bx_XL V2 – The New Loud. - Newer. Louder.

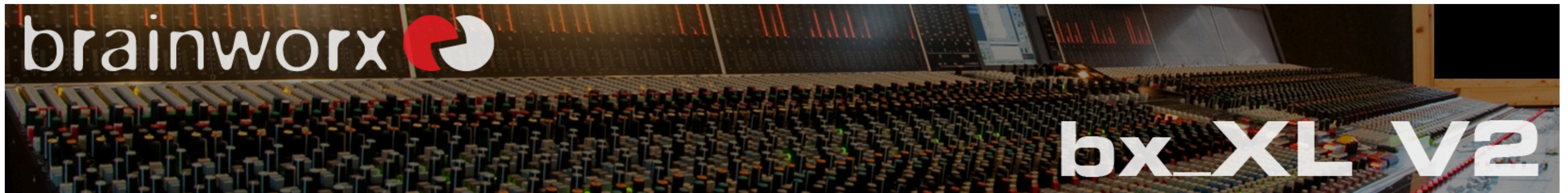**Thank you for using Brainworx plugins!**

bx_XL V2 is a M/S stereo mastering limiter. Its main purpose is to help you get your mixes loud and clear. "As loud" as any major label production, but less squashed and distorted than many of them.

During the development of the bx_XL V2 we asked ourselves several times why it seems to be a "must have" in the audio-world today to "limit" most of the mixes to the extreme. And while you can do so with bx_XL V2 we truly believe that there is a certain stage at which you should just STOP to squash your mixes more and more to eventually achieve "huge loudness" or volume... for the sake of clear and enjoyable sound.

From a certain level on we at Brainworx feel that too much loudness is a true limitation for your music. Limitation in dynamics, in power and strength...

Certain music styles seem to require that squashed sound and "loud first impression", but you might achieve a bigger and longer lasting impact with a powerful mix that is loud... not dead. Please do keep this in mind when cranking up your mixes.

We recommend using the bx_limiter and bx_meter plugins in cooperation with bx_XL V2 during mixdown and mastering. They will help you to catch peaks at various stages of the mix and to monitor your Peak and RMS levels perfectly.
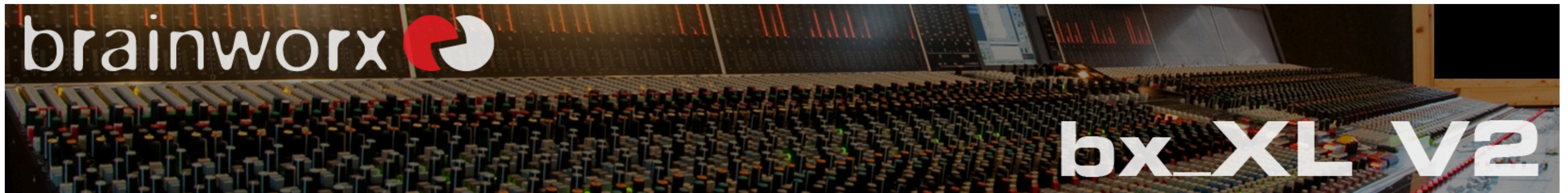
PLUGIN ALLIANCE

bx_XL V2 Quick Guide

- Insert bx_XL V2 on the master bus. Use bx_XL V2 behind all EQs and compressors.
- Play a stereo mix which you know well and engage Solo M and Solo S (center section) to understand what the M signal and the S channel stand for.
- Turn up the Input Gain until the Peak Meters of the stereo main LEDs hit "0" (zero) on peaks.
- Turn up Master Gain Boost and note how your mix gets louder and more squashed the more you crank up. The MidLo and the MidHi signals might hit the Max Gain ceiling now on peaks.
- Adjust the individual Gain Boost sliders to balance the overall sound if necessary. Watch the MidLo/MidHi and Mid/Side meters change as you change the ratio between M & S or MidLo & MidHi.
- Turn down the individual Max Out sliders to tighten up individual channels by driving them into the limiter heavily.
  Do not overdo this, too much gain reduction causes distortion.
- Play with the Crossover Frequency slider and use the "Solo MidLo" feature to adjust precisely.
  Try to separate the bass drum and snare with with it!
- Adjust the individual Attack and Release times of the MidLo, MidHi and Side channels.
- Turn up the Master XL knob and/or the individual XL knobs in the channel to saturate your mix or parts of it.
  This will give you more "perceived volume"/more loudness.
  You cannot win the loudness war without the XL knobs! ;-)
- If the Peak Stop meters show too much gain reduction (> 3 or 4 dB) in the final stage use the Summing Amp Gain to reduce the overall level. Use M & S gains individually to adjust or correct the stereo width.
  Watch the Mid/Side meter if you do so.
- Use the Master Out to turn your overall master output down by -0.2dB if desired.
   Many mastering studios do so to avoid clippings at CD project crossfades, etc.

Advanced steps:

- Sidechain mix: Mix any combination of 2 elements of your mix (MidLo, MidHi, Mid, Side, or External) to be your Sidechain signal. Let this SC signal key the MidLo channel, MidHi channel, Side channel or any combination.
- Pan M and S to balance out uneven mixes.
- Watch the 4 big "needle VUs" as they display important stereo width information and the ratio between low end and hih end frequencies.
- Use Fader Link on the MidLo and S channels to drive signals more into the limiter without boosting the actual volume of that channel!
- Be creative, follow your ideas. We believe that there is not really much that you cannot do with bx_XL V2 when it comes to levels and CD loudness.

What is the bx_XL V2 limiter?

bx_XL V2 is a M/S stereo mastering limiter. bx_XL V2 internally converts stereo signals into M (mid/sum) and S (side/difference) signals and furthermore it splits the M channel into 2 bands (hi & lo).

Phase-X
Mid Lo and Mid Hi will be combined to a phase coherent mono sum using the all-new 'Phase-X' Phase-Linear Crossover Filters.

This way you can limit and level 3 individual channels to increase loudness and improve clarity of stereo mixes drastically – with much less distortion artifacts and while keeping mixes much punchier than conventional limiter systems.

Via the Crossover Frequency slider the MidLo channel can be used to separate the bass drum and limit it different than the rest of your mid signal easily! This is great for all kinds of dance, rap, techno and rock music!

After these 3 channels have been mixed back together to a regular L/R stereo signal internally the signal runs through an additional (fourth!) final brickwall peak stop limiter which offers an adjustable master out level.

bx_XL V2 also has a 3 band "psycho-acoustic" loudness maximizer built-in and offers 4 automatable settings with copy & paste functionality. All these features combined with 32 steps of Undo / Redo and various detailed Level meters make for a sophisticated dynamics & loudness control system second to none.

We recommend bx_XL V2 to be used as the final plugin on the stereo master buss for mixing and mastering purposes and it can work great on any stereo bus / stereo sub group as well.

bx_XL V2 is based upon the M/S technology taken from our modern classic M/S EQ bx_digital. We developed this hi-end analogue EQ 2006/2007 and we have offered a plug-in simulation of this EQ ever since. Engineers and magazines around the globe rave about bx_digital so we decided to develop a limiter that "teams up" perfectly with our EQ in mastering situations.

Multiple Solo, Auto Solo and Link features enable the engineer to precisely adjust all stages of this hi-end mastering limiter. bx_XL V2 looks quite complex at first, but once you get the internal signal flow and audio splits you will be able to use it intuitive and fast.

It might be worth taking a look at the graphical layout of the internal signal flow, see next page.
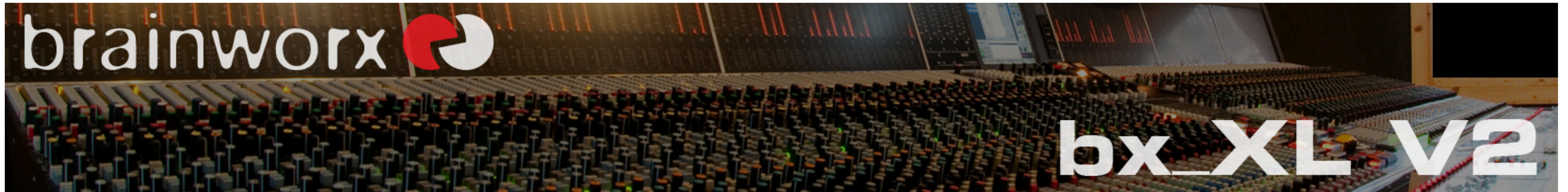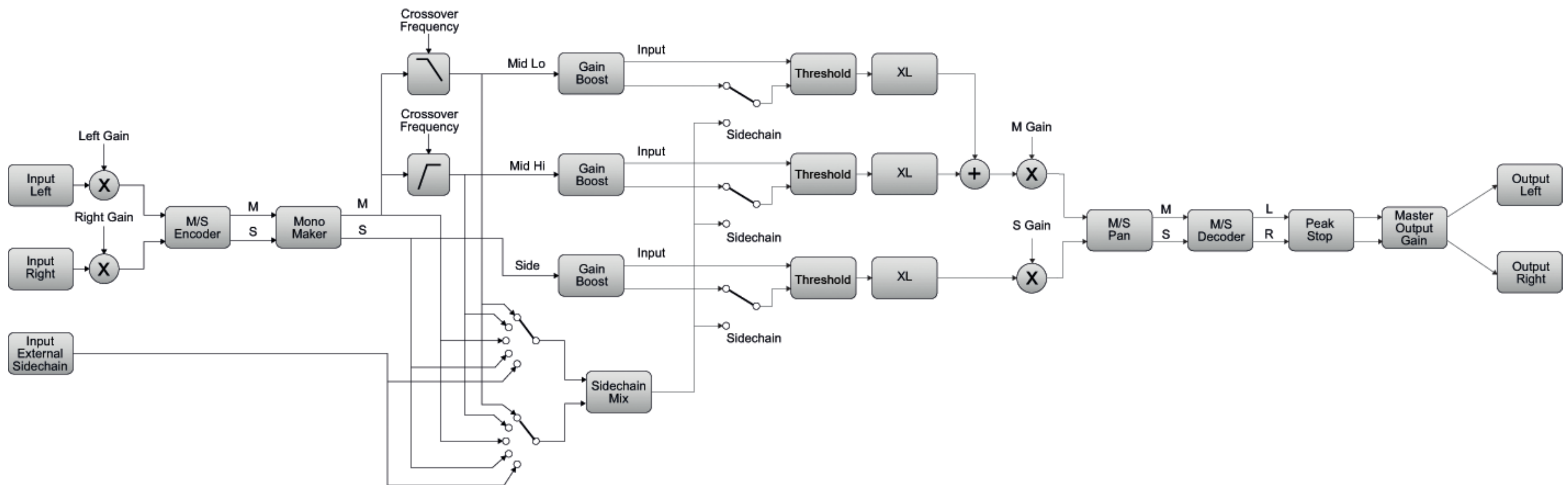
PLUGIN ALLIANCE

bx_XL V2 Signal Flow Chart

Below is an overview of the signal flow.
It can help you to understand the concept and idea behind the bx_XL V2 algorithm.

Maybe print this page and check it while using bx_XL V2 for the first time!

What is M/S technology?

Most engineers who are recording music know about the M/S micro- phone technique (2 different microphones for stereo recordings – they have to be an OMNI or CARDIOID microphone for the M (mid) signal and a "FIGURE-OF-8 microphone" for the S (side) signal).

Recording a signal with M/S microphone technique means to create a stereo (L/R) signal by mixing the M and the S signals together in a special way that will result in a very mono-compatible stereo signal. To master your music in M/S you have to extract the M- and S- signals from your existing stereo mix with an M/S matrix (we offer bx_control as a plugin M/S matrix), then limit your M- and S- mono sums with 2 mono limiters and bounce back to L/R stereo with a second M/ S matrix. Sounds quite confusing?

Well, bx_XL V2 does all that work for you internally, just feed it with a stereo mix and you´ll be able to individually limit (and listen to!) your M- and S- signals. The input and output signals of bx_XL V2 are always regular L/R stereo.

For additional details about this technique you may have a look into any decent audio book. Please do so if you want to learn more about this method to create very mono-compatible stereo-signals, e.g. when recording classical music, drums, choirs or acoustic instruments in general.

What is M/S good for in Mastering?

Well, it may sound simple, but the bx_XL V2 has a built-in M/S matrix that will separate any stereo signal into its mono sum and the stereo difference signals. Thus you are able to separately control these 2 signals which can be very useful when you work on a stereo mix that has certain "problems" - or if you simply want to enhance the perceived volume of your mix with as few audible artifacts as possible.

Ever tried to crank up the guitars and keyboards of your stereo mix while keeping the punch of your drums and the power of your lead vocals? With bx_XL V2 and its built-in M/S technology you can do exactly that.

But what´s so new about bx_XL V2 then?

First of all, bx_XL V2 works different than any other limiter out there. Different in a nice way...

The M/S mode and the internal split of the M-signal into 2 bands allow for a huge increase of overall volume and perceived loudness while keeping audible distortion and artifacts as low as possible. Each band just has to work less, that´s the main idea.
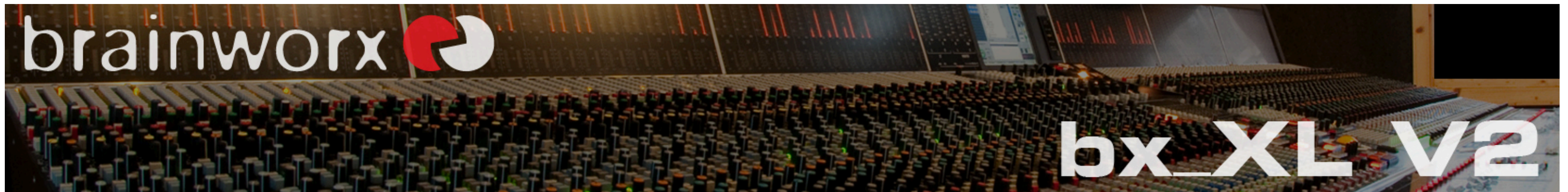
bx_XL V2 is the first and only M/S mastering limiter that allows you to listen to your M and S signals individually and phase corrected by using the same solo knobs that have already made bx_digital the M/S EQ of choice for many of the best engineers around the globe.

"Why is this so unusual?" you might ask now. Well, although the S signal is included in any regular L/R stereo signal, it is not in phase on both channels, so we had to come up with an easy way to phase correct it each time you want to listen to your S-signal soloed.

How do you start? Start by playing some stereo mixes through your bx_XL V2 plug-in and push the Solo button of the MidLo, MidHi and most importantly the Side Section... you will be amazed of what you will hear... you will be able to work on details you have never even heard before in your mixes!

Then dig a little deeper, try the Auto Solo Mode, the Crossover Frequency split while soloing M Lo and M Hi, use the XL knobs on all 3 channels, etc.
You will quickly get into the concept this way.

Features of bx_XL:

- M/S mastering limiter for stereo signals (mixes)
- Splits stereo signal into M & S using NEW **Phase-X** phase-linear Crossover Filters
- Splits the M signal into Lo and Hi (2 bands)
- Multiple Solo features including "Auto Solo" Mode
- 1-click Fader Link for temporary linking (Gain Boost & Threshold)
- Multiple Level meters to control Correlation, Balance, Loudness, M&S ratio, etc.
- Input Gain and individual Pan for M and S signals to control the output balance - with more precision than ever.
- Stereo Width Control (M & S Gains in the Summing Amp)
- Output Gain to adjust overall level.
- Mono-Maker: Adjust the MonoMaker frequency from 20Hz to 20kHz and your stereo mix will be Mono up to that frequency by cutting away the low-end of the stereo-difference of your stereo-mix - and adjusting the potential loss of bass-frequencies in the Mono-Sum automatically! This filter is a true Brainworx innovation.

Ever had problems to cut your electronic music mixes with synthesizer basses to vinyl? Do you want to make sure your bass sounds are tight on disco speakers that might be spread all over the place? Try the Mono-Maker.

- bx_XL V2 works in M/S mode so you can give your mixes that extra lo-end on guitars and synths that the pros have without rumbling bass drums, basses, etc.
- bx_XL V2 keeps the punch of your mix alive!

How do I get started with bx_XL V2 in a typical mastering session?

Mastering music is all about hearing objectively ...and enhancing musical performances if possible... but it is (often enough...) about correcting mistakes that have been made in a mix session... this sounds basic, but we mean it very literally!

We assume that most if not all people who have purchased bx_XL are familiar with using a standard L/R limiter, so we will skip the total basics of "how to use a limiter" and go on with less common-known limiter-techniques...

If you have an average stereo-mix with some problems you want to correct... missing loudness for example - the band you produced just complained that the last major label CD by "XYZ" is much louder than their own recording you just mixed and mastered....

It´s just... how can you change anything for the better if you can´t even hear exactly where the problem lies?

But that´s over now... with its built-in M/S-mastering-mode bx_XL V2 can transform your stereo mix into 2 easy-to-adjust mono sums (M & S, or "Sum & Difference"), and the bx_XL lets you hear both sections perfectly in-phase. In addition to separating M and S bx_XL also splits the M- signal into 2 bands for you and let´s you listen to all channels in Solo mode.

This way you can hear any problem of your mix very obviously and also make any improvements to your mix simple but precisely.

We propose you start working with bx_XL V2 by simply listening to some of the mixes that you know very well or to some of your favorite CD-tracks.

While you do so press the Solo - buttons of the M and S – sections alternately to get used to how your mixes sound separated into these 2 mono sums (respectively 3 bands). You will quickly be able to hear stuff inside your music that you might want to process / adjust, so why don´t you just do it?

Mastering in M/S takes a little time to get used to - it´s just really different limiting 3 separate mono-sums than limiting conventional L&R-signals with a 1 knob "auto-limiter". 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 just be the key for your music to sound as big - yet still open and clear - as productions often referred to as being "BIG"...

Many people who have used the M/S-modes for the first time told us that they had 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 problem. In M/S modes altering phases is done intentionally.
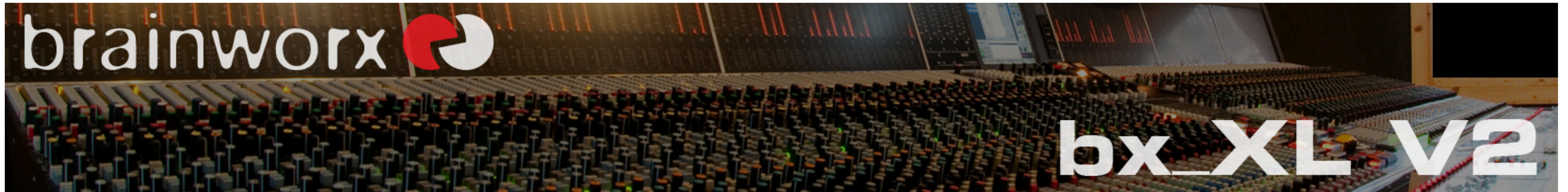
brainworx

bx_XL V2

Once you are used to the basics of M/S you might easily get into more detailed 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 Solo-ing the S-section and adjusting the Balance Gain 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!

Use the Sidechain mixer and let your music bounce to the groove of your bass-drum, record stem mixes that are still being triggered by the whole mix (through the external Sidechain input).

Make your mix wider than it originally was by increasing the Stereo Width without losing the center of your recordings! You will not loose bass drum power or vocals by making your mix wider this way... and it will not sound different played back in mono at all.

Overview & Details

I/O – Input Gain & Panorama M/S

The input gain lets you level the signal you want to process with bx_XL from (-20dB) to (+20dB) before you actually start tweaking knobs to adjust all the details. Watch the RMS Meters and make sure that peaks in your audio material will not cause constant 0dB levels. Peaks around -1dB/0dB are a good choice to start with.

The Input Gain also lets you adjust the overall level and intensity of the limiter sound once you have tweaked all the details. If you feel your mix sounds good but maybe just a bit too squashed try lowering the Input Gain by -0.5dB or -1dB.

The Input Gains for the L(eft) and R(ight) channels can be linked. When Link is ON adjusting one of the Gain knobs will cause both knobs to turn. Please note that you can offset both channels (unlink them and set one channel to more or less volume than the other channel) and still use them in linked mode afterwards whereas the level offset will stay in place!

If you experience uneven or unbalanced mixes at the output (the Balance meter and the RMS level LED´s are a good reference) try adjusting the M and S Pan.
Panning the M shifts signals from the center of your mix (bass drums, snares, lead vocals, bass, etc.) while panning the S signal rather tilts your stereo information (guitars, keyboards, choir vocals, strings, pianos and effect sounds for example).
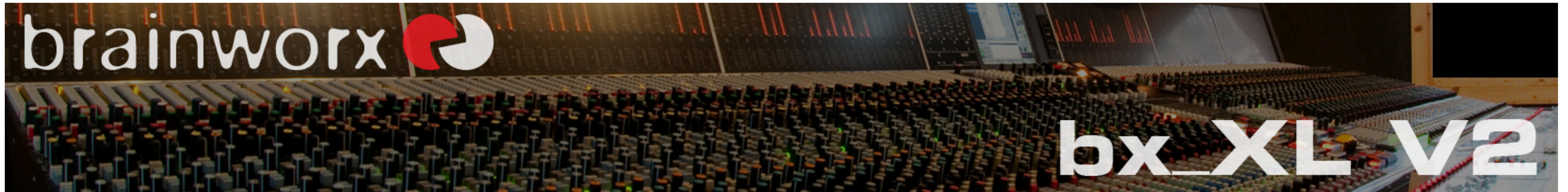
Crossover Frequency

With the Crossover Frequency fader you select the frequency at which the M signal will be split into Low band and Hi band. A value of 120Hz means that the Mid Lo channel will contain all frequencies up to 120Hz, while the Mid Hi band will contain all frequencies above 120Hz.

Phase-X
Mid Lo and Mid Hi will be combined to a phase coherent mono sum using the all-new 'Phase-X' Phase-Linear Crossover Filters.

Mono Maker

The Mono Maker is another true Brainworx invention and is also featured in bx_digital V2, bx_control V2, bx_dynEQ V2 and bx_hybrid.

It will cut away low end frequencies (the ones below the frequency you dial in) only in the S signal to make your mix mono below that frequency! At the same time the Mono Maker automatically compensates for the overall loss of low end sound in the M signal so your mix does not loose bass audibly.

Mono Maker ensures phases below the selected frequency to be accurate and tight and helps preventing bad surprises from playing your music through subwoofer music systems.

Mono Maker is also essential for Vinyl Mastering! Phase problems in the low end can literally make the needle of a record player jump off the groove(!), and Mono Maker effectively eliminates these phase problems.

Try starting with settings around 60 Hz. Much higher frequencies can cause audible loss in stereo width. Crossover Frequency and Mono Maker can be linked for easier use with standard settings.
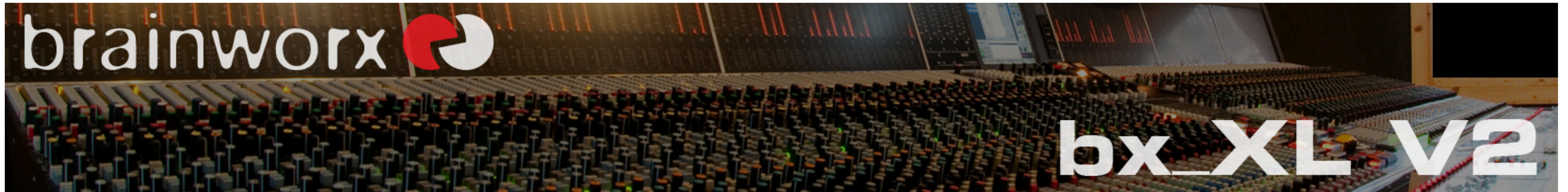
Mid Lo/Hi and Side Sections

Gain Boost

Use the Gain boost faders internally to drive the respective channel into the limiter. The "hotter" you drive a channel the more Gain Reduction will be applied when the channel hits the "ceiling" set by the Threshold.

Gain Reduction Meter

Any audio signal exceeding the Threshold level will cause the limiter of that channel to "block" the audio above that level. This is the main purpose of the limiter. To show you how much level is being "cut" we have implemented the Gain Reduction meter.
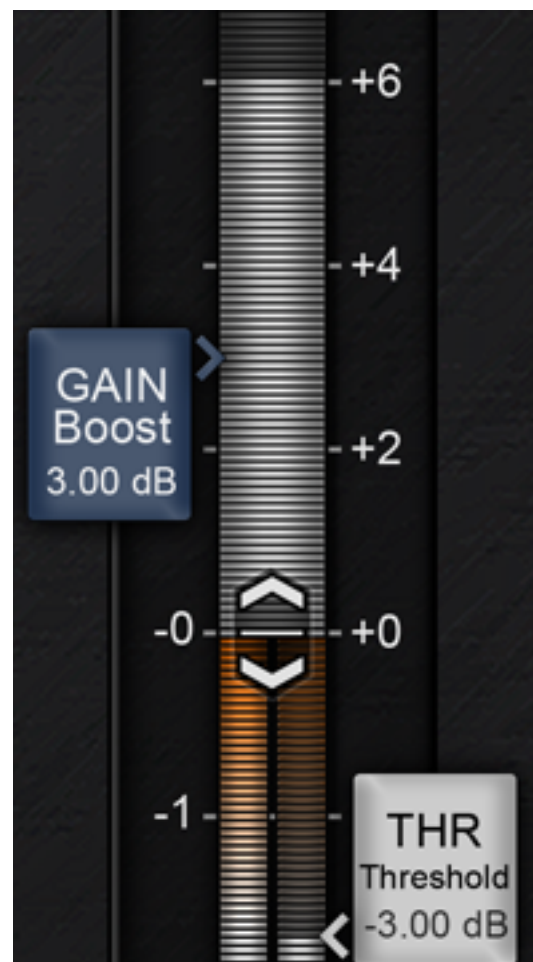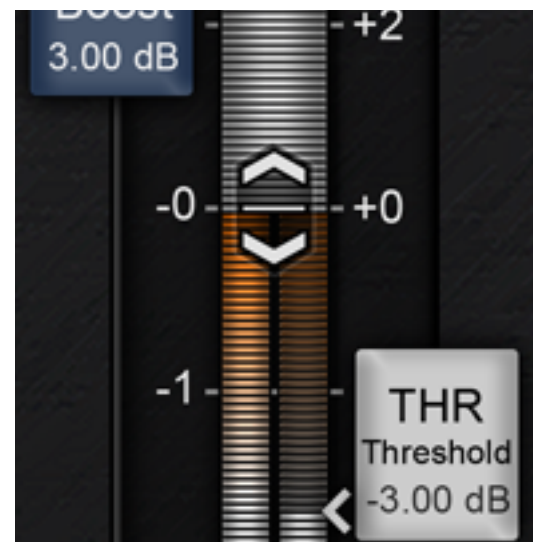
+4dB means that internally the audio signal of that channel is 4dB above the Threshold, and the limiter turns down the output of that channel by 4dB at that moment. Gain Reduction of 6dB or more may be quite audible and result in "pumping" audio.

Threshold

With the Threshold faders you adjust the peak levels upon which the limiter will start working. Setting the Threshold to -2dB (for example) will cause Gain Reduction of any peaks exceeding this level.

XL – The Saturation knob

The XL knob allows to further push the signal and add some warmth by the application of smooth third and fifth order harmonics. Aliasing is prevented due to a special filtering process.

Using the XL feature will let your mix sound way louder – without really altering the actual audio level too much. This way you can achieve mixes that seem to be louder than they actually are!
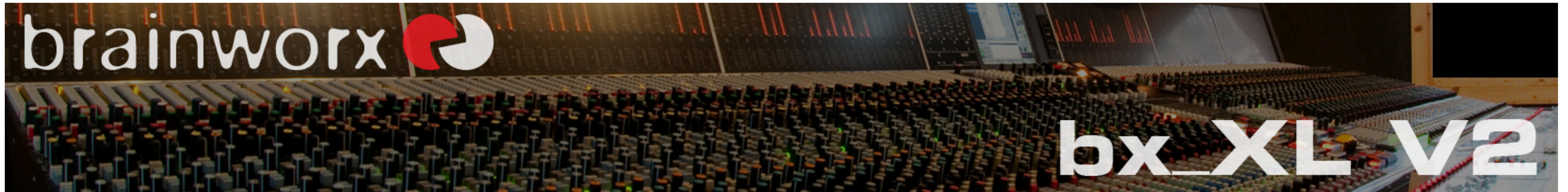
You may apply XL to all 3 channels (Mid Lo, Mid Hi and Side), but we highly recommend using the XL process cautiously on the channel that contains the lead vocals and other natural signals. This will be the Mid Hi channel in most situations.

> XL settings up to 50% should be OK to be used with any material with no problems to be expected, higher settings might work on the Mid Lo and Side chain best.

> XL is a secret weapon for achieving loudness that can usually only be heard on recordings mastered by the very best mastering engineers world wide.
> Just try it and judge for yourself.
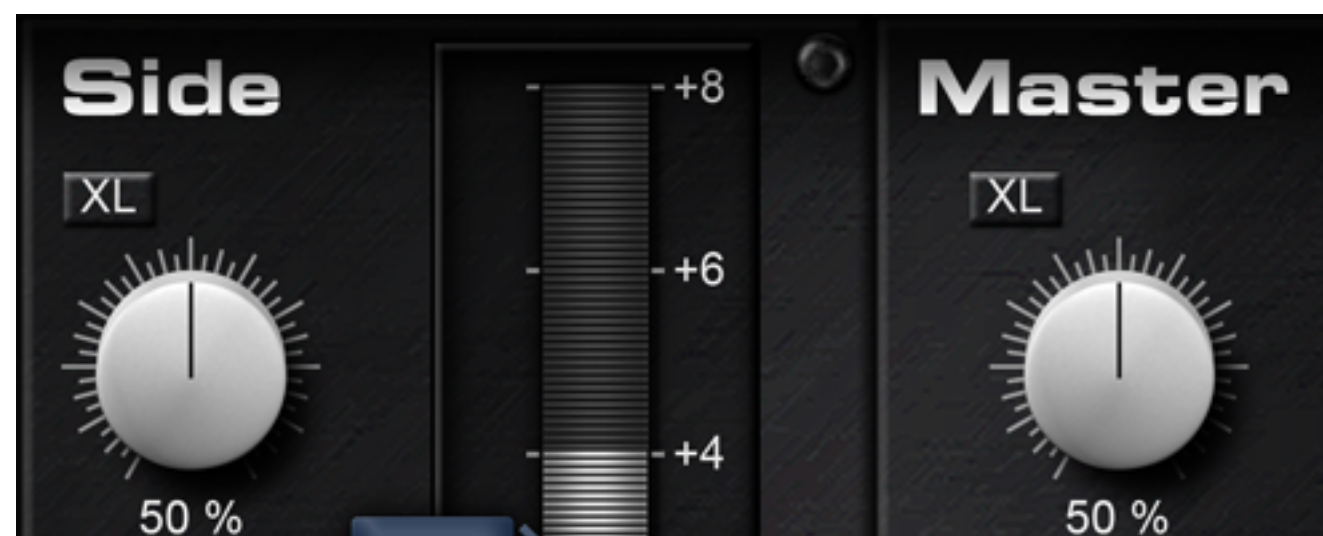
Attack time (0.1ms – 1.5ms)

Attack time is the time the limiter needs to achieve maximum gain reduction when a peak in the signal has caused the signal "hit the threshold". Adjust the Attack time of the limiter of the respective channel (Mid Lo, Mid Hi or Side) fast enough to cut off all the peaks in that channel you want to get rid off. Too fast Attack times though can result in audible peaks, too slow Attack times may not limit your signal effectively enough to cut of all the peaks you want to get rid of.

> As there is a stereo Peak Stop Limiter behind the M/S Summing Amp stage of bx_XL you don´t have to fear audible distortion because of slow Attack times. Any peaks slipping through the limiters of the individual channels will hit the Peak Stop limiter if they are exceeding 0dB at the Summing Amp stage and will be stopped by a fast fourth limiter (in addition the the 3 limiters in the Mid Lo, Mid Hi and Side channels) here reliably. If the Peak Stop meters show Gain Reduction greater than 3 dB (in the Peak Stop level LED´s) you should try to set the Attack times faster to let less peaks pass the respective limiter channel (Mid Lo, Mid Hi or Side).

> If you experience peaks or distortion while soloing individual channels (Mid Lo, Mid Hi or Side) you might want to listen to the whole mix first (= switch OFF all solos!) before changing Attack times.
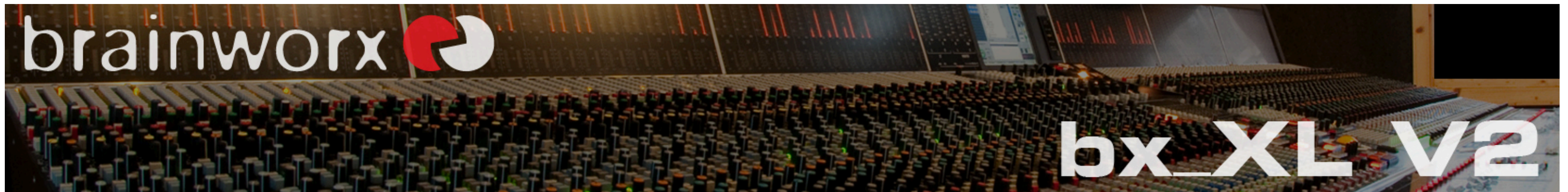
Crackles in a single channel are not necessarily audible in the whole mix.

Release time (0.01ms – 1sec)

The Release time is the time the limiter takes to "let go" and be reset after a peak has caused the limiter to reduce the gain of the channel "hitting the threshold" (and after the level has dropped again below that level, of course).

Faster Release times result in higher output level and higher RMS levels but might cause audible distortion at some point. If you experience clipping sounds please dial in longer Release times.

Slower release times will result in a more gentle gain reduction but might cause audible "pumping sounds". If you experience pumping audio signals please try shortening the release times of the channels containing more rhythmic material. In most cases this will be the M channels.
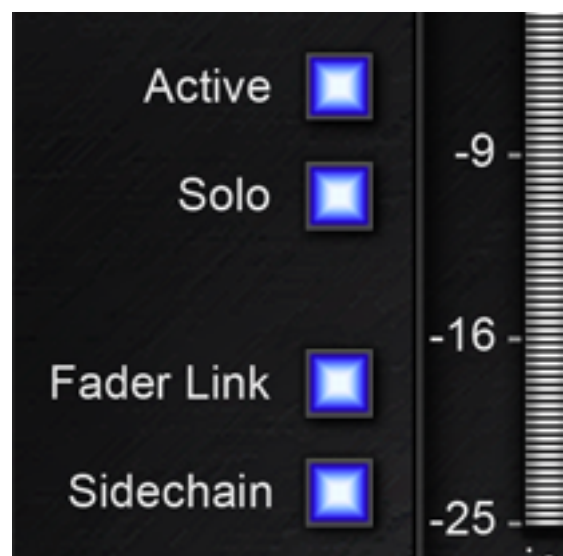
Input, Output & Sidechain LEDs

These LED´s show you the energy (level) of the respective channel (Mid Lo, Mid Hi or Side) going into that channel and leaving that channel to be "bounced back to stereo" in the M/S Summing Amp stage of bx_XL V2.
The Input LED´s can be adjusted / will be affected by the settings of the Master Input Gain, the Master Gain boost knob and the individual channel´s Gain boost slider. The Output LED´s will be affected by the Master Threshold knob, the individual channel´s Threshold slider and the XL settings.

If you activate "Sidechain" in any channel this channel will display a third LED chain, the Sidechain meter. This LED meter is a copy of the Sidechain meter in the Sidechain Mix window and represents the audio signal of the Sidechain Mix. Use this meter to adjust your Threshold if Sidechain is active as the Sidechain audio signal can vary quite radically from the internal audio of that channel.

Example: if you use the Mid audio signal in the sidechain to limit the Side channel the internal audio of the Side channel will be much lower than the Mid audio signal. The Sidechain meters are the slim LED´s between the regular input and Output LED´s.

- As the XL processor is post limiter in every channel the Output LED´s can actually flash higher than the Threshold slider needle. The slider indicates the level that will cause the limiter to cut off peaks but the XL processor added to the limited signal may cause the signal of the respective channel to exceed the Threshold level. This is normal behavior and intended.
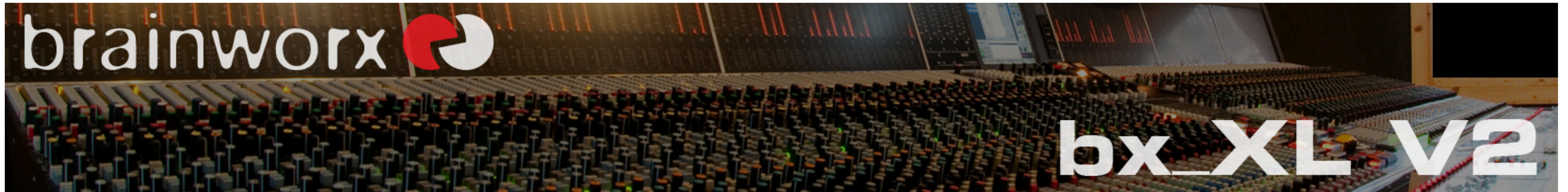
- Any peaks exceeding the Threshold settings of individual channels (Mid Lo, Mid Hi or Side) will be stopped at the final Peak Stop limiter stage.

Channel switches
Channel Active, Solo on/off, permanent Fader Link on/off, Sidechain active

Channel Active

All features (including the XL knob) of this channel will be bypassed when the LED is off.
A blue LED means the channel is active/on/working.

Solo

To listen to any channel solo press its Solo switch. Soloing any other channel deactivates any previous channel Solo. You can also deactivate by clicking the same Solo switch again when it is active. Several Solo knobs cannot be linked. One Solo knob only can be activated at the same time.

Fader Link

"Fader Link" on will link the Gain boost fader and the Threshold fader to "drive that channel into the limiter" harder or softer without altering the overall volume of that channel. The Gain Boost and Threshold sliders will automatically be moved contrarily when Fader link is ON (blue LED indicates ON). Gain boost "up" results in the Threshold being pulled down automa- tically and vice versa!

Temporary Linking: you can link Gain Boost & Threshold without engaging Fader Link by just clicking between the 2 arrows in the channel metering section.
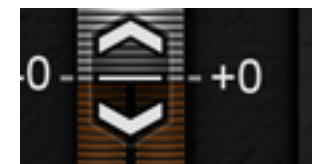
 (1-click Fader Link for temporary linking)

Sidechain Active

When a channel's Sidechain switch is lit (by clicking on the switch), the sidechain signal becomes the "trigger" for the channel's limiter and the internal audio signal is not used for the sidechain. See the next section to select the sidechain signal.

Sidechain Mix

Click on the two labels / buttons that are located directly below the Sidechain Mix slider in turn to select two signal sources for bx_XL's sidechain signal.

The 5 available choices are:
• Mid Lo   • Mid Hi   • Mid (Mid Hi & Mid Lo combined)   • Side   • External [Sidechain provided by many hosts]

After you've chosen your two sidechain signals, blend them together in any proportion by sliding the Sidechain Mix slider to the left or right. This blended sidechain signal serves as the "triggering" signal for the limiter for any or all of the 3 audio channels (Mid Lo, Mid Hi or Side) which have their Sidechain switch activated.

In the example (lef picture) you would be blending a the MID and SIDE signals. This would give you a combination of (let´s say) all of your stereo guitar or keyboard sounds from your mix) with a bit of bass drum and snare peaks added. If you used this signal to trigger your S channel the S channel limiter would react on the peaks of the bass drum and snare to make the stereo elements of your mix (keys, piano, etc.) "groove" with the beats of your track.
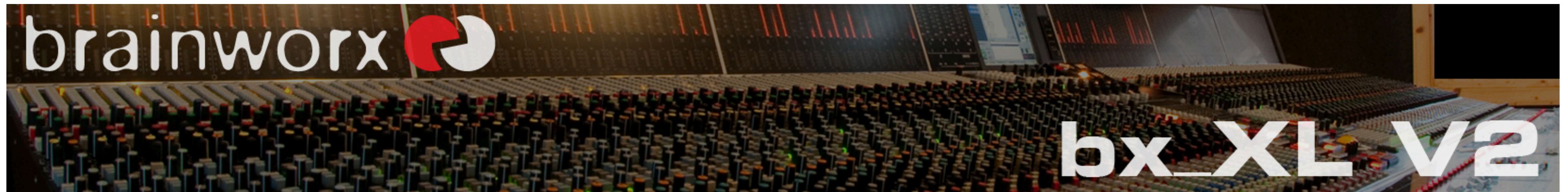
Pro Tip:

Mastering stems with bx_XL V2 using the External Sidechain:

If you like to mix a stereo version of your tracks and then like to bounce multiple stereo "stems" (for example stereo drums, stereo vocals with or without effects, stereo keyboards, stereo guitar groups, etc.) to have greater control and access in the final mastering stage you have probably used a limiter on your stereo master bus when you bounced the full stereo master. (No?? You really **should**!)

But if you solo certain stereo groups now and bounce them with the same master buss settings you will most likely not even get similar (!) results when it comes to the dynamics and the behavior of your master limiter. Single signals are just never as loud as the whole stereo mix is. So your limiter, which was reacting nicely on the overall stereo mix will not even detect peaks if you bounce (for example) the stereo guitar group through the same master buss settings.

With bx_XL V2 now you can:

• adjust bx_XL V2 to your full stereo mix until you have a "perfect mix".
• Then bounce the whole stereo mix **with bx_XL V2 bypassed**.
• Import and route this new bounced stereo mix into the Sidechain input of bx_XL V2.
  (see your audio host manual for details as this procedure varies slightly from host to host)
• now re-activate bx_XL V2 and activate the **External Sidechain for all 3 channels** (Mid Lo, Mid Hi and Side)
• Solo certain instruments or groups of your mix and play them through bx_XL V2 with the Sidechain active on all 3 channels.
• Although the individual instruments will not exceed the Thresholds of the 3 channels you will see bx_XL V2 reacting on the music as if the whole mix was playing!

That is because the whole mix is actually playing through the input of the Sidechain, and your channels are using the whole mix as a trigger…!

• Now if you blend together the multiple stems you have recorded (or bounced) you will get a mix that is still reacting "limited" on every individual stem(!), but you have total control over all nuances from the multi stems you have in place… nice!

Master Section

Master XL

Turning the Master XL knob (the top knob in the Master section) adjusts the levels of the 3 individual XL knobs in the Mid Lo, Mid Hi and Side channels, while preserving their inter-channel control offsets.

Click the Master XL Bypass switch (located above the Master XL knob) to alternately deactivate XL processing simultaneously for the Mid Lo, Mid Hi and Side channels and activate all of the XL knobs that had not been previously disabled.

The Master XL Bypass switch remembers which XL Bypass switches for the individual channels were set to ON or OFF prior to engaging it.

Master Gain Boost

Master Gain Boost will "remote control" the 3 individual Gain boost sliders of the Mid Lo, Mid Hi and Side channels. Individual offsets for any of the 3 channels can be made by using a single Gain boost slider in the desired channel.

Offsets between the 3 individual Gain boosts will cause a shifted frequency spectrum (Mid Lo vs. Mid Hi) or stereo image ("Mid Lo and Mid Hi" vs. S) of your mix. This can be desired but should be monitored via the Master Meters in the top row of the plugin graphics.

More often than not a slight boost of the M Lo and the Side channel results in a "bigger" low end and wider stereo image which is THE sound that most engineers and bands (and fans!) are looking for.

Master Threshold

The Master Threshold "remote controls" the 3 individual Threshold sliders of the Mid Lo, Mid Hi and Side channels. Individual offsets for any of the 3 channels can be made by using a single Threshold slider in the desired channel.

In more or less every stereo music mix the Side channel (= S-signal) contains less energy than the Mid channels. To achieve an evenly limited and tight mix it is therefore needed to set the Threshold of the Side channel much lower than the one of the main Mid channel.

The "main" M channel can be either the Mid Lo or the Mid Hi channel, depending on the setting of the Crossover Frequency.

Master

XL

50 %
Gain
Boost

0.00 dB
Threshold

0.00 dB

Solo L   Solo R

Solo M   Solo S

Solo   Auto
Sidechain   Solo

Solo buttons (with Auto mode) for M&S, L&R and the Sidechain

You can listen to the various elements of your stereo mix by using our Solo knobs.
The phase corrected Solo S is a true Brainworx invention.

Solo M
Listen solo to your M(mono) signal. This is the mono sum of your overall mix, the Left and Right channel combined (L+R).

Solo S
The S signal is a part of any stereo signal and is comprised of the Left channel and the polarity-inverted Right channel (L-R).
Inversion of the Right channel would normally make the soloed S signal difficult to evaluate.

bx_XL automatically flips the polarity of the S signal's Right channel when the S signal is soloed and plays it monoed through both output channels so you can properly evaluate the stereo information in your mix.

Tightening the S channel by limiting it smoothly and boosting it by 1 or 2 dB is very often the key to achieving maximum volume without audible distortion artifacts!

Having the Solo S on board of an M/S weapon such as the bx_XL V2 makes it much easier to understand what you are tweaking right away. If you are new to the M/S processing of stereo mixes do try the Solo S knob to simply LISTEN to a few stereo mixes or CD tracks that you know well. You will get the concept right away this way. Also, if you are interested in M/S processing in general: Brainworx offers a lot of tools that make use of the M/S idea in general, our best known product is probably "bx_digital V2 – THE M/S EQ". It´s a perfect add-on for bx_XL V2, together they make for a great mastering chain.

Solo L & R
Listen to only the L(eft) channel or R(ight) channel, monoed out on both output channels / speakers.

Solo Sidechain
Click on the Sidechain Solo (key-listen) switch in the Master section to monitor bx_XL V2´s sidechain signal. The sidechain signal is comprised of the two signals you blended together using the two pop-up menus and Sidechain Mix slider in the Sidechain Mix section of the GUI (see section 8.4). The sidechain signal serves as your "trigger signal" for limiting any or all of the 3 channels (Mid Lo, Mid Hi or Side) whose Sidechain switches are activated.

Auto Solo
Enabling Auto Solo will automatically solo the channel of the element you are clicking. As soon as and as long as you are clicking it.
Example: clicking the Threshold fader of the Side channel and holding it will solo the Side channel until you release the mouse click.

PLUGIN ALLIANCE
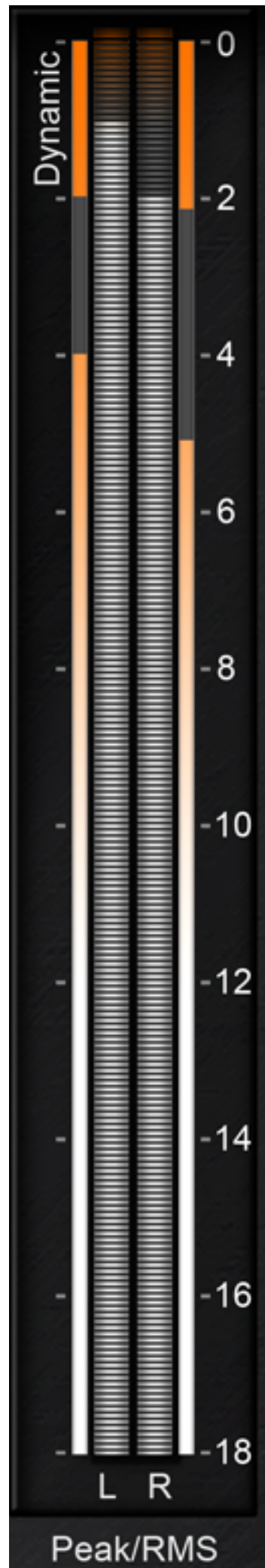
Stereo Master Output LED´s

Peak, RMS, Dynamic Range

This multi-meter simultaneously shows you the Peak and RMS (average) levels of the audio signals for the Left and Right output channels (after all processing).

In addition there is a Dynamic Range meter at the top of the section displaying the overall dynamics of your mix after the limiter stage.

The less dynamic range your mix has the louder it will sound but the more squashed it will also be.

A mix with a Dynamic Range of 6dB will usually sound "loud as hell" and anything with even less Dynamic Range (4dB for example) will start sounding distorted.

Trust your ears, stop at a reasonable level... please.

The M/S Summing Amp

The M/S Summing Gain will receive the output of the 3 individual channels (Mid Lo, Mid Hi and Side) and sum them together in a very special way to create a highly mono- compatible stereo signal derived from the processed "internal stems".

Phase-X
Mid Lo and Mid Hi will be combined to a phase coherent mono sum using the all-new 'Phase-X' Phase-Linear Crossover Filters.
The M & S signals will be converted back to a regular L/R stereo signal that will be fed to the Master Peak Stop Limiter (which works in L/R Stereo mode, not in M/S). The stereo signal will be achieved using this simple formula:
M+S = Left channel
M-S = Right channel

The stereo width of the overall output signal can be controlled via the S channel gain. Higher S output gain = more stereo width.
The gains for the M(id) and S(ide) signals can be linked. When Link is ON adjusting one of the Gain knobs will cause both knobs to turn. Please note that you can offset both channels (unlink them and set one channel to more or less volume than the other channel) and still use them in linked mode afterwards whereas the level offset will stay in place. This way you can alter the overall level being sent into the Peak Stop limiter without altering the overall Stereo width.

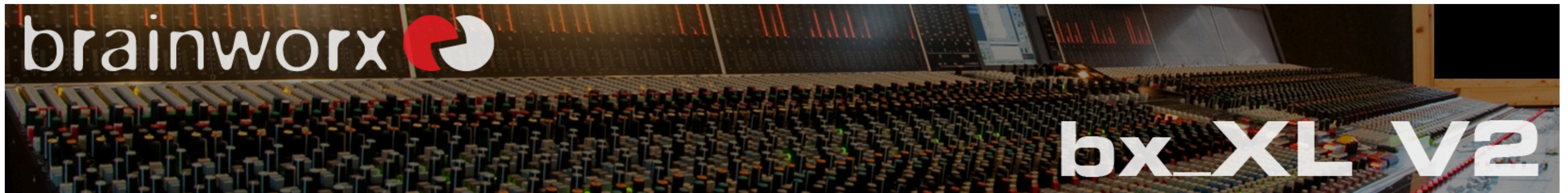## The L/R Stereo Peak Stop Limiter

This peak-stop limiter works in standard L/R mode (after the M/S Summing Amp has summed the Mid Lo, Mid Hi and Side channels back to stereo) using fixed attack and release times to prevent the signal from briefly clipping. This limiter is very similar to the limiter stage of the bx_limiter plugin. It is the final processing stage of the bx_XL V2 limiter before the audio goes to the Master Output Gain knob where the output can be generally dimmed if desired.

Click on the Peak Stop switch to toggle the peak-stop limiter's processing on and off. The peak-stop limiter is active when the button is lit. The meters above the switch show how much gain reduction the peak-stop limiter is producing.

Master Output Gain (-6dB/+6dB)

Master Output receives the final stereo L/R signal limited and clip free from the M/S Summing Amp stage and the Peak Stop limiter at 0dB, but many mastering engineers are used to delivering their mixes at - 0.2dB or -0.3dB. Use the Master Out gain knob to set the final output stage to any level you like. Positive values (greater 0dB) require additional limiters behind bx_XL V2 and may cause serious distortion in your audio signal and further processing stages.

We highly recommend you set the Master Out to - 0.2dB and then forget about it. ;-)

PLUGIN ALLIANCE

Meter Bar

Mid Lo / Mid Hi - Mid / Side - Correlation - Balance
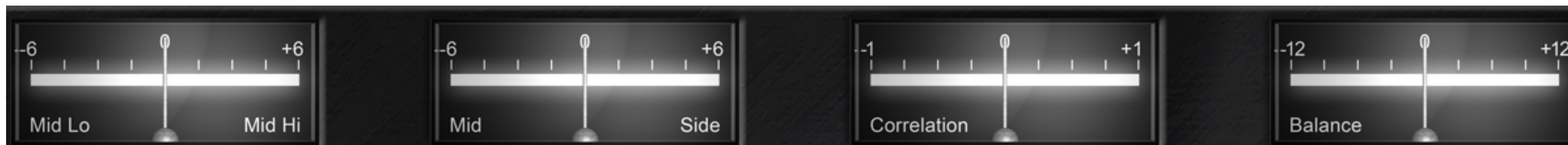
The Mid Lo/Mid Hi meter indicates the ratio between the 2 bands of the M signal in reference to the original (unprocessed) audio. If the needle moves to the left (towards Mid Lo) this means that your processed mix contains more lo-end than the unprocessed mix. You may adjust this or keep things as they are, depending solely on your taste.

The Mid/Side meter indicates the ratio between M and S in refence to the original (unprocessed) mix.
If the needle moves to the left (towards Mid) this means that your processed mix contains less S signal (=less stereo width!) than your unprocessed mix. You can adjust the stereo width with the M and S gain knobs anytime!

Correlation is a standard correlation meter. It can be handy to check phases when doing bigger changes in M/S.

Balance will show how the energy of the mix is shared between L and R channels.
Use the Gain L/R and/or the Pan M & S knobs to alter the Balance if desired.
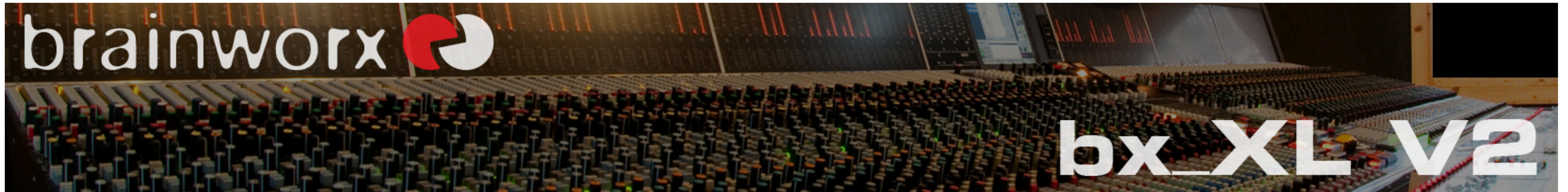
The Brainworx toolbar

Bypass

With the Bypass button you can bypass the whole bx_XL V2 plug-in to compare your original mix and your corrections/ improvements with the bx_XL V2.
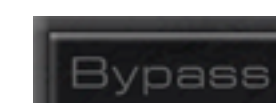
Undo / Redo (32 steps)

bx_XL V2 offers 32 steps of Undo/Redo. Now you can just experiment and Undo whatever you don´t like. Together with the new A/B/C/D settings and Copy/Paste (see "9.3") this is an engineer´s dream.
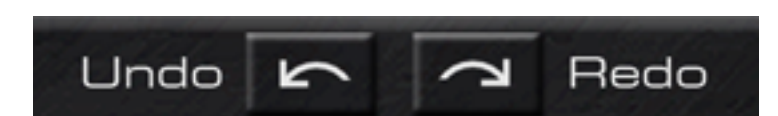
Settings (A/B/C/D)

You can store up to 4 Settings of the plugin without using the audio sequencer´s Preset window (most of them are not really fast and intuitive to use…).

Start with one Setting (A by default), copy it to B (press "copy", click "B", click "Paste", done!), then compare A and B. The same goes for C and D, of course. Also, you can reset single settings.

Using Automation can be helpful to get the maximum out of your mixes. Maybe your mix needs different Stereo Width settings for various parts of the song?
Settings are the way to go… you don´t have to do it.. but you can.

Presets:

Presets can be stored in most audio sequencer host programs. All 4 internal settings (A/B/C/D) of bx_XL will be stored with each single preset.
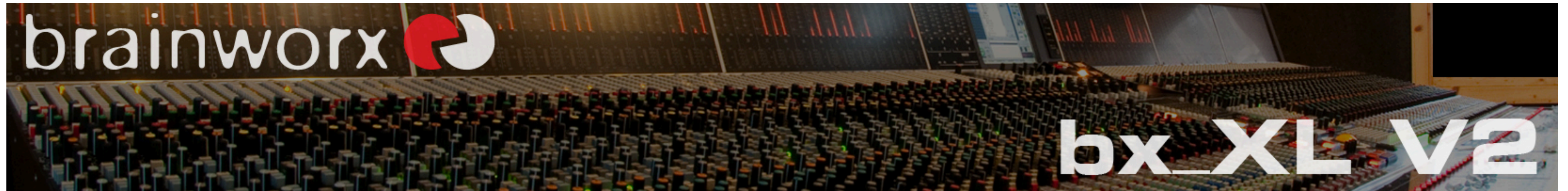
Info

Click here to get general info about the version number, the clever programmers behind this plugin etc.
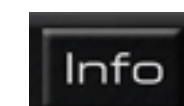
PDF Manual

The PDF version of the manual will be saved on your computer during installation and can be accessed via the Plugin Alliance toolbar underneath the plugin graphics.

Enjoy working with bx_XL V2.

For more information and some great videos about this plugin and the M/S technology
in general please visit:

www.brainworx-music.de and www.plugin-alliance.com

PLUGIN ALLIANCE