Vengeance Producer Suite

Avenger

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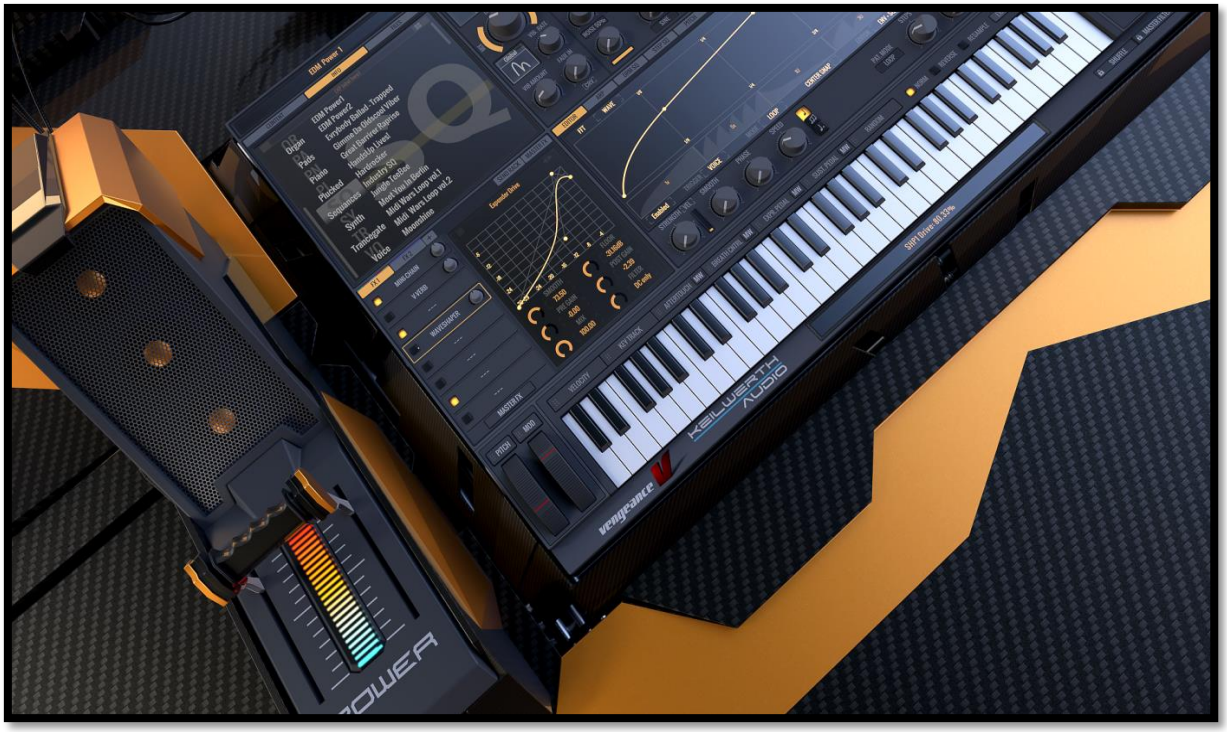

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Introduction

Dear customer,

Thank you for purchasing the plugin „Vengeance Producer Suite – Avenger“ (which we will hereafter simply call: „Avenger“)! This new syntheziser 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 walktroughs and expansion demonstrations here.

http://bit.ly/VPSAvengerYoutubePlaylist

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

Enjoy your new Vengeance Producer Suite – Avenger!

The vengeance-sound team

Installation and maintainance

Registration

In order 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)

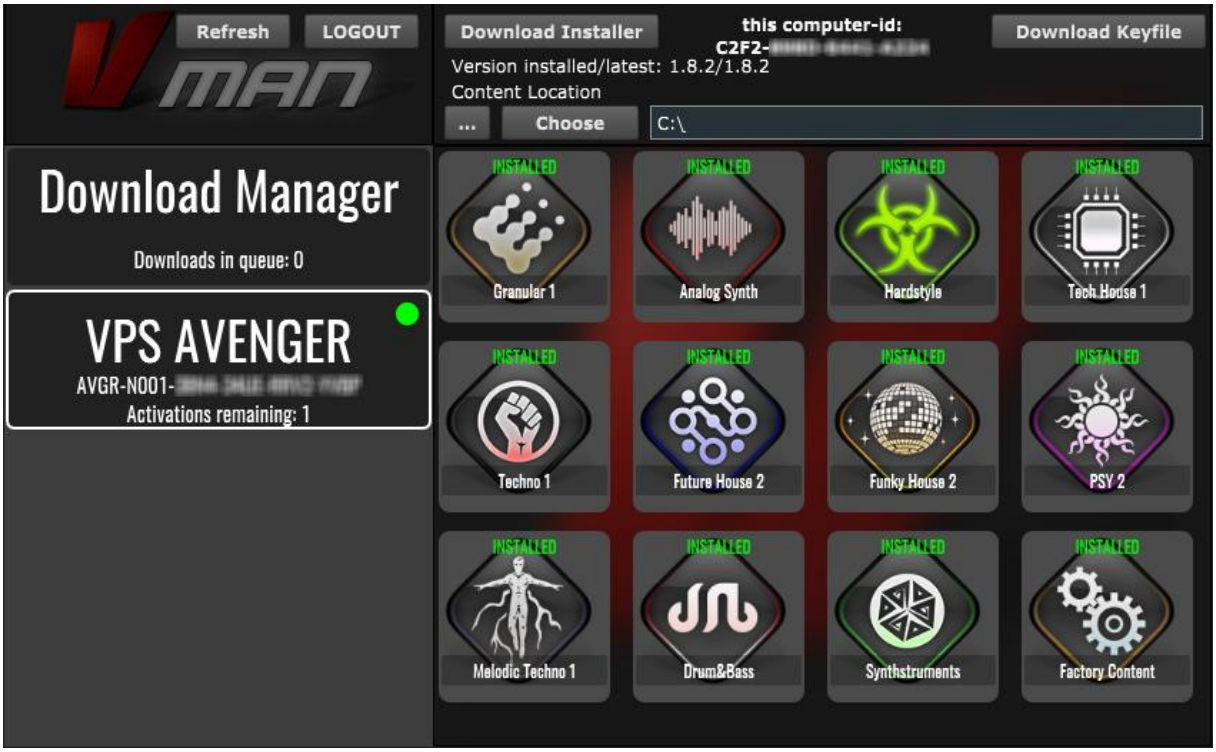
Alternatively:

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 to use 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 https://register.vps-avenger.com/, 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:



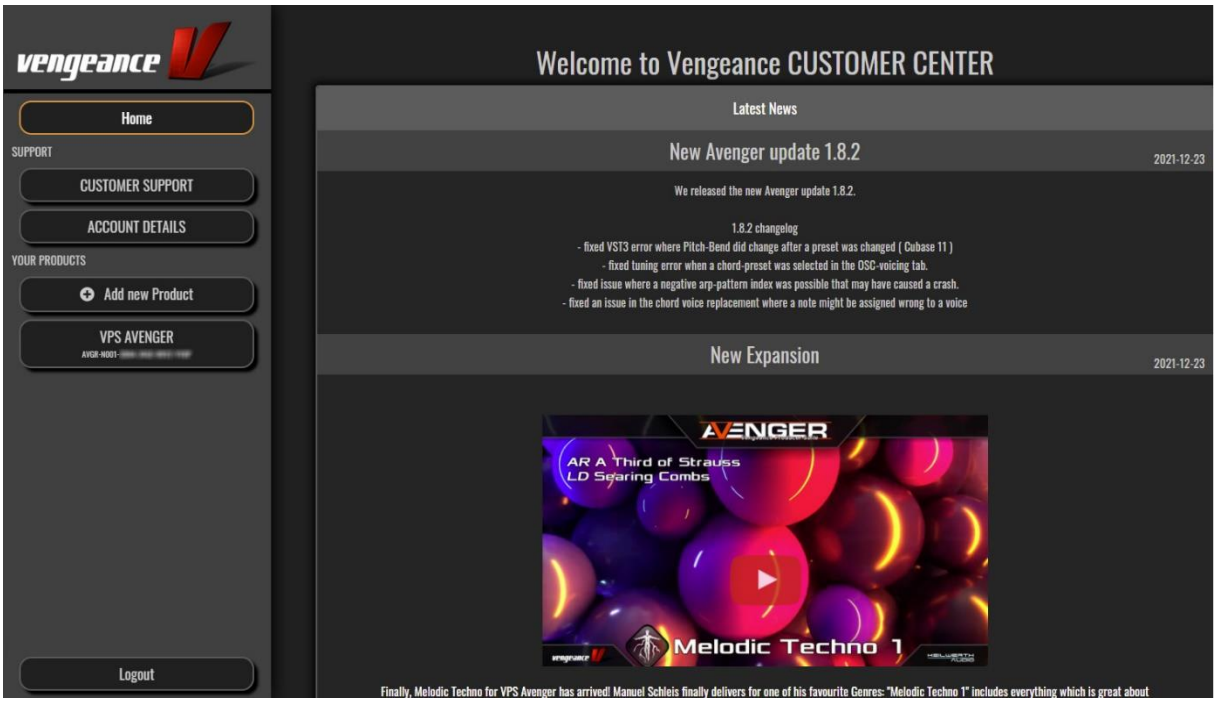
You can download the latest Avenger installer, if necessary, with the top left button.
Select a path for the expansions, and download them per click on its button.

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

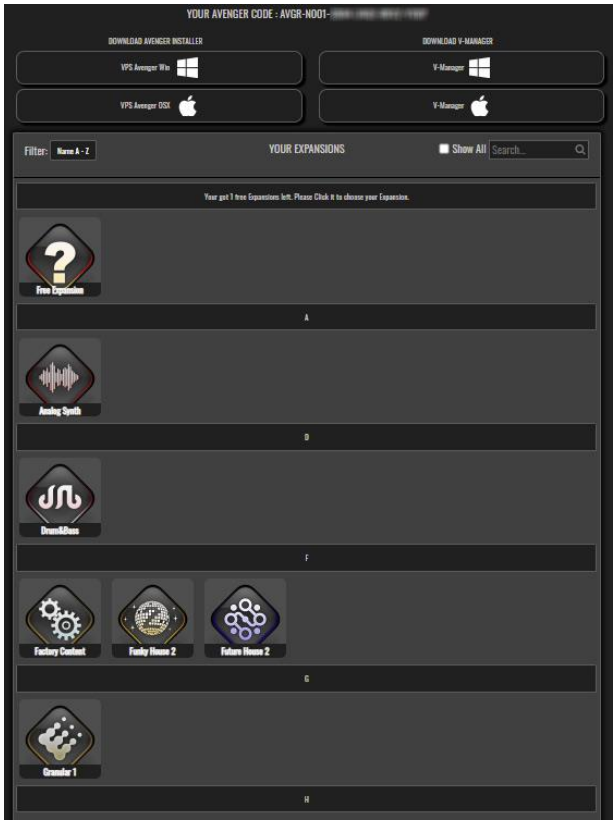
It's also possible to manage your licenses online via our website instead of using V-Manager. Log in again to your account at https://register.vps-avenger.com/



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

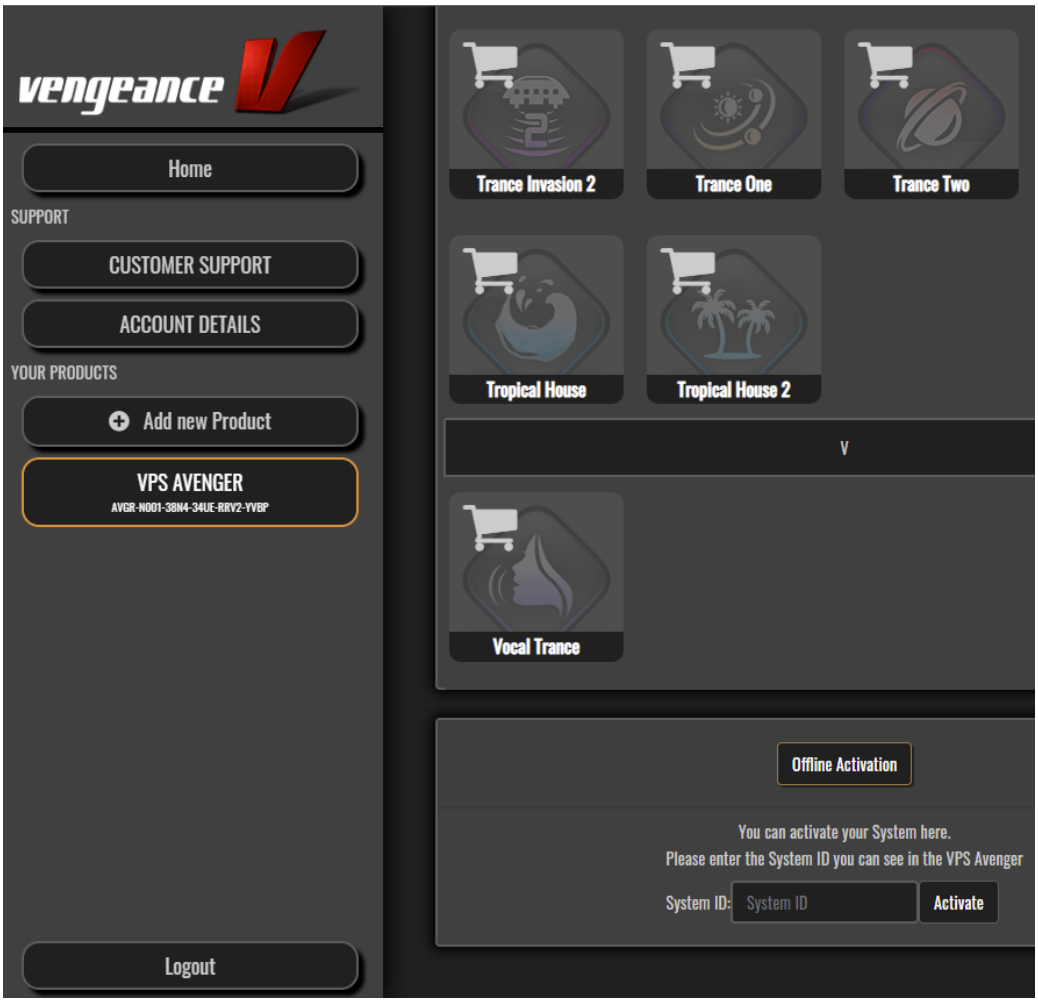
All your expansions are listed, sorted by name, on the right side. By clicking on an expansion, it'll be downloaded immediately to your computer.

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 webshop will be openend.

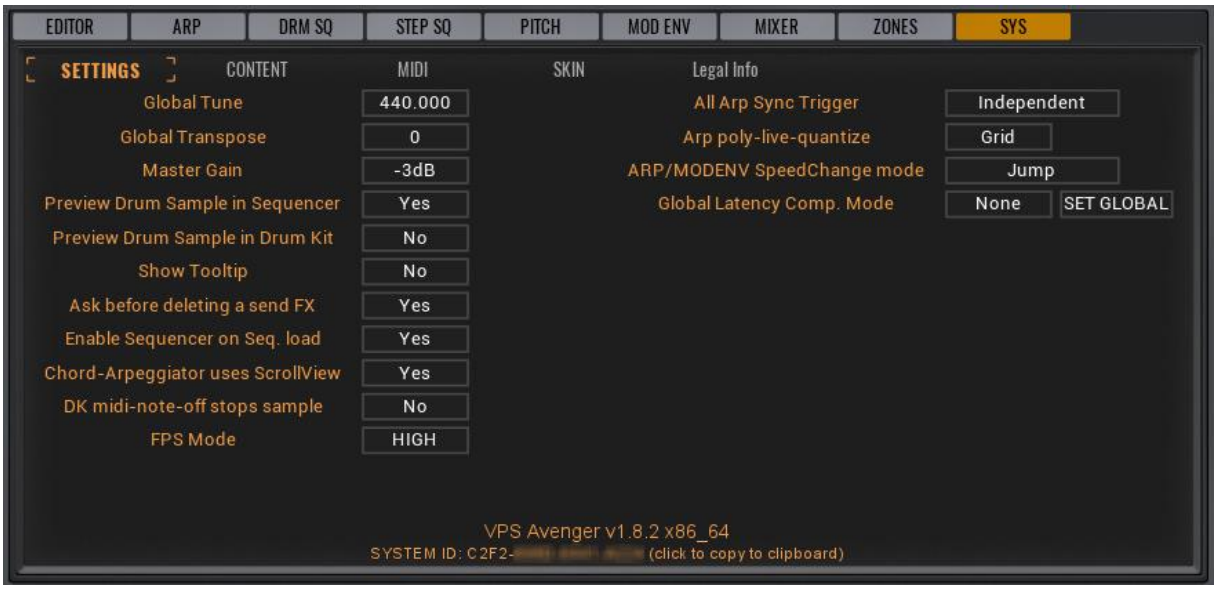


Offline Activation

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 also seperate drumkits complete with drum sequenzer. 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 routeable (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

- **Rawtune a control** in bigger steps by using your mousewheel

- **Finetune a control**
  - Shift + right click (working for all controls) or
  - Right click (for controls without addional 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 hooverin 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 aswell 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 transformated 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 let‘s 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 color 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 of 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 modul**
  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 envs etc).

Futher Avenger includes numerous high quality effects such as sidechain, ArtsAcoustic 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 idealy 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 aswell 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 is now childsplay to organize whole modulation groups and to edit them with just one click. All the sources listed below, including external MIDI or mathematically produced sources can be combined with any imaginable destination – for instance visible dials 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 songs tempo.
- **Pitch envelope**
  The pitch envelope, with its bi-directionality, 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 modi 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 in regard to exact timing and syncronized 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 sequancer 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 specially suited for use with wavetables, for instance a pattern editor to generate „wobble“ sequences in various successive speeds.
- **Macro controller**
  Avenger offers you 3 macro controller and 2 macro switches as modulation sources. 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 assign**
  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 (aggressiv, 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. Your 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 six dots 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.)

Leftclick: **Undo** up to the last 20 changes you made.
Rightclick: **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 throughand 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 a curser key (see tips on working). Dont forget that you can use a mouse wheel to scroll through these menus. Naturally you can use scroll bars in the menus.

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 can mark a preset as favourite by clicking the star. Otherwise you are always able to mark a preset as favourite by rightclicking it and choosing the option “mark as favourite”. Note: Unmarking a preset will only work by clicking the star! Rightclicking 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:

- Categories (stock categories only)
- Tags (stock tags only)
- Textsearch (preset names only, no comments)
- Artist (dropdown menu of all available artists/preset authors)
- Favourites

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

Down right 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

CONTENT
INFO
FILES
Factory
CAT
FAV
CATEGORY
SEARCH RESULT
PA Pads
PI Piano & Keys
PL Plucked
Sequences
SY Synth
TR Trancegate
VO Voice
PD Analog Padding 2
PD Warm Analog Pad
SY Analogica 1
SY Analogica 2
1
House
EDM/Electro
Club/Hardstyle
Dubstep/Complextro
Trance
Minimal/Techno
HipHop/Trap
Pop/Chart
Film/Game Music
Classic Dance
DnB/Garage/BrkBeat
Ambient/Chillout
World/Folk
Industrial/Dark
Arp/Sequence
Lead
Bass
Plucked
Real Inst.
Synth/Misc
2
Chord/Stab
Drum
Organ/Bell
Pad
Voice
Loop/Granular
Bright/High
Dark/Low
Aggressive
Soft/Thin
Wide/Fat
Simple/Raw
Complex
Analog/Warm
Digital/Cold
Snappy/Short
Slow/Release
Noise/LoFi
Pulsating/Moving
Grainy/Cloudy
TEXT SEARCH
3
ARTIST
4
Displaying result (4) for: 2 tags and 2 categories and text: "Analog" and artist:
CLEAR
FAVOURITES ONLY
5
SURPRISE!

Build a custom bank

Building your own bank is simple.

- Rightclick 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 infos 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 sub categories.
- 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 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).

Leftclicking a file:

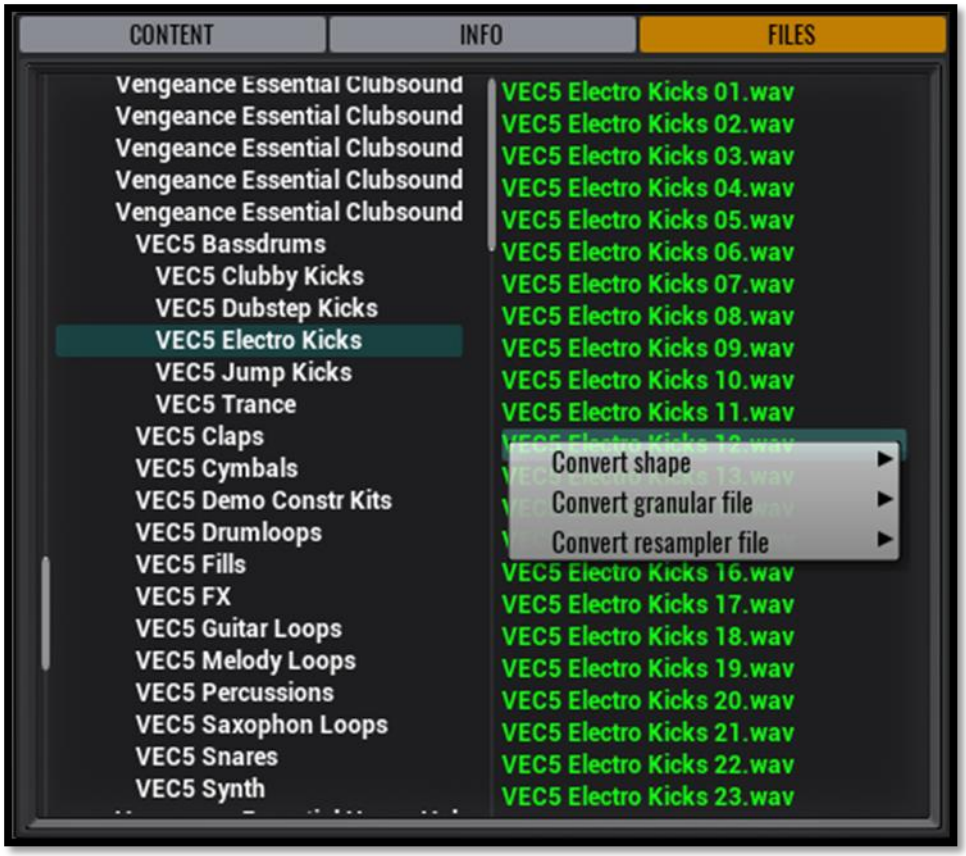
- Drag and drop samples to OSCs, drums or wavetableview

Rightclicking a file:

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

Rightclicking a folder:

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



Importing samples (leftclick):

Importing to OSC:

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

This 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.

This 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 (rightclick):

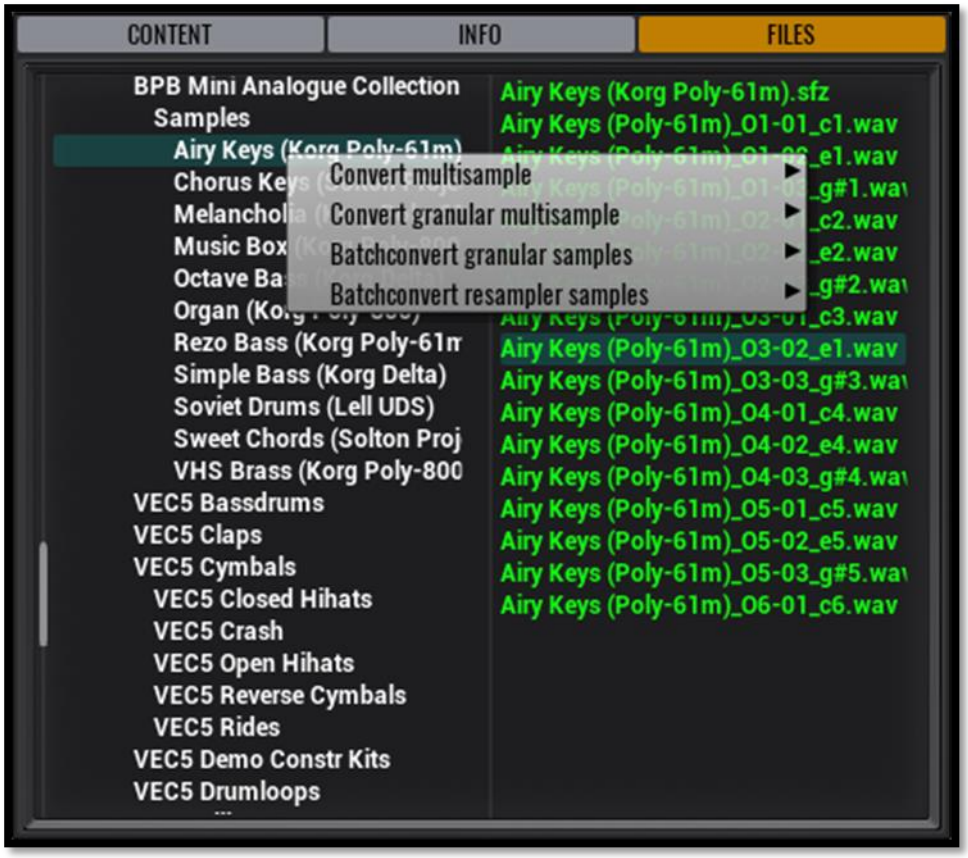
- Create a wav in your favourite audio editor
- The OSC shape needs to be exactly **one** waveform length
- Make sure the waveform is cut cleanly that there are no audible clicks at the beginning or end. (You may intentionally want such clicks however to create more overtones.)
- Rightclick this wav 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

- Rightclick 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)
- Intervalls may be choosen 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 gainstaging 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

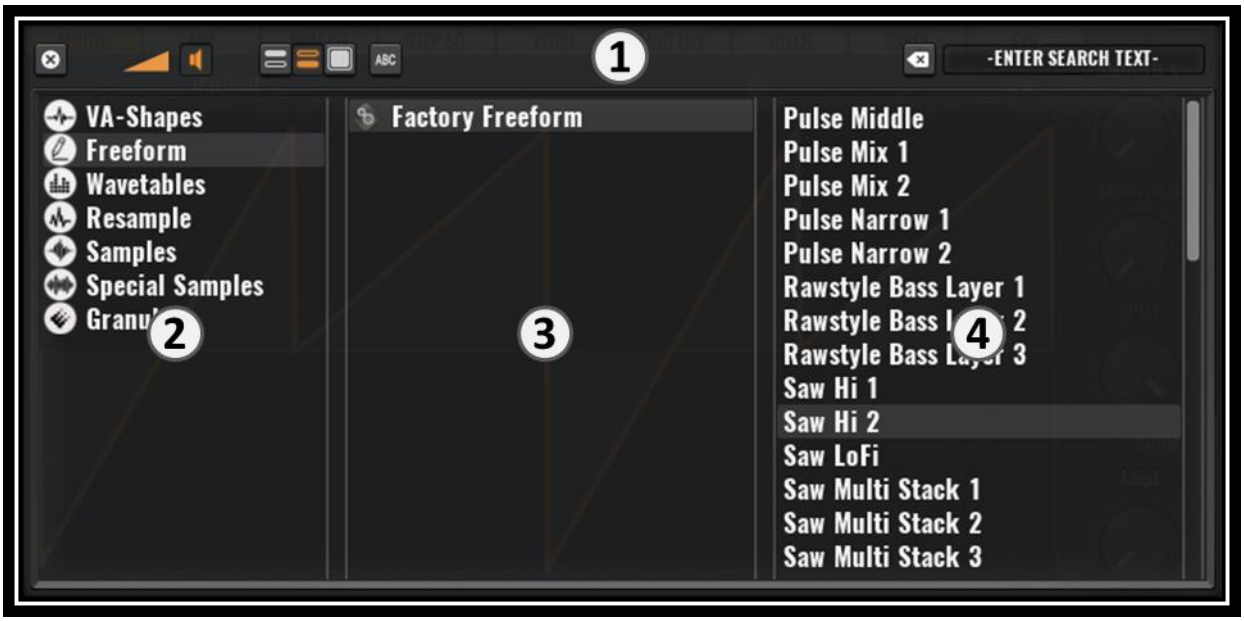
Tab system

Avengers GUI is based on “tabs”. The OSC area will always have at least two tabs, one OSC and the drums. By clicking the “+” (3) you will add another OSC, up to a total of eight. Rename the tabs by doubleclicking them and open the context menue (1) with a rightclick. 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 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**
     Doubleclick 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. Doubleclick 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, doubleclicking 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 stay the same at all times. 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 realtime view of the current waveform. For shapes/freeforms (1) 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 (2) you see the whole sample including the starting position, for granular samples (3) 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 hand book). If the current oscillator is a sample (single, multi or granular) the hpf and lpf are resource friendly 6db/oct filters.

Below the wafevorm 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 mousewheel**
  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 the same at all times. Modes can be changed by using the popup menues behind most of the lables.

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 analog 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.

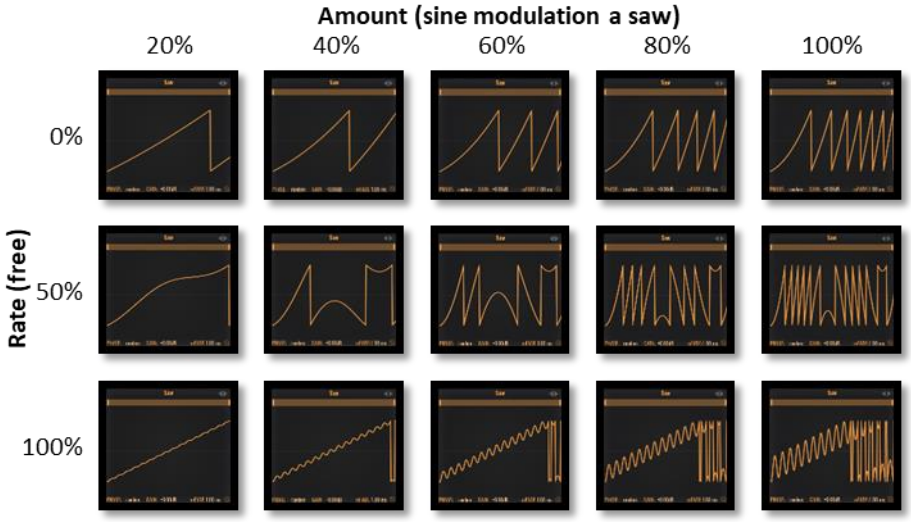
Frequency modulation (FM) means the pitch (frequency) of the oscillator is modulated rapidly by a second oscillator. How deep this occurs can be set here. Choose the shape of the modulating oscillator under the FM dial. The popup contains 9 standard waveforms, 3 customs waveforms/LFOs and other OSCs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

When chosing an OSC, this OSC will be muted and used for modulation only. This is visually represented by a swichted off diode, no color bar above the OSC, and a label saying 'OSC … (FM)'. In order 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, similar to 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.

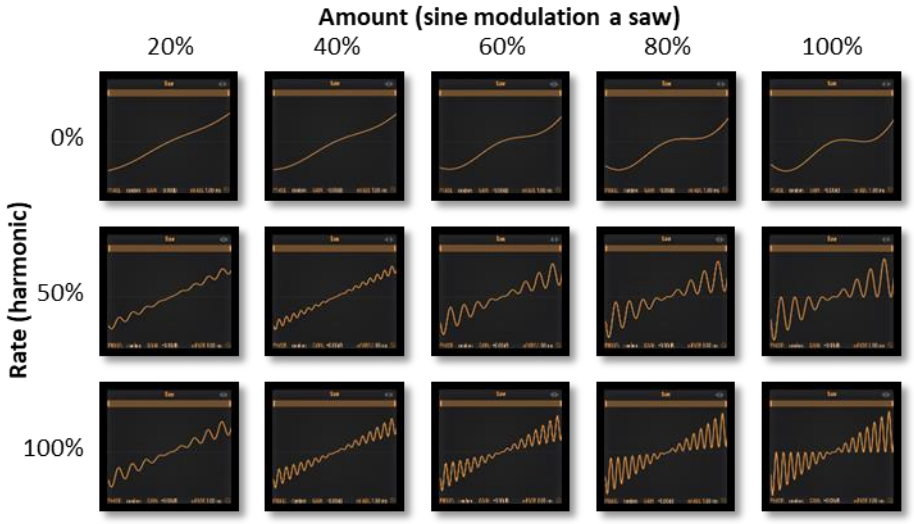


Rate: **AM and FM share the rate dial, which sets the speed/frequency of the modulating oscillator. Since even intervals (octaves) or quintets sound cleaner than odd intervals, various modes can be chosen, which allow only the rates inside the chosen grids. Change grids by using the popup menu.**

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 choosen 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:** mit with this slider you can set the mix level of the V-Saw. At 0 (dial completey 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 *as a whole* (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 set the shape of the transient.

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 (monophone). 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.

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 also 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 the on/off switches.

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 wether or not 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.

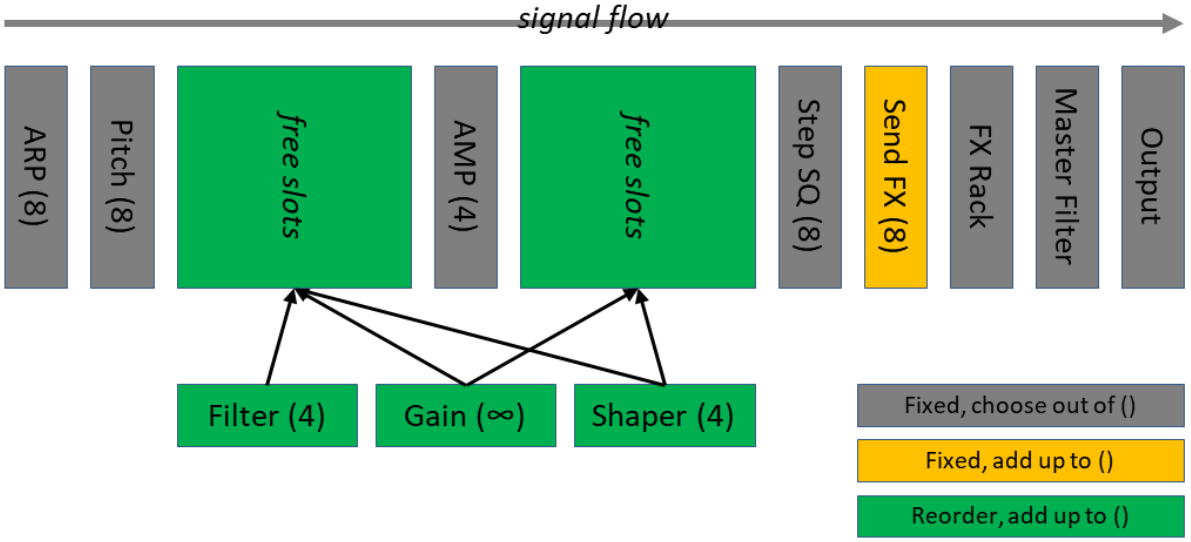
A left click on off of the modules opens a menu to choose the module number (e.g. ARP 2) or delete a module.

You can also add send effects by using the „+“ button. This effect has to 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 loose the overview you can use the „go to“ function. Click on the left of a module and choose „go to“(or use a simple right click). 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 give you a visual feedback about changes in the waveform display at all times, 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.

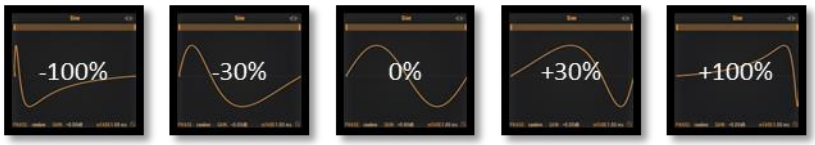
Shapes are fixed waveforms, which came with the factory library, have been imported or created in the freeform editor and saved. The basic form can't be altered.

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 http://www.vengeance-sound.com.

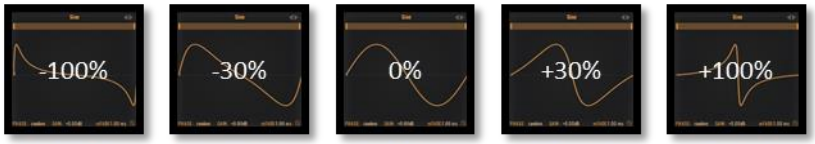
Shape modulation options

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 zerocrossing.
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.

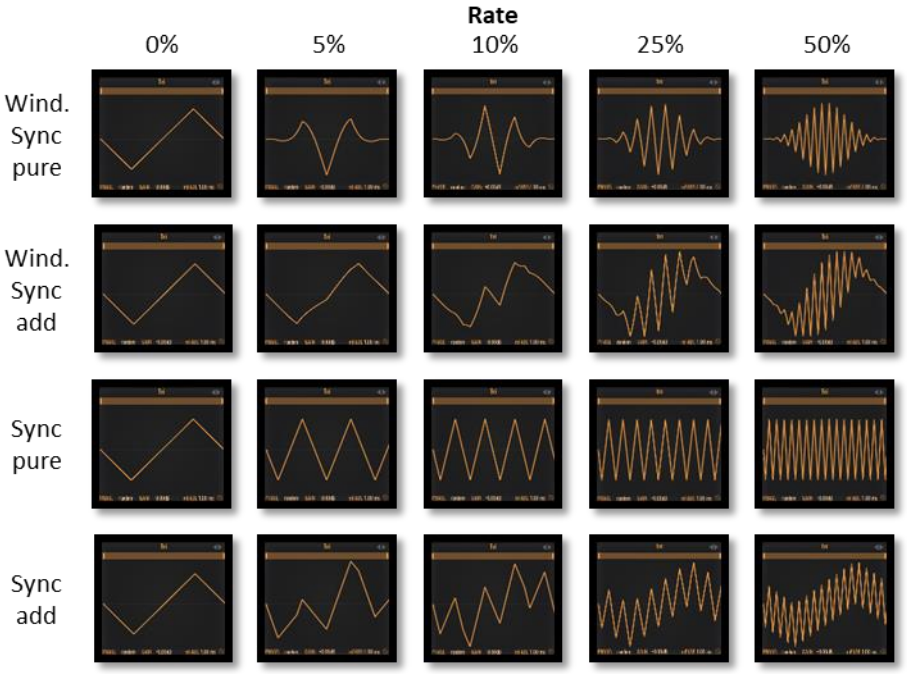
This effect is on oscillator level and acts differently than most normal audio effects that you may know. It actually draws numerous steps and innacuracies into the waveform.

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.

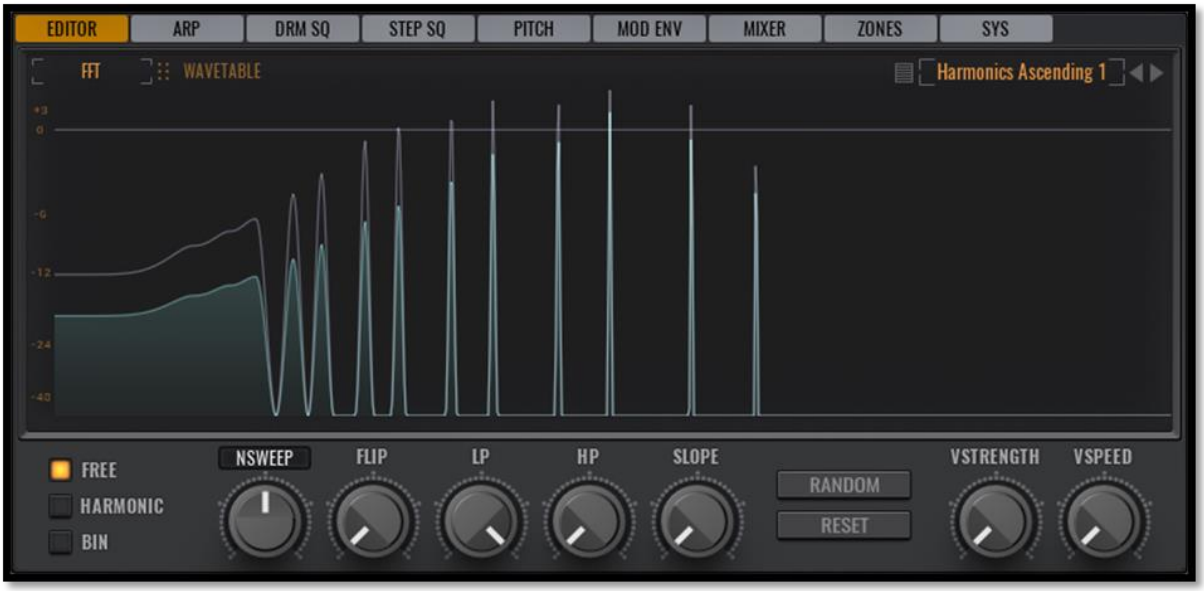
Sync envelope amount (RC): The inner ring controls the amount of modulation, which is sent to the internal sync modulation envelope. This control has a central position 0 (neutral, no modulation). Move it to the right and the sync dial will be positively modulated, move it left and negative modulation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

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

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 innumerous 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 also by the colour of the bands. „0“ is the fundamental harmonic, „1“ is an octave above. Next there is the „7th“, which is a fith (+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 positon will be shown in the read out screen at all times.

Controls in the FFT editor

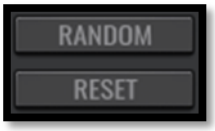
The sweep dial moves your drawn changes upwards or downwards in the frequency spectrum. Thus very nice phasing and morph effects are possible with complex mountain/valley waveforms. Standard setting for this dial is the middle position. The sweep can be placed before or after the lp/hp in the signal 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 dial 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 permament frequency morphings, 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 wavecycle as you like.

When loading the freefrom editor by doubleclicking “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 leads 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 possibilty 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 rightclicking 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 and Resampler can be found here:

https://bit.ly/VPSAvengerWavetables
https://bit.ly/VPSAvengerResampler

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:

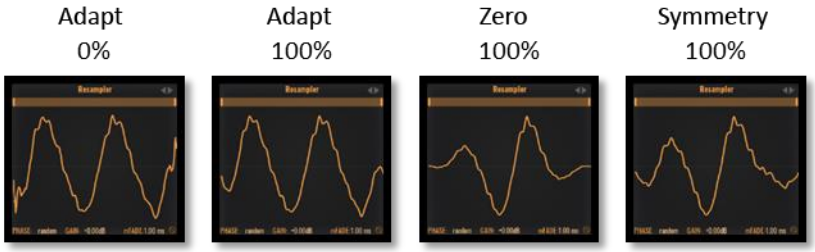
- **Index smooth** allows smooth movement between 2 wavetables by blending from one to the other.
- **Index steppy** mode provides a hard cut between 2 wavetables, without any smoothing or blending.

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 keyzone triggers the envelope once for all notes, no retrigger by further notes until all notes are released - **„last“** – monophonic: Every pressed note in the keyzone will retrigger the envelope for all voices. - **„global first“** – monophonic. The first key pressed will start the envelope, no matter if in the keyzone 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 addionally 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.

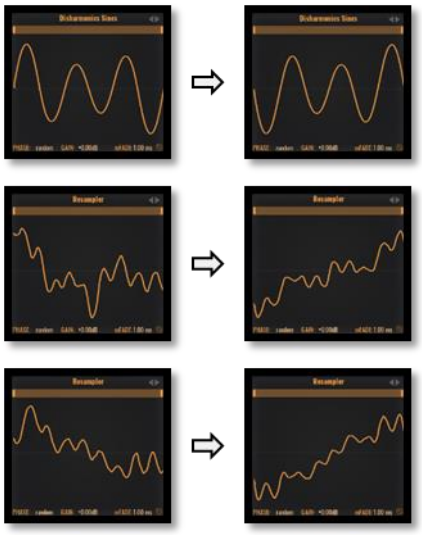
Normalize: This function normalizes the volume of every single table separately. In the signalchain “normalize” is prior to “fade”, so the normalization will be reduced back to the fade settings.

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.



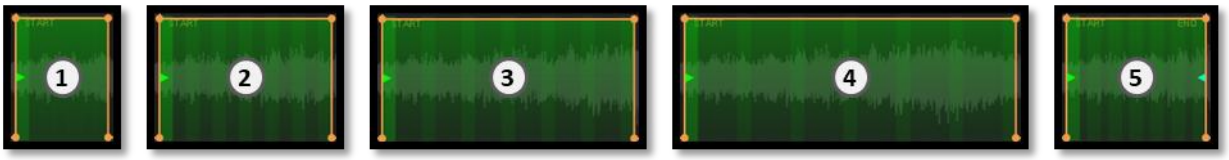
This switch let’s you choose between the controller bar and the wavetable display.

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 wavefile, Avenger needs some information how to handle the wave, which can be set using thess 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 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.

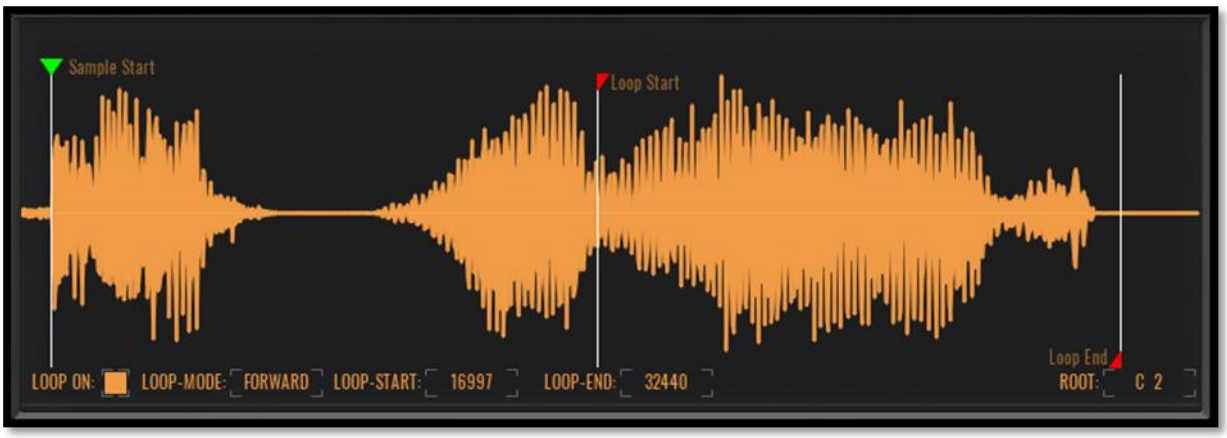
Samples

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 sample, 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: drog+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 exactly the same as described before and contains two types of global settings:

Imidiate 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 respectiveslot 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 linkings.

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 presets or an empty granular module, Avenger will look similar to 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 cllicks 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 excatly 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 similiar 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 rightclick lets you delete points and flip, reverse or reset the envelope. The mousewheel 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 neverending loop, which will switch the position seamless from 100% to 0% and vica 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 timestretching algorithms to chose 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 to use “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 substract (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:

http://bit.ly/VPSAvengerv15Features01
http://bit.ly/VPSAvengerv15Features02

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. All together this then makes a complete drum kit which you can play and use over and over again. Heres 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=bassdrum, 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.
- **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 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 drumsequences (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 drumsequences 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 visa 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:

http://bit.ly/VPSAvengerDrums

Event Trigger module

Overview

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

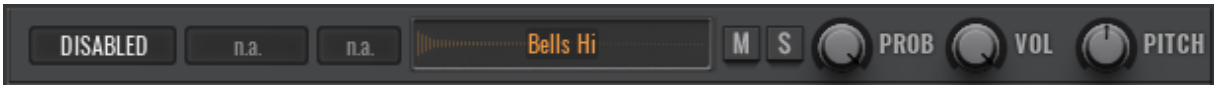
As the name suggests, this module triggers – that means "playing samples" – on events.
You have 10 slots available for events. Each slot has its own trigger rule, sample and routing!

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!

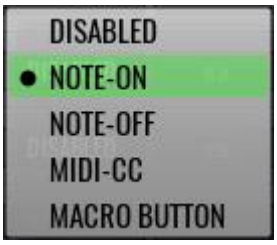
Let's dive into it!

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.

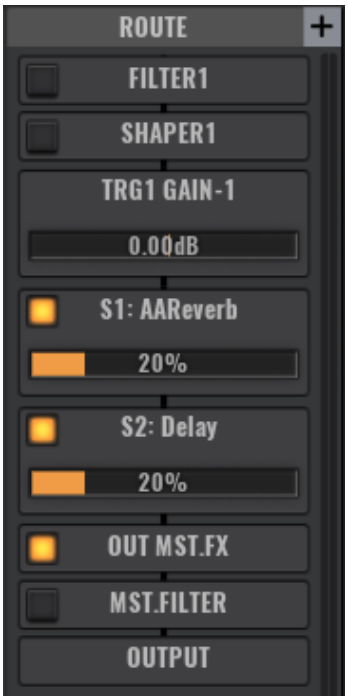
- **Midi-CC**
  With this option, the event is triggered if a specific Midi-CC value is greater or smaller than the specified value in the third box.
  Example:
  If you choose "**CC1 (ModWheel) > Value**" and setting e.g. "64", the sample will be played when the sent CC value (ModWheel) is greater than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

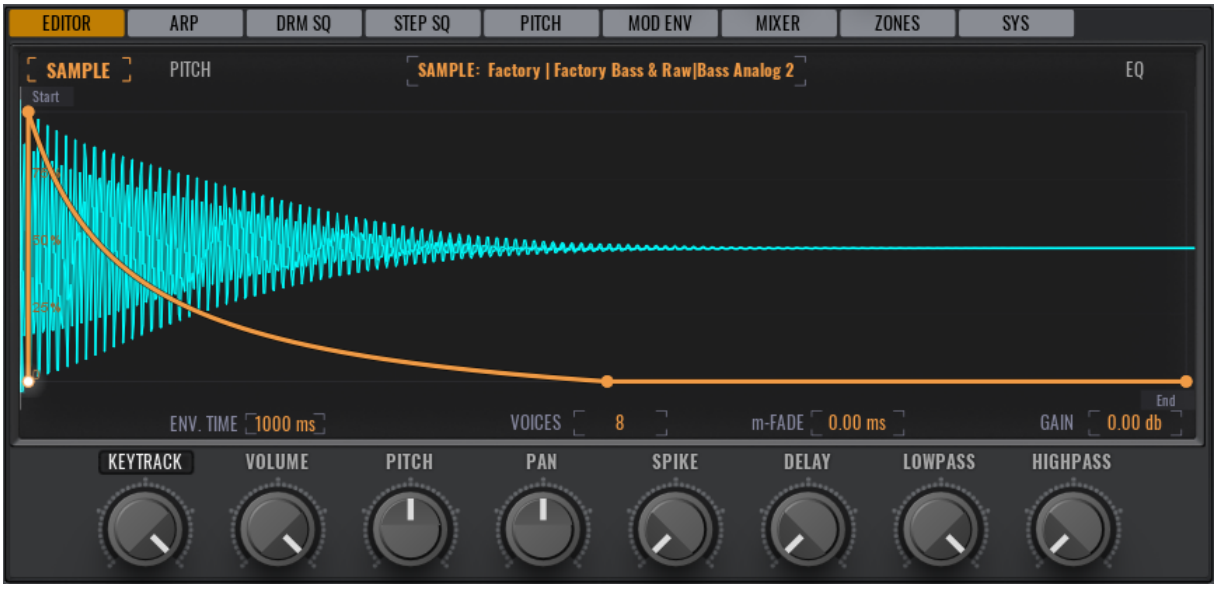


Each event trigger slot has its own routing on the right side, like OSCs have. It works like the OSC routing as well, so there's no special introduction necessary, just set it up as you're used to.

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

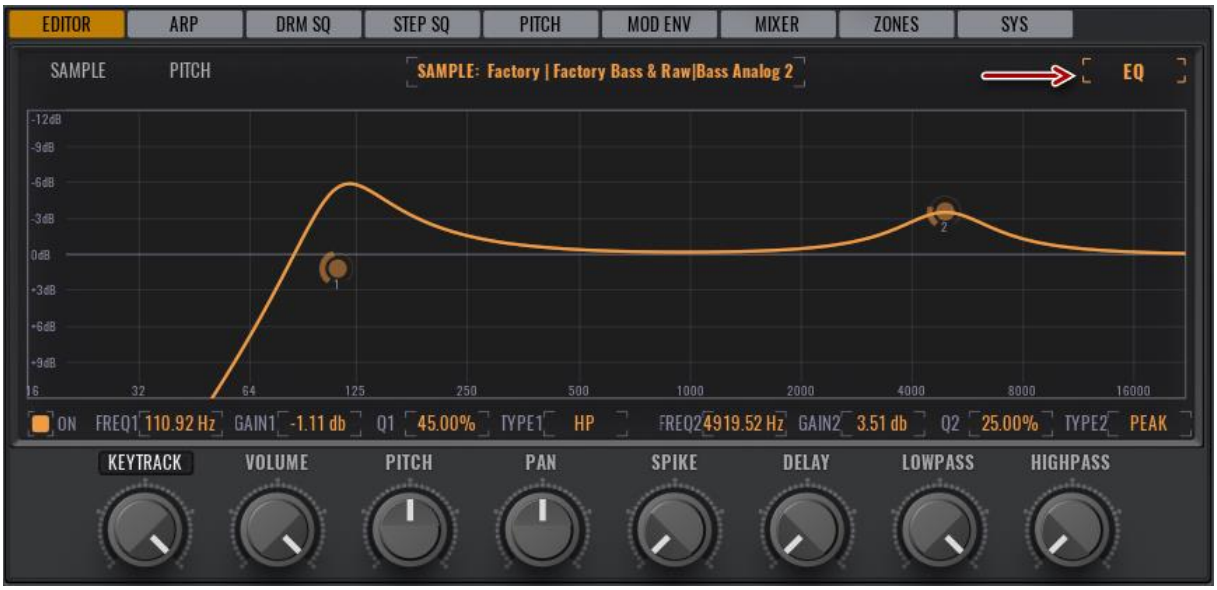
By clicking on a slots' "edit" button, you open the sample editor for each slot



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:

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 melodie „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.

See the added features in **v1.5** here, starting at 12:35

http://bit.ly/VPSAvengerv15Features02

The arpeggiator section was completely rewritten since **v1.4** – get an overview here:

http://bit.ly/VPSAvengerArpeggiator

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:

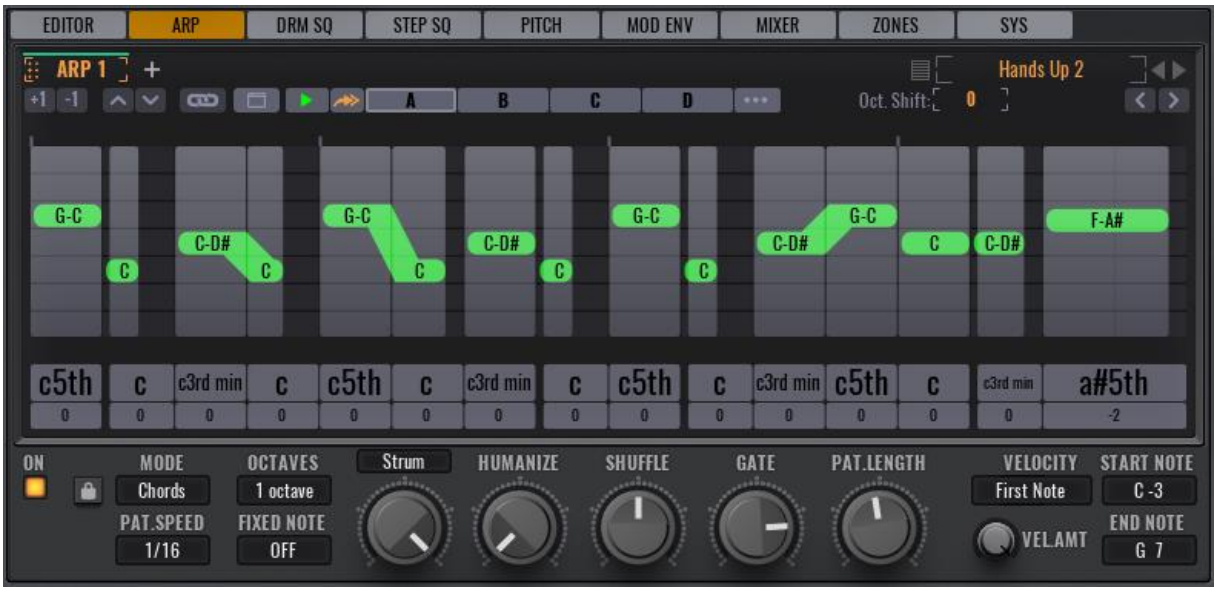
https://bit.ly/VPSAvengerChordsMode

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.

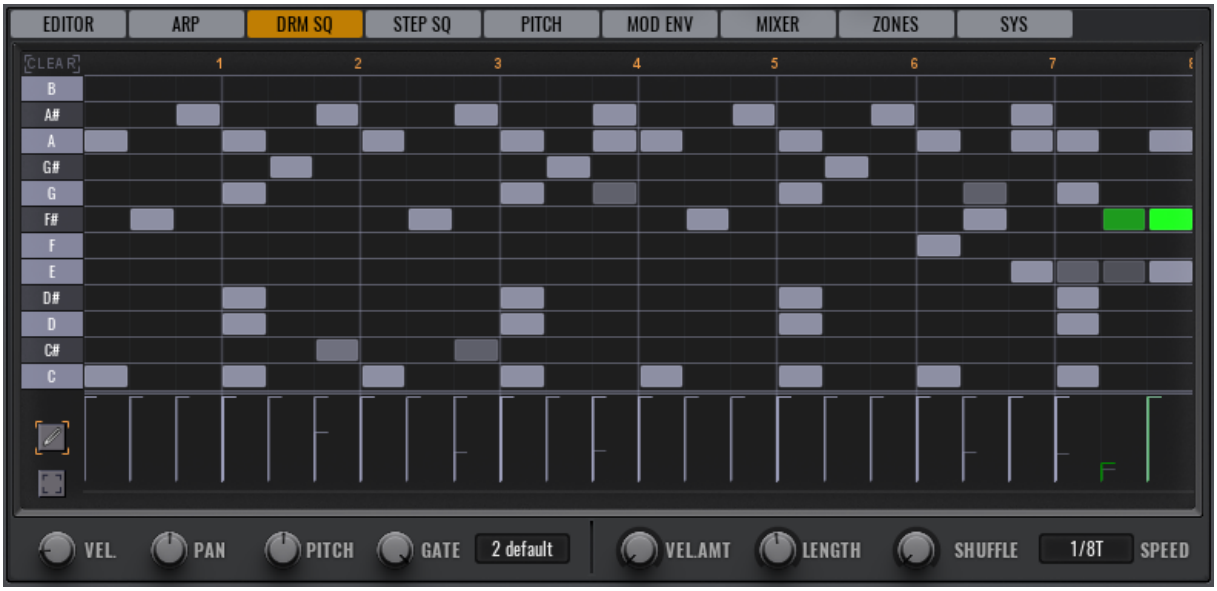


The connect grid only appears, where notes are close enough to each other. If there is too much space between the notes, you cannot connect any notes like here:

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.

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 every selected note can edited. Very short values will only play for instance the „start click" of a bass drum.
- **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

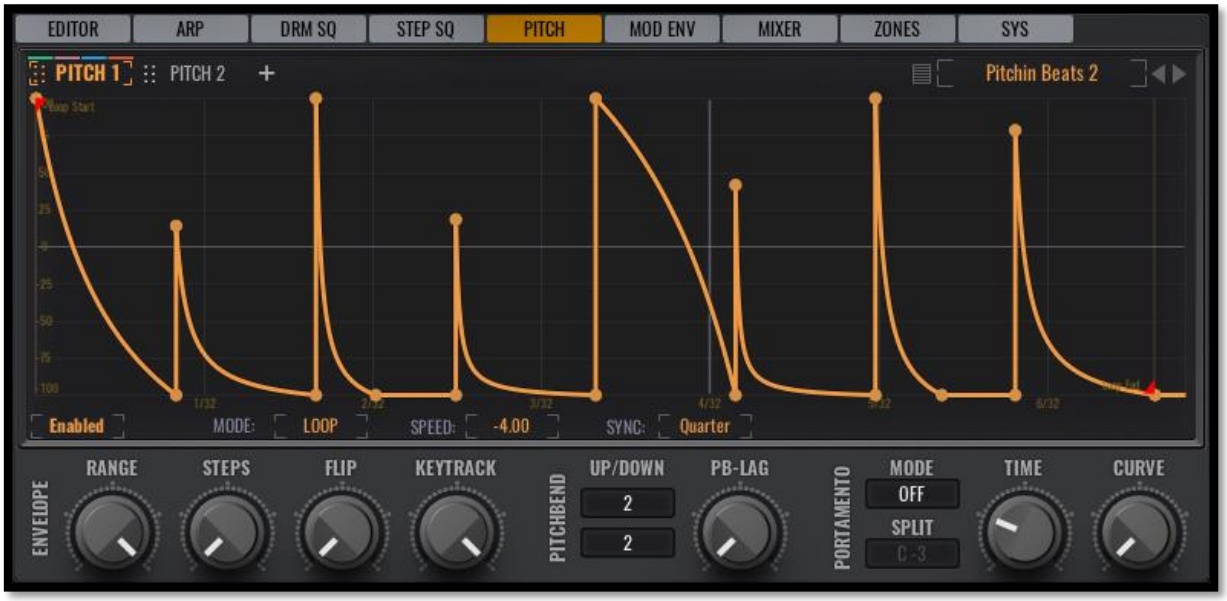
Once known as „trancegate“, this sequencer is now called „step sequencer“ as now far more is modulatable then just the volume. You can generate blocks (steps) which always have a syncronized length simply with a left click. With a held left mouse click you can set the height (depth of modulation) of 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 modualtions. It is whats 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 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 continously 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 or pitch bend automation that isnt 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 monophone. 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 also no effect on higher glided notes. This allows you for 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 portament / 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:

http://bit.ly/VPSAvengerModPitchEnvelopes

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 similar to 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 monophone (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 monophone (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 monophone (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 gows 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 monophone (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.

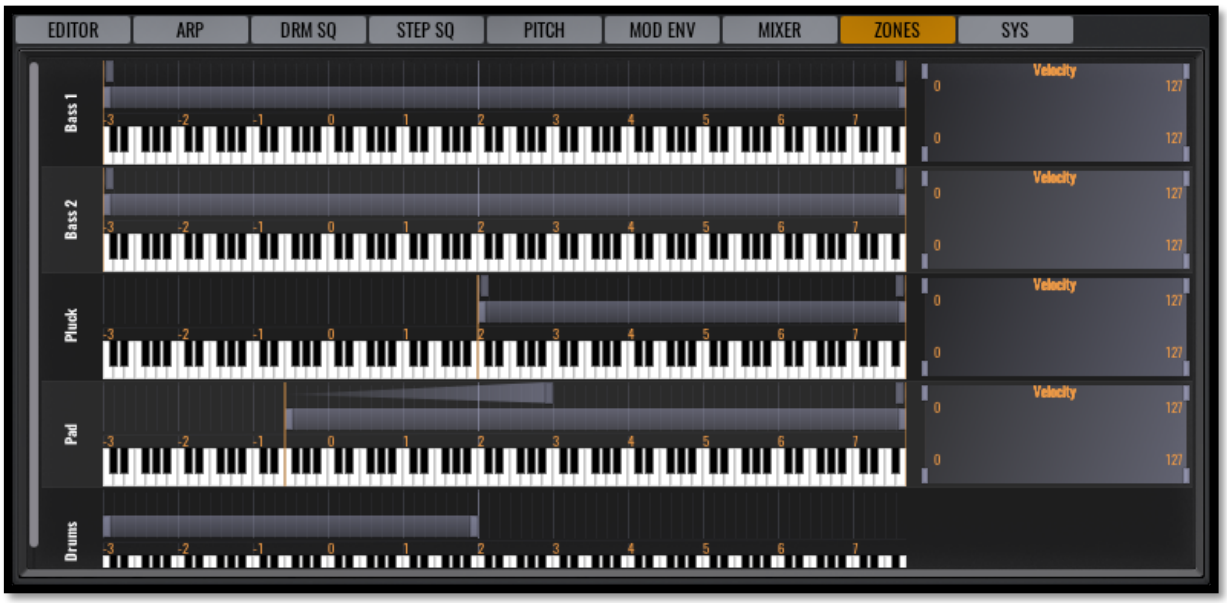
Too much text? Check the video tutorial:

http://bit.ly/VPSAvengerModPitchEnvelopes

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

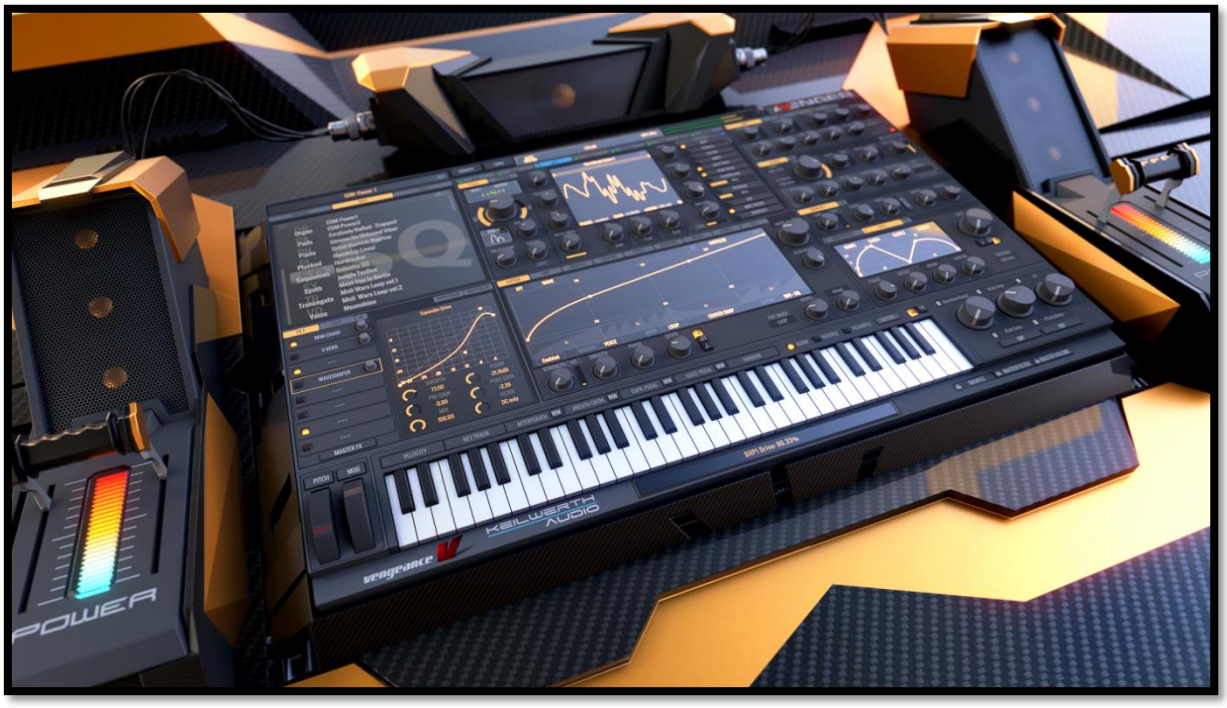
On the system page you set all the general settings for Avenger. The path to the factory library can also be seen here and, if wanted, changed.

- **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 more quiet, 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 effct on all the osc that are using it. Even if you accidentaly 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:** dieser 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:

http://bit.ly/VPSAvengerAmpFilterSection

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 algorithm:

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:

http://bit.ly/VPSAvengerAmpFilterSection

AVENGER
Vengeance Producer Suite
DRUMS
ROUTING
ARP1
PITCH 2
FILTER1
AMP2
STEP SEQ 1
STEP SEQ2
S1:AAReverb
34%
S2:Delay
26%
FX1
AMP 1
AMP 2
AMP 3
VEL
PAN
SPREAD
EXT. SOURCE
FILTER 1
TYPE
ANA LP18
K. TRACK
100.00%
RESO
DRIVE
MST. FILT
ENVELOPE
ATTACK
HOLD
DECAY
SUSTAINE
RELEASE
SHAPER 1

The shaper section

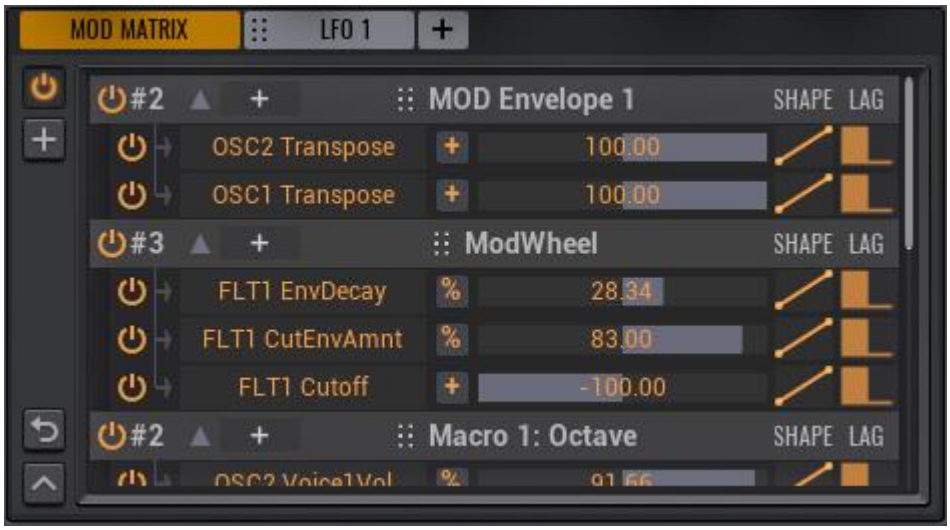
Overview

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 %

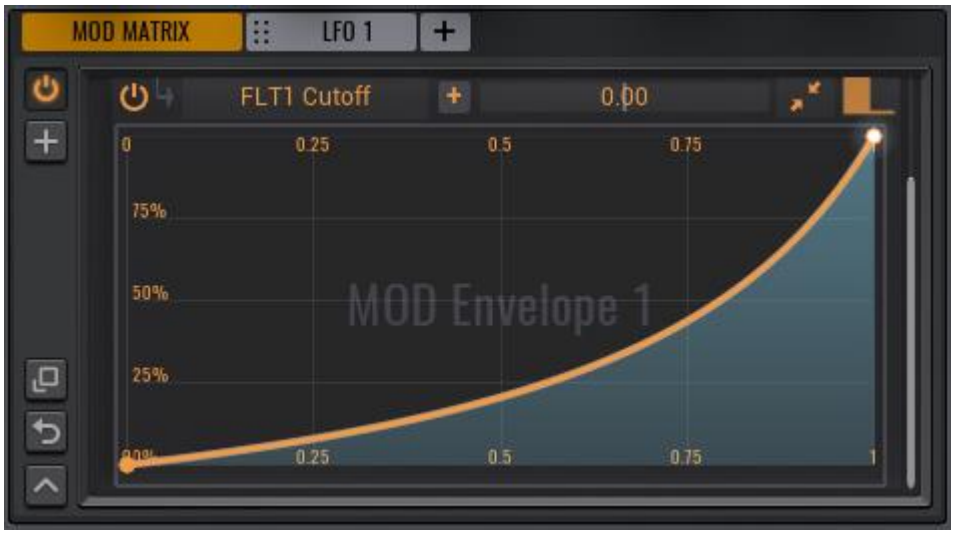
Value x is displayed in procent and can either be negative (-100%) or positive (+100%). No modulation occurs in the central (neutral) setting. Avenger always displays the modulation sources as group headers (grey bar, white centered font). The destination is then shown below in this group (yellow font). 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 dont 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 others 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 commonly 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 more or less 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 footpedal and is similar to a volume pedal. Its 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

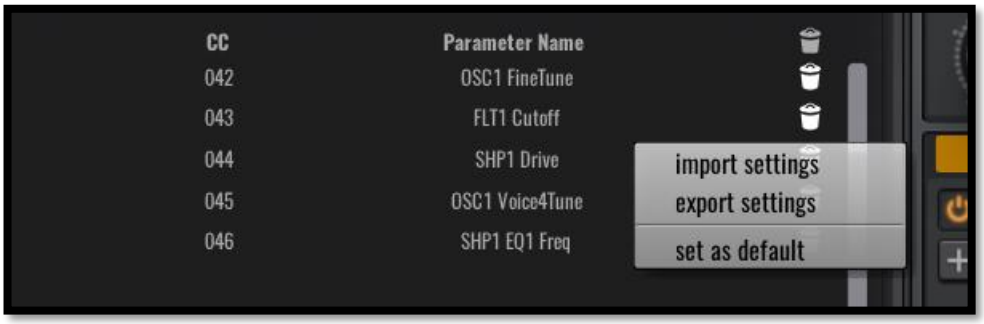
Some of the MIDI controllers have a special function. Because almost all of Avengers factory presets use the modwheel to control modulation within the sound you can, by using the „mw“ buttons easily re-route this controller to the modwheel.

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 Anvenger 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, you 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 rightclick or the icons above.



Check the corresponding tutorial on Youtube here:

http://bit.ly/VPSAvengerMidiLearn

The FX section

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 hand book. You can however look up these descriptions in both of our hand books for „Vengeance Producer Suite FX Bundle 1 & 2“. This can be downloaded on our site:

https://bit.ly/VPS-GetFX1

https://bit.ly/VPS-GetFX2

There are video tutorials for each module on Youtube

https://bit.ly/VPS-FX1
https://bit.ly/VPS-FX2

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

1.8.4 changelog

- ARP: added "Ignore Global latch" option to achieve specific preset design.
- ARP: added "Ignore Endless Switch ARP limits" option to achieve specific preset design.
- added a random/alternating fine tune on OSC Sample stacker slots, so each slot can have its own random tuning
- osc-vibrato frequency is working with a "add" modulation mode
- fixed xp sorting bug
- fixed modulation bug, where chord-detection key zone did not change for an osc if the key zone was changed via the mod-matrix
- fixed an issue where multi-loop samples would not playback on first note when using them with an ARP
- fixed math->random on osc phase modulation which was not working as expected
- fixed issue with granular envelope when using ARP sync mode LATCH
- fixed issue with overlaping note playback during ARP Pattern change while in the middle of a pattern.
- fixed timing issues in multi-loop osx using the TIMEFREEZE algo
- fixed issue with loading LFO OSCx trigger setting from preset

1.8.3 changelog

- fixed issue in license-update where the remaining time was calculated wrong.
- fixed chorder tuner error where -24 was displayed, but not played correct.
- fixed a rare crash when loading presets, caused by a wrong parameter update.
- changed SSE implementation so that CPUs with SSE3 and above supported again.
- fixed text input rounding error for routing-fx-send value
- multi-loop osc voices are ignored by the voice-steal algo so that they are not stopped.
- fixed issue on mod-matrix source "MIN-CHORD" which was always true on any non-maj chord.
- fixed an error when osc uses Multi-Loop mode and ARP is set to "fixed note"

1.8.2 changelog

- fixed VST3 error where Pitch-Bend did change after a preset was changed (Cubase 11)
- fixed tuning error when a chord-preset was selected in the OSC-voicing tab.
- fixed issue where a negative arp-pattern index was possible that may have caused a crash.
- fixed an issue in the chord voice replacement where a note might be assigned wrong to a voice

1.8.1 changelog

- added "Download Keyfile" popup when Avenger tries to load an expansion without the license in the keyfile to simplify the activation process.
- fixed error where an osc my play one note below its keyzone
- fixed issue on IntelMACs where the ImpulseFX was not working correct.
- possible fix for a rare crash on MACOS during load of Avenger
- changed codebase to be compatible with older-non-AVX processors. Minimum requirement changed to SSE4.1.
- WIN: added VisualC redistributeable package to installer.
- keyfile drag n drop should work correct now.
- fixed: switching LFO from Global to per-voice trigger did sometimes not work as expected

1.8.0 changelog

- Avenger is now working on Apple M1 native
- switched copy protection from Codemeter back to keyfile
- added: when preset search is visible, the prev/next button will cycle through the search results instead of loading the next preset from the "normal" expansion list
- added "FAVORITE" icon to preset search to toggle Fav's during search
- added detection for some specific chord (min7-3, maj7-3)
- added ARP triggered incremental mod source
- fixed: fx Phaser does not move when spread parameter is modulated
- fixed: arp chord detections hangs on last chord until a full chord is triggered again (happened on specific circumstances)
- FX impulse: fixed problem where textedit did not update the fx
- fixed: osc display did display the wrong start offset in specific circumstances
- fixed a crash: when changing the legato mode on the pitch tab may try to retrigger also inactive oscs that causes a crash on specific circumstances
- fixed a possible crash in pitch-module preset load
- fixed issue with loop playback in multi-loop module in specific circumstances
- fixed midi note hang in specific circumstances
- fixed: drumkit triggers modenvelope, even if osc-only mode is used as trigger for the mod-envelope
- fixed an OpenGL issue that deleted Textures from other application when closing Avenger's GUI
- fixed macOS: drag n drop onto Wavetable/Resampler sample display is now working as expected
- fixed a possible bug where the Avenger completely muted using sample stacker
- fixed a rare crash when loading presets while the ARP editor was visible

1.7.0 changelog

- added new OSC module: "Event Trigger" - can trigger certain sounds and samples on events like release/note off or midi CCs
- fixed: OpenGL issue where closing Avenger GUI caused display problems in other plugins or may have crashed the DAW
- fixed: midi note was not displayed correctly when clicking the midi keybord inside the Avenger GUI
- fixed: invalid argument exception/crash when entering an empty string to const wavetable length
- fixed ARP note display: notes with 11 and -1 do allign correctly now
- fixed: issue in OSC soundbrowser freeform and the search function. The search found results from other categories than freeform
- added: drag n drop for custom-wavetable files from a path that is not inside expansions

1.6.2 hotfix

- fixed: arp first note is not played correct in some DAWs

1.6.1 changelog

- improved: less CPU usage of Multiloops (especially the CPU-spike at the voice start). These are nearly completely gone now!
- added: new feature for OSC sample stacker: each sample slot can have its own key/velocity range where it is played. This is also displayed in realtime. Go to a sample OSC / Edit / chose slot 1-4 of sample stack
- added: Multiloop module: in the context "chord type" you may now choose what should be the priority when playing just single notes / no chords The user can choose that single notes are detected as minor or major chords
- added: modmatrix "duplicate" feature: You can now duplicate entire mod sources with all its targets into other existing sources. You can find this in the mod matrix context menu /duplicate.
- added: massive speed improvements when converting/importing multisamples, shapes, wavetables etc to an expansion. Should now work nearly instantly!
- added: shape batch convert for folders that conains a lot of shape-samples. Just chose the main folder and select "batch convert OSC shapes" to convert everything whats inside into shapes
- added: TAB key switches the OSC tabs / shift TAB key moves backwards through the OSC tabs
- improved: sample loading time. If you now load large multisamples (100MB and more) from the OSC browser, this now goes a lot faster
- improved: loader will notify the user if the license needs a refreshing. It can be done directly on the Avenger loader or -if you want- like before in the V-Man
- fixed: small timing issues in the ARP
- fixed: Drum-Routing was disabled and showed "OSC used as FM Source" when OSC1 was used as FM source
- fixed: annoying click-sound on chord change/sample change in Multiloop mode under specific circumstances
- fixed: fixed a memory leak/crash when loading data from an expansion
- fixed: volume of the autoplay previews are now taking the master volume into account
- fixed: chords were not always detected correctly when latch mode was on and OSC chord root note filter was set
- fixed: ARP moving notes stepwise to left or right may have caused grafical bugs in the arp under specific circumstances
- fixed: issue with saving/restoring solo mute state in presets after the implementation of the the solo/mute handling
- fixed: issue when modulating the sample-start-delay with a random source
- fixed: issue with UNDO of deleting a stacker sampler that had a modulation in the Mod-Matrix. Now the Mod-Matrix is restored properly on UNDO
- fixed: Modulation ring of the granular desity/grain size works now smooth - without framerate drop
- MAC: fixed a crash that was related to a not released openGL context after closing the GUI

1.6.0 changelog

- multiloop: fixed noise burst when changing special modes (add 12, crazy, add -12 etc) while voice is currently playing
- multiloop: fixed a key-naming problem in the multiloop-map file when creating a multi-loop sample for 5th and save it from the multiloop editor in Avenger
- multiloop: fixed an issue when loading a multiloop -> then init preset -> change the osc to multiloop again = previous key assignements where still visible even if there was no sample loaded
- multiloop module: added a 5th-lock function so that 5ths can be also played when only 1 note (no chords) are played. Or you can choose the chord mode which makes sense when 5ths are combined with other multiloop modules playing min/maj (3 note play required)
- File-Browser: added open/closed indicator to drive/folders to improve readability
- File-Browser: fixed colors which were barely visible due to an error in the factory skin
- OSC: fixed issue with displaying missing content in sample-stacker mode. If a sample stacker now contains unlocated files its now possible to see which one
- OSC: fixed issues with subosc when osc is in sample-playback mode
- ARP: fixed another note-hang problem in the ARP when using humanize and/or strumming
- VST3 plugin format: fixed a crash when loading a preset in Avenger DAW Ableton Live
- added new "solo" button in the sample-stacker module
- Resampler vocoder button: adapt now sits after the vocoder, making it possible to round the saw-ish edges with the adapt
- very long files in the Multiloop module are now being displayed correctly
- Arpeggiator export / live record in DAW now can correctly output and record chord mode, strums and humanize
- under certain circumstances the sub osc could sound lofi. This is now fixed
- global Mute Solo logic improved: Solo now is always a "real" solo, muting all others. This is much more convenient for A/B comparison. You can add solos by unmuting others
- Drums page: rightclick on solo button now has the option to solo a trum track dont mute the oscs. So you can hear a bass drum solo playing together with all your OSCs
- fixed minor bugs and stability

1.5.9 changelog

- fixed issue with Masterfader on Mixer-Drums (OSC was displayed but Master was changed when moving the slider)
- fixed issue with drum-kit slot delay loading. Old problem returned where many drum-kits were loded with a delay of 0.5ms. Now fixed
- fixed issue with right mousebutton (Cntrl+Left) on macOS in ARP Display

1.5.8 changelog

- fixed issue with ARP legato OSC Endless Sub
- fixed a crash when unloading the plugin and an FX-Preset browser was opened that had sub-menu entries
- fixed rare deadlock during preset load
- fixed note hang for endless-sub osc chord root option on specific circumstances

1.5.7 changelog

- fixed: other samplerates than 44.1 could lead to hanging notes. This is fixed now

1.5.6 changelog

- new: changing or modulating the legato mode in a pitch module will not stop the active voices of an OSC using that module. The voices are retriggered instead
- added: File-Browser using arrow keys up/down plays the sample preview now. Right arrow loads the sample to the current active OSC (of an active OSC Tab or the selected drum slot if the DRUM Tab is active)
- added: Guitar loops are working with first-note trigger correct now. If another OSC starts the first note out of the range of the Guitar-OSC, the guitar sample would start on the correct beat-position as soon its triggered
- New Copy/Paste Module mode. Its now possible to copy a module from one preset into another. Previously after loading a preset/initialize the copied data in the clipboard was lost. You can also copy a module from one instance to another instance of Avenger
- optimized DrumSeq ROLL Mode: "reverse Sample-EndSync". Now working like a dream: SampleStart/End is now taken into account. Slot pitch or individual drum note pitch also affects the start position and left neighbor events will also be taken into account and offseting the start position, so the reverse ALWAYS ends correctly on point, no matter what.
- fixed: CombKey filter issue where changing the "damp" Value while a note is activate did not work correctly
- fixed: switching a granular samples in the OSC browser while playing a note on that OSC will keep the envelope position on the correct synced location instead of retriggering the envelope (which lead to unsync behavior between other playing arps)
- fixed: wavetable overlay over the keyboard will be visible or not, now corresponding correct to the overlay-switch on/off setting after preset load
- fixed: preset search filter "ARTIST" - artist is now listed correct for preset saved with 1.5.x
- fixed: modulating the VINT Filter - Filter MOD: Parameter is now displayed correctly
- fixed: issue with wrong end-value in "oneshot" mode for the wavetable-envelope
- fixed: expansion sorting issue in soundbrowser
- fixed: ARP display beat-index lines are listening to the speed modulation and will display triplet-beat when modulated from a normal beat correctly now
- fixed: note hang when activating/deactivating chorder-voices via macro buttons when the OSC used an ARP
- fixed: drumkit AUX output "click" sound when triggering notes too fast
- fixed: click sounds when using oversampled FM on note-start
- fixed: issue with cursor key in the sound-browser when the arp was visible
- fixed: OSC endless sub: when a note is held, changes of the octave/switch key are live audible now
- fixed: issue with wavetable envelope sequencer and first note. the sequence was reset on a new note when the SYS-Page speed change mode is set to "JUMP"
- fixed: poly legato mode when using note-connection in ARP
- fixed: note hang when using legato and triggering note via midi keys and internal keyboard
- fixed: wavetable "first-note" trigger when using a pattern sequence in the wavetable envelope
- fixed: missing notarization in macOS X installer
- added: Resampler editor custom wavetable size accepts now much finer values: decimal values up to 3 digits (for example 1024.123)
- fixed: issue with random tri LFO first value when using the offset parameter - wrong range values were possible

- fixed: issue with the "default settings" for ARP and StepSQ when there is no "default Preset" available in the settings folder for the module
- fixed: drum sample envelope showed wrong ms time information on the envelope points

1.5.5 changelog

- new free skin added! "FLAT" (a flat version of the factory skin by Vlad Shnyrev)
- note-connect: fixed issue where the first note get muted if is is a connected note and the pattern just switched

1.5.4 changelog

- fixed issue with new init preset detected as outdated
- fixed issue with latency-notification to the daw
- Midiwars is working again!
- wavetables and shapes from the freebies section (AKWF / Weidner WTs) can now be used again (redownload new version from our website)

1.5.3 changelog

- fixed crash when using cross FM Fixed Masterfilter bug (low volume on many presets or muted)

1.5.2 changelog

- tunefile is loaded correct for samples and multiloops now. (some presets had wrong volumes or wrong tune) Fixed Masterfilter bug (low volume on many presets or muted)

1.5.1 changelog

- Fixed Masterfilter bug (low volume on many presets or muted)
- fixed bug that The Import button on the Sys tab did ignore avxp2 fil

1.5.0 changelog

Watch these two tutorials on the new v1.5 features:

http://bit.ly/VPSAvengerv15Features01
http://bit.ly/VPSAvengerv15Features02

New major Features:

- New Synthesis Module: "Multiloop" Player. Plays for example Guitar loops in accordance with chord detection in min/maj or 5th, 7th etc.
- New Library of 54 Guitar loop Kits: 9 Distorted Guitars, 28 Electric Guitars, 6 Nylon Guitars and 11 Steel Guitars
- Timestretch algorhitm with Formant shifting and transient detection: Elastique Pro by Z-Plane
- 3 new Guitar Expansion Packs available: XP1 Distortion & Electric / XP2 Muted Nylon and Steel / XP3 Acoustic and Electric Bass
- Added new Vintage self-resonating filters from ArtsAcoustic: Awesome emulation of classic analog filters!
- New Filtertypes: LP12/24dB, HP12/24dB, BP12/24dB, BS12/24dB
- New Filtertypes with resonance distortion
- New Filtertypes drive dependant on input gain
- New Skin: White
- All previous skins updates to new functions
- Factory Library R7: Tons of new Stuff: FX Presets, Arp Presets, Envelope Presets, FX Chains, Drumkits, Shapes, Multisamples and Wavetables
- Over 90 brand new Impulse Responses for the "Impulse Reverb" increasing the number of available Impulses to over 200
- new latch mode for the ARP
- Free Expansion Pack! "Synthstruments"... digitally recreated real instruments via Wavetable, Combfilter and FM technology by Mirko Ruta
- 136 Presets / 12 Drumkits/SQs / 21 new Multisamples / 164 new Wavetables (Bass/Brass/Keys/Mallet/Others/Pluck/String/Voice/Woodwind)
- Added new copy protection system: You can now manage your 3 installations yourself (You now have the ability to de-authorize machines).

New minor Features:

- Further Improvement of ARP Chord Detection
- new Arp connect Mode: Notes can be tied together now. Use it for Portaslides or for the new Multiloop Module
- Arp does now display note Values in the Note Block for a better information
- Mod Matrix is now expandable over entire screen height
- New Button "turn on/off Chord Note-Mute popup"
- Drumkit Export now exports Drum-Rolls correctly
- New dynamic font size detection for XP browser title screen: no more cut fonts
- Mod Env Speed is now automatable polyphonic (each note gets its own values, for example you can automate speed via keytrack, velocity etc...)

- Added: ghost EQ drawing for drumslot-EQ modulations
- Added: 4 new MOD sources: Bipolar Random A B C D (goes randomly into both directions: positive & negative
- ARP Chord selector context menu shows currently selected chord as checked
- "mod env speed" is now per-voice. Modulation of this parameter is now independend for each voice
- resampler - the maximum number of wavetables is calcultated automatically now dependent on the length of the sample you load. Before it always was at max

Bugfixes:

- Fixed: added missing Undo function for the ARP Mode
- Fixed: low frames of Granular mod rings
- Fixed: a bug in the Chorus FX when you typed a value via keyboard there was the wrong value
- Fixed: a click in the Trancegate in conjunction with a granular sound
- Fixed: Arp routing was not loaded correctly in 1.4.10 You were not able to select other arps in the OSC routing!
- Fixed: several note hangs in conjunction with porta legato and endless sub mode
- Fixed: adding a shaper in the drum section routing now works correctly
- Fixed: Arp move left/right buttons could have lead to a polygon grafic error
- Fixed: switching the arp from chord mode back to up: the ranges of the notes were not correctly changed
- Fixed: presets which used the comb filters were sometimes loaded incorrectly (out of tune)
- Fixed: a clicking problem in the delay FX
- Fixed: a bug in the routing of the chorus FX
- Fixed: an aliasing problem with Arp in legato mode
- Fixed: audio preview in the sample browser now plays without click
- Fixed: "phase" in the WT editor was not working correctly
- Fixed: endless sub mode was not displayed correctly in the used voices counter
- Fixed: in the chorder there was zipper noise when automating the volume. This is now gone
- Fixed: drum kits had a slight latency in 1.4.10. This is now fixed
- Fixed: a bug in the AMP release when playing 2 times the same note
- Fixed: Wavetable first note trigger was not working correctly
- Fixed: a problem when the MST filter was muted when you switched to Talkbox
- Fixed: the Wavetable envelope reacted wrong to host tempochanges
- Fixed: "Phase" in the Wavetable editor was not working in conjunction with "First Note" trigger mode
- Fixed: audio clicking when switching chords in the Arp chordmode
- Fixed: Noise oscillator had a bug when it occasionally produces a freezed noise
- Fixed: Wavetable envelop is not set "on" by init default
- Fixed: Arp stayed not sync while host tempo was changed via automation
- Fixed: a problem with granular samples when you changed to 1 BPM and back in your DAW
- Fixed: LFO Synced Delay / Synced Fade did not follow BPM changes correctly
- Fixed: DrumSlot EQ LowPass/HighPass Mode now works correctly
- Fixed: rare OSC microfade "zipper" noise
- Fixed: non-static filter attack phase. Each new note should now sound the same if the osc sends the same audio
- Fixed: rare click sound after a preset was loaded and the first note was played back
- Fixed: drum sequencer midi export/import now rolls correctly
- Fixed: ARP midi-out. Now the Chord base note is also send to midi out
- Fixed: copy paste in DrumSQ. Now the roll information is also copied correctly

- Fixed: drum slot sample Reverse playback is working correctly with sample start/end points now
- Fixed: selecting / descelecting notes in the drumsequencer did sometimes not disable/grey out the parameter dials
- Fixed: master filter selecting "Talkbox" for the first time did result in silence
- Fixed: StepSQ. Filling the StepSQ with mousebutton held down did not set the correct values
- Fixed: drumsequencer - copy/paste is now working correctly for notes with "roll" settings
- Fixed: drum sample slot parameters will not change now, if a sample slot is "locked" and a new drumkit is loaded

1.4.10 changelog

- fixed hang during loading in ProTools DAW
- fixed issue with wrong routing of FX busses after loading a preset in specific circumstances
- fixed issue with granular envelope global first trigger
- fixed issue with retriggering ARP notes when legato is being used and the chorder voices are being turned on and off
- fixed mouse wheel 12 steps for OSC transpose dial
- fixed issue with hanging ARP when sustain pedal is used
- fixed issue with playing ARP notes that were too long / too short after changing the ARP speed

1.4.9 changelog

- added/fixed: Avenger reports a latency to your DAW now for correct auto compensation. You can set this up on the SYS Page "Off" (regular/default behaviour with zero live play latency - "Dynamic" (latency rises depending on the number of Limiters or Comps being used in the preset) and "Fixed" 5,10 or 15ms" (one Limiter or Compressor needs 2,5ms lookahead, so 15ms can compensate 6 of these effect types)
- added: "set global" button for the latency mode: updates all Avengers in your current song project to the desired setting with one click
- added new stereo compensated mode for the VSAW with even voice-counts (2voices, 4voices and 6voices are now equally divided in the stereo field)
- added a new button: ARP "Auto-Follow" - the ARP view will follow your pattern changes if active
- VMAN only logs into the account when opening VMAN. this should speedup loading time a lot
- general improvement of loading times
- fixed: loading a new drumkit and having locked drumslots will now lock all the parameters (vol/pitch etc) of the locked slots, too
- fixed: correct snapping steps to the FM Rate dial when moving it with the mousewheel
- fixed: DC offset in shaper with mode "polynom"
- fixed: bug with triggering mod env if the triggering OSC has a different keyrange
- fixed: issue with appearing "PITCH8" route in the drums after removing MasterFX from a selected range of drumslots
- fixed: pitch envelope in loop mode was not correctly synced to your DAW's BPM after loading a preset in certain circumstances
- Avenger will update the init preset to a new version, because of important changes due to recently added new features. A backup of your customized init-presets will be created
- many minor improvements and fixes

1.4.8 changelog

- added new SYNC MIX modes 100%,75%,50%,25% to specify the intensity of the sync effect (can be found in the context menu)
- included ARP Poly mode to the LATCH modes
- fixed an issue in drum sequencer reverse sample end sync
- fixed an issue with modulation assignent for OSC-Sample stacker slot when another slot was removed
- fixed a note hang when switching to endless sub while a note is active
- fixed a issue with wrong display of enldess sub mode when it is modulated byn the modmatrix
- fixed an issue with note hang when bypassing the plugin
- fixed a crash when using the search function in the soundbrowser and then navigating with the arrows in the browser
- fixed some minor issues in the chord detection

1.4.7 changelog

- fixed a problem with ARP fixed note / Chord Detection
- fixed issue with too much CPU usage on idle in specific circumstances
- fixed an optical issue with switching off the Endless-Sub-Switch mode

1.4.6 changelog

- fixed APR/DRUM-SQ playback issue when not using a LATCH-Sync mode

1.4.5 changelog

GENERAL:
- massively improved chord detection modes
- VST3 fixed an issue where Avenger received MIDI-CC Data even if there was none
- fixed a GUI crash when double clicking the OK button in a pop-up message (i.e. Initialize Preset)
- fixed a rare crash when cross FM was not set correct

SYS-TAB:
- added Arp/DrumSQ-trigger option LATCH to SYS-page

GUI:
- improved MIDI data readout. Its 2 rows now for better readability

MODMATRIX:
- fixed a issue with OSC-target names were wrong after removing OSCs
- added new source that triggers if a MIN or a MAJ chord was detected
- added OSC-StartKey/EndKey mod target
- added OSC Keyzone as mod-target

DRUM-SQ:
- fixed odd scroll behaviour in Drumkit browser when saving a drumkit preset
- fixed an issue with pre-delaying samples timing was not correct if SQ Speed was other than 1/16

OSC:
- new endless sub Menu
- new endless sub mode: endless sub switch
- added octave and note offset to endless sub modes

OSC-SOUNDBROWSER:
- improved search: Now it is possible to search in a specific expansion for a search string
- sound preview plays always note "C" now

VMAN:
- fixed an issue where the expansion list was not updated after activationg a new expansion in VMAN

1.4.2 hotfix
- fixed a problem with arp notes did irgnore legato
- fixed a problem with poly legato split zone load/save

1.4.1 - minor fixes
- minor internal changes to fix the crash on preset save
- sorting folder list for multisample import
- fixed a small issue with multisample-conversion for sample-stacker
- fixed an issue with changing chorder-arp presets would stop arp playback
- fixed note-hang issue
- adjusted font-brightness in the fx-section for the vintage skin

1.4.0 - Chord - ARP update

Updated Factory Content to R5! Please (re-)download it from https://register.vps-avenger.com/
- Hundreds of new presets for ARP (chord mode), FX chains, Mod Env, FX, etc...

ARP:
- added new Arpeggiator module: Chord Mode
- added Per-Note strumming for ARP Chord and Poly mode
- added ARP cotave shift-button (or chord intervall/variation shift in chord mode)
- added selection capabilities to the ARP (hold shift to draw a box and select multiple items)
- added copy/paste 1st or 2nd half of an ARP pattern
- added ARP Humanize function (randomly shifts notes positive AND negative in time)
- ARP: added chord detection as "fixed note mode" where only the base note of a pressed
- rd is played. Perfect for bass adds to pads or SQs.
- fixed an issue with ARP patternmode poly fixed note
- fixed an issue with ARP fixed note octaves parameter not working properly
- fixed an issue with displaying arp pattern modulation in negative direction

Others:
- added a new free skin: Vintage Skin for Avenger by SatYa Tunes
- added new FX type: Clipper (Distortion)
- added new FX type: VMS Stereo Expander
- added new FX type: VMS Stereo Shifter
- improved UNDO for removing a FX from a send slot, which could affect OSC/Drums routing

- changed OSC-soundbrowser preview. its playing 1sec with a single click, if the file is longer, hold the mouse button to preview longer than 1sec
- added scrolling target texts in the mod matrix when the text is longer than the textbox
- fixed an issue with noise-phase lock when using a lower noise-sample rate.
- fixed an issue with tempo-update in the Trancegate
- fixed an issue with PitchBend and value mapping.
- fixed some memory leaks related to VMAN
- fixed a crash when GUI vanished after initializing the preset (very rare)
- OSC Transpose dial has an improved scale when using the mouse-wheel. Now changes 12 semitones or 1 semitone when using shift mouse-wheel
- GRANULAR: added "Convert To Granular" to context on the Granular-Sample display. rightclick to open the context. File will be loaded automaticaly to the OSC after conversion. This is only available on User-Samples, when the source-file is available.
- The minigame "MIDIWARS", which was exclusively in the 8/16Bit XPs is now available for everyone

1.3.5

- added new function for DRUM-SQ: "REVERSE SAMPLE". You can access it in the ROLL-MODE context. That will playback the sample reverse. The tempo anchor point is the Step next to, where the arrow will point at
- added Shape for a MOD entry / slot in the MOD MATRIX. With that function you can additionaly shape the modulation value before if modifies the target.
- added new LFO Parameter: "Synced Mod." When this is turned on, rate changes via modulation will be synced to your Song BPM, meant it will switch the Rate only at full cycle values to stay in sync. So a 32th to 8th wobble will always sound tight in your mix.
- added "CLEAR" button to DrumSQ. Clears all notes
- added UNDO for preset load. If you accidentially load a preset, you can un-do this.
- added COPY/PASTE for FX settings, now you can copy FX specific settings from one instance of an insert FX to another instance
- added ENDLESS BASS Mode playing the octaves from the ARP. Endless Bass Mode also only takes 1/1 voice now in the Voices page / global voice limit.
- added ARP shuffle is now working correct on pattern lenghts that are not related to 4/4 (esp. odd pattern lengths, i.e. length 9 or length 7)
- added KEYTRACK to insert FX: Filter. Good if you want to use the new Comb filter for example on the master sum or an effect bus.
- added visual feedback for inner dials (i.e. OSC PAN, Noise color etc...)
- added visual feedback for the OSC's HP/LP Filter bar
- added phase-lock for OSC Noise, very handy for static attack-noises (Drum sound design)
- added OSC-endless bass mode as mod target
- added: quick assign drum slots to aux or specific FX bus. Now you can route all AUX Outputs with 1 click
- changed: loading a ModEnv preset does not chagne the trigger-mode anymore
- changed: preset search->added VARIOUS folder to author context where authors with less than 10 presets are listed
- fixed issue with solo-ed sample stacker after loading a new sample to a stacker slot where all slots were audible again
- fixed DrumSQ. leftClick CNTRL to move the event free from the bpm-grid. Was working before but the note had to be selected first - now its easier to use. Great for Humanized Drum patterns

- fixed drum kit route gain-slider
- fixed a issue in AAX format where not all AUX outputs were processed correct.
- fixed an issue with resample/wavetable beat selector which was working only for OSC1
- fixed wandering crossFM attack sound
- fixed StepSQ clicks in stereo mode when stereo width is not 100%
- fixed an issue where granular-env position-dot did display the position of OSC1 even if OSC2 was selected
- fixed an issue where custom-samples was not stored correct in the sample-stacker
- fixed an issue with insert FX Filter "inertia". Now the insert FX: Filter is much faster for modulations.
- fixed an issue with Arp clock mode "first note" and play with multiple patterns where the arp did start at pattern A but B should have been already reached.
- fixed an issue in the mod matrix. modulating the strength of a slot using a per-voice-source where the target of the modulated slot is not per-voice
- fixed: changing StepSQ state and stepSQ module on multiple-selected drumSlots does not work
- fixed: mod-matrix slot strength modulation "bar" showed wrong value if mod add was used to modulate the strength
- fixed: granular-envelope speed mode wsa not saved/loaded correct
- fixed: crash when removing ARP1 after ARP2 was created.
- fixed a scrolling issue, when adding a new target/source to a quite full modmatrix
- fixed retriggering voices on chorder on/off and active legato
- VMAN: fixed: expansion not visible after downloading and importing it via VMAN
- VMAN: fixed: wrong folder for VMAN bitmap cache on MAC OS
- tons of minor bugfixes and improvements

1.3.4

- added VMANAGER(beta) to manage the expansions in your account.
- added snap for ARP Pattern length
- improved preset search startup (loading a index list from harddrive so that it must not be created each time the plugin is started)
- fixed a issue for OSX GUI implementation that caused a very highg CPU usage
- fixed a crash caused by the COMB KEY filter
- fixed a tuning error for C-3...D#-3
- fixed some memory leaks
- fixed a issue where arp pattern length 16 could result in length 17
- fixed a issue that caused the routing display to show "#ERROR" after initalizing a OSC and disabling a filter-route
- fixed a problem with pitch-steps-parameter calulation
- fixed a click-noise at sample loops points (introduced with 1.3.0)
- fixed a issue where removing a module could cause a routing into a module of the same type for two times. (i.e. 2x shaper1 when removing shaper 2)
- fixed a issue with DelayFX-Kill Feedback if it is pressed manualy and is modified via the mod matrix could cause a CPU spike

1.3.3 - hotfix

- fixed a crash starting a sound from the drum kit

1.3.2

- fixed a issue where it may occour that not all expansions were visible.
- fixed a issue with recursive cross FM (OSC3-> OSC2 ->OSC 1) where OSC3 was not handled correct

1.3.1 - Hotfix

- removed a memory leak that was intorduced with 1.3.0
- fixed a small issue with deleting a FM-Source OSC. it does not get stuck in source mode anymore

1.3.0

- added REAL-FM. a OSC can be used as FM Shape.
- small cpu improvements on pitch module
- SYSTEM ID is displayed on the SYSTEM-Tab.
- improved sfz code. !Not all SFZ files will be handled correct. Avenger does not support layering (multiple samples for same note velocity), also "#include" opcode will be ignored.
- added MIDI-CC Learn for PREV/NEXT preset
- added MIDI-CC Learn for Macro-buttons
- fixed: Preset Browser Category sorting for OSX High Sierra with APFS
- fixed: FX Chorus, created "phased" sound on disable/enable fx.
- fixed: problem reading skin-zip files that were created on OSX
- fixed a issue where the SteqSQ enabled parameter was always set ON after loading a project
- fixed a crash that may occur after removing a OSC between 2 oscillators that are using samples.

1.2.6

- added new filter model: "COMB KEY". This one is perfectly tuned (keytrack). Use it on waveforms or attack clicks
- added favourite rating system (star) for presets. You can tag your favourite presets and search for them in the search page
- added new roll/flam modes pattern to drum kit sequencer. Fade ins/outs and many more new rolls!
- added new OSC formant mode "x-fade", very smooth and handy for wavetables where the waveform does not start with a zero-crossing
- added line draw mode for FFT-Harmonic & FFT Bin (use ALT key % mouse click)
- added audio preview for shapes, freeform & wavetables in the OSC sound browser
- added new modsource: osc-pitch-keytrack. Try this on formant/x-cite for example to get smooth transitions when using portamento legato
- added current BPM is shown now in the top bar display
- added more voice-limit intervals
- added more master gain intervals
- added own format for user-skin files, so developers are not forced to release their source-images
- added multisample converter for SFZ files. (WAV and AIF samples are supported) Just rightclick on a sfz file in Avengers' browser and convert
- added the OSC browser sound preview now correctly use the loop points in the sample
- added more modulation display in numeric/text box views. (for example OSC gain, Arp Speed etc...)

- added tool-tip for Granular start/end locators
- fixed a crash on NPOINT envelope if loop-end is too close to its left neighbour
- fixed: "loop enable" button was always "ON" after loading a preset that contains a user-sample
- fixed: WaveTable/Granular Sample overlay logic issue
- fixed: Drum Slot Lock state will be resetted on initialize/preset load
- fixed: Zones Page ModMatrix KEYTRACK Slot label was not visible in other zoom modes than 100%
- fixed: issue with loading "Sustain Release Jump" Envelope mode when loading a preset.
- fixed: issue with "Default Settings" on Mod envelope browser did not load a customized "Default Preset"
- fixed: npoint envelope sustain jump mode could have caused strange behavior on specific circumstances
- fixed: fixed a problem with drum kits and locked slots where the locked samples was replaced on save/reload
- fixed: adjusted size for the "X" on Dial-Mod controller. It was too tiny
- fixed: adjusted font size of i.e. ModEnvelope Trigger Mode context for labels "GLOBAL" & "PER VOICE". These were too tiny
- fixed a issue with sample stacker and exclude start offset for a slot

1.2.5

- added: progress bar for function "publish expansion"
- fixed: ARP muting itself on touching notes
- fixed: minor issue on loading NPoint Envelopes
- fixed: aliasing chorder oscs when VSAW num oct parameter = 1
- fixed: rare click sounds that were audible on voice start while send-fx strength was modulated
- fixed: renaming a preset and using prev/next arrows did load the wrong preset
- fixed: sample name for user samples in the stacker is displayed correct
- fixed: midi CC import did not update GUI, import did append the list instead of replacing it

1.2.4

- fixed wrong inital values for mixer volumes after preset load. this caused some "pop" sound in specific circumstances
- fixed a issue with AM-FM filter in the filter module wich have been very slow
- implemented cursor key support for the preset view in the content search
- fixed: using right-arrow in the new sound browser did accidently load a new preset instead of the selected sound
- fixed: missing drum-sequencer notes
- improved Avenger loading time

1.2.3

- added system-ID locked licenses
- included: new Avenger skin: Chrono_Jade by SatYa!
- fixed: high CPU usage on some filter models while no audio was playing
- new mode: if you right-click on the Drumkit lock buttons, they will lock all exept the clicked button
- fixed a crash that occurs while loading a sample while playing notes.
- fixed a crash in the new sound browser
- fixed a crash on loading VPS Avenger
- WIN: fixed importing expansions from folders that containing UTF8 chars
- fixed Drumkit browser lock-state is was not remembered when reopening the GUI

- fixed a rare problem with double drum sequencer notes on loop
- fixed Minichain FX "Drum SQ BD" Triggermode
- fixed a logic-problem when OSC voice limit was set to 1, ARP was active for a OSC and Wavetable trigger was set to "FIRST"
- under certain environments preset loading time is faster now
- dozens of small improvements and minor bugfixes
- preparations under the hood for the next synthesis module

1.2.2

- fixed invisible value readouts
- fixed reordering FX-Slots did not update the GAIN-dails
- fixed ARP-MiniNote handling
- fixed vanishing VEL-Curve buttons on GUI scales < 80%
- fixed a problem with long ARP notes when the ARP length was changed afterwards
- fixed removing a OSC will reset Keyzones for folling OSCs
- fixed click sound caused by midi patterns with single notes in a cue (ie. 1/4 pattern)
- added a write-permission check before the license file will be replaced. this should prevent confusion about still-locked expansions after license import
- changed: Updates will be downloaded via Avenger again. (v1.2.0 did just open the browser) a progress bar is displayed instead the unreadable circle animation

1.2.1

- added Key-File import via SystemTab->Content->button "Import Content"
- added LICENSE-GUIDE. This will show up if Avenger loads an expansion without having the licenes for it.
- fixed: droping a custom sample onto the osc will not automatically switch to Granular mode. Granular mode must be set first to load sample into granular-osc's
- fixed a issue with the library that was invisible if the Computer was running longer than 3-4 days.
- fixed: Transpose of stacker-sample not working correct after retriggering a note
- fixed a ARP releated CPU spike
- fixed Granular Envelope is not working correct on old customized init-presets
- fixed issue in SoundBrowser where selecting a freeform shape did not set the correct synthesis

1.2.0 - big GRANULAR Update

- added new Granular synthesis module
- added 32 new Granular presets
- added granular factory library with 219 waveforms/loops for granular synthesis
- added new mighty soundbrowser to load sounds into an OSC
- added the library for the "resampler" into ne new browser
- added new release mode for mod-envelope (releasing the note in an attack phase will jump to the correspondent volume in the release phase)
- fixed a problem with ARP undo for patterns B, C, D
- fixed some ARP issues like hanging notes, pattern issues
- fixed a issue with loading Impulse samples for "FX Impulse" effect
- added "verify expansion" to the expansion browser, so that customer expansions can be verified before
- publishing them. That shows issues with using content from other expansions than the target expansion or the factory.

- added version check for presets: You can not longer load a preset in an outdated Avenger version (example: a preset created with 1.2 using the new granular module loaded into an Avenger 1.0) which would otherwise lead to a crash.
- added new DrumSequencer functions: export to MIDI and import from MIDI, just rightclick in the DrumSQ area below
- added the possibility of live recording the Arpeggiator note output into Midi (only supported for DAWs which allow MIDI return, and only VST2/3). Just create a new MIDI track and select VPS Avenger as input source.
- INIT preset load fix. The correct INIT preset should now be loaded for everyone
- dozens of smaller bugfixes

1.1.2 hotifx

- fixed the crash that was introduced with verion 1.1.1
- fixed the content import problem at the end of a sucessfull import process

1.1.1

- added support for WAV samples in 32bit PCM format.
- shortcut: now its possible to delete an envelope point with left click ALT
- selecting a mod source on the small triangle symbol will reveal the mod-source in the GUI (zooming red crosshair rectangle)
- OSC Wavetable envelope can now be used as modulation source for other targets than the osc it belongs to
- fixed: adding a source via the " "-button in the modmatrix is working again
- fixed: masterfilter will now load its settings in a project correctly
- pitch envelope did affect OSCs, even if it was not activated in the routing. This if fixed now
- after converting a multisample, the sample was not available in the stacker menu (" " button) directly. This is fixed
- fixed: changing the length of a looping modenvelope during playback lead to a "jumping" playbackposition
- fixed some memory leaks
- fixed a rare crash when a pitch envelope / mod envelope used a mode that used "release"

1.1.0

- custom samples can now be loaded into the OSC via drag and drop from the browser
- added loop editor page for these new imported samples
- added skin selector on the SYS page
- new skin: COBALT BLUE by Satya
- added masterfilter post gain (for post drive gain adjustments)
- added new live play option for the ARP on the SYS page: "Poly Arp quantize". Defines the grid where new notes are positioned when you play live
- added a new shaper mode "EQ-only". The distortion is bypassed and you now only have a (polyphonic) 2 band EQ for each note
- osc phase & microfade modulation can now be assigned via drag n drop
- improved GUI Loading time
- improved OSC-Wave selector open time.
- improved visualization: fast-modulation ring movements now displaying 100% movements correctly
- converting a shape & converting a multisample does create a tune file automaticaly. You can open it with a txt editor for transpose and gain settings.

- removed syspage option for "sustain pedal mode". Mode will now automatically be in "SUSTAIN" mode, when the sustain pedal is NOT used for anything in the mod matrix. If the sustain pedal is used as a switch for something else (for example switching minor/major), it will not sustain notes endlessy as long as this modulation is active.
- removed syspage option for "accelerated sampleload". This mode is now permanently "on", since it had no negative consequences.
- while transposing / moving ARP pattern notes will no longer reset the transpose value when clipping on the max or min heigth
- now ARP pattern notes will reset (by clicking middle mousebutton) to the nearest octave. For example a 14 transpose will reset to 12, instead of 0
- fixed click-noise issue in resampler when numWaves > available samples
- fixed an issues with loading VINTAGE CHORUS presets. Now all Chorus factory presets will sound as intended.
- creating a new TG Module does not reset the SHUFFLE value any more
- display for Modulation ring for cutoff knob hung with the last midi note. This is no longer the case now
- fixed: orange triangle hung in the cutoff, even if there was no assigned modulation
- the editor rembembers selected TABS correct now.
- drumkits did not save correct after function "DrumKit copy sample to slot". This has been fixed
- when you save a Drumkit, now the correct last location when saving a drum kit is remembered
- there was a sorting issue in the mod matrix when removing entries that was created ealier than other items in the same source-group.
- wavetable envelope sequencer pattern mode "PING-PONG" works again as intended
- Route View displayed "ERROR" after removing a second filter module that was used in the routing. This has now been fixed
- Wavetable Env-Sequencer Mode "SILENCE" is now really "silent" again

1.0.34

- fixed a rare crash while loading a project that contains VPS Avenger
- fixed some sound and modulation issues in the Step-Sequncer
- minor changes and improvements

1.0.33

- fixed a crash when loading a preset that contains a ARP in RANDOM mode
- fixed a issue in Pro-Tools OSX where the Editor was not clickable with left MB on specifix circumstances
- fixed a random crash with sample playback
- fixed a error in sample FM while playing the sample-loop
- minor changes

1.0.32

- added: chorder transpose display shows now the modulated value (on mouse over orginal unmodulated value is displayed)
- added: GAIN Modules in the routing can now be drag & drop modulated in the Mod Matrix
- increased the choices you have in the expansion browser view "number of expansions-per-row"
- increased set of pre-created category folders when a new user expansion is created
- exchanged user expansion icon with a completely blank version so its easier to create your own icons within it
- fixed CNTRL and Left mousebutton on OSX for expansion browser

- context menu in the expansion browser did not appear when clicking in an empty row, this is now fixed
- fixed Lock MasterVolume/MasterFilter/Shuffle
- freeform display was not loaded correctly if a sample was loaded before, this is now fixed
- fixed legato note-off while a ARP is active in the routing but disabled in the arp section itself.
- fixed an issue in AA-Flanger where a click-sound occured on specific circumstances

1.0.31

- fixed the WAVESHAPER FX crash (aka the Noiseburst bug)

1.0.30

- Added new button to lock the ARP Mode during ARP Preset load
- Added the ability to store and load complete FX-Chain Presets. New preset button appeared below the FX slots. For the first time: use "restore factory presets" function to create the new FX Chain factory presets
- New "Bypass" button added for each FX Page. This bypasses the complete FX Tab
- Improved Multisample load time multisamples should load up to 5x times faster now. (Added SYS page Option to disable accelerated Sample load if problems occur)
- Rightclick on preset: "Rename Preset" function. The text input for renaming is bigger now and better to read
- The Sub OSC now keeps playing, even when a short sample (Pluck sample for example) has been played and the sample/voice has ended
- fixed a crash when removing a sample from a sample-stacker-osc
- fixed missing labels for ARP7 & 8, PITCH7 & 8 in the routing tab
- fixed noise burst on Mac

1.0.29

- new feature: You can lock drumkit-slots now, so the sample does not change when you load a new drum kit. Now you are able to mix/shuffle the drum kits
- ARP-Key Mod value is sustained until the next arp note is fired. (will not be resettet by an inactive arp note)
- Fixed memory Leaks
- fixed some random memory writes
- fixed a issue with "MISSING CONTENT" message on preset load if file system is case-sensitive
- fixed a issue with "noise" or clicks on AUX outputs when using samples rates > 44100
- minor changes

1.0.28

- fixed a problem with UTF8-Path Names and license import (WINDOWS)
- fixed renaming a module-preset (i.e. PITCH-preset)
- fixed a minor issue when editing DrumSQ velocity
- fixed left control opens the FX-context on OSX
- fixed the context offset in the mod matrix if the mod matrix display was scrolled down
- fixed a issue with OSC Group name(modmatrix) after adding new OSCs
- fixed a issue with wavetables and fast movements while VSAW is active with 2 or more octaves
- fixed a crash on osx loading projects where 2 ore more editors were opened

1.0.27

- OSC-Mixer VU displays correct db value now

- improved OSC Waveform Display graphic
- import of an avengercontent-file (expansion etc) can be done via the internal filebrowser now
- fixed a rare crash that occured while updateing modulations-display and a preset was loaded
- fixed a crash during preset load (endless mod-envelope-recursion)
- fixed AA Reverb: changing the roomtype does not update decay time correct
- added frequency analysis graphic in the background of the Equalizer effect

1.0.26

- removing a modulation with the controller on the dial will also remove the strength-modulation-source of the row in the mod matrix
- modEnvelope reads presets correct
- fixed: TG Pattern is altered on Editor open and if TG is in Stereo Mode
- changed Filter Frequency Readout to Hz
- XP Preset view context menu save function is working as intended now
- fixed parameter readout in DAW for VST2/VST3
- avenger will notify DAW about paramter changes after preset load

1.0.25

- ARP Sync bug case with "touching" notes fixed
- fixed a problem in the NPoint-envelope that may lead to a unsync playstate while envelope is playing and points are changed
- used different font on SYS-TAB for better readability on small scale factors
- fixed: pitch envelope Sync-Triplets not working
- fixed a crash when using mousehweel on Filter-Additional mode selector while there are no additional modes
- fixed a issue with start-/end-key selector for ARP and StepSQ
- sustain pedal setting will not be overwritten on preset load
- it is not possible to load another preset while avenger is loading a preset
- browser file view scrollbar is visible again
- changed font-renderer. All Fonts should be more readable on small scales
- OSX AAX Version: Editor should be working normal now
- fixed a crash related to multiple threads reading the resources

1.0.24

- pitch dial in drums tab is visible again
- fixed a error in wav reader that skipped loading specific samples
- changed gui draw methode to imporve draw performance
- fixed a problem with AU Multi out where the final 8 were not processed

1.0.23

- sypage tabs added
- fps setting added
- improved sustain pedal mode. Pedal on OSCs with active ARP will hold the arps instead of the voices
- experimental: OSX resizing the GUI seamlessy is now possible on Mac
- Scale-Magnifier is clickable even if the "MISSING FACTORY CONTENT" window is visible. so the editor can be resized also on first start
- fixed a crash that occoured during startup on some hosts
- added some status messages in case GL-Rendering fails. this helps to address the problem

- fixed a issue in routing where adding a second shaper caused the route view to display "#ERROR"
- removing a LFO module does now remove the mod-matrix entries (as intended)
- added modulation indicator for sample-stacker volume
- fixed a problem im WAV reader that could cause a crash on some samples

1.0.22

- changed default size of the GUI to 75%. (for first start)
- improved import process. displaying more informations in case of a problem
- imporved GUI performance
- added IMPORT button on system page for importing content if drag n drop does not work because of user-right-restrictions of the OS

V1.00 (December 2016): Official Release

Support & Contact

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Bug reports

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

- Processor
- Graphic card
- Operating system
- DAW

list of category prefixes:

AR = Arpeggio
AT = Athmosphere
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
OR = Organ
OC = Orchestral
PN = Piano
PL = Plucked
RD = Reed
ST = String
SY = Synth
SQ = Sequence / Split
TG = Trancegate
VC = Vocal/Voice
WW = Woodwind