

Protocol Design Example – downtrain coherence while inhibiting high beta

A request was received for a protocol design that “allows me to down-train coherence, 13-18 (with coherence defined conventionally) AND simultaneously inhibit power at 15-30.

As is our policy, the design below is provided for educational purposes. Each practitioner should confirm for themselves that the protocol works as required. It is the practitioner’s responsibility to determine the suitability of this protocol for any clinical use.

Before using this design, be sure to thoroughly test it yourself, and become familiar with its operation, and ensure that it works as expected, before you schedule and see the client.

The design is contained in the demonstration folder “Demo Down Coherence 13-18 and Down Power 15-30” available at www.brainm.com/kb

The design shown below achieves this by using a combination of the standard protocol processor (for the inhibit on 15-30 (“High Beta”) and using the Event Wizard to do the coherence downtraining.

The frequency bands are defined as shown. Note that Beta is defined as 13-18 and Hibeta is defined as 15-30.

Frequency Bands and Damping Factors

Use Hz with 0.001 resolution, 0.0 minimum e.g. 0.0, 0.1, 0.2,..., 63.8, 63.9.
All bands should be 1.0 Hz wide minimum for reasonable transient response

	Low:	High:		Low:	High:
Delta	1.000	3.000	Beta	13.000	18.000
Theta	4.000	7.000	Hibeta	15.000	30.000
Alpha	8.000	12.000	Gamma	38.000	42.000
Lobeta	12.000	15.000	User	30.000	35.000

On-the-fly Frequency Adjust Increment
Increment (Hz) used for on-the-fly frequency band changes. Use values 0.10 - 1.00 (default = 0.50)

Digital Filter Amplitude Smoothing and Damping Factors
Global Smoothing Window (used to slow amplitude changes for all displays and training using digital filters). Specify # of milliseconds to smooth over. Use values 0-1000 (0=no smoothing, default = 60)
Text Damping Factor (used to further slow value changes for text displays). Use values 0-1000 (0=no damping, default=100)

Cancel Standard Settings OK

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The inhibits are created by using the standard Protocol Design control panel (note the “Stop” on Hibeta). This is checked for Channel 1 and for Channel 2.

Control Protocol and Threshold Values

PROTOCOL SETTINGS FOR CHANNEL 1: ACTIVE: C3 REFERENCE: LE

Delta <input type="radio"/> Go <input type="radio"/> Stop <input checked="" type="radio"/> Ignore 0.0	Beta <input type="radio"/> Go <input type="radio"/> Stop <input checked="" type="radio"/> Ignore 0.0
Theta <input type="radio"/> Go <input type="radio"/> Stop <input checked="" type="radio"/> Ignore 0.0	Hibeta <input type="radio"/> Go <input checked="" type="radio"/> Stop <input type="radio"/> Ignore 9.8
Alpha <input type="radio"/> Go <input type="radio"/> Stop <input checked="" type="radio"/> Ignore 0.0	Gamma <input type="radio"/> Go <input type="radio"/> Stop <input checked="" type="radio"/> Ignore 0.0
Lobeta <input type="radio"/> Go <input type="radio"/> Stop <input checked="" type="radio"/> Ignore 0.0	User <input type="radio"/> Go <input type="radio"/> Stop <input checked="" type="radio"/> Ignore 0.0

Select Channel to Adjust
 1 2 3 4

Use these controls to define the protocol and starting threshold for each channel and component band.

Global Sustained Reward Criterion (all channels)
Training Conditions must be met for: to achieve a reward point and sound (use value = 0 - 10000, default=500) 500 milliseconds

Global Refractory Period (all channels)
After a reward, system will wait for: before another reward is possible (use value = 0 - 10000, default=0) 0 milliseconds

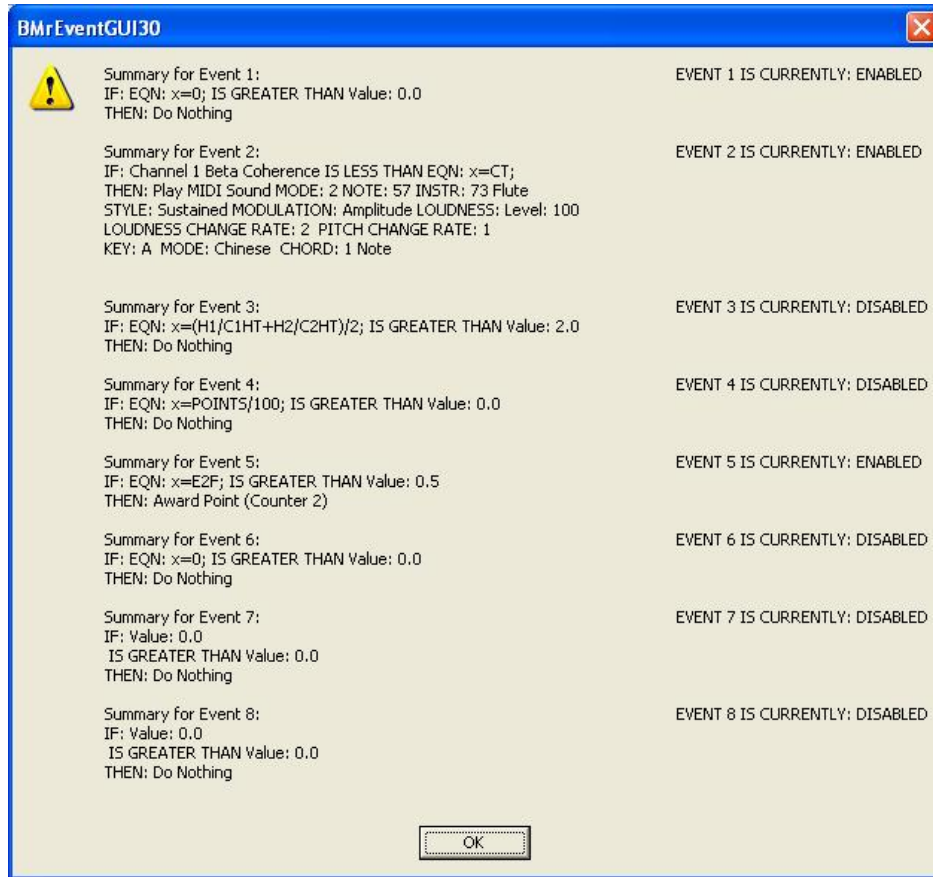
"Original" Sweet Spot Feedback Settings
 ON OFF About...

Points Counting Method
 Normal (1 Counter) Split for 2 Players (2 Counters) About...

Autothreshold Options Use the button at left to view and change Autothresholding Options OK

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The Event Wizard Design uses Events 1, 2, and 5:



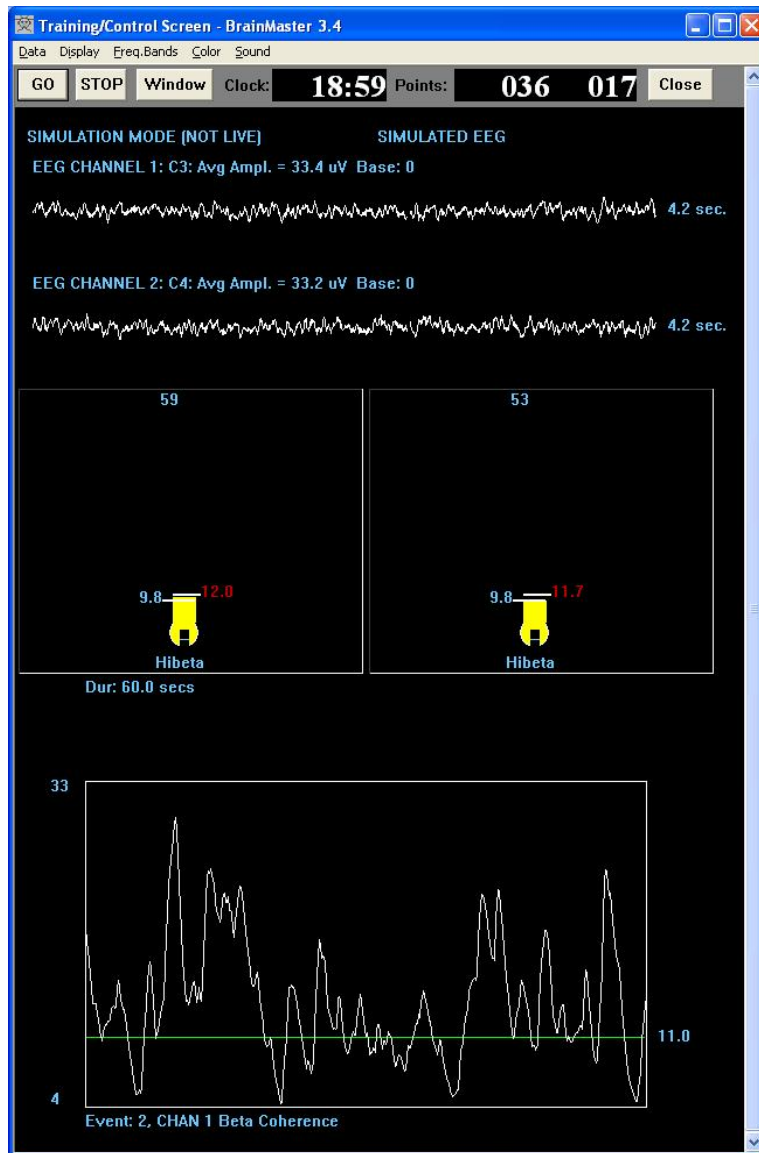
The coherence downtraining is done by Event 2. Event 5 is used to control the Flash games and Multimedia Player, and also to provide points.

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The training screen appears as shown. Sounds are only heard when the coherence is below threshold, and the Hibeta amplitudes are also below threshold. If the hibeta cannot get below threshold, there will be no sound. The left points counter counts points for keeping Hibeta below threshold. The right points counter counts points for keeping coherence below threshold, AND keeping Hibeta below threshold.

All thresholds are manually adjusted, as follows:

- “h” raises the Hibeta inhibit threshold
- “H” lowers the Hibeta inhibit threshold
- “c” raises the coherence threshold
- “C” lowers the coherence threshold.



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The design is set up with connections as follows:

Active 1: C3
Reference 1: Linked Ears
Ground : anywhere
Reference 2: Linked Ears
Active 2: C4

Any pair of suitable sites can be used in place of C3 and C4. The References should be kept as linked ears, and the ground can be anywhere such as Cz, or another ear clip.

To use the protocol generally, do the following to save the settings for future use:

View or Change Settings
Read/Write Settings File
Create New Settings File
(type in settings file name, e.g. “down coherence down power”)
Save Settings to This file

To set up a folder for a client,

Folder Selections
Create New Folder
(type in folder name, e.g. “JTF down coherence & down power”)
Confirm Folder name
Select “down coherence down power” from the settings list
OK
View or Change Settings
Session Control
Change number of sessions to e.g. 40
Change session type to “training”

You are now ready to train a client using these settings. You can change the settings within the new client folder without having to re-save them. The folder will retain any changes to the settings, for that client.

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This design also allows you to review the progress of a session using Review Session Results.

Betacoh 1/2 is the coherence between the channels.

The Hibeta lines show the amplitude of high beta during the session.

