Selig Audio - *Creating Audio Devices Perfectly Within Reason!*

Selig Leveler

User Guide v1.1.0
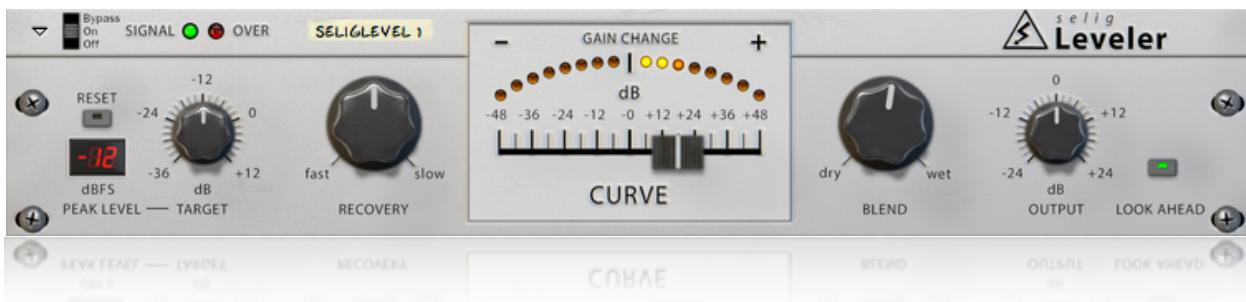
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Quick Start Guide

What does The Selig Leveler do?

The Selig Leveler gives you precise control over mid level audio signals via upwards compression or downwards expansion. The Selig Leveler raises or lowers the mid level audio signals while leaving the highest peaks and the lowest background noise alone, allowing you to preserves transients while not increasing background noise.

Calibrating the Selig Leveler

For the Selig Leveler to do its magic, you first need to complete a quick setup process to calibrate the Selig Leveler to your audio's highest peak.

This is a very simple process, thanks to the built-in Peak Level display. First, create the Selig Leveler in the rack and run your loudest audio signal through it, noting the value displayed on the Peak Level display. This is the highest peak level (HPL) for your signal, and the Curve control will be referenced to this level after calibration.

To finish the calibration process, simply match the Target knob to the HPL as read on the Peak Level display, and you're good to go!

Now you can bring up the Curve control and you will hear an immediate increase in loudness, but note that the highest peak level doesn't change. Welcome to the wonderful new world of the Selig Leveler!

Front panel

Here's a quick tour of the controls and displays on the front panel.
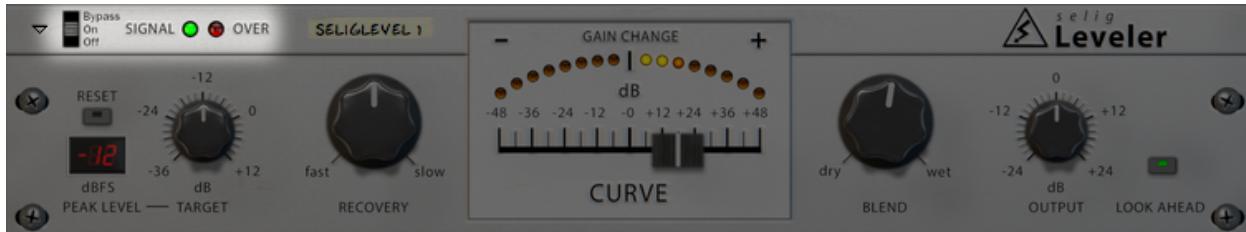
Bypass
This is the standard Bypass/On/Off control found on all Reason effects devices.

Signal meter
This is an activity indicator that lights up for signals above -36 dB. If this doesn't light up then you need to increase your signal level before putting your audio through the Selig Leveler.

Over meter
This is a calibration aid, to let you know if the input signal is above the Target. For most applications you won't want to see this light up, as it indicates your signal is peaking above the active range. But remember, it's NOT a clipping indicator so you won't hear anything "bad" when it is lit.
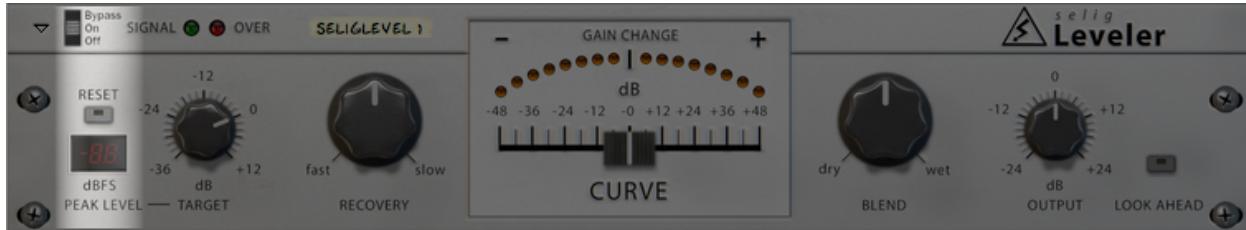

Peak Level display

This meter displays the highest peak level received since creating the device. The lowest level is -36 dB; if the input is lower than that you need to increase its gain externally. This meter also shows signals above 0 dB, and the device can be calibrated for these signals. But such hot signals tend to cause clipping on the output, so you will typically see only negative numbers in this display.

Peak Reset
This button resets the Peak Level display. Use it when you change the input to the Selig Leveler, to find the new highest peak value.
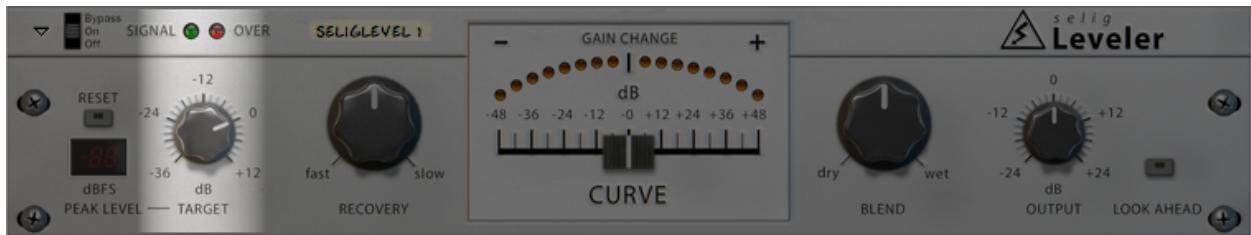
Target
This knob scales the output amplitude of the internal Peak Detector, allowing you to calibrate the Selig Leveler to the highest peak in your audio signal. If you set the Target level above the highest peak, you will boost the signal level above the original peak level. If you set the Target level below the highest peak, the Selig Leveler will not change any signal above the Target level.
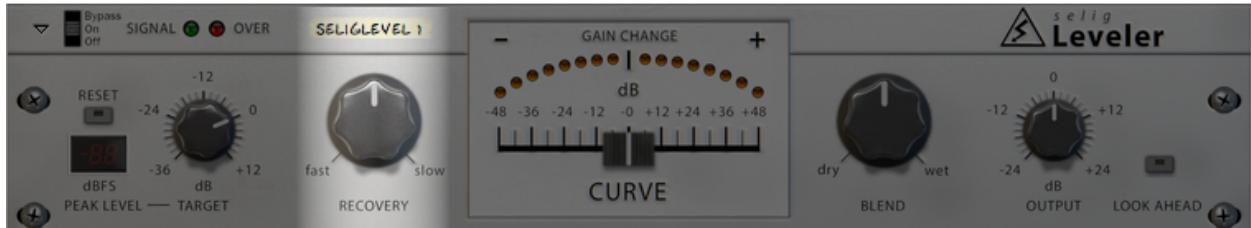
Recovery
This knob controls how quickly the Peak Detector 'recovers' after a transient. The fastest setting is 10 ms and the slowest is 250 ms. The default is 130 ms. The Selig Leveler has a very fast response in order to accomplish its magic. But this means you may hear distortion on low frequency material, which is normal for such extreme settings. If this occurs, try a slower recovery time, engage Look Ahead, or use a lower Curve control setting if possible.
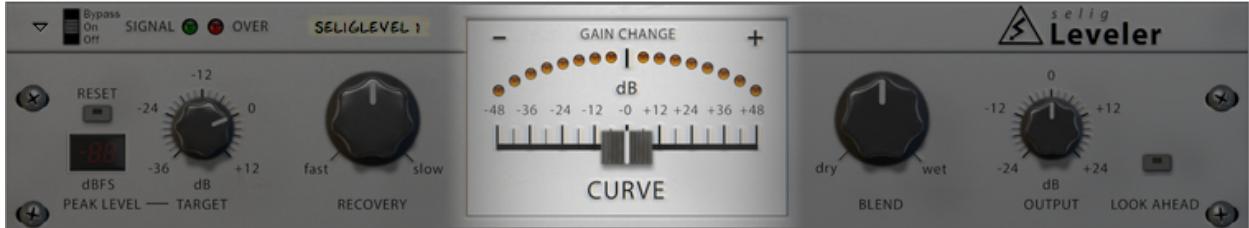
Curve

This is a unique control that defines the signal level range that is affected by the Selig Leveler. The Curve parameter goes from -48 dB, through 0 dB in the center, to +48 dB on the far right. Most of the time you will choose either positive or negative Curve values, but when swept continuously from negative to positive you are effectively controlling the crest factor of your audio signal. Consider the Target as setting the "top" of the "curve", and the Curve control sets the "bottom" by specifying the 'width' of the curve shape.
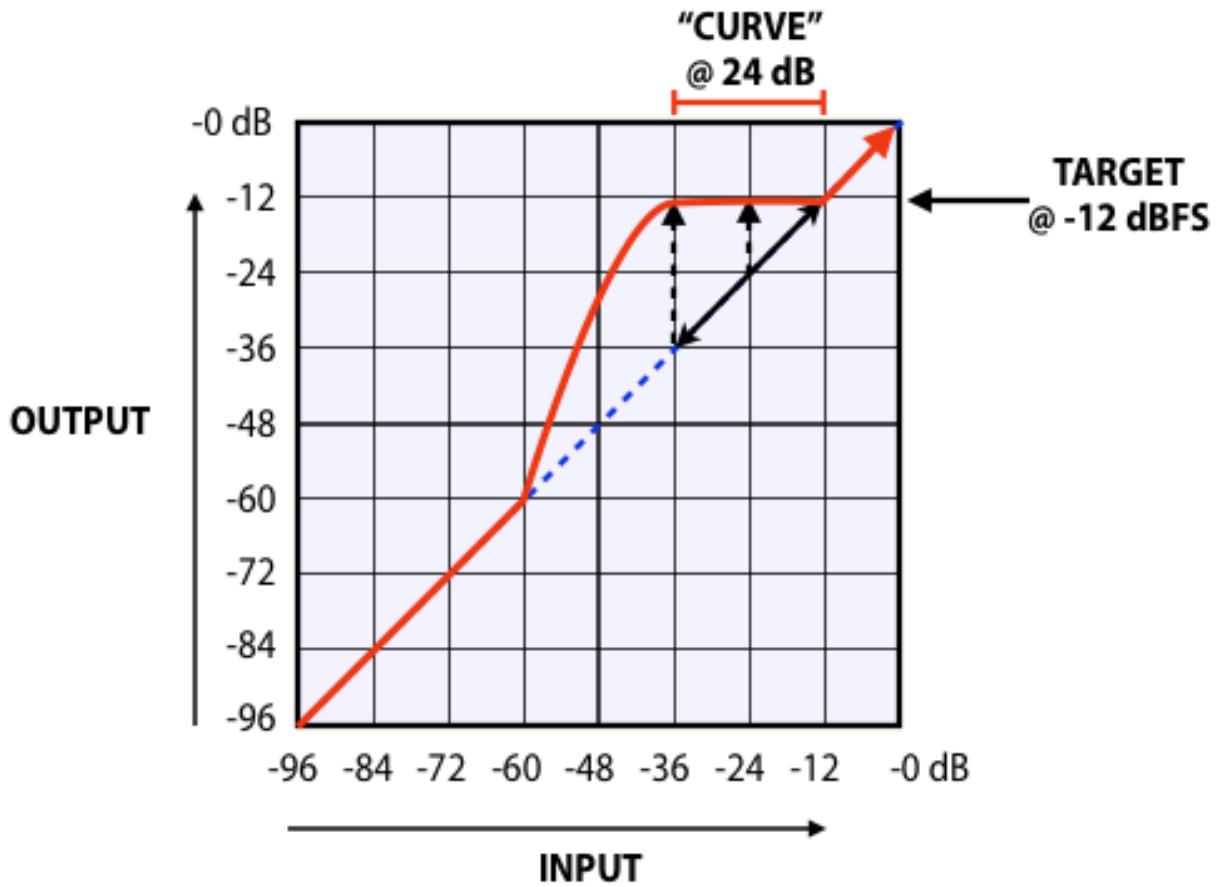
As an example, if the Curve control is set to +12 dB and Target is set to 0 dBFS, then all signals from 0 dBFS down to -12 dBFS will be increased to match the Target (0 dBFS). Below -12 dBFS, the effect falls away. All signals that are leveled are said to fall "within the curve".

Gain Change meter

The array of orange LEDs above the Curve control indicates the gain change applied to the input signal. The LEDs roughly correspond to the dB markings on the scale directly below. Because the Curve control sets a maximum positive or negative gain change, it is normal to see these LEDs operating well within the position of the control. You will still see the Gain Change meter when the Selig Leveler is folded, but the LEDs will be in a straight line.
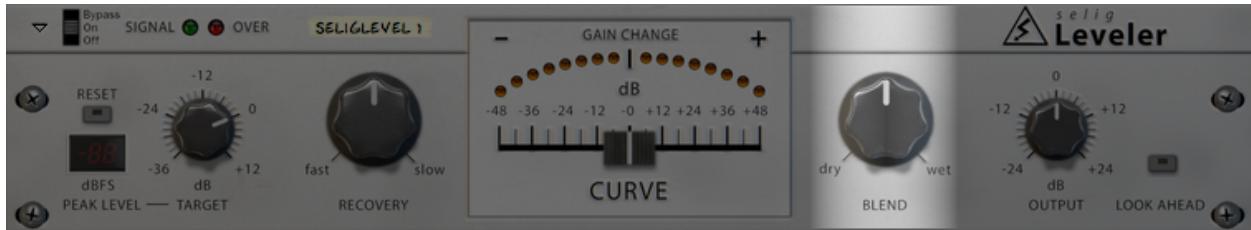
Blend

Essentially a Dry/Wet control, the Blend is an essential component in getting the best results from the Selig Leveler. Because the Selig Leveler can produce extremely concentrated audio signal, it is suggested to "dilute" this concentrated audio signal before use. In some cases you can use the Selig Leveler "full strength", and in others even 10% "wet" can be plenty. In most cases a starting point of 50% is a good choice, but during setup it can be informative to listen at 100% wet.
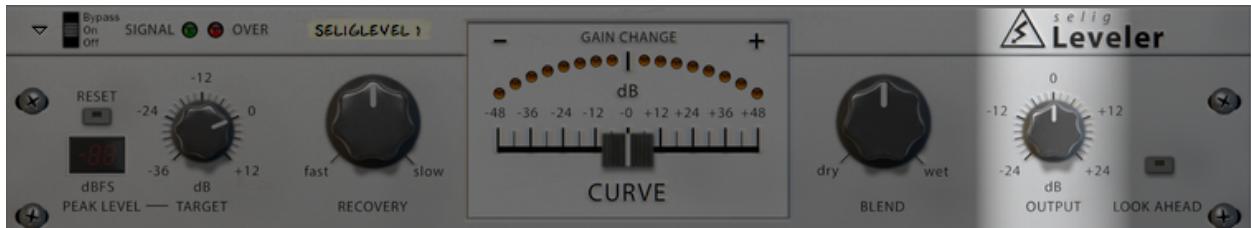
Output

This knob controls the gain on the final output. Up to plus or minus 24 dB is available to fine-tune your levels.
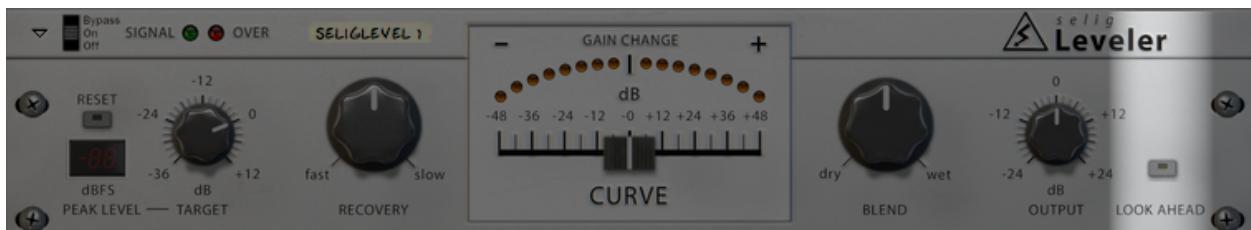
Look Ahead
This control inserts a 2 ms look ahead function into the detector path, along with a little engineering magic. The result is a very smooth response, compared to the more aggressive response without Look Ahead. You may hear artifacts on some audio sources without Look Ahead, so be sure to use Look Ahead if you seek a smoother response.

Back Panel

Here you will find all the I/O for the Selig Leveler. Naturally there are audio inputs and outputs, as well as a side chain input. Also included are CV inputs for the Recovery, Curve, and Blend controls, and CV and audio level outputs for the Peak Detector and Gain Change circuits. For easy reference, the calibration instructions are located on the left side of the back panel.

Recovery CV Input
Expects a bipolar CV signal and modulates the Recovery control by scaling the front-panel knob setting. Zero CV does not change the effective knob setting, positive CV slows Recovery, and negative CV speeds it up. The input is not clipped so it is possible to scale the recovery time considerably in either direction.

Curve CV Input
Expects a bipolar CV signal and modulates the Curve setting. Zero CV does not change the effective control setting, positive CV has the effect of moving the control to the right (more positive gain), and negative CV to the left (more negative gain).

Blend CV Input
Expects a bipolar CV signal and modulates the front-panel Blend setting. Zero CV does not change the effective knob setting, positive CV increases the wet mix, and negative CV increases the dry mix.

Peak Detect Audio and CV Outputs
Provide the real-time output of the internal Peak Detector circuit. The CV output provides a down-sampled version of the peak level, and the audio output provides the sample-accurate level.

Gain Change Audio and CV Outputs
Provide the real-time output of the internal Gain Change circuit. The CV output provides an peak-averaged version of the gain change, and the audio output provides the sample-accurate level.

Applications

The Selig Leveler has many general applications in modern production. These include leveling/smoothing, transient control, crest factor manipulation (for loudness), upwards compression, and downwards expansion (noise reduction). At extreme settings, the Selig Leveler can remove almost all dynamics, making it an excellent FX device or to 'pre-process' a signal before further processing.

Specific applications include precise vocal leveling, individual drum/percussion or bus parallel processing, mastering for loudness, "soft" noise gating, un-compression (results may vary), transient shaping, dynamics removal (for FX), and mastering.

Quick vocal leveling setup
To get started, first use the Peak Level display to find the highest peak level in your vocal track, and set the Target to match this value. Second, find the softest line you can and use a meter to see what the quietest word's peak level is (you can use the Peak Level display for this if it's not below -36 dBFS). Then set the Curve control to the difference between the loudest and the softest word. Example: the loudest word peaks at -10 dBFS and the softest word at - 30 dBFS. The difference is 20 dB, so set the Curve control to 20 dB. To fine-tune this setup, adjust Recovery and Blend to taste. If you hear any distortion type artifacts, switching Look Ahead on will eliminate them (and will insert a 1 ms delay on the audio path).

Quick drum bus setup
Calibrate the Target as usual, and start with the Curve control between 12 dB and 24 dB. For more aggressive sounds, set Recovery faster. Use the Blend control to mix the processed audio with the original.

Quick mastering setup
Start by calibrating the Target as usual. There are two basic approaches that can work when mastering. The first one is to use a wide Curve setting of 36 dB to 48 dB, and blend in a small amount of the processed (wet) signal. Alternatively, you can use a more narrow Curve setting of around 12 dB and use more wet signal via the Blend control. A little goes a long way, and the Selig Leveler can create a very concentrated signal. As always, dilute before using for best results!

FX applications
The Selig Leveler has a few radical tricks up its sleeve. Since it has so much available gain and a fast response time, it can remove most dynamics from an audio signal. This makes it great as a front end for creating pad-like sounds, or in front of gating devices like the Alligator. It can also be useful in front of a guitar amp device, allowing creation of super-sustain effects.

Used in front of a reverb, both positive and negative Curve settings can be useful. Negative, to keep quieter signals out of the reverb and just allow the louder transients, and positive to do the opposite and create even denser reverb signals.

Usage Notes

Reminders
When the Selig Leveler is used inside a Combinator, be sure to calibrate the Target before using (it's easy to forget!). While you can use the Selig Leveler with the Target left at the default setting of 0 dB, the amount of the Curve control needed to produce a specific result will vary depending on the actual input level. Also note that using a Target setting above the highest peak will result in an overall increase in level, something that does not happen when the Selig Leveler is properly calibrated.

Helpful hints
A faster recovery can sound louder (when using positive Curve settings), but can distort sooner. A wider Curve setting *may* make things sound louder, but it all depends on whether there's low level audio in your signal to begin with. A "wetter" blend will sound louder with positive Curve settings. When setting up the Selig Leveler, consider using "opposite" settings between the Recovery/Curve and the Blend. For example, when using a slower recovery time (softer results), you can use much more blend towards the wet side. But when using a faster recovery, try using less wet signal on the Blend control. Likewise, when using a wide positive Curve setting, complement it with a mostly dry Blend setting. These are just general guidelines, as there are interesting effects to be created with extreme settings on the Selig Leveler, for those who dare to probe deeper.

Creative (non-calibrated) Target settings
The Target is generally used to calibrate the Selig Leveler, but there are a few tricks worth mentioning that involve an intentional "mis-calibration" of the Target setting.

The first is for transient preserving. By setting the Target BELOW the highest peak, you can tell the Selig Leveler to ignore all levels above the Target. Lower the Target by -6 dB, and you'll preserve the original 6 dB of transients untouched.

Another use of a lower target is when performing soft gating. In this case you use the Target like a threshold in a noise gate. Set the Target just below the last useful audio level, and this will move the curve into your 'noise'. Now simply use a generous negative Curve setting to reduce all audio below the target level.

Finally, by setting the Target ABOVE the highest peak, you can add gain to the signal dynamically. If you leave the Target at the default setting of 0 dBFS, all audio "within the curve" will be increased to 0 dBSF. By using a wide Curve setting and a low Blend setting, you can bring audio up but do it more subtly (owing to the low Blend setting).

Included Combinators

The Selig Leveler can be at the heart of more complex devices. The Combinator examples below demonstrate some of these possibilities. Remember to set the Target on each inclosed instance of the Selig Leveler to get expected results!

Multi-Band Combinator

The Multi-Band Combinator is a three band Leveler, suitable for mastering and vocals or anywhere else you would use multi-band dynamics processing.

X-Over Shift: moves both X-over points in parallel for quick adjustments (fine-tune the X-Over points internally for more control).
Tilt: moving to the right increases the high band and decreases the low; turning to the left reverses the response.
Curve: controls all three Curve parameters together.
Blend: controls all three Blend parameters together.
Solo Low/Mid/High: allows soloing each band.
Faster: speeds up the recovery time on the mid and high bands.

Mid-Side Combinator

The Mid-Side Combinator allows you to use two Levelers, one for the Mid signal ("Mid Curve") and one for the Sides ("Side Curve"). This allows you to increase (or decrease) the loudness of either the Mid/mono signal or the Sides signal.

Mid Blend: controls the Blend setting for the Mid Curve.
Mid Curve: controls the Curve setting for the Mid Curve.
Side Curve: controls the Curve setting for the Side Curve.
Side Blend: controls the Blend setting for the Side Curve.
Mid Recov Fast: switches the Mid Leveler's Recovery Time from 210ms to 75 ms.
Solo Mid: solos the Mid Curve's output.
Solo Side: solos the Side Curve's output.
Side Recov Fast: switches the Side Leveler's Recovery Time from 210 ms to 75 ms.

Transient Combinator

This Combinator uses two Levelers, one for attack and one for sustain. The front panel controls allow boosting attack or sustain (but not cutting). This Combinator is designed to *add* the peak and sustain levels to the original/dry audio signal, and as such will not retain the original peak level of the audio signals it processes.

Attack Amount: adds the "Attack" Leveler into the mix.
Attack Length: adjusts the length of the attack transient.
Sustain Amount: adds the "Sustain" Leveler into the mix.
Sustain Length: adjusts the length of the sustain.
Attack On: turns the Attack signal on or off.
Dry Signal On: turns the dry signal on or off.
Sustain On: turns the Sustain signal on or off.
Tape Saturation: enables the tape saturation effect.

Side-Chain Combinator

NOTE: This is an experimental Combinator and can produce unexpected results!
By filtering the side chain input, you can further sculpt the sound. Filtering the highs boosts the highs, and vice versa. This is because the Selig Leveler tries to raise the lower level signals, and therefore whatever you filter out will be raised. This process can quickly produce large amounts of gain, so beware of using too much blend. Also note that changing the filter cutoff will change the highest peak level, necessitating a re-calibration of the Target in many cases.

Frequency: adjusts the filter (set by the LP/HP filter button) cutoff frequency.
Recovery: adjusts the recovery time.
Curve: adjusts the Curve parameter.
Blend: adjusts the blend amount (dry/wet).
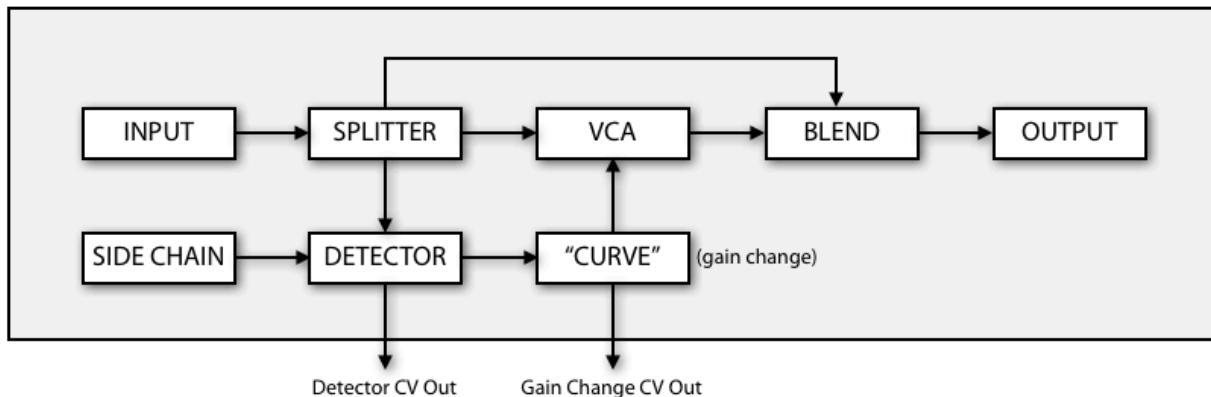*Side Chain On:* allows turning the side chain signal on or off.
LP/HP Filter: selects between the LP and the HP filter for the side chain input.
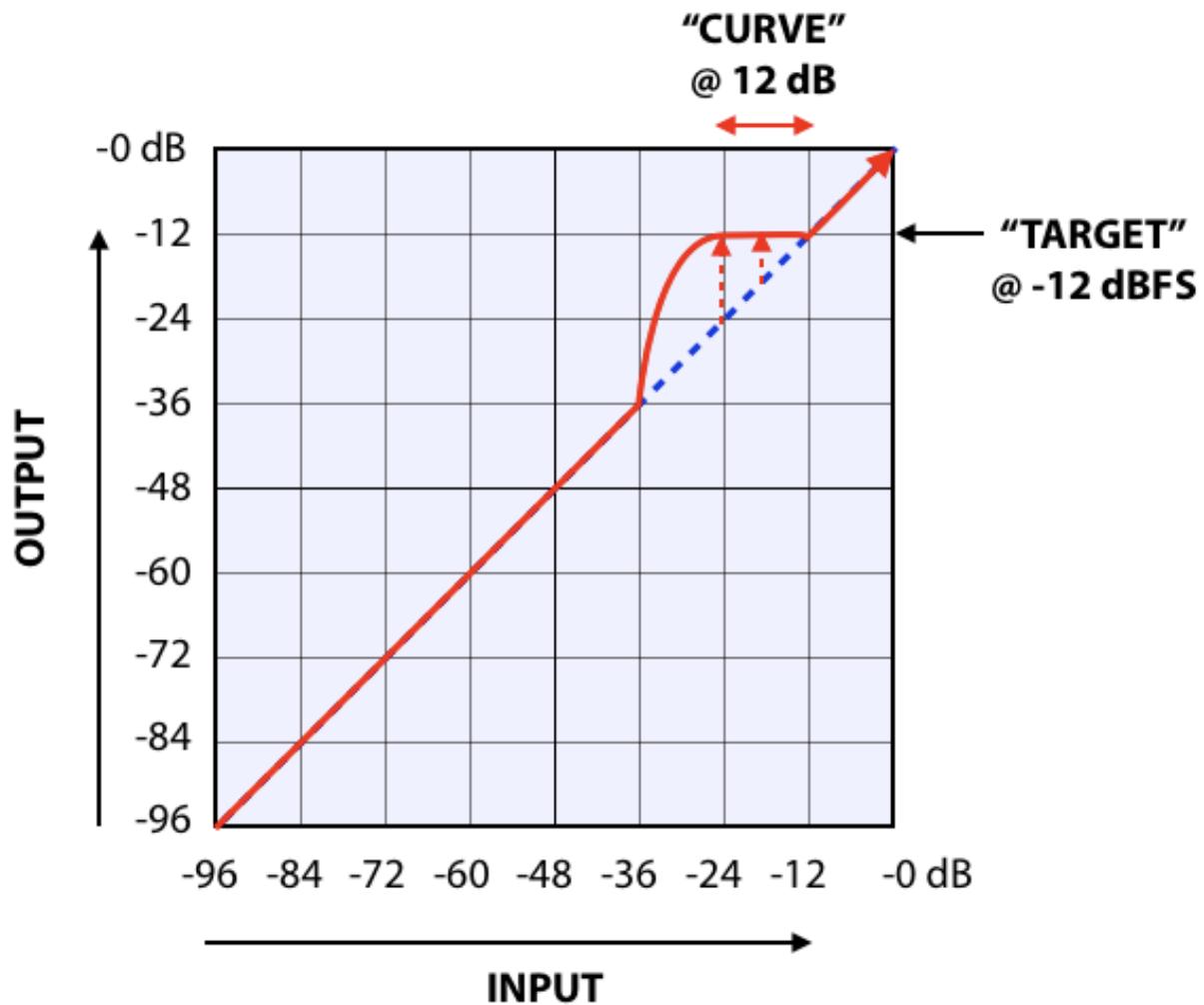*S/C Listen:* allows you to monitor the filtered side chain signal.
-6 dB: cuts the output by 6 dB to account for boosted levels when heavily filtering the side chain signal.

Appendix

The Selig Leveler – Basic Signal Flow:

The Selig Leveler – Input/Output Graph:

The Selig Leveler: MIDI CC Chart

[41] = Reset Peak
[42] = Target
[43] = Recovery
[44] = Curve
[45] = Blend
[46] = Output
[47] = Look Ahead

Credits

Selig Leveler
Concept by:
Giles Reaves

Crafted by:
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Giles Reaves for Selig Audio, LLC.

Many thanks to Ed Bauman, Phyllida Crawford, and all the dedicated beta testers!

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