

**CODEX<sup>®</sup>**

# USER GUIDE



v 1.2

# ColorSynth from Codex

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Please report any errors found in this document to [support@codex.online](mailto:support@codex.online)

## Support

For assistance with ColorSynth please consult the FAQs, tutorials, and documentation at <https://coloursynth.codex.online>

# 1. Introduction

Welcome to this guide for the ColorSynth color grading plug-in. ColorSynth is an incredibly compact yet powerful plug-in that allows you to achieve everything from fast and straightforward corrections to complex multi-layered grades.

The grading stack is pre-wired and pre-optimized to handle challenging grading scenarios, and grades are highly portable between different systems. There are a range of 'nodes' within the plug-in that can be used to manipulate the color in an image. All adjustments are compiled down into one function inside ColorSynth, so performance is not affected by the complexity of your grades.

ColorSynth version 1.2 is not HDR compatible. Support for HDR workflows will be available in a future version.

## 2. Supported Platforms

ColorSynth version 1.2 can be used in the following host applications\*:

- **Apple Final Cut Pro X**
- **Apple Motion**
- **Adobe Premiere Pro**
- **Adobe After Effects**

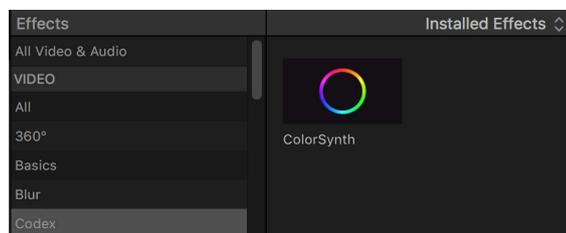
\* A licence is needed to cover each host application separately.

It is recommended to run the most up to date version of the host application.

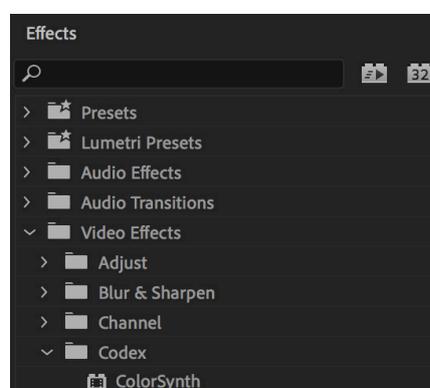
Due to differences between the host applications, there are some small variations in ColorSynth features depending on which host application you are using. These are noted in the relevant sections of this guide.

## 3. Adding ColorSynth as an effect

Once installed, ColorSynth is available from the Effects Browser. Click and drag the Effect to a clip on your Timeline, or double-click the Effect to apply it to the currently selected clip:

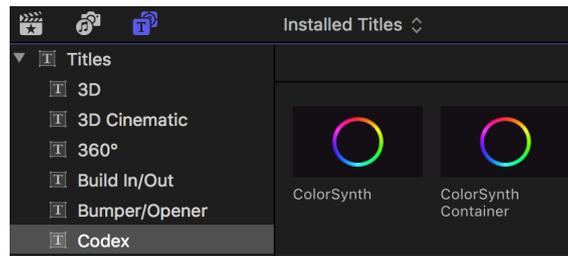


*Final Cut Pro - Effects Browser*



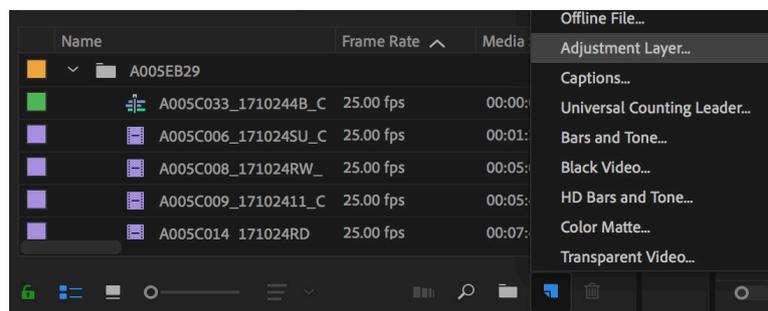
*Premiere Pro - Effects Browser*

ColorSynth is also available as a Title in FCPX. By adding a ColorSynth Title to the timeline you can make color modifications that span clips on the timeline. The 'ColorSynth' Title includes ColorSynth by default, but does not allow re-ordering if used in conjunction with other effects. The 'ColorSynth Container' title needs to have a ColorSynth Effect added manually, and can be used in conjunction with other effects:



*Final Cut Pro - Title Browser*

In Premiere Pro you can add an Adjustment Layer from the Media Browser. ColorSynth can then be applied to the Adjustment Layer to make color modifications that span clips on the timeline:



*Premiere Pro - add Adjustment Layer for use with ColorSynth*

## 4. Overview of Layers

ColorSynth is arranged into 7 primary layers, several of which may contain up to 6 sub-layers. Each layer contains a set of Modifiers (parameters to adjust the image), and some have Qualifiers (parameters to determine which parts of the image get adjusted). Before we look at each layer in more detail, here is an overview of the primary layer stack:

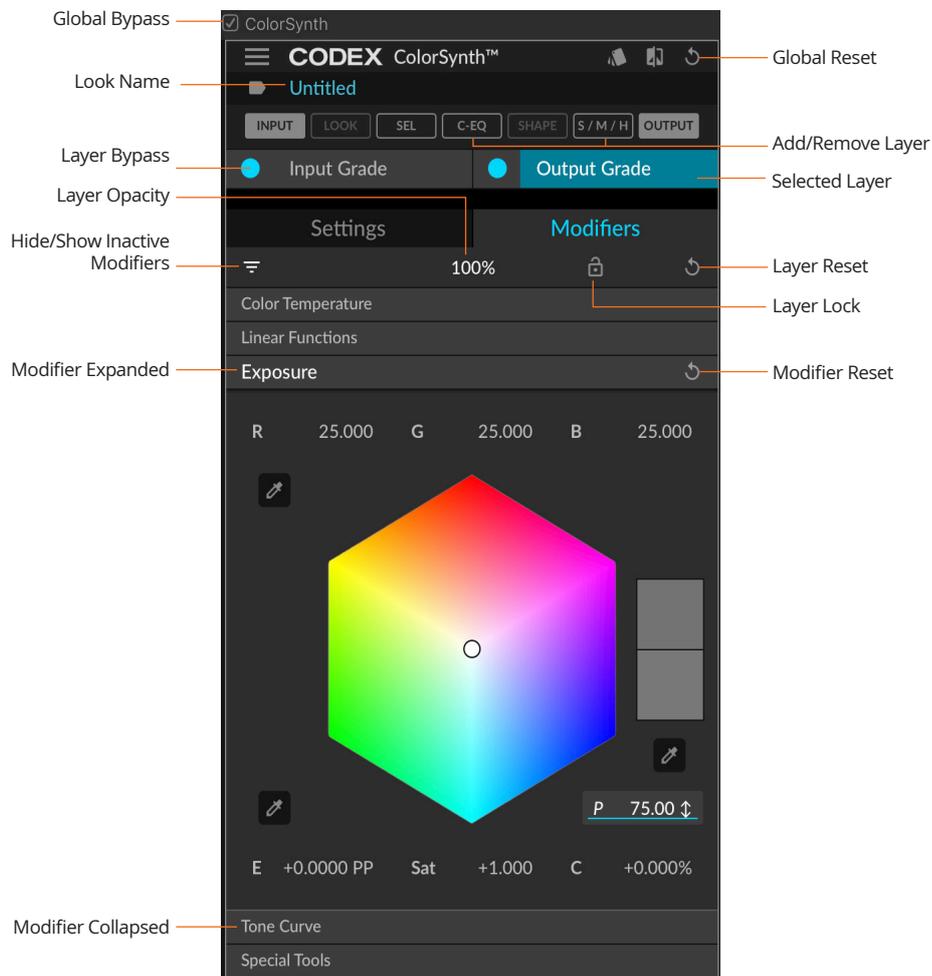
- **Input Grade** - this layer contains all Modifiers for performing 'normalizing' corrections, prior to creative manipulations in any Layers that follow.
- **Color Selections** - the Qualifier of this layer is a high quality chromakeyer, used for performing color isolations. Six color vectors are pre-defined and can be modified. Each of the six separations has its own set of Modifiers.
- **Unselected** - this layer allows adjustment of all parts of the image area not controlled by the Color Selections layer.
- **Color EQ** - this unique layer allows adjustment of Hue, Saturation, and Luminance relative to each other or themselves. The toolset is comprised of 3 panels for different types of adjustment: Main EQ, Color Mixer, and Shading EQ.
- **Shapes** - this layer allows the user to define 6 shapes (sometimes called 'power windows') through which to apply color changes.
- **S / M / H** - this layer allows independent adjustment of Shadows, Midtones, and Highlights, each having its own set of Modifiers. The Qualifier for this layer allows precise and flexible adjustment of the 3 luminance-based ranges.
- **Output Grade** - this layer is similar to the Input layer, providing a set of Modifiers at the end of the grading stack.

Images cascade from top to bottom through the layer stack in the order shown. Within each layer the image cascades through the modifiers from top to bottom in the order shown. Each layer can be independently Reset, Bypassed, or attenuated through an Opacity control. The order of the layers and modifiers is fixed, and has been formulated to handle a variety of difficult grading scenarios.

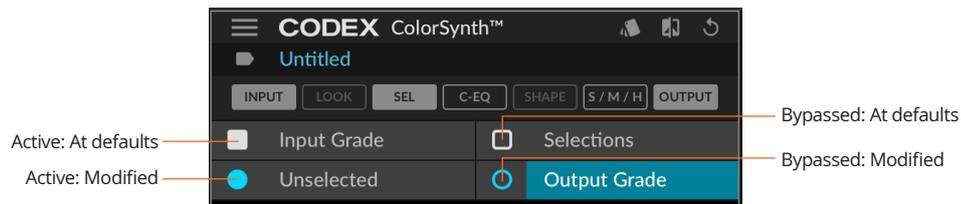
The **Look** layer will be enabled in a future release version.

## 5. Layer Controls

When ColorSynth is first added as an Effect to a clip, the Input and Output layers are enabled by default. The image below shows ColorSynth with these two Layers, and with the Exposure control expanded, so that we can become familiar with the Layer controls.



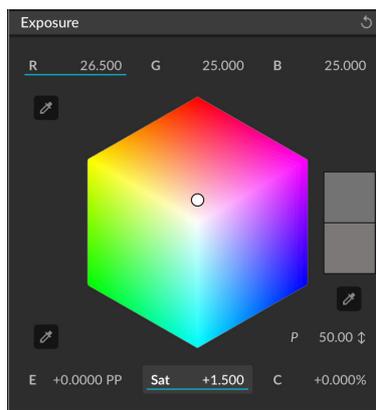
- **Global Bypass** - toggle this control to bypass the entire plug-in. Varies depending on host application.
- **Global Reset** - click to reset **all** values back to their defaults.
- **Look Name** - set the name for the Look. This is used when storing the Look as a Snapshot, or to a .csllook file.
- **Add/Remove Layer** - toggle these controls to add or remove Layers from the grading stack.
- **Selected Layer** - one Layer can be selected at a time. When a Layer is selected, the Modifiers and Settings/Qualifiers for this Layer are displayed.
- **Layer Bypass** - toggle this control to bypass a Layer.
- **Layer Reset** - click to reset the values for a Layer back to their defaults.
- **Layer Lock** - toggle to Lock a Layer so that the values cannot be changed.
- **Layer Opacity** - click on this value and drag the mouse down/left to reduce opacity, or up/right to increase opacity.
- **Hide/Show Inactive Modifiers** - toggle to hide/show Modifier panels that are Inactive (with default values).
- **Modifier Expanded** - click on a collapsed Modifier title bar to expand the panel.
- **Modifier Collapsed** - click on an expanded Modifier title bar to collapse the panel.
- **Modifier Reset** - click to reset the values for a Modifier back to their defaults.



The image above shows the different status indicators for Layers. These indicate if there modifications in the Layer, and whether the Layer is bypassed. A square white symbol means there are no modifications (all settings are at the defaults). A circular cyan symbol means that there have been modifications in the layer. If the symbol is solid this means the layer is active, and if the symbol is an outline this means the layer is bypassed.

## 6. Modifier and Qualifier Controls

Here we will look at some general principles for adjusting parameters within a Modifiers or Qualifiers panel. Below as an example is the Exposure panel, which is available in several of the Layers:



Note that any values that have been changed from the default are underlined in blue, so it is quick and easy to identify which parameters have been adjusted.

Any parameters that change over time and have keyframes associated with them have a magenta or grey line above them. Further details about the keyframing system are available in the later section on 'Keyframes'.

### 6.1. Keyboard Control

Click on a value to highlight it for adjustment. The keyboard can now be used to adjust this parameter, and also to navigate to other parameters in the panel:

- Press **Up** or **Down** to increase/decrease the value by the Default increment.
- Press **Alt + Up** or **Alt + Down** to increase/decrease by a Fine increment.
- Press **Shift + Up** or **Shift + Down** to increase/decrease by a Coarse increment.
- Press **Left** or **Right** to move to the previous/next parameter.

NOTE: The above keyboard shortcuts cannot be used with ColorSynth in Premiere Pro.

### 6.2. Mouse Control

To adjust a value, click and drag on the value: **Up/Right** to increase, or **Down/Left** to decrease.

To manually enter a value, Double Click on the value of a parameter so it is highlighted in blue, and then type in a new value and press Enter.

To reset a value, Double Click on the label of a parameter (such as the 'Sat' above).

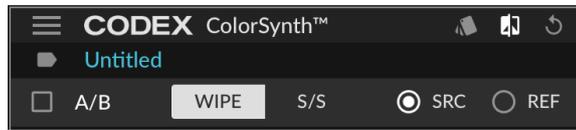
### 6.3. Control with the Keys Panel

Please consult the Keys panel documentation for details on using ColorSynth with the dedicated Keys control panel.

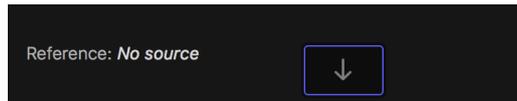
## 7. A/B Image Comparison Controls

NOTE: The A/B Image Comparison Controls are only presented in ColorSynth in FCPX.

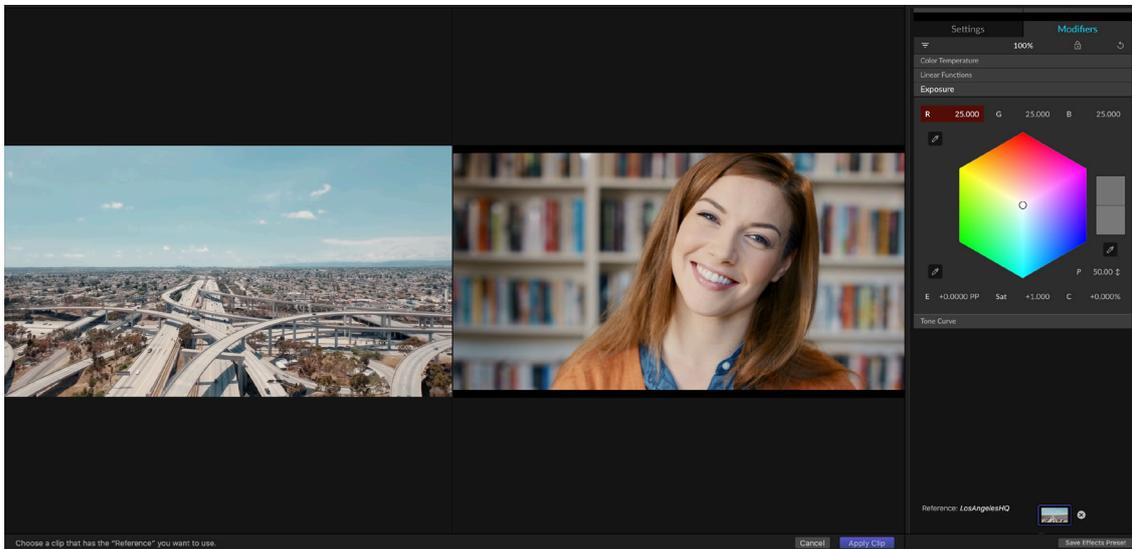
In the top bar of ColorSynth (next to the Reset control) is a button to show the A/B Image Comparison tools:



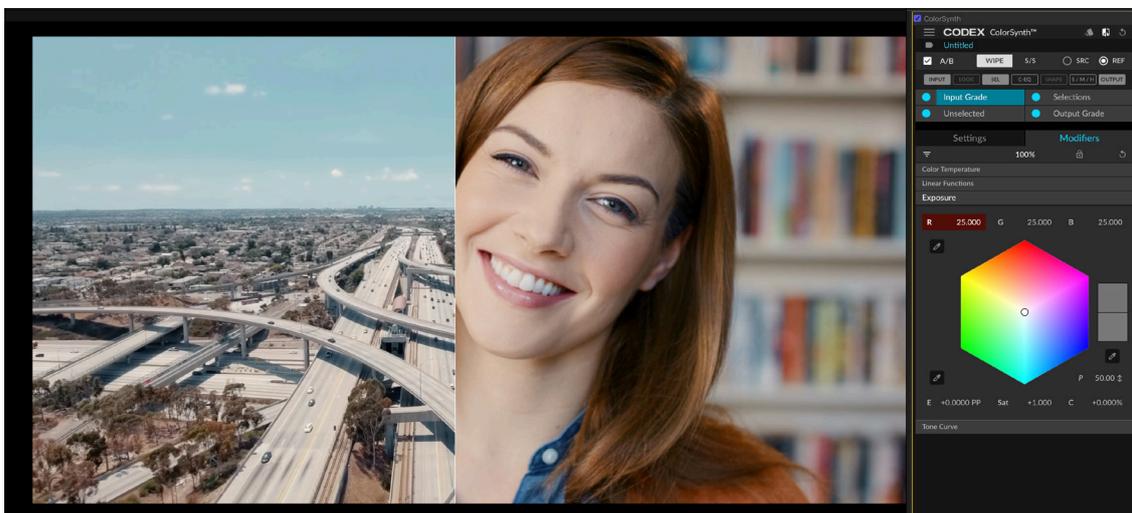
Click the 'A/B' box to enable the tools. By default the SRC option is selected, meaning the viewer will show a comparison of your graded image against the ungraded Source image. At the bottom of the ColorSynth effect is a box with an arrow. Click on the arrow to select a different Reference image from the timeline:



Scroll along the timeline to select a Reference. When the desired Reference has been found click the Apply Clip button:



The images can be displayed in Wipe mode or Side by Side (S/S) mode. In Wipe mode the dividing line can be clicked and dragged to show more of the Reference or Source image (ensure the ColorSynth plug-in is selected so it is highlighted yellow to allow clicking and moving of the dividing line):

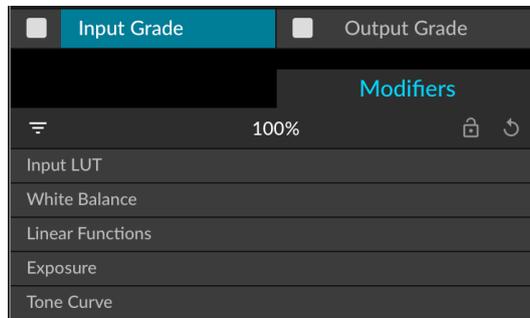


## 8. Layers and Modifiers

We will start by looking at the Input and Output Grade. After this the other Layers and Modifiers will be discussed, which can be inserted between the Input and Output Grade layers for additional corrective and creative modifications.

### 8.1. Input Grade

This layer contains all Modifiers for performing 'normalizing' corrections, prior to creative manipulations in any Layers that follow.



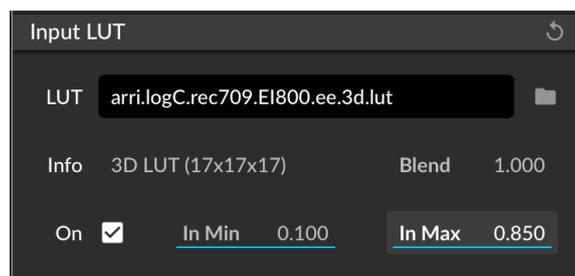
The Modifiers available are:

- **Input LUT** (enable using the tickbox in Preferences)
- **White Balance**
- **Linear Functions**
- **Exposure**
- **Tone Curve**

This layer is intended to be used for your 'One Light' pass on clips.

### 8.2. Input LUT

The Input LUT modifier can be used to apply a LUT at the beginning of the ColorSynth look:



The Input LUT (and Output LUT) modifier visibility can be toggled in the Preferences panel. Additionally the Preferences panel allows the setting of the LUT Root Dir (folder that gets opened by default for selecting LUTs).

The **Blend** value controls whether the LUT is applied at full strength (1.000) or at a reduced opacity. The LUT can be toggled on/off using the **On** tickbox.

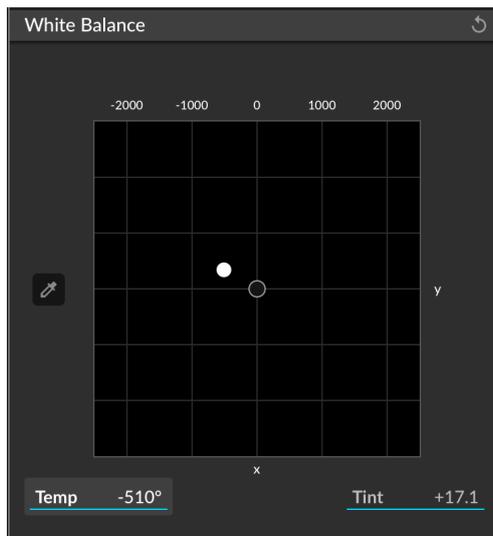
The **In Min** and **In Max** controls allow adjustment of the range of the image before it goes into the LUT. In Min is analogous to Lift and can be used to adjust the shadow levels, and In Max is analogous to Gain and can be used to adjust the highlight levels. These controls can be useful if the image has a wider dynamic range than the LUT is intended for, to prevent clipping once the LUT has been applied.

LUT formats that are supported: 3dl, csp, cub, cube, hdl, look, mga/m3d, spi1d, spi3d, vf.

LUT formats that are not supported: Shaper LUTs or LUT files that contain multiple LUTs, ccc and cc (CDL) and spimtx (matrices).

## 8.3. White Balance

The White Balance modifier panel can be used to adjust color Temperature and Tint:



The black dot shows the Correlated Color Temperature. The white dot shows the adjusted value.

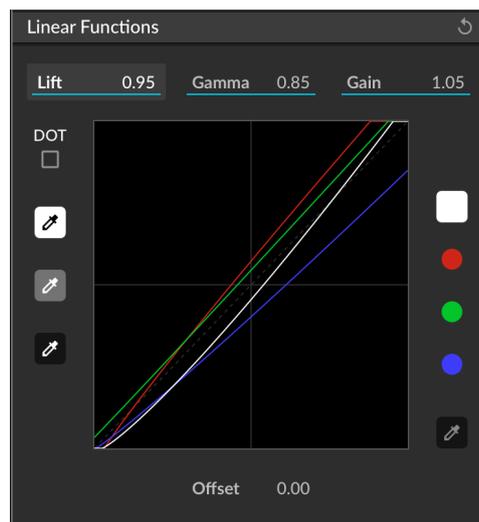
The horizontal (x) axis adjusts Temperature - moving to the right increases the value (making the image 'warmer'), and moving to the left decreases the value (making the image 'cooler').

The vertical (y) axis adjusts Tint - moving up increases the value (towards magenta) and moving down decreases the value (towards green).

The sampler tool can be used for auto White Balancing. Select the tool and then click on a white region in the image. The tool automatically adjusts Temperature and Tint based on that sample to correct the image.

## 8.4. Linear Functions

The Linear Functions modifier panel can be used in two different modes. The first mode gives access to Lift, Gamma, Gain, and Offset controls:



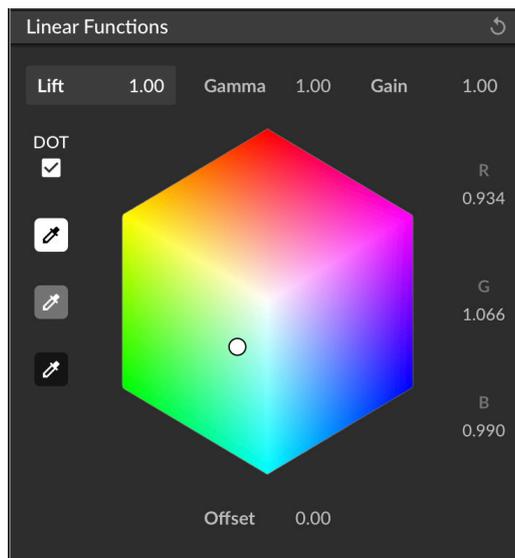
Click and drag the curve to adjust the selected parameter. Lift adjusts the black level of the image, Gamma the mid level, and Gain the white Level. The default value for these is 1.00. Offset adjusts the whole line/curve up or down, to darken or brighten the entire image. The default value is 0.00.

By default, adjusting Lift/Gamma/Gain/Offset will adjust all 3 color channels (ganged RGB), as shown by the White square selected on the right of the panel. Select either the Red, Green, or Blue circle on the right to adjust values for a color channel individually.

As these controls work in RGB space, adding contrast here by decreasing Lift and increasing Gain will also add saturation. The sampler tool on the right is used to display (as numbers and a dashed yellow line) the input and output values of a

sampled area.

Click the DOT box to use the Linear Functions panel in 'Video Grade' mode:



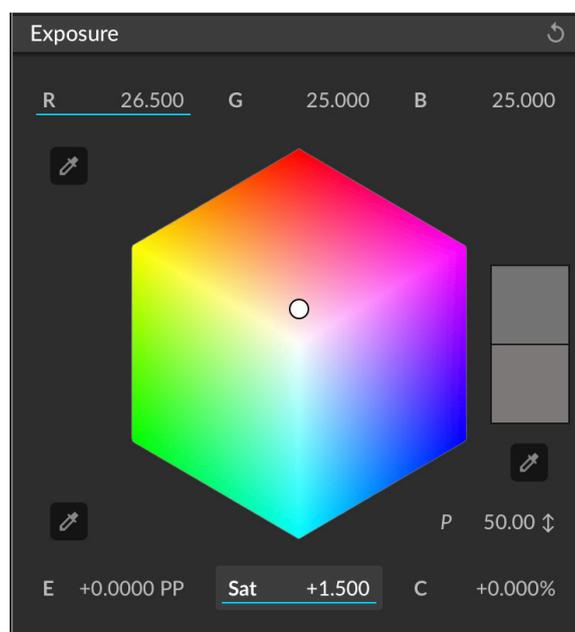
In this mode the RGB balance for Lift, Gamma, and Gain can be adjusted separately. Click either Lift, Gamma, or Gain above the color cube, and then click and drag the white dot to adjust the RGB balance.

The three sampler tools on the left of the Linear Functions panel are (from top to bottom):

- **Auto diffuse white level** (Gain) - click a diffuse white area of the image to set the RGB balance and level to 100% white.
- **Auto midtone neutrals** (Gamma) - click a gray card/object in the image to neutralise the RGB balance without affecting luminance.
- **Auto black point** (Lift) - click a black area of the image to set the RGB balance and level to 100% black.

## 8.5. Exposure

The Exposure modifier panel can be used to adjust RGB balance, Exposure, Saturation, and Contrast in a Layer:



The **R, G, B controls** follow the Printer Lights model, and allow adjustment of the relative densities of red, green, and blue for the Layer. The default value is 25, with a range from 0 to 50. In the Preferences the baseline can be changed to 0.

The increments when adjusting the RGB Printer Points are:

- Default Increment: 1/2 point
- Fine increment: 1/4 point
- Coarse increment: 1 point

The **upper left sampler** normalizes the R, G and B densities such that a sampled area becomes neutral. An 18% grey card is ideal as an input for this.

The **Exposure Value (E)** can be adjusted for the Layer. This defaults to Printer Points mode, as indicated by the 'PP' suffix. Clicking the 'PP' suffix will toggle the control into Exposure Value 'EV' mode.

When in 'PP' mode the increments are the same as for adjusting RGB Printer Points as detailed above. When in 'EV' mode the increments for adjusting the Exposure Value are:

- Default Increment: 1/4 EV
- Fine increment: 1/8 EV
- Coarse increment: 1/2 EV

A change of 1 EV is equivalent to 1 F-Stop/T-Stop. The relationship between EV and Printer Points can be adjusted in the Preferences, and the default 'Points per EV' value is 12.

The **lower left sampler** sets the relative exposure of the scene without changing the RGB balance. The user is expected to sample an 18% grey card.

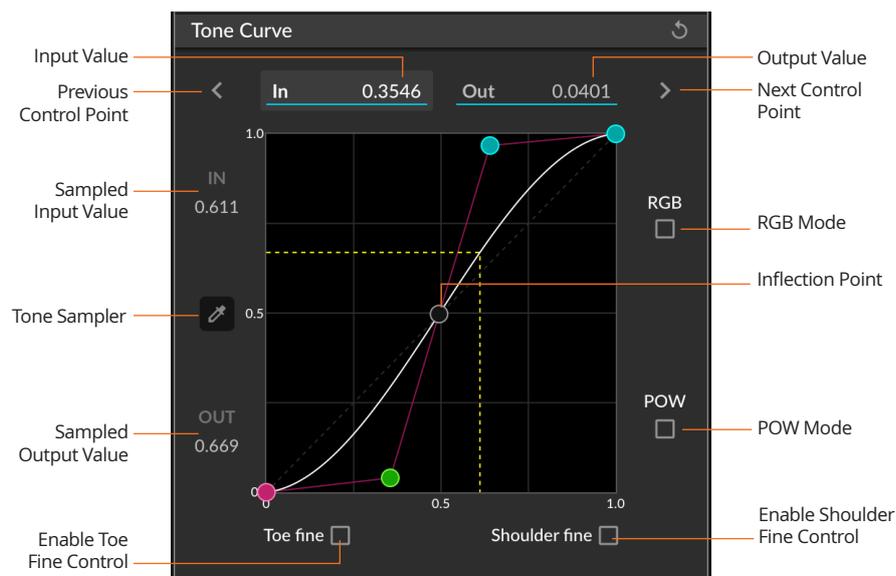
The **Saturation (Sat)** can be adjusted for the Layer. The default value is +1.00, with a range from 0.00 to +3.00.

The **Contrast (C)** can be adjusted for the Layer. The default value is +0.00%, with a range from -100.00% to +100.00%. The default mode is 'Luma' for Contrast adjustments, and in the Preferences this can be changed to RGB if required.

The 'P 50.00' value is the **Contrast Pivot**. A lower pivot value will result in Contrast adjustments that affect the brighter parts of the image, and vice versa. The **lower right sampler** sets the pivot value for the Contrast control.

Click the arrow next to 'P 50.00' and the display changes to 'O 0.00' ("Big O notation"). This is the contrast roll-off, and increasing the value will give a more gentle roll-off to contrast adjustments.

## 8.6. Tone Curve

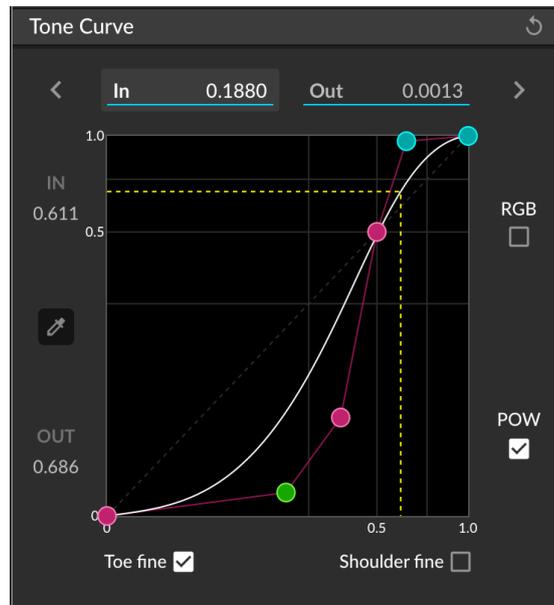


The green Control Point is the one currently selected for adjustment, and the **Input** and **Output Values** for this point are shown above the curve. Values can be typed in, or the point can be moved with the mouse.

Using the Tone Sampler will result in the yellow dashed line, showing clearly where the sampled area sits on the tone curve, along with the **Sampled Input Value** and **Sampled Output Value**.

The default mode is Luma so changes to contrast will not affect color saturation. **RGB Mode** can be enabled so that contrast changes affect saturation if required.

The **POW Mode** can be used to adjust the scale of the Tone Curve, to give more fine grained control in the shadows:

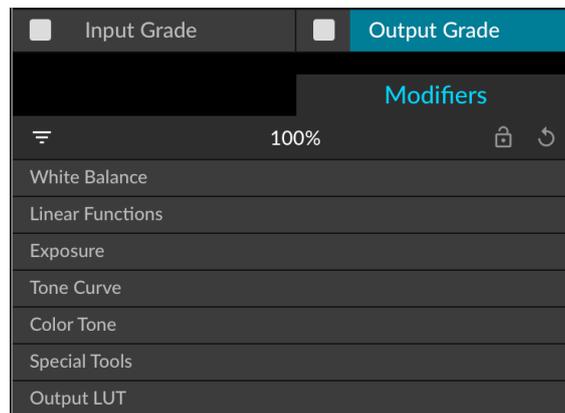


Select the **Toe fine** option can be selected to add 2 additional control points at the lower end of the curve.

Select the **Shoulder fine** option can be selected to add 1 additional control point at the upper end of the curve.

## 8.7. Output Grade

This layer is similar to the Input layer, providing a set of Modifiers at the end of the grading stack. In addition to the Modifiers offered by the Input Grade Layer there are additional Modifiers for **Color Tone** and **Special Tools** which are unique to this layer.

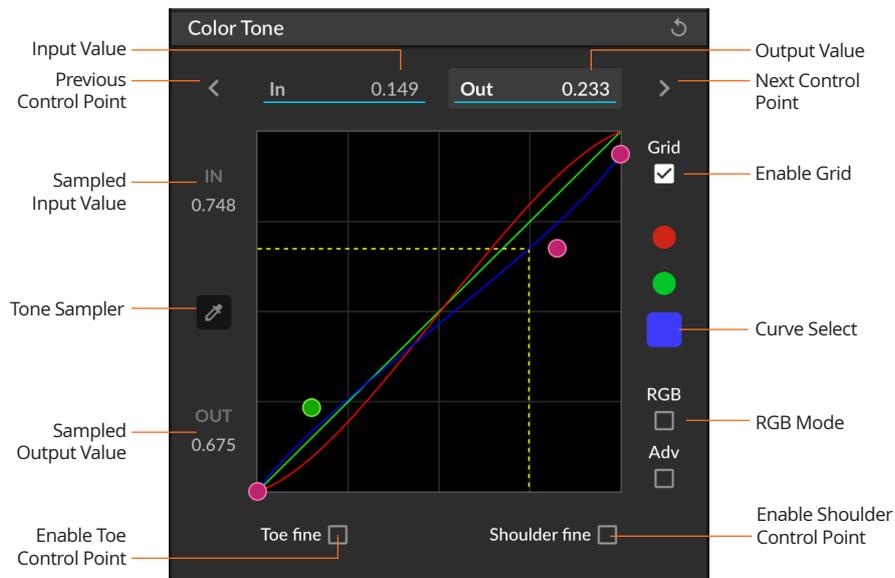


The Modifiers available are:

- **White Balance**
- **Linear Functions**
- **Exposure**
- **Tone Curve**
- **Color Tone**
- **Special Tools**
- **Output LUT** (enable using the tickbox in Preferences. See section on Input LUT for instructions)

## 8.8. Color Tone

The Color Tone panel allows you to define separate RGB curves:



The green Control Point is the one currently selected for adjustment, and the **Input** and **Output Values** for this point are shown above the curve. Values can be typed in, or the point can be moved with the mouse.

Using the Tone Sampler will result in the yellow dashed line, showing clearly where the sampled area sits on the tone curve, along with the **Sampled Input Value** and **Sampled Output Value**.

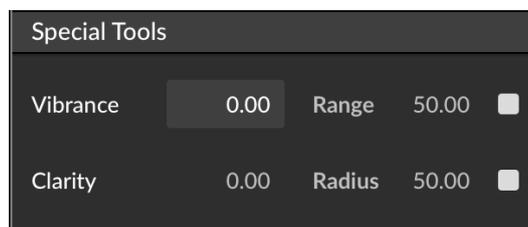
The default mode allows adjustment of the colors without affecting brightness. Click the RGB Mode toggle to change the relative intensities of RGB channels, which affects both colors and brightness.



**See Appendix 13.4 for an example of styling an image with Color Tone.**

## 8.9. Special Tools

In the **Special Tools** panel there are controls for **Vibrance** and **Clarity**:



**Vibrance** is a control for adjusting saturation, but in a more natural way. The change in saturation is inversely proportional to how saturated a color already is. So when adding Vibrance, colors with a low starting saturation will be boosted more than colors with a high starting saturation. The **Range** value modifies how proportional the adjustments are to the image content - a higher value for Range will result in a more pronounced change to saturation when Vibrance is increased.

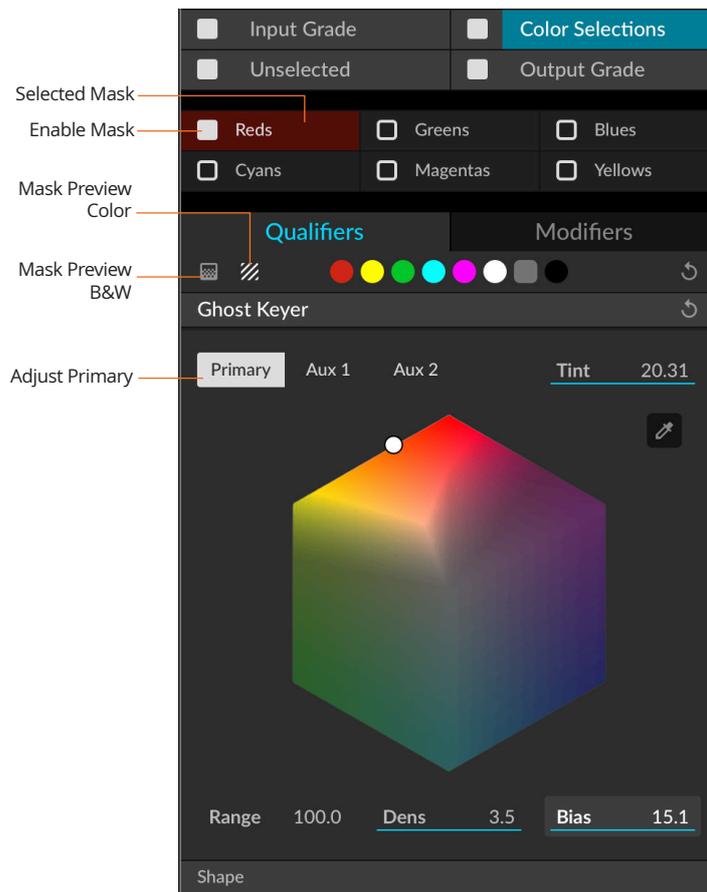
**Clarity** is a control for increasing the perceived sharpness of the image, by controlling local contrast. The **Radius** value adjusts the size of the mask that is used when calculating the new contrast.

## 8.10. Color Selections and Unselected

The Qualifier of the **Color Selections** layer is a high quality chromakeyer, used for performing detail-preserving color isolations. Six color vectors are available as pre-defined sub-Layers and can be modified. Each of the sub-Layers has its own Qualifier and set of Modifiers. Additionally, after defining each chroma-based Qualifier, a Shape mask can be applied to limit the effect to a region of the image.

The **Unselected** layer allows adjustment of all parts of the image area not controlled by the Color Selections layer. As such the Color Selections layer can be used to preserve skin tones, and then the Unselected layer can be used to modify everything else - for example to achieve a classic teal and orange look that leaves skin tones unaffected.

The Qualifiers panel has the following options:



The 'Ghost Keyer' provides a Primary key by default, as well as 2 Auxilliary keys. Each key has full keyer controls, and the Auxilliary keys can be added or subtracted from the Primary key to create highly selective masks:

- **Selected Mask** - click to select a mask to adjust. This mask will remain selected when moving between the Qualifiers and Modifiers.
- **Enable Mask** - toggle to enable and disable this mask.
- **Mask Preview Color** - click and then select a color from the options to the right, to show the mask as a color overlay on the image.
- **Mask Preview B&W** - click to show an 'alpha channel' mask, where parts of the image shown in white are included in the mask.
- **Tint** - adjusts the key color. Use the Sampler below this to select a key color from the viewer.
- **Range** - reduce the value to narrow the range of blended colors in the mask.
- **Dens** - increase the value to add more density towards the edges of the mask.
- **Bias** - adjust the gradient towards the edge of the mask - increase for a steeper gradient, or decrease for a shallow roll off.
- **Primary** - click to adjust the settings for the Primary key.
- **Aux 1** - click to adjust the first auxilliary key.
- **Aux 2** - click to adjust the second auxilliary key.

Use of the **Shape** controls is covered in the later section that provides full details about the **Shapes** layer.

With the available features and unique internal methods used, 'Ghost Keyer' is designed to preserve all the details from the source images and maintain the subtle blending gradients present in natural scenes. Highlights and shadows at either end of the luminance range are handled in a way that does not create unpleasant artifacts which can occur when grading through a mask.

Here is a typical approach for setting up a key using Color Selections:

1. Sample/adjust the Tint to get a fairly flat key on the required part of the image.
2. Increase the Density to make the key fill as much as needed.
3. Decrease the Range to narrow the colours picked up by the key.
4. Work with the Bias to alter the smoothness of the key edge.
5. Cycle through again to fine-tune.
6. If you still pick up too much or not enough adjacent colours, use Auxiliary keys to adjust further (use sparingly).

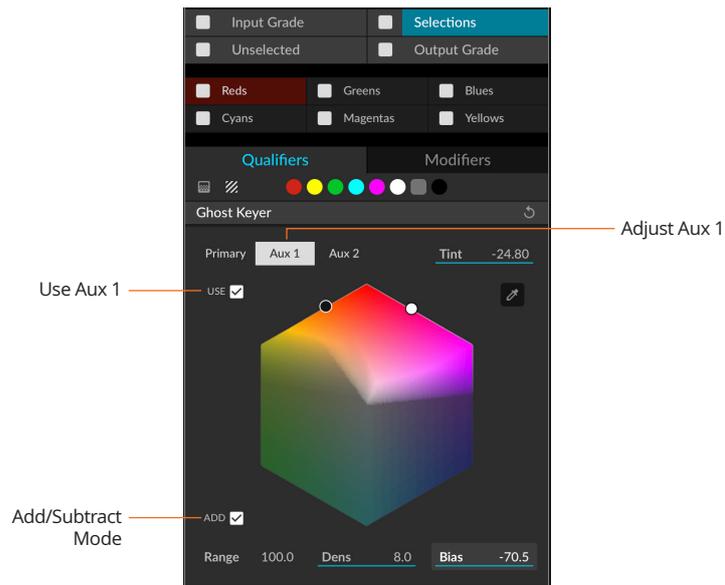
Some additional tips when keying are:

- A dense key will allow more modifier control on the Selection, at the expense of a harsher edge.
- The best modifiers to try first for colour change are Exposure RGB printer lights, and Linear Functions RGB Offsets.
- Saturation, Contrast and Exposure should be used sparingly, to avoid separating the selection too much from its surrounding.
- In some cases the Color EQ will work better - experiment and see.
- Classic "cinematic" grades that alter the scene colorimetry while preserving flesh tones should be done with a Color Selection on the skin, and the main grade on the Unselected.



**See Appendix 13.5 and 13.6 for an example of adjustment using Color Selections.**

Below is an example of a more complex key setup, with further explanation for context:



Here we are pulling a more complex key, with Aux 1 also enabled for the Reds. The Aux 1 key (white dot) is being used in additive mode, and is extending the Primary key (black dot) further towards Magenta. We can also use the Aux keys in subtractive mode, as shown in this example:



The **Color Selections layer** contains Modifiers that can be used to perform corrections on *each separate key*, depending on which one of the sub-Layers is selected. The Modifiers available for each sub-Layer are:

- Linear Functions
- Exposure

The **Unselected** layer allows adjustment of all parts of the image area not controlled by the Color Selections layer.

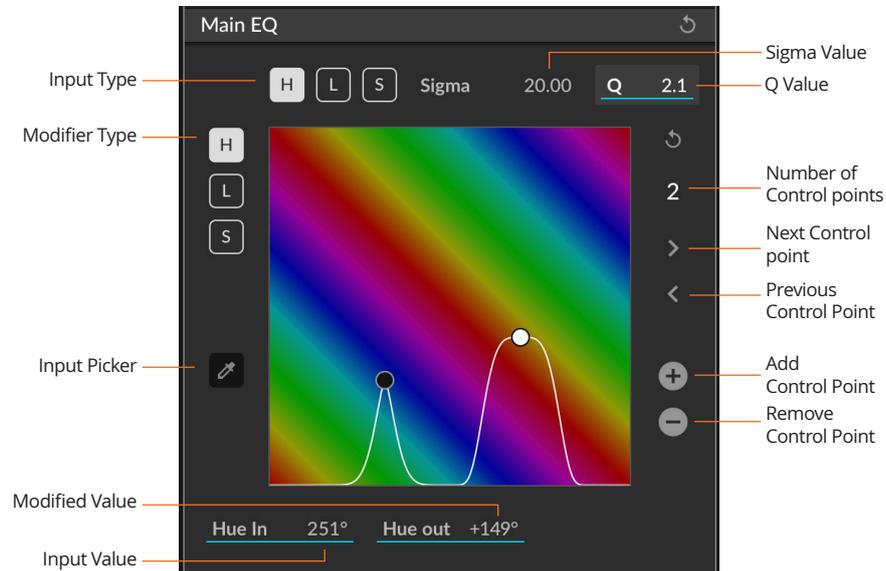
The Modifiers available for this layer are:

- Linear Functions
- Exposure

## 8.11. Color EQ

This unique layer allows adjustment of Hue, Saturation, and Luminance relative to each other or themselves. The toolset here is comprised of 3 sub-panels that allow different types of adjustment: Main EQ, Color Mixer, and Shading EQ.

### 8.11.1. Main EQ



The H, S, and L controls at the top of this layer allow you to select the Input Type, which is the qualifier for which part of the image to adjust. The H, S, and L controls to the left of this layer allow you to select the Modifier Type - the type of modification you want to make. The plot background will change accordingly, depending on which options are selected.

By default there is a single control point, with buttons in the panel to Add or Remove Control Points.

The Sigma Value determines the width of the curve for a Control Point - which surrounding colors are affected.

The Q Value determines the steepness of the curve - how much are the surrounding colors affected.

The Input Picker can be used to select an input value from the image for Hue, Saturation, or Luminance.

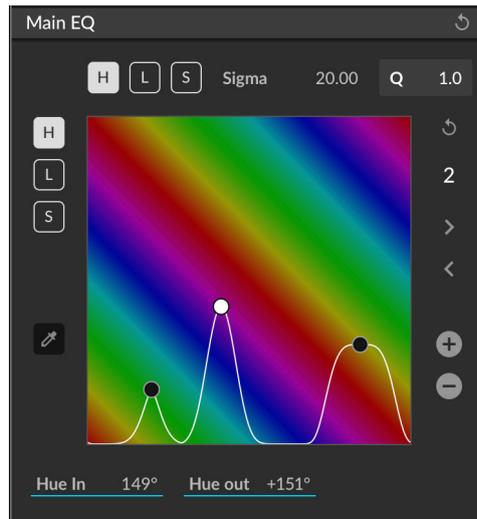
The white modifier curve starts as a flat line. The Input Picker can be used to display a reference (dashed) line of a sampled area in the image.

When adjusting HvL or HvS there is a Sens parameter, which controls the Sensitivity of the adjustment. It is used to control how selectively the lightness or saturation outputs are applied. This control can be useful if any graininess is encountered when remapping saturation and/or lightness.

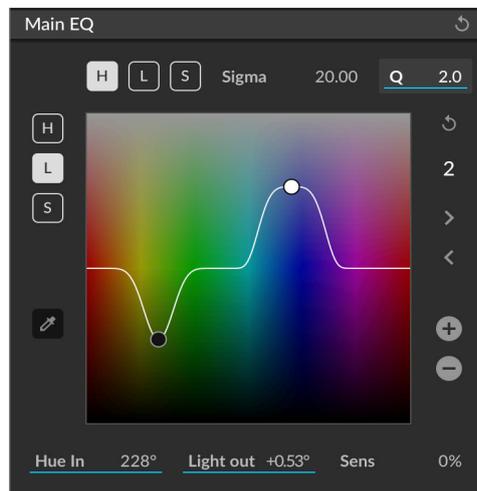


**See Appendix 13.1 for an example of Hue vs Hue remapping.**

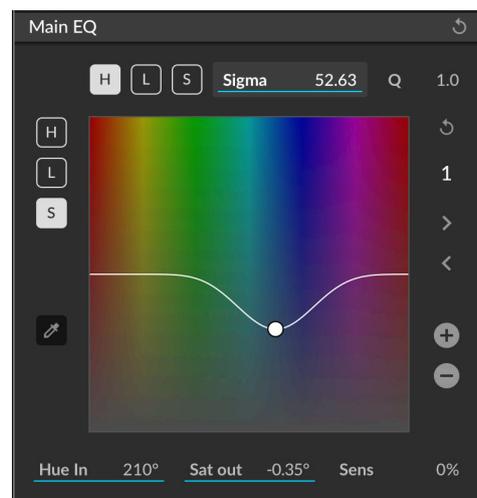
The different possible modes, with the Input Type given first, are: HvH, HvL, HvS, LvL, SvL, SvS. The interface in these modes is shown below:



*Hue vs Hue*



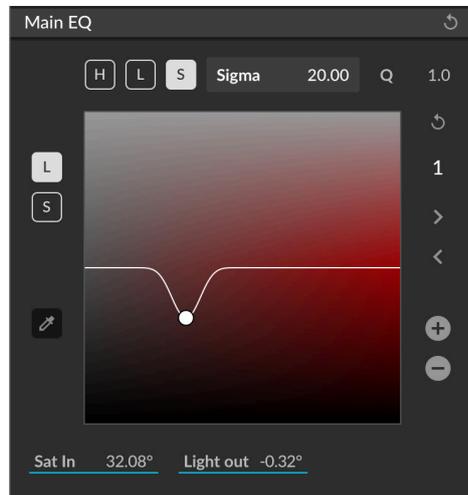
*Hue vs Luminance*



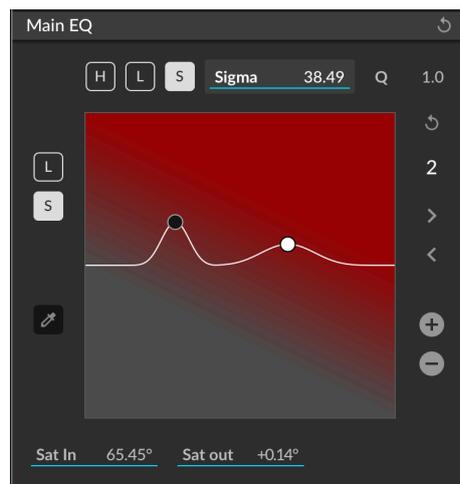
*Hue vs Saturation*



*Luminance vs Luminance*

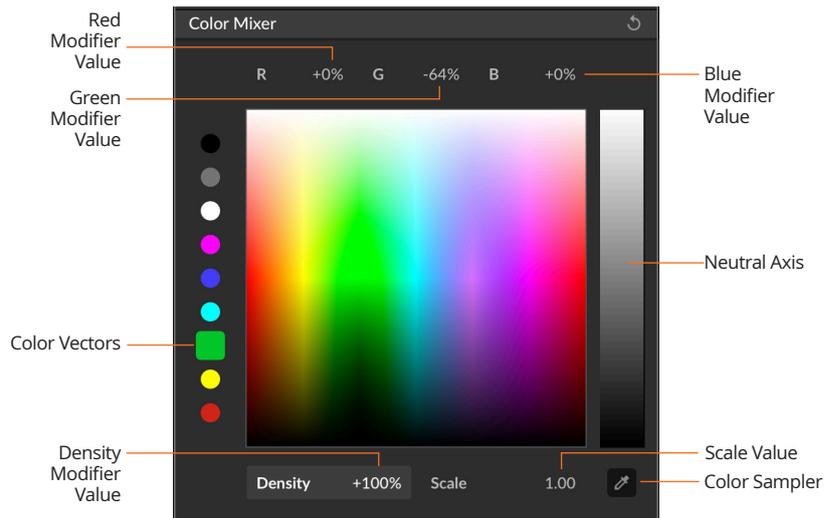


*Saturation vs Luminance*



*Saturation vs Saturation*

### 8.11.2. Color Mixer

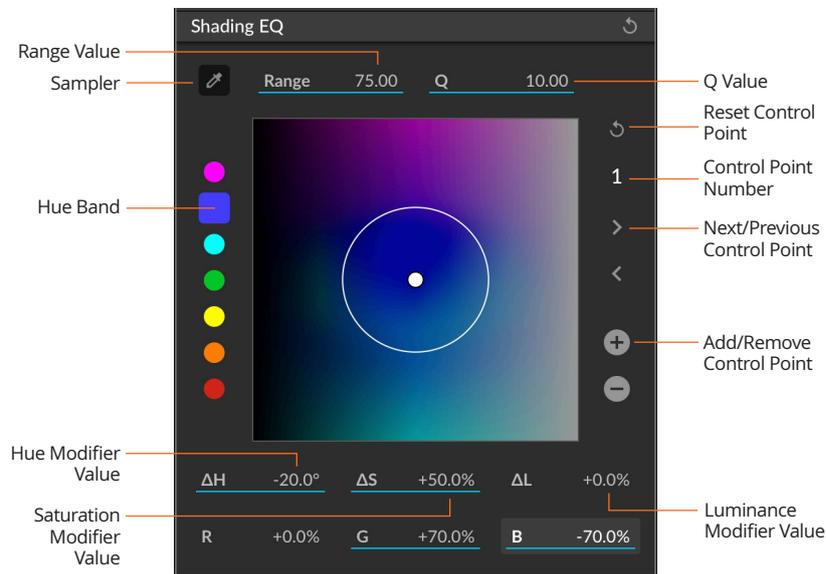


The Color Mixer can be used to adjust the RGB color balance and Density along six different Color Vectors of an RYGCMB cube. Select the Color Vector to modify, then adjust the R, G, B, and Density values. The color vectors are deliberately broad to allow for deep color changes that remain clean.

The color plot in the panel will adjust to show the modifications. In the example shown there is added Density in the Greens, and the Reds have had the Green Modifier Value lowered, resulting in Reds that are more magenta.

The greyscale plot on the right of the panel shows the Neutral Axis of the RYGCMB cube. There is more fine grained control of the Neutral Axis as this is divided into Shadow, Midtone, and Highlight ranges. Select the black, grey, or white buttons above the Color Vectors to adjust the Shadow, Midtone, or Highlight range of the Neutral Axis.

### 8.11.3. Shading EQ



The Shading EQ can be used to target a very specific color for the modification of Hue, Saturation, Luminance, or RGB tinting. The range of colors affected by the change can be much smaller than when using the Main EQ panel.

Use the Sampler to pick the color to adjust. The sampled color will be shown in the appropriate Hue Band. Add a Control Point and the color can be adjusted by changing the Hue, Saturation, Luminance or RGB Values. To also affect surrounding colors, increase the Range value. Enter a Q Value to adjust the steepness of the curve going into these colors.

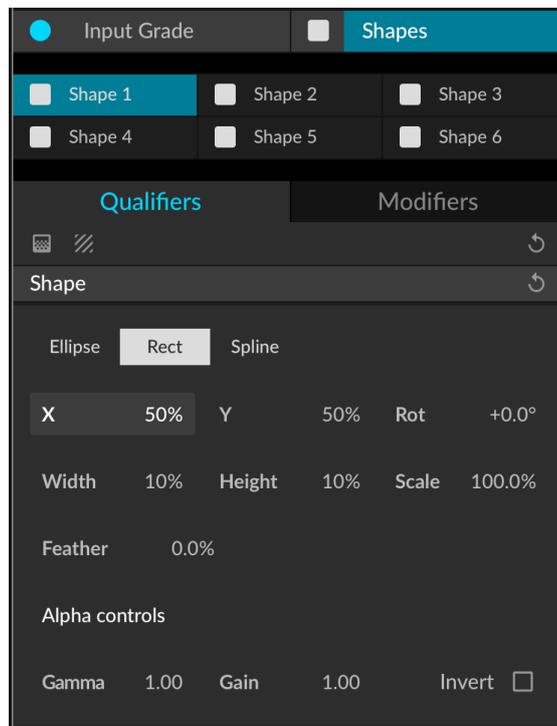
Hue shifting gives access to adjacent hues in a color wheel, whilst RGB tinting can be used to modify the colors towards any other color, so both sets of controls are provided depending on the type of transformation that is required.



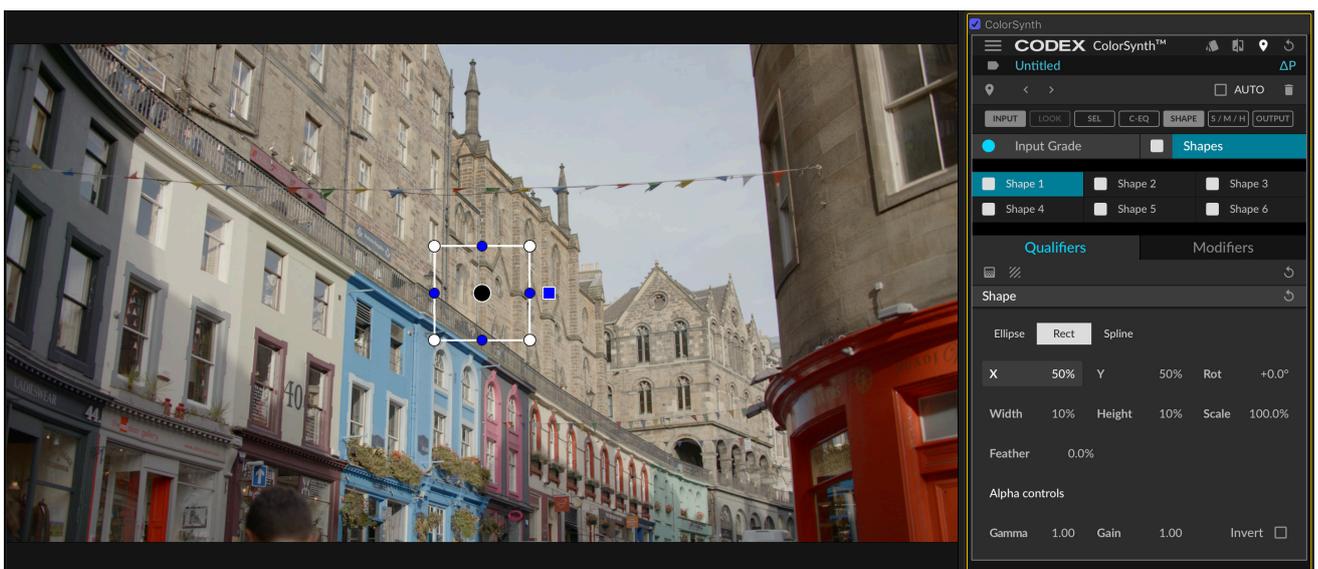
See Appendix 13.2 and 13.3 for examples of retinting with the Shading EQ tools.

## 8.12. Shapes

This layer contains six sub-Layers which allows the user to define up to six independent Shapes (or “power windows”) per clip. These Shapes can be stationary or animated using the Keyframe toolbar. Within the area defined by a Shape the Linear Functions and Exposure panels can be used to modify the image.

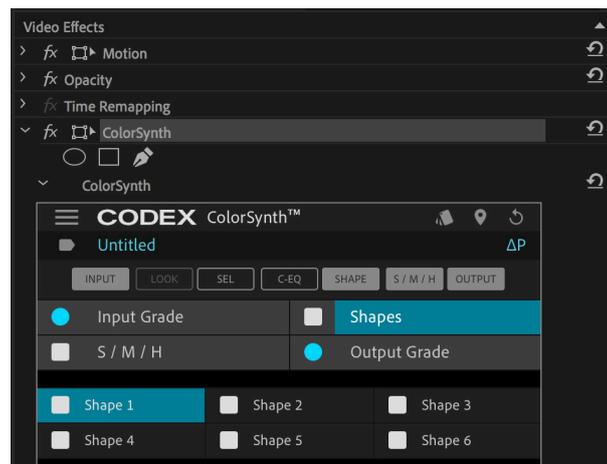


Each shape can be defined as an Ellipse, a Rectangle, or a Spline (free-form drawn shape). When the type of shape is chosen the controls will appear as an overlay in the image viewer:



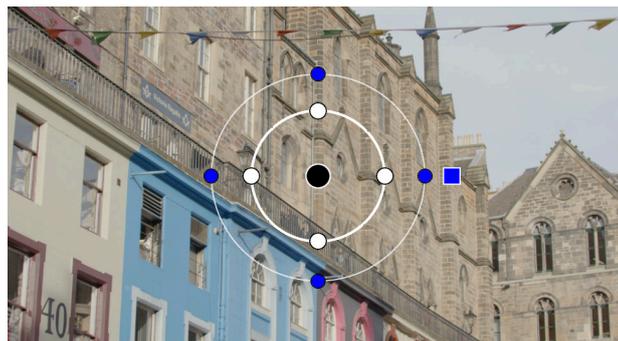
NOTE: In both FCPX and Premiere Pro, the **title** of the ColorSynth effect **must be selected** in order for any overlays (such as shape controls) to be shown in the viewer.

The screenshot above shows FCPX with the ColorSynth effect title selected (as indicated by the yellow border around the ColorSynth effect). The screenshot below shows Premiere Pro with the ColorSynth effect title selected:



### 8.12.1. Ellipse and Rectangle shapes

After choosing to add an Ellipse or Rectangle shape the controls appear in the viewer. The shape can then be adjusted using the controls in the viewer, or the parameters in the shape Qualifier panel:



The control points are used to adjust the shape as follows:

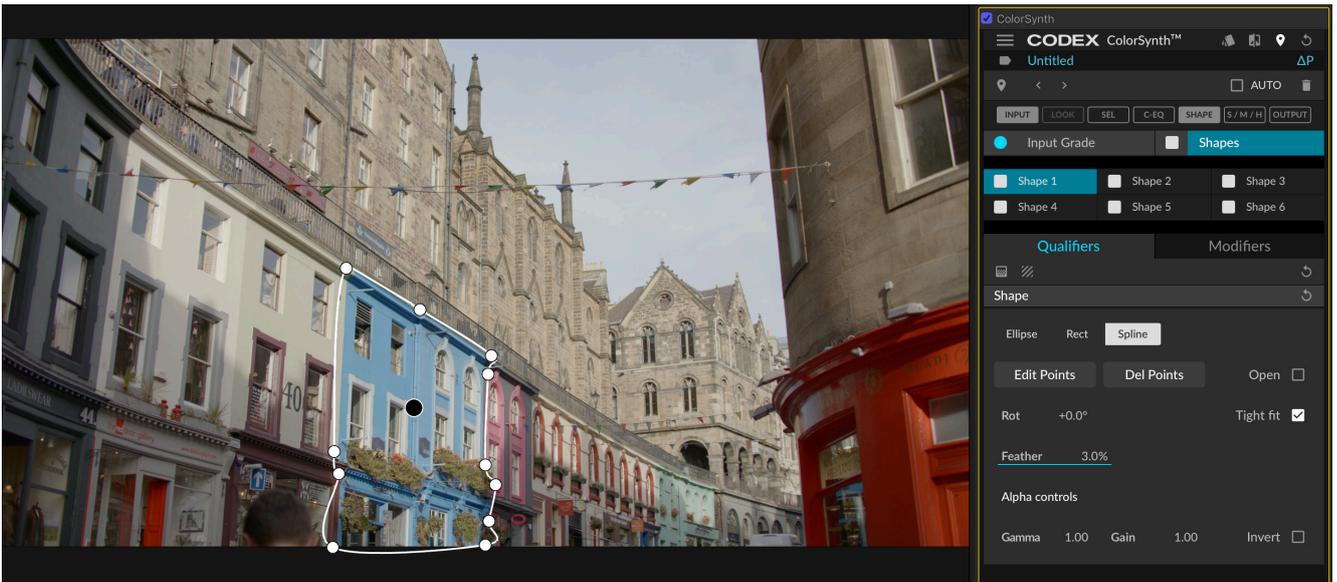
- **Black circle** - position of shape.
- **White circles** - dimensions of shape.
- **Blue circles** - feathering (per-side).
- **Blue square** - feathering (master).

The parameters of the Qualifier are:

- **X** - horizontal position of shape.
- **Y** - vertical position of shape.
- **Rot** - rotation of shape.
- **Width** - width of shape.
- **Height** - height of shape.
- **Scale** - scale factor of shape (useful for keyframing objects as they get further/closer).
- **Feather** - amount of feathering at edge of shape.
- **Gamma** - used to adjust 'roll-off' of feathering.
- **Gain** - used to adjust transparency of mask (and therefore strength of any effect applied through it).
- **Invert** - by default any changes will happen inside a shape. Click the 'Invert' checkbox if you want changes to happen outside the shape.

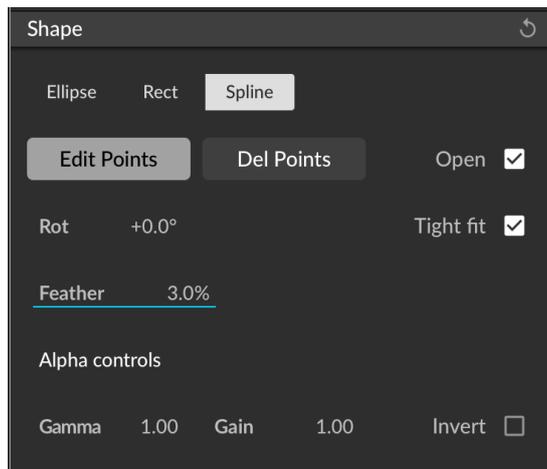
## 8.12.2. Spline shapes

After choosing to add a Spline shape it must then be drawn within the viewer. An example is shown here:



Click in the viewer to add control points around an area in the viewer, until finally clicking on the first control point to close the shape. When this is done the 'Open' toggle box in the shape parameters will become unselected.

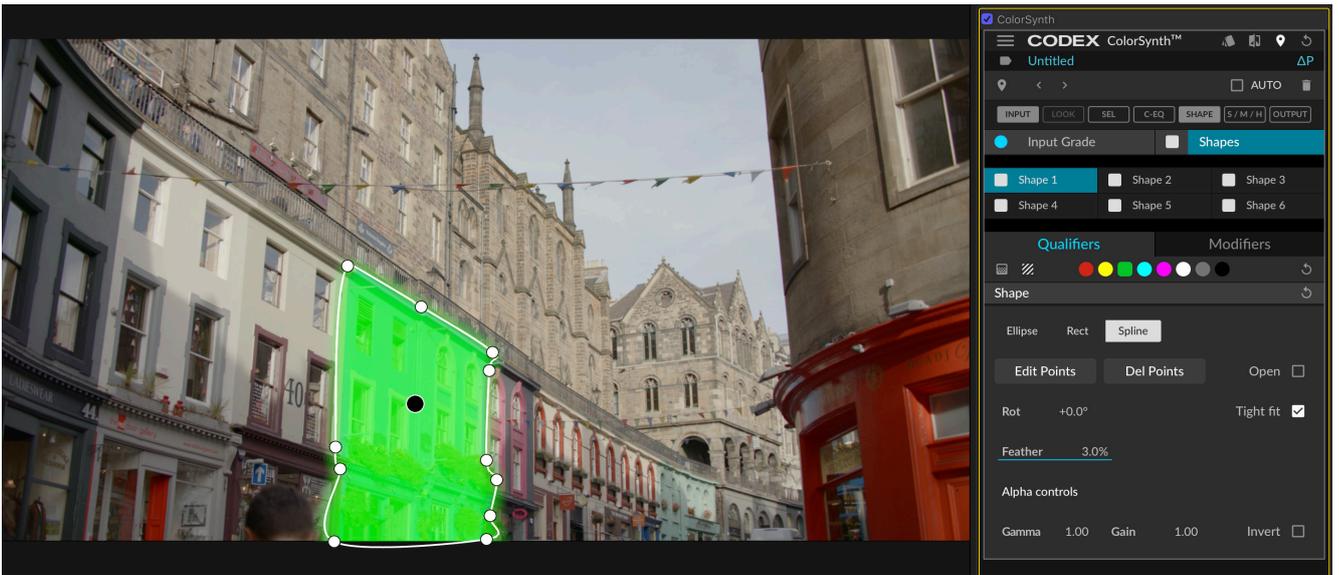
If you want to change the shape you can click and drag the existing points. To reopen the Shape select the 'Open' toggle box again, select 'Edit Points' mode to add new control points, or 'Del Points' mode to delete existing points:



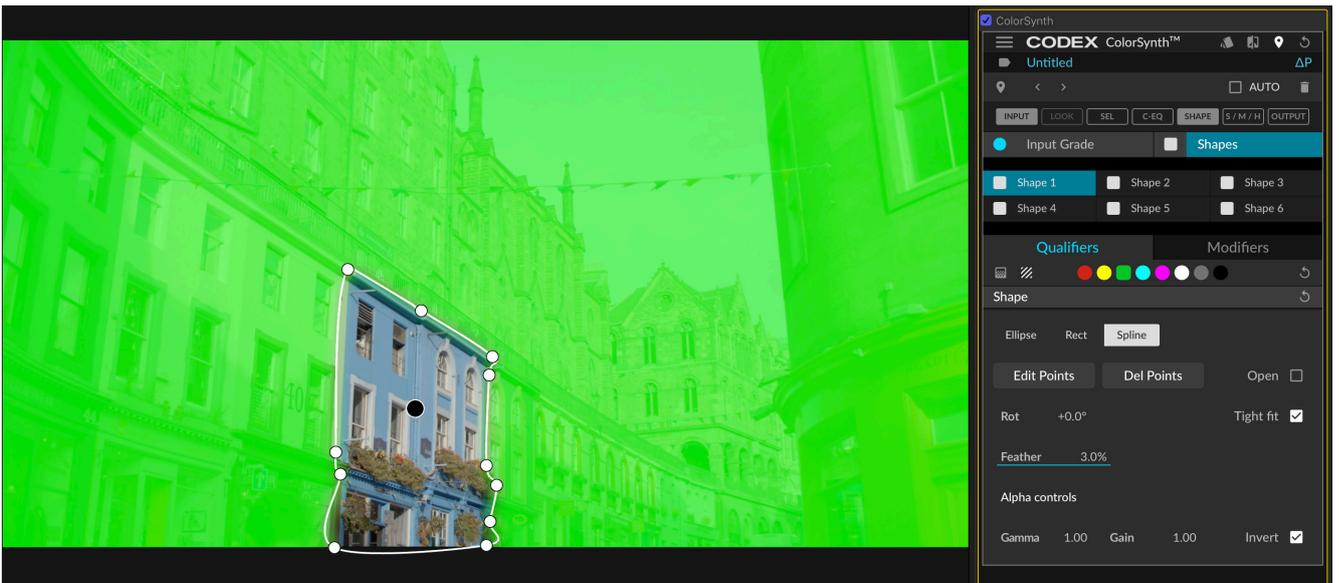
The Feather, Gamma, Gain, and Invert controls perform the same functions as detailed for Ellipse and Rectangle shapes.

### 8.12.3. Shape mask and overlay options

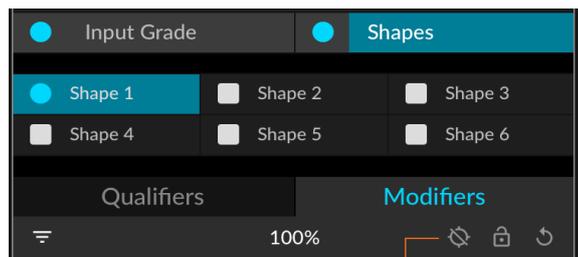
In a similar way to the Ghost Keyer, the mask for a shape can be viewed as an alpha channel or a colored overlay:



The colored area is that which will be affected by any changes. By default any changes will happen inside the shape. To make changes outside the shape click the Invert toggle. An inverted version of the mask is shown here:



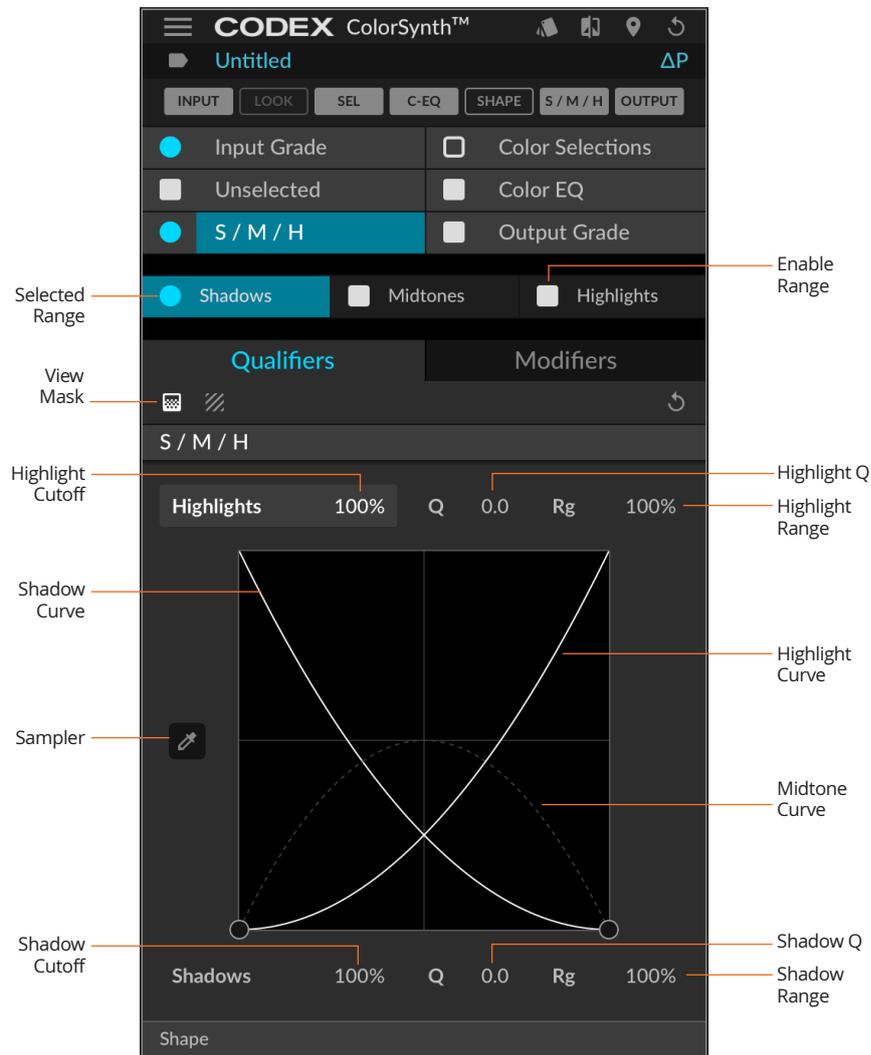
Once the shape has been set and you are back on the Modifiers tab, you can choose whether to hide the shape controls overlay by using the button next to the padlock symbol:



Toggle Shape Overlay

## 8.13. S / M / H

This layer allows independent adjustment of Shadows, Midtones, and Highlights, each having its own set of Modifiers. The Qualifier for this layer allows precise and flexible adjustment of the 3 luminance-based ranges:



When adjusting Qualifiers, the Selected Range (highlighted in blue above the Qualifiers tab) affects what is shown when View Mask is active. When adjusting Modifiers, the Selected Range affects whether you are adjusting the modifiers for the Shadows, Midtones, or Highlights range.

In the Qualifiers panel there are separate controls for Highlights and Shadows:

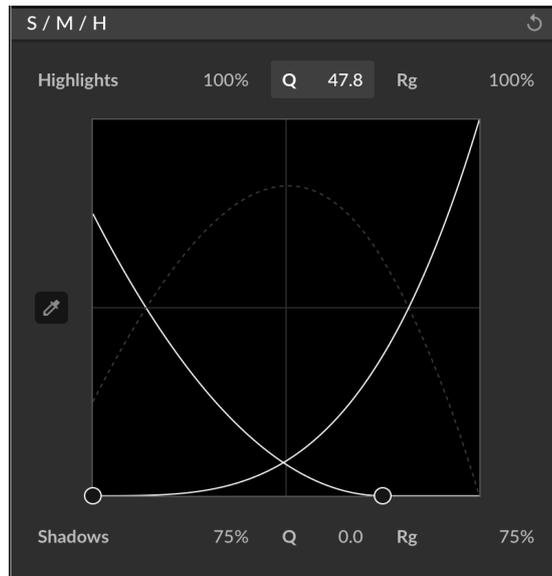
**Highlight and Shadow Cutoff** (default 100%) - reducing these values will increase the influence of the Midtones adjustments.

**Highlight and Shadow Q** (default 0.0) - increase this value to steepen the curve for the Highlight or Shadow controls.

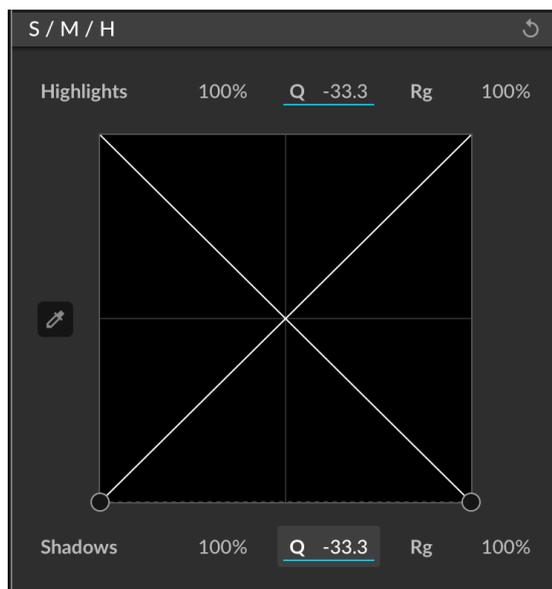
**Highlight and Shadow Range** (Rg, default 100%) - decrease this value to reduce the spread of luminance values covered by the Highlights/Shadows range.

The Midtones range is shown as a dashed line, and is automatically adjusted based on the Highlights/Shadows ranges. The sampler can be used to display a reference dashed line, which can be helpful when setting the boundaries of the Shadows and Highlight masks.

In addition, both the Shadows and the Highlights sub-Layers can have a Shape applied as part of the Qualifier, if you only require the Shadows or Highlights adjustment to affect a particular region of the image.



In the example above the Shadow Cutoff and Range has been reduced, meaning any Midtone adjustment will have more effect in lower luminance areas, and Shadow adjustment will have less effect on higher luminance areas.



By setting the Q value to -33.3 for both Highlights and Shadows this removes the Midtone curve so that Midtone adjustments have no effect, which can be useful in some circumstances.

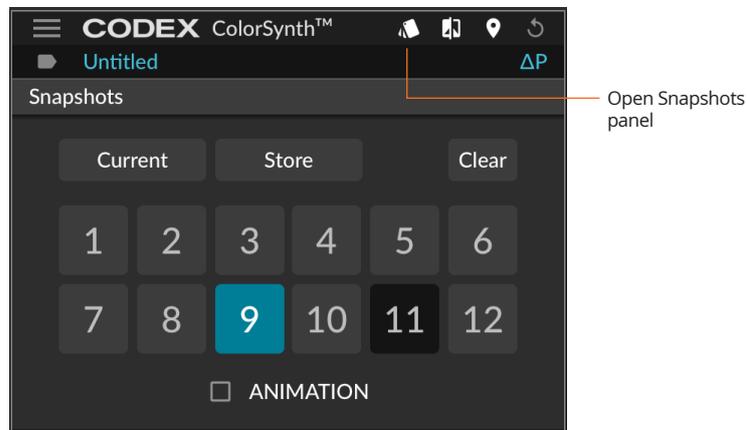
This layer contains Modifiers that can then be used to perform corrections on Shadows, Midtones, and Highlights separately, depending on which one is selected. The Modifiers available for each range are:

- **Linear Functions**
- **Exposure**

## 9. Snapshots

Click the Snapshots icon in the top bar of ColorSynth to open the Snapshots panel.

In the Snapshots panel there are 12 slots for saving looks that you are working with. This provides a way to quickly save and compare different looks on a clip:



When you want to save a look to one of the slots enter a name in the field at the top (where it says 'Untitled' in the example above). Then click Store and click a number to save the look to. Repeat this process to store multiple looks, and then click on the different numbers to audition different looks for your clip. The number keys on the keyboard can be used to switch between looks saved in the different numbered slots.

If you have been working on a look for a clip that is not saved to a numbered slot, click the Current button to revert to this look.

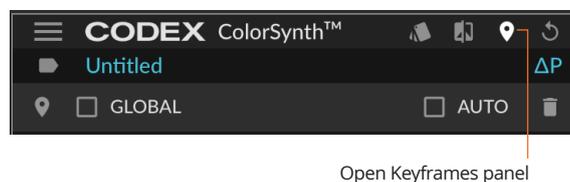
The ANIMATION checkbox can be used to save and recall Shapes and Keyframes when storing and loading a look in the Snapshots panel. If the ANIMATION checkbox is selected when the Store button is pressed then the look will be saved including Shapes and Keyframes. Similarly, if the ANIMATION checkbox is selected when a look is applied to a clip from the Snapshots panel, then any Shapes and Keyframes will also be applied.

If a Snapshot is stored with Shapes or Keyframes then the keyframe icon will be shown next to the Snapshot number.

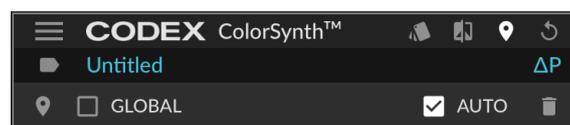
## 10. Keyframes

Keyframes can be used to automate parameters (e.g. Exposure) over time, and also to animate Shapes on a clip.

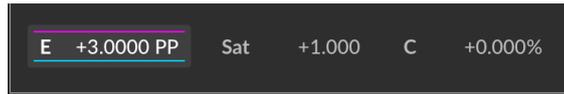
Click the Keyframes icon in the top bar of ColorSynth to open the Keyframes panel:



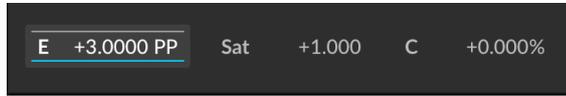
By default the AUTO checkbox is disabled, meaning that keyframes will not be stored. To begin storing keyframes tick the AUTO checkbox and then adjust parameters on the current frame:



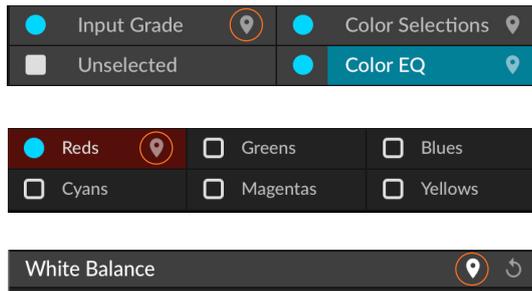
When a parameter has keyframe information stored a magenta line will be shown above the parameter value:



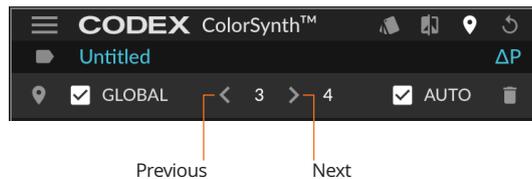
When multiple keyframes are set, ColorSynth will smoothly adjust the parameters in between keyframes. If a parameter is automated like this, but not parked on a keyframe, the line above the parameter will be grey:



Once Keyframes are stored, the keyframe icon is shown on the Layer, Sub-Layer, and Modifier title to help identify which parameters have been automated:



Keyframes can be navigated using the Next and Previous arrows in the Keyframes Panel:



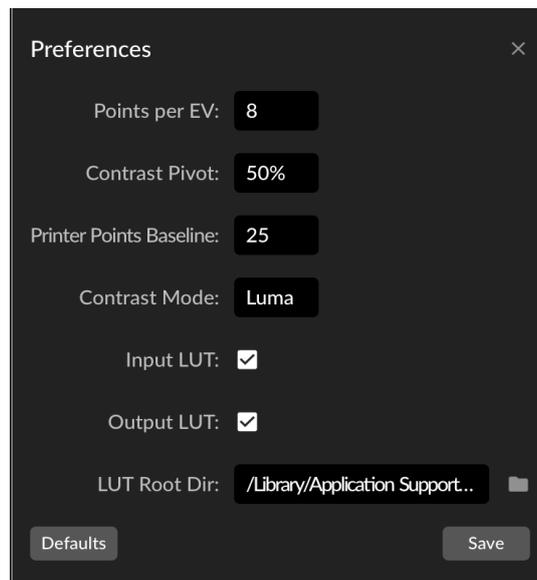
By default the Next and Previous arrows will navigate between keyframes in the *currently open Modifier*. To navigate between all keyframes for a clip select the GLOBAL checkbox.

## 11. Main Menu

The ColorSynth Main Menu is accessed at the top of the effect:



### 11.1. Preferences

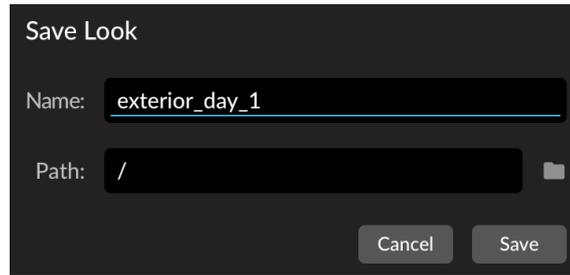


The Preferences allows the user to set:

- **Points per EV** - sets the relationship between Printer Points and EV. The default is 12, so that an EV increase of 1 is equivalent to adding 4 Printer Points of Red, Green, and Blue.
- **Contrast Pivot** - sets a global Contrast Pivot value.
- **Printer Points Baseline** - sets the starting value for Printer Points.
- **Contrast Mode** - sets whether Contrast adjustments are performed in Luma (affecting only brightness) or RGB (also affecting color saturation).
- **Input LUT** - sets whether the Input LUT panel appears in the Input Grade layer.
- **Output LUT** - sets whether the Output LUT panel appears in the Output Grade layer.
- **LUT Root Dir** - sets the default folder that opens from the Input LUT and Output LUT panels.

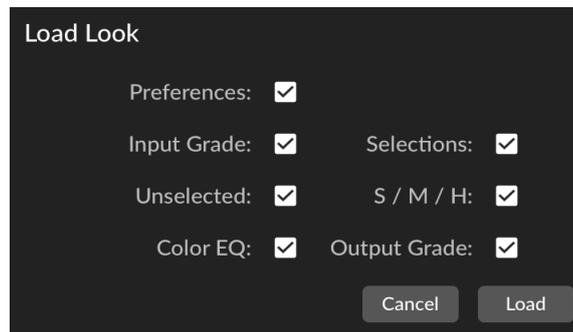
## 11.2. Save Look and Load Look

ColorSynth looks are saved as small and portable .cslook files so that they can be easily shared between systems and users. Click the Save Look button and enter a name for your look and choose a folder to save it to, then click Save:



The 'Save Look' dialog box has a title bar with a question mark and a close button. It contains two text input fields: 'Name:' with the value 'exterior\_day\_1' and 'Path:' with the value '/'. At the bottom right, there are two buttons: 'Cancel' and 'Save'.

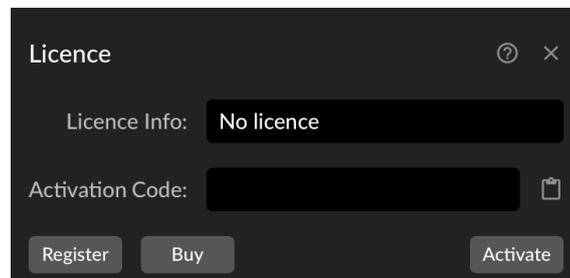
When using Load Look there are tick boxes to select if you want to import the whole look, or only some layers:



The 'Load Look' dialog box has a title bar with a question mark and a close button. It contains six rows of labels and checkboxes: 'Preferences: ', 'Input Grade: ', 'Unselected: ', 'Color EQ: ', 'Selections: ', 'S / M / H: ', and 'Output Grade: '. At the bottom right, there are two buttons: 'Cancel' and 'Load'.

## 11.3. Licence - Trial, Activation, and Transfer

Each user can get a 30 day free trial of ColorSynth. After this a permanent licence must be purchased to continue using ColorSynth. When unlicensed, ColorSynth applies a watermark to the image and this box appears in place of the features:

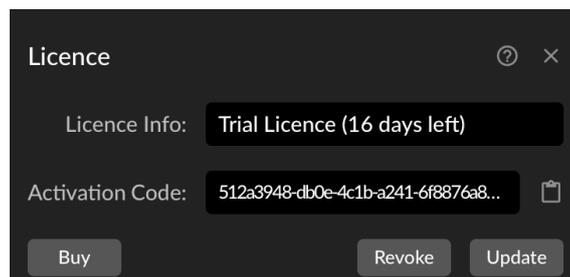


The 'Licence' dialog box has a title bar with a question mark and a close button. It contains two text input fields: 'Licence Info:' with the value 'No licence' and 'Activation Code:' which is empty. At the bottom, there are three buttons: 'Register', 'Buy', and 'Activate'.

Click 'Register' and follow the process to get a free 30 day trial. Once registered enter your email address in the 'Activation Code' box and click 'Activate'.

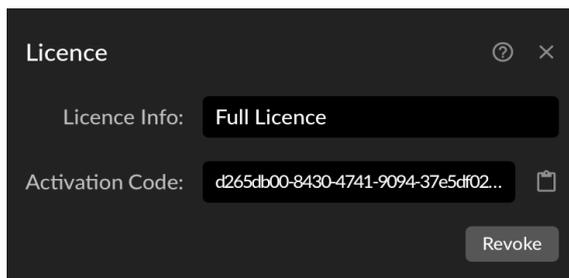
Click 'Buy' to purchase a permanent licence. After purchasing you will receive an Activation Code. Enter this in the 'Activation Code' box and click 'Activate'.

If you are mid-Trial and make a purchase, click Update to get your permanent licence:



The 'Licence' dialog box has a title bar with a question mark and a close button. It contains two text input fields: 'Licence Info:' with the value 'Trial Licence (16 days left)' and 'Activation Code:' with the value '512a3948-db0e-4c1b-a241-6f8876a8...'. At the bottom, there are three buttons: 'Buy', 'Revoke', and 'Update'.

After purchasing, to transfer your licence to another machine first make a note of your Activation Code (you should also have received this by email if you purchased a licence). Then click the Revoke button:



Then on another machine enter your Activation Code and click Activate.

If you need to retrieve your Activation Code and cannot find the original email, go to [www.codex.online](http://www.codex.online) and click 'Login'. Then click the user icon to access your Dashboard:



Click the 'Licenses' section to drop down your licence details and your Activation Code will be shown:

## Licenses

ColorSynth

Hardware Name	Activation Code	Platform	Licence
My Mac	92ffcd05-9a38-4edf-b8f2-70a07c1a83a2		Full

## 12. Keyboard Shortcuts

The following keyboard shortcuts are available in ColorSynth for FCPX:

- **Page Up** and **Page Down** to open the previous or next modifier panel in the current layer.
- **Shift + Page Up** and **Shift + Page Down** to navigate from layer to layer.
- **Shift + Home** and **Shift + End** to navigate between sublayers (in Selections and SMH).
- **Alt + Home** and **Alt + End** to move between the Qualifier/Settings tab and Modifiers tab in the current layer.
- **NumLock/Clear** to toggle on/off the current layer.
- **Shift+NumLock/Clear** to solo the current layer (toggles off all the other layers).
- The numeric keypad "+" and "-" buttons to change the blending value of the current layer.
- The "R", "G", "B" and "Y" or "M" keys to switch the channel under use in the Linear Functions panel.
- The "A" key to toggle the alpha channel (mask) display in a Qualifier (e.g. Ghost Keyer).
- **F13** resets the current layer. For safety the keyboard reset works in ping-pong: first click resets, second click reverts to the state prior to reset. **Shift + F13** resets the whole layer stack.
- **F15** toggles the Snapshots panel.
- **F19** toggles the current modifiers' lock.
- **/** toggles the Reference View.
- The standard hot keys are usable:
  - "Command-Z", "Shift-Command-Z", (built into FCP, only affects parameters)
  - "Command-C", (copy selected value text)
  - "Command-X", (cut text in edit mode otherwise copy)
  - "Command-V", (paste values in edit mode)
  - "Escape" (exits value edit mode)
- When the Snapshots panel has focus, one can directly address a stored look by its number. Simply type its **number** with the numeric keypad or number row. **Arrow keys** can also be used to move between stored looks.
- If a panel is current selected and has several numeric input boxes, one can move between them with the **Right/Tab** keys to go in one direction and **Left/Shift + Tab** to go in the other direction.

## 13. Appendix



### ColorSynth Tips

#### 13.1. Main EQ for hue remapping

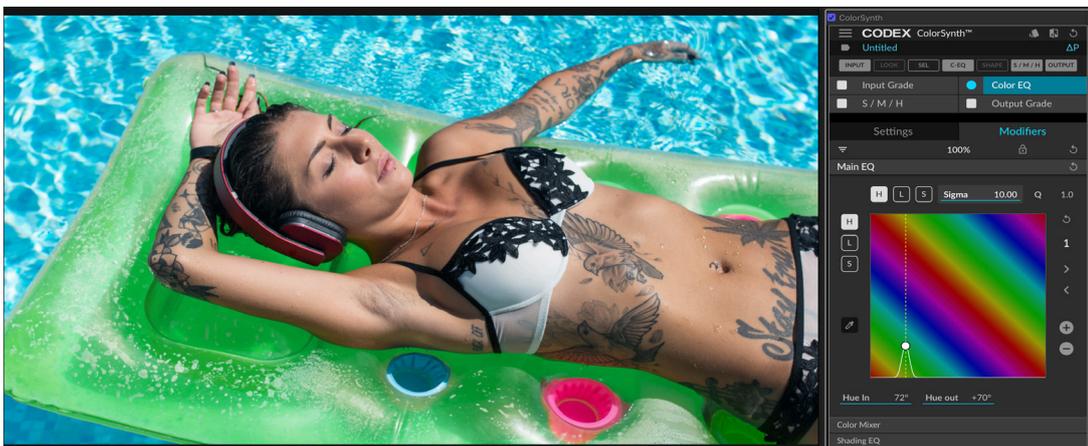
Below is an example of remapping one Hue to another Hue using the Main EQ. Here is the original image:



Using the Sampler, the color of the float is identified, and the control point moved there. The Hue is then remapped towards green. While this has the desired effect on the float, the skin tones are also changed:



By reducing the Sigma value, the width of the curve becomes smaller and the skin tones are no longer affected:



Note that all the transitional colors are beautifully preserved by the proprietary color remapping algorithms.

## 13.2. Shading EQ for sky retinting

Below is an example of sky retinting using the Shading EQ. Here is the original image:



Using the Sampler, the color of the sky is identified, and a control point added there. The Saturation value is then increased. Because the Range is small, the overall effect is not sufficiently pronounced:



By increasing the Range we can include more of the surrounding colors to achieve the desired effect:



The result has been achieved without any masks, and the color changes are exceptionally clean with no banding.

### 13.3. Shading EQ for improving shaded skin tones

Below is an example of recovering saturation in shaded skin tones using the Shading EQ. Here is the original image:



Using the Sampler, the color of the shaded skin tone is identified, and a control point added there. The Saturation value is then increased. Because the Range is small, the overall effect is quite localized to begin with:

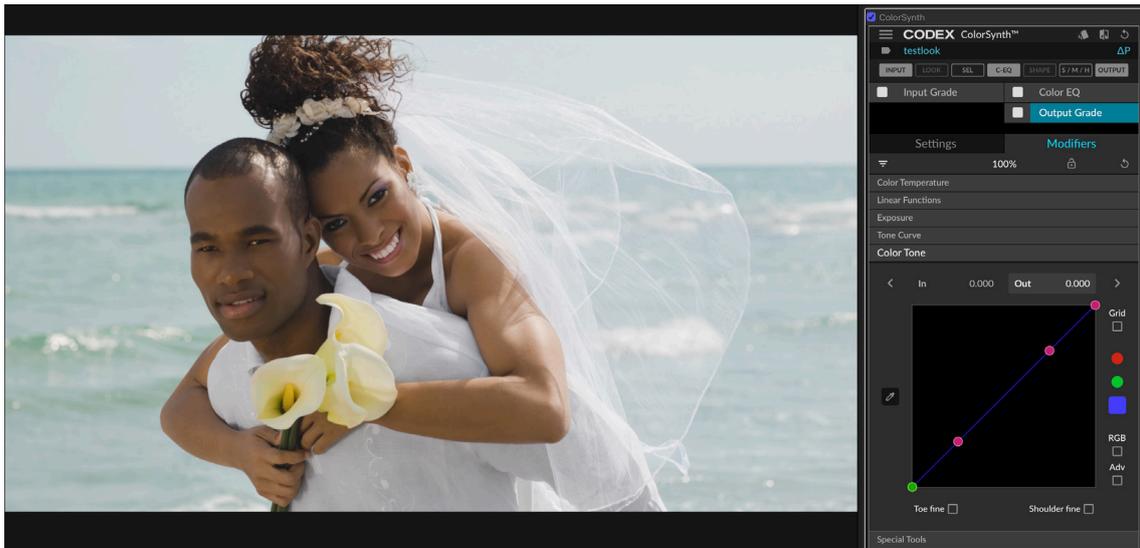


By increasing the Range, adding some Red, and dialling back the Saturation we can get a more subtle and pleasing effect:

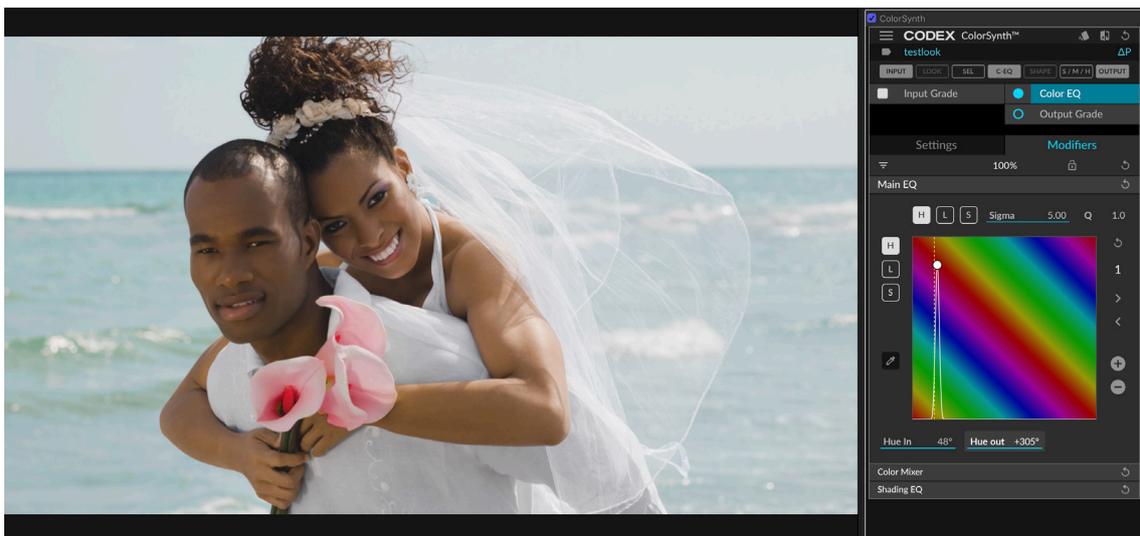


## 13.4. Color Tone for RGB curves

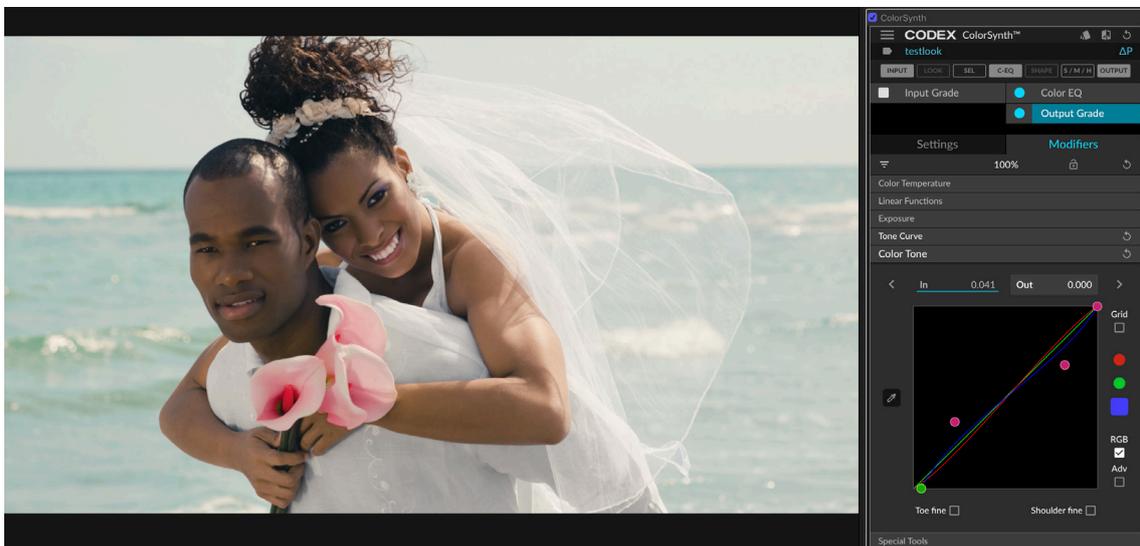
Below is an example of using Color Tone and Color EQ to achieve a stylised look. Here is the original image:



Shading EQ is used to bring some blue back to the water, Main EQ is used to change the color of the flowers:



And then Color Tone is used to stylise the image with opposing red and blue curves:



### 13.5. Ghost Keyer and Selections for treating a background

Below is an example of using Selections and Ghost Keyer to modify an image background. Here is the original image:



In the Qualifiers tab the Ghost Keyer can be used on the Blue sub layer to isolate the background:

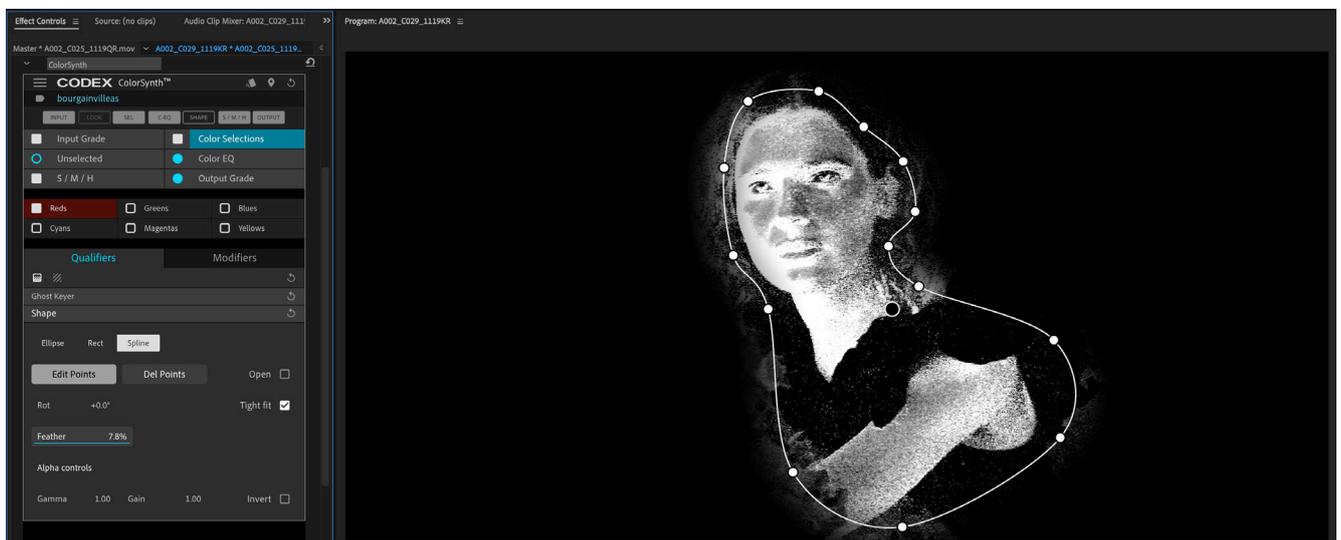
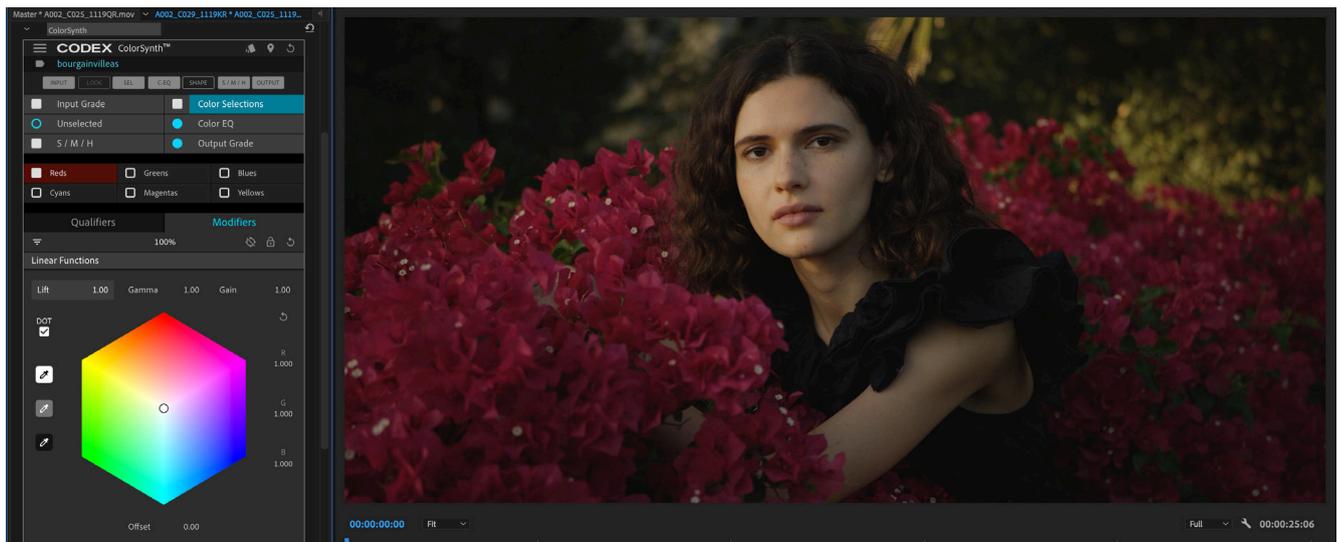


Once the mask is set, the Modifiers are used to adjust the Saturation, Exposure, and RGB Balance of the background:

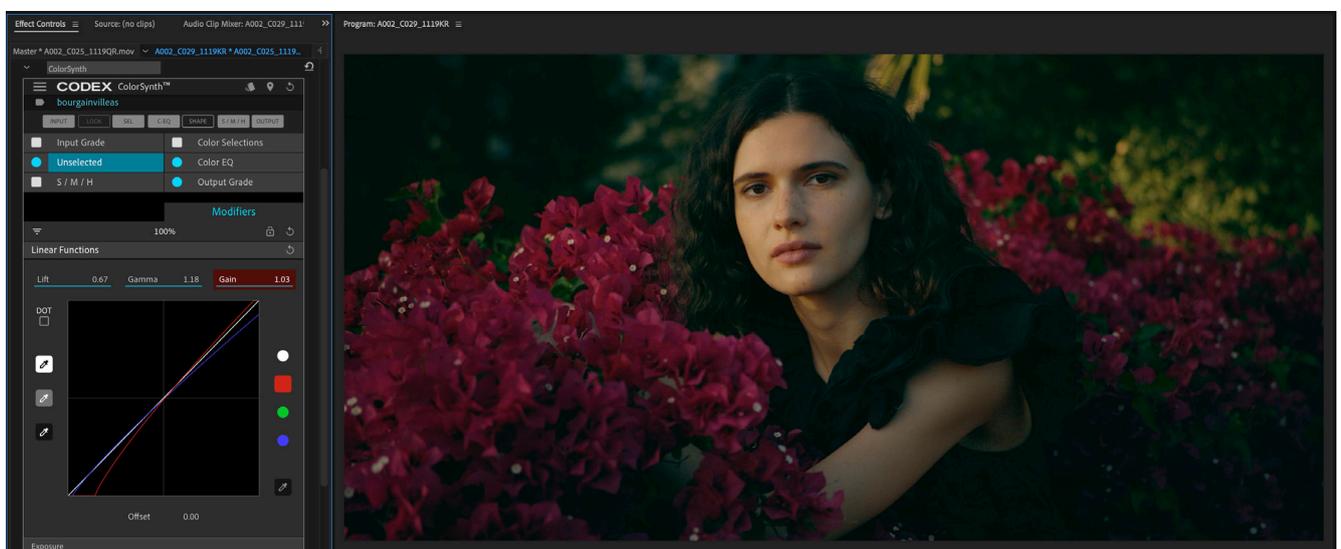


## 13.6. Creating a “Teal and Orange” look with ColorSynth

Use the Color Selections layer to pull a key on the skin tones that you want to preserve, applying a Shape if necessary:



The skin tones are now isolated by the Color Selections layer. Now, move to the Unselected layer, which adjusts everything not included in the mask(s) set in the Color Selections layer. In the Unselected layer use the Linear Functions modifier and lower the Offset or Lift of the Red channel, and lower the Gain of the Blue channel, depending on your preference:







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