

**DVO**

# DUST GT

**USER GUIDE**

# WHAT DOES IT DO?

**DVO Dust GT** is a fast dirt and dust concealment tool based on the original DVO Dust but uses modern processor instruction sets to increase the performance. **DVO Dust GT** is a fully automatic and highly accurate film dirt, dust, random scratch concealment, and video drop-out removal system. It can remove around 90% of visible imperfections without introducing unwanted artifacts.

**DVO Dust GT** utilizes a pioneering set of processing algorithms and new filters with the Digital Vision Emmy award-winning PHAME motion compensation technology. With manual "dust busting" being very time consuming and expensive, the automation in DVO Dust GT can typically reduce the amount of operator time required by an order of magnitude. This saves enormous amounts of time and money without any compromise in terms of picture quality.

This effect has three groups of parameters:

- Basic - preset selections for quick dirt removal
- Standard - specific processing options
- Advanced - additional settings for various processing selections

# HOW DO YOU USE IT?

DVO Dust GT works on the following platforms:



If you're already a Filmworkz veteran, you can jump right in and use **DVO Dust GT**, however if you need a hand getting going, check out these QuickStart Guides:

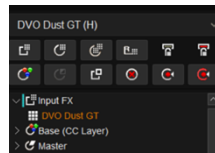
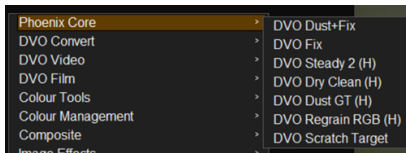
[PHOENIX QUICKSTART GUIDE](#)

[NUCODA QUICKSTART GUIDE](#)

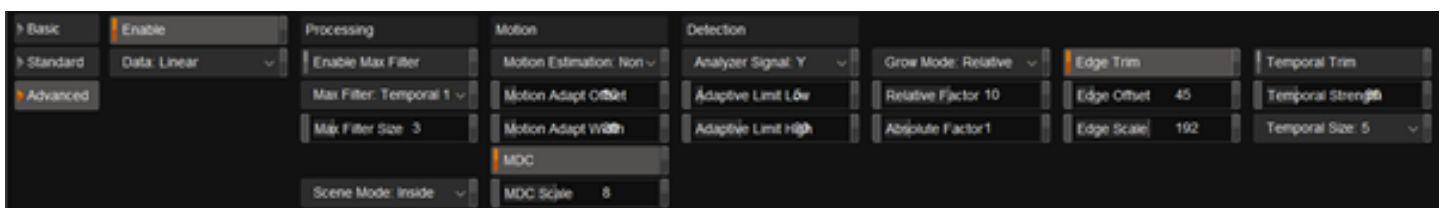
[LOKI USER GUIDE](#)

# GETTING STARTED

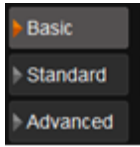
1. Launch your platform on your workstation.
2. Locate the toolbar, (positioned on the left-hand side of the interface)
3. Scan the toolbar options until you find the DVO Dust GT tool



4. Click on it and the control panel under appears



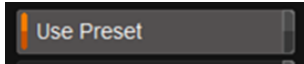
# CONTROL PANEL EXPLAINED



DVO Dust GT provides several presets, ranging from Extra Light to Extra Heavy removal. These presets work as a very good starting point before moving on to the more advanced controls in the Processing and Setup tabs. You may not need to use any of the advanced parameters.

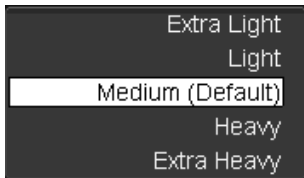
## BASIC

This mode uses presets to automate and hide much of the effect complexity. To activate a preset, turn on the "Use Preset" button and choose your preferred preset and strength.



When you edit any of the settings in the processing or setup tabs the basic mode becomes automatically disabled. Similarly, when you select a mode from the basic modes, all settings will be automatically adjusted to fit the selected mode and basic mode will be automatically enabled.

## PRESETS



This is a collection of presets that set up the effect for a predefined level of dust/dirt.

**Values:** Extra Light, Light, Medium, Heavy, Extra Heavy

**Default:** Medium

## STRENGTH

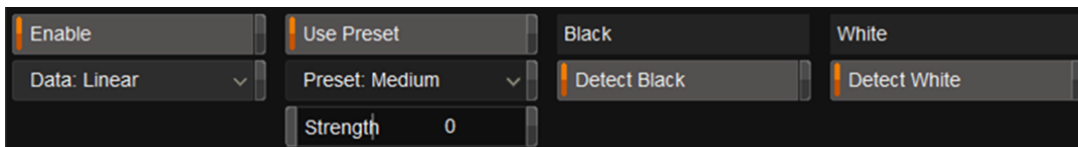


This slider allows the adjustment of the strength of dust reduction processing to use. It is only available in basic mode.

**Range:** -5 to +5

**Default:** 0

## WHITE / BLACK



White/black dirt removal is enabled via the corresponding *Detect White/Detect Black* toggle buttons.

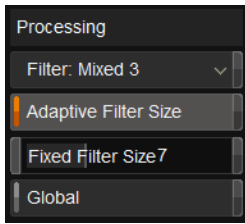
- Detect Black - for black/dark spots.
- Detect White - for white/light spots.

Both can also be enabled at the same time. These options also appear in the *Processing* tab, and they are linked (changing them in one location affects the other). Note that if **neither** button is enabled then *DVO Dust GT* will **not filter at all!**



# STANDARD

## PROCESSING



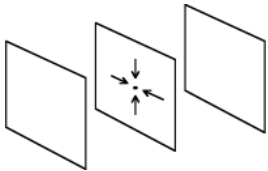
The filters used by the process are very important in determining the final processed quality. DVO Dust GT includes a variety of filter algorithms that can effectively process a wide range of input footage.

## SPATIAL / TEMPORAL / MIXED FILTERS

**Values:** Spatial, Mixed 1, Mixed 2, Mixed 3, Mixed 4, Temporal 1, Temporal 2, Copy Prev, Copy Next, Bypass  
**Default:** Mixed 3

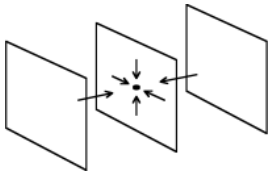
Here's a quick explanation of each filter type:

### SPATIAL



All filters named Spatial are filters that work only within the current frame (or field if the material is interlaced), i.e. it has taps only in the current frame. These filters are intended for very small spots.

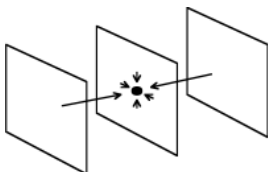
### MIXED



All filters named Mixed have taps in both the current and current frames. That is, it has both spatial and temporal taps. All these filters however have more taps in the current frame than in the previous and following frames together (more spatial taps than temporal). These filters are intended for normal spots.

The different *Mixed* types (Mixed 1,2,3 etc.) change the ratio between spatial and temporal. The larger the number, the more *temporal* filtering.

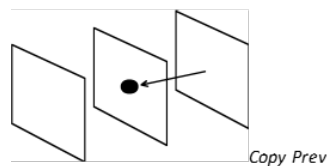
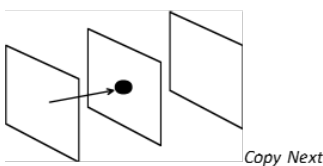
### TEMPORAL



Filters named *Temporal* have both spatial and temporal taps but with more temporal than spatial. This will enable *DVO Dust* to remove any size of spots. These filters may need more careful use, to not give unwanted artefacts.

The filter called '*Temporal 2*' is a special temporal filter that uses **a minimum** amount of information from the current frame. This means that the processed signal will not vary as much as the normal temporal filter in terms of luminance/intensity.

### COPY



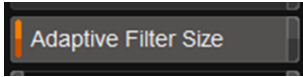
The '*Copy Next*' and '*Copy Prev*' filters should be used for one frame in combination with a *key area* and *Global* mode to replace a big chunk of dirt, a big hole, or a flash frame with information from the next or previous frame.



# BYPASS

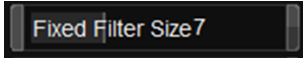
Setting the filter to *Bypass* will leave dirt **unprocessed**.

# ADAPTIVE FILTER SIZE



When the **Adaptive Filter Size** button is enabled, the filter size automatically adjusts during processing according to the size of the dirt found.

# FILTER SIZE



This sets the size of the filter on the current frame, so it is only required for spatial and temporal filters. Use the numeric slider to define the filter size when adaptive filter sizing is not enabled. The larger the size of the dirt the larger this value should be.

**Range:** 0 to 15

**Default:** 7

# GLOBAL



The **Global** toggle button allows you to turn the *adaptation* processing on/off.

When this button is **on**, *DVO Dust* works in **global** mode, filtering the whole image with the same fixed filter selected in the *Filter* menu.

Note that if the **Global** button is **on** then none of the adaptation controls above will have an effect.

# BLACK/WHITE

There are two separate and independent parameter groups controlling the processing for Black (dark) and White (light) areas of dust/dirt.

# DETECT BLACK / DETECT WHITE



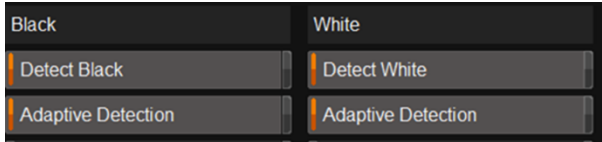
White/black dirt removal can be enabled via the corresponding toggle button.

- Detect Black - to remove black/dark spots
- Detect White - to remove white/light spots

Both can also be enabled at the same time. Note that if **neither** button is enabled then *DVO Dust GT* will **not filter at all!**



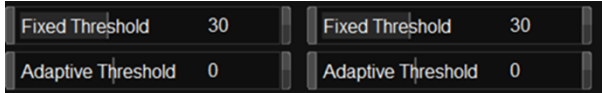
## ADAPTIVE DETECTION



If on, it sets white/black contrast to be adaptive. This will result in the algorithm determining which contrast setting is needed on a pixel-by-pixel basis.

When enabled the contrast controls change to give more, or less, effect of the adaptive contrast.

## ADAPTIVE THRESHOLD



Only applicable if **Adaptive Detection** is on.

**Range:** -32 to 31

**Default:** 0

## FIXED THRESHOLD



Only applicable if **Adaptive Threshold** is off.

**Range:** 0 to 63

**Default:** 30

You should lower the thresholds if you have very low contrast white spots on light background, or black spots on dark background, and increase the thresholds if the luminance difference between the spots and the background is less:



set the contrast threshold to a *low* value.



set the contrast threshold to a *high* value.

## CHANNELS

This control is for selecting the channels from which dirt will be removed.

Normally the processing should be set to all channels, but in some cases, especially with small dirt, better results can be achieved by processing only one or two of the channels.

**Values:** Any combination of R,G and B

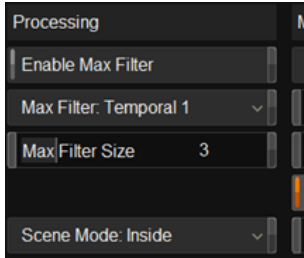
**Default:** R,G,B



# ADVANCED

## MAX FILTER

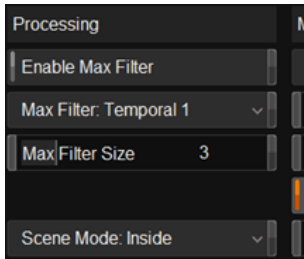
### ENABLE MAX FILTER



In addition to the filter selected in the *Processing* tab, a separate *max filter* can be enabled. The *Max Filter* will only be used when **Adaptive Detection** is enabled in the *Processing* tab.

This is very useful when you have material with mostly small dirt and the occasional bigger stains

## FILTER



Use this drop-down button to select the max filter with which to process **large stains**.

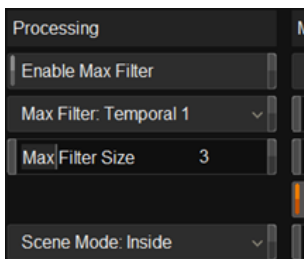
When the *Max Filter* is enabled, the normal filter used for the adaptive filter sizing will take care of the **small** dirt. When the upper size limit is reached it will automatically switch over to the filter selected here.

**Values:** Spatial, Mixed 1, Mixed 2, Mixed 3, Mixed 4, Temporal 1, Temporal 2, Copy Prev, Copy Next, Bypass

**Default:** Temporal 1

The filter used here would typically be a larger temporal filter. The *Max Filter* can also be set to *Bypass*, which will leave big stains unprocessed. These can be processed later by a de-blotcher or 3rd party software.

## SIZE



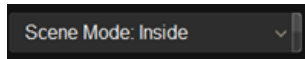
This specifies the size of the *spatial* part of the filter (for spatial and mixed filter types). Use a large value when processing large bits of dirt.

**Range:** 0 to 15

**Default:** 3



## SCENE MODE



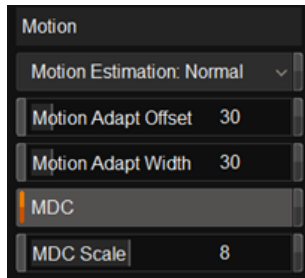
This drop-down button gives options for how to process the frames surrounding an edit/cut point:

- **Inside** - processes the frame before a cut using only the current and previous frame and processes the frame after a cut using only the current and next frame. Stays inside the shot.
- **Across** - ignores cuts, use the previous, current, and next frame. Goes across shots.
- **Bypass** - doesn't process the frames before or after a cut.

**Values:** Inside, Across, Bypass

**Default:** Inside

## MOTION ESTIMATION



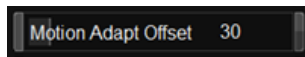
This drop-down button allows you to choose the motion estimation.

**Values:** Off, Normal, Best

**Default:** Normal

When enabled, the motion estimation module gives a performance boost, both in dirt detection and concealment. This means that much more aggressive settings can be used without introducing smearing.

## MOTION ADAPT OFFSET



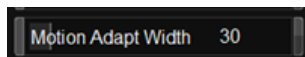
This numeric slider configures the degree of motion sensitivity.

Initially you can set it to 0 (most safety), for maximum motion sensitivity, and then increase it in steps if there isn't enough filtering in moving parts of the picture. A value of 256 corresponds to no motion adaptation at all, which means that temporal filtering can be applied fully to moving parts of the image.

**Range:** 0 to 256

**Default:** 30

## MOTION ADAPT WIDTH



Motion Width is used in combination with the Motion control in the Processing section and defines the motion adaptation behavior.

When motion width is set to 0, the motion setting will be used as a threshold discriminating between moving and non-moving parts.

When motion width is set to a non-zero value, the classification will change gradually from "no motion" to "full motion". Motion width then specifies the size of the transition region.

**Range:** 0 to 255

**Default:** 30





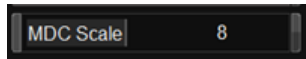
# MDC



The MDC (Motion Detection Current) toggle button determines whether to look at just the previous and next field/frame, or to look at all the previous, current, and next field/frame.

Having this option “on” ensures higher sensitivity and reduces artifacts down to a minimum. For maximum filtering, the control may be set off.

# MDC SCALE



The MDC (Motion Detection Current) toggle button in the Processing section determines whether to look at just the previous and next field/frame, or to look at all the previous, current, and next field/frame. Only used if MDC (Motion Detection Current) control is on.

The higher the scale setting, the *more* filtering (less impact of the MDC algorithm).

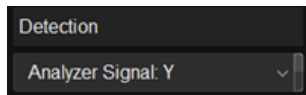
**Range:** 0 to 15

**Default:** 8

# DETECTION



# ANALYZER SIGNAL



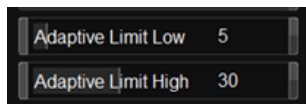
This selects the signal (channel) within which scratches/dirt will be detected.

The adaptation works on one channel only, normally 'Y'. By setting the signal to 'R', for example, when only red scratches are visible, DVO Dust GT will more precisely detect the dirt, minimizing the risk of affecting actual picture content.

**Values:** Y, U, V, R, G, B, Y+U+V

**Default:** Y

# ADAPTIVE LIMITS



The contrast adaptation low and high limit controls only work in the adaptive mode and specify the range of contrast settings the adaptation can work in.

The upper limit is normally set to the non-adaptive contrast setting you normally use. If both limits are set to the same value, the result is the same as when using non-adaptive contrast.

## ADAPTIVE LIMITS LOW

**Range:** 0 to 63

**Default:** 5

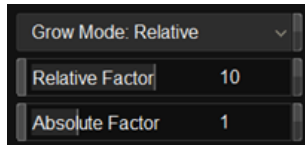
## ADAPTIVE LIMITS HIGH

**Range:** 0 to 63

**Default:** 30



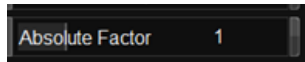
# GROW MODE



The grow mode control is useful when the dirt in the image does not have very well-defined edges. By increasing the grow factor the processor is told that the dirt is bigger than it appears. The result is that the soft edges also are processed.

## MODES:

### ABSOLUTE

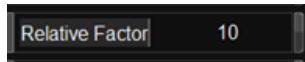


The hit mask for all sizes of scratches is grown by the same amount as specified with the strength control.

**Range:** 0 to 4

**Default:** 1

### RELATIVE



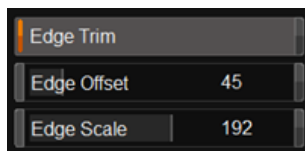
In relative mode large scratches cause a larger growth.

**Range:** 0 to 15

**Default:** 10

The Absolute and Relative sliders control the amount of hit mask growth for each mode. The higher the value, the larger the area around the scratch that will be processed.

## EDGE TRIM

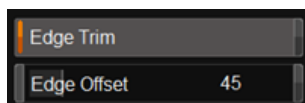


This controls material edge protection.

Edge protection acts as a safety measure and reduces the possibility of false scratch detection. Some material may require this protection e.g. houses at a distance, a forest or material with a slight weave. By turning edge protection on, the built in edge detector will affect where DVO Dust filters and it will reduce filtering where it finds edges.

Edge protection should normally be left on.

### EDGE OFFSET



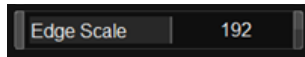
The edge offset acts like a threshold, determining how well-defined edges have to be before the edge control has any effect. The smaller the offset value the sooner the edge control will have an effect.

**Range:** 0 to 255

**Default:** 45



## EDGE SCALE



Edge scale sets the sensitivity of the edge control. The higher the setting the more pronounced the effect of the edge control.

**Range:** 0 to 255

**Default:** 192

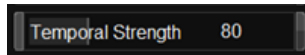
## TEMPORAL TRIM



Temporal Trim acts to exclude falsely detected dust/dirt from being processed. It does this by comparing dirt detected on the current frame with dirt detected on the previous frame (within a sizable window). This toggle button turns temporal adaptation on/off.

The purpose of temporal adaptation is to exclude falsely detected dirt from processing by comparing it with the previous frame's detected dirt within a sizable window.

## TEMPORAL STRENGTH

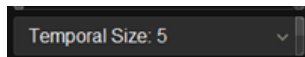


The strength level determines the amount of influence that the previous frame's detected dirt will have on exclusion of dirt detection in the current frame. A higher value will result in more dirt being excluded and less processing carried out.

**Range:** 0 to 255

**Default:** 80

## TRIM SIZE



The trim size corresponds to a "window" in the previous frame which is searched for dirt to compare against the current frame. The smaller the window (trim size) the more filtering that will be achieved.

**Range:** 0 to 7

**Default:** 5

