

Solum

by Synthropia

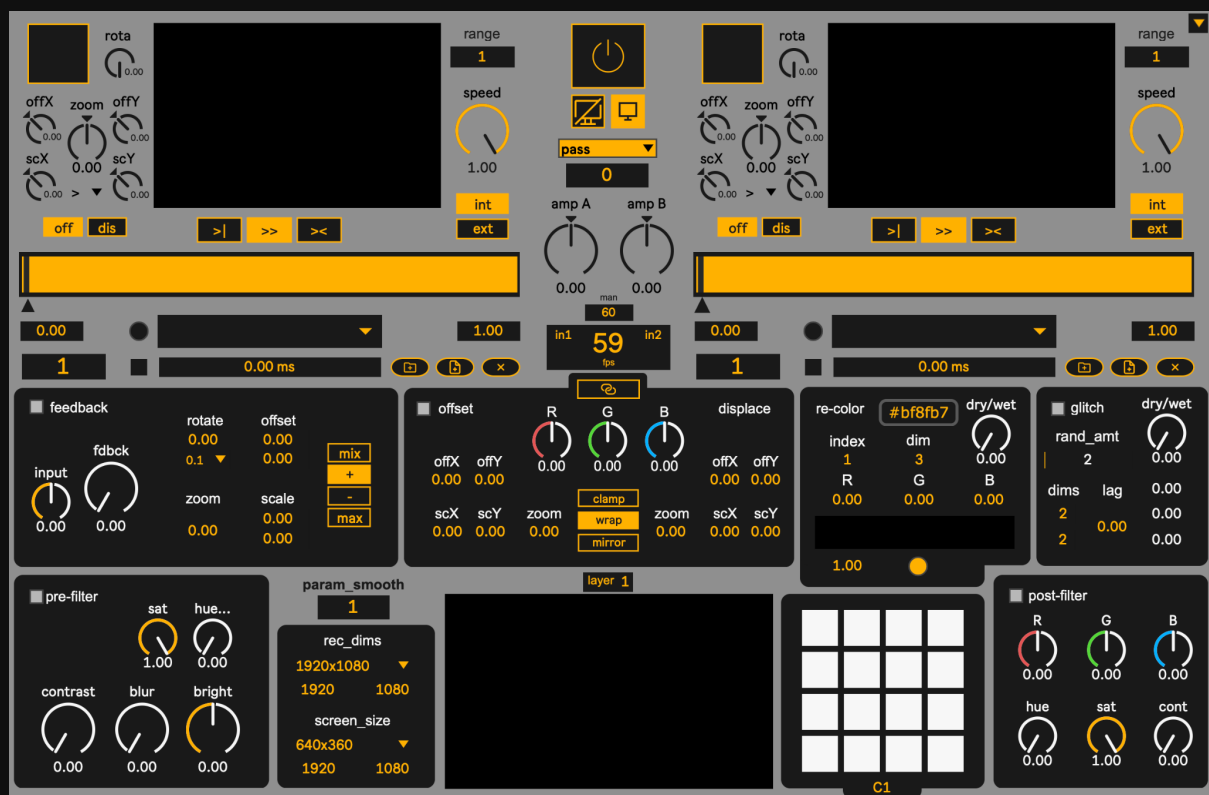


Table of Contents

Overview	4
Best Practices	6
Setting Up Solum	6
Max 4 Live	8
Videoplayers	9
File Loading	10
Video Controls	11
Offset/Displacement Module	13
Camera Input	14
Mixer	16
Rendering	17
Pre-Filter	18
Feedback	19
RGB Offset/Displacement	20
Re-Color	22
Glitch	23
Post-Filter	24
Preset Module	25
Monitoring & Recording	27
Layers	29
Appearance / Sizing	29
Parameter Smoothing	30



Overview

Solum is a video sampler equipped with a powerful effect section featuring many classic video manipulation methods with some unorthodox twists. Solum is a Max for Live device, built with Max MSP. Solum comprises two identical polyphonic video players with cross-modulation possibilities through pixel displacement and various mixing methods. The device incorporates six shader modules (effects), each with hands-on control over all parameters.

Users can save and recall presets using a 16-slot preset section with an MPC-style interface that can be triggered by MIDI notes. Solum is designed to simplify complex ideas for individuals unfamiliar with computer graphics or any visual coding environment. Its user interface ensures that all parameters are instantly accessible, fostering a versatile and flexible instrument suitable for both visual artists and musicians. Whether aiding in the creation of designs, video content, or enhancing live performances, Solum caters to a broad range of creative needs.

Best Practices

Setting Up Solum & Performance

Before using Solum, there are a few important things to consider. Solum requires viddll engine to be set in Max MSP. It should come with Max 4 Live, although in some cases it doesn't. If it's not installed by any reason no video files will be played.

The audio buffer of Ableton Live affects the rendering context of Max. It means you might need to set a buffer size that is ideal for your computer.

In Ableton Live audio playback is on the top of the priority list. It means the audio devices you might use with Solum will always be prioritised and can affect the performance.

Solum is designed in a way that most processing is happening on the GPU. The Ableton CPU metre in the top right corner is not an indicator of performance when it comes to Solum. The FPS metre in the centre of the device can indicate performance. It tells you how many times Max is able to trigger a frame per second. If it's below 25 it means you will experience

some lagging on the screen and things will start to crash.

Performance is highly correlated to the resolution of the image. If your computer cannot run a file properly you might want to consider reducing the resolution of that file. Higher than full HD resolution is not recommended to use.

The left video player serves as the master for the right one, meaning the resolution and aspect ratio of the right video will adjust to match the left side. Consequently, the output aspect ratio is determined by the left side. If you wish, you can alter the output dimensions for recording using the `rec_dims` parameter, allowing for a distinction between incoming and recorded resolutions.

The size of the floating master monitor can be established using the `screen_size` parameter or adjusted manually. However, it is advisable to choose a fixed size since the two values (`rec_dims` and `screen_size`) are interrelated and can impact how the image is projected on the screens.

During performances, you have the option to use the master floating monitor in full-screen mode as an extended screen. You can put the screen to full screen by pressing ESC.

To bring up a second screen, simply click on the master preview monitor.

If you encounter issues such as seeing nothing or glitches on the preview monitor/monitors, you can resolve them by turning the device off and on using the power button.

For a comprehensive understanding of each parameter, after hovering your mouse over them a detailed description will appear in Live's help section in the left bottom corner.

You can toggle rendering on/off using the large power button located in the upper-middle part of Solum. It is recommended to turn rendering off when the device is not in use. The initial rendering frames per second (fps) is set at 60, indicating that the device sends a trigger signal 60 times per second. However, this number may decrease as you apply more effects or work with higher resolution images. It's important to note that this value is not tied to the video's fps but rather reflects how smoothly the device is running on your computer. In the corners of the fps indicator you can find two buttons, in1 and in2 on both sides. You are able to synchronise the fps value

with the fps of the video played by the appropriate video player.

The device is designed to execute most computation on the GPU. Live's CPU metre therefore will not necessarily indicate performance.

To enhance efficiency, consider utilising the HAP codec. A free software tool for conversion, AVF Batch Converter, is available for this purpose. You can find the download link below:

[AVF Batch Converter](#)

Solum should run on a computer with a mediocre GPU and from Ableton Live Suite 10 that bundled with Max 8, although the recommended configuration at least is:

- Ableton Live Suite 11+
- macOS 11, M1, 16GB RAM

If you want to make sure that all functionality is up to date you can download the latest Max and bundle it with your Live. Downloading Max and using any software that was made with it is free.

[MAX MSP download link](#)

Max 4 Live

To reach Solum's full potential it is recommended to download the routable Envelope Follower modded by Dillon Bastan. Strange Mod is another example by him for a modulator that works well with visuals. Both of them are free:

[Ext In Env Follower by Dillon Bastan](#)

[Strange Mod by Dillon Bastan](#)

Videoplayers



Solum features two identical polyphonic video player modules, with an important distinction. The left player functions as the master for the right one. Consequently, the right player adapts its resolution and aspect ratio to match the left one. This implies that whatever is loaded into the left video player will determine the resolution of the output image.

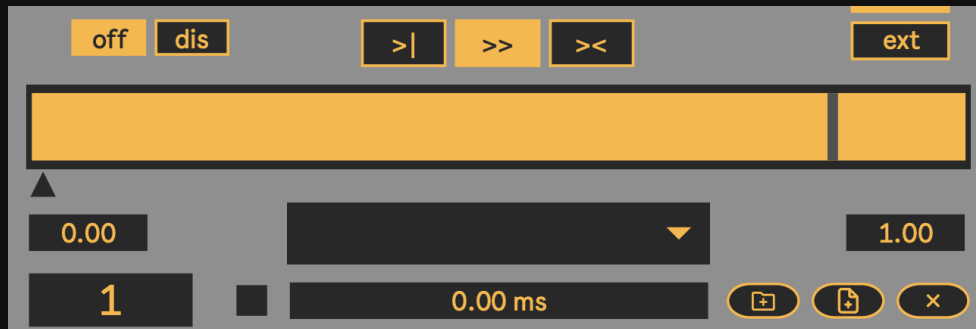
File Loading



You can load multiple video files into the device using the folder/file load buttons. To clear the list, click on the clear button located to the right of the file loader button. If you load a folder, the new folder content will replace the existing list, so consider adding files if you wish to retain your video list. Note that when adding a file, you can only add one at a time.

The names of the loaded files will appear in the drop-down menu at the centre of the video player module.

Recalling files can be done by selecting them from the menu or triggering their index number using the larger-sized number in the bottom-left corner of the video player. Its maximum value corresponds to the total number of files loaded. If the video is still and not playing or the aspect ratio is not what it is supposed to be, changing the video index value will trigger another video and solve the issues. **You can always consider changing the index value in order to make the device play a file.**



To create transitions between videos, use the transition parameter under the drop-down menu. This allows you to specify the exact transition time in milliseconds. Importantly, the aspect ratio of the new video will adjust after the transition concludes, which can be crucial in certain scenarios. It is advisable to choose files with the same resolution for a smoother experience.

Video Controls

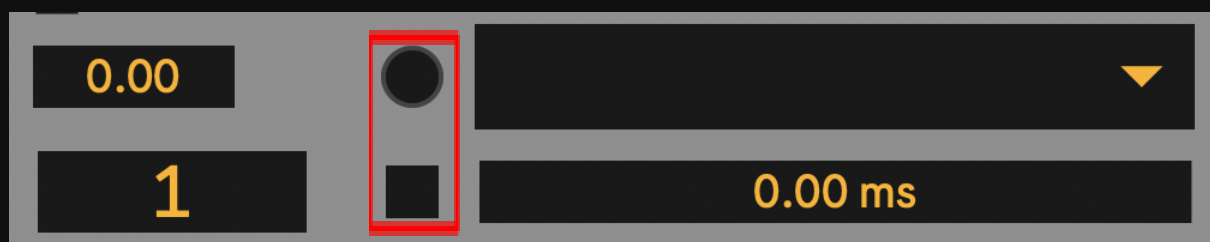
You can define the loop mode with the loop toggle in the middle of the video player module. It has three modes:

1. No loop
2. Loop forward
3. Loop forward and backward

The loop slider, along with the numeric values beneath it, allows you to set up the start and end

points of the loop. These numeric values represent the loop positions and serve as modulation parameters, always ranging between 0 and 1, regardless of the video length.

The grabber slider, located below the loop slider, facilitates video position modulation. When the grabber is engaged (or clicked on), the device will pause the video, and all position changes will be dictated by the movement of the grabber.



The retrig parameters are the small buttons found on the right of the video list. When the square shaped retrig toggle is on, the video file will always start from the beginning or the starting point of the looped section if applicable. The button above it will make the video jump back to the starting position.



In the upper right part of the player module, you'll find the playback speed parameters. The speed value functions as a multiplier, representing the playback speed of the video. The range parameter lets you adjust the range of the speed parameter. Despite seeing values between -1 and 1 on the automation lane, you can still modulate the range. This helps Live avoid confusion in handling automation.

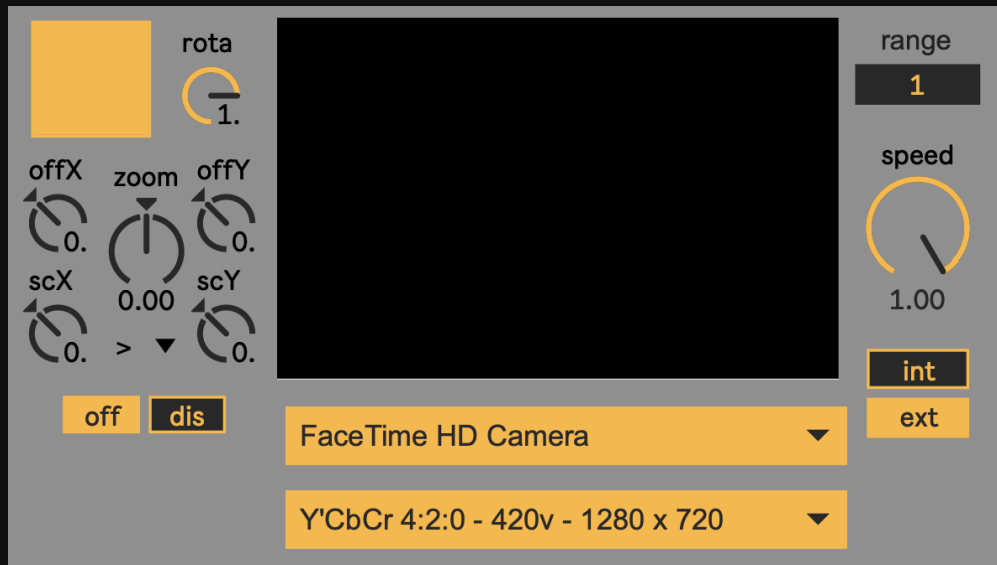
Offset/Displacement Module



Each video player in Solum incorporates an Offset/Displacement Module. You can switch between

modes by toggling the off/dis toggle. In offset mode, you can adjust the image's position through rotation and along the x and y axes. Additionally, you can scale the image on both the x and y axes and both at the same time by the zoom parameter. Notably, you can modulate the positions of the pixels with an incoming signal, and in this case, the signal is always derived from the other video player. This setup opens up captivating cross-modulation possibilities between the two sides, enabling you to redefine the relationship between them dynamically.

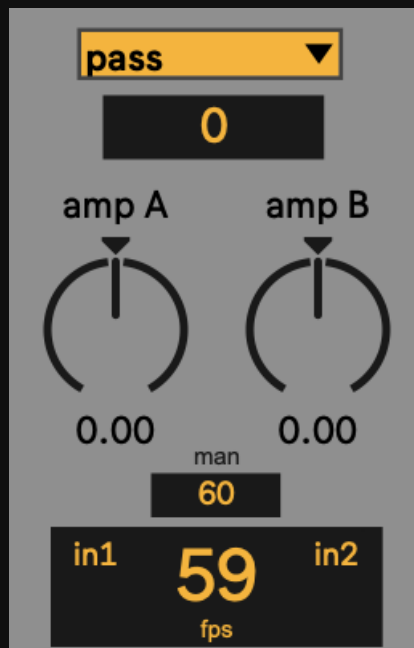
Camera Input



External camera signals can be used with Solum by toggling the int/ext switch. In external mode, the preview monitor shifts to camera mode. You can select from the available camera options in the first drop-down menu and choose the desired resolutions from the second menu.

When the camera is activated, the play button in the upper left corner serves as an on/off toggle. It's important to note that computation occurs on the CPU in external mode, making it a factor to consider in terms of system resources.

Mixer



Solum offers the capability to blend the signals of the video player modules through 32 different mixing algorithms. You can access these algorithms via the drop-down menu or by using the corresponding number parameter below for easy modulation.

These algorithms are based on simple mathematical formulas involving two numbers, which represent the signals of the video players. These signal values can be adjusted using the *Amp A* and *Amp B* parameters, with values ranging between -1 and 1. This allows for both negative and positive adjustments, enabling the creation of various balances between the two sides.

It's crucial to note that the operation begins with the left number, representing the signal of the first video player (*Amp A*). In certain cases, such as subtraction, the signal value of the second video player is subtracted from the first one.

Rendering

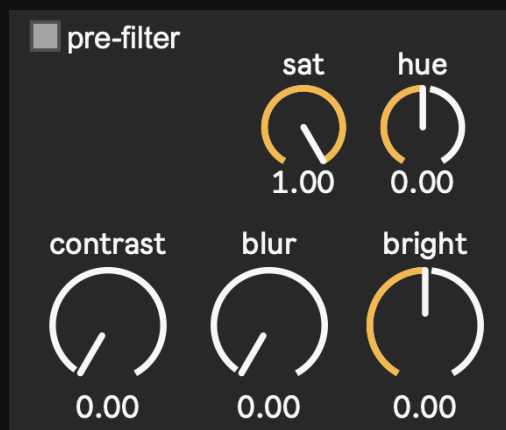
Below the mixer the rendering section can be found. The bigger sized number shows the frame per second can be triggered by the computer in real time. This number indicates not only the fps, but the performance of the device. Performance can be drastically affected by the resolution and quality of the image played by the video players.

In the left and right corners the in1 and in2 buttons can be found. When clicked on the rendering fps value is synchronised to the fps of the incoming video coming from the respected video player and will adjust automatically when files are changed by the user. The smaller sized number value in the top centre of the rendering section is giving us the possibility to set the rendering fps manually. When this number is changed the device will automatically adjust rendering to it.

It is highly recommended to utilise the HAP codec to optimise performance. It is especially useful if speed and video position manipulation is intended. A Free software AVF Batch Converter can be used to convert your files. You can download it here:

[AVF Batch Converter](#)

Pre-Filter

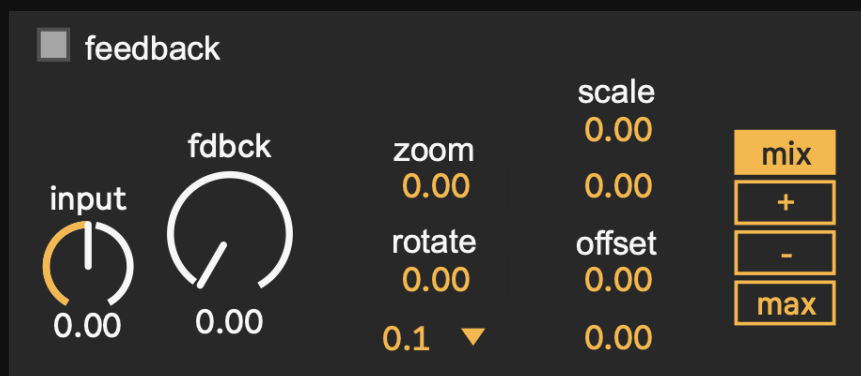


The pre-filter module acts as the first effect in Solum's effect chain, following a signal flow that concludes with the post-filter section. Within the pre-filter module, you'll find a range of fundamental colour manipulation methods, including contrast,

brightness, saturation, and hue, complemented by an additional blur parameter.

The blur parameter can be effectively utilised in combination with contrast to mitigate undesired glitches and pixelations, providing a means to smooth out the visual output. This section allows for basic adjustments to the colour characteristics and overall visual quality of the video signals.

Feedback



Solum features a complex feedback module, akin to the concept of delay in the audio realm, but applied to visuals. In this module, you can feed the incoming signal back into itself and mix the input and feedback signals. There are four ways to mix them:

Mix: Maintaining two separate signals.

+: Summing the signals.

-: Subtracting the feedback from the input signal.

Max: Always returning the maximum value of any signal.

Moreover, the module provides options to offset the position of the feedback signal in various ways, allowing you to create tails and patterns.

RGB Offset/Displacement



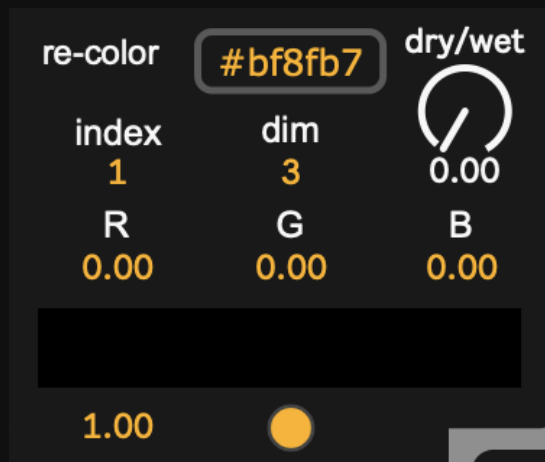
The RGB offset/displacement module in Solum serves as an enhanced version of the offset/displacement module found in the video players. The primary distinction

lies in the capability to add the offset or displacement proportionally on the R (Red), G (Green), and B (Blue) colour planes individually.

The R, G, and B parameters not only represent the colours themselves but also indicate the extent of modulation when offset or displacement values are adjusted. This modulation occurs in proportion to the values dictated by the R, G, and B parameters on each colour plane individually.

By clicking on the unite button, you can amalgamate the three colour parameters into one. In this case, the offset or displacement will affect the entire image uniformly. The pixel displacement is determined by the incoming signal.

Re-Color



The re-color module in Solum provides the ability to entirely replace all colours with custom ones. The dim parameter allows you to define the number of colours, with the x-axis representing the image's resolution and the y-axis always set to 1.

You can employ hexadecimal colour codes to establish your custom colour set. The code will influence the colour represented by the index parameter. Alternatively, you can use the R, G, B parameters to configure your custom colours.

Random colour sets can be generated by clicking the random button at the bottom of the device. The amount parameter, located at the bottom left corner of the module, acts as a multiplier to help you adjust the intensity of the effect.

Importantly, the colour set is saved with the presets and can be recalled at any time.

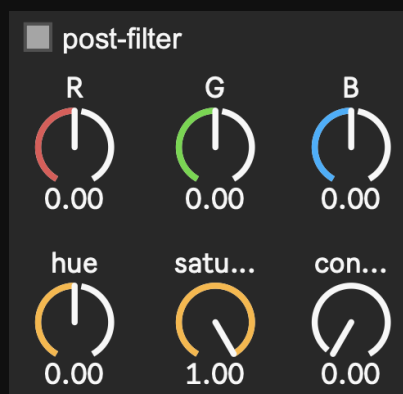
Glitch



The glitch module in Solum generates random events on the image by offsetting the R, G and B planes individually with random resolution and frequency. The R, G and B values at the right bottom corner of the device have values between -1 and 1 that represent the max offsetting and the direction of the offset of the color plane, although the amount of the offset between value 0 and the value the user set is random. The lag parameter defines how often the offset is triggered. Higher value creates a more “lagging” experience, or a less frequent change of

the position of the color or the image. The dims values define the resolution of the glitch effect (or noise matrix that generates the random values under the hood). 1 dimension will offset the whole image. The maximum value is 100. **The user is able to add randomization to all parameters at the same time.** The rand_amt value defines the amount of randomization happening on any parameter. A lower value can add subtle changes, while a higher one can drastically distort the image. The amount of randomization is added to the already set values.

Post-Filter

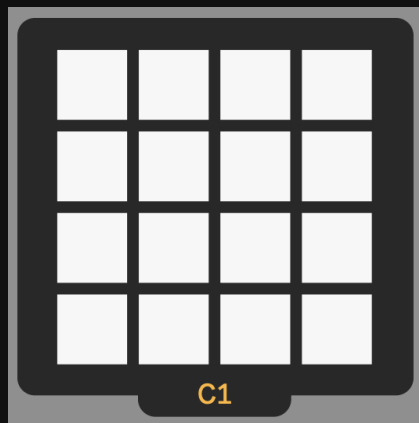


The post-filter module in Solum shares similarities with the pre-filter but introduces some crucial differences. It incorporates a colour EQ that

facilitates colour subtraction or addition. The post-filter also includes fundamental colour manipulation methods such as hue, saturation, and contrast.

One significant distinction is the position in the signal chain. This arrangement allows for nuanced control over the visual output, with the pre-filter impacting the image before other modules, while the post-filter providing a final colour manipulation at the end of the signal chain.

Preset Module



In Solum, you can save the current state of the device using the preset section and recall these presets with an MPC-style control surface. To save a

preset, you need to hold Shift + click on an empty slot. To recall a preset, you can click on a filled slot or use MIDI notes.

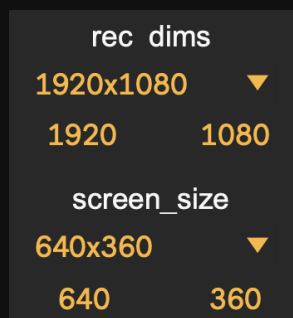
Deleting a preset is possible by holding Shift + Alt and clicking on the filled slot.

The first MIDI note can be assigned using the first note parameter just below the preset module, initially set to C1. This first note corresponds to the upper-left slot on the module.

Certain parameters are excluded from the list of stored values. The ones that might not seem obvious are the parameter smoothing and video transition values. This way the user can create smooth transitions between saved states of parameters and dynamically change it.

Monitoring & Recording

In Solum, there are three fixed-size preview screens responsible for monitoring the video players and the master output individually. If any of the preview screens stops functioning, you can relaunch them by turning the device off and on with the power button. The secondary floating screen can be activated by clicking on the master preview screen.



You can adjust the size of the main floating screen using the `screen_size` parameter.

By clicking on the main floating window and pressing the ESC (Escape) key allows you to put the window in full-screen mode.



You are able to turn the main floating screen off with the left button below the power button at the top of the device. The button on its right is responsible for keeping the screen on the top. This can help you make sure that you can always keep it visible, specially if you have multiple instances open within a Live set.

The resolution for recording is defined by the `rec_dims` parameter.

You are able to choose an option from the drop-down menu or set up your own custom values using the number boxes below them.

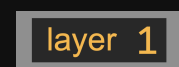
The `rec_dims` values will define the output resolution of the recorded texture in the external client.

For recording, you can use Syphon (mac) or Spout (win). Both are free software options. Opening their standalone clients will detect Solum, and the output image will appear on their respective monitors. This enables you to efficiently record high-resolution

images in the background. Here are the links for both:

- Syphon (mac): <https://syphon.github.io/>
- Spout (win): <https://spout.zeal.co/>

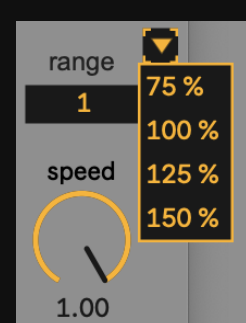
Layers



When multiple devices are open Solum projects the image on a shared screen of the other instance.

The layer parameter on Solum can define which layer will be in front of the other layers.

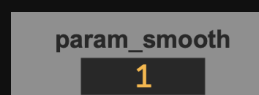
Appearance / Sizing



When launched, Solum opens up in a floating window. The user is able to adjust the sizing of the window by clicking on the arrow button in the upper right

corner of the device. The initial value is 100%, all options are relative values that correspond to the resolution of the screen it is running on. All colours of Solum are dynamic, which means Solum will adjust its colours based on the skin the user prefers to use.

Parameter Smoothing



The `param_smooth` parameter is able to smooth out the movements. It is not a time based value, but represents the number of steps it does to get from a point to b that is defined by the user as the parameter is moved. The higher number results in longer time. The movement happens linearly.

It is important to note that parameter smoothing will affect the behaviour of the movement even when the parameter is modulated by an external device, for example an envelope follower or LF0.

Parameter smoothing is excluded from the list of stored values with the preset module, allowing the

user to create smooth movement between saved parameter positions.