robotfunk
FLOWMOTION 2.0

user manual

Welcome to Flowmotion 2.0

1.1 Welcome

Welcome to Robotfunk Flowmotion 2.0.
Flowmotion is designed by artists for artists, with the emphasis on realtime performance, improvisation, jamming, playing video like playing a musical instrument. Flowmotion is used by VJs, AudioVisual artists, bands/DJs looking to add visuals to their performance, business presentations etc.

1.2 What's new in Flowmotion 2.0?

FreeFrame effect support (*)

FreeFrame www.freeframe.org is an open-source cross-platform real-time video effects plugin system.Support for these type of effects mean that anyone can write plugin effects in C++ or Delphi that work in Flowmotion (as well as VJamm, Resolume, Visual Jockey and others). Users can make their own FreeFrame plugins without any programming skills by combining existing FreeFrame plugins into new ones using Pete Warden's FreeChain application www.petewarden.com . There are currently more than 60 FreeFrame effects freely available, and this number is growing fast. FreeFrame support now increases the total number of realtime effects in Flowmotion 2.0 to well over 100.

Synchronize to MIDI clock

Flowmotion 2.0 can be synchonized to soft- or hardware sequencers, drum machines, groove boxes and other hard- and software that outputs MIDI Clock, including BPM analyzers such as Red Sound Voyager. This will ensure that video loops in Flowmotion are always 100% synchronized with the beat of the music, without the need for tapping the space bar (of course you can still can use that method). Start, Stop and Continue are also recognized.

Scratch pad on every channel

Every channel in Flowmotion has a scratchpad you can use to scratch any playing video with your mouse. Of course you can link it to any audio/LFO/time/fader value or control it with MIDI devices including the ej turntable http://www.ejenterprises.tv/ and the Mixman DM2 controller, using the DM2 to MIDI mapper www.pdoom.ch

Joystick support (*)

Every parameter in Flowmotion 2.0 can be controlled by a joystick or other game controller.

Mask layer on every channel

Every channel can use a mask layer, for which you can use any source such as images, video clips, live camera, or generators you can make yourself in Flash or Director

Custom Gradient Wipe Transitions

Every channel can use a custom wipe transition. You can easily design your own wipes using gradient (greyscale) images.

Completely redesigned User Interface

Flowmotion 2.0 has been completely restyled by designer Anton Bensdorp, resulting in a cleaner, easier to use and much more beautiful interface. The interface screen now has a resolution of 1024x768, allowing for more controls, yet more space. Every effect can be controlled by up to 12 faders.

Easy linking of parameters
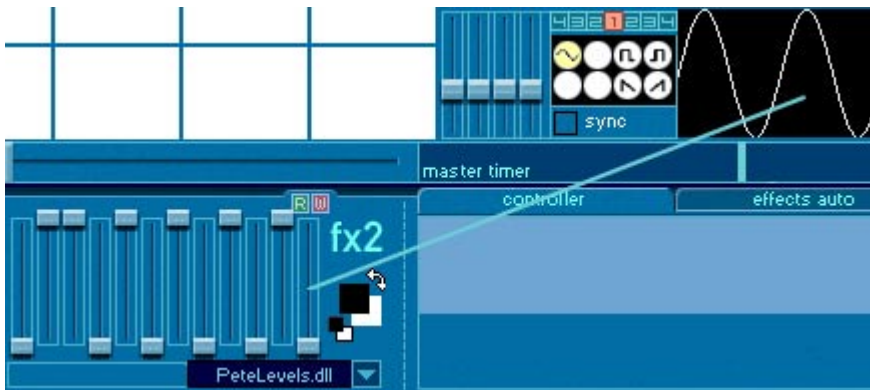
Any fader or scratchpad can be linked to any other fader, scratchpad, or any LFO, FFT frequency band, or the master timer by dragging a cable between them with the right mouse button. Just as easily unlink them with a double click.

Automatically parameter automation view change

When working with any fader, the read/write pattern display automatically updates to the current fader.

Mac OS X support

Flowmotion 2.0 is now available for Mac OS X as well as Windows computers.

Customizable effects list

You can now disable or enable any effect in Flowmotion (internal or FreeFrame) so that you only see the effects you want to use, and don't get swamped by the huge list of over 100 realtime effects in Flowmotion 2.0

Smoother importing of Quicktime movies

Flowmotion 2.0 no longer drops the framerate or jerks while importing Quicktime movies.

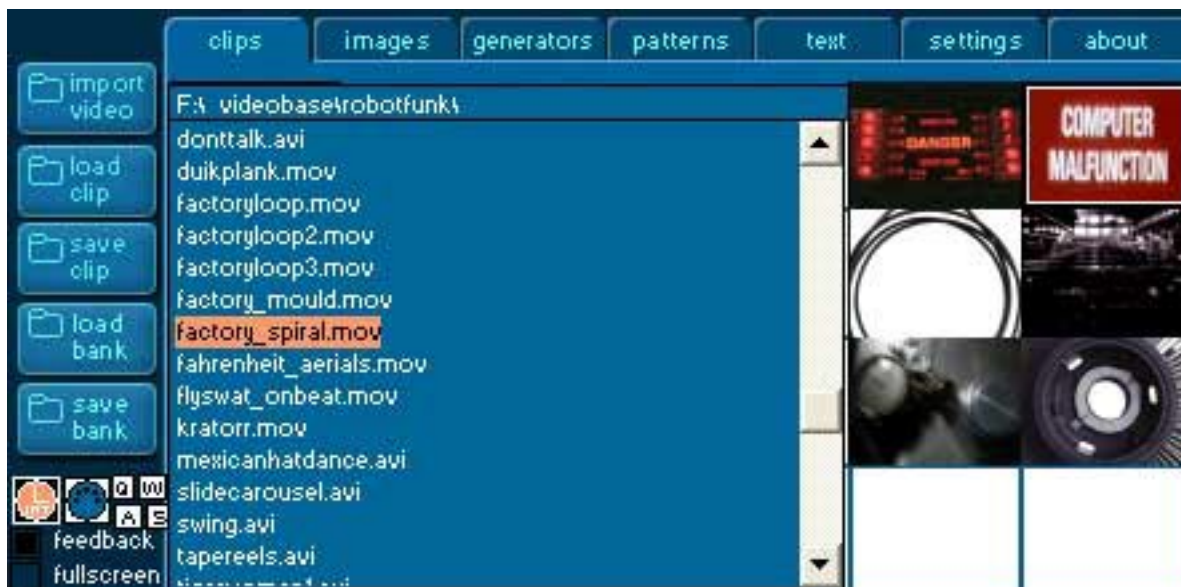(*) This feature isnt currently supported in the Mac OSX function but will be available in a free update.

Chapter 2

Quickstart Guide

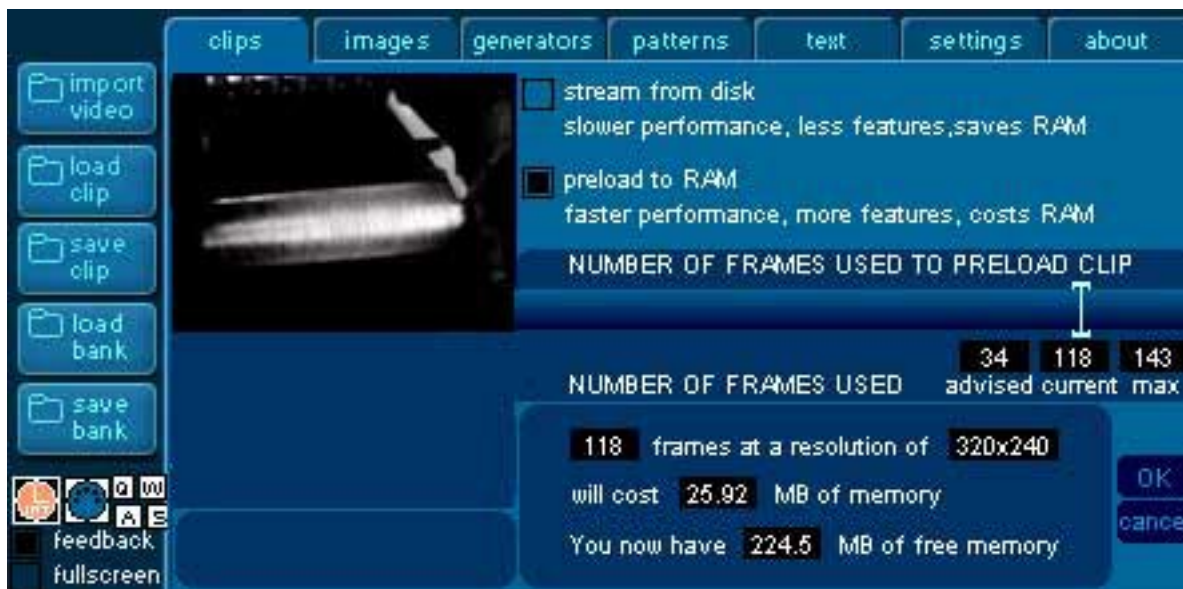The first thing you will want to do is import some clips.

Select a slot in the Clip Grid by clicking on it, and click on ‚import video'.

A File Browser will pop up where you can browse around your harddrive for clips.

Select one by double clicking it

You are now confronted with a couple of important decisions. The first is whether you want to preload or stream a clip. Preloading means loading every frame into memory, which means very fast playback, but also memory restrictions. On the other hand, streaming a clip saves memory, but stresses the CPU more because the clip has to be decompressed constantly. Also streaming clips from harddisk, you might run into harddisk speed limitations, especially at high resolutions and/or many clips streaming at once.

The main deciding factor should consider clip size, duration, resolution and available RAM. Generally you will want to stream clips longer than 10-15 seconds or when using higher resolutions than RAM will permit. Anything short and small will play back much faster when preloaded.

The second decision you will need to make if you chose to preload the clip, is to how many frames you will use to import a clip. The more frames you use, the smoother motion will become, but also the more memory will be required. For this decision, you are presented with some help. You can move the slider left to right, and you will see how many frames you chose, how much memory this will take at the current resolution, and how much free memory you have left. If you don't have enough free memory to import a clip, Flowmotion will not import it, to prevent memory overflow.

force qt import

There may be some codecs that are problematic when importing into Flowmotion. This option enables you to force using the Quicktime engine to import clips, which in many cases helps importing clips that would otherwise fail.

As soon as a thumbnail appears you can apply it to a channel by clicking on the white rectangle in the left part of a channel.

Select another slot in the Clip Grid by clicking it and choose ‚import video' again to choose another file.

Repeat this process until you have a few clips in memory to play with.

If you have applied a clip in the first channel and apply another clip to another channel, you will notice that the first one becomes invisible.

This is because:

1) The second channel ink is set to ‚copy' which does not composite it with previous channels.

2) The transparency fader is at the top (100% visible) so the previous channel does not show through.

You can play with the transparency fader to blend the channel in/out of the previous channels.

You can also change the ink of the channel to try some of the compositing effects possible, such as lightest, darkest, add , substract,etc.

If you have changed the ink or the transparency you should see a composition out of 2 (or more) channels.

Now , in the last channel (flowmotion starts at top , channel 2 is added next then channel 3 etc) select an effect from the fx1 pulldown menu.

play with the faders of fx1 to see the effects change.

You can also add a second effect(fx2) which reprocesses the output of fx1.

Now try something mad. Right-click (control click on Mac) a fader, and drag a cable to one of the LFOs the moving shapes on the top right of the screen. See the fader being moved automatically by the LFO.

You can link almost any parameter to any other parameter this way in Flowmotion.

1 2 3 4

Now turn on some music and tap the space bar to the beat of the music. Flowmotion will assume the first tap is on the first note (on the ‚one') of a bar of music. You will see that the master timer adapts itself to the tempo of your tapping. For even more fun, connect the music to the line in of your computer, and click on the "audio input" button above the LFOs. Choose the line in (mic in on a laptop with builtin microphone can also be very useful) and move your mouse slightly to the right to see the bars moving. You can link any fader to these bars by drawing a cable with the right mouse from a fader to a bar. Each bar represents an octave, so the first one represents sub bass and the last one the highest frequencies.

Global parameters

BPM slider/tap tempo

There are various ways to get Flowmotion in sync with the music.

Manually

The easiest way is just tap the space bar to the beat of the music. Flowmotion will assume that the first tap will be on a first beat of a bar of music. If you just tap on every 1 for a couple of seconds, Flowmotion will pick up the tempo and start looping in the same tempo (you wont have to keep tapping very long).

using MIDI Clock

Another way is to set Flowmotion so that it is a slave to an external MIDI clock, that way Flowmotion is automatically 100% tight with your sequencer, drum machine, groovebox, or other MIDI device. You could also use this feature with a BPM analyzer such as the Red Sound Voyager, Kaoss Pad (mixer), some Yamaha mixers and effect machines etc.

To use MIDI Clock syncing, first go to settings, select 'activate MIDI input' and then click on the MIDI sync button (the button that looks like a midi connector, just right of the preview window).

fullscreen

Some users will prefer to use a hardware solution (zooming scan convertor, zoom feature on matrox cards, etc) to have the second screen output the video composition fullscreen. In all other cases, you will need to check this box to enable fullscreen output on the second monitor.

feedback

This setting controls wether each frame starts with a black frame, or draws over the old one (default). This allows for all kinds of mad feedback tricks in Flowmotion.

Joystick, FFT, LFOs, Master Timer
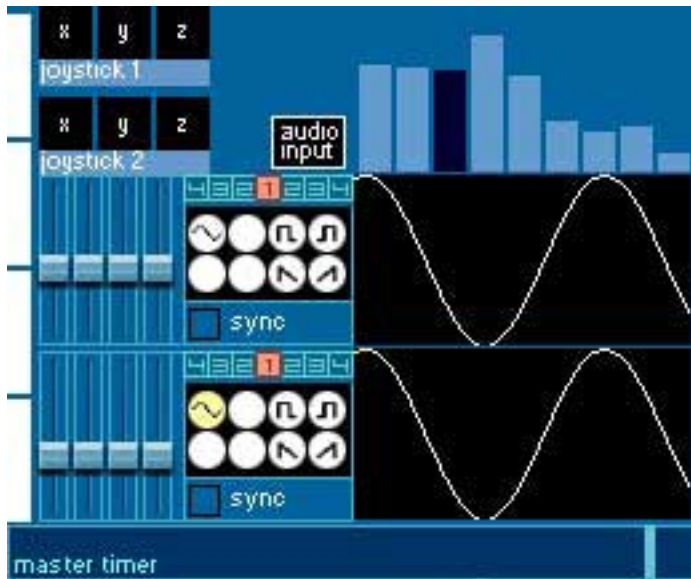
Here you see the Joystick inputs, FFT inputs, the 2 global LFO's (Low Frequency Oscilators)

You can link any fader or scratchpad to these values by dragging a cable between fader and these with the right mouse (control - left mouse on Mac). When the mouse is over a valid linking target you should see the cursor change. You can link to x, y, z of 2 joysticks, any of the 9 octaves (frequency bands) in the FFT, to any wave of the LFOs or to the master timer.

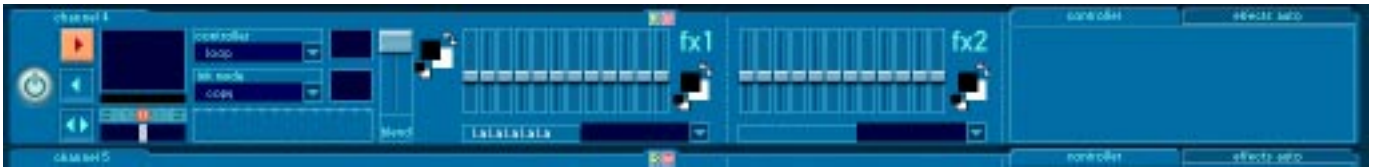The LFO's can be synced to the master tempo (sync) or run on their own speed (no sync)

When synced you can use a tempo subdivider to control the speed relative to the master playback tempo.

When unsynced you control the tempo with the frequency slider.

You can select various waveforms and retrigger each LFO by clicking on its output screen.

Chapter 4

Channels

A channel typically consists of:

A video clip assigned to it (except for midimap which can access all clips and link which reprocesses the output of the previous channel)

An in and out point deciding which portion of the clip is being looped (the bar under the channel thumbnail)

A Tempo Subdivision factor which can make the loop from 1/4 to 4x the master timer speed.

A Tempo Slider which adjusts the clip's speed independant of the master timer speed

A Controller which decides what to draw in the channel

An ink mode assigned to it (the way it composites the layer with the previous layer). Ink modes are similar to transfer modes in Photoshop. See chapter 'Ink Modes' for more information

A transparency set to it (to blend with other layers)

A Fore and Back ground color (leave it black and white for unaltered colors) (doesn't work with all inks)

One or two effects assigned to the channel , each with up to 12 parameters

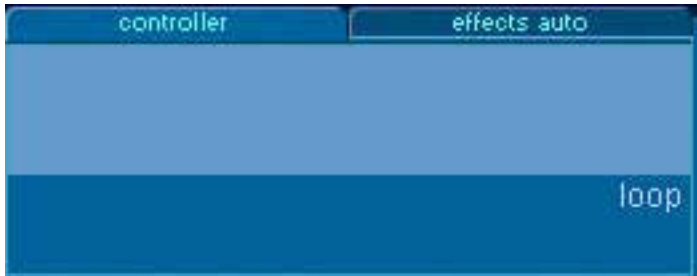a display to the right that can be tabbed between:

A control panel for the currently selected Controller or

A Graph that can record and playback parameter changes for every effect. You can also draw directly into the graph.

Chapter 5

Controllers

A Controller is the heart of every channel in Flowmotion. It defines what is being showed in each channel and how.

Loop

This is one of the most used controllers and also the default controller in Flowmotion. It makes a video clip synchronise to the internal sequencer. (which can be synced to MIDI clock). At its default settings one loop of the video clip will correspond to one bar or four beats of music. You can set a subdivision factor (the numbers 4 3 2 1 2 3 4 under the channel thumbnail) so that you can have one video loop between every 4 bars / 16 beats and 4 times a bar. Below the tempo subdivider is a control which sets the in and out point of a loop

Cutup
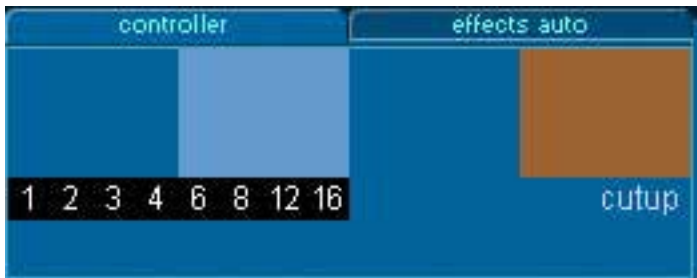
you can cut up the measure/bar of music into 1/2/3/4/6/8/12/16 parts, so that after every slice another (random) slice will be shown. This is a good way to randomly cut up your loop to the beat of the music

Link

This makes the channel reprocess the result of the underlying channels. It is a way to add more effects than the 2 that each channel allows. You can use it in any channel, interesting feedback effects can be achieved.

MIDI map
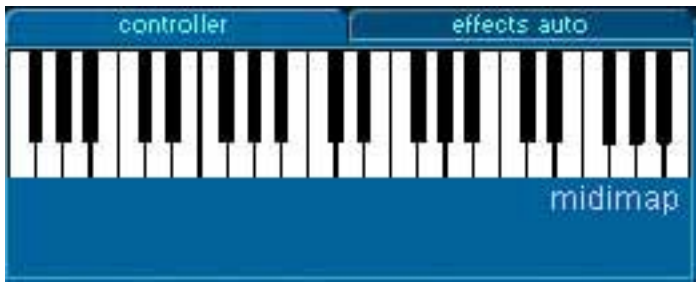
Maps all preloaded video's over a MIDI keyboard range so that each key will trigger a different video clip. Use a MIDI enabled keyboard or sequencer or your PC keyboard to trigger different clips. (pc keyboard currently disabled in this version. you can also use your mouse to click on the virtual onscreen midi keyboard. Imported clips are mapped across this keyboard ... so that the first clip will be the low F note the second F# etc etc. The playback speed of triggered clips is dictated by the master tempo and the subdivision factor (see loop)

sequencer
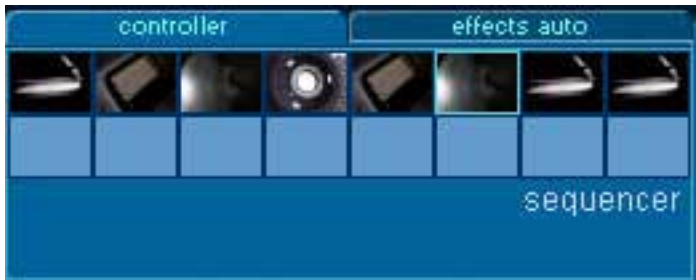
allows clips (or parts of clips) to be triggered after each other.

Each time the time bar goes past the start of the loop, a new clip will be triggered.

16 slots are available. You can fill them with clips, images or streams.

You can use the 4321234 (Time Dividers) to change the speed at which new clips will be triggered. Forward/Backward/PingPong modes will work as expected with this controller.

draw values

Allows you to draw a graph that controls time position of the video layer. Bottom of graph represents the beginning of a loop, top is the end

LFO

A Low Frequency Oscilator (function generator) that controls time. Sine, Square, Saw, Block and Pulse waves are currently implemented.

mouse H/ Mouse V

Use your mouse to ‚scratch' video layers back and forth.

ribbon

Use a MIDI ribbon controller (or other MIDI controller) to scratch a video back and forth

Chapter 6

Effects

Every channel in Flowmotion can use up to 2 realtime video effects. Each effect can have up to 12 parameters, which can be linked to any other parameter in Flowmotion including LFO, FFT values etc.

You can also record and playback fader moves into patterns, using the R/W (Read/Write) buttons above the active fader.

Flowmotion 2.0 introduces support for FreeFrame effects. Because new FreeFrame effects come out frequently, they will not be described in this manual. To learn about FreeFrame effects visit www.freeframe.org

Internal effects:

matrix

The image is repeated to make a matrix of images.

Controllable parameters are Number of Colums and Number of Rows.

matrix flip

Similar to matrix, but every other matrix element is flipped to make a kaleidoscopic effect.Controllable parameters are Number of Colums and Number of Rows.

bender

Sine based distortion of the image.

Controllable parameters are x distortion and y distortion .

dots

Dots placed in a matrix vary in size to form the image . Looks like a blowup of a rasterized newspaper photo. Controllable parameters: resolution

dots color

A color version of dots. Controllable parameters: resolution

lineshift

Distorts the image as if horizontal or vertical sync is lost.

Makes waves in the image based on parameter changes.

feedback

A ‚tunnel vision' effect similar to pointing a camera at the tv its outputting to. Controllable parameters: repetitions, scale, x offset, y offset

blur

Blurs the image.

Controllable parameters: blur amount

rotate

Rotates the image

Controllable parameters: rotation amount

colorize

Change the overall color/tint of an image

Controllable parameters: Color

Color is selected from the fx color picker (the foreground color is used)

color min/max

A lowpass and highpass filter for the colors in an image.

Controllable parameters: min color, max color.

Color is selected from the fx color picker (fore- and background color are min/max)

scale

Scales an image proportionally

Controllable parameters: Size

light ray

Makes ‚beams of light' appear out of the image

Controllable parameters: x direction, y direction

light ray HQ

A higher quality, but slightly slower version of lightray

Makes ‚beams of light' appear out of the image

Controllable parameters: x direction, y direction

sketch

Turns an image into a black & white drawing.

Controllable parameters: Treshold

contrast

Controls the contrast of an image

Similar to control found on regular TV sets.

Controllable parameters: Contrast

desaturate

Gradually desaturates an image (removes the color/ shifts into greyscale)

Controllable parameters: Desaturation

lightness

Changes the lightness of an image ... goes from total white to total black

Similar to control found on regular TV sets.

Controllable parameters: Lightness

pinch

Bulges an image like a lens distortion/ curved mirror effect

Controllable parameters: X offset , Y offset

pinch square

stretches/bulges an image in both x and y directions so that some regions

become larger and others smaller.

Controllable parameters: X offset, Y offset

saturation

controls the color saturation of an image. Differs from desaturate in that it can increase as well as decrease saturation. Similar to control found on regular TV sets.

Controllable parameters: saturation

twist

Twists the image into a spiral

Controllable parameters: twist amount

Synaesthesia:

Inspired by a rare human condition where people can see colours and hear sounds. Uses FFT (Fast Fourier Transform) to subdivide the incoming audio in different frequency bands (like equalizer). Then it colorizes the image according to bass, mid and treble harmonic content. Red, Green and Blue channels are mapped to Low, Mid and Treble harmonic content. The image changes colour by changes in sound. If sound is absent the image is black. Very hard to imagine this from a thumbnail just see for yourself how the music is ‚talking' in the image colors.

distortH

distorts the image horizontally. Adjustable parameter: distortion, amplitude

distortV

distorts the image vertically. Adjustable parameter: distortion, amplitude

squeezeH

squeezes the image horizontally. Adjustable parameter: distortion, amplitude

squeezeV

squeezes the image vertically. Adjustable parameter: distortion, amplitude

flipH

flips the image upside down. No parameters

flipV

flips the image left / right. No parameters

filmstrip

makes a matrix of previous frames untill the newest one. The denser the matrix, the longer time it goes back.

Adjustable parameters: Rows, Columns

filmstrip_flip

makes a matrix of previous frames untill the newest one. The denser the matrix, the longer time it goes back. Additionally, every other frame will be flipped horizontally

Adjustable parameters: Rows, Columns

offset_repeat

offsets the image and tiles it. Adjustable parameters: X offset, Y offset

pixelate

reduces the resolution of an image. Adjustable parameters: Horizontal resolution, Vertical Resolution.

spin_blur

gives the effect of rotational blur. Adjustable parameters: rotation, blend with original

twirl

gives a spiral effect. Adjustable parameters: rotation, blend with original.

SymH

makes image symmetrical horizontally. Adjustable parameter : ink (slider goes from darkest , blend to lightest)

SymV

makes image symmetrical vertically. Adjustable parameter : ink (slider goes from darkest , blend to lightest)

SymHV

makes image symmetrical both horizontally and vertically.

Adjustable parameters : symh ink, symv ink

Chapter 7

Clips

Importing clips

When you click the ‚import clip' button, you are directly confronted with a couple of important decisions. The first is whether you want to preload or stream a clip. Preloading means loading every frame into memory, which means very fast playback, but also memory restrictions. On the other hand, streaming a clip saves memory, but stresses the CPU more because the clip has to be decompressed constantly. The main deciding factor should consider clip size, duration, resolution and available RAM. Generally you will want to stream clips longer than 10-15 seconds or when using higher resolutions than RAM will permit. Anything short and small will play back much faster when preloaded.

The second decision you will need to make if you chose to preload the clip, is to how many frames you will use to import a clip. The more frames you use, the smoother motion will become, but also the more memory will be required. For this decision, you are presented with some help. You can move the slider left to right, and you will see how many frames you chose, how much memory this will take at the current resolution, and how much free memory you have left. If you don't have enough free memory to import a clip, Flowmotion will not import it, to prevent memory overflow.

editing

You can edit each clip (even empty ones) by double clicking them in the clip grid.
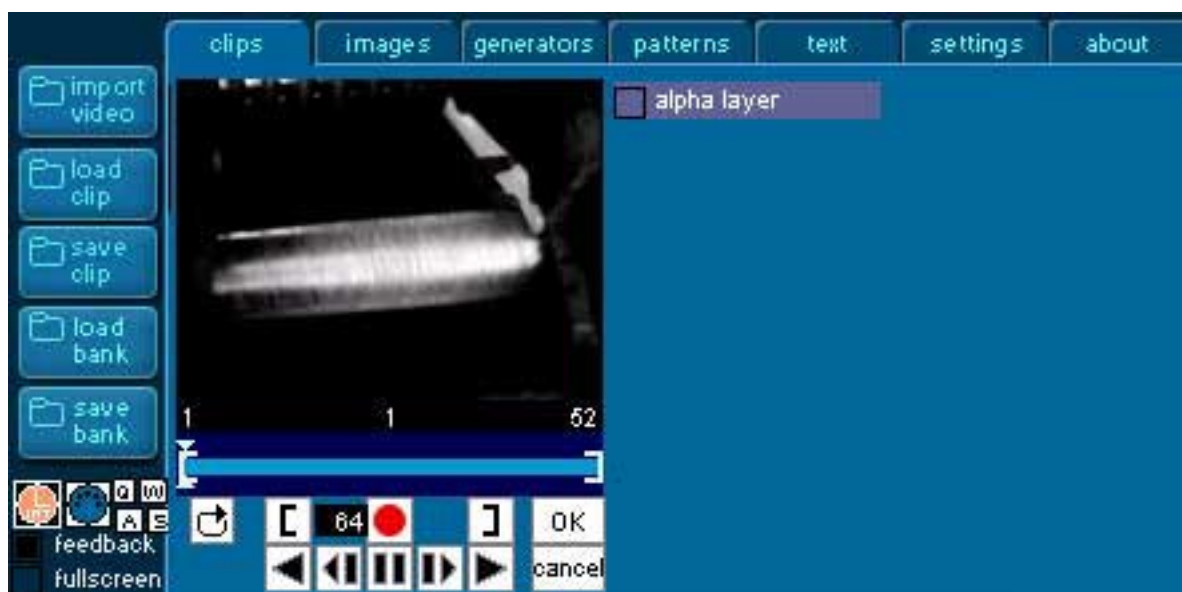
You can use this window to set the in and out points of a clip, when you press OK the changes you made will be applied. If you press the record button, you can record Flowmotion's output in a new clip. You can even record into a clip that is playing in one of the channels for destructive feedback fun.

The alpha layer button adds a fake alpha layer (made out of a greyscale version of each frame).

Images

If you click on the 'images' tab you will be presented with the image grid, where you can load up to 24 images. The images can have any format, including:

-JPEG

-GIF

-PNG

-TIFF

-PCX

-PICT

-PSD (Photoshop)

You can apply images to a channel just like you do with clips, either by dragging them or by clicking on one to select and clicking on a channel thumbnail to apply.

Images can also be dragged on to the little 'wipe' and 'mask' thumbnails.

If you use the 'gradient wipe' ink mode, the image you applied to the wipe thumbnail will define the transition, for example a gradient that goes left to right from black to white will result in a left to right wipe. A spriral gradient will result in a spiral wipe. This way you can easily design your own wipe transitions in your favourite image editor.

When using images in the mask ink, dark parts of the image will define what is shown, and light parts will be hidden, Inbetween values will have inbetween transparency. You are not limited to images in mask ink mode, you can use any source such as clips, camera input, generators, etc.

Chapter 9

Generators

Generators are Director or Flash Movies that play in their own window.

They can be interactive and use variables inside flowmotion

(time, lfo values, fft values, fader values, preloaded clip images etc etc).

This enables everyone who can code a bit of Lingo or Actionscript to add functionality to flowmotion. They can be used as interactive image sources as well as many other things

To load a generator, click on the ‚generators' menu tab, and click ‚load generator'. Select one from the file menu by double clicking it. It will appear as a thumbnail in the selected slot of the Generators grid. You can open it by double clicking on the thumbnail, this will pop up in a new window, which you can close by pressing the [X] button top right of the window. Remember that it will keep running in the background, so when you are done using a generator, remove it by clicking its thumbnail and pressing DELETE or BACKSPACE.

director

A generator can be any .dir, .dxr or .dcr movie, made with Macromedia Director. This enables anyone with some director (or flash) skills to add custom features to Flowmotion. Check back often on www.robotfunk.com to find new released generators.

flash

One of the generators is a Flash loader, which can load any Flash movie. Loading a Flash movie is similar to loading a Generator (director movie), just load the flash_loader generator, select a flash file from the /generators/flash/ directory, and double click.

SDK

Please refer to www.robotfunk.com to see a document describing how to make your own interactive Flash or Director movies, and how to make them respond to variables in Flowmotion.

Chapter 10

Patterns

Patterns are recorded fader moves. You can record the moves of any fader by pressing the red 'R' button above the fader. You will see it being recorded in the 'effects auto' field to the right. (You might need to select the 'effects auto' tab to view this). Press 'R' again to stop recording. You can drag patterns from the effects auto field to the pattern grid and vice versa.

Tip: dragging with the right mouse button will prevent you from altering a pattern as soon as it's applied to the effects auto field.

Chapter 11
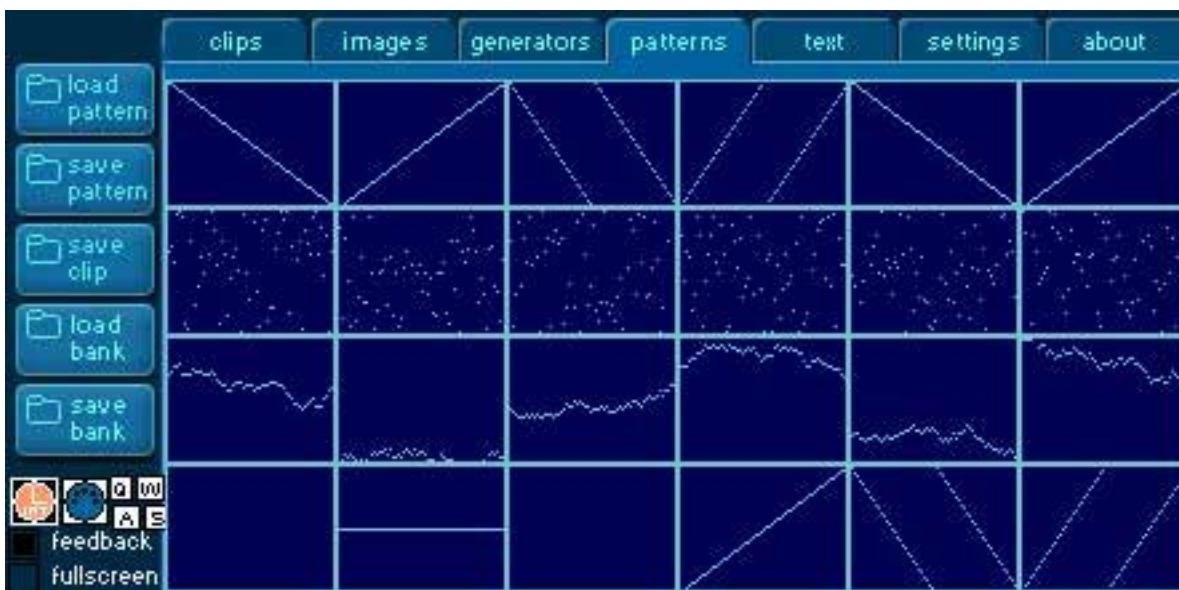
Text

In this window you can quickly compose a text image. When you press 'export image' the text will be converted to an image in the currently selected slot in the image bank. Select text to edit it, you can change the color of each selected part of text by changing the foreground color in the color palette. You can also change the font, size, style, alignment and spacing of the currently selected portion of text.

Finally you can also change the background color of the text by using the background color palette.

Try and keep the text one or two lines, otherwise it might get cropped in the resulting image.

Settings

MIDI

By selecting 'enable MIDI', you turn on MIDI functionality in Flowmotion.

Under this you will find a button called "MIDI Map".

As soon as you press this, you will see all MIDI controllable faders change appeance. To make a fader or other controller in Flowmotion learn what MIDI controller you wish to assign it, click on it. You will see it change color. Now move a knob, fader or press a key on your MIDI controller, you should see it change color again to confirm learning MIDI. Keep doing this until you assigned all Flowmotion controllers to MIDI values, and then click on MIDI Learn again to deactivate is. Press 'save MIDI configuration' to save your newly defined MIDI configuration. When you start Flowmotion again, it will remember this configuration.

Hint: when MIDI learn is on, nothing in the interface in Flowmotion will respond to the mouse other than changing color. If you want to do anything, including closing Flowmotion, turn off MIDI learn first.

quality slider

Here you can adjust the composition quality in Flowmotion from 320x240 (default) to 640x480.

Ink Modes

Ink modes control how the layer image is composited with the layers before it.

Every ink shall be explained briefly and where possible a mathematical formula will be given

(d=destination s=source)

Copy

displays all the original colors in a sprite. All colors, including white, are opaque unless the image contains alpha channel effects (transparency). Copy is the default ink and is useful for backgrounds or for layers that do not appear in front of other artwork, or are setup as a link to reprocess the layer below. Layers with the Copy ink animate faster than layers with any other ink.

Formula: d = s

Transparent

makes all light colors transparent so you can see lighter colors beneath the layer.

Formula: d = d AND s

Reverse

reverses overlapping colors. When applied to the foreground layer, where colors overlap, the upper color changes to the chromatic opposite (based on the color palette currently in use) of the color beneath it. Pixels that were originally white become transparent and let the background show through unchanged. Reverse is good for creating custom masks.

Formula: d = d XOR s

Ghost

like Reverse, reverses overlapping colors, except nonoverlapping colors are transparent. The layer is not visible unless it is over another layer.

Formula: d = d OR (NOT s)

Not Copy

reverses all the colors in an image to create a chromatic negative of the original.

Formula: d = NOT s

Not Transparent

The foreground image is first reversed, then the Transparent ink is applied. Good for creating odd effects.

Formula: d = d AND (NOT s)

Not Reverse

The foreground image is first reversed, then the Reverse ink is applied. Good for creating odd effects.

Formula: d = d XOR (NOT s)

Not Ghost

The foreground image is first reversed, then the Ghost ink is applied. Good for creating odd effects.

Formula d = d OR s

Matte

removes the white bounding rectangle around an image. Artwork within the boundaries is opaque.

Mask

determines the exact transparent or opaque parts of a layer. For Mask ink to work, you must assign a mask image to a layer. This functionality will be included in future versions of Flowmotion.The black areas of the mask make the layer opaque, and white areas are transparent. Colors between black and white are more or less transparent; darker colors are more opaque. See Using Mask ink to create transparency effects.

Blend

controls the transparency of the layer.

Formula: d = d * blend + s * (100% - blend)

Add

creates a new color that is the result of adding the RGB color value of the current layer image to the color value of the background . If the value of the two colors exceeds the maximum RGB color value (255), 256 is substracted from the remaining value so that the result is between 0 and 255.

Formula: d = d + s (with wraparound)

Add Pin

is similar to Add. The current layer images' RGB color value is added to the background RGB color value, but the value of the new color cannot exceed the maximum color value (255).

Formula: d = d + s (max value 255)

Subtract

subtracts the RGB color value of current layer image from the RGB value of the background color to arrive at the new color. If the color value of the new color is less than 0, 256 is added so the remaining value is between 0 and 255.

Formula: d = d - s (with wraparound)

Subtract Pin

subtracts the RGB color value of pixels in the current layer image from the value of the background. The value of the new color cannot be less than 0.

Formula: d = d - s (min value 0)

Background Transparent

makes all the pixels in the background color of the layer image appear transparent and permits the background to be seen.

Formula: d = s if s != bg

Lightest

compares RGB pixel colors in the foreground and background and uses whichever pixel color is lightest.

Formula: d = max(d, s)

Darkest

compares RGB pixel colors in the foreground and background and uses whichever pixel color is darkest.

Formula: d = min(d, s)

Mask

This ink mode uses any source (clip, image, video in, generator) to define what the transparency of the layer. The lighter any pixel in the mask image, the more transparent the layer will be at that pixel.

gradient wipe

Using this ink, you can use greyscale images to define a wipe pattern. The lighter the pixel in the wipe image, the more transparent.

multiply

Looks at the color information in each channel and multiplies the base color by the blend color. The result color is always a darker color. Multiplying any color with black produces black. Multiplying any color with white leaves the color unchanged.

Formula: d = d * s

screen

Looks at each channel's color information and multiplies the inverse of the blend and base colors. The result color is always a lighter color. Screening with black leaves the color unchanged. Screening with white produces white. The effect is similar to projecting multiple photographic slides on top of each other.

Formula: d = (NOT d) * (NOT s)

overlay

Multiplies or screens the colors, depending on the base color. Patterns or colors overlay the existing pixels while preserving the highlights and shadows of the base color. The base color is not replaced but is mixed with the blend color to reflect the lightness or darkness of the original color.

color dodge

Looks at the color information in each channel and brightens the base color to reflect the blend color by decreasing the contrast. Blending with black produces no change.

color burn

Looks at the color information in each channel and darkens the base color to reflect the blend color by increasing the contrast. Blending with white produces no change.

difference

Looks at the color information in each channel and subtracts either the blend color from the base color or the base color from the blend color, depending on which has the greater brightness value. Blending with white inverts the base color values; blending with black produces no change.

color

Creates a result color with the luminance of the base color and the hue and saturation of the blend color. This preserves the gray levels in the image and is useful for coloring monochrome images and for tinting color images.

hue

Creates a result color with the luminance and saturation of the base color and the hue of the blend color.

Chapter 14

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User Interface designed by Anton Bensdorp

FreeFrame interface programmed by Thomas Hellesen

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