

## 4 channel Assessment Gathering – Real-time artifacting with Brain-Trainer for BioEra, Optima+ and TC26/Electrodes

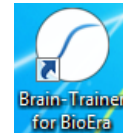
### CONFIGURE SETTINGS

#### *Power on your device*

Connect the Optima device in the USB port of your computer and turn it on.

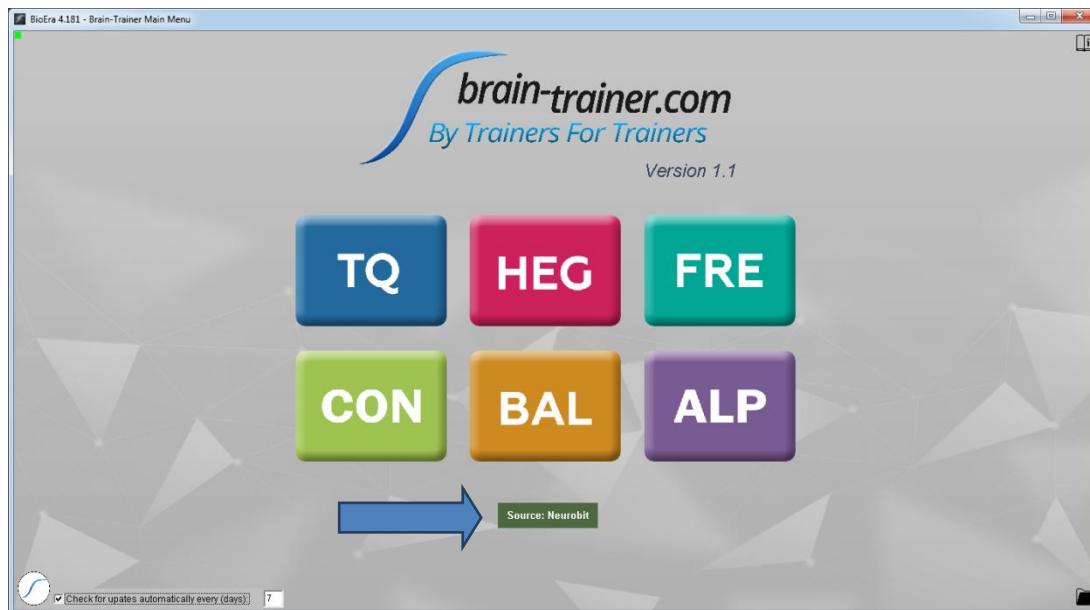
#### *Open Software*

Open *Brain-Trainer for BioEra*. There should be a shortcut on your desktop.

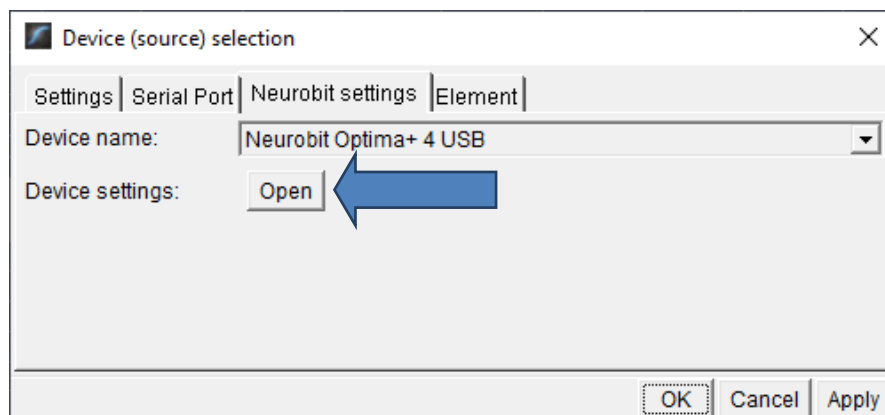


#### *Configure channels*

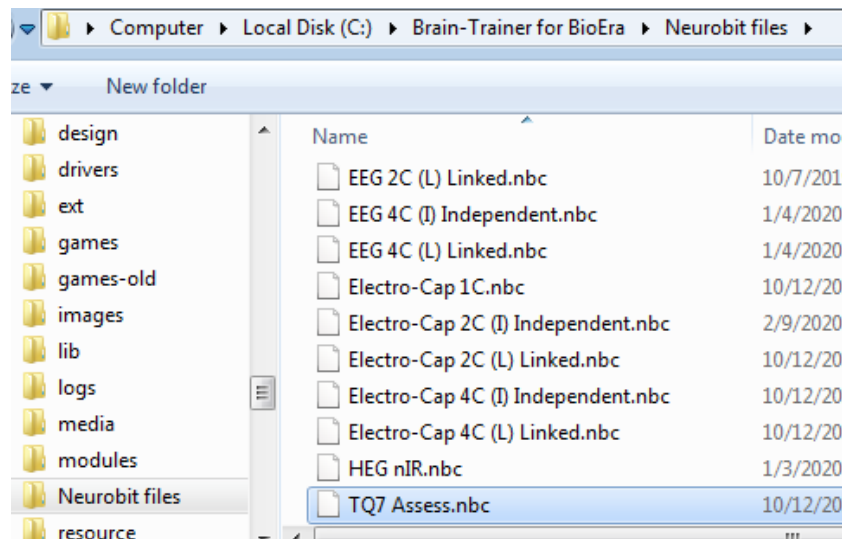
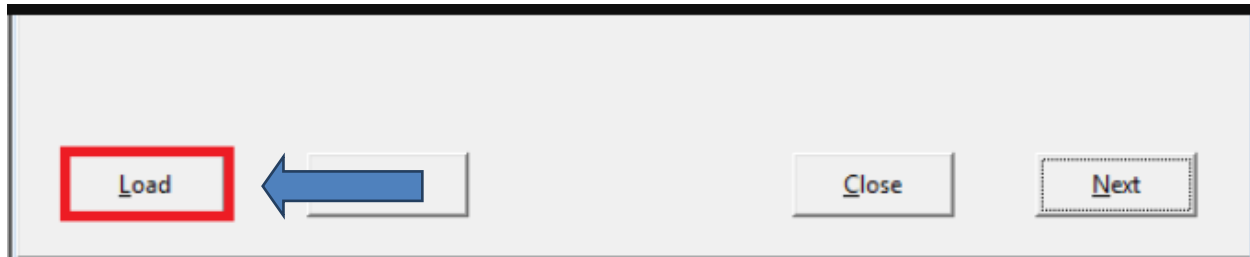
Open the device window by clicking the Source name.



Click the "Open" button for Device settings and the Device settings window will open.

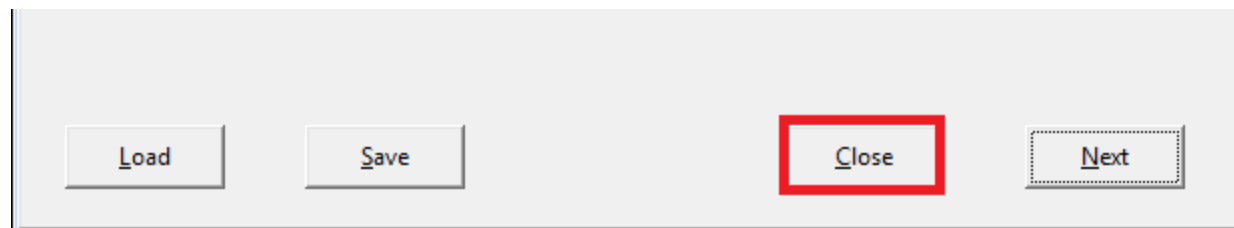


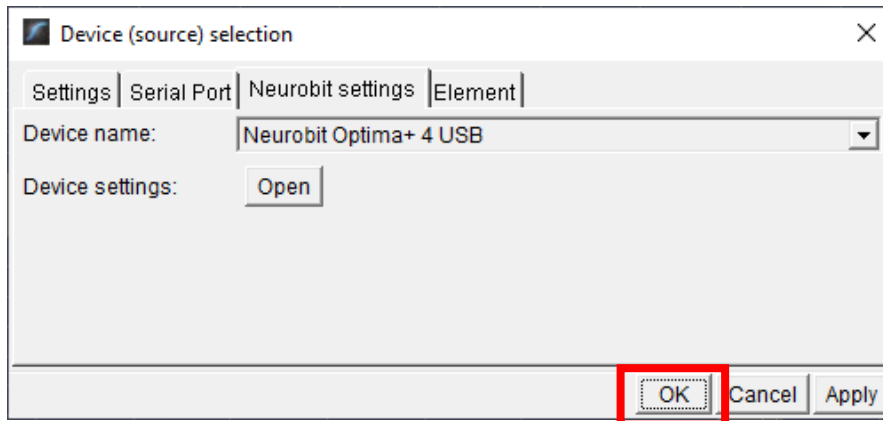
Click the "Load" button at the bottom left of the Settings window. Navigate to the folder C:\Brain-Trainer for BioEra\Neurobit files. Select the file *TQ7 Assess* or *EEG 4C (L) Linked*. They will both perform the same in this case.



Alternatively, you can manually turn on selected measurement channels (*Channel enable* option) on individual channel tabs A, B, C, D.

Click "Close" on the Settings window and "OK" on the Device window to close it.





### Open the TQ design

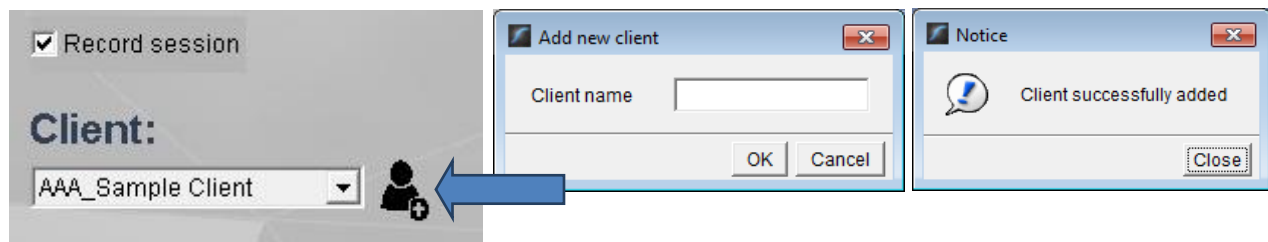
Click the TQ button and select the TQ design to use. In this case we demonstrate TQ 4C no-



artifacts.

### Create Client folder

Click the "Add Client" icon at the left of the design screen and enter client's name. You can make this cryptic if you like (e.g. JODO). Click "OK", then "Close."



Select the client from the client list. *TIP: If you do not see the client name in the list, close the software, save and run this file: ClientListFix.*

[https://www.dropbox.com/s/ebqpkmtetstwj3/BT4BE\\_1.1\\_ClientListFix.exe?dl=0](https://www.dropbox.com/s/ebqpkmtetstwj3/BT4BE_1.1_ClientListFix.exe?dl=0)

*This will not be necessary after the next update. Now reopen the software and the TQ design.*

## APPLY ELECTRODES

When using the real-time artifacting design, the first step before collecting data is to set thresholds with eyes closed and eyes open. Otherwise, you will skip thresholding and begin with Step 1.

Place cap and insert saline-saturated electrodes for threshold setting. Or place electrodes as normal if not using a cap.



### Placing Ground and Reference Electrodes

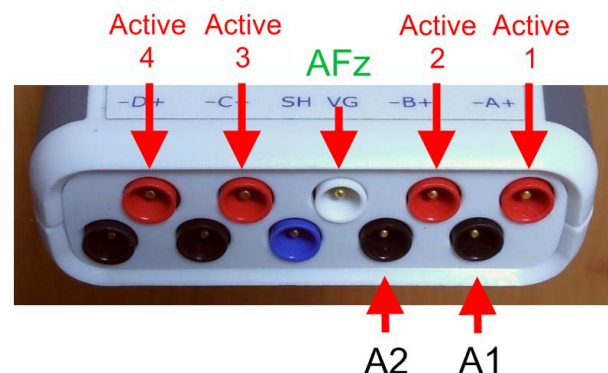
- The ground/neutral on the TC26 Trainer's Cap is at **AFz** and must ALWAYS be used with saline solution. For electrodes with paste, the ground can be any site that is not needed as active or reference.
- **A1** and **A2** are used as references for all steps, placed behind the ears (or on ear lobes with clips)..

### Placing Active Electrodes

The electrode for the first active site listed goes into the 1<sup>st</sup> channel port, the second active into the 2<sup>nd</sup> port, etc. When gathering from homologous sites (e.g. T3 and T4, C3 and C4), electrodes from left hemisphere should always go in CHA, right hemisphere in CHB. When gathering on the midline (z sites), furthest front electrode should go in CHA.

For the initial threshold setting portion of the assessment, place active electrodes as prompted by the design display at the following sites: **P3-P4-C3-C4**.

Connect the electrode wires to the Optima for the thresholding process.



- Ground: **AFz** to VG
- References: **A1** to A-; **A2** to B-
- Actives: **P3** to A+; **P4** to B+; **C3** to C+; **C4** to D+

### EXPLAIN PROCESS TO THE CLIENT

- First part will be relaxed, still, with eyes closed for one minute.
- Second part will be relaxed, eyes open and still for one minute

Thereafter, each set of sites will consist of three steps:

- First minute of recording will be relaxed, still, with eyes closed
- Second minute of recording will be relaxed, eyes open and still
- Third minute of recording will be relaxed performance of a task\* with eyes open. Explain that this is not a test of the client's performance but a way of seeing how the brain responds to the challenge.

Before recording each area, explain the task and verify the client understands what to do.

Verify that the client is relaxed, sitting straight with both feet on the floor with eyes closed or open as appropriate.

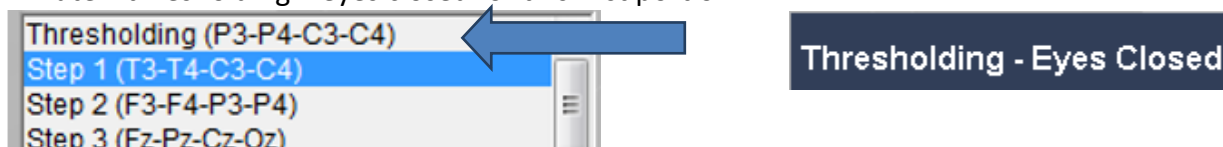
#### \* 4-Channel Tasks for Minute 3

- **T3/T4 and C3/C4**—Client **listens for detail**. Read or tell a story or article with detailed information in it while the client listens. Tell the client you may ask questions after the recording. Ask open-ended questions first (e.g. "what was the paragraph about?") and move to greater detail.
- **F3/F4 and P3/P4**—**Digit-span working memory** test. For the first 30-40 seconds read a series of digits (0-9) one second apart (start with 5 digits) and ask the client to repeat them. If client can do 5, try 6, then 7. You may choose to pause after 30-40 seconds to do Reverse Digit Span: Explain the task (listen to the numbers and repeat them in reverse order)
- **Fz/Pz and Cz/Oz**—Eyes partly open. Client **imagines a desired future change** in himself.
- **F7/F8 and T5/T6**—Client **reads silently for detail**.
- **Fp1/Fp2 and O1/O2**—**Pattern recognition**, counting the number of occurrences of the letter sequence "t, h and e", whether in a word (e.g. **their**, **another**) or as a word itself.

## SET THRESHOLDING

### Select EEG sites

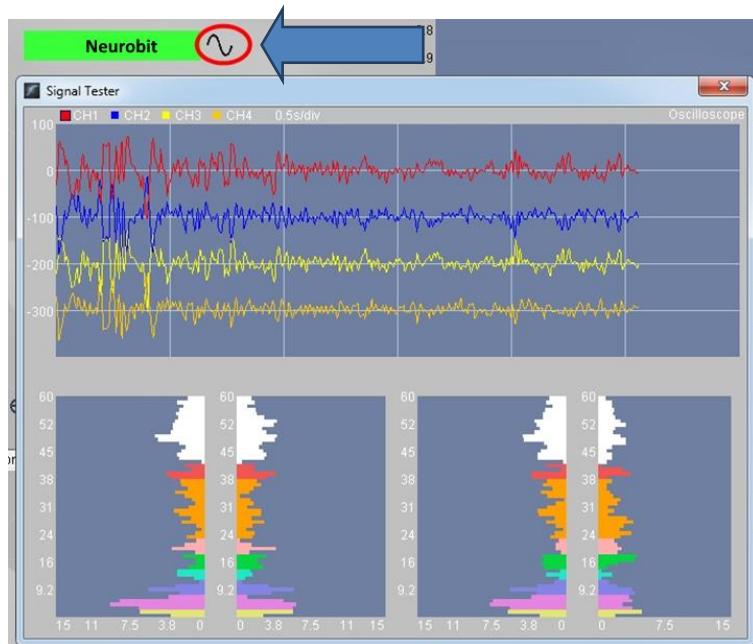
Click Thresholding (P3-P3-C3-C4) in the design. Notice that the design will indicate which active sites are to be used for each step. The design will indicate what the step entails for each minute—thresholding – eyes closed for this first portion.



### Check signal quality

Open the Signal Tester window by clicking the brain wave icon.

- In the Oscilloscope at the top, very regular, mechanical and fast waves suggest artifact. Very large waves or rolling/wandering baseline for a channel also suggest problems. Channels should show about the same amount of activity. A very attenuated signal in one or more channels indicates a poor connection.



- In the Power Spectrum windows below, look for spikes at 50 Hz or 60 Hz depending on your electrical system. If these are dominating the spectrum, there may be electromagnetic interference or you may have a poor connection between the skin and electrode
- If all channels show spikes and you are using a laptop, try unplugging the power transformer from the wall and the computer to run on battery. See if the spikes drop or disappear.
- If there are signal problems, re-prep electrodes and verify that the signal has improved.

When the signal is good, close the Signal Tester.

### Thresholding



Be sure the client is ready with eyes closed and still and click the Start button to begin thresholding. After one minute, the design will pause. The screen prompt will indicate thresholding with eyes open now.

#### Thresholding - Eyes Open

Have the client open eyes and sit quietly. Press Play. After one minute more, the design will stop. There is no thresholding at task. Now you are ready to gather data for the assessment.

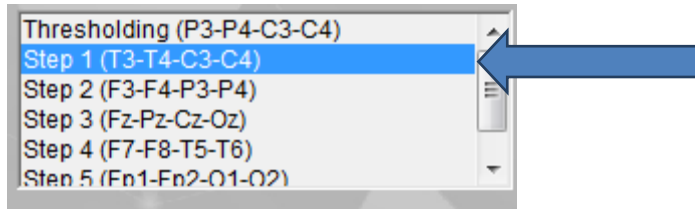
The "Play" button is now a "Restart" button. Click to restart the design.



### GATHER DATA

#### Select EEG sites

Click "Step 1 (T3-T4-C3-C4)" in the design. Notice that the design will indicate which active sites are to be used for each step. The design will indicate what the step entails for each minute--eyes closed for the first minute.



Move the channel 1 and 2 active electrodes to T3 and T4. Channel 3 and 4 electrodes are already at C3 and C4 and will remain there for Step 1.

### Check signal quality

Open the Signal Tester window by clicking the brain wave icon.

When signal is good, close the Signal Tester.

### Begin data collection

1. Click Play. As soon as you click Play, the timer will count down 5 seconds, after which the assessment data gathering will start recording the first minute. In the no-artifacts design, the recording will continue until 60 seconds of artifact-free data are collected. This may take longer than 60 seconds. You can see the progress in the progress bars.



### Step 1 - Eyes Closed

2. After 1 minute, the display will pause. Instruct the client to open eyes and look straight ahead. Click "Play" (white triangle) again to continue recording.

3. After 2 minutes, the display will pause again. Remind the client of the task. Click "Play" again and begin performing the task.

4. After 3 minutes the display will pause again. Now you have completed this recording. Click "Stop" (white square) to save it.

Click the Restart button to prepare for the next sites.



Move active electrodes to next sites and repeat for each channel set. Record a minimum of the 6 basic site pairs; if possible, record the full 10 site-pairs..

- Select next step in design. **Step 2 (F3-F4-P3-P4)**
- Move electrodes to new sites.
- Open Signal Tester and verify good signal and client sitting still.
- Close Signal Tester.
- Press Play to begin recording data.



Site chart	CHA	CHB	CHC	CHD	Task
Step 1	T3	T4	C3	C4	Listening
Step 2	F3	F4	P3	P4	Digit Span
Step 3	Fz	Pz	Cz	Oz	Imagine Desired Change
Optional	F7	F8	T5	T6	Silent Reading
Optional	Fp1	Fp2	O1	O2	Pattern Recognition

### Trainer Tools

- There are three graphs: Eye artifact and Muscle Artifact and Symmetry.
- The artifact graphs should be fairly stable with the lines close together. The Symmetry graphs show the difference between one hemisphere and the other. The values generally will be above the zero line.
- If either of the artifact graphs shows a consistent problem, stop the recording and resolve the problem.
- If there are strong asymmetries, verify that these aren't due to poor connections, eye or muscle artifact.
- Recording the cleanest, most accurate possible data is the trainer's primary task here. Excessive or constant artifact in a file can't be fixed after the fact.

### Special Notes

- When recording in F3/F4, Fz or F7/F8 sites, eyes-open and task segments should be done with the client's eyes "half-open"—peeking through the eyelashes—if this can be done without squinting. This will minimize eye blink artifact.
- Reading tasks should be held at eye-level (use a book stand) to minimize artifact.

## Using the TQ7 Client Report

### Professionals

The Client Report is considered when determining the final selections for the Whole-Brain Training Plan. This should be completed by the trainer through an interview with the trainee and additional members of the support system and saved in the client folder. A saved file is ready for import.

### Open the Client Report

The trainer should create a profile/login at [provider.brain-trainer.com](https://provider.brain-trainer.com) and initiate a report, sending an invitation to the trainee's email. The trainee will then be associated with the provider's account. This can be changed later if needed in the client's report | Edit.

### Complete the Report

Interview the client and family and complete the questionnaire, taking the opportunity to get an understanding of issues present, or the client can complete the report on his/her own.



**Save File**

Click the **Save Client Report** button to save the Client Report file. A name is automatically assigned to the file with "CRep" in the name. The file is available immediately for download. A copy will be sent to the trainer if a trainer has been specified.

**Home Trainers**

The Client Report is considered when determining the final selections for the Whole-Brain Training Plan. This should be completed and saved in the client folder. A saved file is ready for import.

**Complete the Report**

Complete the questionnaire, taking the opportunity to get an understanding of issues present. If you have purchased the Whole-Brain Training Plan, as trainer, select "Whole-Brain Training Plan Service."

**Save File**

Click the **Save Client Report** button to save the Client Report file. A name is automatically assigned to the file with "CRep" in the name. The file is available immediately for download. A copy will be sent to the trainer if a trainer has been specified.

## Appendix: TC26 Trainer's Cap Sites

