

# Funxion

## VSTI Manual

Funxion VSTI is a Hybrid Synthesizer with user definable functions for waveforms and distortion.

### Features

- 3 oscillators with standard VA and custom waveshapes using mathematical functions
- 3 LFOs
- 3 ADSRS with Keytracking ADSR time gets faster with higher notes.
- A Randomizer that changes value constantly or on every triggered note.
- Multimode Filter with 13 different filter types
- Distortion with user definable waveshaping using mathematical functions
- A delay for physical modeling and FX
- Another delay which can also be modulated

### The Oscillators

All of the oscillators has standard VA waveforms including noise and a functions. The function waveforms can be edited in the function editor to the right. The formula is entered below the image of the waveform. To choose which oscillators function to edit click the oscillators name below the waveshape editor or click on edit in each oscillator section.

The difference between the *Function* and *Func-PP* waveforms is that the Func-PP wave is ping ponged resulting in a softer waveform, while the Function waveform mode will often sound more harsh or saw like.

### Mix Morph FM and Sync Modes

- Osc A and B can be mixed, morphed or vertically morphed
- Osc B can be synced to A

Morph mode allows also for changing the morphing cycle. The morph cycle can be set to 4 different modes. In Auto mode the cycle will run at the speed of current pitch. In Osc A and B mode it will use the pitch of respective oscillator. In Fixed mode the cycle runs at a constant rate. All the Cycle modes can be offset changing the rate of the cycle.

Vmorph mode is a vertical morph mode. When the Vmorph slider is at the top it outputs only the A wave. If it is in the bottom it outputs wave B. Pulling the slider down from the top will result in the top part of Wave B Appearing at the top of the combined waveform. If the slider is in the middle then the resulting waveform will have top of Osc B at the positive(upper) part and the bottom of Osc A at the negative(lower) part

Remember that you can morph and mix not only between different waveforms but they can also be in different pitch!

## Oscillator C

Osc C can be mixed with or Frequency Modulated by A + B.  
It also has a sub mode which allows it to bypass the filter and distortion.  
Osc C can be synced to A and B.  
Osc C has a PWM mode for all waveforms with 2 different Cycle modes.  
Pitch mode with cycle rate at zero is like "normal" PWM  
In Fixed mode PWM doesn't follow the pitch of the oscillator.  
The Pulse waveform does not use the cycle modes, but Xpulse does.

## MIDI Controls

Pitchbender, Modwheel, aftertouch velocity and pedal can be assigned to most of the synths parts.

## GUI Controls

Any text that is **blue or grey** can usually be clicked on to change or activate a feature.  
**Grey text** means a feature is off or **disabled**.

## Functions

Supported mathematical functions are:

\*, /, +, -,

^, sin, cos, tan, asin, acos, atan, sinh, cosh, tanh, exp, log, log10, sqrt, floor, ceil, abs, hypot, deg, rad, sgn, min, max

Here is a list of some functions to try.

$5 * \tanh(x/\text{PI} * 9)$	square wave
$(x^5)/(5^4)$	mix between a square and a saw
$5 * \sin((x/1.59155) + 1.59155)$	Bell, sinusoid
$\cos(\cos(x)) * \sin(x * 0.6) * 5.9$	Sinusoid
$1 * x + 1 * \sin(x * 8)$	Saw with sines, resonant sounding
$\tan(\cos(x)) * \sin(x * 0.6) * 3$	Sinusoid
$\sin(x * 11) * 5$	Hi-freq Sines
$(\sin(\tan(x))) * 4$	Metallic
$\tan(x/3)$	4-bit
$5 * \text{asin}(x/\text{PI}) + \sin(x * 4)$	Metallic
$\text{floor}(\sin(x * 2)) * x$	Square on a saw
$(4.17 * \log(6 - x)) - 5 + \text{floor}(x/5) * 5 + 2$	Sydney Opera House, clarinetish
$\text{floor}(x) - \text{ceil}(x) * 2$	Steps down, metallic
$\sin(x * 3) * (\sin(x * 5) * 0.5) * (\sin(x)) * 10$	Triple sine
$x^{\text{sgn}(x)}$	Half saw, half square
$\text{floor}(x/2.5) * 2.5$	Steps up
$\text{floor}(x) / \sin(x) * 0.2$	Batman, lofi cembalo
$\text{abs}(\sin(x/2)) * 10 - 5$	goathorns

$\text{sgn}(x) * 5$	Square
$\text{sgn}(x) * \sin(x) * 5$	McDonald's
$2 * \sin(x/\text{PI}) * \text{floor}(x) - 5$	Chasm
$(\cosh(x)/\sin(-x) - 5)/100$	Hi-passed & noisy
$\text{abs}(x)^*(-2)+5$	Triangle Harmonica
$(0.5 * \sin(x/\text{PI}*10)) * x^2$	Spider
$(x^5)/(5^4)+ \text{floor}(x/5)*2.5$	Something
$5*\sin(x/(\text{pi}/2)) + (x^5)/(5^4)$	S
$(x^4)*0.04 /5 + \text{floor}(x/1)*1$	Circularsawblade
$((\text{abs}(x)^{0.5}) * 2) + (4 * \text{acos}(x/\text{PI}))-10$	Lofi old game
$x * (-1) + \sin(x^5)*5$	Metallic oboe, Ramp down plus sines
$x * \sin(x^2)$	Spider front
$\text{floor}(x) + \sin(x)$	Lofi synflute
$x^{\sin(x)} * 5 - 5$	-Halfsine
$\text{asin}(x/5)*4$	Saw
$\tan(\cos(x))* \sin(x^5) * 3.5$	Metallic
$\tan(\cos(x))* \sin(x^2) * 3.5$	Metallic
$\tanh(\cos(x))* \cos(x*1.5) * 7$	Royal organ
$((x^2)/3) * (-1) + \sin(x*10) + 4$	Halfcircle with teeth
$(\cos(\sin(\tan(x/2))))*20 - 15$	Noisy shape

## License

Funxion VSTI is free to use. It can be distributed freely with this manual as long as you don't make any profit from it. If you want to support me go to [www.xenobioz.com](http://www.xenobioz.com) and listen to my music, comments and feedback is nice too.

## Version History

1.0 Public release