



# Manual

## Master X5 for PowerCore

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This site has been specifically designed to meet the needs of our users. We constantly update the database and you will find the site to be a huge resource of information. Browse through Q&A's and discover new aspects of your TC product.

If you can't find an answer online, you have the option of submitting a question to our technical support staff who will then reply to you by e-mail. The TC Support Team is on constant alert to help you in any way they can.



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**Master X5 goes beyond the Master X3 Finalizer implementation, offering 5 bands, different filter slopes and double-precision processing.**

Master X5 provides even more detailed access during the mastering process for CD and broadcast. It is optimized for 44.1 and 48 kHz processing and is also an ideal tool for optimizing material like commercials for broadcast applications; the 5 bands allow getting even more “level” out of the program material.

Master X5 expedites the mastering process by integrating several phases of mastering into a single, easy to use interface. It features multiband processing with expansion, compression and limiting separately for each band. High quality uncorrelated dithering is included as well.

The intuitive user interface features many new ideas to make the critical mastering process faster and easier. The overall processing characteristics are controlled via “Target Curves” that simplify the handling by providing a global processing style for all bands in all modules.

The interaction between the bands can be fine tuned by applying “Target Factors” which determine the frequency focus of each processing module, significantly reducing the number of required user parameters to set this complex process up. “Soft Clipping” even provides “analog” sound whenever desired.

TC Electronic



**More Punch**

**More Control**

**48 bit Double Precision**

**Optimized for Voice Processing**

TC Master X5 mastering tool supplies five frequency bands in both Compressor, Limiter and Expander sections. Thanks to the innovative user interface of TC Master X5 this does not bring a flood of additional parameters – desired results can still be achieved quickly and intuitively!

### **More Punch**

With five frequency bands you can increase the perceived loudness of your audio material even further.

### **More Control**

The number of bands active can be set to any number from one to five to match the specific needs of a whole host of mastering situations. Auto Make Up Gain can be deactivated whenever desired. By individually boosting each of the five bands, the overall balance can be more precisely finetuned.

### **Optimized for Voice Processing**

With selectable crossover slope characteristics and an additional target curve made especially for voice processing, Master X5 is perfect for processing vocals and voice overs.

### **48 bit Double Precision**

TC Master X5 operates at a resolution of 48 Bit at 48k for even more accurate processing results.

# GENERAL INFORMATION

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## SYSTEM REQUIREMENTS

### Windows

PowerCore software 3.0 or higher  
Windows XP  
PIII 1,4 GHz or faster  
512 MB RAM  
VST compatible host application  
System must meet requirements of the host application

### Mac OS X

PowerCore software 3.0 or higher  
Mac OS X (10. 4 or higher)  
G4/G5 or Intel (1 GHz or faster)  
512 MB RAM  
VST, Audio Units or RTAS\*) compatible host application.  
System must meet requirements of the host application

\*) RTAS (Pro Tools) is supported via the VST to RTAS adapter from FXpansion (optional). More info on [www.tcsupport.tc](http://www.tcsupport.tc)

## GETTING STARTED

### Scroll Wheel Support

If you are using a host application that supports this feature, all parameters support scrolling on both Windows XP and Mac OS X. Simply place the mouse over a parameter value field and use the Scroll Wheel to increment/decrement the associated parameter-value.

### Key Commands

In most host applications, Plug-Ins support keyboard commands for certain functions. The following key commands are available for all Plug-In parameters.

#### Key Commands in Mac OS

Reset To Default = Alt

#### Key Commands In Windows

Reset To Default = Shift & Control

## DSP USAGE

For each open instance of the TC Master X5 on PowerCore devices (X8, FireWire, Compact, Express, mkII, Unplugged), the following DSP usage applies:

#### @44. 1 kHz:

mono 52%  
stereo 52%

#### @48 kHz:

mono 57%  
stereo 57%

#### @88. 2 kHz:

not available  
at 88.2kHz

#### @96 kHz:

not available  
at 96kHz

# USING PRESETS/GENERIC CONTROLS

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## FACTORY PRESETS

TC Master X5 comes with factory presets. These presets were designed by audio professionals who created them in real-life sessions. The presets are extremely useful to get started quickly, and some users might even feel no need to edit them!

## PLUG-IN AUTOMATION

The TC Master X5 parameters can be automated, in case your host applications supports automation. Please refer to your host application's manual to check if and how Plug-In automation works.

## GENERIC CONTROLS

Before we get into details, here are some basic methods for operating TC Master X5.

### Fine Trim Mode

If you press the [Control] key while you're moving a fader, you will get into a Fine Trim Mode. This mode allows you to edit values with extra-high accuracy!

### Reset

If you want to reset a parameter to its default value, hold the <OPTION (ALT)> key while clicking on the fader.

### Group/Ungroup

To group/ungroup faders, for example the band levels or the input faders, hold the [Shift] key while moving the fader(s).

### Inactive Controls/Use of color

Inactive controls are grayed out, color signals active controls! In bypass mode all controls are grayed out.

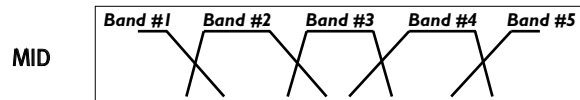
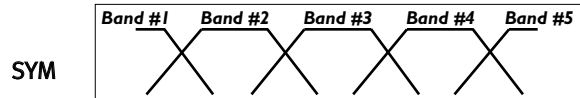
The image shows a detailed view of an audio processor interface with the following labeled components:

- Automatic make-up gain - On/Off**: Located at the top center, set to 'AUTO'.
- Consecutive Clipping Indicator**: Located at the top right, showing '0 0 SAMPLES 0 0'.
- Bandlevels**: Points to the 'FREQUENCY / LEVELS' section showing five frequency bands with levels at 0.0dB.
- Crossover Frequencies**: Points to the crossover frequency sliders: 60.21Hz, 393.4Hz, 2.46kHz, and 12.1kHz.
- Compressor reduction meters**: Points to the five 'BAND 1' through 'BAND 5' graphs.
- 5-Band Expander Controls**: Located at the bottom left, including THRESHOLD, RATIO, RANGE, RELEASE, and TARGET FACTOR.
- 5-Band Compressor Controls**: Located at the bottom center, including THRESHOLD (-10.0dB), RATIO (2.0:1), RANGE (2.0ms), RELEASE (0.2s), and TARGET FACTOR.
- 5-Band Limiter Controls**: Located at the bottom right, including THRESHOLD (-3.0dB), RATIO (15%), RANGE (.14ms), RELEASE (50ms), and TARGET FACTOR.
- Input Level**: Points to the 'LEFT INPUT' and 'RIGHT INPUT' sliders, both at 0.0dB.
- Output Level**: Points to the 'OUTPUT' slider at 0.0dB.
- Look-ahead delay**: Points to the 'LOOK AHEAD' dropdown menu set to 3ms.
- Digital Ceiling**: Points to the 'DIGITAL CEILING' dropdown menu set to 0dB.
- Output Dithering**: Points to the 'OUTPUT DITHER' dropdown menu set to Off.
- 5 band Limiter LEDs**: Points to the 'GAIN REDUCTION' section showing 'SOFT CLIP' and 'LTM' indicators.
- 5 band Expander LEDs**: Points to the 'EXP' section of the gain reduction meters.
- Target Curve**: Points to the 'TARGET CURVE' graph showing a 'HYPED' curve.
- Input/Output PPM Meters**: Points to the 'IN' and 'OUT' meters showing -96.0.
- Meter zoom**: Points to the vertical scale of the PPM meters.
- Limiter Soft Clip Indication**: Points to the 'SOFT CLIP' indicator.
- Preset Manager**: Points to the 'PRESET' and 'FILE' buttons.

# TC MASTER X5 – PARAMETERS

## Slope

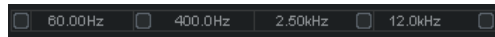
This is a new feature in Master X5: The slopes of the 5 bands can be switched from SYM (symmetrical filter slopes) to MID (mid frequency based filter slopes). The SYM slopes will fit better to music signals, whereas the MID setting is the preferred choice for speech processing.



## Make-Up (AUTO/OFF)

This parameter enables the power of automatic make-up gain and thus delivers the highest possible output level without you having to care about it. By default, this parameter is switched on (in Master X5, Auto Make-Up is always active). By switching it off, the band levels will be lowered according to the current Threshold/Attack settings of the compressor. Therefore, the sound impression will change: With Auto Make-Up active, the sound will function according to the target curve (e.g. with the “Smiley” curve you will get more low end and more high end, but less mids), with Auto Make-Up switched off, you still get more compression on high and low bands. But without automatic make up gain, the output level of these bands will be lower. By moving up the band levels manually, you can adjust this as you like.

## Activate/Deactivate Bands



Master X5 offers the possibility to switch off bands. This way, you can reduce Master X5 to 4-, 3-, 2- or even single-band compression.

# TC MASTER X5 – PARAMETERS

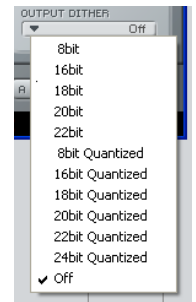
## Talk Target Curve

Besides the Target Curves of Master X5 – Linear, Pink, Hyped and Smiley – there is a fifth Target Curve available in Master X5. The “Talk” curve is designed for use on spoken material and works best with the MID slope.



## Dithering

When clicking on the Dithering pop-up, you will notice that there are entries stating “quantized” in the end. Both types of dithering are uncorrelated stereo dithering algorithms, the difference is in the audio “below” the dithered bits: Having a 24 bit signal dithered to 16 bit will add the dither noise to the 16th bit. The rest of the audio will remain unchanged. The quantized dithering will set all bits lower than the bit depth defined by the dithering to zero. This way, the output signal of Master X5 will be a signal limited to 16 bit – there’s no more information inside the signal. If you are not sure, the quantized dithering would be your choice.



## Why less might be more, or: Why to use Master X5

It is quite common to think that more compression bands will automatically bring the better result. Unfortunately we have to tell you that this isn’t the whole truth: It might also make sense to use Master X5 with “just” 3 bands instead of Master X5. Why? Let’s have a look at the frequency range relevant for audio recordings: This range, starting at 20Hz, goes up to 20 kHz. This makes a range of 10 octaves.

Simple cut filters have a filter slope of 6 dB/oct. If you have 5 bands, there are 4 cross-over frequencies dividing the frequency range. Let’s imagine we have the crossovers set to 1 kHz, 2 kHz, 4 kHz and 8 kHz.

The low band (with the 1 kHz cut-off frequency) will be lowered by 6 dB at 2 kHz and by 12 dB at 4 kHz – this will show easily that the low band will still effect the higher bands. Ok, so let’s take filters with a higher slope, to get the bands separated better. This will of course work, but also introduce other problems. For example will filters with a higher filter slope cause phase shifting depending on the signal frequency. At the very least, this might cause at least coloration of the sound – and might even create a moody sound impression.

And this is a good reason to use a multi-band compressor with less bands than technically possible: a cleaner sound.

# TC MASTER X5 – PARAMETERS

## EXPANDER

### On-Switch

5-Band Expander on/off

### Threshold

Sets the Expander's threshold. Values below the threshold will be lowered in volume according to the ratio set and for the defined range.

### Ratio

The Ratio determines how much the output signal will be lowered in proportion to the original signal.

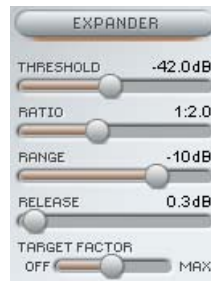
### Range

Range defines how far the Expander is able to lower the part of the signal which is below the set Threshold value.

For example: When you set the Threshold to -40 dB, the Ratio to 1:2.0 and the Range to -10 dB, the Expander will only work when your input signal exceeds -50 dB and doesn't go over -40 dB.

### Release

Release determines the time the Expander takes to return to the original signal level. This parameter only has an effect, when the Threshold and Range parameters are set in a way that the Expander is actually active.



## COMPRESSOR

### On/Off

5-band Compressor on/off.

### Threshold

Sets the Compressor's threshold i.e. above what level it starts processing. Values exceeding the threshold will be compressed.



# TC MASTER X5 – PARAMETERS

### Ratio

Determines the amount of compression, the higher the ratio the “stronger” the processing and the lower the remaining dynamics range.

### Attack

The Compressor's attack time determines how fast the compressor will react on signals exceeding the threshold. Shorter attack times will compress harder but might introduce a “pumping” sound.

### Release

The Release time determines how fast compressed signal returns to unprocessed, whenever the level falls below the set Threshold.

## LIMITER

### On-Switch

5-band Limiter On/Off.

### Threshold

Whenever the signal surpasses the set Threshold, the Limiter processes it with a ratio of “infinite-to-one” (?:1) to limit the possible maximal level.

### Softclip

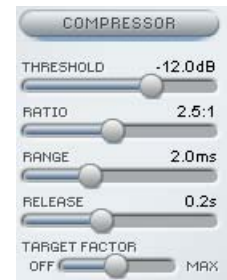
Softclip affects the way the Limiter works. In Off position, the signal will be limited “hard” whenever the Threshold is surpassed. With Softclip active, limiting starts slightly before the set Threshold and then glides into limiting using a much softer curve, making the limiting process less audible. The Softclip LED above the Meters will indicate that Softclip is working.

### Attack

The Limiter's attack time determines how fast the limiter will react on signals exceeding the threshold.

### Release

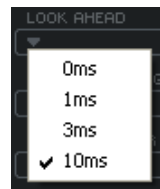
The Release time determines how fast the limited signal returns to unprocessed, whenever the level falls below the set Threshold.



# TC MASTER X5 – PARAMETERS

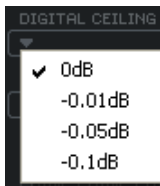
## LOOK-AHEAD DELAY

Master X5 can look into the future, whenever this parameter is active! This won't help you fortune-telling, but it'll help Master X5 to be prepared for sudden peaks in your material, thus ensuring a much better quality processing!



## DIGITAL CEILING

Digital Ceiling will let you define a marginally lower level than 0 dB as maximal value, so you can ensure that you definitely don't have any values reaching 0 dB.



This can be important for mastering – as some devices already show a clip or overload, when 0 dB is reached for one single sample – others take up to 5 or more consecutive clips before they display an overload.



*Do not activate Digital Ceiling before you have adjusted the setting to your liking – Master X5 won't display clips with Digital Ceiling active!*

## TARGET CURVE & TARGET FACTORS

The Target Curves and Target Factors simplify the handling of Master X5 significantly, by reducing the amount of parameters necessary to control the Plug-In by approximately 2/3.

Thanks to these innovative parameters it will be easy for you to keep an overview of all relevant settings at all times – and get to a result fast anyway!

Although you are using a 5-band solution you only have one set of parameters for each module. This is possible due to the use of the Target Meta-Parameters:

The displayed values are always referring to the center band, with Target Curves you define the basic “focus” (like “all equal” or “less treble” etc.) as displayed by the little curve in the Target Curve display – and with the Target Factor you can edit that “focus”, move the target elsewhere in the frequency spectrum.

# TC MASTER X5 – PARAMETERS

## Target Factor

The Target Factor allows fast editing of the relation between the 3 bands, separately for each module. For example, with just one move of the Target Factor in the Limiter block, you can increase the focus of the Limiter block on the hi frequency spectrum.



In OFF position, the Target Factor is deactivated for the module – all 3 bands will be processed with the setting you see on screen. In MAX position, the selected Target Curve will be applied to the maximum – and the 3 bands will be processed differently. So in a way you could say: The Target Factor determines the amount of differences between the bands.

## Target Curves

The Target Curves determine how the 3 bands work together:

### Linear

All 3 bands are processed equally. The Target Factor has no effect. (Imagine the frequency characteristics of white noise)



### Pink

The Hi band will be processed less. (Imagine the frequency characteristics of pink noise)



### Hyped

The Hi band will be processed more strongly.



### Smiley

Lo and Hi band are processed more strongly.





# METERS

## METERS & CONSECUTIVE CLIPPINGS

### Meters

These PPM meters (Peak Programme Meters) include a very accurate Peak Hold function. Set your levels as close to 0 dB as possible, without distorting the signal. The numerical peak display gives you the exact reading you require for that. Clicking on the meters will bring up a pop-up display with a variety of meters options.

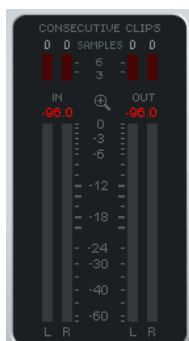


### Meter Zoom

By clicking on the magnifying glass the meter range will change from -60 dB/0 dB to -18 dB to 0 dB

### Consecutive Clippings

The CONSECUTIVE CLIPPINGS display is a highly accurate tool which will display any and all clips in your material. The numerical reading even counts single clips. The meters give you an additional visual feedback after the 3rd consecutive clip. Like in the METERS display, clicking on the clipping meters will bring up a menu with a variety of options.



# MASTER YOUR MIX WITH MASTER X5

## MASTER YOUR MIX WITH MASTER X5!

...or six easy steps to ultimate happiness! The following chapter introduces the various modules and features of Master X5 in a “hands-on” tutorial. Let’s imagine we’re working with some rock music. It’s the final mix from that very expensive recording studio down the road, but for some reason there is 5.0 dB of headroom left, wasting precious volume reserves. No compression was applied to the stereo mix. (Actually, we are happy about this because it leaves all options open).

### 1. Setup

Before we start, let’s set up Master X5 as follows:

Look Ahead Delay:	3 ms
Digital Ceiling:	0 dB
3 Band Levels:	0 dB
Output:	0 dB
Expander:	off
Compressor:	off
Limiter:	off
Target Curve:	linear

*(Alternatively, load the Preset “Manual Workshop 1.”)*

### 2. Input Level Adjustment

Set the input level for both channels to +5.0 dB. In our example, this will bring the input level up to an optimal value of 0 dB. Adjust this value until no clipping is indicated (i.e., until there are no Consecutive Clips in the input). For this example, set it to +4.9 dB. Remember: as long as you don’t alter any settings in the signal chain before Master X5, you won’t get any changes in the input level, so there is no risk of clipping once you’ve set the level correctly!

### 3. Turn on the Compressor block

The FREQUENCY/LEVELS display in the upper-half of the Plug-In window, the three displays beneath them, and the Compressor’s parameter faders come to life! The music has probably come up in volume already, and the sound has changed a little too – and perhaps some “pumping” is evident. So, let’s set the Compressor properly to get rid of the pumping, beef up the overall sound, and, yes – we want it louder!  
*(Alternatively, load the Preset “Manual Workshop 2.”)*

# MASTER YOUR MIX WITH MASTER X5

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Let's set the Attack and Release Times to remove the "pumping" from the sound. We start with small values for both parameters. If the attack time is too short, we may remove some "kick" from the material. That's certainly not what we want, so if it happens, try a greater value. Heavy peaks can be smoothed using the limiter section.

If the release-time is too fast, it will result in a terrible "pumping", because the compressor returns to the uncompressed signal immediately whenever the signal falls below the compressor's threshold setting. Increase the value of the release time until you are satisfied with the result. In our example, we have chosen an Attack time of 1 ms and a Release time of 0.2 s. If you don't get the desired result, try some different crossover frequencies. Keep in mind that you have three independent bands – why should a bass drum signal affect the mid and high bands when its peak is in the low end? (We chose 125 Hz and 2.5 kHz as the settings for our example.)



*Sometimes it's easier to adjust the Attack and Release times and the Crossover frequencies by using extreme values for Threshold and Ratio during setup. This will make the effect of your settings much easier to hear. Additionally, the band SOLO-Function helps to focus on a single band.*

Now we will adjust the compressor's threshold and ratio. Set these parameters to the desired values. In most cases, you would use a low threshold in combination with a small ratio and vice-versa. Let's choose a low threshold of -20 dB and a small compression ratio of 2.5:1 to be satisfied.

Satisfied? Why be satisfied? We have now set the compressor – but with identical settings for all three bands! With identical settings, we are not taking full advantage of the multiband capabilities. This is where the famed Target Curves and the Target Factor come in.

The Target Curves create different settings for each of the three bands. The displayed values in each fader section are always the mid-band settings. If the Target Curve is set to "Linear" (or if the Target Factor is set to "Off"), the values will be identical for all three bands. If you select the "Hyped" curve, for example, the high bands will be compressed more than the others.

The Target Factor defines how much the target curve characteristics will influence the hi or low band. To set the Target Curve and Factor properly, we recommend that you compare the processed signal with the uncompressed, because you can use it to change the overall sound impression. Does your mix lack treble? Use the "Hyped" curve and adjust the target factor to your liking. Too bright? Select "Pink" and adjust the target factor. Not enough treble and bass? Go for "Smiley" and you'll be smiling too!

# MASTER YOUR MIX WITH MASTER X5

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To get a better impression of how the sound – as opposed to the output volume – is influenced by Master X5, reduce the output level so the bypassed and processed signals are equally loud – but don't forget to bring the output level back up in the end! The band levels in the upper display supply you with an additional tool for easily adjusting the sound of your mix. Use them like a low, mid, treble EQ! (Alternatively load the Preset "Manual Workshop 3".)

## 4. Activate the Limiter

We've pumped up the volume and reduced the dynamics to optimize the sound and to make it more compact and "punchy".

But there's something really nasty that can happen when you work with digital audio: digital clipping. If you have more than one tiny sample clip, your whole master will be worthless for serious use – such as putting the music on CD.

That's why there is a Limiter block in Master X5. It ensures that you get only the levels you want, and eliminates the ones that would not only spoil your day but also your whole mix!

You should use the Limiter carefully, as a limiter is always a somewhat "drastic" tool to apply to your audio. Just a couple dB should be enough to limit strong peaks. Softclip will help the limiter work even more smoothly.

For our example we have chosen a threshold of -4 dB and a Softclip of 20%. The Attack Time is short (50 ms), so the Limiter is capable of preventing clips. The release time is set to a value that avoids unwanted pumping (0.3 s).

Set the target factor in the same way you set the compressor. Trust your ears (and the Consecutive Clips meters) to judge whether a band needs more limiting. (Alternatively load the Preset "Manual Workshop 4".)

## 5. Expand!

By compressing the signal we made it sound louder. However, an unwanted side effect is that the ground floor level is also brought up - which may cause you to remark, "Where did all that noise come from?". The noise will be most evident in the pauses. The Expander is one possible cure for this. (Obviously, the Expander can't replace broadband noise reduction – but it will reduce audible noise when applied to vocal tracks, for example.)

Use the Expander carefully. The modulated noise of the ground floor level is much more audible than a higher ground floor level without such modulation.

The Expander's threshold must be lower than the compressor's threshold. If you raise it too much, you might cut into low parts of the signal, such as reverb tails. The Expander's range parameter determines the width of the level range. Also, the target Factor enables you to determine whether to apply different settings to all three bands, and if so, just how different the settings should be!  
**(Alternatively load the Preset "Manual Workshop 5".)**

## 6.Adjust the Output Level

We are almost finished – just one parameter left: the Digital Ceiling. Set this parameter to a value lower than 0 dB to prevent unwanted clipping.

The most common value is -0.01 dB. With this setting, the maximum output level is -0.01 dB. No portion of your signal will be able to pass this absolute setting. Now you can be absolutely sure that there is no clipping – and the difference from 0 dB will be imperceptible.



*If you want to further edit your settings, please make sure that you first switch the Digital Ceiling back to 0 dB. Otherwise, you won't be able to tell if there are internal clips!  
**(Alternatively load the Preset "Manual Workshop 6: Final")***

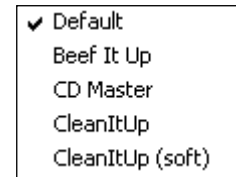
## Introduction

We recommend using the dedicated PowerCore file handling system that, apart from recall; store and compare facilities, allows for easy exchange of entire preset folders with other users, between Windows/Mac platforms and also between different host applications.



## File

Click "File" to open the File menu.



Load Preset: Select to load presets from the default preset location.

Save Preset: Select to save the preset in My Presets folder.

My Presets: Via "My Presets" you are able to load you own presets.



*If you chose to store presets in other locations than the "My Preset" folder, these presets will not appear in the "My Preset" drop down menu. However, you can still navigate to, and load these presets via the Load Preset function.*

## Preset name

This is the name of the preset.

## Up/down

The [UP]/[DOWN] arrows can be used to browse through all presets.

## A/B

With the A/B compare function you can easily compare different parameter settings when working with the plug-in.

# PRESET HANDLING

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When you start working with your preset, the A/B button is grayed out. This state indicates that the settings in both memory locations A and B are identical - so there is actually nothing to compare.

As soon as you touch one of the parameters, the memory location “A” will be active. All parameter changes will be applied to memory location “A”. If you switch to memory location “B”, you go back to the starting point, and all further changes will now be applied to memory location “B”.

Every time you press the A/B button, you will toggle between these two memory locations.



*The A/B memory locations are temporary settings only! Saving a preset, will save the currently selected memory location only. The setting of the other (hidden) memory location will not be saved!*

## Reset

Click “Reset” to clear memories A/B and return to the originally recalled preset.

## DEFAULT PRESET LOCATIONS

The following locations will describe where you can find the presets, which are stored in a folder unique to each plug-in:

### Mac OS X preset paths:

#### Factory presets:

⟨Macintosh HD⟩/Library/Application Support/TC Electronic/⟨plug-in name⟩/Presets/

#### User presets:

/Users/⟨user name⟩/Library/Application Support/TC Electronic/⟨plug-in name⟩/Presets/

### Windows preset paths:

#### Factory presets:

C:\Program Files\TC Electronic\⟨plug-in name⟩\Presets

#### User presets:

C:\Documents and Settings\⟨your user name⟩\My Documents\TC Electronic\⟨plug-in name⟩\Presets

- To delete a preset file, simply move it to the “Trash” or “Recycle bin”.
- To create a new sub-folder that appears in the plug-in menu, simply create a new folder in the plug-in folder that resides in the PRESETS folder of the plug-ins default preset location.



*A folder will not appear in the Preset File Menu unless it has at least one preset inside!*