

# bx\_control

→ Control Listening and Monitoring Instrument

→ M/S Matrix with Mono Maker and Stereo Width Control

## MANUAL

- for SCOPE systems



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## 1. What is the bx\_control?

We at BRAINWORX manufacture hi end analogue hardware audio tools and digital solutions for pro audio users.

The bx\_control is a handy control listening tool with built-in sophisticated features in M/S technique for digital sequencer surroundings. It will work with any host program that allows for the use of RTAS, VST and / or AU plug-ins. We will explain what "M/S technique" is in just a few lines from here – and then take a close look at the features of the bx\_control.

## 2. What is M/S technology ???

Most people who are into recording music know about the M/S microphone technique where you have 2 different microphones for **Mid & Side** signals. Recording a signal with M/S microphone technique means to create a stereo (L/R) signal by mixing the M and the S signal together in a special way that will create a very mono-compatible stereo signal.

To record in M/S you have to feed the M-signal to the Left and the Right channel of your mix while the S-Signal will be fed phase-correct ("in phase") to the Left channel and phase-reversed ("out of phase") to the Right channel.

This means you will have to split the S-signal and use a total of 3 channels for only 2 microphones that will be mixed together to a conventional stereo-signal. The bx\_control can do all that work for you, just feed it with the separate M- and S-microphone signals and "bounce" them into L/R stereo "on the fly" and without even dealing with this scenario... (although we strongly recommend learning at least the BASICS about M/S technology when using it!).

In addition to the possibilities mentioned above there also is a way of **separating any stereo signal** into its M (MONO SUM) and S (STEREO DIFFERENCE) components, and this can be done with the bx\_control as well, of course.

The bx\_control can also be used to serve as an "M/S matrix" to use ANY other stereo (2-channel) plug-in in M/S technique while using the unique tools and features of the bx\_control, such as MONO MAKER, M/S STEREO WIDTH CONTROL, SOLO BUTTONS, etc.

For additional details about M/S technique you may have a look into every decent book about recording basics if you want to learn more about the background and basics of this technique.

### **3. What is M/S good for in MIXING & MASTERING ???**

Well, it may sound simple, but the bx\_control (like our critically acclaimed M/S Mastering and Recording EQ bx\_digital!) has a built-in M/S matrix that will separate ANY stereo signal into its mono sum and the stereo difference signals. This means that after separating M & S you are then able to separately control these 2 signals with other tools (EQs, dynamics, etc.) - which can be very useful when you work on a stereo signal or mix that has certain "problems" or if you just want to enhance certain elements in a stereo signal or a complete mix.

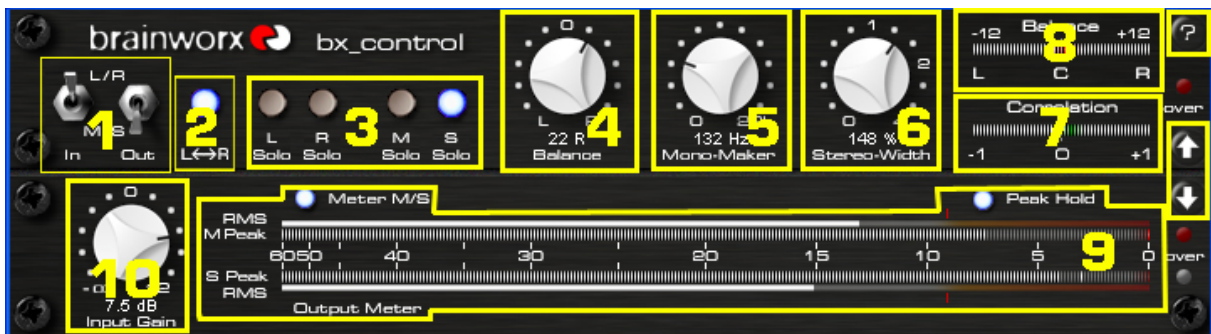
Ever tried to cut high frequencies of a mix to reduce the "essing" of the lead vocals and AT THE SAME TIME boost high frequencies of your harmony instruments (guitars, keyboards, pianos, etc... most likely recorded or mixed in stereo)???

Well, if you separate the M and the S parts of a mix and use some additional tools (EQs, dynamics, etc.) you can do exactly THAT!

### **4. Features of the bx\_control:**

- Individual **SWITCHES** for input and output (**L/R** or **M/S**) let you determine how the bx\_control will work
- **L/R flip** – easily swap left and right channels of any stereo signal or master sum (mix).
- Innovative **SOLO BUTTONS**: listen to the essential "parts" of your stereo signals phase-corrected on BOTH speakers.
  - o Select LEFT channel (**L**), RIGHT channel (**R**), MONO SUM (**M**) or STEREO DIFFERENCE (**S**).
- **BALANCE CONTROL**: balance out any mix so the MONO signals that SHOULD BE in the center are centered properly FOR SURE.
- **MONO MAKER**: our unique tool to easily mono out your stereo signal in the bass frequencies, adjustable from 20Hz up to 22 kHz(!)
- **STEREO WIDTH** Control: M/S width, adjustable with 1 knob from "0" (mono) up to 400%.
- **BALANCE METER**: will SHOW you if your mix is well centered
- **CORRELATION METER**: will SHOW you if the phases of your stereo signals are correct.
- **Hi-Res LED METERING**: PEAK and RMS metering, switchable L/R or M/S, with switchable PEAK HOLD.

## 5. Overview and Details

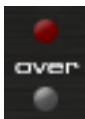


bx\_control - Screenshot



click here to get info (version no etc) about the bx\_control

- SCROLL WHEEL CONTROL: place your mouse above any knob and turn the mouse wheel to increase / decrease values.
- Individual BYPASS: click on ANY FEATURE LABELING to switch it ON (WHITE letters!) or OFF (GREY letters!). Very handsome feature to COMPARE your settings with the unprocessed signal, e.g. to monitor the METER TOOLS while adjusting / comparing your settings. Also, any bypassed feature of the bx\_control will not use any CPU / DSP power.



### OVER LEDs

- will indicate internal CLIPPING.
- RESET them by clicking RED LEDs
  - o bright RED LED: signal is clipping RIGHT NOW
  - o dark RED LED: one or more clippings have occurred since last LED-Reset.
  - o ALL LEDs grey: no clipping has occurred, signal level is fine.
- CLIPPING may occur by MONO MAKER or STEREO WIDTH use with normalized signals (0dB) because these functions may BOOST levels, depending on their settings (see 5 & 6 for details).
- In case of clippings occurring turn down the GAIN knob (10).
- → The upper LED is the MASTER CLIP LED. It will be "glowing" when either the L or R clip LEDs will show alerts. Resetting the master will also reset the other (L & R) clipping LEDs.

## 1. INPUT & OUTPUT selectors



- **INPUT L/R:** the bx\_control will assume that the signal fed into the unit is in L/R format
- **INPUT M/S:** the bx\_control will assume that the signal fed into the unit is in M/S format
- **OUTPUT L/R:** the bx\_control will output L/R format
- **OUTPUT M/S:** the bx\_control will output M/S format

Always set INPUT and OUTPUT switches to the proper format, unless you want to use the bx\_control for sound design.

### → use bx\_control as an M/S MATRIX:

When you intend to use the bx\_control as an “M/S matrix” (to use other plug-ins in M/S mode), simply place any stereo plug-in (actually, double mono units work best, so you can adjust M & S individually...) in between 2 (two!) instances of the bx\_control.

Plug-In No1 / Insert 1:

bx\_control as **M/S ENCODER** (set INPUT to L/R, OUTPUT to M/S)

Plug-In No 2 / Insert 2:

any other stereo plug-in(s) - (double mono versions are best to adjust M & S individually)

Plug-IN NO 3 / Insert 3:

bx\_control as **M/S DECODER** (set INPUT to M/S, OUTPUT to L/R)

→ As long as INPUT & OUTPUT formats are set properly you can use any function of the bx\_control in any combination as the internal signal flow will follow the setting logically. This will also work on either the ENCODER and / or DECODER when 2 instances of the bx\_control are used as an “M/S matrix”.

## 2. L/R FLIP (swap left and right channel)



- when lit the LED indicates that LEFT and RIGHT channel have been reversed (swapped).

### 3. SOLO buttons



- with these SOLO buttons you can listen to any element of your stereo mix (stereo signal), mono-ed out (for L, R, M & S) and phase-corrected (for SOLO S only), and on BOTH SPEAKERS.
- You can also “extract” certain elements of your mix with these knobs easily, for example try recording or bouncing the SOLO S signal for REMIX purposes... which will give you a phase-corrected mono-signal of only the stereo information (keyboards, stereo, guitars, FX sounds, etc.)!!!

### 4. BALANCE CONTROL



- with this knob you can “tilt” the whole stereo image conveniently.
- to balance out a stereo mix perfectly you can monitor the BALANCE METER LEDs (see 8!) and adjust the BALANCE CONTROL knob until your mix is CENTERED.
  - most mixes that come from ANALOGUE MIX CONSOLES or went through analogue outboard equipment (compressors, EQs, etc.) are NOT balanced perfectly. With the bx\_control and its BALANCE CONTROL knob (plus the corresponding LED meters, see 8) you can easily fix that.
  - → the easiest way to “center” a mix is to listen to SOLO S while adjusting the BALANCE CONTROL. When all parts of the mix that are supposed to be centered (bass-drum, bass, lead vocals, etc.) are NOT audible during SOLO S your mix IS centered properly!

## 5. MONO MAKER (via internal M/S technique)



- a true BRAINWORX invention... simply adjust the threshold frequency with the MONO MAKER knob and your stereo mix / stereo signal will be MONO up to that frequency automatically! The MONO MAKER will get rid of all the stereo information below the frequency you set it to - and COMPENSATE for the potential LOSS in the overall bass audio impression automatically!
- In bx\_control the MONO MAKER goes up to 26 kHz(!), so it is actually possible to make a mix MONO completely.

## 6. STEREO WIDTH CONTROL (via internal M/S technique!)



- adjust the stereo width of any stereo mix or stereo signal.
- Leaving the STEREO WIDTH at 100% will not change the width of your stereo signal.
- INCREASING the value (101% - 400%) will make your mix / signal sound WIDER. Be CAREFUL: setting the STEREO WIDTH CONTROL too high can cause serious phase problems!
- DECREASING (99% - 1%) will make your mix / signal less wide. Setting the MONO MAKER below 1% will display MONO. Now your mix / signal is COMPLETELY MONO.

## TIPPS for STEREO WIDTH CONTROL & MONO MAKER use:

- → TRY increasing the STEREO WIDTH (see 6!) of a stereo signal (such as a guitar or keyboard sub-group or FX return!) until your CORRELATION METER (see 7!) indicates phase problems (goes into the RED...). NOW: turn the MONO MAKER up to about 300 or 500 Hz (even higher if needed, this will depend on the actual signal being "played") and watch the CORRELATION METER go back to GREEN, indicating that your phases are ok again!
  - → This way it is actually possible to SPREAD stereo images much further than with any other stereo expansion tool (that we knew of before inventing the MONO MAKER ☺) – but WITHOUT running into the phase problems usually arising out of more or less "heavy" stereo image manipulations, or at least much less...
  - → the bx\_control is the PERFECT WEAPON to be inserted into ANY stereo sub-group of a mix session and will drastically improve your possibilities to increase your stereo width of any stereo signal.
- 

## 7. CORRELATION METER LEDs



- a standard CORRELATION METER tool to monitor the phases (and potential phase problems!) of your stereo mix / signal.
- - 1 means your mix / signal is OUT OF PHASE (180°).
- +1 means your mix / signal is IN PHASE (0°).
- "0" (zero) means that there is either:
  - no signal present
  - signal on only ONE channel
  - phases of L&R channels are shifted exactly 90°.
- → a regular (and proper) stereo mix will make the CORRELATIONS METERS oscillate between 0 and +1 while SHORT flashes of the RED LEDs (negative values) can usually be ignored.
- → PERMANENT RED LEDs will indicate heavy phase problems in the mix / signal and should be taken serious.
- → Try the MONO MAKER to cure any phase problems you might find listening to your mix or monitoring the CORRELATION METER LEDs. The higher you set the MONO MAKER FREQUENCY the more mono your mix will be, and the less phase problems should occur in your stereo mix / signal.

## 8. STEREO BALANCE METER LEDs



- the STEREO BALANCE METER LEDs will show you if your mix is well balanced – or louder on either the left or the right channel.
- You can adjust the STEREO BALANCE with the BALANCE CONTROL knob (see 4).

## 9. HIGH RESOLUTION PEAK & RMS LEDs



- will display PEAK and RMS OUTPUT levels of either the LEFT & RIGHT channel (L/R mode) or the MONO SUM & STEREO DIFFERENCE SIGNAL (M/S mode).
- you may SWITCH the meter between L/R mode and M/S mode with the METER M/S switch. A BLUE LED will indicate the meters displaying M/S meters. This will also be shown by the LABELING on the left side (next to the LEDs).
- The METER LEDs will FOLLOW the OUTPUT SWITCH (L/R or M/S, see 1!) whenever the OUTPUT SWITCH is being toggled – but you can always change to the opposite metering manually.
- Toggling between L/R and M/S METERING will NOT AFFECT the output signal. This way you can monitor M/S levels while listening to L/R mixes, monitor M/S while listening to M/S signals or any opposite possibility.
- PEAK HOLD: when switched on (default setting!) the LEDs will display the maximum values for 3 seconds before internally getting reseted. PEAK HOLD can be switched off manually.
- → The LITTLE RED marks above and underneath the RMS LEDs are placed at -9dBu. Usually any stereo mix that is permanently LOUDER (more compressed) than this level will sound very aggressive and in most cases too “squashed”. Even with the LOUDNESS WAR going on out there (☺) try to be RATIONAL with the levels. Sound first, please...
- → **It´s not about how LOUD you get it.. it´s about HOW you get it loud!**
  - (I have to admit that I read this slogan in some kind of magazine article from a “mastering guru” a few years ago and liked it a lot... but (forgive me!) I don´t recall anymore who it was! ☹ → if YOU know it let me know and I´ll change the manual... deal?\*)

## 10. INPUT GAIN



- to adjust the overall level of the stereo sound running through the bx\_control use the input GAIN knob.
- Since this is an INPUT gain control turning it down a bit will “cure” any internal clippings that may occur when MONO MAKER and STEREO WIDTH CONTROL are being used.

### **6. How do I get started with the bx\_control in a typical mastering, recording or mixing session?**

Recording, mixing and / or mastering music is all about HEARING OBJECTIVELY...and enhancing musical performances if possible... and it is (often enough...) about correcting mistakes that have been made in a prior stage of the production... this sounds basic, but we do mean it literally!

We assume that most if not all people who have purchased the bx\_control are familiar with using a standard dynamic tool or other tools as a plug-in in their sequencer host program, so we will skip the total basics of “how to use a plug-in” and go on with the possibilities arising from using just THIS plug-in. Inserting the bx\_control into any “plug-in-slot” of your sequencer or editor will be done slightly different depending on which host program you are using, and we are (well, at least “almost”!) sure that you already know how to do this with YOUR host software...

#### **6.a. RECORDING M/S microphone signals with the bx\_control:**

You may record the signals of your M (one or several M mics are possible!) & S (one S-mic only, please!) microphones individually and route them straight into the bx\_control. Either do this in REAL-TIME with a proper routing or record the microphones individually and route them into the bx\_control AFTER you have recorded (e.g. during mixdown).

→ check the latency of your system! The bx\_control will NOT add extra latency for its operation! With most modern DAW systems you will be ok to record “through” the bx\_control “on the fly”...

### **ROUTING for M/S RECORDINGS:**

- the M microphone(s) shall be routed into the LEFT input of the bx\_control.
- the S-mic goes straight into the RIGHT input of the bx\_control.

### **INPUT & OUTPUT SWITCHES for M/S RECORDINGS:**

- definitely switch the **INPUT SWITCH to M/S!**
- set the OUTPUT SWITCH to L/R if you want to output a “regular” LEFT / RIGHT stereo signal.
- Set the OUTPUT SWITCH to M/S as well if you want to go on processing your signals in M/S mode (that is possible with ANY additional stereo plugin chained after the bx\_control!) before converting to L/R with a second instance of the bx\_control at a later stage in your signal flow.

### **6.b. using the bx\_control on various elements of your MIX SESSION:**

The bx\_control is a GREAT tool to control the multiple elements that a stereo mix usually contains of:

- try it in SUB-GROUPS (AUX INPUTS, etc.) for controlling STEREO WIDTH of:
  - o guitar groups
  - o keyboard groups
  - o FX returns, etc.

SPREAD the stereo image of only SOME parts of your mix without affecting the phase correlation on the WHOLE mix.

### **ROUTING in MIX SITUATIONS:**

- simply INSERT the bx\_control into any INSERT SLOT of your host program and most likely run it in “L/R in – L/R out” – mode.

### **INPUT & OUTPUT SWITCHES in MIX SESSIONS:**

- switch both SWITCHES (IN & OUT) to L/R
- the controls (STEREO WIDTH, BALANCE, MONO MAKER) will STILL operate using M/S technique.
- No need to worry about anything at all... just monitor the PHASE CORRELATION METER LEDs and BALANCE METER LEDs, use the MONO MAKER to make sure you’re not overdoing the STEREO IMAGING... and ENJOY! ☺

## **6.c. using the bx\_control in a standard L/R MASTERING SESSION:**

**→ Mastering regular L/R stereo signals in L/R mode**

**(mix files or master bus groups)  
(bx\_control in L/R in – L/R out – mode)**

Basically mastering stereo music in L/R mode is not much different from using the bx\_control on single elements of a mix sessions (sub-groups, etc., please check 5.b. above!).

Just insert the bx\_control into the main stereo mastering signal path and leave IN & OUT SWITCHES in L/R.

MONO MAKER, STEREO WIDTH CONTROL and BALANCE will operate as you´d expect them to do, and M/S technique is being used internally due to Input and Output being in L/R format.

### **ROUTING in standard L/R Mastering Sessions (bx\_control in L/R in – L/R out – mode)**

- simply INSERT the bx\_control into any INSERT SLOT of your host program and run it in “L/R in – L/R out” – mode.
- → We suggest you put the bx\_control as the SECOND LAST plug-in into your plug-in chain, while the LAST plug-in would be a brickwall-limiter. This way you make sure to be able to use the SOLO buttons AFTER all other tools you might use are being processed and avoid clipping at the end of your signal-chain.

### **INPUT & OUTPUT SWITCHES in MASTERING SESSIONS:**

- switch both SWITCHES (IN & OUT) to L/R (actually LEAVE them there, this is how the bx\_control initializes anyway).
- the controls (STEREO WIDTH, BALANCE, MONO MAKER) will STILL operate using M/S technique internally.
- No need to worry about anything at all... just monitor the PHASE CORRELATION METER LEDs and BALANCE METER LEDs, use the MONO MAKER to make sure you´re not overdoing the STEREO IMAGING... and ENJOY! ☺

#### **6.d. using the bx\_control in an M/S MASTERING SESSION:**

(other tools being "inserted" between 2 instances of the bx\_control to make THEM (the OTHER tools!) operate in M/S mode as well)

**(mix files or master bus groups)**

Mastering in M/S takes a little time to get used to because it´s just really different to eq 2 separate mono-sums than eq-ing conventional L&R-signals, but it´s a very musical way of working, and there IS a reason why some of the top mastering studios in the world have been working like this for ages with custom-made M/S-boards without really telling anybody... M/S-mastering might be the key for your music to sound just as big yet still open and clear as productions often referred to as being "BIG"... ☺

Many people who have used the M/S-mode for the first time told us that they have the impression of a "3D-like" depth in their mixes after processing the M- and the S-Signals individually. While using the M/S-technique for mastering DOES affect your phases in the stereo-signal we do not see this as a big problem. In M/S mode altering phases is done INTENTIONALLY. Of course, though, M/S mode works best if you want to correct small mistakes in your mixes... for adding or cutting away big amount of general bass or treble signals you might be better off working in L/R-mode...

→ DO NOT let anybody tell you that changing stereo signals in M/S mode can´t be done or shouldn´t be done at all because of phase problems... it´s like somebody telling you your MARSHALL is broken because it distorts your guitar sound... ☺ Anyway, just like you wouldn´t turn all the MARSHALL knobs to the right all the time be sensitive and reasonable when using M/S technique with stereo mixes. Like any good drug it can help A LOT when the dosage is right – and it can KILL when the dosage is too high...

Once you are used to the basics in M/S you might easily get into more sophisticated functions... try balancing out a mix that is not centered 100% (most mixes that come from an analogue desk with inserted compressors, EQs, in the main stereo insert, etc. are not balanced 100%!) by SOLOing the S-section and adjusting the BALANCE CONTROL until all the things that SHOULD be centered (like bass drums, snares, lead vocals, bass, etc.) in your mix disappear completely. If that´s the case you can be sure that your mix IS balanced!

Make your whole mix or elements of your mix (subgroups, stereo channels, etc.) sound wider than it originally was by setting the STEREO WIDTH control higher than 100% - without losing the center of your recordings! You will NOT lose bass drum power or vocals by making your mix wider this way... and it will not sound different played back in MONO at all!

## **ROUTING and IN / OUT - SWITCHES in M/S Mastering Sessions**

(2 instances of the bx\_control operate as a “**M/S MATRIX**” for OTHER stereo tools while still offering the internal M/S features, of course)

When you intend to use the bx\_control as an “M/S matrix” (to use other plug-ins in M/S mode), simply place any stereo plug-in (actually, double mono units work best, so you can adjust M & S individually...) in between 2 (two!) instances of the bx\_control.

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Plug-IN No 1 / Insert 1:

bx\_control as **M/S ENCODER** (set INPUT to L/R, OUTPUT to M/S)

The M-signal will be put out on the LEFT channel of the bx\_control.

The S-signal will be put out on the RIGHT channel of the bx\_control.

Plug-IN No 2 / Insert 2:

any other stereo plug-in(s) - (double mono versions are best to adjust M & S individually)

→ Apply all changes that should effect the M-signal to the LEFT channel of the “inserted” plug-in(s).

→ Apply all changes that should effect the S-signal to the RIGHT channel of the “inserted” plug-in(s).

Plug-IN NO 3 / Insert 3:

bx\_control as **M/S DECODER** (set INPUT to M/S, OUTPUT to L/R)

bx\_control will now “fold back” the M-signal (from the LEFT input) and the S-signal (from the RIGHT input) to a regular stereo signal (L/R).

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→ As long as INPUT & OUTPUT formats are set properly you can use any function of BOTH of the 2 bx\_control instances used in this setup in any combination as the internal signal flow will follow your IN / OUT settings logically and automatically.

### **6.e. the bx\_control as a pure CONTROL LISTENING TOOL:**

Insert the bx\_control into the MASTER BUS of your DAW sessions ALL THE TIME, and you’ll be able to check your overall phases, stereo balance, etc. of your mix anytime. Use the SOLO BUTTONS to check how small changes in your mix sessions effect the M, S, L, R of your main stereo mix, etc.

→ **Finally it has GREAT Level LEDs (Peak & RMS)...**

## 7. PRO TIPP: GUI modes



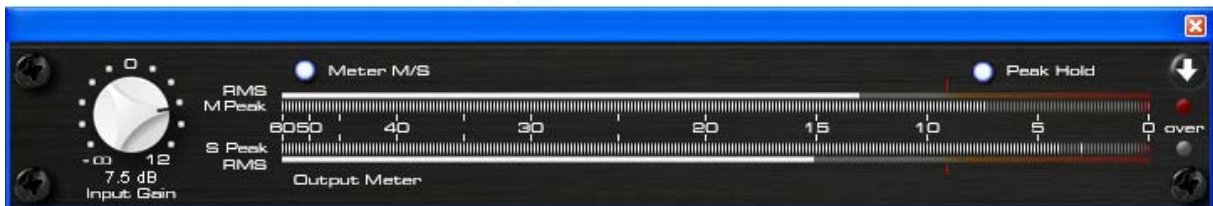
SWITCH the upper unit or the lower unit of the bx\_control ON / OFF

Switchable GUI windows:

- use units individually and save CPU / DSP power!



or



or



→ Bypassed functions or switched-off units will not use CPU / DSP power!

## **8. TROUBLESHOOTING**

→ Incomplete signals

You might have clicked on one or (or more) SOLO-buttons of one section (L/R or M/S), so you only hear parts of your signal. Make sure all SOLO buttons are switched OFF to hear your stereo mix.

→ Your signal sounds MONO?

STEREO WIDTH set to very low values? MONO MAKER set to very high values? SOLO M is active?

→ Wrong panoramas

If you hear parts of your stereo signal not properly in place panorama-wise you might be working with the INPUT / OUTPUT SWITCHES set to wrong modes!

→ NO sound

Do you feed any sound into the bx\_control at all??? ☺

**→ enjoy working with the bx\_control !!!!!**

For more information, an M/S-forum and video tutorials of some of our tools please visit:

**[www.brainworx-music.de](http://www.brainworx-music.de)**

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