

# Brain-Trainer Designs



If you have purchased the Brain-Trainer Designs package (at any time in the past) you are eligible to download the Brain-Trainer Design package at no charge.

Make sure you have downloaded and installed BioExplorer version 1.7 or later from [cyberevolution.com/download.htm](http://cyberevolution.com/download.htm)

This latest release includes:

- Updated designs which should be placed in your BioExplorer\Designs folder
- The latest BioReview Reports for those who like to graph their sessions. This includes an Excel file to simplify graphing of multiple sessions
- Sound files which are in BioExplorer
- This clickable list of Brain-Trainer designs providing instructions for all 1, 2 and 4-channel EEG and HEG designs. Clicking on any item in the table of contents will take you directly to that section.

If you need assistance, contact us at [sales.service@brain-trainer.com](mailto:sales.service@brain-trainer.com)

## Table of Contents

<b>Introduction .....</b>	<b>4</b>
About Brain-Trainer Designs .....	4
Design Naming .....	4
Design Layout .....	5
4-Channel Designs .....	5
Reports.....	5
Choosing Designs .....	6
Target Setting .....	6
Understanding Feedback.....	6
Silence Vision Gamer Gamer can be used with any Somatic Vision design. Some designs are optimized for Silence Vision and are named with "Silence Vision".....	8
Somatic Vision Games .....	8
HeadGames.....	8
Using the Designs List .....	8
Installing Your Brain-Trainer Designs.....	10
Reports for BioReview and Excel .....	11
<b>Chapter 1: Alpha.....</b>	<b>12</b>

ALP1C Alpha Theta.....	12
ALP1C Alpha Up .....	13
ALP2C Slow Frontal Alpha Kill .....	14
CON2C Alpha Sync .....	15
CON4C Alpha Sync .....	16
<b>Chapter 2: Balance .....</b>	<b>18</b>
BAL1C Difference (BxShadow, Flash Games, DVD, Silence Vision, Music Video) .....	18
BAL2C Alpha Beta (BxShadow, Flash Games, DVD, HeadGames, Somatic Vision, Silence Vision, Music Video) .....	19
BAL2C Difference (DVD, Music Video, BxShadow, Somatic Vision, Flash Games) .....	20
BAL2C Dual Bipolar .....	21
BAL2C Dual Bipolar (Calming) (DVD, Music Video, BxShadow) .....	22
BAL2C Sum Difference (DVD, Somatic Vision, Flash Games, Music Video, BxShadow) .....	23
BAL4C Difference (DVD, Music Video, BxShadow, Somatic Vision, Flash Games) .....	24
BAL4C RH Bipolar (Music Video, BxShadow) .....	25
<b>Chapter 3: Connectivity .....</b>	<b>28</b>
CON2C Alpha Sync .....	28
CON2C Gamma SMR Sync (DVD, Flash Games, HeadGames, Music Video, BxShadow) .....	29
CON2C Gamma Up (DVD, Flash Games, HeadGames, Music Video, BxShadow) .....	30
CON2C Multiband Coherence (MBC) (BxShadow, Flash Games, Silence Vision, Music Video).....	31
CON2C SMR Coherence (DVD, Flash Games, HeadGames, Music Video, BxShadow).....	32
CON2C Sync One-Band .....	33
CON2C Sync Two-Band .....	34
CON4C Alpha Sync .....	35
CON4C Gamma Sync (Music Video, BxShadow) .....	36
CON4C Multiband Coherence (MBC) Up or Down (DVD , Music Video, BxShadow).....	37
CON4C Multivariate Coherence Up or Down (BxShadow, Flash Games, DVD, Music Video) .....	38
DMN4C Sync 3-Band Default Mode Network (BxShadow, Music Video).....	39
<b>Chapter 4: Frequencies .....</b>	<b>41</b>
1C Sample Session (Pacman, Video) .....	41
FRE1C (BxShadow, Flash Games, DVD, HeadGames, Somatic Vision, Silence Vision, Music Video) .....	41

FRE1C (HeadGames, Somatic Vision).....	43
FRE1C (Trauma Release) (DVD, BxShadow, Flash Games, Silence Vision, Music Video).....	44
FRE2C (BxShadow, Flash Games, DVD, HeadGames, Somatic Vision, Silence Vision, Music Video).....	45
FRE2C (HeadGames, Somatic Vision).....	47
FRE2C Beta SMR (BxShadow, Flash Games, DVD, HeadGames, Silence Vision, Music Video).....	47
FRE2C Summed (BxShadow, Flash Games, DVD, Silence Vision, Music Video).....	48
FRE4C In+Rew (Somatic Vision, Flash Games).....	49
FRE4C Squish-Squash (BxShadow, Flash Games, DVD, Silence Vision, Music Video).....	50
FRE4C Windowed Squash (BxShadow, Flash Games, DVD, Silence Vision, Music Video).....	51
<b>Chapter 5: SMR.....</b>	<b>53</b>
SMR%1C (BxShadow, Flash Games, DVD, HeadGames, Somatic Vision, Music Video).....	53
SMR1C (BxShadow, Flash Games, DVD, HeadGames, Somatic Vision, Music Video).....	55
<b>Chapter 6: HEG .....</b>	<b>58</b>
HEG nIR Optima+ (DVD, BxShadow, Games, Music Video).....	58
HEG nIR Peanut/Pendant (Pnt), Pocket (DVD, BxShadow, Games, Music Video).....	60
HEG nIR Wiz (DVD, BxShadow, Games, Music Video).....	62
HEG pIR Pendant or Wiz (DVD, BxShadow).....	63
<b>Chapter 7: Reports.....</b>	<b>66</b>
ALP1C Alpha Peak Frequency .....	66
ALP1C Alpha Theta.....	66
ALP1C-4C Alpha Stats.....	66
BAL2C Sum Difference .....	66
BAL2C-4C Alpha Beta .....	67
CON2C Fast Coherence .....	67
CON2C Theta Alpha Gamma Sync.....	67
CON2C-4C Multiband Coherence .....	67
CON4C Gamma Sync.....	67
FRE1C .....	67
FRE1C-4C Theta Beta .....	67
FRE2C .....	67

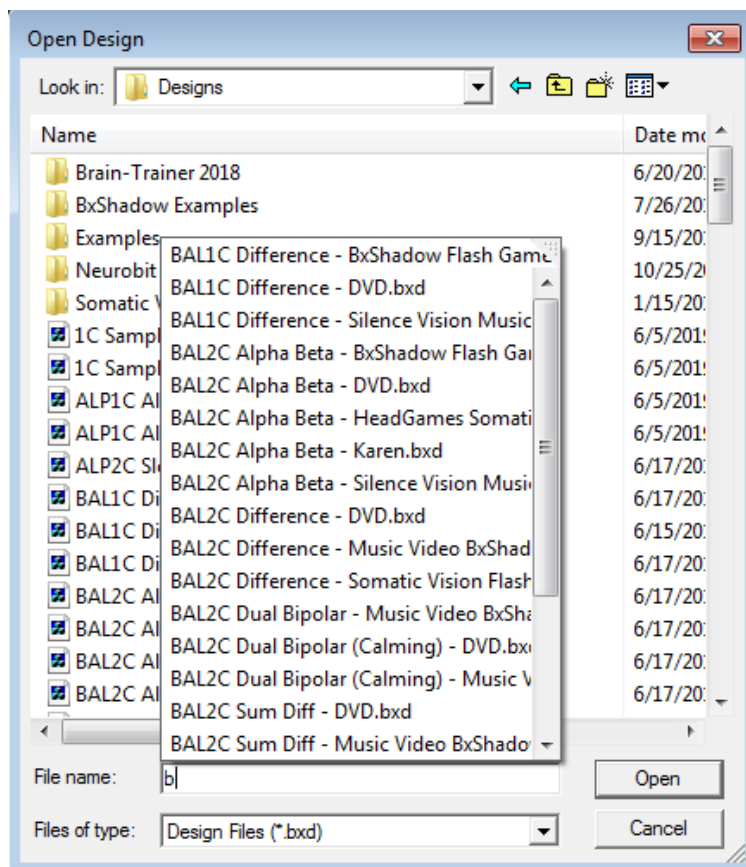
HEG nIR (Peanut, Pendant, Pocket, Wiz) .....	68
OVERALL Report 2C-4C .....	68
TQ7 Assess Pro Gather 2C or 4C Report .....	68
Graphing - Excel .....	68

## Introduction

### About Brain-Trainer Designs

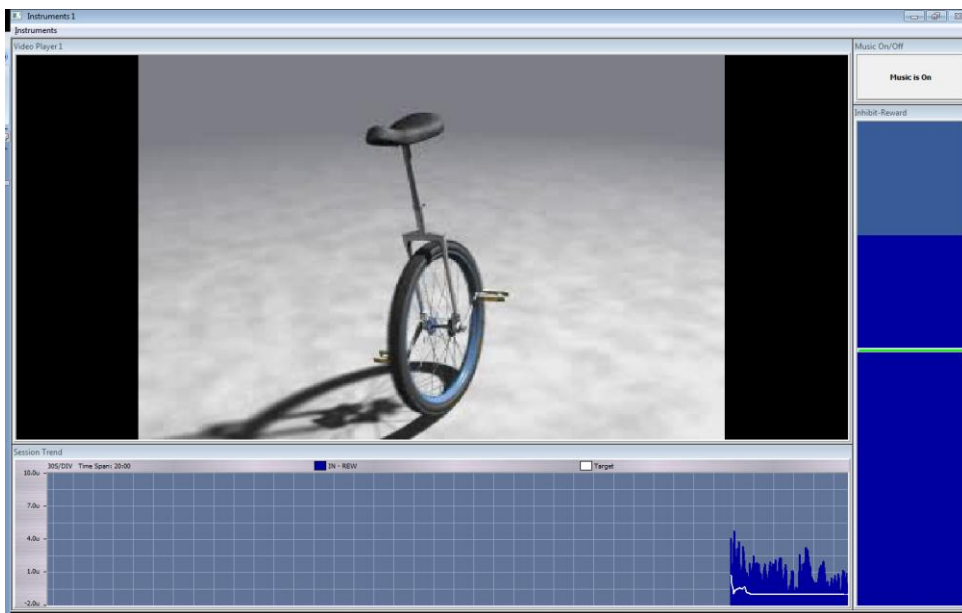
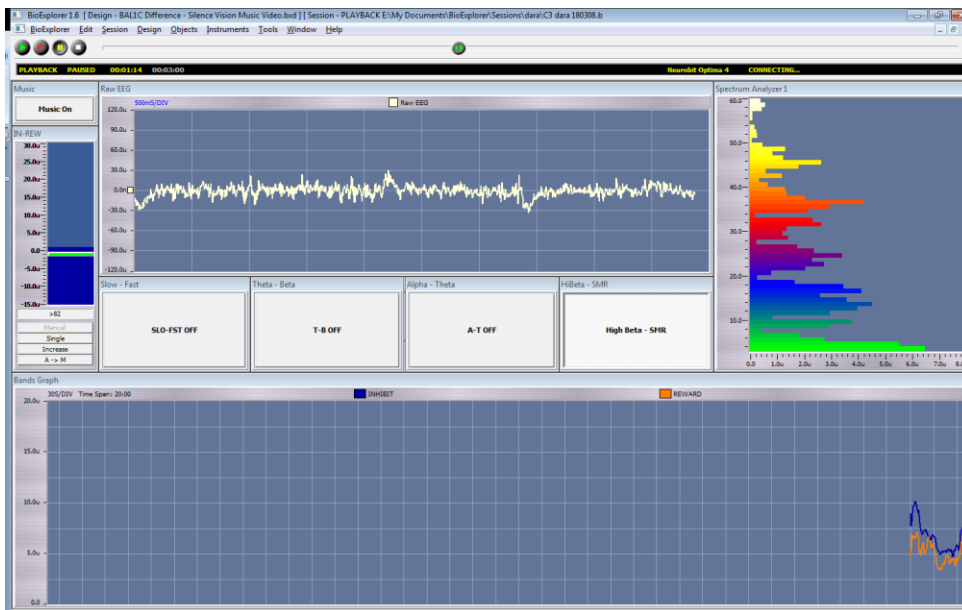
#### Design Naming

- Designs are named by category. These categories are:
  - Alpha (ALP)
  - Balance (BAL)
  - Connectivity (CON)
  - Frequencies (FRE)
  - SMR
  - HEG
- The last part of the design designates the type of feedback programmed in each design. Most designs have multiple versions with various feedback available. Select the design with the type of feedback you want to use. For example, "BxShadow Flash Games" indicates the design can be used with either BxShadow **or** Flash games.
- HEG designs have an additional designation for the amplifier being used for training (Q-wiz, Optima+, etc.) Select the appropriate design for your amplifier.
- To open a design, open BioExplorer, then select Design | Open and type the first letters of the category. This will bring up a listing of designs in that category from which to select.



## Design Layout

- BioExplorer opens the *Trainer screen* (Instruments 2) by default.
- Controls and options for designs are on Trainer screen.
  - Trend graphs are offered to view data specific to training over entire session.
  - Buttons and thresholds are here to set training options.
- *Client screen* (Instruments 1) is offered in most designs and should be detached when used with two monitors.
  - DVD, Flash Game or Video screens take up most of the client screen.
  - Bar graph and trend show up-training (*green*), down-training (*blue*) or both and give client a view of what is happening with training.
- Most designs have a Music control button on both screens, usually found in an upper or lower corner, to turn music feedback off or on.
- Captions should be on for instruments that are not self-explanatory. If not, select Instruments | Show Captions. If checked but not showing, uncheck and check again. [VIDEO Demo](#)



## 4-Channel Designs

There are designs for 4-channel amplifiers compatible with Q-wiz and Optima.

## Reports

There are several Reports for use with BioReview and a universal Excel graphing file for graphing multiple sessions (see [Reports section](#) below).

## Choosing Designs

Refer to Training Plan based on a Brain-Trainer Assessment or other brain-based approach.

- Learn about Brain-Trainer Assessment at this address: <https://brain-trainer.com/about/trainers-q/>
- For help in developing a plan: <https://brain-trainer.com/about/whole-brain-training-plan/>

## Target Setting

- Targets control feedback, so setting them is a crucial part of a successful training session. Too little feedback can be frustrating; too much, boring. Without effective feedback the brain does not learn.
- Most designs adjust targets for the trainer after 30 seconds, but thresholds can be manually adjusted throughout the session.
  - Pressing "A>M" under threshold bar graph resets a manual threshold.
  - Clicking and dragging the bar up or down resets threshold to your desired level.
  - Pressing "Auto" below the threshold bar graph changes an auto threshold to manual and holds the level there.

## Understanding Feedback

- You are training the brain, not the mind. Part of successful training can be getting the mind “out of the way” of the feedback.
- In training to quiet overactive brains, part of the Brain-Trainer approach is to provide feedback that the conscious mind can’t “understand.”
- Music (MIDI) and silent video are included in many designs which work with these types of issues.
- 2 major types of feedback: Contingent and Continuous.
  - Contingent feedback goes on and off as the client passes the targets or not. Often in the form of clicks or dings. Provides the brain with yes-or-no information. Useful with under-activated, inattentive, low-energy clients.
  - Continuous feedback gives constant flow of information (e.g. changing pitch of music or volume or brightness in video). The brain gets a great deal of information but in a form that is difficult to “understand.” A client asks, “Should the music be going up or down? Should it be getting louder or softer?” There is no “should.” It’s just music. Don’t try to understand it. Just listen to it, watch the images. Get your mind out of the way, so your brain can learn.
- The trainer can select the type of feedback that works best for the client. Most Brain-Trainer designs offer a variety of versions with Music/Video, DVD or Game feedback. Several of the specialty designs use music or silent video.

## Video

Designs with this feedback option are designated with "Music Video" in the name.

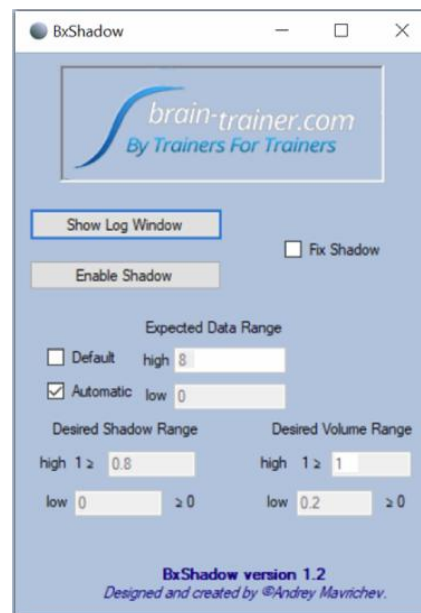
- Video files can be downloaded from the internet (e.g. fractal zoom videos free from <http://ericbigas.com/fractals/index.html>, [other suggestions](#)), home videos made with a digital camera, etc. Various programs are available on the internet to transform videos of other formats to one of the acceptable formats. Generally silent videos are better than those with sound (the Fractal Videos or others without sound are ideal). Videos should be stored in the C:\Program Files (x86)\BioExplorer \Media folder. A sample video is loaded in many designs.

- Right-clicking in the Video Player window and choosing Properties will open a window that allows the trainer to Add videos to the Playlist or to Remove, Move Up or Move Down videos already on the Playlist.
- The video will play when all conditions are being met and pause when target frequencies fail to meet the target.

## BxShadow

For use with any visual application on your screen- your own DVDs, streaming videos, games. Designs with this feedback option are designated with "BxShadow" in the name.

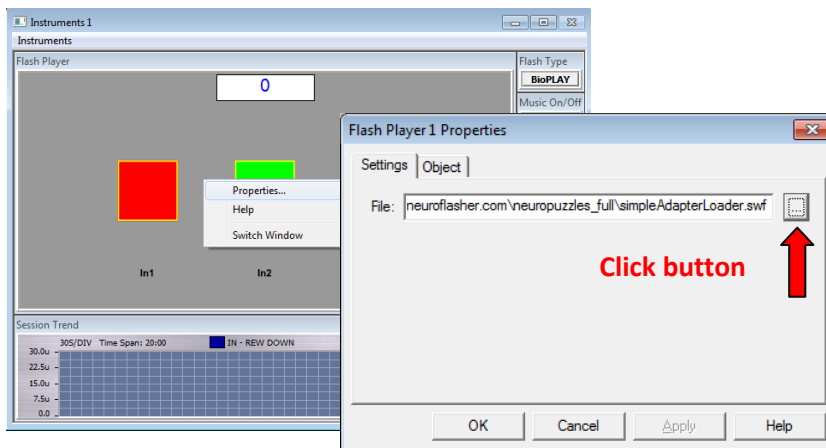
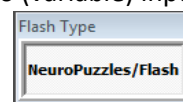
- This is used without the Client Screen (Instruments 1).
- Choose your own DVD, streaming video or other screen activity.
- Once the DVD or other screen activity is ready, **enable shadow**, double-click shadow for full screen. Click "Fix" for mouse control under the shadow. Then click Play in BioExplorer to start the training, avoiding artifact creation.
- Select Automatic Expected Data Range, then uncheck **Automatic** after initial baseline settings (~30 seconds).
- Image brightness and volume will increase as client does better.
- To reset BxShadow targets during a session if necessary, check Default, then Automatic and after several seconds, uncheck it again.
- To turn off volume variability, set **Desired Volume Range** low to .99.



## Flash Games

Plays SWF flash game files (C:\Program Files (x86)\BioExplorer\Flash). The Flash Player can be used with general flash games or NeuroPuzzles.

- BioPLAY, by Itallis, is set as the default game type with *three* inputs: two on/off inputs and one ratio (variable) input.
- Press "BioPLAY" button to choose NeuroPuzzles or other flash games, which require different design setup (e.g. one main input).
- Boxes is a sample game that comes with BioExplorer and is loaded by default. The goal is to fill the boxes with color.
- Load a new game by right-clicking on flash player object and selecting *Properties*. Click the ellipsis button to browse to your flash folder to select the game.
- NeuroPuzzles and BioPLAY games must be purchased separately.
- Start the session before starting flash games.

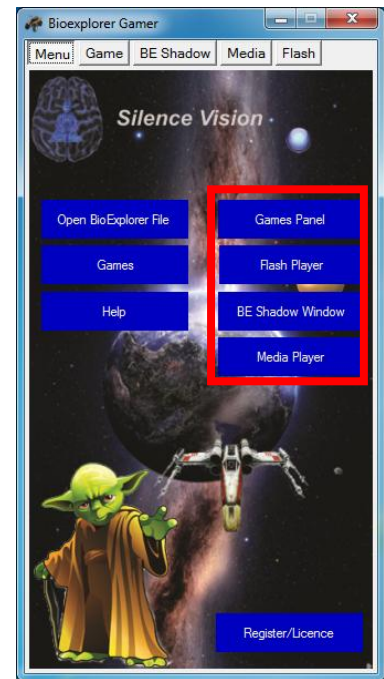


## Silence Vision Gamer

Gamer can be used with any *Somatic Vision* design. Some designs are optimized for Silence Vision and are named with "Silence Vision".

- Select the type of feedback to use by opening window and/or corresponding control panel, selecting from the following:
  - Games Panel
  - Flash Player
  - BE Shadow Window
  - Media Player
- Load your media or game.
- Press Connection.
- Select Gamer settings.
- Start your BioExplorer session.
- Press Play in the Gamer panel.

Please see "Silence Vision Gamer" document for more detailed instructions.



## Somatic Vision Games

- This is used without the Client Screen (Instruments 1).
- Set design controls if any, start the BioExplorer session and then start your Somatic Vision game.

## HeadGames

- HeadGames flash games for EEG by Brain-Trainer require both increase and decrease signals.
- Load the Control Panel (CP) file into Trainer Flash Player (Ins 2) and the Game file into Client Flash Player (Ins 1).
- Start the session and then start the game.

## DVD

For use with *BioExplorer's* DVD player. Designs with this feedback option are designated with "DVD" in the name. If you are using *BxShadow* for DVDs, please select a design with "BxShadow" in the name.

- Place the desired DVD in the player and make sure NOT to allow the computer's DVD player to play it.
- In Window | Instruments 1 click the **Play** button under the DVD player to start the DVD.
- Use the Menu and Slider Bar/Timer to choose the section of the DVD to play.
- Once the DVD is playing as desired, click **Play** in BioExplorer to start the training and allow the thresholds to set. When the client is scoring, click the **Control** button below the DVD player. "**Control**" will turn red.
- Image brightness will be full when the client is in the training range (all targets are being met), and will reduce when training targets are not met.

## **Using the Designs List**

- The list can be printed and kept in the training area for quick reference
- The computerized list has a table of contents that can be clicked to take the trainer immediately to any design.
- Each design description has the same information for the trainer:



- Type of Training
- Starting Session
- Trainer Tools
- Special Notes
- Setting Targets
- Feedback

## Installing Your Brain-Trainer Designs

### Download and run the Auto-Installer as Administrator

- The Brain-Trainer Designs\_Setup file (or DesignsUpdate) will place your files in their respective folders.
- Shortcuts will be placed on your desktop to *Sessions* and *Brain-Trainer*.
- If you have Brain-Trainer designs from past installations, you may want to move your old designs first.
  - Open the Designs folder and create a folder, naming it OLD Brain-Trainer for example.
  - Move all older Brain-Trainer designs you want to save into this folder.

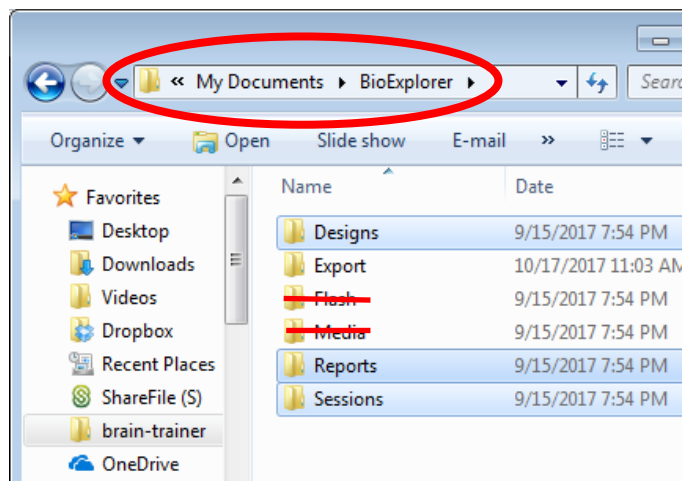
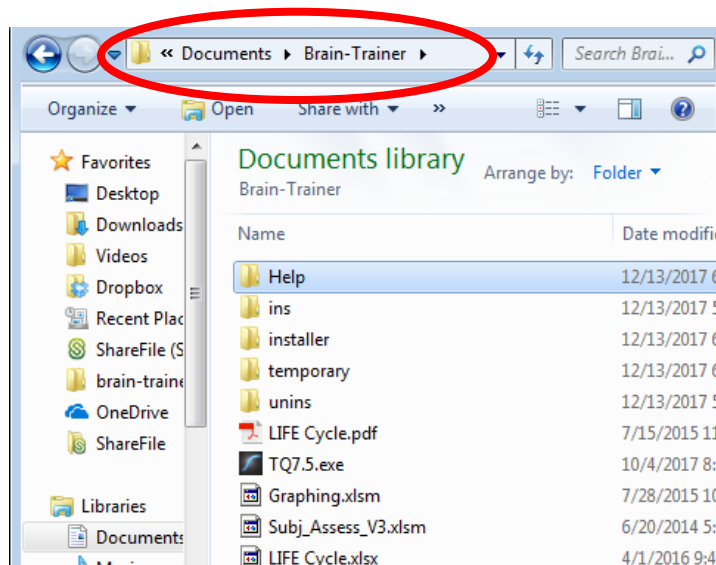
### Verify the results

Go to Documents\BioExplorer\Designs. You should have a folder for Examples and may also have other folders you've created (e.g. OLD Brain-Trainer, etc.)

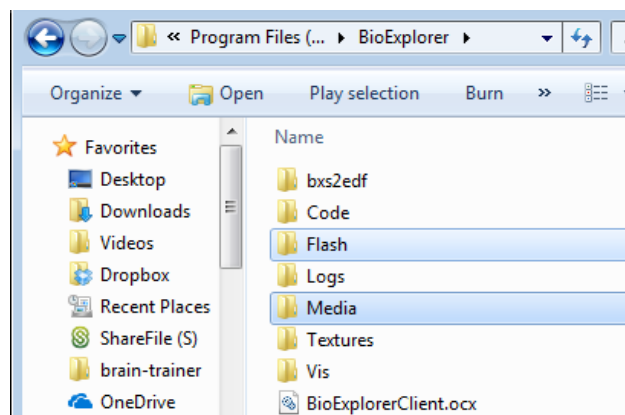
### File Structure

Files will be found in the following folders:

- Instruction files: Documents \Brain-Trainer\Help
- : Documents \Brain-Trainer
- Designs: Documents\BioExplorer\Designs
- Reports: Documents \ BioExplorer\Reports



- Audio and video files: C:\Program Files (x86) \ BioExplorer\Media



## Reports for BioReview and Excel

### The Brain-Trainer Designs package includes Reports for use with BioReview.

- There are three options for graphing or outputting data.
  - Each Design contains Trend graphs that allow you to watch the graph during the running of the session.
  - All recorded sessions will automatically save a bxs recording file for graphing in BioReview. BioReview allows loading a session file and graphing or outputting data files within the program.
  - Each Design produces text files, including a Cumulative Summary text file for graphing multiple sessions over time in the Brain-Trainer Excel [graphing file](#). These text files will appear in the folder where the session is saved.
- The various reports can be opened in BioReview and Run on a session.
  - **1- Open a Report:** To use a Report, open BioReview and select Report | Open. Double-click the Report name you want to use.
  - **2- Run on a Session:** Select Report | Run on Session and navigate to the saved session you want to graph.
  - Session data will be loaded and produce a graph. In most of these, you can choose measures to graph or output.
  - **3- Print Graph:** Select View | Print Epochs and choose Landscape view for your printer.
- In the area beneath the graph, there is a list of the data available to be graphed in that Report
- In the Chart column check or uncheck individual measures to add or remove them from the graph. Each measure has its own color and a legend will show the graphed measures.
- Some of the Reports have more than one View (in the Window menu), each with a title at the top.
- Choosing “Properties” from the View menu allows you to change the “epoch”—the number of seconds averaged into each point on the graph. Making this number smaller (e.g. 1.0 for 1 second) makes the graph much more detailed; raising the number smoothes the graph line.
- Clicking in the graph window and dragging a rectangle over a section of the graph you want to expand, when you release the mouse button the area you have defined will zoom in and become the whole graph. Clicking “Cancel Zoom” in View will return the graph to its full state.
- In the View menu, choosing “Export” will allow you to produce a text file, choose to produce a Cumulative summary file (session average of each of the measures selected), an Epochs file (one point for each measure for each period defined in “Properties” (above). You can also choose to output Raw Data (generally 256 values/second for each selected measure).
- You can choose to output the Mean, Standard Deviation, Minimum and Maximum values for each selected measure.

## Chapter 1: Alpha

### ALP1C Alpha Theta

#### Type of training

- Eyes Closed
- Train to reach “deep” states, where access to subconscious material is improved. A peak performance protocol.
- Monopolar montages usually at P4/A2, Pz/A2 or O1/A1 sites.

#### Starting Session

- Open the Design
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

#### Trainer Tools

- Oscilloscope shows raw EEG.
- Spectrum Analyzer shows amplitude in each band. Check for 60 or 50 Hz spikes.
- 2 graphs show relationship between 9-11 Hz alpha and 6-8 Hz theta—one showing last 30 seconds, the other 20 minutes.

#### Special Notes

- The trainee should wear ear phones. Binaural beats guide the brain toward 7 Hz. To check before training, open Tools | Volumes and uncheck all sounds except Tone Generators. The beat should be barely audible in the headphones. Re-check all sounds.
- Session timer is set for 23:35, enough time to play through all the pre-saved music.
- For more in-depth information on alpha/theta training see [appendix](#).

#### Setting Targets

- The left-most threshold is 7Hz – Alpha. It is set to Manual with the bar at 0. Normally this should not be changed.
- Center bar graph is to block strong surges of high-beta, which can result from increasing anxiety or ruminative thoughts. The signal should stay below the target (even though it is set to "Increase"). It begins in Auto at 15% above its actual amplitude for threshold setting. After 20 seconds it sets itself to Manual at 15% above the range limit and actual amplitude is used.
- Right bar graph is to block strong surges of 3 Hz which can indicate the client is re-experiencing traumatic material or falling asleep. Neither is desirable in this training. The signal should stay below the target (even though it is set to "Increase"). It begins in Auto at 15% above its actual amplitude for threshold setting. After 20 seconds it sets itself to Manual at 15% above the range limit and actual amplitude is used.

#### Feedback

- There are 4 feedback sounds and a sound field background:

- A chant plays continuously throughout the session. This is to set a “spiritual” sound field as background for the feedback.
- The Chant of Metta and Chant files included in the Brain-Trainer package may be used (or combined in the Chants audio player, or other sounds may be used at the trainer’s choice, or they may be removed.
- Bckgrnd Nature audio player plays nature sounds (ocean surf included in the Brain-Trainer package). Use this or use another as preferred. These are louder or softer as alpha amplitudes increase or decrease.
- A MIDI melody plays when theta (6-8 Hz) is greater than alpha (9-11 Hz), its pitch and volume vary with the degree to which theta surpasses alpha—notes are quietest when theta dominance is lowest.
- When slow frequency (3-5) activity surpasses the threshold, a knocking sound plays, softly at first then growing louder.
- When fast frequency (15-56) activity passes the threshold, a deep bass “grunt” plays, softly at first then growing louder.

General Instruction: "Don't think. Don't try. First let yourself get into a still mind state, observing the feedback. Then you may visualize or just go wherever you go."

Instructions for Brain-Trainer's provided chants: “Let the mind be still and pay attention to that while the piano is playing. When the girl starts her chant, either visualize something you'd like to have in your life in as much detail as possible, or mentally replay a video of you doing something you don't want to do but keep doing. But change the script in the movie in your mind, so you respond in some other way. Once you've visualized, then just go wherever your brain takes you, but remain aware of it. The male voice chants and then the violin begins to play. The violin is telling you that you're on your way back, just a few more minutes.”

For more on Brain-Trainer's Alpha Theta see [Appendix I](#)

## ALP1C Alpha Up

### Type of training

- Eyes Closed
- Encourages increase in alpha percentage of total EEG
- Good for many “aging” brains—whether because of years or stress—when adult Peak Frequency is below 10 Hz.
- Monopolar montages usually at P or O sites, usually on right hemisphere or the midline

### Starting Session

- Open the Design
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Oscilloscope shows raw EEG.
- Button selects Dominant Frequency range for training, 8-12 Hz (default) or 6-13 Hz.

- Four graphs starting from the top show trends for Alpha peak (should be 10 or above), Alpha Percent (of total EEG), High/Low Alpha ratio (10Hz/8-12 Hz), and Non-Alpha amplitude.
- Spectrum Analyzer at right of Peak Frequency graph shows detailed amplitude of dominant frequency.
- Meter at right shows session Peak Frequency average.
- Spectrum Analyzer at bottom right shows amplitude in each band. Check for 60 or 50 Hz spikes.

## Special Notes

- The trainee should wear ear phones. Binaural beats guide the brain toward 10 Hz. To check before training, open Tools | Volumes and uncheck all sounds except Tone Generators. The beat should be barely audible in the headphones. re-check all sounds.
- Session timer is set to run 20 minutes and Stop. Clicking the Pause button when desired will allow the client to take breaks.

## Setting Targets

- Alpha PF requires the client to stay within a range of values. It comes set to Manual with a target range of 9.5-11.5 Hz. In most cases it is best not to change these.
- 10 Hz to Total Alpha target is automatic at 50% and should remain there.
- Alpha Percent and Non-Alpha are set to Auto in the beginning of the session and reset to Manual after 30 seconds. The trainer can reset (if it becomes too low or too high) by clicking the A->M button beneath the Threshold or dragging the bar.

## Feedback

- There is a set of 3 tones that form a chord, which play louder or softer volume based on the percent of alpha the brain is producing. They also remain silent if the brain is outside the target band of percents.
- A bass tone in the same chord sounds when the ratio of 10Hz to Total Alpha is within its target range; its volume also varies .
- A MIDI melody plays in the same key when non-Alpha amplitude is below target.
- A MIDI melody is played in the same key with the chords when peak alpha frequency is above target. The note played depends on the APF value, and the volume of the melody tone is controlled by the percent of time the client is passing this threshold .
- Instruction: "Let your mind be still. Listen to the music. It's good to hear the melody and the full chord together."

## ALP2C Slow Frontal Alpha Kill

### Type of training

- Eyes Closed with headphones (binaural beats guide the brain toward 11 Hz).
- Increase fast alpha in the parietals and reduce frontal alpha (and other activity).
- 2-channel monopolar montages. Channel 1 F3/A1 or Fz/A1 (based on alpha percents); Channel 2 P4/A2

### Starting Session

- Open the Design

- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

## Trainer Tools

- Trend graphs at top show Total frontal activity compared with target (top graph), 9-13 Hz alpha, 3-9 Hz and 19-38 Hz in the parietal area (middle graph), and parietal fast Alpha/Slow activity (lower graph). Ideally the alpha band should be highest of the lines.
- Oscilloscope shows raw waveforms for Channels 1 (front) and 2 (parietal).
- Spectrum Analyzers show amplitudes for each frequency to 60Hz.

## Special Notes

- Make sure frontal sites go in channel 1 and parietal in channel 2.
- Session timer is set to run 5 minutes and Pause.

## Setting Targets

- Targets for the 3 inhibit bands begin in Auto mode and switch to Manual after 30 seconds. They can be adjusted by clicking A ->M or by dragging their target bars if desired.
- The alpha band remains in auto threshold mode.

## Feedback

- A flutelike tone plays higher pitch and volume when all inhibit thresholds are met
- A chime tone plays higher pitch and volume when all inhibits are met and fast alpha is rising
- A click sound plays when all targets are met for 2 consecutive seconds.

Instructions: “Don’t think; don’t try. Listen to the sounds. The clicks are very good.”

## CON2C Alpha Sync

### Type of training

- Eyes Closed
- Good for many “aging” brains—whether because of years or stress—when adult Peak Frequency is below 10 Hz.
- Monopolar montages, most commonly trained inter-hemispherically--P3 to P4, O1 to O2, etc. It can be trained from Fz to Pz in the default-mode network, but that would usually be the DMN 4C 3-band protocol.

### Starting Session

- Open the Design
- Load video files if desired
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Oscilloscope shows raw EEG.

- Spectrum Analyzers at left show amplitude in each band. Check for 60 or 50 Hz spikes.
- Trend in center shows Alpha and High Beta amplitudes over entire session.

## Special Notes

- The trainee should wear ear phones. Binaural beats guide the brain toward 10 Hz. To test before training, open Tools | Volumes and un-check all sounds except Tone Generators. The beat should be barely audible in the headphones. re-check all sounds.
- Session timer is set to run 20 minutes and Stop. Clicking the Pause button when desired will allow the client to take breaks.

## Setting Targets

Alpha Sync threshold, High Beta and Theta thresholds are set to Auto at beginning of session and set to Manual after 30 seconds. The trainer can reset (if it becomes too low or too high) by clicking the A->M button beneath the Threshold or dragging the bar.

## Feedback

- A MIDI melody is played when all targets are in range. The note played depends on the Alpha amplitude, and the volume of the melody tone is controlled by the percent the signal is above the threshold .
- A second MIDI melody plays when an even higher threshold is passed.
- Instruction: "Let your mind be still. Listen to the music. It's good to hear the melody and the full chord together."

## CON4C Alpha Sync

### Type of training

- Eyes Closed
- Good for interhemispheric connectedness and deeper spiritual states/higher consciousness.
- Monopolar montages usually at C (central), P (parietal) or O (occipital) sites.
- Use linked ear references

### Starting Session

- Open the Design
- Load video files if desired
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Oscilloscope shows raw EEG.
- Spectrum Analyzers show amplitude in each band. Check for 60 or 50 Hz spikes.
- Trends show coherence and phase over entire session.



## Special Notes

- The trainee should wear ear phones. Binaural beats guide the brain toward 10 Hz. To test before training, open Tools | Volumes and un-check all sounds except Tone Generators. The beat should be barely audible in the headphones. re-check all sounds.
- Session timer is set to run 20 minutes and Stop. Clicking the Pause button when desired will allow the client to take breaks.

## Setting Targets

Coherence thresholds are set to Auto and Phase thresholds are set to Manual

## Feedback

- A tone plays for each of 4 synchrony targets when in range.
- A MIDI melody is played with note and volume depending on the combined Alpha amplitude.
- Instruction: "Let your mind be still. Listen to the music and enjoy the melody."

## Chapter 2: Balance

### BAL1C Difference (BxShadow, Flash Games, DVD, Silence Vision, Music Video)

#### Type of Training

- Eyes Closed or Open, generally monopolar montage.
- Train to reduce (or increase) the difference between two frequencies at the same site.
  - REDUCE the difference between theta-beta, for example, to reduce the theta/beta ratio by bringing their amplitudes closer together.
  - INCREASE the difference between the bands (e.g. alpha – theta with eyes closed) by clicking the Decrease button under the threshold object to change it to Increase.

#### Starting Session

- Open the Design with the type of feedback you want (Music/Video, Games, DVD).
- Load media file(s) in the media player.
- Select the button that relates to the bands you want to train. Default is:
  - SLO-FST (slow minus fast) trains to reduce the difference between 3-11 Hz slow activity and 13-21 Hz fast
  - T-B (Theta minus Beta) trains to reduce theta relative to beta at a site
  - A-T (Alpha minus Theta) trains to reduce alpha relative to theta at a site.
  - HiB-SMR(High Beta minus SMR) trains to reduce High beta (23-38 Hz) relative to SMR at a site
- Instruction: “Don’t think, don’t try. Just focus on the bar or the game and stay focused on the feedback.”
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

#### Trainer Tools

- Oscilloscope shows the waveform of the entire EEG.
- Spectrum Analyzer shows amplitude in each band. Check for 60 or 50 Hz spikes.
- Graph at the bottom shows the trend of the band being reduced and the band being increased.

#### Special Notes

Session timer is set to run 3 minutes and Pause.

#### Setting Targets

The threshold is initially set to Auto and resets to Manual after 30 seconds.

#### Feedback

- A MIDI melody plays when target is threshold target is met. Tone lowers in pitch as difference increases; volume decreases as inhibit amplitude increases.
- A bar graph beside the feedback screen shows when the client is below target.
- A click plays each time the target is met for 2 seconds.

## BxShadow

Screen brightens as signal improves over/under target.

BAL2C Alpha Beta (BxShadow, Flash Games, DVD, HeadGames, Somatic Vision, Silence Vision, Music Video)

### **Type of training**

- Eyes Closed or open with headphones
- Produce proper asymmetries of alpha (higher on right) and beta (higher on left) while reducing high beta in both EEG channels. Right alpha minus left alpha, left beta minus right beta, 2038 Hz down
- 2-channel monopolar montages with linked (ear or mastoid) references.
- Generally trained at homologous sites (F3 and F4, C3 and C4, etc.) based on assessment findings. Can also be used to train front to back (F3 and P4).

### **Starting Session**

- Open the Design with the type of feedback you want (Music/Video, Games, etc.).
- Load media in media player.
- Turn off Beta or Alpha training if desired, or leave at default to train both Beta and Alpha symmetry.
- Start session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### **Trainer Tools**

- Oscilloscope shows raw waveforms for Channels 1 and 2.
- Trend graphs show left and right alpha and left and right beta.
- In the lower left, Spectrum Analyzers show amplitudes for each frequency to 60Hz.
- At the bottom of Instruments 1 a trend graph shows the Asymmetry scores: Alpha (right minus left) and Beta (left minus right) asymmetries. The training goal is to have both consistently above the target line at zero.

### **Special Notes**

- Make sure left hemisphere sites go in channel 1 and right hemisphere in channel 2.
- Session timer is set to run 20 minutes and Stop. Trainer can pause the session as desired.

### **Setting Targets**

Targets begin in Auto mode and switch to Manual after 30 seconds. They can be adjusted by clicking A->M or by dragging the target bar if desired.

### **Feedback**

- There should be audible clicks each time all targets are met for one second.
- Instruments 1 has a visual feedback screen. Silent videos are best.
- Bar graphs show Alpha and Beta balance when they are above zero and a third bar graph shows total EEG amplitude with its threshold.

Instructions: “Don’t think; don’t try. Listen to the music and enjoy the melody.”

## Music/Video

- A tone plays when Alpha balance meets the threshold(s), increasing in pitch and volume as value above lower threshold increases.
- Bells sound when Total EEG is below threshold, increasing in pitch as Beta balance increases.

## BxShadow

Screen brightens further as each target is met.

## BAL2C Difference (DVD, Music Video, BxShadow, Somatic Vision, Flash Games)

### **Type of Training**

- Eyes Closed or Open, generally monopolar montage.
- Train to reduce (or increase) the difference between two frequencies at two sites.
  - REDUCE the difference between theta-beta, for example, to reduce the theta/beta ratio by bringing their amplitudes closer together.
  - INCREASE the difference between the bands (e.g. alpha – theta with eyes closed) by clicking the Decrease button under the threshold object to change it to Increase.

### **Starting Session**

- Open the Design with the type of feedback you want (Music/Video, Games, etc.).
- Load media file(s) in the media player.
- Select the button that relates to the bands you want to train. Default is:
  - SLO-FST trains to reduce the difference between 3-11 Hz slow activity and 13-21 Hz fast
  - T-B trains to reduce theta relative to beta at a site
  - A-T trains to reduce alpha relative to theta at a site.
  - HiB-SMR trains to reduce High beta (23-38 Hz) relative to SMR at a site
- Instruction: “Don’t think, don’t try. Just focus on the bar or the game and stay focused on the feedback.”
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### **Trainer Tools**

- Oscilloscope shows the waveform of the entire EEG.
- Spectrum Analyzer shows amplitude in each band. Check for 60 or 50 Hz spikes.
- Graph at the bottom shows the trend of the band being reduced and the band being increased.

### **Special Notes**

Session timer is set to run 3 minutes and Pause.

### **Setting Targets**

The threshold is initially set to Auto and resets to Manual after 30 seconds.

## Feedback

- A MIDI melody plays when target is threshold target is met. Tone lowers in pitch as difference increases; volume decreases as inhibit amplitude increases.
- A bar graph beside the feedback screen shows when the client is below target.
- A click each time the target is met for 2 seconds.

## BxShadow

Screen brightens as signal improves over/under target.

## BAL2C Dual Bipolar

### Type of training

- Eyes open
- General training to improve cognitive function and self-control; standard option for ADHD.
- Typically, **Active: C3 T3 Reference: I(C4 T4)**
- Bipolar montage, SMR up, 3-38 Hz down
- May want to try for anxiety, rapid speech, compulsions **Active: Fp1 Fp2 Reference: C(M2)**
  - 9-12 Hz for 1 minute, 8.5-11.5 for 1 minute, 8-11 for 1 minute down to around 3-7 Hz
  - Then train LIFE Fp1 & Fp2 DIVE only

### Starting Session

- Open the Design
- Load the desired videos into the Video Player.
- Select SMR band - Leave at 12-16 Hz default or press button to select 9-13 Hz SMR band.
- Instruction: "Don't think. Don't try. Just focus and let the video play, listening to the music."
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Oscilloscope shows raw wave forms for both channels and SMR wave forms.
- Reward button allows selection of 12-16 Hz (default) or 9-13 Hz as a reward. Adjust according to client.
- Trend graph shows amplitudes of Total EEG (decrease).
- Spectrum Analyzers show amplitudes in each band from 0 Hz to 60 Hz.
- Trend graph in Instruments 1 shows amplitudes of SMR (increase).

### Special Notes

- Session timer is set to run 5 minutes and Pause. Clicking Play again will start the next training segment.
- The client should wear headphones to hear the binaural beats included in the design.

### Setting Targets

- The two inhibit bands, will automatically set to Manual after 30 seconds.

- SMR values have Auto thresholds and should be left in this mode.

## Feedback

- There are two musical sounds which change in pitch and volume based on the percentage of SMR to Total EEG in the two bands.
- A click plays each time the target is met for 1 second.

## BxShadow

Screen brightens further as each target is met.

## BAL2C Dual Bipolar (Calming) (DVD, Music Video, BxShadow)

### Type of training

- Eyes open
- Specialty training with 12-35 inhibit and 2-5 reward
- Active T6 T4 with independent references (P4, Fp2)

### Starting Session

- Open the Design
- Prepare visual feedback
- Instruction: "Don't think. Don't try. Just focus and let the feedback play."
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Oscilloscope shows raw wave forms for both channels.
- Trend graph shows amplitudes of inhibits and rewards.
- Spectrum Analyzers show amplitudes in each band from 0 Hz to 60 Hz.
- Trend graph in Instruments 1 shows summed amplitudes of inhibits and rewards.

### Setting Targets

- Thresholds are set to auto with high reward frequency and are meant to be left in this mode.

## Feedback

- Any visual feedback can be used with BxShadow, or DVD player is available if BxShadow is not.
- There are two musical sounds which can be turned off as desired- chime which sounds when inhibits are within range and electric guitar which changes in pitch based on the percentage of all signals in relation to their targets.
- A click plays each time the target is met for 2 seconds.

## BxShadow

Screen brightens further as each target is met.

## BAL2C Sum Difference (DVD, Somatic Vision, Flash Games, Music Video, BxShadow)

### Type of Training

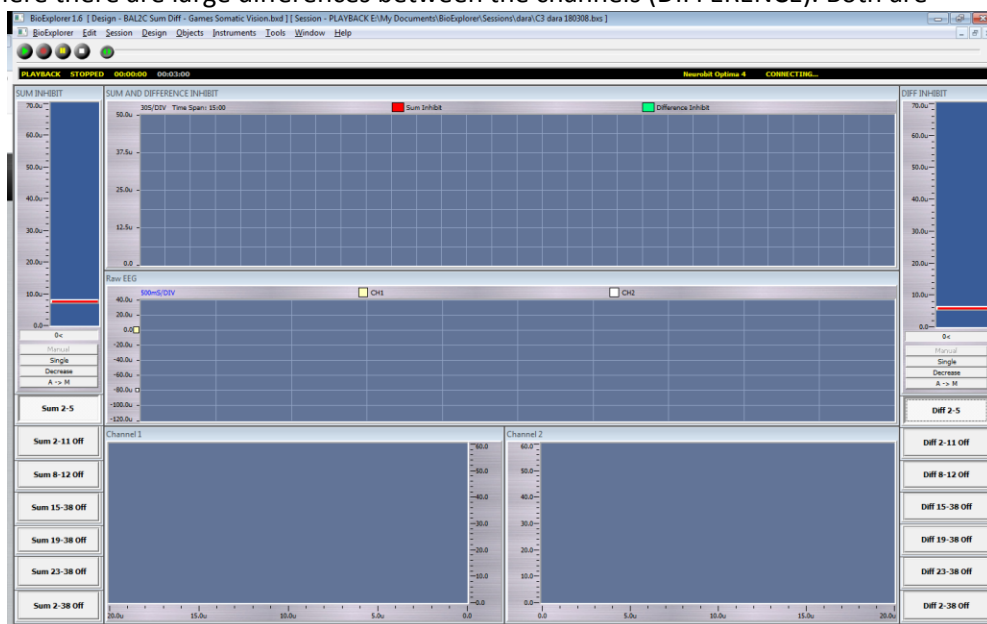
- 2 channel amplitude reduction design that allows the trainer to select a band where amplitude is very high in both channels (the Sum frequency) and the same or another band where the two sides are asymmetrical (the Difference frequency). Its goal is to train a disorganized pair of homologous sites move toward balance and control together.
- Inhibit sum of CH1+CH2 band, Inhibit difference of CH1-CH2 band
- Usually used in 2-channel, monopolar, homologous sites like C3/A1 and C4/A2 or P3/A1 and P4/A2. Often useful in temporals.

### Starting Session

- Open the Design with the type of feedback you want (Music/Video, Games, etc.).
- Load videos in the video player.
- Select a Sum band in the left button column and a Difference band in the right button column.
- Click Play to begin the session. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- At the top of the screen, on either side of the trend graph, there is a threshold- the SUM on the left and DIFFERENCE on the right. Beneath each is a column of buttons. All buttons are initially set to OFF. The trainer must click a button for a sum band in the left column and one from the left column for the difference band. **NOTE: Only one button in each column may be selected.** If more than one button in a column is selected, the uppermost button will be active and the EEG will appear as a flat line as a reminder.
- The first column allows you to select a frequency band where amplitudes are high on both sides (SUM). The right column lets you select a band where there are large differences between the channels (DIFFERENCE). Both are inhibited. These can be the same or different based on the EEG.
- The last button on each side allows the trainer to squash the full band if desired.
- In the upper center of the page is a trend graph showing a line (SUM) and an area chart (DIFFERENCE), both to be reduced.
- An oscilloscope shows the total EEG raw wave forms for both channels. Check for signal quality.
- Spectrum Analyzers show amplitude in each band for the 2 channels. Check for 60 or 50 Hz spikes.



## Special Notes

- Training frequencies can be changed on the fly during the session but the old button must be turned off after the new button is turned on.
- Session timer is set to run 5 minutes and Pause. Clicking the Play button when desired will restart the session and graphing.

## Setting Targets

- After 30 seconds, both targets will automatically set to Manual mode—creating baselines. Minimizing movement artifacts at the beginning of the session will help ensure the accuracy of the baselines.

## Feedback

- Bar graph shows Sum minus Difference value.
- There should be audible clicks each time the client passes all targets at the same time for at least 2 seconds.

## BxShadow

As sum and difference decrease, screen brightens.

## Music/Video

- Feedback is provided via sounds, so it can be done eyes-closed or eyes-open.
  - MIDI 1 (electric guitar) plays a melody line with pitch and volume changing in relation to the target signals (those TRAINED), but this only plays when all thresholds are being met.
  - A chime plays a melody line with pitch and volume changing in relation to the target ratios (those TRAINED), but this only plays when all thresholds are being met.
  - Instruct the client to listen to the music; don't worry about MAKING it play.

## BAL4C Difference (DVD, Music Video, BxShadow, Somatic Vision, Flash Games)

### Type of Training

- Eyes Closed or Open, generally monopolar montage.
- Train to reduce (or increase) the difference between two frequencies at four sites.
  - REDUCE the difference between theta-beta, for example, to reduce the theta/beta ratio by bringing their amplitudes closer together.
  - INCREASE the difference between the bands (e.g. alpha – theta with eyes closed) by clicking the Decrease button under the threshold object to change it to Increase.

### Starting Session

- Open the Design with the type of feedback you want (Music/Video, Games, etc.).
- Load media file(s) in the media player.
- Select the button that relates to the bands you want to train. Default is:
  - SLO-FST trains to reduce the difference between 3-11 Hz slow activity and 13-21 Hz fast.  
Inhibit CH1+CH2+CH3+CH4 slow minus CH1+CH2+CH3+CH4 fast
  - T-B trains to reduce theta relative to beta at a site



- Inhibit CH1+CH2+CH3+CH4 theta minus CH1+CH2+CH3+CH4 beta
- A-T trains to reduce alpha relative to theta at a site.  
Inhibit CH1+CH2+CH3+CH4 alpha minus CH1+CH2+CH3+CH4 theta
- HiB-SMR trains to reduce High beta (23-38 Hz) relative to SMR at a site  
Inhibit CH1+CH2+CH3+CH4 high beta minus CH1+CH2+CH3+CH4 SMR
- Instruction: “Don’t think, don’t try. Just focus on the bar or the game and stay focused on the feedback.”
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

## Trainer Tools

- Oscilloscope shows the waveform of the entire EEG.
- Spectrum Analyzer shows amplitude in each band. Check for 60 or 50 Hz spikes.
- Graph at the bottom shows the trend of the band being reduced and the band being increased.

## Special Notes

Session timer is set to run 3 minutes and Pause.

## Setting Targets

The threshold is initially set to Auto and resets to Manual after 30 seconds.

## Feedback

- A MIDI melody plays when target is threshold target is met. Tone lowers in pitch as difference increases; volume decreases as inhibit amplitude increases.
- A bar graph beside the feedback screen shows when the client is below target.
- A click plays each time the target is met for 2 seconds.

## BAL4C RH Bipolar (Music Video, BxShadow)

### Sites

Active C4 Fp2 T3 P4 with a common reference C (T4)

### What we train

4-Channel Right Hemisphere Bipolar is a blending of several powerful 4-channel bipolar montages that train between active brain sites. These calm physically, mentally, emotionally and reduce excess sensitivity on the right hemisphere (RH).

### Why we train

The brain’s right hemisphere is the source of its macro view of experience, its emotional understanding, its ability to deal with new things. It connects us to the world outside ourselves.

### Starting a session

- Open the Design

- Load media file(s) in the media player or prepare feedback for BxShadow
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).
- May run session for about 6 minutes (2 short fugues or 1 longer one).
- Instruction: "Keep eyes open, listen to the music and watch the video. in the beginning, where most pieces start with a single voice, one can see how the visual matches the audio, moving up and down and using longer or shorter notes. Then, when the second musical voice appears, the video adds a second line of a different color, and one can follow how they work together, etc. It's not about "understanding", but about seeing and hearing and letting the brain make the connection, just enjoying the music."

## Alternative Session

Alternate eyes closed with MIDI and eyes open with Bach fugues

- **EC 3 min:** Train 3 minutes with eyes closed listening to MIDI
- **EO 6-7 min:** Train 6-7 minutes eyes open with Bach fugue video. (Pause MIDI: Press *Music On* button to Off)
- **EC 3 min:** Train 3 minutes eyes closed listening to MIDI music (Pause Bach video)
- **EO 6-7 min:** Train 6-7 minutes eyes open with Bach fugue video. (Pause MIDI: Press *Music On* button to Off)
- **EC 3 min:** Train 3 minutes with eyes closed listening to MIDI (Pause Bach video)
- **EO 3-4 min:** Train 3-4 minutes eyes open with Bach fugue video. (Pause MIDI: Press *Music On* button to Off)

## Trainer Tools

- Oscilloscope shows the waveform of the entire EEG.
- Spectrum Analyzers show amplitude in each band.
- Graphs at the bottom show the trends of the bands being trained.
- 3:00 timer button enables trainer to click to start a 3:00 countdown until a ding sounds indicating that EC segment is finished.

## Special Notes

- Session timer is set to run 25 minutes and Pause.
- For more in-depth information on BAL4C RH Bipolar see [appendix](#).

## Setting Targets

- Inhibit thresholds are initially set to Auto and resets to Manual after 30 seconds.
- Reward thresholds are set to Auto and can be left this way.

## Feedback

- Music (for eyes closed training) - MIDI melody plays when each site's targets are met with another tone playing when all targets are met.
- A click plays each time all targets are met for 2 seconds.

## Video

Screen brightens further as each site's targets are met. (strongly recommend [Bach Fugues](#)).

## BxShadow

Screen brightens further as each site's targets are met. (strongly recommend [Bach Fugues](#)).

To read more on BAL4C RH Bipolar see [Appendix II](#).

## Chapter 3: Connectivity

### CON2C Alpha Sync

#### Type of training

- Eyes Closed
- Good for many “aging” brains—whether because of years or stress—when adult Peak Frequency is below 10 Hz.
- Monopolar montages usually at C, P or O sites, usually on right hemisphere or the midline

#### Starting Session

- Open the Design
- Load video files if desired
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

#### Trainer Tools

- Oscilloscope shows raw EEG.
- Spectrum Analyzers at left show amplitude in each band. Check for 60 or 50 Hz spikes.
- Trend in center shows Alpha and High Beta amplitudes over entire session.

#### Special Notes

- The trainee should wear ear phones. Binaural beats guide the brain toward 10 Hz. To test before training, open Tools | Volumes and un-check all sounds except Tone Generators. The beat should be barely audible in the headphones. re-check all sounds.
- Session timer is set to run 20 minutes and Stop. Clicking the Pause button when desired will allow the client to take breaks.

#### Setting Targets

Alpha Sync threshold, High Beta and Theta thresholds are set to Auto at beginning of session and set to Manual after 30 seconds. The trainer can reset (if it becomes too low or too high) by clicking the A->M button beneath the Threshold or dragging the bar.

#### Feedback

- A MIDI melody is played when all targets are in range. The note played depends on the Alpha amplitude, and the volume of the melody tone is controlled by the percent the signal is above the threshold .
- A second MIDI melody plays when an even higher threshold is passed.
- Instruction: “Let your mind be still. Listen to the music. It’s good to hear the melody and the full chord together.”

## CON2C Gamma SMR Sync (DVD, Flash Games, HeadGames, Music Video, BxShadow)

### Type of training

- Eyes Open
- Train Gamma and SMR Synchrony together.
- Generally use between C3 and C4 when they show low SMR coherence.
- Use linked ear references

### Starting Session

- Open the Design with the type of feedback you want (Music/Video, Games, DVD).
- Load media file in media player.
- Start session by clicking green Start button. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Oscilloscope shows raw waveforms for Channels 1 and 2.
- Spectrum Analyzers show amplitudes for each frequency to 60Hz.
- Trend graphs show the Gamma and SMR coherence level and target, Gamma and SMR phase difference and target range, and SMR amplitudes for channels one and two.

### Special Notes

- The trainee should wear ear phones.
- Session timer is set to run 5 minutes and Pause.

### Setting Targets

- Manual targets are set at -45 to 45 for Phase.
- Coherence and SMR amplitude have auto thresholds and should be left in this mode.

### Feedback

- There are 4 tones for synchrony and amplitude that form a chord. Each bar has its own tone. All tones playing at once is best.
- A melody plays when all targets are met at once.
- A quiet click plays each time all 4 bands are in range for 1 second.
- Instruction: "Don't think. Don't try. Watch the bars and see what makes them go down. It's good to hear all the tones together."

### BxShadow

Screen brightens further as each target is met.

## CON2C Gamma Up (DVD, Flash Games, HeadGames, Music Video, BxShadow)

### Type of training

- Eyes open or eyes closed.
- 2-channel training to improve cognitive function and communication throughout the brain.
- Most any homologous sites (e.g. P3/A1 and P4/A2). Often trained between Fp1 and Fp2 or F3 and F4.

### Starting Session

- Open the Design with the type of feedback you want (Music/Video, Games, DVD).
- Load media in media player.
- Start session by pressing green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- The Oscilloscope shows the raw waveforms for the two channels..
- Trend graphs show Gamma amplitude (yellow, increase) and All EEG (blue, decrease).
- Threshold bar graph at left shows Gamma (increase), graph at right shows All EEG (decrease)
- Spectrum Analyzers show amplitudes in each band from 0 Hz to 60 Hz in the lower center of Instruments1.
- A trend graph at the bottom of Instruments 1 shows Gamma coherence (Music Video) or Gamma Phase (Games).
- A bar graph at the left of Instruments 1 shows All EEG (decrease).

### Special Notes

- Session timer is set to run 5 minutes and Pause. Clicking Play again will start the next training segment.

### Setting Targets

- The threshold for Gamma Up is set to Auto and should remain so.
- The threshold for All EEG will automatically set to Manual after 30 seconds.

### Feedback

- A click sounds whenever both targets are met for 1 second.

### Music/Video

- Choral voices sing higher notes as Gamma coherence rises; volume rises as All EEG amplitude falls.
- A chime melody plays when All EEG is below target, pitch rising as Gamma amplitude rises.

### BxShadow

Screen brightens as signal over/under target improves.

## CON2C Multiband Coherence (MBC) (BxShadow, Flash Games, Silence Vision, Music Video)

### Type of training

- Eyes Closed or Eyes Open
- Train slow or fast frequencies either up or down using the buttons.
- Can also "rock," going back and forth between training up and training down by clicking Up/Down button.
- Generally use between F3 and F4, C3 and C4 or P3 and P4 when they show high fast-wave or low slow-wave coherences.
- Use linked ear references

### Starting Session

- Open the Design with the type of feedback you want (Music/Video, Games, DVD).
- Select settings.
- Load media file in media player.
- Start session by pressing green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Oscilloscope shows raw waveforms for Channels 1 and 2.
- Spectrum Analyzers show amplitudes for each frequency to 80Hz.
- Trend graphs show the 4 trained frequency bands (low and high) and a target line.
- Buttons are used to select Low (slow frequencies) or High (fast frequencies), up-training or down-training. Train Low Up or High Down (unless "[rocking](#)").
  - MBC Up - Multiband coherence Train low frequencies up
  - MBC Down - Multiband coherence Train high frequencies down

### Special Notes

- Session timer is set to run 5 minutes and Pause.

### Setting Targets

- Threshold is on automatic for the first 60 seconds of baseline gathering after which it will change to manual (fixed).
- The target line on the trend graph shows the 40% value that is the target for all 4 bands.

### Feedback

- A quiet click plays each time all bands are in range for 1 second.
- Instruction: "Don't think. Don't try. Watch the bars and see what makes them go up or down. It's good to hear all the tones together."



Training Low Up

## Music/Video

- A music quartet piece is pre-loaded in this design. Each threshold that is met enables one voice. When all are successful, all the voices can be heard together.

## BxShadow

Screen brightens further for each threshold target that is met.

## CON2C SMR Coherence (DVD, Flash Games, HeadGames, Music Video, BxShadow)

### **Type of training**

- Eyes Open only
- Train SMR coherence either up or down in frequency ranges of 12-15 Hz.
- Can be used to "rock," going back and forth between training up and training down by clicking Up/Down button.
- Generally use between C3 and C4 when they show low SMR coherence.
- Use linked ear references

### **Starting Session**

- Open the Design with the type of feedback you want (Music/Video, Games, DVD).
- Load media in media player.
- Start session by clicking green Start button. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### **Trainer Tools**

- Buttons at top select frequency band for SMR and Up or Down training.
- Oscilloscope shows raw waveforms for Channels 1 and 2.
- Spectrum Analyzers show amplitudes for each frequency to 60Hz.
- Trend graphs show the SMR coherence level and target, SMR phase difference and target range, and SMR amplitudes for channels one and two.

### **Special Notes**

- The trainee should wear ear phones.
- Session timer is set to run 5 minutes and Pause.

### **Setting Targets**

- Manual targets are set at 40% (400m) for Coherence and -45 to 45 for Phase. If the client is scoring less than 65% in coherence after 30 seconds, the feedback will switch to Auto threshold so client is rewarded 85% of the time.
- SMR has Auto threshold and should be left in this mode.

### **Feedback**

- There are 3 tones for coherence and phase that form a chord. Each bar has its own tone. All tones playing at once is best.
- A melody plays when all targets are met at once.



- A quiet click plays each time all bands are in range for 1 second.
- Instruction: “Don’t think. Don’t try. Watch the bars and see what makes them go down. It’s good to hear all the tones together.”

## BxShadow

Screen brightens as each target is met.

## CON2C Sync One-Band

### Type of Training

- Eyes closed or open
- Increases synchrony in one band (delta, theta, alpha or gamma may be selected using the buttons).
- Generally used between C3 and C4, P3 and P4 or O1 and O2. Gamma sync may be trained at F3 and F4.
- Use linked references

### Starting Session

- Open the Design
- Load a playlist of videos (preferably silent) if using video feedback.
- Click only one of the buttons on Instruments 2 to select the frequency you want to train to increase synchrony.
- Click Play/Record (the green triangle button) to start the session. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).



### Trainer Tools

- Buttons at left allow trainer to choose band to train.
- Oscilloscope shows the raw wave forms of the EEG for channels 1 and 2.
- The top graph shows the sum minus the difference of the two channels in the chosen frequency. Higher values are better.
- Below this a graph that shows coherences between the two channels in all the channel options with a target line.
- The third graph shows the phase angle between each of the 4 frequency options with a target. Closer to the line is better.
- Spectrum Analyzers show the amplitudes of each frequency to 60Hz in both channels.

### Special Notes

- The client should wear headphones.
- The session timer runs for 20 minutes and stops. The trainer can pause the session as desired..
- Synchrony can be defined as coherence in phase. When a signal has coherence of 100 and phase angle of 0, synchrony is perfect

## Setting Targets

The Sum-minus-difference of the trained frequency is the only target; it changes from auto to manual after 30 seconds.

## Feedback

- There are 2 musical tones which change in frequency and volume based on the level of the trained frequency. Higher pitched tones and louder volumes indicate higher synchrony.
- A quiet click plays each time the target is in range for 2 seconds.
- Bar graph shows average percent of time targets are met.
- Instruction: “Don’t think. Don’t try. Listen to the music go into higher tones and get louder.”

## BxShadow

Screen brightens as each target is met.

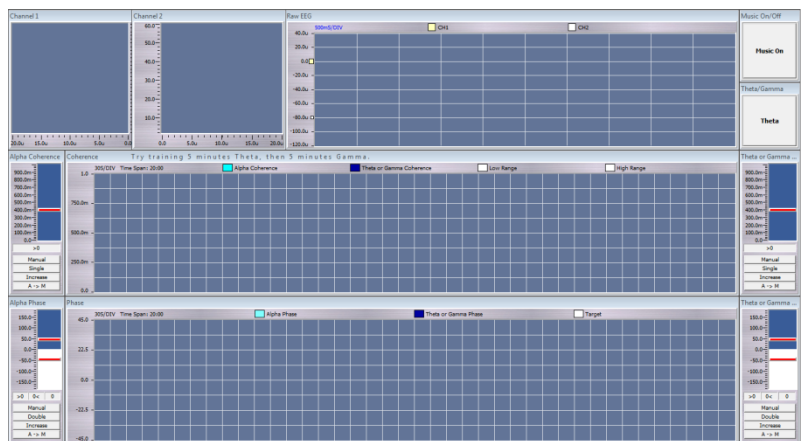
## CON2C Sync Two-Band

### Type of Training

- Eyes closed or open
- Increases synchrony in alpha as one band and either theta or gamma as the second band (trainer chooses).
- Generally used between C3 and C4, P3 and P4 or O1 and O2. Gamma sync may be trained at F3 and F4.
- Use linked references.

### Starting Session

- Open the Design
- Load the video Playlist if desired, preferably with silent videos.
- Click the button at the upper right to select Theta or Gamma.
- Start Playing/Recording the session by clicking the green triangle (Play). If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).



### Trainer Tools

- Spectrum Analyzers show the amplitudes of each frequency to 60Hz in both channels..
- Oscilloscope shows the raw waveforms of the EEG for channels 1 and 2.

- There are 2 trend graphs in the lower central portion of the screen
- The upper graph shows coherences in alpha and the selected band with white lines showing the top and bottom of the range.
- The lower graph shows phase relationships in alpha and selected band with a white target line.

## Special Notes

- The client should wear headphones.
- The session timer runs for 5 minutes and pauses. Try training Theta for 5 minutes, then Gamma for 5 minutes. The trainer can pause the session as desired or turn off the Timer.
- Synchrony can be defined as coherence in phase. When a signal has coherence of 100 and phase angle of 0 synchrony is perfect.

## Setting Targets

Targets for phase angle and coherence are preset and should not be changed in most cases.

## Feedback

- There are 4 tones which form a chord, each related to one of the coherence or phase measures. They go on or off based on performance vs. the target and rise or fall in volume as synchrony in the band increases.
- Two MIDI players produce separate melody lines that change in pitch and volume with the amplitudes of the target bands.
- A quiet click plays each time targets are in range for 1 second.
- Bar graph shows average percent of time targets are met.
- Instruction: "Don't think. Don't try. Listen to the music."

## CON4C Alpha Sync

### Type of training

- Eyes Closed
- Good for interhemispheric connectedness and deeper spiritual states/higher consciousness.
- Monopolar montages usually at C, P or O sites.
- Use linked ear references

### Starting Session

- Open the Design
- Load video files if desired
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Spectrum Analyzers at left show amplitude in each band. Check for 60 or 50 Hz spikes.
- Oscilloscope shows raw EEG.
- Trends show coherence and phase over entire session.

## Special Notes

- The trainee should wear ear phones. Binaural beats guide the brain toward 10 Hz. To test before training, open Tools | Volumes and un-check all sounds except Tone Generators. The beat should be barely audible in the headphones. re-check all sounds.
- Session timer is set to run 20 minutes and Stop. Clicking the Pause button when desired will allow the client to take breaks.

## Setting Targets

Coherence thresholds are set to Auto and Phase thresholds are set to Manual

## Feedback

- A tone plays for each of 4 synchrony targets when in range.
- A MIDI melody is played with note and volume depending on the combined Alpha amplitude.
- Instruction: "Let your mind be still. Listen to the music and enjoy the melody."

## CON4C Gamma Sync (Music Video, BxShadow)

### Type of training

- Eyes open or closed
- Good for training deep consciousness states.
- Monopolar montages usually at C, P or O sites.
- Use linked ear references

### Starting Session

- Open the Design
- Load silent video files if desired
- Start Playing/Recording the session clicking the green Start triangle.

### Trainer Tools

- Oscilloscope shows raw EEG.
- Trends show coherence and phase over entire session.
- Spectrum Analyzers at lower right show amplitude in each band. Check for 60 or 50 Hz spikes.

## Special Notes

- The trainee should wear ear phones. Binaural beats guide the brain toward 10 Hz. To test before training, open Tools | Volumes and un-check all sounds except Tone Generators. The beat should be barely audible in the headphones. re-check all sounds.
- Session timer is set to run 20 minutes and Stop. Clicking the Pause button when desired will allow the client to take breaks.

## Setting Targets

Coherence thresholds are set to Auto and Phase thresholds are set to Manual

## Feedback

- A tone plays for each of 4 synchrony targets when in range.
- A MIDI melody is played with note and volume depending on the combined Gamma amplitude.
- Instruction: "Let your mind be still. Listen to the music and enjoy the melody."

## CON4C Multiband Coherence (MBC) Up or Down (DVD , Music Video, BxShadow)

### Type of training

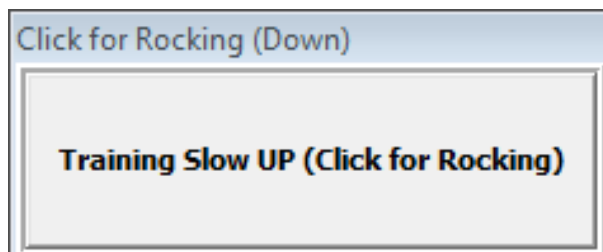
- Eyes Closed or Eyes Open
- Train fast frequencies down or slow frequencies up.
- Can also "rock," going back and forth between training up and training down by clicking Training Up/Training Down button.
- Useful for training up low slow wave coherence at Fz, Pz, Cz ,Oz as indicated in assessment.
- Use linked ear references

### Starting Session

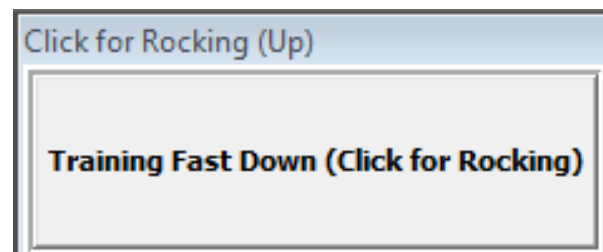
- Open the Design with the type of feedback you want (Music/Video, DVD).
- Load media file into media player.
- Start session by clicking green Play button. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Oscilloscope shows raw waveforms for all channels.
- Spectrum Analyzers show amplitudes for each frequency to 60Hz.
- Trend graph shows the target frequency bands and a target line.
- Button at right is set to default setting (Up for slow and Down for fast). Default setting is Low frequency training up.



Training slow frequency coherence up



Training fast frequency coherence down

### Special Notes

- Session timer is set to run 5 minutes and Pause.

### Setting Targets

- Target thresholds are set automatically after a 60 second baseline gathering period.
- The trainer may click the Reset button under each threshold to reset it, or it may be dragged to desired level.

- The target line on the trend graph shows the 40% value that is the target for all 4 bands.

## Feedback

- A quiet click plays each time all bands are in range for 1 second.
- A bar graph is green when all targets are met.
- Instruction: “Don’t think. Don’t try. Watch the bars and see what makes them go down. It’s good to hear all the tones together.”

BxShadow, DVD, Video

Screen brightens further for each threshold target that is met.

## CON4C Multivariate Coherence Up or Down (BxShadow, Flash Games, DVD, Music Video)

### Type of training

- Special training based on Rob Coben's *Four Channel Multivariate Coherence Training: Development and Evidence in Support of a New Form of Neurofeedback* that may be useful for attention, learning, reading, social skills, perseveration, seizures.
- Eyes Closed or Eyes Open
- Train coherence up or down as indicated by assessment and training plan
- Theta, Beta, High Beta are trained down as needed according to assessment.
- Can be used at F3/A1, F4/A2, P3/A1, P4/A2 for training down high coherence; P3, P4, O1, O2 or C3, C4, P3, P4 for training up; Fz, Pz, Cz, Oz for low coherences or as indicated in assessment.
- Use linked ear references

### Starting Session

- Open the Design with the type of feedback you want (Music/Video, DVD).
- Load media file into media player.
- Start session by clicking green Play button. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Oscilloscope shows raw waveforms for all channels.
- Spectrum Analyzers show amplitudes for each frequency to 60Hz.
- Trend graph shows the target frequency bands and a target line.
- Button at right is set to default setting (Up for slow and Down for fast). Default setting is Low frequency training up.

### Special Notes

- Session timer is set to run 5 minutes and Pause.

### Setting Targets

- Target thresholds are set automatically after a 60 second baseline gathering period.
- The trainer may click the Reset button under each threshold to reset it, or it may be dragged to desired level.

- The target line on the trend graph shows the 40% value that is the target for all 4 bands.

## Feedback

- A quiet click plays each time all bands are in range for 1 second.
- A bar graph is green when all targets are met.
- Instruction: “Don’t think. Don’t try. Watch the bars and see what makes them go down. It’s good to hear all the tones together.”

BxShadow, DVD, Video

Screen brightens further for each threshold target that is met.

## DMN4C Sync 3-Band Default Mode Network (BxShadow, Music Video)

### Sites

Active: Afz Pz P3 P4 with linked ear references L (A1 A2) When using the cap, Fz is used as ground.

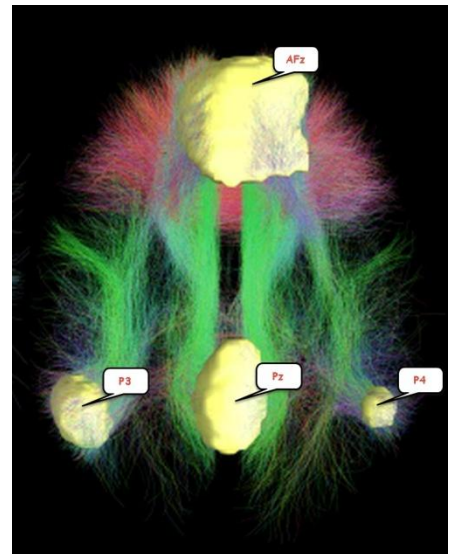
### What We Train

The default-mode network (DMN) is a set of highly-linked areas that underlie a brain’s ability to focus internally. It can be thought of as “what the brain does when it’s not doing anything” —not working on any tasks. The DMN involves synchronous activity between the anterior cingulate (Fpz or AFz), the posterior cingulate (Pz) and the Precuneus (P3 and P4) in the frequencies of theta, alpha and gamma.

### Why We Train

When the DMN is working properly it allows us to be

- Introspective: Thinking about yourself, your feelings and history
- Empathic: Thinking about others, their thoughts and feelings
- Social: Understanding interactions with others and moral decision-making
- Temporal: Thinking about the past and future, our stories and their meaning



### Type of training

- Eyes Open

### Starting Session

- Open the Design.
- Load media file into media player.
- Start session by clicking green Play button. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Oscilloscope shows raw waveforms for all channels.
- Spectrum Analyzers show amplitudes for each frequency to 60Hz.
- Trend graphs show the reward bands' trends for each frequency band.

## Special Notes

- Session timer is set to run 10 minutes and Pause.

## Setting Targets

- Thresholds begin in Auto mode until they switch to manual after 30 seconds.

## Feedback

- Music MIDI melody plays when each band's targets are met.
- A trend graph below the feedback screen shows whether one, two, three or four thresholds' targets are being met.
- Instruction: "Don't think. Don't try. Watch the visual and listen to the audio feedback. It's good to hear all the tones together."

## BxShadow, Video

Screen brightens further as each threshold's targets are met. (Can use [Bach Fugue animated videos](#)).



## Chapter 4: Frequencies

### 1C Sample Session (Pacman, Video)

#### Type of training

- Eyes Open
- Good for many initial sessions, demonstrating for client that he/she has power to change EEG.
- Monopolar montages usually at Cz/A2.

#### Starting Session

- Open the Design
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

#### Trainer Tools

- Spectrum Analyzer shows amplitudes for all frequencies; flatter is better. Check for 60 or 50 Hz spikes.
- Trend graph at bottom shows total activity from 3-35 Hz; lower is better.

#### Special Notes

- Demonstrate the client's ability to change the display by focusing.
- Session timer is not active. Trainer can Pause session at any point, including after each run of PacMan.

#### Setting Targets

Threshold automatically sets the target after 30 seconds.

#### Feedback

- Option for using the design with a new client (Instruments 2 first):
  - Start with Power Spectrum, showing where there is excess activity: "Focus on the tallest bar and bring it down."
  - Show Trend graph: "Focus your attention—don't think, don't try—and keep the graph as low as possible."
  - Show threshold bar graph: "Figure out how you keep the bar below the line; see if you can go below X microvolts."
- Switch to Instruments 1, play PacMan and watch times to complete. Ask client how he/she is making PacMan move.
- Instruction: "Don't think; don't try. Just pay attention."

### FRE1C (BxShadow, Flash Games, DVD, HeadGames, Somatic Vision, Silence Vision, Music Video)

#### Type of Training

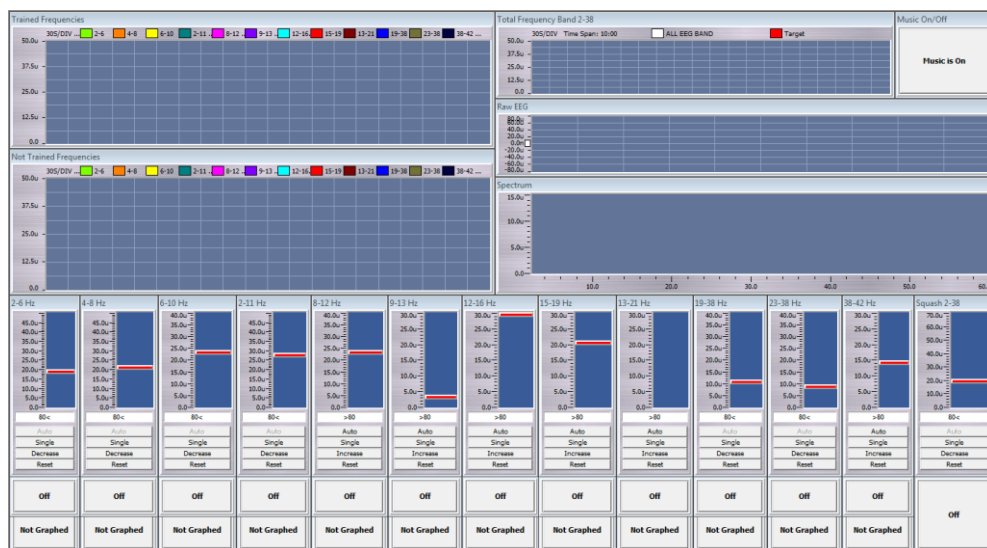
- 1 channel amplitude, nearly any frequency or combination of frequencies, increasing or decreasing.
- Can also be used for percent training by inhibiting 2-38 Hz and rewarding desired frequency.
- Can be used for 1-channel Squash, Squish or Windowed Squash.
- Monopolar or bipolar any combination of sites

## Starting Session

- Open the Design with the type of feedback you want (Music/Video, Games, DVD).
- Load media file(s) into the media player.
- Along the bottom of the screen are 13 frequency bands with the description written across the top of each.
- Beneath each is a button saying Not Trained. No frequencies are chosen at the beginning of a session.
  - In Games design, 2-38 Hz is trained by default for good BioPLAY game play. It may be turned off for other games.
- To choose the training bands, click the appropriate button and it will change to Trained.
- In the set of buttons directly below each threshold bar graph is Decrease/Increase. These are preset in the mode most likely to be useful, but they can be reversed, if desired, by clicking the Increase/Decrease button.
- Press Play button (green triangle) to begin session. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

## Trainer Tools

- Filters listed across bottom of page
  - Click button to change "Off" to "Trained" for desired frequencies.
  - To monitor untrained frequencies, click Not Graphed button to Graph.
- On the upper left are two trend graphs.
  - The left top trend graph shows all Trained frequencies, except for the All Frequencies band, which appears upper right.
  - The left lower trend graph shows frequencies selected by changing the "Not Graphed" button to "Graphed." Trained frequencies are not affected by this button; they will always appear in the upper trend graph. Graphing untrained frequencies can be very useful to seeing how the frequency in the window of a windowed squash is behaving, or for seeing how any untrained bands of interest are behaving.
- On the upper right are three graphs which help identify poor connections, artifacts and shifts in the EEG.
  - A trend graph shows the amplitude of the total frequency range 2-38 Hz, which will often decrease across the training session.
  - An oscilloscope shows the total EEG raw wave form. Check for signal quality.
  - A Spectrum Analyzer shows amplitude in each band. Check for 60 or 50 Hz spikes.



## Special Notes

- Training frequencies can be changed on the fly during the session itself.
- For example, if 2-11 Hz is set as a Trained frequency, but the graph of 2-6 and 6-10 Hz bands (Not Trained but Graphed) shows 2-6 Hz is the area of poorest control, changing the Not Trained button under 2-6 to Trained, and

switching 2-11 Hz from Trained to Not Trained the training can focus more specifically on the problem frequency band.

- Or, noting that high beta (23-38 Hz) activity is surging when training another frequency, the trainer can click to Train that frequency, thus adding it to the training challenge.
- Turning on a reward in a band in a Windowed Squash, making it a Driven Windowed Squash, not only allows the frequency to rise in amplitude but rewards when it does.
- The trainee should wear ear phones. Binaural beats guide the brain toward the middle frequencies. Before training, open Tools | Volumes and uncheck all sounds except Tone Generators. Test to see that the beat is barely audible to the trainee. Re -check the volume boxes and close Tools.
- Session timer is set to run 20 minutes and Stop. Clicking the Pause button when desired will allow the client to take breaks.

## Setting Targets

- Decrease targets should be trained on manual.
  - After 30 seconds, all the original Decrease targets will automatically set to Manual mode, creating baselines. Minimizing movement artifacts at the beginning of the session will help ensure the accuracy of the baselines.
- The numbers at the bottom of each of the TRAINED frequency show the percent of time the client is passing that target. If this number drops down below 75% and stays low or very high, the A->M button under the graph will reset the baseline. The All Frequencies trend (upper right) shows the current threshold in red. If the band is being trained and the threshold is too high or too low, reset the A->M button.

## Feedback

There should be audible clicks each time the client passes all targets at the same time for at least 2 seconds.

## Music/Video

- Feedback is provided via sounds, so it can be done eyes-closed or eyes-open. The client is told to listen to the sound. When both tones are playing the brain is moving toward the desired state.
- MIDI 1 (electric guitar) plays a melody line with pitch changing in relation to the target signals (those TRAINED) and volume changing in relation to overall amplitude.
- A music box chime sounds when overall amplitude is in its lowest ranges.

## BxShadow

Screen brightens as more targets are met.

## FRE1C (HeadGames, Somatic Vision)

### Special Notes

- In order for the games to play properly, Default Increase and Decrease threshold settings must be used (do not change them), and both reward and inhibit must be selected for training.

## FRE1C (Trauma Release) (DVD, BxShadow, Flash Games, Silence Vision, Music Video)

### Type of Training

- Special protocol based on Bessel van der Kolk's *Study of Neurofeedback for Chronic PTSD*.
- 1 channel amplitude, IN (2-6, 22-38) REW (10-13).
- Bipolar, T4 - P4

### Starting Session

- Open the Design
- Load media file(s) into the media player.
- Press Play button (green triangle) to begin session. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- There are three graphs which help identify poor connections, artifacts and shifts in the EEG.
  - An oscilloscope shows the total EEG raw wave form. Check for signal quality.
  - A Spectrum Analyzer shows amplitude in each band. Check for 60 or 50 Hz spikes.
  - A trend graph shows the amplitude of the slow, mid and fast frequency bands being trained.

### Special Notes

- Start training for a 12 minute session. Increase by 3 minutes per session if client reports a positive change. Continue to increase length of each session up to 30 minutes per session.
- If client reports symptoms of over-arousal for 2 training sessions, lower the Reward by 1 Hz at each session until the client reports no change, positive response or symptoms of under-arousal.
- If client reports symptoms of under-arousal, raise the Reward frequency 1/2 Hz.

### Setting Targets

- After 30 seconds, both Decrease (IN) targets will automatically set to Manual mode, creating baselines (65% and 75%). Minimizing movement artifacts at the beginning of the session will help ensure the accuracy of the baselines.
- Increase (REW) target is on Auto (75%).

### Feedback

There should be audible clicks each time the client passes all targets at the same time for at least 2 seconds.

### Music/Video, DVD

- Feedback is provided via sounds, so it can be done eyes-closed or eyes-open. The client is told to listen to the sound. When both tones are playing the brain is moving toward the desired state.
- MIDI 1 (electric guitar) plays a melody line with pitch and volume changing in relation to the target signals vs their thresholds.
- A music box chime sounds when all targets are met.
- The video is at full brightness when all targets are met and dark when they are not.

## BxShadow

Screen brightens as more targets are met.

## BioPLAY

Not all BioPLAY games work well with this bipolar design. Suggestions are Wizard Balls, Crazy Taxi, The Hare and the Tortoise, Gold Fishing, Space Shoot. "Boxes" also works well.

## FRE2C (BxShadow, Flash Games, DVD, HeadGames, Somatic Vision, Silence Vision, Music Video)

### Type of Training

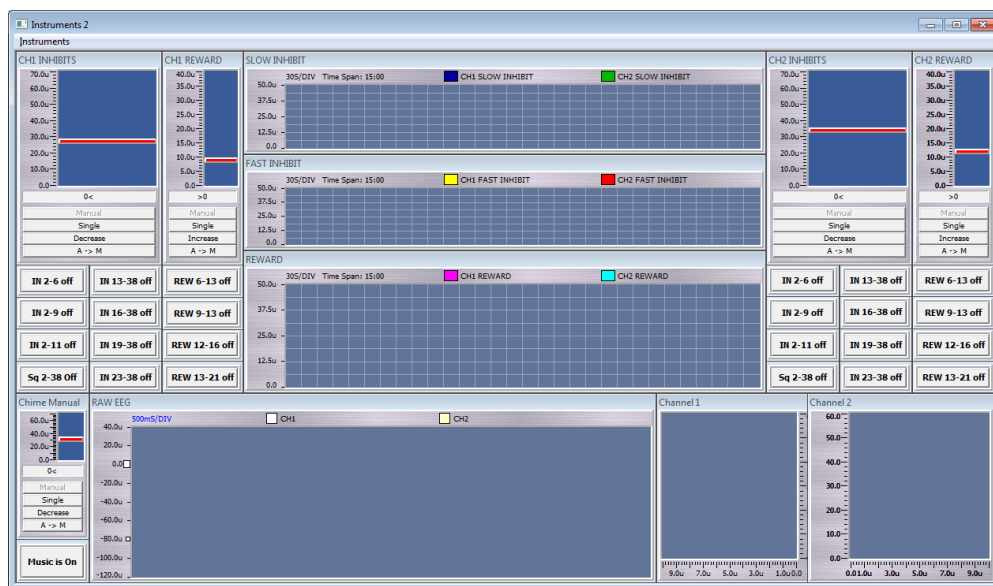
- 2 channel amplitude, nearly any frequency or combination of frequencies, increasing or decreasing.
- Can also be used for percent training by inhibiting 2-38 Hz and rewarding desired frequency.
- Can be used for 2-channel Squash, Squish or Windowed Squash (including closed windowed squash)
- Monopolar or bipolar montages can be used in either channel at any combination of sites

### Starting Session

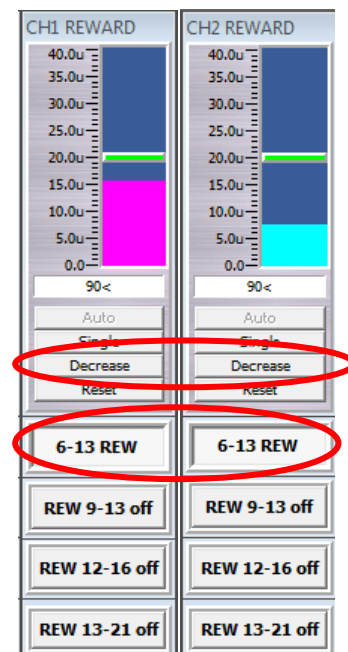
- Open the Design with the type of feedback you want (Music/Video, Games, DVD).
- Load media in the media player.
- Select frequency bands to train. At the top of the screen, on either side of the trend graphs, there are 2 thresholds (1 inhibit and 1 reward), and three columns of buttons. All buttons are initially set to OFF. **NOTE: Only one button in each column may be selected.** The first column allows you to select a low inhibit band, the second column allows you to select a high inhibit band, and the third column allows you to select a reward band. The sum of the amplitudes of the low and high inhibited bands will input to the inhibit threshold. The reward band inputs to the reward threshold.
- Click Play to begin the session. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- CH1 on left, CH2 on right of screen
- The trainer can click a button from the low inhibits and/or the high inhibits for each side (selected bands can differ between the sides). Set the desired frequencies
  - For a Squash (2-38), choose "Sq 2-38".
  - For a Squish, select the buttons on each side that describes the band you want to inhibit.



- For a Windowed Squash, choose the upper and lower bands that leave out the window frequencies (e.g. 2-6 and 13-38 leave a 6-13 Hz window).
- By adding the Reward band of 6-13, the trainer can create a closed windowed squash (actually training up the window frequencies.) Specific buttons can be selected to allow simple Inhibit/Reward training as well.
- Occasionally you may want to train 6-13 Hz down in two channels. In this case, do not select from the inhibit columns and do select 6-13 in the Reward columns. Press the threshold's *Increase* button so that its status will read *Decrease* and you will be inhibiting 6-13.
- In the upper center of the page are three trend graphs.
  - The upper graph shows selected Slow frequencies to be inhibited for both channels.
  - The middle graph shows selected High frequencies to be inhibited for both channels
  - The lower graph shows any selected Reward frequencies for both channels.
- Oscilloscope shows the total EEG raw wave forms for both channels.
- Spectrum Analyzer shows amplitude in each band for the 2 channels. Check for 60 or 50 Hz spikes.



Changing reward band to inhibit

## Special Notes

- Training frequencies can be changed or added on the fly during the session itself.
- Session timer is set to run 20 minutes and Stop. Clicking the Pause button when desired will allow the client to take breaks.

## Setting Targets

- After 30 seconds, all the Decrease targets will automatically set to Manual mode—creating baselines. Minimizing movement artifacts at the beginning of the session will help ensure the accuracy of the baselines.
- The numbers at the bottom of each selected frequency show the percent of time the client is passing that target. The threshold can be reset by clicking the A->M button under the graph or clicking and dragging the target line on the graph.

## Feedback

- A bar graph beside the feedback screen shows the combined success ratio.
- There should be audible clicks each time the client passes all targets at the same time for at least 2 seconds.

## Music/Video

- Feedback is provided via sounds, so it can be done eyes-closed or eyes-open.
  - MIDI 1 (electric guitar) plays a melody line with pitch changing in relation to the target signals (those TRAINED) and volume changing in relation to overall amplitude.
  - A music box chime sounds when overall amplitude is in its lowest ranges, also adjusting pitch and volume. Chimes play at least 10% of the time (the “best” 10%), but if the client is improving, they play more frequently.
- Instruct the client to listen to the music. When the chime plays, that’s very good, but don’t worry about MAKING it play.

## BxShadow

Screen brightens as signal improves over/under target.

## FRE2C (HeadGames, Somatic Vision)

### Special Notes

- In order for these games to play properly, both reward and inhibit must be selected for training. Default Increase and Decrease settings must be used. Do not change reward to inhibit.

## FRE2C Beta SMR (BxShadow, Flash Games, DVD, HeadGames, Silence Vision, Music Video)

### Type of Training

- Eyes open
- General training to improve cognitive function and self-control; standard option for ADHD.
- C3/A1/g/C4/A2

### Starting Session

- Open the Design with the type of feedback you want (Music/Video, Games, DVD).
- Load media in media player.
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- An oscilloscope shows raw EEG tracings for the 2 channels.
- Spectrum Analyzers show amplitudes in each band from 3 Hz to 60 Hz.
- Trend graphs in the middle show amplitudes of Beta and SMR (increase) and slow and fast waves (decrease).

### Special Notes

- Session timer is set to run 3 minutes and Pause. Clicking Play again will start the next training segment.
- Watching the numbers beneath the two inhibit threshold bars will show actual percentage of success in those bands.

### Setting Targets

- The two inhibit bands, which combine the 2 channels will automatically set to Manual after 30 seconds.
- Beta and SMR values use auto thresholds.

### Feedback

- A quiet click plays when all targets are in range for 2 seconds.
- A bar graph displays percent improvement over targets combined.
- Instruction: "Don't think. Don't try. Just focus and keep the game moving/DVD bright."

## Music/Video

Midi tones play when beta, SMR, or slow/fast signals are within target range.

## BxShadow

Screen brightens as signal improves over/under target and dims when going in opposite direction.

## FRE2C Summed (BxShadow, Flash Games, DVD, Silence Vision, Music Video)

### Type of Training

- 2 channels summed amplitude, nearly any frequency or combination of frequencies, increasing or decreasing.
- Special training-- Buttons marked with \*\*\* indicate a protocol that has been shown to be useful for language development.

The more explosive the client is, the closer you will move the CH1 active sensor toward Fz.

CALM, PASSIVE -- F8/A2/g/CP6/A2 (L) or F6/A2/g/CP6/A2 (L)

AGITATED, EXPLOSIVE -- Fz/A2/g/CP6/A2 (L)

### Starting Session

- Open the Design with the type of feedback you want (Music/Video, DVD).
- Load media in the media player.
- Select frequency bands to train. At the top of the screen at the left, there are 2 thresholds (1 inhibit and 1 reward), and three columns of buttons. All buttons are initially set to OFF. **NOTE: Only one button in each column may be selected.** The first column allows you to select a low inhibit band, the second column allows you to select a high inhibit band, and the third column allows you to select a reward band. The sum of the amplitudes of the low and high inhibited bands will input to the inhibit threshold. The reward band inputs to the reward threshold.
- Click Play to begin the session. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- The trainer can click a button from the low inhibits and/or the high inhibits. Set the desired frequencies
  - For a Squash (2-38), choose "Sq 2-38".
  - For a Squish, select the button that describes the band you want to inhibit.
  - For a Windowed Squash, choose the upper and lower bands that leave out the window frequencies (e.g. 2-6 and 13-38 leave a 6-13 Hz window).
  - By adding the Reward band of 6-13, the trainer can create a closed windowed squash (actually training up the window frequencies.) Specific buttons can be selected to allow simple Inhibit/Reward training as well.
- In the upper center of the page are three trend graphs.
  - The upper graph shows selected Slow frequencies to be inhibited.
  - The middle graph shows selected High frequencies to be inhibited .
  - The lower graph shows any selected Reward frequencies.
- Oscilloscope shows the EEG raw wave forms for both channels summed, channel 1 and channel 2.
- Spectrum Analyzer shows amplitude in each band for the 2 channels. Check for 60 or 50 Hz spikes.

### Special Notes

- Training frequencies can be changed or added on the fly during the session itself.



- Session timer is set to run 5 minutes and pause. Trainee may begin with 5 minutes, gradually increasing to 15.

## Setting Targets

- Targets are set to 50% automatic. These can be changed to range from 40%-60%.

## Feedback

- MIDI 1 (electric guitar) plays a melody line with pitch and volume changing in relation to the target signals (those TRAINED), but this only plays when all thresholds are being met.
- A bar graph beside the feedback screen shows the variance.
- There should be audible clicks each time the client passes all targets at the same time for at least 2 seconds.

## Music/Video

- Feedback is provided via sounds, so it can be done eyes-closed or eyes-open.
- Instruct the client to listen to the music. Don't worry about MAKING it play.

## BxShadow

Screen brightens as signal improves over/under target.

## FRE4C In+Rew (Somatic Vision, Flash Games)

### Type of training

- Eyes closed or Eyes open
- Trains down low and high amplitudes in a combined signal and a reward frequency in the middle.
- Use linked ear references

### Starting Session

- Open the Design.
- Load your game in BioExplorer or start your Somatic Vision game.
- Start session by clicking green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).
- Start your game.

### Trainer Tools

- Trend shows amplitudes of combined signal over entire session.
- Oscilloscope shows raw waveforms for each channel.
- Spectrum Analyzers show amplitudes for each frequency to 60Hz.

### Special Notes

- The trainee should wear ear phones for 10 Hz binaural beats.
- Session timer is set to run 5 minutes and pause.

### Setting Targets

- One Threshold starts at auto and switches to manual after 30 seconds.

- A second threshold remains at auto.

## Feedback

- A melody plays with note and volume controlled by combined signal.
- A second melody plays with notes controlled by amount signal is below threshold.
- A quiet click plays each time both manual and auto signals are in range for 2 seconds.
- Instruction: “Don’t think. Don’t try. Watch the bars and see what makes them go down. It’s good to hear all the tones together.”

## FRE4C Squish-Squash (BxShadow, Flash Games, DVD, Silence Vision, Music Video)

### Type of training

- Eyes Open or Eyes Closed
- Trains down combined amplitude of slow, fast, middle or 2-38 Hz frequencies.
- Generally use between temporal, central, parietal lobes, anywhere you have excessive frequencies in several sites in a certain band (F4/A2, C4/A2, T4/A2, P4/A2) or (F3, F4, C3, C4 or Fp1, Fp2, F3, F4) as indicated in assessment.
- Use linked ear references

### Starting Session

- Open the Design with the type of feedback you want (Music/Video, Games, DVD).
- Load media file into media player.
- Select the frequencies to train.
- Start session by clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Buttons at top left select frequencies to train down.
- Oscilloscope shows raw waveforms for each channel.
- Spectrum Analyzers show amplitudes for each frequency to 60Hz.
- Trends show amplitudes of slow, fast, middle and alpha for each channel, whether trained or not.

### Special Notes

- The trainee should wear ear phones.
- Session timer is set to run 20 minutes.

### Setting Targets

Threshold starts at auto and switches to manual after 30 seconds.

### Feedback

- A melody plays when target is met.
- A quiet click plays each time signal is in range for 2 seconds.
- A bar graph displays the combined squish/squash signal.

- A trend displays the combined signal with its threshold over the entire session.
- Instruction: “Don’t think. Don’t try. Watch the bars and see what makes them go down. It’s good to hear all the tones together.”

## BxShadow

Screen brightens as signal improves under target and dims when going in opposite direction.

## FRE4C Windowed Squash (BxShadow, Flash Games, DVD, Silence Vision, Music Video)

### **Type of training**

- Eyes closed or Eyes open
- Trains down low and high amplitudes in a combined signal leaving a middle "window" with no downward pressure from the protocol.
- Use linked ear references

### **Starting Session**

- Open the Design with the type of feedback you want (Music/Video, Games, DVD).
- Load media into media player.
- Start session by clicking green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### **Trainer Tools**

- Trend shows amplitudes of slow, fast and combined signal over entire session.
- Oscilloscope shows raw waveforms for each channel.
- Spectrum Analyzers show amplitudes for each frequency to 60Hz.

### **Special Notes**

- The trainee should wear ear phones for 10 Hz binaural beats..
- Session timer is set to run 5 minutes and pause.

### **Setting Targets**

- One Threshold starts at auto and switches to manual after 30 seconds.
- A second threshold remains at auto.

There's a reason for the Chime MIDI having the two thresholds. The manual is set to the automatic level until 30 seconds. The design however says if EITHER is in range, give the feedback. If the person's brain goes in the right direction, the percent of time hearing the chimes increases. If the person goes in the WRONG direction, he never hears the chimes LESS THAN 20%. It always tells when one is in the best 20%, no matter which way one is going. But it also tells if one is going the right way.

### **Feedback**

- A melody plays with volume controlled by combined signal and notes controlled by amount signal is below threshold.
- A second melody plays a chime with notes and volume controlled by amount signal is below threshold, enabled when one is in the best 20%.

- A quiet click plays each time the 80% threshold signal is in range for 2 seconds.

Instruction: “Don’t think. Don’t try. Watch the bars and see what makes them go down. It’s good to hear all the tones together.”

## BxShadow

Screen brightens as signal decreases and dims as signal increases.

## Chapter 5: SMR

### SMR%1C (BxShadow, Flash Games, DVD, HeadGames, Somatic Vision, Music Video)

#### Type of training

- Eyes open only.
- Trains up the Sensorimotor rhythm (SMR) as a percentage of the total EEG.
- Good for sleep onset and physical relaxation issues, as well as maintaining a focused relaxed state.
- C4/A2, Cz/A2, C3/C4 or Mastoid Crease to Fp1; sometimes used with other bipolar montages (e.g. T3/T4, T4/P4, etc.).

#### Starting Session

- Open the Design with the type of feedback you want (Music/Video, Games, DVD).
- Load media file into media player.
- Select SMR band - See below in *Special Notes*.
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

#### Trainer Tools

- Oscilloscope shows the waveform of the entire EEG and the SMR band.
- Button allows trainer to start with 12-15Hz SMR band (default) or press for 9-12Hz band for training.
- The meter shows SMR % value.
- Trend graph shows SMR amplitude and high beta across the session.
- The Power Spectrum shows 3D display of 11 -16 Hz. The higher the hills, the better the client is doing.
- Threshold bar graphs show the SMR % and High Beta amplitude. Bar turns red when target is not met. High Beta is not trained unless the trainer selects it, if needed, by pressing the button.

#### Special Notes

- SMR frequency range can be optimized.

#### Adults

In adults, alpha is expected to have its peak at 10 Hz in a band from 8-12 Hz, so SMR is likely to be around 12-15 Hz. However some feel more comfortable lowering it a bit to 11.5 to 14.5 or 11 to 14 Hz. **In adults start at 12-15 Hz** and adjust it downward a little at a time if you don't get the desired response.

#### Children

For those younger than 16 years, SMR will almost certainly be a lower frequency. You can look for the alpha band by looking at the power spectrum (brain mirror display) at P4 with eyes closed and eyes open. In most people a particular band will surge out and become dominant with eyes closed and then drop down sharply when eyes are opened. **When you know where alpha is, then SMR is likely to be just above that.**

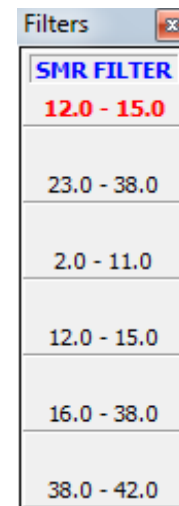
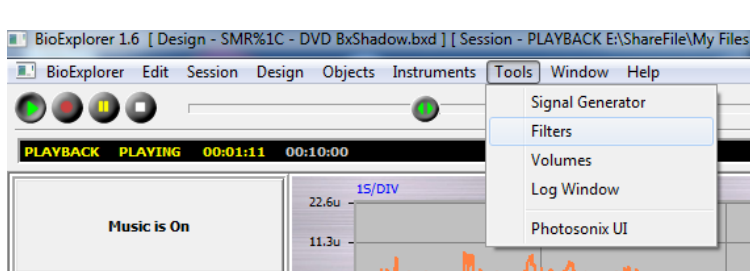
In children of 8 years, the peak alpha frequency is often around 8 (perhaps lower in children who are behind the developmental curve, as most ADHD people are), so the alpha band might be closer to 6.5-9.5 Hz, which would put SMR

around 9-12 Hz. **Start at 9-12 Hz with younger children.** Titrating down the frequency further will end up discovering a band where the body begins to relax and slump, eyes get heavy, breathing deepens and the client gets still. Some will even fall asleep.

## Adjusting the SMR Band

1. Open the Filters tool. Leave it open while training.

Select Tools | Filters and click SMR filter to select it. (Select the default 12-15 or use 9-12 if you have pressed the button to select 9-12Hz SMR.)



2. Adjust the frequency

Press the left arrow button on your keyboard to move the entire frequency band .1 Hz -.5 Hz lower. **Right arrow** button will increase frequency.

The response you want the body to have is to feel limp and as though melting into the chair. Breathing should slow and the body should feel heavy. If it feels like muscles are tense instead of limp then you are training too high. If the client becomes drowsy, you can start bumping the frequency back up 0.1 Hz at a time.

You can also push the *HI BETA OFF* button so the status reads *Hi Beta Down* so that you will also be training high beta down which is connected to the green line on the graph. Sometimes the green line will respond according to what your body is experiencing. If the green line - high beta - goes up then you may be getting more tense. If the green line goes down then it could be a sign that your muscles are becoming more loose.

If the trainee feels either more fidgety or very sleepy you may be training at too low a frequency so adjust the filter upward. It may take about five minutes for you to notice any response to a particular frequency. The key is to see the client's body relax, muscle tone dropping significantly, and often becoming sleepy.

- Timer is set to pause at 5 minutes.

## Setting Targets

- The SMR % and High Beta targets are automatically set to manual after 30 seconds. The trainer can reset (if they become too low or too high) by clicking the A->M button beneath the Threshold or dragging the bar.
- High Beta is *not* trained unless you click the "HI BETA OFF" button so the status says "High Beta Down."

## Feedback

- Watch the bar display and let the rising/falling band stay above target bar.
- There should be audible clicks each time all targets are met for one second.

Instruction: "Let your mind be still and focused. Listen to the music. Watch the video and notice what makes them play."

## BxShadow

Screen brightens as signal improves over/under target

## SMR1C (BxShadow, Flash Games, DVD, HeadGames, Somatic Vision, Music Video)

### Type of Training

- Eyes open only
- Trains up the Sensorimotor rhythm (SMR 12-15 Hz), while training down slow and fast frequencies.
- Good for sleep onset and physical relaxation issues, as well as maintaining a focused relaxed state.
- Cz/A2, C4/A2, C3/C4; sometimes used with other bipolar montages (e.g. T3/T4, T4/P4, etc.).

### Starting Session

- Open the Design
- Load media in the media player.
- Start Playing/Recording the session clicking the green Start triangle. If recording, Browse to Documents\BioExplorer\Sessions and your client folder (or create one at this time).

### Trainer Tools

- Oscilloscope shows the wave form of the raw EEG and SMR waves.
- Meter shows Maximum SMR amplitude.
- Trend graph shows the SMR and inhibits amplitudes across the session.
- Threshold bar graphs show the trainee's SMR (12-15) and inhibits (3-9 Hz and 19-38 Hz) amplitudes in relation to the targets. Bar turns red when target is not met.
- Spectrum Analyzer shows amplitude in each band between 11 and 16 Hz. Check for 60 or 50 Hz spikes.

### Special Notes

- SMR frequency range can be optimized.

### Adults

In adults, alpha is expected to have its peak at 10 Hz in a band from 8-12 Hz, so SMR is likely to be around 12-15 Hz. However some feel more comfortable lowering it a bit to 11.5 to 14.5 or 11 to 14 Hz. **In adults start at 12-15 Hz** and adjust it downward a little at a time if you don't get the desired response.

### Children

For those younger than 16 years, SMR will almost certainly be a lower frequency. You can look for the alpha band by looking at the power spectrum (brain mirror display) at P4 with eyes closed and eyes open. In most people a particular band will surge out and become dominant with eyes closed and then drop down sharply when eyes are opened. **When you know where alpha is, then SMR is likely to be just above that.**

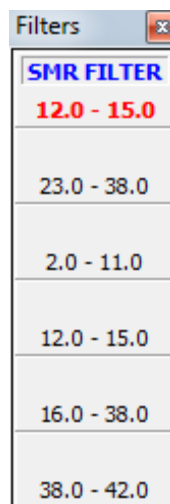
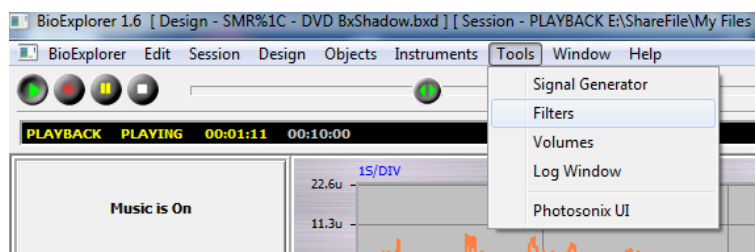
In children of 8 years, the peak alpha frequency is often around 8 (perhaps lower in children who are behind the developmental curve, as most ADHD people are), so the alpha band might be closer to 6.5-9.5 Hz, which would put SMR

around 9-12 Hz. **Start at 9-12 Hz with younger children.** Titrating down the frequency further will end up discovering a band where the body begins to relax and slump, eyes get heavy, breathing deepens and the client gets still. Some will even fall asleep.

## Adjusting the SMR Band

1. Open the Filters tool. Leave it open while training.

Select Tools | Filters and click SMR filter to select it.



2. Adjust the frequency

Press the left arrow button on your keyboard to move the entire frequency band .1 Hz -.5 Hz lower. **Right arrow** button will increase frequency.

The response you want the body to have is to feel limp and as though melting into the chair. Breathing should slow and the body should feel heavy. If it feels like muscles are tense instead of limp then you are training too high. If the client becomes drowsy, you can start bumping the frequency back up 0.1 Hz at a time.

You can also push the *HI BETA OFF* button so the status reads *Hi Beta Down* so that you will also be training high beta down which is connected to the green line on the graph. Sometimes the green line will respond according to what your body is experiencing. If the green line - high beta - goes up then you may be getting more tense. If the green line goes down then it could be a sign that your muscles are becoming more loose.

If the trainee feels either more fidgety or very sleepy you may be training at too low a frequency so adjust the filter upward. It may take about five minutes for you to notice any response to a particular frequency. The key is to see the client's body relax, muscle tone dropping significantly, and often becoming sleepy.

- Timer is set to pause at 5 minutes.

## Setting Targets

- The Inhibits (slow, 3-11 Hz and fast, 19-38) targets begin in Auto mode and reset to Manual after 30 seconds. The trainer can reset (if they become too low or too high) by clicking the A->M button beneath the Threshold.
- The SMR and Gamma targets are set at Auto and should remain there.
- Gamma is off by default. Press "Gamma Not Trained" to activate Gamma training.

## Feedback

- A MIDI melody plays continuously when targets are met, rising in pitch and volume as the SMR amplitude rises.
- There should be audible clicks each time the client passes all targets at the for 1 second.



## BxShadow

Screen brightens as signal improves over/under target .

## Chapter 6: HEG

### HEG nIR Optima+ (DVD, BxShadow, Games, Music Video)

#### Type of training

- 1 channel blood perfusion and oxygenation training.
- Only for use with nIR (near Infrared) usually performed at 3 different forehead sites, often Fp1 / Fp2 / Fpz. Sites should be rotated in different order and can go out to the edge of the forehead. Not recommended on temples.
- Generally useful for executive/control functions: physical/emotional/behavioral regulation, organizing/planning, attention, etc..
- Every 3-4 days is sufficient; do not over-train in terms of time or frequency to avoid headaches, irritability, etc.

#### The Training Session

- Open the Design with the type of feedback you want (Video, Games, etc.).
- Load media into media player.
- **Load Optima settings for nIR HEG** (*HEG nIR.nbc in Documents\Neurobit*)
- Position the headband and start Playing/Recording the session clicking the green Start triangle.
- Instruments 2 has a Trend Graph. Watch the red area on the graph until ratio stabilizes. Then click Capture Baseline button which will reset the timer, Attention Index Points and record the baseline. If desired, immediately change threshold to Manual, so threshold = baseline. Click Control on DVD player if applicable.
- Trainer may prefer to do 3 sites in a single graph to see how levels at each site compare.

#### Trainer Tools

##### Attention Index

- At upper left there are two meters showing the Attention Index current value and session average. The Attention Index is a measure of how consistently the HEG ratio is increasing. 100% is best. The AI Session score can be used to track progress across sessions.
- At center left is the AI threshold. This is set at 70% and should not be changed. Bar is orange when trainee is above 70%.
- Below the threshold are two buttons that allow you to control the sound associated with the threshold. You can choose to have a tone or not. If you turn the Tone On you can choose whether it will play when trainee is above the threshold (reward) or falls below 40% (warning). The tone can be useful when the client is training during a task.
- At lower left are two meters which show the AI points and AI points per minute. A point is earned each time the AI index is 100% for one second. Average AI Points for the session can also be used to track progress across sessions.
- At lower center is a trend graph showing the AI across the entire session.

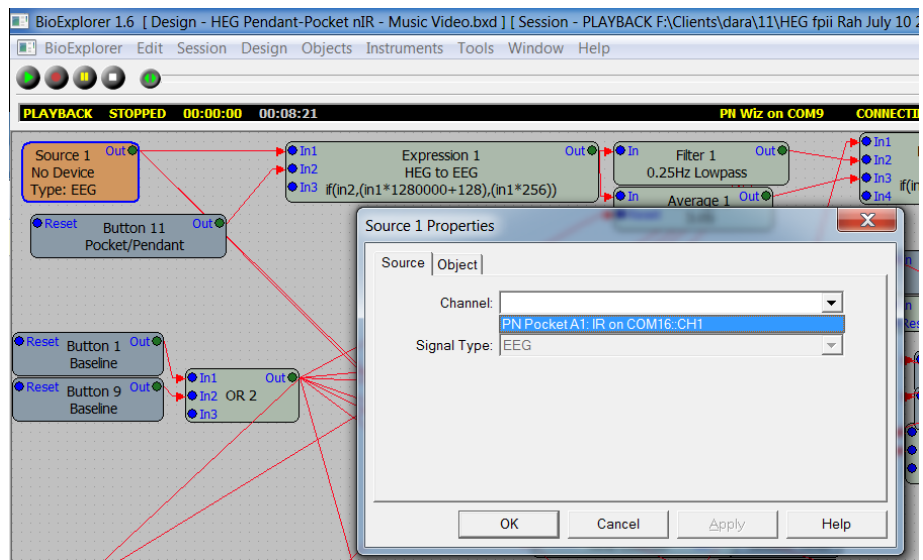
##### Red/Infrared Ratio

- Threshold bar on the right controls the visual feedback and the white target line in the red trend Graphs on Instruments 1 and 2. When the bar is above the green line and turns red, the video/DVD/game reward feedback will occur. When the bar falls below the green line, the display will stop or change.

- The threshold is originally set to Auto 80%. The green line will move to keep the trainee scoring 80% of the time. By clicking Auto, you can toggle the threshold to Manual. It will then be stationary unless you move it. If you change to Manual at the same time you click Capture Baseline, the threshold and baseline (value shown on Instruments2) will be approximately the same. And the white line in the red trend graphs will be flat and equal the baseline.
- Below the threshold is a button that allows you to control the sound associated with the threshold. You can choose to have a tone or not. If you turn the Tone On it will sound when the HEG ratio is below threshold target.
- The current value of the ratio and the baseline is in white. When the baseline is captured, the meter will show the ratio at the time as a constant. This is the value the trainee wants to stay above.
- On the lower right two meters show the gain over the baseline. Current HEG Gain shows percent gain (or loss) of current ratio over the baseline. Max% shows the highest gain for the session.
- Trend graph in center of page shows training ratio and target line. The trainer can use the trend graphs for feedback, telling the client, “figure out how to make the graph rise.”

## Special Notes

- Session timer is not set. Trainer should control session length based on graphed performance or targeted training time. When the client’s graph turns to a consistent negative trend, it is best to stop training;
- In early sessions, segments may last 3-6 minutes. Times will increase gradually. Do not train above 10 minutes per site. Two sessions a week (1 every 4 days) are optimal; sessions may be done every 2-3 days in the very beginning if times are short.
- If you start the session *and no signal is playing*, open Window | Signal Diagram and change the source. Right-click Source, press dropdown arrow for Channel and select the device you are using.



## Feedback

- The Instruments 2 window presents graphs and a tone controlled by the increase of HEG ratio over baseline (Gain).
- The Instruments 1 window displays video, DVD or games for the trainee. How these behave depends on the trainee’s performance with ratio signal over threshold.
- A click sounds whenever the HEG ratio is above threshold for 1 second.

## BxShadow

- Use Attention Index (AI) training (default) or Ratio training to control the shadow using the button under the threshold.

- Start the session, capture baseline and then set BxShadow's range to Automatic and enable shadow.

## HEG nIR Peanut/Pendant (Pnt), Pocket (DVD, BxShadow, Games, Music Video)

### Type of training

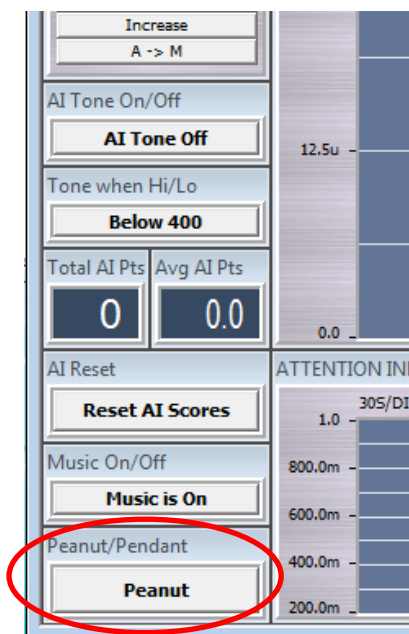
- 1 channel blood perfusion and oxygenation training.
- Only for use with nIR (near Infrared) usually performed at 3 different forehead sites, often Fp1 / Fp2 / Fpz. Sites should be rotated in different order and can go out to the edge of the forehead. Not recommended on temples.
- Generally useful for executive/control functions: physical/emotional/behavioral regulation, organizing/planning, attention, etc..
- Every 3-4 days is sufficient; do not over-train in terms of time or frequency to avoid headaches, irritability, etc.

### The Training Session

- Open the Design with the type of feedback you want (Video, Games, etc.).
- Load media into media player.
- **Select for Pendant or Peanut** (default).
- Position the headband and start Playing/Recording the session clicking the green Start triangle.
- Instruments 2 has a Trend Graph. Watch the red area on the graph until it stabilizes. Then click Capture Baseline button which will reset the timer, Attention Index Points and record the baseline. If desired, immediately change threshold to Manual, so threshold = baseline. Click Control on DVD player if applicable.
- Trainer may prefer to do 3 sites in a single graph to see how levels at each site compare.

### Trainer Tools

- In the Pnt design, at lower left is a button to select Pendant or Peanut. Use Pendant driver in BioExplorer | Devices.



### Attention Index

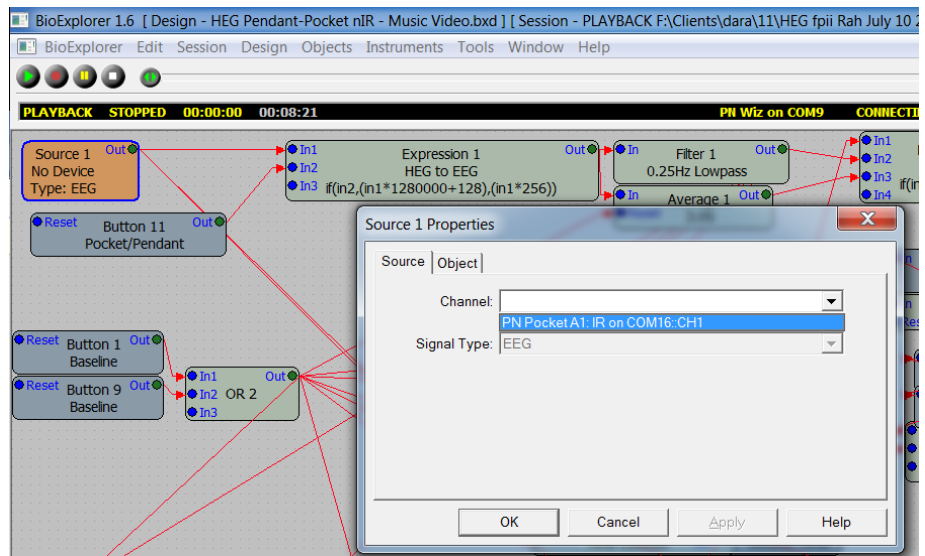
- At upper left there are two meters showing the Attention Index current value and session average. The Attention Index is a measure of how consistently the HEG ratio is increasing. 100% is best. The AI Session score can be used to track progress across sessions.
- At center left is the AI threshold. This is set at 70% and should not be changed. Bar is orange when trainee is above 70%.
- Below the threshold are two buttons that allow you to control the sound associated with the threshold. You can choose to have a tone or not. If you turn the Tone On you can choose whether it will play when trainee is above the threshold (reward) or falls below 40% (warning). The tone can be useful when the client is training during a task.
- At lower left are two meters which show the AI points and AI points per minute. A point is earned each time the AI index is 100% for one second. Average AI Points for the session can also be used to track progress across sessions.
- At lower center is a trend graph showing the AI across the entire session.

## Red/Infrared Ratio

- Threshold bar on the right controls the visual feedback and the white target line in the red trend Graphs on Instruments 1 and 2. When the bar is above the green line and turns red, the video/DVD/game reward feedback will occur. When the bar falls below the green line, the display will stop or change.
- The threshold is originally set to Auto 80%. The green line will move to keep the trainee scoring 80% of the time. By clicking Auto, you can toggle the threshold to Manual. It will then be stationary unless you move it. If you change to Manual at the same time you click Capture Baseline, the threshold and baseline (value shown on Instruments2) will be approximately the same. And the white line in the red trend graphs will be flat and equal the baseline.
- Below the threshold is a button that allows you to control the sound associated with the threshold. You can choose to have a tone or not. If you turn the Tone On it will sound when the HEG ratio is below threshold target.
- The current value of the ratio is and the baseline is in white. When the baseline is captured, the meter will show the ratio at the time as a constant. This is the value the trainee wants to stay above.
- On the lower right two meters show the gain over the baseline. Current HEG Gain shows percent gain (or loss) of current ratio over the baseline. Max% shows the highest gain for the session.
- Trend graph in center of page shows training ratio and target line. The trainer can use the trend graphs for feedback, telling the client, “figure out how to make the graph rise.”

## Special Notes

- Session timer is not set. Trainer should control session length based on graphed performance or targeted training time. When the client’s graph turns to a consistent negative trend, it is best to stop training;
- In early sessions, segments may last 3-6 minutes. Times will increase gradually. Do not train above 10 minutes per site. Two sessions a week (1 every 4 days) are optimal; sessions may be done every 2-3 days in the very beginning if times are short.
- If you start the session *and no signal is playing*, open Window | Signal Diagram and change the source. Right-click Source, press dropdown arrow for Channel and select the device you are using.



## Feedback

- The Instruments 2 window presents graphs and a tone controlled by the increase of HEG ratio over baseline (Gain).
- The Instruments 1 window displays video, DVD or games for the trainee. How these behave depends on the trainee’s performance with ratio signal over threshold.
- A click sounds whenever the HEG ratio is above threshold for 1 second.

## BxShadow

- Use Attention Index (AI) training (default) or Ratio training to control the shadow using the button under the threshold.
- Start the session, capture baseline and then set BxShadow's range to Automatic and enable shadow.

## HEG nIR Wiz (DVD, BxShadow, Games, Music Video)

### **Type of training**

- 1 channel blood perfusion and oxygenation training for nIR only.
- nIR (near InfraRed) usually performed at 3 different forehead sites, often Fp1 / Fp2 / Fpz; sites should be rotated in different order and can go out to the edge of the forehead. Not recommended on temples.
- Generally useful for executive/control functions: physical/emotional/behavioral regulation, organizing/planning, attention, etc.
- Every 3-4 days is sufficient; do not over-train in terms of time or frequency to avoid headaches, irritability, etc.

### **The Training Session**

- Open the Design with the type of feedback you want (Video, Games, DVD).
- Load media in media player.
- Position the headband and start Playing/Recording the session clicking the green Start triangle.
- Instruments 2 has a button to Capture Baseline and a Trend Graph. Watch the red area on the graph until it stabilizes. Then click Capture Baseline button which will reset the timer, Attention Index Points and record the baseline. If desired, immediately change threshold to Manual, so threshold = baseline. Click Control on DVD player if applicable.
- Trainer may prefer to do 3 sites in a single graph to see how levels at each site compare.

### **Trainer Tools**

#### Attention Index

- Upper left there are two meters showing the Attention Index current value and session average. The Attention Index is a measure of how consistently the HEG ratio is increasing. 100% is best. The AI Session score can be used to track progress across sessions.
- Center left is the AI threshold. This is set at 70% and should not be changed. Bar is orange when trainee is above 70%.
- Below the threshold are two buttons that allow you to control the sound associated with the threshold. You can choose to have a tone or not. If you turn the Tone On you can choose whether it will play when trainee is above the threshold (reward) or falls below 40% (warning). The tone can be useful when the client is training during a task.
- Lower left are two meters which show the AI points and AI points per minute. A point is earned each time the AI index is 100% for one second. Average AI Points for the session can also be used to track progress across sessions.
- Lower center is a trend graph showing the AI across the entire session.

#### Red/Infrared Ratio

- Threshold bar on the right controls the visual feedback and the white target line in the red trend Graphs on Instruments 1 and 2. When the bar is above the green line and turns red, the video/DVD/game reward feedback will occur. When the bar falls below the green line, the display will stop or change.

- The threshold is originally set to Auto 80%. The green line will move to keep the trainee scoring 80% of the time. By clicking Auto, you can toggle the threshold to Manual. It will then be stationary unless you move it. If you change to Manual at the same time you click Capture Baseline, the threshold and baseline (value shown on Instruments2) will be approximately the same. And the white line in the red trend graphs will be flat and equal the baseline.
- Below the threshold is a button that allows you to control the sound associated with the threshold. You can choose to have a tone or not. If you turn the Tone On it will sound when the HEG ratio is below threshold target.
- The current value of the ratio and the baseline is in white. When the baseline is captured, the meter will show the ratio at the time as a constant. This is the value the trainee wants to stay above.
- At the lower right two meters show the gain over the baseline. Current HEG Gain shows percent gain (or loss) of current ratio over the baseline. Max% shows the highest gain for the session.
- Trend graph in center of page shows training ratio and target line. The trainer can use the trend graphs for feedback, telling the client, “figure out how to make the graph rise.”

## Special Notes

- Session timer is not set. Trainer should control session length based on graphed performance or targeted training time. When the client’s graph turns to a consistent negative trend, it is best to stop training;
- In early sessions, segments may last 3-6 minutes. Times will increase gradually. Do not train above 10 minutes at any site. Two sessions a week (1 every 4 days) are optimal; sessions may be done every 2-3 days in the very beginning if times are short.

## Feedback

- The Instruments 2 window presents graphs and a tone controlled by the increase of HEG ratio over baseline (Gain).
- The Instruments 1 window displays video, DVD or games for the trainee. How these behave depends on the trainee’s performance with ratio signal over threshold.
- A click sounds whenever the HEG ratio is above threshold for 1 second.

## BxShadow

- Use Attention Index (AI) training (default) or Ratio training to control shadow using the button under the threshold.
- Start the session, capture baseline and then set BxShadow's range to Automatic and enable shadow.

## HEG pIR Pendant or Wiz (DVD, BxShadow)

### Type of training

- 1 channel blood perfusion and oxygenation training.
- pIR (passive InfraRed) always performed at Fpz.
- Generally useful for executive/control functions: physical/emotional/behavioral regulation, organizing/planning, attention, etc.
- Every 3-4 days is sufficient; do not over-train in terms of time or frequency to avoid headaches, irritability, etc.

### The Training Session

- Open the Design.
- Load DVD into DVD player.

- Position the headband and start Playing/Recording the session clicking the green Start triangle.

## Automatic Mode

- Start DVD and click **Control** on DVD player. Client should now enjoy the movie with no feedback.
- The baseline will set automatically at 5 minutes.
- Wiz amplifiers: When ding sound is heard at 4 minutes, press HEG Calibrate In Wiz window (or link on Q-wiz)

## Manual Mode

- Start DVD and click **Control** on DVD player. Client should now enjoy the movie.
- When signal is stable click the "Capture Baseline" button and the feedback will respond to the signal.

## **Trainer Tools**

### HEG Level

- Threshold bar on the right controls the visual feedback and the white target line in the green graphs on Instruments 2. When the bar is above the green line and turns green, the DVD/reward feedback will occur. When the bar falls below the green line, the display will stop or change.
- The threshold is originally set to Auto 66%. The green line will move to keep the trainee scoring 66% of the time. If feedback does not stop at least 1 or 2 times per minute you may change the threshold to manual or change the target.
  1. Right-click on the threshold object in the trainer screen.
  2. Select Properties.
  3. Change the number in Auto Targets (Percent Success) (e.g. 60).
- The current value of the HEG level and the baseline is in white. When the baseline is captured, the meter will show the HEG level at the time as a constant.
- Below the threshold is a button that allows you to control the sound associated with the threshold. You can choose to have a tone or not. If you leave "HEG Level Alert" on it will sound when the HEG level is below threshold target.
- The graph at top displays 10 seconds of the HEG signal as it rises and falls.
- Trend graphs in center of page show training level and target line over 1 minute and the entire session.
- On the lower right two meters show the gain over the baseline. Current HEG Gain shows percent gain (or loss) of current ratio over the baseline. Max% shows the highest gain for the session.

### Trainee Screen (Instruments 1)

- DVD player fills most of the screen.
- Bar at left shows HEG training signal
- Small graph below shows 1 second of the HEG signal so you can observe which direction the signal is traveling.
- Trend graph below DVD player shows the Training Level and Target over 1 minute's time.

## **Special Notes**

- Session timer is set to 35 minutes. Trainer should control session length based on graphed performance or targeted training time. When the client's graph turns to a consistent negative trend, it is best to stop training;



- In early sessions, segments may last 3-6 minutes. Times will increase gradually. Do not train above 30 minutes. Two sessions a week (1 every 4 days) are optimal; sessions may be done every 2-3 days in the very beginning if times are short.

## **Feedback**

- The Instruments 2 window presents graphs and a tone controlled by the increase of HEG ratio over baseline (Gain).
- The Instruments 1 window displays DVD for the trainee. How this behaves depends on the trainee's performance with HEG signal over threshold.

## BxShadow

- Enable BxShadow, start feedback (e.g. movie) and drag the shadow over the feedback screen. Double-click the shadow to maximize and click Fix (upper right corner) to use full screen.
- Start session and select Automatic expected data range. After the baseline is set, the shadow will respond to the HEG level, brighter when above threshold, dimmer when below.

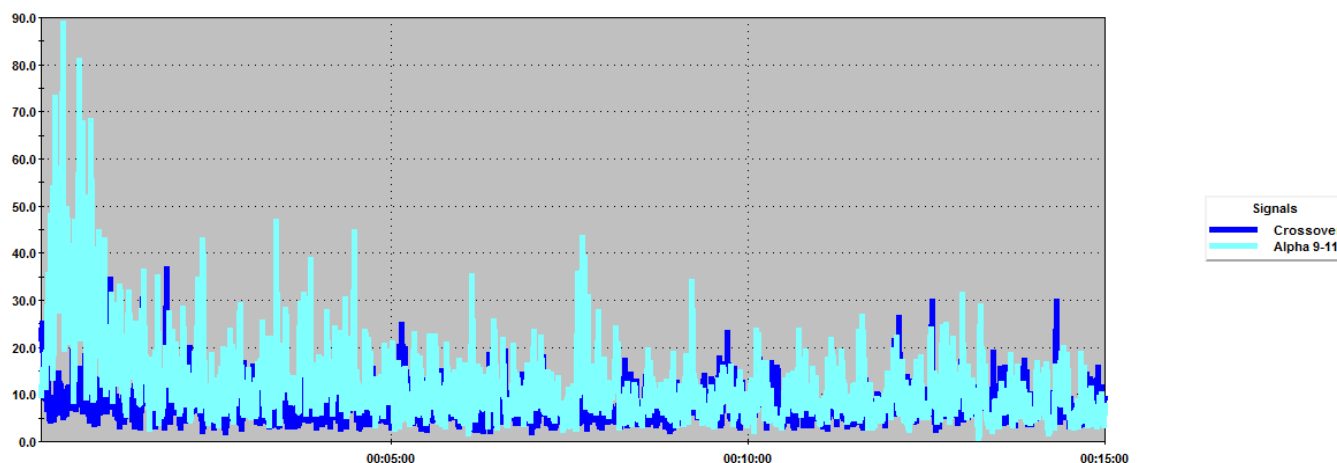
## Chapter 7: Reports

### ALP1C Alpha Peak Frequency

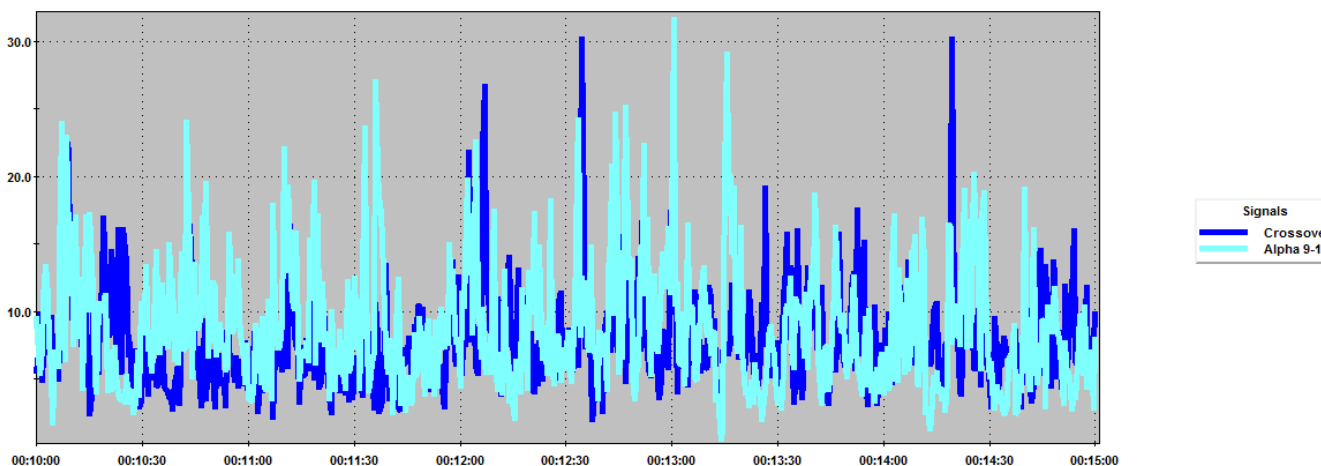
Default view shows Alpha peak frequency and 2-38 Hz peak frequency with overall standard deviation. Check amplitudes or High alpha/Low alpha Ratio to view them.

### ALP1C Alpha Theta

View 1 shows 6-8 Hz Crossover, 9-11 Hz Alpha with the option to view 4-8 Hz Theta, 2-5Hz "Hum" or 19-38 Hz "Static."



Zoom in to see crossovers in detail. When dark blue shows behind light blue, that is a crossover.



### ALP1C-4C Alpha Stats

View 1 shows Alpha Amplitude vs. Non-Alpha Amplitude. View 2 shows Fast Alpha/Slow Alpha ratio. View 3 shows Alpha percent as ratio of entire EEG. View 4 shows Dominant Frequency for 8-12 Hz.

### BAL2C Sum Difference

Default view shows 2-11 Hz and 15-38 Hz Amplitudes with option to view additional bands' amplitudes, including 2-38 Hz.

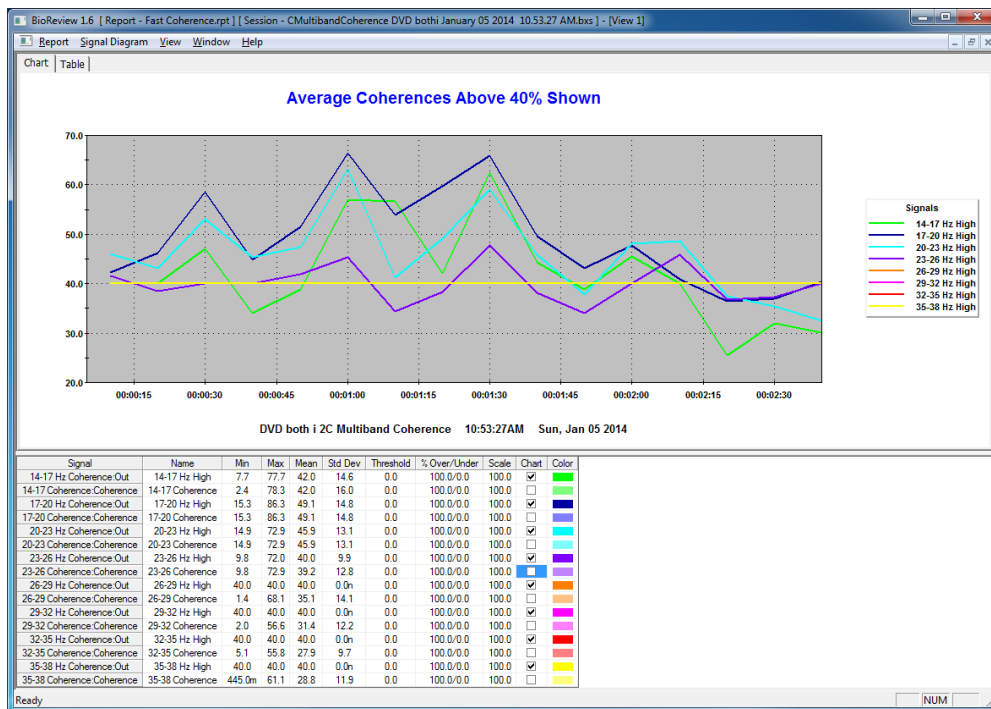
## BAL2C-4C Alpha Beta

View 1 default is Beta Left/Right, Alpha Right/Left. Check Differential signals to view Left-Right, Right-Left. View 2 shows amplitudes.

## CON2C Fast Coherence

Fast coherences in 3 Hz bands are shown to identify any specific bands where training would make sense (to reduce). If the average coherence is above 40% it is shown on the graph. Display actual coherence level to check signals if needed.

In the example, the four slowest bands' average are above 40% and are shown. The rest are flat at 40%, indicating that their average is not high. Notice in the last 30 seconds averages have come down below 40%.



## CON2C Theta Alpha Gamma Sync

View 1 shows slow and fast amplitudes for each channel and combined slow and fast amplitudes. View 2 shows Theta, Alpha and Gamma Phase with the option to view these coherences as well as combined amplitudes for each.

## CON2C-4C Multiband Coherence

Shows Coherence and Phase difference in low and high frequencies for 2- or 4-channel recordings.

## CON4C Gamma Sync

Left/Right and Front/Back Gamma Coherence and Phase difference for 4-channel recordings.

## FRE1C

Default view shows 2-11 Hz, 9-13 Hz, 13-21 Hz and 23-38 Hz amplitudes with the option to view amplitudes in smaller bands and 3-30 Hz peak frequency.

## FRE1C-4C Theta Beta

View 1 shows Theta/Beta power ratio for each channel in 1- to 4-channel recordings. View 2 shows 4-8 Hz Theta and 13-21 Hz Beta amplitudes for each channel.

## FRE2C

Default view shows 2-38 Hz squash amplitude in each channel and 12-16 Hz window amplitude with the option to view various bands of interest as used in Frequency 2C design.

## HEG nIR (Peanut, Pendant, Pocket, Wiz)

A simple session trend graph to see the HEG ratio and gain over a session.

## OVERALL Report 2C-4C

Multiple views showing amplitudes, ratios, peak frequencies, coherence and phase based on the TQ7 Assess Pro Gather design. Select or deselect signals to view.

## TQ7 Assess Pro Gather 2C or 4C Report

Create epochs txt files for TQ7 artifacting for 2-channel or 4-channel recordings made with older versions of the TQ7 Assess design.

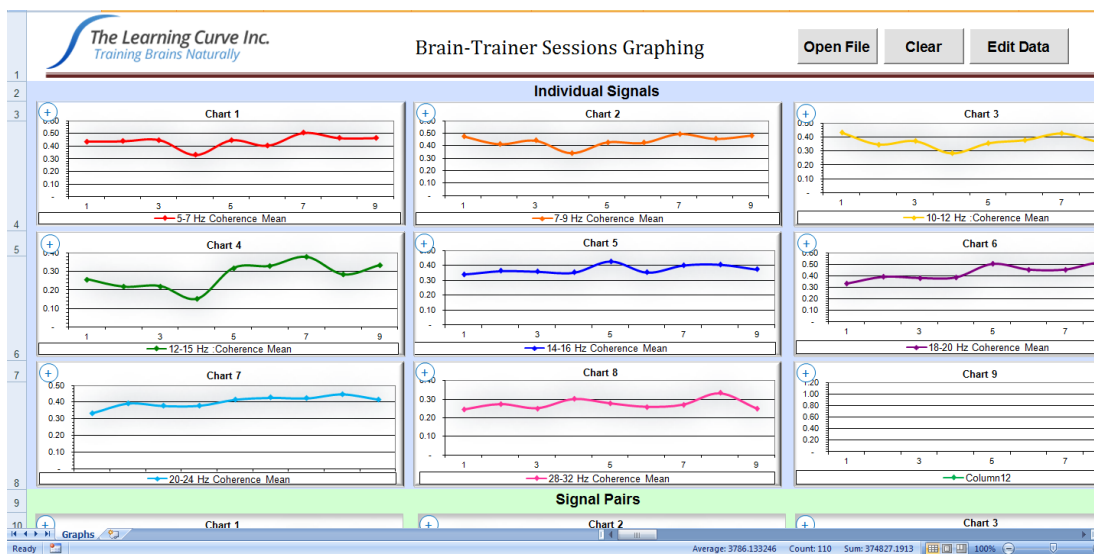
### [Reports Video Demo](#)

## Graphing - Excel

Universal graphing file opens in Excel to graph BioExplorer's Cumulative Summary.txt data. **To use this file you must record your training sessions.** Before beginning with each client, select the client folder (if already present) or create a client folder in My Documents\Sessions to keep training data separate.

When starting a session, *press Record (red circle) to save data.*

Keep this file in your Documents\Brain-Trainer folder for easiest file finding or any place you prefer. Browse to the client folder to open the Cumulative Summary.txt file and data are graphed.



You may view individual signals or signal pairs, depending on type of training and preference.

### [Graphing Video Demo](#)

## Appendix I: Alpha/Theta

The Pachelbel Canon is a 60-beat baroque piece which has been shown to be effective in increasing alpha levels in the brain. The instruction while the "piano is playing" is to disengage your mind from your thoughts: just watch them. When a thought comes in, don't fight it and don't ride it. Just notice it is there, as you notice the music and your body.

The Chant of Metta is a beautiful prayer--a blessing song sung in sweet childlike voices. When "the girl begins to sing" the client is to begin her visualization. After they have finished the visualization, then we tell them let your brain go where it goes.

Chant is a male voice, more of a primitive feel. Some see it as darker, scarier. The instruction here is just to continue your voyage, go where you go.

Finally the Meditation on Thais, the violin piece, tells us that we've turned for home. The music will end, we'll open our eyes (when ready) and recall what we choose. The higher frequency violin line tends to draw the brain toward faster speeds as well.

### VISUALIZATION

Before the session--often a week before, I spend some time with the client to talk about her visualization. This can be oriented at changing an unwanted behavior or attracting herself toward some desired outcome. It can also be used to guide an experience.

One client with a history of neglect very early in life told me at the end of one of her sessions that she let herself sink down into the Chant of Metta and feel herself as an infant surrounded by that love and gentleness. I've passed that along from time to time, and others have found it helpful. We choose what she will use prior to the session, talk about whether she has "videos" that run in her head replaying painful or humiliating experiences. We may spend a session or two showing her how to clear these. We talk about visualizing an experience, what happens, how she responded, then rewrite the script by having her visualize herself doing something different, how the experience changes, etc.

### GOING DEEP

The woman who visualized in the Chant of Metta, after a session or two could stay in it all the way through the piece. One session, after perhaps 5-6 Alpha Thetas she came up at the end with the news that she had been able to carry her experience into the male voice, which had always stopped her before. She felt Metta was caring/nurturing while chant was safety and protection, and she was finding sources of both within herself.

2:38 end of canon

12:07 end of metta chant

19:13 end of deep chant

23:47 music ends

## Appendix II: BAL4C RH Bipolar

Actually the BAL4C RH Bipolar is a combination of effective bipolar montages as follows:

C4/T4 (reducing fast/increasing slow differences between the sites) often very helpful for reducing physical hyperactivity.  
Fp2/T4 (reducing fast/increasing slow differences between the sites) often very helpful for reducing racing thoughts.  
T3/T4 (reducing all differences between the sites) for emotional stability  
P4/T4 reducing fast/increasing slow differences between the sites) often very helpful for reducing sensorial sensitivity.

I do not generally use this protocol for slow-brained children or adults, but those with fast activity often respond very well to it. The protocol is automatically triggered on the plan (with an \*) by one or more items on the Client Report relating to the issues the protocol trains.

Note that this protocol is training right hemisphere linkages--except for the classic T3/T4--to reduce excessive activation over the right, which keeps that hemisphere from functioning effectively.

The Bach Fugues have been shown to activate the right-hemisphere's ability to function more integratively and dealing with complexity/novelty instead of the more rules-based and habitual strategy of the left. One explanation for this is that in the fugues, Bach works with multiple "voices" playing different lines that operate in counterpoint. The complexity overwhelms the left hemisphere.

I chose the video that not only play the music but also provide a visual representation of the voices. I don't train in the way outlined. I turn off Music and leave on Video (in BioExplorer the video player is loaded with the three videos/audios). I ask the client to keep eyes open, listen to the music and watch the video. I explain that in the beginning, where most pieces start with a single voice, he can see how the visual matches the audio, moving up and down and using longer or shorter notes. Then, when the second musical voice appears, the video adds a second line of a different color, and the client can follow how they work together, etc. I tell him it's not about "understanding", but about seeing and hearing and letting his brain make the connection, just enjoying the music.

I usually use the design for about 6 minutes--two of the shorter fugues (about 3 minutes each) or the Great Fugue, which is about 6 minutes.