

# Introduction & Installation

# Introduction

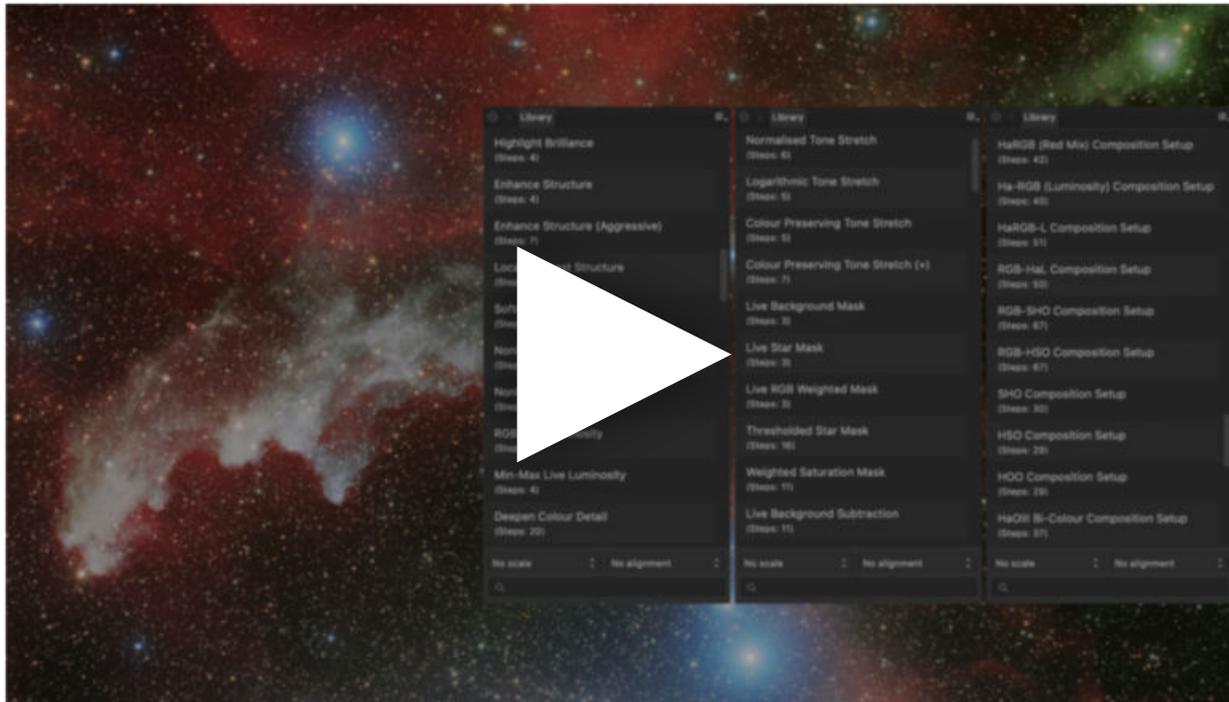
This macro pack contains over 100 macro functions for astrophotography editing, including features such as colour-preserving tone stretching, star size and intensity reduction, bandpass sharpening and more. These macros aim to be completely non-destructive where possible, avoiding Merge Down/Merge Visible which results in redundant pixel layers.

**Please note:** most macros are designed for use in a 32-bit per channel pixel format—e.g. in DeepSkyStacker when saving to a TIFF this is referred to as '32-bit/ch Rational'. The macro results may look incorrect if you try to use them in 16-bit or 8-bit. If you are stacking in Affinity Photo, this will always default to 32-bit precision anyway.

I have also included a second category of macros for use with 16-bit per channel editing—these do not include the tone stretching macros (which should always be done in 32-bit) and composition macros, but they can be used after tone stretching if you flatten/merge and convert to 16-bit. There are macros at the bottom of the 32-bit category that will help with this 16-bit conversion procedure. Taking this approach will speed up editing: older or weaker hardware may struggle with 32-bit compositing, and 16-bit compositing is less taxing on both the CPU and GPU.

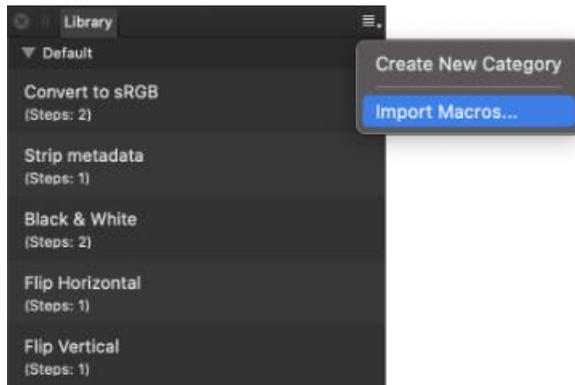
You will see which macros can be used in 16-bit by looking underneath the macro title in this readme: you will typically see RGB/32 but any macro that also has RGB/16 will be available in the 16-bit macro category.

I have also recorded a video that covers some of V15's new functionality. [You can view it on YouTube by clicking here.](#)



# Installation

1. Extract the *.afmacros* files to a directory of your choice.
2. Drag drop the *.afmacros* files, e.g. *JR - Astrophotography V19 (32-bit).afmacros*, onto Affinity Photo's user interface and release the mouse button.
3. The macro category will be installed and the **Library** panel will automatically appear, displaying the new macros.
4. The **Library** panel can be toggled on/off by going to **Window>Library**. The macros can also be installed via this panel by clicking on the panel options and choosing **Import Macros**.



# Main Macros

You will find four .afmacros files that can be installed:

- JR - Astrophotography Stretching
- JR - Astrophotography 32-bit
- JR - Astrophotography 16-bit
- JR - Astrophotography Data Setups

If you stack in Affinity Photo, you will always default to working in 32-bit, therefore you should install the 32-bit macros and the stretching macros. The same applies if you stack in other software and save as a 32-bit floating point / rational TIFF or FIT file, which you then open in Affinity Photo to edit further. **Stretching macros should always be run in 32-bit, and not 16-bit.**

The 16-bit macros are primarily for workflows where you will bring in a post-tone stretch image for further retouching in Affinity Photo, which may have been saved in 16-bit precision.

However, you may find that 32-bit compositing is too demanding on your computer, in which case you can flatten after tone stretching and convert to 16-bit for better performance. I would then recommend you use the 16-bit macros, since they have various adaptations because 16-bit operates in gamma corrected space, as opposed to 32-bit's linear space.

# Tone Stretching (JR - Astrophotography Stretches)

## Macro

### NEW:

(Live) Basic Tone Stretch  
(Live) Arcsinh Tone Stretch  
(Live) Structural Tone Stretch  
(Live) Logarithmic Tone Stretch  
(Live) Colour Preserving Tone Stretch  
RGB/32

## Functionality

*Run once you have all your data layers aligned and blended in one document.*

*If you are working with one shot colour (OSC) data, you won't need to do anything. If you are working with mono data, you will likely want to colour map it using the Data Setup macros.*

For the best result, delete the existing Curves and Levels adjustment layers that are created by default.

These are various hyperbolic stretches implemented in a non-destructive manner that does not require layer merging—you may have to experiment with a couple of parameters to find the best result for your own imagery.

To configure the stretching to work for your data, expand the created **Tone Stretch** group to see a couple layers:

- Click the **Stretch** layer thumbnail for access to a **Stretch Factor** slider that you can alter to control the overall strength of the stretch. There is also a **Gamma** slider for brightness.
- Click the **Compression** layer thumbnail for access to a **Compression Blend** slider. This controls the blend between two different compression methods: on the left, compression with more contrast (for punchier tones), and on the right, compression with more highlight preservation (for scenes with more dynamic range).

Do experiment with the different methods available: Asinh is a good all-rounder for most data. Colour Preserving works especially well for one shot colour data.

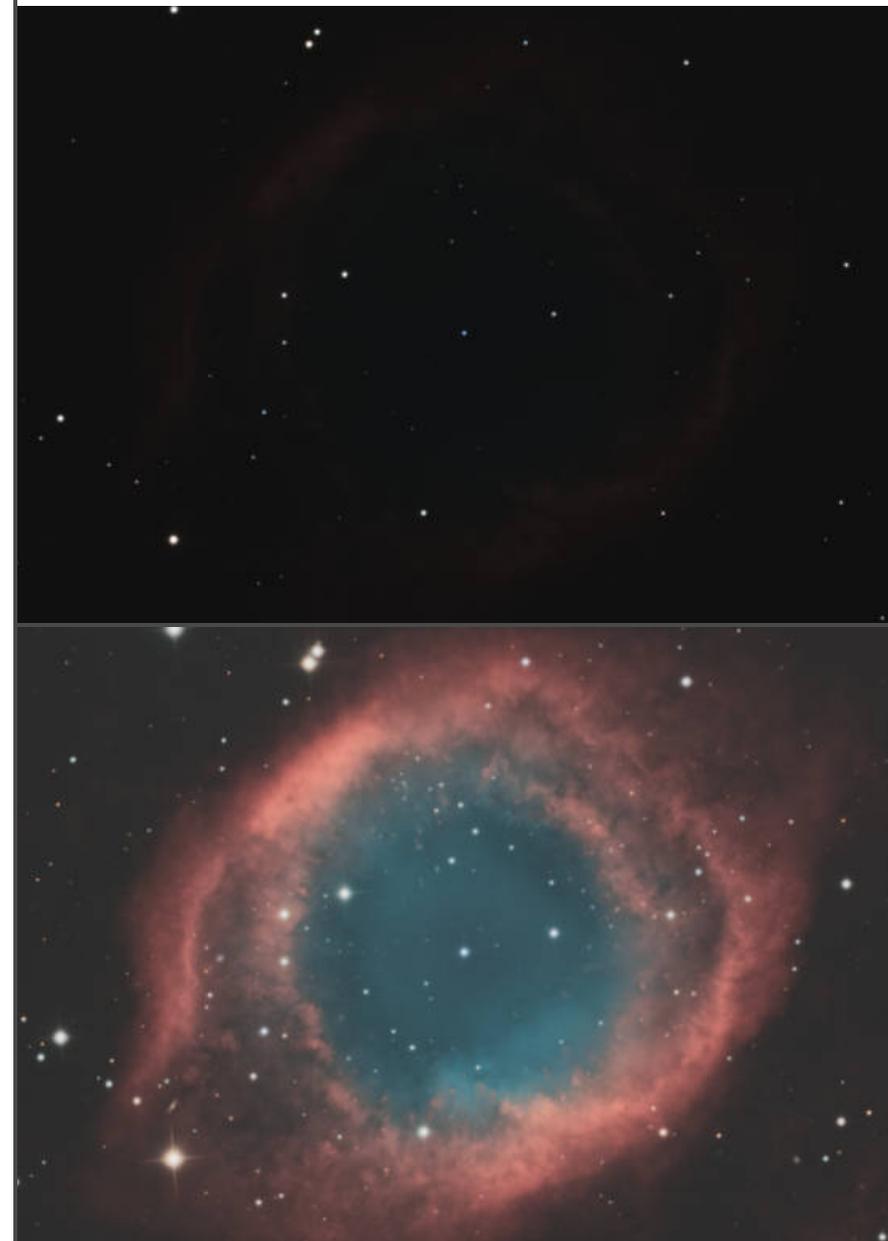
## Neutral Tone Stretch

RGB/32

*Run once you have all your data layers aligned and blended in one document.*

For the best result, delete the existing Curves and Levels adjustment layers that are created by default.

Performs a weighted logarithmic transform then stretches the values in each colour channel to reveal object detail and give you a starting point for further retouching work. This is a good option to start with, then you can move onto the other methods below if you require a more colourful result (or wish to evaluate differences to see which you prefer).



Above: Unstretched. Below: (Live) Arcsinh Tone Stretch

## Macro

### Normalised Tone Stretch RGB/32

## Functionality

*Run once you have all your data layers aligned and blended in one document.*

**For the best result, delete the existing Curves and Levels adjustment layers that are created by default.**

Performs a nonlinear transform then stretches the values in each colour channel to reveal object detail and give you a starting point for further retouching work.

The tone stretching will reveal any background colour casts and gradients that may be present. With the *Normalised Tone Stretch* layer selected, you can remove these by going to **Filters>Astrophotography>Remove Background**.

### Logarithmic Tone Stretch RGB/32

Performs a powerful logarithmic tone stretch that retains more colour intensity. This is a good option if you want slightly more colour detail as a starting point and feel that the **Normalised Tone Stretch** result is too neutral.

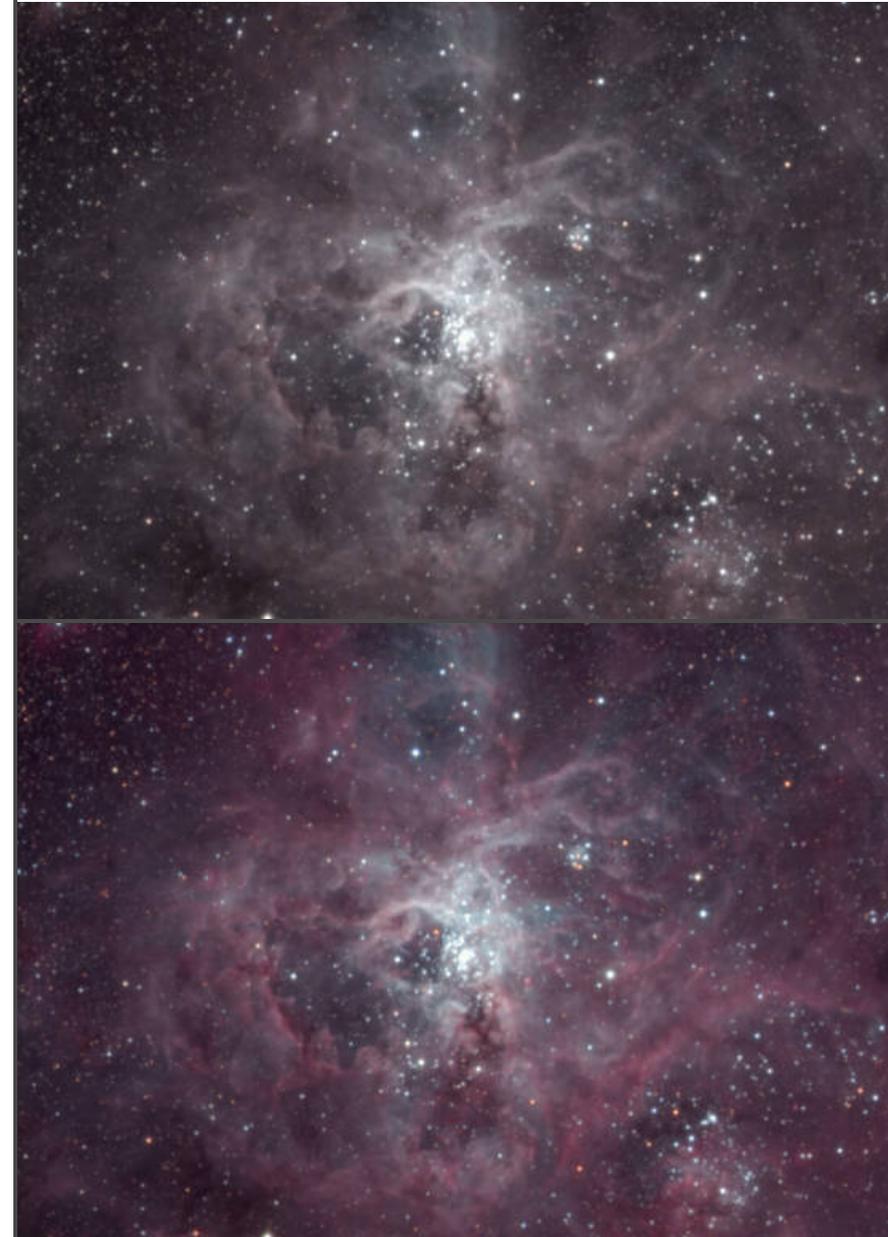
**For the best result, delete the existing Curves and Levels adjustment layers that are created by default.**

### Colour Preserving Tone Stretch Colour Preserving Tone Stretch (+) RGB/32

Inspired by requests for an equivalent to Archsinh tone stretching, this performs tone stretching with superior colour preservation compared to the traditional Levels/Curves approach. Works best on broadband data—narrowband data may appear oversaturated, but do experiment as all data sets are unique.

**For the best result, delete the existing Curves and Levels adjustment layers that are created by default.**

There is also a (+) version, which will perform an additional nonlinear transform and histogram correction. This will really tease out fainter detail but may be overkill for most data—again, feel free to experiment and see whether it works for your imagery.



Above: Normalised Tone Stretch. Below: Colour Preserving Tone Stretch

## Macro

Mono Stretch (RGB)  
Mono Log Stretch (RGB)  
Mono Stretch (L-RGB)  
Mono Log Stretch (L-RGB)  
Mono Stretch (SHO)  
Mono Log Stretch (SHO)  
RGB/32

Stretch Selected Layer  
Log Stretch Selected Layer  
RGB/32

## Functionality

*Run once you have all your data layers aligned but BEFORE the colour mapping (achieved with the Data Setup macros).*

**For the best result, delete the existing Curves and Levels adjustment layers that are created by default.**

Rather than tone stretching the composited, colour-mapped result, these macros will instead tone stretch each mono layer individually. You can colour map using the data setup macros before or after this process. I have found that this approach can yield some much better results for complex nebulae, and it's easier to pull the colours apart and create a final image with more depth.

There are two methods available for RGB, L-RGB and SHO data sets: Mono Stretch, and Mono Log Stretch. The log stretch may work better for clean, high quality data. If the data is not optimal, I would advise trying the standard stretch. Do try both, however, and see which works better for you.

Note that this should be considered as an alternative to the existing tone stretching methods above, not a replacement! As always, experiment and see which methods work best for your data: indeed, you may find that one method may be exceptional for one set of data, but not another.

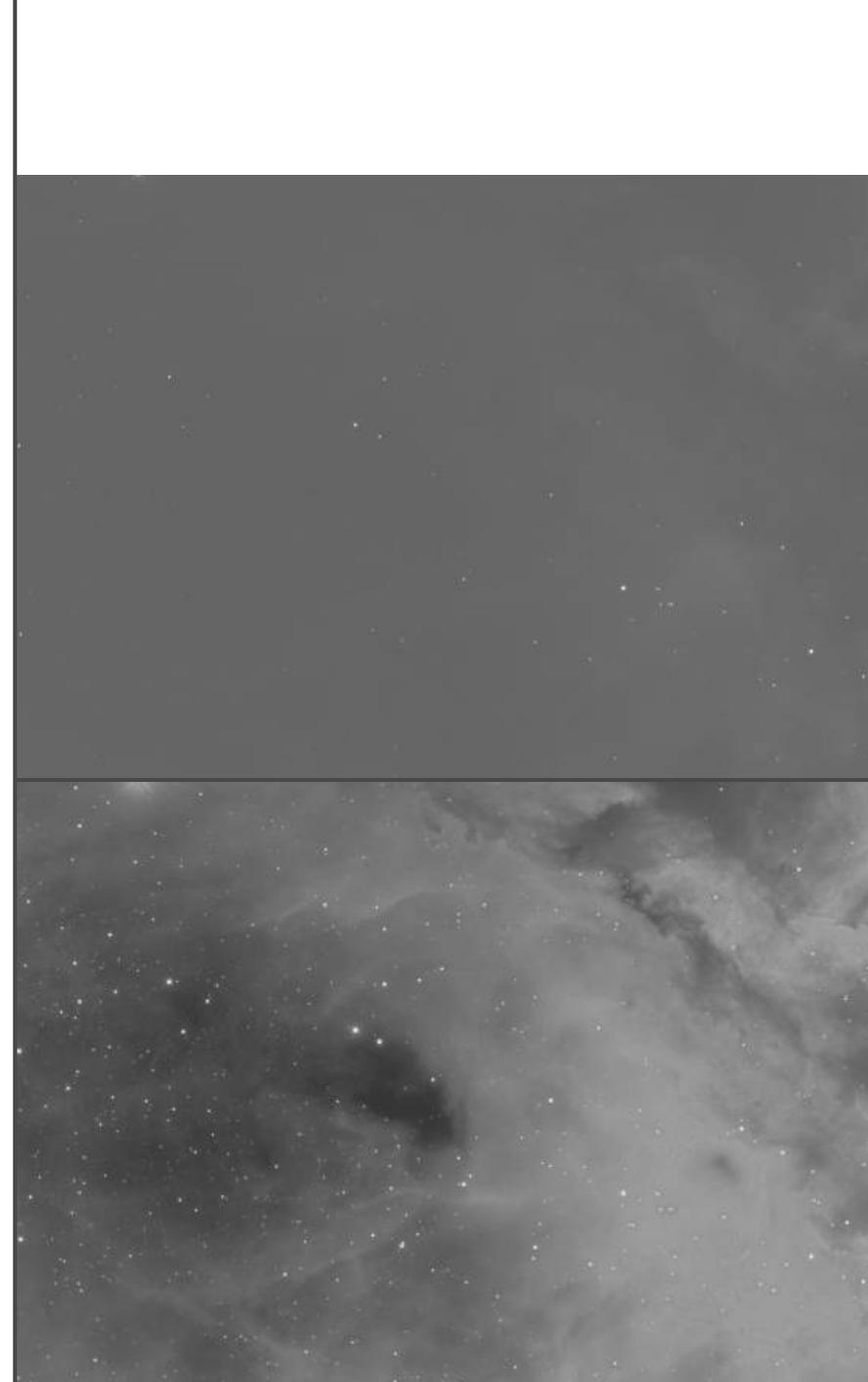
The mono data stretching macros also require masking to avoid overexposing bright detail: the masks for this process are based off an average of several different data sets.

You may find however that you need more manual control over this process: you can use these macros to stretch an individual layer that you have selected.

Alternatively, you might be using a non-conventional combination of data layers—such as enhancing an RGB composition with Ha—and you would need to stretch the Ha data individually.

A ***Stretched (Merge Down)*** layer will be created, with a ***Protect Highlights*** mask inside it.

Configure this mask until the highlight detail looks suitable for that data, then select the parent layer and use **Layer>Merge Down** to merge it into the initial data layer underneath. You can then repeat this process for all of your data layers until you are ready to colour map them.



Mono Log Stretch on Ha data

## Macro

Enhance R (Mono) Layer  
Enhance G (Mono) Layer  
Enhance B (Mono) Layer  
Enhance SII (Mono) Layer  
Enhance Ha (Mono) Layer  
Enhance OIII (Mono) Layer  
RGB/32

Boost R Layer  
Boost G Layer  
Boost B Layer  
Boost SII Layer  
Boost Ha Layer  
Boost OIII Layer  
RGB/32

Pre-Tone Stretch Denoise (RGB)  
Pre-Tone Stretch Denoise (L-RGB)  
Pre-Tone Stretch Denoise (SHO)  
RGB/32

Post-Tone Stretch Denoise  
RGB/32

Post-Tone Stretch Log Transform  
RGB/32

## Functionality

*Run once you have all your data layers aligned and blended in one document. If using the mono tone stretching method, perform the tone stretching first then use these afterwards.*

To aid the mono data stretching process, there are also macros to enhance specific mono layers (e.g. SII, Ha, OIII, R, G, B etc). You can use these to bring out more detail for a specific data layer, e.g. if the SII detail was a bit faint and you wanted to enhance it.

Once a macro has been run, an additional layer will be created above the specified mono layer. You can change the opacity of this layer to control the amount of enhancement.

*Run once you have tone stretched your data and have begun the retouching/editing process.*

These are designed to be used after the tone stretching process and further on in the edit. You may want to simply bring out some more colour or detail in a particular data layer such as OIII, or the G layer. This will copy the specific data layer, move it to the top and enhance its structure whilst preserving highlight detail.

*Run before tone stretching. Ensure your data layers are named according to the composition type (e.g. R, G and B, or SII, Ha and OIII).*

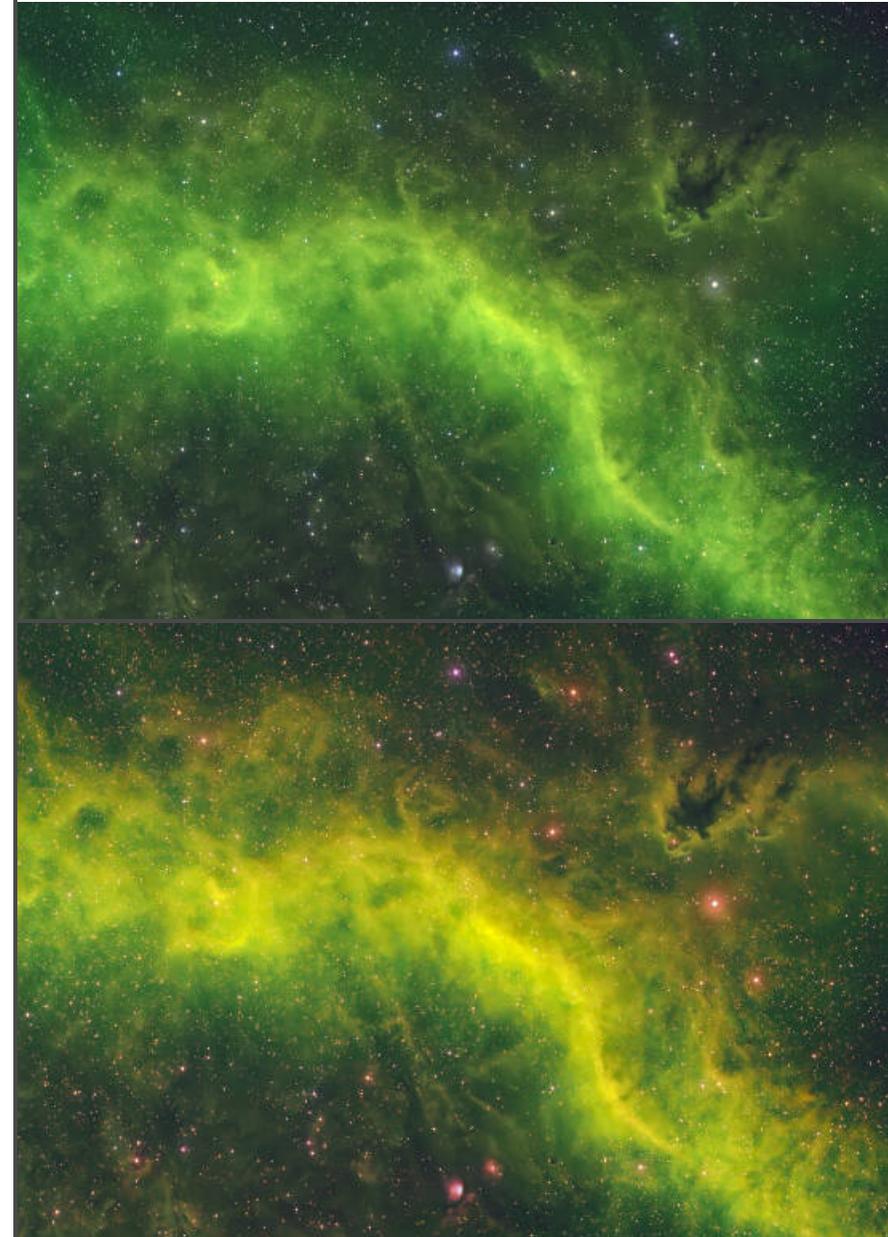
Allows you to denoise the individual monochrome data layers before tone stretching—depending on your data, this may yield better results than denoising after tone stretching.

*Run once you have tone stretched your data and have begun the retouching/editing process.*

After tone stretching, your imagery may contain both luminance and chrominance noise. This macro offers a reasonable attempt at noise reduction which will clean up the image. You can lower the opacity of the *Post Tone-Stretch Denoise* layer if the denoising is too aggressive.

*Run once you have tone stretched your data and have begun the retouching/editing process.*

Some imagery may require further tone stretching to pull detail away from the background. This option will bring out subtle detail, and has configurable range and blend sliders (click on the *Post-Tone Stretch Log Transform* layer thumbnail to bring these up).



Enhance SII (Mono) Layer

# Tone Manipulation

## Macro

### Tone Compression & Contrast RGB/32

## Functionality

Provides a smooth tonal compression (avoiding harsh highlight detail) whilst also increasing general contrast across the image. This can be applied before or after further retouching as long as the document is still in 32-bit. Change the *Tone Compression & Contrast* layer opacity to control the strength of the effect.

### Tone Compression & Gamma RGB/32

Provides a smooth tonal compression (avoiding harsh highlight detail) and brightens the image. The effect is less aggressive compared to using *Tone Compression & Contrast*.

### Darken Mono Stretched Result RGB/32

When using the new mono data stretching macros, you will often find that the resulting composition is quite bright once all the layers are blended together. This will produce a pleasing brightness reduction, whilst also offering an optional non-linear brightness boost that will even out the contrast for trickier data.

To access the non-linear brightness boost, click on the *Darken Mono Stretched Result* layer thumbnail.

### Highlight Recovery RGB/32

If you are compositing multiple mono layers together (e.g. RGB, SHO), this macro can be used to recover any blown out highlight detail.

Note: this only works in 32-bit, as pixel values are 'unbounded', which means they can be greater than the 0-1 range. This means pixels brighter than 1 can be remapped to within a displayable range.

Click on the *Highlight Recovery* thumbnail and use the **Highlights Range** slider to configure the range of bright pixels that are recovered.

### Generate Weighted Luminosity Layer RGB/32 RGB/16

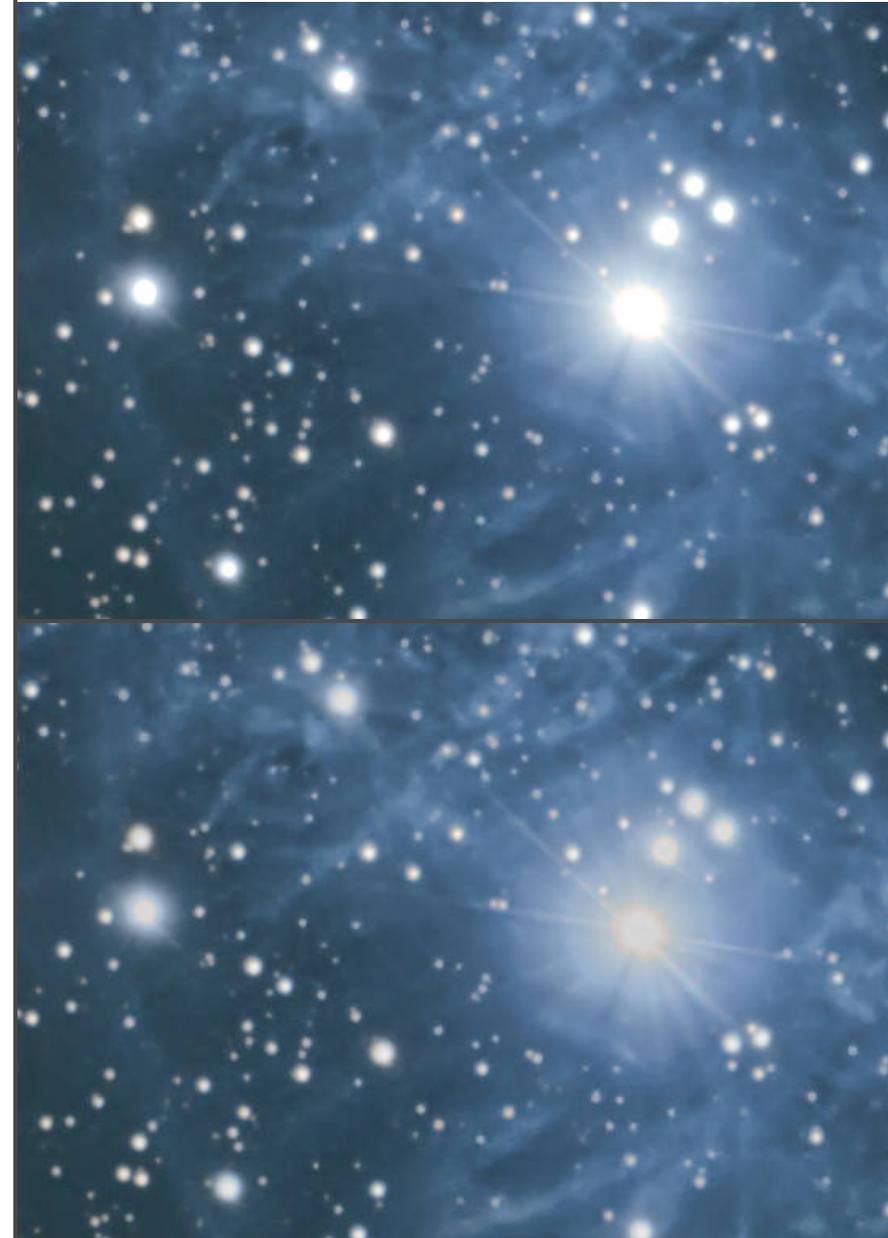
Best run after tone stretching and any basic tonal adjustments. Creates a layer set to a Luminosity blend mode based on the weighted greyscale intensity (or luminosity) of your image so far.

This allows you to use all manner of adjustments and filters to alter the colour detail in your image without affecting brightness. To do this, just make sure you add your layer work underneath the *Weighted Luminosity* layer (which will be placed at the very top of the layer stack).

### **NEW:** Live Denoise (Choma) Live Denoise (Luma & Chroma) RGB/32 RGB/16

Quickly applies a non-destructive Denoise filter with appropriate settings based on whether you're using the 32-bit or 16-bit version.

Chroma will just remove colour noise. Luma & Chroma will also remove luminance noise (which will smooth detail out).



Highlight Recovery

## Macro

### Polynomial Contrast Curve

RGB/32  
RGB/16

## Functionality

Applies a non-destructive polynomial function with gamma correction to enhance contrast.

Click on the Polynomial Contrast Curve thumbnail to control individual red, green and blue channel gamma, allowing you to add a colour tint/cast if required.

### Punch & Saturation

RGB/32  
RGB/16

Gives the image a little more contrast and saturation. The effect is blended out of the highlight detail to avoid clipping or brightening star detail and other intense areas.

### Masked Gamma Stretch

RGB/32  
RGB/16

Creates a structural mask that excludes star detail and applies it to a Levels adjustment, allowing you to perform a non-linear gamma boost. Especially useful when used with individual colour channels (e.g. raising gamma of a weaker colour channel without overexposing bright details).

### Masked Curves Stretch

RGB/32  
RGB/16

Performs a masked tone stretch that excludes bright star and nebula detail. Good for increasing brightness and contrast of darker areas.

### Masked Contrast Boost

RGB/32  
RGB/16

Applies a gentler curves adjustment that is masked to exclude bright detail. Useful for a general contrast enhancement without significantly brightening detail.

### Highlight Preserving Tone Boost

RGB/16  
RGB/32

Boosts shadows and mid tones whilst preserving highlight detail—this is achieved through a non-destructive mask calculation whose parameters can be altered.

Expand the *Highlight Preserving Tone Boost* group, then click on the *Highlight Mask* thumbnail to control the highlight threshold and mask fine tuning. Click on the *Brightness / Contrast* thumbnail to alter the actual brightness and contrast enhancement.

### Highlight Preserving Brightness Boost

RGB/16  
RGB/32

Boosts overall brightness whilst preserving highlight detail using blend ranges. Click on the *Highlight Preserving Brightness Boost* thumbnail to change the brightness value.



Highlight Preserving Tone Boost

## Macro

### Highlight Protected Tone Lift

RGB/16  
RGB/32

## Functionality

This has replaced the **Final Tone Lift** macro and is more or less the same: it simply lifts the overall brightness and contrast of your composition without overexposing the highlights.

A quick way to control the overall tone lift strength is to change the opacity of the *Highlight Protected Tone Lift* macro.

### Nonlinear Tone Boost

RGB/16  
RGB/32

A nice simple equation-filter option for achieving a tonal boost that focuses on raising darker tones. This is generally useful if you are trying to brighten up your composition but Curves or other adjustment layers just aren't working.

Click the *Nonlinear Tone Boost* layer thumbnail for access to the **Highlight Threshold** slider. Moving this left will increase the tone boost.

### Edge Masked Contrast

RGB/16  
RGB/32

Produces a very subtle contrast enhancement to wide edge detail. Good for enhancing detail in large nebula objects.

Expand the *Edge Masked Contrast* group and click on the *Bandpass Mask* layer to the luminosity range graph, which will allow you to control the strength of the contrast enhancement.

### Reduce Mid-Tone Contrast

RGB/16  
RGB/32

Useful for flattening nebula detail if it has too much contrast. Uses blend ranges to avoid affecting the shadow and highlight tones.

Click the *Reduce Mid-Tone Contrast* thumbnail to change the contrast value.

### Shadow Stretch

RGB/16  
RGB/32

Uses Photo V2's new live Luminosity Mask to apply a tonal stretch to shadows and mid-tones, leaving highlights alone. Useful for high contrast imagery where you need to 'soften' the transition between shadow and deep sky object detail.

### Compress Highlights

RGB/32

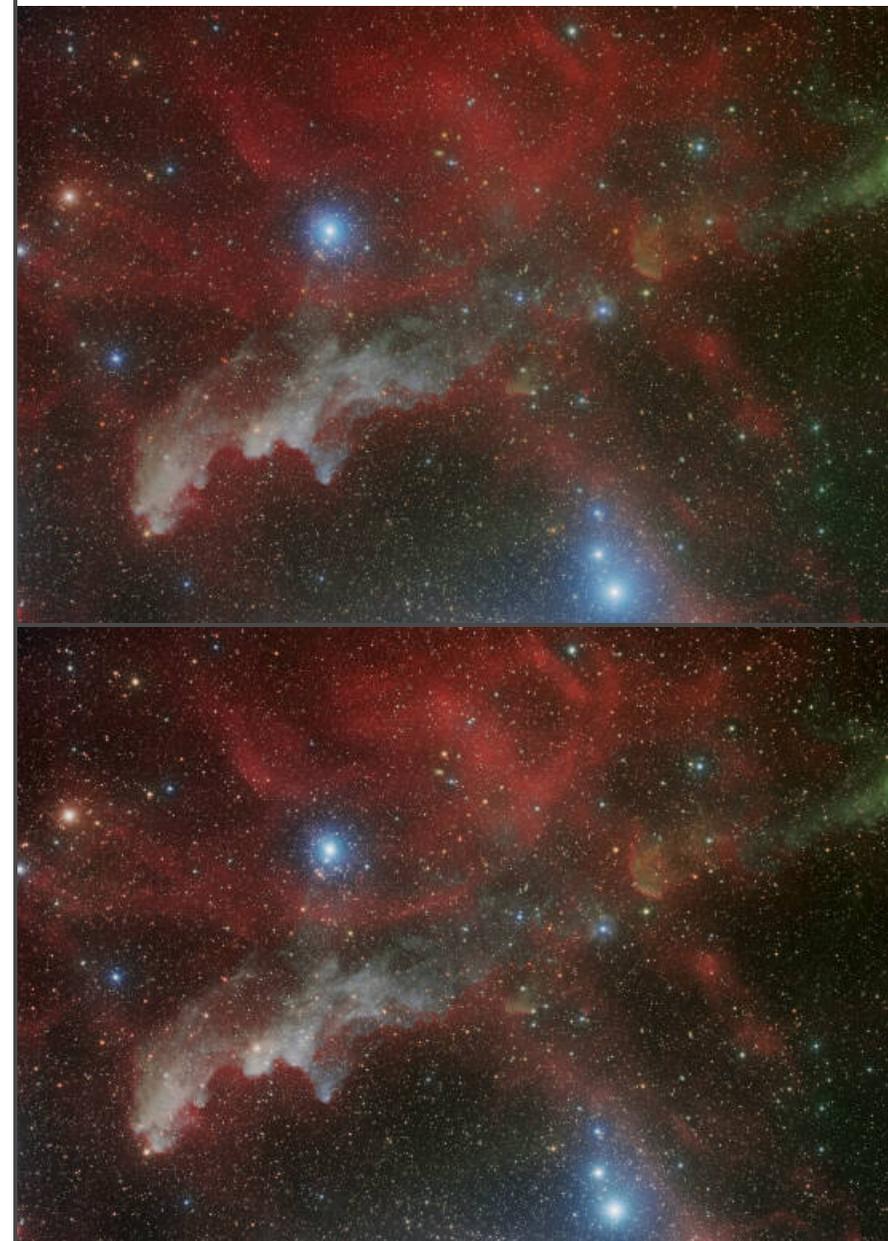
Renders a smooth roll-off for highlights whilst preserving colour intensity.

### Weighted Luminosity Enhancement

RGB/16  
RGB/32

Calculates a weighted greyscale intensity based on the composited RGB data, then uses it to enhance luminance.

Click the *Weighted Luminosity Enhancement* thumbnail and use the **Clamping** slider to adjust brightness clamping.



Shadow Stretch and Weighted Intensity Mixer

## Macro

### Weighted Intensity Mixer

RGB/16  
RGB/32

## Functionality

Lets you mix together different weighted intensity calculations based on the RGB channel data. This could be useful if you are struggling to balance the luminosity of your different colours and want to quickly experiment with various blends.

Click the *Weighted Intensity Mixer* thumbnail to access the various blending sliders.

### Weighted RGB Tonal Boost

RGB/16  
RGB/32

Lets you add a subtle brightness and tone boost with configurable RGB contribution, in addition to offset sliders which allow you to gradually raise the brightness of the colour channel information in a gentle, non-linear fashion.

Click the *Weighted RGB Tonal Boost* thumbnail to access weighting and offset sliders.

### RGB Live Luminosity

RGB/16  
RGB/32

Adds a single live filter layer that enables you to bring through luminosity data using single channel information *or* a mix of channel information.

Click the *RGB Luminosity* thumbnail, then alter the three contribution sliders to determine which mix of red, green and blue luminance information you would like.

Defaults to purely red channel information for a quick red channel luminance boost.

### Min-Max Live Luminosity

RGB/16  
RGB/32

Adds a single live filter layer that enables you to control luminosity using maximum and minimum RGB colour calculations.

Click the *Min-Max Luminosity* thumbnail then alter the **Max** and **Min Strength** contribution sliders to determine the contribution from each calculation, then use the **Blend** slider to control the balance between the two.

An additional **Nonlinear Boost** slider allows you to boost darker detail without overexposing highlight detail.

### Extract Inferred Ha Luminance

RGB/16  
RGB/32

Useful for when you don't have separate Ha data to use for luminosity enhancement. Merges your layer work so far, then performs a logarithmic transform and channel manipulation to extract 'inferred' Ha data from the red channel. The resulting layer's effect can be modified by changing its **Opacity**, or by clicking on the *Luminosity Strength* thumbnail and altering the **Gamma** slider.



Extract Inferred Ha Luminance

# Star Detail Retouching

## Macro

Star & Background Separation (L)  
Star & Background Separation (L) (+)  
Star & Background Separation (S)  
Star & Background Separation (S) (+)  
RGB/32

## Functionality

*Run after tone stretching, and please ensure any background gradients are already eliminated.*

Splits the image into two layers: **Starless** and **Stars**. The macro may take some time to complete, and the star removal is not always foolproof (larger stars may remain).

This macro is very helpful if you want to retouch the object detail independently of the star detail. It doesn't produce flawless starless images: for that, you would need StarNet++ or StarXTerminator.

However, if your intention is to keep the stars, but you want to modify the object detail independently (e.g. enhance structure, modify or boost colours), you can perform layer work underneath the **Stars** layer. You can even clip adjustments and live filters into the **Stars** layer, for example to reduce fringing or colouration.

There are four variants. (L) should be used for images with larger stars (or lower resolution). The (+) version is more aggressive and targets dimmer stars. (S) should be used for images with smaller stars (or higher resolution), and the (+) version will target dimmer stars.

Star Size Reducer  
RGB/16  
RGB/32

Adds a live filter for non-destructive real time star size reduction. You can control the strength by altering the *Star Size Reducer* layer's **Opacity**.

**Please note:** the live application is performance-intensive (hardware acceleration is advised) and also needs to be viewed at 100% zoom for accurate rendering.

Reduce Star Luminosity  
RGB/16  
RGB/32

Decreases star luminosity without reducing the size or shape. Useful for longer exposure results where star detail can tend to overpower the image.

Non-destructive application: click the **Live Star Mask** thumbnail to adjust threshold and smoothing for the star mask, and click the **Luminosity** thumbnail and alter the **Luminosity Shift** slider to alter the star reduction.

Reduce Star Intensity  
RGB/16  
RGB/32

Reduces size and overall intensity of star detail. Useful for broadband data where star detail is more prominent.

Note: the live Minimum Blur filter should be previewed at 100% zoom for an accurate representation. If the redrawing is too visually distracting, temporarily hide the layer whilst retouching, then show it again before exporting.

The **Reduce Star Intensity** layer has its own mask, which you can easily paint on with black to remove the effect from certain areas.



Star Size Reducer

# Background Detail Retouching

## Macro

**Reduce Background Luminosity**  
RGB/16  
RGB/32

## Functionality

Darkens and de-emphasises the background by reducing its luminosity and saturation.

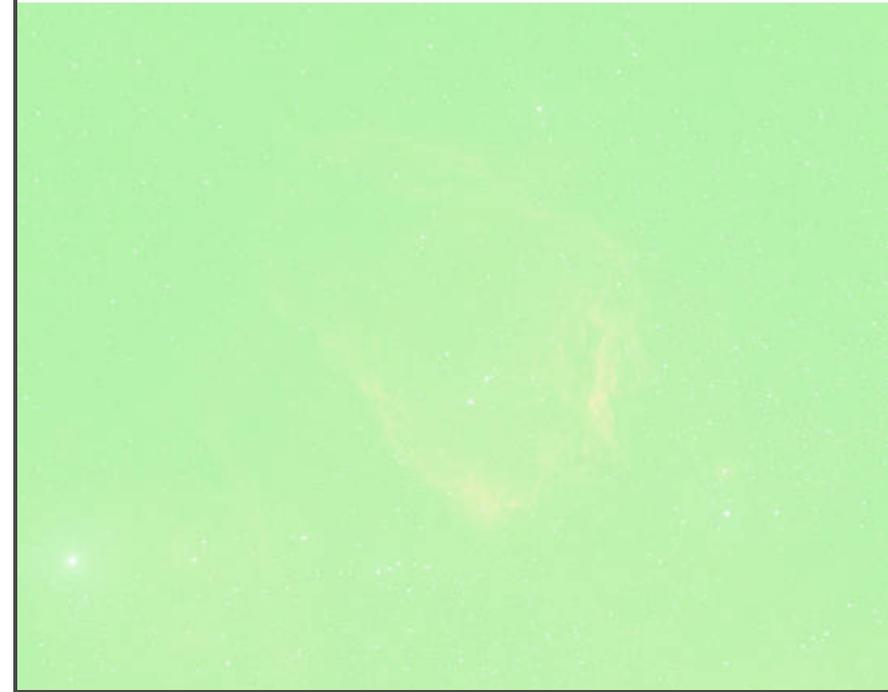
Non-destructive application: click the *Live Background Mask* thumbnail to adjust threshold and smoothing for the background mask, and click the *Luminosity* thumbnail and alter the **Luminosity Shift** slider to control the background brightness. You can also modify the **Saturation Shift** slider to control background colour intensity.

Generally, altering the overall **Opacity** of the *Reduce Background Luminosity* layer is a great way to quickly change the strength of the effect.

**Live Background Subtraction**  
RGB/16  
RGB/32

Non-destructively removes background colour casts. The *Sampled Colour Fill* layer will be selected by default: use the Colour Picker on the **Colour Panel** to sample a background tone from your image, then click the picker icon to assign it.

Now show (enable) the *Live Background Subtraction* group and the background colour will be removed. If the background is too dark, click the *Black Level Offset* thumbnail and change the **Output Black Level** slider.



Live Background Subtraction

# Structure Retouching

## Macro

### Enhance Structure

#### Enhance Structure (Aggressive)

RGB/16

RGB/32

## Functionality

Enhances structure/texture—useful for bringing out fainter objects like nebula gas detail. Only blends into shadow and mid-range detail to avoid overexposing star highlights.

The *Enhance Structure* layer has its own mask: you can paint with black to subtract over areas where you don't want structure enhancement. Alternatively, you can use Layer>Invert to make the mask black, then paint in with white over areas where you want structure enhancement,

You can also control the strength of the structure enhancement by changing the *Enhance Structure* layer's **Opacity**.

The Aggressive version creates a new merged pixel layer at the top of the layer stack and applies a destructive filter, which results in stronger structural enhancement.

Within the *Enhance Structure (Aggressive)* layer you will find a mask layer, which can be used to control where the structural enhancement is being rendered. Don't forget you can also change the opacity of the layer to alter the strength of the effect.

### Enhance Nebula Structure

RGB/16

RGB/32

Similar to the Enhance Structure macros. Enhances nebula structure whilst aggressively excluding bright star detail. The *Star Exclusion Mask* can be controlled with minimum, maximum and highlight threshold parameters (accessible by clicking on its thumbnail).

### Super Texture

RGB/32

RGB/16

Produces an incredibly strong textural enhancement effect.

The macro will create a mask and select it: you can immediately invert this (Layer>Invert) and paint back in with the **Paint Brush Tool** if you wish to selectively apply the effect.

The effect may also be far too strong by default: simply change the *Super Texture* layer opacity to reduce the strength.

Note: the 16-bit category version will look different (arguably superior) because it can use bilateral filtering which is not available with 32-bit float compositing.



Enhance Structure

## Macro

### Super Structure

RGB/32  
RGB/16

## Functionality

Creates a dramatic structural enhancement on a new layer. The layer's opacity can be lowered to reduce the strength of the effect.

### Laplacian Structure Enhancement

RGB/32  
RGB/16

Uses a laplacian pyramid technique (frequency decomposition) to enhance broader details in the image. The default effect may be too strong: simply reduce the *Laplacian Structure Enhancement* group opacity.

Upon expanding the *Laplacian Structure Enhancement* group, you will see several layers labelled by the amount of downsampling performed. Expand these to find either a Brightness/Contrast or Curves adjustment: manipulating the adjustments will let you fine tune the amount of enhancement each layer is contributing.

Alternatively, you can also alter the opacity of each layer.

Note: if you are seeing black "splotches" around edge detail (e.g. stars), please ensure you are using the 32-bit version on a 32-bit document.

### Gaussian Difference Structure Enhancement

RGB/32  
RGB/16

Uses a gaussian low pass technique to generate difference masks and uses them for Brightness / Contrast adjustment enhancement.

If you expand the *Gaussian Difference Structure Enhancement* group, you will find several adjustments named after the kernel value for each low pass filter used to generate the mask. Try adjusting the opacity of each layer to further configure the effect, or changing the opacity of the top level group to control the overall strength.

### Local Contrast Structure

RGB/16  
RGB/32

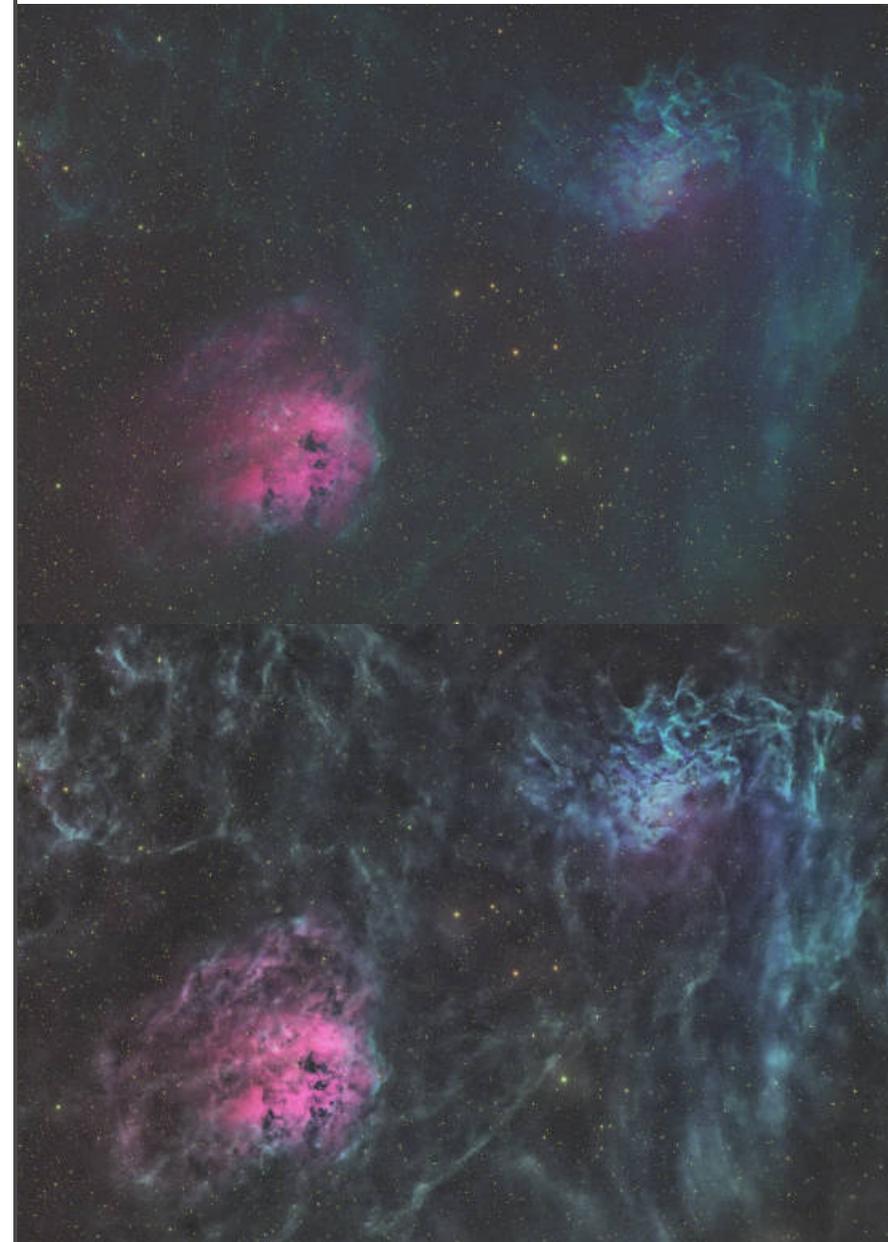
Combines a live High Pass filter with blend ranges and linear light blend mode—this enhances local contrast and brings out structural detail without crushing shadow or highlight detail.

### Hue Masked Structure

RGB/16  
RGB/32

Creates a configure setup that enhances clarity based on specific hue ranges.

Expanding the *Compound Mask* reveals two *Colour Range* layers that can be configured by clicking on their thumbnails. These default to red/orange and green/yellow colour ranges, but can be changed based on the dominant colours in your image.



## Macro

### Enhance Depth & Contrast

RGB/16  
RGB/32

### Soften Structure

RGB/16  
RGB/32

### Soft Rendering

RGB/16  
RGB/32

## Functionality

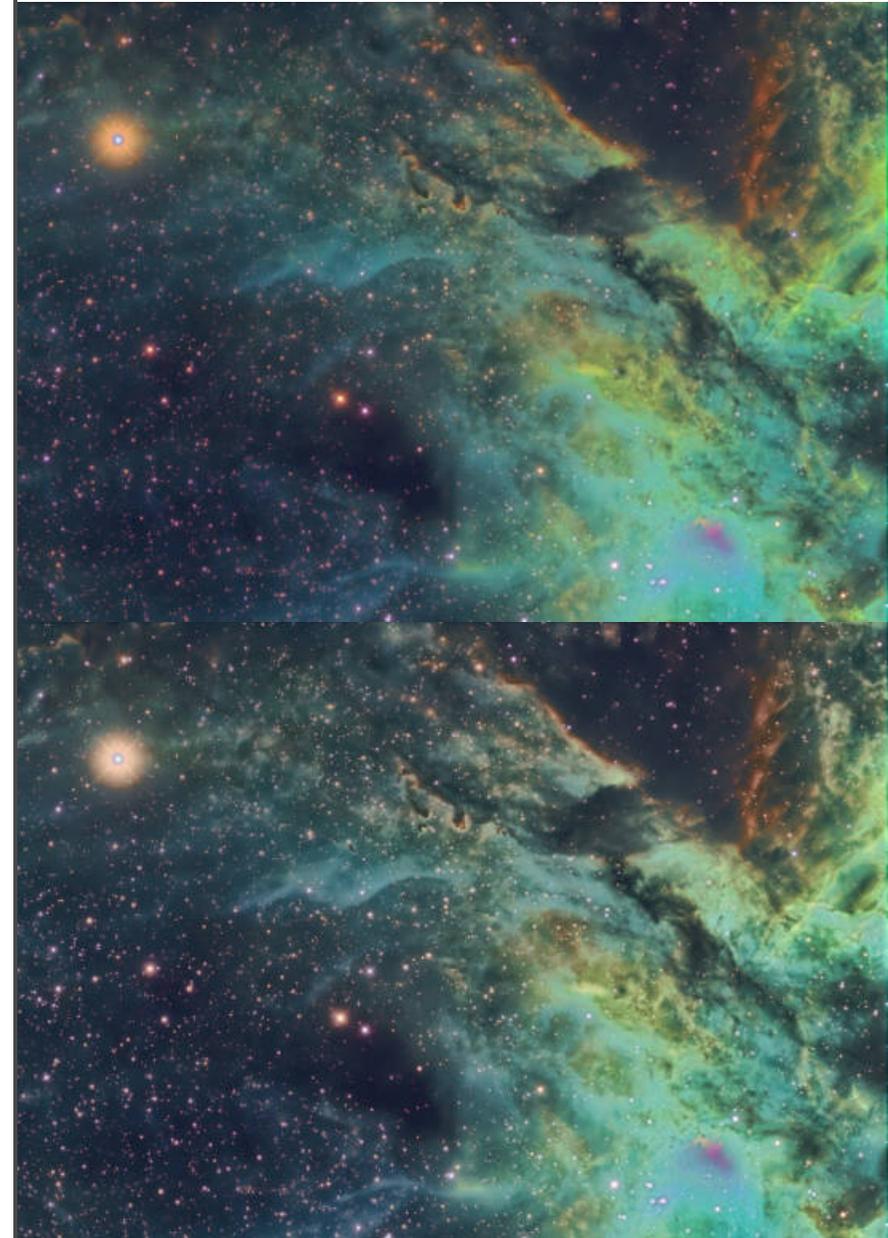
Enhances perceptual depth of the image (especially for complex nebulae) and also boosts colour.

Click the **Enhance Depth & Contrast** layer and type in a larger **Radius** value for stronger enhancement, or reduce the layer opacity to lessen the effect.

Uses a gamma transform layer setup and negative Clarity live filter to 'soften' or reduce the crispness of textural detail—good for dimming star detail before using adjustments like Curves to bring nebula/other deep sky object detail forward.

Creates an interesting and pleasing rendering effect that softens and reduces star detail as well as diminishing background noise.

Change the opacity of the **Soft Rendering** layer to control its contribution. You can also access the **Blend Ranges** dialog to control its blending in more detail.



Enhance Depth & Contrast

# Effects

## Macro

### Diffuse Glow

RGB/16  
RGB/32

## Functionality

Renders a pleasing diffuse light effect on highlights within the image and deepens bright colour detail. You can change the *Diffuse Glow* layer's opacity to increase or decrease the strength.

### Highlight Brilliance

RGB/16  
RGB/32

Adds an emphasis to highlight detail, making all stars in the image appear brighter and enhancing brighter nebula detail.

Non-destructive application: you can change the *Highlight Brilliance* layer's opacity, or click the layer thumbnail and change the **Radius** value to alter the strength of the effect.

### Subtle Contouring

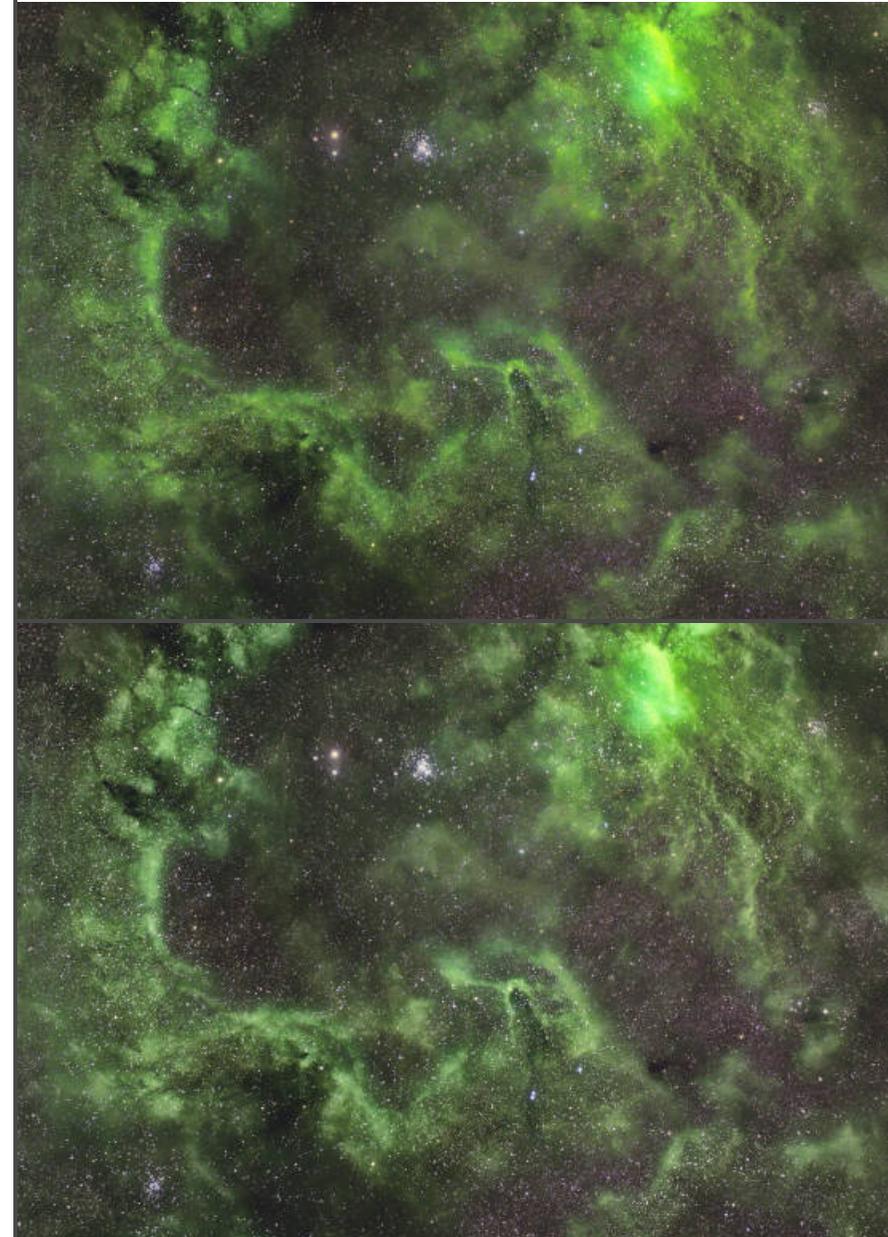
RGB/16  
RGB/32

Adds a very slight "contouring" or definition to detail, enhancing contrast slightly. Good to experiment with later on in the editing process.

### Harsh Contouring

RGB/16  
RGB/32

Similar to **Subtle Contouring**, but is far harsher with bringing out structure and edge contrast detail.



Highlight Brilliance

# Corrective

## Macro

### Average Neutralisation

RGB/16  
RGB/32

## Functionality

Creates a merged pixel layer based on your current layer stack, then creates an average flat colour representation. This is divided against the layer stack to 'neutralise' any prevalent colour casts—in practicality, it is useful for balancing out images that may be too strong in a particular colour channel.

Expand the *Average Neutralisation* layer and click the *Neutralisation Parameters* thumbnail to fine tune the effect: raise **White Level** if the effect is too dark, and lower **Output Black Level** to increase the strength of the effect.

### Reduce Harsh Noise Reduce Harsh Noise (+)

RGB/16  
RGB/32

Adds a simple live blur blended into a very specific tonal range that helps to reduce harsh 'blocky' noise, which is typically difficult to remove using the traditional Luma noise reduction method.

Use the **(+)** version for stronger harsh noise removal (at the risk of blurring the image slightly).

### Reduce Salt and Pepper Noise

RGB/16

16-bit only. Uses median filtering with custom blending to reduce blocky 'salt and pepper' noise which can sometimes occur when tone stretching monochrome data.

Altering the opacity of the *Reduce Salt and Pepper Noise* layer will control its overall strength.

### Remove Star Fringing Remove Star Fringing (Selective)

RGB/16  
RGB/32

Adds a non-destructive defringing filter. If using the selective version, it will be masked just to star detail, which prevents loss of colour information in other deep sky objects.

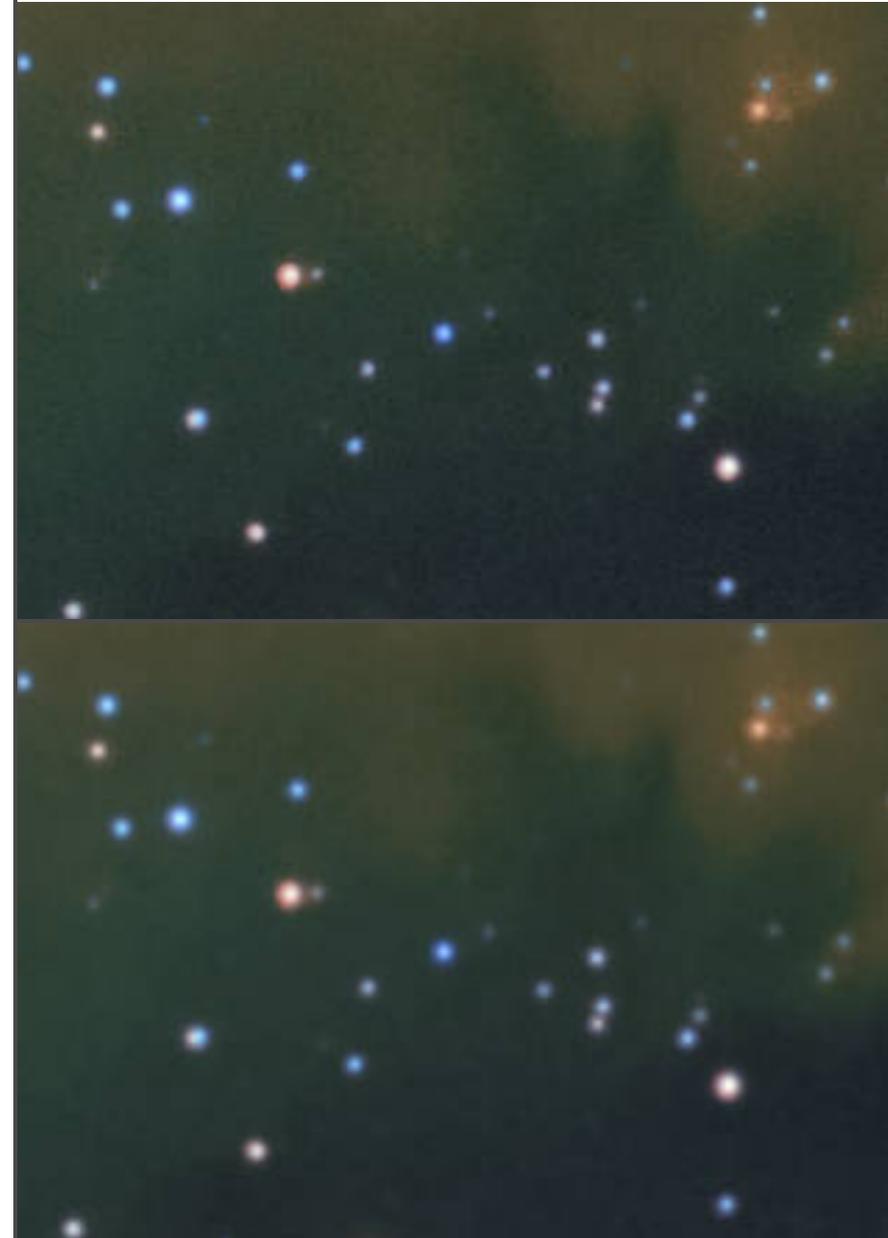
Use this to combat fringing and chromatic aberration artefacting around stars—very typical of older optics like manual focus lenses adapted to modern camera mounts. Click the *Remove Star Fringing* thumbnail and move the **Fringe Colour** slider to determine the fringing colour that you want to remove.

### Reduce Magenta Star Colour

RGB/16  
RGB/32

Quickly creates a masked adjustment that targets and desaturates intense magenta-coloured star detail.

Reduce the opacity of the *Reduce Magenta Star Colour* layer if the effect is too strong.



Reduce Harsh Noise

## Macro

### Brighten Star Centres

RGB/16  
RGB/32

## Functionality

Sometimes, with aggressive masked stretching or stretching that protects highlight detail, you will find that star centres are darker than their surrounding glow areas and the result looks odd. This macro will create a star mask using a convolution filter and enhance the brightness of the star centres to try and mitigate this.

Expand *Brighten Star Centres* and click the *Star Range Mask* thumbnail to alter the luminosity mask that controls the star masking.

Click the *Brighten Strength* thumbnail and raise the **Brightness** slider to increase the intensity of the star brightening.

### Green Channel Noise Reduction

RGB/16  
RGB/32

Performs aggressive noise reduction on isolated green channel data, leaving red and blue channel data alone.

### Green Channel Synthetic Substitution

RGB/16  
RGB/32

Interpolates the green channel from a blend of red and blue channel data—useful for bi-colour compositions, or broadband compositions where green channel information would be mostly noise rather than meaningful data.

Double click the *Green Channel Synthetic Substitution* layer and use the Red/Blue Substitute slider to control the balance between red and blue channel data contribution.



## Macro

### SCNR Green Max / Additive

RGB/16  
RGB/32

## Functionality

An implementation of subtractive chromatic noise reduction used to reduce green channel noise, with the ability to blend non-destructively between maximum and additive methods.

Double click the *SCNR Green Max/Additive* layer to gain access to the *Removal Strength* slider and *Maximum / Additive Method Blend* slider.

### SCNR Green Neutral / Max Neutral

RGB/16  
RGB/32

An implementation of subtractive chromatic noise reduction used to reduce green channel noise, with the ability to blend non-destructively between maximum and additive methods.

Double click the *SCNR Green Neutral / Max Neutral* layer to gain access to the *Neutral / Max Neutral Blend* slider.

### Nonlinear Compositing

RGB/32

There are other adjustments, filters and blending options whose behaviour will differ in 32-bit linear. Blend modes, for example, may not behave as expected. You might prefer how these render in 16-bit nonlinear.

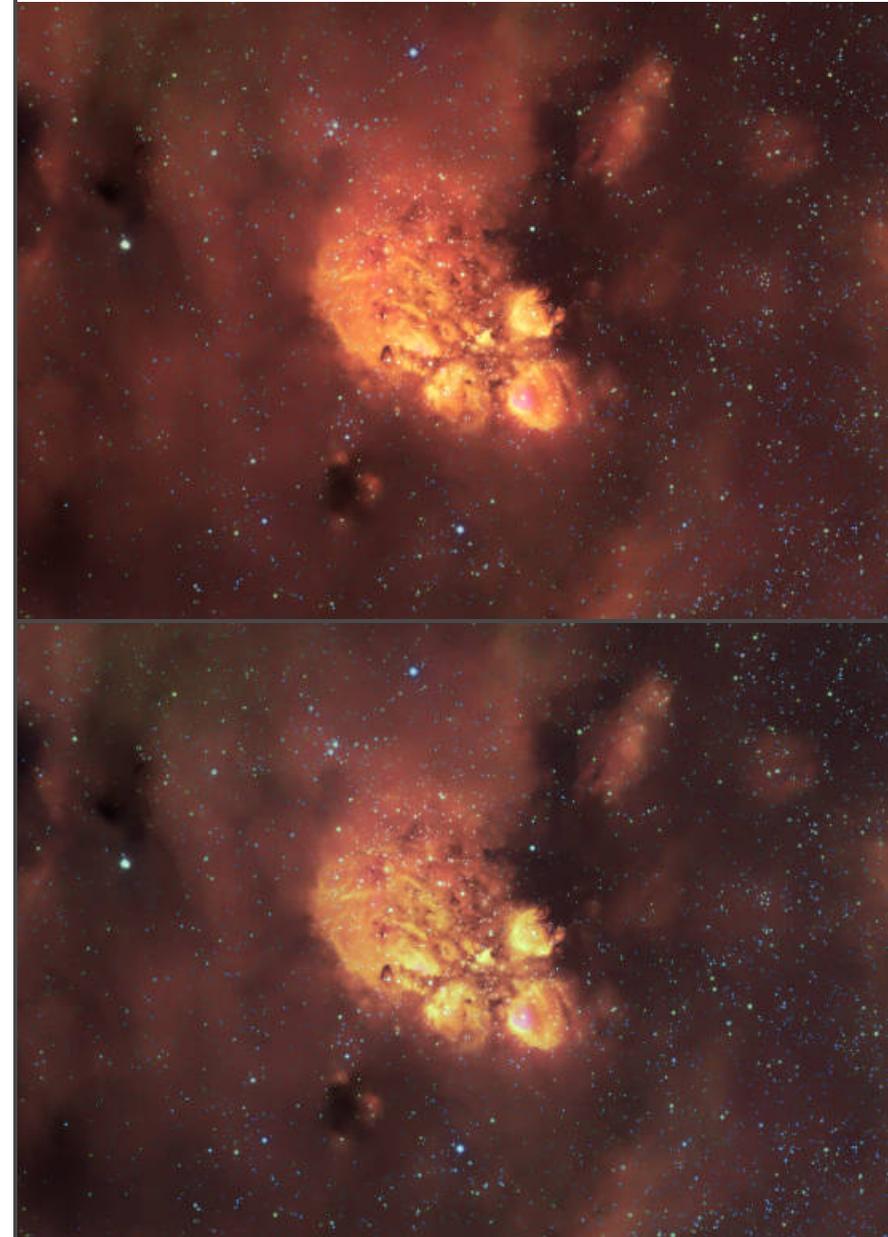
This macro creates a nonlinear transform group—add your layer work in-between the *Nonlinear* and *Linear* transform layers to composite them in gamma corrected space.

### Remove NaN Pixels

RGB/32

During editing in 32-bit float, you may come across odd pixels—they may perhaps be very intense in a particular colour channel. When a colour picker is used on them, they may report NaN.

Not-a-Number pixels can sometimes occur when particular blending operations (such as blend modes) and filters are used on unbounded pixel values. If these appear in your document after compositing, you can try running this macro to clamp them to within the 0-1 range of pixel values.



Average Neutralisation

# Masking

## Macro

### Live Star Mask

RGB/16  
RGB/32

## Functionality

Adds a live filter that masks away background detail (leaving just stars) based on controllable threshold and smoothing values.

Click the *Live Star Mask* thumbnail for threshold and smoothing options.

To use: configure until you have the desired mask effect, then click-drag the *Live Star Mask* layer over the thumbnail of the layer you wish to mask and release the mouse button.

### Live Background Mask

RGB/16  
RGB/32

Adds a live filter that masks away star detail based on controllable threshold and smoothing values.

Click the *Live Background Mask* thumbnail for threshold and smoothing options.

To use: configure until you have the desired mask effect, then click-drag the *Live Background Mask* layer over the thumbnail of the layer you wish to mask and release the mouse button.

### Live Channel Mask

RGB/16  
RGB/32

Adds a live filter that masks based on colour channel contribution (defaults to full red channel).

Click the *Live Channel Mask* thumbnail for R, G and B contribution options.

To use: configure until you have the desired mask effect, then click-drag the *Live Channel Mask* layer over the thumbnail of the layer you wish to mask and release the mouse button.

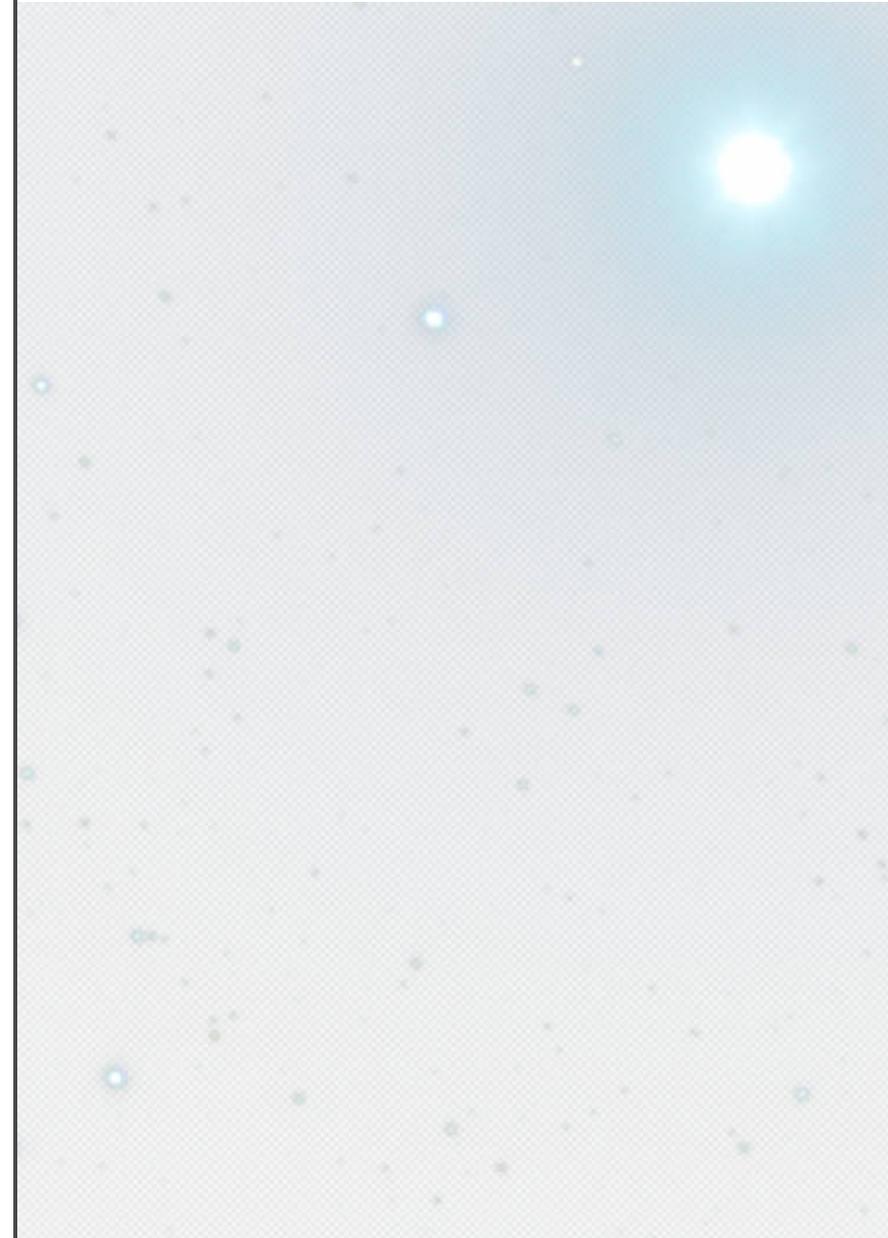
### Live RGB Weighted Mask

RGB/16  
RGB/32

Adds a live filter that masks based on weighted RGB values controlled by the user via an elevation-rotation input.

Click the *Live RGB Weighted Mask* thumbnail for weighting control and a clamping option.

To use: configure until you have the desired mask effect, then click-drag the *Live RGB Weighted Mask* layer over the thumbnail of the layer you wish to mask and release the mouse button.



Live Star Mask

## Macro

### Weighted Saturation Mask

RGB/16  
RGB/32

### Use Layer as Mask

RGB/16  
RGB/32

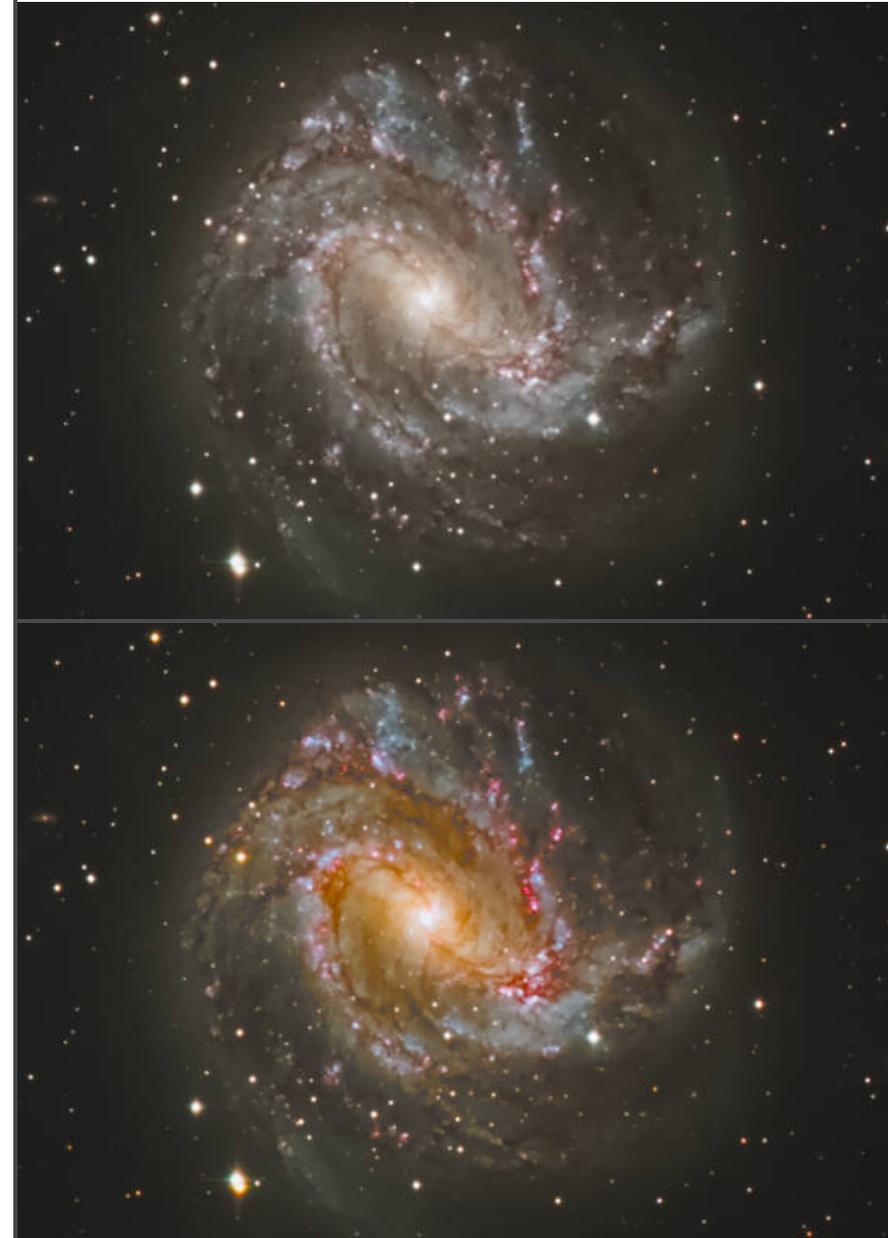
## Functionality

Saturates colour detail based on a weighted RGB mask.

Non-destructive application: click the *Live RGB Weighted Mask* thumbnail to adjust weighting and clamping for the saturation mask, and click the *HSL Adjustment* thumbnail and alter the *Saturation Shift* slider to control the overall saturation.

Takes your currently selected layer and allows it to be used as a mask non-destructively, as opposed to using *Rasterise to Mask* which is a destructive operation. You could, for example, use this on a stacked Luminance layer to use that data as a mask.

After running the macro, click-drag and drop your layer into the *thumbnail* of any other layer and it will become a mask. E.g. you could drop it into an HSL adjustment to saturate colour detail selectively.



Weighted Saturation Mask

# Colour Manipulation

## Macro

**Deepen Colour Detail**  
RGB/16  
RGB/32

**Vivid Colour Boost**  
RGB/16  
RGB/32

**Enhance DSO Luminosity**  
RGB/16  
RGB/32

**Luminosity Masked Saturation**  
RGB/16  
RGB/32

**Golden Boost**  
RGB/16  
RGB/32

**SII Ha Tone Enhancement**  
RGB/16  
RGB/32

**OIII Ha Tone Enhancement**  
RGB/16  
RGB/32

## Functionality

Uses an interesting differential blending technique to enhance colour detail in a natural-looking way.

Change the opacity of the *Colour Structure* group to control the strength of the colour saturation.

Uses a weighted RGB transform to significantly enhance colour intensity, with a particular red bias. Reduce the *Vivid Colour Boost* layer opacity if the effect is too strong.

To further control the colour tones, expand the *Enhance DSO Luminosity* group, double click *Colour Range Luminosity* and move the *Luminosity Shift* slider for particular colour ranges.

Creates a configurable setup that increases saturation based on two luminosity ranges combined together.

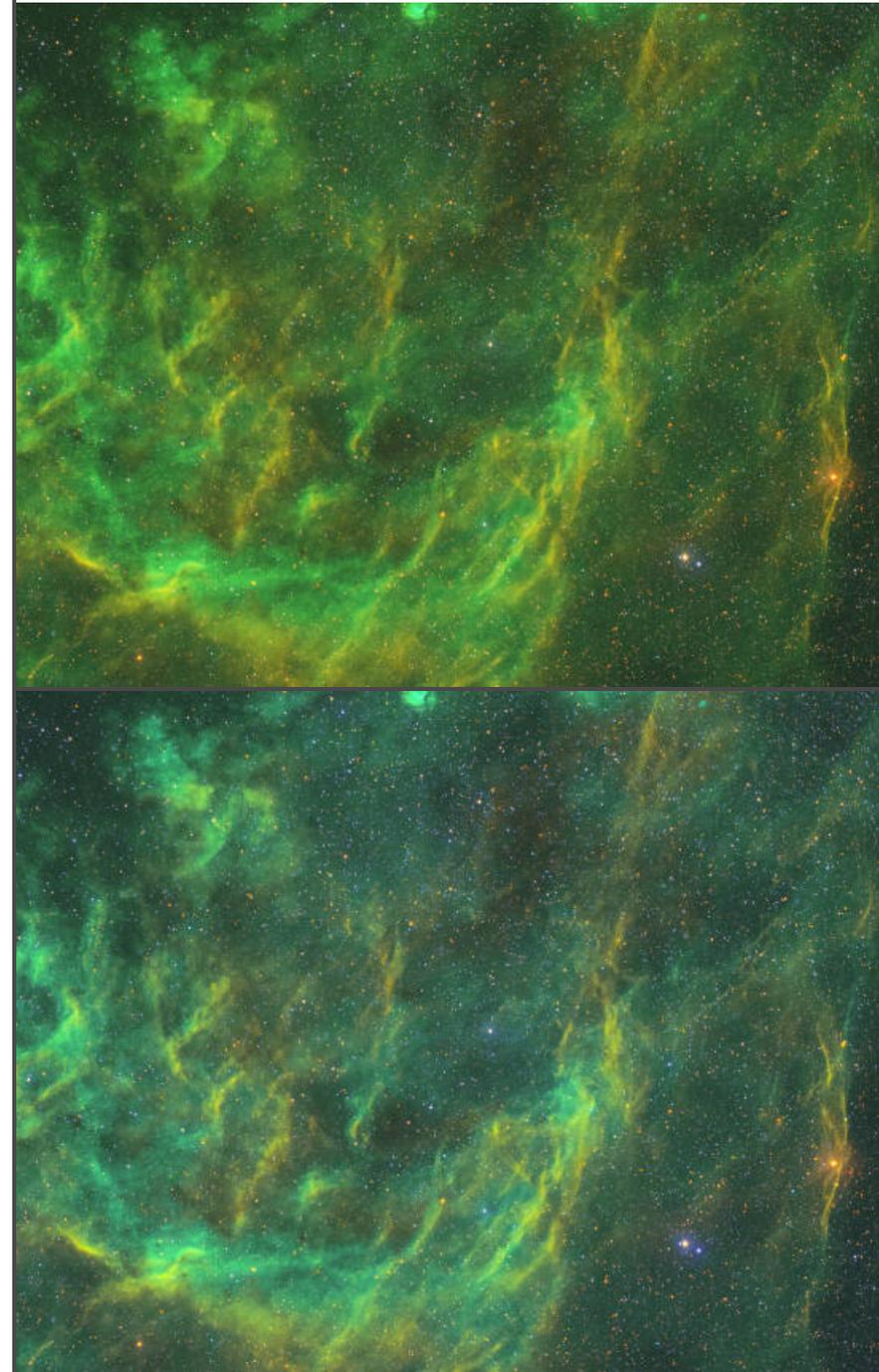
Expanding the *Compound Mask* reveals two *Luminosity Range* layers that can be configured by clicking on their thumbnails. By default, these mask through mid-tones and highlight tones so that darker background tones avoid being saturated.

Uses the LAB colour model and blending to produce a rich gold/cyan look—works particularly well with false colour SHO images if you want the green Ha data to look unique and interesting.

Try experimenting with the *Golden Boost* layer's blend mode—change from *Hard Light* to *Overlay* for a softer application for example. You can also experiment with the *Opacity* value.

Uses gradient mapping with blending techniques to enhance and bolden red/green tones commonly associated with Ha and SII signal data when creating false colour compositions (e.g. HSO, SHO).

Uses gradient mapping with blending techniques to enhance and bolden blue/green tones commonly associated with OIII and Ha signal data when creating false colour compositions.



OIII Ha Tone Enhancement

## Macro

Enhance Red Signal  
Enhance Green Signal  
Enhance Blue Signal  
Enhance Cyan Signal  
Enhance Magenta Signal  
Enhance Yellow Signal  
RGB/16  
RGB/32

Boost Red/Yellow Detail  
Boost Blue/Green Detail  
RGB/16  
RGB/32

Channel Masked White Balance  
RGB/16  
RGB/32

Warm Red Tones  
RGB/16  
RGB/32

Cool Blue Tones  
RGB/16  
RGB/32

Dual Band Colour Mixer  
RGB/16  
RGB/32

## Functionality

Very useful for quickly bringing out specific colour tones. Uses a combination of adjustment layers and blend modes to enhance colour ranges. There are a total of six macros which correspond to each colour range.

Each macro will provide a group layer. Simply change the opacity of this group to control the overall strength of the colour range enhancement.

Compared to the Enhance Signal macros, the Boost Detail macros focus more on increasing colour intensity. They work incredibly well when used on broadband imagery, especially with galaxies and other objects that have fainter colour detail.

You can change the Opacity of the top level group to control the overall strength of the boost effect, or change the opacity of each individual layer within the group for further customisation.

Alters white balance based on a colour channel mask.

Non-destructive application: double click the *Live Channel Mask* filter to adjust RGB contribution, and double click the *White Balance* layer to control white balance and tint.

Targets a specific hue range of red and orange tones to 'warm' them and enhance the richness of the colours.

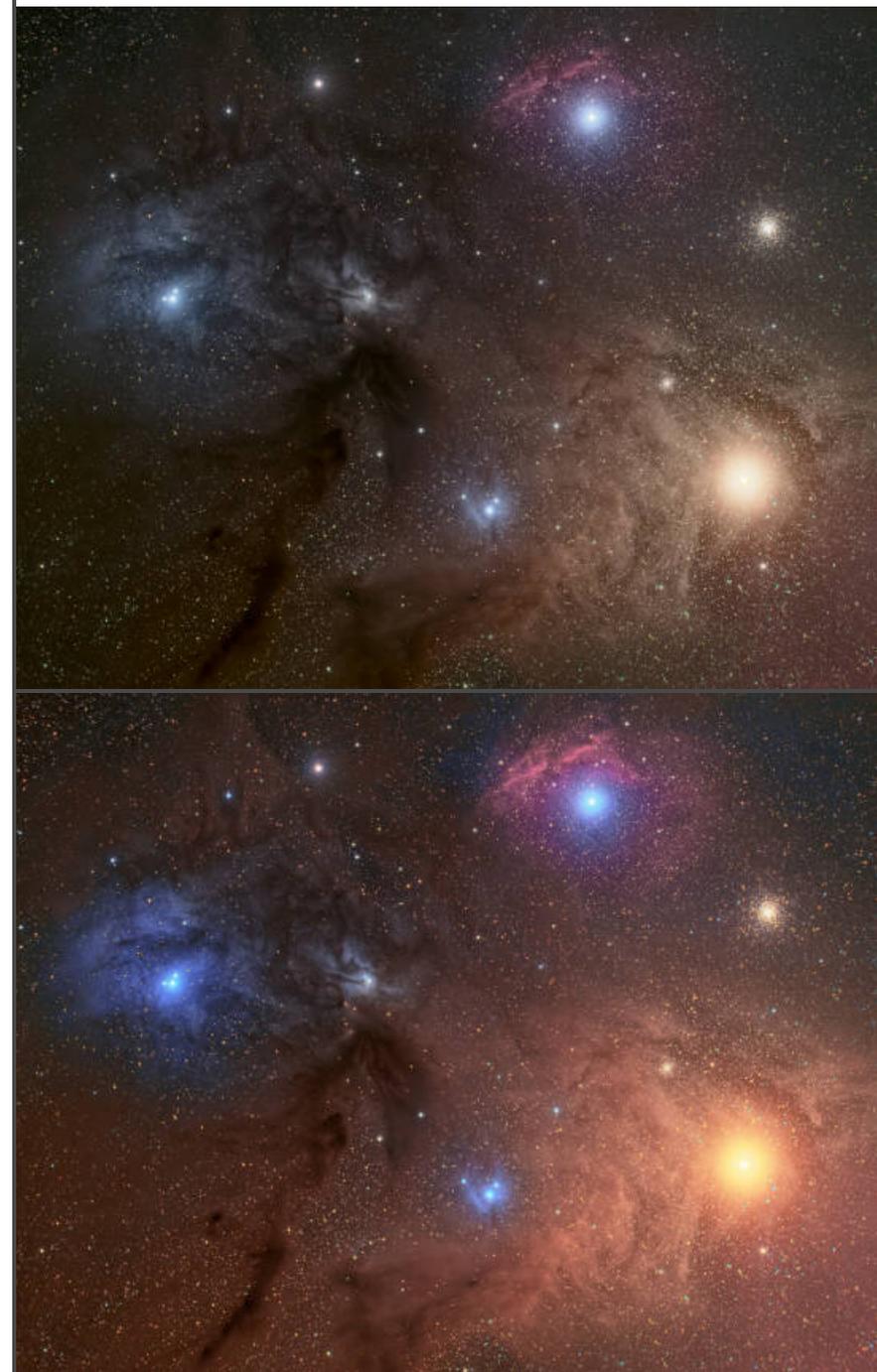
The opacity of the *Warm Red Tones* layer can be changed to control the strength of the effect.

Targets a specific hue range of blue and cyan tones to 'cool' them and enhance the richness of the colours.

The opacity of the *Cool Blue Tones* layer can be changed to control the strength of the effect.

An experimental option: allows you to mix three different weighted intensity calculations for RGB channel data, producing a look similar to dual band compositions (e.g. HaOIII, HaSII). For further experimentation, try changing the layer's blend mode to Saturation or Hue.

Click the *Dual Band Colour Mixer* thumbnail to access the red, green and blue mixing options.



# Sharpening

## Macro

Bandpass Sharpening  
(Micro)  
(Fine)  
(Regular)  
(Wide)  
RGB/16  
RGB/32

## Functionality

Intended as a final sharpening step. This sharpening method performs the same multi-bandpass decomposition technique that is used with Absolute Point of Focus sharpening. It gives you very fine control in terms of enhancing different frequency ranges of detail in your image, and also increases perceptual 'depth' whilst avoiding over-sharpening noise.

Once running the macro, you have full control over the strength of each bandpass. Feel free to change the top group opacity, or change the opacity of individual *Pass* layers.

You can also hide individual *Pass* layers to remove the effect of that bandpass entirely. All of this flexibility allows you to completely fine-tune the sharpening for your own imagery.

There are five variants (**Repetitive** is covered below) which each use different progressions for the bandpass values. **Micro** offers very fine detail enhancement, **Fine** offers slightly more enhancement, **Regular** is suitable for most imagery and **Wide** will produce a stronger or 'wider' contrast enhancement around edge detail.

Bandpass Sharpening (Repetitive)  
RGB/16  
RGB/32

Uses multiple bandpass filters all set to the same value.

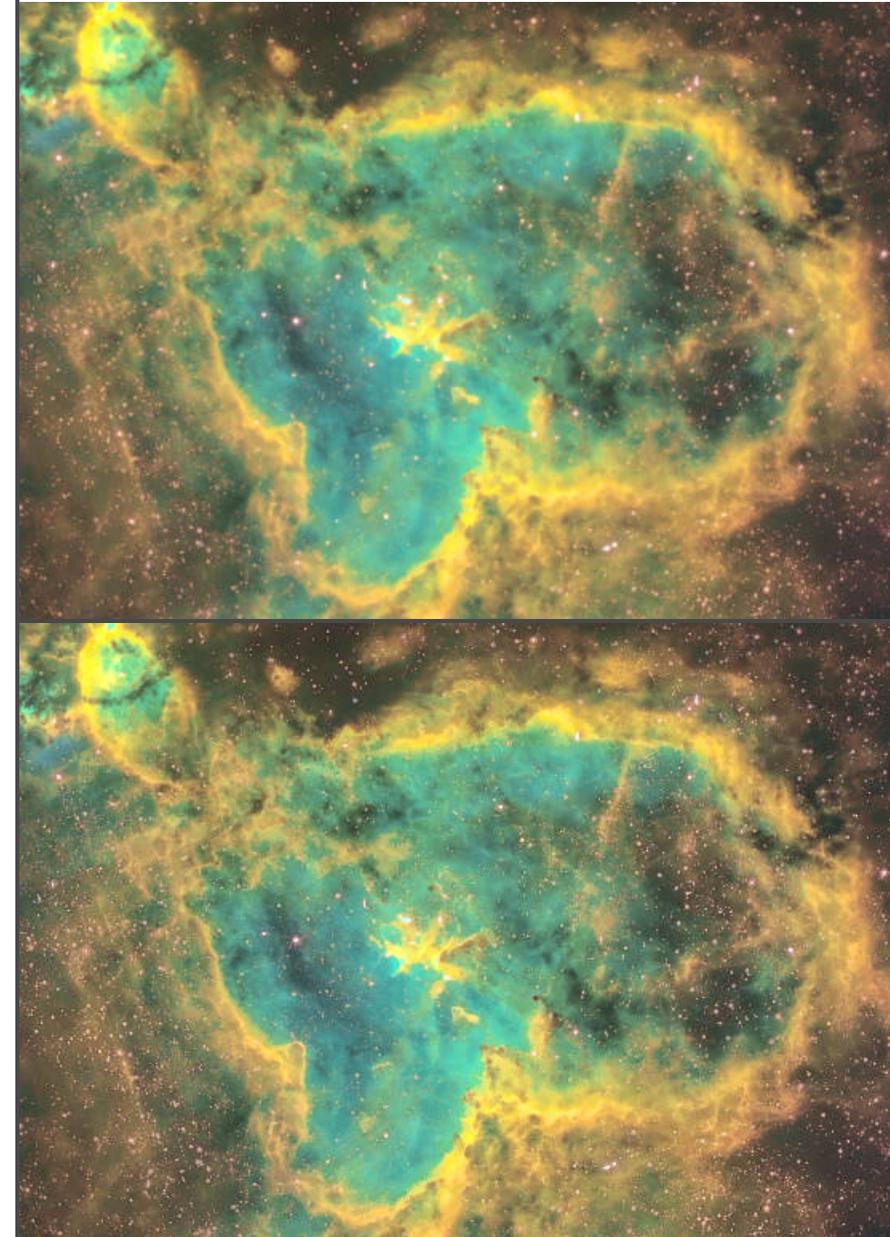
Each pass gradually enhances detail and sharpness in a very subtle and refined way.

If the sharpening is too strong, click any of the **Linked Bandpass** layer thumbnails and change the **Radius** value to taste—this value is linked between all the filters.

Background Sharpening  
RGB/16  
RGB/32

Creates a masked group structure that sharpens dark and mid-tone detail, avoiding bright areas such as star detail. Very useful for avoiding black star halos around high contrast edges.

Expand the *Background Sharpening* group and double click the *Sharpening Mask* layer to access the *Sharpening Scale* option. If the sharpening is too weak or subtle, increase the scale value.



Bandpass Sharpening (Micro) and Bandpass Sharpening (Fine) blended together

## Macro

### Gaussian Kernel Sharpening

RGB/16  
RGB/32

### Gaussian Subtractive Sharpening

RGB/16  
RGB/32

### Nonlinear Sharpening

RGB/32

#### NEW:

Final Balance  
Final Colour  
Final Colour & Balance  
Final Contrast

RGB/32  
RGB/16

## Functionality

Creates a top sharpening layer (based on your current layer work) masked to edge detail based on a gaussian kernel.

This is a really good method for sharpening bright star detail without producing noticeable halo artefacts around the edges.

Creates a non-destructive sharpening group based on a subtractive gaussian kernel method. The 32-bit version uses additional non-linear and linear transform stages to avoid "panda eyes" around bright star detail.

Within the main *Gaussian Subtractive Sharpening* group, you will find two sub-groups: *Large Detail Sharpening* and *Small Detail Sharpening*. You can hide/show these based on the size of object detail that you wish to sharpen, or change the **Opacity** to control their contribution.

Because 32-bit composites in linear space within Affinity Photo, you may find an Unsharp Mask or High Pass filter produces distracting black halos ("panda eyes") around stars and other detail.

This macro non-destructively composites a live High Pass filter in gamma-corrected space, reducing these black halos. It is akin to sharpening in 16-bit nonlinear space, but you can do so without flattening and converting, so you can remain in 32-bit for the entire workflow.

A mask layer is automatically added and selected. You can immediately invert this if you wish (Mac: **CMD+I**, Windows: **Ctrl+I**), then begin painting on/off the mask with the **Paint Brush Tool (B)**.

Once you reach the end of your editing, give these a try: they will generally try to balance out the tones (especially the background areas).

Final Balance will tackle any glaring contrast and channel balance issues.

Final Colour & Balance will do the above, but also try and correct any colour bias (e.g. white balance) issues.

Final Contrast is more light-handed, and will just modify contrast of the image if an adjustment is needed.



Gaussian Subtractive Sharpening

## Other

StarXTerminator: Extract Stars to Separate Layer  
RGB/32  
RGB/16

Please note: **this is not a replacement for StarXTerminator**. It is designed to accelerate the process of separating the stars onto a separate layer so you can retouch both star and object detail separately.

To use: create a merged layer (**Layer>Merge Visible**), then run StarXTerminator to remove the stars. Now run this macro.

You will now be presented with two layers called **Starless** and **Stars**. You can retouch above the **Starless** layer but beneath the **Stars** layer for greater control over the object detail.



StarXTerminator: Extract Stars to Separate Layer (starless and stars layers)

# Data Composition Setups

The JR - Astrophotography Data Setups macro category is designed to speed up the colour mapping process for monochrome data once it has been stacked.

To use these macros, name your data layers accordingly (e.g. "Ha", "OIII", "SII" for a narrowband false colour composition, or "R", "G", "B", "L" for an RGB composition with luminosity enhancement) then run the appropriate macro. Please note, the layer names are *case sensitive*, so be sure to use "OIII" rather than "oiii" for example.

New to V15 is the **Extract OSC Layer to Mono RGB** macro. This lets you take one layer from a one shot colour camera and split it into red, green and blue channel layers. You can then run the mono stretch macros such as **Mono Log Stretch (RGB)** on these separated layers to tone stretch the channel data separately. This will generally yield a much better result and give you much more detail to work with.

You will also find some one shot colour narrowband macros to help with colour blending when using one shot colour data that has been captured with dual/quad narrowband filters. These are work in progress and any feedback is appreciated.

## Macro

### Rename Stacked Layers

Orders:

- 1. Ha, 2. OIII, 3. SII
  - 1. Ha, 2. SII, 3. OIII
  - 1. R, 2, G, 3, B
  - 1. R, 2, G, 3. B, 4. L
  - 1. L, 2, R, 3, G, 4, B
  - 1. OIII, SII, Ha
  - 1. OIII, Ha, SII
  - 1. SII, OIII, Ha
  - 1. SII, Ha, OIII
- RGB/16  
RGB/32

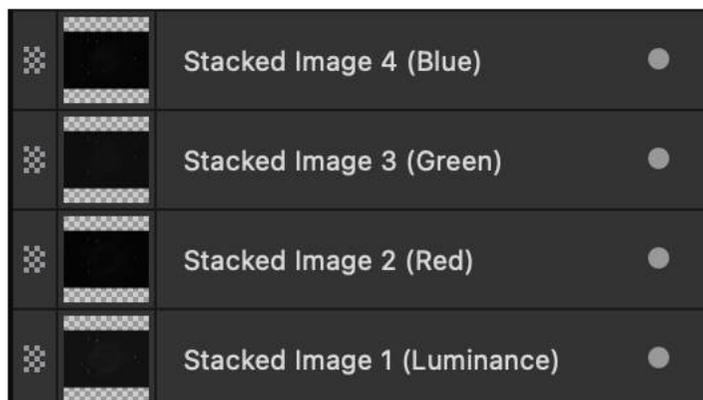
## Functionality

Several options for quickly renaming stacked layers if you've used file groups during stacking for multiple sets of data, which is recommended for speed and simplicity. Please see my official tutorial on how to use this feature:

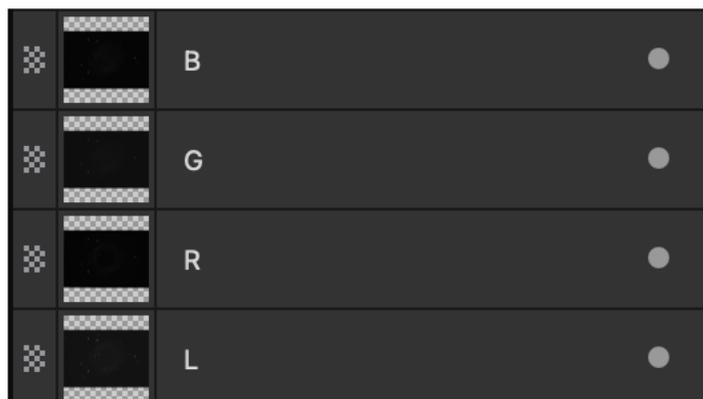
<https://youtu.be/Uu091-Rqfwu>

These macros will speed up the layer renaming process which is required for the various composition setup macros to work (e.g. L-RGB, SHO, HSO).

When you stack using file groups, you will tag each file group with a particular data type such as Red, Green, Luminance, H-alpha etc. When you apply the stack and move to the main layer-based editing workspace, these data layers will appear like so:



You will typically add Luminance, Red or H-alpha as the first file group. Run the macro that corresponds to the ordering of the layers to quickly rename them:



## Macro

### Extract OSC Layer to Mono RGB RGB/32

## Functionality

Takes one full colour data layer (e.g. from a DSLR, mirrorless or OSC astrophotography camera) and splits it into R, G and B mono data layers.

You can then run the mono tone stretching macros on these to obtain a much better result than just tone stretching the full colour layer.

Once you have tone stretched the mono layers, you can run the **RGB Composition Setup** macro to colour map them.

### RGB Composition Setup RGB/32

Automates the process of compositing monochrome RGB data. Recolours each monochrome layer, sets the appropriate blend mode, adds an optional **Contribution** adjustment to each layer (modify **Gamma** to alter the contribution) and provides a **Channel Balance** layer to control the channel balance.

To use: stack your monochrome data using file groups, then name your layers **R**, **G** and **B** (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### L-RGB Composition Setup RGB/32

Automates the process of compositing monochrome RGB data using Luminance data for luminosity enhancement.

To use: stack your monochrome data using file groups, then name your layers **R**, **G**, **B** and **L** (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### HaRGB (Red Mix) Composition Setup RGB/32

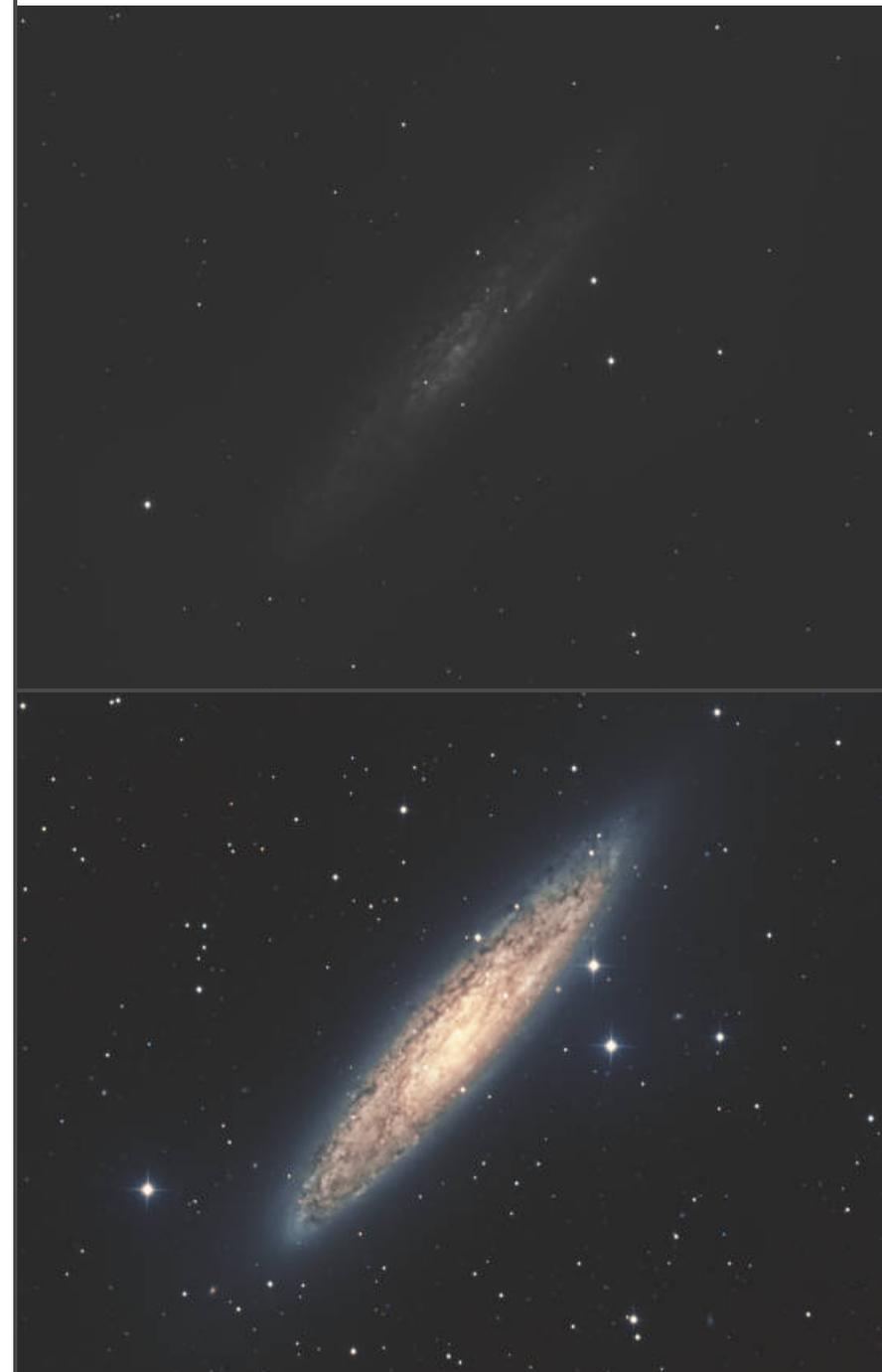
Automates the process of compositing monochrome RGB data with additional Ha (hydrogen alpha) data which is blended with the red channel data—you can alter the weighting by changing the opacity of the **R** and **Ha** layers.

To use: stack your monochrome data using file groups, then name your layers **R**, **G**, **B** and **Ha** (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### Ha-RGB (Luminosity) Composition Setup RGB/32

Automates the process of compositing monochrome RGB data using additional Ha (hydrogen alpha) data for luminosity enhancement.

To use: stack your monochrome data using file groups, then name your layers **R**, **G**, **B** and **Ha** (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.



L-RGB Composition Setup

## Macro

### HaRGB-L Composition Setup RGB/32

## Functionality

Automates the process of compositing monochrome RGB data with additional Ha data to contribute to the red channel, then Luminance data for luminosity enhancement.

To use: stack your monochrome data using file groups, then name your layers **R, G, B, Ha** and **L** (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### RGB-HaL Composition Setup RGB/32

Automates the process of compositing monochrome RGB data, then an average of both Ha and Luminance data for luminosity enhancement.

To use: stack your monochrome data using file groups, then name your layers **R, G, B, Ha** and **L** (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### RGB-SHO Composition Setup RGB/32

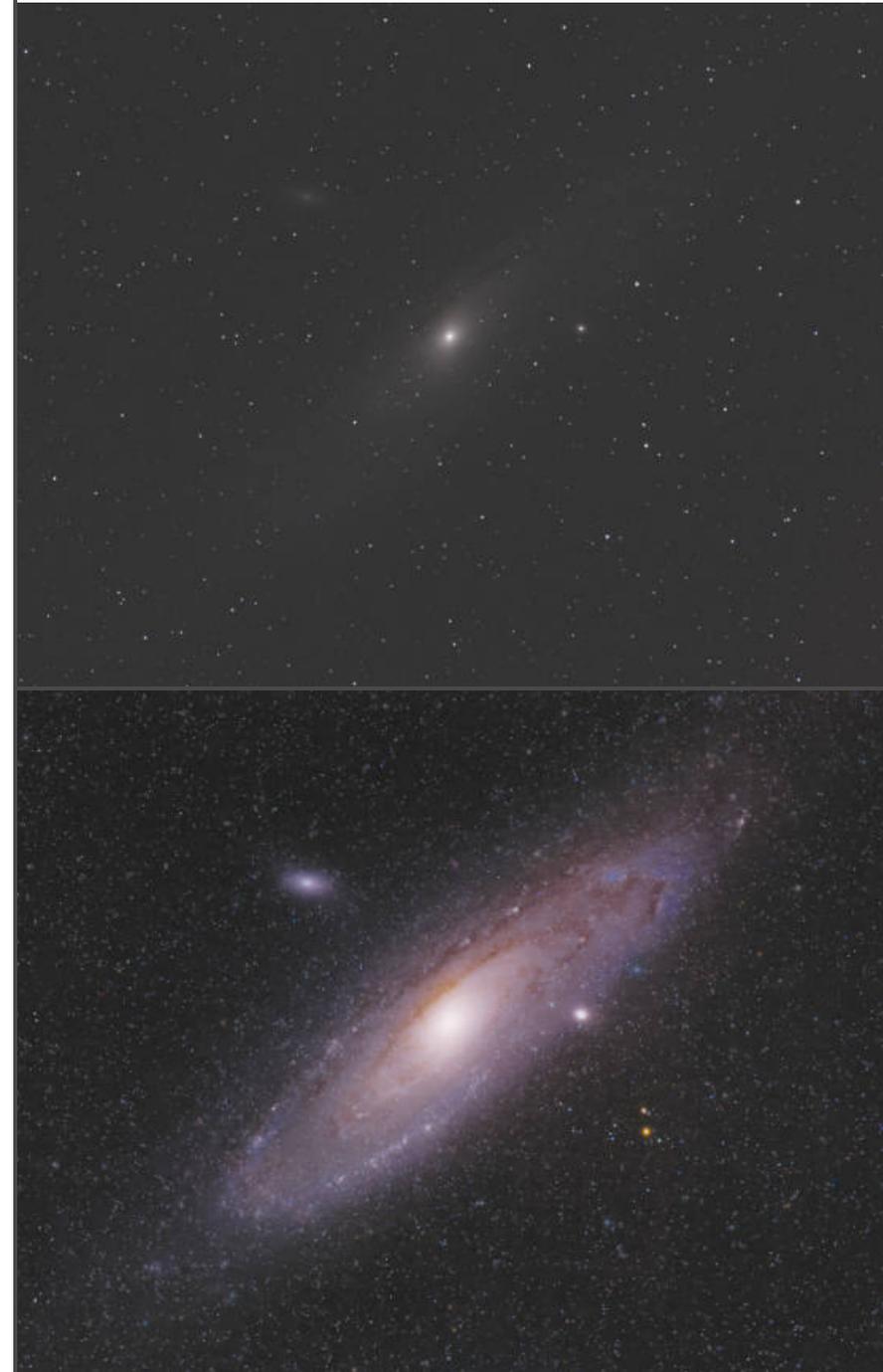
Automates the process of compositing monochrome data into a joint RGB and SHO composition, where the colour and narrowband data layers are averaged for each channel (R and SII, G and Ha, B and OIII).

To use: stack your monochrome data using file groups, then name your layers **R, SII, G, Ha, B** and **OIII** (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### RGB-HSO Composition Setup RGB/32

Automates the process of compositing monochrome data into a joint RGB and HSO composition, where the colour and narrowband data layers are averaged for each channel (R and Ha, G and SII, B and OIII).

To use: stack your monochrome data using file groups, then name your layers **R, Ha, G, SII, B** and **OIII** (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.



## Macro

## Functionality

### SHO Composition Setup RGB/32

Automates the process of compositing monochrome narrowband data into an SHO colour assignment.

To use: stack your monochrome data using file groups, then name your layers *SII*, *Ha* and *OIII* (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### HSO Composition Setup RGB/32

Automates the process of compositing monochrome narrowband data into an HSO colour assignment.

To use: stack your monochrome data using file groups, then name your layers *Ha*, *SII* and *OIII* (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### HOO Composition Setup RGB/32

Automates the process of compositing monochrome narrowband data into a bi-colour representation, where *OIII* provides both green and blue colour data.

To use: stack your monochrome data using file groups, then name your layers *Ha* and *OIII* (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### HaOIII Bi-Colour Composition Setup RGB/32

Automates the process of compositing monochrome narrowband data into a bi-colour representation, where both *Ha* and *OIII* are averaged for the green colour data.

To use: stack your monochrome data using file groups, then name your layers *Ha* and *OIII* (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.



HaOIII Bi-colour Composition Setup

## Macro

## Functionality

### OSH Composition Setup

RGB/32

Automates the process of compositing monochrome narrowband data into an OSH colour assignment. Recolours each monochrome layer, sets the appropriate blend mode, adds an optional **Contribution** adjustment to each layer (modify **Gamma** to alter the contribution) and provides a **Channel Balance** layer to control the channel balance.

To use: stack your monochrome data using file groups, then name your layers **OIII**, **SII** and **Ha** (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### OHS Composition Setup

RGB/32

Automates the process of compositing monochrome narrowband data into an OHS colour assignment. Recolours each monochrome layer, sets the appropriate blend mode, adds an optional **Contribution** adjustment to each layer (modify **Gamma** to alter the contribution) and provides a **Channel Balance** layer to control the channel balance.

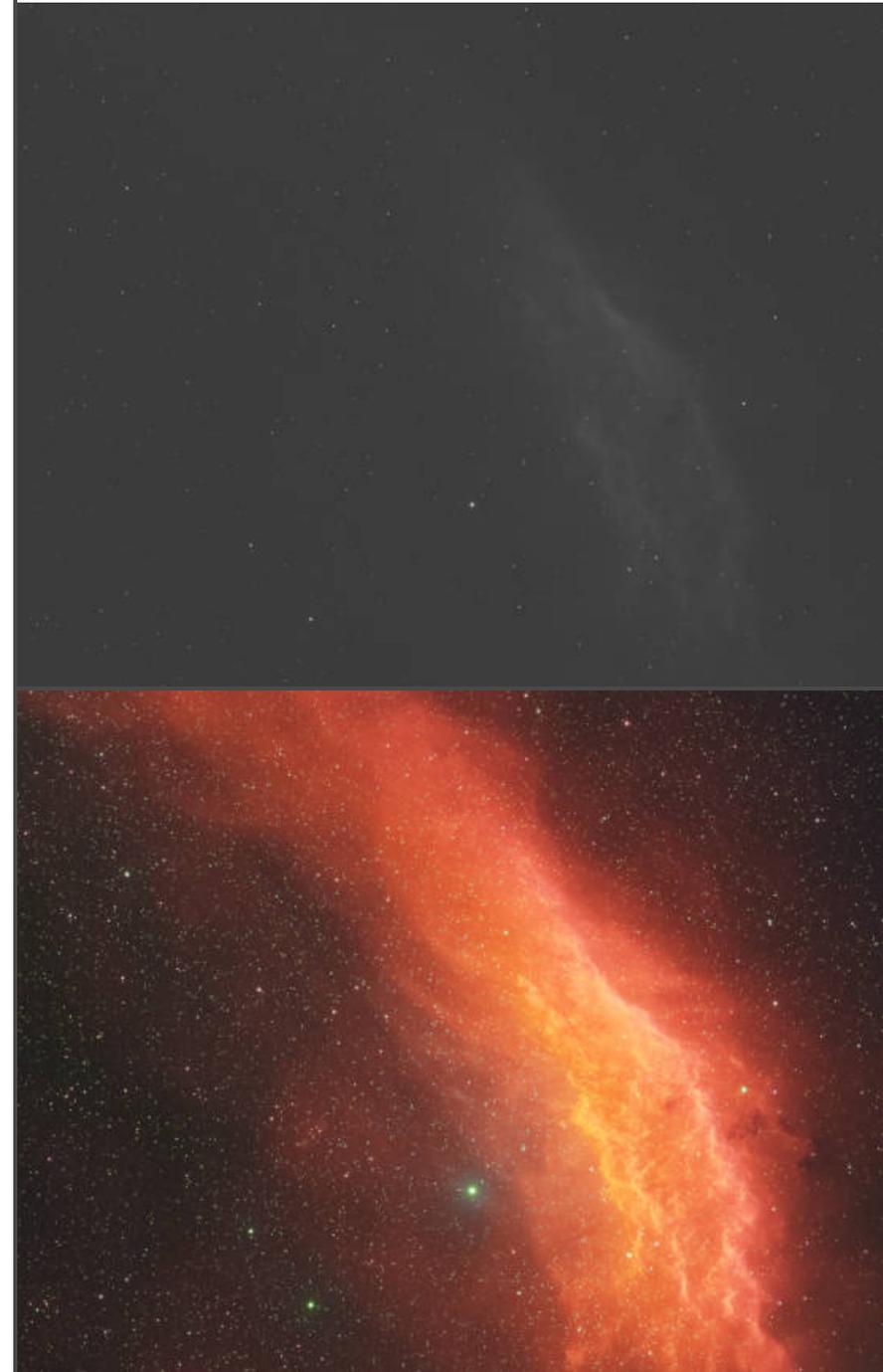
To use: stack your monochrome data using file groups, then name your layers **OIII**, **Ha** and **SII** (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### HOS Composition Setup

RGB/32

Automates the process of compositing monochrome narrowband data into an HOS colour assignment. Recolours each monochrome layer, sets the appropriate blend mode, adds an optional **Contribution** adjustment to each layer (modify **Gamma** to alter the contribution) and provides a **Channel Balance** layer to control the channel balance.

To use: stack your monochrome data using file groups, then name your layers **Ha**, **OIII** and **SII** (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.



## Macro

### HSS Composition Setup RGB/32

## Functionality

Automates the process of compositing monochrome narrowband data into a bi-colour representation, where *SII* provides both green and blue colour data. Recolours each monochrome layer, sets the appropriate blend mode, adds an optional *Contribution* adjustment to each layer (modify *Gamma* to alter the contribution) and provides a *Channel Balance* layer to control the channel balance.

To use: stack your monochrome data using file groups, then name your layers *Ha* and *SII* (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### HaSII Bi-colour Composition Setup RGB/32

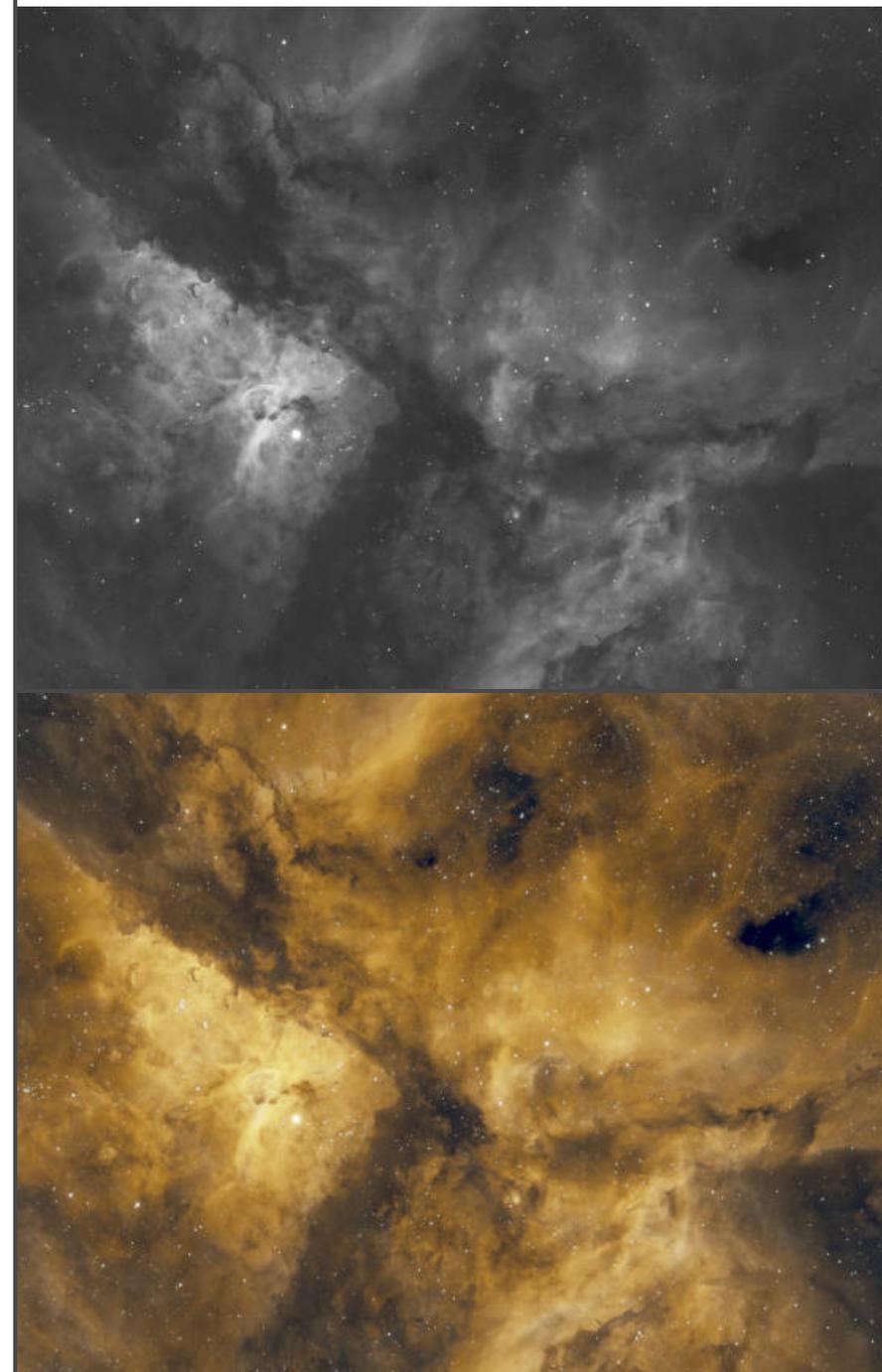
Automates the process of compositing monochrome narrowband data into a bi-colour representation, where both *Ha* and *SII* are averaged for the green colour data. Recolours each monochrome layer, sets the appropriate blend mode, adds an optional *Contribution* adjustment to each layer (modify *Gamma* to alter the contribution) and provides a *Channel Balance* layer to control the channel balance.

To use: stack your monochrome data using file groups, then name your layers *Ha* and *SII* (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### HORGB Composition Setup (R+B) RGB/32

Automates the process of compositing monochrome data into a joint RGB and HaOIII composition, where the colour and narrowband data layers are averaged for red and blue channel data (R and Ha, G, B and OIII).

To use: stack your monochrome data using file groups, then name your layers *R*, *Ha*, *G*, *B* and *OIII* (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.



HaSII Bi-colour Composition Setup

## Macro

### HORGB Composition Setup (G+B)

RGB/32

## Functionality

Automates the process of compositing monochrome data into a joint RGB and HaOIII composition, where the colour and narrowband data layers are averaged for green and blue channel data (R, G and Ha, B and OIII).

To use: stack your monochrome data using file groups, then name your layers *R, G, Ha, B* and *OIII* (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### HORGB-L Composition Setup (R+B)

RGB/32

Automates the process of compositing monochrome data into a joint RGB and HaOIII composition enhanced with L data for luminosity, where the colour and narrowband data layers are averaged for red and blue channel data (R and Ha, G, B and OIII).

To use: stack your monochrome data using file groups, then name your layers *R, G, Ha, B, OIII* and *L* (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### HORGB-L Composition Setup (G+B)

RGB/32

Automates the process of compositing monochrome data into a joint RGB and HaOIII composition enhanced with L data for luminosity, where the colour and narrowband data layers are averaged for green and blue channel data (R, G and Ha, B and OIII).

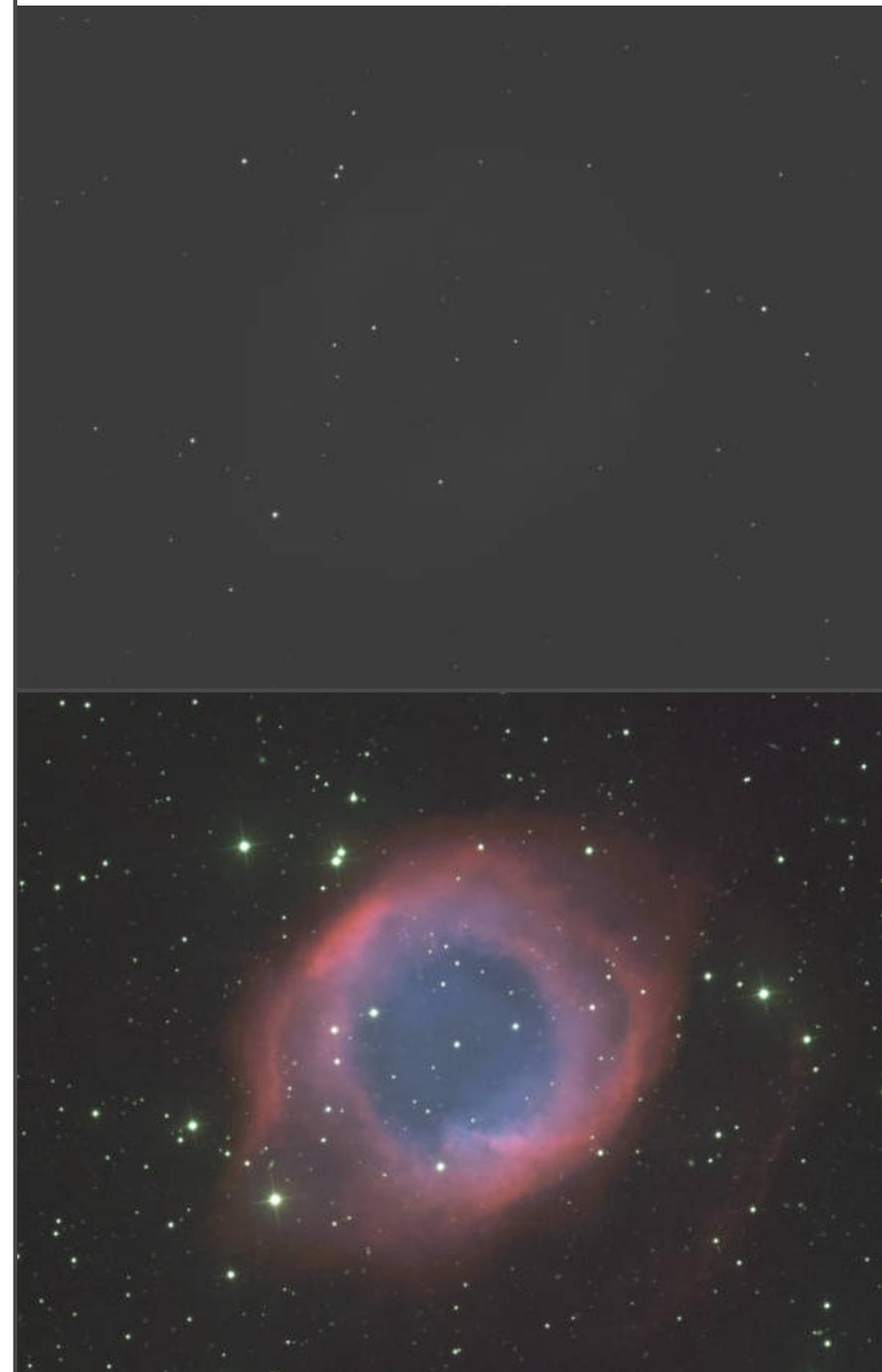
To use: stack your monochrome data using file groups, then name your layers *R, G, Ha, B, OIII* and *L* (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.

### RGB-SHO Composition Setup (Mixed Luminance)

RGB/32

Automates the process of compositing monochrome data into a joint RGB and SHO composition, where the SHO data layers are averaged to enhance luminosity.

To use: stack your monochrome data using file groups, then name your layers *R, G, B, SII, Ha* and *OIII* (important!). If you stacked your data layers separately and not with file groups, don't forget to align all layers by selecting them then going to *Arrange>Align Layers by Stars*.



HORGB-L Composition Setup (R+B)

## Macro

### Dynamic Narrowband Mix

RGB/32

### Post-Stretch Gamma Mixing

RGB/32

### Channel Swap R<>G

Channel Swap R<>B

Channel Swap G<>B

RGB/32

## Functionality

An implementation of the idea to dynamically mix Ha, SII and OIII colour data (based on a blog post from The Coldest Nights). This option tends to work best with SHO mapped data.

You can apply this before or after tone stretching. Click the *Dynamic Narrowband Mix* layer thumbnail to access the gamma sliders for each channel, as well as an additional *Tri-Colour Mix* slider which will blend in a dynamic mix for the blue channel.

A simple live gamma transform filter that can be applied after tone stretching to further alter the balance of each colour channel.

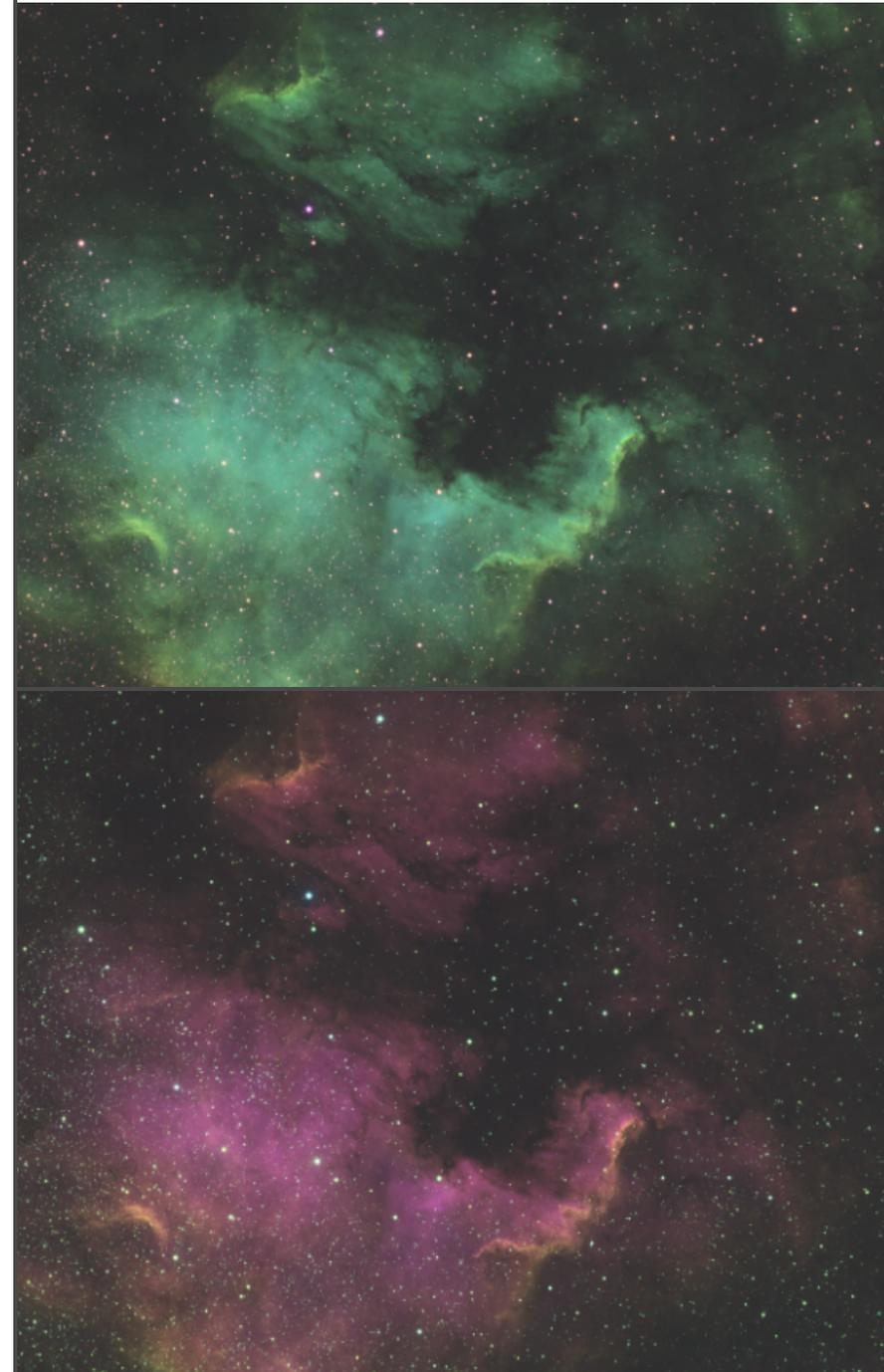
The interesting feature of this, however, is that the blend range is restricted to a very specific region of the luminosity. The idea is to help raise brightness of nebula detail but leave very dark and bright areas alone (so you are not also boosting the brightness of the background detail or overexposing star detail).

Click the *Post-Stretch Gamma Mixing* layer thumbnail to access the Red, Green and Blue Gamma sliders.

Quick presets you can apply to completely swap channel data, allowing you to audition different narrowband colour combinations.

For example, if you used the *SHO Composition Setup* macro, you could use *Channel Swap R<>G* to quickly switch to an HSO composition instead, or you could use *Channel Swap R<>B* to try an OHS composition setup.

These options are non-destructive and you can simply delete the layers to return to your original composition.



Channel Swap R<>G

## Macro

### Ha Luminosity Setup

RGB/32

## Functionality

Automates the process of setting up an Ha data layer for luminosity enhancement—this is typically done with broadband RGB or one shot colour imagery to enhance hydrogen alpha emission areas.

To use: stack your Ha data, then copy/paste it into your main data document and align it (if necessary). Ensure you rename your Ha data layer to **Ha** then run the macro. It will automatically target the Ha layer, set its blend mode and provide an additional **Luminosity Strength** adjustment. You can double click this and use the **Gamma** slider to control the overall luminosity enhancement.

### Monochrome Colour Mapping

RGB/16

RGB/32

*Run at the top of the layer stack after tone stretching has been performed.*

Non-destructively maps greyscale data (e.g. just one **Ha** data layer) to a controllable colour range, which defaults to red for a false-colour Ha composition.

To tailor the colour mapping to your own data result, expand the **Monochrome Colour Mapping** group.

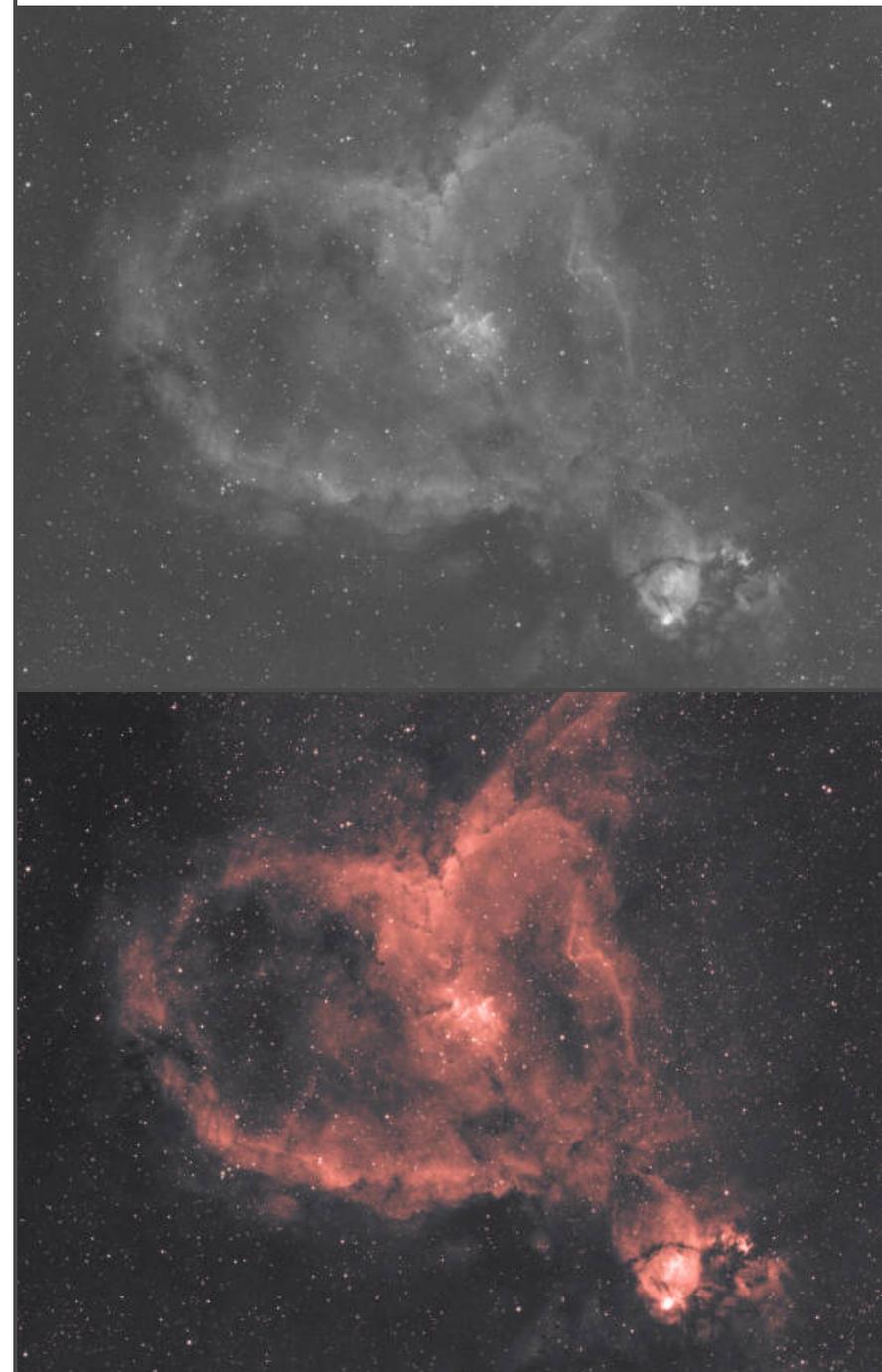
- Double-click **Colour Mapping** and move the second black node to control the range of tones that receive colour.
- Double-click **Black Level** and change **Output Black Level** if the result is too dark or bright.
- You can use the other adjustment layers such as **Brightness & Contrast**, **Saturation**, **Luminosity** and **Colour** to tweak the colour mapping result further.

### Greyscale Solar to False Colour Setup

RGB/32

Intended specifically for greyscale solar imagery of the sun. This macro will take a greyscale document, convert it to full colour (RGB 16-bit), and apply the following operations, all of which are configurable:

- Highlight Recovery
- Colour Mapping (with separate R, G and B gamma controls)
- Brightness Boost
- Yellow colour enhancement
- Softening of detail contrast
- Optional structure enhancement



Monochrome Colour Mapping

## Macro

### Moon Processing Workflow (16-bit) RGB/16

## Functionality

Designed for stacked imagery of the moon using Affinity Photo's File>New Stack functionality, which lets you align, stack and average pixel content using Median and Mean operators.

This macro will perform a number of initial steps:

- Flatten and convert to 16-bit per channel format
- Separate colour and luminosity
- Provide preset HSL layers underneath the luminosity layer so you can saturate and bring out colour detail
- Add a live defringing filter to colour fringing around the edges of the moon (feel free to hide if your image doesn't have this)
- Perform structure and highlight detail enhancement with configurable non-destructive layers
- Add final band-pass sharpening and fine detail sharpening, which are again configurable

### Merge to 16-bit sRGB RGB/32

*Run anywhere in the layer stack after tone stretching has been performed.*

Groups all of your existing layer work, then creates a merged pixel layer before converting to 16-bit precision with an sRGB colour profile.

This is useful if you want to use the Median Blur filter, which is unavailable in 32-bit. 16-bit is also less performance-intensive, so this may help for less powerful hardware setups.

### Merge to 16-bit Wide Gamut RGB/32

Performs the same function as **Merge to 16-bit sRGB**, but instead converts to ROMM RGB (ProPhoto), which is a significantly wider colour gamut and allows for more intense colour detail.



# Credits

All astrophotography retouching and editing by James Ritson. Data gathered using own equipment and remote imaging services iTelescope and Telescope Live.

