d16 group
AUDIO SOFTWARE

DEVASTOR 2

MULTIBAND DISTORTION UNIT

User Manual

Overview

Devastor is a multiband stereophonic distortion effect unit. It has two independent signal processing paths (for each channel: L,R).

After loading the plug-in within a host application, the GUI will appear:

Devastor graphical interface

There are two sections:

- **Configuration and preset management**

Configuration and preset selection section

- Signal processing control section consists of the all remaining controls

Signal flow

This chapter describes the signal path through Devastor. It also explains the basic components of the effect unit and their control parameters.

Basic modules

Internally, Devastor consists of a few basic components. These correspond to the sections on the graphical interface.

Dynamic's flattener

Depending on the value of **Dynamics** knob, this module will equalize levels in the signal's amplitude. Its principle of working is similar to a compressor's operation with auto normalization of the amplitude. However, its control (using one knob) is much simpler than that.

Dynamics knob

Diode clipper

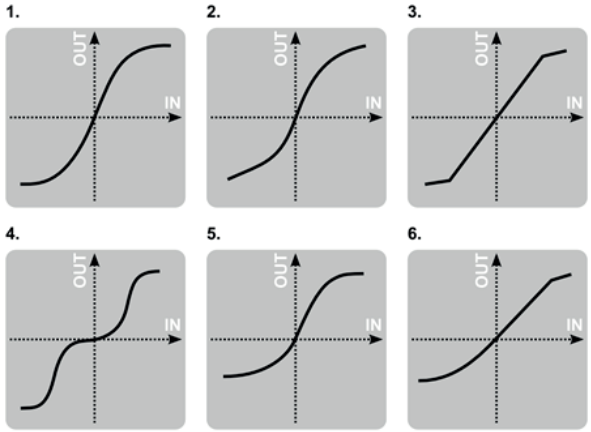
This is the central and the most important element of Devastor. It simulates the behavior of a diode clipper analogue circuit. The signal

distortion is caused by the circuit “clipping” the top and bottom from the audio waveform.

Diode clipper section

Control of this module is performed by following controls:

- **Preamp** – Amplification of signal in **Diode clipper.**
- **Threshold** – This is the nominal level of amplitude, above this the distortion of the signal occurs.
- **Shape** – Depending on a chosen **Clipping** curve, this parameter changes its characteristics.
- **Clip** – Clicking the display that shows **Clipper’s** curve, we can switch between 6 available different curves:



Devastor Clipper’s curves

- Hyperbolic tangent (*Tanh*)
- Arcus tangent
- Linear hard clip
- Crossover
- Asymmetric hyperbolic tangent
- Mixed *Tanh* and Linear hard clip

Two LEDs; **Clip +/−** indicate exceeding the threshold value by **positive** and/or **negative** halves of signal. This module works asymmetrically relative to zero.

Filter

In Devastor, we have three filter units at our disposal. They are independently configurable and are able to work in different configurations (they are connected in parallel, before or after the **Clipper** circuit – see figure below)

Filters' section

For each filter, the following parameters can be controlled:

- **Cutoff** - Filter's cut-off frequency
- **Reso/B.Width** - Filter's resonance or in a case of band-pass or band-reject filters, it's width.
- **Volume** - Volume of output signal (from the filter).
- **Filter type** - Filter type; **LP** – low-pass, **BP** – band-pass, **HP** – hi-pass, **BR** – band-reject, **Off** – filter off.

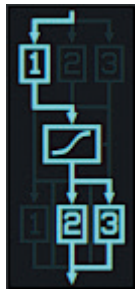
Above parameters apply to all filters. Filters can only be connected in parallel, serial or mixed.

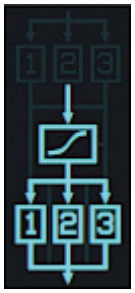
Possible filters' and clipper's configurations

Clicking the **Signal Routing** control allows reconfiguring the circuit connections between filters as well as the **Clipper** module.

Filters' and clipper's signal routing

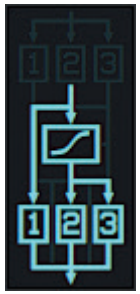
There are 9 various topologies to choose from:

GUI symbol	*Name*	*Description*
	All Pre	The signal is parallely processed by all 3 plugin's **Filters.** Their sum then is fed onto to the **Clipper** block.
	**1 Pre / 2 Post**	Signal is processed by **Filter 1** before it gets to the **Clipper.** Distorted signal then is processed by **Filter 2** and **Filter 3** simultaneously, the output of which is summed.
	2 Pre / 1 Post	Signal processed simultaneously by **Filter 1** and **2,** then the sum of their outputs is routed to **Clipper**. Its output is then processed by **Filter 3**.

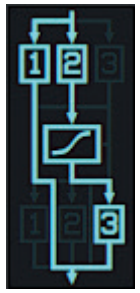


All Post The signal routed through **Clipper** is being processed by all the 3 **Filters** parallelly.

1 Side / 2 Pre Signal is processed by each of the 3 **Filters** parallelly. After that the sum of the **Filter 2** and **Filter 3** outputs is routed to **Clipper** and eventually summed with **Filter's 1** output.



1 Side / 2 Post Signal processed by **Filter 1** and **Clipper** simultaneously. The **Clipper's** output then is equally fed onto **Filter 2** and **3** inputs. Finally all 3 **Filters'** outputs are summed.



Side / Pre / Post Input signal is distributed to **Filters no 1** and **no 2. Filter 2** is then routed to the **Clipper**, which output then gets to the **Filter 3**. **Filter no 1** and **no 3** are eventually mixed together.

2 Side / 1 Pre Signal is input to every **Filter** equally. **Filter 2** routed to **Clipper**, is eventually mixed with **Filter 1** and **3** outputs.

2 Side / 1 Post Signal is parallelly input to **Filter 1, 2** and **Clipper**. **Clipper**'s output then is routed to **Filter 3**, the output of which is then mixed with **Filter's 1** and **2** outputs.

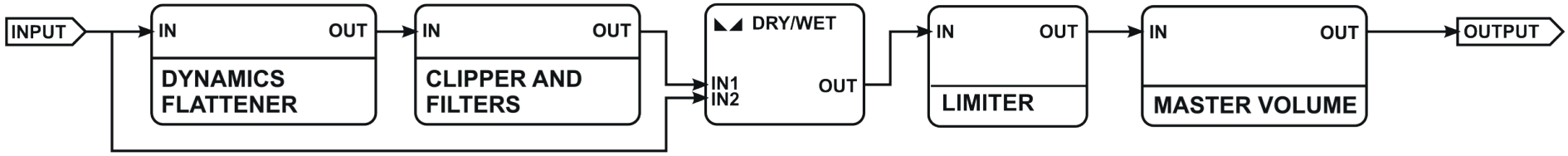
Master section

- Amplitude of the output signal is adjusted by the **Output** volume knob.
- The **Output meter** shows the current amplitude of the output signal after the adjustment.
- **FX** knob controls proportions between processed and non-processed sound outgoing from Devastor.
- The Devastor's master output can optionally be secured with limiter (optionally enabled by **Limiter** toggle button). It is applied to the mixed **Wet** and **Dry** signals.

Master section

Path of the signal's flow

The input signal goes to the **Flattener**, then, depending on setting of the **Signal Routing** section, it is sent to the group of **Filters** and the **Diode Clipper**. Then, the amplitude of output signal is modified by the **Output** volume knob and optional **Limiter.** And finally the output mixed with dry signal accordingly with the value of **FX** value.



Signal flow

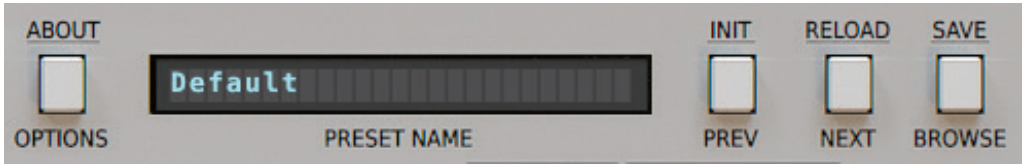
Preset Management

Preset Storage

Presets, both those from the **Factory** content, and **User** ones, are stored as files in proper locations on a disc. Each time the plug-in instance is loaded to the project, these locations are scanned and presets found there are consolidated into one linear structure (list) in the **Preset Browser.**

Browsing Presets

Presets Configuration and Management section enables quick navigation and browsing the presets structure:



Presets Configuration and Management Section

- **Preset Name** – Displays the name of the currently loaded preset.
- **Prev / Next** – Buttons that allow for linear browsing of presets list (depending on currently set filters – see sections below).
- **Init (Prev + CTRL)** ▶ –Simultaneous use of the **Prev** button and the **CTRL** key restores initial settings of plug-in parameters.
- **Reload (Next + CTRL)** ▶ – Simultaneous use of the **Next** button and the **CTRL** key reloads a current preset.

▶ CTRL button in Windows system and Apple CMD in Mac OS X system.

- **Save (Browse + CTRL)** – Simultaneous use of the **Browse** button and the **CTRL** key saves current parameters as a new preset or allows for overwriting of the existing one (see sections below).
- **Browse** – Expands the **Preset Browser** panel at the bottom of GUI section.

The **Preset Browser** looks as follows:

Preset Browser

One can see three main sections:

- **Content** – Sources from which presets can be read.
- **Filters** – Configuration of presets **Filters** (non-active by default).
- **Results** – List of presets from resources that meet criteria set by **Filters.**

Resources

In this section you can choose a resource/resources in which you want to browse presets. There are two resources to choose from:

- **Factory** – Delivered together with the plug-in, cannot be modified (read-only).
- **User** – Created by the user during using the plug-in and can be freely modified, shared with other users etc.

Choosing any of them will cause narrowing the results to the presets from one resource.

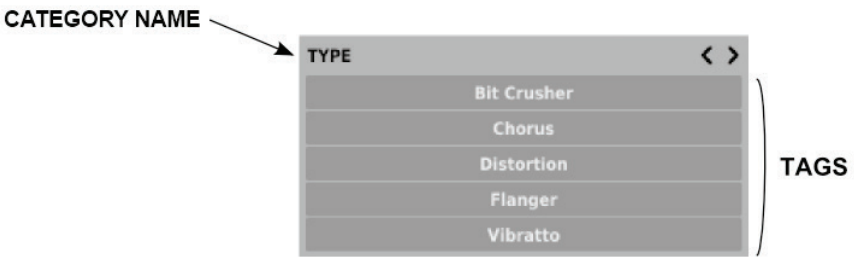
Preset Filters

The plug-in enables classification of presets with the use of **Categories** and **Tags** system, whose aim is to facilitate the process of browsing the content by filtering.

Preset Browser Categories Filters

Categories and Tags

Each preset is described by a few common **Categories.** Within each of them there may be one or more **Tags** from a particular set.



A single category in a filter with a description of its elements

Presets from **Factory** resource were described by **Categories** and **Tags** during the stage of its creation. **Categories** and **Tags** are chosen in such a way so as to describe the content in the best possible way, taking into account the plug-in purpose.

Edition of **Categories** and **Tags** in case of **Factory** content is not possible – it is blocked. **User** presets may be described only with **Categories** and **Tags** from factory content or, alternatively, the users may define their additional **Tags** in order to describe their own presets.

Results

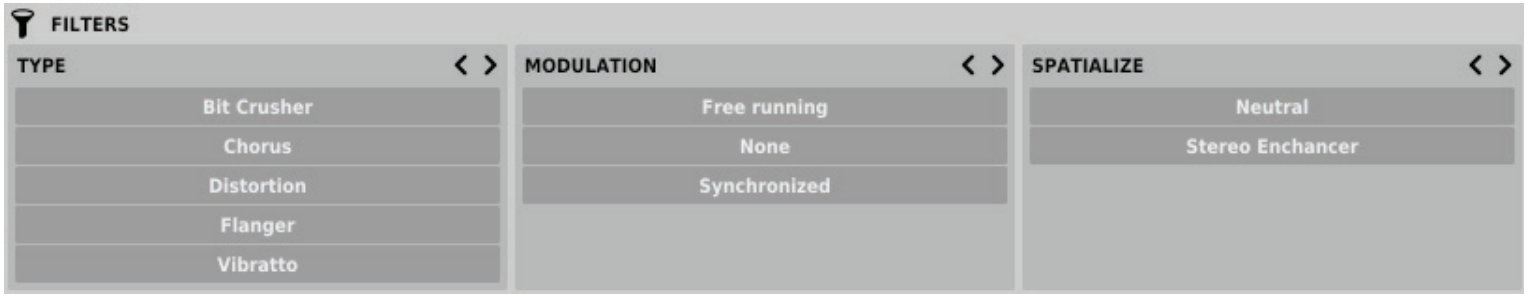
This is a list of presets from chosen resources that meet the filtering criteria. The basic function of this section is browsing and loading presets (in **Browsing Mode** – by default).

Results Section in Preset Browser

Click any name to choose and load the preset.
Double-click the name to enter preset name edit mode. ◘

Presets Filtering

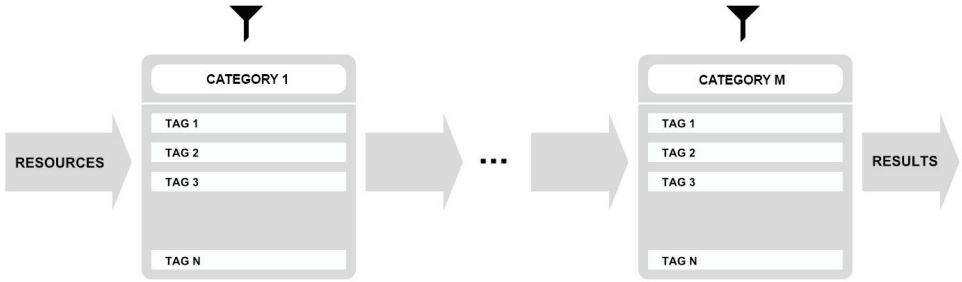
Filters section columns represent particular **Categories – Category filters,** while rows in each of these columns represent **Tags** available within each **Category.**



Preset Browser Categories Filters

Filtering results have a form of a cascade (columns), from left to right. This means that all presets available in the selected resources are filtered as to presence of **Tags** from the first **Category** (first column from the left), next a set of presets being a result of filtering by the first **Category** is filtered by the **Category** represented by the second column etc., until it is filtered with the last active **Category Filter.**

◘ Possible only in the Edit Mode



Presets Filtering with the use of Categories Tags

The result of a cascade filtering process (presets that meet the criteria of each filter) is listed below, in the **Results** section.

Basic Actions on Filters

Tag buttons in **Filters** work in toggle mode. Click to activate/deactivate **Tag** (Grey color means that the **Tag** in inactive, teal blue means that the **Tag** is active). If at least one **Tag** in a column (**Category**) is active, then the **Filter** also becomes active.

For example, if the first column represents *Type* **Category** with a set of the following **Tags**: {*Bit Crusher*, *Chorus*, *Distortion*, *Flanger*}, clicking the *Chorus* **Tag** will activate the **Category Filter** *Type* and narrow down a list of presets to the items in case of which the *Chorus* **Tag** appeared in the Type **Category**.

Enabling Chorus tag in Type Category

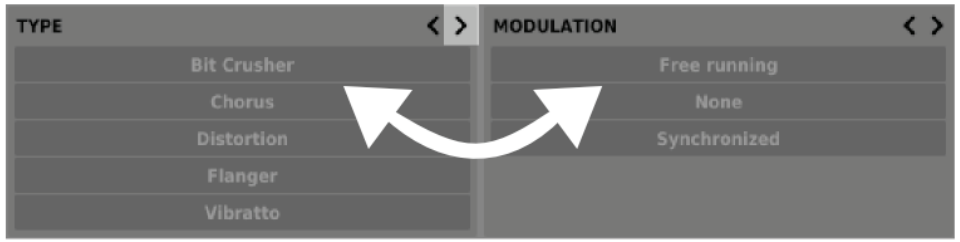
If you click the *Chorus* item again, you will deactivate the **Filter,** so all presets from the content will be displayed again.

Reordering Categories

To the right of the **Category Filter** header there are buttons with arrow icons:

Filter reordering

They enable moving the **Category** to the left or right in a cascade. Clicking the right arrow replaces the current **Category** with the **Category** on the right. Clicking the left arrow replaces the current **Category** with the **Category** on the left.



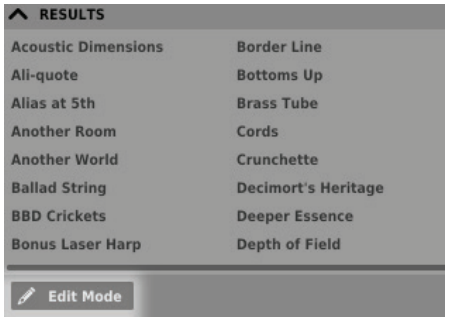
Presets Filtering with the Use of Categories Tags

Clicking the left arrow for the **Category** located on the far left does not change anything. The same is true for the **Category** located far to the right and right arrow (as the column has no predecessor/successor with which it could be replaced).

Presets Editing – Edit Mode

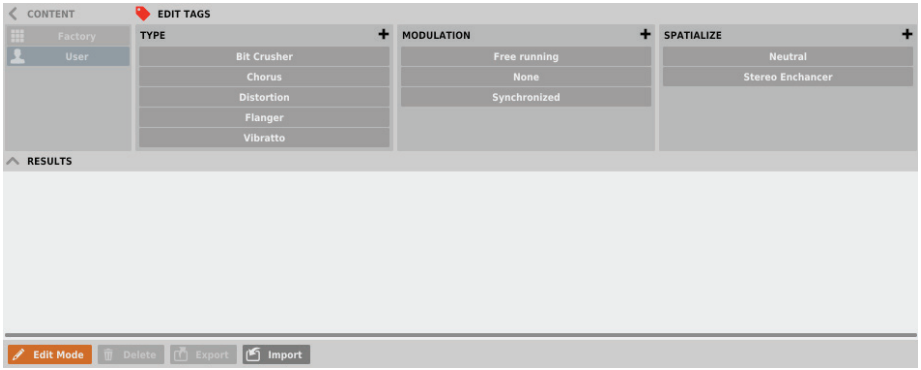
An active **Edit Mode** in **Preset Browser** changes its function (enables the change of presets names, edition of **Categories** or **Tags,** deletion of presets as well as their export or import. One should bear in mind, however, that these operations are not allowed in case of **Factory** presets, but only for the **User** presets.

Edit Mode can be activated with a button located in the bottom left-hand corner (click again to deactivate):



Edit mode button

In this mode **Preset Browser** slightly changes its appearance (not only function):



Preset Browser in Edit mode

1. The **Filters** section changes into the **Edit Tags** section, whose appearance is almost identical, but the function is different. The section is used not as a filter, but as an editor of **Categories** and **Tags** of chosen presets.
2. The role of the **Results** section is to choose presets for edition (edition is possible only for user presets).
3. At the bottom of the screen there are **Delete**, **Export** and **Import** buttons used respectively to delete or export selected **User** presets as well as to import a set of presets to the **User** resources.
4. The choice of the resource in the **Content** section does not work, as edition is possible only for user presets.

Selection of Presets for Edition

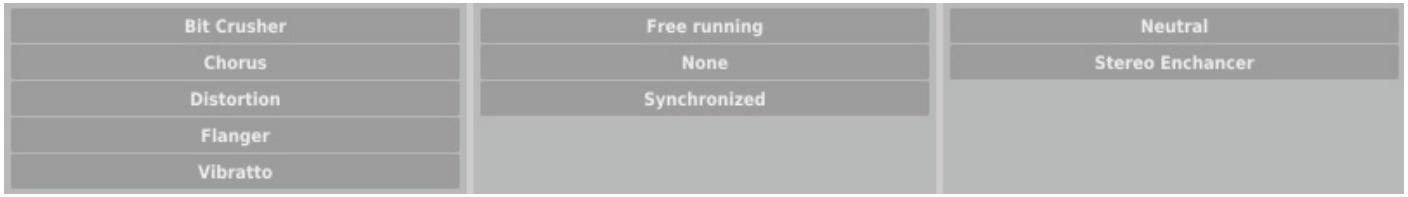
You can edit both single preset and a set of presets. Using the functionality of the **Results** section, you can choose a preset or a set of presets in the following way:

- **Click the preset** – Choose the preset from the list,
- **Click the preset + press CTRL** – Add another preset to an already chosen preset or a set of presets,
- **Click the preset + press SHIFT** – Select a part of a list of presets from the last chosen preset to the item clicked together with **SHIFT** button.

Tags Edition

Change of Tags status in Presets

Tag buttons work in toggle mode, similarly as in case of filtering. Clicking them you can respectively set **Tag** or erase them from chosen presets.



Filters' tags

Choosing a greater number of presets, in which the tags were already defined, enables their re-edition. Consequently; in case when a specific **Tag** appeared in all selected presets, it will be marked with an intensive teal blue color.

When a specific **Tag** is set only in a part of chosen presets, then it is codified with a pale teal blue. The **Tag** that does not appear in any of the presets is marked with grey colour:

Notification about Tags Status in Chosen Presets

The change of the **Tag** status for one or more chosen presets sets or erases this **Tag** in all these presets. The status change is signalized with an **Asterisk** located to the left of the **Tag** buttons .

Notification about Changes in Tags Status in Chosen Presets

Elements/**Tag** buttons highlighted with pale teal blue colour (meaning different values of a particular **Tag buttons** for the highlighted pre-sets) work in a three-state system; erasing the **Tag** (grey colour), setting of the **Tag** (intensive teal blue colour) or no changes (pale teal blue) for all selected items.

Changes introduced during edition do not have to be confirmed, they are signalized by asterisks located by **Tag** changed for particular presets

Adding New Tags

Using the **Plus** button in the **Category** header, you can add new **Tag** to a particular **Category** (for chosen presets):

Adding New Tag Button

After clicking you will see a dialogue box with a question about the **Tag** name. After confirmation the **Tag** will be added to a particular **Category** and automatically set to chosen preset(s).

Presets Names Editing

Double-click the name of a preset to enter name editing mode.

Deleting Presets

Selection of one or more presets activates **Delete** button at the bottom left corner. It can be used to delete the selected presets.

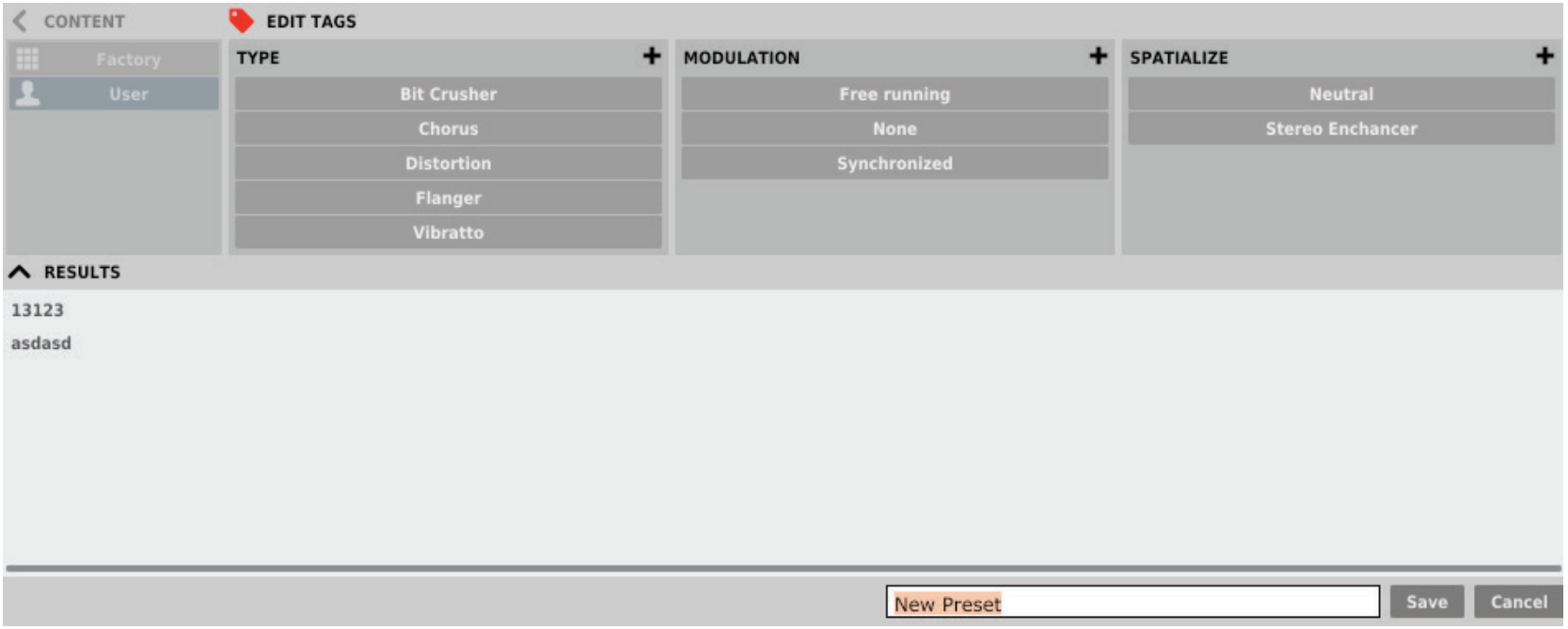
Presets Export and Import

The use of **Import** or **Export** buttons at the bottom part of the **Preset Browser** enables a proper import of presets package (exported before) or export to the presets package ▶ the presets selected in the **Results** section.

▶ Export and Importare possible only for presets from User resources.

Saving the current settings as Preset

To save plug-in parameters settings as a user preset use the **Browse** button pressed together with **CTRL** button in **Configuration and Presets Browsing** section. This action automatically opens the **Preset Browser** with an active **Edit Mode.**



Saving the Settings as Preset

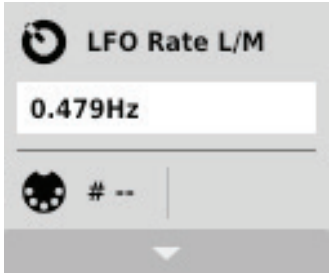
Additionally, at the bottom there will be a textbox into which you should enter a name of a newly created preset, and then confirm it by clicking **Save** or cancel by clicking **Cancel.**

As the **Preset Browser** is in the **Edit Mode** before confirmation of the newly created setting as preset, we can straightaway categorize a particular setting, using functionality of the **Edit tags** section, even just before saving it as **Preset.**

Configuration

Parameter settings

Right-click any plug-in parameter to open the context menu



Closed Context Menu

It allows for:

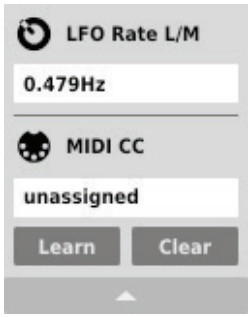
- Checking the name and current value of a parameter,
- Checking if the parameter is attributed to MIDI CC controller, and if it is – to which number,
- Linking the parameter to MIDI CC controller.

Clicking the arrow in any area of the menu expands it and displays all available options.
Next right-click on the parameter or left-click outside the menu area closes it automatically.

MIDI Learn

MIDI Learn function enables a quick assignment of physical controllers (from MIDI controller) to plug-in parameters. The assignment can be divided into a few steps:

1. Right-click the parameter which you want to attribute to physical MIDI controller in order to expand the context menu.
2. Click arrow at the bottom in order to expand the context menu.



Expanded Context Menu

3. Click the **Learn** button to put the plug-in into a pending state until you move any MIDI CC controller.
4. Click **OK** to save the change or click the **Cancel** button to restore the previous setting.

MIDI Unlink

You can also delete MIDI CC code attributed to plug-in parameter from the context menu:

5. Open the context menu, right-clicking the parameter attributed to a particular MIDI CC
6. Expand the menu, using the arrow at the bottom
7. Click the **Clear** button
8. Confi rm with **OK** button

Plug-in's current settings

Current settings are relevant to a specific instance of a plug. They are initialized with the **Default settings,** when the plug-in is loaded (see the next chapter):

At the bottom of UI there is a status bar that enables the change of **Current settings.**

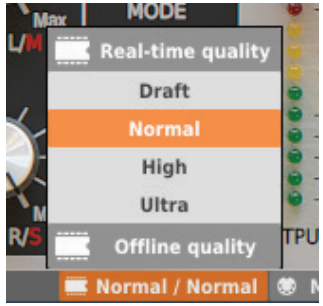
Current Settings in a Status Bar

From left to right there are:

- The setting of **Current processing path quality** for the **Offline** mode and the **Real-time** mode
- Saving/Loading the **MIDI CC Map**
- The choice of current size of GUI

Processing Path Quality

Clicking the item expands the menu that allows to select the **Current quality** of generated sound for **Real-time** or **Offline** modes.

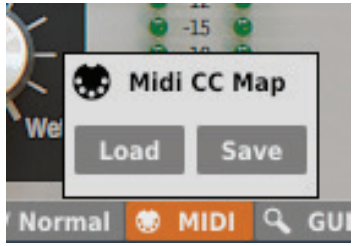


Processing Path Quality Settings

We can choose from four available grades for each mode.

Saving/Loading the MIDI CC Map

This item enables to save current parameters of MIDI CC codes as MIDI Map in a file or to load them.



Saving/Loading the MIDI CC Map

Current Size of GUI

This last item allows for a choice of plug-in interface size. There are two sizes to choose from:

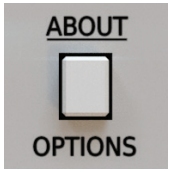
Choosing the plug-in interface size

Plug-in's default settings

The **Options** panel allows us to change the **Default settings** of the plug-in. Every time the plug-in is loaded in the host application (new instance is created) a **Default settings** are used for initialization of the **Current settings.**

Default settings are stored within a configuration file of the plug-in. This file is updated at the moment of unloading any of active plug-in instances from the host application.

Use the **Options** button on GUI to open the panel:



Options button

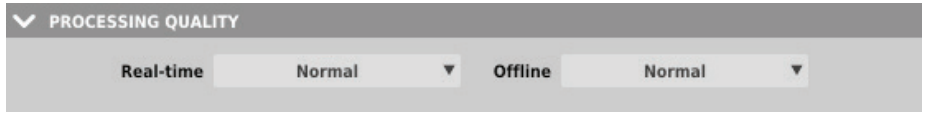
The **Options** panel operates as an accordion where you can click a specific section to expand it:

Options Panel

There are three sections:

- Processing Path Quality
- **MIDI Map S**etting
- Interface size settings

Default Processing Path Quality



Processing Quality Choice Section

In this section you can configure a default quality of the processing path for the **Real-time** mode and the **Offline** mode.

Default MIDI CC Map

Default MIDI Map Choice Section

This section allows for setting of a path to a file with a default **MIDI Map** that was prepared before. Clicking **MIDI CC** Map check box activates load of **MIDI Map** and the possibility of pointing it (**Browse** button).

Default size of UI

Processing Quality Choice Section

In the **User Interface** you can choose a default size of the UI.

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