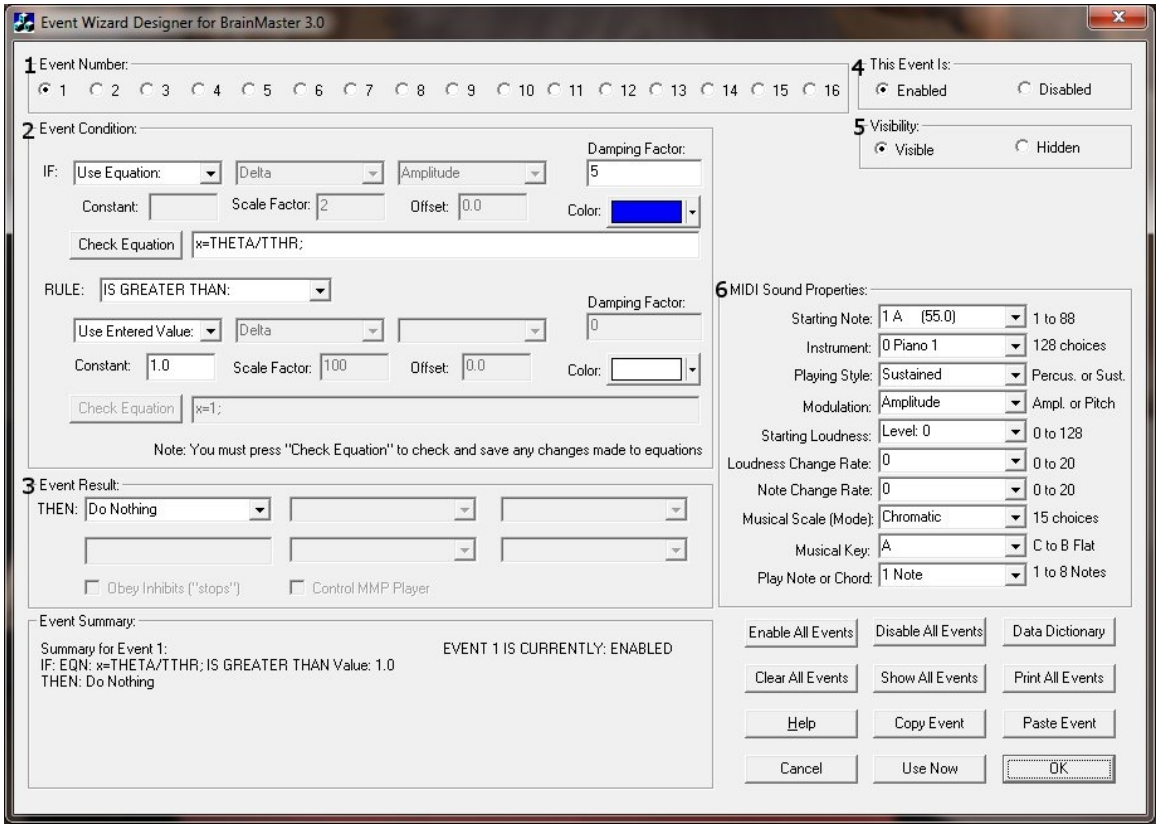
Event Wizard for 2.5 Software

Event Wizard Control Menu Display



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. **This Event Is: Section** – Section where you set whether the chosen Event is enabled or not.
5. **Visibilty Section** – Section where you set whether the chosen Event Graph will be visible or not, when the Trend Graphs are chosen for display.
6. **MIDI Sound Properties Section** – Section where you can set the properties for MIDI reward feedback for the chosen Event.

Event Wizard Control Menu Display(Continued)

7. **Enable All Events Button** – Click to enable all 16 Events.
8. **Disable All Events Button** – Click to disable all 16 Events.
9. **Data Dictionary Button** – Click to bring up the Data Dictionary.
10. **Clear All Events Button** – Click to clear the data from all 16 Events.
11. **Show All Events Button** – Click to show the Event Summary information for all 16 Events.
12. **Copy Event Button** – Click to copy the chosen Event.
13. **Paste Event Button** – Click to paste an Event that has been selected from the Copy Event Button.
14. **Cancel Button** – Click to cancel any changes made, and exit the Event Wizard.
15. **Use Now Button** – Click to accept all changes.
16. **OK Button** – Click to Exit the Event Wizard.

Data Dictionary for the Event Wizard

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"
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.	
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"

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 (Sterman/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
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
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 gropuing, 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).**
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
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

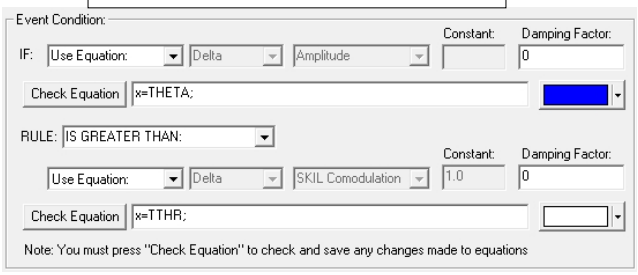
PercentZPROK(range) or PZPROK(range)	Percentage of POWER RATIO Z scores that are within "range" of normal. Returns value between 0 and 100
PercentZPROKUL(upper, lower) or PZPROKUL(upper, lower)	Percentage of POWER RATIO Z scores that are below upper limit, and above lower limit. Returns value between 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
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

Designing an Event

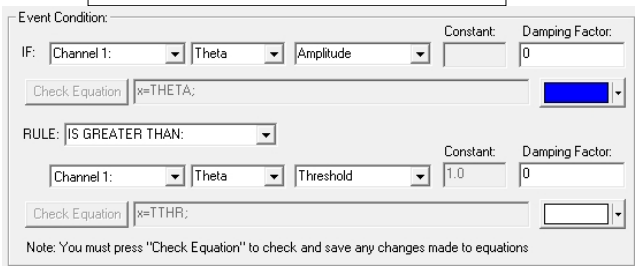
1. On The Even Wizard Screen, choose the Event Number that you would like to work with (For this Example, we will work with Event 1).

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

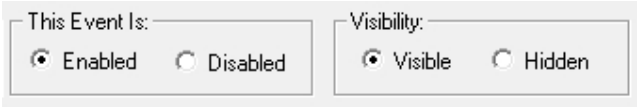


Event Condition with Channels

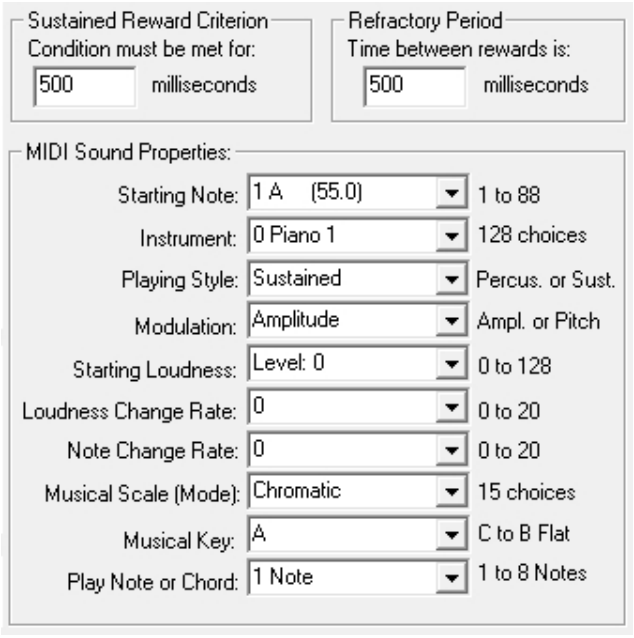


3. Next, set the Event Result (For This example, if the Event Condition is met, a .wav will play. This will also Control BMrMMP).

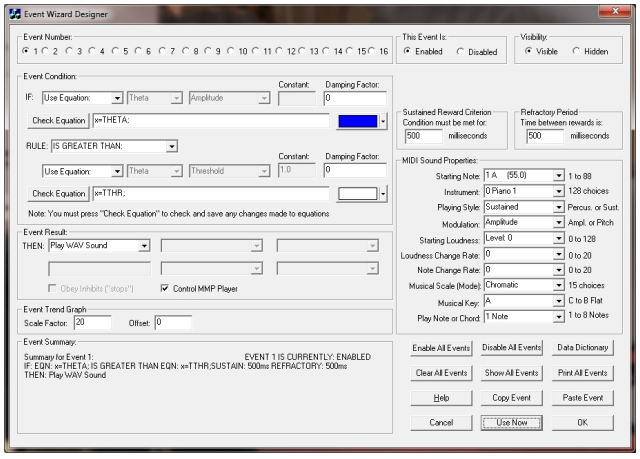
4. Next, you will need to make sure, that the Event is enabled. You will also need to choose whether you would like it visible or not. If the Event is not enabled, it will not work. But, if the Event is Hidden, it will still operate.



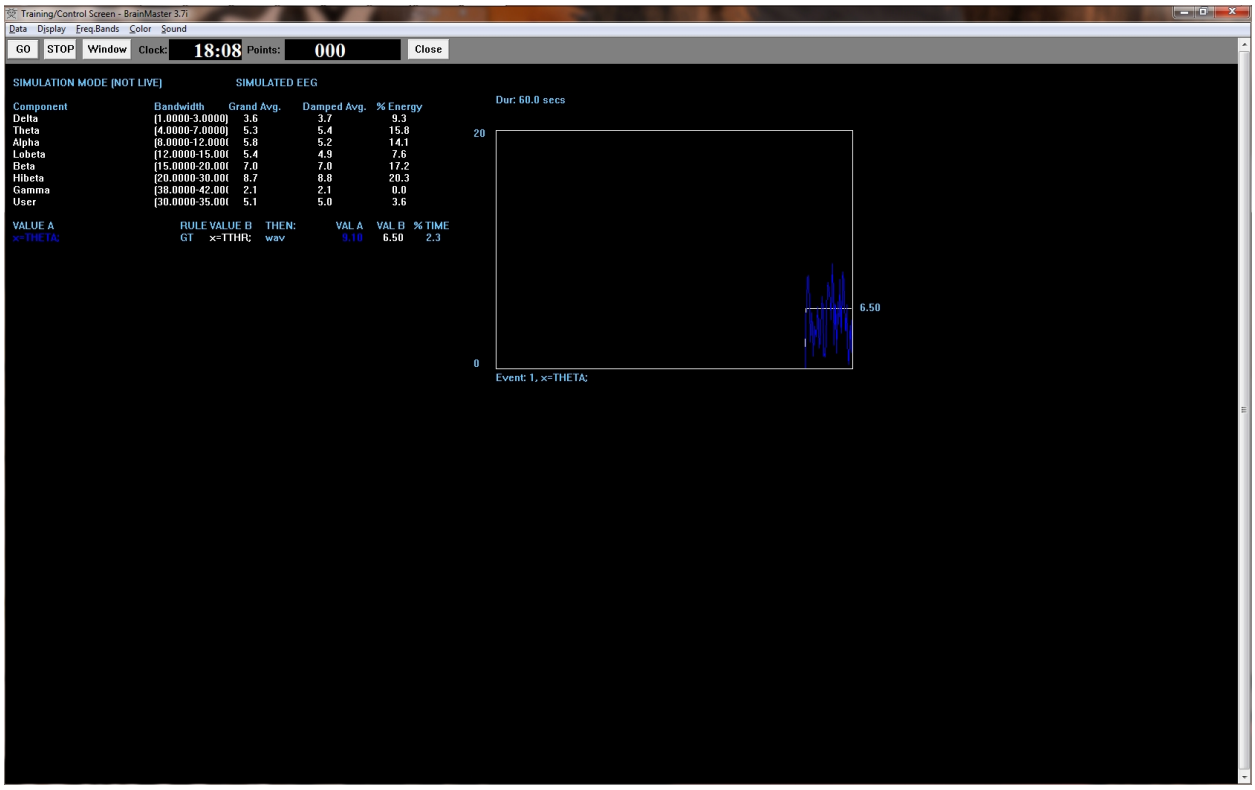
5. Next, set the Sustained Reward Criterion, Refractory Period and the properties of the MIDI Sound. If you are not utilizing a MIDI sound for a reward sound, you do not have to set this. The Sustained Reward Criterion and Refractory Period effect how often a reward can be give (For this example, the 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).



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

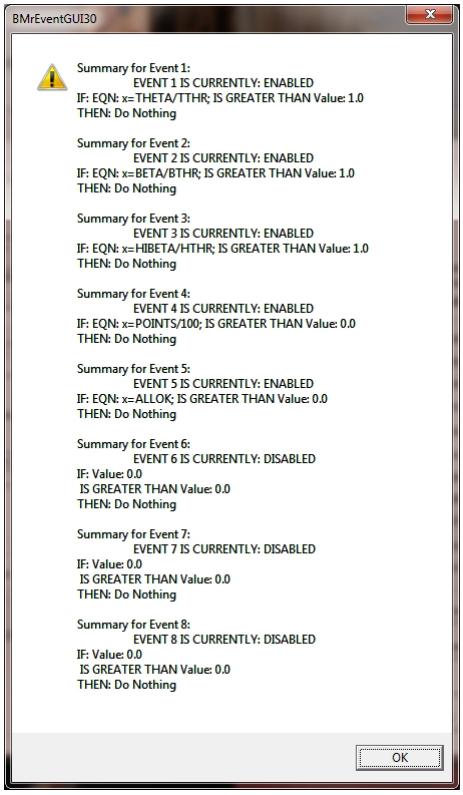


The Event Wizard has been set for the Client Folder. You will be able to tell this during the running of a session. If the Event was set to Visible, then you will see a graph if you choose the Display Event Trend Graph, or Wide Event Trend Graph. If you do not have the Event set to Visible, then you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



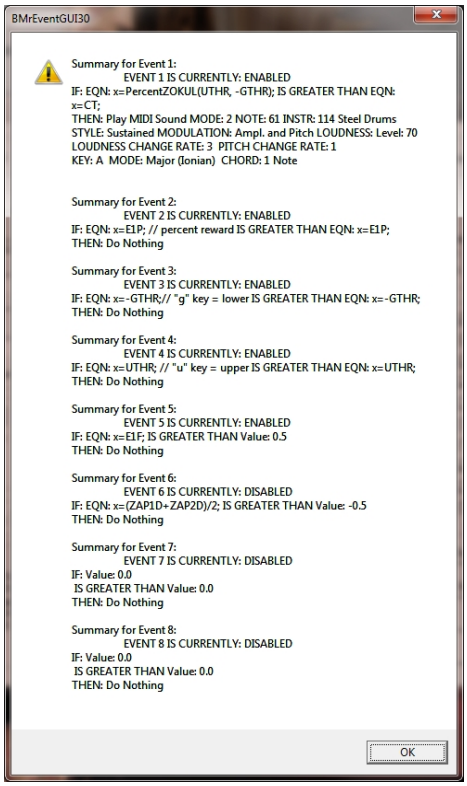
Basic BrainMaster Setting Protocol through the Event Wizard

Alert



Event 1 – THETA/TTHR 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.

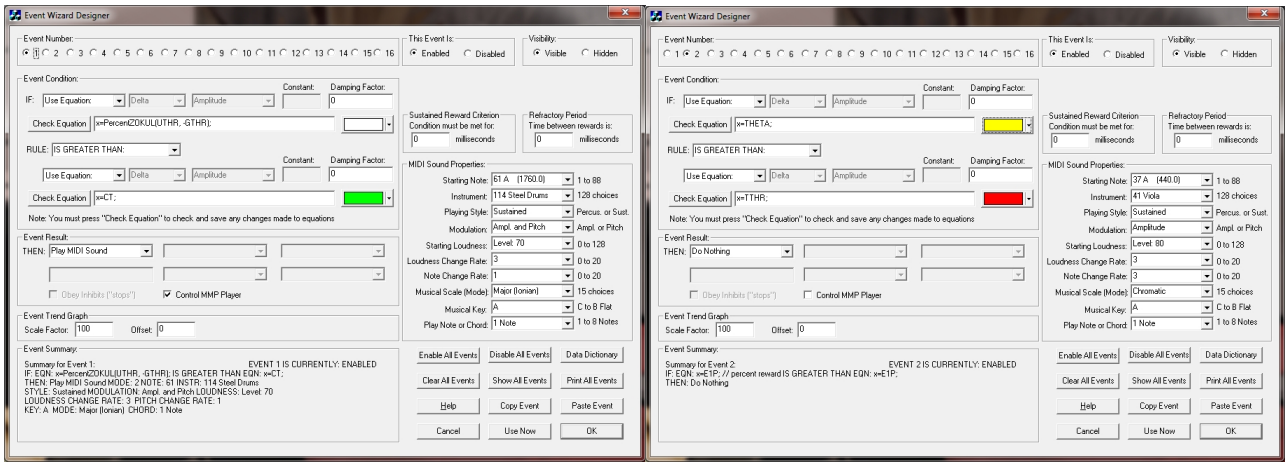
Z-Score PZOKUL



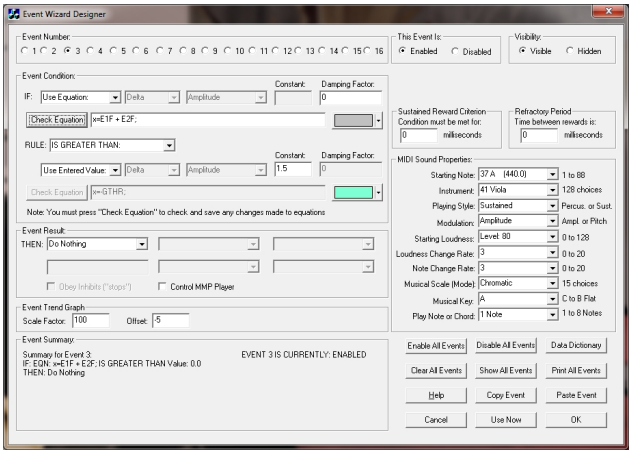
Event 1 – x=PercentZOKUL(UTHR, -GTHR) is Greater than CT. This rewards the Percentage of Z-Scores that are with-in the ranges of the U Threshold and G Threshold that are above the threshold that is defined by the C Key.
Event 2 – x=E1P. This shows the percentage of reward for Event 1.
Event 3 – x=-GTHR is greater than x=-GTHR. This gives a graphical representation for the Lower threshold for the Z-Score equation.
Event 4 – x=UTHR is greater than x=UTHR. This gives a graphical representation for the Upper threshold for the Z-Score equation.
Event 5 – x=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

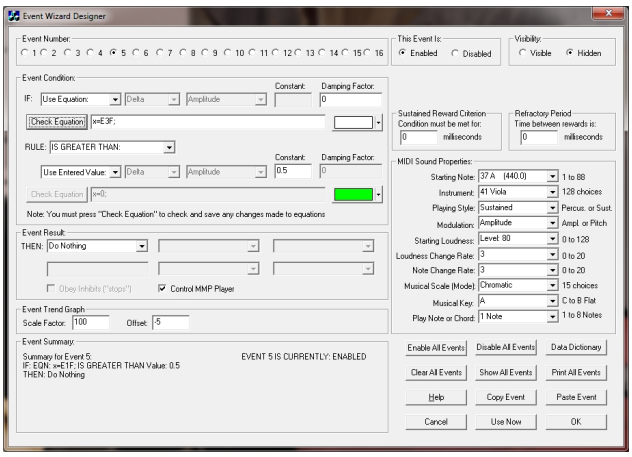
Enabling Multiple Events to control Flash Player (2 Event Example)



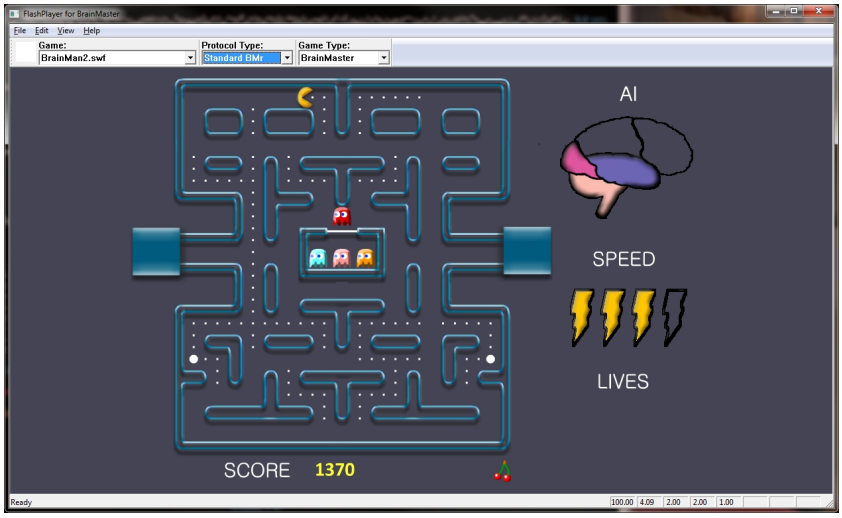
1. Create an Event (Event 3) that Flags these Events, and requires them to be greater than the possible combination with-out all being met (For this example, since there are two Events, we want the Event Condition to be greater than 1.5. This way, we are only successful when both Event 1 and Event 2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



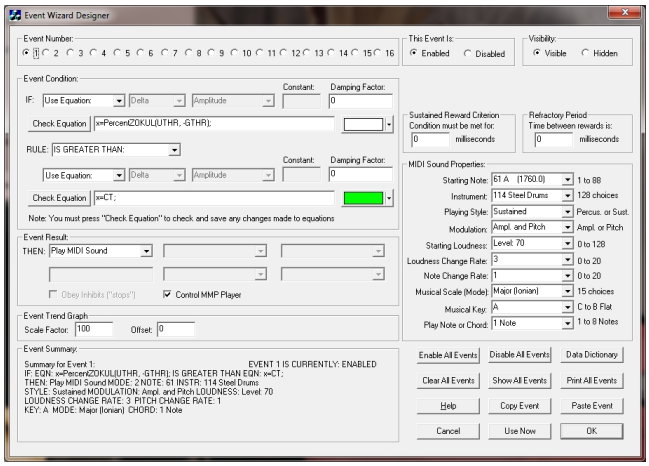
2. Next, we will need to flag the results of this last created Event into Event 5, so that the Flash Player can be controlled.

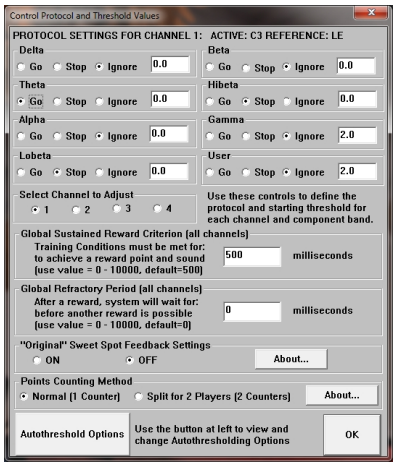


Your protocol will now be able to drive the Flash Player when all Event criteria has been met for the different Event Conditions. You will be able to tell, as you can see that the Flash Player will operate to Event 5

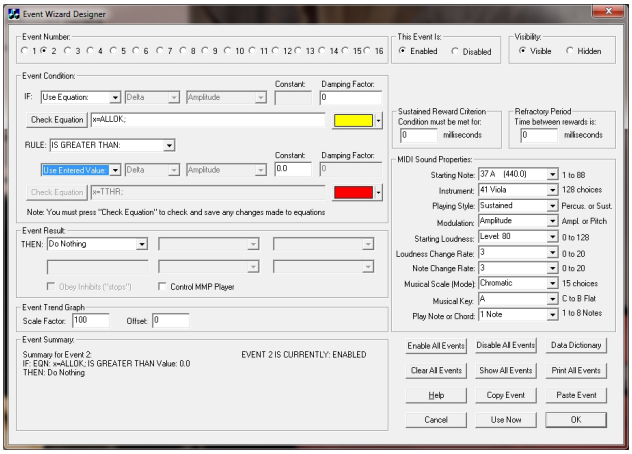


Enabling Amplitude and Events to control Flash Player

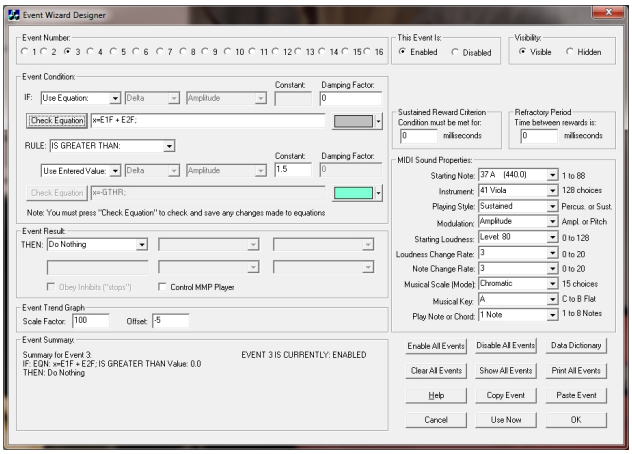




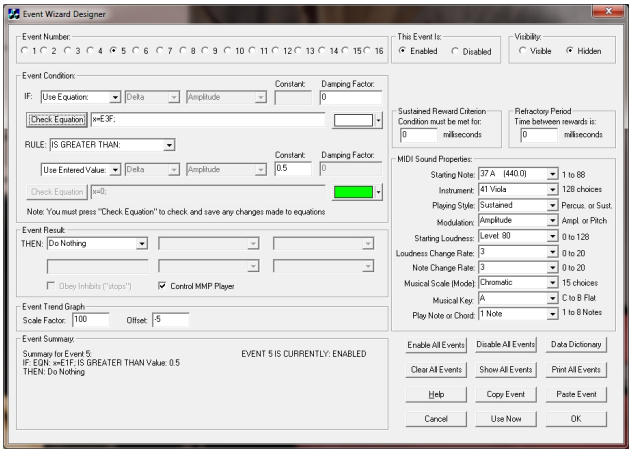
1. Create an Event to indicate that all amplitude components have met their criteria.



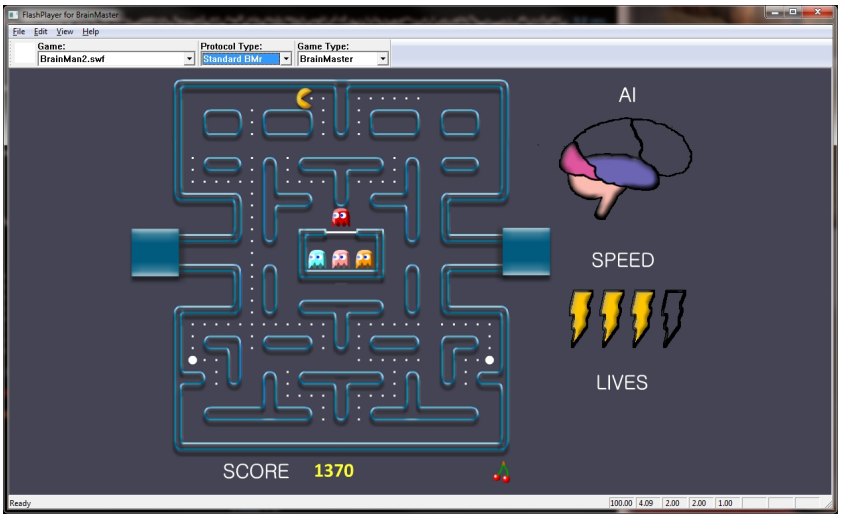
2. Create an Event (Event 3) that Flags these Events, and requires them to be greater than the possible combination with-out all being met (For this example, since there are two Events, we want the Event Condition to be greater than 1.5. This way, we are only successful when both Event 1 and Event 2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



3. 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



BrainMaster Products are manufactured by:
BrainMaster Technologies Inc.
195 Willis St.
Bedford, OH 44146
United States
1-440-232-6000

EC REP

European Representative:
mdi Europa GmbH
Langenhagener Straße 71
D-30855 Langenhagen

Phone: +49-511-39 08 95 30
Fax: +49-511-39 08 95 39
Email: info@mdi-europa.com
Internet: www.mdi-europa.com