

The background of the image is a dark gray or black color. It features several faint, glowing white lines that form complex, swirling patterns known as Lissajous figures. These figures are more concentrated in the center and right side of the frame, creating a sense of depth and motion. The overall aesthetic is minimalist and scientific.

L I S S A J O U S





**Lissajous** is a real-time audio reactive graphics device built in Max/MSP and inspired by the work of Jules Antoine Lissajous.

**Lissajous** was first released as a standalone application in June 2015 and is now available as a **MaxForLive** device. With this update, Ableton Live users will be able to use **Lissajous** within their projects, and to midi map and control all of its parameters.

The media project is born with the purpose of investigating the relationship between sound and vision, chaos and order, closely related to astronomy, mathematics & physics. It explores the field of harmony and disorder and let the user dip into an elegant, dreamlike, minimalist yet chaotic space which reflects the complex rules of the universe in all its abstract beauty.

The software shows sound oscillations as XY matrix functions and creates complex graphics curves. **Lissajous** graphically describes sound and allows observation of constantly varying signal voltage of two audio signals as function of time. Video generated by sound can be controlled in endless ways by giving to the user the possibility of a wholenew range of interactions.

**Lissajous:** A universe of shapes.



# LISSAJOUS M4L

Installation guide

Download PeRColate Library at those link (**Max6** | **Max7**) and move it inside Max/MSP directory:

## OSX

[Max6]  
[Max7]

/Application/Max 6.x/Cycling '74  
/Users/User-name/Documents/Max 7/Library

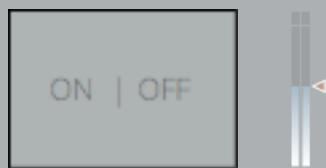
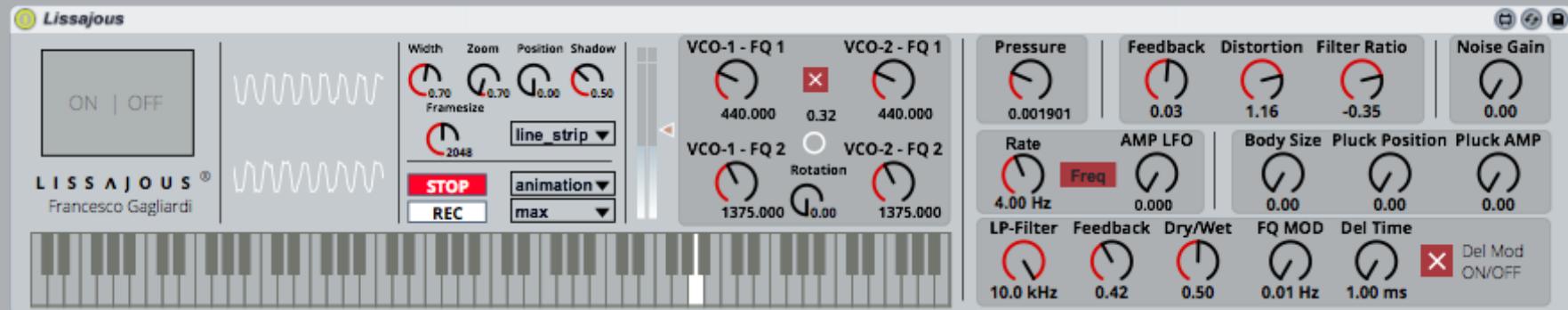
## PC

[Max6]  
[Max7]

C:/Program Files/Cycling '74/Max 6.x/Cycling '74/externals  
C:/ProgramData/Max 7/Library

# LISSAJOUS M4L

Instructions



Press [ON | OFF] Toggle to start generating graphics and use [Master] to control the direct out volume.



This software generates sounds from the main two VCOs. Each of them moves his behavior from more flute-like to more electric guitar-like behavior.

[VCOs FQ1 & FQ2] control the frequency of both VCOs electric guitar & the flute.

The [Rotation] parameter allows to slightly change the frequency of the VCOs (in this case the VCO2-F2) creating an acoustic beat effect and phase cancellation.

The [Red Round Button] sync/unsync VCOs-FQ1 with the keyboard.

# LISSAJOUS M4L

## Instructions

Body Size Pluck Position Pluck AMP



### Pressure



Rate Freq AMP LFO



Feedback Distortion Filter Ratio



Noise Gain



LP-Filter Feedback Dry/Wet



FQ MOD Del Time Del Mod ON/OFF



[**Pluck Position**], [**Pluck AMP**] and [**Body Size**] are powerfull excitation methods for both electric guitar and the flute. It also allow the player to color the pluck with the body-filter of the impulse response (the [**Body Size**] parameter scales this impulse). The [**Pluck Position**] and the [**Pluck AMP**] control the position and the strenght of the pluck on physically modelled string.

The outputs from guitar-like & flute-like strings are summed and combined with whatever breath [**Pressure**] the player provides and then fed into the "distortion unit" and feedback delay line.

This LFO controls the Amplitude of the VCOs. It's possible to sync or unsync (**Freq**) it with Ableton Live clock. The [**FQ LFO**] controls the speed of the LFO and the [**AMP LFO**] controls the amplitude

[**Feedback**] [**Distrotion**] and [**Filter Ration**] parameters are used to square the **Lissajous** shapes.  
[**Feedback**] change the internal Karlplus-Strong feedback coefficent and in this modeled system causes the sound to "build up" overtime.

[**Filter Ration**] interpolates between the one-pole filter of the flute and the lowpass filter of the plucked string.

It's also possible to add a noise signal with the [**Noise Gain**] control.

The dalay section is designed following the loop process of a tape delay effect.

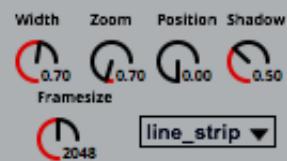
It's possible to change its [**Delay Time**], [**FQ MOD**] paramter or overload the machine with the [**Feedback**] coefficent.  
[**LP-Filter**] is a Low-pass Filter on delay lines.

# LISSAJOUS M4L

Instructions



A [Keyboard] to control VCOs Frequencies (it's possible to use any workstation, such as Ableton Live, to send midi notes to the app).



[Zoom] is to control the distance of the rendering video zooming in and out from 0% to 300%. Change the [Framesize] to draw from 10 to 3072 points in time of the audio functions to be represented. Other interesting and useful video controls are the [Shadow Trail], which controls the sharpness, the [Line Width] the size of the functions and the [Drawing Style] which sets the style of the drawings (**Points, Lines, Line Strip, Triangles**).



[Rec | Stop] is used to record and stop the matrix video. It's possible to choose between different codecs (**animation, raw, jpeg, bmp, mjpega, mjpegb, gif, video, graphics, dvpal, flic, png, tiff, mpeg4, targa**) and quality methods (**max, high, normal, lossless, min, low**)



This two scopes are the audio Left and Right direct outputs.

# LISSAJOUS M4L

Specification



[OS]

Macintosh | Windows

[Required Software]

Ableton Live | MaxForLive | Max/MSP

[Cross-platform]

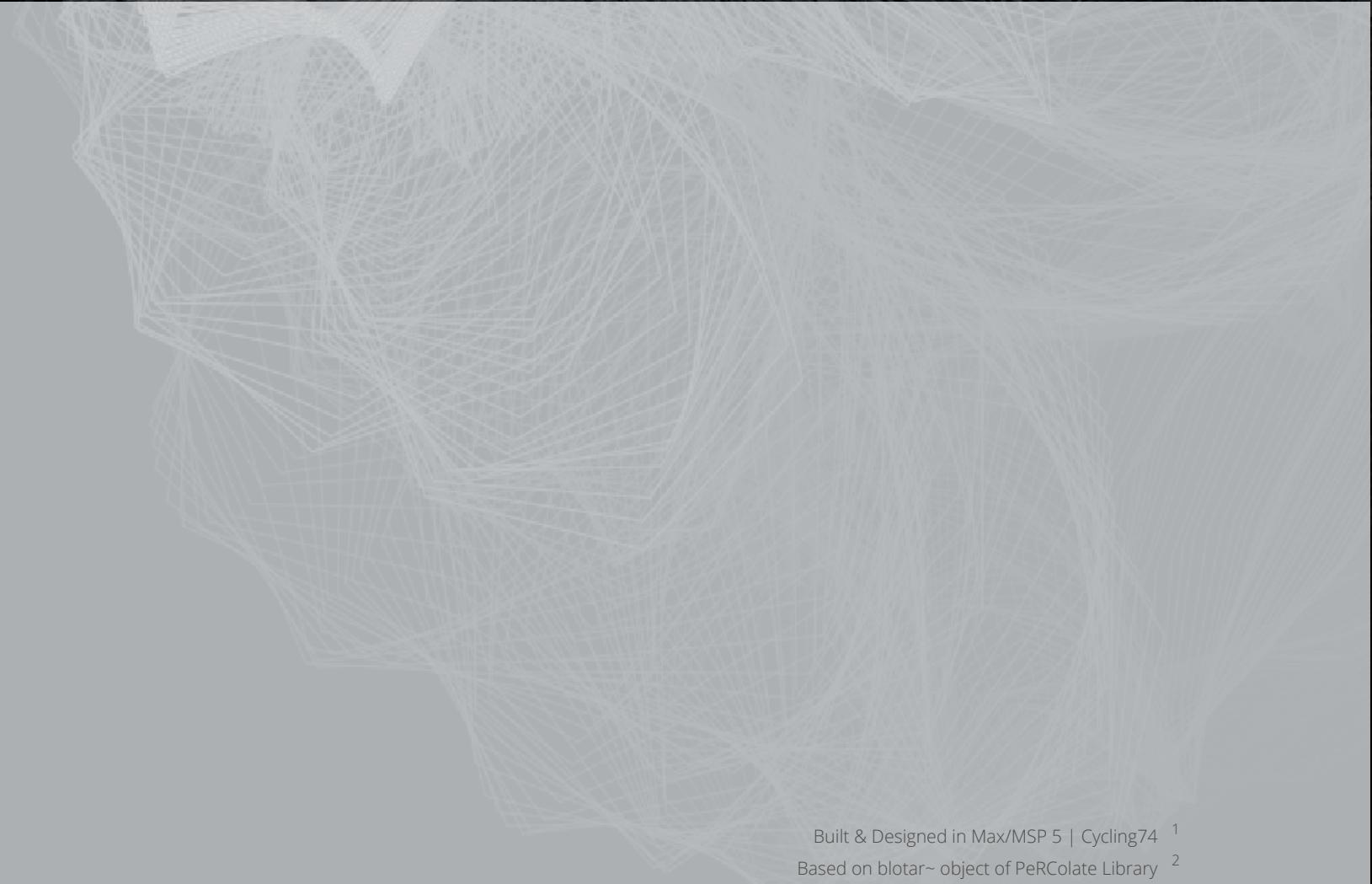
Java | Oracle

[RAM]

>= 4GB

# LISSAJOUS M4L

Resources & References



Built & Designed in Max/MSP 5 | Cycling74<sup>1</sup>

Based on blotar~ object of PeRColate Library<sup>2</sup>

Kevin Karplus and Alex Strong: "Digital synthesis of plucked-string and drum timbres"<sup>3</sup>

Van Stiefel, Dan Trueman, and Perry Cook: "Re-coupling: the uBlotar synthesis instrument and the sHowl speaker-feedback controller"<sup>4</sup>

# LISSAJOUS M4L

Credits & Contacs

**Francesco Gagliardi** ..... Develop | Concept | Art Direction ..... [raw@null.net](mailto:raw@null.net)  
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