

density

Set the density of the filter in [ev]. A low value underexposes slightly whereas a high value creates a strong filter.

It is expressed as [ev] that is equivalent to *f-stops*. Lens filters are often referred as ND2, ND4, ND8 and so on. Each time you add an [ev] you double the ND. So ND2 is 1 ev, ND4 is 2 ev, and so on. You can also express it in optical density or transmittance. The table below sums up the different approach for the most common filters:

ND	[ev] or f-stop	absorbance	transmittance
ND2	-1	0.3	50%
ND4	-2	0.6	25%
ND8	-3	0.9	12.5%
ND400	-9	2.7	0.195%

compression

Set progressiveness of the gradient. A low value creates a smooth transition, whereas a high value makes the transition abrupt.

hue

Set the hue to add a color cast to the gradient.

saturation

Set the saturation to add a color cast to the gradient.

position

You can set the position of the gradient directly on the image by moving the white line. For fine tuning, you can also use the rotation slider. Negative values turn clockwise.

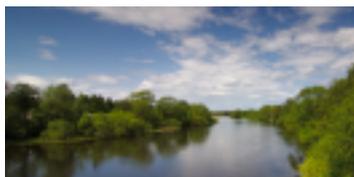


Examples

Here is an example that shows various options of darktable's graduated density filter:



This is the original image with a pretty overexposed sky, use it as reference for the changes below...



And now we have added a neutral ND8 filter which does a pretty good job on the image..

we or I ?



And at last, I added an orange colored filter rotating it -180 degrees, applying it on water/trees for a more artistic use of the filter.

darktable's graduated density filter is a powerful tool. Nevertheless, hardware filters have some advantages over a pure software solution. With a physical GND filter you can in fact reduce the dynamic range of your scene to make it better fit the limits of your camera sensor.

In this example a hardware GND filter (Hitech ND0.6, soft edge) helped me to prevent over-exposure in the sky and tree tops, while at the same time getting a well exposed image of the ground. A rather disturbing element is the decay of lightness in the tree trunks from bottom to top.



darktable's graduated density filter together with the parametric mask feature (see Section 3.2.7, "Parametric mask") comes in handy. We can add a lightness gradient that is just inverted in relation to the hardware filter. As we only want to compensate the unnatural decay of lightness in the tree trunks, we combine the module with a suited blend mask.



The resulting image.



Tip: If you know you intend to use the graduated density filter before actually making a shot with your camera you might want to underexpose by one or two thirds of an f-stop to make sure detail remains in the highlights. When all detail has truly been blown out the graduated density filter cannot produce a pleasing results, this is a limitation that is inherent to digital postprocessing. For instructions on how to intentionally underexpose, please consult your camera's manual, look for "exposure compensation".

3.5. Examples

3.5.1. Converting to black and white

3.5.1.1. Overview

Black and white conversion can be achieved in several ways with darktable. Indeed, darktable comes with a lot of modules, especially for color manipulation. In this manual, I will show you 4 ways to perform a black and white conversion.



3.5.1.2. The obvious way: monochrome module

To perform the conversion, just activate the *monochrome* module (Section 3.4.3.6, “Monochrome”). You can then simulate a color filter, by dragging the circle above the colours you want to filter. Filter size can be modified thanks to wheel scrolling.

3.5.1.3. The simple way: color correction module

To perform such conversion we use the *color correction* module (Section 3.4.3.5, “Color correction”).

1. Activate the color correction module
2. Use the bottom slider to set saturation to zero

3.5.1.4. The artistic way: color zones module

To perform the conversion we use the *color zone* module (Section 3.4.3.7, “Color zones”).

1. Activate the colour zones module
2. By default, the first radio-buttons row is set to “colorness” whereas the second is set to “hue” which means that color are selected according to their hue (horizontal scale) and you can change for each hue its “colorness” (vertical scale). You simply need to set all points to the minimum of the vertical scale to de-saturate every hue.
3. But now if you want, you can keep some hues a little bit saturated, so your image will be all black and white but some hue. A classical use for portrait is to keep red hue saturated in order to make the lips standing out.

You can also use presets that perform black and white conversion, keeping some hues saturated.

3.5.1.5. The sophisticated way: channel mixer module

To perform the conversion we use the *channel mixer* module (Section 3.4.3.2, “Channel mixer”).

1. Activate the channel mixer module
2. Select the gray output channel
3. Set the proportion of each color, the sum having to equal 1 if you want to keep your global lightness.

radio-buttons ?

colorness = saturation ?

3.5.2. Cross-processing

3.5.2.1. Overview

Cross-processing is an analog processing technique where slide film (normally developed thanks to an E6 solution) is processed in chemicals used for processing print film (C41). The resulting images get skewed colors usually a cyan hue and increased contrast and saturation.



The standard way for doing digital cross-processing is to use a channel curve tool but darktable lacks this tool for the moment and another way to accommodate the effect is used.

3.5.2.2. Procedure

This procedure uses tone curve, channel mixer and splittoning modules.

1. Image preparation

Prepare the image for the cross process steps by adjusting the base settings such as exposure, whitebalance etc. for a correctly looking image.

2. Boost contrast

Select the medium contrast curve preset for *tone curve* module (Section 3.4.2.3, "Tone curve") to boost the overall contrast in the image. You might later return here to tune the curve for better result.

3. Color cast

This step changes the color cast as the base for the effect using the *channel mixer* module (Section 3.4.3.2, "Channel mixer"). You might later again return to this and finetune the colorcast of the final result.

a. Enable the channel mixer module

b. Select blue channel and set blue color value to 0.8

c. Select red channel and change blue color value to 0.1 — red ?

d. Select green channel and change blue color value to 0.1 — green ?

4. Splittoning

We use *splittoning* (Section 3.4.5.3, "Splittoning") to add some more coloring to the result for cyan/blue shadows and yellow highlight.

a. Enable the splittoning module

b. Select a cyan/blue tone for shadows and set saturation around 50%

c. Select a yellow/orange tone for highlights and set saturation around 70%

d. Set compression to 10%

e. Use the balance slider to tune the splittoning effect. This differs on every image due to its exposure, motive etc.

3.5.3. Cyan toned image

3.5.3.1. Overview

Cyan is a nice color touchup for black and white images, this example guides you through how to make this with darktable and how to control the tone. You can choose any tone of your like for this tutorial...



3.5.3.2. Procedure

This procedure uses ~~tone curve~~, channel mixer and splittoning modules.

1. Image preparation

Prepare the image for the cyan toned steps by adjusting the base settings such as exposure, black level, contrast etc. for a correctly looking image.

2. Black and white

Enable the *monochrome* module (Section 3.4.3.6, "Monochrome") to make the image black and white.

3. Add color tone

This step selects the base tone of the image using *channel mixer* (Section 3.4.3.2, "Channel mixer"), we are going for cyan tone but you can choose any tone that you like here.

a. Enable the channel mixer module

b. Select red channel destination and set red color value to 0.7

c. Select green channel destination and ~~red~~ ^{green ?} color value to 1.15

d. Select blue channel destination and ~~red~~ ^{blue ?} color value to 1.15

As you notice we mix blue and green color to get a cyan tone, we subtract 0.3 from red channel and add them to blue and green.

4. Splittoning

The result of previous step does also add a color cast on highlight that we actually want to have white for a prettier result. We also want to add some blue color cast to the shadows in order to emphasize them. Module *splittoning* (Section 3.4.5.3, "Splittoning") can accomplish this.

a. Enable the splittoning module

b. Select a blue/cyan tone for shadows and set saturation around 50%

c. Set highlights saturation to zero, to remove saturation on highlights.

d. Set compression to zero

e. Use the balance slider to tune the effect, our example uses a balance of 70/30

3.5.4. Removal of red-eye effect

3.5.4.1. Overview

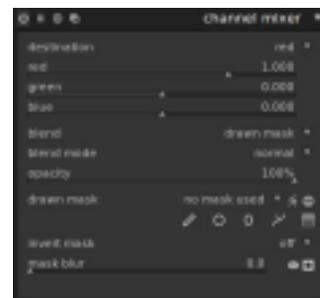
The red-eye effect in photography is the common appearance of red pupils in color photographs of eyes. It occurs when using a photographic flash very close to the camera lens (as with most cameras with built-in flash), in ambient low light.



We use the channel mixer module to reduce the red color of the pupil. To limit the processing to the pupils we have to apply two masks.

3.5.4.2. Masking

1. Enable the channel mixer module (see Section 3.4.3.2, "Channel mixer").

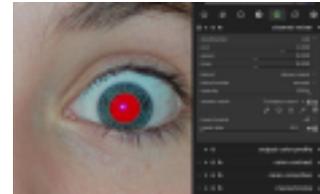


2. Activate blending

Modules with blending support exhibit an additional combobox "blend" at the bottom of their GUI. Blending is activated with this combobox. Set value to "drawn mask". Additional controls are displayed which allow you to draw a mask.

3. Masking the pupil

Clicking the  symbol adds a circle shape.



Click into the canvas to place the circle. Left-click and drag the circle to the position of the first pupil. Use the scroll-wheel of your mouse while in the circle to change the diameter. Scroll within the circle border to minimize the width of the gradual decay.

Alternatively you can use an elliptical mask. See Section 3.2.6, "Drawn mask" for further details.

shape ?

4. Repeat step 3.

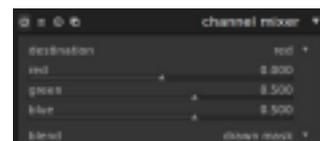
Clicking the  symbol adds another circle shape.

Mark the second pupil.

3.5.4.3. Desaturation

1. Approach - Modifying the output channel "red".

a. Set output channel "destination" to "red" (default)



b. Set red color value to 0.00

c. Set green color value to 0.50

d. Set blue color value to 0.50

You are free to experiment what gives you the most realistic pupil, but this is a good starting point. Another proposal is 10/60/30. The sum of the three values should be 1.

0.1/0.6/0.3



5. Approach - Modifying the output channel "gray".

a. Set output channel "destination" to "gray"

b. Set red color value to 0.24

c. Set green color value to 0.68

d. Set blue color value to 0.08

You are free to experiment what gives you the most realistic pupil, but this is a good starting point. The sum of the three values should be 1.

