# ImX user manual *Image/ine for OsX*

Introduction

ImX is real-time video software that has two main areas of application: live perform-
ance on stage (VJ, or as a part of a live music performance) and installation art. As a
secondary application one can generate movie clips in real- and non real time, but
there ImX is not the best software, by far. Coming from the STEIM tradition, real
time, redundant and flexible control is everything. Midi, OSC and HID devices are
supported for all parameters, as well as lfo's, keyboard, mouse and more. This allows
for a totally separate, networked rendering engine, as well as catering to the key-
board and mouse focussed laptop artist. The user interface of ImX is not the most in-
tuitively understood interface you'll have come across. This has two reasons, the first
being that the program is complex and has many options and possibilities. The second
reason is that the software is really laid out for live performance, where the user
needs feedback on what he or she is doing in an immediate and very clear way; a
combination of 'edit' and 'performance' mode is what you see in the interface. After a
little while it will all make sense...

As of version 1.0ß it is ImX is native Intel only, and will require OSX 10.5 or later. The
home page for IMX is www.image-ine.org. Download the latest version. The applica-
tion unzips with a camcorder icon. IMX is intended as a real time, interactive pro-
gram, suitable for performances and installations. There is a provision to record the
output, but it will not record sound. Other options are to record the video and audio
output directly to a video recorder or use screen capture software (SnapZ Pro).
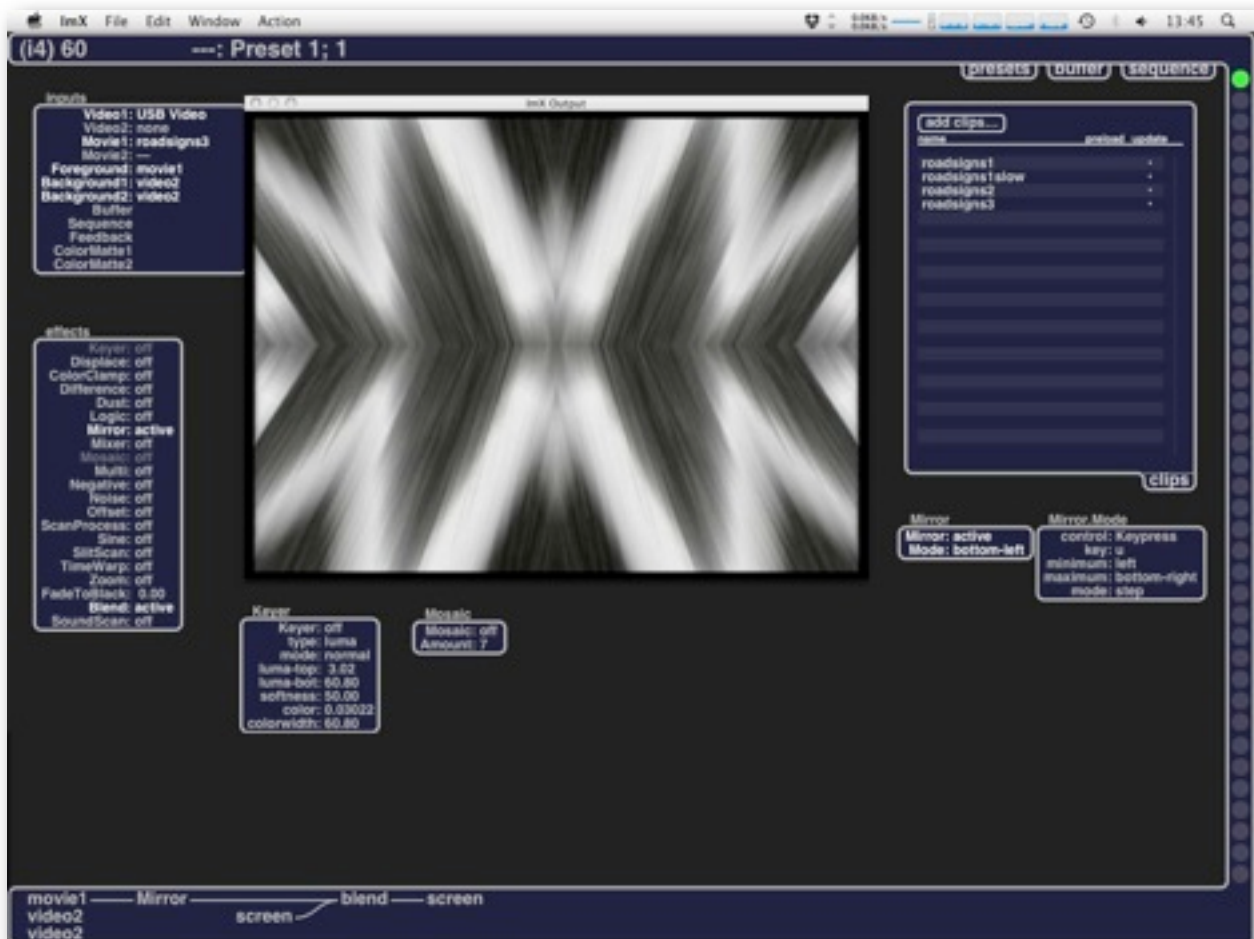
Overview

The ImX interface is laid out as one big 'desktop' on which you'll find several sub windows for effects and input controls as well as resources used in the file. An output window is visible on this desktop when not in full-screen mode.

ImX works best in a two-monitor setup, as you will still be able to see the interface and thus the values of the different parameters that you manipulate. It is not mandatory, however; once you have stopped editing and are just 'performing' or if the setting is an installation, a single monitor setup is just fine.

On the desktop and especially in the parameter windows the right mouse button is used to open and close sub windows, and especially the parameter control settings. The right mouse click usually also closes the window when in blank real-estate of the sub window. Please see the section *"Parameter Mappings & Controllers"*

The basic idea of ImX is quite straightforward. A series of effects is chained one after the other from three input layers to one final output. One effect takes 1 to 3 inputs and writes to one output layer, which in turn serves as one of the input layers for the next effect in the chain. Complexity emerges through elaborate real-time control of parameters, feedback and timed captures to various buffers.

The following sections will describe the different windows and elements of the program and user interface in some detail. Most will only be really understood through experiment, however.

Menu bar

This overview describes only menu bar items that are specific to Imx:

ImX

<u>Preferences...</u>
Imx preferences are described in their own section, below.

File

<u>Collect & Save...</u>
This will save your file and settings in a 'package' which contains all the movies and the images that you use in sequence and buffer. In this way you have only one file to copy, and will never forget to copy a movie or image that you'll use in the file.

Edit

<u>Load Image...</u>
Will let you load an image to be placed in the buffer.
<u>Send to Back...</u>
This will send the selected image in the buffer to the back. In this way you can arrange overlapping images in the buffer.
<u>Video Settings 1 & 2</u>
These bring up the standard QuickTime video input settings dialog for either of two attached camera's.

Window

Select any of the windows in ImX through these entries.

Action

<u>Record to Movie...</u>
This will toggle recording of the output on and off. The format, size and compression settings are set in the preferences panel. Recording to a QuickTime

movie will slow down rendering; you may slow down the overall ImX 'clock' to allow for higher quality (and slower) compression settings, if needed. Clips are saved to your 'Movies' directory; a new one for every 'toggle'.

<u>Display Bindings</u>
Display Bindings shows the assignments of the keyboard to various functions like effects on/off, mouse, midi and lfo assignments. When you open up imx the first time, most of these are pre-assigned, you can freely re-assign.

1. Preferences
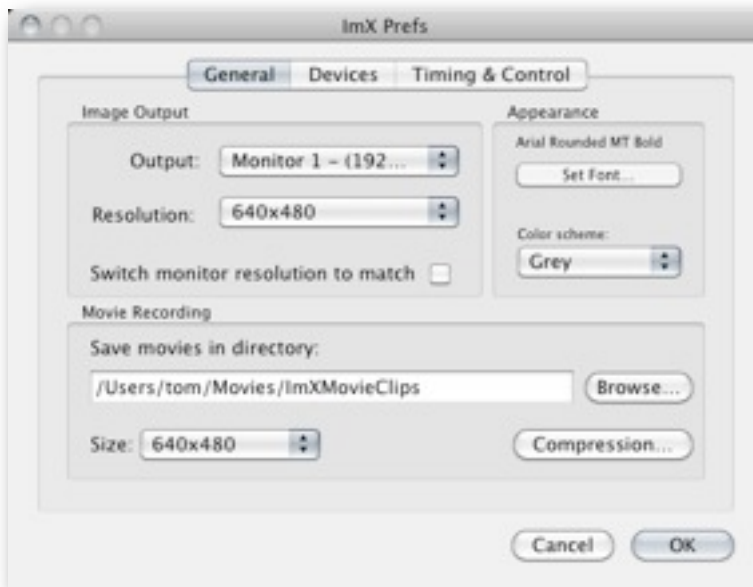
General:

In a multi-monitor setup, select here which monitor will display your output when you switch to Full-Screen. The rendering resolution should, but is not required to, match the native resolution of the attached camera when you use live video input. Ideally, your output monitor is set to these exact dimensions, but ImX will scale to any output size, at the cost of some performance. When 'Switch monitor resolution…' is selected, ImX will attempt to set the external monitor to this resolution. When the resolution is not supported, the nearest supported resolution is chosen. If you do not select this box, output will be scaled by ImX to match the resolution of your output monitor.

When recording clips from ImX, here is where you set the size and select and configure the compression used for the saved clips. The compressor selected determines the quality of the resulting clips to a great extend, guides to which compression to use for particular sorts of video content are found on the internet. Modern machines should support MPEG-4 quite reasonably in real-time, this is set as default.

Appearance allows you to select the interface font and color scheme. Enterprising users can edit the file 'colors.xml' in the Resource directory of the ImX package.

Devices:

Audio, Midi input/output should be obvious; sound output is generated through the Sound-Scan plugin. Midi output is not used, at the moment. VideoPattern 1 and 2, give you a choice between test patterns and grey ramps to use as input layers.

All parameters send and re-spond to OSC, Open sound con-trol, on the UDP port selected.

The send movie sync checkbox send a snc signal on the local network which other instances of ImX will use to synchronize movie playback. If you are not connected to a network, turn it off, or your movies will not loop.

Timing & Control:

The Preset and State timer are meant for installations. Both can be set to random or se-quential. The timing is random-ized to a value between the entered numbers. For fixed timing just set the numbers to be equal.

Crash check is also meant for (unattended) installations. When enabled, ImX detects problems like hangs or crashes and restarts with the selected file. Obviously this is not meant to happen, but it can save the day when it does.

Midi preset control is through 'program change' only. The channel where ImX listens for PGC is selected here. State changes, however, can be assigned to any midi mes-sage. The offset is handy when you use a keyboard, for instance; the screenshot shows that note number 48 will trigger state 0. This is what offset -48 does.

The rendering speed can be reduced for non real-time applications. Obviously this does not make much sense when you use live video input, but it does with complex non real-time processing from movie to movie, for instance. All movie speeds and LFO settings are slowed down, giving the rendering engine and movie output compressor time to complete a frame before the next is due to be rendered.

The increments are 1%, 5%, 10%, 20% 50%, and 100%.

2. Status Bar

The status bar, the top section across the screen, displays run-time information. From left to right it is:

- An indicator to show how many cpu cores are being used (left over from the old days when this was interesting information).
- A numerical FPS (Frame Per Second) indicator, that adds an 'R' when you are recording the output to disk.
- File name, preset and state numbers.
- MIDI and OSC input monitor

3. States display

The dots on the far right side of the screen are called "states". There are 128 possible states for each preset. A **preset** is a collection of up to 128 states, together with the stored (static) content of the buffer and sequences and layout of the control screen.

States are snapshots of the settings of all control parameters and input selects. When a stored state is activated, it restores all effects, inputs and controls to the values they were when the state was set.

To store a state, click the mouse on an empty state dot, and it turns green. If you click on a dot that is filled you will reload the setting from that state instead, so to overwrite a state right-click on that dot and select 'store'; this also works for empty dots, of course.

Dots can also be copied, pasted and color labeled through this menu. Color labels are a visual help only, allowing you to group favorite or similar states.

To recall a state, click the corresponding state dot. There are a few shortcuts: 0-9 on the numerical keypad recalls stored states for the first ten states.

Clicking "*" (star) on the keypad, followed by 0-9 will store the current state in the position determined by the digit typed, overwriting the state that may already be there.

The "/" (forward slash) on the keypad is a shortcut for 'next state', wrapping around to the first when no more are available. When preceded by "*", the slash will store the current state in the next available slot.

On MacBooks there's no numeric keypad; an external USB keypad will work.

There are several ways to manipulate states: using the mouse or keyboard as described above, or by MIDI or OSC (open sound control).

To assign MIDI to States, go to the Preferences > Timing & Control and assign a note value with a "-" (minus) before it. That note value will then recall the first state, the next note the next state and so on.

OSC is simply "/imx/state <0-127>" to recall a state, or "/imx/state/capture <0-127>" to capture a state. See OpenSoundControl.org to learn more about OSC.

4. Signal path display

On the very bottom of the screen is the connection indicator, showing the active signal path. Many of the effects here are can be click-dragged left/right or up/down, allowing you to change the priority of target and destination layers of effects. Ex-

periment with this as the order of the effects and the layers they work on will make a big difference in many cases. Choices made here will be stored with the state.

5. *Windows*

The center of the display holds 7 windows.

Output

The output window (⌘1) displays the video output of the program. This can be displayed on a second monitor, or full-screen when in performance mode.Use ⌘F to toggle full screen. Use Preferences to control multi-screen setup and output resolution.

Inputs

These are the input signals to ImX; here you assign nine inputs to the three layers, and set up the controls for all inputs. Please see the *"Inputs"* section for details.

Effects

The effects window lists all available effects, you can enable them directly in this window, or through the mappings you have set up (or the default ones on the keyboard keys). See section *"Parameter Mappings & Controllers"* for details on setting up mappings, section *"Effects" for details on the individual effects.*

Buffer

To access the 'buffer' window, click on the tab in the upper right of the screen or press ⌘2. Please see the *"Buffer"* section for details.

Sequence

Click on the tab in the upper right of the screen or press ⌘3 to open the sequence window. Please see the *"Sequences"* section for details.

Presets

Click on the tab in the upper right of the display or press ⌘4 to open the Presets window. Here you can add presets and access existing ones. Presets can store a set of states, control window displays and buffer content. To name a Preset, click and type new name. The "Add Preset" command copies any highlighted preset and adds "copy" to the name. The presets order is edited through cut/copy/paste commands. There are four ways to access a preset:
• you can double click on the preset name
• use the + (plus) and - (minus) keypad keys
• use midi "program change"

- OSC '/imx/preset/<number>'.

Clips

Click on the tab in the upper right of the display or press ⌘5 to open the Clips window. The "add clips" will access your movie files. You can multiple-select and bring in more than one at once. Please see the "*Inputs*" section for details.

## 6. *Parameter Mappings & Controllers*

ImX is set up to be as flexible as possible in controlling effects and parameters. Individual parameters can be controlled in many ways and these control mappings (a controller is 'mapped' to a parameter) are stored in the states, so the same controller can control different things in different states and presets.

A right-click on an effect or an input brings up a window with all controllable parameters for that effect or input.

If there is just one single parameter to control (i.e. just on/off for *Negative,* for instance) the '*parameter edit*' pop-up window for that parameter displays immediately, to the right of the parent window.

If an effect or input has more than one controllable parameter, the '*parameter select*' window will stick to your mouse; just click to set it down anywhere on the 'desktop'.

The '*parameter select*' windows can stay on the desktop so you will be able to have visual feedback of the actual parameter values during performance.
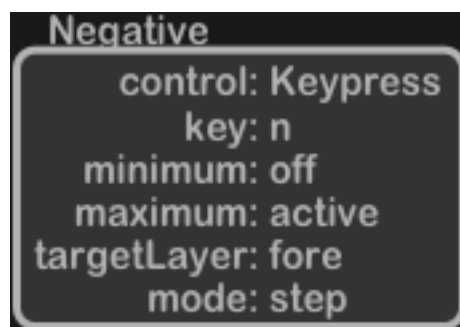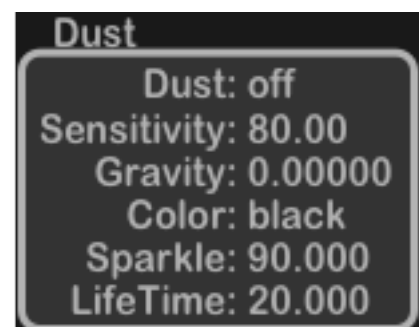
| Param Edit Window | Param Select Window |

A right-click on a parameter in the *parameter select window* will bring up a *parameter edit window* for the selected parameter, again, flush right with its parent window.

The parameter edit window is where you will assign a controller to a particular parameter (of a particular effect or input).

All controllers are best understood when you regard them as normalized to the range 0-100%. This means, effectively that a key pressed outputs 100, a key released outputs zero. The mouse at the rightmost edge of the screen is at 100, at the left edge at 0. A midi pressure of 127 is read as 100, pressure 0 as zero. (internally everything is 14 bit accurate, however).

The values that you can set in the parameter edit window will depend on the actual controller selected. They'll be discussed with the controller, below.

In general, though, you will find a **minimum** and **maximum** entry for most parameters, these allow you to limit the range of the controller to these values, and effectively remap the 0 to 100 range of the controller to the min-max range selected here.

Another setting for parameter control you'll often see is the *'mapping'*. These are curves that can be applied to change the response of a controller. Default is 'linear' which corresponds to a straight line from 0 to 100. *Inverse* maps zero to 100 and 100 to zero. Then there are log and exp, in two strengths and their inverse versions. Below you see the actual response curves; experiment, especially when using LFO controllers, to add a bit of non-linearity to your effect.
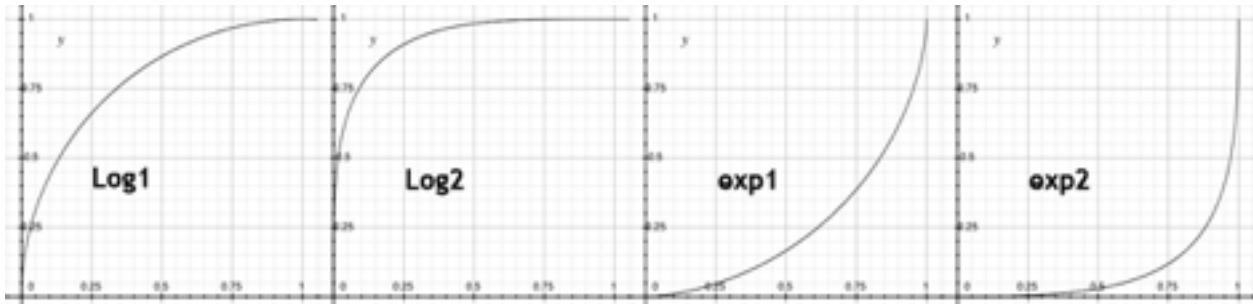
Top level controllers, the ones that switch an effect on or off have a *'targetLayer'*. This speaks for itself; the effect take the pixels from its source layer (or two; displacement, for instance, or even three, as with the external keyer) and writes the processed pixel to the target layer set here.

Often you'll see a *mode* selector. This can be either 'step' or 'direct'. This choice is only available for non-continuous parameters, when controlling, for instance, an effect on/off or the input select for the foreground layer. When applied to a keypress, 'step' will select the next available value on each push of the key, on to off, or video1 to video2 to movie1 etc. The key 'steps' through the values. *'Direct'*, when attached to the horizontal mouse, f.i. will select 'on' when the mouse is in the right half of the screen, 'off' when it is in the left half. When a mouse (or any other continuous controller) is set to 'step', values are 'bumped up' one on each crossing of the 50% level from low to high.

Finally you may com across a '**damping**' selector. This is mostly meant to 'dampen out' jittery control inputs. Easiest to demonstrate with the sound input. A high setting evens out the inputs over a longer period, needing more sustained high level input to actually raise the controller value that with lower settings.

Available controllers are:

- **Mouse**

    In ImX the mouse is set up as the most powerful instrument of continuous control. Movement in the x and y axis, or the mouse wheel provide continuous input on as many as 32 different 'channels'.
    The x and y axis cover the main screen (the one with the menu bar) only, either in single monitor setup or multi monitor. Bottom-left is x:0, y:0; top-right is 100,100%.
    Using combinations of modifier keys you are able to select different 'channels'. This means you have, for the x,y and wheel, up to 32 separate continuous controllers for a total of 96.

In order to effect this, we 'jump' the mouse position to the last selected value any time the combination of pressed modifier keys changes. This is against all human interface guidelines, and is a bit confusing at first; you'll get used to it, though.

The modifiers are *caps-lock, shift, control, option* and *command.* Whenever you select the mouse as a controller you'll see a modifiers section with the letters **lscod**, for caps**L**ock. **S**hift, **C**ontrol, **O**ption and comman**D.** Type any combination here, or click and scroll through the combinations with the mouse, and the parameter will be controlled with the mouse *only when the right combination of modifiers is pressed.* In the default setup, for instance, the caps-lock key controls the keyer levels; hit 'k' to activate the keyer, mouse the mouse around, and nothing happens. When you engage caps-lock, the mouse pointer will jump to the currently set levels and moving the mouse will change them. The caps-lock is of course different from the others in that it 'sticks'. For other modifiers you'll have to keep them pressed when changing values.

- **Keyboard**

    All the 'normal' keys can be mapped, the function keys and the numerical keypad are not available. In the default setting, many of the letter keys will toggle specific effects on and off. Given the switch nature of the keyboard keys they are best suited to act as toggles; if, however, you set the mode to 'direct' you will have an effect on only as long as you hold the specified key down. When controlling continuous parameters, the single key will give you 100% when pressed, 0% when released.

    Using the 'keymap' control you can 'map' different keys to different values for managing continuous parameters. When you click 'edit...' a pop-up window will show; here you can set a value for each key (of course you don't need to set a value for *every* key). As an example we'll set up three values for the 'blend' strength to be quickly selectable through the I,O and P keys (caps).

    Right-click on 'blend' in the effects window, click to set the pop-up parameter select window down anywhere on the desktop. Then right-click on the 'strength' parameter to open the param edit window for blend:strength.

    Hit shift-i to select the cap-i entry, click and scroll on the '---' to the right and set it to 50; hit shift-o and set the value to 80, hit shift-p and set to 90. Click 'done'. You can also scroll the window to the right key, hitting the key to edit is just an nice quick shortcut.

    Now hit 'b' to switch on blend, make sure you have video showing in the output window. Selecting I,O or P now quickly selects the preset values for the strength of the effect.

    The keyboard can also be used to 'nudge' values up and down, see below at 'Nudge'.

- **MIDI**

    Midi is freely assignable, except for 'program change' which controls the preset select. When assigning notes or controllers you can just hit the note or use the controller when the corresponding field in the param-edit window is activated. The number will be entered automatically.

The 'NoteMap' control works exactly the same as the 'KeyMap' control described above. This time you match specific note events to specific continuous valued of a specific parameter. NoteVelocity is the control you select if you want to use midi note events as toggles. The rest of the choices should be clear, for a MIDI reference see for instance: http://en.wikipedia.org/wiki/MIDI

- **LFO (low frequency oscillator)**

   Built-in low frequency oscillators allow for free-running or triggered automated parameter changes. Most used, perhaps, is the square wave to trigger an event, such as an image capture, periodically.

   LFO's can be free-running, meaning that they run through the minimum to maximum value entries continuously, or they can be triggered (by a sound, a key press, movie-restart or any other controller) to run through these values once, then stop waiting for another trigger. To set up a trigger, right-click on 'trigger' and select the controller in the usual way. By having the frequency and or phase controlled through another lfo very complex non-linear control effects are possible.

   Frequency runs from 0-50Hz, using the mouse is fairly course, by typing in the exact values much more fine-grained settings are possible, use the keyboard for fine-tuning very low frequencies.

- **Random**

   Simply changes it's value periodically, or triggered (see LFO, above). By setting the mapping to log or exp you can bias the values to the top (log) or bottom (exp) of the min - max range.

- **Sound**

   Using the sound control, the volume (LogRMS, to be exact) of left and right input channel directly controls the parameter value. The sound input source is selected in the preferences panel.

- **Movie position / restart**

   Two 'internal' controllers allowing the movie position of either movie layer to control another parameter. The restart will typically be used as a trigger, the position as a continuous controller.

   Allows effects and other parameters to be synchronized with playing movie clips.

- **Wacom tablet**

   When you have a wacom tablet attached, this should be self-explanatory.

   Pen x,y and pressure are recognized. The buttons may work, or they may not...

- **Nudge**

   The nudge control allows you to 'nudge' a value op and down through keyboard keys or midi notes. When you hit the up or down key, or play the up or down note, the time between press and release or non-on and note-off is added to or subtracted from the value of the controller. Very short taps add a little, longer notes add more. The actual response can be tweaked with the sensitivity parameter.

When the max or min is reached further taps in that direction have no effect.

- **Fixed**

  No controller, really. Here you set the value of the parameter directly.

- **HID**

  Input support for any connected HID device like joystick or game pad. They will appear after the 'Fixed' entry. Sometimes the names that you see in this list will not be immediately obvious. And sometimes you'll see other devices (on my system there's a 'PTZ-630', for instance. Turns out to be the Wacom Tablet).

- **OSC (open sound control)**

  OSC is not selectable as a controller. It is always active. Whenever an '/imx/...' message is received, the corresponding parameter value will be updated, irrespective of the controller assigned, i.e. the last one will determine the value. OSC messages either take a float 0.0-1.0, or, where relevant, a string (enumerable parameters). They are always interpreted in 'direct' mode. That is, using OSC you cannot step through values, you always need to set them directly.

7. Inputs

It is helpful to look at the inputs as three groups:

- The first group allows you to select which sources to connect to the video inputs and which movies will be routed to the two movie input layers.
- The next group is foreground and background 1 and 2, these select the active ones for that layer from the nine available inputs.
- the last group deals with the buffer, sequences, feedback and color mattes. These can be seen as 'internal' inputs.

These are accessible and loaded into the program for use through the Movie1 and Movie2 settings in the inputs window. To display them to the output window, they must be assigned to the foreground or backgrounds. Since these moves seem sometimes to be confusing to beginners, here is a recap: 1. Add Clip2. Assign clip to movie 1 or 23. select movie 1 or 2 to foreground or background.

8. Buffer

The buffer input is controlled with the parameters that you set through a right click on 'buffer' in the inputs window.

The buffer has two modes; a still-image mode, where it acts as a a general storage area for grabbed and pre-loaded images, and a 'random' mode in which the buffer is filled with random pixels or lines, good for many special effects. Choose between the two by right-clicking in the buffer window.

Load images through ⌘L (edit menu); you can distribute these across the 'frame slots' in the buffer through right-click and selecting 'distribute'. Alternatively, when

the buffer is in picture mode, you can grab video, movie or screen frames into it (default control is set up as key '4').

The size of the buffer is set by clicking and dragging on the numbers next to the word "size".

Parameters working on the buffer are pan-x, pan-y for horizontal and vertical panning across, scale and grab.

9. *Sequences*

There are three sequence buffers, meant for video sampling from …? and time based effects like …?. The size – length, # of frames? or image size? of each is adjustable by clicking and dragging on the number after the word "size" below each sequence. Sequences can also be loaded with images or movies (right click to load), and as they are stored as individual frames, direct access is quicker and better than using the movie clips directly. Playback of sequences as well as grabbing inputs into them, is controlled using the sequence entry in the inputs window.

10. *Effects*

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