



Diamant DustBuster

Diamant DustBuster

Interactive movie cleaning and retouching tool

Manual and step-by-step tutorial

DustBuster 2.0 as of 15.05.2009

Sample images thanks to grateful permission from:

Filmes do Serro (Joaquim Pedro de Andrade: Macunaima, 1969)
Philips Company Archives (Musica Eterna, 1951)
Internationale Hanns Eisler Gesellschaft (WhiteFlood, 1940)
Filmarchiv Austria (diverse samples, 1915-1930)

Table of Contents

| | | | | | |
|-----|----------------------------|----|------|---------------------|----|
| 1 | INTRODUCTION | 5 | 4.4 | AutoFix | 15 |
| 2 | INSTALLATION | 6 | 4.5 | Retouch | 19 |
| 3 | QUICK START | 7 | 5 | REFERENCE SECTION | 27 |
| 3.1 | Testing your workstation | 7 | 5.1 | Starting DustBuster | 27 |
| 3.2 | Loading single image files | 7 | 5.2 | File Menu | 27 |
| 3.3 | Loading a quicktime movie | 7 | 5.3 | View Menu | 28 |
| 3.4 | Navigation | 7 | 5.4 | Navigation Menu | 30 |
| 3.5 | Principles of operation | 8 | 5.5 | Marker Menu | 30 |
| 3.6 | AutoFix | 8 | 5.6 | Retouch Menu | 31 |
| 3.7 | Retouch | 9 | 5.7 | AutoFix Menu | 34 |
| 4 | STEP-BY-STEP TUTORIAL | 13 | 5.8 | Help Menu | 34 |
| 4.1 | Start | 13 | 5.9 | AutoFix Toolbar | 36 |
| 4.2 | Load | 13 | 5.10 | Retouch Toolbar | 37 |
| 4.3 | Navigate | 14 | 5.11 | The Monocle | 41 |
| | | | 5.12 | Navigation Toolbar | 42 |
| | | | 6 | PREFERENCES | 45 |
| | | | 6.1 | Settings | 45 |
| | | | 6.2 | Shortcuts | 48 |

1 Introduction

DustBuster is an interactive tool for repair and retouch of movie sequences and films.

The product supports automatic cleaning of single spots (=AutoFix) as well as cloning (=Retouch).

Providing those functions in an optimised way, makes DustBuster an efficient tool in the DI workflow and in all QC processes. Dust busting, wire removal and manual restoration are fully supported and efficiently implemented.

DustBuster can work on:

- single file image sequences, as long as all images are in a directory;
- Quicktime movies;
- integrated environments (like DIAMANT – Digital Film Restoration Software);

DustBuster is available as free demo version with full functionality, but it does not include any possibility to save the work back to disk.

We encourage to evaluate DustBuster with the demo version and decide consequently upon licensing.

However, in any case we invite to use the demo version of DustBuster for replay and visualisation purposes for free.

[If you know already our M.I.R. application, then we recommend you to quickly review chapter 3.6 in order to get familiar with the new and comfortable AutoFix option.](#)

2 Installation

The distribution of DustBuster includes:

- CD with software, manual and tutorial files

If DustBuster has been licensed there is also

- an USB Dongle and
- a printed DustBuster Manual

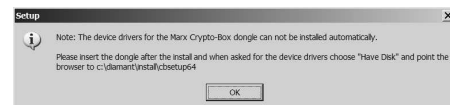
Insert the CD in your workstation drive; log-into as user with Administrator-rights and start:

Setup_Diamant_DustBuster.exe

- Setup leads you through the installation process.
- You need to explicitly accept the licence agreement to continue.
- We strongly recommend keeping the proposed

installation directory as this simplifies support.

- In the course of the installation the driver for your USB dongle needs to be installed. This is done automatically. Just confirm the installation for USB Versa, if being asked by the operating system.



3 Quick Start

3.1 Testing your workstation

DustBuster does not have very strong system requirements, however for good operation the workstation should be equipped with sufficient RAM (~2 GB, depending on the image resolution).

Moreover the graphic-card needs to provide a well working OpenGL 2.0 interface. Please make sure that you are using a graphic-card with at least 512MB RAM and that you have the latest OpenGL driver installed.

In case of unsatisfying performance, please use the "Performance Tests" option from the "Help" menu and let us know the results.

Please contact us immediately (support@hs-art.com) for remedy, if you cannot solve this problem.

3.2 Loading single image files

Select **open** from file menu and browse to the location of single images to be loaded.

Select the sequence and DustBuster will automatically determine first and last image to be opened.

3.3 Loading a quicktime movie

To open a Quicktime movie just select the file in the open dialog.

3.4 Navigation

Use **space-bar** to play the movie, stop by pressing space-

bar again. Navigation can be done by "<-" or "->". "Home" and "End" are shortcuts to jump to the first or last image in the movie.

For fast viewing the operator can use the so called micro loop for cyclic RAM-replay around the current image. When stopping the micro loop, the operator is automatically back at the same image from where he started the micro loop.

3.5 Principles of operation

DustBuster offers 2 modes, the one is called AutoFix and supports semi-automatic clean-up. This should be the normal mode of operation. The second mode is called Retouch and is the full manual mode. For efficiency reasons we recommend to use Retouch

mode only, when the AutoFix is not providing the desired results. You can simply switch between the options with the function key F1 for Autofix and F2 for Retouch.

3.6 AutoFix

Just mark the defect resp. spot to be repaired roughly by a rectangle. The spot will in most cases automatically disappear. For specific requirements you can change the Reference-parameter by pressing 1-4 or set it manual by indicating a relative offset. You can also select between several AutoFix modes by pressing 6-9 which will apply different algorithms. Such change is then applied to all marked rectangles and to all future defects until you change

the parameter again. **Dust** should be used for single frame defects like dust, dirt, scratches and the like. In the case of **Dust** the defect will be detected automatically inside the ROI and only that part will be fixed. **Interpolate** is using the selected reference frames to recreate the information inside the ROI and **Inpaint** will recreate the information by using the surrounding of the ROI. **Undo** will use the information of the background sequence to replace the content of the selected region. You can modify the default parameters of the AutoFix tools with the **Configure** dialog.

3.7 Retouch

DustBuster offers a brush with several types (circle, elliptical with horizontal and vertical

focus). Those brush types can easily be changed by keyboard and mouse. Whereas circle type brushes are good for removal of regular particles like dust, the elliptic brushes are very helpful to repair line scratches, etc.

Working with the brush in an image is like erasing information from the foreground and leading to the display of background information in the "brushed/painted" regions. The Undo resp. healing-brush is available with the pressed right mouse button. The result of a brush-application is a so called mask.

Monocle is a specific patented tool for supporting the repair process. The Monocle consists of 2 parts, one showing the brush in the foreground and the second showing that portion of the background, that would be

revealed when applying the retouch operation. This kind of preview is very helpful, just play around to get a feeling for it.

The operator can display the **mask** only, or he can view a **blending** or a **difference** of the foreground and background sequence. If the operator finds the created mask is not good, he can clear it anytime. The background can be changed in spatial dimensions (x, y) as well as temporal dimension (t).

When satisfied, the operator has to confirm resp. **fix** (shortcut **F**) the image. This results in storage of the foreground image.

Choose a **brush size** and **style** that fits best to the type of event you want to retouch.

Adapt the brush size **continuously** by pressing **Ctrl**

and turning the mouse **wheel** up and down until your desired size.

Simply **apply** the brush, by using the left mouse-button or "undo" the brush by using the right mouse-button.

Change the **background image** until you are happy with the result by pressing **T**, **X** or **Y** together with the **mouse wheel**. **T** controls the temporal offset of the background sequence, so that content from other images is used to complete the retouch. **X** resp. **Y** change the horizontal resp. vertical offset of the background sequence.

Use **Alt** together with mouse-pointer to **freely move** the background.

The most powerful function is **auto-alignment** by pressing **A**. It automatically shifts the selected background image into

a good matching position. Manual adjustments can be applied after the auto-adjust on demand.

For [verification](#), if the proposed change fits well into the sequence you can:

- use the [micro loop](#) function to preview in real time,
- use the [cursor keys <- and ->](#) to step forward/backward.

For a quick “[jump back](#)” to the treated image you should use [J](#). Please note, that there is no possibility to apply the tool on other images, as long there is an unfixed tool-application in the buffer.

[Fixing](#) saves the result and clears the mask you have been creating. Be careful, as this normally results in an update of

your opened sequence, without the possibility of an undo.

[Fix and Go](#) is a combination of fixing the retouch result and moving forward to the next image. By using this function with the shortcut [G](#) you keep your left-hand fingers on the same position for the whole restoration process.

For the same purpose DustBuster offers the shortcuts [D](#) for [resetting the temporal offset](#), [S](#) for [resetting the spatial offset](#) and [E](#) for [going one frame back](#).

[Two hand operation:](#)

DustBuster is optimized for “[two hand operation](#)”. The left hand should be placed on the left side of the keyboard and controls, whereas the right hand uses the mouse-device, especially through the mouse

wheel in addition with modifier keys.

New operators should print the shortcut descriptions and try to perform keyboard operations only with the left hand.

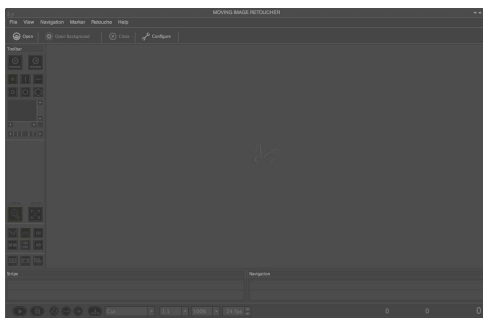
4 Step-by-step Tutorial



4.1 Start

After successful installation, a shortcut is available on the desktop. Double-click on this icon, to start DustBuster.

DustBuster is now ready for use.



4.2 Load

Open the tutorial sequence.

Press on the tool bar and navigate to the folder, where the tutorial is located (typically `c:\ProgramFiles\Diamant DustBuster\Tutorial\Sequence`) and select the sequence as displayed.

The first image of the sequence is shown and DustBuster is ready to go.

Alternatively you can start DustBuster with the tutorial from the Windows Start menu.



4.3 Navigate

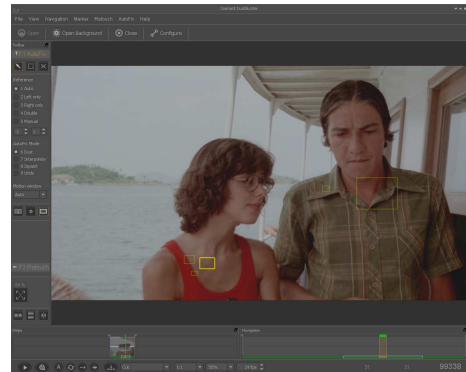
You can **start** and **stop** playing by pressing "spacebar" or go step-by-step by using the cursor keys. Navigate to image number 99329.

You can zoom with the mouse wheel and pan the image using "Ctrl + left mouse button".

In the lower right corner of DustBuster you see the current position as **frame number** or **time code**. Click the right mouse button on the display to toggle. Click on the frame number resp. timecode to edit.

Press "Ctrl+spacebar" to activate **micro loop**. Press "spacebar" again to stop and return to the treated image.

space



15 15 99329

15 15 00:00:00:10

Ctrl space

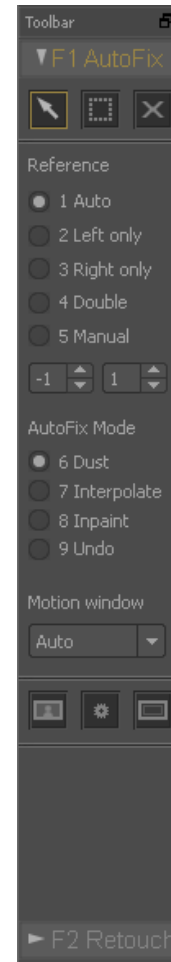
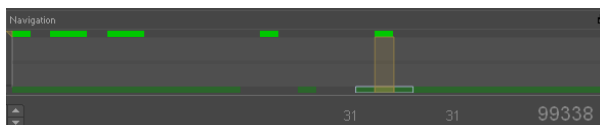
space

4.4 AutoFix

The most effective working mode within DustBuster is the AutoFix mode, where the operator just needs to draw a region (rectangular ROI) around the defect and an automatic correction will be instantly applied to fix the defects in the marked area.

Select AutoFix option from the DustBuster's toolbar or press **F1** and make sure that the mouse-pointer is activated.

Navigate to image number 99338.



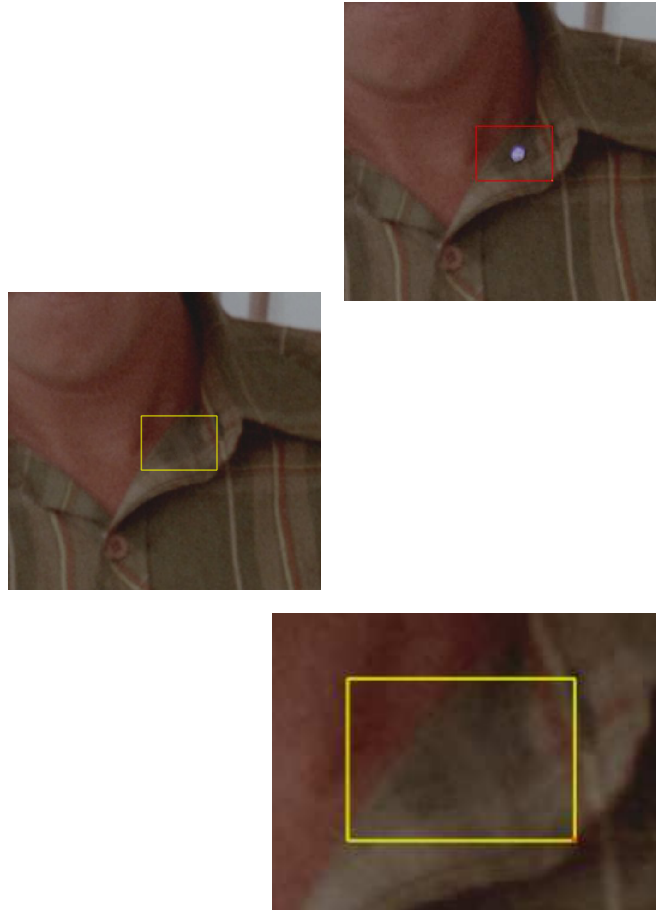
Move the pointer (mouse, graphic tablet) to the area of the defect, press it and drag until the rectangle covers the defect and some area around.

Release the pointer and the colour of the rectangle will soon change from red to yellow. The spot will disappear simultaneously. If the option Show/Hide ROI's is off the ROI will disappear instead.

You can resize the rectangle by pointing to the corner. Then the corner will be highlighted. Drag the corner and move it to the position of your choice. After release the rectangle will become red again which indicates not rendered yet.

Calculation time for detection and removal of the spot(s)

inside the region depends on the size of the region.



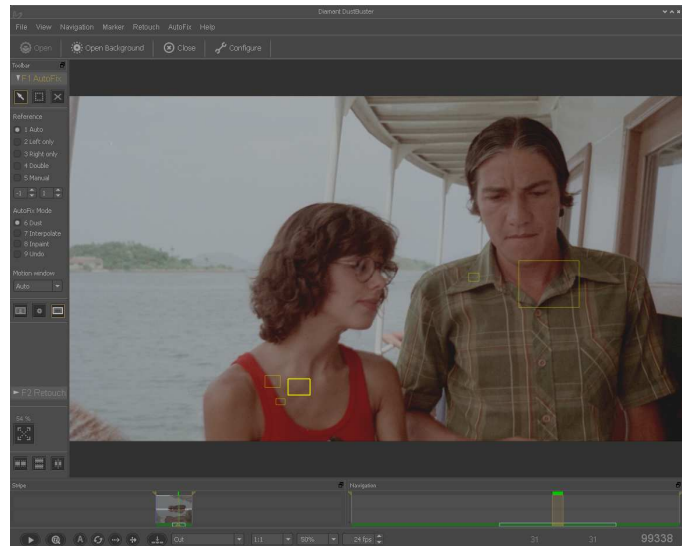
Go to other spots and mark them as the previous ones. Should you draw a rectangle you don't like, you can move the pointer upon it and press "Del".

Should you find, that the result of the AutoFix is not what you want you can anytime change the mode to Retouch.

On the other hand you can also play with various AutoFix parameters (e.g.: if your spots appear on two consecutive images).

Such parameter changes are applied on all selected (=high-lighted) rectangles and for any further region you draw.

Double left/right means an increased distance of previous-/next reference images (e.g.: images 99336 and 99339 for Double left).



You can mark multiple rectangle regions by changing the menu from the pointer to the dotted rectangle and then use the mouse pointer to mark an area, containing all rectangles you want to select.

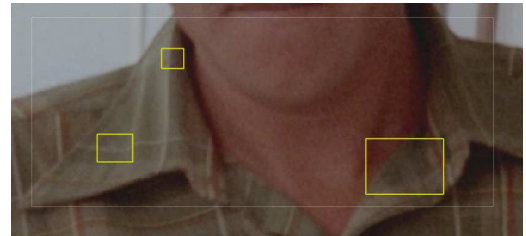
With the AutoFix Mode you can also select different algorithms.

Dust should be used for single frame defects like dust, dirt, scratches and the like. In the case of **Dust** the defect will be detected automatically inside the ROI and only that part will be fixed. **Interpolate** is using the selected reference frames to recreate the information inside the ROI and **Inpaint** will recreate the information by using the surrounding of the ROI. **Undo** will use the information of the background

sequence to replace the content of the selected region.

A change of the AutoFix mode is automatically applied on the selected ROIs.

You can also modify the default parameters of the AutoFix tools with the [Configure](#) dialog.



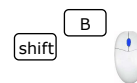
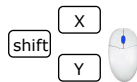
4.5 Retouch

Moving the mouse onto the image shows the retouch tool as **monocle**. The monocle display shows the content that corresponds to the retouch area together with the foreground image. The zoom factor of the monocle can be adjusted with "Ctrl + mouse wheel".

The inner blue circle in the monocle indicates the brush-size or retouch area, that is affected in a repair action. With "shift + mouse wheel" you can easily adapt the **brush-size**. Pressing in addition "X" or "Y" changes the corresponding dimension.

The outer blue circle indicates the softness of the brush. With "shift + B + mouse wheel" you can modify the softness.

If you prefer to work without monocle, deactivate it by pressing "V".

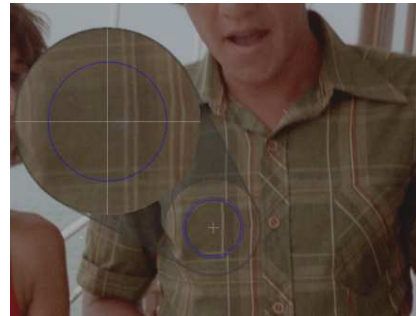
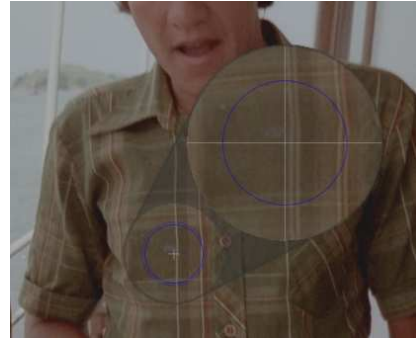


Looking onto the current image reveals a light blue spot on the shirt of the male person.

Moving the retouch tool over the spot provides you with the following situation.

Use "T" and the mouse-wheel to change the temporal offset of the background image. Just set the offset to the previous image (-1) and then press the left mouse-button to apply the retouch-tool.

You can see that the spot has been eliminated, but the repaired content does not fit well, due to the movement in the film. If you are not sure about the effect please zoom-in and use the micro loop.



To shift the background image use the mouse wheel together with "Y" and "X". When reaching a vertical displacement of 10 and a horizontal displacement of 14 the repaired area looks perfect.

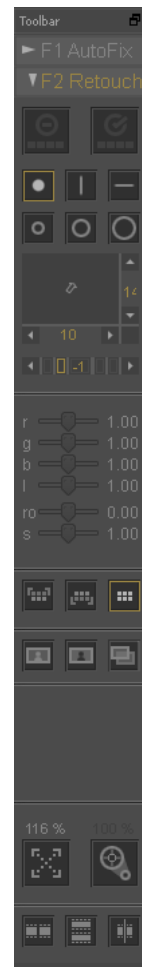


Alternatively you can use the ALT key and the mouse in order to change the horizontal and vertical offsets.



Before confirming the retouch operation make sure that the repaired area looks well. This is the case if you see in the retouch toolbar a temporal offset of -1, a vertical offset of 14 and a horizontal offset of 10.

Now, press "F" to fix the retouch operation. The changes will be saved and you can deal with the next defects.



In our tutorial we are moving to the next event at time code 00:00:00:11.

In this image there is another spot in the hairs of the man.

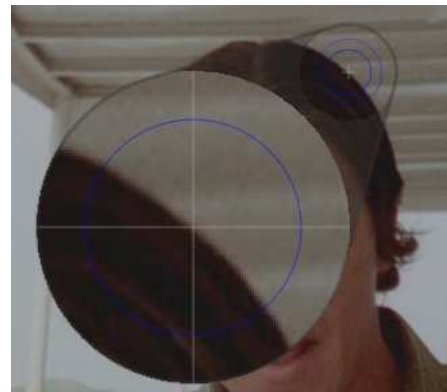
Apply the retouch-tool by clicking the left mouse-button.



If the temporal offset is -1 you get the following situation.

Now you try the **auto alignment** function of DustBuster to adjust for the spatial offset.

Just move your mouse "cross" to the border of the hairs and press "A". The background image will be automatically aligned to the proper position.



Make sure that the tool-centre is on a structure, in the sample you could point to the border between hairs and background. If you are not fully happy with the result, retry by moving the tool to a slightly different position and press "A" again.



You can anytime adjust the position manually, with "X" or "Y" and the mouse wheel.



You can use "Shift + B" and mouse-wheel to change the brush border (i.e.: make a soft border).



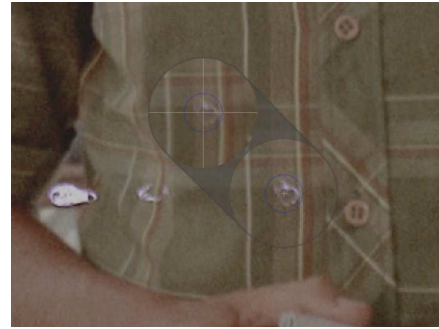
Press "F" to save the fix.



Press "S" for resetting the spatial offset, before you navigate to the image with the time code 00:00:00:13.



Move the retouch tool to the first spot as indicated in the image and apply it with the left mouse button.



You see that there is need for adjustment in horizontal dimension.

Do it again with the Auto-Alignment "A", which leads to a perfect result, when placing the tool on a vertical line of the shirt nearby the spot.

A



Press "F" for fix if you are satisfied.

F

Go ahead and do the similar procedure on the next spot. In this case the result fits already well and there is no need for another auto alignment. Just press "F" to fix.

F

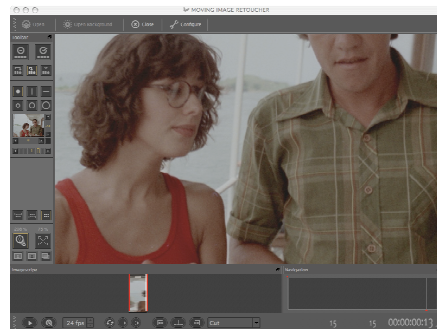
Finally you move on to the last remaining spot.

If you have applied the tool improperly, you can always make a **partial undo**, by using the right mouse button.



Working with **auto-alignment** is much faster than the manual offset. However, sometimes it will be necessary to select a different background by using "T" and mouse-wheel or even do a manual adjustment of the position. The Auto-alignment tool can only correct 25 pixels offset (in HD resolution).

T



Finally you can press as usual "F" and then proceed to the next image for further retouch actions.

F

Alternatively you can use "G" to fix and go in one step.

G

Some other useful things to know:

DEL resets all retouch tool operations and permits you to re-start the repair.

DEL

J jumps you back to the frame under repair. There is always only one frame where the retouch tool can be applied before confirming the repair by Fix.

J

If you are lost, press **ESC** to reset all settings you have made in DustBuster.

ESC

Auto-alignment can be used instead of manual shifting anytime.

A

The **mask mode** shows you only the locations where the retouch tool has been applied.

CTR M

5 Reference Section

5.1 Starting DustBuster

DustBuster as standalone application is available directly from the desktop of your workstation.

5.2 File Menu

Open Ctrl-O
Opens an image sequence.

Open Background
Opens a different sequence for the background layer. With this function you can load a different source for the retouch operation, however the image dimension have to be the same.

In combination with the view commands show foreground and show background you can switch between the two different sequences.

Recent Foreground Sequences
Recent Background Sequences
Gives a fast access to the sequences that have been recently treated.

Show Sequence Information
Provides some feedback about the sequence under treatment (e.g.: resolution, number of images and location).

Close
Closes the foreground and background image sequence.

Leave Ctrl-Q
Quits the application

5.3 View Menu

Retouch Monocle V
Toggles the monocle view.

Show Background Ctrl+1
Shows only the background sequence.

Show Foreground Ctrl+2
Shows only the foreground sequence.

Show BG and FG (Retouche Mode) Ctrl+3
Shows background and the foreground sequence.

Show BG left FG right Ctrl+4
Shows the foreground and the background sequence .

Show BG up FG down Ctrl+5
Shows the foreground and the background sequence.

Split Screen Ctrl+6
Shows the foreground and the background sequence in split screen mode.

Toggle FG and BG TAB
Toggles between foreground and background sequence. In the retouch mode - foreground and background sequence are visible - you can use the shortcut Q to see the original foreground. Please note that this is only possible before a fix was done. Q

Blend Mode Ctrl+Shift+B
Blends the foreground and background sequence together.

Mask Mode Ctrl+M
Shows only these areas a retouch operation is currently applied.

Difference Mode **Ctrl+D**
Shows the difference of the foreground and background sequence.

View All Channels **Ctrl+A**
Shows all colour channels.

View Red Channel **Ctrl+R**
Shows only the red colour channel.

Show Green Channel **Ctrl+G**
Shows only the green colour channel.

Show Blue Channel **Ctrl+B**
Shows only the blue colour channel.

Fit to Window **Ctrl+W**
Fits the image into the window.

Exact Pixel Scale (100%) **Ctrl+E**
Sets the zoom factor to 100%.

Full Screen **Ctrl+F**
Switch to full screen mode.

5.4 Navigation Menu

Prev Frame <
Goto to the previous frame.

Next Frame >
Goto to the next frame.

Goto First Frame Home
Goto to the first frame.

Goto Last Frame End
Goto to the last frame.

Prev Micro Loop Position Alt+<
Step back as much frames as defined by the duration of the micro loop.

Next Micro Loop Position Alt+>
Step forward as much frames as defined by the duration of the micro loop.

Goto Previous Marker Ctrl+<
Goto to the previous marker as selected in the marker type selection box (navigation toolbar).

Goto Next Marker Ctrl+>
Goto to the next marker as selected in the marker type selection box (navigation toolbar).

Goto Any Prev Marker Ctrl+Alt+<
Goto Any Next Marker Ctrl+Alt+>

5.5 Marker Menu

Set In Point I
Sets the In-Point of the foreground sequence.

Set Out Point O
Sets the Out-Point of the foreground sequence.

Set/Unset Default Marker M

Sets the marker specified by the marker type selection box (navigation toolbar) at the current position. If a marker is already set at this position it is unset.

Set/Unset Cut Marker C

Sets the cut marker at the current position. If a cut marker is already set at this position it is unset.

Set/Unset Reference Marker R

Sets the reference marker at the current position. If a reference marker is already set at this position it is unset.

Set/Unset Bookmark Marker B

Sets the reference marker at the current position. If a

reference marker is already set at this position it is unset.

Delete All Cut Markers

Deletes all cut markers.

Delete All Reference Markers

Deletes all reference markers.

Delete All Bookmark Markers

Deletes all bookmark markers

5.6 Retouch Menu

Revert to original image

When applying a permanent fix, the foreground sequence is permanently changed. This feature permits to restore the original, if a fall-back is required by the operator.

Clear **DEL**

Clears all current retouch operations not fixed.

Fix **F**

Makes a permanent fix of all current retouch operations. After a fix the retouch mask is cleared and the foreground image is saved.

Fix and Go **G**

Performs a fix operation and automatically steps to the next frame or the next marker. Please note that this functionality will not work when the stepper is off.

One frame back **E**

This function is provided in order to support the "two hand operation".

Goto Retouch Frame **J**

Jumps to the frame, where the retouch operation started. You can use this function, when the "forbidden cursor" indicates, that you are positioned in another image.

Increment Temporal Offset

Increments the temporal offset between the foreground and background sequence.

Decrement Temporal Offset

Decrements the temporal offset between the foreground and background sequence.

Reset Spatial Offset **S**

Sets the spatial offset between foreground and background sequence to (0,0).

Reset Temporal Offset D

Sets the temporal offset between foreground and background sequence to 0 frames.

Auto Spatial Offset A

Provides an automatic alignment of the background image. The current tool position is automatically matched with the background image and the background image is shifted in order to give the best match for the retouch tool. However, there is a maximum shift that can be edited in the DustBuster setting, see configure section, page 45. For big corrections (e.g. more than 25 pixels offset in HD material) it is recommended to adjust the position roughly by manual interaction and then do the fine

tuning with the auto spatial offset function.

Stepper Off

Turns off the auto stepper functionality.

Next Frame After Fix

Sets the auto stepper functionality to "goto to the next frame after fix".

Next Marker After Fix

Sets the auto stepper functionality to "goto to the marker frame after fix".

Round Brush

Sets the brush to a round shape. Please note, that the brush can be changed with the help of shift + mouse wheel. Pressing X or Y in addition will result in change only in corresponding direction.

Vertical Brush

Sets the brush to a vertical shape.

Horizontal Brush

Sets the brush to a horizontal shape.

Small Brush

Selects a small brush size .

Medium Brush

Selects a medium brush size .

Large Brush

Selects a large brush size .

5.7 AutoFix Menu

Delete ROI

Delete the selected ROI.

Del

Edit ROI

Selects, modifies ROIs.

Select ROIs

Multi selection of ROIs.

Delete ROIs mode

Switches the tool in the delete ROI mode. Click on ROI to delete it.

Show/Hide ROI

Shows or hides the drawn ROIs. ROIs which are currently rendered are always shown in red.

Delete all ROIs on current frame.

This deletes all the ROIs on the current frame.

5.8 Help Menu

About

Shows the version number and gives some background information about the persons and institutions behind DustBuster.

Visit the DustBuster website
Opens the internet-browser and connects to the website of HS-ART, that is: <http://www.hs-art.com/DustBuster>

Define Shortcuts

Allows to change the shortcuts of DustBuster. Please note, that the default shortcuts were optimized for the "2 hand" operation.

Reset Shortcuts to Factory

Defaults

Resets all shortcuts to the factory defaults as described in this manual.

Reset GUI Settings to Factory

Defaults

Resets all settings of the user interface to factory results. This is especially useful when you

switch from a multi monitor operation to only one monitor.

Self Test

Checks the disk performance and the open GL driver version and performance.

Configure

Sets the preferences of the application.

5.9 AutoFix Toolbar

The reference section allows selecting the input frames which are used by the AutoFix algorithms.

“Auto” is usually using the frames before/after but handles scene cuts correctly. With “Left only” only frames before are used and with “Right only” only frames after the current frame are used. “Double” uses the frame before and 2 after accordingly. There is also a possibility to set the reference manually with “Manual”.

With the AutoFix Mode you can select an algorithm you want to use.

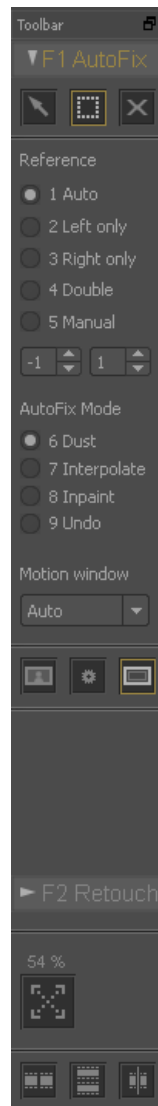
Dust should be used for single frame defects like dust, dirt, scratches and the like. In the case of **Dust** the defect will be

detected automatically inside the ROI and only that part will be fixed. **Interpolate** is using the selected reference frames to recreate the information inside the ROI and **Inpaint** will recreate the information by using the surrounding of the ROI. **Undo** will use the information of the background sequence to replace the content of the selected region.

You can modify the default parameters of the AutoFix tools with the **Configure** dialog.



To apply the tool the pointer tool needs to be selected. The next icon is the selection mode and the third is the delete mode.



5.10 Retouch Toolbar

All retouch operations are stored in a mask. This mask defines which area of the foreground sequence will be replaced by the background sequence.

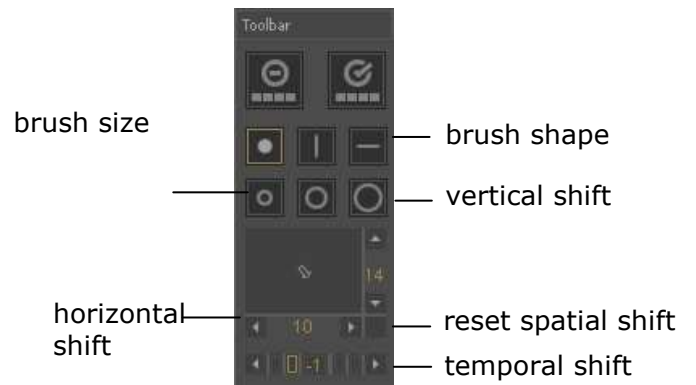
Before you can start a retouch operation on a new frame or wish to apply a new background shift you have either to confirm all operations with the **fix** function, or you have to **clear** the mask. Be aware that the **fix** operation results in a definite change of your foreground sequence.



DustBuster currently offers a [freely configurable brush](#). However for a quick start you can simply select the favoured brush type ([round](#), [vertical](#), [horizontal](#)) and adapt it further. Any brush in DsutBuster has soft-border. The softness can be changed in the configuration menu or simple by using the shortcut Shift+B+mouse wheel. There are 3 different [pre-defined brush sizes](#) available. You can also change the brush size to any desired size by operator interaction.

When applying a retouch operation a [spatial and temporal offset](#) can be specified for the background sequence. The offset is reset with the shortcut S (spatial) or D (temporal).

Please note that the offset can also be computed [automatically](#), see page 33.



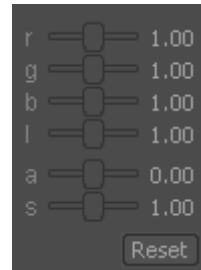
Additional professional correction functions are also available.

You can define colour correction (r...red, g...green and b...blue) as well as luminance/brightness adaptation (l...luminance).

Furthermore rotation angle (a...angle) and scaling (s...scaling) can be adapted according to the needs of the operator.

Simply move the slider with the mouse or move the mouse upon the slider and use the mouse wheel for fine-tuning or use the shortcuts like [Alt+R+mouse wheel](#) to change the red.and so on

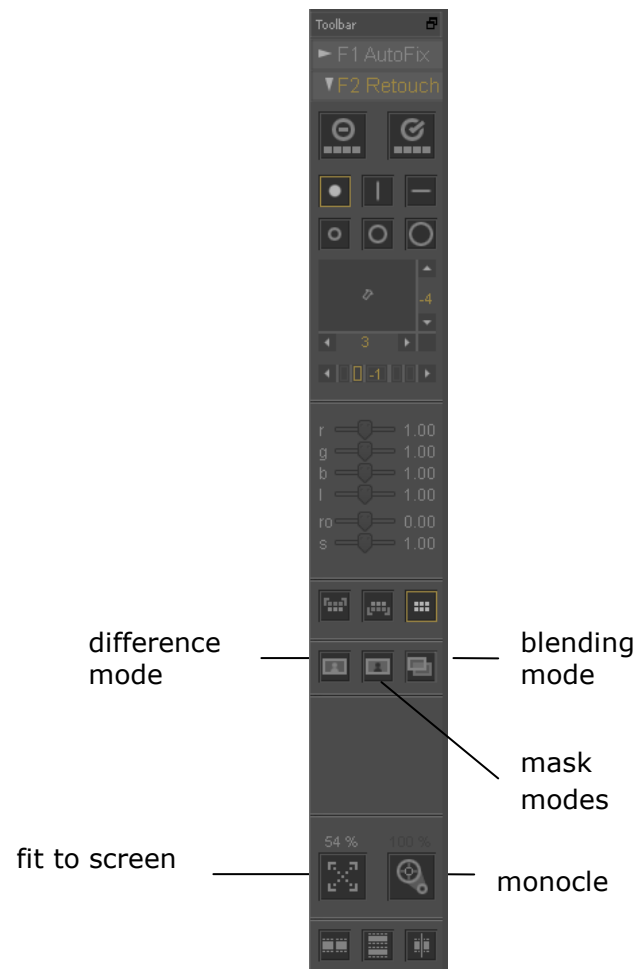
"Reset" resets the values.



You can view only the **background** or the **foreground** sequence or **both** of them. The last mode is called retouch mode. You can reset the viewport by the **Fit to Screen** operation. Please note, that you can also use the shortcut **Esc** to reset the viewport and in addition to this also the background shift and the retouch mask.

The background and foreground sequences can be **blended together** or be viewed in **difference** mode. At each retouch operation your brush creates a mask, to reveal the content of the background image into the foreground sequence. Only the areas with a **mask** can be displayed.

Please note, that the blend- and difference-mode require specific hardware features from your graphic-card.

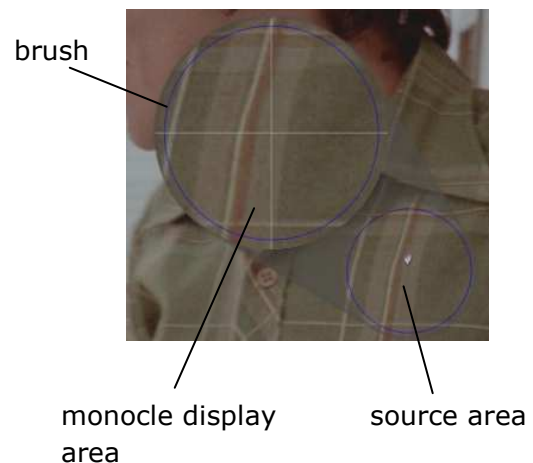


5.11 The Monocle

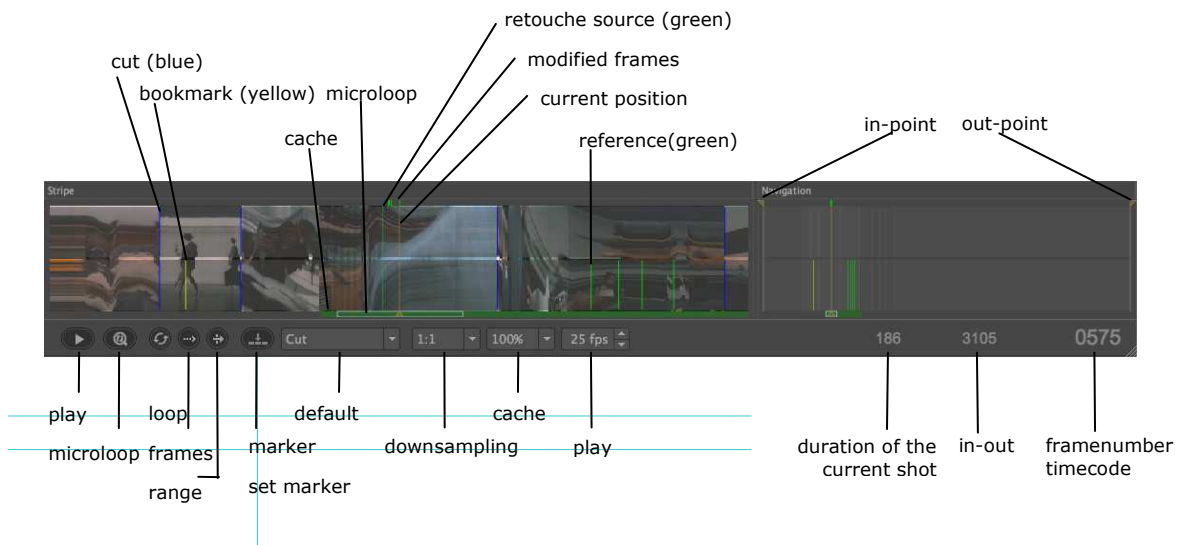
The patented monocle is a specialized tool for comparing and retouching image sequences. In the [monocle display area](#) we see in reference to the current cursor position the image with constant magnification independent of the zoom factor of the canvas. The monocle shows either

- The [same sequence](#).
This is the case if we view only the fore-ground or background sequence.
- [Foreground and background](#) sequence mixed together in the retouch mode (monocle blend enabled).
- [Only the background](#) sequence in retouch mode (monocle blend disabled).

You can very easy change the [magnification](#) of the monocle with the mouse wheel and pressing the Ctrl key. Please note that the [minimum magnification](#) of the monocle is **100%**, i.e. you will never see the image down sampled in the monocle display area. There is now restriction in the maximum magnification of the monocle. The size of the monocle display area will be always constant, however the size of the source area will be adjusted to show the area covered within a specific magnification level.



5.12 Navigation Toolbar



The [imagestripe](#) widget shows the temporal changes around the current position, whereas the [navigation](#) widget permits to change the temporal position in the full duration of the sequence.

[In/out-points](#) are visualised as orange vertical lines, [cuts](#) are shown as blue lines, [bookmarks](#) as yellow lines and [reference](#) markers as green lines. All [modified frames](#) are shown by a

green bar at the top of the in the stripe widget and navigation widget.

In addition to the common used [play](#) and [pause](#) command, DustBuster offers the so called [micro loop](#), to play the images before and after the current position. So you can judge your retouch operations and when you stop the micro loop brings you automatically back the position where you started.

There is also a playback mode for switching between preview or highres quality if available. [A](#) means that preview is read during playback and the highres is automatically loaded when you are stopping on an image. [P](#) means always show preview images and [H](#) means always show highres images.

In the playback you can choose the loop to be [cycling](#) or [bouncing](#). The [loop range](#) can be either between the active markers or between the in and out points.

If your hard disk is fast enough the sequence will always be played with the frame rate you specified. If your hard disk provides images at a lower rate than you can choose either to see all images in the [play all frames mode](#) or to drop frames in the [play real-time](#) mode.

You can the [default marker](#) at the current position. The default marker type can be chosen between [cut](#), [bookmark reference](#) and the [modified frames marker](#). Please note, that all temporal position are in

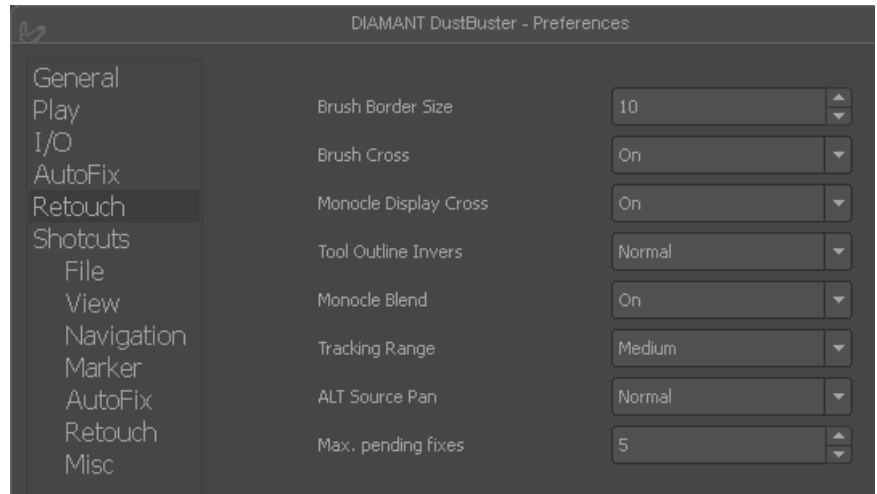
reference to the foreground sequence.

If you work with very large images (e.g.: 4k) and you still want to view the sequence at reasonable speed you can use the [downsampling](#) feature. Consequently a downsampling ratio of 1:2 means, that you would then only use half-sized images (e.g.: 2k) in the visualisation. However, all retouch operations will still be done on the full image size.

DustBuster uses the free RAM of your workstation to buffer the images for fast access. [Cache usage](#) indicates how much of the available RAM will be consumed by DustBuster buffers. Thus DustBuster can be flexible adapted to the load of your workstation.

You can define the desired [play speed](#) or the play operation by [frames per seconds](#).

You can see the [duration](#) of the current shot, the duration from the [In Point](#) to the [Out Point](#) and the [current position](#). By [Ctrl clicking](#) in the fields you can change the two display modes from frame numbers to time code display. By clicking the position field you can [input](#) a value in order to jump to a specific position.



6 Preferences

6.1 Settings

You can personalise DustBuster to match your personal preferences and needs. The preferences are grouped into several logical sections.

The following parameters can be specified:

General:

Auto Save GUI

Remembers GUI settings like position and size

Wheel Sensitivity

Adjusts the sensitivity of the mouse wheel.

Highlight difference level

Indicates the threshold value

Generate stripeimage

Specifies up to which size a strip image should be generated

Play:

Micro Loop Duration
The duration of the micro loop.

Default FPS

If DustBuster is used in standalone mode, this parameter specifies the frames per seconds, when a sequence of image files is opened.

I/O:

Number of I/O threads
Indicates the number of simultaneous I/O threads

Read block size
Indicates the I/O block size for reading

DVS video I/O mode
Specify if you automatically want to configure the video board or use the board settings.

AutoFix:

Dust:
Sensitivity
Detection sensitivity for the dust. Range [1-20]

Force mode
Disables protection mechanism against aretifacts.

Interploate:

Regrain
Turn regraining on/off

Magnitude
Indicates the amount of grain added [0-100]

Inpaint:

Regrain

Turn regraining on/off

Magnitude

Indicates the amount of grain added [0-100]

Retouch:

Brush Border Size

Softness of the restoration brush.

Brush Cross

Specifies whether a small cross is drawn in the centre of the brush.

Monocle Display Cross

Specifies whether a small cross is drawn in the centre of the monocle display area.

Tool Outline Inverse

The tools outline is drawn in default mode in light blue. With this parameter you can change it to inverse mode.

Monocle Blend

If the monocle blend functionality is enabled in the monocle display area background and foreground are blended together.

Tracking Range

Specify the tracking range for the auto tracking function. Note, that a high tracking range results in higher computing times.

ALT Source Pan

Switches the behaviour for panning the source with the ALT key.

Max. pending fixes

Indicates the maximum allowed modified frames which are not saved.

6.2 Shortcuts

DustBuster is dedicated for the operator's convenience and efficiency. Thus nearly all functions can be assigned to specific keyboard and mouse interaction. The following table shows the predefined shortcuts of DustBuster. Please note, that these results from a series usability studies and will allow an efficient and consistent interaction using the mouse wheel and keyboard shortcuts.

Keyboard Shortcuts

| | | | |
|---------------------------|--------------|--------------------------|------------|
| Help | H | Fit to Window | Ctrl+W |
| | | Exact Pixel Scale | Ctrl+E |
| Open | Ctrl-O | Full Screen | Ctrl+F |
| Leave MIR | Ctrl-Q | | |
| | | Play/Stop | SPACE |
| Retouch Monocle | V | Play forward | Up |
| Show Background | Ctrl-1 | Play backward | Down |
| Show Foreground | Ctrl-2 | Microloop | Ctrl+SPACE |
| Show BG and FG (Retouche) | Ctrl-3 | Prev Frame | < |
| Show BG left FG right | Ctrl-4 | Next Frame | > |
| Show BG up FG down | Ctrl-5 | Next Microloop Position | Alt+< |
| Split screen | Ctrl-6 | Prev Microloop Position | Alt+> |
| | | | |
| Toggle FG/BG | TAB | Goto First Frame | Home |
| Show only foreground | Q | Goto Last Frame | End |
| | | Goto In-Point | Ctrl+I |
| Blend Mode | Ctrl+Shift+B | Goto Out-Point | Ctrl+O |
| Mask Mode | Ctrl+M | Goto Previous Marker | Ctrl+< |
| Difference Mode | Ctrl+D | Goto Next Marker | Ctrl+> |
| | | Goto Any Previous Marker | Ctrl+Alt+< |
| View All Channels | Ctrl+A | Goto Any Next Marker | Ctrl+Alt+> |
| Show Red Channel | Ctrl+R | | |
| Show Green Channel | Ctrl+G | | |
| Show Blue Channel | Ctrl+B | | |

| | |
|----------------------------|-----|
| Set In Point | I |
| Set Out Point | O |
| Set/Unset Default Marker | M |
| Set/Unset Cut Marker | C |
| Set/Unset Reference Marker | R |
| Set/Unset Bookmark Marker | B |
| | |
| Clear Mask | DEL |
| Fix | F |
| Fix and Go | G |
| One frame back | E |
| Goto Retouche Frame | J |
| Reset Spatial Offset | S |
| Reset Temporal Offset | D |
| Auto Spatial Offset | A |
| Reset all Parameters | ESC |

Mouse and Wheel Operation

Paint Canvas

| | |
|------------------|----------------------|
| Apply Brush | mouse + left button |
| Undo | mouse + right button |
| Pan Foreground | Ctrl+mouse |
| Pan Background | Alt+mouse |
| Zoom | wheel |
| Monocle Size | Ctrl+wheel |
| Brush Size | Shift +wheel |
| Brush Size X | Shift +X+wheel |
| Brush Size Y | Shift +Y+wheel |
| Brush Softness | Shift+B+wheel |
| Temporal Offset | T+wheel |
| Spatial Offset X | X+wheel |
| Spatial Offset Y | Y+wheel |

Stripe Widget

| | |
|--------------------|---------------------|
| Zoom Stripe | wheel in upper part |
| Microloop Duration | wheel lower part |

Navigation Widget

| | |
|--------------------|---------------------|
| Navigate / Scrub | wheel in upper part |
| Microloop Duration | wheel lower part |

