

Event Wizard

Event Wizard Control Menu Display

1 Event Number: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

2 Event Condition:
 IF: Use Equation: Delta Amplitude Constant: Damping Factor:
 Check Equation: $x = \text{THETA} / \text{TTHR}$
 RULE: IS GREATER THAN:
 Use Entered Value: Delta Constant: 1.0 Damping Factor: 0
 Check Equation: $x = 1$
 Note: You must press "Check Equation" to check and save any changes made to equations

3 Event Result:
 THEN: Do Nothing
☐ Obey Inhibits ("stops") ☐ Control MMP Player

4 Event Trend Graph
 Scale Factor: 2 Offset: 0

5 This Event Is: ☒ Enabled ☐ Disabled

6 Visibility: ☒ Visible ☐ Hidden

7 Sustained Reward Criterion
 Condition must be met for: 0 milliseconds

8 Refractory Period
 Time between rewards is: 0 milliseconds

9 MIDI Sound Properties:
 Starting Note: 1 A (55.0) 1 to 88
 Instrument: 0 Piano 1 128 choices
 Playing Style: Sustained Percus. or Sust.
 Modulation: Amplitude Ampl. or Pitch
 Starting Loudness: Level: 0 0 to 128
 Loudness Change Rate: 0 0 to 20
 Note Change Rate: 0 0 to 20
 Musical Scale (Mode): Chromatic 15 choices
 Musical Key: A C to B Flat
 Play Note or Chord: 1 Note 1 to 8 Notes

10 Enable All Events **11** Disable All Events **12** Data Dictionary
13 Clear All Events **14** Show All Events Print All Events
 Help **15** Copy Event **16** Paste Event
17 Cancel **18** Use Now **19** OK

Event Summary:
 Summary for Event 1:
 IF: EQN: $x = \text{THETA} / \text{TTHR}$; IS GREATER THAN Value: 1.0
 THEN: Do Nothing
 EVENT 1 IS CURRENTLY: ENABLED

1. **Event Number Section** – Section where you choose which Event you are viewing.
2. **Event Condition Section** – Section where you set the chosen Event Condition for operation.
3. **Event Result Section** – Section where you set what the chosen Event does when the Event Condition has been met.
4. **Event Trend Graph Section** – Section where you set the size for the Graph.
5. **This Event Is: Section** – Section where you set whether the chosen Event is enabled or not.
6. **Visibility Section** – Section where you set whether the chosen Event Graph will be visible or not, when the Trend Graphs are chosen for display.
7. **Sustained Reward Criterion Section** – Section where you set how long the chosen Event Condition must be met to produce the selected Event Result.
8. **Refractory Period Section** – Section where you set how long for a time before another reward is possible for the chosen event.
9. **MIDI Sound Properties Section** – Section where you can set the properties for MIDI reward feedback for the chosen Event.
10. **Enable All Events Button** – Click to enable all 16 Events.
11. **Disable All Events Button** – Click to disable all 16 Events.
12. **Data Dictionary Button** – Click to bring up the Data Dictionary.

Event Wizard Control Menu Display(Continued)

1 Event Number: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

2 Event Condition:

IF: Use Equation: Delta Amplitude Constant: Damping Factor: 5

Check Equation: $x=THETA/TTHR;$

RULE: IS GREATER THAN:

Use Entered Value: Delta Constant: Damping Factor: 1.0 0

Check Equation: $x=1;$

Note: You must press "Check Equation" to check and save any changes made to equations

3 Event Result:

THEN: Do Nothing

☐ Obey Inhibits ("stops") ☐ Control MMP Player

4 Event Trend Graph

Scale Factor: 2 Offset: 0

Event Summary:

Summary for Event 1: EVENT 1 IS CURRENTLY: ENABLED

IF: EQN: $x=THETA/TTHR;$ IS GREATER THAN Value: 1.0

THEN: Do Nothing

5 This Event Is: ☒ Enabled ☐ Disabled

6 Visibility: ☒ Visible ☐ Hidden

7 Sustained Reward Criterion Condition must be met for: 0 milliseconds

8 Refractory Period Time between rewards is: 0 milliseconds

9 MIDI Sound Properties:

Starting Note: 1 A (55.0) 1 to 88

Instrument: 0 Piano 1 128 choices

Playing Style: Sustained Percus. or Sust.

Modulation: Amplitude Ampl. or Pitch

Starting Loudness: Level: 0 0 to 128

Loudness Change Rate: 0 0 to 20

Note Change Rate: 0 0 to 20

Musical Scale (Mode): Chromatic 15 choices

Musical Key: A C to B Flat

Play Note or Chord: 1 Note 1 to 8 Notes

10 Enable All Events **11** Disable All Events **12** Data Dictionary

13 Clear All Events **14** Show All Events **15** Copy Event **16** Paste Event

17 Cancel **18** Use Now **19** OK

13. Clear All Events Button – Click to clear the data from all 16 Events.

14. Show All Events Button – Click to show the Event Summary information for all 16 Events.

15. Copy Event Button – Click to copy the chosen Event.

16. Paste Event Button – Click to paste an Event that has been selected from the Copy Event Button.

17. Cancel Button – Click to cancel any changes made, and exit the Event Wizard.

18. Use Now Button – Click to accept all changes.

19. OK Button – Click to Exit the Event Wizard.

Data Dictionary for the Event Wizard

| | |
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| User-defined bands | |
| Any component names may be used to access data, including user-defined variables. | band name: channel 1 amplitude (from digital filters) for 8 components e.g. "User1" or "EMG" |
| Any component name followed directly by the letter "T" will automatically access the current threshold from the protocol processor for that band. | channel 1 thresholds (from digital filters) for 8 components, e.g. "User1T" or "EMGT" |
| <p>Note: User-defined bandnames will automatically override any built-in names. For example, if you define your own band called "D", then "D" will be used for your band, not the default D (Delta) band. This allows you to completely redesign the component band names and use all of your redefined band names in the Math Wizard.</p> | |
| Standard 1-channel variables computed in real time using BrainMaster built-in filter and protocol processing system | |
| D, T, A, L, B, H, G, U | channel 1 amplitude (from digital filters) for 8 components |
| DELTA, THETA, ALPHA, LOBETA, BETA, HIBETA, GAMMA, USER | channel 1 amplitude (from digital filters) for 8 components |
| DTHR, TTHR, ATHR, LTHR, BTHR, HTHR, GTHR, UTHR | channel 1 thresholds (from digital filters built-in autothresholder) |
| D1, T1, A1, L1, B1, H1, G1, U1 | channel 1 amplitude (from digital filters) for 8 components |
| DELTA1, THETA1, ALPHA1, LOBETA1, BETA1, HIBETA1, GAMMA1, USER1 | channel 1 amplitude (from digital filters) for 8 components |
| C1DA, C1TA, C1AA, C1LA, C1BA, C1HA, C1GA, C1UA | channel 1 amplitude (from digital filters) for 8 components |
| C1DF, C1TF, C1AF, C1LF, C1BF, C1HF, C1GF, C1UF | channel 1 modal frequency (from FFT) for 8 components |
| C1DE, C1TE, C1AE, C1LE, C1BE, C1HE, C1GE, C1UE | channel 1 percent energy (from FFT) for 8 components |
| C1DP, C1TP, C1AP, C1LP, C1BP, C1HP, C1GP, C1UP | channel 1 percent time over threshold (using digital filters) |
| C1DT, C1TT, C1AT, C1LT, C1BT, C1HT, C1GT, C1UT | channel 1 thresholds (from digital filters built-in autothresholder) |
| C1DV, C1TV, C1AV, C1LV, C1BV, C1HV, C1GV, C1UV | channel 1 variability (from digital filters) |
| Standard variables for channel 2 | |
| D2, T2,...DELTA2, THETA2,...C2DA, C2TA,...C2GV, C2UV | channel 2 repeats all channel 1 variables shown above that use a "1" e.g. D1, C1AF, etc., with the "1" replaced by "2" |

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| Standard variables for channel 3 | |
| D3, T3,...DELTA3, THETA3,...C3DA, C3TA,...C3GV, C3UV | channel 3 repeats all channel 1 variables shown above that use a "1" e.g. D1, C1AF, etc., with the "1" replaced by "2" |
| Standard variables for channel 4 | |
| D4, T4,...DELTA4, THETA4,...C4DA, C4TA,...C4GV, C4UV | channel 4 repeats all channel 1 variables shown above that use a "1" e.g. D1, C1AF, etc., with the "1" replaced by "2" |
| Standard 1/2 channel cross-channel variables | |
| CT | Coherence Threshold currently in use in built-in coherence processor. This will automatically track any changes in the coherence threshold. |
| C1DC, C1TC, C1AC, C1LC, C1BC, C1HC, C1GC, C1UC | Coherence (currently selected type) between channels 1 and 2 |
| DCOH, TCOH, ACOH, LCOH, BCOH, HCOH, GCOH, UCOH | Coherence (currently selected type) between channels 1 and 2 |
| DPCOH, TPCOH, APCOH, LPCOH, BPCOH, HPCOH, GPCOH, UPCOH | "Pure" coherence between channels 1 and 2 |
| DTCOH, TTCOH, ATCOH, LTCOH, BTCOH, HTCOH, GTCOH, UTCOH | Similarity ("Training Coherence") between channels 1 and 2 |
| DSIM, TSIM, ASIM, LSIM, BSIM, HSIM, GSIM, USIM | Similarity ("Training Coherence") between channels 1 and 2 |
| DCOR, TCOR, ACOR, LCOR, BCOR, HCOR, GCOR, UCOR | "Spectral Correlation Coefficient" (SCC) between channels 1 and 2 |
| DCOM, TCOM, ACOM, LCOM, BCOM, HCOM, GCOM, | Comodulation (Sternman/Kaiser "SKIL" type) between channels 1 and 2 |
| C1DH, C1TH, C1AH, C1LH, C1BH, C1HH, C1GH, C1UH | Phase between channels 1 and 2 |
| DPHASE, TPHASE, APHASE, LPHASE, BPHASE, HPHASE, GPHASE, UPHASE | Phase between channels 1 and 2 |
| Values from other events: | |
| Events can read real-time data from other events. The events are processed in numerical order, so that the events are evaluated and act in order, e.g. Event 1 before Event 2, etc. Note that all events are checked for to see if any inhibits are generated, before events take action. All data passed between events are treated as double precision, floating-point numbers. | |
| E1A, E2A, E3A, E4A, E5A, E6A, E7A, E8A, E9A, E10A, E11A, E12A, E13A, E14A, E15A, E16A | values of "antecedent" variables in Events 1-16. These are the selected component values, or the values of the "x=" equation in the "IF" portion of the event design. Note: These are also the values of "In1", "In2", "In3", through "In16", in the Macromedia Flash Player for BrainMaster |

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| E1, E2, E3, E4, E5, E6, E7, E8, E9, E10, E11, E12, E13, E14, E15, E16 | values of "antecedent" variables in Events 1-16. These are the selected component values, or the values of the "x=" equation in the "IF" portion of the event design. Note: These are also the values of "In1", "In2", "In3", through "In16", in the Macromedia Flash Player for BrainMaster |
| E1B, E2B, E3B, E4B, E5B, E6B, E7B, E8B, E9B, E10B, E11B, E12B, E13B, E14B, E15B, E16B | values of "condition" variables in Events 1-16. These are the selected component values, or the values of the "x=" equation after the "RULE" portion of the event design. Note: These are also the values of "In16", "In17", "In18", through "In32", in the Macromedia Flash Player for BrainMaster |
| E1F, E2F, E3F, E4F, E5F, E6F, E7F, E8F, E9F, E10F, E11F, E12F, E13F, E14F, E15F, E16F | values of flags for Events 1-16. These are 0 if the event's condition is not met, and 1.0 if the event's condition is met. These are also the values of "Flg1", "Flg2", through "Flg16" in the Macromedia Flash Player for BrainMaster |
| E1P, E2P, E3P, E4P, E5P, E6P, E7P, E8P, E9P, E10P, E11P, E12P, E13P, E14P, E15P, E16P | percent time meeting the condition for Events 1-16. These allow any events to "see" how often other events are "true" and use these values in rules. Values are returned as percent, e.g. between 0 and 100 |
| Built-in Training Control Variables: | |
| INHF1, ENHF1, NUME1 | channel 1 training flags: number of "stops" meeting criterion, number of "gos" meeting criterion, number of possible "go's" |
| INHF2, ENHF2, NUME2 | channel 2 training flags: number of "stops" meeting criterion, number of "gos" meeting criterion, number of possible "go's" |
| ALLOK | indicates that all "gos" are met, and no "stops" exceed threshold. Use e.g. "x=ALLOK" for Event 5, to allow games like BrainMan and BrainCell to work automatically with any amplitude-based protocol that is set up using the standard "Training Protocol" setup. |
| Special Built-in Functions (note that "arg" can be any number or variable name, including other Event Values, flags, etc. etc.) | |
| Zor1(arg) | returns 0 if argument is <1, 1 otherwise. Note: when used with a fraction e.x. X/Y, returns 1.0 if X >= Y, 0.0 otherwise |
| GT(arg) | returns 0 if argument is <1, 1 otherwise. Note: when used with a fraction e.x. X/Y, returns 1.0 if X >= Y, 0.0 otherwise |
| Rng(arg1, arg2, arg3) | returns 0 if arg1 is within arg2 of arg3. E.g. Rng (C1AF, 0.5, 10) returns 1 if Channel 1 Alpha Frequency is within 0.5 Hz of 10 Hz. E.g. between 9.5 and 10.5 Hz, and returns 0 otherwise |

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| Bnd(channel, low, high) or Band(channel, low, high) | returns total FFT energy in a band for a channel. E.g. Bnd(2, 4, 6) returns the energy in channel 2 between 4 Hz and 6 Hz |
| Modf(channel, low, high) | returns modal frequency ("first moment") from FFT in a band for a channel. E.g. Modf(2, 4, 6) returns the modal frequency in channel 2 in band from 4 Hz to 6 Hz |
| Peakf(channel, low, high) | returns peak frequency (highest amplitude) from FFT in a band for a channel. E.g. Modf(2, 4, 6) returns the peak frequency in channel 2 in band from 4 Hz to 6 Hz |
| Special Built-in Constants: | |
| Schumann, SCH | Schumann Frequency = 7.81 |
| PHI, GOLDEN, GM | Golden Mean = 1.618 |
| PI | PI = 3.14159 |
| Standard Operators: Note: all arguments and parameters are treated as double precision floating point values | |
| + - * / | add, subtract, multiply, divide |
| % | modulus returns the remainder after an integer division |
| ^ | power: $y = x^2$ |
| () | parenthetical grouping, unlimited, e.g. (2 + BETA) / THETA |
| ; | semicolon, needed at end of each equation in formula |
| // | comment, single line |
| /*...*/ | comment, multiple lines |
| Priority of Operators: | |
| () | highest |
| ^ | next |
| -x (unary minus) | next (e.g. $y = -x^2$, the ^ occurs before -) |
| */^ | next |
| + - | lowest |
| Standard Built-in Functions: | |
| abs(x) | return absolute value |
| acos(x) | calculate arccosine |
| asin(x) | calculate arcsine |
| atan(x) | calculate arctangent |
| atan2(x,y) | calculate arctangent with two parameters to preserve quadrant angle |
| bessj(n,v) | Bessel function of the first kind. n is order and v is input value |
| bessy(n,v) | Bessell function of the second kind. n is order and v is input value. |
| Ceil(x) | Find integer ceiling |
| Cos(x) | Calculate cosine |
| Cosh(x) | Calculate hyperbolic cosine |

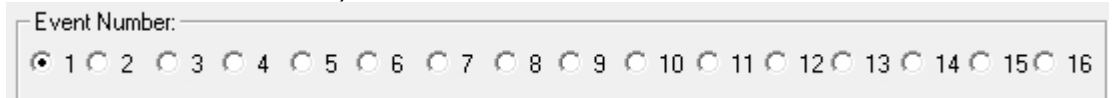
| | |
|--|--|
| exp(x) | calculate exponential function "e to the x" |
| floor(x) | Find integer floor |
| hypot(a,b) | calculate hypotenuse of right triangle |
| log(x) | calculate natural logarithm |
| log10(x) | calculate base-10 logarithm |
| max(x,y) | return larger of two values |
| min(x,y) | return smaller of two values |
| rand(x) | get pseudorandom number between 0 and 1 |
| sin(x) | calculate sine |
| sinh(x) | calculate hyperbolic sine |
| sqrt(x) | find square root |
| srand(x) | initialize pseudorandom series |
| tan(x) | calculate tangent |
| tanh(x) | calculate hyperbolic tangent |
| Z-Scores (using optional NeuroGuide Real-Time Extensions for BrainMaster) | |
| With this option, the equation processor can access real-time z-score computations based upon the NeuroGuide normative database. (www.appliedneuroscience.com) | Note: With 2 channels, N Z scores = $26 * 2 + 24 = 76$ targets (24 are connectivity-related). With 4 channels, N Z scores = $26 * 4 + 6 * 24 = 248$ targets (144 are connectivity-related). |
| Available output values: (76 total targets) | |
| ZAP1D, ZAP1T, ZAP1A, ZAP1B, ZAP11, ZAP12, ZAP13, ZAP1G, ZAP2D, ZAP2T, ZAP2A, ZAP2B, ZAP21, ZAP22, ZAP23, ZAP2G | delta, theta, alpha, beta, beta1, beta2, beta3, gamma Absolute Power 2 channels / 8 bands |
| ZRP1D, ZRP1T, ZRP1A, ZRP1B, ZRP11, ZRP12, ZRP13, ZRP1G, ZRP2D, ZRP2T, ZRP2A, ZRP2B, ZRP21, ZRP22, ZRP23, ZRP2G | delta, theta, alpha, beta, beta1, beta2, beta3, gamma Relative Power 2 channels / 8 bands |
| ZPR1DT, ZPR1DA, ZPR1DB, ZPR1DG, ZPR1TA, ZPR1TB, ZPR1AB, ZPR1AG, ZPR1BG, ZPR2DT, ZPR2DA,... | d/t, d/a, d/b, d/g, t/a, t/b, t/g, a/b, a/g, b/g Power Ratios 2 channels / 10 ratios |
| ZAAD, ZAAT, ZAAA, ZAAB, ZAA1, ZAA2, ZAA3, ZAAG | delta, theta, alpha, beta, beta1, beta2, beta3, gamma Amplitude Asymmetry 8 bands |
| ZCOD, ZCOT, ZCOA, ZCOB, ZCO1, ZCO2, ZCO3, ZCOG | delta, theta, alpha, beta, beta1, beta2, beta3, gamma Coherence 8 bands |
| ZPHD, ZPHT, ZPHA, ZPHB, ZPH1, ZPH2, ZPH3, ZPHG | delta, theta, alpha, beta, beta1, beta2, beta3, gamma Phase Difference 8 bands |
| Additional Z Scores for 4-channel systems: (248 total targets) | |
| ZAP3D, ZAP3T,... ZAP4D, ZAP4T,... | delta, etc. absolute power, channels 3 and 4 |
| ZRP3D, ZRP3T,... ZRP4D, ZRP4T,... | delta, etc. relative power, channels 3 and 4 |
| ZPR3DT, ZPR3DA,... ZPR4DT, ZPR4DA,... | d/t, d/a, etc. power ratios, channels 3 and 4 |
| ZAA12D, ZAA12T, ... | asymmetry between chans 1 and 2 (same as ZAAD, ZAAT, etc) |
| ZAA13D, ZAA13T, ... | asymmetry between chans 1 and 3 |

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| ZAA14D, ZAA14T, ... | asymmetry between chans 1 and 4 |
| ZAA23D, ZAA23T, ... | asymmetry between chans 2 and 3 |
| ZAA24D, ZAA24T, ... | asymmetry between chans 2 and 4 |
| ZAA34D, ZAA34T, ... | asymmetry between chans 3 and 4 |
| ZCO12D, ZCO12T, ... | coherence between chans 1 and 2 (same as ZCOD, ZCOT, etc) |
| ZCO13D, ZCO13T, ... | coherence between chans 1 and 3 |
| ZCO14D, ZCO14T, ... | coherence between chans 1 and 4 |
| ZCO23D, ZCO23T, ... | coherence between chans 2 and 3 |
| ZCO24D, ZCO24T, ... | coherence between chans 2 and 4 |
| ZCO34D, ZCO34T, ... | coherence between chans 3 and 4 |
| ZPH12D, ZPH12T, ... | phase between chans 1 and 2 (same as ZPHD, ZPHT, etc) |
| ZPH13D, ZPH13T, ... | phase between chans 1 and 3 |
| ZPH14D, ZPH14T, ... | phase between chans 1 and 4 |
| ZPH23D, ZPH23T, ... | phase between chans 2 and 3 |
| ZPH24D, ZPH24T, ... | phase between chans 2 and 4 |
| ZPH34D, ZPH34T, ... | phase between chans 3 and 4 |
| PercentZOK(range) or PZOK(range) | Percentage of Z scores that are within "range" of normal. Returns value between 0 and 100 |
| PercentZOKUL(upper, lower) or PZOKUL(upper, lower) | Percentage of Z scores that are below upper limit, and above lower limit. Returns value between 0 and 100 |
| PercentZAOK(range) or PZAOK(range) | Percentage of ABSOLUTE POWER Z scores that are within "range" of normal. Returns value between 0 and 100 |
| PercentZAOKUL(upper, lower) or PZAOKUL(upper, lower) | Percentage of ABSOLUTE POWER Z scores that are below upper limit, and above lower limit. Returns value between 0 and 100 |
| PercentZROK(range) or PZROK(range) | Percentage of RELATIVE POWER Z scores that are within "range" of normal. Returns value between 0 and 100 |
| PercentZROKUL(upper, lower) or PZROKUL(upper, lower) | Percentage of RELATIVE POWER Z scores that are below upper limit, and above lower limit. Returns value between 0 and 100 |
| PercentZPROK(range) or PZPROK(range) | Percentage of POWER RATIO Z scores that are within "range" of normal. Returns value between 0 and 100 |
| PercentZPROKUL(upper, lower) or PZPROKUL(upper, lower) | Percentage of POWER RATIO Z scores that are below upper limit, and above lower limit. Returns value between 0 and 100 |
| PercentZASOK(range) or PZASOK(range) | Percentage of ASYMMETRY Z scores that are within "range" of normal. Returns value between 0 and 100 |
| PercentZASOKUL(upper, lower) or PZASOKUL(upper, lower) | Percentage of ASYMMETRY Z scores that are below upper limit, and above lower limit. Returns value between 0 and 100 |
| PercentZCOK(range) or PZCOK(range) | Percentage of COHERENCE Z scores that are within "range" of normal. Returns value between 0 and 100 |

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| PercentZCOKUL(upper, lower) or PZCOKUL(upper, lower) | Percentage of COHERENCE Z scores that are below upper limit, and above lower limit. Returns value between 0 and 100 |
| PercentZPOK(range) or PZPOK(range) | Percentage of PHASE Z scores that are within "range" of normal. Returns value between 0 and 100 |
| PercentZPOKUL(upper, lower) or PZPOKUL(upper, lower) | Percentage of PHASE Z scores that are below upper limit, and above lower limit. Returns value between 0 and 100 |
| PercentZCCOK(range) or PZCCOK(range) | Percentage of ALL CONNECTIVITY Z scores that are within "range" of normal. Returns value between 0 and 100 |
| PercentZCCOKUL(upper, lower) or PZCCOKUL(upper, lower) | Percentage of ALL CONNECTIVITY Z scores that are below upper limit, and above lower limit. Returns value between 0 and 100 |
| | NOTE: ALL CONNECTIVITY Z Scores includes scores for ASYMMETRY, COHERENCE, and PHASE |
| Controls for Atlantis Photic Output Controls | |
| x=SetPhoticRate(rate) or x=SPR(rate) | sets rate of photic stimulation to value given by "rate" |
| Controls for DC and Slow Cortical Potentials Atlantis or Discovery Training Channels | |
| | |
| x=DC1, DC2, ... | DC offset for channel 1, 2, ... 1 unit = 4 microvolts |
| x=DCE1, DCE2, ... | Enhanced DC for channel 1, 2, ... 1 unit = 1 millivolt |
| Controls for Discovery Acquired Channels DC and Slow Cortical Potentials | |
| x=DCA1, DCA2, ... | DC Acquired channel 1, 2, 24 |
| x=CA1DCP, CA2DCP, ... | DC Acquired channel 1, 2, 24 |
| x=DCALL | DC average of all 19 10-20 channels |
| x=DCFR | Frontal DC: Fp1 F3 F7 Fz Fp2 F4 F8 |
| x=DCBK | Back DC: P3 P4 Pz T5 T6 O1 O2 |
| x=DCLT | Left DC: Fp1 F3 F7 C3 T3 P3 T5 O1 |
| x=DCRT | Right DC: Fp2 F4 F8 C4 T4 P4 T6 O2 |
| x=DCFp1, DCFp2, DCF3, DCF4, ... | DC of any 10-20 site specified by name |

Designing an Event

1. On The Even Wizard Screen, choose the Event Number that you would like to work with (For this Example, we will work with Event 1).



Event Number: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16

2. Next, set the Event Condition (For this example, we are going to reward the Channel 1 Theta band, when it is greater than its threshold). There are many ways that the Event Wizard can define what is being trained (See Attached pictures). If an equation is used, the Check Equation Button must be clicked, or it will not save this.

Event Condition with Equations

Event Condition:

IF:

Check Equation

RULE:

Check Equation

Note: You must press "Check Equation" to check and save any changes made to equations

Event Condition with Channels

Event Condition:

IF:

Check Equation

RULE:

Check Equation

Note: You must press "Check Equation" to check and save any changes made to equations

3. Next, set the Event Result (For This example, if the Event Condition is met, a .wav will play. This will also Control BMrMMP).

Event Result:

THEN:

☐ Obey Inhibits ("stops") ☒ Control MMP Player

4. Next, set the size of the Event Trend Graph. If you are not going to make your graph visible, you do not need to do anything with this (For this example, the graph will range from 0 to 20).

Event Trend Graph

Scale Factor: Offset:

5. Next, you will need to make sure, that the Event is enabled. You will also need to choose whether you would like it visible or not. If the Event is not enabled, it will not work. But, if the Event is Hidden, it will still operate.

This Event Is: ☒ Enabled ☐ Disabled

Visibility: ☒ Visible ☐ Hidden

6. Next, set the Sustained Reward Criterion, Refractory Period and the properties of the MIDI Sound. If you are not utilizing a MIDI sound for a reward sound, you do not have to set this. The Sustained Reward Criterion and Refractory Period effect how often a reward can be give (For this example, the Sustained Reward Criterion and Refractory Period are both set for 500 milliseconds. This means, that a reward will not be given unless the client stays above the threshold for 500 milliseconds. Then, another reward is not possible for another 500 milliseconds).

Sustained Reward Criterion

Condition must be met for:

500

milliseconds

Refractory Period

Time between rewards is:

500

milliseconds

MIDI Sound Properties:

Starting Note:

1 A (55.0)

1 to 88

Instrument:

0 Piano 1

128 choices

Playing Style:

Sustained

Percus. or Sust.

Modulation:

Amplitude

Ampl. or Pitch

Starting Loudness:

Level: 0

0 to 128

Loudness Change Rate:

0

0 to 20

Note Change Rate:

0

0 to 20

Musical Scale (Mode):

Chromatic

15 choices

Musical Key:

A

C to B Flat

Play Note or Chord:

1 Note

1 to 8 Notes

7. Click the Use Now Button, and then click OK.

Event Wizard Designer

Event Number: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

This Event Is: ☒ Enabled ☐ Disabled

Visibility: ☒ Visible ☐ Hidden

Event Condition:

IF: Use Equation Theta Amplitude Constant: Damping Factor:

Check Equation:

$x = \text{THETA}$

RULE: IS GREATER THAN

Use Equation

Theta

Threshold

Constant: 1.0

Damping Factor: 0

Check Equation:

$x = \text{TTHR}$

Note: You must press "Check Equation" to check and save any changes made to equations

Event Result:

THEN: Play WAV Sound

☐ Okay Inhibits ("stops") ☒ Control MNP Player

Event Trend Graph

Scale Factor: 20 Offset: 0

Event Summary:

Summary for Event 1: EVENT 1 IS CURRENTLY: ENABLED

IF EQN: $x = \text{THETA}$ IS GREATER THAN EQN: $x = \text{TTHR}$. SUSTAIN: 500ms REFRACTORY: 500ms

THEN: Play WAV Sound

Sustained Reward Criterion

Condition must be met for:

500

milliseconds

Refractory Period

Time between rewards is:

500

milliseconds

MIDI Sound Properties:

Starting Note:

1 A (55.0)

1 to 88

Instrument:

0 Piano 1

128 choices

Playing Style:

Sustained

Percus. or Sust.

Modulation:

Amplitude

Ampl. or Pitch

Starting Loudness:

Level: 0

0 to 128

Loudness Change Rate:

0

0 to 20

Note Change Rate:

0

0 to 20

Musical Scale (Mode):

Chromatic

15 choices

Musical Key:

A

C to B Flat

Play Note or Chord:

1 Note

1 to 8 Notes

Enable All Events

Disable All Events

Data Dictionary

Clear All Events

Show All Events

Print All Events

Help

Copy Event

Paste Event

Cancel

Use Now

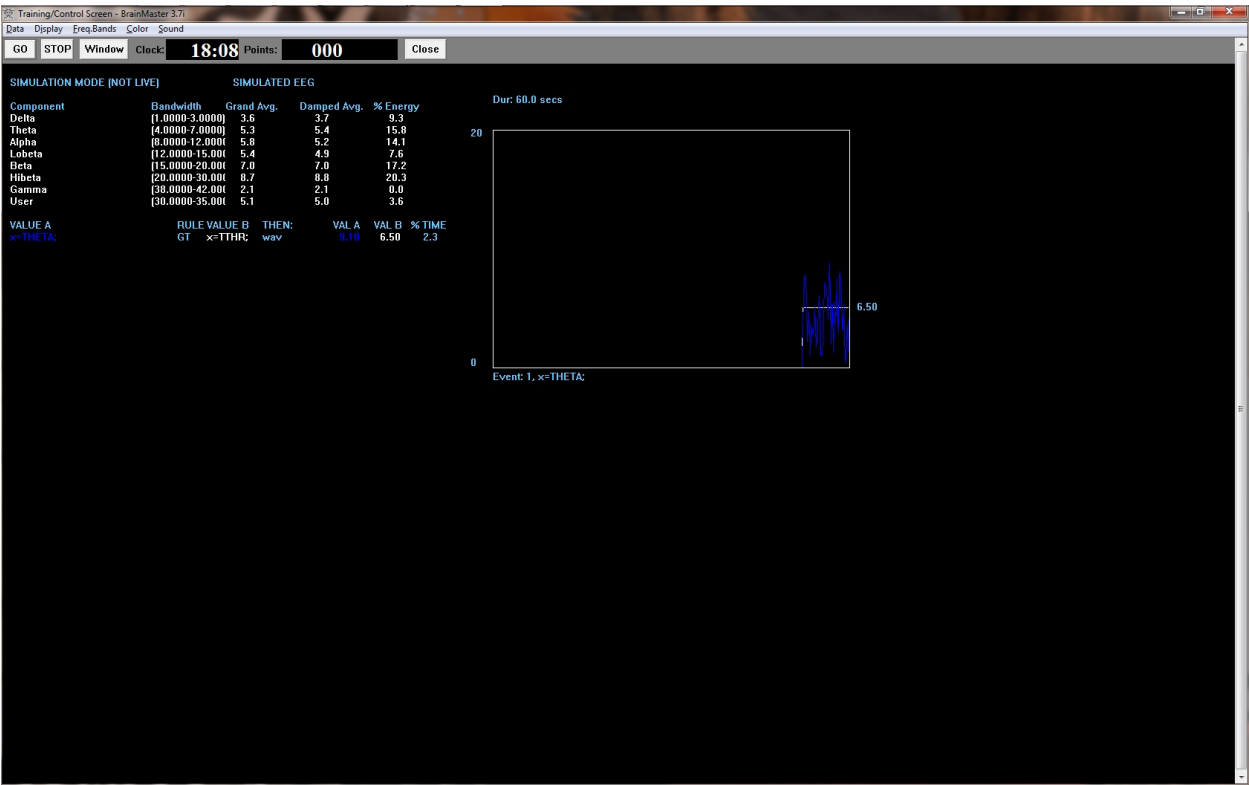
OK

REF

531-344 v1.0 2-7-12

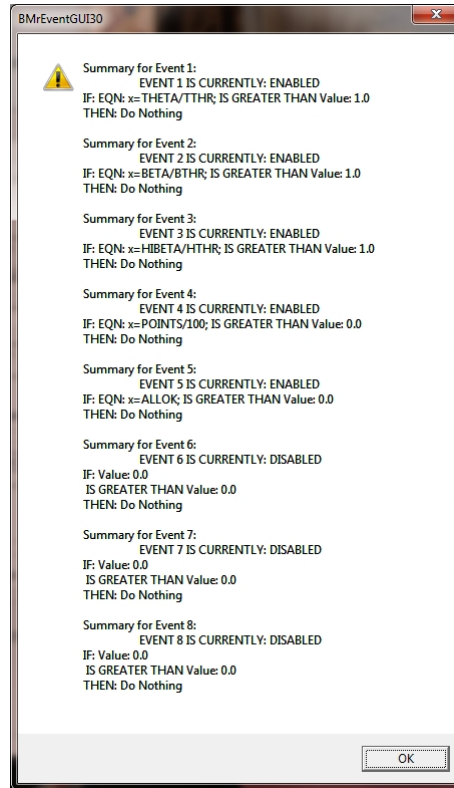
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The Event Wizard has been set for the Client Folder. You will be able to tell this during the running of a session. If the Event was set to Visible, then you will see a graph if you choose the Display Event Trend Graph, or Wide Event Trend Graph. If you do not have the Event set to Visible, then you can still see that this is occurring through the Display Text Stat Panel.



Basic BrainMaster Setting Protocol through the Event Wizard

Alert



Event 1 – THETA/TTTHR is Greater than 1. This shows the ratio of the low “stop” inhibit to its threshold.

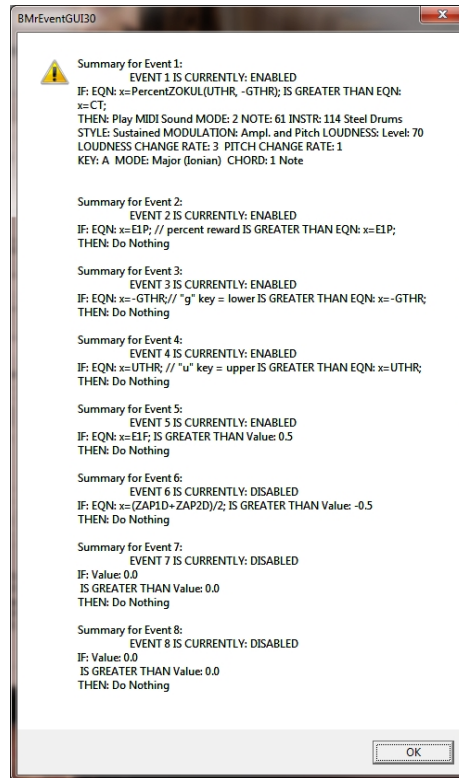
Event 2 – BETA/BTHR is Greater than 1. This shows the ratio of the “go” component to its threshold.

Event 3 – HIBETA/HTHR is Greater than 1. This shows the ratio of the hi “stop” inhibit to its threshold.

Event 4 – x=POINTS/100. This shows the points divided by 100. This is merely for the Flash Game indicator.

Event 5 – x=ALLOK. This indicates that all components meet criteria, and the Flash Game can “move” or proceed.

Z-Score PZOKUL



Event 1 – $x = \text{PercentZOKUL}(\text{UTHR}, -\text{GTHR})$ is Greater than CT. This rewards the Percentage of Z-Scores that are with-in the ranges of the U Threshold and G Threshold that are above the threshold that is defined by the C Key.

Event 2 – $x = \text{E1P}$. This shows the percentage of reward for Event 1.

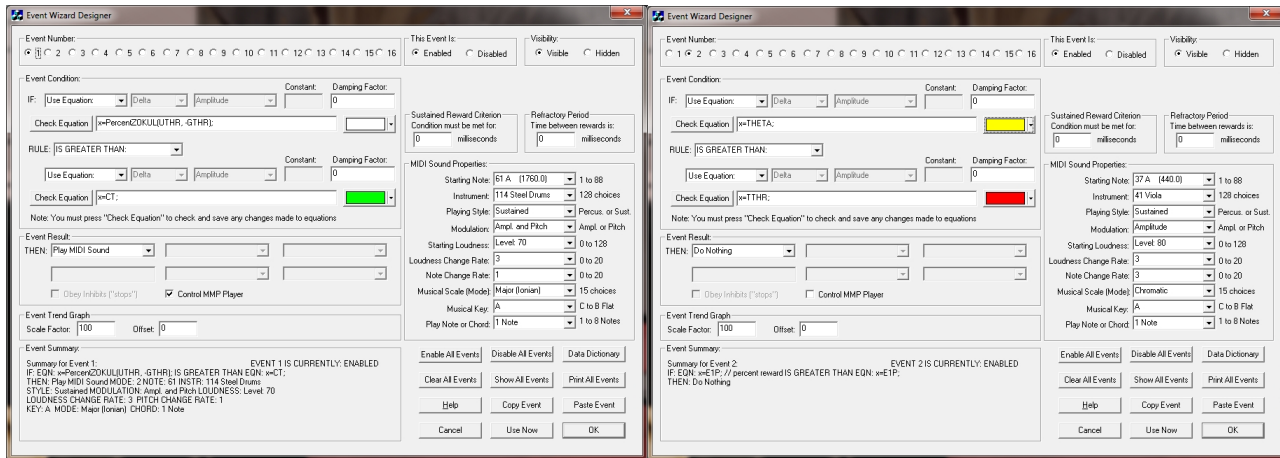
Event 3 – $x = -\text{GTHR}$ is greater than $x = -\text{GTHR}$. This gives a graphical representation for the Lower threshold for the Z-Score equation.

Event 4 – $x = \text{UTHR}$ is greater than $x = \text{UTHR}$. This gives a graphical representation for the Upper threshold for the Z-Score equation.

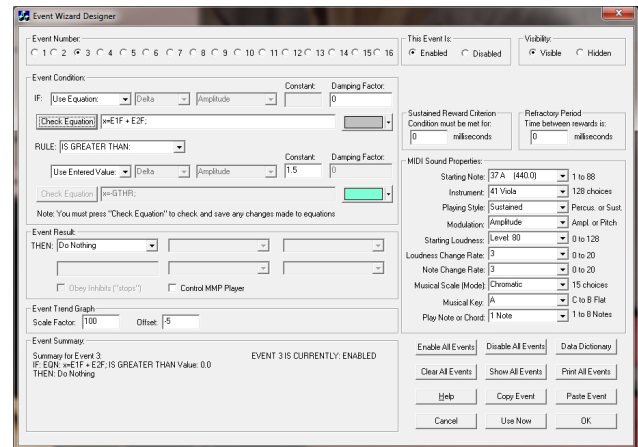
Event 5 – $x = \text{E1F}$ is greater than 0.5. This flags Event 1. When the Event 1 meets its Event Condition, Event 5 produces a 1, which indicates that this component has met criteria, and the Flash Game can “move” or proceed.

Advanced Event Wizard Controls

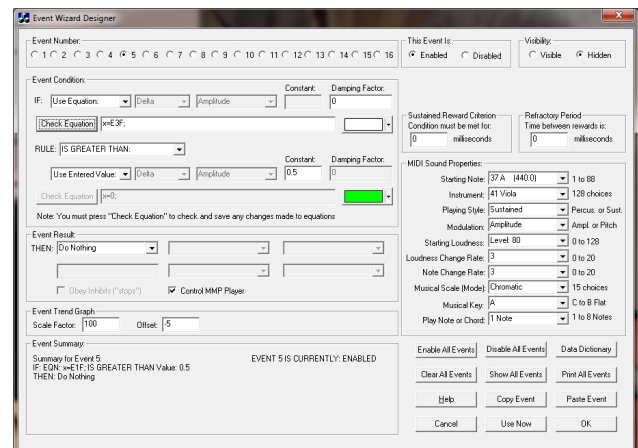
Enabling Multiple Events to control Flash Player (2 Event Example)



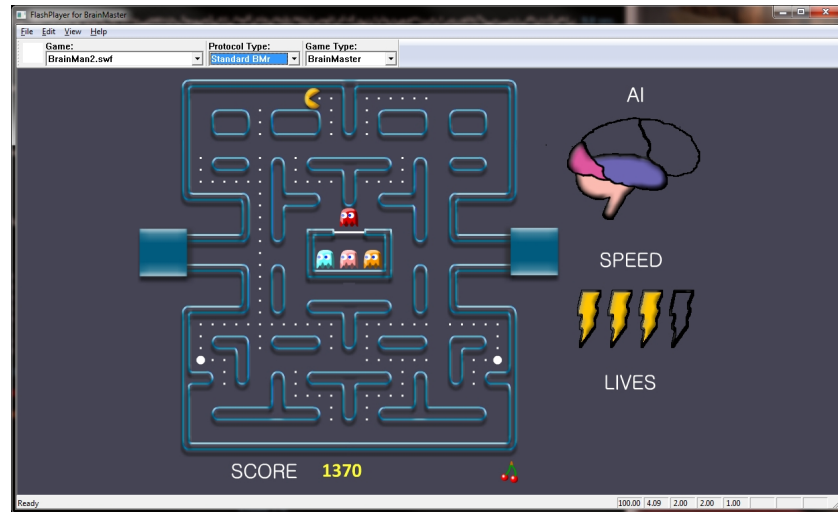
1. Create an Event (Event 3) that Flags these Events, and requires them to be greater than the possible combination with-out all being met (For this example, since there are two Events, we want the Event Condition to be greater than 1.5. This way, we are only successful when both Event 1 and Event 2 have been met).



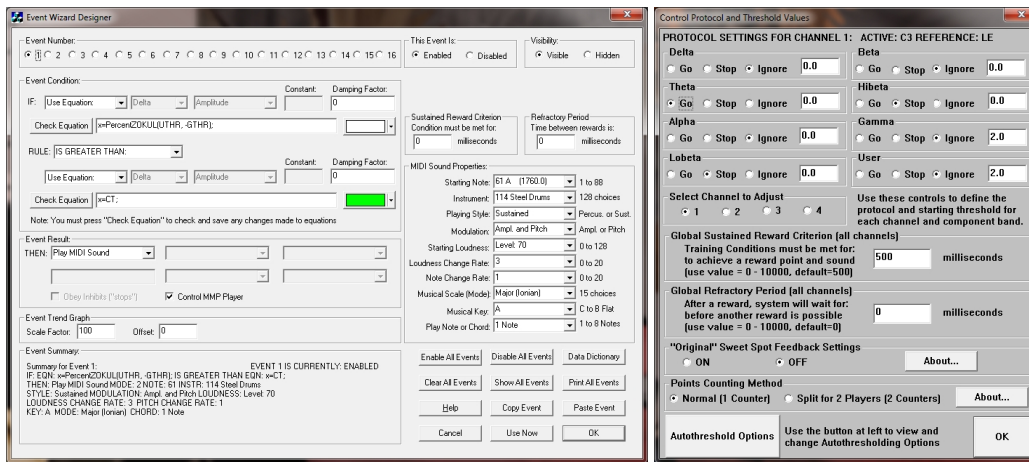
2. Next, we will need to flag the results of this last created Event into Event 5, so that the Flash Player can be controlled.



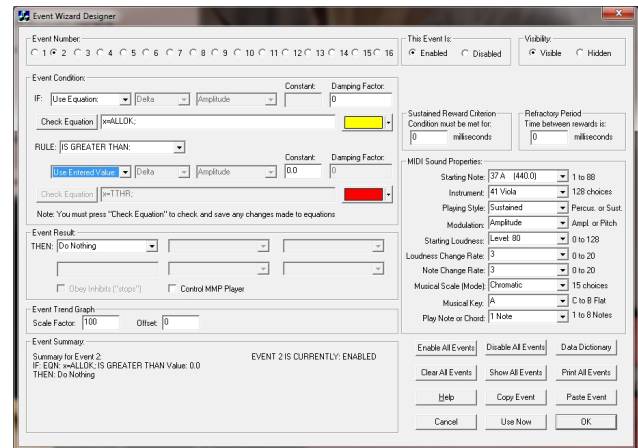
Your protocol will now be able to drive the Flash Player when all Event criteria has been met for the different Event Conditions. You will be able to tell, as you can see that the Flash Player will operate to Event 5



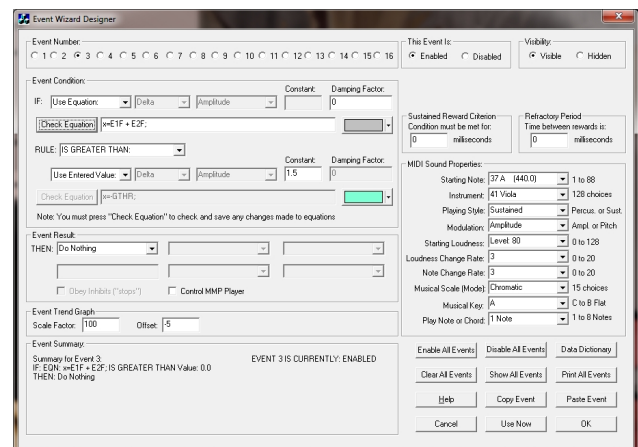
Enabling Amplitude and Events to control Flash Player



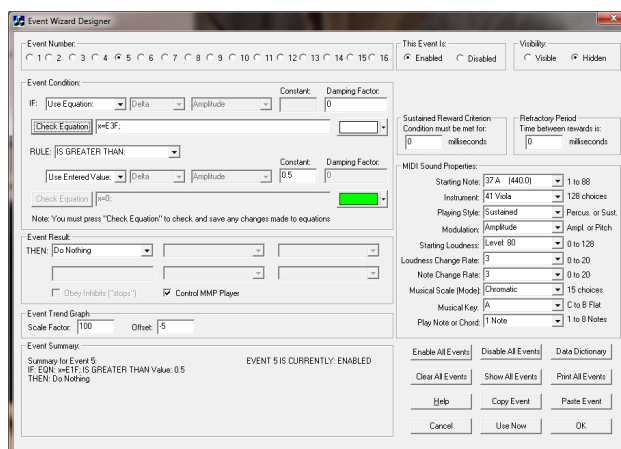
1. Create an Event to indicate that all amplitude components have met their criteria.



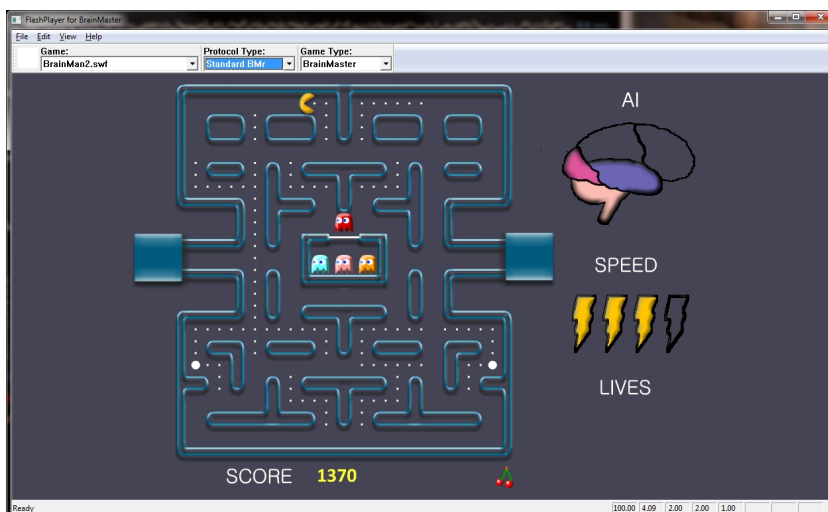
2. Create an Event (Event 3) that Flags these Events, and requires them to be greater than the possible combination with-out all being met (For this example, since there are two Events, we want the Event Condition to be greater than 1.5. This way, we are only successful when both Event 1 and Event 2 have been met).



- Next, we will need to flag the results of this last created Event into Event 5, so that the Flash Player can be controlled.

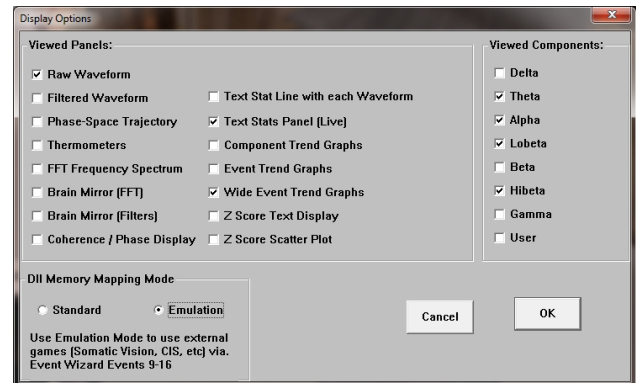


Your protocol will now be able to drive the Flash Player when all Event criteria has been met for the different Event Conditions. You will be able to tell, as you can see that the Flash Player will operate to Event 5

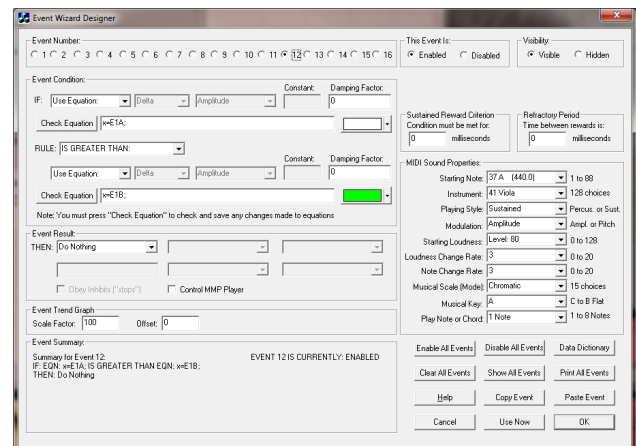


Enabling Events to control Third-Party Games

1. First, the BrainMaster Software has to be set into Emulation Mode. This is accomplished in the Display Options Menu under the DLL Memory Mapping Mode.

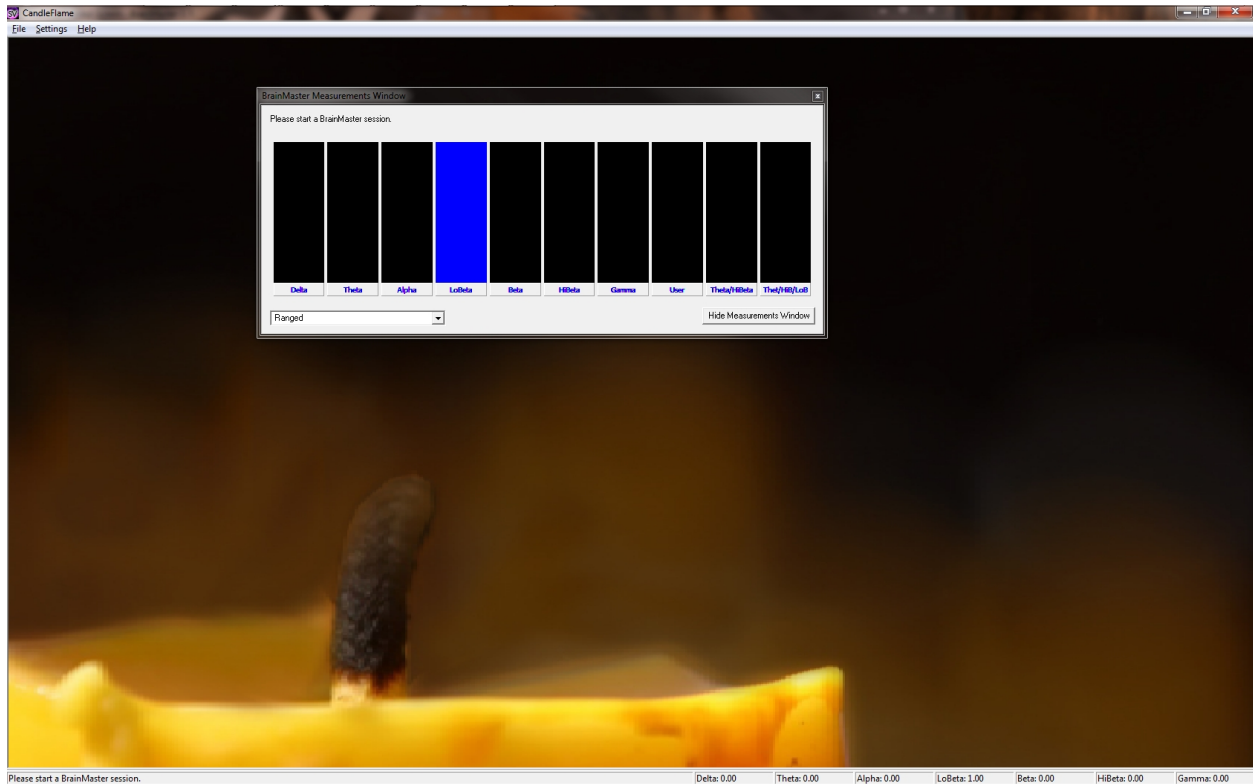


2. Next we have to set the Events so that they will properly operate. This is accomplished, by utilizing Events 9-16 to emulate the Filtered Waveforms. A list of the Events to what band they are referring to, see below (For this example, we are going to want the game to react to training done on the Lobeta band. Because of this, we will use Event 12). For proper reaction, the Event Condition must be Event must be greater than its condition (For this example, we want the training reaction from Event 1. So, because of this the Event Condition is "IF Equation: $x=E1A$, is GREATER THAN Equation $x=E1B$ "). You can do this for up to all 8 Events.



| Event Number | Third-Party "Filtered band" |
|--------------|-----------------------------|
| 9 | Delta |
| 10 | Theta |
| 11 | Alpha |
| 12 | Lobeta |
| 13 | Beta |
| 14 | Hibeta |
| 15 | Gamma |
| 16 | User |

You have now enabled the BrainMaster protocol to have its Events be seen as a Filtered waveband in the third-party game. You will be able to see this, by starting the third-party game, and seeing the band that you chose to affect the games reward. If this is not working, please make sure that you have set the reward for the game to the bands that you have chosen.





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