

WAVES

dbx[®] 160

COMPRESSOR/LIMITER

USER GUIDE

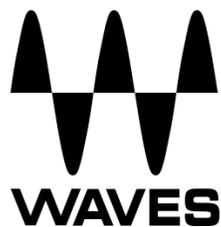


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Chapter 1 – Introduction

1.1 Welcome

Thank you for choosing Waves! In order to get the most out of your new Waves plugin, please take a moment to read this user guide.

To install software and manage your licenses, you need to have a free Waves account. Sign up at www.waves.com. With a Waves account you can keep track of your products, renew your Waves Update Plan, participate in bonus programs, and keep up to date with important information.

We suggest that you become familiar with the Waves Support pages: www.waves.com/support. There are technical articles about installation, troubleshooting, specifications, and more. Plus, you'll find company contact information and Waves Support news.

1.2 dbx[®] 160: The Original Hardware

dbx[®] Inc. is an American manufacturer of professional audio recording equipment. Founded in 1971 by David E. Blackmer, the company's most important inventions were the dbx voltage-controlled amplifier (VCA) and the dbx RMS detector. The original dbx 202 VCA (the "Black Can" VCA) was built using discrete transistors that were hand-matched while running at an elevated temperature in an oven. Though noisy and having significant distortion, the dbx 202 units exceeded by far the performance of other early VCAs and were used in most early automated mixing boards.

In 1976, dbx introduced the dbx 160 compressor. Using dbx's decilinear VCA, RMS level-detection circuits and feed-forward gain reduction, this compressor allowed much smoother gain reduction than its counterparts. The feed-forward gain reduction allowed infinite compression without excessive distortion or oscillation. It also allowed the compressor to track the attack and release times of compression based on the signal's envelope. In addition, the dbx compressor introduced overeasy compression, which created a soft knee at the start of the compression process.

1.3 dbx[®] 160: The Plugin

The dbx[®] 160 plugin is a digital model of a classic feed-forward hard-knee VCA-based compressor.

On top of the accurate modeling of the original compressor's sound, Waves has added, for optimal use, several features that did not exist in the original hardware:

1. Input gain control – to let you perfectly adjust the input level going into the compressor.
2. Mix control – to enable very quick parallel compression within the plugins.
3. Noise control – to add the hardware-modeled noise.
4. MS matrix in the stereo component – to enable separate compression between the mid and sides of the stereo signal.
5. Sidechain High Pass (SC-HP) – giving you the option of introducing a high-pass filter around 90 Hz on the sidechain, in order to remove low-frequency energy from the sidechain pass. The outcome is less compression on low-frequency centered signals.

1.4 Concepts and Terminology

VCA

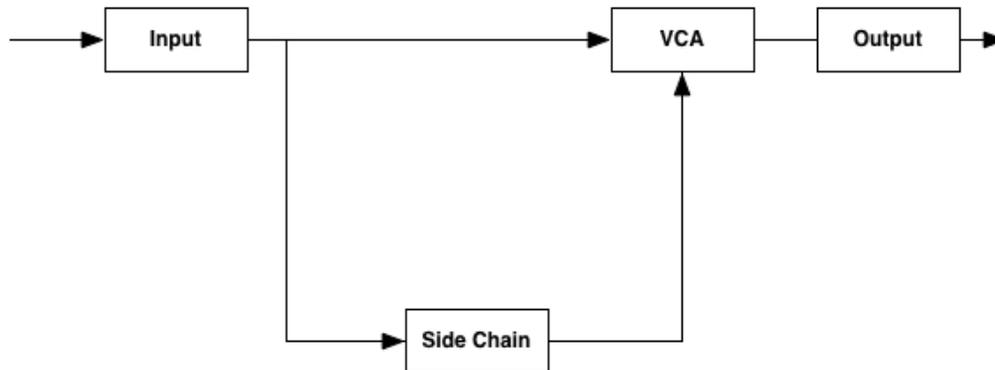
A VCA, or voltage-controlled amplifier, is an amplifier that varies its gain depending on a control voltage, such that the input voltage determines the output voltage. The dbx[®] 160 is a VCA-based compressor.

Sidechain Voltage

The sidechain section of the dbx[®] 160 converts the signal from AC to DC, with the VCA controlled via the DC current. The higher the DC current, the more compression you get. The sidechain voltage can range from a couple of mV to 15 V.

Feed-Forward Compression

The signal entering the compressor is split: one copy goes to the output (through the VCA), while the other is fed forward to the VCA via a sidechain circuit. See the image below:



Sidechain High Pass (SC-HP)

As explained in the Feed-Forward Compression section above, the input signal is fed to the VCA. Generally, the more energy you have in the sidechain, the more compression you get; but if you apply a high-pass filter to remove low energy from the signal, the result will be less energy when low-frequency energy is present, hence less compression. In bass guitars, for example, the abundance of low energy entails lots of compression; but if a high-pass filter is applied on the sidechain, the VCA will identify less energy on the low bass notes than there is in the actual input signal and will therefore attenuate the signal less, allowing more low frequencies.

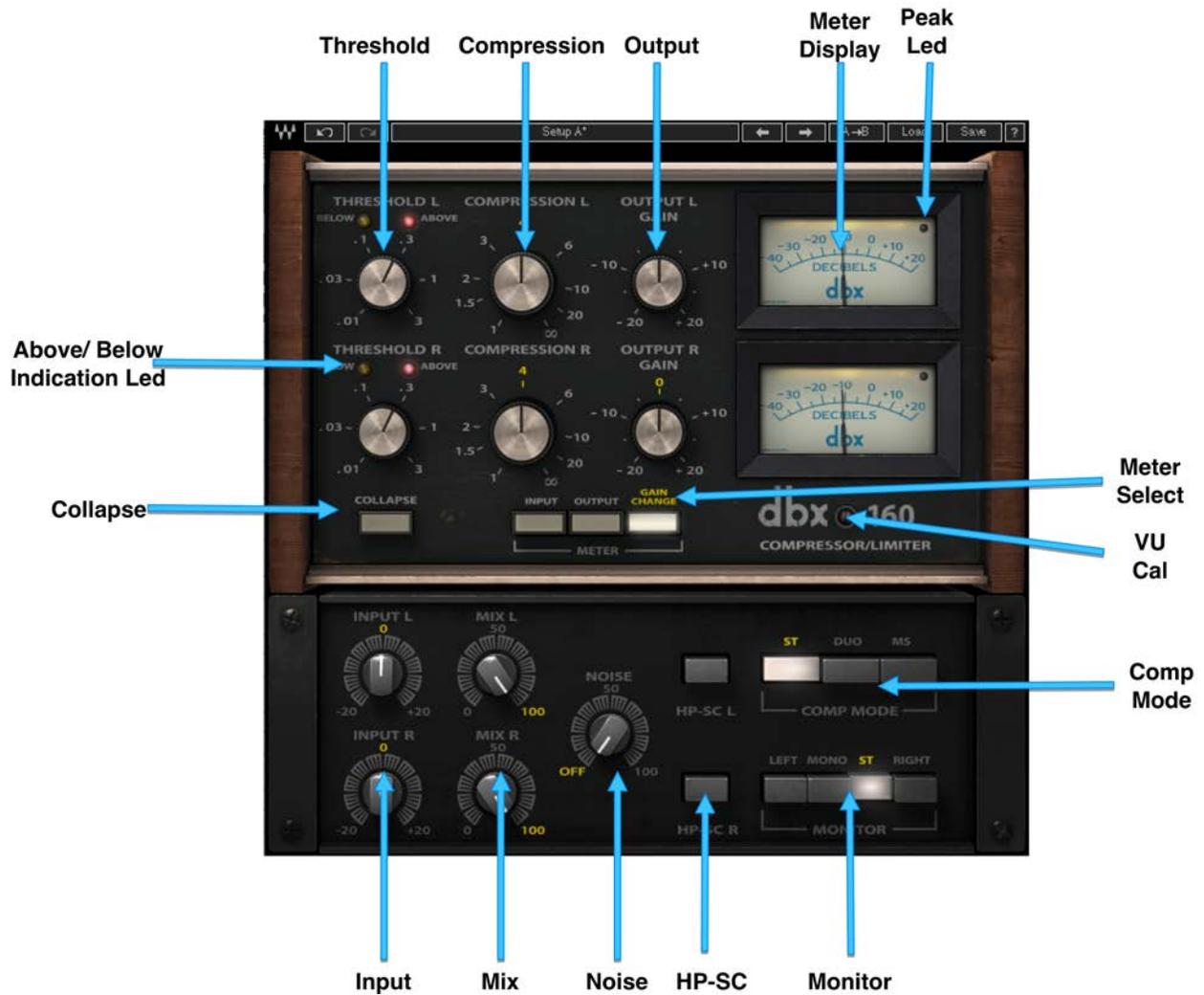
1.5 Components

WaveShell technology enables us to split Waves processors into smaller plugins, which we call **components**. Having a choice of components for a particular processor gives you the flexibility to choose the configuration best suited to your material. **dbx[®] 160** includes the following components:

- dbx[®] 160 Mono
- dbx[®] 160 Stereo

Chapter 2 – Interface and Controls

2.1 Interface



2.2 Controls

Input

Increases or decreases the gain of the input signal.

Range: -20 dB to 20 dB

Default: 0 dB

Threshold

Sets the level (in Vrms) above which compression will take place.

Range: 0.01 Vrms (-60 dBFS) to -3 Vrms (-9 dBFS)

Default: 1 Vrms (-18 dBFS)

Compression

Sets the ratio of the compression.

Range: 1:1 to inf:1

Default: 4:1

Output

Increases or decreases the gain of the output signal.

Range: -20 dB to 20 dB

Default: 0 dB

SC-HP

Applies a high-pass filter on the sidechain signal at around 90 Hz, resulting in less compression on the low end.

Range: On, Off

Default: Off

Mix

Controls the balance between the compressed and the uncompressed signal.

Range: 0% to 100% (0.1% increments)

Default: 100%

Noise

Controls the amount of noise and hum added to the processed signal.

Range: Off to 100

Default: Off

Compressor Mode (Stereo Component Only)

Selects the stereo processing mode.

There are three stereo compressor modes:

- **Stereo** – All controls are in link mode. When you set a control on one side (L or R), the other side changes to the same value. Any difference in the settings between sides (created using the Duo or MS mode) will be preserved when you move back to Stereo mode.
- **Duo** – Controls can be set independently in each side, L and R.
- **MS** – This mode applies an MS encoding matrix to the input of the plugin, allowing you to separately compress and level the Mid (sum) and Sides (difference) signals. In this mode, the letters M (for Mid) and S (for Sides) will be added at the header of the channels (M at the top left, S at the top right). In MS mode, all the left side controls affect the “Mid” signal in the matrix, while the right side controls affect the “Sides” signal in the matrix.

Default: Stereo

A note on automation: When you automate settings in Stereo mode, your settings will be saved for the specific channel (L or R) you have selected, but will affect *both* L and R. When you automate L and R to different values in Duo mode, you will need to delete your settings for one of the channels (L or R) before you return to Stereo mode in order to avoid conflicting values.

Monitor (Stereo Component Only)

Selects the source of the monitor output.

- **Left** – Left output is sent to both sides (in MS Mode this monitors the mid).
- **Mono** – Left and Right outputs are summed to mono and trimmed down by 6 dB.
- **Stereo** – Stereo mode.
- **Right** – Right output is sent to both sides (in MS Mode, this monitors the sides).

Default: Stereo

Metering

VU Meter

Displays input, output, and gain reduction levels, depending on your selection.

Range IN/OUT: -40 to 20

Range GR: 0 to -40

VU Meter – Headroom Calibration Control

The meter's headroom calibration default is set to 18 dB headroom. The meter can be adjusted using the little screw underneath to provide a headroom of 0–24 dB, where X dBFS = 0 VU.

Range: 0 to 24 dB

Default: 18 dB

Meter I/O

The meter I/O lets you select from three monitoring modes:

- **GR** – Shows the total amount of gain reduction/increase.
- **IN** – Shows the input level of the plugin's post-input control, so that any change in the input is reflected in the meter.
- **OUT** – Shows the output level of the plugin's post-output control, so that any change in the output is reflected in the meter.

Clip Indicator

Indicates peak clipping for both input and output regardless of the selected meter mode. To reset, click on the meter.

2.3 WaveSystem Toolbar

Use the bar at the top of the plugin to save and load presets, compare settings, undo and redo steps, and resize the plugin. To learn more, click the icon at the upper-right corner of the window and open the WaveSystem Guide.