



BIOFEEDBACK FOUNDATION OF EUROPE  
*The Foundation for Learning™*  
 Educational CD-ROM

# Integrated Neurofeedback

Replaying mode. Open Display session. Client: Le\*\*\*\*\*, O\*\*\*\*\*. Screen: C+D Low + High Inhibits / Rewards 1 Puzzle All

File Session Screens Edit Options View Help

×10 Min Max Thr1 Thr2 5 sec. 1x GoTo 00:00:00

C: Raw EEG

High % ->>> 70.99 %  
 in the grey zone is good

How long to complete this animation?  
 OR  
 How many points in X minutes?

Try to beat your score / time from previous sessions.

TITLE HERE represents the values for the bargraph (the percentage instrument), the linegraph, and the bars in the trend instruments.

C: Lo Artefact

D: Low inhibit LCF = 3.0 HCF = 9.0

C: Reward 1 LCF = 15.0 HCF = 18.0

C: High inhibit LCF = 19.0 HCF = 38.0

C: Hi Artefact

D: Raw EEG

Keep bar grey, without inhibit or artefact, for one unit of time to get animation going with extra sound.

Keep it grey for the set # of units to get 1 point, the light, and a sound.

If you don't want to use artefacts, raise thresholds very high.

Right-click on bands values to change them (below).

D: Lo Artefact

D: Low inhibit LCF = 3.0 HCF = 9.0

D: Reward 1 LCF = 12.0 HCF = 15.0

D: High inhibit LCF = 19.0 HCF = 38.0

D: Hi Artefact

One time unit. The animation moves with 2rd sound

4 Units  
 27 Points

5 sec. epoch    20 sec. epoch    First minute    1 minute epoch

Session paused    Open session: 00:03:01.625 / 00:03:02.000

Démarrer    IntegratedNeurofeedbac...    Infiniti Software Syst...    11:41

## SUITE CONTENT SUMMARY

- In the Integrated Neurofeedback Suite most screens use multiple bands from 2 channels, combined in one main bar graph. A judicious use of user-defined bands automatically creates a large number of training screens tailored to the client's specific needs. Unique Protocol Selector screens speed-up review time and helps selecting the next protocol by comparing the one just used to other potential protocols.
- While this suite includes screens which use the typical protocols, like 4-8 Hz / 15-18 Hz, it becomes especially useful when used with values coming from assessments (Full QEEG, TLC Assessment and other mini-Qs, CNC-1020, etc.).

## DR. FRANCOIS DUPONT

*Dr. François Dupont is a Clinical Psychologist in private practice at the University of Ottawa, Health Services. His first contact with bio/neurofeedback was in 1991 under Paul Swingle's doctoral supervision. He has used bio/neurofeedback in the context of chronic pain, ADD/H, ASD, Tourette's syndrome, anxiety, traumatic brain injury, trauma, OCD, etc. Dr. Dupont combines bio/neurofeedback with techniques borrowed from cognitive-behavioural, dynamic/humanistic and experiential approaches. His doctoral comprehensive examination looked at the psycho-socio-existential adjustment to cancer, while his doctoral dissertation dealt with the effect of sub-threshold audio recording on EEG and on behavioural changes in ADD/H children. For more information go to: [www3.sympatico.ca/fdupont-phd](http://www3.sympatico.ca/fdupont-phd).*

## DOCUMENTATION

The Integrated Neurofeedback Suite includes information on the use of the training screens, the review screens, and how to make the most of the Protocol Selectors.

## SAMPLE DATA

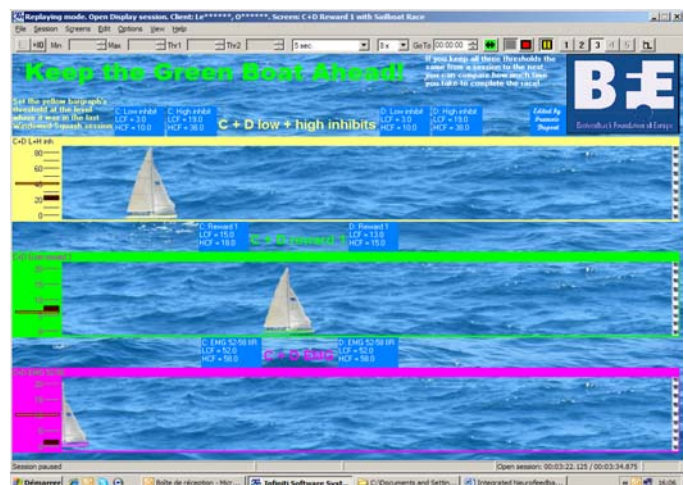
The suite contains data from clients with different symptoms in each session, so you can replay sessions with different training screens and experiment with the review screens and the Protocol Selectors.

## CHANNEL SETS

The Integrated Neurofeedback Suite, a continuous work in progress, contains, at this stage, 18 channel sets. One is reserved for general training screens, one is for connectivity (coherence and phase), another one is for Percentage of Total Power from Joint Time-Frequency Analysis (Gabor), while the others are for statistics (including the possibility of using the same review screens with other BFE and TTL suites which use 1 EEG and/or physiology measures).

## DISPLAY SCREENS (In your word processing software, zoom in at 200% for details)

- While screens using the widely accepted bands are offered, this Suite is especially easy to use with values coming from assessments (QEEG, CNC 10-20, TLC Assessment and other mini-Qs) and from research and exploration data. For example, a clinician could easily integrate the values suggested elsewhere for training with a specific condition, and would retain the ability to train with one main bar graph, instead of six (for 2 channels). The same review screens one gets comfortable with could also be used.
- Many screens are automatically created with clients' specific values, including the "Auto-Ratio Screens" and the "Race Screens".



## List of Screens in the Integrated Neurofeedback Suite (January 2009)

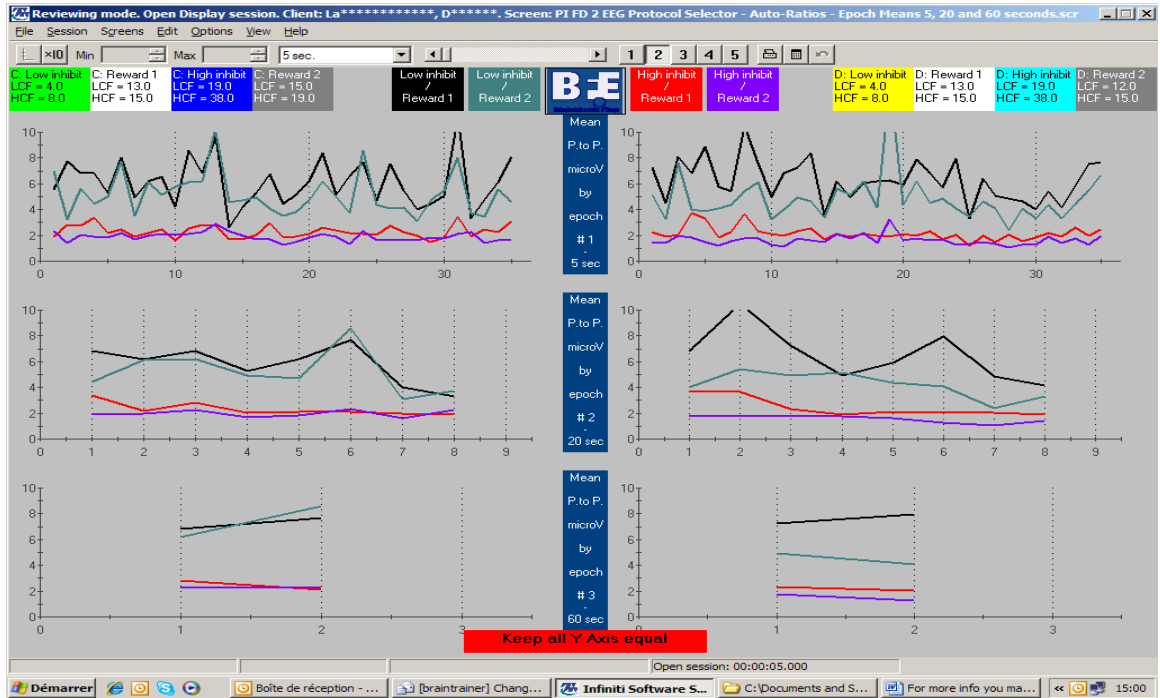
For channels A and B with P2 and P+ encoders; and for channels C and D with P1 and P5.

<b>2 Channel Off-Training Screens</b> One Planning Screen and many Review / Protocol Selectors Screens	<b>1 Channel Training Screens</b> All with animation and DVD as feedback options.	<b>2 Channel Training Screens</b> All with animation and DVD as feedback options.
<ul style="list-style-type: none"> <li>• A 2 channel Planning Screen</li> </ul> <p>Used to set the following bands to the clients' specific needs:</p> <p>Wide Bands (Default: 2-38 Hz)                      Low Artefacts (Default: 0.5-2 Hz)                      High Artefacts (Default: 52-58 Hz)                      Low Inhibits                      High Inhibits                      Small Band Inhibits                      Rewards 1                      Rewards 2                      User Defined Bands for Percentage of Total Power</p> <p>Review screens for:</p> <ul style="list-style-type: none"> <li>• Standard Bands</li> <li>• User defined Bands</li> <li>• Standard Ratios</li> <li>• Auto-Ratios</li> <li>• Complex Protocols - 2 channels combined</li> <li>• Complex Protocols - 2 channels separated</li> <li>• Alpha - Beta Symmetry</li> <li>• Raw signals with Low and High Artefacts</li> <li>• Raw signals with 3D spectra</li> <li>• Coherence</li> <li>• Screens for statistics</li> </ul> <p>Also, all training screens can be used for review, since they all integrate trend instruments in them.</p>	<ul style="list-style-type: none"> <li>• Small Band Inhibit (Squish)</li> <li>• Wide Band (2-38 Hz) Inhibit</li> <li>• Low + High Inhibits (1 channel Windowed Squash)</li> <li>• Low + High Inhibits / Reward 1</li> <li>• Low + High Inhibits / Reward 2</li> <li>• Low + High Inhibits / Rew. 1+2</li> <li>• High Alpha 10-12 Hz Percentage of Total Power (FFT)</li> <li>• User Defined Band Percentage of Total Power (FFT)</li> <li>• Percentage of Total Power from Joint Time-Frequency Analysis - Gabor</li> <li>• High Inhibit / Reward 1</li> <li>• High Inhibit / Reward 2</li> <li>• Low Inhibit / Reward 1</li> <li>• Low Inhibit / Reward 2</li> <li>• Theta 4-8Hz / LoBeta 13-15Hz</li> <li>• Theta 4-8Hz / Beta 15-18Hz</li> <li>• HiAlpha 10-12 / Theta 4-8 (Up)</li> <li>• Intensity 19-23 / HiAlpha 10-12</li> <li>• Busy Brain 23-38 / LoBeta 13-15</li> <li>• 10-12 Hz Reward - With</li> <li>• 13-15 Hz Reward - 8</li> <li>• 15-18 Hz Reward - inhibits</li> <li>• 38-42 Hz Reward - integrated</li> <li>• User's Reward 1 - in 3</li> <li>• User's Reward 2 - bar graphs</li> <li>• Alpha-Theta (4 screens)</li> <li>• Alpha Peak Frequency</li> <li>• Alpha Peak Frequency + HiAlpha % of Total Power</li> </ul>	<ul style="list-style-type: none"> <li>• Small Band Inhibits (Squish)</li> <li>• Wide Band (2-38 Hz) Inhibits</li> <li>• Low + High Inhibits (2 channel Windowed Squash)</li> <li>• Low + High Inhibits / Rewards 1</li> <li>• Low + High Inhibits / Rewards 2</li> <li>• Low + High Inhibits / Rew. 1+2</li> <li>• High Alpha 10-12 Hz Percentage of Total Power (2 bar graphs)</li> <li>• User Defined Band Percentage of Total Power (Default is 15-18 Hz on channel 1 and 13-15 Hz on channel 2)</li> <li>• Rewards 1 in 1 bar graph</li> <li>• Rewards 1 in 2 bar graphs</li> <li>• Rewards 2 in 1 bar graph</li> <li>• Rewards 2 in 2 bar graphs</li> <li>• Rewards 1 racing with Inhibits</li> <li>• Rewards 2 racing with Inhibits</li> <li>• Rewards 1+2 racing + Inhibits</li> <li>• Ch. 2 Alpha / Ch. 1 Alpha</li> <li>• Ch. 1 Beta / Ch. 2 Beta</li> <li>• Alpha Beta Symmetry</li> <li>• Coherence (Many bands)</li> <li>• Experimental Alpha Phase</li> </ul>

## REVIEW SCREENS

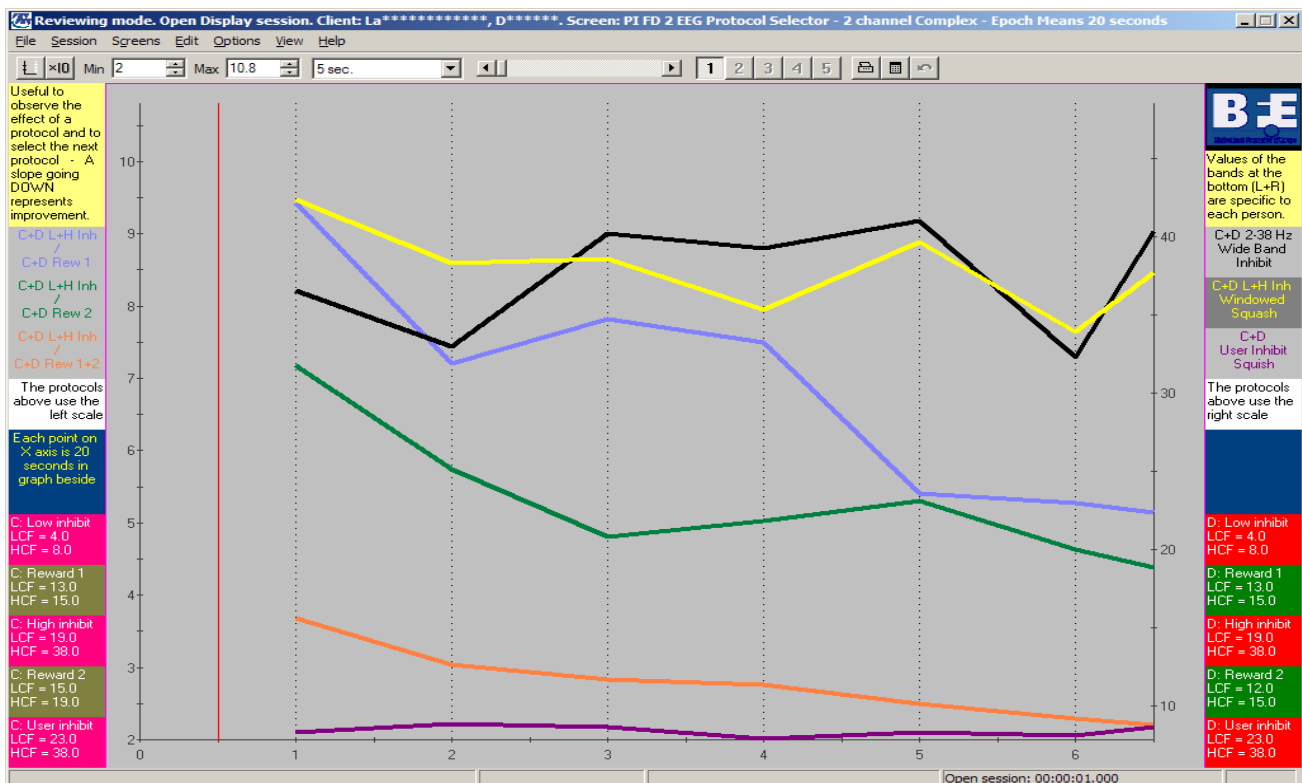
- All review screens present 2 channels, even when we use only one channel during training. For example, with the ProComp Infiniti (PI), input C is always on the left side of the review screens, and input D is always on the right. As a rule, input C is used for the left or front of the head and input D for the right or the back of the head. This approach helps the comparison of results from different training sessions.

- The Protocol Selector screens plot the actual protocol (the resulting bar graph value) instead of displaying only the values of the individual bands.



- For example, it will plot the value of "left and right low inhibits + left and right high

inhibits", not only to quickly and easily show if the client is making overall progress, but also to verify if maybe another protocol could be superior to the one used in the recording. Analysing the following screen capture, one could decide to test the hypothesis that the blue protocol (2 channel reward 1) or the green protocol (2 channel Windowed-Squash), which was used for the recording of this session. All band values are client specific.



## SUPPORTED HARDWARE

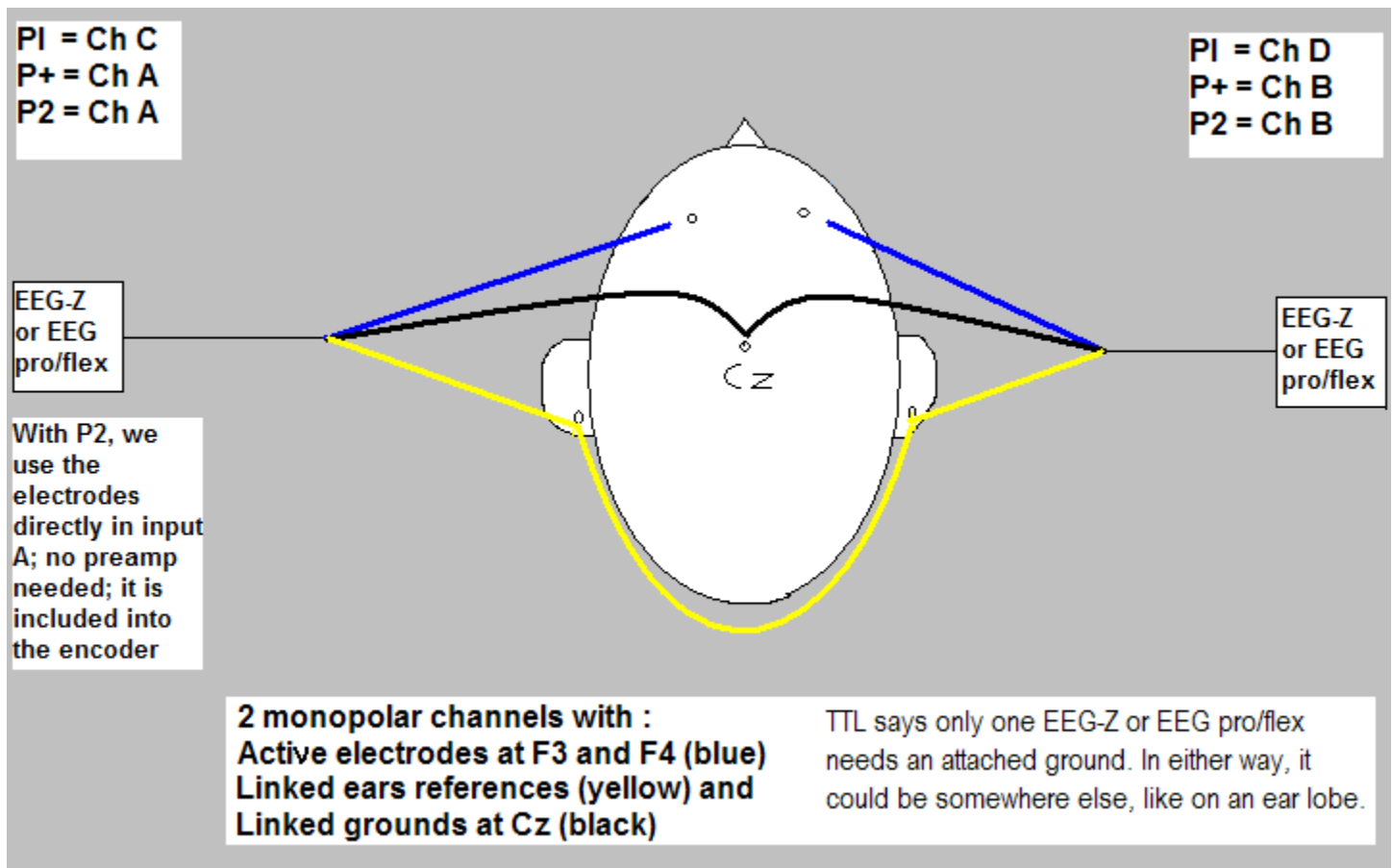
The Suite can be used on the ProComp Infiniti, ProComp 5, ProComp 2, and ProComp + encoders.

## SUPPORTED SOFTWARE

The Suite can be used with the BioGraph Infiniti software version 5.

## SUGGESTED SENSORS, EXTENDER CABLES AND ACCESSORIES

The Suite, to be used optimally, requires 2 EEG pre-encoders (like the EEG-Z) and related sensors. Linked ear references and common ground is preferable. Contact your equipment distributor for options.



## OTHER LANGUAGE AVAILABILITY

Only in English at the moment.