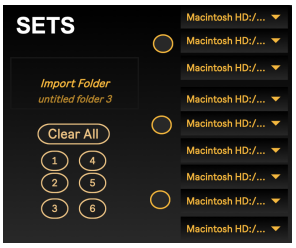
v.4MP: M4L Device Documentation

v.4MP

v.4MP is a device for building and performing audio-driven visual media. v.4MP enables building dynamic mapping systems between audio features and visual effect parameters within the graphical user interface. The visual output is realized through user-supplied image or video files that are composited in a sequentially rotating manner. Users are able to create “sets” of three folders for navigating through during a performance.

1 Sets Section



v.4MP's graphics are powered by image or video files loaded into the system. These files are composited sequentially from one image to the next within a folder. v.4MP draws from three separate folders simultaneously, ensuring that three images are always part of the full composition. At any given time, one image is at full opacity, one image is increasing in opacity, and one image is decreasing in opacity.

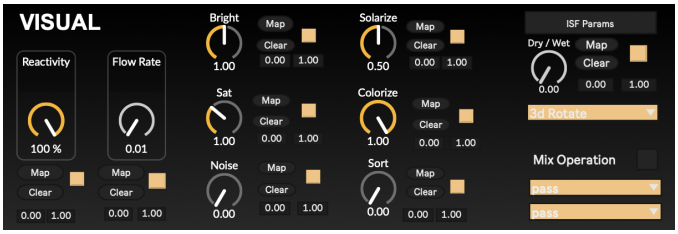
1.1 Loading Files

To load files, simply drag and drop a folder of images onto the “import folder” object. Folders can contain as many or as few images as you’d like and they do not have to have a consistent number. To clear all folders from the system, click the “clear all” button. To remove a single folder from the system, click one of the buttons labeled 1-6. These correspond to the folders in the order they are displayed in the drop-down menus. It is important to know that all media files must be in Max’s search path in order to load properly.

1.2 Sets

Sets allow for creating unique three-folder groupings for use during performance. This enables shifting the visual output to match changes in your performance in any way you see fit. To create a set, from the sets tab, click to open one of the drop-down menus. These menus are populated with all the loaded file folders. Make a selection for all three slots in a set and toggle the selection cell to make the set active.

2 Visual Effects



The visual section contains all the controls for visual output. It allows you to manage how your images or video files transition and blend, and provides visual effects applied in post.

2.1 Built-In Effects

Flow Rate: Sets the rate at which the displayed images change.

Reactivity: Sets the global percentage of reactivity between audio analysis objects and visual effect parameters.

Brightness: Adjusts the overall image brightness.

Saturation: Adjusts the overall image saturation.

Noise: Introduces visual noise into the image.

Sort: Introduces vertical pixel sorting.

Solarize: Adjusts the level of solarizing.

Colorize: Adjusts the level of colorizing associated with the Solarize effect. A value of 1 results in no change, while a value of 0 results in grayscale.

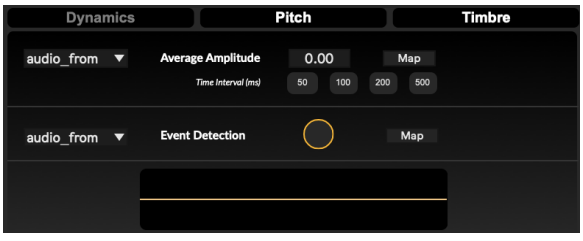
2.2 ISF Shaders

ISF shaders are a collection of shader files (visual effects that run on the GPU) that can be added to the other provided visual effects. v.4MP's architecture only allows for running one of these at a time and it is implemented last in the effect chain. To implement an ISF shader, open the drop-down menu and make a selection. Use the Dry/Wet knob to blend the effect into the visual output. 0% dry/wet results in no effect from the ISF shader. Clicking the "ISF Params" button will open a menu containing parameters associated with the selected shader file.

2.3 Mix Operations

v.4MP, by default, runs a complex mix operation on the three image files displayed at any given time. This operation works well for many artistic contexts. However, it is also possible to create custom mix operations for greater flexibility and style changes throughout a performance. To do so, simply toggle the cell above the mix operation selectors to on. This will switch v.4MP out of the default blend mode and into the custom blend mode. To create a mix operation, simply select from the drop-down menus. The first operation corresponds to the mix between image 1 and image 2, while the second operation corresponds to the output of mix 1 with image 3.

3 Audio Analysis



v.4MP, by default, contains three categories of audio analysis: dynamics, pitch, and timbre. Each category contains two analysis objects. To view and edit, select a category from the header tab.

3.1 Dynamics

Dynamics refer to changes in an audio signal's amplitude levels.

Average Amplitude: Reports the average signal level over a specified time period. This can be set by selecting a value from the "time interval" options.

Event Detection: Triggers each time the signal falls below and then rises above a threshold in a period of time. This is great for detecting percussive sounds or note onsets.

3.2 Pitch

Pitch analysis detects and interprets the tonal content of the audio signal, enabling visual elements to respond to musical notes and harmonies.

Fundamental Frequency: Tracks the lowest frequency in a harmonic series and is often perceived as the pitch of the sound. It can be particularly useful for visualizing melodies or bass lines.

Chroma Vector: Analyzes the distribution of energy across the 12 different pitch classes regardless of octave. This is useful for representing the overall key of the music and can be visually represented in a way that reflects the tonal harmony or dissonance within the piece.

3.3 Timbre

Timbre focuses on the color and quality of the sound, which distinguishes different types of sound production, such as different musical instruments or voices in a mix.

Spectral Centroid: Calculates the center of mass of the spectrum, providing a measure that is often associated with the perceived brightness of a sound.

Spectral Spread: Measures the width of the spectrum, giving an indication of how "spread out" the sound is across frequencies. It can be used to visualize the richness or fullness of the sound, with a wider spread potentially corresponding to a more complex and rich timbre.

4 Mapping

A key feature of v.4MP is the mapping interface, enabling custom audio-to-visual mappings. EchoNet supports building one-to-one mappings within the graphical user interface. Additionally, the OSC section can be used for building complex, many-to-many mappings when used in association with *Wekinator *(OSC section in-progress)*.

4.1 Direct Mappings

To create a direct (one-to-one) mapping, begin by clicking the “map” button associated with the audio analysis object of interest. Next, select the map button associated with the visual parameter of interest and the mapping connection will be made. The the square, active button allows for toggling a mapping on or off, while the clear button removes a mapping completely.

4.2 Scaling

The two float values underneath each mapping section are scaling values for the target (visual effect parameter). Use these to control the reactivity of the visual effect. It is useful to watch the visual effect value while tweaking these parameters with audio playing. The input range is automatically normalized to produce a value between 0 and 1.

5 Saving Presets

Presets are great for managing state changes throughout a performance. Presets can store all settings, including sets and mappings. You can even map audio analysis objects to control preset selection.

To save a preset, set all parameters to the desired state and shift-click the preset cell you want to save to. You can then rename the preset to something memorable for later navigation. To change the active preset, simply click the corresponding cell.

6 Suggestions and Best Practices

- More information can be found about each UI object by turning on Info View in Ableton and hovering the mouse over the parameter of interest.
- Try organizing folders by different themes you want to blend together. One image from each folder in a set will always be displayed in tandem.

*Wekinator

Wekinator is a machine learning software built by Rebecca Feinbrink. It allows for building classification and regression models over the OSC (Open Sound Control) protocol. Detailed information on Wekinator can be found on its website: http://www.wekinator.org