

# brainworx



## bx\_digital V3

### Plug-in Manual

# Brainworx bx\_digital V3

## The Brainworx Flagship M/S EQ



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The Legendary M/S Mastering and Recording EQ  
Developed under license by Brainworx GmbH Germany and Distributed by  
Universal Audio.



The bx\_digital V3 EQ plug-in can be installed and operated like any other UAD-2 plug-in.  
Please check [www.uaudio.com](http://www.uaudio.com) for general info about the system requirements, etc



# About the Brainworx bx\_digital V3



## The bx\_digital Legacy

Brainworx's bx\_digital EQ plug-in has been the company's flagship product since its first release in 2006. The original bx\_digital (aka V1) perfectly modeled the workflow of the Brainworx bx1 Analog Modus Equalizer, a hardware unit released by Brainworx founder, and noted producer, Dirk Ulrich in 2005.

With the release of bx\_digital V2 in 2009, the reputation of this powerful and flexible equalizer as THE go-to M/S mastering and recording EQ for producers and engineers alike really took off. Voted #1 Best Plug-in of the Decade by Future Music, the bx\_digital V2 has become the standard by which other equalizers are judged.

By including all the features and character that made bx\_digital V2 a legend, while introducing a plethora of powerful new features that will improve your workflow with bx\_digital V3, Brainworx has once again taken EQ plug-ins to the next level.

More options for slopes and filter types have been added to the HP/LP filters and the EQ bands, and the effective frequency range of the EQ section has been boosted to 40

kHz. A proportional Q mode (similar to the API 550 or SSL console EQs) now provides the option for band focus to be increased with gain. The indispensable De-Esser section (newly referred to as a Dynamic EQ) now has two speeds and supports

an inverse mode, allowing for amplitude-dependent cut or boost of frequencies. Finally, the user-friendly Bass and Presence Shifters have become more versatile, adding three tones of tilt EQ, so you can better dial-in low-end core or high-end character.

*"I never even dreamed about where this EQ design of mine would take me or Brainworx as a company to in only 10 years when I first designed it. I am so proud of knowing that bx\_digital can be heard on countless #1 hits and movies all over the planet. This has been the EQ that started it all, and seeing it develop even further in this V3 while looking even closer to the original hardware puts me in plug-in heaven."*

*Dirk Ulrich  
CEO/Founder, Brainworx*

# Using the bx\_digital V3 (1/2)



## What is bx\_digital V3?

bx\_digital V3 is an ultra low-latency 11-band stereo EQ that works in several modes, among them two sophisticated M/S modes for mastering and microphone recordings. It also includes a built-in stereo De-Esser/Dynamic EQ as well as filtering techniques and controls that, when combined, introduce a unique and powerful way to mix and master sound.

V3 is based upon the “modern classic” bx\_digital V1 and the analog bx1 EQ. Brainworx developed this high-end analog EQ in 2006/2007 and has offered a software emulation ever since.

The hardware bx1, or “MODUS EQ”, was an analogue class-A equalizer that runs in four different modes, providing up to three channels of extremely musical filters:

- A conventional L[eft] and R[ight] stereo mode for any stereo/dual mono applications.
- A stereo mode with a built-in M/S-matrix, mainly used for stereo mastering purposes.
- A three-channel mode (one stereo PLUS one mono channel) for surround mastering & recording studios purposes.
- An M/S-Recording-mode that will use two 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 was an “Image Shifter” and De-Esser that can work in M/S mode as well, thereby making it the perfect extension to the bx1 when it comes to mastering stereo signals. It also included a “Mono-Maker” that allows one to fold the frequencies of a mix between 20 Hz and up to 22 kHz to mono and make sure the bass-section is tight and compatible for vinyl-pressings.

The bx\_digital V1 (and subsequently the V2) was an exacting emulation of both units’ features, the state-of-the-art bx1 equalizer and its expansion unit, bx2. Only one mode of the hardware, the three-channel-mode, was left out for audio host standard reasons. Together, these two units are the perfect choice when looking for an extremely musical and tasty way of equalizing and de-essing stereo signals in a mix, when mastering full mixes, or when recording with M/S-microphone-techniques.

bx\_digital V3 now offers additional features that neither the original bx1 analog EQ nor the V1 or V2 plug-ins offered.

## What is M/S technology?

Most engineers who record music know about the M/S microphone technique (two different types of microphones for stereo recordings – an omni or cardioid microphone for the M [mid] signal and a “figure-8 microphone” for the S [side] signal).

Recording a signal in M/S 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, while having deeper control over stereo width and placement. Traditionally, recording in M/S without a dedicated matrix processor means the “M” signal has to be fed to the left and right channel in a mix, while the “S” signal is duplicated and phase inverted between the Left and Right channels. This means a total of 3 channels that come from only 2 microphones are mixed together to create a conventional stereo signal. Needless to say, this can easily get quite tedious.

bx\_digital V3 does all that work for you; just feed it with the separate M and S microphone signals and switch it to M/S Recording...

Details on M/S recording can be found in any decent audio book. Feel free to explore 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. [You may also watch this video by Dirk Ulrich for an in-depth demo on using the bx\\_digital when recording in M/S.](#)



## Using the bx\_digital V3 (2/2)



We assume that most if not all people who have purchased bx\_digital V3 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 commonly 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 okay with using the standard L/R mode of the bx\_digital and use the EQs rather carefully.

But let’s assume we have an average stereo signal (e.g. a mix) with some problems that we want to correct throughout the frequency spectrum and within the stereo field. It can be difficult to pick apart the components of a mix in an attempt to surgically alleviate problem areas.

With the M/S mastering mode of bx\_digital V3, you can now transform your stereo mix into two, easy to adjust, mono sums (M & S, or “Sum & Difference”); the bx1 lets you hear both sections perfectly in phase. This way you can clearly hear any problem within your mix and make any needed improvements simply and precisely.

We propose you start working with bx\_digital V3 in M/S mastering mode (that’s the default setting) 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 two mono sums. You will very quickly be able to hear stuff inside your music that you might want to correct or adjust, so why don’t you just do it?

### Using bx\_digital V3 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 somewhere in the process.

Start EQ’ing the M and S sections individually while soloing the respective section. Don’t forget to switch the Solo buttons off from time to time and listen to your complete mix in “full stereo sound” again. This way you get a feel for how your adjustments on the individual sections affect the whole stereo mix! After you have used a few EQ bands on your mix, compare it to your original mix by using the Bypass switch for the whole unit or for individual EQ bands.

Mastering in M/S takes a little time to get used to – it’s just really different EQ’ing two 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 just be the key to your music sounding as big, and yet still open and clear, as that pinnacle of sound to which productions often refer... :-]

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 phase in the stereo signal, we do not see this as a problem. In M/S modes, phase alteration is done intentionally. Of course, the M/S mastering mode also works well if you want to correct small mistakes in your mixes... for adding or cutting away large amounts of bass or treble signals, you might be better off working in L/R-mode.

TIP: If needed, simply use two instances of bx\_digital on your master bus: one in L/R mode, the second in M/S mode.

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 Soloing the S section and adjusting the M and S Pan and Balance controls 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 Stereo Width 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. If you notice the Correlation Meter showing less than 90°, dial up the Mono Maker a bit to tighten up the low-end until acceptable levels are shown.

Conversely, if you have a drum loop that was recorded with too much ambient sound or reverb, just get rid of it by decreasing the Stereo Width (in all modes!).

# The bx\_digital V3 Master Section



**Gain In:** Continuous from [-∞] - 0 dB - [+12 dB]  
Drives the amount of signal input gain

**Gain Out:** Continuous from [-∞] [0 dB] [+12 dB]  
Drives the amount of signal output gain

**\*Stereo Width:** Continuous from 0% - 100% - 400%  
Increases or decreases the perceived width of the signal by manipulating the relative volume of the S signal

**\*Balance L/R:** Continuous from 100 L - C - 100 R  
Tilts the stereo image between left and right channels

**\*Pan M:** Continuous from 100 L - C - 100 R  
Offers individual control over the position of the M signal within the stereo field; good for correcting theoretical centers and off-axis sound stages

**\*Pan S:** Continuous from 100 L - C - 100 R  
Offers individual control over the position of the S signal within the stereo field; this is a much more subtle effect than positioning the M signal and should not be used to make drastic changes

**\*Auto Solo:** Discrete two-steps on/off  
When this is enabled, each section (M and S or L and R) will be automatically soloed when changing parameters within that section



**\*Modus Knob:** Discrete 3 steps: "L/R", "M/S Master", "M/S Record"

Use this setting to control the internal M/S matrix of bx\_digital V3:

-Use **L/R** for normal stereo processing; M and S sections of the EQ will now be labeled L and R

-Use **M/S Mst.** to process stereo signals through the internal M/S matrix, allowing M and S channels of the signal to be individually adjusted

-Use **M/S Rec.** to process signals that were recorded in M/S; the internal matrix will process each signal individually and output a stereo signal

**\*L<>R:** Discrete two-steps on/off  
Swaps the left and right channels with each other

**Auto-Listen:** Discrete two-steps on/off  
Toggles Auto Listen feature

**EQ Active:** Discrete two-steps on/off  
Toggles the EQ section

**\*Channel link:** Discrete two-steps on/off  
Links both M and S (or L and R) channels of the EQ section

\*Stereo operations are not available on the Mix version of bx\_digital V3

## Configuring Auto Listen

**Q f G:** 7 steps: "Q - -", "- f -", "- - G", "Q f -", "Q - G", "- f G", "Q f G"

Configures the Auto Listen function, allowing for a customization of which EQ functions are automatically monitored when adjusting a parameter.

-**Q** enables monitoring of Quality factor, allowing for the affected bandwidth to be heard when making adjustments to Q.

-**f** enables monitoring of frequency by using an extremely narrow and high-gain peak filter to facilitate precision when adjusting a band's frequency

-**G** enables monitoring of gain on each band by soloing the change in gain being made to that band





# The bx\_digital V3 Input Filters and EQ Bands



## Input Filters

The input filters on bx\_digital V3 have been upgraded from those of V2. A wider frequency range is now available (20 Hz to 30 kHz), as well as two different filter slopes.

**Slope:** Discrete 3 steps: "Off", "6 dB", "12 dB"

Changes the rolloff of dB/octave for each of the input filters

**High Pass Cutoff Frequency:** Continuous from 20 Hz - 30 kHz

Sets the cutoff frequency for the High Pass filter

**Low Pass Cutoff Frequency:** Continuous from 20 Hz - 22 kHz

Sets the cutoff frequency for the Low Pass filter

**Link:** Discrete two-steps on/off

This button links the settings between both High Pass or Low Pass filters



## EQ Bands

The bands on bx\_digital V3 have also been updated from V2, extending the range of the High Band from 22 kHz to 40 kHz, allowing for work in the highest regions of the spectrum. There has also been the addition of a *Proportional Q* mode, which narrows the bandwidth as the gain increases (much like an API 550 EQ band). This allows for more aggressive settings while minimizing the introduction of added gain in the surrounding frequencies.

**EQ Band Quality Factor:** Continuous from 0.28 to 15 (logarithmically scaled)

All five bands feature a Quality range of between 0.28 and 15, with the exception of the Low Band and High Band, which switch to a Low Shelf and High Shelf, respectively.

**EQ Band Gain:** Continuous from -12 dB to +12 dB

Each of the five bands has a 24 dB range of gain addition or reduction; the Gain parameter is affected by the Gain Scale setting. At the lowest Gain setting, the three middle bands (LMF, MF, HMF) produce a Notch Filter.

## EQ Band Frequencies

**LF:** Continuous from 20 Hz - 2 kHz

**LMF:** Continuous from 20 Hz - 2 kHz

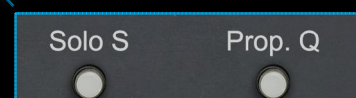
**MF:** Continuous from 20 Hz - 22 kHz

**HMF:** Continuous from 400 Hz - 22 kHz

**HF:** Continuous from 2 kHz - 40 kHz

**EQ Band Active:** Discrete two-steps on/off

Each EQ band can be deactivated via the button below the Frequency knob



**Solo M (L) / Solo S (R):** Discrete two-steps on/off  
Use this to audition each signal in either the Mid/Left or Side/Right section of bx\_digital V3

**Prop. Q:** Discrete two-steps on/off

Implements a proportional Q per-band that is similar to the behavior of an API 550. Use this to make drastic changes in frequency gain response while minimizing unwanted collateral gain.



# The bx\_digital V3 Shifter and Dynamic EQs



## Bass Shift Module

This is a fixed-band tool that can be used to instantly achieve an excited and punchy bass while automatically reducing the effect of the unwanted partials in the adjacent higher frequencies, *tilting* the curve so as to achieve a more natural sounding 'thump.'

Conversely, one can also use the Bass Shift to reduce the core of a bass sound while emphasizing the adjacent frequencies, creating an *implied bass*.



**Bass Shift:** Discrete two-steps on/off  
Toggles the Bass Shift module

**Tone A:** Discrete 3 steps: "A", "B", "C"

Offers three distinct flavors of the tilt-shift EQ, introducing changes in center frequency, bandwidth and relative gain

**Link:** Discrete two-steps on/off

Links each Bass Shift parameter between both M and S (or L and R) modules

**Gain:** Continuous from -12 dB to +12 dB

Controls the amount of gain added or reduced within the frequency band when using Bass Shift

## Presence Shift Module

The Presence Shift is much like the Bass Shift, in that a tilted curve is used in order to excite the frequency range most associated with creating presence in a mix, and compensated for by reducing surrounding frequencies that would muddy the character. Use it to easily boost non-sibilant frequencies and add more breath, or compensate for rigorous de-essing in the M signal by replacing lost frequencies in the S signal.



**Presence Shift:** Discrete two-steps on/off  
Toggles the Presence Shift module

**Tone A:** Discrete 3 steps: "A", "B", "C"

Offers three distinct flavors of the tilt-shift EQ, introducing changes in center frequency, bandwidth and relative gain

**Link:** Discrete two-steps on/off

Links each Presence Shift parameter between both M and S (or L and R) modules

**Gain:** Continuous from -12 dB to +12 dB

Controls the amount of gain added or reduced within the frequency band when using Presence Shift

## Dynamic EQ

The Dynamic EQ parameter is the successor to the De-Esser found on bx\_digital V2. Rather than exclusively performing dynamic reduction of a certain frequency, this parameter can now either boost or cut frequencies based on a signal trigger. Where the reaction speed and in-circuit position were once fixed, you now have the ability to shape the way the Dynamic EQ responds to and affects sound as it relates to the entire process.



**Dynamic EQ:** Discrete two-steps on/off  
Toggles the Dynamic EQ module

**Gain:** Continuous from -30 dB to +30 dB

Controls the amount of gain dynamically added or reduced within the selected frequency range

**Link:** Discrete two-steps on/off

Links each Dynamic EQ parameter between both M and S (or L and R) modules

**Position switch:** Discrete two-steps "Pre (EQ)" and "Post (EQ)"

Sets the position of the Dynamic EQ to either pre or post the main EQ circuit

**Speed switch:** Discrete two-steps "Fast" and "Slow"

Sets the reaction speed at which the Dynamic EQ band is triggered

**Solo:** Discrete two-steps on/off

Solos the part of the signal affected by the Dynamic EQ

**Frequency:** Continuous from 20 Hz to 22 kHz (logarithmically scaled)

The bx\_digital V3 Shifters and Dynamic EQ - Master Version





# The bx\_digital V3 Gain Scale and Mono Maker



## Gain Scale

New to V3, the Gain Scale parameter gives you control over the factor by which ALL EQ bands are adjusted. Think of it like a global More / Less setting for all the EQ bands, like a Master Gain knob for all EQ bands. There is instant visual feedback when referencing the Frequency Graph display.

**Gain Scale:** Continuous from -200% to 200%

Controls the factor by which every gain band is calculated. For example, 100% is the default amount at which the EQ will adjust every band according to its actual gain knob setting; 200% is twice the gain boost or cut, and 50% is half the effect.

**Gain Scale Active:** Discrete two-steps on/off  
Toggles the Gain Scale parameter

## The Mono Maker

This tool is a critical component to several Brainworx processors, and it is an invaluable tool when mastering or tightening up a mix. Sweepable from 20 Hz to 22 kHz, this parameter folds the processed sound to mono at and below the frequency set. The most common setting is between 100-200 Hz, below which bass frequencies reside, where common practice deems that most sound should be mono. Other uses include folding an entire mix in order to check mono compatibility and avoid phase incoherency.

**Mono-Maker Active:** Discrete two-steps on/off  
Toggles the Mono Maker

**Mono-Maker Frequency:** Continuous from 20 Hz to 22 kHz  
Sets the frequency at which the signal will be summed to mono; use this to tighten up the low end (<200) on a mix or ensure phase coherence when using stereo widening techniques



The bx\_digital V3 Gain Scale and Mono Maker

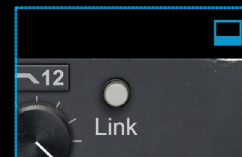


# The bx\_digital V3 Frequency Graphs and Metering



## EQ Panels

bx\_digital V3 offers accurate frequency response representation via two graphs at the bottom of the plug-in's interface; this section can be hidden by clicking the button at the top right corner of the interface. There are two graphs: one for the M (or L) channel, and one for the S (or R) channel. In the Mix version of bx\_digital, there is only one graph.

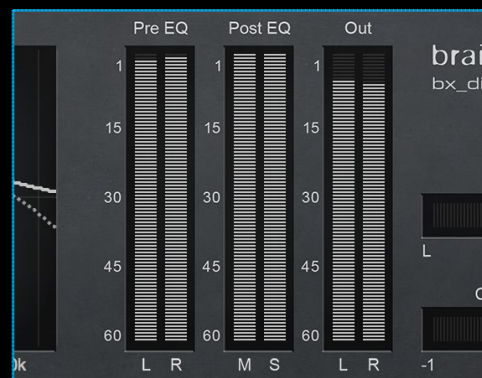


## Volume Meters

**Pre EQ** measures levels before processing by bx\_digital V3; stereo information is measured by default, but values reflect Mid and Side information when in M/S Recording mode.

**Post EQ** measures levels after processing by bx\_digital V3, which will always be measured in the signal's Mid and Side components.

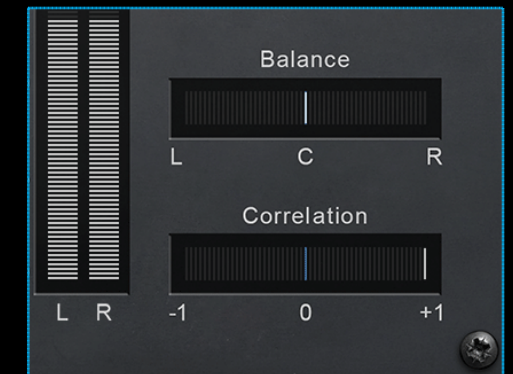
**Out** shows the final output of bx\_digital V3, which is always in stereo, and includes a clip indicator for overdriven signals.



## Balance and Correlation Meters

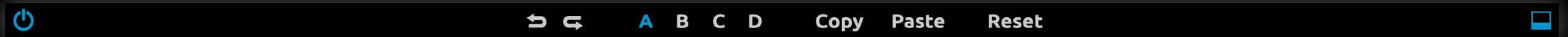
While these indicators are deceptively simple, they will show critical information concerning the final stereo image after processing has been done with bx\_digital V3. If the **Balance** meter is off-center, remember to play with the several options for panning offered by the master section (Pan M, Pan S, Bal. L/R) to experiment with the best ways to center the stereo image desired.

The **Correlation** meter shows phase coherence between the stereo channels of the entire processed sound. A value of +1 indicates a fully cohesive signal (mono-compatible), a value of 0 indicates a 90° phase shift, and a value of -1 indicates a full phase inversion between channels (mono-incompatible).





# The bx\_digital V3 Toolbars



## Plug-in Settings Toolbar

### **BYPASS**

Bypasses processing done by the bx\_digital V3

### **UNDO/REDO (Arrows)**

Up to 32 steps of parameter history

### **Settings A / B / C / D**

Select banks of parameter settings; use the A/B/C/D settings to copy a complex channel setting and alter it slightly for different parts of your song, for example. These settings can be automated by your DAW system, so you can jump from setting A (in the verse) to setting B (in the chorus, for example).

### **COPY / PASTE / RESET**

Copy and Paste between setting banks, reset parameters of selected bank



Closes and opens the bottom panel containing the frequency response graphs and the meters

### **ABOUT**

Information about the development of the plug-in

## Mouse/Keyboard Control

### **ALT or COMMAND (Mac) / CTRL (Win) + MOUSE CLICK**

reset any knob to its initial value (host dependent)

### **COMMAND (Mac), SHIFT, or CTRL (PC) + SCROLL WHEEL**

Allows for fine tuning of any knob (host dependent)

### **SCROLL WHEEL CONTROL**

place your mouse above any knob and turn the mouse wheel to increase/decrease values.

### **TYPING IN VALUES**

10.000 Hz can be typed in as “10k”, 12.000 Hz would be “12k”, etc.