

bx_digital MANUAL

- for TDM systems -



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1. What is the bx digital?

We at BRAINWORX manufacture hi end analogue hardware audio tools, and we offer digital emulations of these units at the same time. Our first products are the bx1 and the bx2.

The hardware bx1 is our "MODUS EQ", an analogue high class equalizer that runs in 4 different modes, giving you up to 3 (!) channels of extremely musical filters:

- a conventional L(eft) and R(ight) stereo mode for any stereo / dual mono applications.
- stereo mode with built-in M/S-matrix, mainly used for stereo mastering purposes.
- a 3-channel mode (1 stereo PLUS 1 mono channel) for surround mastering & recording studios purposes.
- an M/S-RECORDING-mode, that will use 2 individual microphone-signals (M&S-signals) fed into the bx1 to create a highly mono-compatible stereo-signal, mainly used for orchestral recordings, choirs or for recording acoustic instruments in general.

The hardware bx2 is an "Image Shifter" and De-Esser that can work in M/S mode as well and is therefore the perfect extension to our bx1 when it comes to mastering stereo signals. It also includes a "Mono-Maker" that allows you to mono the bass frequencies of your mix from 20 Hz up to 400 Hz to make sure your bass-section is "tight" and compatible for vinyl-pressings.

The bx_digital for TDM-systems that you have purchased is not only an exact but even an **ENHANCED emulation of both**, our state-of-the-art equalizer bx1 and its expansion unit bx2, with only one mode of the hardware (the 3-channels-mode) NOT working for TDM-standard-reasons. Together these 2 units are the perfect choice if you are looking for an extremely musical and tasty way of eq-ing and de-essing stereo signals (mixes), most likely in a mastering process, or if you are into mixing and sound-design as well as recording with M/S-microphone-technique.

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 and 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 Right channel of your mix and the S-Signal will be fed phase-correct to the Left-channel and phase-reversed 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_digital does all that work for you, just feed it with the separate M- and S-microphone signals...

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

3. What is M/S good for in MASTERING ???

Well, it may sound simple, but the bx1 has a built-in M/S matrix that will separate EVERY stereo signal into its mono sum and the stereo difference signals. This way 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 just want to enhance certain elements in the 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, with the bx1 and its M/S mode you can do exactly THAT!

4. But what ´s so NEW about the bx1 / bx2 / bx digital then ???

The big advantage is that the bx1 is not only a great sounding equalizer, but can also be the "heart" of your mastering setup, executing many duties that will be done with complex and expensive "mastering desks" and patchbays in state-of-the-art mastering studios, e.g. using the built-in M/S-matrix, using the bx1 to control the individual components of your stereo signal (M,S,L,R) without the need for an external control-listening-section, etc. Also the LINK-function allows you to use the bx as a phase-coherent stereo-EQ with the possibility to process L&R or M&S individually on certain EQ-bands / functions only or on all bands / functions. Working this way will cause phases to be non-linear, but all top professional mastering engineers use this technique if a mix needs it.

You don´t HAVE to do this with the bx... but you CAN!*

Also, while there are already some M/S - tools on the market, the unique feature that only the bx1 gives you is the possibility to SOLO your M or S - signal, which means you can listen to ONLY the M or S signal of your mix and work on these two signals individually.

Why is that so unusual???... you might ask now. Well, although the S signal is included in a regular L/R stereo signal, it is not in phase on both

channels, so we had to come up with a way to correct that each time you want to listen to your S-signal SOLO, and we did...

Play some stereo mixes through your bx_digital plug-in and push the SOLO button of the S-section... you will be amazed of what you will hear... you will be able to correct stuff you have never before even HEARD in your mixes!

5. Features of the bx_digital TDM:

bx1:

- 7-band EQ-bands for mastering purposes with Shelving, Bell and Pass-Filters (all other versions but TDM are 5-band only).
- Input Gains L and R to adjust levels and to balance out mixes that are not 100% centered.
- Individual Output Gains for M and S or L and R (depending on the selected mode of the bx) signals to control output balance and even the stereo width of your mix (in M/S-modes). Make your mix wider than it is without an effects processor by outputting more S-signal in the two M/S-modes!
- Filter section includes Lo-Shelving, Hi-Shelving, full-parametric Bell type, Lo-Pass & Hi-Cut. All 7 bands have been adjusted in frequency-range and type-selection of the bands by top professional mastering engineers to help you get top-professional results for your mixes.

bx2:

- "Image Shifter" for your bass frequencies and high frequencies. With single knobs you can "tune" your lo-end and hi-end of your mix for a "bigger" overall sound with "more air" at the same time and control potential "harsh" frequencies in your mixes.
- De-Esser that works with adjustable and dynamic EQs. SOLO Buttons let you listen to what you cut away individually.
- Mono-Maker: Adjust the MM-knob from 20 Hz to 400 Hz 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 of your mix in the Mono-Sum! 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!
- the bx2 works in M/S - mode just like the bx1, so you can give your mixes that extra lo-end on guitars and synths that the pros have without getting rumbling on your bass drums, basses, etc.,

or de-ess your voice very tight without making your whole mix dull, etc.

EQ-Panel:

- shows up to 11 bands of EQ for M and S separately (for all bx1 and bx2 EQ bands)

6. How do I get started with the bx digital in a typical mastering or recording-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 literally, of course!

We assume that most if not all people who have purchased the bx_digital are familiar with using a standard L/R-eq, so we will skip the total basics of "how to use an eq" and go on with less common-known eq-techniques... In fact if you have a more or less "perfect" stereo-signal to work on (e.g. a very good mix) it might be a good idea NOT to change it at all or at least not very much, so you might be ok with using the "regular" L/R-mode of the bx_digital and use the eqs rather smoothly.

But, let's assume we have an average stereo-signal (e.g. a mix) with some problems that we want to correct...it's just... how can you correct problems you can't even hear exactly???

That's over now... in the M/S-mastering-mode the bx_digital can transform your stereo mix into 2 easy-to-adjust mono-sums (M & S), and the bx lets you hear both sections perfectly in-phase so you can hear any problem of your mix really easy and also make any improvements to your mix very simple but precisely.

We propose that you start to work with your bx1 / bx2 bundle (in M/S-Recording-mode) by simply listening to some of your mixes that you know very well or to some of your favorite CD-tracks through the bx1 / bx2, and while you do so press the SOLO - buttons of the M and S - sections alternatively to get used to how your mixes sound separated into these 2 mono-sums. You will very fast be able to hear stuff inside your music that you might want to correct / adjust, so why don't you just do it?

Start EQ-ing the M- and S-section individually while SOLOing the respective section, and don't forget to switch the SOLO-buttons off in intervals to listen to your complete mix in "full stereo sound" again to get a feel for how your adjustments on the individual sections effect the whole

stereo mix! After you have eq-ed a few EQ-bands on your mix compare it to your original mix by using the BYPASS switch of the whole unit.

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 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... in professional mastering sessions we do in fact use two (!) instances of the bx_digital in a row. L/R mode first, then M/S mode...

Once you are used to the basics in 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 SOLOing the S-section and adjusting the L and R Gains 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!

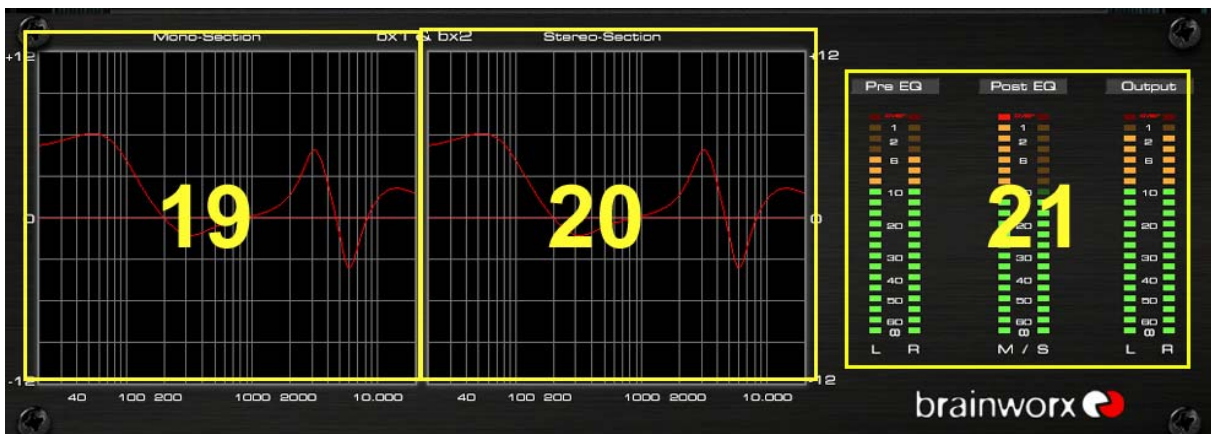
Make your mix wider than it originally was by increasing the output gain of the S section without losing the center of your recordings! You will NOT lose bass drum power or vocals by making your mix wider this way... and it will not sound different played back in MONO at all!

Otherwise, if you have a drum-loop that was recorded with too much ambience sounds / reverb, just get rid of it by decreasing the S-section output gain or increasing the M-section output gain!

7. Overview and Details



bx1 & bx2 - Screenshot



bx1/bx2 EQ-Panel & LEDs - Screenshot

1. EQ-Section M (Mono) or L (Left), depending on the selected mode

7 bands, each with G (Gain), f (Frequency) and Q (Quality) pots

- LF: switchable from SHELIVING to PEAK via Q-pot
- LMF: PEAK
- MF: PEAK
- HMF: PEAK
- HF: switchable from SHELIVING to PEAK via Q-pot
- Dedicated Hi-Pass
- Dedicated Lo-Pass

2. **Input GAIN for L (left) and R (right) or M and S channels, depending on the selected mode**

Adjust input levels for L and R (or M&S) individually (up to +12 dB) to adjust levels and to balance out mixes. (press "SOLO S" to balance out your mix in M/S-mastering mode!*)

3. **Output GAIN for L (Left) and R (Right) or M (Mono) and S (Stereo / Difference) signals, depending on the selected mode**

Adjust your levels, and change the stereo width of your mixes:

- increasing the output level of your S signal will result in a wider mix
 - decreasing the S-signal will make your mix less wide, at the same time your (stereo) effects and reverbs will be less loud. Turning OFF your S output will make your whole mix MONO!!!
- Be carefully with these knobs... you can get great results by increasing your S gain by 1 or 2 dB, but don't overdo it...*

4. **The MODUS switch**

With this knob you can switch between the 3 different "modes" of the bx_digital plug-in:

- 1- **M/S-MASTERING-mode**: for individual processing of the mono-sum and the stereo-difference of a Stereo-Signal.
- 2- **L/R-mode**: for conventional L/R-processing, linked or un-linked.
- 3- **M/S-RECORDING-mode**: this mode will provide an Stereo-signal at the output when the bx is fed with separate M&S-microphone signals!

5. **Master switches, SOLO-buttons and AUTO SOLO mode**

With the EQ ON / OFF switch you can bypass all EQ-sections of the bx (including the Image-Shifters!!!) without bypassing the whole plug-in. The LINK button will link / unlink all EQ-bands and functions of the bx_digital when pressed, and it will indicate that one or more Link-switches for only some EQ-bands or functions have been activated (local Link-switches at any button / knob).

The SOLO-buttons (M&S or L&R, depending on the selected mode) will provide you with a phase-corrected Mono-signal of only the M-, S-, L- or R-signal on both speakers, which is a very handy function for EQ-ing the individual signals without phase-problems or signals only audible on one speaker.

The AUTO SOLO button will make the bx_digital interact with you! Whenever you work on any knob / button the bx will automatically switch to SOLO (M/S/L or R). As soon as you release the mouse (or even some touch-sensitive controller´s knobs / switches, e.g. DIGIDESIGN´s ICON controller) the bx will switch back to full stereo sound. This is a very handy feature for ALWAYS hearing exactly what you do.

6. EQ-Section R (Right) or S (Stereo / Difference), depending on the selected mode

The same EQ section that you also have for the L or respectively the M section, depending on the selected mode, please check "1".

7. BRAINWORX Logo, click here for credits, links and infos.

8. & 9. LEDs for the L/R or M/S sections

Contrary to the bx1 hardware unit we have included a digital level control for the bx_digital. RED LEDs mean potential distorted signals in the respective signal-path and should be avoided...

10. & 11. BASS SHIFT

The bass shift is an "intelligent" EQ band for the bass frequencies of your mix. We call it BASS SHIFT because different frequencies will be "shifted" against each other with the turn of one knob. The frequencies have been pre-set by very professional mastering engineers, so all the SHIFTS in the bx_digital can be used to easily adjust the overall bass and presence sound of your recordings in a professional way... Turning your BASS SHIFT knob to the right will "push" your bass down one octave by boosting one part of your bass frequencies while at the same time cutting other (higher) bass frequencies. Turning the BASS SHIFT to the left will cause the opposite...

→ Please check the EQ panels (21. & 22.) to actually see what you are doing when working with the BASS SHIFT!

Turning your BASS SHIFT to the right will result in a more "indirect" and "deep soft" bass sound, while turning to the left will result in a "drier" bass sound.

→ A lot of contemporary pop & rock productions can be enhanced with "phatter" guitar / keys sounds by turning the BASS SHIFT to the right up to 3 or 4, and the same setting will make your bass drums sound HUGE!*

12. & 13. PRESENCE SHIFT

A similar function to what the BASS SHIFT does to your bass signals for the hi end of your recordings.

Turning the PRESENCE SHIFT to the right will put more "air" into your mixes without making them harsh!

→ For M/S-modes: Try filtering out all the harsh frequencies of your mix in the M section with your EQ M and the M section of the De-Esser M (14.) and then make sure your mix doesn't sound dull by putting back some high frequencies into the mix via the EQ S (7.) or the PRES SHIFT!

→ The PRESENCE SHIFT boosts frequencies above the ones that usually cause "ess-ing" of your voice. So you can try to de-ess your main voice (most likely to be in the center of your mix) with the M section of the bx's De-Esser (14.) and then set your PRESENCE SHIFT of S to 3 or 4...

14. & 15. DE-ESSER L/R or M/S, depending on the selected mode

The bx_digital De-Esser works with dynamic EQs, that you can easily adjust to the needs of your mix with just 2 knobs! With the SOLO buttons of the De-Esser section it is possible to listen to **only** the frequencies that you want to **filter out** of your mix.

→ When working in L/R-mode you should LINK the two channels for sure to avoid unwanted "panning" of your stereo-signal caused by uneven volume changes in the L or R channel.

→ SOLO the respective section of your De-Esser on the bx2 panel. Turn up the THRESHOLD knob until you start hearing some high frequencies. Adjust the frequency to be filtered with the "f DSR" knob and set the THRESHOLD knob to a value where the De-Esser will deduct as much high frequencies as you want.

→ Use the De-Esser's LEDs to control your gain deduction.

→ When the De-Essers of both channels have been LINKED in L/R-Mode, the detection signal for both channels will be a MONO-MIX of both channels. (L&R)

16. MONO MAKER

The MONO MAKER will mono bass frequencies of your stereo mix, adjustable from 20 Hz up to 400 Hz, using the M/S-technique, even when the bx runs in L/R-mode! The Mono-Maker will cut bass-frequencies off the STEREO-Signal (S) and compensate this in the MONO-Section (M) with a dedicated (extra) shelving EQ in the mono-sum.

→ This is a great tool for vinyl mastering, since it is essential to make sure that your lowest bass frequencies are mono, otherwise the needle could jump off the groove of a vinyl record. Especially when you master electronic music with huge stereo bass sounds to vinyl for promotion copies / DJ copies make SURE to mono out your deep bass sounds.

→ Mono-ing your bass up to 60 / 80 Hz can also make a big impact on bass and bass drum sounds in general, and it will make sure that your bass sounds sound "tight" on EVERY single speaker of a big disco speaker systems that might use a lot of speakers (combinations of L and R signals) throughout the room(s), also stereo-systems with subwoofers will play back your lowest bass frequencies cleaner when you avoid phase-problems in your sub-signals.

→ Setting the MONO MAKER too high can result in an audible loss of stereo width for certain instruments, i.e. low-end heavy guitars or synthesizer basses.

17. BYPASS & PRESETS & AUTOMATION

With the BYPASS button you can bypass the whole bx_digital plug-in to compare your original mix and your corrections / improvements with the bx_digital.

The PRESET and AUTOMATION buttons will give you access to the PRESET and AUTOMATION functions according to the TDM standard where you can store and recall your various settings, or automate ALL functions of the bx_digital except for the SOLO-buttons.

→ It´s a good and professional idea to store one preset for EVERY song that you master, maybe even make folders for certain projects, albums, etc.

This way you can easily recall any preset you made to change settings after you checked your mixes on other stereo systems (outside the studio). Keep in mind: if YOU don´t do it... your customers WILL! ☺

→ Using Automation in mastering can be helpful to get the maximum out of your mixes. Maybe your mix needs different EQ-settings for various parts of the song? Once again... you don´t HAVE to do it.. but you CAN...*

18 & 19. EQ-PANELS

The EQ panel shows you all the EQ curves of your bx_digital separately for the L/R or for the M/S sections of your mix. Unlike a lot of other EQ plug-ins we have NOT included any possibility to change your EQ settings via the graphic panel. We did that on purpose. There are simply too many EQ-bands (if you keep in mind that the BASS SHIFT and PRESENCE SHIFT are displayed additionally to the 5 "regular" EQ bands of each section.

Otherwise we feel that mastering music is all about making cautious changes to your mix (unless the mix you work on was completely screwed up...*), and when we tested the bx_digital working in the EQ panel often led us to making pretty big changes very fast.

In the end we also wanted to give you the "feel" of the hardware as authentically as possible, so we decided to make the EQ panel only a VISUAL CONTROL tool for what you do with the knobs of the bx_digital.

→ Please notice that it is very easy to type in exact values to ANY parameter of the bx_digital by simply clicking on the value fields (text fields) below each knob. This makes it particularly comfortable to tune your EQ-bands to certain frequencies.

20. LEDs

We have included dedicated LEDs for the Input Section (L&R or M&S, depending on the mode you use), the M&S Section and the Output stage (L&R), so you have total optical control over what you hear and what you do. Like with every other digital audio tool you should NOT push your levels into the RED!*

→ Even in L/R-mode the LEDs will also show M/S-signals levels, just for control purposes.

→ In M/S-RECORDING-mode the first LED-segment will show M/S instead of L/R since this segment shows the INPUT stage of the bx_digital since you are intended to input 2 individual signals (M&S instead of L/R) to the bx_digital in this mode.

8. TROUBLESHOOTING

→ Incomplete signals

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

→ Switch all SOLO switches OFF, and you should hear your regular stereo signal.

→ Phasing / wrong panoramas

If you hear parts of your stereo signal not properly in place panorama-wise you might be working in the M/S-RECORDING mode with a standard-stereo-signal running through your bx_digital plug-in!

→ NEVER use the M/S-RECODING mode for processing stereo-signals (like mixes!), unless you want to do experiments in sound-design...

→ NO sound

Do you feed any sound into the bx_digital at all??? ☺

→ ENJOY WORKING WITH THE bx_digital !!!!!

For more information, an M/S-forum and a video tutorial please visit:

www.brainworx-music.de