vengeance

Vengeance Producer Suite

AVENGER 2

Vengeance Producer Suite

Version: 2.4.1
Date: June 2025



Contents

Introduction 6

Installation and maintenance 7

Registration 7

Activation 8

V-Manager activation 8
Activation via Website 9
Offline Activation 10

Overview 11

Quick guide 11

GUI 12

Handling concept 13

Generators 14

Filter, shaper, effects and mixing 16

Modulation 17

Organization and helpers 18

Quick handling bar 19

File menu 19

Info screen 19

Browser 20

Content tab / Preset browser 20

Preset search 22
Build a custom bank 23
Info tab 24

File browser 25

Importing samples (left click): 26
Converting shapes (right click): 26
Converting granular or resampler files 26
Importing (granular) multisamples 27

The oscillator area 28

Tab system 28

OSC Browser 29

The oscillator panel in detail 30
Waveform display 30
Global OSC panel controls 32
Voices panel 35
V-Saw 35
Vibrato 35
Chorder 36
Sub osc 36
General 36
Quantize 37
Routing panel 38
OSC types 39
Shapes 39
Shape modulation options 39
FFT (fast Fourier transform) editor 42
Freeform 45
Wavetables / Resamples 47
Samples 54
Samples and multisamples 54
Sample stacker 56
Granular samples 58
Multiloop samples 62
Drums 64
Drums main page 64
Drum sample browser 65
Drum sample editor 66
Drums routing 67
Drums routing (multi selection) 67
Drumkit / sequences browser 67
Event Trigger module 68
Overview 68
In-depth 69
The central display 73
Editor tab 73
The Arpeggiator 74
Chords mode 76
Connection Overlay 77
Arp note randomizer 79
Arpeggiator Custom mode 81
The drum sequencer 83

The step sequencer **85**
The pitch module **86**
The modulation envelopes **88**
The mixer area **90**
Key and velocity zones **91**
System page **92**
The amp section **94**
Overview **94**
The filter section **96**
Overview **96**
Filter Types **98**
Filter algorithms **98**
The shaper section **100**
Overview **100**
The mod matrix **101**
Overview **101**
Shape **102**
Mod matrix routing via drag & drop **103**
The LFO section **104**
Overview **104**
Macro area **106**
Overview **106**
Lock buttons **107**
Overview **107**
Readout Display **107**
(MIDI) Controller bar **108**
(MIDI) Controller to Modwheel **109**
MIDI Learn **110**
The FX section **111**
Overview **111**

Avenger only FX 113

RUTA VERB 113
Ruta Chorus 115
Phase Puncher 116
Ruta Distortion 117
BIT BITE 119
OTTER 120
Envelope Follower 121
Q4antum FX 122
Stereo Matrix 125
AA Vowel Filter 126
AA Wha Wha 127
AA Peak Limiter 128
AA Peak Compressor 128

Tips on working: 129

Right clicks and menus 129
The middle mouse button / double click 129
Turning the dials (fine) 129
Effects as send effects 129
Master filter 129
Cursor keys / preset choice 129
MIDI controller (pedals) 129

Changelog 131

Support & Contact 138

Bug reports 138

Introduction

Dear customer,

Thank you for purchasing the plugin „Vengeance Producer Suite – Avenger“ (which we will hereafter simply call: „Avenger“)! This new synthesizer will open you undreamed of possibilities!

3 years of planning, development, dedication and love have flowed into Avenger to make this synthesizer the most complete and best synthesizer on the market. Avenger is capable of a lot of common and new forms of synthesis, has almost unlimited modulation possibilities and a wonderful - as well as informative - graphic interface, by which you can experience live, direct and to the point, what is happening to and with a sound or modulation.

For a live overview of Avenger, it is worth having a look at our YouTube channel, providing you with more than 20 (still growing) tutorials by Manuel Schleiss, covering the major parts of Avenger in over 5 hours. Further, you will find preset walkthroughs and expansion demonstrations here.

https://bit.ly/VPSAvengerTutorials

http://bit.ly/VPSAvenger-XP-Walkthroughs



Enjoy your new Vengeance Producer Suite – Avenger!

The vengeance-sound team

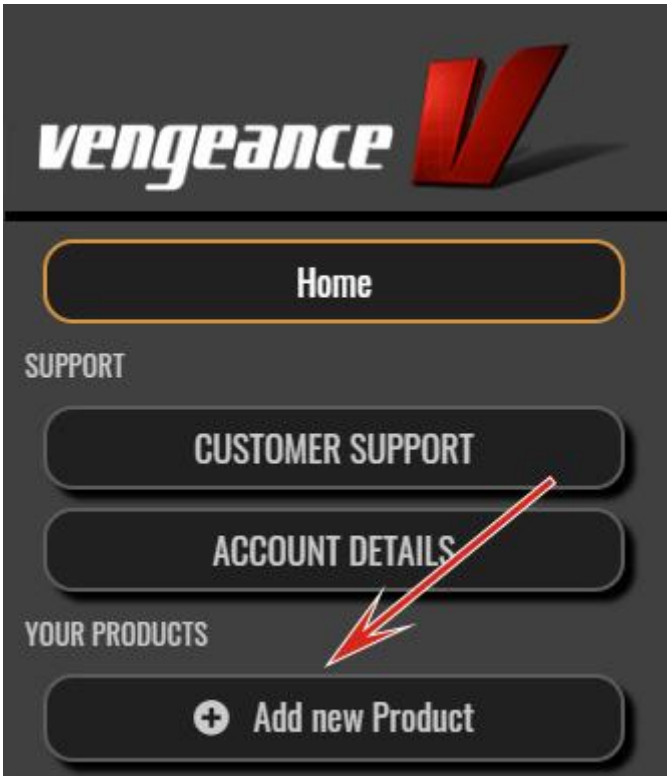
Installation and maintenance

Registration

To use the full version of Avenger, you will have to activate your license at:
https://register.vps-avenger.com/login.

There are a few initial steps to follow:

1. Register first
2. Log in and enter the activation code (ShareIt has provided with you via e-mail) at "Add new Product" (see screenshot)
3. After successful registration, Avenger will show up under "Your products"
4. Now download & install V-Manager to manage licenses and Avenger / expansion installations. You'll find it at "Your products -> VPS Avenger -> Download V-Manager" (on the right side)



Alternatively:

5. Download the Avenger / expansion installer directly from our website
6. Make sure the demo version is uninstalled (if you have demoed)
7. Install Avenger & expansions (at least "Factory content")
8. Activate licenses via V-Manager or our website (see next chapter)

Activation

V-Manager activation

We suggest using the V-Manager for the activation process, because it's the easiest and most hassle-free way to activate your licenses. Download V-Manager from

Windows:
https://vps-avenger.com/vmanager-download/win
Mac:
https://vps-avenger.com/vmanager-download/mac

Start it and login with your credentials.
You should see your registered Avenger on the left side, and available licenses for the expansions on the right side like this:



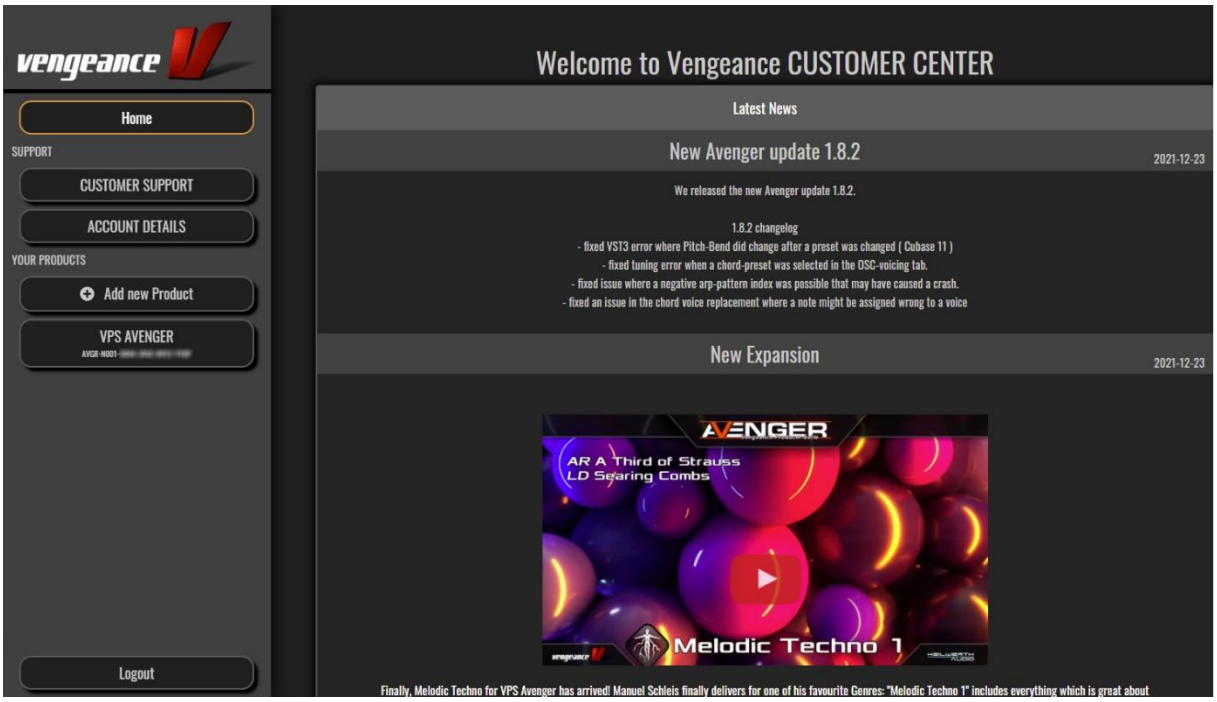
You can download the latest Avenger installer, if necessary, with the top left button.
Select a path for the expansions and download them per click on its button.

To activate Avenger within your DAW, get your personal keyfile with the top right "Download Keyfile" button. When you open Avenger in your DAW, just follow the steps, or just throw the keyfile via drag&drop on Avenger. You might restart your DAW to complete the activation.

Now you're ready to open Avenger in your DAW.

Activation via Website

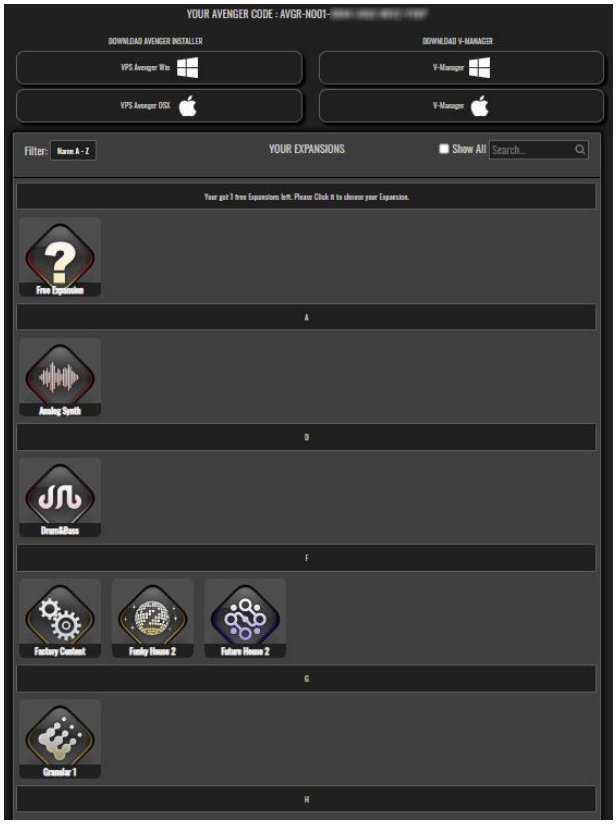
It's also possible to manage your licenses online via our website instead of using V-Manager. Log in again to your account at https://register.vps-avenger.com/



Click on "Add new Product" to enter the activation code for Avenger or expansions you got after purchasing via email.

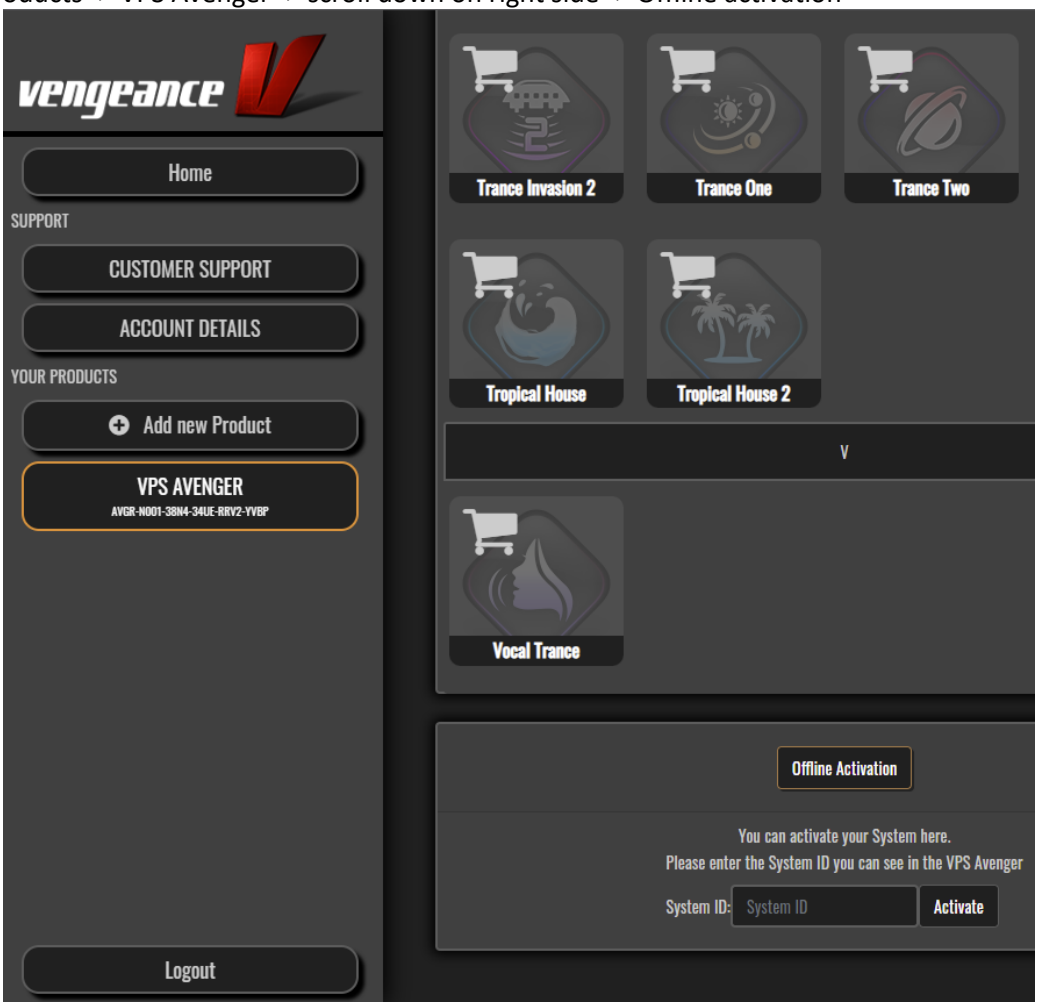
All your expansions are listed, sorted by name, on the right side. By clicking on an expansion, it'll be downloaded immediately to your computer.

When you click on "Show all", all available Avenger expansions will be shown. When you click on the ones you don't own, the Vengeance web shop will be opened.

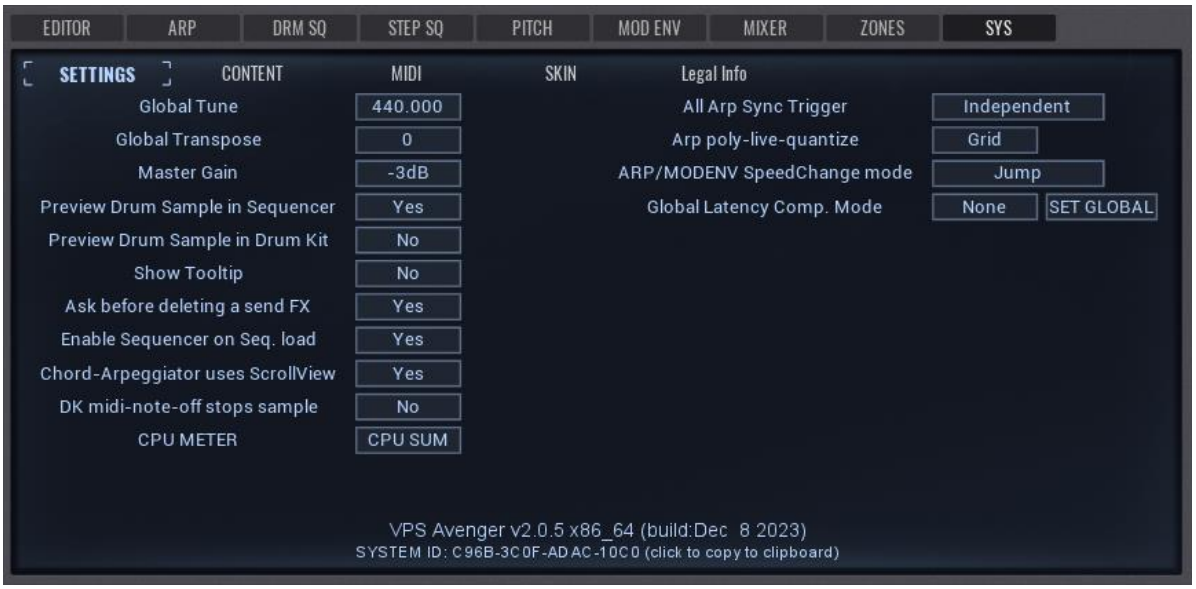


Offline Activation

If you want to activate your system offline, go to
Your products -> VPS Avenger -> scroll down on right side -> Offline activation



You need to enter your System ID, you can find in **SYS** tab within Avenger, then click **Activate**:



Overview

Quick guide

Avenger is an incredibly powerful synthesizer and the latest development from vengeance-sound and keilwerth-audio. There is almost nothing that you can't do with Avenger. A preset in Avenger can begin simply and grows automatically depending on how complex you want it. Individual components like oscillators, LFOs, filters or effects can be added or removed whenever you want, by use of the tabs or and can be freely linked by you, in any way you wish. Every waveform can be bent and manipulated live and directly or by modulation in all directions and frequencies (FFT) – all that with very low cpu use and amazing alias-free sound quality.

Avenger features a multitude of synthesis forms for the sound generation such as complex wavetables. In this form of synthesis, the relationship between the harmonic and disharmonic overtones can be regulated at any time by FFT. All the results can be seen at all times in the central display which shows the current waveform. Avenger comes with a very clean and CPU friendly „supersaw" mode named V-Saw, a chorder to stack notes, a multisample stacker for layering samples and separate drumkits complete with drum sequencer. Thus, very complex arpeggios and sequences can be created.

The flexible effect routing system is also one of the highlights. There are insert racks, send and master racks. The oscs (oscillators) and busses are freely routable (for example: rack 1 -> rack 2). There is the shaper with many different distortion types which can be placed before or after the filter. Naturally there are many filter types in which we invested a great deal of time to achieve the best sound and performance possible.

Modulators have never been so complex yet so easy to configure as in Avenger. Almost everything can be combined with anything else. You can do this in the modmatrix or simply be dragging and dropping between source and destination. There are arpeggiators, step sequencer, drum sequencer, pitch and mod envelopes, special wavetable envelopes with patterns for wobble sequences, keyzones, velocity zones, macro controller, MIDI controller/pedal support and much more.

As well as all this there is a graphical librarian with a tag/cloud keyword filter. The user also has the possibility to import own samples, waveforms, wavetables or drums which expands the possibilities even further.

GUI

We have been carefully designing the Avenger GUI, to provide the best possible workflow and show everything needed on screen at any time. Most areas contain tabs. Usually they are color coded, to provide a fast overview, which oscillator is connected to which further processing steps.



1. Quick handling bar
2. File menu
3. Info screen
4. Output level meter / master volume
5. Browser
6. Voices panel
7. Oscillator panel
8. Routing panel
9. AMP panel
10. Filter panel
11. Effects panel
12. Central panel
13. Shaper panel
14. Modulation panel
15. Controller bar / wavetable-view
16. Macro panel
17. V-Manager (VMAN)
18. Readout screen
19. Lock buttons

Handling concept

Looking at the general handling concept, there are only a few things to remember:

- **Resetting controls** to its default state
  - Control + click or
  - Double clicking

- **Additional functionality**, such as adjusting attack curves or adding a random pitch be editing the inner ring
  - Right click the control



- **Raw tune a control** in bigger steps by using your mouse wheel

- **Finetune a control**
  - Shift + right click (working for all controls) or
  - Right click (for controls without additional functionality)

- **"Go to" function** in the routing panel:
  - Right click on the module or
  - Left click on the module and choose "go to"

- **Set up a modulation**:
  - Drag the "six points" to whatever you want to modulate or
  - Use the modulation matrix to set source and target



- **Adjust a modulation**:
  - Use the modulation matrix for bigger changes
  - Use to small orange triangle in the upper left of the dial

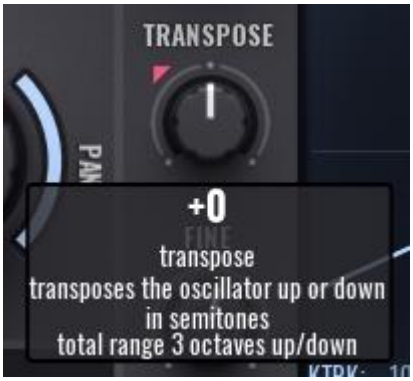


- **Add a tab** by clicking the "+" next to the last tab

- **Copy, past or delete a tab** by right clicking on the tab

- **Tool tips** can be enabled on the sys page and are provided for most controls. For those with additional functions the tip will be shown, when right clicking while hovering over the control.





Generators

- **VA Shapes**
  Classic synthesis, consisting of 1-cycle waveforms. This is where you find the classic waveforms, like sine, saw, pulse, triangle etc (basic shapes)., but as well you can convert all 1-cycle wav-files to a shape (imported shapes) or even draw your own shapes (**Freeform**). All shapes can be manipulated and transformed by the various options Avenger is giving you. 100% clean and free of any aliasing.
  There are some additional free shapes on the Avenger download page.
- **Wavetables**
  These are various „oscillator shapes“, one after the other (for instance: 256), which you can smoothly move through. Avenger comes complete with a huge collection of wavetables, you can however also create your own.
  There are some additional free wavetables on the Avenger download page.
- **Resample**
  In principle a wavetable, but this mode lets you load large wave files and then move through microscopically small grains to use as your sound source.
- **(Multi-)Samples**
  An oscillator can also play multisamples. With our „sample stacker“ you can stack up to 4 samples per osc (layers). Oneshots such as „attack clicks“ or „organic noises“ also belong to the samples which can be layered to the multisamples.
- **Granular**
  The granular engine lets you load wavefiles and splits them into tiny pieces (so called grains), which can be used to do everything from small adjustments to the original sound, to creating completely new sounds through various parameters.
- **Multi Loops**
  Multiloops are prerecorded audio sample phrases in different pitches and scales (e.g., minor/major).
- **Drumkits**
  These are not simply multisamples but rather „real“ drumkits with many editing options and their own specially optimized drum sequencer.



Transformators

- **FFT filter (free / harmonic / bin)**
  All the above-mentioned synthesis forms (apart from (multi-)samples/drumkits and granular) can be cut up using an FFT filter. Root tones, individual harmonic, fifths, or disharmonic frequency parts can be individually increased, reduced, or completely removed.
- **X-bend / formantshift / crush**
  The waveforms from each mentioned synthesis forms (for (multi-)samples/drumkits and granular only crush is available) can be bent, squashed, stretched or effected by lo-fi effects. All this controlled and modulated in real time or by envelopes/LFOs.
- **OSC sync**
  Every one of the above-mentioned synthesis forms (apart from (multi-)samples/drumkits and granular) can be "synced". An integrated "sync envelope" can be used as modulation source.
- **FM/AM**
  Frequency and amplitude modulation can be used on each of the above-mentioned synthesis forms (apart from the drumkits).
- **Noise**
  A noise generator that can be mixed with all the synthesis forms. The sound colour and the sample rate of the noise can also be set.
- **V-Saw**
  The V-Saw is our equivalent to the well-known "supersaw" (unisono) and functions with all the synthesis forms (apart from drumkits). The V-Saw can generate up to 7 voices, softly detune as well as allow voices to be spread in the panorama or octave. Adding to this there is a vibrato LFO that can be applied to all the voices at once or even to any of the 7 voices. All the while the CPU usage is happily kept to a minimum.
- **Chorder**
  A comfortable "note stacker". With the chorder you can quickly generate a further 4 voices, for instance a +12 voice on top or a -12 bass voice, a quinte or any other interval/chord. All voices can be placed in the panorama, volume levels can be adjusted and the detune factor also can be set.
- **Sub bass module**
  Avenger includes a genuine sub oscillator that can be mixed in all the synthesis forms (apart from the drumkits), using a sine, triangle, saw or square waveform.







Filter, shaper, effects and mixing

- **Filter / master filter**
  We paid a lot of attention to the development of the filter. You have the possibility to choose between many filter types. Also included are special filters for vocal/robot sounds, a tb303 filter, comb, FM and lofi filters. Many of these filter types can be overdriven (drive).
- **Shaper**
  The shaper is a distortion module on an oscillator level with 2 integrated special EQs. It includes numerous distortion models and can be routed flexibly (before or after a filter, before or after envelopes etc).







In addition, Avenger includes numerous high-quality effects such as sidechain, Arts Acoustic reverb, delay, various distortion and lofi effects, dynamic and chorus effects as well as special effects like tapestop, each one coming with presets and able to save your own presets. Avenger offers channel presets, so you can safe and recall your favourite effect chains.

- **Insert FX rack**
  Avenger offers you up to 4 insert FX racks with up to 8 individual effects per rack. The output of an insert FX rack can be routed to another insert FX rack, to the master FX rack or directly to the output.
- **Send FX rack**
  There is a separate effect rack solely for the send effects (up to 8 parallel effects). The active effects found here can be mixed with any oscillator without adding to the CPU load.
- **Master FX rack**
  At the end of the effects chain is the master effect rack. This includes a further 8 slots. The master effects rack is ideally suited for EQs, compressors or limiters. Individual FX busses or oscs can be routed to bypass the master FX. So, for instance, you can route a bass drum to bypass the master limiter while heavily compressing the rest of the drums.

Mixer
To improve the overview, Avenger offers a mixer page, where you can clearly see and mix all your drums, oscs, amp groups as well as the master fader.

Modulation

- **Mod matrix**
  The heart of all your modulations: we have given the mod matrix in Avenger a completely new look! It's now a breeze to organize entire modulation groups and edit them with just one click. All sources listed below, including external MIDI or math-generated sources, can be combined with any destination imaginable - for example, with visible controls and with almost any possible setting.
- **LFOs**
  You can have up to 4 LFOs. LFOs work as modulation sources, can also receive modulation for instance to reduce their own speed. You can choose between many included LFO forms or simply draw up to 3 of your own.
- **Modulation envelopes**
  Another source of modulation are the modulation envelopes – in short “mod envs”. These are freely editable envelope curves which means you can add as many points as you require simply by double clicking. These mod envs can also be looped and synced to the song's tempo.
- **Pitch envelope**
  The pitch envelope, with its bidirectionality, is specifically suited to affect the pitch of an oscillator. The pitch envelope can however also be routed to any other destination. Here you will also find further settings such as poly/legato mode or settings for the pitchbend wheel.
- **Step sequencer**
  Once known as “trancegate”, this step sequencer can now however do much more than simply influence volume and naturally – as with the rest of Avenger – can also be routed to any parameter or setting. The step sequencer offers amazing possibilities regarding exact timing and synchronized modulation.
- **Arpeggiator**
  Avengers arpeggiator has also grown: an “arp” can consist of up to 4 patterns (a b c d) which can be played after one another or separately. The arpeggiator is also a powerful and accurate source of modulation: the pitch of a note could for instance control the filter cutoff amount at the same time as controlling velocity and reverb mix.
- **Drum sequencer**
  The drum sequencer is a totally new development specifically designed for working with the drum kits. A major difference to the arp is for instance that you can play several notes at the same time (kick+clap). Apart from that it offers numerous special functions such as various copy/paste modes, a drumroll mode for fast notes, group selections and velocity flags.
- **Key/velocity zones**
  You have the possibility to freely set the playability of any preset. You can set different velocity zones, which for instance add new oscs, when a key is pressed harder, or keyzones that splits the keyboard into different areas. Everything is clearly and graphically editable. Seamless blends between the areas are naturally also possible.
- **Wavetable envelope / envelope patterns**
  This is an envelope that traverses the wavetable index, which also obviously can be routed to anything else. This envelope offers many features that are especially suited for use with wavetables, for instance a pattern editor to generate “wobble“ sequences in various successive speeds.

- **Macro controller**
  Avenger offers you overall 12 macro controller and 8 macro switches as modulation sources, over 4 macro tabs (3 controller + 2 switches on each). These macros typically control modulation groups and thus totally change the sound. All the macro controllers and switches can be freely named and are naturally saved with the preset. All the factory presets have sensible allocations that allow you to directly influence the sound.
- **External MIDI pedals**
  You have the possibility to connect a breath controller, expression pedal, foot pedal or sustain pedal to any destination you wish. As most of the presets have already been given suitable modulation routed to the mod wheel, you can simply route these controllers with one click to the mod wheel. The MIDI pedal for instance would then be routed to the modulation that is routed to the mod wheel.
- **Quick modulation assigns**
  A comprehensive modulation matrix is great but there are times when things need to be quick and easy. You can therefore link by drag & drop almost every source you can see on the gui with almost any destination and then directly set the modulation depth. It could not be easier. As each dial has a surrounding led ring you can always see, live, when a dial is being modulated.

Organization and helpers

- **Preset librarian**
  The new preset librarian in Avenger allows you to organize all your installed sound banks. The librarian is not simply text based. It uses graphics and icons for things like sound banks or expansions to improve readability.
- **Tag / search**
  Avenger comes with a huge number of presets. To help clarity and find the sound you want Avenger uses a tag cloud. With these you can select sounds by genre (house, edm, dub etc.) or by sound characteristics (aggressive, warm, bass etc.). The search will then be limited to all the chosen characteristics.
- **Import / organize**
  You can also import your own (multi)samples, wavetables, drums etc from your hard drive. On top of that, you can create your custom expansions with all presets and used samples in one file. You can also add your own icon to your custom expansion.
- **Preset browser everywhere**
  Within every sub system in Avenger you have the possibility to save presets. There are already very many presets for each effect type such as arpeggiator, step sequencer, FFT filter, wavetable envelope, chorder, drum sequences etc.
- **Undo**
  Avengers amazing undo function should also be mentioned! Whatever you have done – loaded another preset by mistake, changed the filter or deleted an arp note – anything can be restored with a single click. A real life safer in many situations.

Quick handling bar



This bar provides you with four functions (left to right):

- **Zoom level**
  Avengers GUI was designed with future screen resolutions in mind and is scalable from 50%-200%. We recommend using a resolution higher than full HD and at least 100% zoom level to experience the full beauty of Avenger – nevertheless it will work on smaller screens as well.
- **Assign preset to a bank**
  Navigate to the bank and category you want the preset to be, click and hold the red dot or the preset name and move it to the preset browser. This will be a duplicate, like “save as”.
- **Rename preset**
  Change it by double clicking and the name. After renaming you will have to “save as” or use the “Assign preset to a bank” function to make this change permanent.
- **Previous/next preset**
  This is exactly what it you would expect: Navigate through a preset bank, one by one.

File menu



Load, save or save as a preset.
Initialize the preset. (Set the init preset on the “sys – content” page.)

Left click: **Undo** up to the last 20 changes you made.
Right click: **Redo** and see which where **the last 11 parameters you changed**

Info screen



- **Global maximum voices** are set here, as well it is showing the currently played voices. 1 played note per oscillator tab = 1 voice. Example: 3 oscs, C4 only played = 3 voices
- Used **number of oscillators**. This value is calculated for each osc-tab by:
  [(voices + chorder) x v-saw] x 2 (if endless sub is used).
  - muted tabs are counted as well
  - “v-saw” only if “mix” > 0%, number of voices
  - “sub” doesn’t count
  - “endless sub” doubles the value
- Last **played note** + velocity
- CPU usage
- Host BPM

Browser



The browser will help you to navigate through and search for presets, build your own expansions, categorize presets, and browse your computer for content to import to Avenger.

Content tab / Preset browser

Avenger comes with a well-developed preset browser, which will help you to keep an overview of the factory presets, own presets or bought expansions packs. It works on three levels:

1. Bank/expansion
2. Category
3. Preset

The level 1 view can be switched from “list” to 1-8 per row in the left upper corner. This might be handy when the number of banks is rising.

As soon as you click on one of these banks, you will land in category choice menu of this bank.



In the second level the categories in this bank can be seen on the left. By clicking on a category, you land on the following level, the preset choice itself. Presets can be now loaded with a double click or with the “to the right” cursor key (see tips on working). Don’t forget that you can use a mouse wheel to scroll through these menus. Naturally you can use scroll bars in the menus.

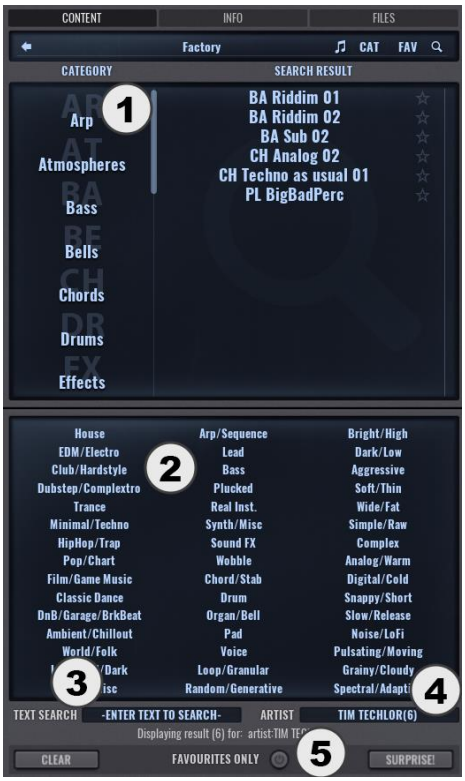
If the note symbol (top right-hand corner of the browser, to the left of "Cat") is activated, an audio preview is played when a preset is selected (not loaded!).

Go back to the expansion overview at any time by clicking the arrow in the upper left corner.

If you got the “favourites-view” (FAV, top right) active, you could mark a preset as favourite by clicking the star. Otherwise, you are always able to mark a preset as favourite by right clicking it and choosing the option “mark as favourite”. Note: Unmarking a preset will only work by clicking the star!
Right clicking will also let you rename, delete, duplicate, and save the preset as well.

Banks and presets can also be organized directly on your hard drive.

Preset search



By clicking the magnifying glass in the upper right corner, the search function will open.

You got up to five options to combine a search:

1. Categories (stock categories only)
2. Tags (stock tags only)
3. Text search (preset names only, no comments)
4. Artist (dropdown menu of all available artists/preset authors)
5. Favorites only

The results will be displayed in the content browser. Sort them by category (CAT) or alphabet (ABC).

Downright you see a “surprise!” button – this will load a random preset, based on the search result.

Please note: To make this preset search fully functional it is important that you name, tag, and label your own presets. If you want to release the expansions this becomes of even greater importance! When you create your own presets, please remember to use the tag cloud to activate all appropriate characteristics to help you (and others) find your presets later.

Tip on handling:

Browse through the library with your keyboard:

- Up/down: navigate up or down
- Right: load a preset

Build a custom bank



Building your own bank is simple.

- Right click in level 1 of the content browser and create a new customer expansion.
- Rename it afterwards
- Choose “Browser Folder with explorer”
- Adjust the “.info” file if you want to add some info about the expansion
- Folder image: Replace the image with anything you like – make sure it’s the same size
- Folder presets: Although we strongly recommend staying within the stock categories, to keep all search options you can create new folders or rename existing ones for customized subcategories.
- Create presets!

In case you want to publish your expansion:

- “Verify expansion” to make sure all needed content files (shapes, samples etc.) are in the folder and you used all files in the folder
- Publish your expansion!

Building your own presets:

- We recommend using category prefixes (see appendix)
- Tag your presets in the info tab
- Add a comment if needed
- Type in your own artist name (or save it in your init preset, so you do this only once)

Info tab



As already mentioned there some options to categorize presets and make them searchable.

Activate words in the tag cloud to describe your presets. Add a comment, if there are some special functions in the preset, you want to hint at and adjust the artist's name.

You need to save your preset, to make your choices permanent.

File browser

The third tab in this section takes you to the file browser. Here you can browse through all your drives and import your own content (wave files).

Left clicking a file:

- Drag and drop samples to OSCs, drums or wavetable view

Right clicking a file:

- Convert shapes
- Convert granular samples
- Convert resampler samples
- Convert sfz to multisample
  (not recommended, depending on source file, problems might occur)

Right clicking a folder:

- Convert multisamples
- Convert granular multisamples
- (Batch-) Convert granular samples
- (Batch-) Convert resampler samples



Importing samples (left click):

Importing to OSC:

- Drag and drop them to the waveform-display in the OSC-panel

These imports will be only for this Avenger patch, they won't be available in the library.

Drums:

- Change to the "drum" page (click above the routing panel)
- Drag and drop your chosen drum samples to the appropriate slot.

Granular/Resampler/Wavetable:

- Select a resampler or granular OSC (see below)
- Drag and drop the sample to the wavetable view.

These imports will only available be in other Avenger instance if you save the altered drum kit.

In contrast to the drag and drop actions, all following imports/conversions will be permanently added to the library.

Converting shapes (right click):

- Create a wav in your favourite audio editor
- The OSC shape needs to be exactly **one** waveform length
- Make sure the waveform is cut cleanly that there are no audible clicks at the beginning or end. (You may intentionally want such clicks however to create more overtones.)
- Right click this wav file
- Select "convert shape"
- Choose the destination path in Avengers library
- Use the waveform in Avengers engine, free of any aliasing

By the way: You can draw your own waveforms as well in the freeform editor (see below).

Converting granular or resampler files

- Right click the wav file
- Select "convert granular/resampler file"
- Choose the destination path in Avengers library

Importing (granular) multisamples



Please choose a folder that contains the multisample files in wav format. Following rules apply:

- The last characters contain the note, from that the sample will be used (to avoid aliasing downwards to the next sample, upwards only if it's the highest sample)
- Allowed range: C-3 to G7
- Sharp notes (#) may be used, flat notes (♭) are forbidden
  (Please note: sharp notes won't work from C#-3 to A#-1)
- Intervals may be chosen to your likings and may change inside one multisample
- The multisample will be named like the source folder
- The multisample can be found in the chosen library

Notes on use:

- Samples need to be prepared loop point wise
- Keep the sample size in mind – a multisample will be fully loaded to the RAM
- A multisample could be used for different sounds as well, for granular multisamples this only a reasonable choice, when turning keytrack to zero.
- You can use any text you wish. The only important thing is that the note name at the end before the .wav is included. However, we recommend however that you use a system (e.g. numbers) as this helps keep an overview. Above picture uses following system:

Patch name		Octave no.		Sample in oct.		Note
Air Keys (Poly-61m)	_	O4	-	02	_	E4
Air Keys (Poly-61m)	_	O5	-	03	_	G#5
Air Keys (Poly-61m)	_	O6	-	01	_	C6

The oscillator area

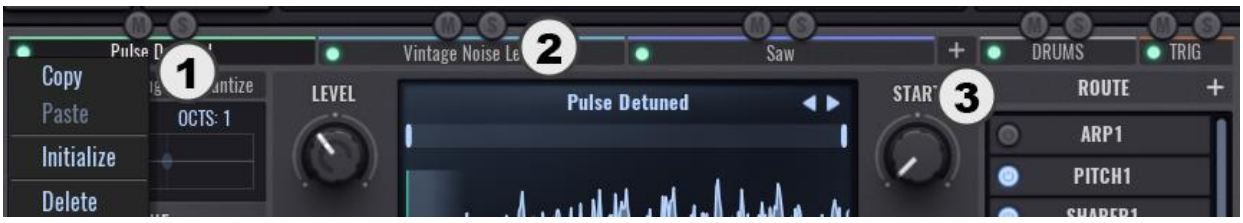


With its up to 8 single oscillator modules and drums the oscillator area is the heart of Avenger. An oscillator module can however be far more than just a single voice. Every osc module has its own V-Saw, its own chorder, sub oscillator and its own routing. Although you got this lot of possibilities – try to use as little as possible, when designing new sound, to prevent CPU hugs. Keep gain staging in mind – your ears are easily fooled by just making things louder and will tell you “more is better” even if the sound didn’t get any better, but only louder. The complete 8 OSCs will barely ever be needed to create a full sound.

The OSC area always consists of the voices panel, oscillator panel and the routing panel. Depending on the type of OSC, the central panel and the controller bar / wavetable-view will be used as well. Last but not least, keyzone may be adjusted in the “zones”-tab.

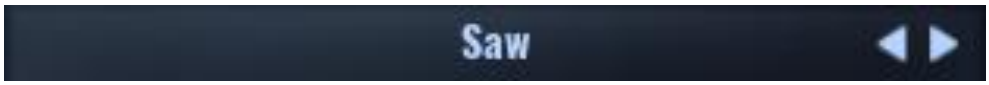
You’ll find an in-depth video about the OSC section here: http://bit.ly/VPSAvengerOSC

Tab system



Avengers GUI is based on “tabs”. The OSC area will always have at least three tabs, one OSC, the drums and the “Trig” tab. By clicking the “+” (3) you will add another OSC, up to a total of eight. Rename the tabs by double-clicking them and open the context menu (1) with a right click. By hoovering over the tabs, they can be muted/soloed (2). This function is linked to the mixer tab. Every tab will have its own colour to help you follow your routings in a bigger patch.

OSC Browser



At the top of the waveform display, the name of the currently used oscillator is shown. To change to another OSC preset within the OSC type, there are two options:

- use the two arrows on the right to step through them
- click on the name to open the browser, containing the Avenger oscillator library



The Browser is easy to understand and follows Avengers design concept:

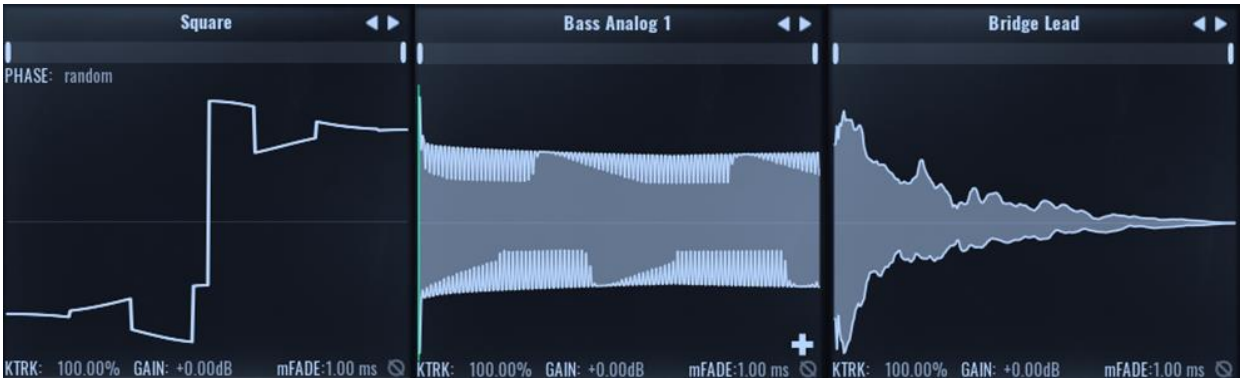
1. **Browser settings and search function**, functionality from left to right:
   - **Close the browser**
   - **Preview function and volume slider**.
     When used the preset will be previewed, when clicking/selecting them
   - **Size and position of the browser.**
     Choose your favourite position and size
   - **Font size**
     Choose from 4 font size options by using the ABC button.
   - **Search function**
     Click the search field and enter your text to find results within the chosen OSC type in all banks
2. **OSC selection**
   Click once to choose an OSC type and browse through the banks and presets. Double click to open an empty instance of this OSC type (working for Freeform, Resample, Samples and Granular only)
3. **Bank selection within the chosen OSC type**
4. **Preset selector**
   Clicking once will preview the preset and show the waveform in the associated display, double clicking will load the preset and close the browser.

The oscillator panel in detail



The OSC panel consist of the inner waveform display, (shape based OSC types). For samples based OSC types. Depending on the OSC type, these options may vary, only the left side will always stay the same. Some functions will be linked to other parts in the Avenger GUI, offering the same function; other functions will be reachable only here.

Waveform display



The core of the OSC panel is the waveform display, showing a real time view of the current waveform. For shapes/freeforms (left) you will see one cycle of the waveform in detail, and it will give you visual feedback about the changes you are making by using the multiple options around the display to alter the sound. When choosing a resample/wavetable it will be similar, showing the current wavetable position in detail. For samples (middle) you see the whole sample including the starting position, for granular samples (right) there will be no starting point, since this is controlled by the granular envelope.

You will find a simple high- and lowpass **filter bar** between OSC browser and waveform display. The bar has two handles, the **hipass filter (hpf) on the left**, the **lowpass filter (lpf) on the right**. If your oscillator is a normal oscillator or a wavetable, the hpf and lpf are linked to the FFT area and you will get instant feedback how your waveform changes (more in the FFT section of this handbook). If the current oscillator is a sample (single, multi or granular) the hpf and lpf are resource friendly 6db/oct filters.



Below the waveform display are up to 5 parameters, depending on your OSC type.

- **OSC phase (OSC/Freeform/Wavetable only)**
  The phase can be random or fixed to a specific phase position. Click on „random“ and move the mouse upwards while keeping the mouse button pressed and you can set the start phase. A green bar appears in the waveform display to help you. Alternative a double click will open a text field. Enter a value from -1 (random) to 100% here.
- **Keytrack (Single, multi or granular sample)**
  Controls how the sample pitch is aligned to the keyboard. 100% means full scale, while 0% means no pitch over the whole keyboard (you might want this for drums or vocals). For samples this is linked to the keytrack knob inside the central panel.
- **Gain**
  If you are using very quiet waveforms or samples you can use the gain control to raise the volume. This gain has a further function. It influences **only** the oscillator itself, not any noise that may be mixed in. You can thus turn the gain completely down to hear the noise only. This is useful when designing drum sounds.
- **Micro fade in**
  In certain start phase positions the oscillator may cause clicks. This may be wanted e.g for bass drums, generally however this is not wanted. For this reason, you can use a tiny micro fade (up to 5ms) to fade in the waveform so such clicks will be eliminated.
- **Phase invert**
  This small icon at the bottom right turns the phase 180°. This is good, for instance, to use together with a second oscillator to create very specific cancelations.
- **+**
  When using a sample, a “+” will appear above the phase invert sign. This is part of the sample stacker, which will be explained in detail later.

Global OSC panel controls

For the various controls around the waveform display following operating concept is used:

- **Left click (LC)**
  Open a context menu.
- **Left click and hold**
  Control the outer ring, horizontal bar or envelope curve
- **Right click (RC) and hold (no inner ring)**
  Finetune the control (same as using 'shift' + left click)
- **Right click and hold (inner ring)**
  Control the inner ring. Finetune by using 'shift'.
- **Hoover and mouse wheel**
  Rawtune a control or scroll through context menu options

The right-hand side provides controls that are OSC type specific and will be explained in the respective parts of this handbook. The left side and the bottom will be always the same. Modes can be changed by using the popup menus behind most of the labels.



Volume (LC): **Set the total volume of the oscillator (OSC + noise).**
Range: 0% to 200% / -96dB to +6dB

Panning (RC): **Set the panning of the OSC.**

Both parameters are linked to the mixer tab.



Transpose: Set the pitch of the oscillator.
Range: -48 to +48 semitones.



Fine tune (LC): Fine adjust the pitch.
Range: -1 to +1 semitone.

Random pitch (RC): The inner dial controls the amount of pitch change for every retrigger of a note (keypress or ARP). Turn the inner ring to the left for random pitch, turn it right for alternating pitch. The more you turn up/down the dial the more intense will be the results. This function is excellent for analogue sounds.
Range: up to -1 to +1 semitone from the pressed note



Noise volume (LC): Set the noise volume
Stereo spread: There is a choice of 3 stereo width settings. Noise 100% is full stereo width, left and right are totally different. Noise 50% has only half the width and noise mono has, as the name suggests, no stereo width. Phase lock can be turned on to have better transient control e.g. for drums.
Noice colour (RC): Control the colour of the noise. You can mix smoothly between white, pink and brown noise.
Rate reducer: The horizontal slider under the noise dial is a rate reducer just for the noise. Perfect for lofi sounds or percussion.

Frequency modulation (FM) means the pitch (frequency) of the oscillator is modulated rapidly by a second oscillator. How deep this occurs can be set here. Choose the shape of the modulating oscillator under the FM dial. The popup contains 9 standard waveforms, 3 customs waveforms/LFOs and other OSCs (‘real FM’ – only if there are at least 2 OSCs).



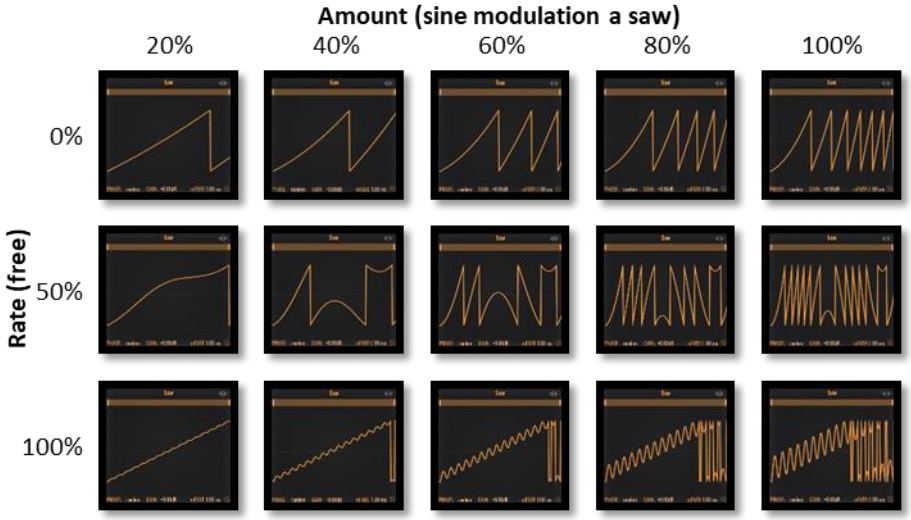
When choosing an OSC, this OSC will be muted and used for modulation only. This is visually represented by a switched off diode, no colour bar above the OSC, and a label saying ‘OSC … (FM)’. To choose an OSC, you need to use FM modes ‘continuous’ or ‘oversampled’. Apart from the disabled routing, the FM OSC can be changed and modulated as any other OSC.

FM (continuous/oversampling): This mode continuously generates FM signals. It’s thus completely smooth. Because of this aliasing can occur in the highs, which could be wanted in some cases. To reduce this, the oversampling mode could be used – but be aware: This will be very CPU consuming!



FM (table mode): This FM mode generates a FM signal in blocks, like a wavetable. Intermediate steps, which doesn’t fit in the table, sound different than in the normal FM mode. We suggest „harmonic“ or „octave“ mode for FM rate. With these all the waveforms fit perfectly in a table. This mode is crystal clear in the highs and has no aliasing artifacts.

FM (table mode windowed): Equivalent to the normal “table mode“, but a fadein/fadeout at the beginning and end of the table will take place to damp clicks, when a wave doesn’t fit properly in the table.





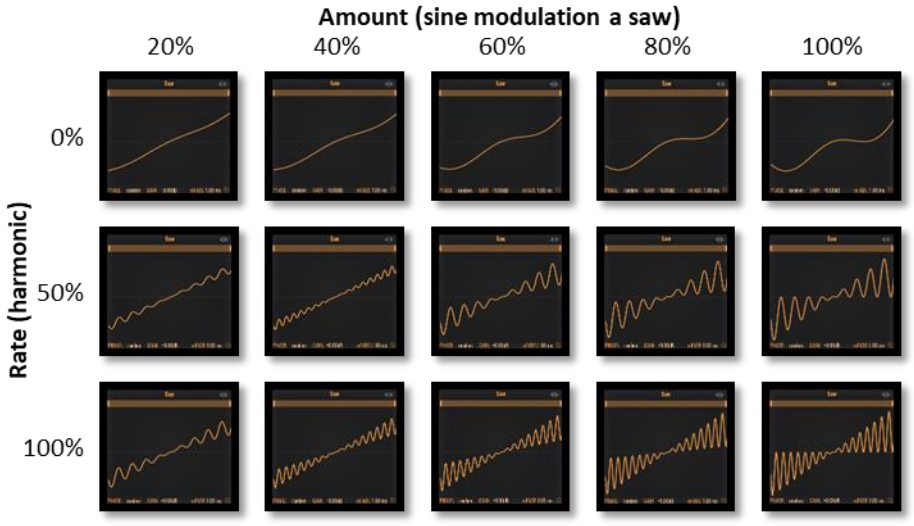
Rate: **AM and FM share the rate dial, which sets the speed/frequency of the modulating oscillator. Since even intervals (octaves) or quintets sound cleaner than odd intervals, various modes can be chosen, which allow only the rates inside the chosen grids. Change grids by using the popup menu.**

Free: **No grid, the pitch of the modulating oscillator can be smoothly set. Since all other modes start at a rate around 50% of the free mode, you need to choose the free mode for lower rates.**
Harmonic: **Only octaves and quintets are allowed.**
Semi: T**he rate dial is fixed in semitone steps.**
Octave: **Only octaves are allowed.**
Chord octave min: **only octaves and minor third (+3 semitones) intervals.**
Chord octave maj: **only octaves and major third (+4 semitones) intervals.**
Chord octave 5th: **only octaves and fourth (+5 semitones) intervals.**
Chord octave 7th: **only octaves and fifth (+7 semitones) intervals.**

Phase lock: **Sets the start phase of the modulation oscillator for FM/AM. If phase lock is on, the phase is the same as the main voice. If phase lock is off, the modulation phase is random. This will be clearly visualized, when setting a phase/start offset for the main oscillator.**



AM: Oppose to FM, which modulates the pitch/frequency, this dial modulates the volume (amplitude). Amplitude modulation (AM) simply multiplies the original waveform amplitude by the chosen waveforms amplitude at a higher frequency/rate. Depending on the rate setting, this will produce different overtones, which are added to the original signal.
You will have the same modulations shapes as for FM, apart from other OSCs, which are reserved for FM only.



Voices panel

The voices panel provides a supersaw, vibrato, a chorder, the sub OSC and an endless sub mode.

V-Saw



Avengers V-Saw is a classic "supersaw" unisono module with its own special features. With this you can quickly and efficiently create really fat detuned sounds which are essential in modern club music.

- **Voices:** Avengers V-Saw can generate up to 7 voices. Here you choose how many there should be (2-7).
- **Octaves:** using this control the 7 voices can be spread over 4 octaves.
- **Voices display:** a small display shows you the number of voices, the octave spread, detune and panning.

- **Mix:** With this slider you can set the mix level of the V-Saw. At 0 (dial completely down) the V-Saw is not active (and thus uses no cpu). If the mix dial is at its full position (right at the top) this means the additionally generated voices are as loud as the original voice.
- **Detune:** the largest and most important dial in the V-Saw is the detune knob. With this you set how much the voices are detuned from each other.
- **Pan:** here you can set how much the (up to 7) voices are spread out over the stereo field.

Vibrato

- **Vibrato LFO waveform:** the V-Saw gives you a special vibrato LFO. This modulates the pitch of the V-Saw. You can choose between two modes:
    - **Global:** the vibrato LFO modulates the pitch (all voices 1x).
    - **Independent:** the vibrato LFO modulates the pitch of *every single voice* differently. This gives you many possibilities and allows you to create even wider sounds.
- Under the global/independent selector you can choose the waveform of the LFO. Click on the waveform graphic and take your pick.

- **Vibrato LFO rate:** here you can set the speed of the LFO.
- **Vibrato LFO amount:** here you set the amount of pitch modulation (depth of the vibrato).
- **Vibrato LFO fade in:** the pitch modulation of the LFO can start with a delay and slowly reach the set amount. Here you can set the time of this delay. With the "curve" control under the fade in dial you can adjust the shape of the fade-in.

Chorder

Avengers chorder, as the name suggests, generates chords and other intervals. On top of that the chorder can act as a second unisono module as you can set panning, volume, and detuning of the individual voices.



- **Chorder preset browser:** Numerous chorder presets are included and can be selected through the browser.
- **On/off switch:** Turn the individual voices on and off. The chorder can generate a maximum of 4.
- **Coarse tune:** Set the pitch (-24 to +24 semitones).
- **Tune (fine):** With the tune dial you do the fine adjustment of the pitch. The range of the dial is -1 to +1 semitone.
- **Pan:** You can position each of the voices in the chorder across the stereo field. The central position is “centered“.
- **Volume:** Volume of this chorder voice. (0%-200%)

Sub osc

In every oscillator in Avenger, you can mix in a sub oscillator which is one octave below the main voice. This saves resources and is clearer than using a completely new oscillator.

- **Volume:** Volume of the sub OSC, up to +6 dB.
- **Invert:** Inverts the phase of the shape
- **Shape:** the sub osc can have various shapes. From right to left: sine, triangle, square and sawtooth.
- **Octave:** Choose from -1 / 0 / +1. +1. Plus one would be the same octave as the trigger note, minus one 2 octaves below the trigger.

General

- **Voices:** Sets the voice limit for the selected oscillator. This can be used to save on cpu (for instance with pads that have a long release time) or if you want a special play mode (monophonic). In modes max 1-64 the usual ‘first in – first out’ applies. Additionally, there are two special modes: ‘max 1 lowest’ and ‘max 1 highest’, which will always play the lowest/highest played note, not caring which note has been triggered earlier.
- **Endless sub mode / Midi Special:** This is a special mode designed for bass sounds use in sequencers (SQs). If the endless sub mode is active there are only 2 octaves on bass that continuously blend with each other. This means that even if you play to the far left on the keyboard the bass stays clearly audible and powerful. This is important with sequencer and arpeggio runs.

Quantize



OSC Quantize
The Quantize feature of the Oscillator lets you constrain the possible notes to a selected musical scale. It comes with plenty presets to choose from.

The GLOBAL button lets you select, if the selected scale should be used for all other oscillators as well or just for the current.

Each Quantizer lets you setup 4 scale sets, which can be even chosen via a modulation signal!

The Quantize Pitch Knob (upper) transposes the oscillator scale. It depends on the selected trigger mode. (TRIG)

The dropdown lets you select its processing range:

- PITCH FULL
- PITCH 1 OCT
- PITCH 2 OCT
- PITCH 3 OCT

The Quantize Glide Knob (lower) defines how note pitches behave, when the Quantize Pitch Knob is modulated.

GLIDE SMOOTH
Notes glide from one pitch to the other, depending on the Quantize Glide Knob value.

GLIDE QUANTIZED
If this option is selected all notes will be transposed without any pitch transition. The value of the Quantize Glide Knob defines the duration of the stepped sequence.

TRIG



The TRIG option determines when notes get transposed by the Quantize Pitch Knob value:

- NO GRID
- ARP PATTERN SPEED
- ARP NOTES
- HOST 16th

INCOMING MIDI



AUTO
The selected scale will be transposed by the incoming note.

FIXED
incoming notes are quantized to the selected scale.

Routing panel



The entire right side of the oscillator panel consists of the routing panel. In principle this allows you to see the path the selected oscillator takes in the signal chain, to influence it and to add effects etc. You can add new modules (for instance a further shaper or filter) at any time by clicking on the "+" button in the top right corner and temporary disable them by using the on/off switches on the left side. Some modules such as the ARP or the AMP are fixed and not moveable in this chain. Other modules can be moved. It makes a huge difference for instance whether a shaper module is before or after a filter. You can move a module by clicking with the left mouse button and dragging the module to where you would like it. If a module is moveable, you can see immediately where you can move it to.

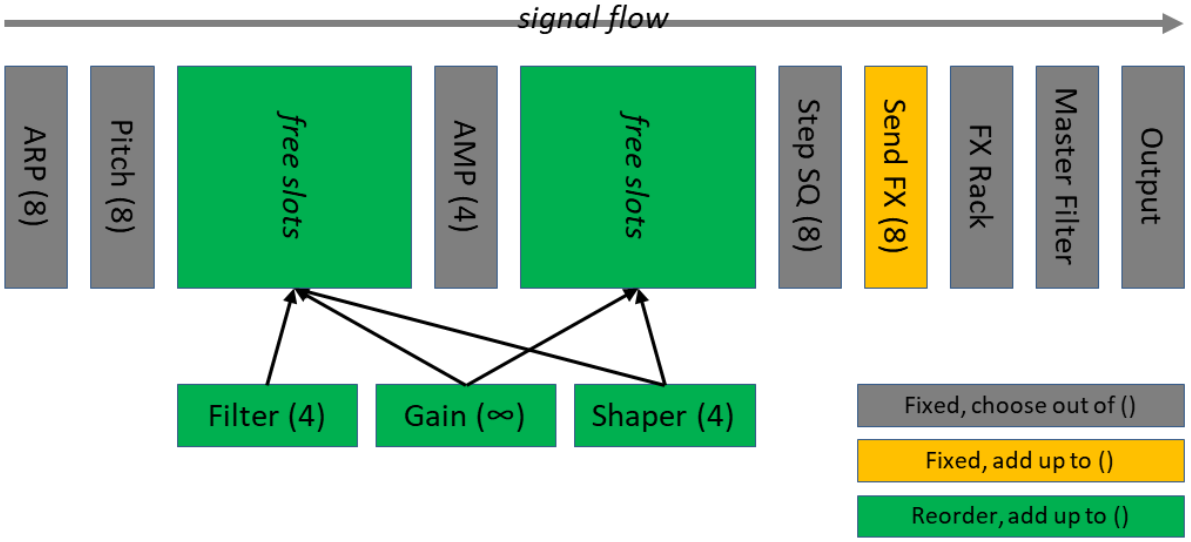
A left click on the modules opens a menu to choose the module number (e.g. ARP 2), serial or parallel mode (for filter) or delete a module.

You can also add send effects by using the „+" button. This effect must obviously be added first in the send rack before it can be seen in this list. Send effects are a resource friendly way to use effects such as reverb or delay. The effect is only loaded once, can be used however on every oscillator with its own mix setting.

At the end of the chain, you can route the oscillator to one or more of the 4 insert effect channels or directly to the master FX. The master filter can also be turned on and off here.

Note: All modules need to be created first ("+" tab) before they appear here in the lists.

Should you lose the overview you can use the "go to" function. Left click of a module and choose „go to" or use a simple right click to do the same. Avenger shows you with a red target cross where the module can be found on the GUI.



OSC types

Avenger comes with two superordinate OSC types: shapes and samples. While shapes provide a lot of opportunities to form them and always give you visual feedback about changes in the waveform display, samples tend to bring complex textures with them that can't be reached that easy by modulation shapes. Shapes, freeform shapes, and resamples / wavetables are shape based, single samples, multisamples and granular samples are – as the name indicates – sample based.

Shapes

Shapes, freeforms, resamples and wavetables are basically the same, varying in flexibility only. They always provide exactly one wavecycle, which will be transposed through the whole keyboard range without any aliasing. They share the same parameters and can be modulated and transformed in various ways.

Shapes are fixed waveforms, which came with the factory library, have been imported or created in the freeform editor and saved. The basic form can't be altered.

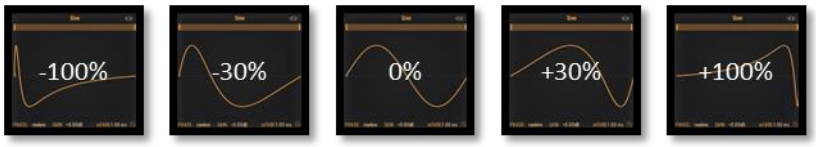
In the VA-Shapes folder, you will find all the basic waveforms: saw, square (which serves as pulse by using the X-side control as well), triangle, sine, noise, and static noise. Further you will find a lot of additional imported and created shapes in this folder as well. Most expansions provide additional shapes, and some are free to find on the internet. E.g. there is a pack of 400 available on https://bit.ly/VPSAvengerWavetableDownloads.

Shape modulation options

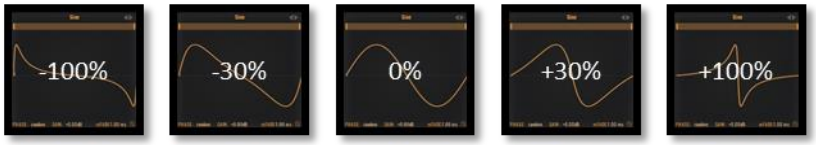
All shape based OSC types come with the same options to modulate the shapes on the right side of the OSC panel control.



XCITE-side:
Squash the left or right side of waveform, depending on which direction you turn the dial from its central position (neutral).



XCITE-mid:
Zoom the middle of the waveform in or out, depending on the direction in which you turn the dials from its central position (neutral).



Formant: Controls the pulse width of the waveform. Turn it left and the waveform is squashed and shrunken towards the left-hand side. Turn it the right and the waveform is expanded out of the right hand side. The part of the waveform that is sticking out will either be simply cut off (clicks) or gently faded out depending on the mode you are in.

Cut: The end is not faded, producing clicks.



Fade: The end is faded to zerocrossing.





X fade/X fade 2: Both crossfade modes behave the same in + range, blending start and end into zero crossing.
In minus range **X fade** blends start and end into each other.



In **X fade 2**, start/end amplitude of the original waveform are preserved and used for blending.



This effect is on oscillator level and acts differently than most normal audio effects that you may know. It actually draws numerous steps and inaccuracies into the waveform.

Modes: Rate, bit, both



Rate reducer: Reduce the rate (number of horizontal steps in time in the waveform amplitude) down to a minimum of three steps).

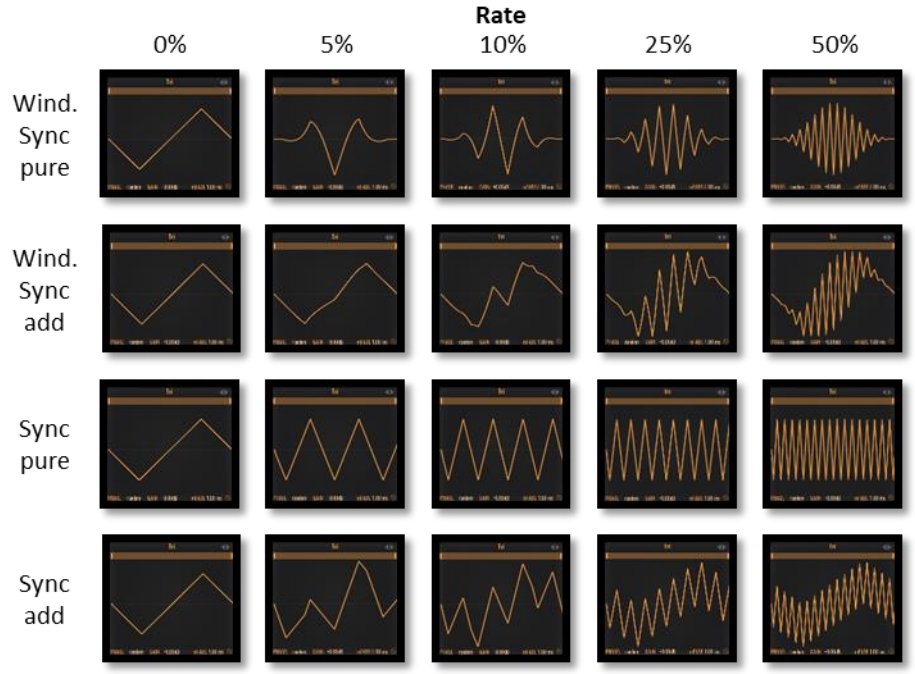


Bit reducer: Reduce the bit depth (number of possible different vertical values in a waveform amplitude) up to a square.



You can use a second OSC (having the same waveform as the original OSC) and add it to the original waveform (add modus) or use the copy only (pure modus). The rate/pitch of this copy is increased and modulated independent of the original OSCs pitch. In windowed mode the second synced oscillator is faded in and out to avoid clicks, when a pitch that would be outside the original waveform occurs. This can be easily heard in the nonwindowed mode. The sync effect has its very own envelope.





Sync amount/frequency (LC): Set the frequency of the 2nd OSC from zero 0% (original pitch) to 100% (+5 octaves) seamless.

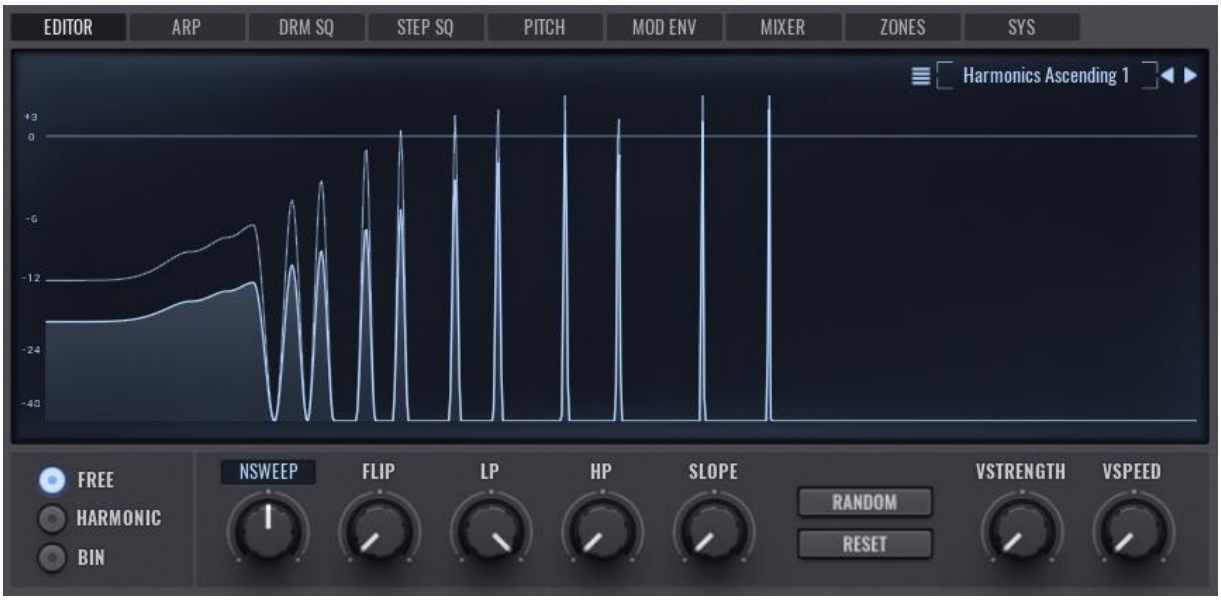
Sync envelope amount (RC): The inner ring controls the amount of modulation, which is sent to the internal sync modulation envelope. This control has a central position 0 (neutral, no modulation). Move it to the right and the sync dial will be positively modulated, move it left and negative modulation occurs.

Sync envelope length: The horizontal control under the sync dial controls the length of the modulation and can be set from 50ms to 3500ms.

Sync envelope curve: The sync dial has its own small modulation envelope. This can be bent up and down. This is set by the inner dial. The envelope is bent upwards by turning the dial past its central position. Turning the dial left of its central position and you bend the envelope downwards.

FFT (fast Fourier transform) editor

For all types of shapes, the editor tab in the central panel will show the FFT editor. When using a freeform, resample or a wavetable, you need to choose the FFT tab to see the FFT editor. A FFT splits the signal into in numerous bands and lets you thus work very closely on individual harmonic or disharmonic frequency components. The deepest harmonic is known as the fundamental harmonic. The FFT editor has 3 different modes (to be selected bottom left):



Free mode: In this mode you can freely draw in the FFT with the mouse. With a pressed “Alt”-key you can draw straight lines. The scale on the left shows the amplification or reduction in dB. The 0dB line is the normal standard volume of the waveform. As the display is logarithmic the deeper bands are larger than higher bands.



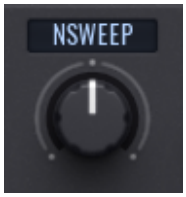
Harmonic mode: The harmonic mode groups individual harmonic or disharmonic bands together. You can identify the bands at the bottom scale and by the colour of the bands. “0“ is the fundamental harmonic, “1“ is an octave above. Next there is the “7th“, which is a fifth (+7 semitones) higher (colour is slightly darker). Following this comes the “2“ (next octave) and after that you can see a “trash”-band

without a name (very dark colour). These bands are all disharmonic bands to the next harmonic band grouped together.



Bin mode: In bin mode all the 256 bands of the FFTs are shown at the same size, linear and not logarithmic. Because of the width of this screen, you can zoom in and out using the mouse wheel. Straight harmonic octaves have been marked with lines to help with orientation.
As you can see in the pictures, the scales differ from mode to mode, the controls stay the same. The values of the mouse position will be shown in the read out screen at all times.

Controls in the FFT editor



The sweep dial moves your drawn changes upwards or downwards in the frequency spectrum. Thus very nice phasing and morph effects are possible with complex mountain/valley waveforms. Standard setting for this dial is the middle position. The sweep can be placed before or after the lp/hp in the signal chain by switching modes. A set lp/hp value can act as a limit for the sweep (**sweep disabled**) or move along with the sweep (**sweep enabled**).



As the name suggests, the flip control flips all the drawn settings in the FFT editor around. A valley would so become a mountain.

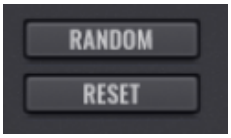


LP/HP: An FFT-based lowpass and highpass filter. This is linked to the filter bar above the waveform display of the OSC panel.

Tip: Naturally those dials can be automated with an envelope. Thus, the LP and HP dials give you a FFT based alternative to a normal filter. The special thing about a FFT based filter is the steepness of its flanks and the resonance, which can be freely drawn by you. The steepness can be up to 90°!



If you dont want to draw the steepness of the lp/hp yourself, you can use the slope dial to in- or decrease it.



Random:
The „random“ buttom gives all of the 256 FFT bands a random value.
Reset:
This sets the FFT back to its original state, leaving the dials as they are



Vspeed / Vstrength:
This is a special mode in the FFT. You can pulsate all the bands with a speed of your choice (vspeed dial) and the intensity of your choice (vstrength dial). A really nice effect for permanent frequency morphing, for instance on organic sounds.

Again, a preset browser is included to choose between numerous FFT curves and patterns. Also your own FFT presets can be saved and stored by clicking on the „save as“ button.

Freeform

Avenger allows you to draw your own waveforms. Freeforms are created and edited with the freeform editor, which allows you to draw one wave cycle as you like.



When loading the freeform editor by double-clicking “Freeform” in the OSC browser or loading the default setting from the menu, you see a horizontal middle line which is your starting point, and you can now draw using the left mouse button. Keep the right mouse button pressed and you can draw straight lines. The background of the display has visible aids that help you draw basic shapes. Please remember, 90° angles or other overly exaggerated bends can lead to clicks = highs/brilliance.

Controls in the freeform editor

- **Preset browser:** the freeform section also has many waveform presets as well as the possibility to create and save your own presets.
- **Smooth A / smooth B:** Here you can smooth the waveforms in zone A and zone B. Sharp corners are evenly smoothed. The amount of smoothing can be seen in the waveform graphic (the filled area inside the yellow lines).
- **Split:** The waveforms can be smoothed in 2 different areas, A and B. This dial lets you decide where these areas are. In the standard setting this is set to 100% which means that zone B is not active and zone A fills the complete waveform.
- **Normalize:** When this is activated, the waveform is continuously normalized. This means it’s made as loud as it can be without going over 0db.
- **Adapt / zero / symmetry:** this dial gives you another possibility to smooth the waveform and avoid jumps. This however only on the start (fade in) and end (fade out) of the waveform. “adapt“ tries to center the start and ending of the waveform. “Zero“ is always set to 0 (center line) and the „symmetry“ mode cross blends the entire right and left half of the waveform together.

As soon as you have created an interesting waveform, this can be converted to a new shape preset by right clicking the waveform display in the OSC panel and selecting “create shape“. The currently shown shape will be added to your Avenger shape presets. After clicking on “create shape“ you simply have

to name the shape and set the destination folder. Your new osc shape is from then on available for use.

Wavetables / Resamples

A wavetable (WT) is in principle a string of different waveforms (in Avenger up to 256), which can be travelled through in real time. Avengers resampler (RS) lets you load normal wav files from which you can generate wavetables. Both modes are, from a parameter point of view, almost identical, which is why they are explained here as one. As already mentioned, WTs and RSs have the same parameters and controls und functions as a normal OSC shape, they won't be explained again here.
Choose „Resampler" in the OSC browser or load a „wavetable" and quite a lot changes in the central panel and the controller bar.
A deep insight into Wavetables can be found here

https://bit.ly/VPSAvengerWavetableTutorial



1. The waveform display shows "Resampler" in RS mode or the WT name in WT mode
2. A new tab lets you choose between the FFT editor and the WT editor
3. WT travel controls + RS exclusive controls
4. WT travel envelope editor
5. WT travel sequencer / pattern editor
6. WT travel strength editor
7. WT travel editor controls
8. WT/RS controls + RS export to WT + view selector: controller bar / wavetable view
9. Wavetable view + WT/RS controls

The main functionality for wavetables, traveling through the WT, is controlled by the following three dials and drop down menues, which can be found on the right side of the central panel.



When a wavetable is loaded, all the waveforms are displayed one after the other in the wavetable view and can be scrolled through with the index dial This is visualized by the highlighted part in the wavetable view and can be followed in the waveform display as well. The index dial has two sub modes:

- **Index smooth** allows smooth movement between 2 wavetables by blending from one to the other.
- **Index steppy** mode provides a hard cut between 2 wavetables, without any smoothing or blending.



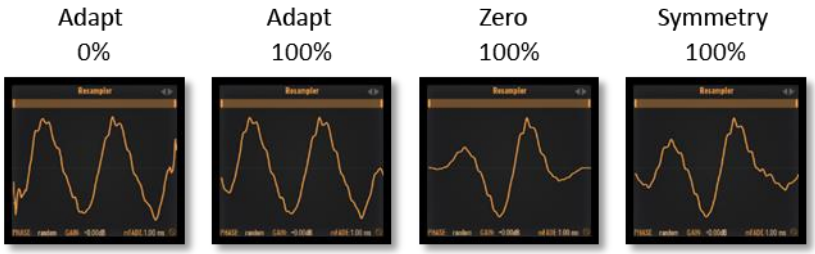
This dial allows you to increase (RS only) or decrease (RS + WT) the number of waveforms used by the index dial.

The minimum is 2, maximum 256.

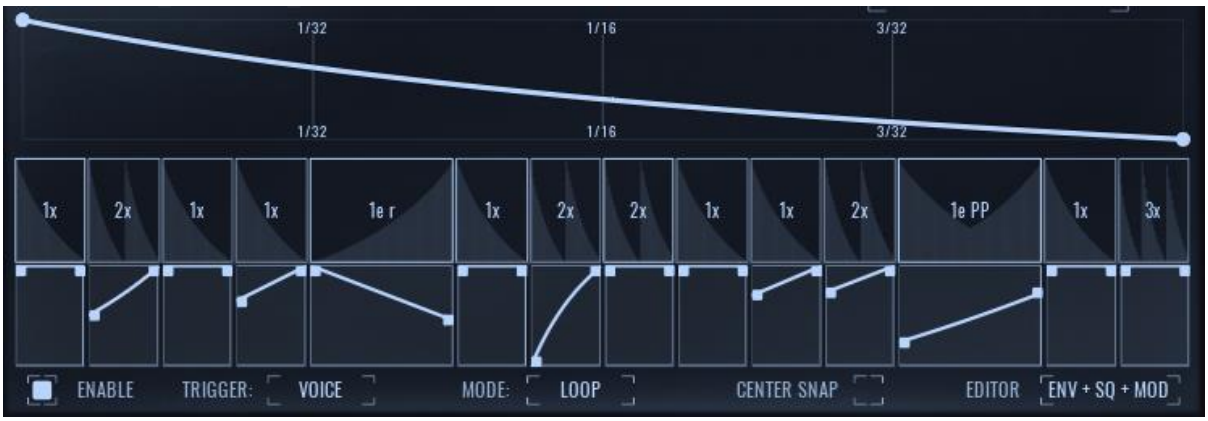


As already explained in the freeform area, this dial smoothes the start and end of the waveform to avoid clicks, providing three modes.

Adapt will center start and ending of the waveform.
Zero will blend into zerocrossing.
Symmetry blends the left and the right half into each other.



Since the most important difference of RTs/WTs to shapes and freeforms are the multiple waveforms, Avengers RS/WT module comes with its own modulation source, which lets cycle you comfortably through the tables. There are up to three editors, which can give you quite complex results in no time.



Envelope editor
The envelope editor is used to build the basic envelope. Add envelope points by doubleclicking in the editor, drag and drop existing points wherever you would like them, or use the rightclick context menu, to delete points. Further the context menu lets you flip the envelope, reverse or reset it. Curves between two points can be altered by dragging them up or down and reseted by ctrl+click.

Sequencer / pattern editor
The pattern editor could be called "wobble" editor as well - it allows you to to play the RS/WT envelope in a sequence of different speeds and in a number of variations with the following options:

Step mode	Abbr.	Description
Normal	x	Plays the complete envelope, multiplying the envelope speed by the chosen number of iterations for this step. (This is the standard behaviour for PP, R, U as well.)
Trigger	t	Splits the envelope into the chosen number of iterations for this step, repeating the first part for the chosen number of iterations.
Ping Pong half	PP	Cuts the envelope into half and uses the first half forwards-backwards
Reverse	R	Reverses the whole envelope
Flip	U	Flips the envelope upside down
Silence	S	The RS/WT won't be played
High	H	Uses the last waveform in the RS/WT
Mid	M	Uses the middle waveform in the RS/WT
Low	L	Uses the first waveform in the RS/WT

The step mode can be set by rightclicking in the steps. A leftclick plus holding and moving the mouse up/down will set the number of iterations and the step length. Maximum step length can be 2 steps (1e), minimum 1 step. Minimum number of iterations is 0.5, growing in steps of 1 from 1 to max. 16.

Strength editor: this is an extension of the pattern editor, which allows you to set the strength of the index modulation per step. This is achieved with a simple envelope with start and end points. A further point can be added in the middle of the curve by a double click. You can also bend the envelopes up or down.

Please note: There is no undo for the envelope editor!

Below the RS/WT envelope editor, there are some additional settings:



ENABLE	**On/off:** Turn the wavetable envelope completely on or off.
TRIGGER:	- **„voice“** – polyphonic: The envelope is used per voice (only the last voice is visualized) - **„first“** – monophonic: The first pressed note in the key zone triggers the envelope once for all notes, no retrigger by further notes until all notes are released - **„last“** – monophonic: Every pressed note in the key zone will retrigger the envelope for all voices. - **„global first“** – monophonic. The first key pressed will start the envelope, no matter if in the key zone or not.
MODE:	- **Loop**: This is the default mode. The envelope (and pattern and strength settings) is continuously looped. - **Ping pong**: The envelope is also looped, but this time forwards / backwards. - **Oneshot**: the envelope is played only once and not looped. The last point in the enveloped will be hold.
CENTER SNAP	Blends in a visual help line exactly in the middle of the envelope. This is helpful when working with bi-polar values where the index is in the middle and movements are possible to both the left and right
EDITOR	Blends in and activates the two additional editors: - ENV: Only the envelope will be used - ENV + SQ: Envelope + pattern editor (sequencer) will be used - ENV + SQ + MOD: The strength editor will be used as well

Further settings can be done by using the knobs, dropdowns, and buttons below the envelope editor.





The **strength dial** sets the amount of modulation of the index position by the wavetable envelope.

The **strength velocity slider** defines how much the strength dial reacts to velocity. Click and hold the **small piano** above the slider to bend the velocity curve in a positive or negative direction.

When the strength editor is used, the set strength is adjusted percentagewise.



Smooth rounds the the wavetable envelope by adding inertia to it and slowing down the time of reaction.



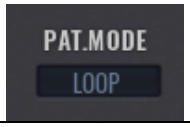
Phase sets the start phase of the wavetable envelope. This has a huge effect on the rhythm, when the pattern editor is in use.



As the name suggests, this will flip the envelope



The **speed dial** sets the speed at which the wavetable is travelled through by the envelope. Next to the speed dial you can set whether or not this is syncronized to bpm or not. This is set to ¼ notes in its standard setting. This means the envelope pulses in a 1/4th note grid. Triplets (t) and dotted (d) or free are also possible. The choosen setting will be represented in the envelope editor as well.



„Pattern mode“ offers 3 modes: loop, pingpong and oneshot.



„Steps“ sets the number of blocks in the pattern editor from 1 to 16. This option will be only available, when the SQ editor is used.

To cover the multiple wavetable functionalities in Avenger, the controller bar is used additionally to the central panel.



The currently loaded wav file or wavetable is displayed in the wavetable view. One light green block equates to one „table“. By turning the index dial you can see how the waveform is traversed (highlighted table), the red dot shows the current wavetable position, when using the envelope.

Use the mouse wheel to zoom in and out. As well as this you can move the start and end markers to limit the played area (resampler only).

You also have the possibility to fade in the start or end of the wave. Please be aware: The more you blend, the more clicks will be produced. Blending all the way, as in above picture will result in heavy clicks.

In the top right area above the waveform display, there are also several new elements.



Normalize: This function normalizes the volume of every single table separately. In the signal chai “normalize” is prior to “fade”, so the normalization will be reduced back to the fade settings.



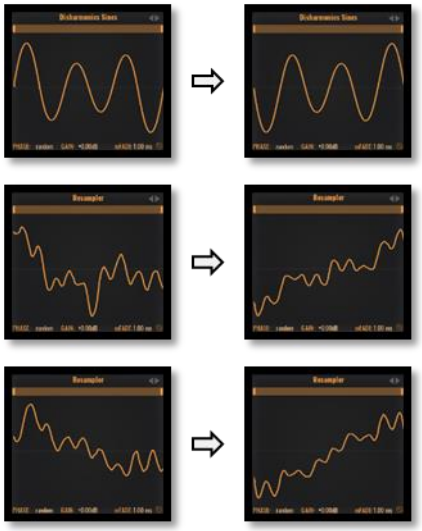
Reverse: Turns the complete wavetable/waveform around.



Vocoder:
An alternative sound variation. This sometimes works better with certain waveforms and also prevents clicks.

It forces the waveform to be symmetrical, going from down- to upwards..

As you can see in the examples, the changes to the waveform can be quite dramatic, which will result in a significant changed sound as well.





This switch let’s you choose between the controller bar and the wavetable display.

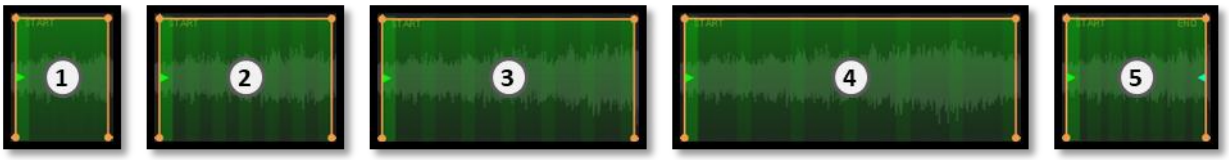
Resampler mode:



These drop-down menus are resampler exclusive and won't appear in WT mode. They are used to design the wavetable (pitch and waveforms).

A wavetable in Avenger can consist of 2 to 256 waveforms, each having between 128 and 4096 samples per waveform. When loading a wave file, Avenger needs some information how to handle the wave, which can be set using these two options and the start/end point in the wavetable view.

Increments: This first drop down allows you to set a distance between individual waveforms (highlighted in the wavetable view). "Increment" (1) means waveforms will directly follow the previous one. An increment of "Incr.x2" (2) skips the waveform between 2 shapes, "Incr.x3" (4) skips two waveforms and "Incr.x4" (4) three.
There is also a special mode "sub. divide" (5), which is kind of a free mode for distances between tables and allows overlapping tables as well. This will simply create the chosen number of waves in the range between start- and endpoint. Depending on your root setting and the distance between start- and endpoint this will cause overlapping or a free distance between the waveforms.



The starting point can be moved for all modes (drag & drop), the end point only in "sub div." mode.

Root: The length of one waveform, which determines the tuning of the wavetable, can be set here. This is done by defining the number of samples per waveform, which defines the frequency, which defines the tune. The length is shown in the wavetable view as well in the highlighted index position.

Input options are note values, fixed number of samples or manual set number of samples. The note values will be translated to the number of samples per waveform as well, they are here to make life easy for you. So if its known that the wav file, you have loaded, is in „c", you should choose „c" here., o the wave length fits a c note perfectly. If the root note of the wavefile is missing, just use a multiple of the sample number below for tuning.

Note	Samples	Note	Samples	Note	Samples	Note	Samples
C0	337	C1	674	C2	1350	C3	2696
C#0	318	C#1	636	C#2	1272	C#3	2545
D0	300	D1	600	D2	1201	D3	2402
D#0	283	D#1	566	D#2	1133	D#3	2267
E0	268	E1	535	E2	1070	E3	2140
F0	253	F1	505	F2	1010	F3	2020
F#0	238	F#1	476	F#2	953	F#3	1907
G0	225	G1	450	G2	900	G3	1800
G#0	212	G#1	424	G#2	849	G#3	1698
A0	200	A1	400	A2	801	A3	1603
A#0	189	A#1	378	A#2	756	A#3	1513
B0	179	B1	357	B2	714	B3	1428

The Export-Button will be shown above the wavetable view in WT and RS mode but be active in RS mode only. It will create a wavetable using the chosen settings.



Samples

The second superordinate OSC type is the sample. Based on samples are the (multi-)sample player with its sample stacker and the granular engine.

Samples and multisamples

Choose a sample in the OSC browser and the display content changes slightly. The right side of the OSC panel will have other options, when compared to a shape based OSC type. All of them can be found in the editor in the central display as well. Dials and the drop down are linked to each other.





Depending on your choice of sample the central display will provide more (single loop, see below) or less options. While the single sample can be edited to some point, multisamples need to be prepared in advance in terms of loop settings. The parameters for single samples are quite selfexplaning (loop on/off, loop mode forward/crossfade, loop start/end, root key) and won't be explained further.





The **shift dial** is useful for multisamples. It will shift the samples up- or downwards while keeping the pitch. This will alter your sound, producing typical pitch effects. Depending on the number of used samples, the dial will have different numbers of steps.
Example: 5 samples (S1-S5, root C4-E4), showing the used samples:

Shift:	**…**	**C4**	**C#4**	**D4**	**D#4**	**E4**	**…**
-3	S1	…	…	…	S1	S2	S2
-2	S1	…	…	S1	S2	S3	S3
-1	S1	…	S1	S2	S3	S4	S4
0	S1	S1	S2	S3	S4	S5	S5

+1	S2	S2	S3	S4	S5	…	S5
+2	S3	S3	S4	S5	…	…	S5
+3	S4	S4	S5	…	…	…	S5



Keytrack has a range of -100% to 0% to +100%.

- +100% is the default setting, playing all notes as expected.
- 0% will play the same pitch at all times, regardless of the played note.
- -100% will turn the notes upside down – a low note will produce a high sound and vica versa.

The keytrack dial is linked to the "KTRK"-option in the waveform display.

Using this parameter will pitch every sample from its root note to a C2. When using a multisample, this will be done for each sample in the defined range.



Sample start: Sets an offset to the sample start, which is visualized by a green line in the displays. The sample starts, when a key is pressed from the green line and skips anything before this line. By doing so you can for instance ignore the attack phase of a piano and create a pad sound.

When setting the sample start by drag+drop the green line in the central display, your position is shown in milliseconds instead of percentage.



Random start: Turn this dial and a grey area appears over the waveform. Inside this area a random start position will be chosen, when you press a key.

This is very useful when using the V-Saw so that all 7 voices have a different phase length. With arpeggios you can use the same function to avoid any „machine gun effect".



Delay: here you can set a delay of up to 200ms for the samples. After pressing a key, the sample will start after the delay time set here. This is useful for instance with a group of bells that you would like to play with slightly different starting times.



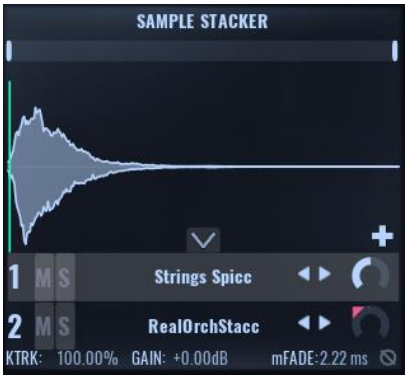
Rate/bit reducer: This effect is similar to the rate/bit reducer in the shape based OSCs. Its sound however is more like the sound of an external rate reducer/bitcrusher effect.



The low pass and high pass filters are resource friendly 6db/oct filters. They are linked to the filter bar in the waveform display of the OSC panel.

Sample stacker

Avenger offers you a very comfortable way to stack samples on top of each other (layering): the sample stacker.





You reach the sample stacker mode, when you first load a sample and then press the „+“ symbol in the bottom right corner of the waveform display. The library opens once again and lets you choose another sample. As soon as you load a second sample, the waveform gets smaller, and the sample stacker shows two samples. The original sample and the new one. You can layer up to 4 samples per oscillator. The new set of controls, which becomes visible, when you have 2 or more samples layered, has the following options in the waveform display:

- **Arrow down**: Blend out the sample stacker menu.
- **Plus**: Add another layer.
- **Numbering/delete:** a simple numbering (1-4). When you hover over a layer number, it allows you to remove this layer by clicking the red “X”.
- **Solo:** solos this layer
- **Name:** shows the loaded sample in this layer. A click on the name selects the layer and provides additional options in the central panel for this specific layer. Further now you can change the sample via drag+drop from the file browser. Please note: drag+drop will always replace the selected sample – no matter where you drop it.
- The **arrows** allow you to step through the library samples without having to open the browser.
- **Volume:** a simple volume control for this layer It is linked to the control in the central panel.

Further settings need to be done in the editor of the central panel. The editor will have two tabs now, named “Global” and “SLOT x: Name of the sample”. The global tab is the same as described before and contains two types of global settings:

Immediate impact on all stacks:
Those settings will be applied to all stacks.

Shift, rate-/bitcrusher, low pass filter, high pass filter
Optional impact:
Those settings can be switch on/off for each stack on the respective slot tab.
Keytrack **on/off switch: Keytrack**
Start **on/off switch: Start offset**
Rnd. Start **on/off switch: Random offset**
Delay **on/off switch: delay**

Further individual settings for each stack on the slot tab:

Shift	Works like the global shift and may be used additionally to the global shift
Transpose	Transpose the sample up to 3 octaves up or down
Fine	Fine tune the sample +/- 100 cents
Volume	Raise or lower the volume of the stack. Link to dial in the waveform display.
Pan	Pan the slot to your linking.

Remember, a sample stacker needs much less cpu compared to putting every multisample in its own oscillator module. For this reason, always use the sample stacker if you can. To take the sample stacker apart again you simply need to delete all but one of the layers or choose another multisample or osc shape in the main browser.



Granular samples

The granular engine could be seen as the counterpart to the wavetable module in the sample world. Granular synthesis cuts a sample into small fragments, so called “grains” and combines those grains back to a full sound (up to 200 grains per second). While doing so, grains may overlap, be played forwards and backwards and be randomized in pitch, pan and position. Grains are smeared into each other, which lets you hold even smallest samples as long as you’d like to.

Again, a dedicated granular envelope lets you travel through the sample or jump to specific points.

When opening a granular preset or an empty granular module, Avenger will look like this:



The OSC panel will provide you with three new controls, density, grain size and random position, which are all linked to the respective controls in the editor in the central panel. The editor will have granular specific controls, which will be explained in detail.

The waveform display below the editor is used mainly for visualizing the granular synthesis with some additional functionalities.

The main functionality of granular synthesis is traveling through the sample and hold the position by playing the grains. This is controlled by the following dials and drop down menues, which can be found in the central panel.



Position defines the starting point of your sound in the sample. When using an envelope, this will move the starting point from the beginning (0% to the end (100%) and adjust all values in between.

When working without envelope this dial defines the position, which will be played.



Density defines the number of played grains per second and may be set from 10 grains per second to 200. While 200 grains per second will result in quite a rich soundscape, this will as well use a lot more CPU than going for 10 grains per second. A density of less than 30 grains per second will – depending on the grain size - result in a rhythmic effect. When choosing a higher number or a bigger grain size, the grains will overlap and produce a higher amplitude (loudness) and complex sound textures, containing more formants and overtones.



Grain size can be set to anything between 25ms and 1000ms and defines the length of the individual grains. This is visualized in the waveform view below the editor.

Combined with the density control this will have the biggest influence on the sound and the use of CPU as well.



Grain envelope the defines how grains are blended in and out, which will have a big influence on clicks and overtones. Options are:

- Triangle: 50% blend in, 50% blend out. Smoothest setting, no clicks.
- Trapezoid: near to a square with a short fade in/fade out.
- Ramp up: Fade in, no fade out. May produce clicks.
- Ramp up rounded: Rounded version, less clicks
- Ramp down: No fade in, but fade out. May produce clicks
- Ramp down rounded: Rounded version, less clicks



Root note needs to be set like in every sampler, when using a sample for melodic purpose.



Rnd Pos (Random Position) sets a random starting point in the sample. 0% will be exactly the chosen position. The random chosen grain position will increase in relation to the position dial. This means at 100% the grains will be chosen from anywhere in the sample. Small values lower 10% might introduce a small flanging effect.



Rnd Pitch (Random Pitch) works similar to random position, but will alter the pitch. While using smaller values results in a rich and full sound, high values might be less harmonic and sound chaotic.



Spread pan will spread the grains in the stereo field. Turn this dial left to use a random position in the stereo field for each grain, turn it right to make the grains alternating from left to right.

The dial can be set from 100% left (random) to 0% (none) to 100% right (alternating) and defines the depth of the stereo effect.



Spread pitch pitches the left and the right channel in opposite directions. A left turn means left up to 1 octave down, right up 1 octave up, a right turn the opposite.



RND, the random grain directions decides the direction of playback of the grains. While 100% means all grains are played forward, 50% will have halfe the grains played backwards, half of them forwards and 0% will play all grains backwards.

To set the granular envelope the central display is used, which works like all other envelopes. A double click will add an envelope point, envelope curves are done by dragging the line between two points up- or downwards, a right click lets you delete points and flip, reverse, or reset the envelope. The mouse wheel zooms in and out the envelope. Further the loop and release points can be moves via drag and drop. For a detailed description please read the for the pitch module and the modulation envelope since they work the same.





Speed sets the playback speed of the granular envelope. The drop down lets you choose between “smooth” and “steps”. Smooths provides you with seamless speed options, while steps will give you only specific options.

This dial is linked to the speed parameter below the envelope editor.



Flip will flip the envelope upside down. This can be followed in the waveform display.



Strength and strength velocity works as all other strengtg velocity options in Avenger. Again the result can be seen in the waveform display only, not in the envelope editor.

The last part of the granular module is the waveform view.

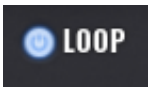


It visualizes your sound by showing green dots – which represent the played grains.

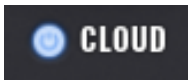
When turning up the random position, they will spread to the left and the right, turning up the random pitch lets them wander from the middle to the top and the bottom.

Bottom left you can set the grid with a right click, clicking inside the view will move the position in the wave and scrolling will zoom in and out the waveform.

Finally, there are three buttons:



The **loop** button makes the sample to an never ending loop, which will switch the position seamless from 100% to 0% and vice versa. When switched off, grains from start and end of the sample won't be blended into each other.



Cloud was made for lengthy samples. When a sample is played in the higher octaves, it will be played faster due to the pitching and therefore get shorter. When activating "Cloud", the grain will preserve its length. Sometimes the grains might be too long for the shortened sample, which leads to a smeary sound. This is good for slow pads, but not suitable for drums or loops.

Therefore, the initial setting is off, and grains will be shortened to fit the sample length of the note pitch.



Transient add a dry version of the original sample to the attack phase to emphasize the transients. This option shouldn't be used for pads to soften the sound.

Multiloop samples

Multiloops are prerecorded audio sample phrases in different pitches and scales (e.g. minor/major). When you play a chord, Avenger will detect the chord and plays the correct phrase in the multiloop set.





Algorithm There are three time stretchin algorithms to choos from. “Pro” sounds best but has the highest CPU load. “Efficient” is lighter on the CPU with less quality. “Timefreeze” is the lightest algorithm. We recommend using “Pro” as long as you have enough power.

Latch To prevent retrigger the sample playback, set latch mode to **normal** Now you play a chord, and it will be played forever, when playing another chord, the phrase switches to the corresponding chord on-the-fly. In **quantized** mode, it will change the phrase at the next grid step.



Formants You can shift the formants of the multiloop in 1st, 2nd or 3rd order.



To start the multiloop from a different position, use the **offset knob**. It shows a snapped-to-the-grid line in the editor, which also can be dragged by mouse.



Loop start / end / speed In case you want to edit the loop boundaries, use the **loop start** and **loop end** knobs. You’ll have a visual representation in the editor when moving them. You can double or half the speed with the designated **speed buttons**.



FX Type Select an effect type in the dropdown box and dial in the fx amount via the underlying knob**.**



ST Width (Stereo width) You can add (clockwise) or subtract (counter clockwise) the stereo signal of the multiloop with this knob. Please note: If there is no stereo signal, this knob won't have any noticeable effect at all.



The info panel below the editor lets you change the **grid** resolution between 1/4 and 1/8. You can also set the **chord type** (for chord detection) from default maj/min to just minor or major if you want to prevent switches between major and minor scales.



Watch these two tutorials on the new multiloop features:

https://bit.ly/VPSAvengerLoopsTutorial

Drums



You can also find the tab for the drums / drum kits amongst the osc tabs. This osc module differs quite largely from the normal oscs. V-Saw and voicing are not present and these make place for a vertical keyboard octave. The keys of this keyboard can be filled with drum samples. The result is a complete drum kit that can be used over and over again. Here's a short overview of all the elements:

Drums main page:

- **Vertical keyboard/sample fields:** every key has a sample loaded on it. For better orientation the names are set (c=bass drum, d#=clap). This aligns with the general MIDI standard. You can naturally load different samples.
- **Waveform view:** a miniature waveform view shows the form of the sample. A running line show you the current position during playback. Hover over the waveform with the mouse and an "edit" text appears which you can click on to enter the sample editor for the sample. Left to the "edit" text there's the icon to the drum browser. Right to it, you'll find "<" and ">" icons to load the very next sample.
- **Mute/solo:** here you can mute or solo the individual drums.
- **Vol:** this sets the volume of that particular drum slot. Another way of raising or lowering the volume is by using the „gain" dial. This is in the sample editor and will be explained further on in this hand book.
- **Pan:** this positions the sample in the stereo field.
- **Pitch:** this sets the pitch of the specific sample. This dial is set to step in semitones. A pitch control that can be set freely can be found in the sample editor.
- **Save drumkit:** with a right click on the drum main page gets you to the menu. Here you can play the current drumkit or initialize.

Drum sample browser



Clicking left on the 'edit' text in the miniature waveform view of a particular sample will take you to the Drum Sample Browser. In the Drums main section, you can select a specific slot, such as BD (bass drum) in this example, and select a different sample from your installed Expansions.
If you want to take a bass drum sample from a specific expansion, select the desired expansion in the middle column, otherwise select "All Expansions" to get a list of all bass drum samples in the right column.

If you select a different sample slot in the Drums main page, such as CLP (clap), the Drum Browser will automatically switch to the corresponding category in the left column.

You can now select a sample from the right-hand column, or simply use the "<" and ">" arrows in the top right-hand corner to load the previous or next sample.

Drum sample editor:



By clicking on „edit“ in the miniature waveform view of a specific sample you reach the drum sample editor. Here you can do various things that only affect that sample.

- **Sample start and end flags:** these two flags are to be found in the wavefom and represent the start and end of the sample.
- **Monophone/polyphone:** if very fast successive overlapping notes are used (for instance a snare drum roll) then this control sets if the notes can overlap (polyphone) or are cut off (monophone).
- **Gain:** if the normal volume dial isn't enough you can use the gain dial to set the volume. This is helpful if you are using very loud or very quiet samples.
- **Envelope:** above the waveform graphic you can also find the envelope. Its possible to add new points to the curve or by using a right click to delete them. The menu that appears per right click contains many other functions such as mirroring or rotating of the envelope.
- **Volume:** this dial is the same as the volume dial you already know from the drum main page.
- **Pitch:** this dial is the same as the pitch dial on the drum main page with the difference that it isn't fixed to turn in semitone steps. It has a finer resolution.
- **Pan:** this dial is the same as the one on the drum main page.
- **Spike:** this gives the sample an additional accent on the attack time (the first milliseconds of the sample).
- **Delay:** ths control has two functions. You can use it to delay the sample (right of center) or push the sample forwards in the drum sequencer (left of center). If you delay the sample, it will be played later and the waveform moves back. Pull the sample forwards and a green bar appears. This bar represents the anchor point in the drum sequencer. The sample is lined up with this point. This makes it possible to exactly position handclaps, snares or short FX swooshes.
- **Lp/Hp:** a simple 6db/oct filter. Well suited to thin out hihats or dampen a kick.

Drums routing:

In principle functionally the same as with the normal oscillators (see „the oscillators area“ -> „routing“). The drum routing is however not quite so involved. You do have the possibility to add send effects, FX busses or shaper modules. The routing is per drum sample, it thus affects only the drum sample that is currently chosen on the left. The first entry is however an exception. The „drum sq“ is global and turns the internal drum sequencer for the entire drum section on and off.



Drums routing (multi selection):

You can have a multi selection with the drums by pressing the shift key. Every change that you then do in the routing will affect all the selected drums. With a pressed ctrl/strg key you can also add or take drums out of the selection. This way you can select everything in one go then deselect for instance the bassdrum and so add a reverb insert FX to everything except the bassdrum.



Drumkit / sequences browser:

Under the routing area you can find the browser for drumkits and drum sequences (tab: „drums“ and tab „seq“). In the „drums“ tab you can load the drumkits from the factory bank or your own kits. In the „seq“ tab you can load the drum sequences from the factory bank / expansions as well as your own. Between both these tabs you can see „lock symbol“. If this is activated whenever you load a drumkit the related drum sequence is also loaded (and vice versa). Warning: if you want to link your own drumkits and sequences they only have to have the exact same file name. There are folders for drumkits and drum sequences in your Avenger folder.



Check this in-depth video about the drums section here:

https://bit.ly/VPSAvengerDrumsTutorial

Event Trigger module

Overview

Since v1.7 you'll find a new tab right to the "Drums" tab – the "Event trigger" tab or module.



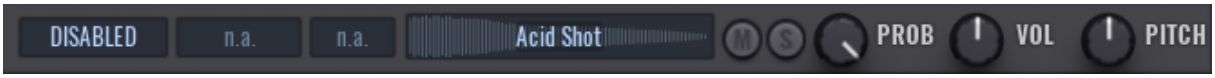
As the name suggests, this module triggers – that means "playing samples" – on events.
You have 10 slots available for events. Each slot has its own trigger rule, sample and routing!

Overall, each event trigger slot behaves like a (multi-) sample OSC tab. Once you got the idea, it's extremely easy and fun to work with it!

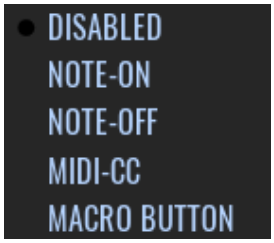
Let's dive into it!

In-depth

In each row you have these options:



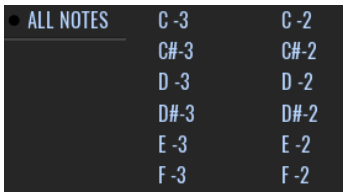
Event trigger type
In the first box you define the event trigger type, you can choose between Note-on, Note-off, a Midi-CC value or a macro button.
Depending on your selection the next 2 boxes will contain further setting options.



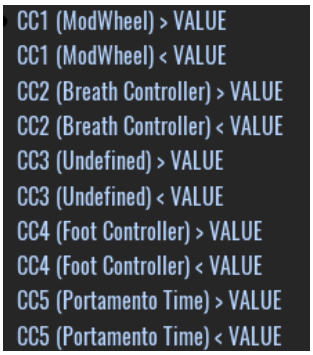
Event Trigger options

- **Note-On / Note-Off**
  When using Note-on/off setting, in the second box you can specify if the event should be triggered **globally** – that means on all OSC tabs (or simply "by sending a note") – or more detailed, by a specific OSC.
  In the third field you can set whether the event should be triggered on "**All notes**" or on a single specific note.
  "Global Midi" and "All Notes" setting is the best go-to setting to play with.





- **Midi-CC**
  With this option, the event is triggered if a specific Midi-CC value is greater or smaller than the specified value in the third box.
  Example:
  If you choose "**CC1 (ModWheel) > Value**" and setting e.g., "64", the sample will be played when the sent CC value (ModWheel) is greater than 64.
  It will trigger again, when the Modwheel goes below "64" (or the amount you set) and raises over "64" again.

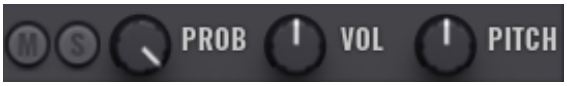


- **Macro Button**
  Obviously, this option will trigger the event when you press the selected Macro Button. You can choose if button 1 or 2 should be used, and in the next selectbox, if the event should be triggered when clicking the button on, off, or on both states.





Event trigger slot options



Each event trigger slot has its own **mute** and **solo** button, and a **volume** and **pitch** knob to dial the settings directly for each slot. Furthermore, there is a **probability** knob to set a certain degree of randomness for the event trigger slot.
Per default it's set to 100%, which means that every time the event is triggered, e.g. by playing a note at note-on/off setting.
If you set the probability to 50%, only every second event will be played on trigger, on 10% only 1 out of 10 hits will be played, and so on.

Event trigger routing

Each event trigger slot has its own routing on the right side, like OSCs have. It works like the OSC routing as well, so there's no special introduction necessary, just set it up as you're used to.

Please note that you can't route it through every existing module like Arp, step sequencer or AMP, but you can set the velocity and pitch envelope directly in the sample editor, we'll cover next.



Event trigger - Sample editor

By clicking on a slots' "edit" button, you open the sample editor for each slot





The editor tab works like the **sample** edit page in OSC tabs but has some little tweaks.
First of all, in the Sample window (as in the image above), you're able to set the velocity curve directly, because you cannot route through the AMP module. Within the editor, you can set the **start** and **end** of the used sample as well using the little flags labled start / end in top left / bottom right corner. Below that, set the envelope time, max used voices micro-fade time and overall gain.

The same appears for the pitch edit page, which you can reach by clicking on "**pitch**" right to the sample selector button. Please note, that you might enable the pitch envelope on the left side, below the editor main window.



On the right side, above the editor main window, you can select “EQ” for an additional 2 band equalizer, which is set **before** the signal is sent to the routing chain!



Check this in-depth video about the event trigger module here:

https://bit.ly/VPSAvengerTriggerTutorial
http://bit.ly/VPSAvengerEventTrigger

The central display

The tab based central display is used in many ways and will provide different functions for the OSC types, modulation sources.

Editor tab

The “editor“ tab has various functions depending on which form of synthesis has been chosen in the currently active OSC: Those functionalities are described in the chapter “OSC Types” and won’t be repeated here.



The Arpeggiator



Avengers arpeggiator lets you create complex sequences and rhythms. Each of the up to 8 arp modules consist of up to 4 patterns (a, b, c and d) each with a maximum length of 32 blocks. You can set a block (note) simply by clicking in the arp area. This can then be transposed up or down by clicking on the „0“ at the bottom with the left mouse button and moving up or down. The length of the blocks can also be changed by clicking it and moving the mouse left or right while holding down the mouse button. Green blocks are always positioned on an octave, transposed notes in between, for instance +6 or +7 are displayed in yellow. Every block also has a velocity value. This is the grey bar in the background behind the blocks. You can click on the background and with a pressed mouse button move the velocity bar up or down.

The controls in detail:

- **+1/-1 shift:** here you can simultaneously move all arp notes together a semitone up or down.
- **Toggle Connection Overlay:** Switch display to connect notes. More details in chapter below.
- **Pattern play:** if the play button is active (green) Avenger will play all the active patterns in succession (a b c d). If the play button is deactivated (grey) then only the currently chosen pattern will be played and then looped.
- **Pattern selector:** switches between the 4 possible patterns (a b c d).
- **Pattern options:** to the right of the pattern selector you can see another button which offers you further options such as copy/paste for a preset etc.
- **On/off button:** at the bottom on the left you can see the on/off button for this arp module.
- **Mode:** every arp module can also have a special mode which sets how incoming polyphone notes are separated in the arp. For instance with the mode „up“ the notes are separated from top to bottom. The special mode „poly“ doesn’t separate the notes at all but rather sends them in their original polyphone state. This allows for chords. „Chords“ mode will be explained in detail below.
- **Pattern speed:** here you can set the length of an arp block. This also sets the speed for this arp module.
- **Octaves:** with the octave choice you can set over how many octaves the arp notes are spread.

- **Fixed Note**: With chord detection, only an "A" is inserted in the arp, if you play an A major, A minor or any other A chord. The advantage is that you can play a normal PAD with your left hand, and the arp will play the correct bass line. It would be difficult if there were +3, +8 + 4 etc transposings in the arp pattern. You grab an A major and the arp has +3 in it - that wouldn't fit. That's what the "+" mode is for. This scales the arp in real time and changes the +3 to +4 if you play e.g. major. Check the corresponding video tutorial: http://bit.ly/VPSAvengerArpChordDetection
- **Strum:** when chords or poly mode is active, you can adjust here how strong the chord strumming should be. Click on “Strum” to edit each step individually.
- **Humanize:** this will randomly shift the starting position of each step.
- **Shuffle:** this is the global shuffle in Avenger. Shuffle gives the melody „groove“ or „swing“. This control is global which means other shuffles, for instance in the drum or step seq are linked to this.
- **Gate:** the gate dial lets you shorten the arp blocks. This always affects all the arp blocks in the arp module. **Important**: if a portamento / legato is set then only the notes which are touching in the arp will „slide“. This means the gate dial should be set to maximum, otherwise this will never happen.
- **Pattern length:** here you can set how many blocks this arp module has. Put differently, the length of the arpeggio. The range is from 2 to 32 blocks.
- **Velocity:** here you set how the arp module deals with incoming velocity values.
    - **First note:** the note pressed first sets the velocity. It stays then set no matter what velocity any following notes may have.
    - **Last note:** every newly pressed note sets the velocity. All the previously played notes then get this new velocity value.
    - **Each note:** every played note has its own velocity value which it then keeps.
    - **Lowest note:** the lowest note currently active sets the velocity value.

- **Star note / end note:** here you can set the range / zone in which the arp is active. This is especially important with complex sequence presets when you only want for instance that a bassline arp will play in the left hand part of the keyboard. The commonly used split in Avengers sequence presets is „b1“. This note separates the bottom half of the keyboard from the top.

Watch the arpeggiator tutorial from Jon

https://bit.ly/VPSAvengerArpTutorial

Chords mode



When choosing “Chords” in Mode panel, the ARP panel view is changing. Each step are now chords, not single notes. Select the root chord – like major, minor etc – directly under each step. Under the chord selection you can transpose the chord by semitones.
If you move a chord step horizontally (up or down), you change the interval of the chord.
Place the cursor over a step and wait 2 seconds, a popup will appear where you’re able to delete single notes from that chord, or adding a sub note, which can be separately transposed.

Check the corresponding tutorial on YouTube here:

https://bit.ly/VPSAvengerChordsMode

Connection Overlay



Click on the toggle button or press and hold CTRL on your keyboard, the connection overlay will appear. Here you can connect notes together, so the arpeggiator will **not retrigger anything** on that point, but changes the pitch by "sliding" to the destination note.

Click on the appearing grid to connect notes. The grid changes to red when the notes are connected.



When you're done, toggle back to the main view (click on the button again or release CTRL key), and you'll see the connected notes.



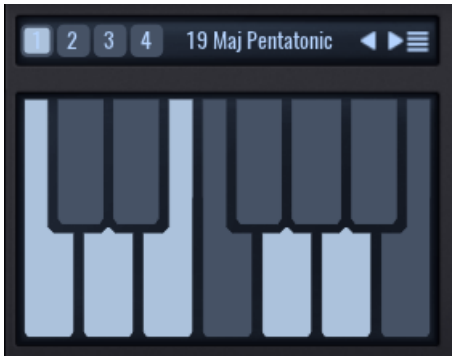
The connect grid only appears, where notes are close enough to each other. If there is too much space between the notes, you cannot connect any notes like here:



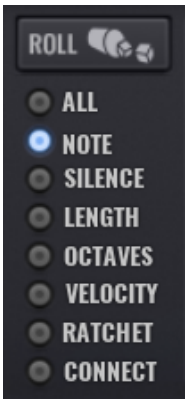
Arp note randomizer

The note randomizer feature is a powerful tool to generate arpeggio patterns based on your input. It even can automatically generate new patterns on each cycle. Generated patterns can also be saved for later usage.

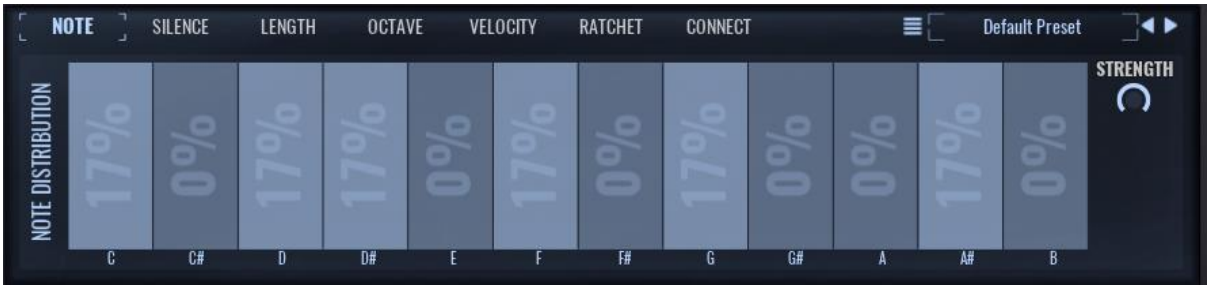
The scale input selector lets you constrain the generated note to a certain musical scale. It comes also with a huge variety of presets to choose from.



Remember, the displayed notes are always relative to the played input note. For example, if you generated a pattern in c-major and play a D key, the pattern would be played in d-major instead etc.



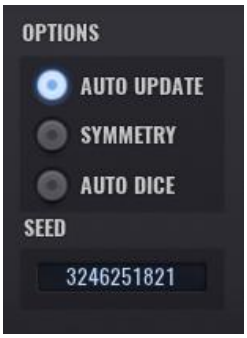
Right beside the scale input, you find the ROLL section.
Here you can select which components of the arpeggio should be generated on the next roll.



On the NOTE page you can define the note distribution probability and its strength.
All notes which do not belong to the selected scale, will receive the probability of 0% and displayed with a darker blue.

For example, if you select 100% C, only C notes will be generated and so on.

The same principal applies to the other pages, except that some offer additional self-explanatory option like NOT twice or on OCTAVE page ONLY UP / ONLY DOWN.



AUTO UPDATE
If this is enabled, any changed you make are reelected immediately.

SYMMETRY
A symmetry of the first and last part is applied to the generated notes.

AUTODICE
Automatically roll the dice again on each cycle (endless new patterns!)

SEED
Displays the random seed number, it can be copy/pasted for further usage if needed.

Check the corresponding tutorial on YouTube here:

https://bit.ly/VPSAvengerArpRandomizerTutorial

Arpeggiator Custom mode

The VPS Avenger 2.4 update includes a new **Custom ARP mode**. When you switch to this mode on the ARP page, you see **bars representing steps** instead of the usual notes. You can adjust the number of steps. The vertical position of each bar controls the **octaves**, and horizontal sliders adjust **semitones** for each step.



The core functionality of the custom mode is selecting which notes from the chord you are currently playing are triggered by each step. You do this by clicking on a step's bar and choosing from **options 1 through 5**, corresponding to the first, second, third, fourth, or fifth note in your chord from lowest to highest. A key feature is the ability to select **multiple notes simultaneously** for a single step. If you select a note option (like 4 or 5) that is higher than the number of notes you are holding in your chord, a **Fallback method** determines what is played instead. Fallback options include Silence, Lowest Midi Key, Next Lower Midi Key, or Random Key. There is also a dedicated **"Root" option** for a step to always play the lowest Midi note of the chord, and you can set individual steps to **"Random"**. The mode also includes an **"Octave Interval"** setting to control how often octaves shift. This new feature comes with **70 presets** specifically for the Custom ARP mode that you can explore.

Accessing the Custom ARP Mode:
Ensure your signal is being sent to the arpeggiator (ARP). Then, navigate to the ARP page. You will find the option for the Custom ARP Mode there.

1. **Basics of the Custom ARP Mode**: When you first enter, you will see bars instead of the familiar notes. These bars represent the steps of your arpeggio pattern.
2. **Adjusting Octaves and Semitones**: The vertical position of a bar controls the **octaves**. If you drag a bar upwards, the step will play an octave higher; if dragged downwards, an octave lower. The horizontal sliders next to the steps are for **semitones**.
3. **Selecting Which Notes to Play (The Core of Custom Mode)**: Click on one of the bars to open a menu. This menu contains five options that correspond to the notes in the chord you are playing:
    - Option 1: Plays the first (lowest) note in the chord (the "Root").
    - Option 2: Plays the second note in the chord.
    - Option 3: Plays the third note in the chord.
    - And so on, up to Option 5.



4. **Setting Up a Simple Pattern (Example: Ascending)**:
    - Set the first step to the first note (Option 1).
    - Set the second step to the second note (Option 2).
    - Set the third step to the third note (Option 3).
    - If you only have three notes in your chord, you can continue this logic to create patterns like ascending or descending. For example, step 4 could play the first note again. This essentially emulates the basic "Up" mode.
5. **Multiple Notes Per Step**: In Custom Mode, you can select **multiple notes simultaneously for a single step**. Simply click on the corresponding options (1-5) for the desired step. This opens up many creative possibilities. If you select all five options, but only play three notes in the chord, you need to consider the fallback setting.



6. **The Fallback Method**: If you select a note option (e.g., Option 4 or 5) that is higher than the number of notes actually played in your chord, the **Fallback Method** comes into effect. This determines what is played instead. You can find the Fallback settings in the menu that opens when you click on a step. The options are:
    - **Silence**: Nothing is played.
    - **Lowest Midi Key**: The lowest played Midi note (the root) is played.
    - **Next Lower Midi Key**: The next lower played Midi note is played.
    - **Random Key**: A random note is played.
7. **Root Option**: There is also a special "Root" option. When this is selected, the step will always play the lowest Midi note (the root) of your chord. In this case, options 1-5 cannot be selected.
8. **Random Option for Steps**: In addition to the Fallback settings, you can set individual steps to "Random". This means a random note will be played for that step. This can lead to a kind of "controlled randomness". You can have some steps determined and others random.
9. **Octave Interval**: Below the steps, you will find the "Octave Interval" setting. Here you can define how many steps (from 1 to 8) an octave change should span. For example, if you choose "1 Step", the next note will be played one octave higher. You can choose standard octave settings (1 to 4) here, like a regular arpeggiator.
10. **Exploring Presets**: The Custom ARP Mode comes with 70 presets. It can be very helpful to load and study these presets under the "Custom" category. This allows you to see how different settings (note selection, octave shifts, etc.) are used. For example, some presets might hit the first two notes on a single step or use the random mode for the last few steps.

The Custom ARP Mode offers many possibilities and may require some time to fully understand and use creatively.

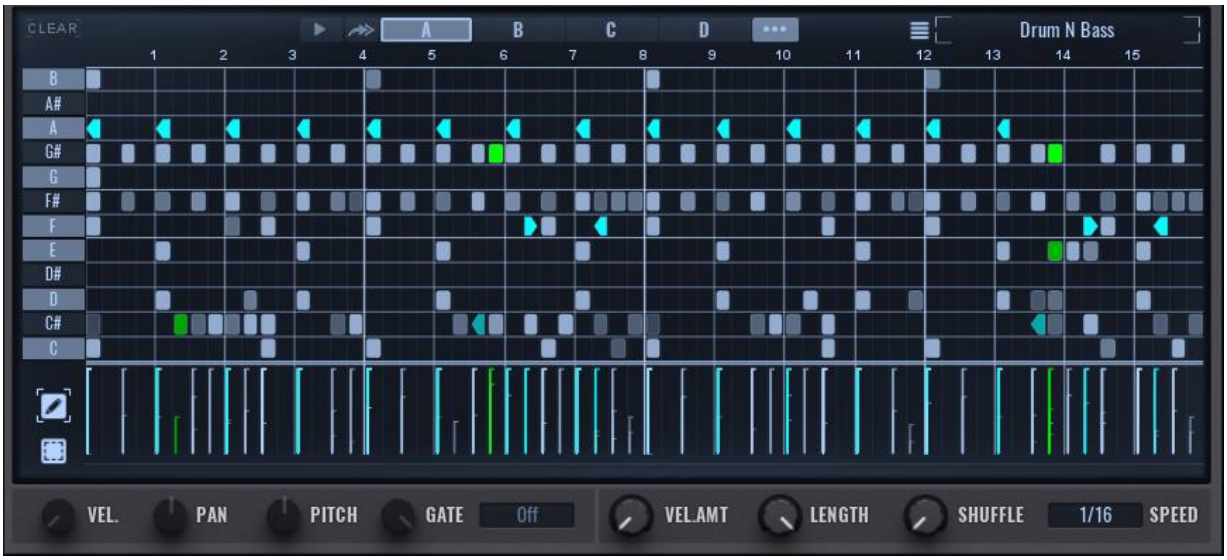
Check the corresponding tutorial on YouTube here:

https://bit.ly/VPSAvengerArpCustom

The drum sequencer

Avenger offers you a very deep and unique drum sequencer. In principle it's a polyphone sequencer which has been specially designed for drums. There is no pitch but rather the 12 samples of the drum kit are displayed. Key c is the bass drum, key d the snare etc. Notes can be placed with a simple left click and removed with a right click. A pressed shift key allows you to draw a bounding box and so to select multiple notes, for instance to move or edit a group. Since version 2.2, the drum sequencer has a total of 4 patterns, which work in a similar way to those in the Arp module.

The elements in detail:



Per note area:

- **Velocity:** here you can set the velocity (volume) of the currently selected notes.
- **Pan:** the currently selected notes can be positioned in the stereo field with this control.
- **Pitch:** this dial sets the pitch of the currently selected note.
- **- Gate:** The length of each selected note can be edited. Very short values will only play the "start click" of a bass drum, for example.
- **Roll / Reverse:** here you can set if a currently selected note gets a roll or not. For instance, 2x rapidly plays the note 2x successively. Set to 8x and the note will be played 8 times. The value 3x is a triplet. Since v1.35 it's possible to play a sample backwards (reverse). The second option, Reverse, end sync" will sync the reversed sample to the end of the step.
- **Clear:** Clears the actual drum pattern. Located in the top left corner.

Pro tipp:
Holding CTRL key while dragging a note in drum sequencer will turn off snap-to-grid so you can fine adjust the position of that note.

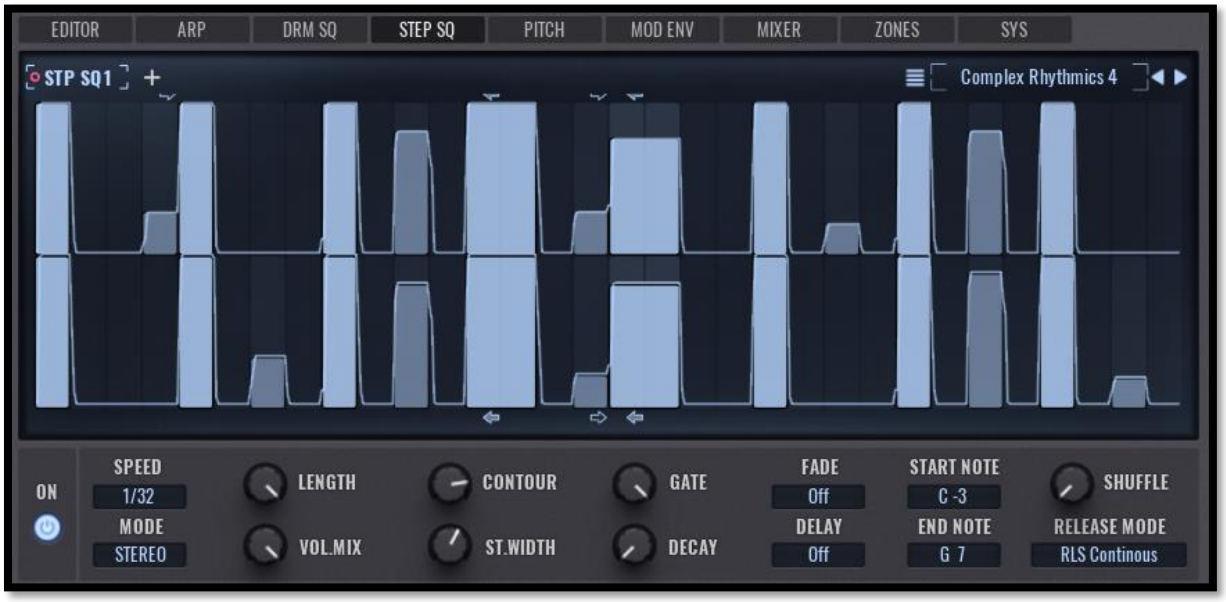
Global area:

- **Velocity amount:** here you set whether or not the entire drum sequence reacts to velocity. Set velocity values in the drum sequencer remain untouched, this only refers to played velocity on a keyboard. Set the velocity for instance to „0“ and the incoming velocity will be totally ignored.
- **Length:** you can set here the length of the drum sequencer. This is in beats, maximum length is 16.
- **Shuffle:** this dial is exactly the same as in the arp section.
- **Speed:** this sets the speed at which the drum sequencer is played. Triplets are also possible. A beat is then automatically spilt up and no longer consists of 4 but rather 3 parts.
- **Pen / frame selector:** you can choose between 2 different control modes. If „pen“ mode is active you can the set and delete notes. If „frame“ mode is active you can do multi selections. Tip: if you are in frame mode you can open a special menu with a right click with numerous functions, for instance mirror, invert, copy or repeat a selection. A further special feature in this mode is when you can select note blocks with the frame mode and then move this block up, down, left or right by using the cursor keys on your keyboard. You can also use shift and cursor up/down to change the velocity of all selected notes.



The step sequencer

Once known as „trancegate“, this sequencer is now called „step sequencer“ as now far more is modulable then just the volume. You can generate blocks (steps) which always have a synchronized length simply with a left click. With a held left mouse click you can set the height (depth of modulation) of each of these steps. Individual steps can be linked and unlinked by use of the arrow symbols. With a right click you can delete individual steps.

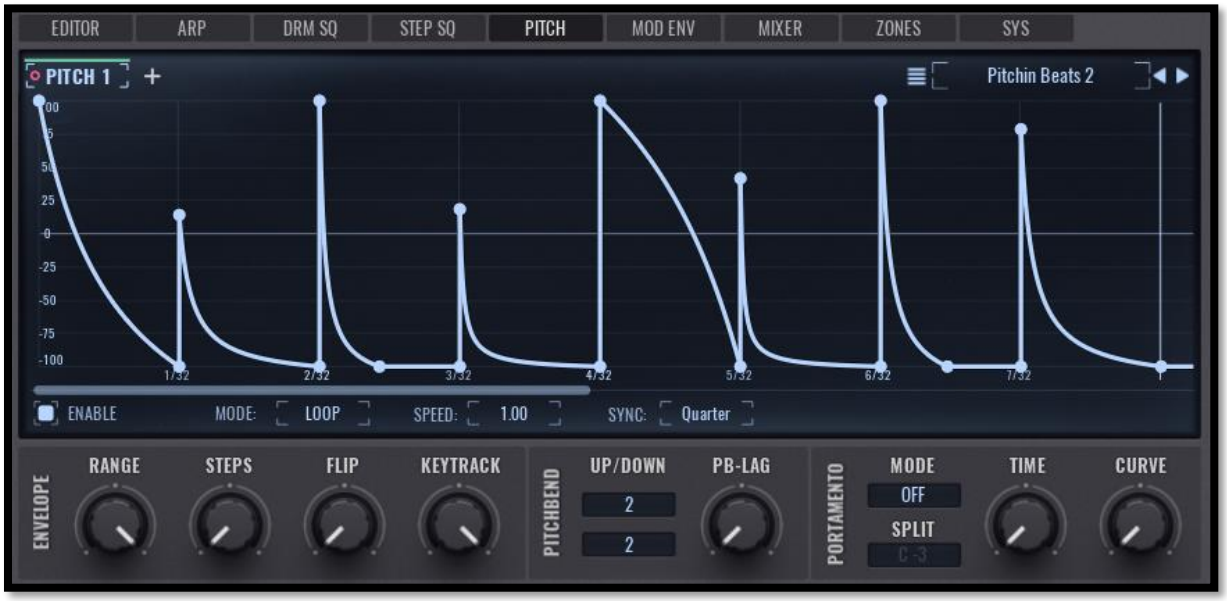


The functions in detail:

- **Speed:** Here you can set what length a step has. This also then affects the speed at which this step sequencer module plays.
- **Mode:** Mono or stereo can be chosen. In stereo mode the step sequencer is split in the middle. The top half is now the left side, the bottom half the right side.
- **Length:** Here you set the length of the step sequencer. Possible are 2 to 32 steps.
- **Contour:** Normally the steps have got a very angular and hard form. With the contour dial you can change these to a softer form to prevent any possible clicking.
- **Gate:** Gate time sets the length of the individual steps.
- **Vol mix:** The step sequencer is set up initially like a classic trance gate (routed to volume). The depth of the volume modulation can be set with the „vol mix“ dial. To turn the pre set volume modulation off simply turn this dial to 0.
- **Stereo width:** If you are in stereo mode (see „mode“) you can set how wide or narrow the stereo separation is.
- **Decay:** In addition to the gate time the steps can also have a decay time.
- **Fadein:** Sets long the modulation in the step sequencer fades in.
- **Delay:** Sets how much times passes before the step sequencer starts.
- **Start/end note:** As in the arpeggiator module. You can set a key zone in which the step sequencer is active.
- **Shuffle**: This dial is the same as the one in the arpeggiator section.

The pitch module

Here you can do many settings which affect the pitch. The centrally placed pitch envelope is a bi-polar envelope, the middle position is neutral, positive and negative values are above and below. This is thus perfect for use as a source for pitch modulations. It is what's known as a "multipoint envelope" on which you can add as many points as you wish with a double click. A right click then "delete" lets you delete a point. Click on the line between two points and you can set the curve. A right click in a free field opens a menu which offers further options such as turn upside down, rotate, and reset.



The controls in detail:

- **Enable on/off:** Turns the pitch envelope on or off.
- **Mode:** There are 4 different modes on offer:
    - **Oneshot:** Oneshot is the standard setting. In this mode the pitch envelope once per played note from beginning to the end. It isn't looped.
    - **Sustain:** In this mode an envelope is also started for every note. It however keeps the position of the release flag when a key is pressed and stays there till the key is released. The envelope then runs through to the end. When released in the attack stage, it will jump right to the release point.
    - **Sustain release jump:** Works basically like the sustain mode, but when releasing the note in the attack stage, it will search for the corresponding point in the release stage and jump there This comes handy to avoid "jumps" in the sound, when releasing the note.
    - **Loop:** In this mode 2 moveable flags appear. The envelope then loops continuously between these two markers.
    - **Loop + release:** This mode is the same as the normal mode apart from one thing: after releasing a key the position jumps to the release flag and runs then to the end of the envelope.
    - **Loop pingpong:** This mode is the same as the normal mode except for the play direction. Here the play direction goes backwards and forwards between start and end.

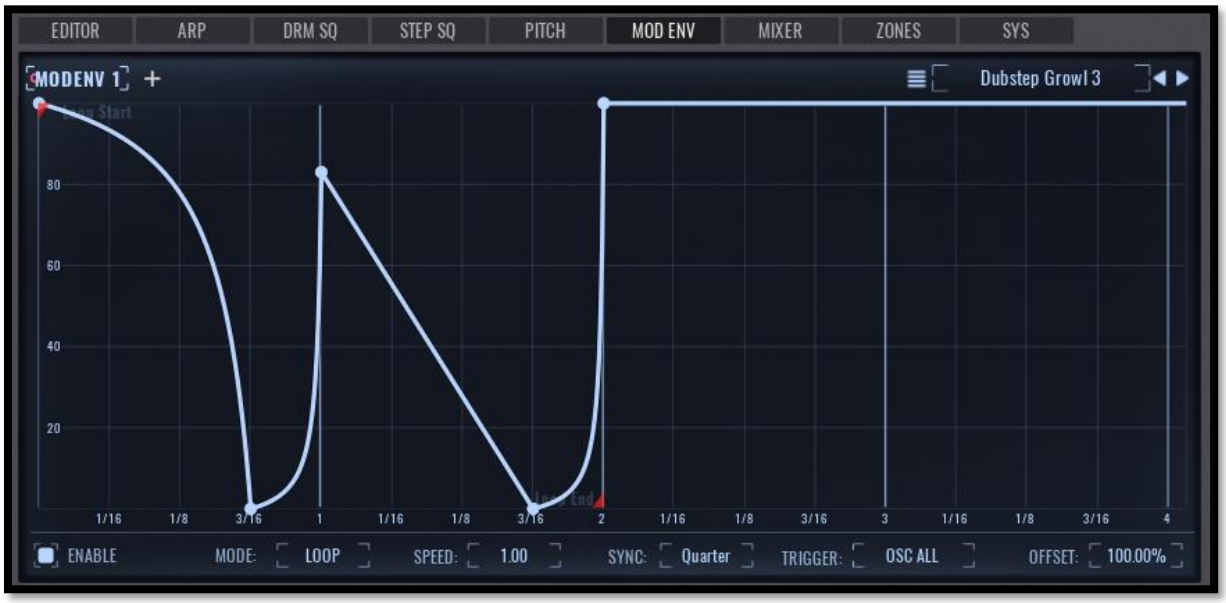
    - **Loop pingpong+release:** This mode is the same as the normal loop pingpong mode apart from one difference: after releasing a key the position jumps to the release flag then runs through to the end.
- **Speed:** This sets the play speed of the pitch of the pitch envelope, (max = 10x quicker, min = 10x slower).
- **Range:** Here you can set the pitch range of the envelope. 24 semitones, both up and down are possible. 48 semitones in total.
- **Steps:** Normally the envelope works very smoothly. You can use this control however to make it more stepped to create for example arcade game sounds or FX.
- **Flip:** Flips the envelope on its head. Tip: this dial is obviously modulatable from other sources.
- **Keytrack:** This dial has nothing directly to do with the envelope but rather sets an area which can actually be pitched. A setting of 0 means that an oscillator that is routed to this pitch module can no longer be pitched. Negative -100 would mean that everything is turned on its head, higher notes would be ever lower. Standard setting is +100.
- **Pitchbend up/down:** Here you can set the range of the pitch bend control. 2 semitones are set as standard you can however, set it for instance at an octave (+12).
- **Pitchbend lag:** Here you can give the pitch bend a certain amount of lag. This can smooth 90° host automation or pitch bend automation that isn't as smooth as it could be.
- **Portamento mode:** This sets whether or not an oscillator routed to this pitch module gets a portamento / glide. If this is not wanted you should switch this to "off".
    - **Legato:** This makes the sound monophonic. When notes overlap (old and new notes) the sound will glide smoothly to the new note (at the speed set by "time").
    - **Poly:** The sound will glide this time polyphone. This has the disadvantage that every note (apart from doubly played notes) glides, for instance in a chord.
    - **Poly legato:** This is a mixture of both modes. A simultaneously pressed chord will not glide, every additional note played after however will be.
    - **Split zone:** Some modes (poly und poly legato) have the possibility to define a note from which the portamento is active. All notes below this note will not be glided and no effect on higher glided notes. This allows you for instance to play bass notes and a lead voice. Only the lead voice glides, the bass doesn't.
- **Time:** Here you set the length of the portamento / glide.
- **Curve:** This control allows you to make the glide function, which is normally linear, become logarithmically bent upwards. This sounds slightly different, similar to a siren.

Too much text? Check the video tutorial:



https://bit.ly/VPSAvengerPitchTutorial

The modulation envelopes



Avenger gives you up to 8 modulation envelopes, so called multipoint envelopes. The modulation envelopes are a very flexible modulation source. They can loop areas and work then like an editable LFO or, per one shot mode, fade out like an envelope. With double clicks you can add as many points as you wish. Apart from this you have in „sync“ mode an time based envelope similar to the step sequencer.

Many of these elements have already been explained in the pitch envelope section. For this reason, we will now explain only the new elements:

- **Enable on/off:** turns mod envelope on and off.
- **Mode:** see pitch envelope section.
- **Scale:** see pitch envelope section.
- **Sync:** see pitch envelope section.
- **Trigger modes:**
    - **First MIDI note:** the note that arrives first starts the mod envelope. All additional notes get added together at the current position in the mod envelope. This mode is monophonic (global) as only one envelope is active at any time.
    - **Last MIDI note:** every new mote starts the mod envelope. Example: if a key is pressed the mod envelope starts. Keep this key pressed and play other keys the mod envelope re-starts. This mode is monophonic (global) as only one envelope is active at any time and is simply re-triggered by new notes.
    - **Arpeggiators:** played or sent MIDI notes play no part in this mode. Only internally played notes (the arpeggiator) trigger the envelope. This mode is also monophonic (global) as only one envelope is active at any one time and is simply re-triggered by new notes.
    - **Drum sq:** this mode acts the same as the „arpeggiators“ mode, with the difference that here Avengers internal drum sequencer triggers the mod envelope.
    - **Osc \ all oscs:** in this mode the mod envelope is polyphone (per voice). This means that every incoming note gets its own copy of the mod envelope which all run

completely separately from one another. An example: the mod envelope controls pitch changes in an oscillator. Every pressed key goes though the same pitch changes. Even notes played shortly after one another don't affect each other. The note that was played first isn't re-triggered but rather runs independently from any subsequently played notes.

- **Osc \ osc1-8:** oscillators can also re-start the mod envelopes. This module is however monophonic (global). An example: whenever osc 2 sounds the mod envelope is triggered which is then, per mod matrix, could be routed to osc 1.
- **Drums:** in the sub menu you can select one of the 12 drum slots as a trigger. For instance, the bass drum. This means that the mod envelope is started whenever the bass drum sounds. A well-known use for this is a fade in on osc 1 (the so called side chain effect) or also other destinations such as filter, pitch, reverb send amount etc.

- **Offset:** the mod envelope is not bipolar in its standard setting. With the offset dial you can however insert a 0 central line. This way the offset dial becomes bipolar, it works in both directions like the pitch envelope.

Too much text? Check the video tutorial:

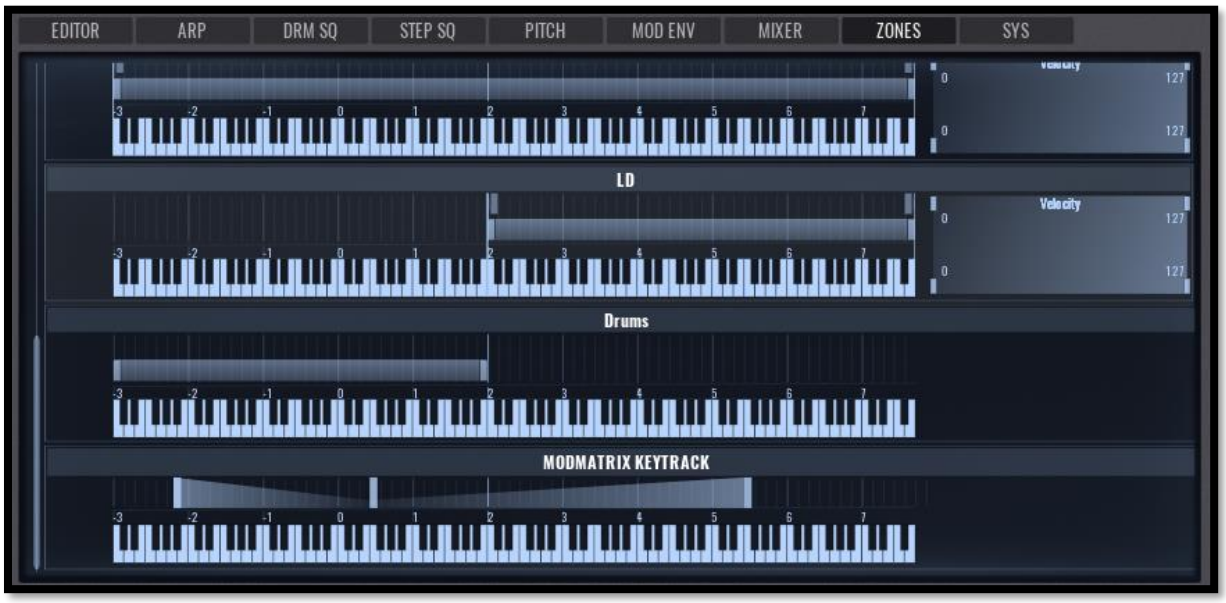
https://bit.ly/VPSAvengerModEnvTutorial

The mixer area



In Avengers mixer you can see an overview of all the included channels (osc, drums or amp groups). You thus have a better overview for mixing your presets or drum tracks. Individual channels can be soloed and muted. Panning can also be set. On the far right there are 3 tracks for osc (all osc groups), drums (all drum tracks as group) as well as the master output (the output of the entire plugin).

Key and velocity zones



In the keyzone tab you can find all the functions to define key and velocity zones. You can set zones in which oscs or drums play or zones in which velocities have an affect oscs or drums. You do all this graphically! Each currently existing osc has its own row with a keyboard which displays the entire pitch range (split into octaves, -3, 0 to +7). Above the keyboard image you have a moveable bar with handles on each end for the start and end point of the keyzone. Smooth transitions are also possible. For this you have to move the bar sitting above, this generates a fade in or out for the keyzone. The light vertical line in the middle marks the keyboard split between the lower and upper parts of the keyboard which is usually to be found in the factory presets sequences. To give a better overview the names of the osc can be found be vertically on the left. As already explained you can use a double click to rename an oscillator.

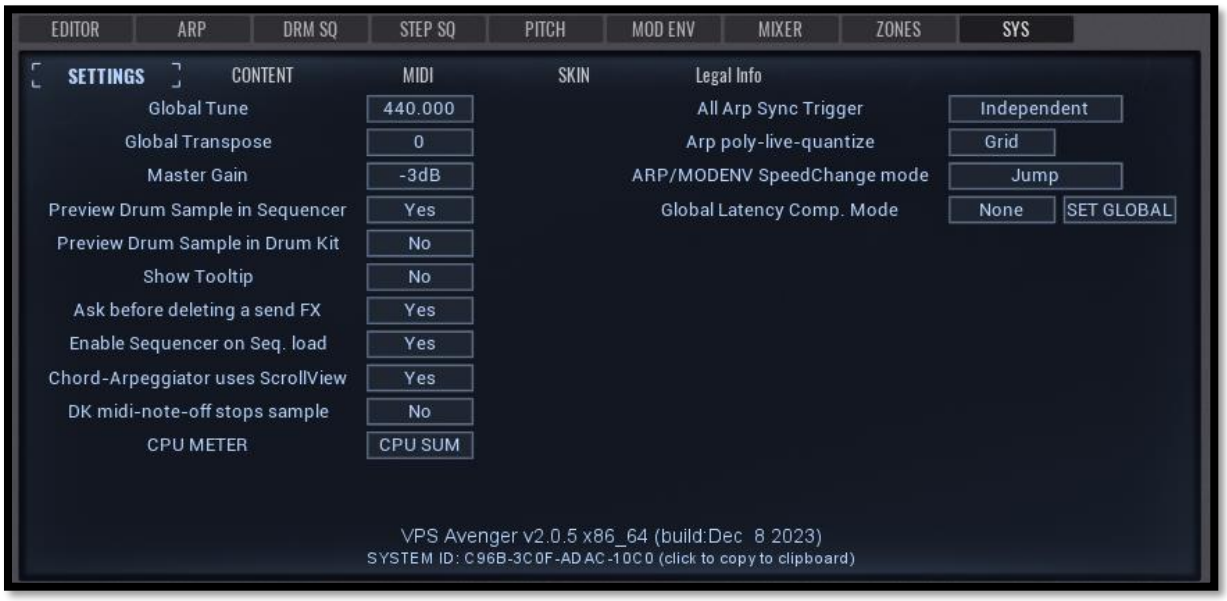
The editor on the right functions works in a very similar way. The number at the bottom left is the start point of the velocity zone. In the top left you can set a fade in for this zone. The number at the bottom right is the end point of the velocity zone. A fade out for this zone can be set at the top right.

Tip: when you press a key on your MIDI keyboard you can see in the keyzones the currently played key and in the velocity zone the currently played velocity. This help with orientation.

Get a deeper insight into this topic on Youtube here:

http://bit.ly/VPSAvengerKeyzones

System page



On the system page you set all the general settings for Avenger. The path to the factory library can also be seen here and, if wanted, changed.

- **Global tune:** Avenger is set to the concert pitch (440hz). This can however be changed. You can see this as a fine tuning for the entire plugin.
- **Global transpose:** here you can set the octave position for Avenger. -12, 0 (default) or +12 are possible.
- **Master gain:** this setting influences the volume level in which Avenger enters your DAW. -3db is the standard setting. If you want it to be louder or quieter, you can do that here. Be careful not to go too loud to avoid clipping in the DAW.
- **Preview drum sample in sequencer:** here you can set if the drum sound plays when you place a drum note. This is on in the standard setting.
- **Preview drum sample in drumkit:** here you can set whether or not the drum sample is played when you click on a drum slot on the drum page. This is set to on in the standard setting.
- **Show tooltip:** here you can turn the tooltips (help windows that appear when you hover over an element) on and off. In standard mode this is set to on. Advanced users can turn this off.
- **Ask before deleting a send FX:** if this is turned on Avenger checks with you if you really want to continue when you delete a send FX. Deleting a send FX has an effect on all the osc that are using it. Even if you accidentally delete something you can always use Avengers undo function to correct your mistake.
- **Enable sequencer on seq load:** this turns the drum sequencer on when you load a drum sequence through a preset so you can immediately hear the loaded sequence.
- **MIDI note-off stops sample:** this option sets whether or not a sample is played to the end or stops when you release the key. This is set to on in the standard mode.
- **All arp sync trigger:** this is a very interesting function and affects the live playing with sequences and arp presets.
    - **First note:** if the first note is played then this silently starts all the arps and sequencers in Avenger even if they are in other keyzones and not audible. This has the advantage

that a note played slightly afterwards in another keyzone is always in sync with the note that was played first. Example: a sequencer preset with bassline/drums on the left of the keyboard and a lead arp on the top part of the keyboard. When you want to play bot at the same time it could be that for instance the bass note for the bassline/drum is played somewhat late. Normally this would mean that their arps start slightly later and so are out of sync with the arps being played by the top part of the keyboard. This can be avoided by using the „first note“ setting as all arps start (silently) when the first note is pressed.

- **Independent:** arps in the various keyzones start independently from one another when a key is their keyzone is pressed.

- **Init preset:** here you can set the path to your init preset (the preset that is loaded when you start Avenger). You can design a preset for this and use this as your start preset.
- **Content location:** this sets the path to Avengers factory content.



The amp section

Overview



This area is Avengers amplifier. To put it shortly, everything that has anything to do with volume or panning happens here. Every osc must be connected to an amp (see the chapter: „the oscillator area" – „routing"). Avenger gives you the possibility to create 4 independant amp modules. Here the elements in an amp module:

- **Volume:** this dial sets the volume of the amp module.
- **Volume velocity:** with this vertical slider you can set the reaction of the volume to key pressure (velocity). If the slider is fully open (at the top) the volume reacts to 100% to the the velocity. That means if a note is played at full velocity (128) then the volume is 100% of the set volume. If the velocity is only half as much (64) this means 50% of the volume that has been set. At velocity 0 the volume is 0.
- **Spike:** the spike function adds a very short set amount of volume to the start of the note. It thus accentuates the attack. A high spike value gives you very percussive sounds.
- **Spike inner dial:** with the inner dial you can set the shape of the envelope which affects the attack. If the dial is completely to the left the env is bent downwards (closes quickly). To the right and the env is bent upwards (closes slowly at the beginning then end faster).
- **Spike velocity:** the spike function can also react to key pressure (velocity). The harder the key pressure (high velocity) the higher the spike value.
- **Pan:** with this you set the position of this amp in the stereo panorama field.
- **Pan keytrack:** the pan can also be linked to the keyboard. This way you can, as with a piano, have the deeper notes to the left and the higher notes more to the right. The central setting of this dial in the neutral position. Turn to the left or the right and it swaps the relevant direction around.
- **Spread:** the spread dial allows you to set whether you want individual notes to alternate or randomly move in the panorama field. The central position is neutral, here nothing happens. Turn the dial to the left and this sets the amount of a random panorama placement of the sound. Turn the dial to the right and this sets the amount of an alternating panorama spread (alternating left and right).

The amp section runs subsequently through an envelope. This has various phases (attack, hold, decay, sustain und release):

- **Attack:** the first phase of the envelope is the attack. This sets how quickly a note reaches its maximum value after it is played.
- **Attack inner dial:** the inner dial lets you set the form of the attack phase and also bend it in both directions. The neutral position, in the center, is a linear form.
- **Hold:** the second phase of the envelope is the hold phase. After the attack has reached the maximum level, the length of time this level is kept before moving onto the next phase is set by the hold parameter.
- **Decay:** the third phase is the decay. You can set here how quickly the decay into the 4th phase should be.
- **Decay inner dial:** the decay dial also has an inner dial with which you can set the form. The central position is neutral (linear).
- **Sustain:** the fourth phase is the sustain. This phase is a special one. It doesn't have a fixed time but rather affects the level of the held volume. The sustain phase is active as long as a note is being played.
- **Release:** the fifth phase is the release phase. This phase starts as soon as a note or key is released. Then the phase moves from sustain to release and the sounds fades out. Release always ends at 0.
- **Release inner dial:** this lets you set the form of the release phase. Negative bends sound nicer and represent how most sounds reacts in nature. You should however keep an eye on the number of voices / cpu, because notes that can barely be heard still use cpu.
- **External source:** with this selection box you can avoid the amps own internal envelope and instead use for instance the mod envelope or the envelope from another amp module. As soon as you have chosen another source, the internal amp envelope is no longer working.
- **Status led:** this light gives you a visual feedback for your envelope. The greater the level and or value in the envelope the brighter this lights up.

Check the corresponding video on Youtube:



https://bit.ly/VPSAvengerAmpFilterSectionTutorial

The filter section

Overview

Filters are inherent in modern music production. Its the filter that gives a sound its form and character. Avenger gives you the possibility to create and use 4 independent filter modules. In the routing section you can also route the filters to be behind one another. There are many different filter modules that are explained further on. First all the elements of a filter module in detail.



- **Keytrack:** the keytrack sets if and by how much the filter reacts to the pitch of an incoming note. If the keytrack is set to 0% then the filter doesn't react to the pitch at all and sounds the same no matter which key is pressed. Set it to 100% and the cutoff of the filter will open further and further as the pitch of the notes being played increases. The distances at 100% relate directly to the note distances, that means you can for instance create a playable „whistling" tone by setting the filter resonance very high. This is, at 100% keytracking, tonally playable.
- **Filter type:** see „filter types" further down.
- **Cutoff:** the cutoff dial is the most important dial in the filter section and sets how open or closed the filter is.
- **Cutoff velocity:** the intensity of the cutoff dial can also obviously be controlled by velocity. Set the velocity slider high and the cutoff will be low when a key is played softly. Play with more velocity and the cutoff will be higher.
- **Resonance / Q:** the resonance dial sets the level of amplification on the cutoff edge frequency. High resonance values sound very shrill and this shrill whistling sound. It moves when the cutoff is moved.
- **Resonance velocity:** the level of the resonance can also be controlled by velocity. This can be set with this slider.

- **Drive / band / comb:** this dial has numerous functions depending on the type of filter:
    - **Drive:** this is the distortion directly in the filter.
    - **Band:** on most of the bandpass or notch filters you can use this to set the distance of the high and low bands. Very important for vocal-like filter sounds.
    - **Comb:** a comb filter can be added to many of the filter types and creates many interesting phase cancellations. If comb is selected, then the filter envelope also reacts to the strength of the comb effect.
- **Envelope amount:** the intensity with which the filter envelope acts on the cutoff can be set here. The central setting is neutral (no effect). Negative values are also possible.
- **Envelope amount velocity:** the intensity of the cutoff on the filter envelope can also be set to be controlled by velocity with this slider.

The filter section then goes through an envelope. This has various phases (attack, hold, decay, sustain und release). In principle all these phases are the same as in the amp section. The same can be said about the „external source“ function and the led light.

Filter Types

Filter Steepnesses: 6 / 18 / 12 / 24 db, defines how steep the filter cutoff frequency is
Filter type: LP / HP / BS / BP – Shortcut for LowPass, HighPass, BandStop and BandPass

Filter algorithms

OnePole: This the most basic filtertype in 6 db. This is quite a soft filter, although it offers resonance, which is untypical for a 6db filter. Best used on natural instruments like strings, piano or brass

AN: The basic filter type of Avenger. They have the lowest possible CPU consumption while still sounding analog and smooth.

NX: These are filters are taken from reFX Nexus. Their characteristic is to have a quite quick envelope reaction time. And they boost the high treble (especially the 24dB). CPU consumption is higher than with the AN type.

VINT: These are specially modelled "Vintage / analog" filters. Their CPU consumption is higher than the AN type, but they sound fantastic and have several specials like resonance self oscillation, input driven distortion stage and the resonance can simulate analog "unstability" (done via the "mod factor" field above the resonance dial)

PXL: These are taken from our standalone filter plugin: VPS PhiltaXL. They have a special sounding smooth and clear resonance.

POW: This filter uses slightly different mathematical functions to create the filter. It has a slightly different sound, especially with resonance. In HP Mode this sounds more like 6dB, but with Resonance it behaves much stronger

IRS: This is another filter with a different mathematical approach. The 12dB typa has a very special and damped reaction to high resonance

T-Bee: This filter is modelled after the 303 filter, its 18db and its resonance and distortion behaves differently to work nicely with simple bassline sounds

COS (HP): This type reacts quite damped and more narrow to higher resonances. Its bands are also less steep and more equal to the entire curve

SSM (BS/BP): Another Bandreject/Bandpass filter type made of 2 corresponding filters. The Drive knob turns into the "Band" dial where you can setup the distance between the 2 filters

Ana Peak: This is a peak EQ, which behaves like a filter. Its perfectly mapped for keytracking so you can boost a certain frequency and play it tuned on the keyboard. The resonance defines the amount of gain. The ANA Peak-Phase is not phase neutral so it has audible changes in phase when modulated.

COMB: This is Avengers basic Comb Filter. You can use this for effect type of sounds. The Drive knob switches to Polarity to change between positives and negatives

COMB Key: This is Avengers enhanced Comb Filter. Its speciality is the perfect lock on keytracking, so you can do Karplus-Strong synthesis with it. Just feed it with a "click" sample from the Factory Special Sample category "Attack Clicks". You should set keytrack to 100% and remove filter velocity completely. Then you can tune it manually to C, which is around 261hz (cutoff readout)

Trash Rate: Instead of a filter you have a Rate Reducer (sample rate). Cutoff controls the depth of the rate reduction, resonance controls the jitter speed

Trash FM: Instead of a filter you have a Frequency Modulator (FM). Cutoff controls the speed of the Frequency modulation, resonance controls the depth
Trash Ring: Instead of a filter you have a Ring Modulator (AM). Cutoff controls the speed of the volume modulation, resonance controls the depth

Talk 6 (BS/BP): this is a bandreject or bandpass filter, specially optimized for formant like vowels, to imitate a human voice with 2 corresponding filters. The Drive knob turns to the "Band" dial where you can setup the distance between the 2 filters. Use a certain amount of resonance to make it sound like a voice

VPS Talkbox: Another formant filter to imitate human voice. This is taken from our standalone Talkbox plugin (from our VPS FX Bundle suite)

Check the corresponding video on Youtube (start on 9:30 for filter types):

https://bit.ly/VPSAvengerAmpFilterSectionTutorial



The shaper section

Overview

The shaper module in Avenger is a very effective distortion unit which can be positioned before or after the filter. Two parametric eqs are placed before the distortion that allow you to colour the distortion. You can have up to 4 shaper modules which can be positioned after one another. You can also route as many osc modules to a shaper as you wish. Here are the controls in detail:



- **Drive / distortion model:** here you can choose the type of distortion in the drop down menu and set the level of distortion with the dial.
- **Drive velocity:** the level of distortion can also be controlled by velocity. The amount iss et with this slider. A key played at maximum velocity (128) always relates to the currently set value.
- **Eq gain1/2:** here you can set the amount of amplification or reduction of the eqs that are influencing the gain. Central position is and deactivates that eq band.
- **Eq freq1/2:** this dial sets the frequency of this eq band.
- **Eq q1/2:** the q-factor sets the width of the eq band. Thinner settings reduce the area in which the eq is working.
- **Eq split:** with this button you can position band 1 far left and band 2 far right in the stereo field. This allows an extreme widening of the stereo signal.

The mod matrix

Overview



Avenger has a very powerful mod matrix. A mod matrix can seem complex at first but its worth the effort to understand it. When creating this mod matrix, we have tried (and succeeded) in making it less complicated than most. For instance, same sources are displayed in groups. In principle a mod matrix area consists of 3 elements:

Source modulated → destination → with value x %

Value x is displayed in procent and can either be negative (-100%) or positive (+100%). No modulation occurs in the central (neutral) setting. Avenger always displays the modulation sources as group headers (grey bar, white centered font). The destination is then shown below in this group (yellow font). A source can be sent to more than one destination at once. Here the individual elements in detail:

- **On/off button:** the button on the left at the top (with on/off symbol) lets you turn on or off the entire mod matrix. Turned off, no modulations will occur.
- **„+“ button:** directly below the on/off button you can find the „+“ button. With this you can add a new modulation source. Press the button an a menu appears containing all the sources available in Avenger. Choose a source and this then appears as a new group on the right and now needs a destination.
- **Init button:** this botton sets the mod matrix back to its initial state.
- **Collapse in/out:** this button allows you to collapse or show all the source groups. This is handy in complex mod matrix set ups to help keep the overview.
- **Group on/off button:** with this button you can turn on or off this individual modulation group.
- **Readout (#1 etc):** this readout helps with clarity and shows how many modulation destinations there are currently in this group. If for instance a #7 is shown here this means that this source is being sent to 7 destinations.
- **Group collapse:** to the right you can find an arrow to collapse/show this group.
- **Source (name display):** in the middle, in white text, you can see the chosen source for this group. You can change this at any time by clicking on the name.

- **+add button:** this button allows you to add additional modulation destinations to this group. A selection of all possible destinations appears, and the selected destination will be added to the group.
- **Destination on/off button:** individual modulation destinations can also be turned on or off.
- **Destination (name):** all modulation destinations are displayed in a yellow text. You can change any destination to be another at any time simply by clicking on this text and selecting a new destination for this group. If you want to delete a destination, simply choose the selection „-----„. The destination is then removed from this group.
- **+/% switch:** the modulation can affect the destination additively (fixed value positive or negative) or procentual (value depends on the remaining travel). An example: source LFO and destination is FM amount. The FM amount dial is set to its middle position (has 50% of its possible value and 50% travel available left and right). Set the strength of the modulation to +100% and the +/% switch to + (additive). The FM amount dial will now be stopped at 50% of its value, it can't go further. Now switch the +/% to % (procentual) and the available travel from 50% to 100% can be used and it ends cleanly at 100% at the end of the dials travel. It will however always wander to the end of its travel even if you set the FM amount to just 20%.
- **Modulations strength:** here you set the strength of the modulation. It goes from -100% to +100%. In the central position it has no effect.
- **Modulations lag (inertia):** the small control to the right of the modulation strength sets whether or not the modulation has a certain amount of inertia or not. You set this by clicking on this element, holding the mouse button and moving the cursor up or down. If the graphic is angular then the modulation happens immediately. If the graphic is round, then there is a certain amount of inertia and the modulation happens somewhat later (and smoother).

Shape

In the mod matrix you can click on the shape button of each modulation. Here you can change the shape of the modulation from linear to any desired envelope.



Mod matrix routing via drag & drop

As we have just shown when talking about the mod matrix you can do many complex things to your sound. Avenger however offers you the possibility to link modulations together in a far easier way. Look for this symbol:



This symbol marks valid modulation sources. These can be clicked on and dragged to any valid modulation destination. For instance, you can click on the symbol on the bottom left over the mod wheel and drag it to the filter cutoff dial. This then appears in the mod matrix:

Source: modwheel → destination: filter 1 cutoff

What is now missing is the strength of the modulation. After releasing the mouse button, you will see that a new symbol has appeared next to the cutoff dial:



You can click on this symbol and move it up or down to set the strength of the modulation. A coloured ring will appear that shows the set modulation strength. You can also delete these routing links. Simply click on this symbol with the right mouse button and delete the modulations you don't want in the menu that appears. Once you have got used to routing modulations in this way you will never want to be without it.

The LFO section

Overview

Avenger offers up to 4 independent LFOs as modulation sources. An LFO is a periodically oscillating waveform which cn be used to modulate a number or parameters. Here the individual elements in a LFO module:



- **Waveform display:** here you can see the current waveform and by clicking on the display also choose other waveforms. The last 3 waveforms are freely editable.
- **C(ustom)-LFO1-3:** when you click on these tabs you have the chance to draw your own LFO shapes. Every Avenger preset can have 3 seperate and individual shapes. The shapes you have drawn can be chosen directly in the waveform choice menu. These shapes can also be used as modulation for the vibrato LFO of the V-Saw and for the FM mode.
- **Oneshot mode:** to the left of the waveform you can find the „Oneshot“ button. Normally a waveform will be looped. This can be turned off with this button. If the oneshot mode has been activated, then the waveform will be played only once. This is useful for percussive sounds or other single events.
- **Phase:** turning this dial and you move the phase position of the waveform. The LFO starting point can thus be moved further backwards or forewards in the waveform.
- **Offset:** with this dial you can move the position of the waveform. The central position is neutral which means the waveform moves above (positive) and below (negative) the null line. You can move the waveform so that for instance the entire waveform is above the null line and thus only emits positive values.
- **Delay:** here you can delay the start of the LFO. The LFO will so pause before starting after a set amount of time.
- **Fade in:** with this dial you can let the LFO fade in. The effect of the LFO will thus start from 0 and increases with the delay set here smoothly to the final set value.

- **Rate:** the rate sets the frequency (speed) of the LFO waveform.
- **Sync:** the sync function affects the rate dial and determines whether this runs to a fixed note value and thus to a bpm or not. You have here a choice between 4 different modes:
    - **No button activated:** the rate is in „free“ mode and isn’t synchronized to the song tempo or note values.
    - **Noten button activated:** this is the normal sync mode with „even“ note values, 1/8, 1/4 etc.
    - **„t“ button activated:** this is the sync mode for triplet note values. For instance 1/8t or 1/4t.
    - **„d“ button activated:** this is the sync mode for dotted notes. For instance 1/8d or 1/4d etc.
- **Synced Mod:** When activated, a rate change via “Rate” knob will always be synced to the beat.
- **Trigger (LFO mode):** the LFO can have various trigger modes:
    - **Global free:** in this mode the LFO is monophone. That means there is only one LFO that permanentaly runs in the background, even when no note is being played. The LFO has thus no link to newly played notes.
    - **First MIDI note:** the first note starts the LFO. All further notes add to each other in the current LFO position. This mode is monophone (global) because only one LFO is active at any time.
    - **Last MIDI note:** every new note starts the LFO. For example: playing a key starts the LFO. Keep this note pressed and press other keys and the LFO starts over with each key pressed. This mode is monophone (global) because only one LFO is playing and is only being retriggered by newly incoming notes.
    - **Arpeggiators:** played or sent MIDI notes play no part in this mode. Only internal notes played by Avengers arpeggiator itself triggers the LFO. This mode is also monophone as only one LFO is playing at any time. It is simply being retriggered.
    - **Drum sq:** this mode is identical to the arpeggiators mode with one difference, Avengers internal drum sequencer triggers the LFO.
    - **Osc / all oscs:** this is the standard mode. In this mode the LFO is polyphone (per voice). That means that every note played has its own copy of the LFO which then run fully independently from one another. For example: the LFO controls a pitch change of a sawtooth osc. Every note played will go though this same change. Notes played shortly after one another have no effect on each other. The note that was played first is not retriggered but rather runs its course fully independent to what comes after it.
    - **Osc / osc1-8:** oscillators can also re-start the LFO. This mode is however monophone (global). Example: whenever osc sounds the LFO is retriggered which could be, through the mod matrix, linked to osc 1.
    - **Drums:** in this sub-menu you can select any one of the 12 drumslots as triggers. For instance, the bass drum. This means whenever the bass drum sounds the LFO is started. A well known example of this would be a volume fade in on osc 1 (sidechain effect) or also other destinations such as filter, pitch, reverb send amount etc.

Macro area

Overview



Avenger offers 3 macro controllers as well as 2 macro buttons which have been set up from the factory to have useful modulation routings. Thus, you can quickly and easily do changes and modulations to your sound with these controllers. You can also patch these controllers to your external hardware MIDI controllers for live use without a mouse.

- **Macro controller:** a normal dial which is without function till it has been given a modulation destination. The easiest way to do this is per drag & drop (see chapter: mod matrix routing by drag & drop). Every macro controller can be freely named. To do this simply double click on the readout and type. For instance „filter sweep“ for a filter movement or „vibrato“ for a pitch modulation.
- **Macro button:** in principle the same as the macro controllers apart from the fact that this has 2 states: off and on (0% or 100% of the set modulation). These are great to for example switch arp patterns or to turn something on and off.
- **Macro button special mode:** hidden in a menu (access by a right click on a macro button) you will see these buttons have a special function. If the special mode is active, then both buttons can never both be active. One will always, when activated, turn the other off. This is sometimes necessary with advanced modulations to make sure button 1 and 2 never add to each other or get in each other’s way.



Lock buttons

Overview



Problem: you have found the perfect shuffle factor, reverb amount or global volume for your song and dont want to lose these when you load new presets. You have the possibility here to „freeze“ these three settings. They will then not be changed when new presets are loaded.

- **Lock shuffle:** here you can freeze the shuffle factor. This will stay unchanged even when you load new drum kit patterns, arp presets etc.
- **Lock master filter:** the master filter module stays unchanged when loading new presets.
- **Lock master volume:** Avengers global master volume stays as you have set it even when you load new presets.

Readout Display



This large display area which you can find in the center at the bottom edge should always be kept an eye on when you are turning a dial. You can see here the complete names of all the controls being moved and also their exact values.

(MIDI) Controller bar

Directly above the keyboard you can see many buttons that represent further modulation sources. From left to right:



- **Pitch**(bend)**:** this is the pitchbend wheel. A pitchbend wheel can be found on almost all master keyboards. It has a neutral central position and allows movements in positive (up) and negative (down) directions.
- **Mod**(wheel)**:** this is the most used controller in Avengers presets. The modwheel is, like the pitchbend, a central part of any master keyboard and allows for movement from the lowest setting at the bottom (0) to fully up (127).
- **Velocity:** velocity means the pressure at which the keys on a keyboard are pressed or of the notes being sent per daw.
- **Aftertouch:** aftertouch is a second velocity layer. After pressing a key, you can once more push even harder on the key and so generate a controller value from 0 to 127 (soft to hard).
- **Keytrack:** the pitch of incoming notes can also be used as a MIDI controller. Deep notes send lower control values and high note high values.
- **Breath controller:** a breath controller is a mouthpiece which can convert the strength with which one blows into it into MIDI values.
- **Expression pedal:** an expression pedal is the most common MIDI foot pedal and is similar to a volume pedal. It's the same as the modwheel only controlled by your foot.
- **Sustain pedal:** originally from the piano world. On a piano you achieve more sustain by pressing the sustain pedal which releases the dampers from the strings allowing them to swing freely. You could obviously route a sustain pedal to amp/release to get a similar result but other (harder) switchings are possible. The sustain pedal knows only 2 modes: "not pressed" (0) and "pressed" (127).
- **Random:** this controller is a special function. Used as a modulation source it generates random values between 0 and 127.

(MIDI) Controller to Modwheel



Some of the MIDI controllers have a special function. Because almost all of Avengers factory presets use the modwheel to control modulation within the sound you can, by using the „mw“ buttons easily re-route this controller to the modwheel.

An example: you load a preset which has a mod matrix setting in which the modwheel controls the filter cutoff. Now, by clicking on „expression pedal / mw“, you can re-route your MIDI expression pedal to the modwheel. You can thus immediately control the modwheel and thus the cutoff with your foot. You can obviously route more than one destination to the modwheel in this way.



MIDI Learn

Connecting external MIDI controllers:
In the lower right corner, you can see the lastly used incoming midi controller. As you can see, there is a 6pin handle to drag and drop this controller to any VPS Avenger control (like you can do with the Mod Matrix drag and drop feature). Once you connected it with an VPS Avenger control, for example the cutoff dial, your midi controller is from now on linked with the cutoff. If you turn the midi controller, your cutoff will also turn.



Deleting and manage existing MIDI connections:
On the SYSTEM page tab, you can reach the MIDI connections overview. You can delete existing MIDI connections here. Furthermore, you can import & export your settings, or set them as default, so the settings will be saved even if you close/re-open VPS Avenger. You reach those functions with a right click or the icons above.



Check the corresponding tutorial on Youtube here:

http://bit.ly/VPSAvengerMidiLearn

The FX section

Overview



Avenger gives you a substantial effects section. Effects are important and give a sound often their necessary depth and complexity. You can create up to 4 independent FX modules (busses). Each of these models can be home to up to 8 effects which work in series. There is also a send module with up to 8 send effects which run in parallel and can be mixed to every osc in individual amounts. There is also a master FX module which is at the end of the chain and consists of up to a further 8 effects working in series. All together this means you can have 48 effects open at once. This huge amount will however hardly ever be needed. You can also set where the output of the 4 FX modules (busses) should be routed to. This can be another FX bus, direct to the master FX bus or even completely bypass all this and go straight to the output.

Here the controls in detail:

- **FX slot:** as already mentioned each FX module has 8 such slots into which you can load effects. A click on a slot opens a menu containing all the available effects. You can also change the effects position in the list. Click on a effect and drag it to its new position.
- **FX slot on/off:** on the left of every FX slot, you can find a bypass button (on/off).
- **FX slot gain:** on the right of every FX slot, you can find a dial with which you can set the intensity of the effect.
- **FX editor area:** the parameter settings of each loaded effect are displays here. Each effect also has its own browser for presets.
- **Output routing:** under the FX slot you can find a button with which you can set where the output of this effect chain should be sent. This can be other FX modules (should they exist), master FX module (standard setting) "output", which means that the signal is sent directly to the output. This way you can for instance send a bassdrum past the mastering (master FX) so it doesn't run to the limiter.

The effects in the FX modules 1-4 have a mix dial. With this the relationship between wet (effected signal) and dry (non-effected signal) can be set. Please notice that this dial is missing in the send effects. The wet/dry relationship of send effects is set in the osc, to which they are to be mixed, directly in the routing.

Tip: A detailed description of every effect type would be too much for this handbook. You can however look up these descriptions in both of our handbooks for „Vengeance Producer Suite FX Bundle 1 & 2". This can be downloaded on our site:

https://bit.ly/VPS-FX1_Manual
https://bit.ly/VPS-FX2_Manual

There are video tutorials for each module on Youtube

https://bit.ly/VPS-FX1_tutorials
https://bit.ly/VPS-FX2_tutorials

Avenger only FX

RUTA VERB

RUTA VERB
The Ruta Verb, is a Reverb Effect which consists of the following components.
Drop down menus, which can be opened by clicking the list icon ( ) reveal further options.

Type
In this section you can choose one of the 5 available reverb algorithms.
Ambient is the smallest and Abysses the largest.

Decay
This is the decay time of the later reflections, the tail of the reverb.

Pre-delay
Either you can set the reverb pre-delay in milliseconds or BPM synced by enabling the SNC button.

Shimmer TN
The 'Shimmer Tune' defines the interval of the generated shimmer partials. For example, the value 12 generates ascending octaves and -7 descending fifths. The count of partials depends on the Shimmer feedback amount.
The drop-down menu lets you even select shimmer partial generation, parallel in both directions. Here you can also adjust the feedback and quality settings. The edit curves window (see screenshot below) lets you configure the interplay of the decay time and the shimmer partial generation.



Shimmer FB
Determines the duration of the shimmer partial generation feedback. The higher the value, the longer the generation lasts.

Modulate
Here you can set the amount of chorus like modulation added to the Reverb.

R**eflection**
100 means that the Reverb tail is not dampened at all,
0 is maximum damping.

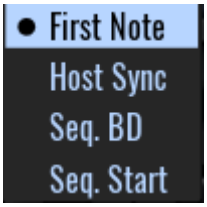
ER/LR
The balance between early and late reflections.

Low-cut
Low-cut filter amount

High-cut
High-cut filter amount

Mix
The reverb mix amount.

SC Mix
Sets the strength of the MidiChain ducking effect. Its drop-down menu lets you setup the retriever mode (First Note / Host Sync / Seq. BD / Seq. Start)



Ruta Chorus



The Ruta Chorus in Avenger 2 is a sophisticated chorus effect that creates rich, spacious modulation by duplicating the input signal and applying pitch modulation to create the classic chorus sound.

Main Parameters:

Shift 1 & Shift 2: These controls set the pitch shift amounts for the two chorus voices, measured in cents. It's creating subtle pitch variations that give the chorus its characteristic shimmer and movement.

Feedback: Controls how much of the processed signal is fed back into the effect. Higher values create more pronounced and sustained chorus effects, while lower values produce subtler modulation.

Voices: Determines the number of chorus voices used in the effect. More voices create a denser, richer chorus sound, while fewer voices produce a cleaner, more transparent effect.

Depth: Controls the intensity of the modulation applied to the chorus voices. Higher depth values create more dramatic pitch variations and a more obvious chorus effect.

Phase Offset: Adjusts the phase relationship between the chorus voices. This parameter helps spread the chorus effect across the stereo field and prevents phase cancellation issues.

Frequency: Sets the rate of the LFO that modulates the chorus effect. Lower frequencies create slow, sweeping chorus movements, while higher frequencies produce faster, more vibrato-like effects.

Deviation: Controls random variations in the chorus timing. Adding deviation creates a more natural, less mechanical chorus sound by introducing slight timing irregularities.

Pre-Delay Sync: When enabled, synchronizes the pre-delay timing to the host tempo. If the setting is set to 0.0, no pre-delay is applied.

Filtering Controls:
Low-Cut: High-pass filter that removes low frequencies from the chorus effect, helping to keep the low end clean and focused.

High-Cut: Low-pass filter that removes high frequencies from the chorus effect, which can help tame harsh frequencies and create a warmer chorus sound.

Mix: Blends between the dry (original) and wet (processed) signals. Lower values provide subtle chorus enhancement, while higher values create more prominent chorus effects.

Phase Puncher



The Phase Puncher in Avenger 2 is a dynamic phase-based effect that creates rich modulation and movement by manipulating the phase relationships of the audio signal. It's particularly effective for adding movement and interest to static sounds, creating stereo width, and adding harmonic complexity through phase manipulation. It's especially useful on synthesizer pads, strings, and other sustained sounds where subtle movement and spatial enhancement are desired. The combination of vibrato controls and level adjustments allows for precise shaping of the phase effect from subtle enhancement to dramatic modulation.

Main Parameters:
Intensity: The master control slider at the top governs the overall strength of the phase effect. Higher intensity values create more pronounced phase modulation, while lower values provide subtle enhancement.

Vib Phase: Controls the phase offset of the vibrato modulation. This parameter determines the starting point of the phase cycle and can create different tonal characteristics when adjusted.

Vib Speed: Sets the rate of the vibrato modulation. Higher values create faster phase modulation, resulting in more rapid tonal changes, while lower values produce slower, more sweeping phase effects.

Vib Strength: Determines the depth of the vibrato modulation. This controls how dramatically the phase modulation affects the signal - higher values create more obvious phase effects, while lower values provide subtle movement.

Double: An on/off switch that doubles the phase effect, creating a more complex and pronounced modulation pattern when activated.

Level Controls:
Mono Level (S-2-M): Controls the level of the mono (center) portion of the signal. This affects how much of the centered audio passes through the effect.

Stereo Level: Adjusts the level of the stereo-widened portion of the signal. Higher values create more dramatic stereo separation and width.

Dry Level: Sets the amount of unprocessed signal in the mix. This allows for blending the original signal with the phase-processed audio.

Output Gain: Final output level control for matching levels and preventing clipping after processing.

ON/OFF: Master bypass switch that enables or disables the entire Phase Puncher effect.

Ruta Distortion



The Ruta Distortion is a versatile distortion effect that provides warm, analog-style saturation and overdrive with comprehensive tone shaping capabilities.

Main Parameters
Gain In: Controls the input level going into the distortion circuit. Higher values drive the distortion harder, creating more saturation and harmonic content. Lower values provide cleaner input with less distortion.

Drive: Sets the amount of distortion applied to the signal. This is the primary control for the intensity of the overdrive effect - higher values create more aggressive distortion, while lower values provide subtle saturation.

Edge: Adds high-frequency emphasis and edge to the distorted signal. This parameter enhances the bite and presence of the distortion, making it cut through dense mixes. Higher values add more brightness and aggression.

Mode Selection
Mode: Default set to "WarmTube" mode. This determines the character and response curve of the distortion algorithm. The available modes include:

- **WarmTube:** Provides analog tube-style saturation with smooth, musical harmonic content and warm character
- **WarmSaturator:** Offers gentle, warm saturation with subtle harmonic enhancement
- **ColoredAmp:** Delivers colored amplifier-style distortion with frequency-dependent saturation
- **Clipping:** Produces hard clipping distortion with aggressive, digital-style saturation
- **LaserMelt:** Creates intense, modern distortion with harsh, cutting characteristics

Each mode offers a different flavor of distortion, from subtle warmth to aggressive saturation.

Symmetry: Controls the balance between positive and negative wave distortion. At center position, the distortion is symmetrical. Positive values emphasize one half of the waveform, while negative values emphasize the other, creating different harmonic characteristics.

Character: Shapes the tonal character of the distortio. This parameter affects the harmonic content and frequency response of the effect, allowing you to dial in different flavors of distortion from smooth to aggressive.

Filtering Section
HPF (High-Pass Filter): Removes low frequencies before the distortion stage. This helps prevent muddiness and can tighten the low end when using heavy distortion settings.
LPF (Low-Pass Filter): Removes high frequencies after the distortion stage. This parameter smooths harsh frequencies and can warm up the distorted signal, making it less brittle.

Output Controls
Gain-CMP: A gain compensation toggle that automatically adjusts the output level to maintain consistent volume when changing distortion settings. When enabled, it prevents dramatic volume changes as you adjust the drive and other parameters.

Gain Out: Final output level control for matching levels and preventing clipping after processing.

Mix: Blends between the dry (original) and wet (distorted) signal. Lower values provide subtle enhancement with mostly clean signal, while higher values create more prominent distortion effects. This is particularly useful for parallel processing techniques.

Visual Feedback
The waveform display at the bottom shows the transfer function of the distortion curve, providing visual feedback of how the effect shapes the input signal. This helps you understand the character of the distortion and how your parameter adjustments affect the signal processing.

Usage Tips
The Ruta Distortion is ideal for adding warmth, presence, and harmonic richness to synthesizer sounds, drums, and other audio sources. The WarmTube mode is particularly well-suited for musical applications where you want analog-style saturation without harsh digital artifacts. Use the Mix control for parallel processing to maintain the original signal's dynamics while adding harmonic content.

BIT BITE



Bit bite is a bit-crusher effect with additional possibilities to sculpt the incoming audio.

BITS
Here you can either click the rectangle to select which bit should be processed or use the slider below for randomization.

DRY/WET
Here you can adjust the amount of the unprocessed and processed signal.

+R/-R
Processing bit type.

PEAK AMNT
The intensity of the peak filter.

COMPRESS
Compression amount.

PEAK FREQ
Center frequency of the peak filter.

FEEDBACK
Feedback amount.

TIME
Feedback time.

LOW / HIGH DAMP
Amount of low/high damp.

CRUSH
The bit crusher intensity

DRIVE
Drive intensity

FILTER
This section lets you limit the processing range.

OTTER

Is a 3 band upward downward also referred as “Over the Top” compressor.
It pushes the loudest parts of the sound down and pulls up quite sounds, which results in a quite compact sound.



AUTOGAIN
Enables/disables the autogain feature.

LIMITER
Enables/Disables the build-in limiter.

THRESHHOLD
The processing threshold.

RATIO
The compression ratio.

DRY
Amount of mixed unprocessed signal.

ENV
Envelope scale.

WET
Amount of mixed processed signal.

OUT-GAIN
overall output gain.

INTENSITY
OTT process intensity.

Envelope Follower



The envelope follower lets you modulate other parameters with the amplitude of the incoming audio signal. The detection range can be determined and limited by using the THRESHOLD and build-in bandpass filter (BP).

The lower part of the interface visualizes the output modulation curve as blue curve, as well as the threshold as green line.

At the bottom you can MUTE, audition the chosen band limited input signal (BP FILTER) or pass through the incoming audio signal (OUTPUT).

GAIN
Adjusts the top be analyzed input gain.

THRESHHOLD
The threshold value from which the process should start.

BP FREQ
Determines the center frequency of the process.

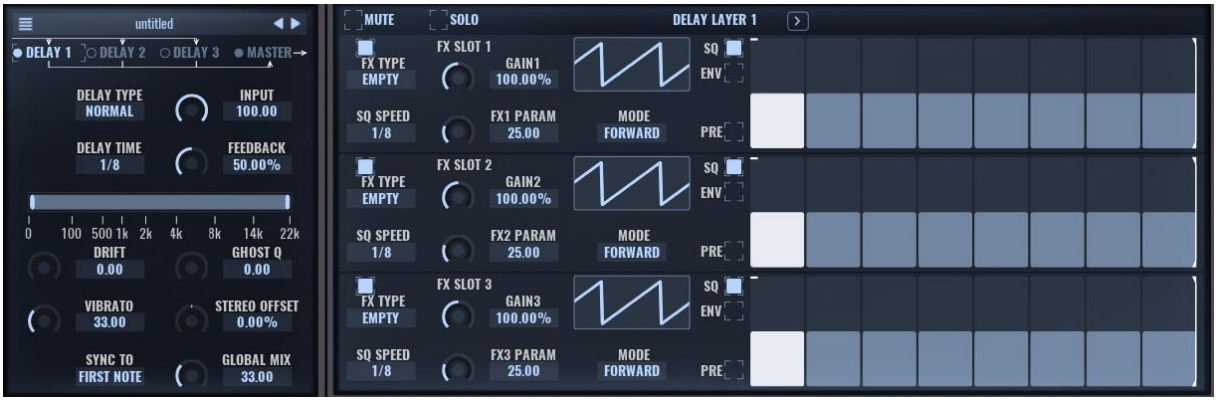
BP WIDTH
This parameter lets you limit the width process range.

ENV1 ATK
Defines the attack curve of the generated modulation signal.

ENV RLS
The release curve of the modulation signal.

Q4antum FX

The Q4antum FX is a combination of 4 DELAY effect layers, where each has its own modulation page. There is also a MASTER layer, for further processing and routing. It also has a dedicated modulation page. The interface is divided into 2 main parts. The right side, mentioned before as modulation page, follows the respect selection (e.g. DELAY 1) on the left. On the left we have the DELAY and MASTER layers with its parameters.

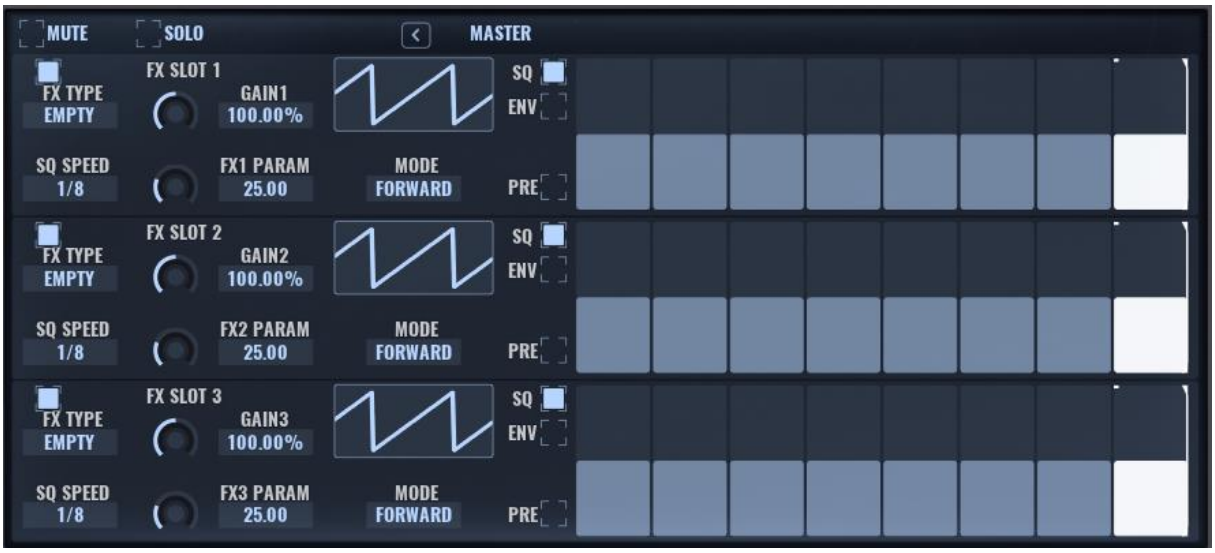




Each DELAY has its own set of quite self-explanatory parameters, whereas the MASTER allows you to route the DELAY outputs into each other and furthermore apply and adjust a SC MIX (mini chain ducking effect), VIBRATO, STEREO OFFSET, SYNC TO and GLOBAL MIX.

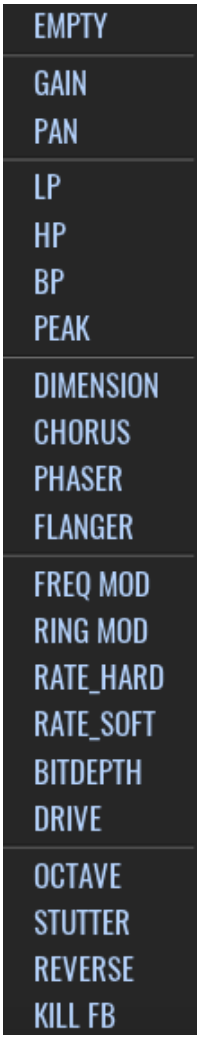


A filled dot before the tab name indicates whether the layer has an Q4ntum FX audio input applied.

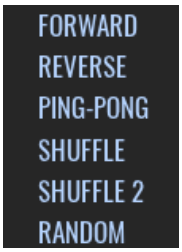


As outline above, the right side follows the selection of the layer on the left.
Here we can chain up to 3 FX SLOTS. Each FX SLOT has its own FX TYPE, GAIN, FX PARAM, SQ SPEED and MODE input. The function of the FX PARAM depends on the effect type and the MODE determines the playback direction of the modulation sequence or envelope.

Available FX Types

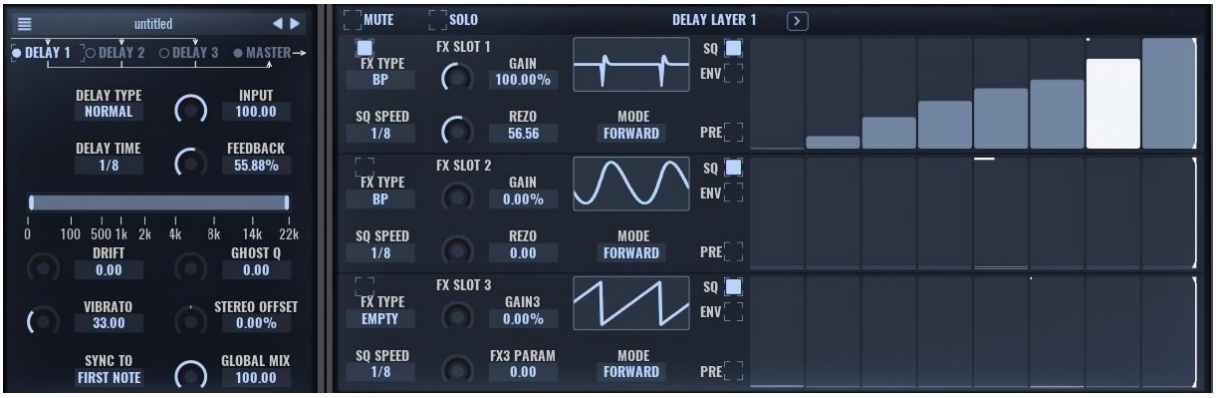


Available Modes



Once you added a FX, you can decide to either modulate its intensity with an envelope (ENV) or with a step sequence (SQ) and if the FX should be placed before (PRE enabled) or after the delay.

For example, let's add a bandpass-filter (BP) to FX SLOT 1 and keep it simple by just using DELAY 1 with a 1/8 delay and some feedback.



The FX PARAM shows now that we can adjust the resonance (REZO) of the filter.
Since the SQ SPEED and DELAY time are the same, each delayed tone is filtered from low to high according to our defined step sequence. The same applies to the envelope with the difference that we get a gradual modulation instead of steps.

Stereo Matrix



The Stereo Matrix effect allows for precise control over the stereo field and positioning of a sound.

Key controls include:

Gain Left/Right: Adjusts the volume of the left and right channels independently.

Delay Left/Right: Introduces a delay time to the left and right channels, creating a stereo-widening effect.

Mono Level: Sets the overall volume of the mono (center) portion of the signal.

Stereo Level: Adjusts the overall volume of the stereo (left/right) portion of the signal.

Panning: Centers the signal in the stereo field.

Mix: Blends the dry and processed signals.

This effect provides comprehensive stereo shaping capabilities, enabling users to fine-tune the width, balance, and positioning of a sound within the stereo image. The independent gain and delay controls for left and right channels allow for creating unique and dynamic stereo placements.

AA Vowel Filter



A vowel filter is an effect that modulates sounds so that they imitate the sound of human vowels (e.g. A, E, I, O, U). It works by emphasizing or suppressing certain frequency ranges that are typical for the formants of a vowel. This creates a characteristic, "speaking" sound that is often used for creative sound effects in music productions. Vowel filters are often used in electronic music to make synthesizer or vocal sounds livelier and more expressive.

Vowel selection: Select up to five vowels in the Vowel 1-5 slots to activate the desired formant filters.

Shift control: Adjust the sound of each vowel with the Shift V1-V5 controls (fine adjustment of frequencies).

Brightness: Adds some brightness to the sound.

Fader: Fade between the vowels (0 = Vowel 1, 100 = Vowel 5)

Out Gain & Mix: Control the output volume and the overall balance of the effect.

AA Wha Wha



A wah-wah effect is an audio effect that creates a distinctive "wah-wah" sound by using a bandpass filter. The filter is swept back and forth across the frequency spectrum, creating a dynamic, expressive tone that is commonly associated with electric guitar and other instruments. The filter's frequency is typically controlled by a pedal or other input, allowing the performer to manually "sweep" the filter as they play. This creates the characteristic rising and falling wah-wah sound that has become an iconic effect in music.

The Wah Wah filter in Avenger 2 provides a versatile and dynamic wah effect, with three distinct operating modes: **Auto**, **Pedal**, and **Mod**.



In **Auto mode**, the wah is automatically modulated based on the incoming audio. The **Tracking** parameter controls how the filter responds to the input, while **Sensitivity** adjusts the threshold for triggering the modulation.

In **Pedal mode**, the **Pedal** knob directly controls the opening and closing of the wah filter, allowing you to manually sweep the effect. You can assign this control to the mod wheel for real-time manipulation.
The **LR Phase** knob adjusts the stereo positioning of the filter, with the fully closed filter positioned on the left and the fully open filter on the right. This creates an interesting spatial effect as you sweep the wah.



The **Min/Max** sliders set the frequency range for the wah, so you can fine-tune the filter's sweep. There is also a built-in high-pass filter (**HPF**) with separate **In Gain**, **Out Gain**, and **Mix** controls to blend the processed and unprocessed signals.

Mod mode enables you to sync the wah effect to an internal LFO. The Depth parameter controls the intensity of the modulation, while the **Trigger** setting determines when the LFO cycle restarts - options include Free, Host, and First Note. The **Offset** knob (OFST) adjusts the starting point of the LFO cycle.



Overall, the WahWah FX panel in Avenger 2 provides a comprehensive set of controls for shaping and automating the classic wah effect. The various modes and parameters allow you to create dynamic, expressive filter sweeps that can greatly enhance your sound design and performance.

AA Peak Limiter



The AA Peak Limiter is designed to respond to signal peaks, making it useful for controlling fast transients in a mix, especially on the master bus.

Key controls include:

- **Input Gain**: Adjusts the input level going into the limiter.
- **Threshold**: Sets the level at which limiting begins.
- **Release**: Determines how quickly the limiter recovers after a peak.
- **Output Gain**: Allows boosting the output after limiting.

The limiter also includes a Gain Reduction meter to visualize the amount of limiting being applied.

AA Peak Compressor



The AA Peak Compressor is designed to respond to signal peaks rather than RMS levels, making it well-suited for transient-heavy sounds like drums.

Key controls include:

- **Input Gain**: Adjusts the input level going into the compressor.
- **Ratio**: Sets the compression ratio, controlling how much the peaks are reduced.
- **Attack**: Determines how quickly the compressor reacts to peaks.
- **Release**: Sets the time it takes for the compression to return to unity gain after a peak.
- **Makeup Gain**: Allows boosting the output to compensate for gain reduction.
- **Knee**: Adjusts the sharpness of the compression curve, from a hard knee to a more gradual, soft knee.

The compressor also includes a Gain Reduction meter and a **Mix** knob for blending the compressed and uncompressed signals for parallel compression.



Tips on working:

Right clicks and menus

Whenever possible try to see if a right click opens a menu. In various areas of the plugin it is in this way possible to do additional settings.

The middle mouse button / double click

Almost every element in VPS Avenger, be it a dial, envelope, fader or number field can be set to its standard value (default) by clicking on the control with the middle mouse button. If you don't have a middle mouse button, then a double click for normal dials and a double right click for inner dials does the same.

Turning the dials (fine)

With a left click and holding the button while you move the mouse you can turn a dial, so much is clear. However, not everyone knows that by turning a dial with the right mouse button instead of the left button you can control the turning of the dial in a far finer, more accurate way. This is ideal to finely set certain values. For inner dials, which normally use the right mouse button, you have to use a shift+right click to achieve this.

Effects as send effects

Effects such as reverb, delay or chorus are perfect to be used as send effects. This way you only have an effect, for instance a reverb, open only once and you can send every track in your project through this one reverb. This enormously saves CPU and helps to keep the overview. How to create send effects can be found in this hand book.

Master filter

A simple way to send the entire output of Avenger through a filter (for instance a high pass or low pass sweep) is to use the master filter. This has to first turned on. It acts like all other filters and offers the normal filter types.

Cursor keys / preset choice

The easiest way to browse through the presets is to use the cursor keys. Up/down chooses a preset in the current folder, right arrow loads this preset, left arrow sends you a folder level deeper. Warning: certain DAWs block such a use of the cursor keys. We couldn't find a way to bypass this. In these hosts the cursor keys unfortunately wont work.

MIDI controller (pedals)

As we only have two hands it can be at times difficult to adjust the mod wheel whilst playing. The hands are in use; we have however two feet. Here you can use a MIDI pedal. With a bit of practice this can be used at the same time as you play. You will never want to be without one. Warning: there are expression pedals with a range of 0-127 which are so perfect for controlling the mod wheel. There are also sustain pedals, these are simple on/off switches which send only 0 and 127. These are perfect to

for instance completely open the release of a note or change patterns. If both feet are also now in use you only have your mouth left. Here you can use a breath controller. At the point the coordination becomes somewhat difficult…

Changelog

2.4.1 (hotfix)

- fixed a random crash when any global latch mode (latch first note, latch independent) is active
- fixed arp not reacting correct to note-off and note-on in specific circumstances
- added sample stacker curved velocity fade ranges.

2.4.0 Release notes

Added:

- added new ARP mode: "Custom". This new mode allows you to define new patterns freely - apart from up/down/alternate/etc. Even polyphonic notes are possible.
- added 3 new insert FX
- Ruta Chorus - despite the name, this new multi-effect also allows to create fully customizable reverbs, flanging and Special effects
- Ruta Distortion - a new distortion effect for warm, mid range drives, ideal for chords or basslines. Has 4 different distortion algos.
- Phase Puncher - the "phaser trick" to create spiky attacks and Psy-basses. Let you stack up to 64 Phasers in a row.
- added new modsource "Math/Increment N vc", which is per voice incrementing - each new voice has a new value.
- added options when generating previews for single presets. (octave, duration, chord/single note etc)
- 50 new Q4ntum Presets by Manuel Schleis and many more other new FX presets... 70 new Arp Presets (for the new "Custom" mode)
- change: removed the load arp Sub pattern from arp pattern context. Hold shift button when you load a ARP-Module Preset to load the pattern into the current selected ABCD slot.
- fixed instable AMP envelope attack timing - now you can define accurate and stable spiky attacks for percussion / kick design

Fixes:

- Fixed unstable AMP envelope attack timing.
- Fixed an issue causing hanging or incorrect notes when bouncing a project with chord detection enabled in ARP or OSC modules.
- Fixed jumping note issue in ARP UI when releasing the mouse button during selection.
- Fixed crash occurring when changing sample rate if an OSC used parallel filter mode.
- Fixed noise burst/crash when using "Noise Verber" in the OSC noise generator as a sample.
- Fixed error where AKWF shapes were either invisible or replaced by factory shapes.
- Fixed issue with WAVETABLE-Oneshot: When the envelope finished, it looped back to the first envelope value instead of staying at the last.
- Fixed display error when modulating OSC-pan of OSC 1 and switching to another OSC; the modulation display incorrectly showed OSC 1 modulation.
- Fixed slow volume changes for drum slot/loop samples.
- Compressor FX now correctly displays modulated threshold values.
- Fixed an issue with legato and ratchet in ARP where no ratchet notes were played.
- Fixed rare note hang issue in Logic Pro X (possibly other DAWs) when using ARP and legato mode on an OSC.
- Fixed an error in ARP randomizer where ratchet mode could be incorrectly applied to silent parts of the pattern.

2.3.1 Release notes:

fixes:

- fixed an rare crash when loading a preset with custom samples in the drumkit
- fixed an issue in routing display when that could cause the to display items with name "#ERROR" after removing a routed module
- AMP Sustain param was ignored in UNDO.
- fixed arp to midi export on Triplet Speeds
- fixed issue where wrong DrumsQ speed was displayed after changing the drumkit-preset with cursor-keys.
- macOS: fixed issue with changing SYSTEM-ID. A new SYSTEM ID might be generated after this update, but should not change anymore

2.3.0 Release notes:

added:

- Avenger will now try to download a new keyfile when an expansion is imported via drag'n drop when the current license file has not the license for the new xp yet.
- lfo cycle end mod sources (alternate, increment 4..32)
- osc noise density parameter added, with "single click" option
- an organic noise sample can be selected as noise source
- osc noise sample pitch added.
- added option to bypass the filter and shaper process for an osc noise, the noise will be mixed to the voice at the amp position in the route
- added new modsource "Math/Incrementan N vc", which is per voice incrementing, each new voice has a new value.
- added loop start/end for wavetable envelope when its not in WT-Squencer mode.
- added osc octave divider mode to emulate old analog phase behaviour (set osc start phase above 100% to activate)
- Hovering the mouse over the drumkit name display below the drumkit browser will show the expansion and DK Name in the DATA-Readout. (if you forgot where it was from...)

rework:

- Macro Dials in "Snap to center" mode will set default value to center(50%) instead of 0%
- Improved preset loading times

Fixes:

- issue in Chorder Mute Main voice when Specrat Granular is used.
- DrumSlot Editor PitchRange was using a pop up menu from time scale.
- Sample Editor did display the wrong sample length when chaing wave to the corresponding played sample.
- fixed an issue with copy paste a trance gate where several paramters where not updates in the ui.
- fixed an issue with initialPath with fx preset save as function.
- "Save Preset as.." option should open in the correct last folder again. not the Filesystem Root, when the last preset or folder was moved
- drumsq: velocity y-range fixed.
- fixed crash in arp pattern copy/paste
- mod envelope: DrumSQ trigger mode did also retrigger on global first note.
- midi import/export for drums will work on B-C-D patterns as well.
- issue with random LFO and HOST sync where new random value was triggerd too often aa reverb pre-delaytime not accessable via mod source drop.
- Trashverb Color Parameter not reacting to modulations
- macOS: when using left mouse + cmd key, and changing the inner dial value will turn the out dial too.
- fixed an issue in VST3 wrapper midi CC handling



2.2.0 Release notes:

New Features:

- Added Drum SQ multi pattern.
- Added formant lock to single loop osc mode to preserve formants while pitching 12/-12.
- Any multisample displays will switch to the sample for the recently played note.
- New icons for preset preview.
- Reworked previews: added categories with different play lengths, changeable on the sys page.

Rework:

- Preset -> update preview now displays a small progress on the file in the browser instead of an annoying popup.

Fixes:

- Fixed an issue where the drumkit browser had an incorrect scroll size after renaming a preset in a custom expansion.
- Sound browser now shows the correct selected sample for the slot in osc stacker mode when changing the slot.
- Fixed arp ratchet 7-in preset having a wrong value.
- Renaming a preset in a custom expansion that has a preview will also rename the preview correctly.
- Fixed an initial click sound when modulating oscMaster, DrumMaster, or MasterVol from high to zero on the first voice.
- Fixed another issue with osc velocity.
- Fixed adding a shaper module not displaying the correct selected initial shaper model.
- Fixed pitch envelope used as mod-source on a non-per-voice target being triggered by drum voices.
- Fixed an issue with MIDI export when speed is triplet or dotted.
- Fixed an issue with macro button modulation where the final value now behaves more like a button than a dial.
- Fixed a crash on windows when file load/save dialog was open while DAW was about to get closed by the user.
- Fixed an issue where osc keytrack was not correct applied when using copy/paste
- Fixed a click sound in TG when stereo width is not 0% or 100%
- Fixed AAX timeout on "ALL NOTES OFF" midi cc

2.1.1 Change Log

- fixed: TG display shows wrong init settings after a new TG module was added
- fixed: Harmonizer Enabled, Hamronizer Voices Enabled display correct modulation state even if no voice is active
- fixed: Velocity was ignored when a osc was in single loop mode.
- fixed: modulating harmonizer on/off did not respond correct.
- fixed: avenger reported wrong latency on other samplerates than 44100
- fixed: drum loopsample preview working again.
- fixed possible deadlock in host notification of latency change
- fixed a crash on mac when browsing presets
- fixed an issue where loading a custom preset, oscs could load a single loop custom sample as "freeform" mode in specific circumstances
- fixed mixer drum routing selector does not recognize when fx bus was added

2.1.0 Change Log

- ADDED: FX AA PEAK LIMITER
- ADDED: FX AA PEAK COMPRESSOR
- ADDED: FX AA WHA WHA
- ADDED: FX VOWEL FILTER
- ADDED: osc harmonizer

- ADDED: osc chorder main voice muteable via preset browser menu
- ADDED: NEW PARAMETERS to StereoMatrix fx
- ADDED: Preset-Preview can be played with DAW-BPM to get a better feel how it sounds in your project.
- ADDED: volume-control for preset-preview in presetbrowser.
- fixed: a fx will display "Default Preset" instead of "untitled" when a new instance is loaded.
- fixed: drum slot aux routing pulldown not updated correct after preset load
- fixed: mod-matrix "add target" was showing inactive routing elements
- fixed: drum loop sample is still visible in the scope after removing the sample from the slot
- fixed: osc velocity zone was ignored when osc is in multi-loop mode.
- fixed: trigger module saves user samples in the preset now.
- fixed mod-env osc-x trigger where keyzone was not taken into account on note release.
- fixed an issue where last ratchet note may slide, even if the gate is lower than 100%
- fixed a crash when try to copy/paste to master filter
- fixed click-sound issue in spectral playback when looping a sample.
- fixed a cpu spike that could occur when using random-arp-auto-dice
- fixed an issue where a fx preset is not selected correct when using the "save preset as..." function in the fx preset browser.
- improved stability. fixed several crashes that could occur while loading a preset.
- improved: when saving a preset via the memory button into a custom expansion, the preset will be located/revealed in the expansion-preset-browser

2.0.6 Change Log

- Added upwards/downwards OTT compressor FX.
- FIXED: Crash in ProTools when loading Avenger.
- MEMORY button -> SAVE: Disabled the quick save function when the preset name has changed, to avoid overwriting the previous saved preset.
- Fixed issue in chord detection for 5th-multiloop samples with MIDI-note-on that are just a few samples apart.
- Corrected the position of the "NUM WAVES" dial in the resampler editor.
- Prev/next preset now works correctly when preset search is active.
- OSC sound browser search is reset when the sound browser is closed (to avoid confusion when coming back later and seeing just a few sounds).
- Preset preview with progress bar and stop button. Additionally, any note will stop the preview, and any new preview will stop the synth.
- This is to avoid simultaneous audio from the preview and the synth.
- OSC quantizer: incoming MIDI option is now set correctly for the selected osc and not just for OSC1.
- Quantizer preset browser context shows the correct selected preset.
- Converting samples to any expansion content type will cause an update of the OSC-Soundbrowser to show new samples as intended.
- Fixed: Rename preset in custom expansion not working.
- Fixed issue in drumkit where "Copy Sample to Slot X" was not working correctly.
- Fixed issue in granular/spectral with multisamples where the wrong root note was used.
- Fixed a rare crash when accessing internal content lists while these lists are being updated.
- Fixed an issue where the "SURPRISE ME" button at the preset-search yielded the same sequence of presets each time Avenger was opened.

2.0.5 change log

- fixed an issue when importing custom expansions
- fixed a strange ui problem on windows/fl-studio when drumsample browser is open, the ui starts to lag.
- added data readout to random arp distribution display

- fixed issue with two revers-end-sync notes.

2.0.4 change log
- spectral-granular-root note is working as expected now
- fixed additional utf8 problems
- fixed a skin issue in random arp where the length and silense option buttons where switched
- fixed arp-randomizer not using notes after edit
- fixed a issue with drum sample reverse-end-sync on very long samples

2.0.3 change log
- fixed a small memory leak
- fixed a crash that mostly occurred on MAC when loading presets while ARP tab is visible.
- fixed an issue with xp image caching. UI should load a little faster now if many expansions are installed.

2.0.2 change log
- fixed extreme cpu usage when changing parameters vie MIDI or DAW automation
- macOS 10.13 support, rewrote framework functions that required macOS 10.15, so they now are available on 10.13.
- added "reimport settings" from expansion to xp browser. if fx presets or ARP-Module presets are missing, use this function
- reworked memory management for ARP keys to improve stability

2.0.1 change log
- old factory.avxp expansion is not displayed when it is installed in parallel with a factory.avxp2
- new avenger activation bitmaps to reflect version 2.
- WINDOWS: fixed license activation carousel caused by an UTF-8 path name problem.
- WINDOWS: reimplemented version information in Avenger2 files. VMAN should display the version correct now. (instead of n.a.)

2.0.0 change log (short version)

- added new spectral module incl. spectral expander module
- added new single loop module
- added drumloops for drumkits
- added quantizer module for OSCs
- arpeggiator can now do ratchets
- arpeggiator randomize module
- midi export for arpeggiators
- added new 4k main GUI
- added the possibility of parallel filter routing
- 60hz smooth framerate support
- improved loading times of presets and samples
- improved cpu spikes and overall cpu consumption
- improved RAM usage
- added shimmer feature in Reverbs
- drum slots/editor can now do bitrate reducing per slot
- new drumkit browser - swap single sounds on the fly
- new pitch envelope for each drumslot
- ability to use single wav loops in the multi loop module

- added new macro controller sub tabs
- added a fifth AMP, FLT, SHP, LFO tab
- added a new row with categories in the search info tags (Weird/Misc, Random/Generative Spectral/Additive)
- added new Factory 2 ROM library with 250 new presets, samples, wavetables and granular loops
- added 1500 new drumloops to the factory
- added tons of new sub-presets for all fx modules, envelopes etc.
- added new effect type: Q4ntum multi fx delay
- added new effect type: BitBite
- added new effect type: RutaVerb
- added new effect type: EnvFollower
- improved stability
- improved chord detection modes
- updated old skins for 2.0 compatibility
- auto preview (audio) for presets
- many new impulse responses for our Impulse reverb
- dozens if not hundreds of minor fixes and changes

Support & Contact

Technical support: https://www.facebook.com/VengeanceSound/
support@vengeance-sound.com

Community support (Avenger user group): https://www.facebook.com/groups/VPSAvenger

Contact: info@vengeance-sound.com
Billing support: nicole@vengeance-sound.com

Manual: Rafael Biermann / Tim Techlor (https://www.instagram.com/timtechlor/)

Copyright 2024 vengeance-sound/keilwerth audio

Bug reports

Please report any bugs you encounter to support@vengeance-sound.com. Please describe your problem as precise as possible, sometimes pictures are helpful. Please name your setup, including:

- OS
- CPU
- GPU
- DAW
- Possible crash logs
- Plugin version & Bug description and how to reproduce the bug (if possible)

list of category prefixes:

AR = Arpeggio
AT = Atmosphere
BA = Bass
BR = Brass
BL = Bell
CH = Chord
DK = Drumkit
DR = Drum
DL = Drumloop
FX = Effect
GT = Guitar
IN = Instrument
KB = Keyboard
LD = Lead
MA = Mallet
MU = Multiloop
OR = Organ
OC = Orchestral
PN = Piano
PL = Plucked
RD = Reed
ST = String
SY = Synth
SQ = Sequence / Split
TG = Trancegate
VC = Vocal/Voice
WW = Woodwind