

DVO

NOISE

USER GUIDE

WHAT DOES IT DO?

DVO Noise is designed to manage and reduce unwanted analog electronic noise problems in video content. The processing is done in *field mode* to address tape and transmission related problems.

The tool is organized into three sections:

- **Processing** - specific processing options
- **Key** - Keyer settings for chroma adaptation
- **Setup** - settings for various processing selections

HOW DO YOU USE IT?

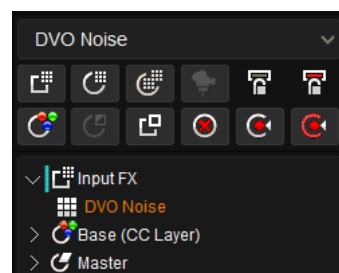
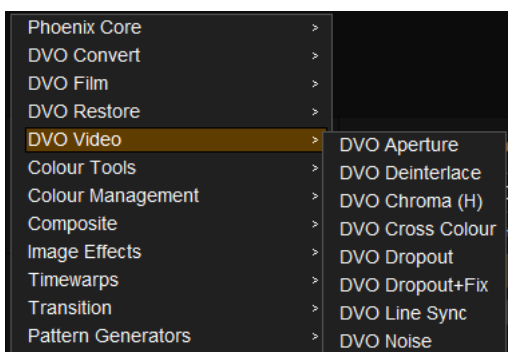
DVO Noise works on the following platforms:



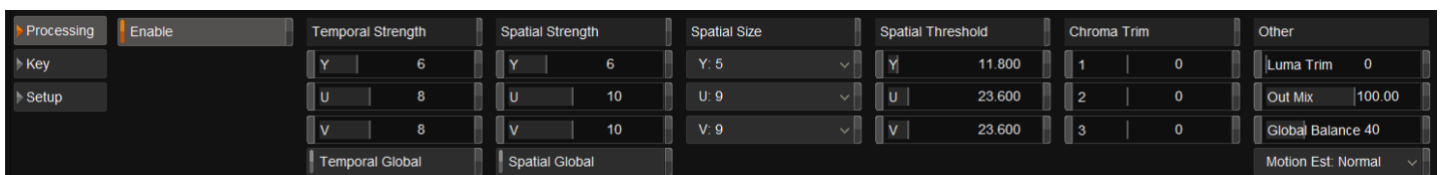
If you're already a Filmworkz veteran, you can jump right in and use **DVO Noise** however if you need a hand with anything, our friendly AI assistant [Juno](#) is your first port of call. Whether it's guidance with DVO tools, help getting started in Phoenix, Nucoda or Loki, access to the latest versions or discovering best practices, **Juno's** here to offer instant, accurate support, any time you need it - that's 24/7 because **Juno** never sleeps!

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 Noise** tool.



4. Click on it and the control panel under appears





CONTROL PANEL EXPLAINED

PROCESSING

DVO Noise utilizes a process that adaptively selects the best mix of spatial and temporal (recursive) filtering for each pixel.

The default settings are a good start point for analog noise reduction. Adjust as required.

TEMPORAL FILTERING

The temporal (or recursive filtering) is the most effective filter in terms of reducing noise.

TEMPORAL STRENGTH

Temporal Strength	
Y	6
U	8
V	8

Use the numeric sliders to set the amount/level of temporal recursive filtering in each component.

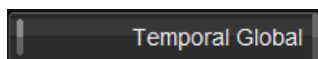
Y, U and V components are treated independently.

Range: 0 - 15

Default: Y, U, V: 6, 8, 8

Avoid settings greater than 11-12 except for extreme situations. Also note that both *Chroma Trim* and *Luma Trim* (see below) will add their values to these set strengths.

TEMPORAL GLOBAL



DVO Noise is an *adaptive* noise reducer. This means it disables the temporal/recursive processing of all moving edges within the image to assist in the reduction of motion artifacts.

Temporal Global enables filtering of the whole picture regardless of motion for maximum temporal filtering. The default setting is off.

Temporal global should normally be set to Off and only enabled in extreme situations (or to create a motion smearing effect).

Enabling *Temporal Global* might cause excessive smearing in the picture.

In addition to the above controls, the *motion sensitivity* control on the *Setup* section adapts the temporal filtering in respect to noise size and intensity.



SPATIAL FILTERING

Edge-preserving spatial filtering complements the adaptive temporal filters by processing noise in portions of the image that are detected as being in *motion*, while leaving non-moving areas unaffected.

The spatial filtering is done before application of the temporal filters and works in unison with the motion processing.

SPATIAL STRENGTH

Spatial Strength	
Y	6
U	10
V	10

This is the overall level of *spatial* filtering applied in each channel.

Y, U and V components are treated independently.

Range: 0 - 15

Default: Y, U, V: 6, 10, 10

SPATIAL SIZE

Spatial Size	
Y	5
U	9
V	9

The Spatial Size drop-down lists adjust the spatial size of the noise (in pixels) for each component.

Values: 1, 3, 5, 7, 9

Default: Y, U, V: 5, 9, 9

Chroma spatial size is normally larger due to subsampling and PAL/NTSC color technique.

SPATIAL THRESHOLD

Spatial Threshold	
Y	11.800
U	23.600
V	23.600

The Spatial Threshold determines when to filter, depending on the intensity of the surrounding pixels.

If there's a high enough intensity/contrast (e.g., an edge) between the noise and surrounding pixels, filtering will **not** occur.

A low setting will only affect low intensity pixels (flat areas). A high setting will start to affect high intensity pixels (edges).

Range: 0 - 100

Default: Y, U, V: 11.8, 23.6, 23.6



SPATIAL GLOBAL

Spatial Global

This enables filtering of the *whole* picture by switching off the motion adaptation.

A moderate level of global spatial filtering can be used as a basic level of grain and noise reduction before using the temporal filtering (also see *Global Balance*). The default setting is **OFF**.

This may cause excessive softening of the picture if the spatial filter is not set up correctly.

In summary:

- **Temporal filtering** works in areas with no or little motion.
- **Spatial filtering** works in areas of motion.
- **Global** enables the filters to work on the *entire* picture.

OPTIMIZING THE SPATIAL FILTER

1. Set Spatial Strength, Size and Threshold to their **maximum**
2. Turn Spatial Global on
3. Adapt the spatial filter to the grain/noise size by decreasing the spatial size settings to as low as possible while still removing noise
4. Decrease spatial threshold until edges are not affected (a typical setting is between 8-25%)
5. Decrease spatial strength until the desired level of spatial filtering is achieved
6. Decide whether Spatial Global should be left on (filtering of the whole picture) or turned off (filtering only in areas with motion).

CHROMA TRIM

Chroma Trim	
1	0
2	0
3	0

The *Chroma Trim* controls are used to adjust the noise reduction on each selected color. This allows for boosting or reducing both the spatial and temporal filter settings within the selected color.

The colors 1, 2, 3, are selected via the *Key* page, as described in the Chroma Adaptation section below.

Range: -8 - 7

Default: 0

An important note: having a temporal strength of 7, setting up Chroma Adaptation for a red color and its corresponding trim to +2 will set the temporal strength to $7 + 2 = 9$ for areas in the picture that contain the selected red color.



OTHER

LUMA TRIM



The Luma Trim control works in conjunction with the Luma Profile controls in the Setup section.

Having selected the mode and luma thresholds in the Setup section, use the Luma Trim control to adjust the noise reduction levels equally for the Y component in high lights (High) or low lights (Low).

Range: 0 - 7

Default: 0

Processing is **slower** using trims. Even if Temporal/Spatial strengths are at 0, *Luma Trim* will still add to this and result in processing within high lights or low lights.

OUT MIX



The *Out Mix* control determines the percentage mix between the processed image (with noise removed) and the input image to give the final output image.

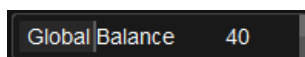
The default value of 100% results in an output with full grain removal, while a setting of 0% results in an output equal to the input image.

Range: 0 - 100

Default: 100

This makes it possible to mix in some of the original noise into the processed picture.

GLOBAL BALANCE



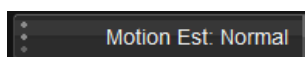
Global Balance allows a combination of the basic level of spatial filtering and motion adaptive spatial filtering. Maximum filtering according to spatial strength is achieved in areas with *motion*.

The Global Balance slider allows you to set a minimum level of spatial filtering, rather than having the level set entirely based on motion detection. If the slider is set to 0, then parts of the image with no motion will receive no spatial filtering. Increasing the slider increases the spatial filtering of areas with little or no motion.

Range: 0 - 100

Default: 40

MOTION ESTIMATION



DVO Noise is a fully **motion compensated** noise reducer. This means that much more aggressive settings can be used without introducing smearing.

The *Best* setting is good for **fast** motion but is slower than *Normal*. In almost all cases, *Normal* or *Best* should be used.

Values: Off, Normal (default), Best



KEY (CHROMA TRIM)

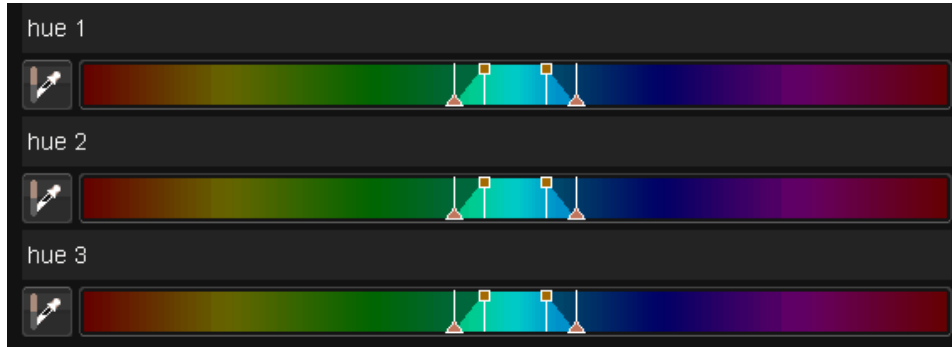
The Key (chroma adaptation) function can be used to adjust the levels of noise reduction in user-selectable color regions.

As an example, this feature can be used for greater noise reduction in sensitive areas such as a blue sky, or less noise reduction in skin tones.

Three independent channels of chroma adaptation (labelled 1,2 and 3) allow adjustment of noise reduction levels (both spatial and temporal) in the regions of the selected color.

Only colors with a *saturation* higher than approximately 5% will be detected.

Use the Key screen to adjust the hues and widths to isolate the colors in each channel:



Click the color picker toggle button to enable/disable color picking from the displayed monitor image:



You can also select the hue by clicking on the hue bar with the left mouse button and dragging the hue bar left and right:



Drag the hue bar and/or orange box indicators to alter hue selection.

After selecting the colors in the Key controls, the corresponding Chroma Trim control in the Processing section may be used to adjust the grain/noise reduction for each selected color. Chroma Trim allows for the boosting or reducing of both the spatial and temporal filter settings within the selected color.

Even if Temporal/Spatial strengths are at 0, Chroma Trim will still add to that number, resulting in processing within selected color.



SETUP

The Setup section allows various other effect parameters to be configured.

HISTORY REQUIRED



The **DVO Noise** tool is recursive.

Recursive means the result for any given frame depends on the result of the **previous** frame(s).

For the best results a certain amount of frame history needs to be built up, and this numeric slider is used to specify how many frames of history to use.

Range: 0 - 15

Default: 5 frames

USE HANDLES

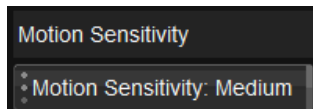


The Use Handles button controls whether the history includes available handles of a scene/shot.

Normally, the history frames accumulated will **terminate** on a shot edit/event (start/end edit). There may be extra frames available (handles) before or after the start and end edit points of a shot however and these will be included as history if **Use Handles** is set. The default setting is **ON**.

If handles exist, full and precise processing will be available from the first frame of a clip.

MOTION SENSITIVITY



Motion sensitivity adapts the temporal filtering with respect to noise size and intensity. This control allows you to set the level of sensitivity.

Values: Low, Medium (Default), High

Motion sensitivity has a large impact on processing and the type of filter (spatial/temporal) being used. It may be better to set Motion Sensitivity to Low rather than just increasing filter strengths.



SPATIAL FILTER

Spatial Filter

SPATIO TEMPORAL

Spatio - Temporal

Enabling this extends the spatial filter to become a **3D spatio-temporal** filter, by including the use of *temporal taps*. This can enhance the noise reduction achieved. The default setting is **ON**.

TEMPORAL MIX

Temporal Mix: High

The temporal mix controls the *balance* between the spatial and temporal taps of the spatio-temporal filter.

This setting affects the noise reduction achieved by the spatio-temporal filter, with more noise reduction for the higher settings.

For fast motion material and a higher than default spatial filter threshold setting, a high temporal mix setting may increase the probability of artifacts. In such cases, this setting may be lowered. For a lower than default spatial filter threshold setting, the *Full* setting may be used.

Values: Low, Medium, High (Default), Full

The default setting *High* should be safe in most circumstances.

SPIKE

Spike: Narrow

Spike enhances the spatial filter performance by incorporating a **spike adaptation** which relates to the grain/noise characteristics.

A low setting (e.g., *Narrow*) is suitable for smaller noise sizes and/or less pronounced variations in amplitudes, while a high setting (e.g., *Wide*) is suitable for larger noise and/or more pronounced variations in amplitudes.

Values: Off, *Narrow* (Default), Medium, High, *Wide*

Setting *Spike* to *Narrow* in conjunction with setting *Motion Sensitivity* to *High* and *Motion Estimation* (in the Processing group) to *Best* can help avoid motion estimation errors caused by very noisy material.



LUMA PROFILE

Luma Profile

Luma Profile allows the user to select the amount of noise reduction (both spatial and temporal) applied to the high lights or low lights within the image.

MODE

Mode: Low

Low - more noise reduction in low lights

High - more noise reduction in high lights

Values: Low (Default), High

Having selected the mode, you need to set the Luma Trim level on the Processing group (see above). This will adjust the noise reduction level in the Y component in highlights or lowlights.

LUMA THRESHOLDS

Luma Threshold Low0

Luma Threshold High100

The range of luminance values affected by the *Luma Trim* can be set by two *Luma Thresholds*. These two thresholds determine the point in highlights and lowlights where the Low or High trim is at a maximum.

The effect of the Trim will gradually decrease between these two points.

Luma Threshold Low

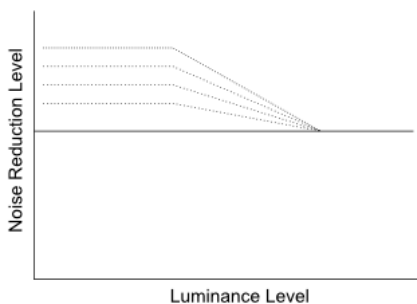
Range: 0 - 50

Default: 0% Luma

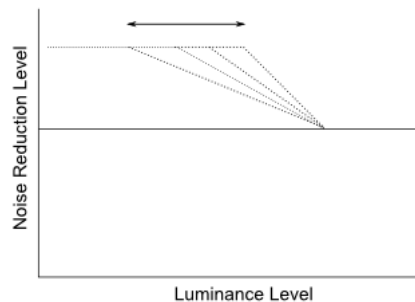
Luma Threshold High

Range: 50 - 100

Default: 100% Luma



Luma Trim level in Low mode



Luma Threshold Low adjustment



WANNA KNOW

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