

Optimaster



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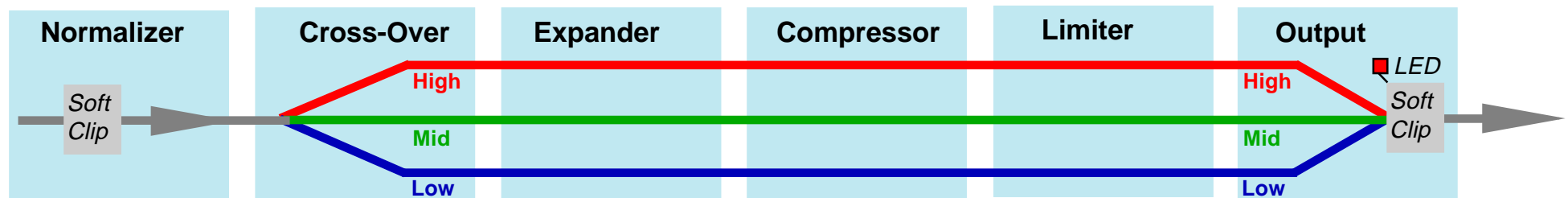
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Introduction

Thanks for choosing the Optimaster. The Optimaster is a stereo mastering tool for CreamWare DSP systems. It optimally maximizes the loudness of your mix - and thus its impact and "punch". At the same time, it can modify the sound of your mix by processing different frequency bands differently. And the integrated expander function lets you eliminate noise and unwanted sounds from softer passages.

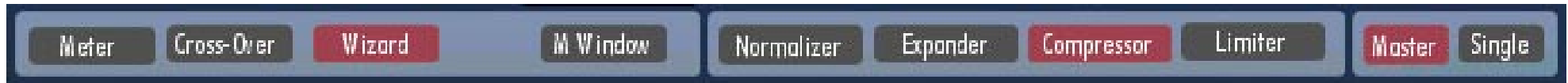
In order to optimally handle these tasks in the widest possible variety of situations - that is, with material coming from many different musical directions, which has already been mixed more or less "hot" - the Optimaster combines an assortment of effects algorithms which are applied to the signal in a serial fashion, or in somewhat simpler terms: the signal is processed through various effects blocks one after another.



Signal flow in the Optimaster

Functional blocks

These blocks correspond to the following functional units:



Normalizer

This stage adjusts the original material to an optimal level before passing it along to the various effects processors.

Cross-Over Filter

The dynamics processors described in the following sections are multiband processors. The original signal is divided into multiple frequency bands which are individually processed, since different frequencies normally require different parameter settings for the dynamics processors. The Optimaster operates using three frequency bands: low, mid and high.

Expander

The expander can be used to minimize the level of noise in pauses or quiet passages. In theory, it can also be used to reverse the process of dynamics compression - a mix which sounds somewhat lifeless owing to excessive use of compression can within certain limits be "reanimated" via the Expander.

Compressor

The compressor is the heart of the Optimaster. It compresses the dynamics of the individual frequency bands, so that these can then be raised to maximum loudness without the danger of digital overload occurring. The compressor's settings largely determine how hot, how concentrated or how dynamic your mix ends up sounding.

Limiter

The limiter which follows the compressor makes precise processing of loudness peaks possible.

Output

In this final stage, the separately processed frequency bands are recombined into a complete signal.

Wizard

To make it easier for you to arrive at optimal settings for the most important parameters, the Optimaster features a **Wizard**. This is an algorithm which analyzes the dynamics of the original material and suggests specific settings for the Normalizer and Compressor.

DSP usage

The computing capacity required by all of the Optimaster's functions is provided by the DSPs on the CreamWare card. Theoretically, with a Pulsar2 board, up to four instances of the Optimaster can be loaded simultaneously.

Warning - addiction hazard!

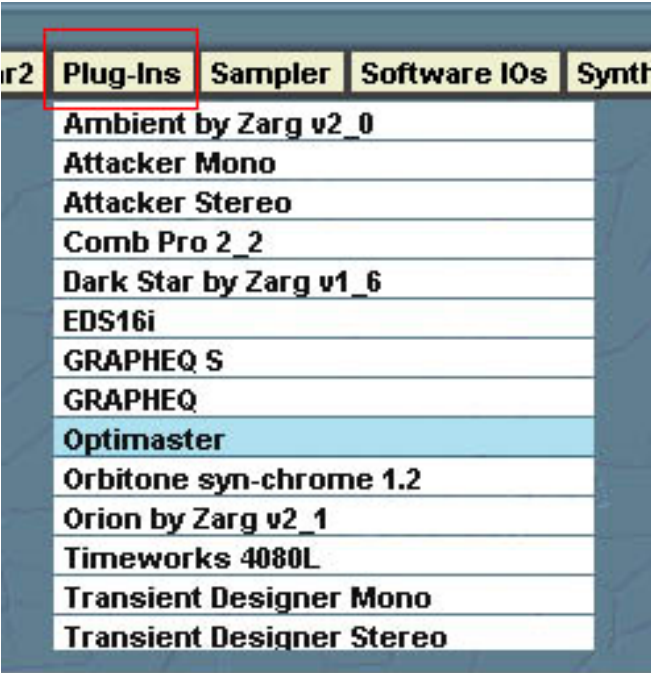
Keep in mind when working with the Optimaster that such a device can produce an "addiction" leading to its excessive use. Dynamics processing, after all, always represents a compromise between the preservation of a variable, lively and natural sound and the limiting of dynamics in order to yield a maximally loud and thus maximally

potent-sounding mix. Your ears should always be the final judge, but direct comparisons with pieces from your CD collection may also help you avoid gross mistakes. If you observe these ground rules, you can be certain of quickly achieving optimal results with the Optimaster.

Loading

Following installation, the Optimaster appears in the "Plug-Ins" subdirectory of the Devices folder. You can drag it into your project in the usual fashion using drag-and-drop from the File Browser or from the device menu along the upper edge of the Project Window. Alternatively, you can drag the Optimaster into a mixer insert slot.

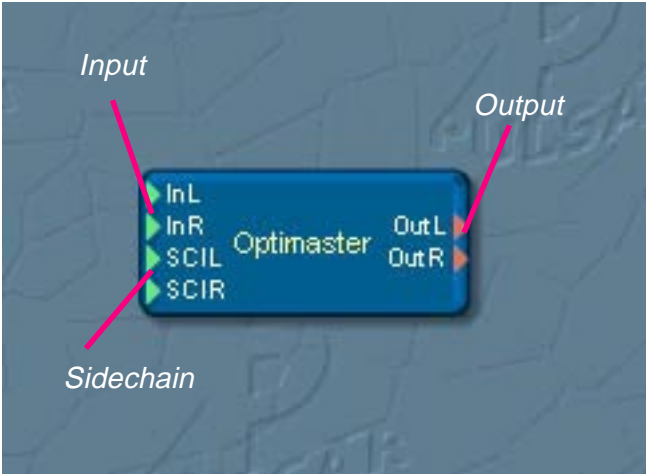
As the Optimaster is a stereo device, it should be loaded as an insert only into stereo mixer channels. In practice, insertion into the master channel of the mixer is an obvious option.



Cabling

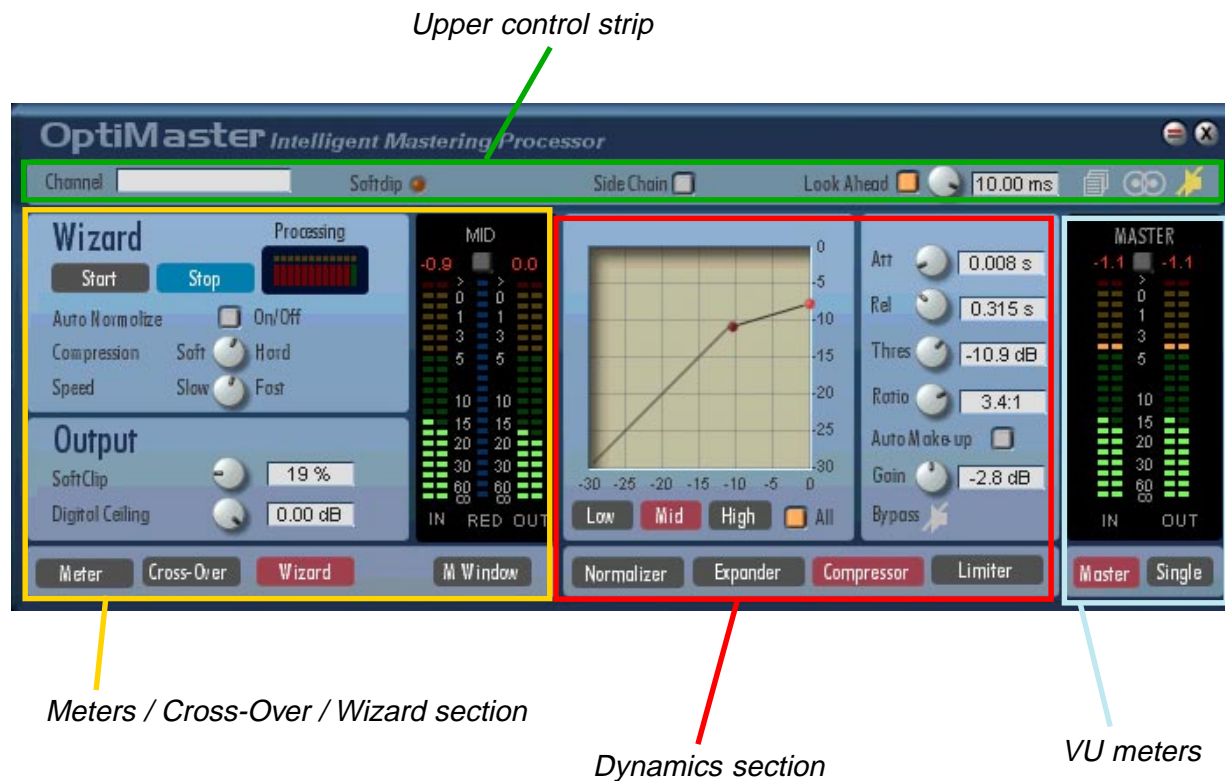
If you don't load the Optimaster into a mixer as an insert effect, then you must cable it in the Project Window in the usual manner.

Along with the two inputs (InL and InR) and outputs (OutL and OutR), the Optimaster also provides sidechain inputs (SCIL and SCIR) via which an additional signal can be fed in for control of the dynamics section using SideChain Mode.

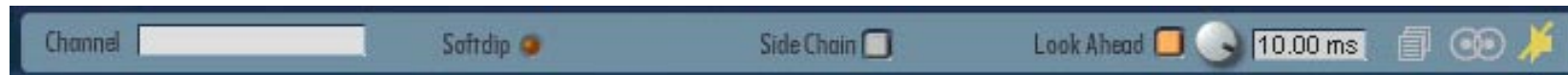


The control surface

The control surface is divided into four sections. Some of these sections incorporate multiple pages or views presenting different functions or parameter sets within the same space. Switches are provided accordingly so you can select the desired view.



Upper control strip



Channel: If the Optimaster is loaded as an insert in a mixer channel, the name of that channel is displayed in this field.

SoftClip: This LED lights when the internal limiter in the output section goes into action.

SideChain: Click this button to open two routing fields which can be used to cable the Optimaster's SideChain inputs. Right-click on these fields (Mac: Ctrl-Click) to open a context menu showing all available outputs, and select the desired one to make the connection.

Alternatively, you can cable the SideChain inputs directly in the Project Window.

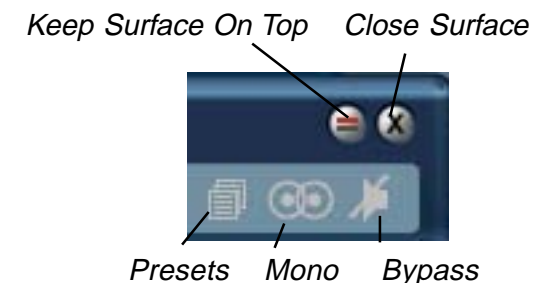
Look Ahead: When SideChain (see above) is not activated, this button can be used to activate the Look Ahead function. With this function, the Optimaster delays the input signal by the specified amount of time, enabling it to analyze the input signal in advance of processing it. The Optimaster thus "looks into the future", so to speak, and can react to signal peaks with exact timing.

Look Ahead control: Adjusts the internal Look Ahead processing delay over the range 0.06 msec .. 16.67 msec.

Preset Icon: Click on this icon to open the Optimaster's preset list.

Mono Icon: Clicking on this icon causes the left input signal to be passed to both channels of the Optimaster. The right input signal is not used.

Bypass: Clicking on this icon causes the unprocessed input signal to be passed directly to the outputs.



Meters / Cross-Over / Wizard section

In this section at the left end of the control surface, the Meter, Cross-Over and Wizard buttons switch between alternate views.



Meter

This view presents three stereo VU meters corresponding to the three frequency bands (low, mid, high). These meters display the input and output levels (LED chains *IN* and *OUT*) in each frequency band for the dynamics block currently selected in the Dynamics section. Between each set of *IN* and *OUT* meters, an additional *RED* meter shows the current level reduction in the associated band.

The Meters view is not available if the Normalizer is currently selected in the Dynamics section.

The peak signal level detected thus far (margin) is displayed directly above each VU meter. This display can be cleared by clicking the Margin Reset button next to the display.

One VU meter remains visible even when the Cross-Over or Wizard views are selected. This meter displays the levels for the frequency band currently selected in the Dynamics section (within the dynamics block currently displayed in that section).

Cross-Over

The Cross-Over filter splits the full frequency spectrum into three bands. The transition frequencies are specified here.

Low Split: Enter the split frequency between the low and mid bands here. Alternatively, simply reposition the associated blue split point in the display.

High Split: Enter the split frequency between the mid and high bands here. Alternatively, simply reposition the associated blue split point in the display.

The spacing between Low Split and High Split cannot be adjusted to less than one octave.

Bands On/Off: The individual bands can be switched on and off via these buttons, permitting the effect of the control settings within each band to be clearly heard and evaluated.



Wizard

The Wizard is an intelligent circuit which simplifies the process of finding optimal settings. The Wizard first analyzes the input signal and then sets the compressor and the gain control of the Normalizer as appropriate to the specific characteristics of the material as determined during the analysis.

Using the Wizard

For best results when applying the Wizard with mono input signals, the Mono icon in the upper control strip should be switched on.

First make certain that a valid input signal is present - i.e., start playback of the piece you wish to process. It's a good idea to begin by analyzing a loud passage, so that the Wizard can determine an optimal Gain setting for the Normalizer (the **Auto Normalize** option is activated automatically when the Wizard is started).

Now click the Start button. The Wizard now analyzes the running signal over a period of time determined by the setting of the **Analysis Window** control. The red status bar shows the progress of the analysis. When the green segment at the end of the status bar is reached, the Wizard delivers its recommended settings to the Normalizer and Compressor.

If you don't stop the Wizard via the Stop button, it remains active even after the green segment at the end of the status bar is reached. This is indicated by a moving point along the upper edge of the status bar. The Wizard can thus continue to make corrections to the determined settings as necessary.

Note:

Whenever the Wizard is started, the Expander and the Limiter are automatically switched into bypass. In addition, the SoftClip control in the Output section is set to 60%.

Once the Wizard has analyzed the complete song, or at least its loudest passage, you should deactivate Auto Normalize.



As long as the Wizard remains activated, it continues to make fine adjustments to the parameter settings on the basis of both the foregoing analysis and the analysis of the current passage. Thus, the Wizard never arrives at an absolute final result. You should deactivate the Wizard once you are essentially satisfied with the settings it has delivered, and make the last corrections manually.

Tip: With material having little dynamic range or scarcely any peaks (for example, with some classical music), it may occur that the Wizard does not reach the green end of the status bar. In such cases, you should set the analysis window to minimum, so that the Wizard is at least able to derive a value for Normalizer Gain.

Start: Starts the analysis process.

Stop: Ends the analysis process.

Status Bar: During the analysis process, the red bar progresses towards the right. A green segment at the right end indicates that the Wizard has passed its recommended settings to the compressor. The running light above this display indicates that the Wizard is still active and may continue to make corrections to the settings it has derived.

Auto Normalize: When this option is activated, the Wizard will also make adjustments to the Normalizer - thus, the input signal is first normalized before being submitted for dynamics processing.

This option is activated automatically when the Wizard is started. Once the Wizard has determined an optimal setting for the Normalizer, this option can be deactivated.

Compression: Controls how strongly the Optimaster modifies the signal. Rotate this control towards the left (Soft) for more moderate compression or towards the right (Hard) for more aggressive compression.

Analysis Window: Controls the duration of the analysis process.

The exact duration always depends to some extent upon the material being analyzed.

Output

The Wizard section also includes the Output section of the Optimaster. In this section, you can tweak the maximum output level and use SoftClip to prevent distortion.



SoftClip: SoftClip "intercepts" digital overload. It comes into play at a specified threshold level and limits the output signal via a "flat" curve. A setting of 100% corresponds to a threshold level of -4 dB. Lower settings shift the threshold progressively higher. At 0%, the threshold is 0 dB and SoftClip is effectively disabled.

SoftClip emulates the compression behavior of analog tape saturation. This permits you to develop output signal levels in the Dynamics section of up to +2 dB without causing digital distortion.

Digital Ceiling: Here, the maximum output level can be adjusted over the range -0.10 dB .. 0.00 dB.

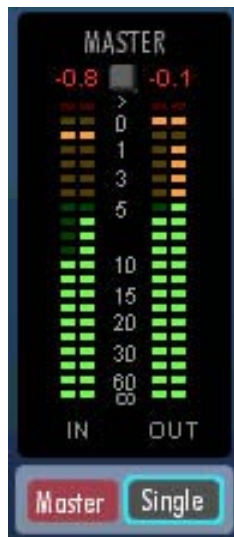
A setting of 0 dB is typical. In some productions, however, a slightly lower level is used during mastering for the sake of caution.

Meter display

At far right on the control surface is a pair of stereo VU meters. The left and right meters show input and output signal levels, respectively.

The peak signal level detected thus far (margin) is displayed directly above each VU meter. This display can be cleared by clicking the Margin Reset button next to the display.

Via the **Master** and **Single** buttons, you can choose whether these meters show the input and output levels of the Optimaster as a complete unit (Master) or the levels of the individual processing block currently displayed in the Dynamics section (Single).



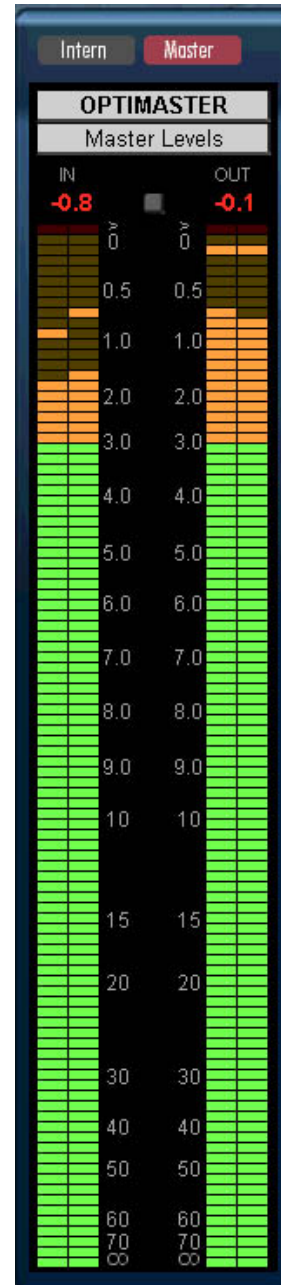
M Window

This button opens an oversized VU meter display. As with those discussed previously, these meters show input and output signal levels at left and right, respectively.

The peak signal level detected thus far (margin) is displayed directly above each VU meter. This display can be cleared by clicking the Margin Reset button next to the display.

Via the **Master** and **Intern** buttons, you can choose whether these meters show the input and output levels of the Optimaster as a complete unit (Master) or the levels of the individual processing block currently displayed in the Dynamics section (Intern). In the latter case, the display indicates signal levels within the frequency band currently selected in the Dynamics section.

In Intern mode, an additional LED chain (*RED*) between the *IN* and *OUT* meters indicates the current amount of signal level reduction within the corresponding frequency band.



Dynamics section

Via the buttons at bottom, the Dynamics section can present views of the Normalizer, the Expander, the Compressor or the Limiter.

Normalizer

The Normalizer raises (or lower) the level of the input signal so that the loudest signal peaks reach a level of precisely 0 dB. If you activate the Auto Normalize feature of the Wizard, it will determine the Gain control setting necessary to

achieve this and set the Normalizer automatically.

In addition, the Normalizer has a switchable SoftClip function for the prevention of audible digital distortion, as well as a display that shows the current input signal in waveform format.

Gain: This control adjusts input gain in the range -∞ (display "--") to +12 dB.

Clip - Hard: When this switch is on, SoftClip is disabled - digital distortion is not "intercepted".

Clip - Soft: When this switch is on, SoftClip is activated - digital distortion is "intercepted".

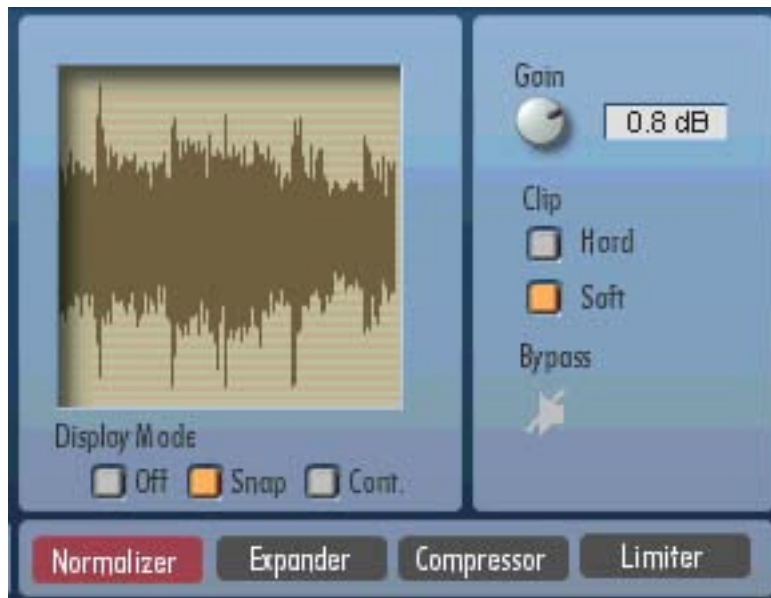
The SoftClip LED along the upper edge of the control surface belongs to the SoftClip function in the output stage and is not associated with the Normalizer.

Bypass Icon: Click on this icon to deactivate the Normalizer. The signal passes unmodified through the Normalizer.

Display Mode

The waveform display of the input signal can be deactivated (Off) or switched between **Snap** and **Cont** (Continuous) modes. In Snap mode, a block of two seconds length is displayed and the display is updated once per second. In Continuous mode, the waveform moves continuously along the time axis.

Continuous mode places a substantially higher load upon the CPU.



Expander

The Expander can be used to minimize noise and unwanted sound in pauses and quiet passages. It functions by decreasing the levels of signals which are below an adjustable threshold according to an adjustable ratio - the further below the threshold a signal is, the more its level is decreased. The Expander can be adjusted differently for each of the three frequency bands low, mid and high.

In theory, the Expander can also be used to reverse the process of dynamics compression - a mix which sounds somewhat lifeless owing to excessive use of compression can within certain limits be "reanimated" via the Expander.

Transfer curve display: The values for Threshold (upper red point) and Ratio (lower red point) can be viewed in this display and can be adjusted here as well by moving the red points with the mouse.

Low: Causes the transfer curve and other parameters for the low frequency range to be displayed.

Mid: Causes the transfer curve and other parameters for the mid frequency range to be displayed.



High: Causes the transfer curve and other parameters for the high frequency range to be displayed.

All: In this mode, the Expander operates with the same settings for all three frequency bands.

Att (Attack Time): Adjusts how long the Expander waits once the input signal level falls below the specified threshold before it begins decreasing the signal level.

Rel (Release Time): Adjusts how long the Expander waits once the input signal level rises above the specified threshold before it begins fading out the reduction of signal level.

Thres (Threshold): Sets the signal level below which signal level reduction begins.

Ratio: Adjusts the ratio by which signal level is reduced in relationship to the decrease in original signal level when the original signal level is below the specified threshold.

Gain: This control adjusts the signal gain for the current frequency band over the range -∞ .. +18 dB.

Bypass Icon: Click on this icon to deactivate the Expander. The signal in the current frequency band passes unmodified through the Expander.

Compressor

The Compressor is the heart of the Optimaster. It compresses the loudness of each of the three frequency bands, so that these can then be optimally raised - without the risk of overloading - to yield a maximum-impact sound.

Transfer curve display: The values for Threshold (upper red point) and Ratio (lower red point) can be viewed in this display and can be adjusted here as well by moving the red points with the mouse.

Low: Causes the transfer curve and other parameters for the low frequency range to be displayed.

Mid: Causes the transfer curve and other parameters for the mid frequency range to be displayed.

High: Causes the transfer curve and other parameters for the high frequency range to be displayed.

All: In this mode, the Compressor operates with the same settings for all three frequency bands.

Att (Attack Time): Adjusts how long the Compressor waits once the input signal level rises above the specified threshold before it begins decreasing the signal level.

Rel (Release Time): Adjusts how long the Compressor waits once the input signal level falls below the specified threshold before it begins fading out the reduction of signal level.

Thres (Threshold): Sets the signal level above which signal level reduction begins.

Ratio: Adjusts the ratio by which signal level is reduced in relationship to the increase in original signal level when the original signal level is above the specified threshold.

Gain: This control adjusts the signal gain for the current frequency band over the range -∞ .. +18 dB.

Auto Make up: If this option is activated, the Gain control will automatically be set to the highest value at which no overloading occurs.

Bypass Icon: Click on this icon to deactivate the Compressor. The signal in the current frequency band passes unmodified through the Compressor.



Limiter

The Limiter makes it possible to intercept signal peaks very precisely.

For optimal results, it can be helpful to adjust the foregoing Compressor for more moderate compression and to allow the Limiter, rather than the Compressor, to intercept the signal peaks which the Compressor doesn't catch.

Transfer curve display: The values for Threshold (upper red point) and Ratio (lower red point) can be viewed in this display and can be adjusted here as well by moving the red points with the mouse.

Low: Causes the transfer curve and other parameters for the low frequency range to be displayed.

Mid: Causes the transfer curve and other parameters for the mid frequency range to be displayed.

High: Causes the transfer curve and other parameters for the high frequency range to be displayed.

All: In this mode, the Limiter operates with the same settings for all three frequency bands.

Att (Attack Time): Adjusts how long the Limiter waits once the input signal level rises above the specified threshold before it begins decreasing the signal level.

Rel (Release Time): Adjusts how long the Limiter waits once the input signal level falls below the specified threshold before it begins fading out the reduction of signal level.

Thres (Threshold): Sets the signal level above which signal level reduction begins.

Ratio: Adjusts the ratio by which signal level is reduced in relationship to the increase in original signal level when the original signal level is above the specified threshold.

Gain: This control adjusts the signal gain for the current frequency band over the range -∞ .. +18 dB.

Bypass Icon: Click on this icon to deactivate the Limiter. The signal in the current frequency band passes unmodified through the Limiter.



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