brain-trainer.com
By Trainers For Trainers

# TQ7 Trainer's Q Guide

Complete guide to **Assessment gathering**, **Training Plan service**, **Assessment processing**-all versions of TQ7 --- **QuickStart instructions**, a concise guide plus **detailed instructions** for thorough explanation --- **Features guide**, **Site finding** and **brain pattern findings** included

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# Part 1 Client Report

## Chapter 1 Using the TQ7 Client Report

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. Alternatively, a client who is self-training can fill out the report on his/her own or on behalf of a family member. A saved file is ready for import to the TQ7.

### *Completing the Report*

Ideally the trainer will complete the Client Report online with the client. It will be available immediately for download. Alternatively, a link can be emailed to the client to complete on his/her own. If the link was initiated from the trainer's or mentor's link (at provider.brain-trainer.com) the trainer/mentor will receive an email with the report attached (CRep_trainee-name.csv). Save this file into the trainee's assessment folder. If the client is a self-trainer without a mentor, the client must complete a trainer profile to manage his/her own client reports at provider.brain-trainer.com.

#### Open the Client Report

If there is a Brain-Trainer mentor, the mentor should send a link to the client for an invitation to complete the Client Report. If there is a trainer, the trainer should create a trainer profile at provider.brain-trainer.com and 1) initiate a report, completing the report with the client present with the option "Start Client Report" or 2) send an invitation to the trainee's email with the option "Email a Link." The trainee will then be associated with the provider's account.

#### Complete the Report

Interview the client and family and complete the questionnaire, taking the opportunity to get an understanding of issues present.

#### 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.

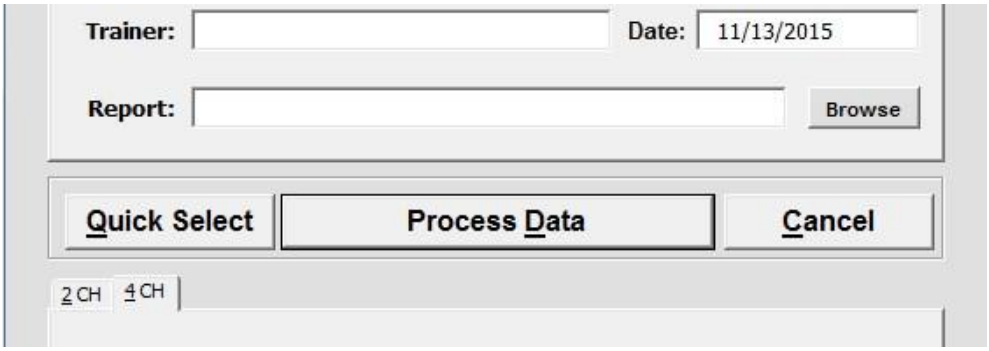
### *Importing the Report (for TQ7 owners)*

**Open the TQ7 file** (must be purchased first)

This is found in Documents\Brain-Trainer. A shortcut should be on your desktop.

### Import the Client Report File

As with the recordings, these can either be selected manually by clicking “Browse” or simply clicking inside the textbox. If you use *Quick Select* and the "CRep".csv file is in the same folder as the recordings, the report will be added automatically. When you click the *Process Data* button, the Client Report is transferred and ready after the assessment has finished updating.




### Making Corrections to the Client Report *after importing to the TQ7*

- Registered trainers can open the client's Client Report at provider.brain-trainer.com and **make necessary changes**.
- Download the corrected file and put it in the client Assessments folder in place of the outdated file.
- In the TQ7 select the *Comparison* tab. Select **"Client Report Before Training"** or **" Client Report After Training"** to browse to the client assessment folder to select the correct revised file and click "Open."
- Select the *Summary Report* tab to update the information. "**Create Executive Summary Report**" again by selecting Excel or Word version.
- **Save the revised file** using File | Save (or the "Save" icon). 

# Part 2 TQ7 Assessment Gathering Guide

Trainers using Brain-Trainer software will find assessment gathering instructions in our online resources. Trainers using other software (BioExplorer, Infiniti) can choose from the below options.

QuickStart instructions are concise steps for those already familiar with the process. Standard instructions include detailed information for new users.

## Chapter 2 Brain-Trainer for BioEra software

Instructions for assessment gathering with Brain-Trainer for BioEra software are found online, listed by amplifier type from the Brain-Trainer for BioEra manual, our *Foundations of Brain-Training* lesson "Recording the Assessment" and on our Tech Support page.

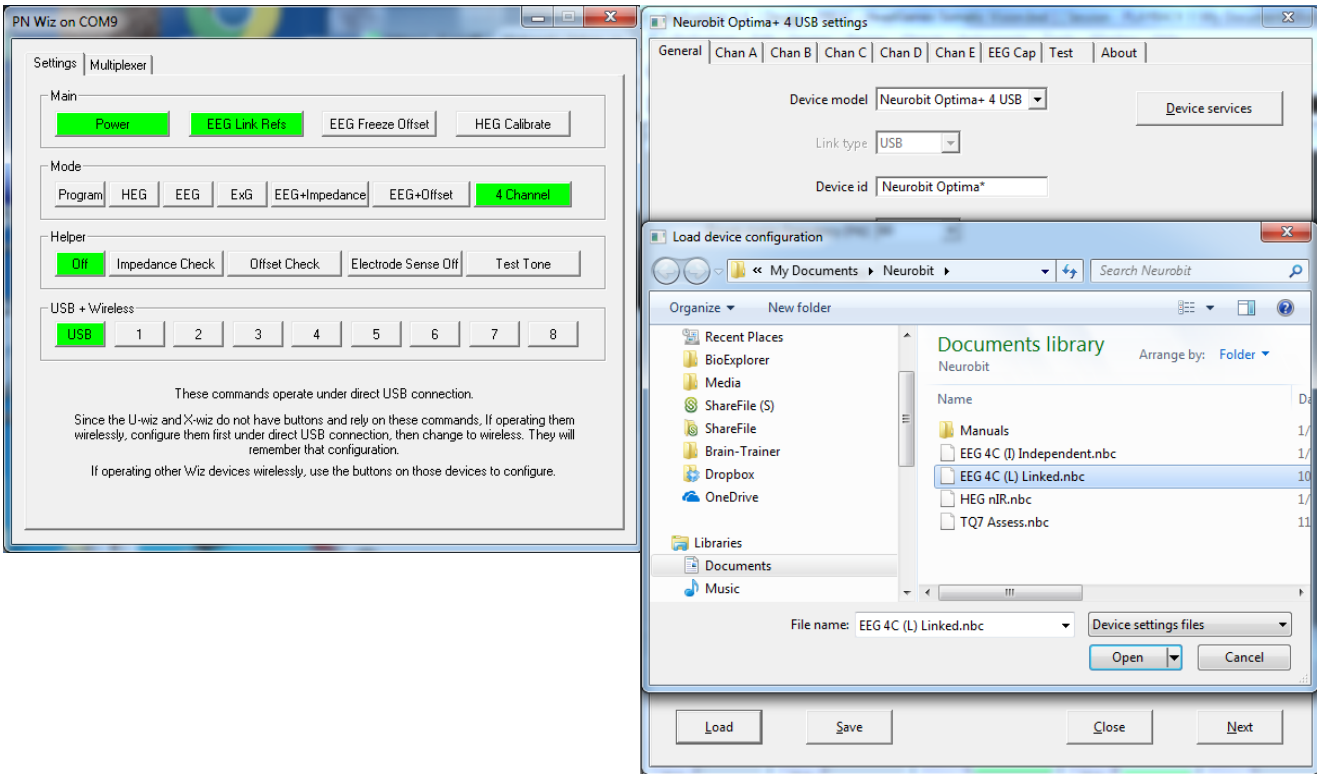
# Chapter 3 QuickStart Assessment: BioExplorer 4-Channel with TC26

BioExplorer Preferences should have been set. Open ***TQ7 Assess Pro Gather 4C*** design.

## PLACE CAP, INSERT SALINE-SATURATED ELECTRODES

- **Ground/Neutral - AFz** Ground must always be used
- **Reference - A1 and A2** - Behind ears on mastoid bone
- **Active channels 1, 2, 3, 4: T3 T4 C3 C4 / A, B, C, D: T3 T4 C3 C4**

**Q-wiz**: EEG Link Refs, 4 Channel Helper Off, USB **Optima**: Load TQ7 settings file in Settings window



# INSTRUCT CLIENT

**The Process**

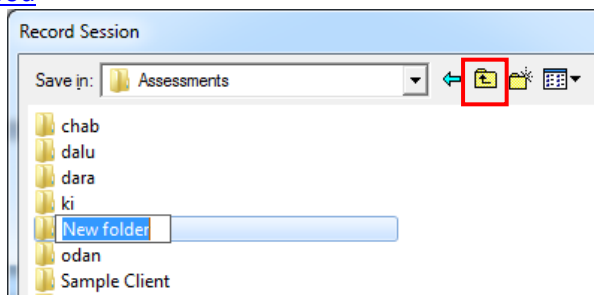
1. 1st minute: Eyes closed, relaxed, still
2. 2nd minute: Eyes open, relaxed, still; minimize blinking
3. 3rd minute: Task with eyes open; minimize eye movement; see how brain responds to the challenge

**Client Position to minimize artifact**

- Sit relaxed, sitting straight with feet on floor
- Let mouth hang open a bit
- Keep head up

# GATHER DATA

- Click "Capture" (green triangle) and assure signal is good
- Navigate to Documents\BioExplorer\Sessions\Assessments and open/create client folder. (Client ID: first 2 letters of first and last name)
- Create Assessments folder within and open it.
- Name file (e.g. T3 SMBO 150127), "Save"




1. At 1 minute, instruct the client to open eyes and look straight ahead. Click "Capture" again to continue recording.
2. At 2 minutes, remind the client of the task. Click "Capture" and begin performing the task.
3. At 3 minutes, recording is complete. Click "Stop" (white square) to save it.

| Cap Sites | CH1 | CH2 | CH3 | CH4 | 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 |
| Step 4 | F7 | F8 | T5 | T6 | Silent Reading |
| Step 5 | Fp1 | Fp2 | O1 | O2 | Pattern Recognition |

Move electrodes to Step 2 sites F3 F4 P3 P4 and repeat the steps, saving all recordings in the same client folder. Repeat for all site sets.

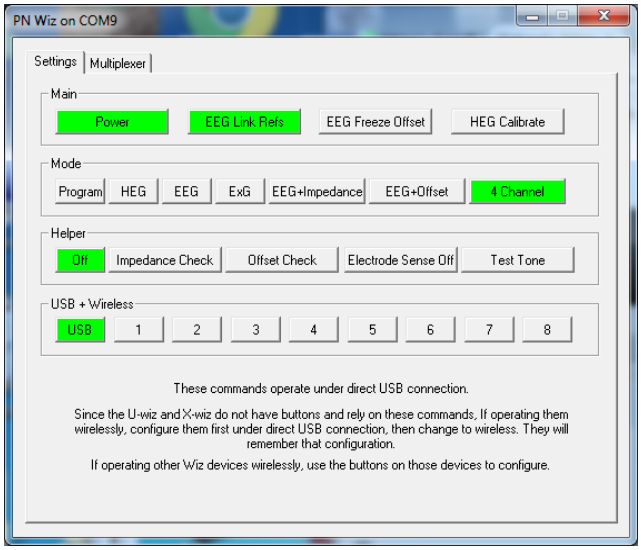
# Chapter 4 QuickStart Assessment: BioExplorer 4-Channel & Electro-Cap

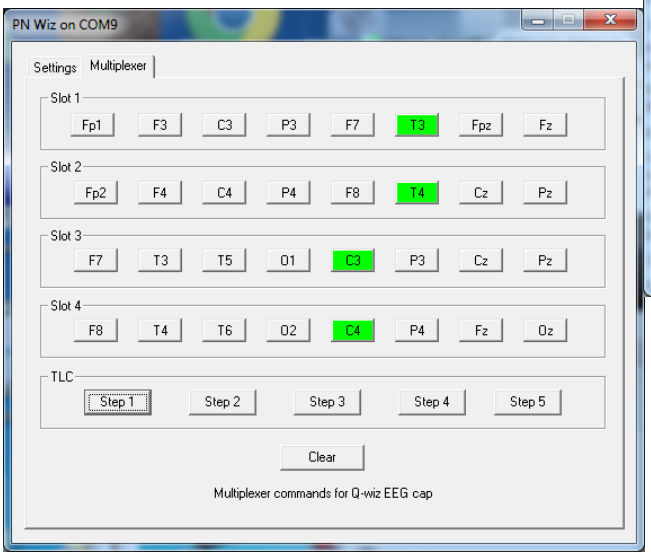
BioExplorer Preferences should have been set. Open ***TQ7 Assess Pro Gather 4C*** design.

## PREPARE SITES WITH GEL

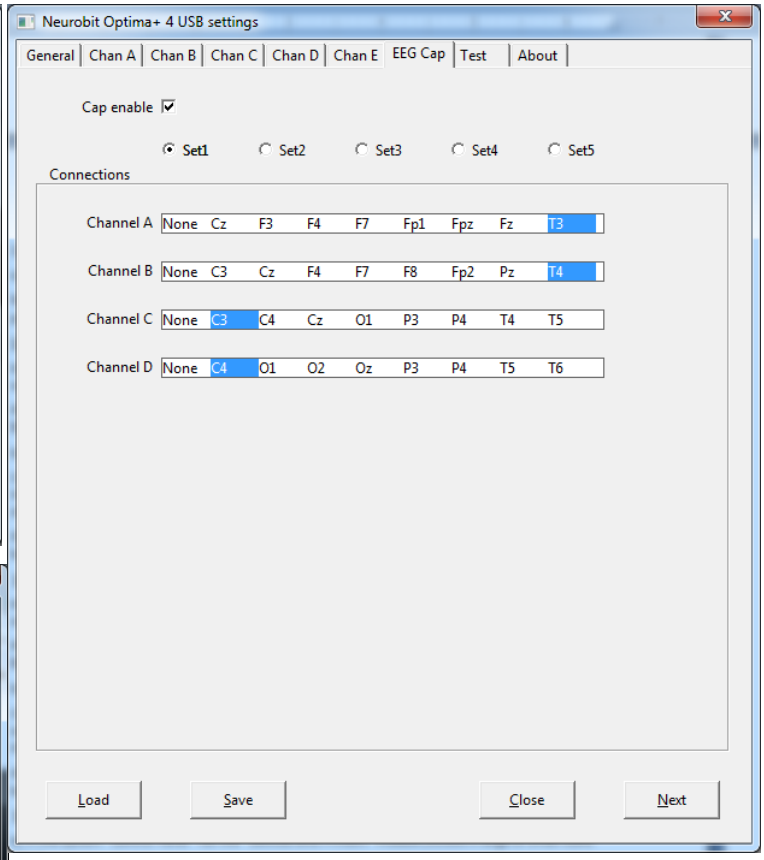
- **Ground/Neutral -** AFz must always be prepared
- **Reference - A1 and A2** - Connect and prep ear clips with Electro-Gel
- Select settings for your amplifier

Wiz settings, Multiplexer to "Step 1"




Optima+ 4 Load **TQ7 Assess** file; EEG Cap "Set1"



# INSTRUCT CLIENT

**The Process**

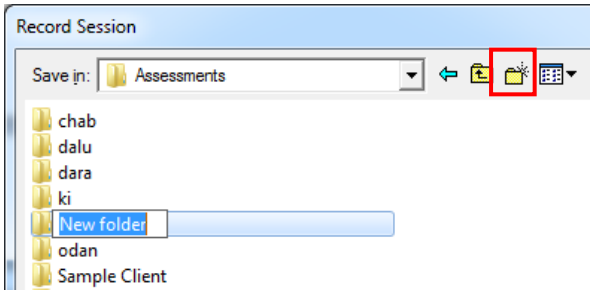
1. 1st minute: Eyes closed, relaxed, still
2. 2nd minute: Eyes open, relaxed, still; minimize blinking
3. 3rd minute: Task with eyes open; minimize eye movement; see how brain responds to the challenge

**Client Position to minimize artifact**

- Sit relaxed, sitting straight with feet on floor
- Let mouth hang open a bit
- Keep head up

# GATHER DATA

- Click "Capture" (green triangle) and assure signal is good
- Navigate to Documents\BioExplorer\Sessions\Assessments and open/create client folder. (Client ID: first 2 letters of first and last name)
- Create Assessments folder within and open it.
- Name file (e.g. T3 SMBO 150127), "Save"




1. At 1 minute, instruct the client to open eyes and look straight ahead. Click "Capture" again to continue recording.
2. At 2 minutes, remind the client of the task. Click "Capture" and begin performing the task.
3. At 3 minutes, recording is complete. Click "Stop" (white square) to save it.

| Cap Sites | CH1 | CH2 | CH3 | CH4 | 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 |
| Step 4 | F7 | F8 | T5 | T6 | Silent Reading |
| Step 5 | Fp1 | Fp2 | O1 | O2 | Pattern Recognition |

Set Multiplexer/EEG Cap tab to Step 2/Set2 and repeat the steps, saving all recordings in the same client folder. Repeat for all site sets.

# Chapter 5 QuickStart Assessment: BioExplorer 4-Channel & Electrodes

BioExplorer Preferences should have been set. Open ***TQ7 Assess Pro Gather 4C*** design.

## APPLY ELECTRODES

- **Ground/Neutral - Cz** or elsewhere on midline. If using snap-in electrodes, the back of the neck below hairline is good.
- **Reference - A1 and A2** - Connect amplifier's Reference (-) inputs (with a jumper if device does not have internal connection). Place earlobe or mastoid electrodes into 1- (-A) and 2- (-B).

| 4CH Sites | CH1 | CH2 | CH3 | CH4 | Task |
|---|---|---|---|---|---|
| Run 1 | F3 | F4 | P3 | P4 | Digit Span |
| Run 2 | T3 | T4 | C3 | C4 | Listening |
| Run 3 | Fz | Pz | Cz | Oz | Imagine Desired Change |
| Optional | F7 | F8 | T5 | T6 | Silent Reading |
| Optional | Fp1 | Fp2 | O1 | O2 | Pattern Recognition |

## INSTRUCT CLIENT

**The Process**

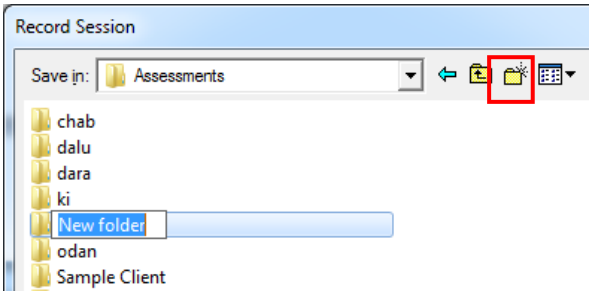
1. 1st minute: Eyes closed, relaxed, still
2. 2nd minute: Eyes open, relaxed, still; minimize blinking
3. 3rd minute: Task with eyes open; minimize eye movement; see how brain responds to the challenge

**Client Position to minimize artifact**

- Sit relaxed, sitting straight with feet on floor
- Let mouth hang open a bit
- Keep head up during eyes open

## GATHER DATA

- Click "Capture" (green triangle) and assure signal is good
- Navigate to Documents\BioExplorer\Sessions\Assessments and open/create client folder. (Client ID: first 2 letters of first and last name)
- Create "Assessments" folder within and open it.
- Name file (e.g. F3 SMBO 150127), "Save"




1. At 1 minute, instruct the client to open eyes and look straight ahead. Click "Capture" again to continue recording.
2. At 2 minutes, remind the client of the task. Click "Capture" and begin performing the task.
3. At 3 minutes, recording is complete. Click "Stop" (white square) to save it.

Move electrodes to their next positions and repeat the steps, saving all recordings in the same client folder. Repeat for all site sets.

# Chapter 6 QuickStart Assessment: BioExplorer 2-Channel & Electrodes

BioExplorer Preferences should have been set. Open ***TQ7 Assess Pro Gather*** design.

## APPLY ELECTRODES

- **Ground/Neutral - Cz** or elsewhere on midline. If using snap-in electrodes, the back of the neck below hairline is good.
- **Reference - A1 and A2** - Connect reference electrodes to Reference (-) inputs (with a jumper if device does not have internal linking). Place earlobe or mastoid electrodes into 1- (-A) and 2- (-B).

## INSTRUCT CLIENT

**The Process**

1. 1st minute: Eyes closed, relaxed, still
2. 2nd minute: Eyes open, relaxed, still; minimize blinking
3. 3rd minute: Task with eyes open; minimize eye movement; see how brain responds to the challenge

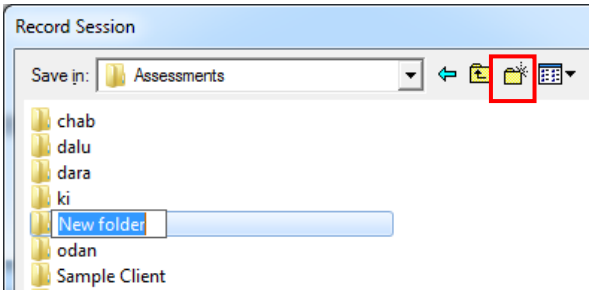
**Client Position to minimize artifact**

- Sit relaxed, sitting straight with feet on floor
- Let mouth hang open a bit
- Keep head up

| 2CH Sites | CH1 | CH2 | Task |
|---|---|---|---|
| Run 1 | C3 | C4 | Silent Reading |
| Run 2 | P3 | P4 | Serial Calculation |
| Run 3 | F3 | F4 | Digit Span |
| Run 4 | T3 | T4 | Listening |
| Optional | O1 | O2 | Pattern Recognition |
| Optional | T5 | T6 | Silent Reading |
| Optional | F7 | F8 | Reading Aloud |
| Run 5 | Fz | Pz | Visualize desired change |
| Run 6 | Cz | Oz | Pattern Recognition |

## GATHER DATA

- Click "Capture" (green triangle) and assure signal is good
- Navigate to Documents\BioExplorer\Sessions\Assessments and open/create client folder. (Client ID: first 2 letters of first and last name)
- Create "Assessments" folder within and open it.
- Name file (e.g. C3 SMBO 150127), "Save"




1. At 1 minute, instruct the client to open eyes and look straight ahead. Click "Capture" again to continue recording.
2. At 2 minutes, remind the client of the task. Click "Capture" and begin performing the task.
3. At 3 minutes, recording is complete. Click "Stop" (white square) to save it.

Move electrodes to their next positions and repeat the steps, saving all recordings in the same client folder. Repeat for all site pairs.

# Chapter 7 BioExplorer 4-Channel Assessment with TC26 Trainer's Cap - Q-wiz

## SETUP FOR ASSESSMENT

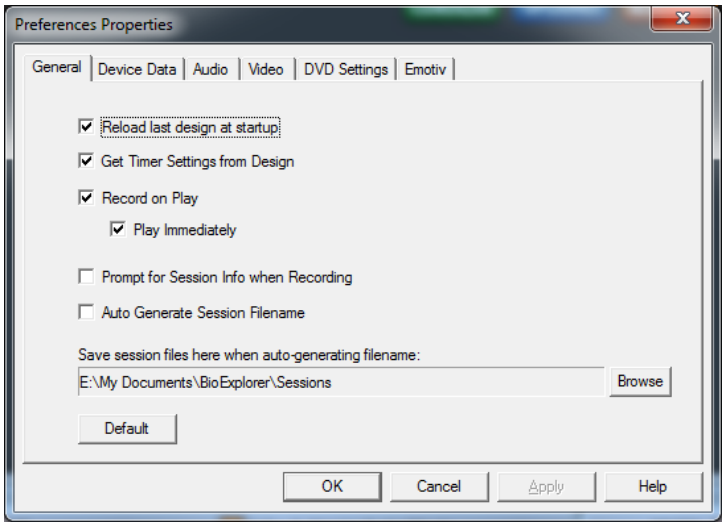
**Run the installer** which will place files in their respective folders, creating *a Brain-Trainer\Help* folder in your local drive with a shortcut on your desktop.

### *Verify the Results*

Open BioExplorer, click Design | Open and verify that the ***TQ7 Assess Pro Gather 4C*** design is there and opens properly.

### *Set Preferences in BioExplorer (first time only)*

Open BioExplorer and select BioExplorer | Preferences from the menu at the top.




In the *General* tab you may check

- "Get Timer Settings from Design."
- "Record on Play"
- "Play Immediately"
- Do not check "Auto Generate Session Filename."

Click "OK" to set Preferences. These preferences will be saved for the next time BioExplorer is opened.

## APPLY ELECTRODES

Place cap and insert saline-saturated electrodes for Step 1.

### *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.
- **A1** and **A2** are used as references for all steps, placed behind the ears.

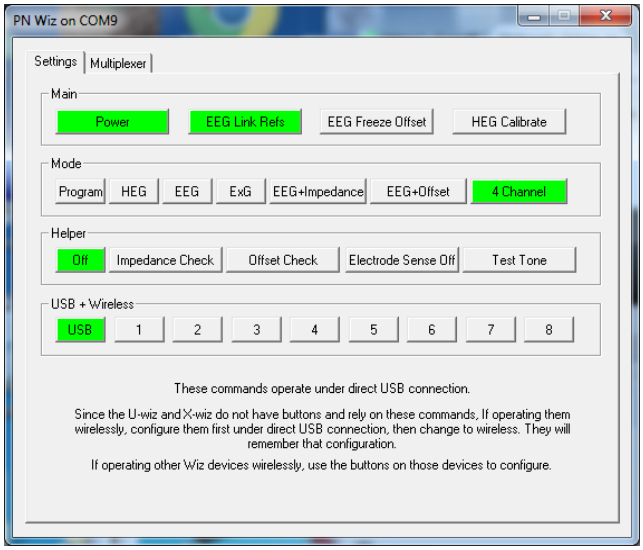
### *Placing Active Electrodes*

Step 1 active sites Channels 1, 2, 3, 4: **T3, T4, C3, C4**.
When gathering from homologous sites (e.g. T3 and T4, C3 and C4), electrodes from left hemisphere should always go in CH1, right hemisphere in CH2. When gathering on the midline (z sites), furthest front electrode should go in CH1.

Connect the electrode wires to the unit.
**Q-wiz:** AFz to gnd; **A1** to 1-; **A2** to 2-; **T3** 1+; **T4** 2+; **C3** 3+; **C4** 4+

### *Select Settings in BioExplorer Wiz Window*

Click buttons EEG Link Refs and 4 Channel to select linked references and Mode 4. The Mode in current use is indicated on the Q-wiz by the number of blinks of the green LED.




The green LED will be lit/blinking when the connections are good; high impedances will cause the LED to turn off.

## EXPLAIN PROCESS TO THE CLIENT

- 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**

- **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. **the**ir, ano**the**r) or as a word itself.

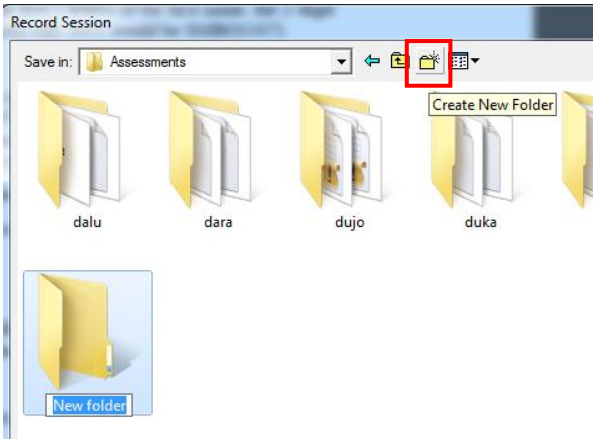
# GATHER DATA

With *TQ7 Assess Pro Gather 4C* design open, click "Capture" (green triangle) and observe signal quality.

## *Check signal quality*

- In the Power Spectrum windows (upper windows) 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
- In the Oscilloscope (lower right) 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.
- 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, click "Pause" (yellow parallel lines). Re-prep electrodes. Then click "Capture" again and verify that the signal has improved.

When signal is good, in the "Record Session" window, navigate to Documents\BioExplorer\Sessions\Assessments and click the "Create New Folder" icon to the right of the "Save In" field and open it.




Name the folder (e.g. SMBO) and open it. (Client ID: first 2 letters of first and last name)

In the "File Name" field, type the name of the file with the channel 1 site (e.g. T3), client ID and date


and Save.

Be ready to have eyes closed when you click Save. As soon as you click Save, the first minute will start as the timer then starts back at 00:00 and start recording the first minute. If the session has paused, click "Capture" again and start again with eyes closed.

1. At 1 minute, a tone will sound and the display will pause. Instruct the client to open eyes and look straight ahead. Click "Capture" (green triangle) again to continue recording.
2. At 2 minutes, the tone will sound and the display will pause again. Remind the client of the task. Click "Capture" again and begin performing the task.
3. At 3 minutes the tone will sound and the display will pause again. Now you have completed this recording. Click "Stop" (white square) to save it.

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.

- Click "Capture"
- Verify good signal and client sitting still
- Name file with site, client ID and date

| Cap Sites | CH1 | CH2 | CH3 | CH4 | Task |
|---|---|---|---|---|---|
| Run 1 | T3 | T4 | C3 | C4 | Listening |
| Run 2 | F3 | F4 | P3 | P4 | Digit Span |
| Run 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 (bottom left of Instruments 2) and Symmetry (Instruments 1).
- 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.

# Chapter 7 BioExplorer 4-Channel Assessment with TC26 Trainer's Cap - Optima+

## SETUP FOR ASSESSMENT

### Software setup

1. If you have not installed BioExplorer software application, install it first.

*Download the latest BioExplorer installer (full version) from its manufacturer's website:*
*http://www.cyberevolution.com/download.htm*

2. *Run the installer and proceed in accordance with messages showing on the screen.*
3. *Connect BioExplorer license key to USB port.*
4. *When setup is finished, restart the operating system.*

Optional - Upgrade Neurobit Driver used by your software application:

1. Download the latest driver version for your application from the webpage: http://www.neurobitsystems.com/download/Neurobit_Runtime-versions.htm
2. Unpack the downloaded archive to a **C:\Program Files (x86)\BioExplorer**, overwriting existing files. The BioExplorer application should not be running during this step.

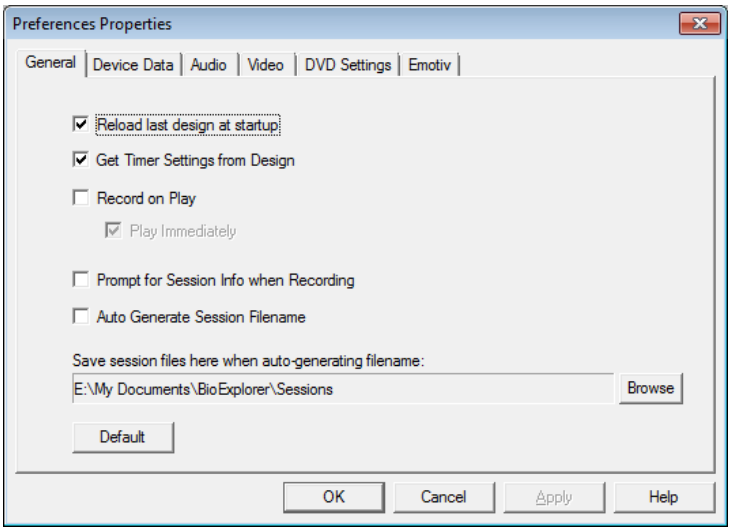
HINT: Administrator rights may be required in your system to overwrite the older driver files.

#### *Set Preferences in BioExplorer (first time only)*

Open BioExplorer and select BioExplorer | Preferences from the menu at the top.

In the *General* tab you may check

- "Get Timer Settings from Design."
- Do not check "Auto Generate Session Filename."




Click "OK" to set Preferences. These preferences will be saved for the next time BioExplorer is opened.

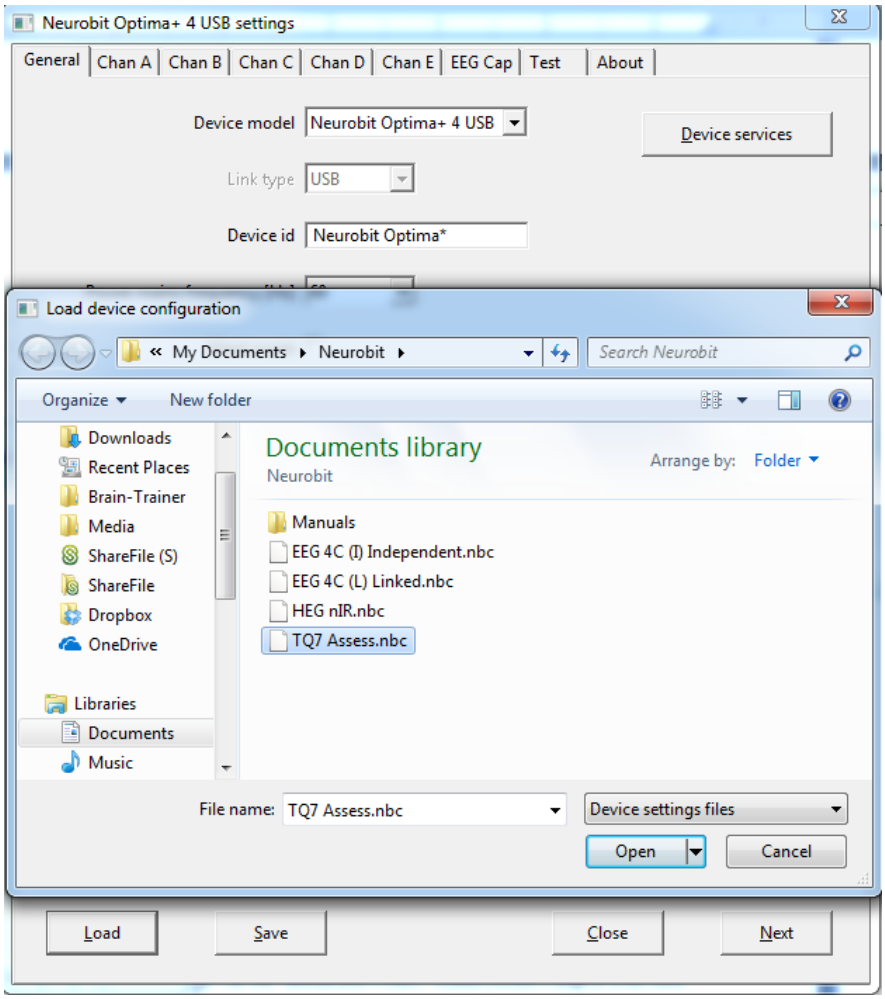
Open BioExplorer, click Design | Open and select the ***TQ7 Assess Pro Gather 4C*** design

#### *Select Optima as Device*

Select the option BioExplorer | Devices from menu of the application, in "Device Manager" window click Add button, select your Neurobit device (Optima+ 4 USB) on the list and click OK.

### *Configure channels*

Click the button “Optima Config Window” in “Device Properties” window. There is a tab for each measurement channel. Enable and configure channels, which you plan to use in the nearest session. For convenience, In device settings window Load **TQ7 Assess** settings file from Documents\Neurobit or you can manually turn on selected measurement channels (*Channel enable* option on individual channel tabs A, B, C, D. Optima+ 4 uses *Common Reference: Internal Connection*.




## APPLY ELECTRODES

Place cap and insert saline-saturated electrodes for Step 1.

### *Placing Ground and Reference Electrodes*

- The ground/neutral on the TC26 Trainer's Cap is at **AFz** and must ALWAYS be used with conductive saline solution.
- **A1** and **A2** are used as references for all steps, placed behind the ears.

### *Placing Active Electrodes*

Step 1 active sites Channels A, B, C, D: **T3, T4, C3, C4**.
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.

Connect the electrode wires to the unit.
**Optima+:** **AFZ** VG (ground); **A1** -A; **A2** -B; **T3** +A; **T4** +B; **C3** +C; **C4** +D

### Active Sites/Tasks (Suggested Order)

- **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)
- **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.
- **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. **the**ir, ano**the**r) or as a word itself.

## EXPLAIN PROCESS TO THE CLIENT:

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

1. First minute of recording will be relaxed, still, with eyes closed
2. Second minute of recording will be relaxed, eyes open and still; minimize eye blink
3. 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.

- Sit relaxed, sitting straight with both feet on the floor
- Minimize eye movement and blinking
- Let mouth hang open a bit to reduce artifact at temporals
- Keep head up to reduce artifact at back of head

## GATHER DATA

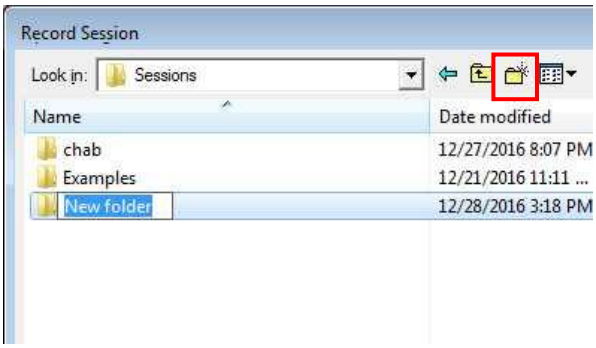
With electrodes on the client, make sure your amplifier (EEG device) is turned on and selected. (It should appear in the black status bar across the top of the screen and show "Connected.") With *TQ7 Assess Pro Gather 4C* design open, click "Capture" (green triangle) and observe signal quality.

### *Check signal quality*

- In the Power Spectrum windows (upper windows) 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

- In the Oscilloscope (lower right graph) very regular, mechanical and fast waves suggest artifact. Very large waves or rolling/wandering baseline for a channel also suggest problems. The channels should show about the same amount of activity. A very attenuated signal in one or more channels indicates a poor connection.
- 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, click "Pause" (yellow parallel lines) button. Re-prep electrodes. Then click "Capture" again and verify that the signal has improved.

When signal is good, in the "Record Session" window, navigate to the *Documents**BioExplorer**Sessions*\Assessments and click the "Create New Folder" icon to the right of the "Save In" field and open it.




Name the folder (e.g. SMBO) and open it. (Client ID: first 2 letters of first and last name)

In the "File Name" field, type the name of the file with the channel 1 site (e.g. F3), client ID and date and Save.


Be ready to have eyes closed when you click Save. As soon as you click Save, the first minute will start as the timer then starts back at 00:00 and start recording the first minute. If the session has paused, click "Capture" again and start again with eyes closed.

1. At 1 minute, a tone will sound and the display will pause. Instruct the client to open eyes and look straight ahead. Click "Play" (green triangle) again to continue recording.
2. At 2 minutes, the tone will sound and the display will pause again. Remind the client of the task, eyes open. Click "Capture" again and begin performing the task.
3. At 3 minutes the tone will sound and the display will pause again. Now you have completed this recording. Click "Stop" (white square) to save it.

Move electrodes to their next positions and repeat the steps, saving all recordings in the same client folder. Record a minimum of the 6 basic site pairs; if possible, record the full 10 site-pairs.

- Click "Capture"
- Verify good signal and client sitting still
- Name file with site, client ID and date

| **4CH Sites** | CH1 | CH2 | CH3 | CH4 | Task |
|---|---|---|---|---|---|
| Run 1 | F3 | F4 | P3 | P4 | Digit Span |
| Run 2 | T3 | T4 | C3 | C4 | Listening |
| Run 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 (bottom left of Instruments 2) and Symmetry (Instruments 1).
- 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.

# Chapter 8 BioExplorer 4-Channel Assessment with TC26 Trainer's Cap - Optima (Bluetooth)

## SETUP FOR ASSESSMENT

### Software setup

If you have not installed BioExplorer software application, install it first.

*1. Download the latest BioExplorer installer (full version) from its manufacturer's website:*
*http://www.cyberevolution.com/download.htm*

*2. Run the installer and proceed in accordance with messages showing on the screen.*

*3. Connect BioExplorer license key to USB port.*

*4. When setup is finished, restart the operating system.*

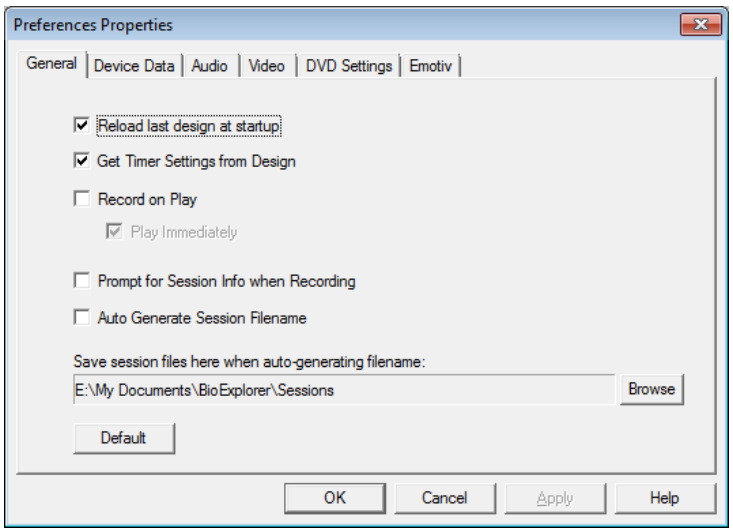
Upgrade Neurobit Driver used by your software application:

1. Download the latest driver version for your application from the webpage:
http://www.neurobitsystems.com/download/Neurobit_Runtime-versions.htm

2. Unpack the downloaded archive to a suitable folder of your application, overwriting existing files. That application should not be running during this step.

HINT: Administrator rights may be required in your system to overwrite the older driver files.

*For BioExplorer the archive should be unpacked to the main folder of the application.*




#### *Set Preferences in BioExplorer (first time only)*

Open BioExplorer and select BioExplorer | Preferences from the menu at the top.

In the *General* tab you may check

- "Get Timer Settings from Design."
- Do not check "Auto Generate Session Filename."

Click "OK" to set Preferences. These preferences will be saved for the next time BioExplorer is opened.

Open BioExplorer, click Design | Open and select the ***TQ7 Assess Pro Gather 4C*** design

# Bluetooth installation

The following instructions apply to Microsoft Windows 8/7/Vista/XP systems.

If your computer is equipped with built-in Bluetooth hardware (or you have already used some Bluetooth USB dongle), make sure that it uses Microsoft (or Intel) Bluetooth driver:

1. Open the “Device Manager”:

Vista: Open the “Control Panel” (available in the Start menu). Select classic view on the right side, next find and double click “Device Manager” icon.

Windows 7: Open the “Control Panel” (available in the Start menu). Select small or large icons view, next find and double click “Device Manager” icon.

Windows 8: On the Start screen swipe up and tap the “All apps” icon (or right click the screen and then click “All apps”). Scroll or swipe to the right until you see the “Windows System” section, next tap or click on “Control Panel” located there. Select small or large icons view, next find and click or tap “Device Manager” icon.

2. In the “Device Manager” expand Bluetooth category.

3. Double click (or tap) your Bluetooth internal hardware (or dongle) and select the Driver tab.

4. Peek at the “Driver Provider” field.

If it is Microsoft or Intel, your Bluetooth hardware should work with Neurobit Optima. Some newer drivers by Broadcom are suitable as well.

5. If there is another provider name, the driver may not be fully compatible with Microsoft Bluetooth API required for Neurobit Optima. Especially, BlueSoleil drivers do not work with the unit.

In such case please disable your internal Bluetooth hardware. There is Disable button on the Driver tab. Alternatively, you can disable Bluetooth with special key available in many portable computers. (If you have used Bluetooth dongle, disconnect it from USB port.) Next follow the steps below.

If your computer has not got Bluetooth hardware working with Microsoft (or Intel) Bluetooth driver, install suitable Bluetooth USB adapter - typically delivered with Neurobit Optima:

1. Connect the adapter to USB port.

2. The system should detect the new hardware and automatically install required drivers (already available in the system, no CD or download is required).

# Neurobit Optima setup

1. Open a battery compartment at the bottom of the device, slightly pressing an arrow on the lid with the thumb and pulling it out. Insert 2 fresh AA batteries (alkaline or rechargeable Ni-MH), observing polarity, in the following way: put in a battery with positive pole turned down, push it to metal contact in the enclosure, next squeeze in the negative pole end. Draw the lid.

2. Briefly press on/off button. The Power indicator should light green and the device should beep shortly.

HINT: The device automatically shuts off after 5 min. in idle state (without a connection). If it occurs during next steps, simply turn on the device again.

3. Place the Optima in the vicinity of the computer.

4. Pair Neurobit Optima with your computer to enable Bluetooth communication.

Note: Depending on system version and configuration, authorization may be required during above process.

Vista:

a) In the system “Control Panel” run the “Bluetooth Devices” module (visible in large or small icons view).

Alternatively, on the task bar you can right click Bluetooth icon (if not hidden) and select “Show Bluetooth devices”.

b) Click "Add wireless device" button.

c) Bluetooth devices detected in the vicinity (and not paired yet) will be listed within a dozen or so seconds. Especially, there should be “Other device”, changing shortly to “Serial Port Device” (the name of Optima Bluetooth module). Select that device and click Next button.

d) In next window select "Enter pairing code for the device" and write down the code: 0000. Click Next button.

Windows 7:

a) In the system “Control Panel” run the “Devices and Printers” module (visible in large or small icons view).

Alternatively, on the task bar you can right click Bluetooth icon (if not hidden) and select “Show Bluetooth devices”.

b) Click "Add device" button.

c) Bluetooth devices detected in the vicinity (and not paired yet) will be listed within a dozen or so seconds. Especially, there should be “Other device”, changing shortly to “Serial Port Device” (the name of Optima Bluetooth module). Select that device and click Next button.

d) In next window select "Enter pairing code for the device" and write down the code: 0000. Click Next button.

Windows 8:

a) In the system “Control Panel” run the “Devices and Printers” module (visible in large or small icons view).

Alternatively, on the task bar you can right click Bluetooth icon (if not hidden) and select “Show Bluetooth devices”.

b) Tap or click "Add device" button.

c) Bluetooth devices detected in the vicinity (and not paired yet) will be listed within a dozen or so seconds. Especially, there should be “Other device”, changing shortly to “Serial Port Device” (the name of Optima Bluetooth module). Select that device, then tap or click Next button.

d) Enter device pairing code: 0000. Tap or click Next button.

After successful pairing close the window.

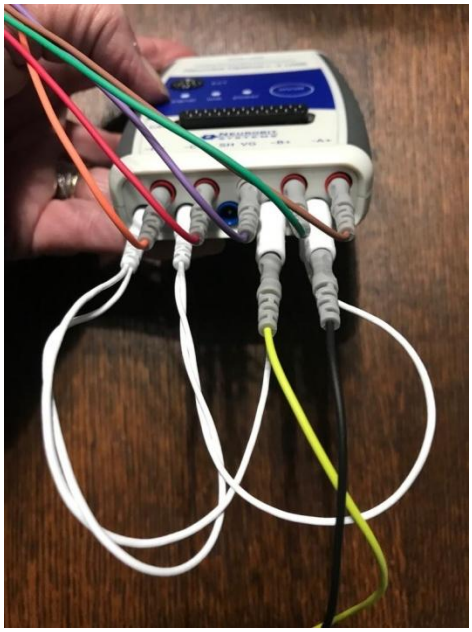
### *Select Optima as Device*

Select the option BioExplorer | Devices from menu of the application, in “Device Manager” window click Add button, select your Neurobit device on the list and click OK.

### *Configure channels*

Click the button “Optima Config Window” in “Device Properties” window. There is a tab for each measurement channel. Enable and configure channels, which you plan to use in the nearest session. In device settings window Load **TQ7 Assess** settings file from Documents\Neurobit or manually turn on selected measurement channels (*Channel enable* option on individual channel tabs A, B, C, D). If necessary, you can also change other settings, according to hints in the device manual.

## APPLY ELECTRODES



Optima 4 with jumper 1

Place cap and insert saline-saturated electrodes for Step 1.

### *Placing Ground and Reference Electrodes*

- The ground/neutral on the TC26 Trainer's Cap is at **AFz** and must ALWAYS be used.
- **A1** and **A2** are used as references for all steps, placed behind the ears.

The TQ7 requires linked references. Use the supplied jumper to link for Optima 4. (Optima+ 4 uses internal connection and jumper is not required.)

Connect the 4-channel jumper to -A, -B, -C, -D

### *Placing Active Electrodes*

Step 1 active sites Channels A, B, C, D: **T3, T4, C3, C4**.

When gathering from homologous sites (e.g. T3 and T4, C3 and C4), electrodes from left hemisphere should always go in odd channels (e.g. CH A, C), right hemisphere in even channels (e.g. CH B, D). When gathering on the midline (z sites), furthest front electrode should go in CH A.

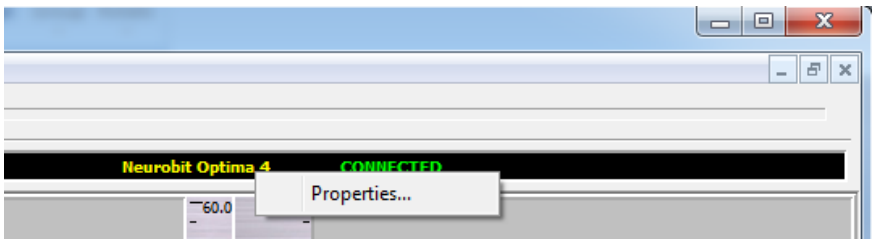
Connect the electrode wires to the unit.

**Optima: AFZ** VG (ground); **A1** -A; **A2** -B; **T3** A+; **T4** B+; **C3** C+; **C4** D+

You can next test impedances of electrode-skin contacts or sensor circuits on Test tab. Click the *Test* button. Link and Signal indicators on the Optima front panel should begin to shine and impedances will be shown with bar graphs and digital values on the Test tab. If everything is o.k., all the indicators and bars should be green (and after all yellow). If there is some red, connections and/or electrode application should be corrected.

When you get correct and stable test results, click Stop button, then Close button, close “Device Properties” and “Device Manager” windows with OK and Close buttons.

HINT: Device configuration will be restored at next start of the application. If necessary, you can modify the settings (or test impedances), right-clicking on device name in status bar and clicking Properties.




A word “Connected” should appear on the status bar of BioExplorer (under the menu and icon bars). Measurements will start in the device. Link and Signal controls will light up in Neurobit Optima unit.

If BioExplorer does not correctly connect to the device, check the chapter “Known issues” near the end of the document.

*In BioExplorer click the button “Optima Config Window” (in the “Device Properties” window). Optima settings window will appear (it may take a few seconds, if the unit is off).*

## EXPLAIN PROCESS TO THE CLIENT

- 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**

- **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. **the**ir, ano**the**r) or as a word itself.

## GATHER DATA

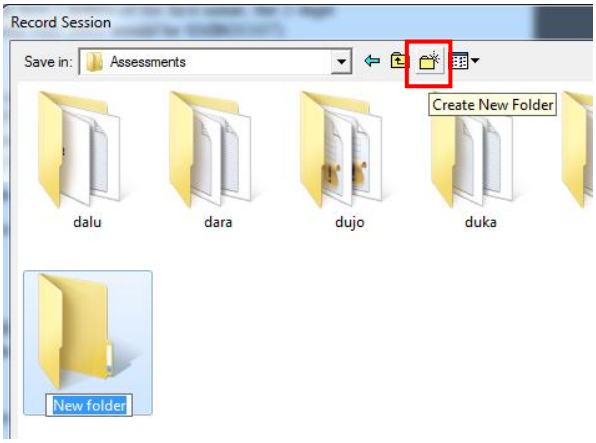
With *TQ7 Assess Pro Gather 4C* design open, click "Capture" (green triangle) and observe signal quality.

### *Check signal quality*

- In the Power Spectrum windows (upper windows) 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

- In the Oscilloscope (lower right) 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.
- 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, click "Pause" (yellow parallel lines). Re-prep electrodes. Then click "Capture" again and verify that the signal has improved.

When signal is good, in the "Record Session" window, navigate to Documents\BioExplorer\Sessions\Assessments and click the "Create New Folder" icon to the right of the "Save In" field and open it.




Name the folder (e.g. SMBO) and open it. (Client ID: first 2 letters of first and last name)

In the "File Name" field, type the name of the file with the channel 1 site (e.g. T3), client ID and date


and Save.

Be ready to have eyes closed when you click Save. As soon as you click Save, the first minute will start as the timer then starts back at 00:00 and start recording the first minute. If the session has paused, click "Capture" again and start again with eyes closed.

1. At 1 minute, a tone will sound and the display will pause. Instruct the client to open eyes and look straight ahead. Click "Capture" (green triangle) again to continue recording.
2. At 2 minutes, the tone will sound and the display will pause again. Remind the client of the task. Click "Capture" again and begin performing the task.
3. At 3 minutes the tone will sound and the display will pause again. Now you have completed this recording. Click "Stop" (white square) to save it.

## *Next Steps*

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

**Optima: F3** +A; **F4** +B; **P3** +C; **P4** +D

- Click "Capture"
- Verify good signal and client sitting still
- Name file with site, client ID and date

| Cap Sites | CH1 | CH2 | CH3 | CH4 | Task |
|---|---|---|---|---|---|
| Run 1 | T3 | T4 | C3 | C4 | Listening |
| Run 2 | F3 | F4 | P3 | P4 | Digit Span |
| Run 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 (bottom left of Instruments 2) and Symmetry (Instruments 1).
- 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.

# Chapter 9 BioExplorer 4-Channel Assessment with Electro-Cap - Q-wiz

## SETUP FOR ASSESSMENT

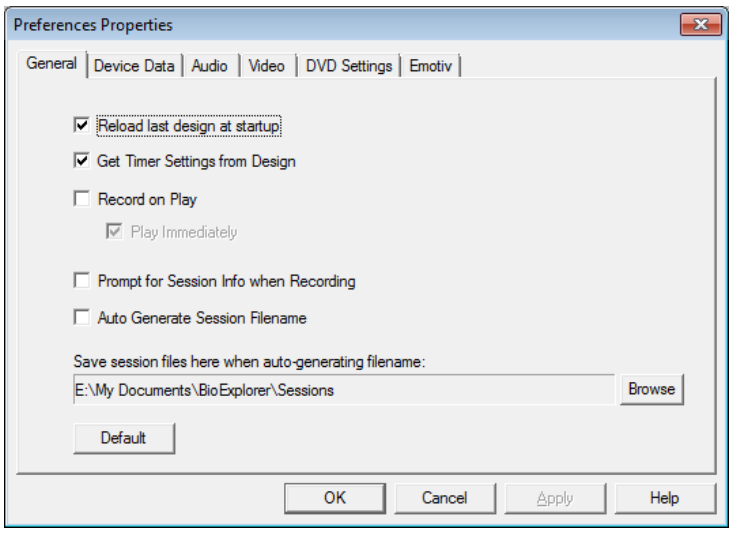
**Run the installer** which will place files in their respective folders, creating *a Brain-Trainer\Help* folder in your local drive with a shortcut on your desktop.

### *Verify the Results*

Open BioExplorer, click Design | Open and verify that the ***TQ7 Assess Pro Gather 4C*** design is there and opens properly.

### *Set Preferences in BioExplorer (1st time only)*

Open BioExplorer and select BioExplorer | Preferences from the menu at the top.




In the General tab check

- "Get Timer Settings from Design."
- Do not check "Auto Generate Session Filename."

Click "OK" to set Preferences. These preferences will be saved for the next time BioExplorer is opened.

## SELECT SETTINGS

### *Open Design*

Open BioExplorer, click Design | Open and select the ***TQ7 Assess Pro Gather 4C*** design

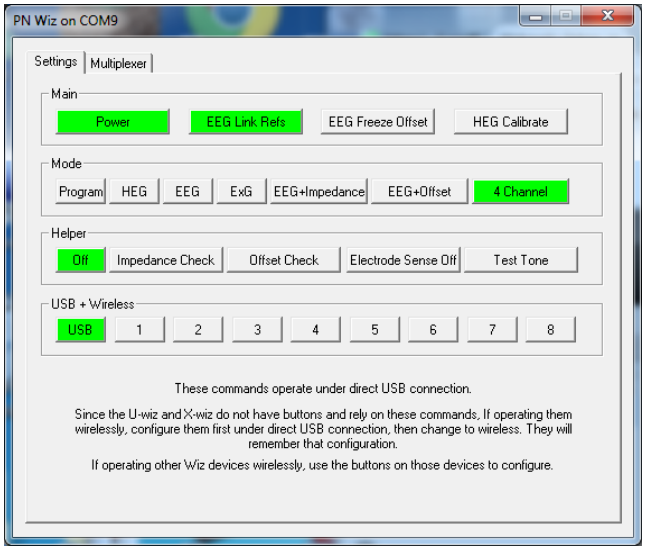
### *Configure channels*

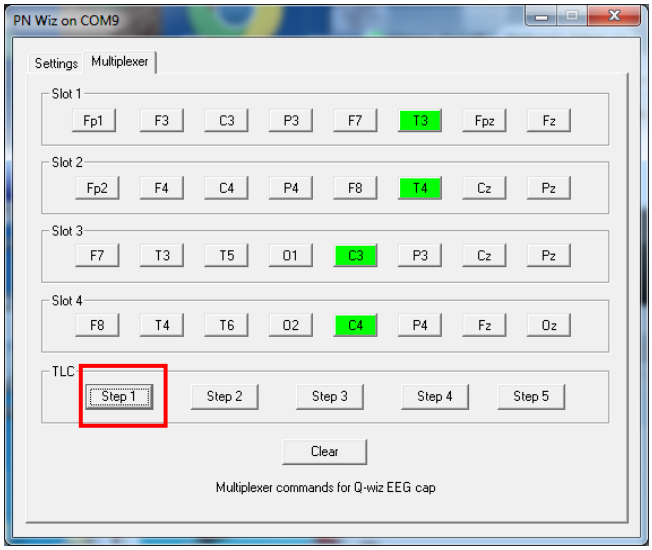
Click on the PN Wiz window to select settings.

Click buttons EEG Link Refs and 4 Channel to select linked references and Mode 4. The Mode in current use is indicated on the Q-wiz by the number of blinks of the green LED.

### *Select EEG sites*

In the "Multiplexer" tab, select Step 1 for the first assessment site-set (T3 T4 C3 C4). This will begin "cap mode."




## PREPARE SITES

Place the cap and prep all sites you will include in the assessment and the **ground** and the **ear clips**. The ground on the Electro-Cap is at AFz and must ALWAYS be prepared with Electro-Gel. Plug the Electro-Cap cable into the 25-pin input on the front of the unit. The green LED will be lit/blinking when the connections are good; high impedances will cause the LED to turn off.

## EXPLAIN PROCESS TO THE CLIENT

- 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**

- **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. **the**ir, ano**the**r) or as a word itself.

# GATHER DATA

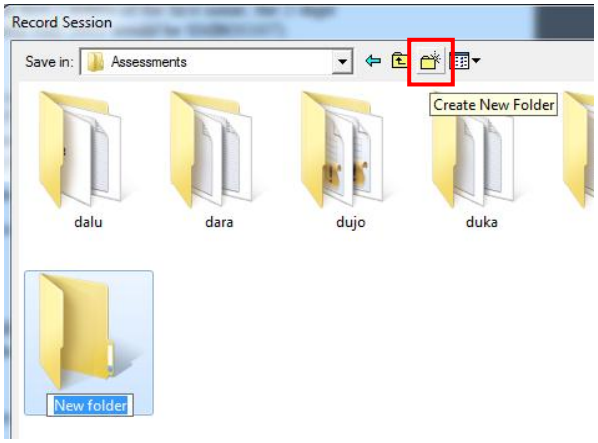
With *TQ7 Assess Pro Gather 4C* design open, click "Capture" (green triangle) and observe signal quality.

## *Check signal quality*

- In the Power Spectrum windows (upper windows) 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
- In the Oscilloscope (lower right) 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.
- 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, click "Pause" (yellow parallel lines). Re-prep electrodes. Then click "Capture" again and verify that the signal has improved.

When signal is good, click the "Record" (red circle) button. In the "Record Session" window, navigate to Documents\BioExplorer\Sessions\Assessments and click the "Create New Folder" icon to the right of the "Save In" field.

Name the folder and open it. (e.g. SMBO-Client ID: first 2 letters of first and last name)




In the "File Name" field, type the name of the file with the channel 1 site (e.g. T3), client ID and date and


Save.

Be ready to have eyes closed when you click Save. As soon as you click Save, the first minute will start as the timer then starts back at 00:00 and start recording the first minute. If the session has paused, click "Capture" again and start again with eyes closed.

1. At 1 minute, a tone will sound and the display will pause. Instruct the client to open eyes and look straight ahead. Click "Capture" (green triangle) again to continue recording.
2. At 2 minutes, the tone will sound and the display will pause again. Remind the client of the task. Click "Capture" again and begin performing the task.
3. At 3 minutes the tone will sound and the display will pause again. Now you have completed this recording. Click "Stop" (white square) to save it.

**In the Wiz settings window**, select "Step 2" and repeat for each channel set. Record a minimum of the 6 basic site pairs; if possible, record the full 10 site-pairs.

- Click "Capture"
- Verify good signal and client sitting still
- Name file with site, client ID and date

| Cap Sites | CH1 | CH2 | CH3 | CH4 | Task |
|---|---|---|---|---|---|
| Run 1 | T3 | T4 | C3 | C4 | Listening |
| Run 2 | F3 | F4 | P3 | P4 | Digit Span |
| Run 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 (bottom left of Instruments 2) and Symmetry (Instruments 1).
- 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.

# Chapter 10 BioExplorer 4-Channel Assessment with Electro-Cap - Optima+

## SETUP FOR ASSESSMENT

## Software setup

If you have not installed BioExplorer software application, install it first.

*1. Download the latest BioExplorer installer (full version) from its manufacturer's website:*
*http://www.cyberevolution.com/download.htm*

*2. Run the installer and proceed in accordance with messages showing on the screen.*

*3. Connect BioExplorer license key to USB port.*

*4. When setup is finished, restart the operating system.*

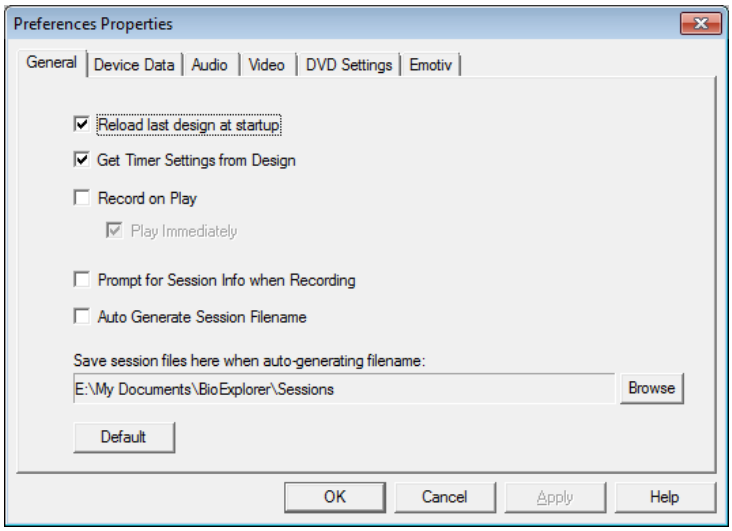
*5. Run Neurobit_Setup to update drivers.*

### *Set Preferences in BioExplorer (first time only)*

Open BioExplorer and select BioExplorer | Preferences from the menu at the top.

In the *General* tab check

- "Get Timer Settings from Design."
- Do not check "Auto Generate Session Filename."




Click "OK" to set Preferences. These preferences will be saved for the next time BioExplorer is opened.

Open BioExplorer, click Design | Open and select the ***TQ7 Assess Pro Gather 4C*** design

### *Select Optima as Device*

Select the option BioExplorer | Devices from menu of the application, in "Device Manager" window click Add button, select your Neurobit device on the list and click OK.

## SELECT SETTINGS

### *Open Design*

Open BioExplorer, click Design | Open and select the ***TQ7 Assess Pro Gather 4C*** design

### *Configure channels*

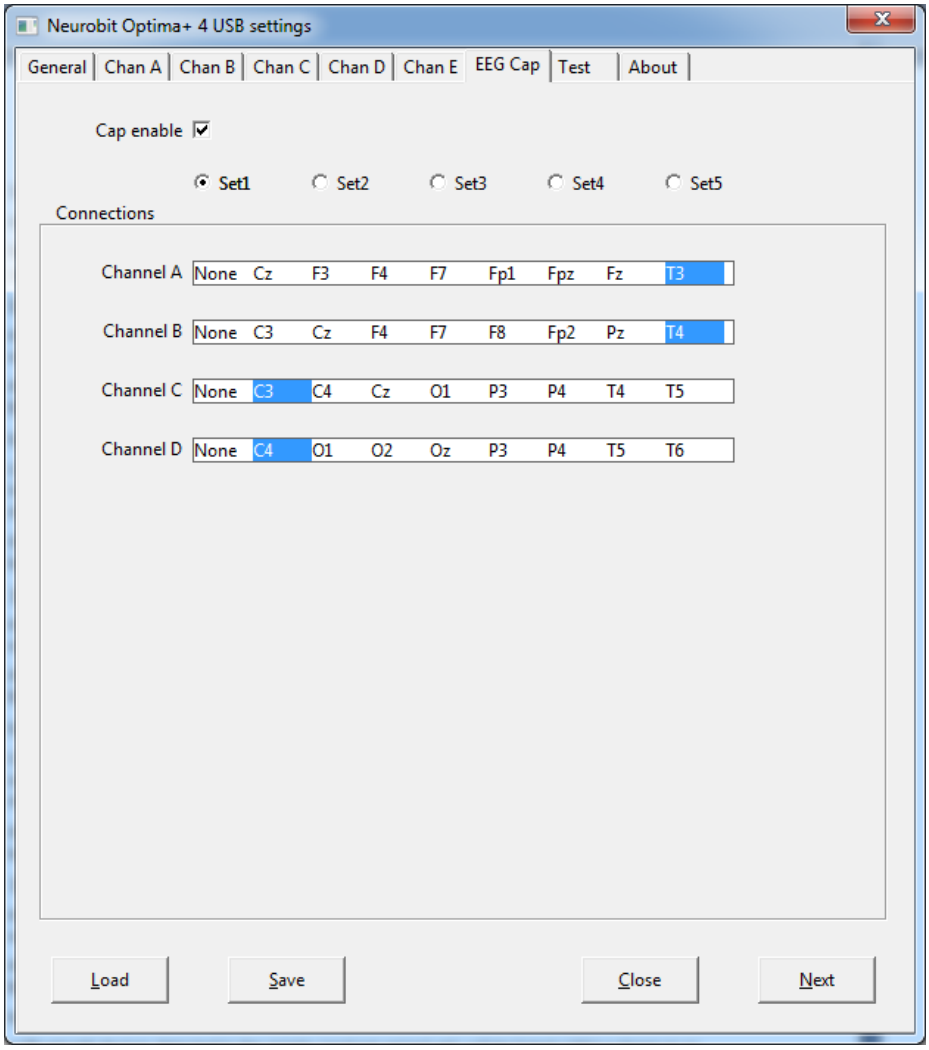
Right-click on Neurobit Optima in the black status bar in BioExplorer. Select Properties.

Click the button "Optima Config Window" in the "Device Properties" window that opened.

Click the "Load" button to open *Documents\Neurobit* and select the ***Electro-Cap TQ7 Assess*** settings file.

### *Select EEG sites*

On the *EEG Cap* tab, "Cap enable" should be checked. Select Set1 (T3 T4 C3 C4). Then click "Close" and "OK".




## PREPARE SITES

Place the cap and prep all sites you will include in the assessment and the **ground** and the **ear clips**. The ground on the Electro-Cap is at AFz and must ALWAYS be prepared with Electro-Gel. Plug the Electro-Cap cable into the 25-pin input on the front of the unit. Plug A1 ear clip into A- on the Optima and A2 ear clip into B- on the Optima.

## EXPLAIN PROCESS TO THE CLIENT

- 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**

- **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. **the**ir, ano**the**r) or as a word itself.

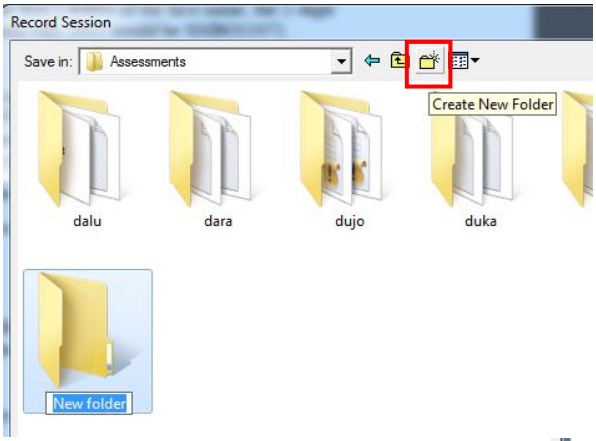
# GATHER DATA

With *TQ7 Assess Pro Gather 4C* design open, click "Capture" (green triangle) and observe signal quality.

## *Check signal quality*

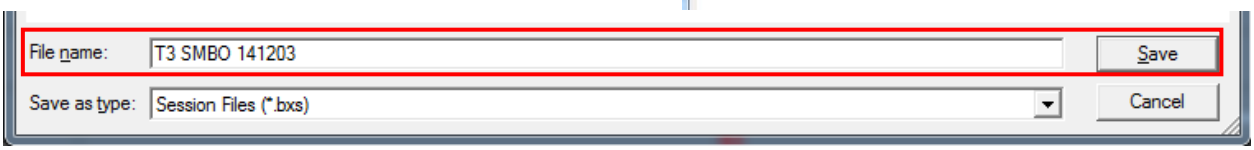
- In the Power Spectrum windows (upper windows) look for spikes at 50 Hz or 60 Hz depending on your electrical system. If these are dominating the spectrum, there may be electromagnetic interference or you may have a poor connection between the skin and electrode
- In the Oscilloscope (lower right) very 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.
- 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, click "Pause" (yellow parallel lines). Re-prep electrodes. Then click "Capture" again and verify that the signal has improved.

When signal is good, click the "Record" (red circle) button. In the "Record Session" window, navigate to Documents\BioExplorer\Sessions\Assessments and click the "Create New Folder" icon to the right of the "Save In" field.




Name the folder (e.g. SMBO) and open it. (Client ID: first 2 letters of first and last name)

In the "File Name" field, type the name of the file with the channel 1 site (e.g. T3), client ID and date



and Save.

Be ready to have eyes closed when you click Save. As soon as you click Save, the first minute will start as the timer then starts back at 00:00 and start recording the first minute. If the session has paused, click "Capture" again and start again with eyes closed.

1. At 1 minute, a tone will sound and the display will pause. Instruct the client to open eyes and look straight ahead. Click "Capture" (green triangle) again to continue recording.
2. At 2 minutes, the tone will sound and the display will pause again. Remind the client of the task. Click "Capture" again and begin performing the task.
3. At 3 minutes the tone will sound and the display will pause again. Now you have completed this recording. Click "Stop" (white square) to save it.

**Open Optima settings again**: Right-click on "Neurobit Optima" in the black status bar in BioExplorer. Select Properties. Click the button “Optima Config Window”. In the Optima settings window, select "Set2" and repeat for each channel set. Record a minimum of the 6 basic site pairs; if possible, record the full 10 site-pairs.

- Click "Capture"
- Verify good signal and client sitting still
- Name file with **site**, client ID and date

| **Cap Sites** | CH1 | CH2 | CH3 | CH4 | Task |
|---|---|---|---|---|---|
| Run 1 | T3 | T4 | C3 | C4 | Listening |
| Run 2 | F3 | F4 | P3 | P4 | Digit Span |
| Run 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 (bottom left of Instruments 2) and Symmetry (Instruments 1).
- 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.

# Chapter 11 BioExplorer 4-Channel Assessment with Electrodes - Q-wiz

## SETUP FOR ASSESSMENT

**Run the installer** which will place files in their respective folders, creating *Brain-Trainer\Help* folder in your local drive with shortcuts on your desktop.

### *Verify the Results*

Open BioExplorer, click Design | Open and verify that the ***TQ7 Assess Pro Gather 4C*** design is there and opens properly.

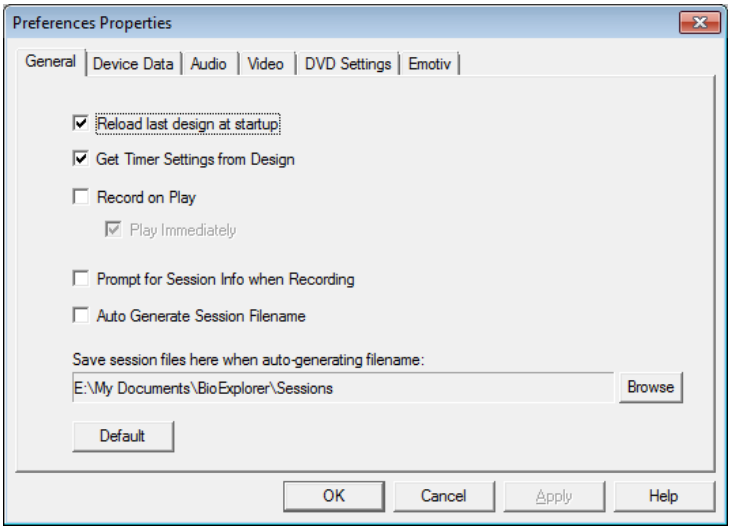
### *Set Preferences in BioExplorer (1st time only)*

Open BioExplorer and select BioExplorer | Preferences from the menu at the top.

In the General tab check

- "Get Timer Settings from Design."
- Do not check "Auto Generate Session Filename."

Click "OK" to set Preferences. These preferences will be saved for the next time BioExplorer is opened.




## APPLY ELECTRODES

### *Placing Ground and Reference Electrodes*

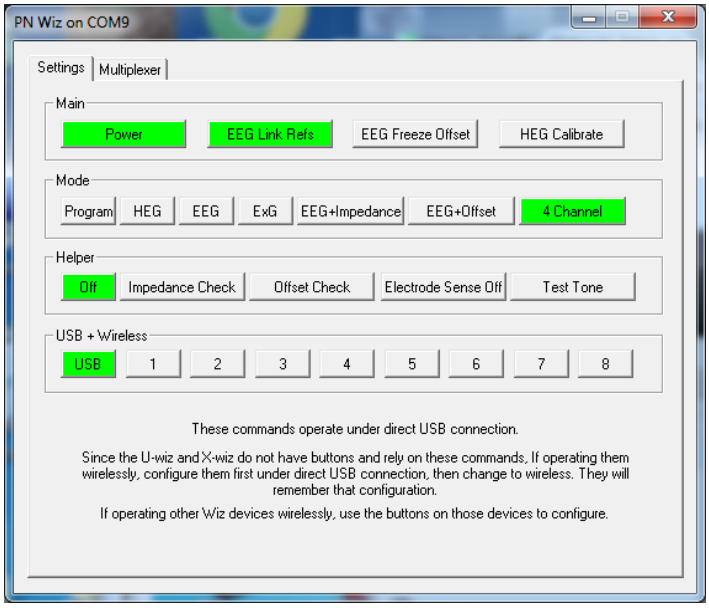
- **Ground/Neutral** electrode should be placed somewhere on the midline for the assessment. You may choose Cz to simplify finding other sites.
- Connect the **Reference** electrodes from the earlobes or mastoids into the Wiz 1- and 2- inputs.
- If you are using snap-in electrodes, back of the neck below the hairline is a good ground site.

### *Placing Active Electrodes*

When gathering from homologous sites (e.g. C3 and C4, P3 and P4), electrodes from left hemisphere should always go in CH1, right hemisphere in CH2.

When gathering on the midline (z sites), furthest front electrode should go in CH1.

Select Wiz settings (EEG Link Refs, 4 Channel, Helper Off, USB)




**Active Sites/Tasks (Suggested Order)**

- **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)
- **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.
- **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. **the**ir, ano**the**r) or as a word itself.

## EXPLAIN PROCESS TO THE CLIENT:

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

1. First minute of recording will be relaxed, still, with eyes closed
2. Second minute of recording will be relaxed, eyes open and still; minimize eye blink
3. 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.

- Sit relaxed, sitting straight with both feet on the floor
- Minimize eye movement and blinking
- Let mouth hang open a bit to reduce artifact at temporals
- Keep head up to reduce artifact at back of head

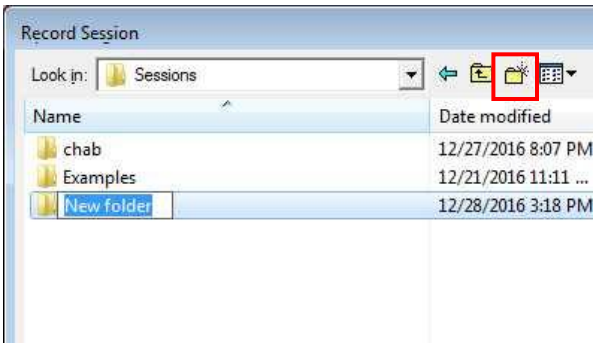
# GATHER DATA

With electrodes on the client, make sure your amplifier (EEG device) is turned on and selected. (It should appear in the black status bar across the top of the screen and show "Connected.") With *TQ7 Assess Pro Gather 4C* design open, click "Capture" (green triangle) and observe signal quality.

## *Check signal quality*

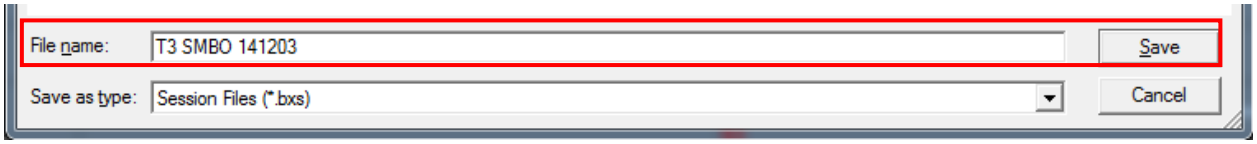
- In the Power Spectrum windows (upper windows) look for spikes at 50 Hz or 60 Hz depending on your electrical system. If these are dominating the spectrum, there may be electromagnetic interference or you may have a poor connection between the skin and electrode
- In the Oscilloscope (lower right graph) very regular, mechanical and fast waves suggest artifact. Very large waves or rolling/wandering baseline for a channel also suggest problems. The channels should show about the same amount of activity. A very attenuated signal in one or more channels indicates a poor connection.
- 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, click "Pause" (yellow parallel lines) button. Re-prep electrodes. Then click "Capture" again and verify that the signal has improved.

When signal is good, in the "Record Session" window, navigate to the *Documents\BioExplorer\Sessions\Assessments* and click the "Create New Folder" icon to the right of the "Save In" field and open it.




Name the folder (e.g. SMBO) and open it. (Client ID: first 2 letters of first and last name)

In the "File Name" field, type the name of the file with the channel 1 site (e.g. T3), client ID and date and Save.




Be ready to have eyes closed when you click Save. As soon as you click Save, the first minute will start as the timer then starts back at 00:00 and start recording the first minute. If the session has paused, click "Capture" again and start again with eyes closed.

1. At 1 minute, a tone will sound and the display will pause. Instruct the client to open eyes and look straight ahead. Click "Play" (green triangle) again to continue recording.
2. At 2 minutes, the tone will sound and the display will pause again. Remind the client of the task, eyes open. Click "Capture" again and begin performing the task.
3. At 3 minutes the tone will sound and the display will pause again. Now you have completed this recording. Click "Stop" (white square) to save it.

Move electrodes to their next positions and repeat the steps, saving all recordings in the same client folder. Repeat for other site sets. Record a minimum of the 6 basic site pairs; if possible, record the full 10 site-pairs.

- Click "Capture"
- Verify good signal and client sitting still
- Name file with site, client ID and date

| **4CH Sites** | CH1 | CH2 | CH3 | CH4 | Task |
|---|---|---|---|---|---|
| Run 1 | F3 | F4 | P3 | P4 | Digit Span |
| Run 2 | T3 | T4 | C3 | C4 | Listening |
| Run 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 (bottom left of Instruments 2) and Symmetry (Instruments 1).
- 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.

# Chapter 12 BioExplorer 4-Channel Assessment with Electrodes - Optima (Bluetooth)

## SETUP FOR ASSESSMENT

### Software setup

If you have not installed BioExplorer software application, install it first.

1. *Download the latest BioExplorer installer (full version) from its manufacturer's website: http://www.cyberevolution.com/download.htm*
2. *Run the installer and proceed in accordance with messages showing on the screen.*
3. *Connect BioExplorer license key to USB port.*
4. *When setup is finished, restart the operating system.*

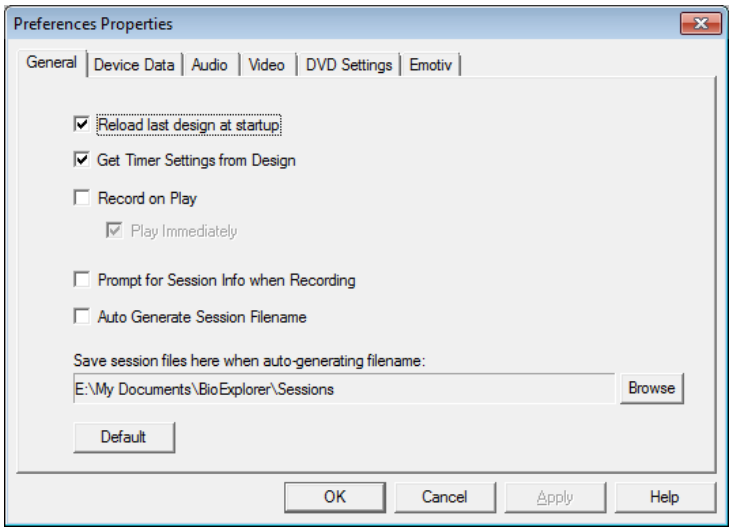
Upgrade Neurobit Driver used by your software application:

1. Download the latest driver version for your application from the webpage: http://www.neurobitsystems.com/download/Neurobit_Runtime-versions.htm
2. Unpack the downloaded archive to a **C:\Program Files (x86)\BioExplorer**, overwriting existing files. The BioExplorer application should not be running during this step.

HINT: Administrator rights may be required in your system to overwrite the older driver files.

#### *Set Preferences in BioExplorer (first time only)*

Open BioExplorer and select BioExplorer | Preferences from the menu at the top.




In the *General* tab check

- "Get Timer Settings from Design."
- Do not check "Auto Generate Session Filename."

Click "OK" to set Preferences. These preferences will be saved for the next time BioExplorer is opened.

Open BioExplorer, click Design | Open and select the ***TQ7 Assess Pro Gather 4C*** design

### Bluetooth installation

The following instructions apply to Microsoft Windows 8/7/Vista/XP systems.

If your computer is equipped with built-in Bluetooth hardware (or you have already used some Bluetooth USB dongle), make sure that it uses Microsoft (or Intel) Bluetooth driver:

1. Open the "Device Manager":

Vista: Open the “Control Panel” (available in the Start menu). Select classic view on the right side, next find and double click “Device Manager” icon.

Windows 7: Open the “Control Panel” (available in the Start menu). Select small or large icons view, next find and double click “Device Manager” icon.

Windows 8: On the Start screen swipe up and tap the “All apps” icon (or right click the screen and then click “All apps”). Scroll or swipe to the right until you see the “Windows System” section, next tap or click on “Control Panel” located there. Select small or large icons view, next find and click or tap “Device Manager” icon.

2. In the “Device Manager” expand Bluetooth category.

3. Double click (or tap) your Bluetooth internal hardware (or dongle) and select the Driver tab.

4. Peek at the “Driver Provider” field.

If it is Microsoft or Intel, your Bluetooth hardware should work with Neurobit Optima. Some newer drivers by Broadcom are suitable as well.

5. If there is another provider name, the driver may not be fully compatible with Microsoft Bluetooth API required for Neurobit Optima. Especially, BlueSoleil drivers do not work with the unit.

In such case please disable your internal Bluetooth hardware. There is Disable button on the Driver tab. Alternatively, you can disable Bluetooth with special key available in many portable computers. (If you have used Bluetooth dongle, disconnect it from USB port.) Next follow the steps below.

If your computer has not got Bluetooth hardware working with Microsoft (or Intel) Bluetooth driver, install suitable Bluetooth USB adapter - typically delivered with Neurobit Optima:

1. Connect the adapter to USB port.

2. The system should detect the new hardware and automatically install required drivers (already available in the system, no CD or download is required).

## Neurobit Optima setup

1. Open a battery compartment at the bottom of the device, slightly pressing an arrow on the lid with the thumb and pulling it out. Insert 2 fresh AA batteries (alkaline or rechargeable Ni-MH), observing polarity, in the following way: put in a battery with positive pole turned down, push it to metal contact in the enclosure, next squeeze in the negative pole end. Draw the lid.

2. Briefly press on/off button. The Power indicator should light green and the device should beep shortly.

HINT: The device automatically shuts off after 5 min. in idle state (without a connection). If it occurs during next steps, simply turn on the device again.

3. Place the Optima in the vicinity of the computer.

4. Pair Neurobit Optima with your computer to enable Bluetooth communication.

Note: Depending on system version and configuration, authorization may be required during above process.

Vista:

a) In the system “Control Panel” run the “Bluetooth Devices” module (visible in large or small icons view).

Alternatively, on the task bar you can right click Bluetooth icon (if not hidden) and select “Show Bluetooth devices”.

b) Click "Add wireless device" button.

c) Bluetooth devices detected in the vicinity (and not paired yet) will be listed within a dozen or so seconds. Especially, there should be “Other device”, changing shortly to “Serial Port Device” (the name of Optima Bluetooth module). Select that device and click Next button.

d) In next window select "Enter pairing code for the device" and write down the code: 0000. Click Next button.

Windows 7:

a) In the system “Control Panel” run the “Devices and Printers” module (visible in large or small icons view).

Alternatively, on the task bar you can right click Bluetooth icon (if not hidden) and select “Show Bluetooth devices”.

b) Click "Add device" button.

c) Bluetooth devices detected in the vicinity (and not paired yet) will be listed within a dozen or so seconds. Especially, there should be “Other device”, changing shortly to “Serial Port Device” (the name of Optima Bluetooth module). Select that device and click Next button.

d) In next window select "Enter pairing code for the device" and write down the code: 0000. Click Next button.

Windows 8:

a) In the system “Control Panel” run the “Devices and Printers” module (visible in large or small icons view).

Alternatively, on the task bar you can right click Bluetooth icon (if not hidden) and select “Show Bluetooth devices”.

b) Tap or click "Add device" button.

c) Bluetooth devices detected in the vicinity (and not paired yet) will be listed within a dozen or so seconds. Especially, there should be “Other device”, changing shortly to “Serial Port Device” (the name of Optima Bluetooth module). Select that device, then tap or click Next button.

d) Enter device pairing code: 0000. Tap or click Next button.

After successful pairing close the window.

### *Select Optima as Device*

Select the option BioExplorer | Devices from menu of the application, in “Device Manager” window click Add button, select your Neurobit device on the list and click OK.

### *Configure channels*

Click the button “Optima Config Window” in “Device Properties” window. There is a tab for each measurement channel. Enable and configure channels, which you plan to use in the nearest session. In device settings window Load **TQ7 Assess** settings file from Documents\Neurobit or manually turn on selected measurement channels (*Channel enable* option on individual channel tabs A, B, C, D. Optima+ 4 uses *Common Reference: Internal Connection*.

## APPLY ELECTRODES

### *Placing Ground and Reference Electrodes*

- **Ground/Neutral** electrode should be placed somewhere on the midline for the assessment. You may choose Cz to simplify finding other sites.
- If you are using snap-in electrodes, back of the neck below the hairline is a good ground site.
- Connect the **Reference** electrodes to -A and -B inputs on your amplifier (using a jumper for Optima 4, electrode can go in either jumper plug). **A1** and **A2** are used as references for all steps, either placed on the earlobes or mastoids.

### *Placing Active Electrodes*

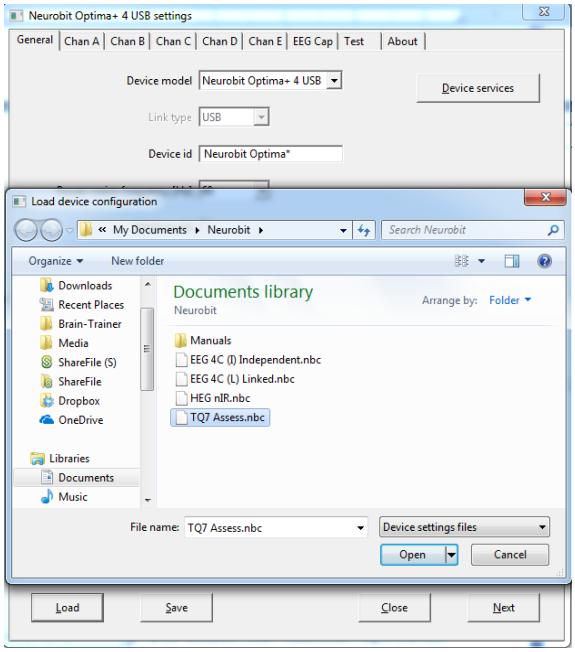
When gathering from homologous sites (e.g. F3 and F4), electrodes from left hemisphere should always go in odd channels (e.g. CH A, C), right hemisphere in even channels (e.g. CH B, D). When gathering on the midline (z sites), furthest front electrode should go in CH A.

Connect the electrode wires to the unit.

**Optima: AFZ** VG (ground); **A1** -A; **A2** -B; **T3** A+; **T4** B+; **C3** C+; **C4** D+

## SELECT SETTINGS

**Optima: Load TQ7 Assess settings**



**Active Sites/Tasks (Suggested Order)**

- **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)
- **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.
- **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. **the**ir, ano**the**r) or as a word itself.

## EXPLAIN PROCESS TO THE CLIENT:

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

1. First minute of recording will be relaxed, still, with eyes closed
2. Second minute of recording will be relaxed, eyes open and still; minimize eye blink
3. 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.

- Sit relaxed, sitting straight with both feet on the floor
- Minimize eye movement and blinking
- Let mouth hang open a bit to reduce artifact at temporals
- Keep head up to reduce artifact at back of head

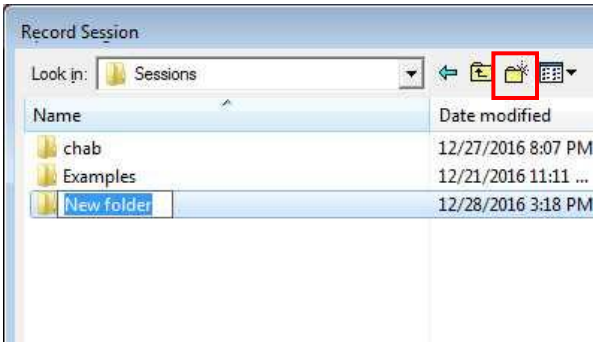
## GATHER DATA

With electrodes on the client, make sure your amplifier (EEG device) is turned on and selected. (It should appear in the black status bar across the top of the screen and show "Connected.") With *TQ7 Assess Pro Gather 4C* design open, click "Capture" (green triangle) and observe signal quality.

### *Check signal quality*

- In the Power Spectrum windows (upper windows) 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
- In the Oscilloscope (lower right graph) very regular, mechanical and fast waves suggest artifact. Very large waves or rolling/wandering baseline for a channel also suggest problems. The channels should show about the same amount of activity. A very attenuated signal in one or more channels indicates a poor connection.
- 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, click "Pause" (yellow parallel lines) button. Re-prep electrodes. Then click "Capture" again and verify that the signal has improved.

When signal is good, in the "Record Session" window, navigate to the *Documents**BioExplorer**Sessions*\Assessments and click the "Create New Folder" icon to the right of the "Save In" field and open it.




Name the folder (e.g. SMBO) and open it. (Client ID: first 2 letters of first and last name)

In the "File Name" field, type the name of the file with the channel 1 site (e.g. F3), client ID and date and Save.


Be ready to have eyes closed when you click Save. As soon as you click Save, the first minute will start as the timer then starts back at 00:00 and start recording the first minute. If the session has paused, click "Capture" again and start again with eyes closed.

1. At 1 minute, a tone will sound and the display will pause. Instruct the client to open eyes and look straight ahead. Click "Play" (green triangle) again to continue recording.
2. At 2 minutes, the tone will sound and the display will pause again. Remind the client of the task, eyes open. Click "Capture" again and begin performing the task.
3. At 3 minutes the tone will sound and the display will pause again. Now you have completed this recording. Click "Stop" (white square) to save it.

Move electrodes to their next positions and repeat the steps, saving all recordings in the same client folder. Record a minimum of the 6 basic site pairs; if possible, record the full 10 site-pairs.

- Click "Capture"
- Verify good signal and client sitting still
- Name file with site, client ID and date

| **4CH Sites** | CH1 | CH2 | CH3 | CH4 | Task |
|---|---|---|---|---|---|
| Run 1 | F3 | F4 | P3 | P4 | Digit Span |
| Run 2 | T3 | T4 | C3 | C4 | Listening |
| Run 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 (bottom left of Instruments 2) and Symmetry (Instruments 1).

- 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.

# Chapter 13 BioExplorer 2-Channel Assessment with Electrodes

## SETUP FOR ASSESSMENT

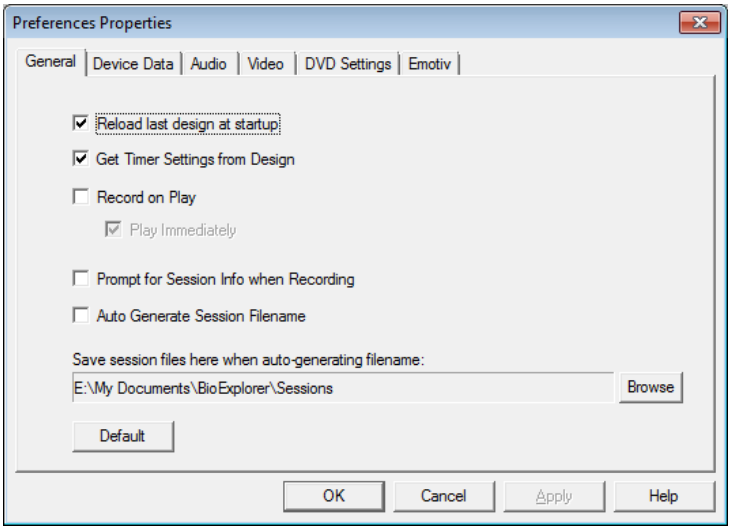
**Run the installer** which will place files in their respective folders, creating *Brain-Trainer\Help* folder in *your local drive* with shortcuts on your desktop.

### *Verify the Results*

Open BioExplorer, click Design | Open and verify that the ***TQ7 Assess Pro Gather*** design is there and opens properly.

### *Set Preferences in BioExplorer (1st time only)*

Open BioExplorer and select BioExplorer | Preferences from the menu at the top.




In the General tab check

- "Get Timer Settings from Design."
- "Record on Play"
- "Play Immediately"
- Do not check "Auto Generate Session Filename."

Click "OK" to set Preferences. These preferences will be saved for the next time BioExplorer is opened.

## APPLY ELECTRODES

### *Placing Ground and Reference Electrodes*

- **Ground/Neutral** electrode should be placed somewhere on the midline for the assessment. You may choose Cz to simplify finding other sites.
- If you are using snap-in electrodes, back of the neck below the hairline is a good ground site.
- **Reference - A1 and A2** - Connect earlobe or mastoid electrodes into amplifier's Reference (-) inputs (1-, 2- / -A, -B).

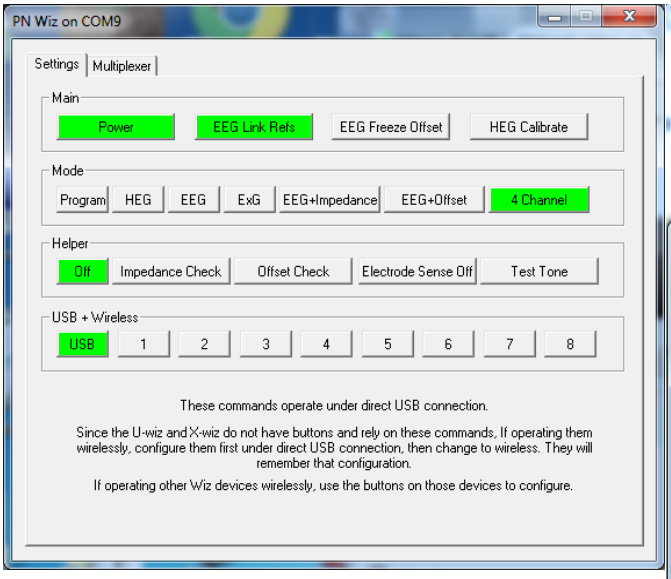
### *Placing Active Electrodes*

When gathering from homologous sites (e.g. C3 and C4), electrodes from left hemisphere should always go in CH1, right hemisphere in CH2.

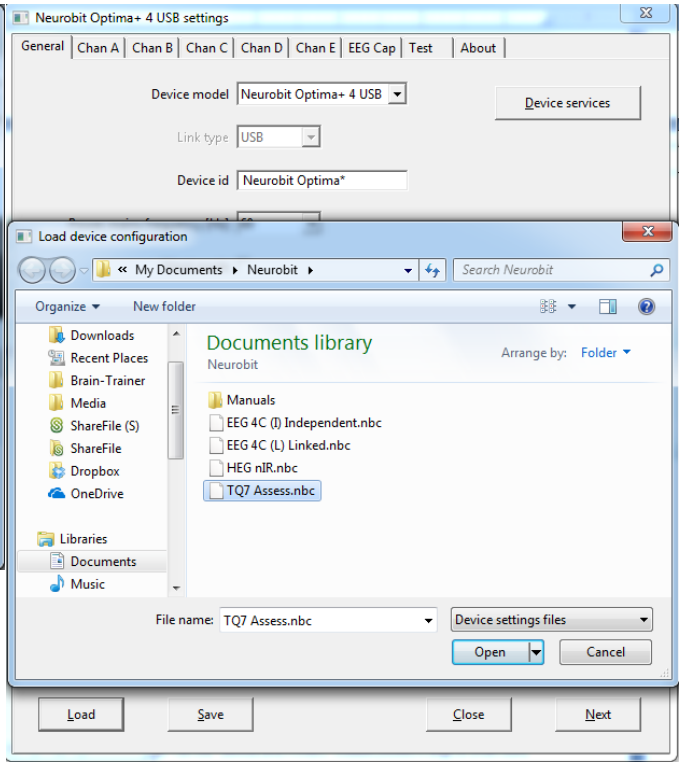
When gathering on the midline (z sites), furthest front electrode should go in CH1.

# SELECT SETTINGS

**Wiz: EEG Link Refs, 4 Channel, Helper Off, USB**




**Optima: Load TQ7 Assess settings**




**Active Sites/Tasks (Suggested Order)**

1. **C3/C4 Centrals—Reading silently for details**. Provide appropriate reading material with factual information in it (magazine or newspaper articles can be good sources). Tell the client you may ask questions after the recording. When preparing for the next site, ask open-ended questions first (e.g. "what was the paragraph about?") and move to greater detail if the client doesn't provide it.
2. **P3/P4 Parietals—Serial calculation**. Start with simple problems (e.g. 2+3X4/5), with a brief pause between each step. The client should perform each calculation silently and give the result at the end. If the client does well, increase the challenge. Alternative—Ask the client to count aloud by 2 or 3 or count backward.
3. **F3/F4 Frontal—Digit-span working memory**. 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)
4. **T3/T4 Temporals—Listening for details**. 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 if necessary.
5. ***O1 & O2 (Optional)—Pattern recognition.*** Tell the client to search 1-2 paragraphs of printed material and count the number of times the letters t, h, and e appear in sequence. This can be a word "the", beginning a word ("these"), the middle of a word ("other"), the end of a word ("lithe") or across 2 words ("what he"). A game like Where's Waldo or finding hidden images can also be used. *Same as Midline Cz/Oz site pair.*
6. ***T5 & T6 (Optional)—Sensory integration.*** Repeat the task from Centrals. Provide appropriate reading material with factual information in it

7. ***F7 & F8 (Optional)—Impulse control and language output***. Tell the client to read aloud from printed material, keeping facial and other movements to a minimum and minimizing eye movements.
8. **Fz/Pz Default Network**—Eyes semi-closed, let your mind wander.
9. **Cz/Oz Midline—Pattern recognition**. Tell the client to search 1-2 paragraphs of printed material and count the number of times the letters t, h, and e appear in sequence. This can be a word "the", beginning a word ("these"), the middle of a word ("other"), the end of a word ("lithe") or across 2 words ("what he"). A game like Where's Waldo or finding hidden images can also be used.

## EXPLAIN PROCESS TO THE CLIENT:

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

1. First minute of recording will be relaxed, still, with eyes closed
2. Second minute of recording will be relaxed, eyes open and still
3. 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.

- Sit relaxed, sitting straight with both feet on the floor
- Minimize eye blink and movement
- Let mouth hang open a bit to reduce artifact at temporals
- Keep head up to reduce artifact at back of head

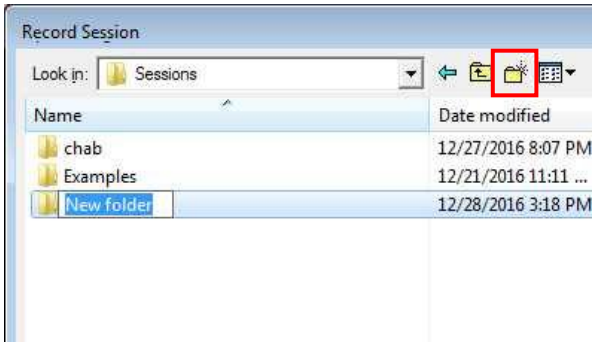
## GATHER DATA

With electrodes on the client, make sure your amplifier (EEG device) is turned on and selected. (It should appear in the black status bar across the top of the screen and show "Connected.") With *TQ7 Assess Pro Gather* design open, click "Capture" (green triangle) and observe signal quality.

### *Check signal quality*

- In the Power Spectrum windows (upper windows) 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
- In the Oscilloscope (lower right graph) very regular, mechanical and fast waves suggest artifact. Very large waves or rolling/wandering baseline for a channel also suggest problems. The channels should show about the same amount of activity. A very attenuated signal in one or more channels indicates a poor connection.
- 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, click "Pause" (yellow parallel lines) button. Re-prep electrodes. Then click "Capture" again and verify that the signal has improved.

When signal is good, in the "Record Session" window navigate to *Documents\BioExplorer\Sessions\Assessments* and click the "Create New Folder" icon to the right of the "Save In" field and open it.




Name the folder (e.g. SMBO) and open it. (Client ID: first 2 letters of first and last name)

In the "File Name" field, type the name of the file with the channel 1 site (e.g. C3), client ID and date and Save.


Be ready to have eyes closed when you click Save. As soon as you click Save, the first minute will start as the timer then starts back at 00:00 and start recording the first minute. If the session has paused, click "Capture" again and start again with eyes closed.

1. At 1 minute, a tone will sound and the display will pause. Instruct the client to open eyes and look straight ahead. Click "Capture" (green triangle) again to continue recording.
2. At 2 minutes, the tone will sound and the display will pause again. Remind the client of the task, eyes open. Click "Capture" again and begin performing the task.
3. At 3 minutes the tone will sound and the display will pause again. Now you have completed this recording. Click "Stop" (white square) to save it.

Move electrodes to their next positions and repeat the steps, saving all recordings in the same client folder. Repeat for other site sets. Record a minimum of the 6 basic site pairs; if possible, record the full 9 site-pairs.

- Click "Capture"
- Verify good signal and client sitting still
- Name file with site, client ID and date

| **2CH Sites** | CH1 | CH2 | Task |
|---|---|---|---|
| Run 1 | C3 | C4 | Silent Reading |
| Run 2 | P3 | P4 | Serial Calculation |
| Run 3 | F3 | F4 | Digit Span |
| Run 4 | T3 | T4 | Listening |
| Optional | O1 | O2 | Pattern Recognition |
| Optional | T5 | T6 | Silent Reading |
| Optional | F7 | F8 | Reading Aloud |
| Run 5 | Fz | Pz | Visualization |
| Run 6 | Cz | Oz | Pattern Recognition |

### *Trainer Tools*

- There are three graphs: Eye artifact and Muscle Artifact (bottom left of Instruments 2) and Symmetry (Instruments 1).
- 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.

# Chapter 14 Infiniti TQ7 Assessment

**NOTE: The current CD from Thought Technology provides a script for the 6.6 version of the TLC Assessment. These instructions include description of how to alter the process to produce the data for TQ7. Once the data is loaded into TQ7, the only thing missing will be the phase information on the Synchrony page. When the new CD for TQ7 is released, this will be announced on the braintrainer list.**

## COLLECT DATA

(Collect raw EEG data to inform your training choices. Should take 45-60 minutes.)

1. Make sure your ProComp+, ProComp2 or Infiniti encoder is connected to your computer and turned on, then open Biograph Infiniti software.
2. Click on the Start Session menu and either select or create a client from the *Client Database* window that opens. Click OK. Select "Script" as the Session Type and click Session Configuration.
3. Scroll down the *Script Database* list and select the desired TLC Assess Pro script for your encoder (P+ for ProComp+, P2 for ProComp2 or PI for ProComp Infiniti). Each offers 3 screen options: a 3D spectrum, a multi-line graph or a simplified screen for computers with limited RAM. Click OK to enter the assessment script.
4. The script will guide you through the placement of leads and gathering of the assessment data. Alter as described below. You should also review the document included in your CD package entitled Infiniti TLC Step-by-Step in images.
5. At the end of each one-minute segment, the script will give you the option of repeating the segment (if there were significant signal disturbances, for example) or continuing to the next minute.
6. Put active and reference leads at P3/A1 in the first channel and P4/A2 in the second. Use a midline site as your ground (perhaps not Cz as this will be an active site later), or the back of the neck if using adhesive electrodes. If possible used "linked-ear" reference by placing a jumper between the two references.
7. Explain and demonstrate the challenge task for the segment you are recording.( For Parietal sites perform a serial calculation task, see below). Remind client of the importance of minimizing blinking and tension. Some clients can "peek through their eyelashes" for the eyes-open tasks—especially for frontal placements.
8. Start the data collection, verifying that the signal is good. In the first minute note peak frequencies for alpha, beta and total EEG, power spectrum, coherence values and Theta/Beta and Alpha/Theta ratios.
9. When the timer reaches 1 minute, the display will Pause. Tell the client to open (or partially open) eyes and look straight ahead. When EEG is stable, re-start recording.
10. At 2 minutes, the display will Pause again. Remind the client of the task, eyes open, and start it. When the EEG is stable, click the "Capture" button again.
11. For Parietal sites perform a **serial calculation task**. Start with simple problems (e.g. 2+3X4), with a brief pause between each step. If the client does well, increase the challenge. The client should perform each calculation silently and give you the result at the end.
12. Move the P3 and P4 leads to C3 and C4, and repeat steps 7-11 above. Replace the task with a **silent reading task**. Ask questions about the material read after moving leads to the next site, just before starting the next recording. Note results.

13. Move the C3 and C4 leads to T3 and T4 and repeat steps 7-11 above. Replace the task with a **listening task**. Ask questions about the material presented after moving leads to the next site, just before starting the next recording. Note results.
14. Move the T3 and T4 leads to F3 and F4 and repeat steps 7-11 above. Replace the task with 30-40 seconds of **digit-span testing**, reading a series of digits one second apart (start with 5 digits) and ask the client to repeat immediately. When client can do 5, try 6, then 7. In the final 20-30 seconds ask the client to repeat the numbers in reverse (starting with 4 digits). Note performance forward and backward. At 3 minutes, the display will stop.
15. *Optional*: You may assess up to 3 optional site pairs: O1/O2, T5/T6, F7/F8. Repeat steps 7-11 above. Replace the task with one appropriate to the site pair you have chosen[1].
16. Move the Channel 1 lead to Cz and the Channel 2 lead to Oz (Midline). Repeat steps 7-11 above. For the task (**pattern recognition**), ask client to search a text and count the number of times the letters t, h, and e appear in sequence. This can be a word "the", beginning a word ("these"), the middle of a word ("other"), the end of a word ("lithe") or across 2 words ("what he").
17. Move the Channel 1 lead to Fz and the Channel 2 lead to Pz (the Default network). Repeat steps 7-11 above. For the task, have client keep eyes semi-open and let the mind wander, for example **daydreaming about a desired future situation**.
18. After completing all site-pairs, end the program.

[1] Tasks for optional sites:
T5/A1/g/T6/A2 for sensory integration. Use silent reading task, Step 12.
F7/A1/g/F8/A2 for impulse control and language output. Tell the client to read aloud from printed material, keeping facial and other movements to a minimum and minimizing eye movements.
O1/A1/g/O2/A2 for pattern recognition. Use search task Step 16.

# Chapter 15 Nexus-10 TQ7 Assessment

Importing data from the Nexus-10/BioTrace+ to the TQ7 requires a conversion, which is offered here using a MS Excel workbook. This manual was written for version V2015B1 of BioTrace+.

The steps (which will be described more fully in following sections) are as follows:

1) Collect the data through the provided Nexus-10 protocol
2) Artifact the data
3) Compute Statistics (which outputs data to a text file)
4) Copy and paste the statistics into the conversion MS Excel workbook
5) Output the data into the TQ7 format (requires only a single button push)
6) Input data into the TQ7

Although, the TQ7 can process data collected during a 2-Channel protocol or 4-Channel protocol, only the 2-Channel protocol and conversion for the Nexus-10/BioTrace+ are available at this time. The protocol also only collects information for the required 6 site pairs. The optional site pairs are not included at this time.

## INSTALLING FILES

The files needed for Nexus-10 protocol and conversion to TQ7 can be purchased and downloaded from brain-trainer.com and include:

Protocol:
- Sequence Script
- Channel Set
- Screens

Conversion Tool:
- Nexus-10 to TQ7 Conversion MS Excel Workbook

Once the files have been downloaded, navigate to your BioTrace+ folder. (The original installation location for v.2015 is C:\BioTrace+ NX10, which is where you should find it, unless you have moved it elsewhere.)

Place the following files in the sub-folder indicated:

Channels Folder: TQ7.channels
Protocols Folder: TQ7.script
Screens Folder: TQ7 Screens Folder

If you prefer, you can create a favorites shortcut button to begin the protocol, which is described in the **Optional Instructions** section at the end of this document.

You may also prefer to create a shortcut to the text file to which the computed statistics are output. Again, see **Optional Instructions** section at the end of this document.

# RUNNING THE PROTOCOL

### *Collect Data*

The protocol will guide you through the collection of EEG data from the six basic site pairs required to run the TQ7 assessment.

1. Start the protocol (either by choosing the "01 Main" from the TQ7 folder of the Screens menu or using the optional Favorites Shortcut) and follow the instructions on the screen. The script will lead you through the assessment which includes three conditions (eyes closed (EC), eyes open (EO) and task) for each of the six site pairs. Each condition is timed at 60 seconds. After each set of the three conditions, the script provides instructions regarding the next set of sensor placements. Although the script will provide on-screen instructions, reading the TQ7 Complete Guide and familiarizing yourself with the site pairs and tasks prior to running the session is highly recommended.

2. Prepare the sites. Attach the active, reference and ground sensors for the first site pair as indicated on the main screen and described below:

1. EEG Ground to Cz
2. EEG 1 Reference (Black 1) to Left Ear (or mastoid process)
3. EEG 2 Reference (Black 2) to Right Ear (or mastoid process)
4. EEG 1 Active (Red 1) to C3
5. EEG 2 Active (Red 2) to C4

3. Make sure your Nexus-10 encoder is turned on and your bluetooth connection is enabled. Also make sure you are using an EEG Linked Ear Cable. Some trainers may also wish to monitor peripheral signals including GSR,TEMP and RESP. If so, connect these sensors now.

4. Explain the three conditions: eyes closed, eyes open and task, and that you will describe each task when it is time. Inform the client a harp strum will be heard at the beginning of the EO segment that you will also verbally prompt to open eyes.

5. Before beginning the assessment (and as necessary throughout) remind the client of the importance of reducing artifact. To do so:

a. Keep feet on the floor
b. Rest hands comfortably in lap
c. Peek through eyelashes for the eyes-open tasks— especially for frontal placements - to minimize blinking
d. Keep focus on reading material provided (or that general area after the reading task) to reduce eye movement.
e. Allow mouth to hang open slightly and tongue to rest gently to reduce jaw and tongue muscle artifact

6. Click the "Start Protocol" button. The window pops up "Please select a CLIENT for the new session". Navigate to the client or click "Add New" and follow the instructions, then click the "Continue…" button. The protocol will advance to a signal test screen. Verify the signal quality is sufficient and muscle artifact is minimal. Once you are satisfied you have a clean signal, click the "Continue" button to advance to the "Eyes Closed" screen. Continue to monitor signal quality and muscle artifact in the instruments. If you have attached Resp, GSR and Temp you can monitor any distress the client may experience as well.

7. The harp strum alerts the protocol has advanced to the “Eyes Open” screen. Prompt the client, “Open your eyes.” Continue to monitor signal quality and artifact. After one minute, the protocol will advance to the first task and recording will pause.

8. Read the instructions from the screen and when the client signals readiness to continue, click the “ok” button and the recording will continue. When the 60 seconds of recording is complete, the protocol will advance to the next screen and recording will pause. Change the sensors as indicated and click the “continue” button.

9. Repeat the process for each of the 6 site pairs. The order of pairs and tasks for each pair are listed below.

Note: At the 6th pair, Cz/Oz, it is helpful to move Sensor 2 first placing it at Oz, which will free up Pz for the ground, and then Sensor 1 can be moved to Cz.

C3/C4 Centrals—Reading silently for details. Provide appropriate reading material with factual information in it (magazine or newspaper articles can be good sources). Tell the client you may ask questions after the recording. When preparing for the next site, ask open-ended questions first (e.g. “what was the paragraph about?”) and move to greater detail if the client doesn’t provide it. Using a book stand so that the head remains level and the client does not have to hold the reading material is highly recommended.

P3/P4 Parietals—Serial calculation. Start with simple problems (e.g. 2+3X4/5), with a brief pause between each step. The client should perform each calculation silently and give the result at the end. If the client does well, increase the challenge. Alternative—Ask the client to count aloud by 2 or 3 or count backward.

F3/F4 Frontal—Digit-span working memory. 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)

T3/T4 Temporals—Listening for details. 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 if necessary.

Fz/Pz Default Network—Eyes semi-closed, let your mind wander.

Cz/Oz Midline—Pattern recognition. Tell the client to search 1-2 paragraphs of printed material and count the number of times the letters t, h, and e appear in sequence. This can be a word “the”, beginning a word (“these”), the middle of a word (“other”), the end of a word (“lithe”) or across 2 words (“what he”). A game like Where’s Waldo or finding hidden images can also be used.

10. After the 6th site pair, you will be prompted to save the recording. Enter “TQ7” and click “save”.

### *Artifact Data*

Artifact the data using the BioTrace+ "Automatic Artifact Rejection" tool, if you are familiar with it, or manually as described below. Keep in mind having clean data is critical for the successful use of the TQ7.

To artifact manually:

1. Press the Tab key to get to the review screen.

2. Right click within the data and select "Size of TIME axis" and select "Time-axis: 10 seconds"

3. Scroll through the data by dragging the bar at the bottom right of the screen and look for areas of artifact such as large increases in a frequency or variations spanning all frequency bands. Be sure to remove the area of artifact that is created after the pause in recording at the beginning of each task. Artifact areas are added by clicking and dragging in the timeline at the bottom of the screen and selecting "Segment: add Artifact area" from the pop-up menu.

Note: If you are using automatic artifact rejection, make sure you are checking artifact in both Sensor A and Sensor B and both low and high frequencies. Artifact channels (88 & 89 in the channel set) have been created for the sum of channels A & B at 2-6 hz for the low frequency and at 23-42 hz for the high frequency.

You may prefer to run the automatic artifact rejection tool and then manually verify the segments identified.

## USING THE CONVERSION WORKBOOK

The data will be exported in two sets. The first set includes amplitude measures for each of the frequency bands for each condition. The second set includes peak frequency and coherence measures.

1. After artifacts have been removed, navigate to the "Report Amp" screen, (press the "Tab" key, if necessary, to get to the review screen) and right click in the data. Choose "Compute statistics" from the pop-up menu, and then "on all segments".

This process will result in a pop-up window which may or may not include the full data set. The full data set can be found in a text file named "Statistics" which is located in your BioTrace+ NX10 folder. Each time the "compute statistics" process is run, this text file is replaced with the current data.

2. Open the "Statistics" text file (either by navigating to the BioTrace+ NX10 folder or using the Statistics shortcut you have created. See **Optional Instructions** section at the end of this section).

3. Select and copy all of the data. This can be done by right clicking within the data and choosing "Select All" from the pop-up menu and then right clicking within the highlighted data and selecting "Copy" from the pop-up menu. Click the "X" in the upper right hand corner of the window to close the document.

4. Open the Excel file named **Nexus-10 to TQ7 Conversion**

5. Right click within cell A1 and choose paste from the pop-up window. You will know you have completed the operation successfully if the channel labels listed in Column G match the channel labels listed under "Placement Verification" in Column I. The paste of the first set of data replaces the

contents of the cells through row 718. You will see cells highlighted in red at row 719 indicating where the second paste begins.

To export the second set of data, navigate to the "Report Pk Freq & Coh" screen and repeat the first four steps listed above.
At Step 5, click within cell A719 and choose paste from the pop-up window. This will replace the contents of cells through row 1205. Again, verify the success of the operation by comparing the channel labels in Column I with those in Column G.

To avoid having to compute statistics and export/import for this client's assessment again in the future, you may want to save this file. To do so, choose "Save As" from the Excel "File" menu, change the name and save the file for this client.

6. Once you have verified the data has been imported correctly using the two paste operations, export the data to TQ7 format by clicking the green "Export Files" button. A window will pop up asking permission "Saving in 'C:\BioTrace+ TQ7 Data'. Click "OK". The process continues and creates 6 separate text files within this folder, one for each of the site pairs and another window pops up: "Export complete. Find your files in C:\BioTrace+ TQ7 Data". Click "OK".

Warning: Each time the "Export Files" button is used, a new set of files is created. They are differentiated by the end of the file name which is the date and time they were generated. You must delete or move previously exported files in order to import the correct files into the TQ7. If you inadvertently create a new data set before the old data set is removed, sort the files in the "C:\BioTrace+ TQ7 Data" folder by "Date modified" and the data sets will be grouped together and easy to delete or move.

## OPTIONAL INSTRUCTIONS:

### *Creating a Favorites Shortcut*

Once the files have been installed, you may prefer to create a Favorites Shortcut. Navigate to the TQ7 screens and select "01 Main" by clicking once. Select the icon above the screens with the star. Name the shortcut "TQ7" (or another name you choose). From the "Home" screen, you can then navigate to "Favorites" and start the protocol by selecting TQ7 (or name you have given).

### *Creating a Shortcut for the Statistics Text File*

Navigate to "C:\BioTrace+ NX10" and right click on the "statistics" text file. From the pop-up menu, select "Send to" and from the next pop-up menu select "Desktop (create shortcut)". Using this shortcut will always open the file with the latest "compute statistics" data even if a previous version of this document is already open.

# Part 3 Whole-Brain Training Plan Service

## Chapter 16 Using Whole-Brain Training Plan Service

*Purchase **Whole-Brain Training Plan service** first (for users without TQ7)*

**Complete Client Report**

If you have a mentor, your mentor should send you a URL link to complete the Client Report online.

If you have purchased the Whole-Brain Training Plan service only, you may complete the online questionnaire at provider.brain-trainer.com. A copy will automatically be sent to brain-trainer.

**Complete TQ7 Assessment gathering**

The link above takes you to Assessment gathering instructions.

**Email as attachments to wbtp@brain-trainer.com:**

- All **.epochs.txt** files (one for each site pair)
- Session recording files for **F3 and T3**
  - **.recording.txt for Brain-Trainer for BioEra**
  - **.bxs for BioExplorer**

Brain-Trainer assessment specialists will artifact your data, complete the Brain-Trainer Assessment, develop a training plan of up to 6 protocols and e-mail it to you or fax it to you.

# Part 4 TQ7 Assessment Processing

## Chapter 17 TQ7.5 Trainer's Q

Welcome to TQ7--Brain-Trainer's Trainer's Q—your 30-minute process to gather up to 20 EEG sites of brain information and produce a custom training plan. Following is a step-by-step process for using this new file. Video Demo

## TQ7.5 Processing Contents



## INSTALL THE TQ7

**Run the installer** which will place files in their respective folders and create a *Brain-Trainer* folder in your local drive with shortcut on your desktop. Follow instructions to supply your computer's unique ID to receive your unlock key code. If upgrading from an earlier version to TQ7.5, you can use the same unlock key. You will need Microsoft Excel 2007 or later to run the TQ7 file. The TQ7 will be found in your Documents\Brain-Trainer folder. A shortcut will be found on your desktop.

## RECORDING THE DATA FOR AN ASSESSMENT

Follow the instructions for recording the TQ7 as always. The key things to remember are:

1. **Properly name the files**. Each file name should identify the client and MUST include the site name for channel 1 active site. For example, the file that contains T3/A1/T4/A2/g/C3/A1/C4/A2 must include T3 in the name.
2. **Save all the files from the assessment in a single folder.** If you are using BioExplorer, the program will automatically produce files ending with .epochs.txt which will load directly into the TQ7.
3. **If you are using Thought Technology Infiniti or Nexus BioTrace+, process and remove artifact following the instructions contained in your guide.**
4. Record a minimum of the 6 basic site pairs; if possible, record the full 10 site-pairs.

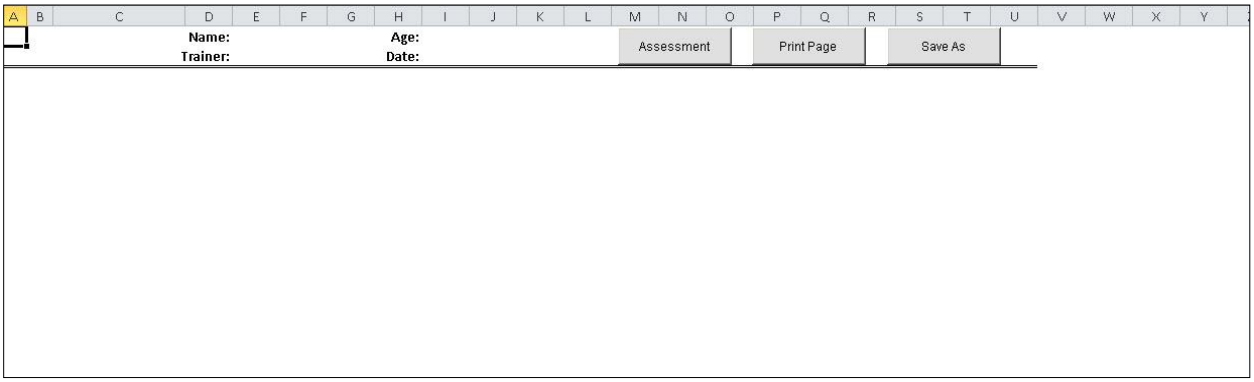
## COMPLETE CLIENT REPORT

Follow the instructions for completing the Client Report. The key things to remember are:

1. **Keep the filename format.** The Client Report is automatically named with the prefix "CRep" and the client name. You may change the name or add a date, but leave the "CRep" at the beginning. This will allow automatic importing to the TQ7. The file type is *.csv*.
2. **Save the file in the client assessment folder** with the assessment recordings files. It will be imported along with the recording files.

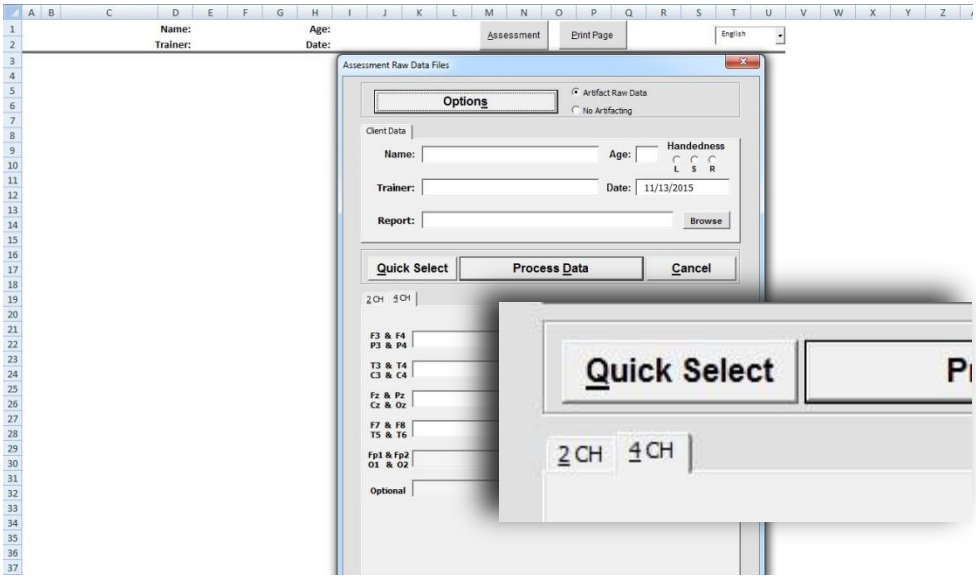
## LOADING DATA INTO THE TQ7

Double-click the TQ7 file, and it will open directly to the input page.

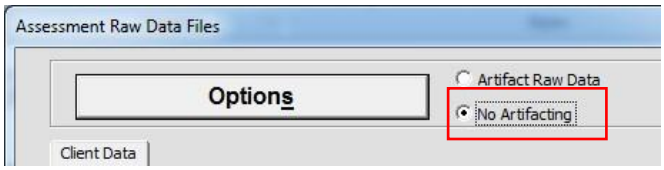



Click the "Assessment" button at the top of the page, and the input window will open.

Select the 2CH or 4CH tab depending whether you gathered data in 2 or 4 channels.



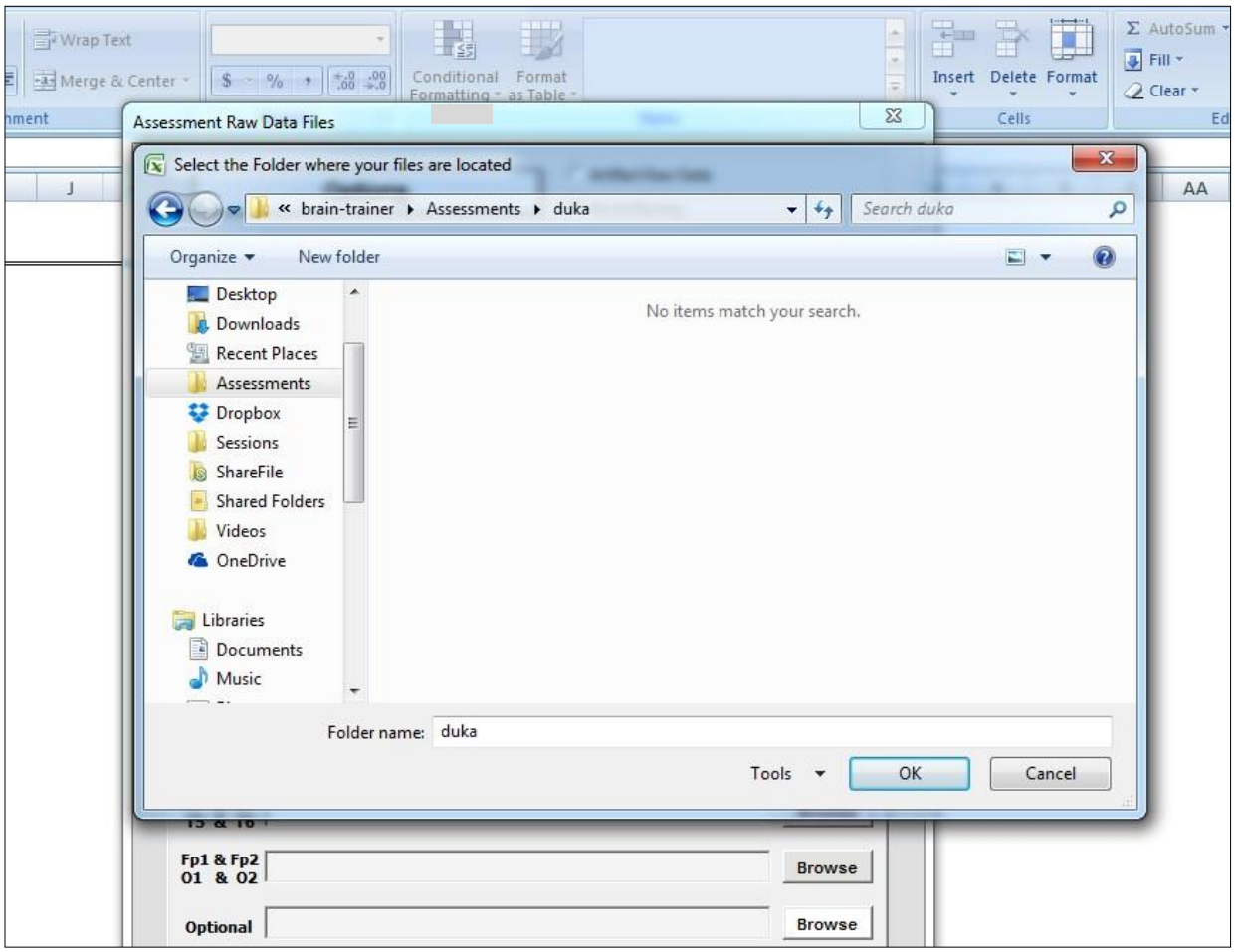
**If you are loading artifacted data from Infiniti or BioTrace+, at the top of the page, select the button for "No Artifacting."**



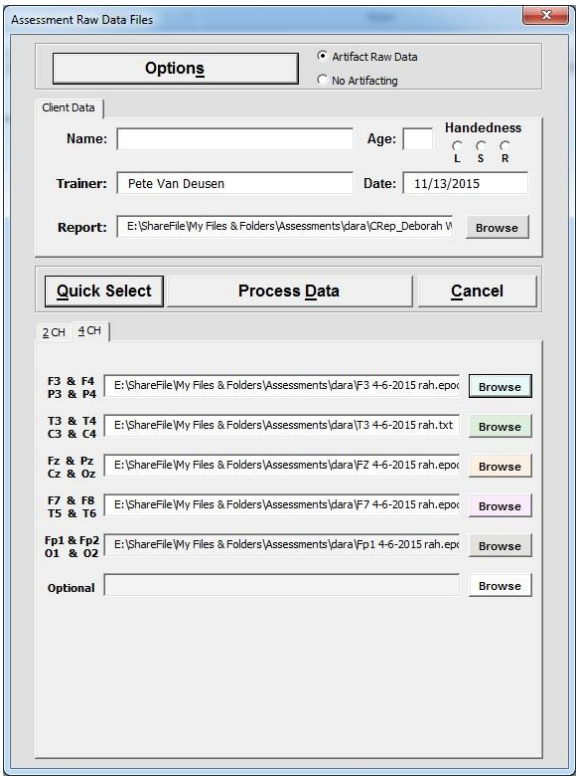

If you make an error in recording, reversing the channel 1 and channel 2 sites, you can manually Browse for the file to add for a site and check the Reverse box. If you have misnamed a file, you can manually select it with the "Browse" button.

Most users will simply click the "Quick Select" button. This will open a window in which you will navigate to the proper folder.

The text files will not appear in the folder, but click "OK" to load anyway.



The screen will show the selected file for each site-set, *.epochs.txt*. Verify that these are correct. If files are not showing, select the data files to be loaded for each 2 or 4-channel site set by clicking the "Browse" button and navigating to the appropriate file until all have been loaded. At the top of the window type in name, trainer, age and the date if not loaded from the Client Report.

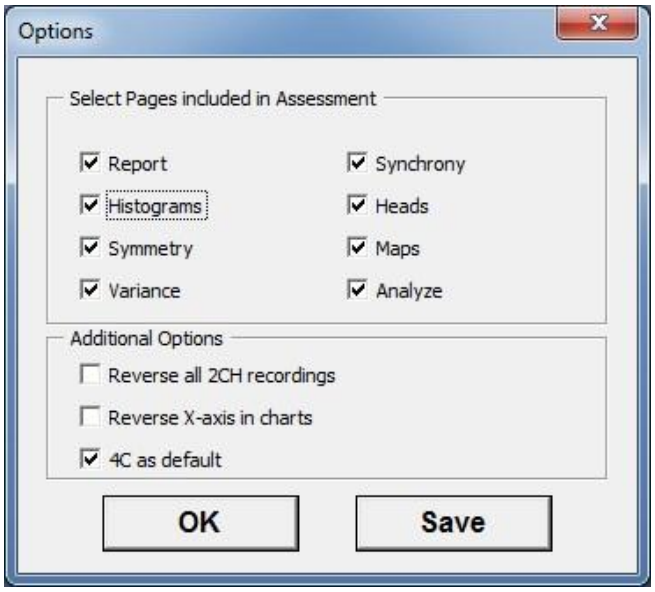



Once all files are selected, click *Process Data*.

## FILE OPTIONS

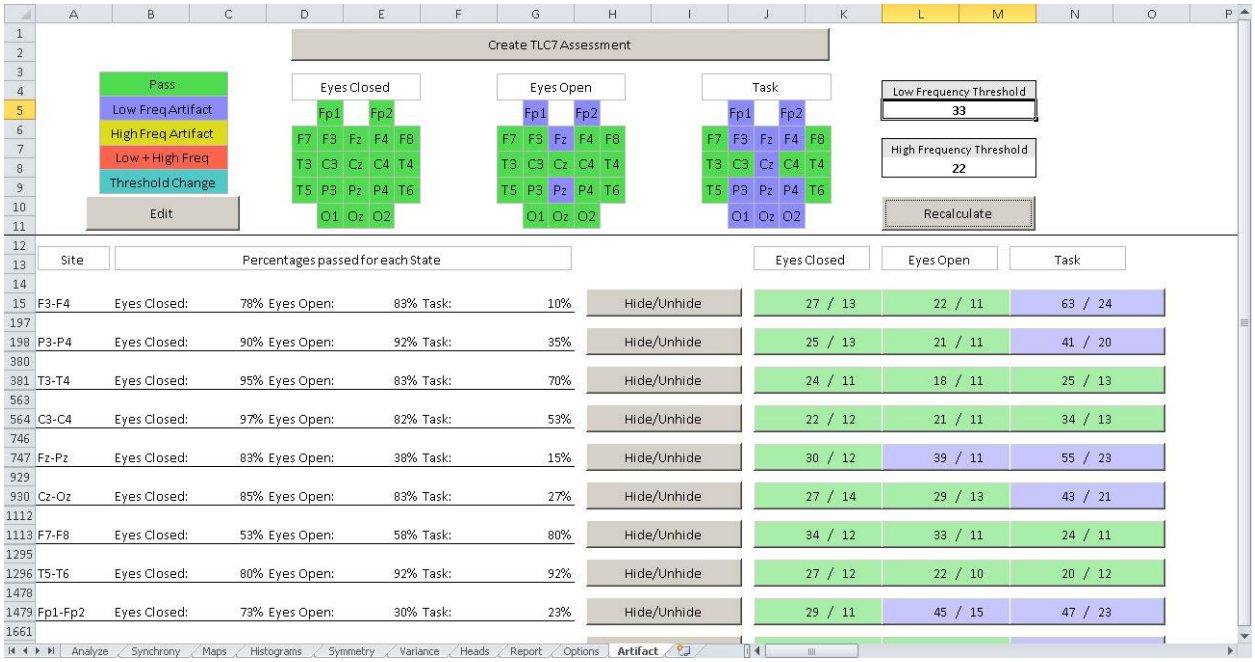
The *Options* button provides selections that may be saved as default to:

- Select pages to display
- Reverse all recordings in the event of an error
- Reverse the x axis on graphs (for right to left languages)
- Load the 4 channel tab as default



# ARTIFACTING

The artifacting page shows 3 “heads” across the top with a square for each recorded site.

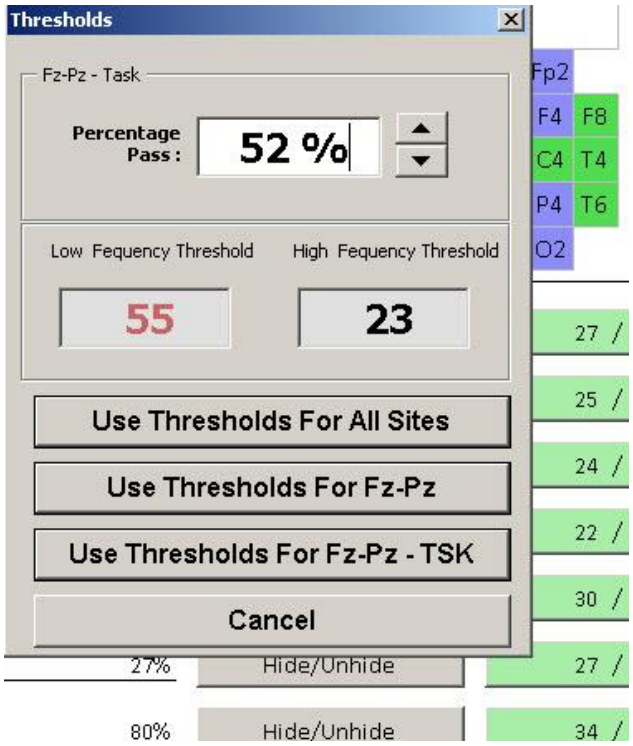



These are colored depending on whether they passed artifacting (more than 50% of the file was below the Low Frequency and High Frequency thresholds listed to the right of them) or failed either due to too much low-frequency (eye blink or movement) or high-frequency (muscle tension) or both. Colors from the legend to the left show the status of each site.

Below the line, rows for each data-pair show the percent of passing data for eyes-closed, eyes-open and task recordings on the left. On the right are buttons for each state and each site showing the target for low and high frequency that would permit 50% of the data to pass.

It is possible that a site may fail to pass because of a slight variation from the targets. In this case the trainer may decide to adjust the targets manually to allow the data into the assessment. For example, in the image above, the slow frequency target is 33. The eyes-open blocks at Fz/Pz would pass if the low target were raised to 39, a small increase. Scanning the other sites that failed to pass, there are a number of sites failing in the task state, including P3/P4, O1/O2 and Cz/Oz—all states well back from the front of the head where eye blink artifact is most likely. Raising the target to 43 would allow all of these to pass. This can be done by simply clicking the "Recalculate" button and changing the low-frequency target to 43 to recalculate. Frontal sites, where eye blink is more likely, would require increasing the target to 55 or 63—an increase of more than 65%. These probably really are artifact, and the trainer may choose to let the TQ7 remove them.

Sometimes a site or pair may show much higher activity for reasons that really relate to the brain. For example, hot temporal lobes or a hot cingulate may require an increase in the high-frequency threshold to allow the data to pass. Failing to do this will actually screen important information about the brain out of the assessment. In such a case, the trainer can click on the button showing the recommended targets to open a Thresholds window. This shows the required threshold change to pass the site (the passing percentage is shown at top). The trainer can type over the suggested targets or use them as suggested. The new thresholds can be applied to all sites, only to the selected sites, or only to the selected state at the selected sites. In most cases it is preferable to change at all sites, so all are being measured against the same target.



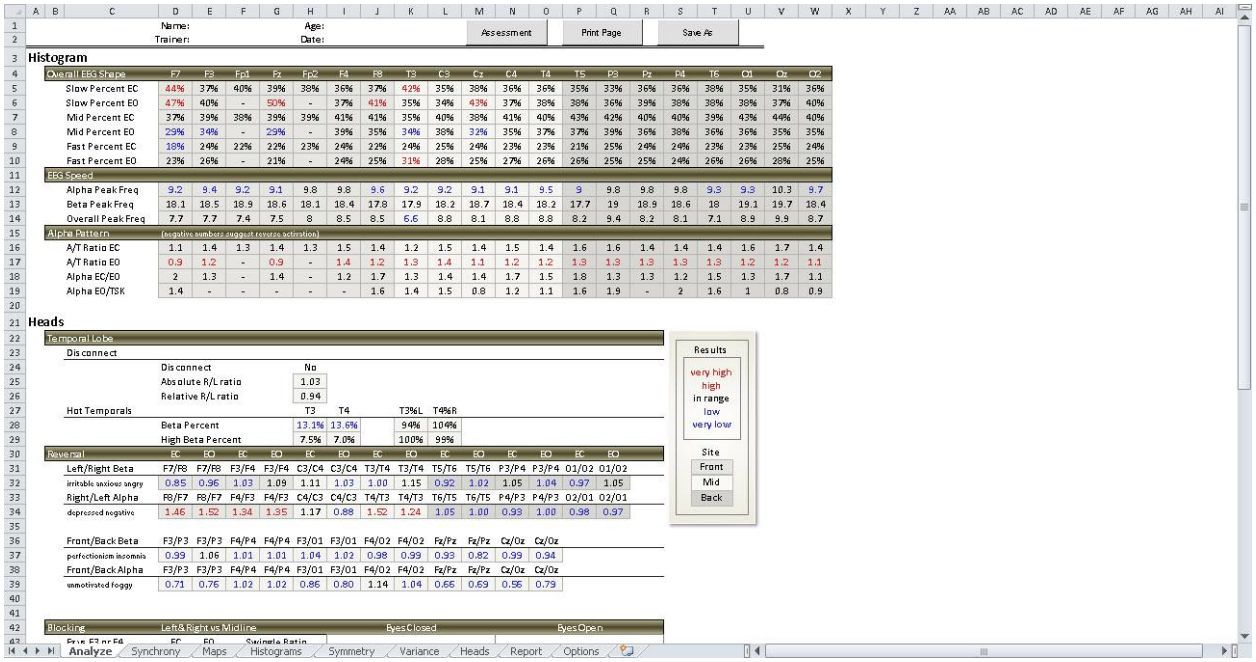

Some keys to remember in artifacting are:

1. The eyes-closed and eyes-open states are most important to the analysis of the EEG in the TQ7.
2. Data should NOT be included just to fill out the assessment; adding artifact to the data greatly reduces the usefulness of the assessment. Better to re-record the assessment if necessary.
3. The best way to artifact is to pay attention during the recording, minimizing eye movement, muscle tension, asymmetrical scalp connections, etc. BEFORE completing the recording.

Once desired changes have been made and recalculated, click the button at top to "Create TQ7 Assessment." The data will be processed and loaded into the presentation file.

# PRESENTATION FILE

The loaded TQ7




shows a series of tabs across the bottom of the page (Analyze, Synchrony, Maps, etc.) By clicking each of these, the trainer can view the brain via various measures of its activity. Many of these use coloring to point up areas of potential focus in training. Red numbers generally indicate values that are higher than expected, while blue ones indicate lower values.

### Save File

Before going on, click the "Save As" button at the top of the screen. The file should be saved in the data folder where the raw recordings are kept, and it will automatically be named according to the name of the client and the date of the processing.

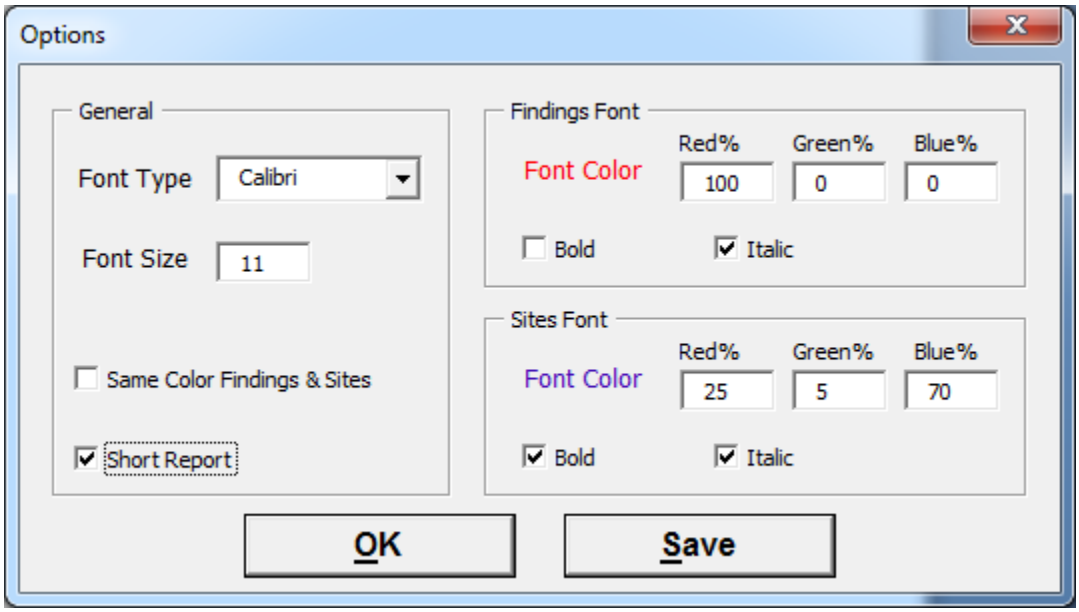
It is important to remember that the TQ7 is NOT a pathology-based tool. It is descriptive rather than normative. A client whose brain shows dominance of fast frequencies, for example, may simply be more oriented toward thinking than feeling, more of a logical/rational language processor. If the client is, for example, an engineer or accountant, this may be very adaptive.

# EXECUTIVE SUMMARY REPORT

The Executive Summary Report brings data from the TQ7 assessment data and the Client Report. It summarizes findings for sharing with referral sources or others—or helps to guide the trainer in choice of protocols. Refer to these findings when selecting final options for the Whole-Brain Training Plan.

To create the report, select either Excel version or Word version. *Excel version* will show the report in the Summary Report page. This will be saved with the assessment when you save the file. *Word version* will create a Word file which can be saved to the client's Assessment folder.

Options allows you to adjust the font type, size and color for the Summary Report. You can also choose to have a short Summary Report, excluding the informative text not specific to the client.



# TRAINING PLAN OPTIONS

The Options page is the source of the Whole-Brain training plan. It can be used completely automatically, or it may be adjusted based on the trainer's experience.

Clicking the button "Start Protocol Selection" produces the raw plan recommendations.

Name:
Trainer:

Print Page | Save As

Start Protocol Selection | 4CH Protocols | 2CH Protocols | Complete Autoplan

Default EEG Sites
Q-wiz EEG cap Sites

| Block 1 | | Weight | Active | Reference | 4CH Protocol | State | | Weight | Active | Reference | 2CH/1CH Protocol | State |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Selectable Protocols | 1 | 120.1 | P3 P4 T3 T4 | L(A1 A2) | FRE4C Squish (19-38) | EC/EO | | 48.4 | P3 P4 | L(A1 A2) | FRE2C IN (19-38) REW (9-13) | EC/EO |
| | 2 | 47.7 | (Oz) P4 T5 T6 | L(A1 A2) | FRE4C Squish (19-38) | EO | | 28.1 | P4 O2 | C(A2) | FRE2C IN (19-38) REW (6-10) | EO |
| 0 | | 47.2 | P3 P4 (Oz) T6 | L(A1 A2) | FRE4C Squish (19-38) | EO | 3 | 20.7 | F7 T4 | (F8) (T3) | BAL2C Dual Bipolar | EO |
| | | 47.1 | (Oz) P4 (O2) T6 | L(A1 A2) | FRE4C Squish (19-38) | EO | | 16.3 | O1 O2 | L(A1 A2) | BAL2C Alpha Beta (Alpha) | EO |
| | | 44.8 | (Oz) P4 O1 T6 | L(A1 A2) | FRE4C Squish (19-38) | EO | | 15.6 | F3 F4 | L(A1 A2) | BAL2C Alpha Beta (Alpha) | EO |
| | | 40.8 | P3 P4 T5 (Oz) | L(A1 A2) | FRE4C Squish (19-38) | EO | | 15.6 | P3 P4 | L(A1 A2) | BAL2C Alpha Beta (Alpha) | EO |

| Block 2 | | Weight | Active | Reference | 4CH Protocol | State | | Weight | Active | Reference | 2CH/1CH Protocol | State |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Selectable Protocols | 1 | 112.8 | F3 F4 O1 O2 | L(A1 A2) | CON4C MBC Down | EC/EO | | 90.5 | F3 F4 | L(A1 A2) | CON2C MBC Down | EC/EO |
| | | 109.7 | F3 F4 P3 P4 | L(A1 A2) | CON4C MBC Down | EC/EO | | 39.7 | O1 O2 | L(A1 A2) | CON2C Gamma Up | EO |
| | | 107.7 | F3 F4 C3 C4 | L(A1 A2) | CON4C MBC Down | EC/EO | | 22.3 | O1 O2 | L(A1 A2) | CON2C MBC Down | EC/EO |
| 0 | 2 | 51.5 | P3 P4 O1 O2 | L(A1 A2) | CON4C Gamma Sync | EO | 3 | 19.6 | P3 P4 | L(A1 A2) | CON2C MBC Down | EC/EO |
| | | 46.4 | F3 F4 O1 O2 | L(A1 A2) | CON4C Gamma Sync | EO | | 11.8 | P3 P4 | L(A1 A2) | CON2C Gamma Up | EO |
| | | 41.6 | P3 P4 O1 O2 | L(A1 A2) | CON4C MBC Down | EC/EO | | 6.7 | F3 F4 | L(A1 A2) | CON2C Gamma Up | EO |

| Block 3 | Weight | Active | Reference | 4CH Protocol | State | | Weight | Active | Reference | 2CH/1CH Protocol | State |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Selectable Protocols | | | | | | 2 | 37.1 | C3 C4 | L(A1 A2) | BAL2C Alpha Beta | EO |
| | | | | | | 3 | 20.8 | C3 C4 | L(A1 A2) | BAL2C Alpha Beta (Beta) | EC |
| 0 | | | | | | 1 | 10.6 | C4 | A2 | SMR%1C Up | EO |
| | | | | | | | 7.6 | C3 C4 | L(A1 A2) | CON2C SMR Coherence | EO |
| | | | | | | | 6.1 | Cz | A2 | SMR%1C Up | EO |

| Block 4 | Weight | Active | Reference | 4CH Protocol | State | | Weight | Active | Reference | 2CH/1CH Protocol | State |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Selectable Protocols | | | | | | 2 | 28.5 | Cz Oz | L(A1 A2) | CON2C MBC Up | EC/EO |
| | | | | | | 1 | 23.6 | Fz Cz | L(A1 A2) | FRE2C IN (2-6) REW (13-21) | EC/EO |
| 0 | | | | | | 3 | 10.2 | Oz | A1 | FRE1C IN (19-38) REW (6-10) | EO |
| | | | | | | | 8.9 | Fz | A1 | FRE1C IN (2-11) REW (13-21) | EO |
| | | | | | | | 6.8 | Pz | A1 | FRE1C IN (19-38) REW (6-10) | EO |
| | | | | | | | 5.4 | Fz | A1 | FRE1C IN (2-11, 19-38) REW (12-16 | EO |

| Block 5 | Weight | Active | Reference | 4CH Protocol | State | | Weight | Active | Reference | 2CH/1CH Protocol | State |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Selectable Protocols | | | | | | 1 | 95 | O1 O2 | L(A1 A2) | FRE2C Squash | EC 10:00m |
| | | | | | | | 85 | P4 or O1 | A2 or A1 | ALP1C Alpha Up | EC 10:00m |
| 0 | | | | | | 2 | 80 | P4 or O1 | A2 or A1 | ALP1C Alpha Theta | EC 23:50m |

These are divided into 5 blocks—each representing a training session with a different focus.

This page contains two major areas: a set of montages and protocols for 4-channel training and another set for 2-channel training. Some lines in each block are printed in red, indicating that they are recommended. Others are printed in black.

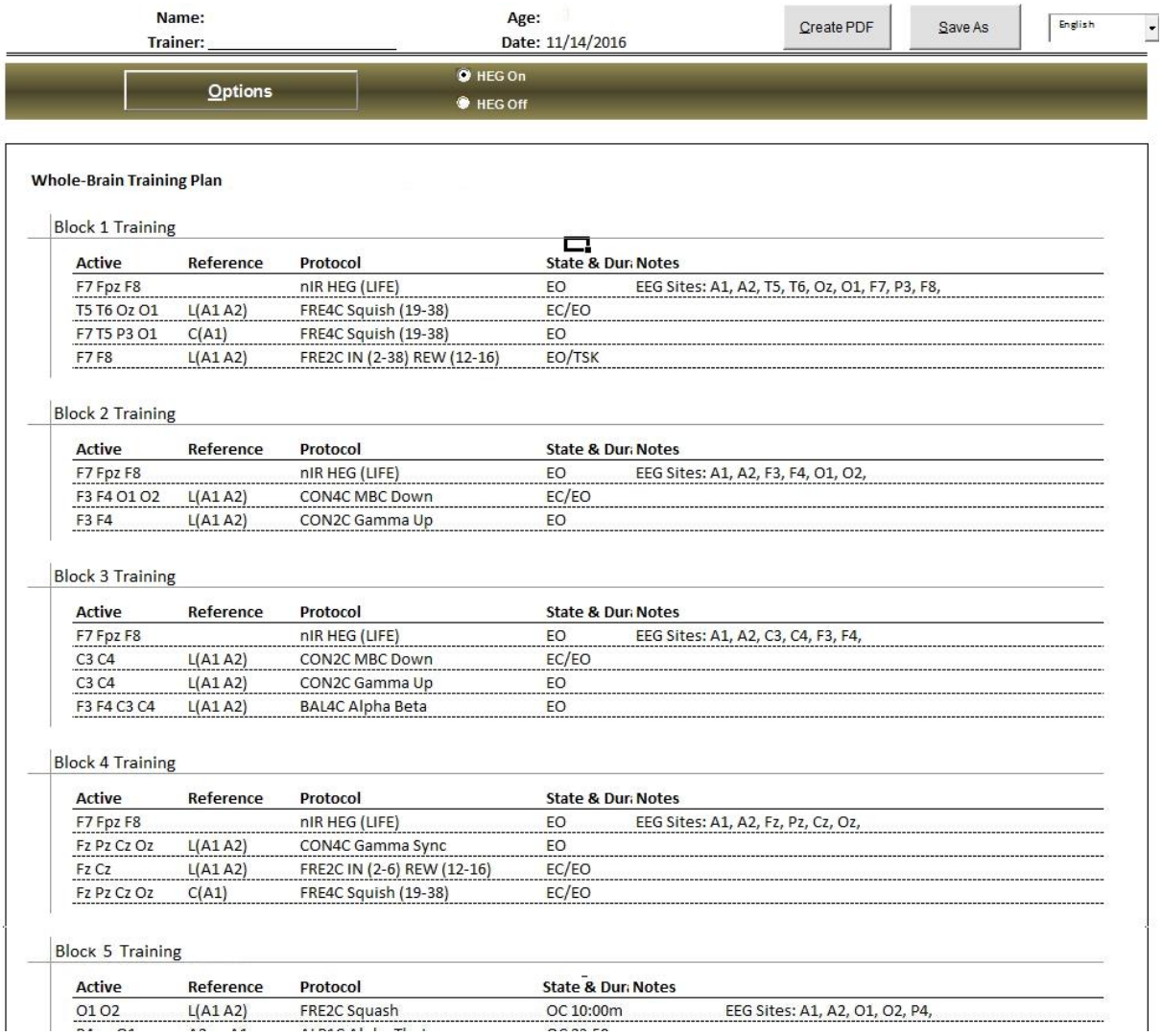
Clicking either the button for 4CH or 2CH protocols will proceed to select and highlight the recommended plan by bolding up to 3 montage/protocol sets in each block. Note that a 4CH plan may include 2-channel options, but the 2CH plan will never include 4-channel options. Each of the recommendations is numbered 1-3.

Select Default EEG Sites or Q-wiz EEG cap Sites, depending on what sensors will be used for training.

The Whole-Brain Training Plan includes 3 EEG options in each block, indicating where to place the active and reference electrodes, what Brain-Trainer design to use and whether to train eyes-open or eyes-closed or both. A trainer may choose to use fewer options in each session by clicking on one or more of

the selections to de-select them. The Whole-Brain Training Plan focuses several options on the same general training issue (often in different sites), but choosing any one of the selections—or replacing one or more of them with other options that were not selected—will maintain the focus in a less intensive way.

Once the selections are made or accepted, clicking the "Complete AutoPlan" button will produce the printable training plan. Select "HEG Off" if HEG training is not available.


Name: Age:
Trainer: Date: 11/14/2016
Create PDF Save As English
Options
HEG On
HEG Off

**Whole-Brain Training Plan**

Block 1 Training

| Active | Reference | Protocol | State & Dur | Notes |
|---|---|---|---|---|
| F7 Fpz F8 | | nIR HEG (LIFE) | EO | EEG Sites: A1, A2, T5, T6, Oz, O1, F7, P3, F8, |
| T5 T6 Oz O1 | L(A1 A2) | FRE4C Squish (19-38) | EC/EO | |
| F7 T5 P3 O1 | C(A1) | FRE4C Squish (19-38) | EO | |
| F7 F8 | L(A1 A2) | FRE2C IN (2-38) REW (12-16) | EO/TSK | |

Block 2 Training

| Active | Reference | Protocol | State & Dur | Notes |
|---|---|---|---|---|
| F7 Fpz F8 | | nIR HEG (LIFE) | EO | EEG Sites: A1, A2, F3, F4, O1, O2, |
| F3 F4 O1 O2 | L(A1 A2) | CON4C MBC Down | EC/EO | |
| F3 F4 | L(A1 A2) | CON2C Gamma Up | EO | |

Block 3 Training

| Active | Reference | Protocol | State & Dur | Notes |
|---|---|---|---|---|
| F7 Fpz F8 | | nIR HEG (LIFE) | EO | EEG Sites: A1, A2, C3, C4, F3, F4, |
| C3 C4 | L(A1 A2) | CON2C MBC Down | EC/EO | |
| C3 C4 | L(A1 A2) | CON2C Gamma Up | EO | |
| F3 F4 C3 C4 | L(A1 A2) | BAL4C Alpha Beta | EO | |

Block 4 Training

| Active | Reference | Protocol | State & Dur | Notes |
|---|---|---|---|---|
| F7 Fpz F8 | | nIR HEG (LIFE) | EO | EEG Sites: A1, A2, Fz, Pz, Cz, Oz, |
| Fz Pz Cz Oz | L(A1 A2) | CON4C Gamma Sync | EO | |
| Fz Cz | L(A1 A2) | FRE2C IN (2-6) REW (12-16) | EC/EO | |
| Fz Pz Cz Oz | C(A1) | FRE4C Squish (19-38) | EC/EO | |

Block 5 Training

| Active | Reference | Protocol | State & Dur | Notes |
|---|---|---|---|---|
| O1 O2 | L(A1 A2) | FRE2C Squash | OC 10:00m | EEG Sites: A1, A2, O1, O2, P4, |

The **Active** column shows which active EEG sites are used for training, listed in order - channels 1, 2, 3 and 4. The **Reference** column shows which sites to use as references. "L" indicates linked references, "C" common. Many montages not specifying the "L" can still use linked references, but in cases where the montage is bipolar or sequential meaning the reference is another active brain site (e.g. C3/C4), linked references should not be used.

There must always be a ground! The ground can be anywhere on the client's head. A ground site equal distances from the active electrodes is ideal.

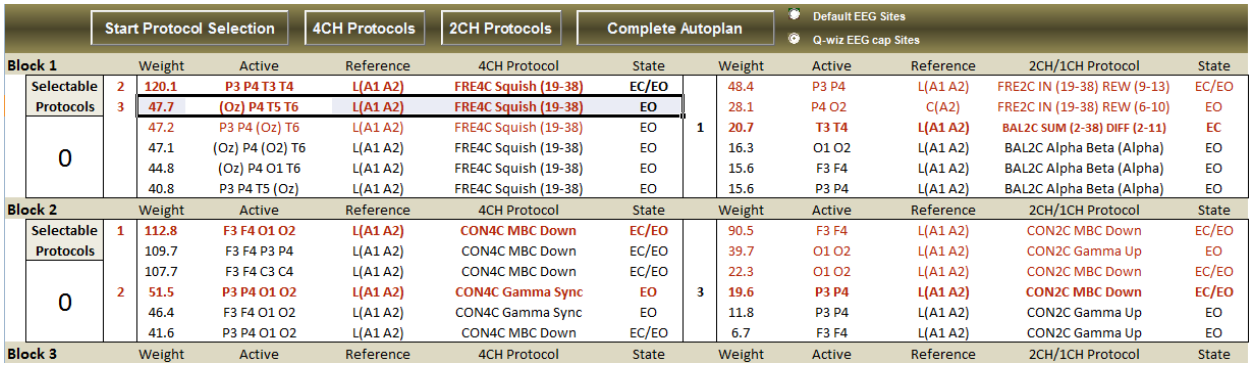
A site within parentheses indicates a Quick Insert electrode will be needed to override the Electro-Cap's default electrode site.

## FURTHER CUSTOMIZING THE PLAN

As a trainer gains experience with multiple clients, changing the auto-plan may make sense. Also users of Infiniti software, or others who do not have access to the Brain-Trainer designs package, may wish to change the presentation of the plan manually.

Most of the Protocols are relatively self-explanatory. BAL indicates a symmetry protocol, CON indicates Connectivity (coherence or synchrony), FRE is frequency training (usually indicating the frequencies to be trained down and/or up. SMR and ALP protocols are self-explanatory. Brain-trainer's CON MBC (multi-band coherence) designs are not available in most other systems, but the trainer may select a band to train by looking on the Synchrony page.

This can be done




by clicking on a line and using the Tab key on your keyboard to move to the montage or protocol field. Once in that field, the trainer may type in changes to what is listed—or a whole new selection. If the line was selected as a numbered option, clicking it will remove the number. When the changes are completed, clicking it again will re-number it. A trainer can also de-select one or more of the recommended sites and then re-click them as desired to change the order.

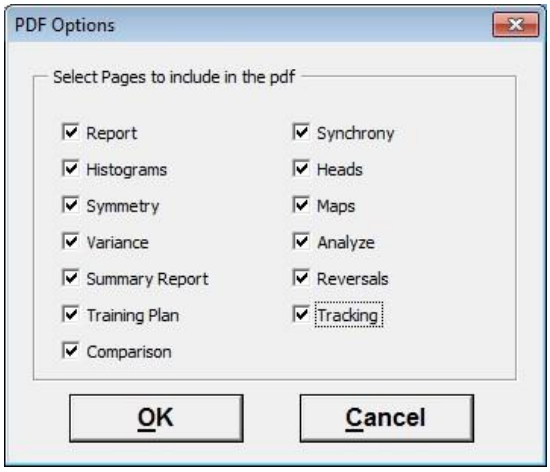
As mentioned earlier, a trainer may choose to work with shorter sessions and use fewer protocols in each, selecting only 2 or even 1 in each block.

## TRAINING PERIODS

Trainers may choose to work with shorter or longer sessions. Except in a few cases (e.g. Alpha Theta), the time is not defined. This allows the trainer to define the number of minutes to train for each exercise in a set. It also allows the trainer to "rock" training, using 2-minute segments for multi-band coherence or other types of training.

## PRINTING THE ASSESSMENT

Selecting *Create PDF* will open options for selecting which pages to include in a final portable document which can be shared digitally with professionals and can be printed in full. Pages can be printed by creating PDF and selecting print from that file.

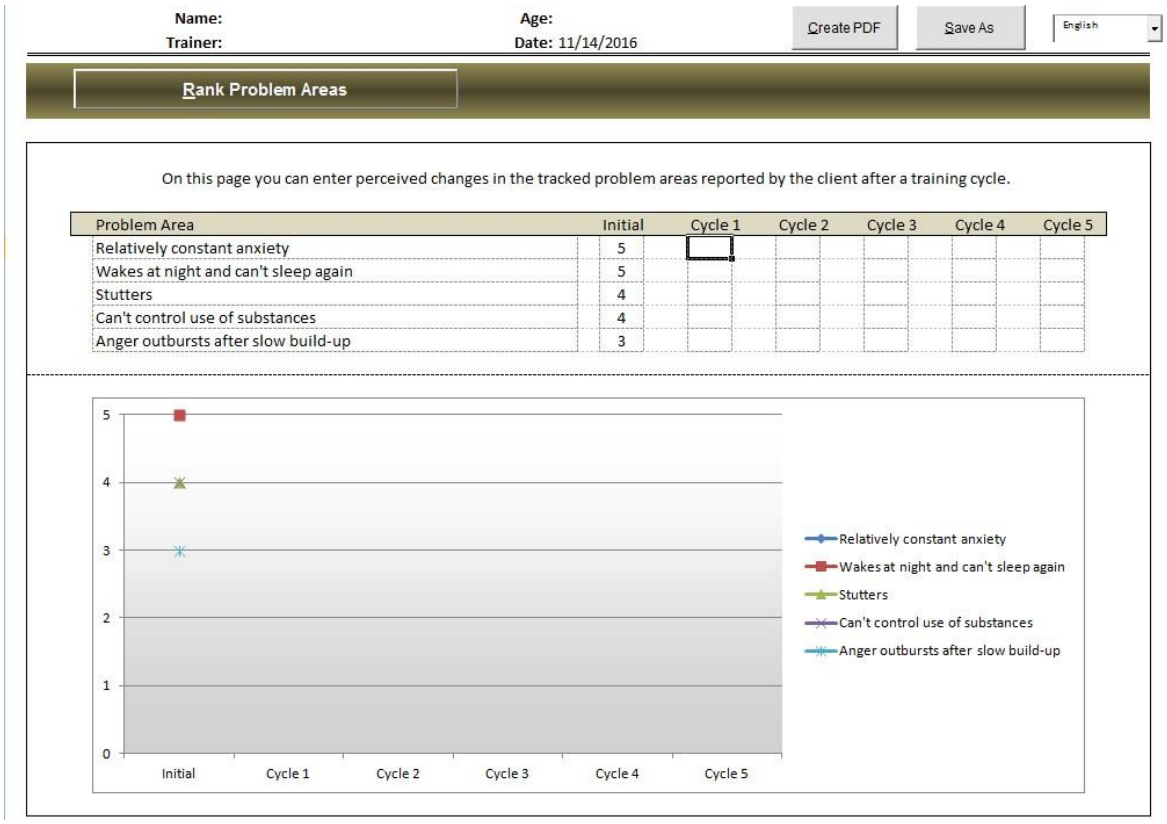



## TRACKING

The Tracking page allows one to select ranked issues to follow for progress and to compare Client Report questionnaires from before and after training.

### Select Issues to track

- Click **"Rank Problem Areas"** button
- Click on the name of the problem area to select it for tracking. Up to 6 areas can be selected.
- Select the number of cycles you want to complete for tracking.
- Click **"Create Tracking Page"** button




After each cycle of 5 sessions, rank the selected problem areas. Their trend will be shown on the graph.

To view all issues or rank problem areas click **"Rank Problem Areas"** button.

# COMPARISON

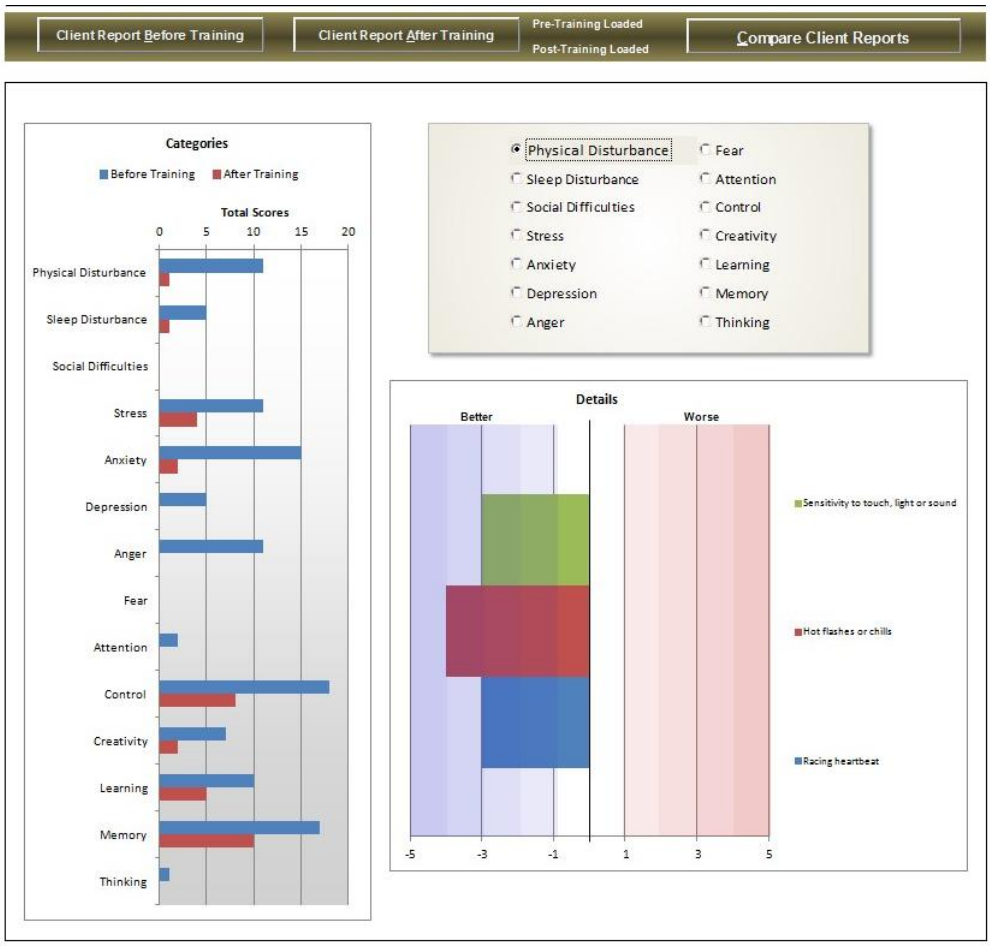
The Comparison page allows one to compare Client Reports from before training and after to show trends in symptom improvement. Have client complete the Client Report after several cycles of the Whole-Brain Training Plan. Trainer's can invite a client to complete another report at provider.brain-trainer.com by entering the client's email and sending an invitation.

## Compare Pre- and Post-training Client Reports

- The Before Training Client Report should already be loaded. This will be verified by the notation "Pre-Training Loaded." If not, Click **"Client Report Before Training"** to browse to the client's Assessment folder and select the original pre-training Client Report file to load it.
- Click **"Client Report After Training"** button to browse to client's Assessments folder and select the post-training Client Report file. This will probably have (1) as part of the filename.
- Click **"Compare Client Reports"** to expose charts showing amount of change in problem areas between the start of training and the end.

The Categories chart shows the total score of all problem issues in each category, before and after training.

Selecting a category will display the details of any category. Negative numbers ("Better") show reduction of symptom severity.



# Part 5 Appendices

## Appendix A: TQ7 Quick Features Reference

### TQ7 PAGES

Assessment - Load assessment data files

Create PDF - Create pdf version of the assessment. Select which view (pages) to include. The assessment or any page can be printed from the pdf file.

Save As - Save copy of entire assessment under client's name

Language selector for English, Portuguese, Spanish, Italian, German, French

#### Assessment Raw Data Files

Client Data fields - Name, trainer, age, date of assessment, handedness

2 CH / 4 CH tabs- Selection of data files dependent on whether 2 channel or 4 channel amplifier was used in data gathering

Rev checkbox- Reverse-correction for use if channels were reversed in data collection by mistake (e.g. T4/T3 instead of T3/T4)

Browse - Navigate to the folder to select data text file manually

Quick Select - Navigate to the folder and data text files are selected automatically

Options - De-select view pages to include in assessment or reverse all 2 channel recordings

Artifact Raw Data check box - Artifacts data when loading data text files

No Artifacting check box - Use for Infiniti when artifacting is done outside of TQ7

Process Data - Begin artifacting and loading of assessment data

Cancel - Abort assessment file selection

### ARTIFACT PAGE

Create TQ7 Assessment button - Process data after artifacting and create views

Pass - More than 50% of data below low frequency and high frequency thresholds

Low Freq Artifact - Over 50% not passing due to too much low-frequency (eye blink or movement)

High Freq Artifact - Over 50% not passing due to too much high-frequency (muscle tension)

Threshold Change - More than 50% of data below low frequency and high frequency thresholds based on new threshold

Edit - Obsolete; has no current function

Low Frequency Threshold - Target under which low frequency data must come in order to pass

High Frequency Threshold - Target under which high frequency data must come in order to pass

Recalculate - Change low or high frequency targets to allow data not likely to be artifact to pass

Hide/Unhide - Shows underlying data. Red lines are deleted as artifact; bold-faced red shows which column caused the deletion (slow or fast frequencies). Not used for editing in the TQ7.

Numbered buttons (recommended targets, e.g. 27/13) - Change targets for low or high frequency at all sites, one site or selected minute of recording (e.g. task)

## SUMMARY REPORT PAGE

Excel Version - Display Executive Summary Report in the Excel file on the Summary Report page.

Word Version - Create Word version of the Executive Summary Report to save separately.

Options - Select font type, size color for assessment findings and relevant sites in the Summary Report, short report.

## TRACKING PAGE

Rank Problem Areas - Click to shows top issues to select for tracking

Number of Training Cycles - Select the number of cycles of the 5-block training plan you estimate training. This number of cycles will be shown on the graph.

Create Tracking Page - *Rank Problem Areas* becomes *Create Tracking Page* when clicked. After selecting problem area items, areas selected are shown and should be ranked after each cycle is completed. A graph shows each problem's rank for each cycle.

## COMPARISON PAGE

Client Report Before Training - Loads initial client report file if it has not been auto-loaded already. If loaded you will see "Pre-Training Loaded."

Client Report After Training - Loads client report for comparison with the first after several cycles of training. Be sure to select the second report. There should be two in the client folder if the client has completed a second report and you have placed it into the client folder. Once loaded you will see "Post-Training Loaded.

Compare Client Reports - Shows a graph to display general category total scores, before and after training as well as category list to show each issue within each category.

Categories - All scores from problems within one category are shown.

Details - When a category is selected from the list, each issue in that category is shown on the graph detailing how much change, for better or worse, there has been.

## OPTIONS PAGE

Start Protocol Selection - Produces raw plan recommendations

4CH Protocols - Suggests 4 channel and/or 2 channel options for training plan

2CH Protocols - Suggests only 2 channel options for training plan

Complete AutoPlan - Produce printable training plan

Default EEG Sites / Q-wiz EEG cap Sites - Displays options according to training with either electrodes or cap

Block - One training session; do one block per session in order, then repeat

Selectable Protocols - Number of protocols available to select for training plan. Choose up to 3 per block.

Select/De-select Protocol - This is done by clicking on the line. This will alternately de-select and select a protocol. Use Tab key to move to within the line to desired field to type changes.

Weight - Not applicable

Active - Active sites to be prepared and training in a protocol selection

Reference - Reference sites to be prepared and trained in a protocol selection; L - Linked; C- Common; otherwise use independent reference(s)

4CH Protocol - Protocol options using 4 channels

2CH/1CH Protocol - Protocol options using 1 or 2 channels

State - Eyes Closed (EC)  or Eyes Open (EO); can include duration of training

## TRAINING PLAN PAGE

Options - Switches to Options page for editing of training options and creating new plan

HEG On - Includes HEG in the daily plan

HEG Off - Removes HEG from the training plan entirely

EEG Sites - Lists all sites that need to be prepped with electrodes applied

# Appendix B: Site Finding Guide

The 10/20 System is based on Latitude and Longitude on the head. There are 4 Anchors from which points are measured

### *Front-to-Back Measurement*

Nasion- the lowest point on the bridge of the nose
Inion- the bottom of the bump at the back of the skull, where the neck joins

### *Side-to-Side Measurement*

Pre-Auricular notches—the indentations in front of the ear holes, left and right

Each site is designated by a **LETTER** and a **NUMBER**

The **LETTERS** indicate the lobe of the brain over which the site is found, as follows:

- **Fp** (Frontal Pole) is in the mid-forehead over the pre-frontal cortex
- **Af** (Anterior Frontal) is at the top of the forehead over the pre-frontal cortex
- **F** (Frontal) is behind the hairline over the frontal lobe
- **C** (Central Strip) is a 2-inch strip across the top of the head side-to-side over the sensory-motor cortex
- **P** (Parietal) is the break at the back of the head, over the parietal lobe
- **O** (Occipital) is the back of the head, over the occipital lobe
- **T** (Temporal) is the sides of the head, over the temporal lobes
- **A** (Auricle) is the earlobe
- **MC** Mastoid crease, behind ear

The **NUMBERS** indicate the location on the head relative to the front-back midline:

- **Odd** Indicate a site on the client's left side
- **Even** Indicates a site on the client's right side
- **z** (zero) Indicate a site on the front-back midline

Points are based on combinations of 10 or 20 percent of the total front-back or side-side measurement of an individual head.

Starting from the nasion, going straight back over the Vertex (where front-back and side-side lines cross), taking the total measurement to the inion:

10% back is Fpz
20% back is Afz
30% back is Fz

Starting from the Pre-auricular notch on the left, going across the vertex to the right,

10% up is T3
30% up is C3

# Appendix C: Site Measuring Chart

CLIENT _____

F/B ____ L/R ____ EQU ____ C3/C4 ____

| | | Front/Back | | | | | | Left/Right | | | | Equator/2 | | | | C3/C4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Fp1 | F7 | T5 | O1 | F3 | P3 |
| Size | Mer | Fpz | Afz | Fz | Cz | Pz | Oz | T3 | C3 | C4 | T4 | Fp2 | F8 | T6 | O2 | F4 | P4 |
| 28 | | 2.8 | 5.6 | 8.4 | 14 | 19.6 | 25.2 | 2.8 | 8.4 | 19.6 | 25.2 | 2.8 | 8.4 | 19.6 | 25.2 | 8.4 | 19.6 |
| 29 | | 2.9 | 5.8 | 8.7 | 14.5 | 20.3 | 26.1 | 2.9 | 8.7 | 20.3 | 26.1 | 2.9 | 8.7 | 20.3 | 26.1 | 8.7 | 20.3 |
| 30 | | 3 | 6 | 9 | 15 | 21 | 27 | 3 | 9 | 21 | 27 | 3 | 9 | 21 | 27 | 9 | 21 |
| 31 | | 3.1 | 6.2 | 9.3 | 15.5 | 21.7 | 27.9 | 3.1 | 9.3 | 21.7 | 27.9 | 3.1 | 9.3 | 21.7 | 27.9 | 9.3 | 21.7 |
| 32 | | 3.2 | 6.4 | 9.6 | 16 | 22.4 | 28.8 | 3.2 | 9.6 | 22.4 | 28.8 | 3.2 | 9.6 | 22.4 | 28.8 | 9.6 | 22.4 |
| 33 | | 3.3 | 6.6 | 9.9 | 16.5 | 23.1 | 29.7 | 3.3 | 9.9 | 23.1 | 29.7 | 3.3 | 9.9 | 23.1 | 29.7 | 9.9 | 23.1 |
| 34 | | 3.4 | 6.8 | 10.2 | 17 | 23.8 | 30.6 | 3.4 | 10.2 | 23.8 | 30.6 | 3.4 | 10.2 | 23.8 | 30.6 | 10.2 | 23.8 |
| 35 | | 3.5 | 7 | 10.5 | 17.5 | 24.5 | 31.5 | 3.5 | 10.5 | 24.5 | 31.5 | 3.5 | 10.5 | 24.5 | 31.5 | 10.5 | 24.5 |
| 36 | | 3.6 | 7.2 | 10.8 | 18 | 25.2 | 32.4 | 3.6 | 10.8 | 25.2 | 32.4 | 3.6 | 10.8 | 25.2 | 32.4 | 10.8 | 25.2 |
| 37 | | 3.7 | 7.4 | 11.1 | 18.5 | 25.9 | 33.3 | 3.7 | 11.1 | 25.9 | 33.3 | 3.7 | 11.1 | 25.9 | 33.3 | 11.1 | 25.9 |
| 38 | | 3.8 | 7.6 | 11.4 | 19 | 26.6 | 34.2 | 3.8 | 11.4 | 26.6 | 34.2 | 3.8 | 11.4 | 26.6 | 34.2 | 11.4 | 26.6 |
| 39 | | 3.9 | 7.8 | 11.7 | 19.5 | 27.3 | 35.1 | 3.9 | 11.7 | 27.3 | 35.1 | 3.9 | 11.7 | 27.3 | 35.1 | 11.7 | 27.3 |
| 40 | | 4 | 8 | 12 | 20 | 28 | 36 | 4 | 12 | 28 | 36 | 4 | 12 | 28 | 36 | 12 | 28 |
| 41 | | 4.1 | 8.2 | 12.3 | 20.5 | 28.7 | 36.9 | 4.1 | 12.3 | 28.7 | 36.9 | 4.1 | 12.3 | 28.7 | 36.9 | 12.3 | 28.7 |
| 42 | | 4.2 | 8.4 | 12.6 | 21 | 29.4 | 37.8 | 4.2 | 12.6 | 29.4 | 37.8 | 4.2 | 12.6 | 29.4 | 37.8 | 12.6 | 29.4 |
| 43 | | 4.3 | 8.6 | 12.9 | 21.5 | 30.1 | 38.7 | 4.3 | 12.9 | 30.1 | 38.7 | 4.3 | 12.9 | 30.1 | 38.7 | 12.9 | 30.1 |

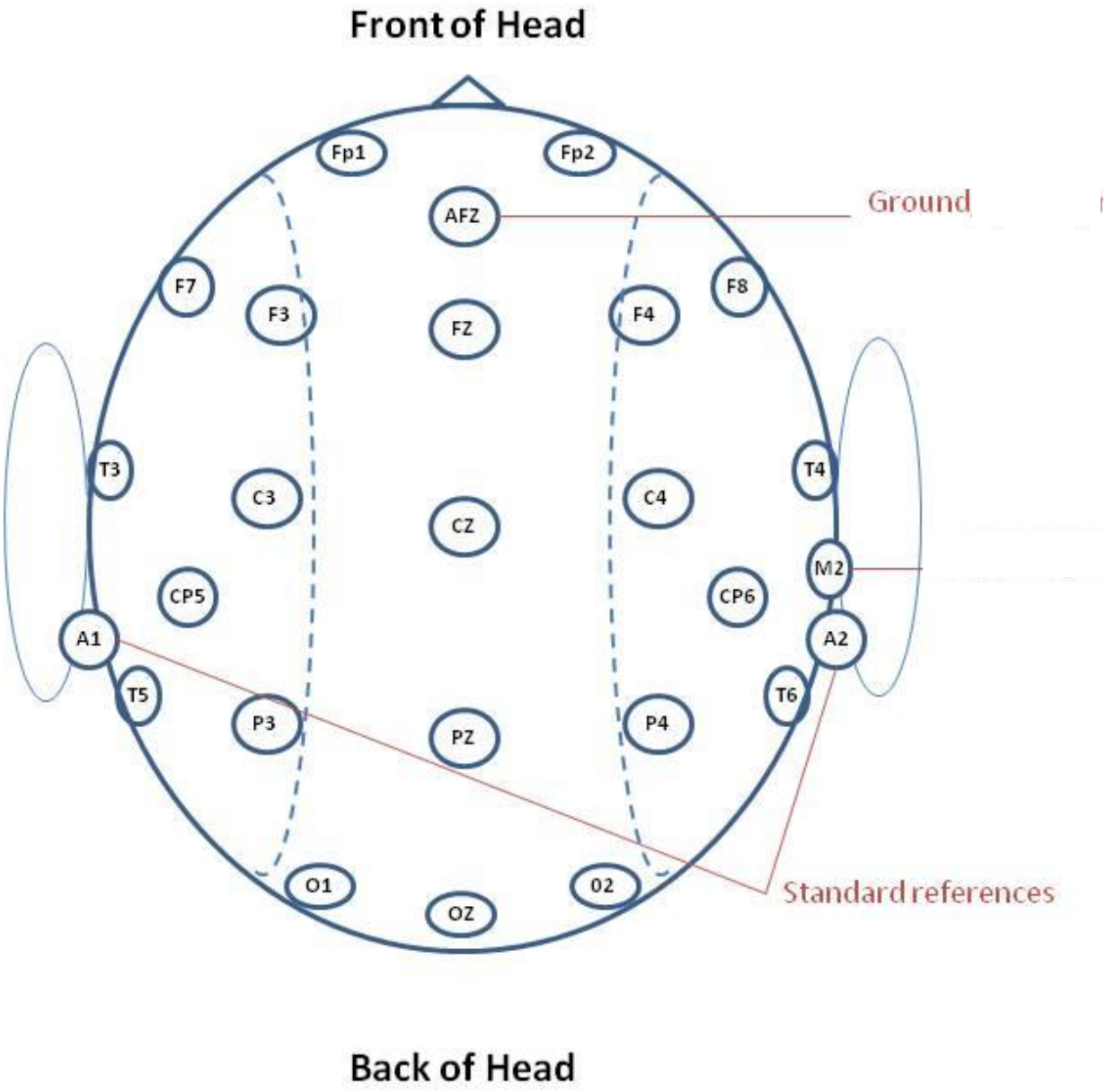
**To Prepare Sheet**

1. Measure from Nasion to Inion through Cz and place value on F/B line (e.g. 38 cm)
2. Place "F" in "Mer" column following correct value (e.g. 38 cm)
3. Measure between Pre-auricular notches and place on L/R line
4. Place "L" in "Mer" column following correct value
5. Measure around head from middle of forehead touching tops of ears, divide by 2 and place value on Equ line
6. Place "E" in "Mer" column following correct value
7. Measure from Nasion to Inion through C3 or C4 and place value on F/B line
8. Place "C" in "Mer" column following correct value

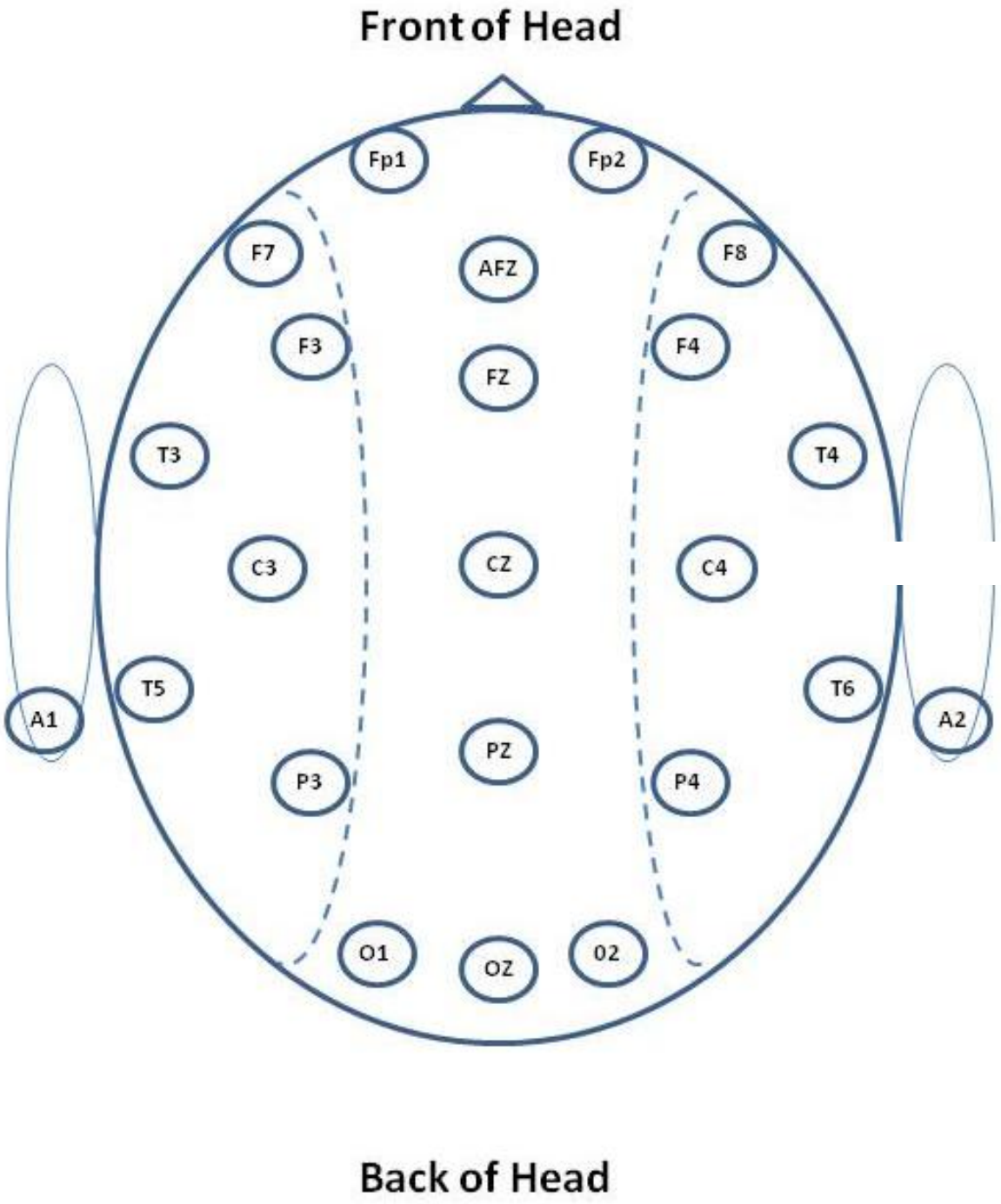
**To Find Site**

1. Find site column (e.g. T5) and note what Meridian it is in (e.g. "Equ")
2. Fine row with the appropriate Meridian designator (e.g. Row with "E" in the Meridian column)
3. Follow row across to desired site's column.
4. The value listed is the distance in cm from the starting point to the site on the meridian.

# Appendix D: TC26 Trainer's Cap Sites

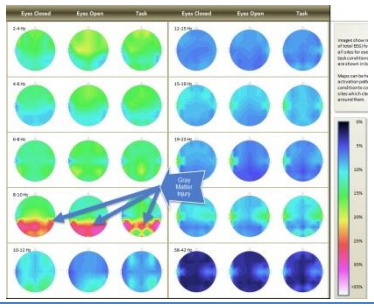


## Appendix E: Electro-Cap Sites

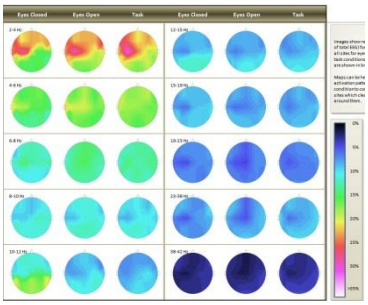


# Appendix F: Brain Patterns on the TQ7

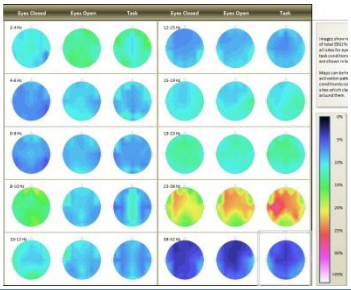
**Grey-matter head injuries** kill neurons. Most immediately the brain shows lower amplitudes in all frequencies. The brain replaces these neurons over time, but the new neurons may not re-form the connections of those which are lost. Result: a spike in Alpha that does not go away with eyes open or at task.



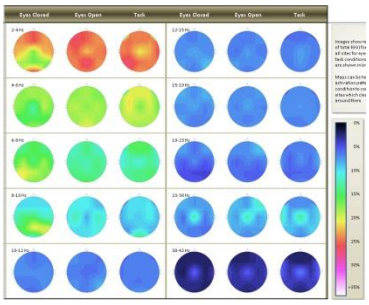
**White-matter head injuries** tear axons, breaking neuronal connections. The neurons keep firing, but they can't receive or pass along signals, so they pulse at the Delta rhythm. White matter cannot be repaired. Result: a spike in Delta that does not go away with eyes open or at task.



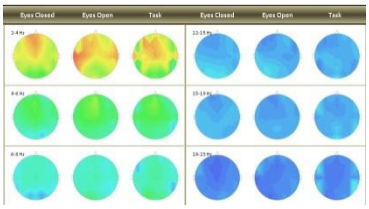
**Fast-Brain pattern** can be related to stressed, anxious, angry, obsessive states—being stuck in "fight-or-flight". Because this brain burns so much energy, even at rest, adrenal fatigue, low energy levels and depression can result as well. The hotter the brain is on the right hemisphere and/or right-rear quadrant, the more problematic.



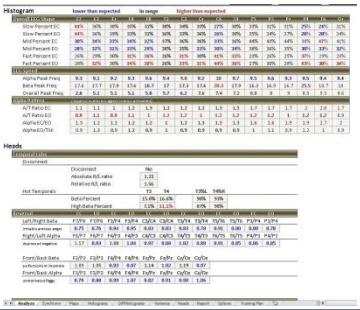
**Slow-Brain Pattern** may be depressed, inattentive, dreamy, have difficulty processing language or working with sequences and hierarchies. When the brain de-activates (gets slower at task) it is metabolically unable to sustain higher energy states involved in processing.



**Burned out Anterior Cingulate:** The Anterior Cingulate is involved with motivation and it is the spigot that controls the flow of emotions from the limbic system to the prefrontal. When emotional drive is very strong—or the brain's strategy is to deny feelings—the cingulate has to work very hard (Amen's Hot Cingulate), but we often see it nearly shut down after years of over-use.

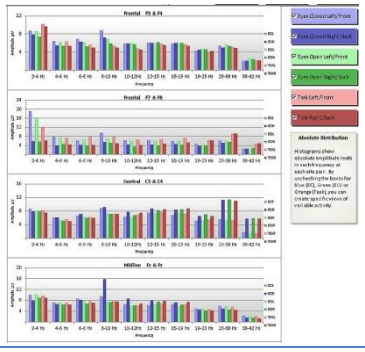


**Analyze page:** The TQ7 provides your data as you like it. If you're a fan of tables and numbers, the Analyze, Symmetry and Heads pages let you see the data but they help you make sense of it with coloring. Look at the relationships among frequencies, peak frequencies, relationships between alpha and theta or theta and beta, activation along the cingulate, even synchrony measures—all on one page!

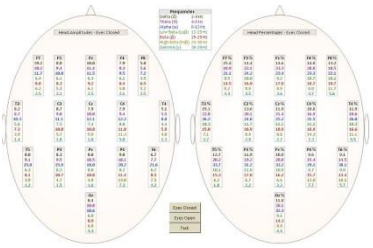


**The Synchrony page:** Rather than looking at dozens of synchrony measures between individual sites, the TQ7 looks for areas where high levels of connectivity limit the brain's efficiency by locking areas together so they can't operate independently or where low levels of connectivity keep the brain from idling and from coordinating its activities.

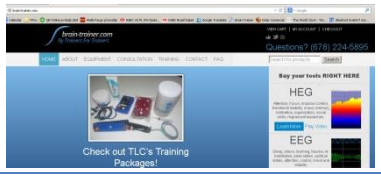
**Histograms:** For fans of the visual, the histograms let you see in amplitudes the relationships among frequencies, how different sites activate or de-activate at different speeds, where there are asymmetries and much more. You can turn on or off eyes-closed, eyes-open or task to see them all together in one graph or to look at each independently with the click of a button.



**Heads:** A combination of visual and data views, this page shows amplitudes or percentages for each frequency group at each site, so you can compare them. A click of a button shows you eyes-closed, eyes-open or task data.



**One-stop shopping:** For hardware, software, the Trainer's Q, skill-building videos, training designs and consultation/support, come to brain-trainer.com. Remember that "Less is More" at Brain-Trainer. By trainers, for trainers really does make a difference.




**The best free education in the field:** For answers to your questions about the brain and training it, check out our amazing FAQ area at brain-trainer.com. Or join us on the braintrainer Yahoo group.