



Berzerk

Creative Distortion Plugin

User Guide



Introduction

Waves Berzerk is a flexible tool for anyone who wants to use distortion for more than just enhancing an instrument. It's a powerful plugin that provides detailed control of all aspects of a distortion effect. It combines distortion, feedback, dynamics, EQ, and a certain amount of craziness, to help you give a track a whole new personality.

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Components

There are two Berzerk Distortion components: mono and stereo.



Mono Component



Stereo Component

The components are identical except for the number of channels. Note that the mono component does not have a Stereo Mode selector in the Input section or a Channel selector in the Feedback section.

Both components use very little CPU, even when up-sampling.



Getting Started

Berzerk Presets

To make getting started fast and easy, we've provided several presets that help you round out, edge up, fit, distort, and otherwise mold your sound. In many cases, you'll find just the right effect by loading a preset whose name sounds like (or "feels" like) what you're looking for. Starting with a preset has two advantages:

- **It's fast.** Begin with a preset whose name makes sense for what you want to do. This might be all you need.
- **It's a good way to learn.** Load a preset and see how the controls are set. Listen, change some settings, and notice how it affects the sound. Load another preset, note the settings, make some changes, and listen. Do this a few times and you'll understand what the controls do and how the sections work together.

Here are a few examples of how Berzerk presets can help you solve a problem or create a new sound. All of these presets use the "Crushed" character setting, so that they are easier to compare. Change the character and you'll understand the importance of this basic setting.

Presets are loaded from the WaveSystem Toolbar, just above the plugin.

PRESET: M/S PROCESSING

Issue: I want to distort the kick and snare but keep the loop cymbals clean.

Stereo Input Mode: Mid; moderate input level

Drive: Full, Density: Order

FDBK: Blend off, effectively bypassing the section

DYN: Bypassed

Mix: 100%

The interesting part of this plugin is the Input section. Switch between St, M, and S, and listen to how different parts of the sound are emphasized. Setting the Input mode to **M** limits distortion processing to the middle, where logically you'll find the kick and snare. If the cymbals are on the sides of the stereo image, then they will largely go unprocessed. Try changing the overall input level, as well as the M level.



PRESET: RIDER

Issue: There's too much of a brick wall feeling. Can it be more dynamic? Do I need to automate the output to achieve this?

Stereo Input Mode: ST; moderate input level

Drive: full, Density: Order

FDBK: Blend off, effectively bypassing the section

DYN: Blend full; Down/Rider

Mix: 100%

The Down/Rider combination compresses only the sounds above the threshold, leaving the quieter sounds unchanged. Use the Threshold and Blend controls to contour the sound that is feeding the Drive section (not the output). Since the Rider tracks the signal amplitude, you do not need to automate the output level.

PRESET: EXPLODE

Issue: The effect is too gentle.

Stereo Input Mode: ST; moderate input level

Drive: full, Density: Order

FDBK: Blend off, effectively bypassing the section

DYN: Blend full; Up/Dyn

Mix: 100%

The Up/Dyn can produce a pumping sound, raising the floor between notes. Like the Rider preset, this preset distorts mostly the sounds above the threshold.

PRESET: IMplode

Issue: It's not crazy enough!

Stereo Input Mode: Stereo; moderate input level

Drive: full, Density: Order

FDBK: Blend and Level set relatively high; Low D (octave 1), High E (octave 5), moderate speed; track sine.

Dynamic; Down/Down

Mix: 100%



The Feedback section is the star of this preset. There's a rather wide low/high range, and the speed is low enough to allow the "laser shots" to peek through. In the Dynamics section, experiment with the Threshold and Blend to control the tightness of the effect.

That ought to make it crazy enough.

Getting Started from Scratch

If you want to forgo presets and dive right in, we suggest that you start by following these steps:

INPUT: INPUT GAIN AND STEREO MODE

1. Adjust the **Input** level. Increasing or decreasing the level will influence the behavior of the entire plugin. A LED above the input knob indicates peak level. If it is occasionally red, you probably won't encounter trouble. But if you see continuous red, lower the input level. If the level is too low, the dynamics section may not work properly.
2. Choose a **Stereo Mode**. This determines which part of the signal will be processed: stereo (ST), mid (M), sides (S). Adjust the level of the sides or mid with the small knob.

DRIVE: A GAIN SHAPER THAT GENERATES DISTORTION

3. Choose a **Character** from the drop-down menu. This sets the basic waveform type, which establishes the core sound of the effect. Turn the **Drive** knob to adjust the amount of shaper gain introduced to the sound.
4. Click the **Go!** button. This takes the current Character and produces a unique variation each time you click the button. If you like this new waveform variation, save it as a preset, since you'll never again get the exact same one.
5. Adjust the **Density**. This controls the amount of the randomness applied to the distortion shape. Usually, the lower the setting, the "cleaner" the selected character feels.

FEEDBACK/DYNAMICS/EQ PANEL: CLICK TABS TO ACCESS EACH PROCESSOR

6. The **Feedback** section is an oscillator that produces a sinus curve that follows the input signal amplitude. Its output is sent back to the Drive section. It is not part of the output audio.
 - a. Choose a Feedback **Input Source** (L, R, S).



- b. Set the **Low** and **High** limits of pitch motion. **Speed** controls how long it takes the pitch to move from the Low value to the High value.
- c. Adjust the **sidechain filters** and choose INT or EXT sidechain.
- d. **Level** controls the output of the Feedback section. **Blend** is the mix of Feedback and Drive.

DYNAMICS SECTION

7. This controls the dynamics of the signal sent to the Drive section. It is not part of the output audio. In addition to the **Threshold** control, there are two switches.
 - a. The switch on the right controls the **Type** of dynamics (e.g., low-frequency compressor, gain riding, soft gate).
 - b. The switch on the left sets what happens to the signal as a result of the Type. This is explained later in this guide. But for now, experiment with the switches and the Threshold to get an idea of how they affect the sound.
8. At this point, go back to the **Drive** section. The adjustments you made with Feedback and Dynamics will have likely changed the sound of the Drive.

EQ SECTION

9. Use the three-band **EQ** to adjust the color of the post-Shaper, post-Feedback, and post-Dynamics signal. It sits just before the Output section.

OUTPUT SECTION

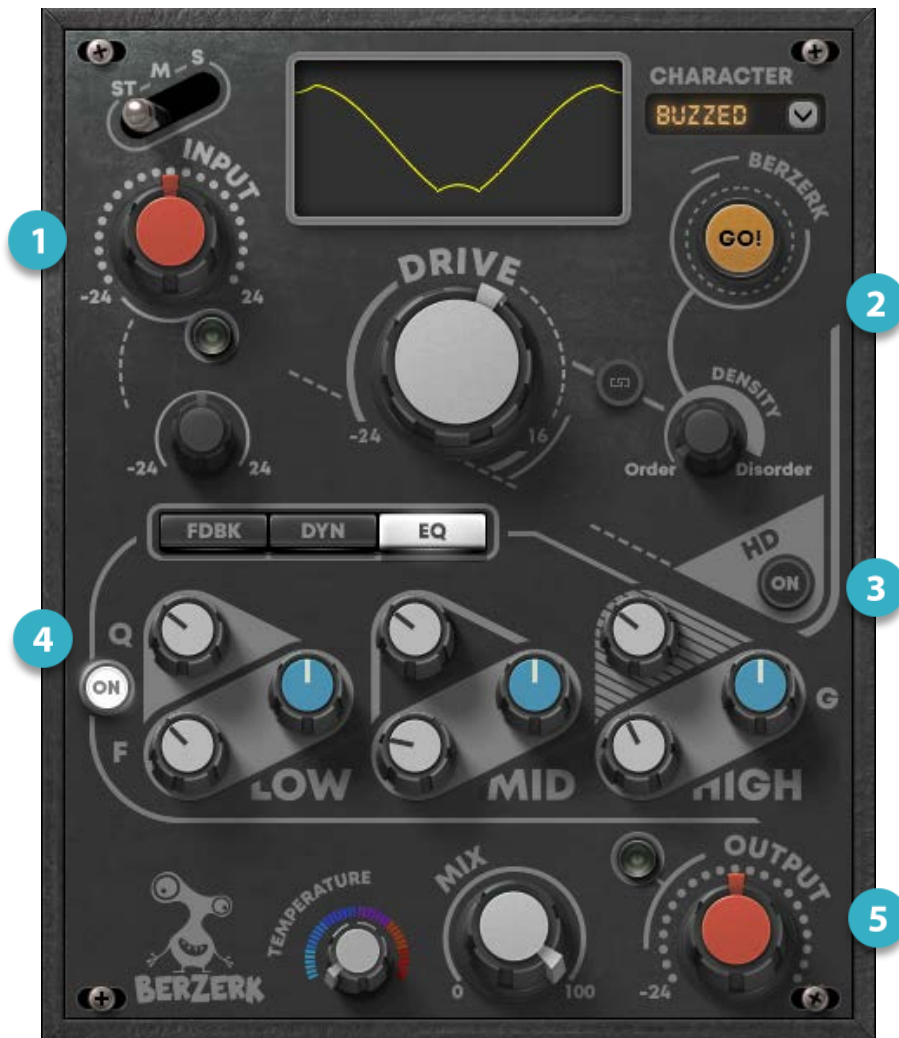
10. Use the **Output** section to color the plugin output, set the wet/dry mix, and the output level. The plugin output is limited, so the feel of the plugin changes if you increase the output gain considerably.

Once you're happy with your settings, create a **user preset**.



Interface and Controls

Interface Sections



- 1 **Input** sets input level from the DAW.
- 2 **Drive section** determines the nature and amount of the distortion.
- 3 **High Definition Switch** provides improved output of low-level signals.
- 4 **Processing section** provides feedback, dynamics, and EQ processing.
- 5 **Output section** sets the level and mix of the return to the host. It also lets you control the temperature of the output signal.

Processing sections work interactively. The output of the center processing section, for example, feeds back to the Drive section, whose output will once again be sent to the processors. Keep in mind that after setting one section you may need to adjust other sections.



Controls

Input Section



INPUT CONTROL

Controls input level from the DAW. The adjacent LED indicates input peak level. Generally, green peaks indicate an appropriate input level. Occasional red peaks will usually not result in unwanted distortion, but if the LED is steady red, reduce the Input setting or lower the output from the DAW.

Range: -24 dB to +24 dB

Default: 0 dB

ST (STEREO) INPUT MODE

Sets how a stereo signal will be processed:

- In **Stereo** mode, the entire stereo image is processed, so the middle of the image is processed in the same manner as the sides.
- In **M** mode, the middle of the stereo image is processed. The sides are not processed.
- In **S** mode, the sides of the stereo image are distorted. The middle is not processed.

MID OR SIDE MODE INPUT LEVEL

When the Input section is set to Middle or Side, this knob controls the input level of the M or S signal, independent of the plugin input. A letter following “Input M” or “Input S” identifies whether the gain of M or S is being controlled. When Stereo input is selected, this control is grayed out.

Range: -24 dB to +24 dB

Default: 0 dB



Drive Section

The Drive section serves as a gain shaper that applies a selected waveform to the input signal.



CHARACTER

This drop-down menu establishes the overall shape of the distortion waveform. Changing the Character setting will result in a significant change in the overall effect. So if you're after a specific sound, it's generally best to select a Character and then adjust the rest of the controls.

Drive Controls the amount of generated distortion based on the selected Character type.
Range: -24 dB to +16 dB

DENSITY

Controls the amount of randomness applied to the currently loaded Character. It adds complexity, disarray, and "edge" to the waveform, as seen in the Shaper display. The Density knob is initially grayed out—it is active only once Go! has been clicked. Click the small Link button between the Drive and Density knobs to move the two controls together.
Range: 0 to 100, Default: Disabled until Go! is clicked.

SHAPER DISPLAY

Shows the waveform being used to create distortion. The basic waveform shape reflects the selection in the Character menu. As Drive is increased, waveform amplitude increases. As Density is increased, the waveform becomes more jagged. The Shaper Display also displays the activity in the Dynamics section.

Go!

Creates a randomly generated, unique variation of the current waveform. It keeps the same fundamental shape as the one it's derived from. This is an essential part of the creative process of the plugin. You don't need Go! to create distortion, but you do need it to create a unique distortion.

HQ ON/OFF

(On) enables x8 up-sampling of the output signal. With low-resolution files, low and high frequency parts of a signal tend to collapse, and compression can be perceived as edgy. Up-sampling provides more room for these parts of the signal and can result in a more pleasant sound. When HQ is Off, you can get a grittier sound.



Central Processing Section

The Central Processing Section is made up of three processors that influence the post-distortion signal. It includes Feedback, Dynamics, and EQ modules.

Feedback



The Feedback module is an oscillator. It generates a sine wave that tracks the amplitude of the input section. The Feedback module is fed to the Drive and Drive is fed back to the oscillator. The module is not part of the audio chain.

When the input of the Dynamics section has low dynamics, there will be little or no modulation of the generated signal. Greater dynamic range results in increased modulation.

The overall feedback Character level is determined by the distortion Type and the Density settings.

STEREO SOURCE

Sets which channel of a stereo signal will be processed in the Feedback section. This is useful when the left and right channels are appreciably different, which can result in misalignment of the pitch in the left and right channels. This is not necessary a problem—it may be just what you want. You can, however, choose to use just one channel for pitch tracking.

- In **Stereo** mode, both the left and right sides of the stereo signal are processed.
- In **R** mode, only the right side of the signal is used for processing.
- In **L** mode, only the left side of the signal is used for processing.

This control is available only when the Stereo Input Mode switch in the Input section is set to Stereo.

LEVEL

Controls the output level of the feedback processor to the Drive section.

BLEND

Sets the mix between the output of the Drive section and the feedback section.



LOW/HIGH

Sets the range within which the pitch moves. Values can be viewed in musical notation (pitch) or frequency. Hover over a knob to see its value.

Freq Range: (Low) 20 Hz to 20,000 Hz, (High) 20 Hz to 20,000 Hz

Pitch: (Low and High) C0 to C8



FREQ/PITCH SWITCH

Selects if Low and High controls are gauged in frequency or pitch. When Pitch is selected, small plus (+) and minus (-) buttons appear. Use these to move up or down in one-octave increments. A number indicates the current octave.

LINK

The small button between the Low and High controls links them so that they move together. Existing offsets are maintained.

SPEED

Specifies the time it takes the pitch to cycle between the Low and High values.

Low/High values define the maximum range of pitch motion, but the pitch may not travel by the full specified range. This is likely because the envelope's level is too low, or its amplitude is too small. To provide better resolution, the envelope is normalized prior to modulation. If the dynamic range is still inadequate for modulation, the pitch will not cover the selected range. In certain cases, the pitch will remain static.

TYPE

Sets what is being modulated: the input signal or the generated sine signal.

SIDE CHAIN SOURCE

Selects between an internal or external side chain source.

SIDE CHAIN FILTERS

HP and LP sidechain filters

Range: 5 Hz to 22 kHz

SIDE CHAIN LISTEN

Click to solo the side chain. The panel blinks white when Sidechain Listen is engaged.



Dynamics

The Dynamics section allows you to control the dynamic characteristics of the signal fed to the Drive section for distortion processing. It does not affect the dynamics of the audio signal sent to the output.



BLEND

Mix between the Drive signal and the Dynamics section. Note that as the Blend value increases, the waveform in the Shaper Display becomes increasingly complex.

THRESHOLD

Threshold control for Rider and Dynamics modes.

DYNAMICS MODES

There are two switches that determine the mode and effects of dynamic processing.

RIDER/DYN

Determines which dynamic part of the signal we will perceive as distorted.

- Dynamic: Primarily, low-level sounds will be returned to the Drive section for distortion processing.
- Rider: Primarily, high-level sounds will be returned to the Drive section for distortion processing.

UP/DOWN

Sets whether the signal is raised or lowered when level passes the threshold.



DYNAMICS CONTROLS COMBINATIONS

Up/Down	Rider/Dyn	Effect
Up	Dynamic	Sounds that exceed the threshold will be distorted. This can yield a pumpy-type distortion sound.
Up	Rider	Soft signals below the threshold will be distorted. Louder sounds will not be distorted.
Down	Dynamic	Sounds above the threshold will receive downward compression, thus less distortion.
Down	Rider	Sounds above the threshold are compressed; lower-level sounds are not compressed.

EQ

The three-band EQ colors the sound of the distorted. It is located just before the output section and is not fed back to the Drive section.



Low band

Q: 0.5 to 100; Gain: -12 dB to +12 dB; Freq: 60 Hz to 550 Hz

Mid band

Q: 0.5 to 100; Gain: -12 dB to +12 dB; Freq: 800 Hz to 2500 Hz

High bank

Q: 0.5 to 100; Gain: -12 dB to +12 dB; Freq: 3000 Hz to 11,000 Hz

The On/Off button bypasses the section.



Output Section



TEMPERATURE

Adjusts the overall color and feeling of the output of the plugin. Higher settings generally result in a roomier, darker, and smoother sound. Lower settings usually provide more presence and more articulation. Temperature does have the same effect as the EQ section control; it tends to have a greater impact on the “air” surrounding the sound.

Range: 0–100

Default: 0

MIX

Controls the balance between total distortion processing and the input signal.

Range: 0% to 100%

Default: 100%

OUTPUT

Sets output level of the plugin. An output limiter is set to -0.9 dB is placed before the output gain control. The LED next to the knob indicates limiter activity. Red indicates excessive limiting, which may color the output sound. Raising output gain after the limiter can clip the signal sent to the DAW.

Range: -24 dB to +24 dB

Because Berzerk is, well, Berzerk, there are certain unusual conditions where controls don't behave as you'd expect. For example, decreasing any gain-related control (e.g., Drive) or selecting a different Character may result in a higher level, and vice versa. This behavior also depends on the audio source and its dynamics. Don't worry, it's just Berzerk behavior. Pick a different Character or adjust another control and the odd behavior will likely go away.

