Blip 1.1

User Documentation

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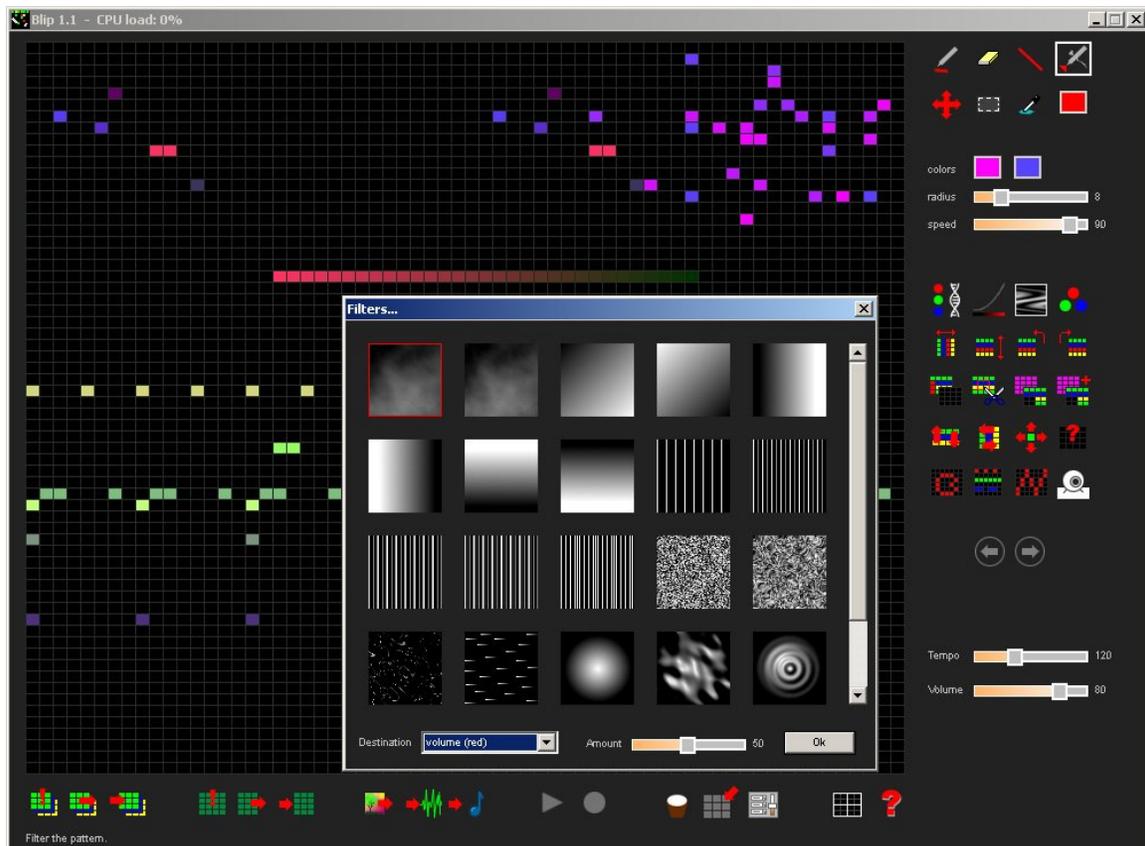
1 - Introduction

The concept behind Blip is to create innovative sounds and loops by drawing with the usual graphic tools (pencil, airbrush, line…). The classic painting functions take a whole other dimension, as they create melodies and rhythms in the musical domain.

Blip continuously scans a grid of 64x64 cells. Each cell corresponds to a note, whose starting time is determined by its column, and whose instrument is determined by its row. The color of the cell controls the volume of the note (red component), its pan (green component), and its pitch (blue component).

Painting in the grid can be done in real-time while the loop is playing, which coupled with MIDI support and numerous shortcuts, transforms Blip into a very powerful live instrument. There are 16 patterns, each of them having its own tempo.

Blip can be used in many different ways. Here are a few of them:
- with a lot of short percussive sounds to create glitchy patterns
- with a slow tempo and long samples with fading envelopes to create complex ambiences
- with simple tones and only a few painted cells to create wave sequences
- with sine waves for additive / granular synthesis etc…
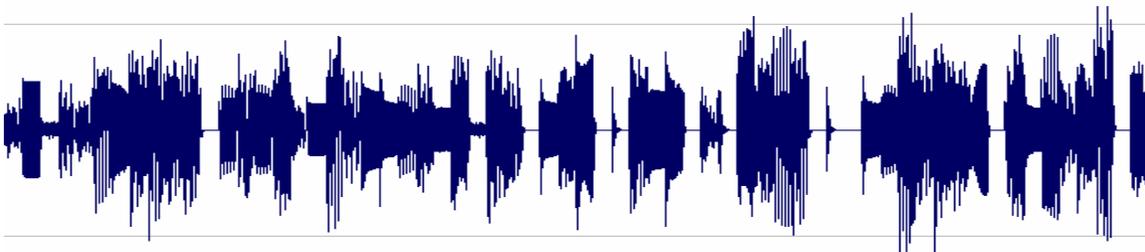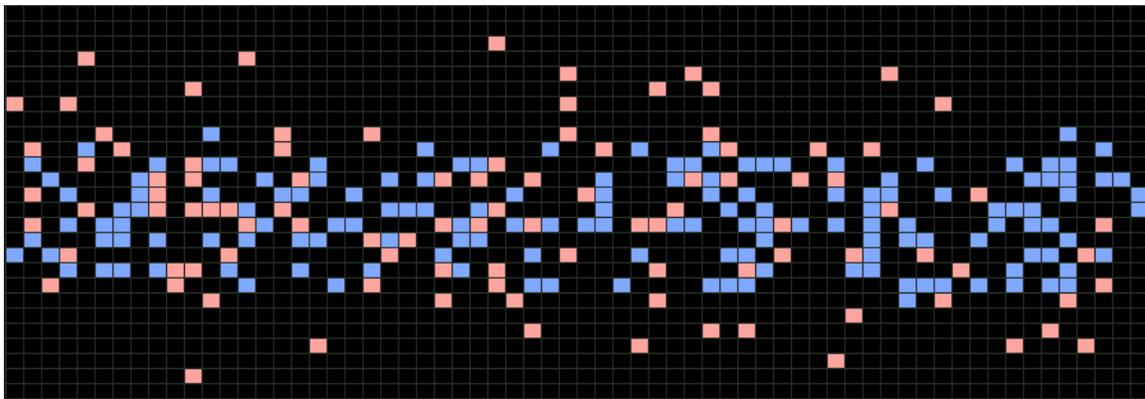
2 - Installation

When you start Blip for the first time, it will create the following folders:

Projects: where you can save your full projects (.blp files).
Patterns: for individual patterns (.pat).
Kits: for sound kits (.kit).
MIDI: where you can export your MIDI files (.mid).
Waves: you may want to store your individual instruments, or export patterns as wave files in this folder.
Output: where the output of the recording function is saved (.wav).
Pictures: to store the pictures to import as patterns.
Filters: all the pictures placed in this folder can be used as filters. The filter function will automatically look into this directory, so you have to place the pictures or patterns you want to use as filters here.

Most of these folders are created for your convenience, and you can choose to save your files in other folders. However the Filters and Output folders are directly referenced by Blip.

Note: If you get an error and can not run Blip, you are probably missing Dlls. Please install this:

http://www.microsoft.com/downloads/details.aspx?FamilyID=32BC1BEE-A3F9-4C13-9C99-220B62A191EE&displaylang=en

You will get everything you need to run Blip, and other Windows programs using the same Dlls.

3 - Main Commands

Here is the description of Blip's main commands. Please note that when you are hovering over a button, Blip will display the purpose of that button at the bottom of the screen.

New Project
This button creates a new project, after a confirmation message. All 16 patterns are deleted. The current kit is also cleared.

Load Project
This button loads a new project. Projects have the .blp extension and contain 16 patterns as well as a kit. A kit does not include the samples themselves but only references to the .wav files, so no sample data is actually stored in a project. It is also possible to load a new project simply by dropping a .blp file in the main window. Loading a new project actually stops the playback.

Save Project
This buttons saves the current project as a .blp file, which includes the 16 patterns and the kit in use.

New Pattern
This button clears the current pattern and resets its tempo to 120. A confirmation message is displayed.

Load Pattern
This button loads a pattern into the current one. Patterns have the .pat extension and contain the values of the cells in the grid, as well as the tempo setting. It is also possible to load a new pattern by simply dropping a .pat file in the main window. Loading a new pattern does not stop the playback and can be done in a live situation.

Save Pattern
This button saves the current pattern as a .pat file. It includes the content of the grid and its tempo.

Kit
The kit button gives you access to the Kit dialog where you can edit, load and save kits. A kit is a collection of 64 instruments (.wav files), one for each row of the grid.

Import Picture
The import picture button allows you to open any JPEG, GIF or BMP file and to import it as a pattern. The size of the picture will automatically be reduced to 64 x 64 to fit in the grid.

Export Wave
The export wave button will write a .WAV file corresponding to the pattern currently in the grid. The wave file is 44100 Hz, 16-bit, stereo, and its duration is exactly one pattern.

Export MIDfile
This button lets you export the current pattern as a MIDIfile format 1. The MIDIfile will contain 64 tracks, one for each row in the grid, and will have the duration of the pattern (i.e. 4 measures at whatever tempo is selected). The names of the tracks will be the names of the instruments as they appear in the Kit Editor. For each cell which is not black, MIDI events are generated for the pan (based on the green component), and for the note triggering [based on the red component (velocity) and the blue component (pitch)].Several options could be useful in the future, such as smoothing the control curves between the cells, exporting all the patterns in several MIDI files, or one after the other in a single sequence etc..

Play
The play button lets you start and stop Blip audio playback.

Record
The record button allows you to save a wave file of what you are currently playing in Blip. The wave file is 44100 Hz, 16-bit, stereo and will be automatically saved in the "output" subfolder of Blip. You will have to press the button again to stop the recording.

Grid
This button displays or hides the helping grid, which regroups cells in areas of 4 x 4 cells.

About
This dialog displays version information, credits, as well as a link to go directly to Blip's web site.

Among the main controls are also two sliders. As for all sliders in Blip, you can adjust them more precisely with the left and right arrow keys.

Tempo
The tempo can be set between 1 and 360.The 64 cells in a row of the grid correspond to 4 measures at the tempo selected.

Volume
This is the master volume. It affects everything generated by Blip.

4 - Graphic Tools

All these tools can be used while Blip is playing the grid, transforming Blip into a powerful live instrument.

Pencil
This is the typical drawing tool, with a little twist though. You can select the color of the pencil, but also a variation percentage. Every time you paint a cell, the color will be slightly different, which is really nice to create drum patterns for example. Simply set the color variation parameter to zero if you want to always paint the cells with the exact same color.

By clicking on the right mouse button in the pencil mode, you can erase a cell.

When you are in pencil mode, you can also click on a cell while holding Ctrl to modify its color. A dialog box will appear, with three sliders to adjust the red, green and blue components of the cell color. Two squares are displayed, one with the original color on the left, and the second with the new color on the right. When you move the cursor over these squares, it will change to a little speaker. Clicking on the squares allows you to listen to their sound, and to compare the original sound to the new one.
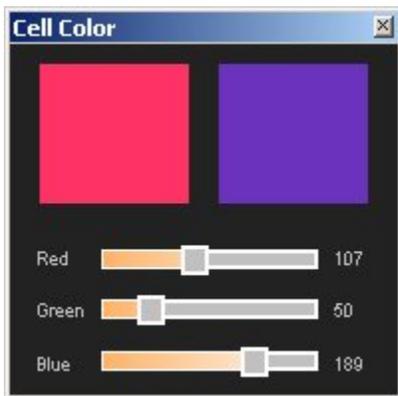
Eraser
The eraser tool allows you to erase large parts of the picture, by stamping a black square on the grid. The size of the eraser can be selected, from 1 cell to 10 cells.

Line
Again, this is a typical drawing tool but it takes a whole new dimension in Blip. You can select the starting and ending colors of the line. The variation between the red components of these two colors will create crescendos, while the changes in the blue component will generate glissandi. The differences between the green components will make the sound go from one part of the stereo field to another.
Note: if you want to use a single color, you can easily copy it from one slot to the other by dragging it while pressing the Ctrl key.
The line tool also offers a quantize parameter, from 1/16 to 1. It allows you to draw only some of the points in the line, and becomes very handy to create drum patterns quickly.

Airbrush
The airbrush is another classic drawing tool, which randomly paints cells within the selected radius (here from 2 to 32 cells). The cells painted by the airbrush can vary between two colors. Finally, the speed at which the cells are painted can be selected.

Moving cursor
The moving cursor allows you to move the whole grid in any direction.
If you press the Ctrl key at the same time, you can move the content of a single row.
By pressing the Ctrl + Shift keys, you can move the content of a single column.

Selector
The selector tool is useful in conjunction with the copy / cut / paste functions.
Pressing escape will cancel the selection.

Color Picker
The color picker tool lets you pick a color by clicking on a cell of the grid. The color is stored in the color button immediately to its right. It is then possible to drag and drop the color on another tool's color button (pencil, line, and airbrush) and to use it.
It is also possible to click on the tool's color button to edit it. It can be thought of as temporary color storage.

5 - Graphic Functions

All the graphic functions can also be used while Blip is playing the grid.

Mutate colors
This command allows you to mutate the colors of the current grid. It is possible to mutate the color components independently. Depending on the amounts selected, the mutation will be subtle or more pronounced. For example, you might just want just to add a bit of randomness to the volumes and set the red variation percentage to 10%, while you keep the green and blue variations to zero. You can click on the Mutate button in the dialog box to try different mutations with the same settings.
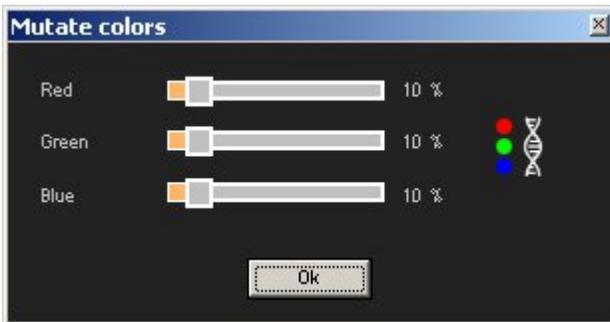
Color curves
This command lets you modify the dynamic of the colors, by choosing an exponential or a logarithmic curve or even by inverting the colors. The curve for each component can be modified independently, and the results can be heard in real-time.
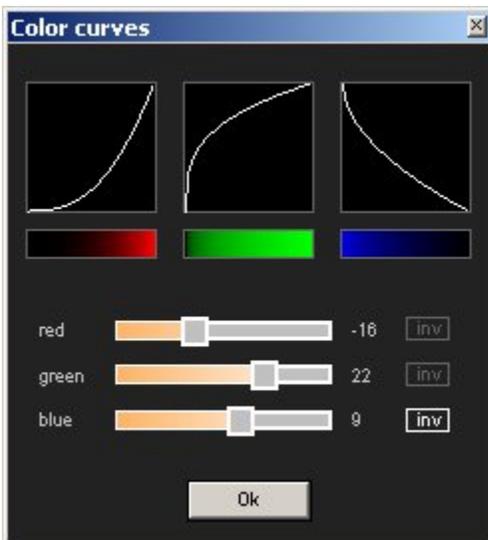
Filters
The filter command lets you modify the color of the cells in the grid based on the color of an external image or an existing .pat file. Every cell color is modified depending on the intensity of the cell at the same location in the filter picture.

A filter is a grid of 64x64 cells. The filter files must be placed in the "Filters" folder. They can be graphic files (.bmp, .jpg, .gif etc...), or even Blip pattern (.pat) files.

The amount slider determines how much influence the filter has on the initial color.
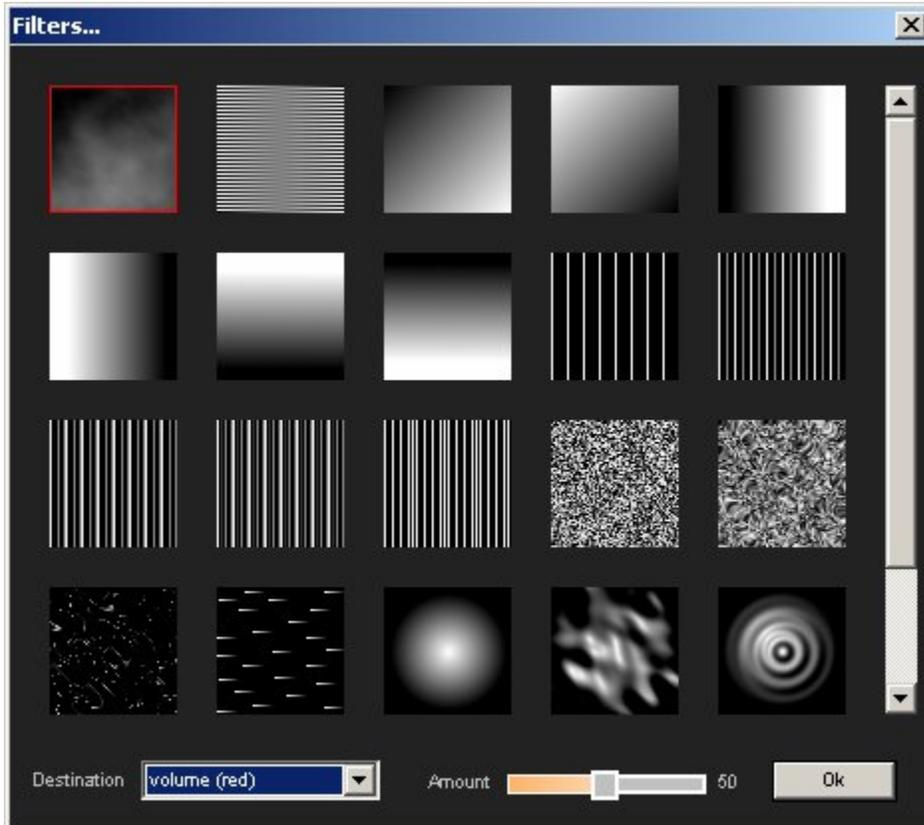
The provided filters are pictures in grey scale. However you can use color pictures. If you choose to filter the volume (red), the red component of the picture will affect the red component of the cells in the grid etc...It is simply easier to figure out their action when they are in grey scale, and the filters can be used in the same way for all colors as all their components have the same value.

 Offset colors

This command simply adds an offset (positive or negative) to the color components. You can use it for example to increase the overall volume of the grid, or have it move towards the left speaker etc… Changes can be seen and heard in real-time.
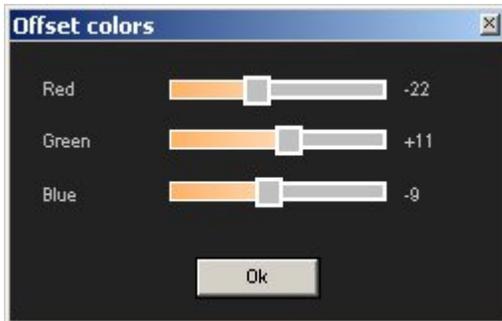
 Reverse H

Flip the grid horizontally.

 Reverse V

Flip the grid vertically.

 Rotates 90 degrees counter-clockwise

Rotate the grid 90 degrees. Since it is a square composed of 64x64 cells, no information is lost in the process.

 Rotates 90 degrees clockwise

Rotate the grid, but clockwise this time.

 Copy

Copy the area defined by the Selector tool into memory.

 Cut

Cut the area defined by the Selector tool. The cells located in this area are painted in black.

 Paste

Paste the area previously copied into memory on the grid. Once the paste button is clicked, you can move the picture on the grid and click where you want to paste it. You can press "Escape" to abort the operation.

 Mix

Mix is similar to paste, except that black cells form the copied picture are treated as transparent.

 Shuffle rows

This button randomly rearranges the rows of the grid. The result is a pattern that keeps the same rhythmic feel but the instruments have changed.

 Shuffle columns

This button randomly rearranges the columns of the grid. The result is a pattern that has been sliced in 64 parts and rearranged.

Shuffle cells

This button randomly rearranges all the cells in the grid. All the cells keep their color but are simply moved to another location. The pattern keeps the same "density" but the rhythmic feel and sound at a given time have changed.

Random cells

The random function has two modes: add and replace. The first one will simply add random cells on the top of the existing pattern, which can be a nice way to make a pattern evolve into something more complex. The second one will first clear the pattern, and then add the cells.
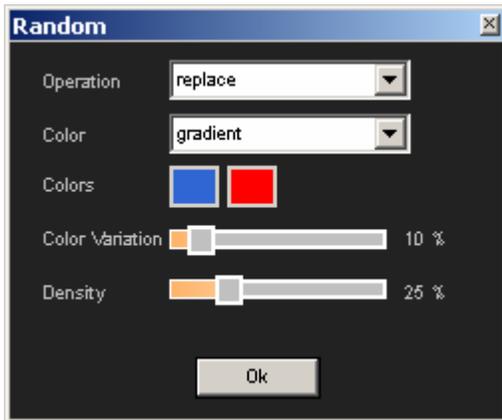
The density parameter controls how many cells will be added by the function. If you set the density to 25%, for example, one fourth of the grid will get new colors.

Two color modes are available: single color and gradient. In the first mode, all the cells added will be of the selected color (more or less adjusted by the color variation parameter). In the second mode, the cell color will be randomly picked between two colors. Again the color variation parameter can be used to add a bit more fun...

Cellular Automaton

The cellular automaton creates a new pattern based on the existing one, by applying a few simple evolution rules. It is based on Conway's game of life.

Basically, Blip counts how many of the 8 neighbours of a cell are painted and then applies these 3 simple rules:
-    if the count is less than 2 or greater than 3, the current cell is switched off (death)
-    if the count is 2 or 3 and the current cell is painted, it is left unchanged (survival)
-    if the current cell is black and the count is exactly 3, the cell is painted (birth) with a color randomly picked amongst the neighbours' colors.

A good way to understand how the cellular automaton operates is to call the *Random Cells* function with a density of about 25%, and press the "a" key continuously. You will see the grid evolve and patterns emerge.

An obvious extension of this tool would be to allow the user to define his own set of rules in future versions.

Drum Pattern

This tool generates a pattern which exposes the same characteristics than a typical drum pattern. The current pattern will be lost.

Several lines (between 3 and 6) with different quantification and offset settings are created. From 0 to 3 more lines, consisting of 8-cell repeating patterns, are also added. Each line of the drum pattern has a fixed volume and pan, as well as a central pitch. By using this tool in conjunction with the random kit feature, a multitude of new rhythmic patterns can be created in just a few clicks.

Wave sequence

In sound synthesis, a wave sequence is a concatenation of elementary waveforms. This tool helps you create a wave sequence by drawing a periodic curve on the grid, playing the instruments of the kit one after the other. It makes sure that only one cell of the grid will be playing at a given time.

Six basic curves are available: sine, exponential, ramp, triangle, sample and hold, and noise. These curves can further be modified by two buttons which flip them along the x-axis or the y-axis. If you are using sample and hold or noise and want to have another set of random values, simply click on the corresponding curve button again.

The period of the curve generated, its scale, as well as its horizontal and vertical offsets can be adjusted. Curves with a high period will appear more like series of dots instead of lines. This is normal as we want to ensure that only one cell of the grid will be playing at a given time.

It is also possible to define the starting and ending colors of the curve. Thus the wave sequence can go from the left to the right of the stereo field, or go crescendo etc… Don't forget that you can copy one color onto another by pressing the Ctrl key and using drag and drop.

Video

This tool allows you to update the grid in real-time with pictures coming from a webcam or any other video device. Blip will replace all the cells of the pattern with the video input (or only the painted ones or the black ones). But you can also choose how much the video input will affect the current cell colors (for each component). For example, you might only want to slightly modify the red component (volume), instead of replacing the cell completely by the video input.
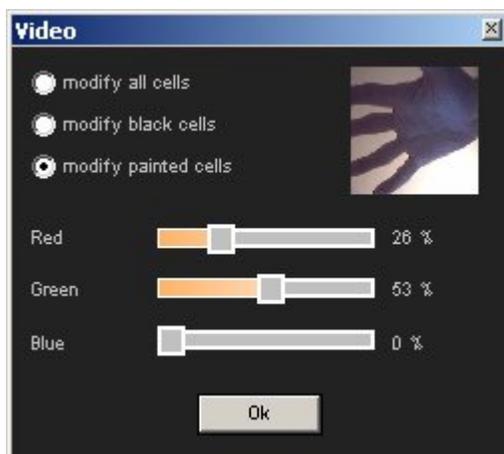
There are a lot of applications for this command. For example, it is possible to use Blip as a video Theremin, by moving your hand in front of the camera, and modifying the volume and the pitch of an existing pattern. You can also create a completely new pattern by filming an evolving texture like water, or moving the camera above a painting etc…

Undo and Redo buttons.
These functions undo or redo the last edit done to the current pattern (either by a graphic tool like the pencil or by a graphic function such as the filter).
They also work while Blip is playing audio, which means that in a live situation, you can use them to go back and forth in the pattern history, adding and removing complexity on the fly…
Note: the undo stack is reset when you switch to another pattern.

Keyboard Shortcuts in the main window

F1: Pencil
F2: Eraser
F3: Line
F4: Aero
F5: Hand
F6: Selector
F7: Color picker

Ctrl + N = new project
Ctrl + O = open project
Ctrl + S = save project
Ctrl + Shift + N = new pattern
Ctrl + Shift + O = open pattern
Ctrl + Shift + S = save pattern

Ctrl + I: import image
Ctrl + W: export pattern to wave file
Ctrl + M: export pattern to MIDI file

Space = Play / Stop
Enter: Record on / off

Ctrl+Z: Undo
Ctrl+Y: Redo

P: open the pattern selection window
K: open the kit editor window
F: open the filters window
Arrow keys: move the pattern one cell in any direction
Arrow keys + Shift: move the pattern 4 cells in any direction
D: random cells
A: trigger the cellular automaton
I: play the instrument assigned to the row below the cursor

R = increase by one the value of the red component of all non-black cells
Ctrl + R = decrease by one
Shift + R = increase by 10
Ctrl + Shift + R = decrease by 10
G / Ctrl + G / Shift + G / Ctrl + Shift + G = same thing for the green component
B / Ctrl + B / Shift + B / Ctrl + Shift + B = same thing for the blue component

Numeric keypad 1-9: switch to pattern 1-9
Ctrl + numeric keypad 0-6: switch to pattern 10-16

6 - The Patterns Window

The pattern window offers an easy way to switch from one pattern to another. It displays thumbnails for all 16 patterns available in Blip. Simply click on one of them to select it.
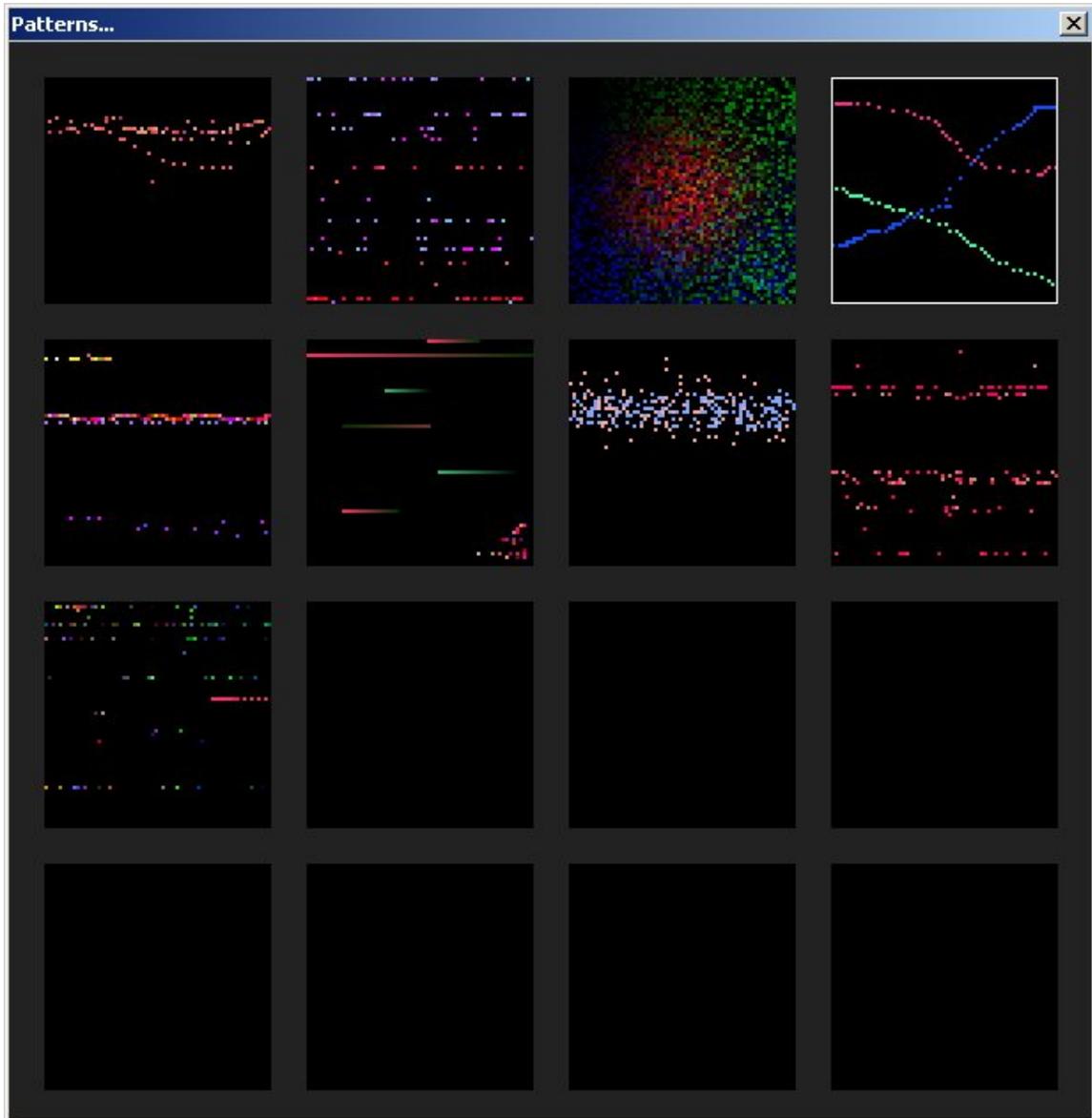
The following shortcuts are available in the patterns window:

Arrow keys: navigate through the patterns
Enter: selects a new pattern
Escape: returns without selecting a new pattern

7 - The Kit Window

The kit window lets you edit a kit. A kit contains 64 slots, one for each row of the grid. Each slot corresponds to a sample (.wav file). The samples can be 8-bit, 16-bit, 24-bit or 32-bit, mono or stereo, and have any sample rate. However, the audio engine of Blip works at 44100 Hz, and samples at other sample rates will not be resampled. All 16 patterns in a project use the same kit.

```
Kit Editor                                    [x]
01 - A10 Attack Jet 02            →  ∧  1340611   C5
02 - Tear Index Card 01           →  ∧  20829     C5
03 - Rotary Telephone Dial 08     →  ∧  73853     C5
04 - UFO Sweep 01                 →  ∧  73730     C5
05 - Turn Page of Hard Cover Book 08  →  ∧  41078  C5
06 - Switch 09                    →  ∧  6983      C5
07 - Object Spins and Falls off Counter  →  ∧  144486  C5
08 - dharma                       →  ∧  81930     C5
09 - Missle 07                    →  ∧  117678    C5
10 - Hammering Nail into Wood 06  →  ∧  36187     C5
11 - Cell Phone Ring 07           →  ∧  93252     C5
12 - Cheetah5                     ↻  ∧  51328     C5
13 - Cable Tie 02                 →  ∧  30247     C5
14 - Film Take Scene 1A Take 2    →  ∧  105976    C5
15 - Close Medicine Cabinet Door  →  ∧  22073     C5
16 - Lake Shore on a Windy Day    →  ∧  440320    C5
17 - Arcade Movement 12           →  ∧  43254     C5
18 - Wrapper Opened 03            →  ∧  70402     C5
19 - Toilet Flush                 →  ∧  172372    C5
20 - AM Radio Buzz 01             ↻  ∧  157573    C5
21 - plastic5                     →  ∧  170493    C5
22 - Sink 02                      →  ∧  211645    C5
23 - Car Start 02                 →  ∧  143947    C5
24 - Bar Crowd Loop 03            →  ∧  196678    C5
25 - Crowd Before a Show          →  ∧  686592    C5
26 - Creature Growl 07            →  ∧  103474    C5
27 - Cutting Paper with Scissors 02  →  ∧  62503   C5
28 - Tear Paper 08                →  ∧  23529     C5
29 - Write on Paper with Pencil 01  →  ∧  45680   C5
30 - Crowd Laughing 04            →  ∧  122265    C5
31 - Cell Phone Ring 01           →  ∧  100413    C5
32 - Sci Fi Beep 11               →  ∧  15865     C5
33 - Water Drip 01                →  ∧  13001     C5
34 - Plastic Wrapper 02           →  ∧  70873     C5
35 - Open Microwave Door          →  ∧  26686     C5
36 - Crowd Laughing 06            ↻  ∧  114386    C5
37 - Tape Measure Closed 02       ↻  ∧  30533     C5
38 - Radio Hit Descent 05         ↻  ∧  71589     C5
39 - Box of Push Pins Shake 01    ↻  ∧  84043     C5
40 - Close Door 02                →  ∧  38220     C5
41 - leopard6                     →  ∧  34225     C5
42 - Electric Drill 03            →  ∧  87877     C5
43 - sticks8                      →  ∧  17216     C5
44 - drum2                        →  ∧  76800     C5
45 - Hard Cover Book Close Cover 03  →  ∧  26791   C5
46 - Brush Teeth 02               →  ∧  181234    C5
47 - Gadget 08                    →  ∧  71936     C5
48 - Walkie Talkie Chatter 04     →  ∧  141838    C5
49 - cougar4                      →  ∧  51631     C5
50 - Switchboard Telephone Receiver Put  →  ∧  28059  C5
51 - Staple Gun into Wood 01      →  ∧  18419     C5
52 - audiopaint10                 →  ∧  88200     C5
53 - TigerRoarLoop                →  ∧  42496     C5
54 - voice + reverse +chopper2    →  ∧  123403    C5
55 - Crowd Laughing 07            →  ∧  107838    C5
56 - Wind Howl 02                 →  ∧  100223    C5
57 - Glass Break 02               →  ∧  43290     C5
58 - Window Break 02              →  ∧  79073     C5
59 - Sword Whip 02                →  ∧  14719     C5
60 - Chickens in a Barn 03        →  ∧  324885    C5
61 - Creature Growl 02            →  ∧  42091     C5
62 - Arcade Power Up 01           →  ∧  39392     C5
63 - Space Age Motor Cycle 03     →  ∧  149353    C5
64 - Microwave                    →  ∧  332967    C5

C:\Data\Samples\dharma.WAV
```

When moving the mouse over the slots, samples are automatically selected and will appear reddish instead of grey. Pressing the space bar will let you audition the selected sample, and pressing the return key will open the default wave editor, as specified in the settings window.

The first way to add / replace a sample is to simply click on the name of tone of the 64 slots. An empty slot displays "not used". If you want to clear a slot, you can simply right-click on its name. You can clear a full range of slots by just right-clicking on the first one and then moving your mouse. You can also clear all the slots by holding Shift while right-clicking.

In addition, you can drag one or more wave files from the desktop and drop them on the kit editor window. They will be assigned to the free slots.

The samples can be played as one-shots, or as loops, if their duration is shorter than the duration of a cell (this obviously depends on the tempo setting). One-shot samples are represented by a straight green arrow while looped samples are represented by a red circling arrow. You can click on the icon to change the type of sample. If looping is selected, samples do loop in their entirety. Potential looping points present in the .wav files are ignored.

Samples can also be faded in/out or not. You can click on the yellow icons to configure this.

Clear Kit
This removes all the wave files from the current kit and resets fading and looping settings.

Load Kit
This loads a new .kit file. It is also possible to load a new kit simply by dropping a .kit file on Blip's main window. Loading a new Kit actually stops the playback.

Save Kit
This buttons saves the current kit as .kit file. The kit files are saved in XML. Therefore they can be easily edited by hand or automatically generated by another tool or a script. They include the path to the wave files and their settings, such as fading or looping. Wave files are only referenced by the kit files and no actual sample data is saved in them.

Of course, creating a list of 64 samples has never been something especially exciting in itself.
The Kit window has 4 buttons to make this process a bit less cumbersome.

The first button lets you select one or more files, and add them to the first available slots in the kit.

 The second button lets you select a folder. Blip will assign any wave file it finds in this folder to any empty slots in the kit. Therefore, it is easy to prepare sample data in folders with whatever tool you are using (batch processor, slicer etc...) and create a full kit in one click.

The third button also lets you select a folder. But in this case, Blip will build a list of all compatible wave files in this folder and its subfolders, and then randomly select 64 of them. This is a very easy way to create original kits and can lead to surprising results.

A fourth button allows you to select a long wave file. Blip will slice it in 64 files of the same duration, save them as wave files, and assign them to the 64 slots of the current kit.

Keyboard shortcuts for the Kit editor:

- Space: listen to the selected sample
- Up and Down Arrows: select sample
- Enter: open the wave file in the sample editor selected in the settings window
- L: toggles the Loop parameter of the selected sample
- Shift + L (or Shift + click on a Loop icon): sets all Loop parameters
- F: toggles the Fade parameter of the selected sample
- Shift + F (or Shift + click on a Fade icon): sets all Fade parameters
- Delete: clear selected slot
- Shift + Delete (or Shift + right click on slot name): clear all slots

8 - The Settings Window

The higher part of the Settings window is dedicated to MIDI, and the lower part to audio.
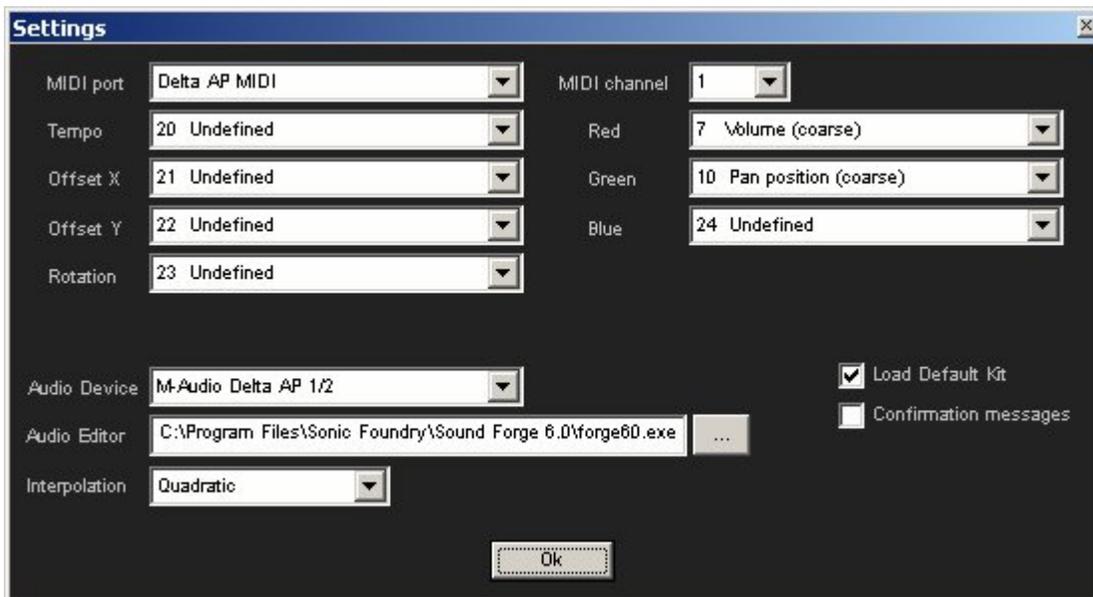
In the MIDI part, you can select the MIDI In port and channel Blip will respond to. Then you can assign a MIDI controller number to the following operations:

- offset x and y
- red, green and blue components: this will adjust the color of the whole grid. Note: these commands do not have a memory of what was initially drawn. So if you push the green value to the maximum and every cell has a green level of 255, then when you come back to a more reasonable value, all cells will still have the same value, say 120.
- rotation
- tempo

Don't forget that Blip will also respond to program change messages on the MIDI channel you have selected. Program changes #1 to #16 will switch to the corresponding patterns.

In the Audio part, you can choose audio output device, and the default wave file editor. When you are in the Kit window, pressing return over an instrument will open the corresponding wave file in this program.

It is also possible to select the type of interpolation used by Blip's audio engine. This parameter directly impacts the quality of the sound output. The choices are Truncate, Linear and Quadratic, from the lowest quality to the highest (but also from the fastest algorithm to the slowest).

Finally, there are two other options. First, if the "Load Default Kit" box is checked, a kit can be automatically loaded when the program is started. The kit must be named default.kit and must be located in the Blip\Kits folder. The second checkbox allows you to turn the confirmation messages on or off. Such messages are displayed for example when you are clearing a pattern. Although they provide an extra level of security against mishaps, they might not be wanted in a live situation, as they usually have a system sound attached to them.

9 - Future Developments

While Blip 1.1 is already a powerful tool, it opens doors to many exciting improvements and experiments. Features expected to appear in the next versions include:

- Instruments with min and max notes, as well as a musical scale, to which the blue levels will be mapped, in order to sound more musical.

- Digital audio effects (tempo-based delay, resonant filter, chorus…).

- Alternate grids, in complement of the note grid, to change effect send levels, or to set the probability that one note will actually be played.

- New ways to procedurally generate of grids.

- Automatic evolution / mutation of the grid patterns for live performances.