Polygonal Waveforms

Intro

The intention of this plug-in it's to draw images on a oscilloscope.
All tests were made with a Korg-NTS-2 oscilloscope.
It can obviously also be used as an oscillator somehow, as it produces waves and there is the possibility to change the frequency, It could be used as a LFO or whatever your imagination let you do with it do it but it's original purpose is to draw on a oscilloscope.

There are 15 options to choose from:
- **POLYGONAL**
- **SINE**
- **TRIANGLE**
- **SAWTOOTH**
- **SQUARE**
- **POLYHEDRON**
- **LISSAJOUS**
- **STAR**
- **HEART**
- **BICICLETTE**
- **SUN**
- **NESTED CIRCLES**
- **SNAIL**
- **LEMON**
- **BUTTERFLY**

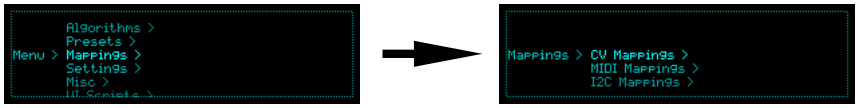
Tips

Give yourself time to try out every single parameter one step at the time and experiment.

When you first load the plugin there are standard values set, change them and see what happens on your oscilloscope.

Start with low values in the settings and look what happens on the oscilloscope changing the values step by step, every little change can create a new shape (or not).

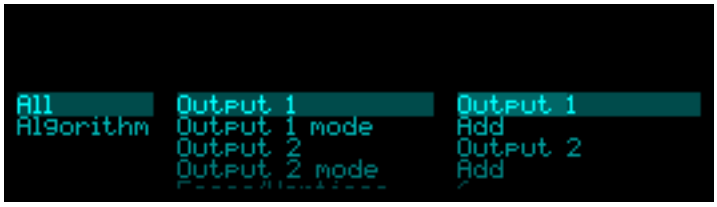
You can use the plugin as it is and change the values by hand or (and there it will definitely be more interesting) you can modulate every single parameter using CV Mappings.
The Disting NT has 12 inputs where you have plenty of possibilities to plug something in, like an LFO, an envelope, an offset generator, an oscillator (be careful it then becomes a real madness), whatever comes to your mind, experiment and look what happens.



Settings

Output 1 & 2

Output 1 & 2 are set as a standard and you can change them if needed



Faces/Vertices

Here you can set how many Faces/Vertices your polygonal flower, , your polyhedron, your star and sun has

Rotation

Rotation let u rotate the resulting drawing, from 0 to 360 degrees, it's cool to set up a channel in the NT with CV mappings where a sin wave rotates your drawing

Frequency

Frequency is self explanatory I guess

Amplitude

You can adjust the voltage from 0 to 5V

Phase Offset

The Phase offset is set to 90 degrees as a standard, only that way the drawings on the oscilloscope appears correctly (sine/cosine principle).
Only works for Polygonal, Sine, Triangle, Square and Polyhedron. Note that Polyhedron has a -90 degrees offset to allow it to show up correctly when selected the first time

Waveform

You can choose following options:

POLYGONAL
SINE
TRIANGLE
SAWTOOTH
SQUARE
POLYHEDRON
LISSAJOUS
STAR
HEART
BICICLETTE
SUN
NESTED CIRCLES
SNAIL
LEMON
BUTTERFLY

They are explained below a little bit more in detail….

POLYGONAL

It let’s you draw a flower shape and you can choose how many “petals” the flower has with “Faces/Vertices”

Example:

SINE

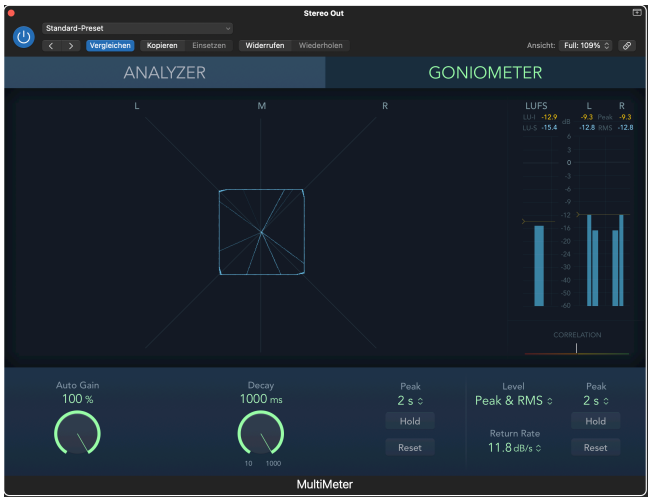
It draws a Circle using sine waves

Example:

TRIANGLE

It draws a square using Triangle waves

Example:



SAWTOOTH

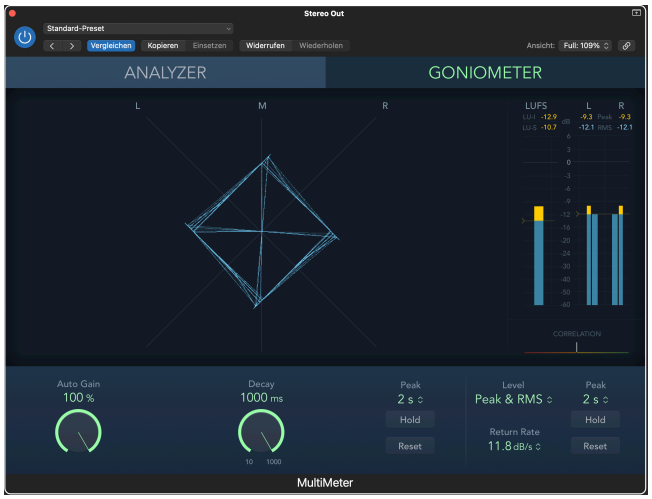
It draws two triangles facing each other using Sawtooth waves

Example:

SQUARE

It draws a square shape with strange edges using Square waves

Example:

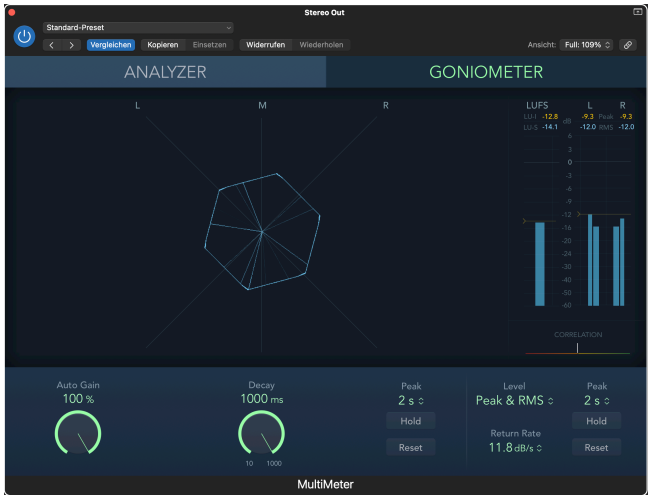


POLYHEDRON

It draws Polyhedrons with the possibility to chose from 3 to 32 sides.
It is somehow vaguely inspired by the work of Christoph Hohnerlein, Maximilian Rest, Julius O. Smith about **Continuous Order Polygonal Waveform Synthesis (*)**

You can draw triangles, squares, pentagons, hexagons etc. up to almost a circle with 32 sides.
You can set the Polyhedron “Tilt”, if you want to enable a wave folder, the amount of the wave fold and the offset of the wave fold.

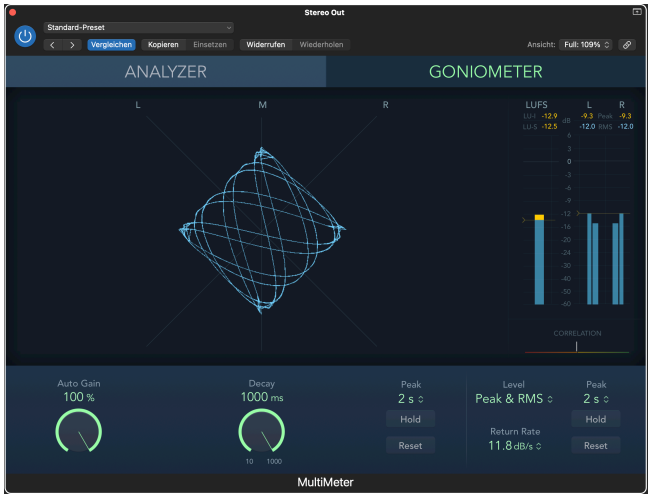
Example of a hexagon (6 sides)



(*) (https://quod.lib.umich.edu/cgi/p/pod/dod-idx/continuous-order-polygonalwaveform-synthesis.pdf?c=icmc;idno=bbp2372.2016.104;format=pdf)

Lissajous

It draws Lissajous, here an example of a 8:5 ratio

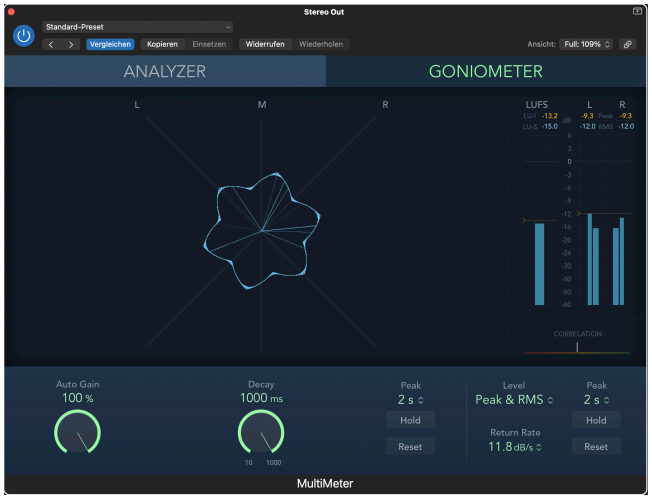


In the settings you can define the X/Y ratio of the lissajous, from 1:1 up to 20:20

STAR

It draws a sort of star, you can change the number of points of the star in the “Faces/Vertices” option, note that if you select 3 it shows a 6 pointed star, if you choose 4 it shows a 8 pointed star and so on…

Example with 3 selected in “Faces/Vertices”



HEART

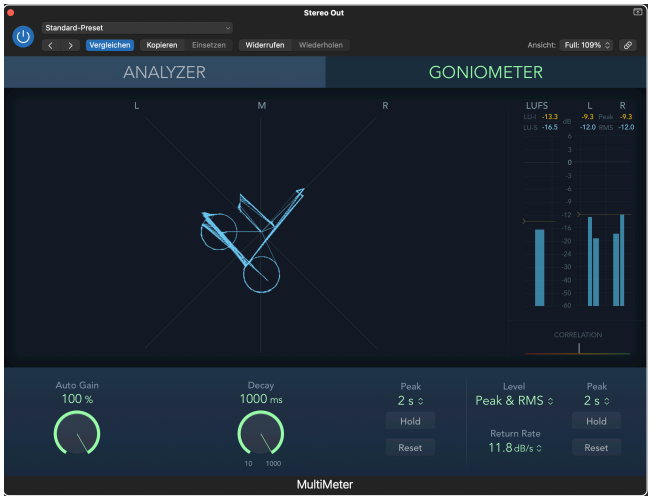
It draws, you guessed it a Heart shape.

Example:

BICICLETTE

It somehow tries to draw a Bycicle

Example:



SUN

It draws a sun shape, it's very similar to the star, you can choose how many points it has but you also have the possibility to change the internal radius where the points converge

Example:

In the Sun circle radius you can choose from 10 to 100

NESTED CIRCLES

This was one of my first “happy accidents” and it has its own settings to play with that are somehow explained below

Example:

Nested Circles settings

NC v1 : Defines the position of the first “ virtual inner circle” where the generated waves align
NC v2 : Defines the position of the second “virtual middle circle” where the generated waves align
NC v3 : Defines the position of the third “virtual outer circle” where the generated waves align

Note:
Please note that “ virtual inner circle”, “virtual middle circle” and “virtual outer circle” are in quotation marks because you start with the standard settings where the 3 waves generated will align to 3 virtual circles that are positioned that way (inner with a value of 200, middle with a value of 500 and outer with a value of 800), but changing those 3 values their position will change, a lower value puts the “virtual circle” more inside and a higher value more outside.

NC Freq and NC PWM Freq: those parameters are used to draw different shapes.
A good starting point is NC Freq set at 20Hz and NC PWM Freq at 1Hz and then start to experiment one step (steps of 1Hz) at the time

SNAIL

This was my second “happy accident” and draws a sort of snail shell (or a rolled up Armadillo)

Example:

You can change two values in the settings

Snail Freq : Defines the shape

Snail s : Defines how big the image is

LEMON

Was originally supposed to draw a lemon shape

Example:

You can change two values in the settings

Lemon freq : Changing the frequency the shape changes
Lemon s : Changing the s value the shape becomes smaller or larger

BUTTERFLY

It draws a Butterfly.

This shape is made by a very complex transcendental curve, if you're interested have a look at this Wikipedia page

https://en.wikipedia.org/wiki/Butterfly_curve_(transcendental)

Example:

In the settings you can change the frequency

It becomes interesting when you modulate the "Butterfly freq" and the "Frequency"