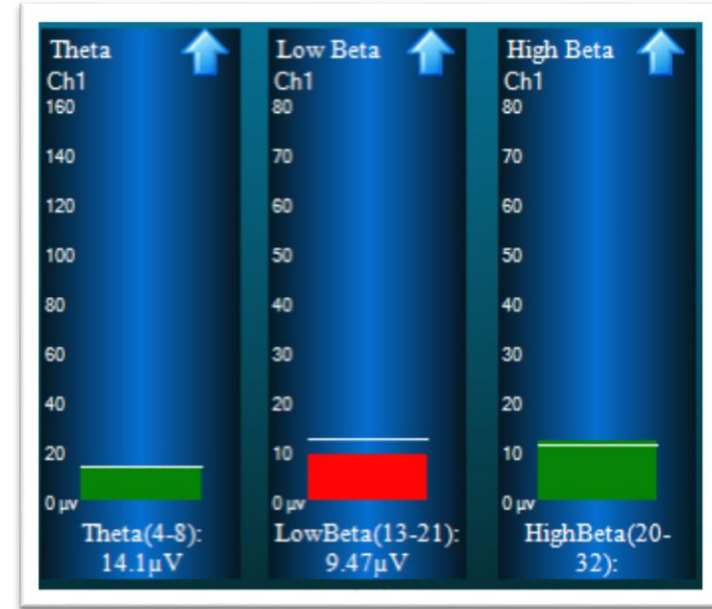
# FFT Settings

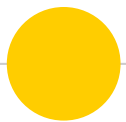
- **Band:** Brain waves spectrum (1-50 Hz) or low / high artifacts.
- **V/D:** changes the scale of amplitude axis in order to optimize diagram display in FFT.





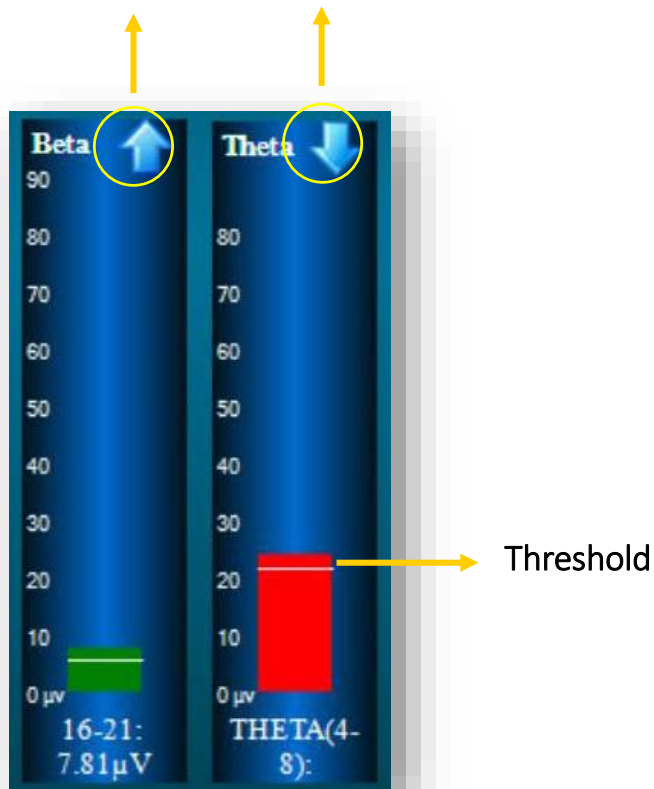
# Logic Bar Panel





bar direction  
(increasing)

bar direction  
(decreasing)



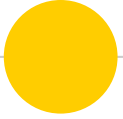
## Logic Bar

- Each logic bar represents a certain band amplitude range (e.g. beta) and has a threshold and a direction. The direction indicates the preferred fluctuation of that band (increase or decrease of the intended band). Threshold is a line that a person should be able to adjust the amplitude of their waves according to it.

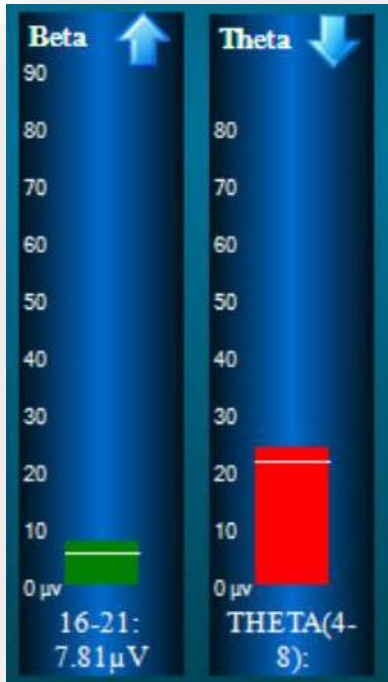
- Each bar's logic represents the treatment protocol, that includes the band(e.g. beta) which is demanded to be modified, the direction of change (increase or decrease) in the intended area of head (e.g. Cz).**

The **green color** in the logic bars indicates a **desired change**, which is defined in accordance to the direction of the bar, the desired direction of change. in increasing direction, the ascending of the amplitude bar from the threshold is considered desirable and in the decreasing direction, the descent from the threshold is desirable.

And in contrast with what was stated above, the **red color** indicates an **undesirable change**.

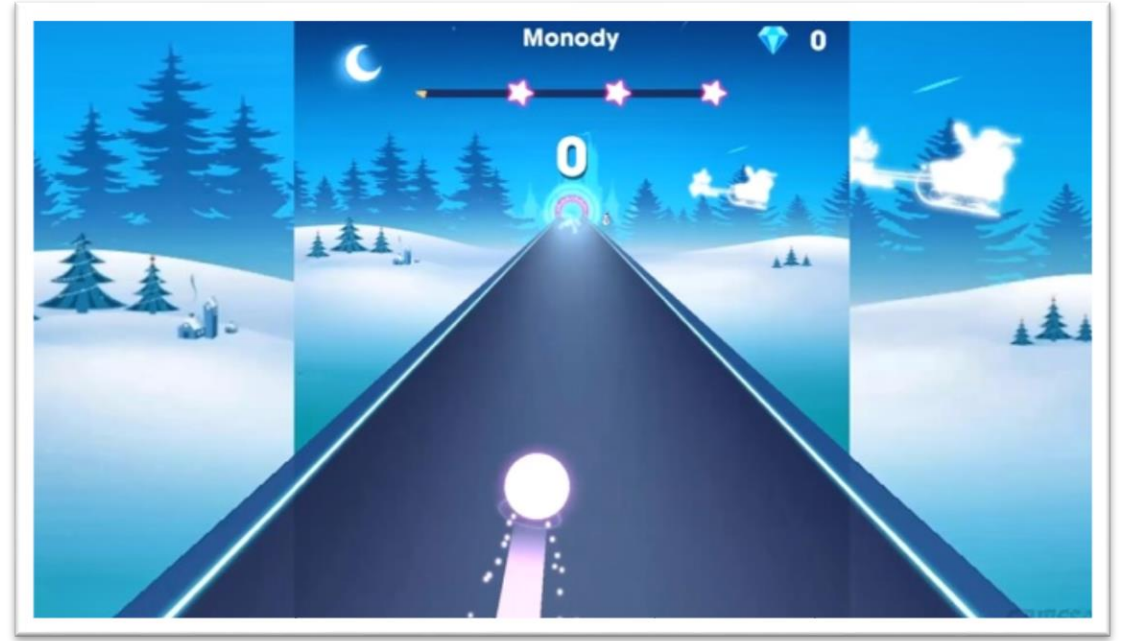


## Logic Bar Settings



- **Threshold:** Customizable in either manual or percentage mode (at higher percentages, feedback is easier to apply).
- Manual values can be set by moving the white line in the bar using the mouse, and the therapist determines the threshold by observation, but in the percentage mode values will change due to amplitude fluctuations.
- **V/D:** Changes the scale of amplitude axis to optimize the display of the diagram in the logic bar.





# Feedback Panel



## Feedback Panel

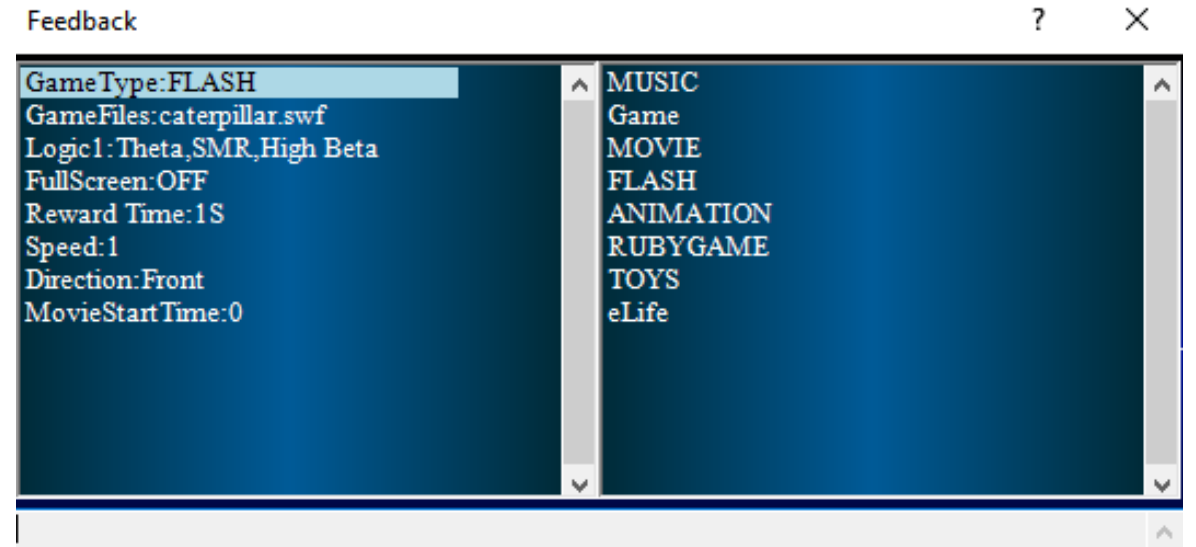
- Feedback panel lets you play movies, animations, music or games. The game, music or movie works and is displayed according to the reference brain waves that are shown in the logic column and according to the features defined for it. The game or movie is used as a reinforcing factor or reward for feedback
- By using this panel, you can choose the type of game or file you want to display. You can also set the logic of the game or display.





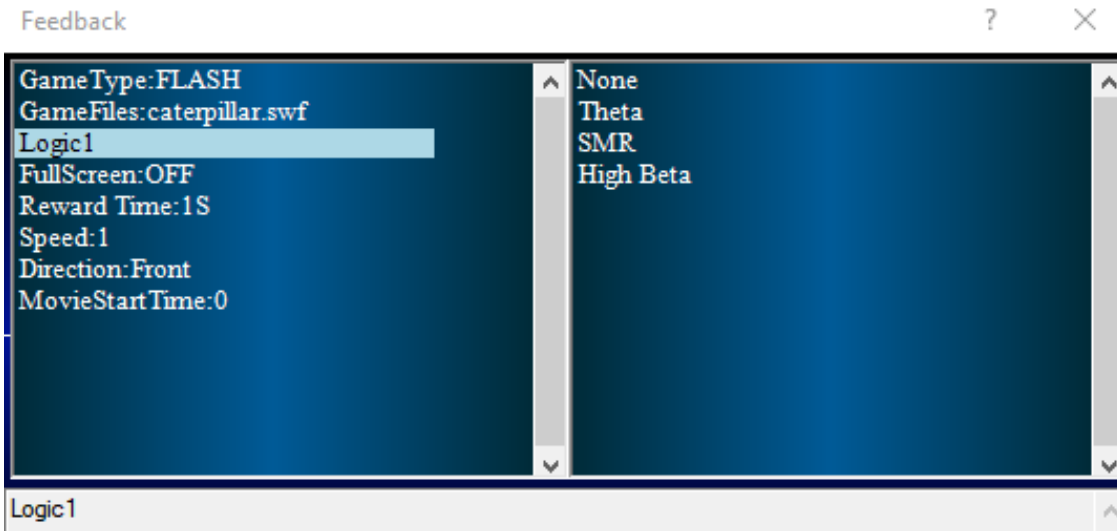
# Feedback Settings

- **Game Type:** Feedback type including games, movies, animations or music.
- **MUSIC:** turn the volume of the song up or down.
- **MOVIE:** Shrink or enlarge a movie or cartoon image
- **Game:** Going forward in the game
- In the new versions of the software, due to Windows update, Flash option is not applicable.
- The animation contains moving images that are moved to the previous or next frames.
- **Game File:** Select the feedback file (movie, etc.) available in the protocol folder .





# Feedback Settings

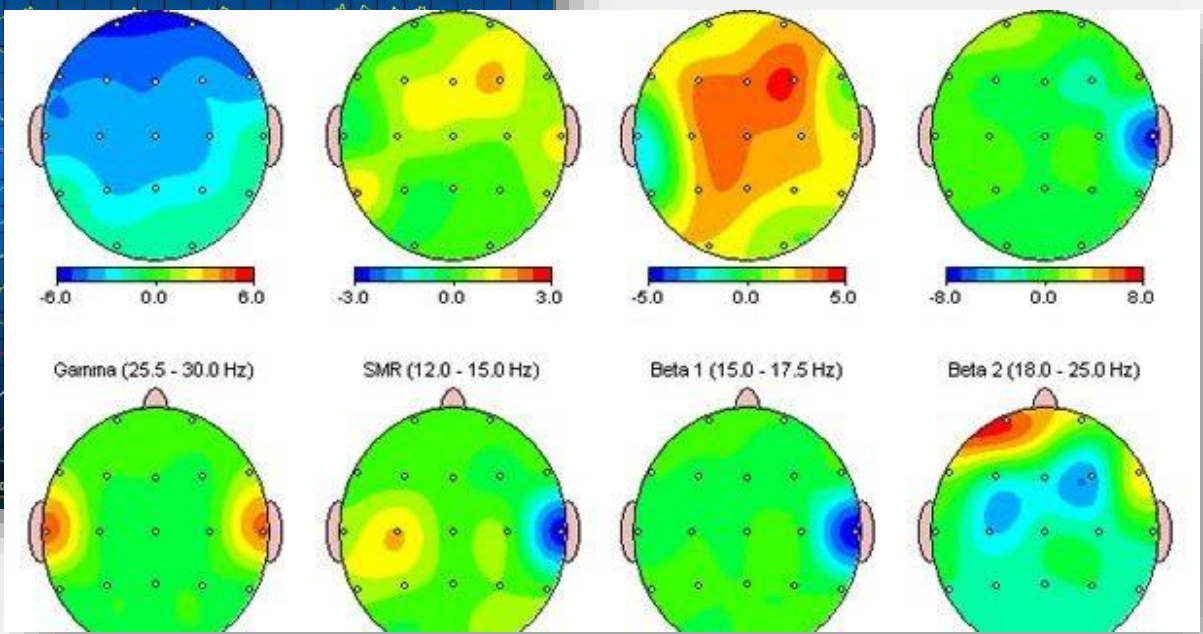
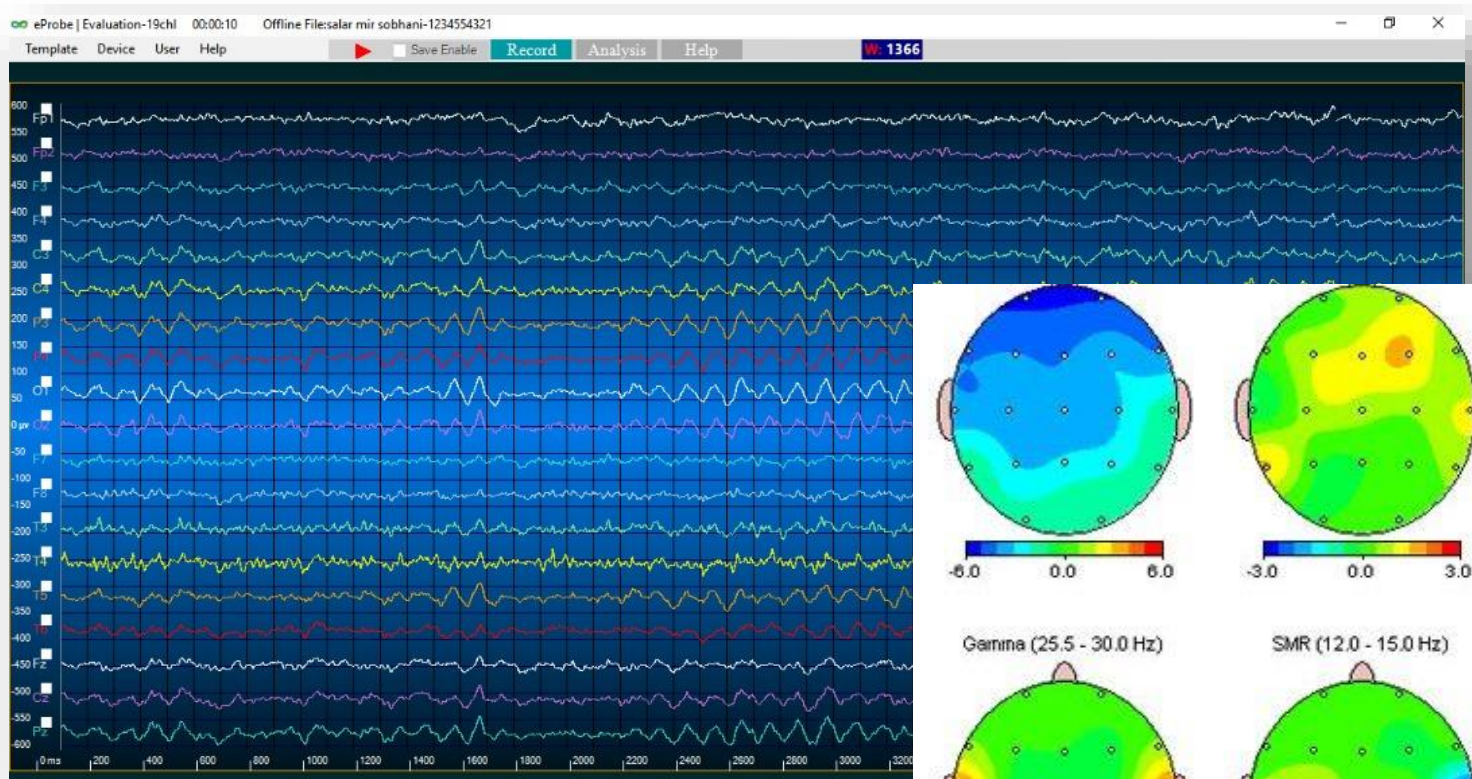


- Logic: Controls the feedback function using the output of one or more logic bars. To do this, you must select the logic bar in “Logic1”. You must select both to include theta and beta1 logic bars. The output of both bars forms the logic of the game (i.e. the game continues whenever the amplitude of the theta and beta 1 waves in the client is within the desired range).

- Full Screen: Full screen display on the second monitor in ON mode (using Extended display monitor and drag the game screen to the second monitor)
- Reward Time: The interval when the value is reached for the points references. The shorter the time, the faster the user earns points.



# Recording EEG /QEEG

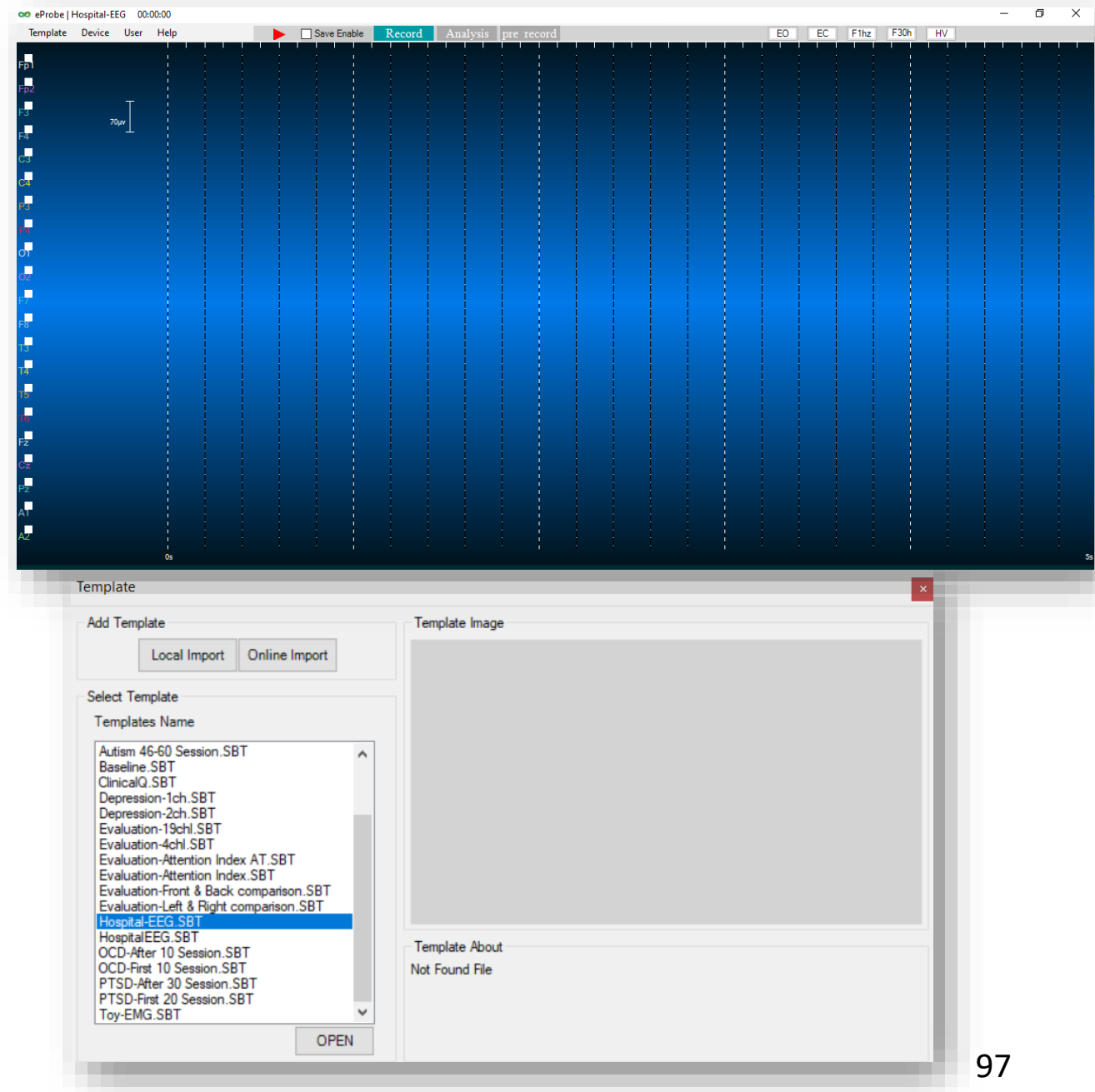


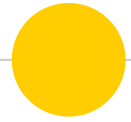




# Recording an EEG

- Open “Hospital-EEG” protocol from the “Template” menu.
- This protocol has three options:
  - Record: Recording the signal online
  - Analysis: Reporting and printing
  - Pre Record: Check the optimal signal impedance
- Also on the top right, “Event” buttons are displayed.
  
- Follow the instructions on the next pages for recording.





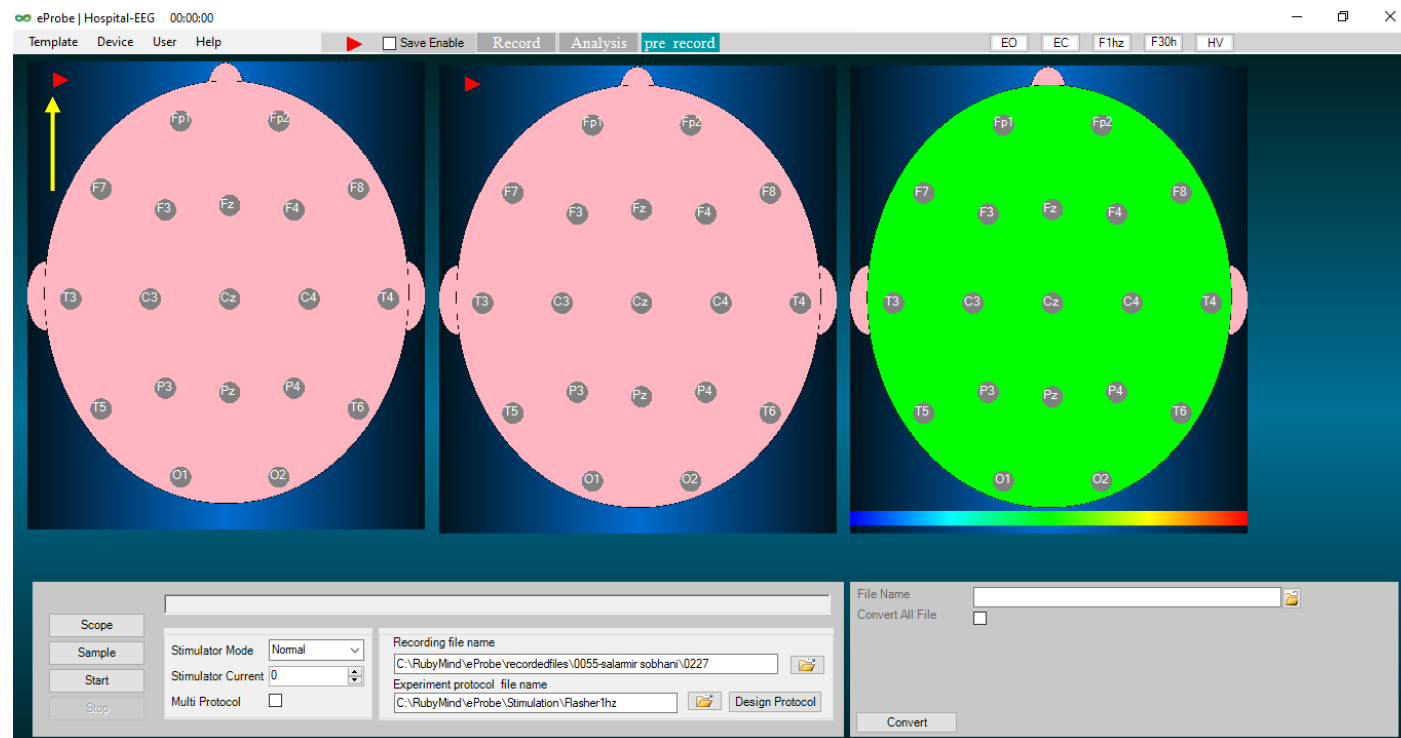
## **Standard electroencephalography (EEG)**

- ⦿ Standard electroencephalography (EEG) is practiced according to the following method.
- ⦿ The protocol for this recording is available in the online download section.
- ⦿ Make sure the device is connected properly before recording.
- ⦿ Save the waves according to the instructions on the previous pages.
- ⦿ All data must be saved for the purpose of both reporting and printing.
- ⦿ Various events such as open and closed eyes, Various light flashers and Hyperventilation will be described.



## Hospital-EEG Protocol Pre Record

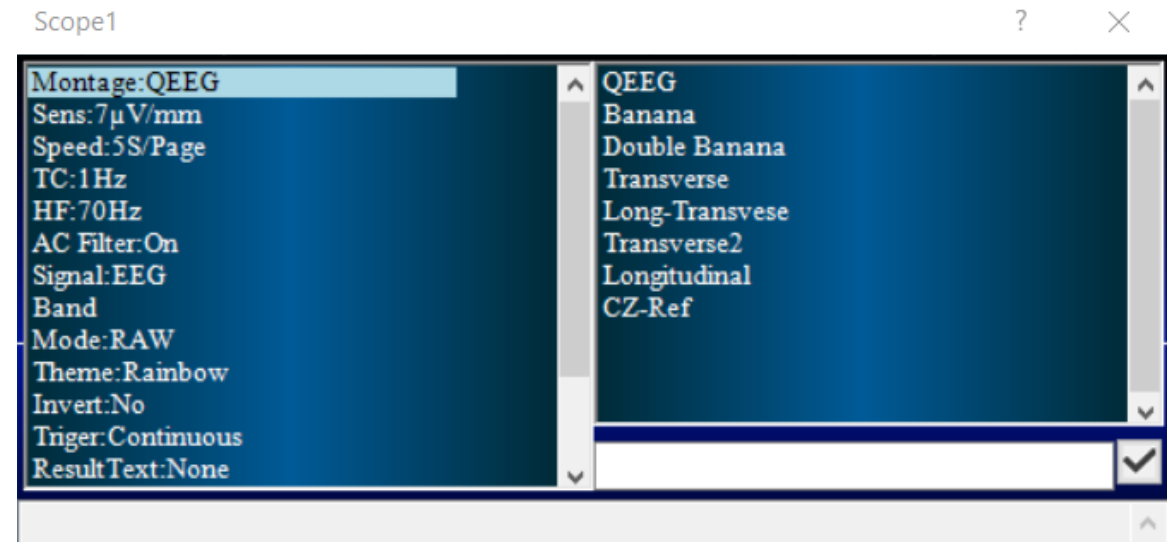
- In the “Hospital-EEG” protocol, click on the “Pre-record” tab - before initiating a recording in the impedance section. Make sure that all channels are connected correctly. To apply gel into the cap, run the software and click on the arrow indicated in the image.
- The amount of impedance in each electrode will be displayed below each item in ohm unit.
- Proper impedance is displayed in green, acceptable is in orange, and unacceptable is shown in red. 200 ohm is an optimal impedance figure.
- To start recording, all channels must have an optimum level of impedance. You should improve impedance by adding gel and make sure the attachment between the cap, gel, and electrodes is adequate.
- After all, points turned green, stop the impedance procedure. Go back to the recording tab and click the “Play” button.





## Recording

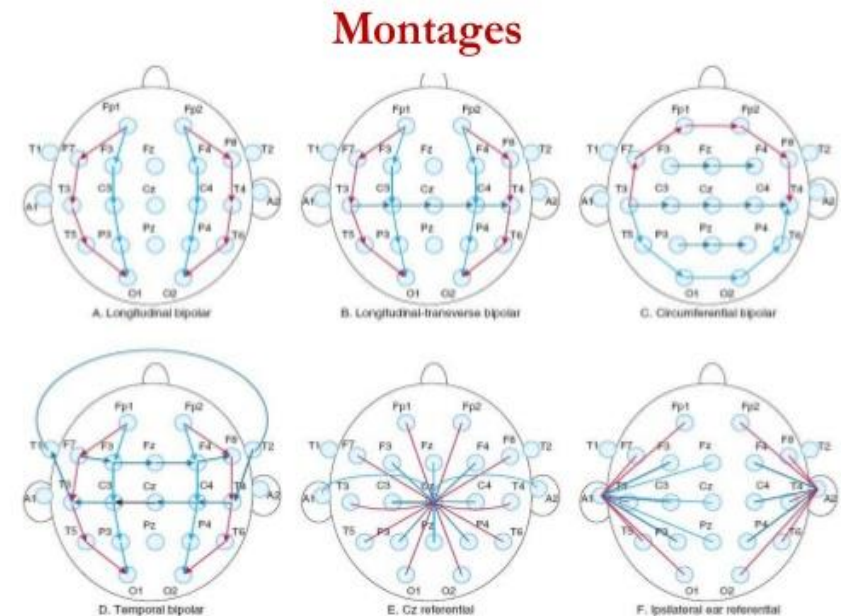
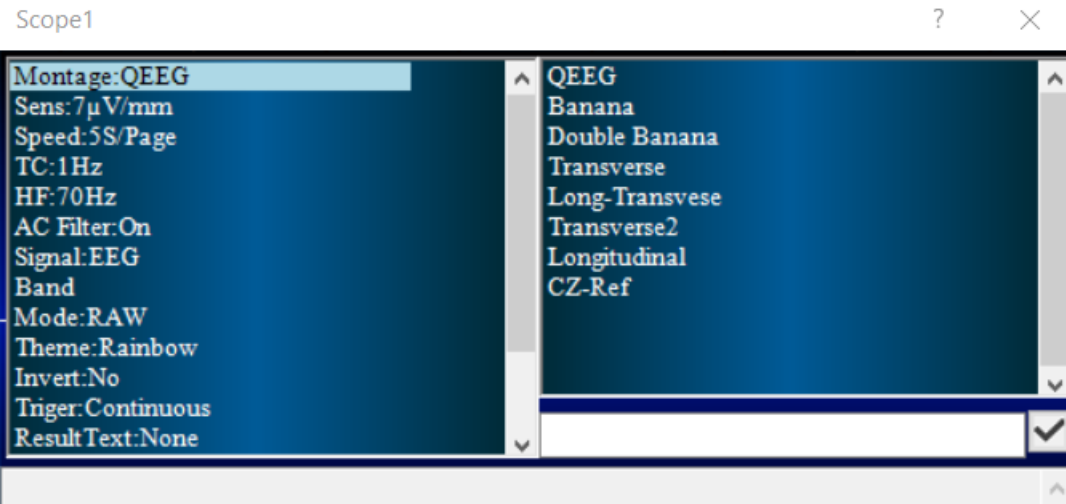
- By right-clicking on the scope in the protocol a page opens up where you can select your desired brain montage.
- Speed is equivalent to t/D in neurofeedback protocols.
- Sens is equivalent to V/D in neurofeedback protocols.
- First, click on the start button, and if the signal seems convincing save it then.
- To save, follow the instructions in the neurofeedback section (user creation and data storage).

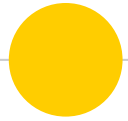




# EEG Montages

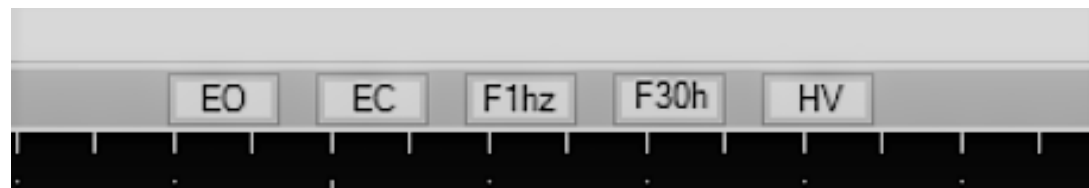
- Demanded montages must be chosen for optimal display in a Routine EEG recording.
- You can also design new montages in the software.
- To select the montage, right-click on the scope screen and select the preferred option from the “Montage” menu. Select the “QEEG” option to record QEEG





## recording Contd. - Event Buttons

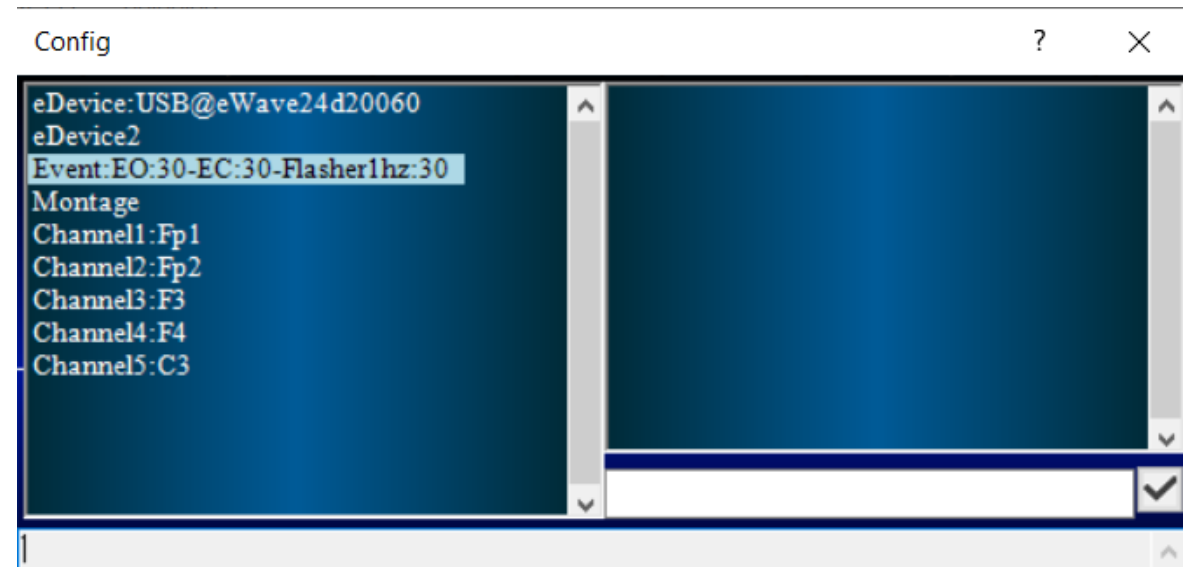
- Following events are defined for the below protocol:
- Open eyes or EO
- eyes-closed or EC
- 1 Hz or F1hz
- 30 Hz or F30hz
- HV or rapid breathing
- The duration of each event is 30 seconds and can be changed.





## Changing Time/Name of the Events

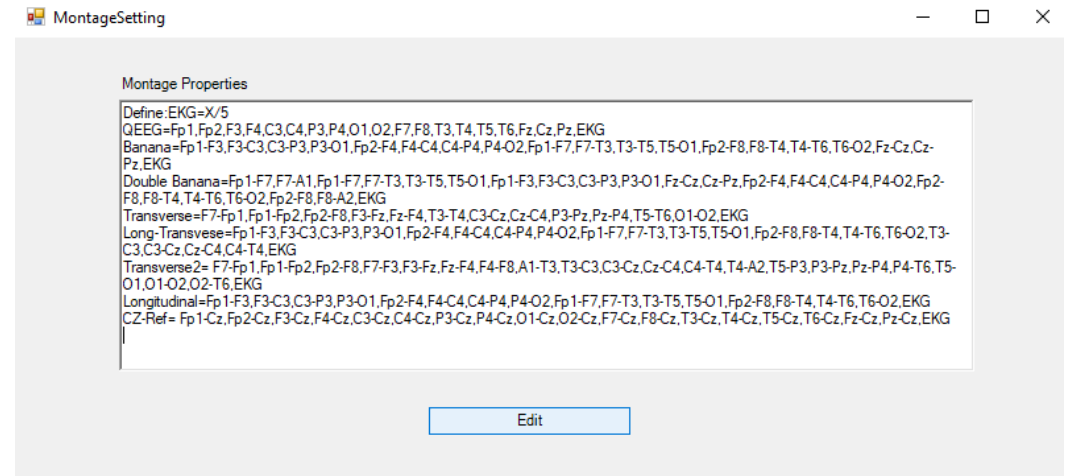
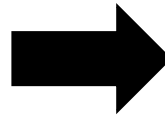
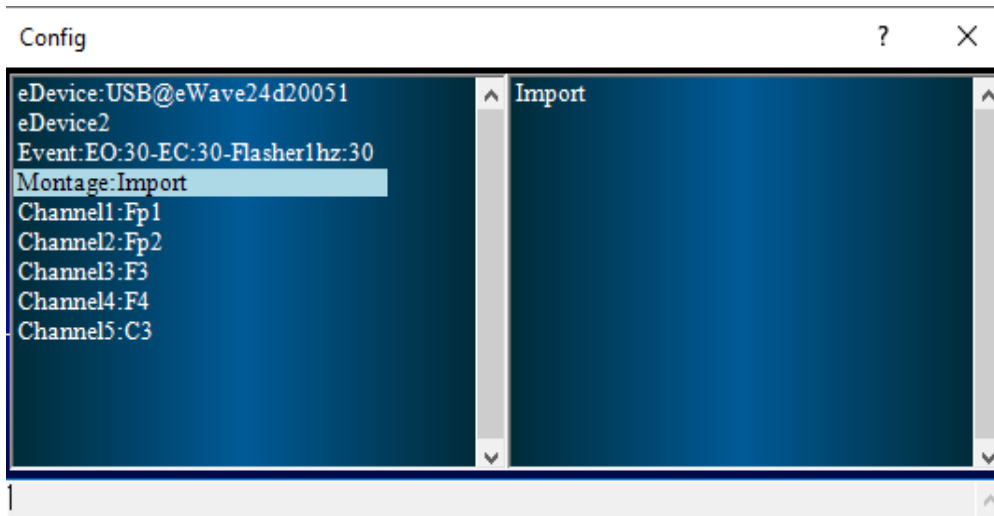
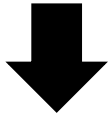
- In “device” menu click on “event”.
- You can enter the following values as a sample:  
  
EC:30-EO:40  
  
Flasher1HZ:30 -Flasher30Hz:30 -EC:30 -EO:30
- By clicking on the “confirm” button, events are displayed on right top side corner .





# Create and Add Montage

- Go to the “Device” menu in the opened window, select “Montage” and click on “Import”. A new window will open.
- In this window, you can enter your desired montage.

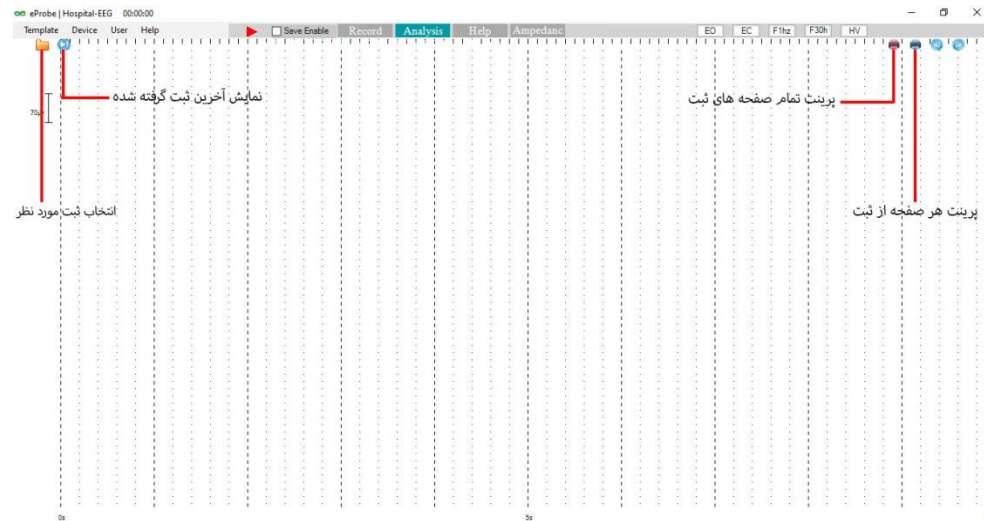






# Signal Report Page

- This panel is used for offline display and printing.





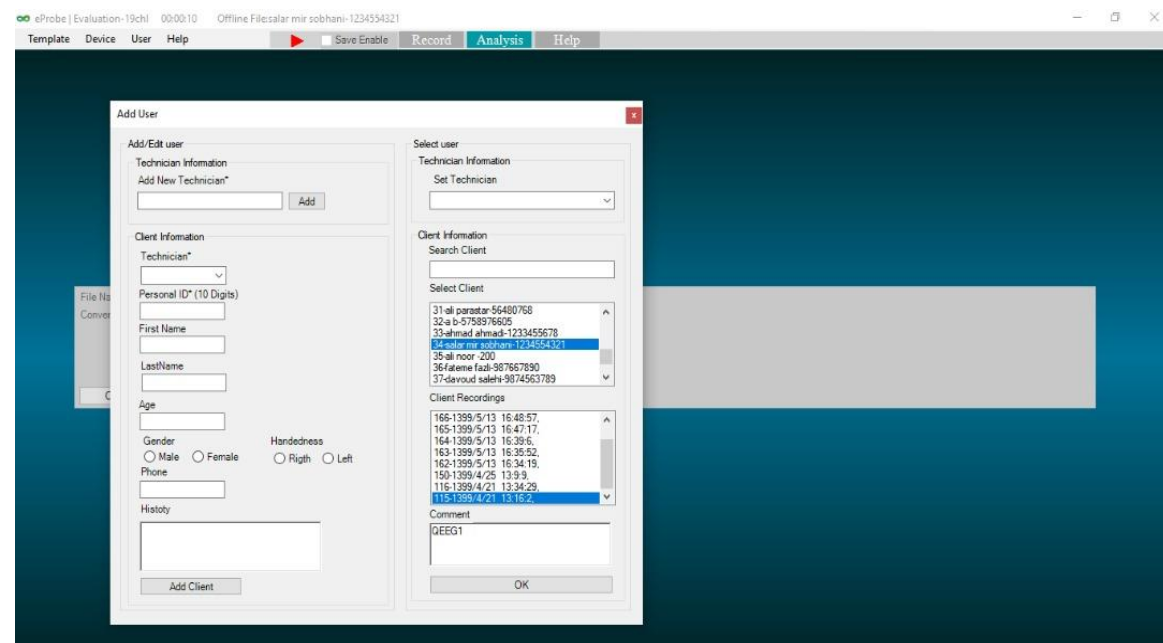
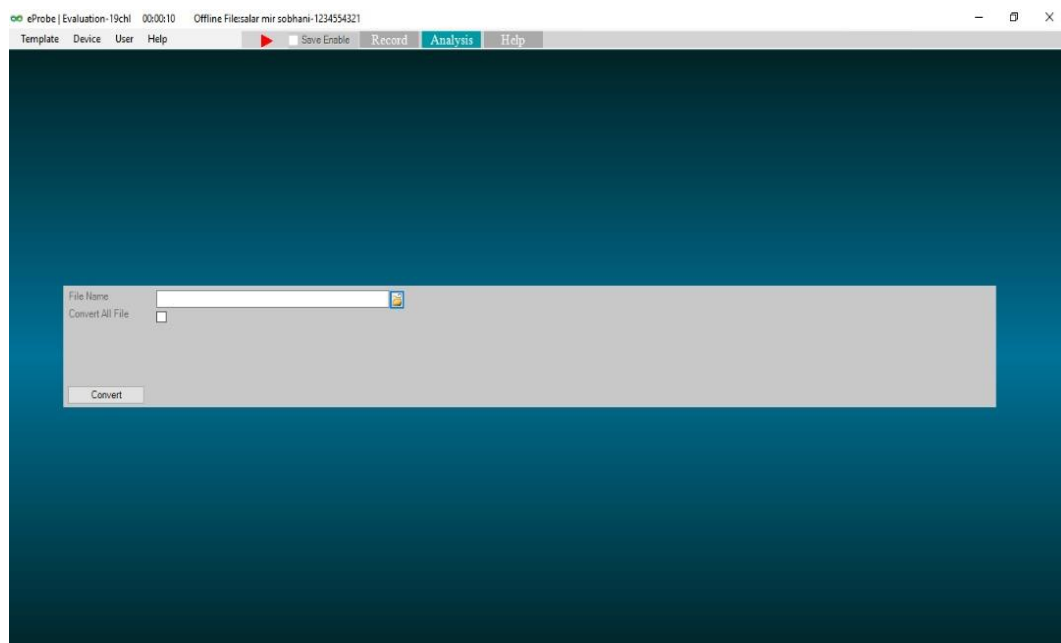
## QEEG

- ⦿ Select “Evaluation 19ch” protocol from the “Template” section.
- ⦿ place the cap on the client’s head and connect the device to a computer using Bluetooth or a USB cable.
- ⦿ Next, insert some gel into the required points (based on your protocol) on the cap.
- ⦿ If no noise was detected, enter the client’s information in the “User” menu, leave a comment and check “Save Enable” to save this recording.
- ⦿ Click “Play” and take recordings for 4 min. Ask your client to keep their eyes open during the recording.
- ⦿ Then refer to the “Analysis” menu and select the saved signal.



# EEG Wave Analysis in Neurogide

☉ In the analysis panel, select your desired file.





## EEG Wave Analysis in Neuroguide

- After selecting the user, click the convert button.
- Enter Neuroguide program and perform the following action : File → Open → Text file (uv)
- Enter Rubymind folder and select converted file from the Recorded files folder.

