DSMC3™ RED© 7 Inch Touch Monitor

SMALLHD

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Regulatory Information

Legal Information

On product information can be found in the monitor's Settings menus under Compliance.

FCC 15.21 Information to user

Please be aware that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC 15.105 Class A compliance statement

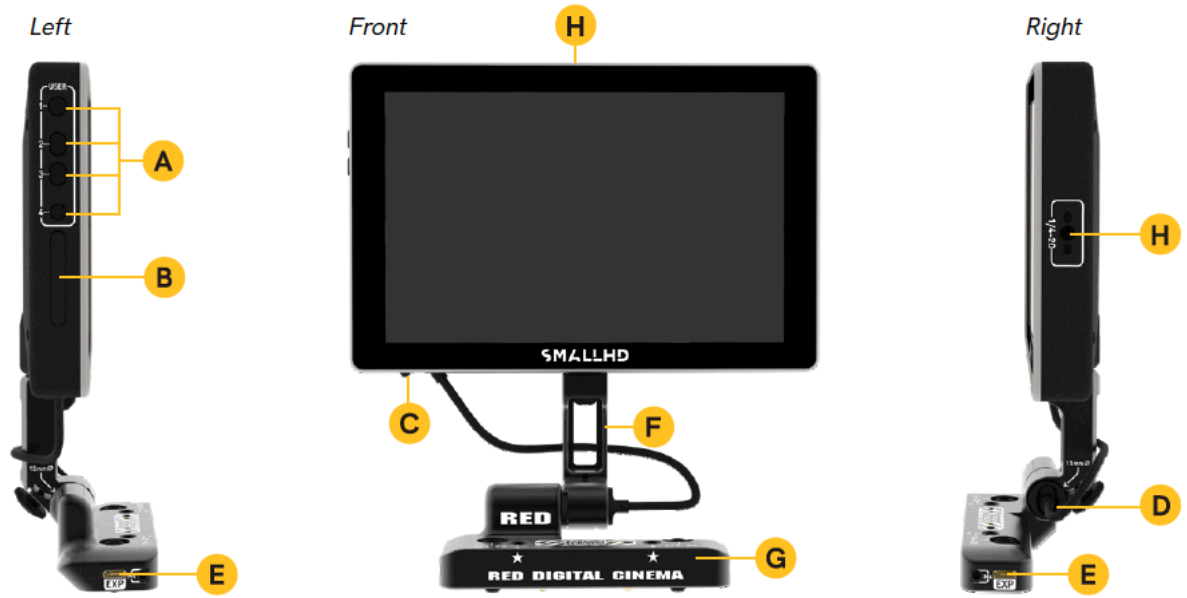
NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Quick Start Guide

DSMC3 Red 7 inch Touch Monitor Quick Start Guide

PHYSICAL PROPERTIES

PHYSICAL PROPERTIES



A: Custom Function Buttons
B: SD Card Slot
C: RMI Input
D: RMI Output
E: EXP Ports
F: Swivel Arm
G: RED Monitor Interface
H: 1/4"-20 Mounting Points

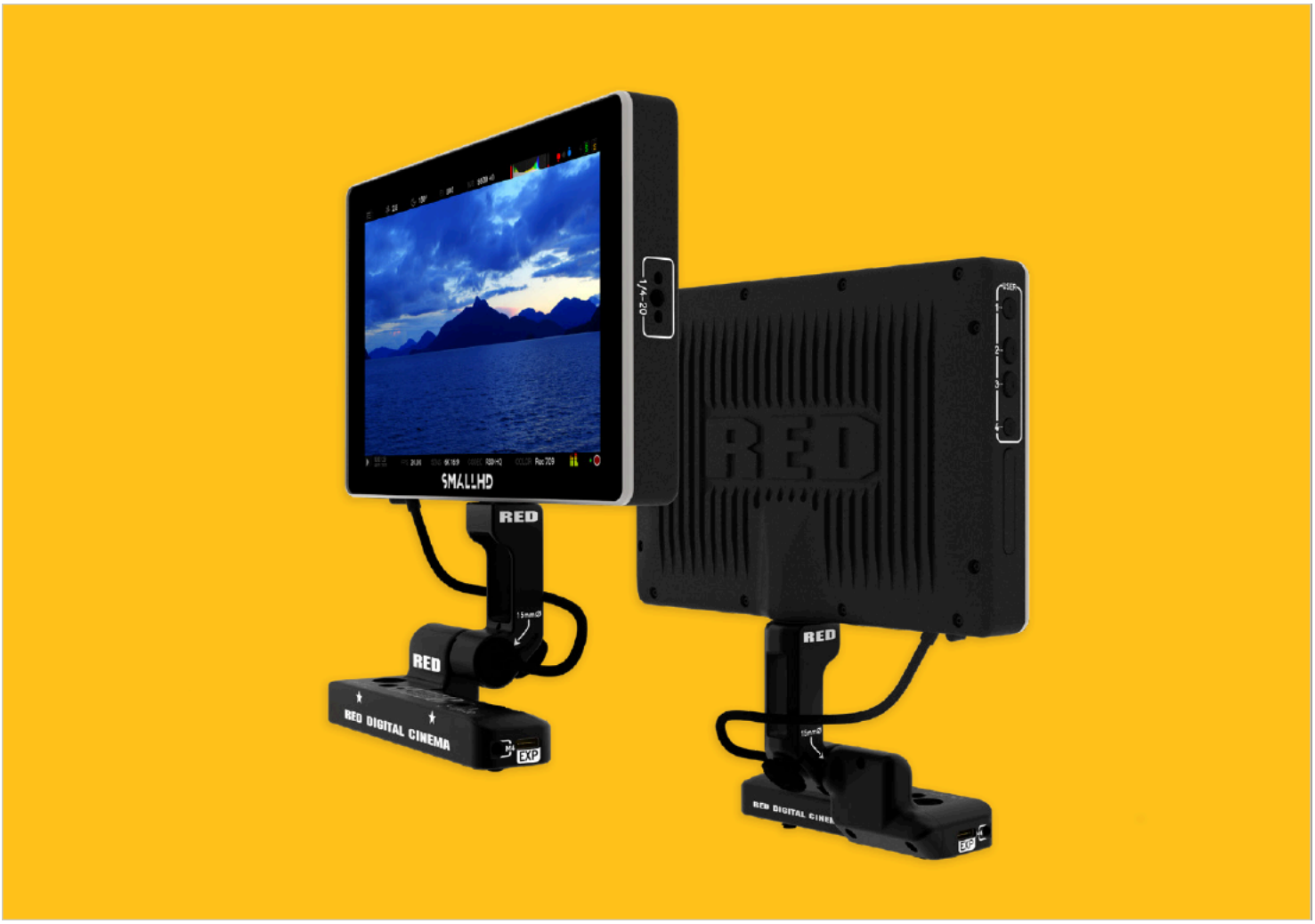

SMALLHD
RED
RED
RED DIGITAL CINEMA
EXP
1/4-20
RED
RED
EXP

TABLE OF CONTENTS

POWER AND CONNECT

POWER & SIGNAL

Your monitor receives its power and signal from the single RMI cable connected between the monitor and Red Monitor Interface.

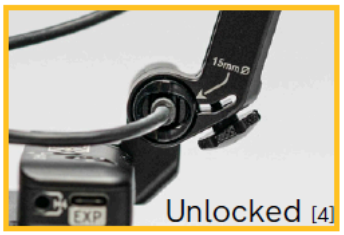
- Connect this single cable to your monitor and RMI to receive power and signal automatically when the camera is turned on - no need to select an input.
- The connection utilizes cable-locking to keep power uninterrupted. On the RMI side of the cable, twist to lock and unlock the cable into place. On the monitor end, the cable locks in place automatically when connected. Pushing the latch at the RMI connection point releases the cable from its locked position.
  - To attach your RMI cable to your monitor, make sure you insert the cable at an angle. [1]
  - The cable will lock in place once it is fully inserted into the monitor.
  - To release the cable and remove it, just push this lever towards the center of the monitor and pull it out. [2]

POWER AND CONNECT

POWER & SIGNAL

- To attach the RMI cable to your monitor arm, make sure that your cable lock is in the open position. [3]
- Insert the RMI cable until you can feel that it is fully seated in the RMI port. [4]
- Rotate the cable lock wheel to lock your connector in place. [5]

[3]



Unlocked [4]

Locked [5]

MOUNTING OPTIONS

ARTICULATING ARM

- This custom arm allows for 170 degree rotation for easy storage
- Use allen wrench to detach from monitor

UI OVERVIEW

8

UI OVERVIEW


Tap a camera setting along the top or bottom of your screen to adjust.
IRIS 2.8
STR 180°
ISO 800
WB 5600 +0
T/E
FPS 24.00
SENS 6K 16:9
CODEC R3D HQ
COLOR Rec 709
SMALLHD

UI OVERVIEW

AUTOFOCUS

- Tap the "AF" icon to access Autofocus; this will reveal two rows of options at the top and bottom of the monitor.
- While in this mode, tap anywhere on the camera feed to change the location of the Autofocus Window.

AF MODE (TOP ROW)

- Select 'Single' to activate autofocus only until it achieves a lock within the AF Window area.
- Select 'Continuous' for Autofocus to constantly remain active within the AF Window area.

AF WINDOW (BOTTOM ROW)

- Select between Small, Medium, Large, Wide & Vertical window sizes to dial in the precision you need.
- Tap the 'X' on the top or bottom row to exit the Autofocus menu.

UI OVERVIEW

Swipe up and down to adjust the Red camera settings once adjustment menu appears.

Note: SmallHD PageOS4 inside. The SmallHD UI functions the same as always.

UI OVERVIEW

Swipe down to enter the pages / lookaround view

PAGEOS 4 OVERVIEW

The PageOS 4 interface allows users to configure and assign specific image analyzing tools and/or features to up to eight customizable pages. Users can access those tools by navigating to the corresponding page on the monitor, instead of enabling or disabling features individually.

GENERAL LAYOUT

1. **Pages View**
   The 'Pages View' offers a zoomed-out perspective of all configured pages, allowing organization and naming to ensure the most efficient overall setup.
2. **Settings**
   Adjust a wide range of global monitor settings.

PAGEOS 4 OVERVIEW

BASIC NAVIGATION

1 **Touch Screen**
PageOS has an easy to navigate touch screen that works just like your smartphone.

- Pinch to zoom
- Swipe left and right between custom pages
- Slide you finger down for a view of all your preset pages
- Swipe all the way left to access your deep settings menu (Calibration, Profiles, etc)

2 **Adding New Pages**
To create a new page from either a fresh workspace, a premade template, or a specific utility, navigate to the right-hand side of the Pages View

PAGEOS 4 OVERVIEW

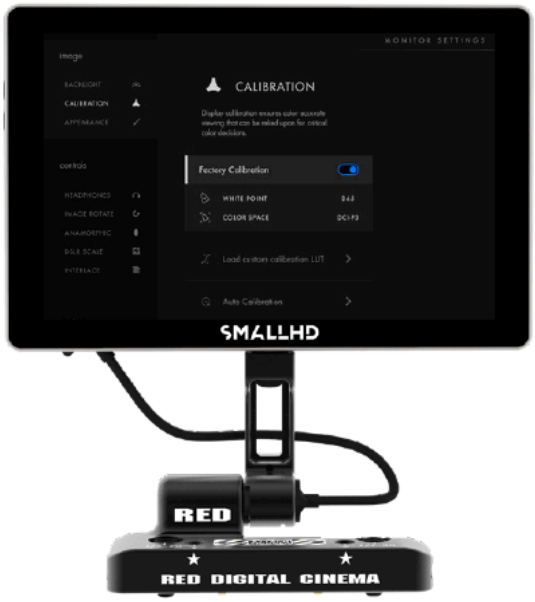
3 **Activating Tools**
Tap your screen while on any page to reveal the toolbar. Then select the tool you want to activate. To adjust the custom settings of that tool press the arrow that appears next to the name of the tool.

4 **Add New Tool to a Page**
Tap your screen while on any page to reveal the toolbar. Press the plus sign that appears on the left side of the page. Select the tool you want added to that page.

PAGEOS 4 OVERVIEW

SETTINGS MENU

Access monitor settings by swiping to the left-most page.



SETTINGS: DISPLAY

1. **Backlight**
   Select a backlight level that suits your viewing environment to maximize contrast and viewability.

2. **Calibration**
   Calibration ensures chrominance and luminance accuracy that can be relied upon for critical color decisions.

3. **Appearance**
   Apply sharpening to the video data, if desired.

PAGEOS 4 OVERVIEW

SETTINGS: CONTROLS

1 **Image Rotate**
Image Rotate options enable upside-down mounting - or enable Mirroring for when the monitor must face the subject.

SETTINGS: CAPTURE

1 **Image Capture**
Configure the Image Capture tool to help facilitate shot matching or for automatic thumbnail creation upon pressing Record. (Note: SD card must be inserted into the monitor to perform an image capture).

2 **Image Gallery**
Browse the Image Gallery to review the images on your removable media.

PAGEOS 4 OVERVIEW

SETTINGS: INTERFACE

1 **Pixel Zoom**
Configure the default zoom levels for Pixel Zoom to 'punch in' to a desired amount when spot checking a particular shot.

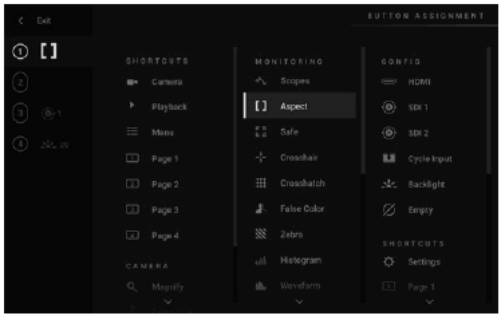
PAGEOS 4 OVERVIEW

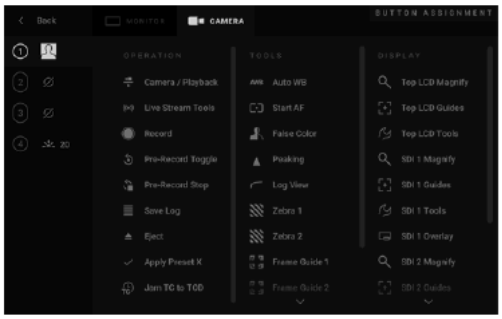
SETTINGS: USER

1 **Backdrop**
Enable a customizable backdrop for when the monitor is not displaying a signal.

2 **Date Time**
Setting the correct Date & Time will ensure that captured images get an accurate timestamp.

3 **Profiles**
Save or load the entire monitor's configuration to an SD card, great for keeping consistent settings across several monitors.





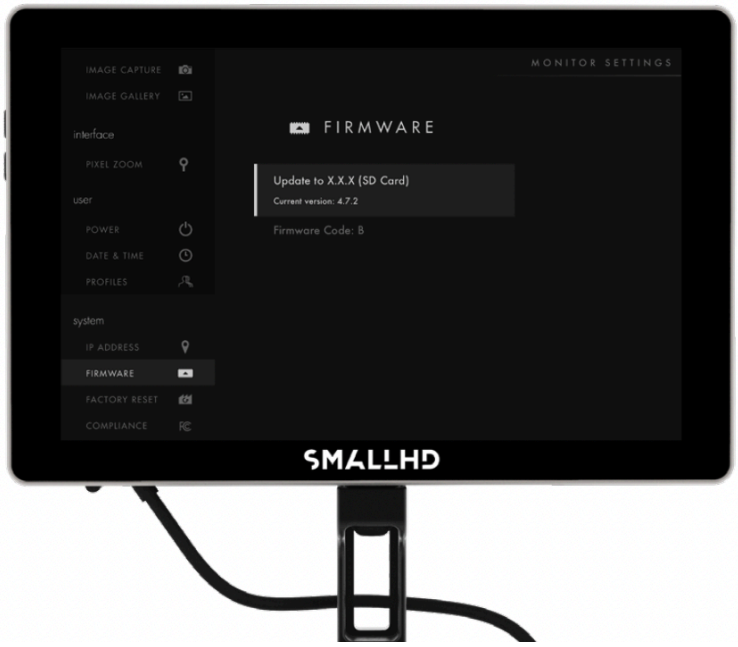
PAGEOS 4 OVERVIEW

SETTINGS: SYSTEM

1 **Firmware**
Firmware can be updated by inserting an SD card with a compatible update file.

For the latest firmware download visit:
www.smallhd.com/software

2 **Factory Reset**
Reset the monitor settings to its original factory settings, with the option to clear registration and calibration.



PAGEOS 4 OVERVIEW

UPDATE YOUR MONITOR'S FIRMWARE:

- Visit https://downloads.smallhd.com and select the RED® Touch tab to download the latest firmware file.
- Copy the .bin file to your SD card. Use an SD card that is at least 2GB and at most 16GB.
- Insert your SD card into the monitor.
- From the settings menu, scroll down to the 'Firmware' option.
  (To get to the settings menu, navigate to the leftmost page of the monitor UI.)
- An option to update your firmware should appear on the screen.
- Select 'Update' and follow the on-screen prompts to complete the firmware update.

  Note: Ensure that power is not interrupted during the installation

LINKS AND FCC RULES/REGULATIONS

1 Additional Resources
guide.smallhd.com

2 Social Media
@smallhd

Compliance

Certifications

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: this device may not cause harmful interference, and this device must accept any interference received, including interference that may cause undesired operation.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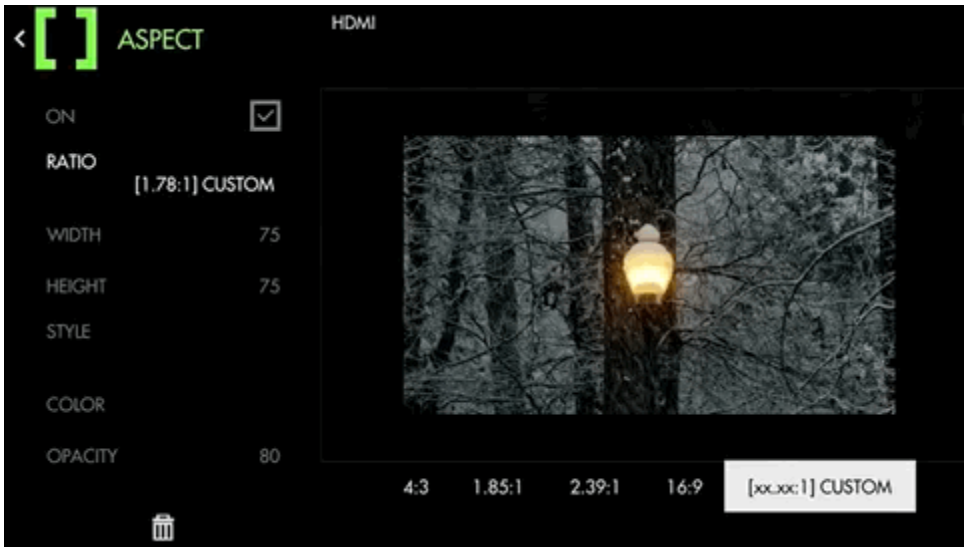
Rev A

Tools - Framing

Aspect (guides) PagesOS 4



If you are **shooting** in a **different aspect ratio** than the expected **final output**, place an **Aspect Guide** on your page for framing your shots instead of just using gaffer tape. These act like a Matte, but do not affect your footage.

Aspect - Settings

ON

Enable/Disable the Aspect guide. You can also enable or disable the tool by selecting it on the tool bar. It will be Green when enabled and Grey when disabled.

RATIO

Select the aspect ratio you wish to visualize with the guide. There are several presets that you can use. If none of these meet your needs, you can create your own with the Custom setting if using a non-

standard ratio.

Custom Ratio (x.xx : 1) will open two new menu options:
WIDTH - This sill translate as a % from left to right.
HEIGHT - This will translate as a % from top to bottom of the frame.

STYLE

You have two options.
MATTE - will give you "bars" over the top of the image.
LINE - Will have a 2-3 Pixel line, like a guide line, showing you the edges of the aspect you have selected.

*Line style may be more helpful when needing to see very clearly what is outside the active area as it will not get 'painted' over as it does with solid color.

Color

Define the color of the overlay area if using 'MATTE' style or define the color of the border when using 'LINE' style.

Opacity

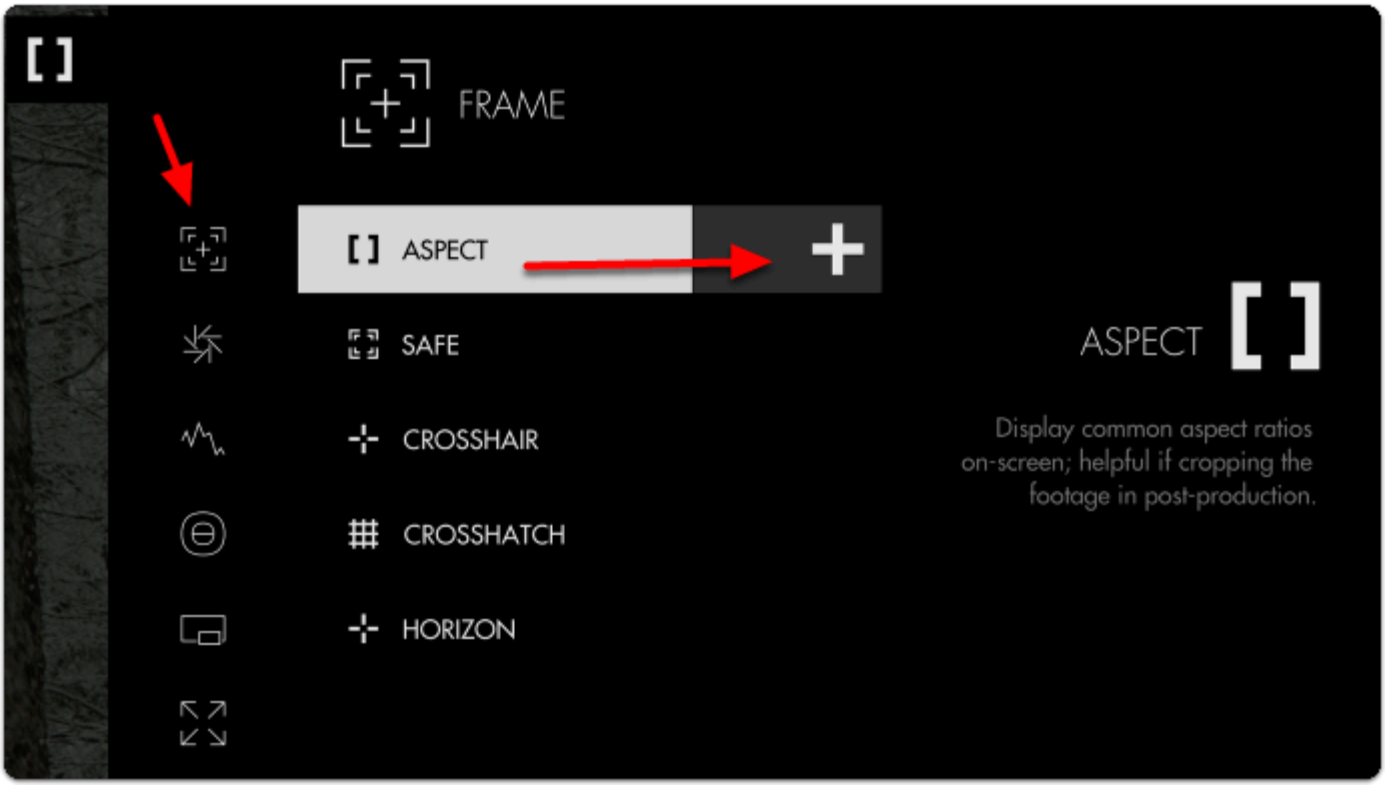
Adjusts the opacity/transparency of the matte area or line borders depending on the chosen Style.

Aspect - Quick Start

For this example we will be preparing for a **cinemascope (2.39:1)** aspect ratio while filming in standard **16x9**. This means we wish to visualize the top and bottom of the image being cropped for the final product via **Aspect Guides**.

From any page, **click the joystick** or **tap the screen** on a touchscreen monitor and select **'Add New Tool'**

Navigate to **Frame** > **Aspect** and select the **'+'** to add it to the current page.



Once added you can **edit** the settings by **navigating right** or **tapping the right arrow** when 'Aspect' is highlighted.

The **default** setting is for previewing a **4:3** aspect ratio for older TVs. Select **'Ratio'** and change it to **2:39** to see the black bars switch to a horizontal configuration.

By default the bars are set to 50% opacity; adjust **'style'** and **'opacity'** to taste for whatever you find most viewable. Here I set the opacity to 80% to keep the off-screen areas from being distracting.

If your production relies on boom audio, you can use the top and bottom dead zones to give your boom operator a 'grace area' for getting close-but-not-too-close.


ASPECT
HDMI
ON
RATIO
STYLE
COLOR
OPACITY
80
0
80

Safe (guides) PagesOS 4

Also known as Title-safe, this tool provides a simple line **border** near **edges of the frame** as a friendly reminder to keep important elements in-frame to account for 'overscan'- some TVs will crop out part of the frame to fit various aspect ratios/resolutions being sent and title safe is still used by broadcast stations and other users not using an internet medium.

Safe (guides) - Settings

On

Enable/Disables Safe guides. This can also be done at the tool bar level by activating or deactivating the tool. It will be Green when active and Grey wen not.

Format

Adjusts the aspect ratio of the safe guides; set this to what you consider the 'least common denominator', i.e. if you have to make a 16x9 AND a 4x3 deliverable, use the 4x3 guide to account for the 'worst case'.
*These are the two standard when it comes to Broadcast Television. If you know you will need a custom title safe area, you can use the ASPECT tool in line mode.

Color

Choose the line color of the guides for easier view-ability depending on your shot.

Opacity

Adjust the transparency/visibility of the guide lines, best practice is typically to go with 'visible but not distracting'.

Safe-Action

Enables/disables the Action safe (outside) border.
*This again dates back to broadcast, if you wanted to be sure that the crop of the panel on the TV would not interfere with your image/ or action in the frame.

Safe-Title

Enables/disables the Title safe (inside) border.

*This again dates back to broadcast, if you wanted to be sure that graphics would not interfere with your image/ or action in the frame.

Safe (guides) - Quick Start

Let's apply Safe guides to a page to help judge where to keep titles and action

From any page, click the joystick or tap the screen to bring up **'Add New Tool'.**

Navigate to **Frame** > **Safe** and select to add it to the current page.

Odds are the default setup is all you will need but you can edit the settings by navigating right when 'Safe' is highlighted.

Let's change the aspect ratio to 4:3 so we can visualize how an old TV would crop our image.

If the guides are not visible in your viewing environment you can edit the Color and Opacity for better viewability.

Crosshair PagesOS 4

Places a crosshair reticule in the center of your image; great reference point on shoots when symmetry or panning accuracy is an important part of the composition.

*You will need a video signal to use most tools.

Crosshair - Settings

On

Enable/Disables the Crosshair. This can also be done on the tool bar by selecting the the tool and activating or deactivating it. Active tools are green, inactive are grey.

Style

You have three choices:

CROSS +

BOX ▫

POINT •

Color

Define the color of the Crosshair for better visibility depending on your shot.

Size

Choose the size of the Crosshair to taste for your preferred balance of visibility and cleanliness.

Opacity

Sets the transparency/opacity of the crosshair.

Crosshair - Quick Start

From any page, click the joystick or tap the screen to bring up ‘Add New Tool’ and navigate to Frame > Crosshair and select to add it to the current page.

A crosshair will be placed on your image. You can edit the settings by navigating right when ‘Crosshair’ is highlighted.

Crosshatch PagesOS 4

Also known as "Grid" this tool will overlay ta geometric grid pattern over your image with customizable rows/columns for a variety of on-set compositional needs.

Crosshatch is beneficial for aligning elements of a shot into a grid-like and structured pattern, and can also be used for frame balance/ composure.

Crosshatch - Settings

On

Enable/Disable the Crosshatch. This can also be done on the tool car by activating or deactivating the tool. It will be Green when active, and Grey when inactive.

Color

Set the line color of the Crosshatch to adjust its visibility.

Opacity

This will adjust how much you can "see through" the grid.

Regions

This setting lets you define the density of the Crosshatch grid for achieving the desired amount of granularity.
You can have 2x2 <to> 9x9 equal portions on the grid.

Crosshatch - Quick Start

‘Add New Tool’ and navigate to Frame > Crosshatch and select to add it to the current page.

Once the Crosshatch is added you can edit the settings by navigating right when ‘Crosshatch’ is highlighted.

The pattern is going to be a 1:1 in sections. So if you want a 3x3 (rule of thirds) it will give you 3 wide by three high which is 9 equal squares in total.

Tools - Exposure

Exposure Assist (False Color) PagesOS 4

Exposure Assist is a **highly visible**, **quick** and **accurate** guide to setting exposure for your shots by 'painting' pixels when they hit a specified luma (brightness) value. This helps you **pinpoint** the exact areas your image may be **clipping** and quickly roll exposure to adjust for it, particularly in difficult viewing conditions (outdoors or on a gimbal or crane)

Exposure Assist - Overview

Use this section to compare Exposure Assist with SmallHD's other exposure tools to help you find what suits your personal preference.

Because Exposure Assist 'paints' your image different colors depending on what their luma (brightness) value is, it can be beneficial to memorize these colors to make the most sense of your exposure range. Alternately you can now create your own exposure/color scale if you find the presets not to your tastes or suitable for your camera.

Exposure Assist is a very fast tool for finding proper exposure because you can simply look at your image - if a desired portion of the picture is being painted the color designated for highlights for example, that typically means you'll have to bring down the exposure to regain the detail in that area. As an example it can be used for shots that need to have an even exposure, like a keyed background (green screen).

If the colorizing effect of Exposure Assist is too distracting for your other on-set tasks, try creating a new page specifically for it so that you can flip back and forth for a quick exposure spot-check when needed.

Because the Exposure Assist scale can now be customized allowing you to map many colors to many brightness ranges, it can give you an incredibly comprehensive look at your exposure values. The Waveform only offers slightly more utility in that it can be used to gauge chrominance (color) in addition to luminance (exposure) when using Parade or RGB modes.

If you would rather look at a graph to expose your image than to have it 'painted over', have a look at the Waveform.

Because of the nature of Exposure Assist and how it paints the image various colors, it can become distracting to other necessary jobs on set. Tools like the Zebra, though less comprehensive, may work better for you. This is a simplified single spectrum IRE tool. EXPOSURE ASSIST is meant for more complicated exposure level monitoring of the image.

Exposure Assist - Settings

Access Exposure Assist's settings menu by navigating right or pressing the right arrow when the Waveform is highlighted.

On

Toggles Exposure Assist Off/On. You can also do this on the tool bar by selecting the tool and activate ot deactivating it. It will be green when active and grey when inactive.

Style

Choose from a preset exposure assist scale or start with a generic map that you can customize.

You will have the Following Options:

ARRI - R(99-100),Y(97-99),Pk(52-56),G(38-42),B(2.5-4),Pu(0-2.5)
Spectrum - Rainbow Gradient from Pink(0) to Red(0)
MAP (1,2,3) - Custom settings that you create

Edit (MAP)

You can make up to 3 different MAP styles.
You can have up to 10 different gradient selections on a single MAP setting.

The new customizable MAP allows you to really fine tune your exposure settings to your liking.

Once a MAP is selected, entering edit mode will bring up the IRE guide.
Select the [+]
This will add a line with a COLOR box, MIN value, MAX value and GRADIENT slider.
Adjusting the MIN and MAX will set your values for start and stop for that color against your exposed image.

This will be represented on the slider. Selecting the slider, you can adjust the overall position of the MIN/ MAX against the overall gradient form 0-100.
Selecting the trashcan will delete that line/ color.
Once finished you can hit save to store your settings.

Ignore Look

Allows Exposure Assist to work on the signal directly from the camera even if you have a Look (3D LUT) applied as a tool on the monitor which would otherwise affect the results on the scale. Uncheck if you wish to monitor exposure values AFTER a look has been applied to see what effect it may bring to the final image.

We recommend leaving this on for most shooting scenarios unless you are baking a LUT into your footage on set and do not intend to color grade in post.

Show IRE Guide

Display a visual 'legend' to help make sense of the colors that correspond to brightness values. This is helpful as a reminder if you have a wide variety of aspects you are monitoring.

Guide Location

Set the location of the IRE guide to a spot of your choosing.
This can be moved to 6 positions on the monitor:
TOP = Left, Center, Right
BOTTOM = Left, Center, Right

Intensity

Dial in the intensity of Exposure Assist to make its effect more subtle, allowing an easier view of the original image. Dialing back the Intensity will also decrease Exposure Assist's greyscale influence, bringing saturation back into your image.

Exposure Assist - Customization

NEW with firmware version 3.0! - Continue this section to learn how to get the most out of Exposure Assist by **creating your own preset (MAP).**

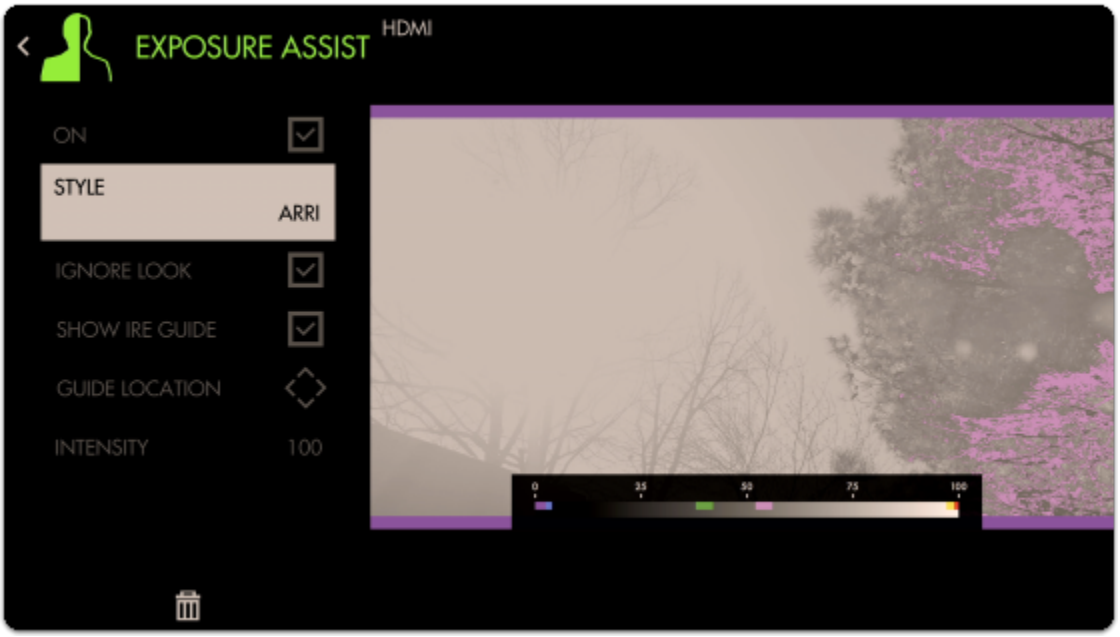
Many cameras, particularly when shooting in 'log' mode keep their **brightest** highlight and **darkest** shadow at values **other than 100%** and **0%** respectively. Full shadow clipping might be as high as 10% and highlights might be as low as 90% for example. **Customizing the Exposure Assist** scale ensures these settings are **tuned** to your **specific camera** for **guaranteed accuracy**.

To begin setting the scale we need to first **find the limits**. For the following example I'm using a DVX200 set to V-Log gamma but this procedure applies to any camera or gamma.

First, point the camera toward any **bright** objects that will **overexpose** the shot (a white car or exposed concrete on a bright day will do fine) - **turn off ND filters**, **open the aperture** and **decrease the shutter speed** if needed:

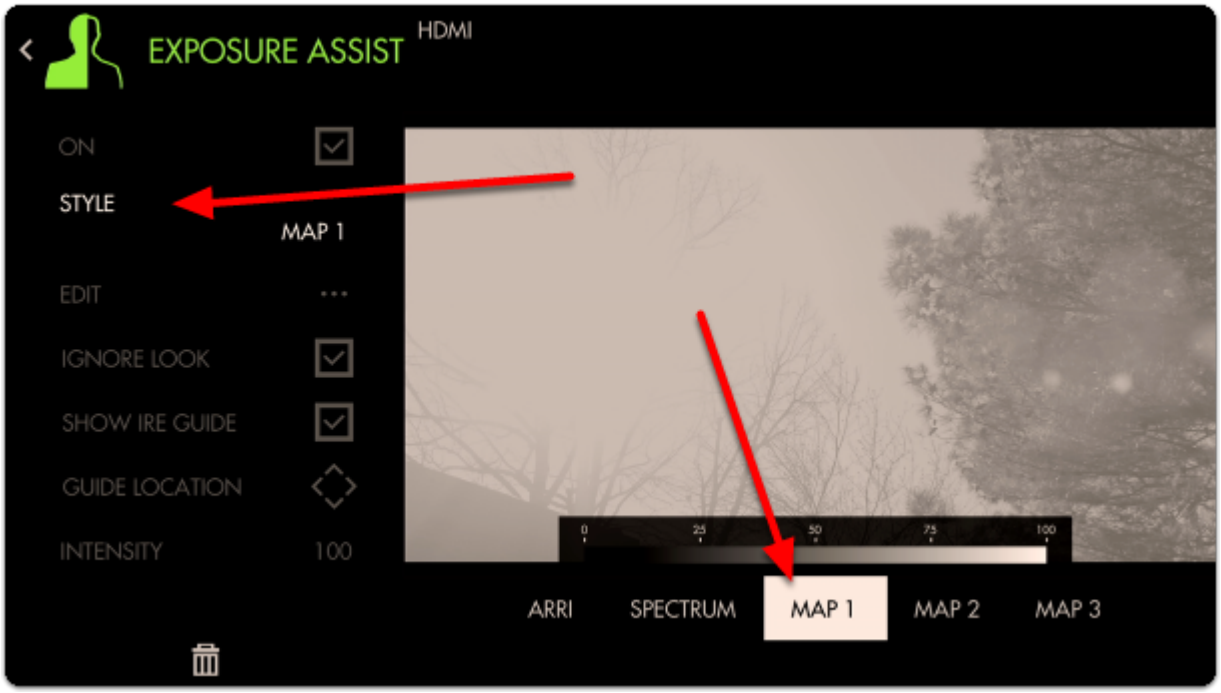
I briefly pointed the camera towards the sun during midday for this shot - this is generally not advisable to keep the sensor safe but I did it so you don't have to ;-)

Add an Exposure Assist via **Add Tool > Expose > Exposure Assist** if not already applied.



Even though the **sun** area is **clearly clipping**, the Arri false color scale doesn't pick it up - **we need to fix this for an accurate reading**.

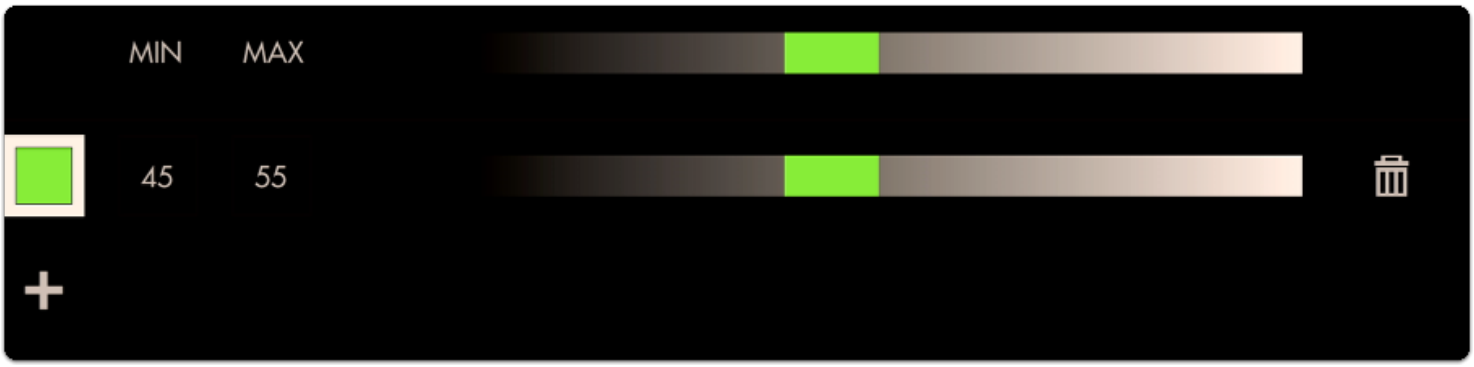
Select '**Style**' and choose '**Map1**' to start with an empty preset that we can modify.



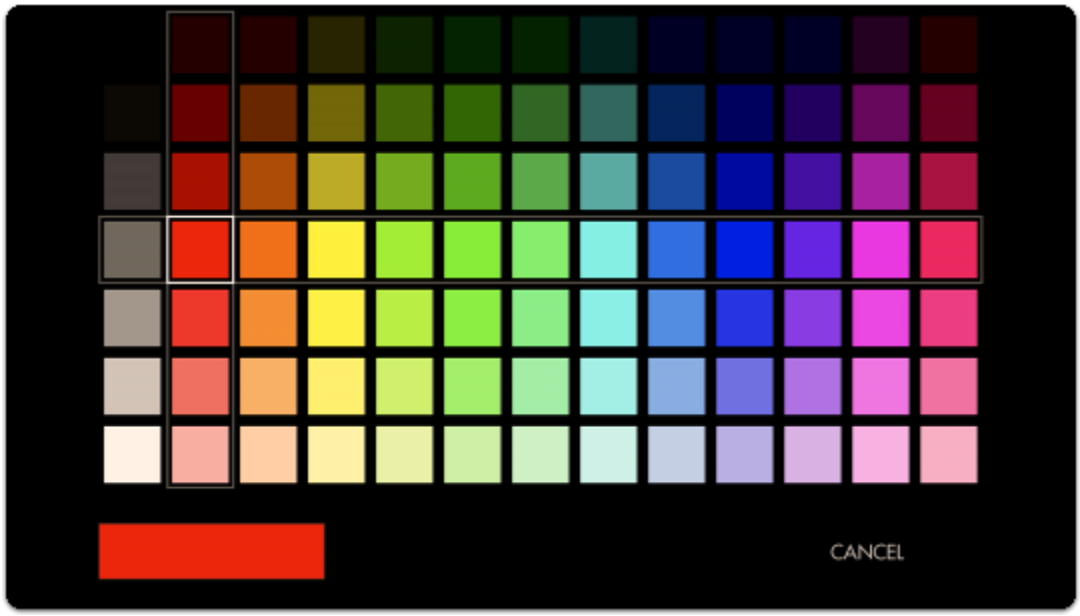
Select '**EDIT**' to begin customization

To begin adding a range, **select the '+'**

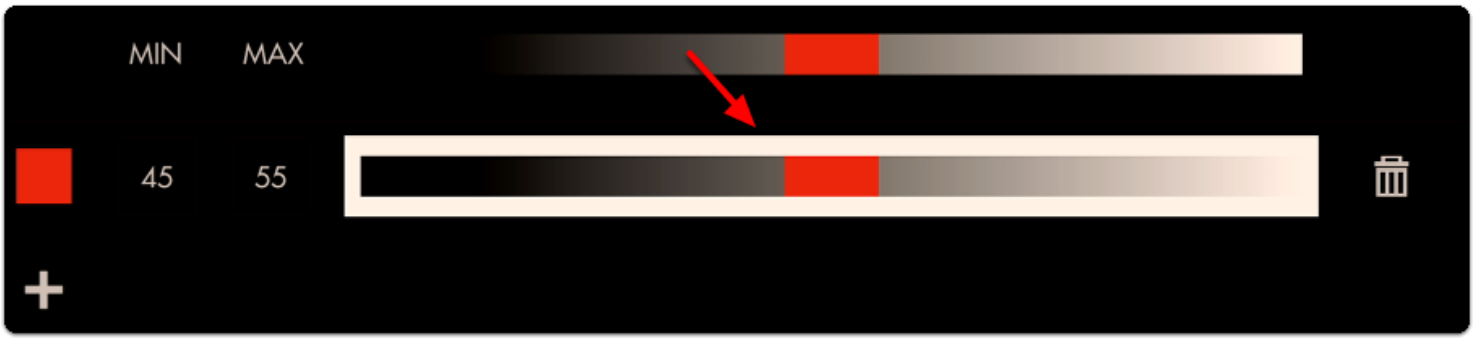
A default color and range is placed onto the scale; let's **change** this color by **selecting** it



Let's choose **red** to act as an overexposure clip warning.

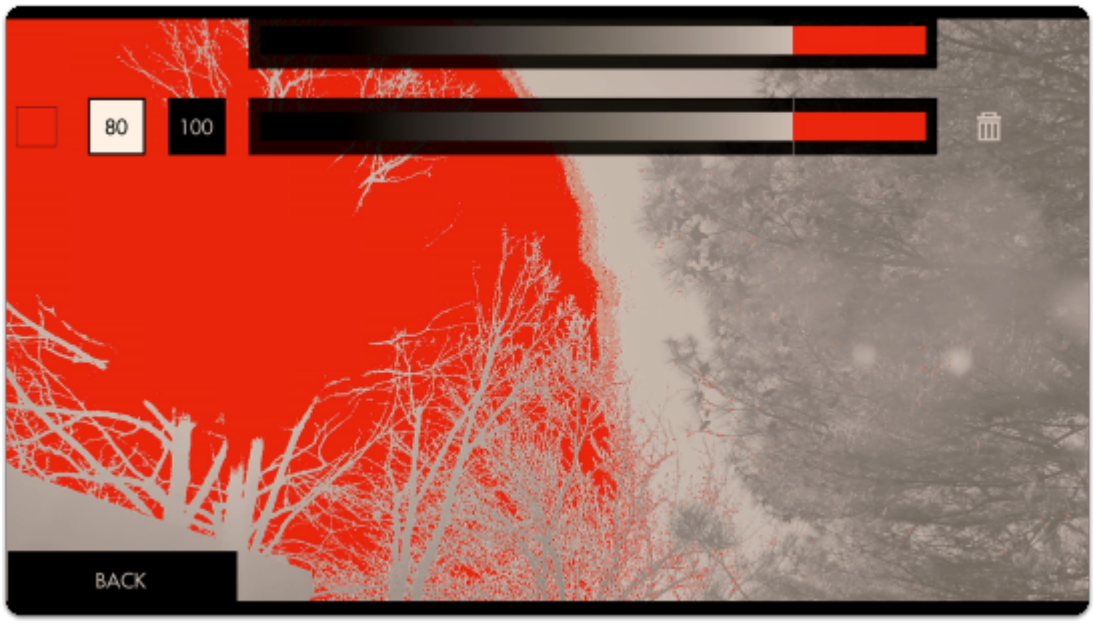


Next we can **edit the position** of this color on the luminosity scale by **selecting it** and dragging in either direction



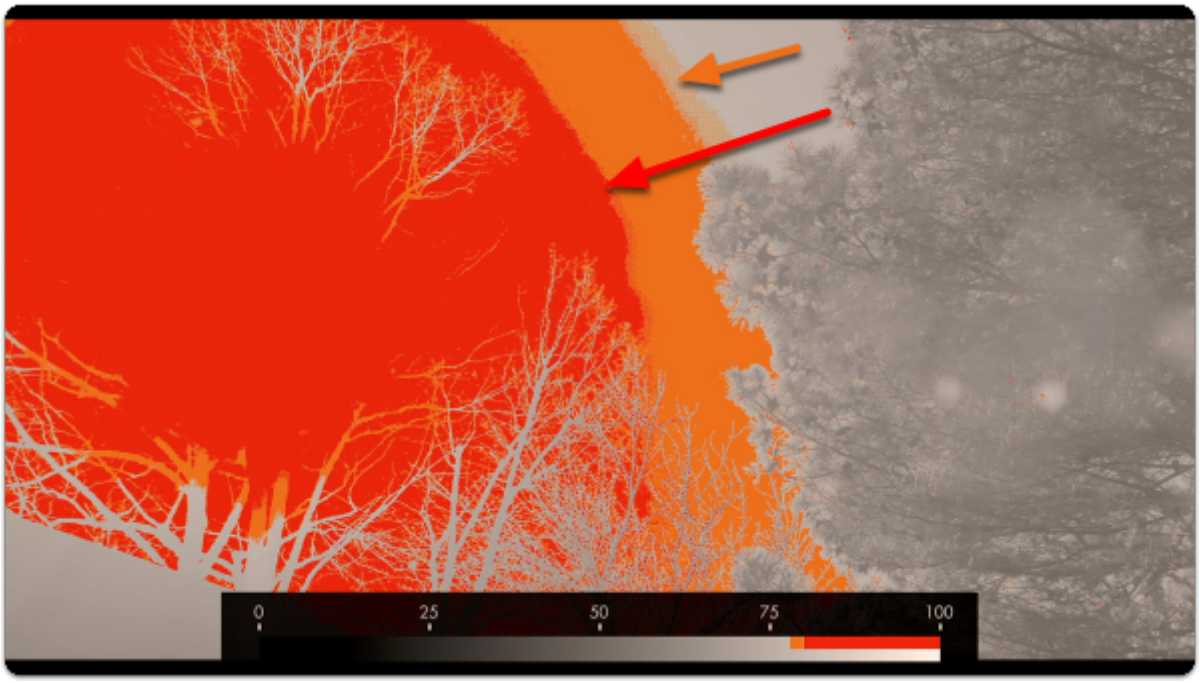
Move the color block to the far right - now any **values in the 90%-100% range will get painted red**. As can be seen none of the values in this image even reach 90% so we need to **decrease the 'MIN'** until we see a **red blob** appear where the sun is located.

When decreased to **80%**, we have finally found the **limit** at which this camera **clips highlights**.



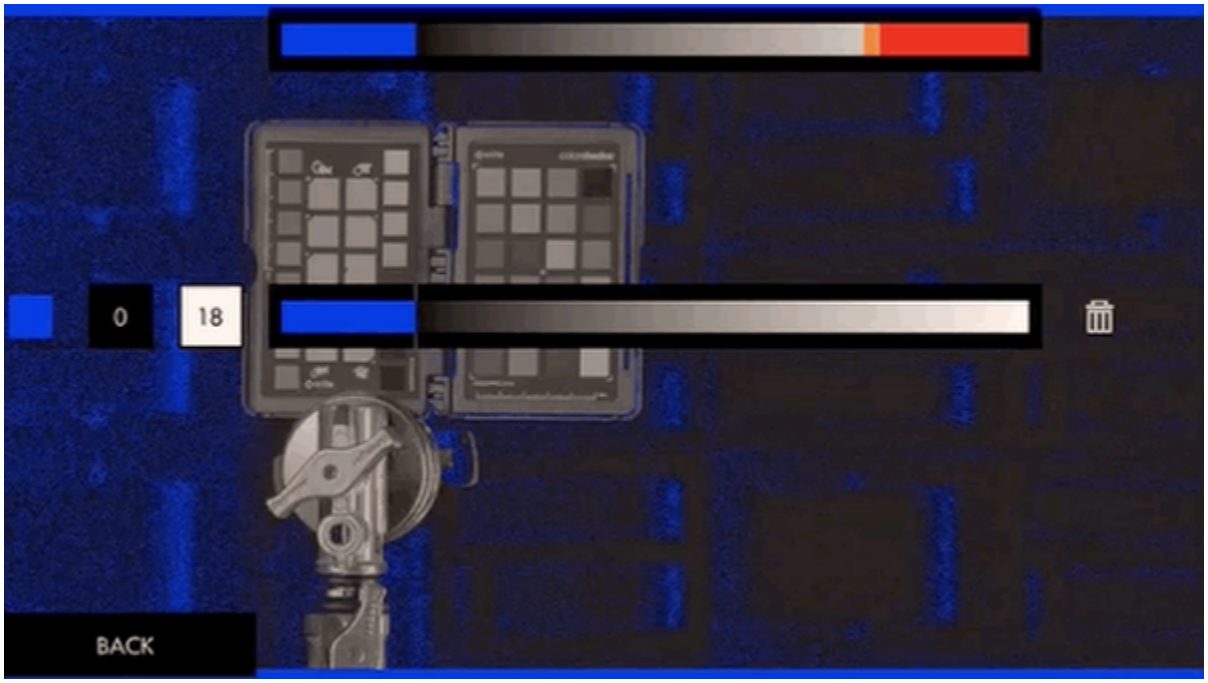
This red area is telling you 'this data is getting clipped' so let's set up another small color value immediately beside this one to act as a warning:

Now if you see orange it means you're **almost clipping highlights** and if you see red you **are clipping highlights**.



Repeat the same process but this time to the **darker extremes** - I have my shot set up in a dark environment but you may simply cover the lens for this stage when looking to pinpoint the camera & gamma's **native black point**.

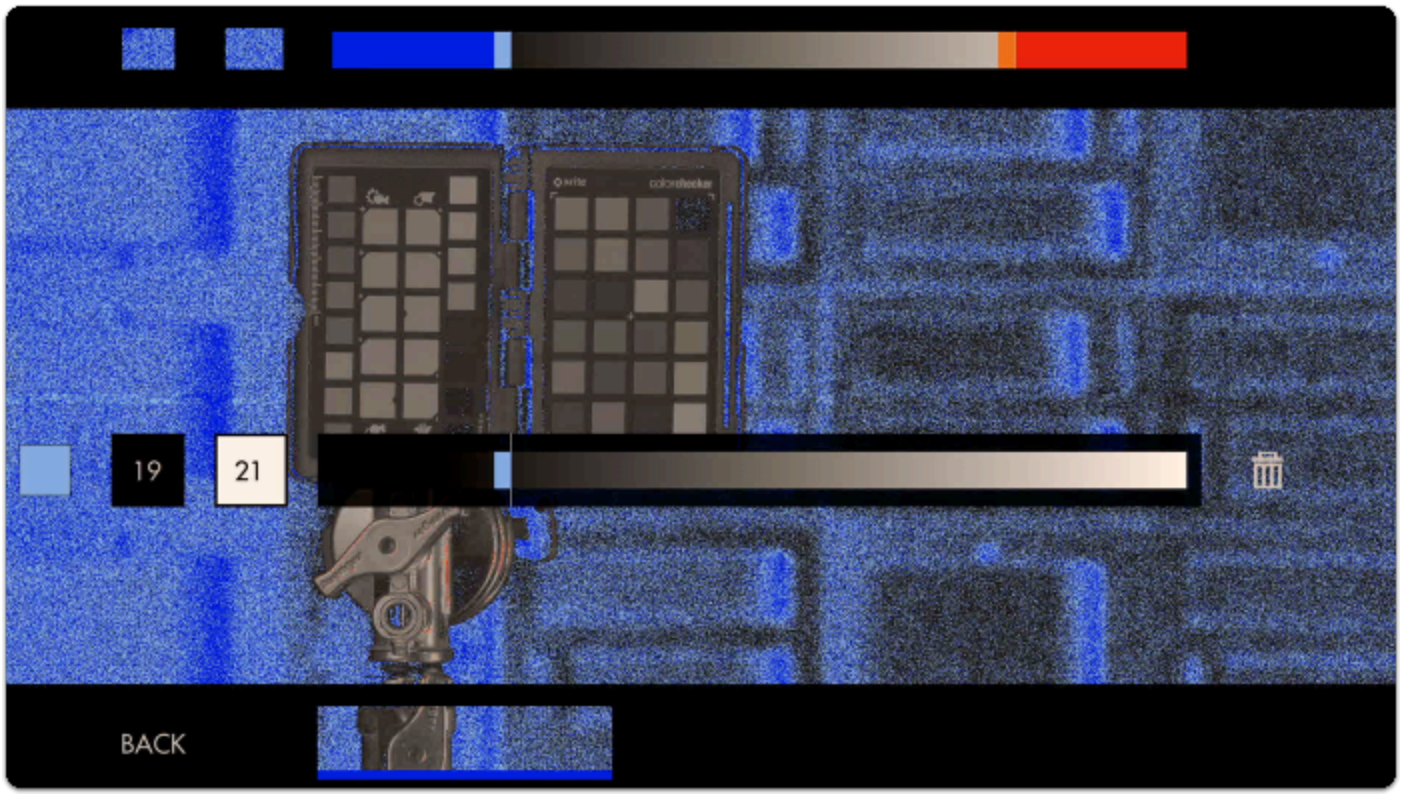
Create a new color band for the **shadows** - I prefer 'cool' colors for dark areas and normally set highlights to 'warm' colors to help me identify each zone quickly but feel free to use any configuration that makes sense to you!



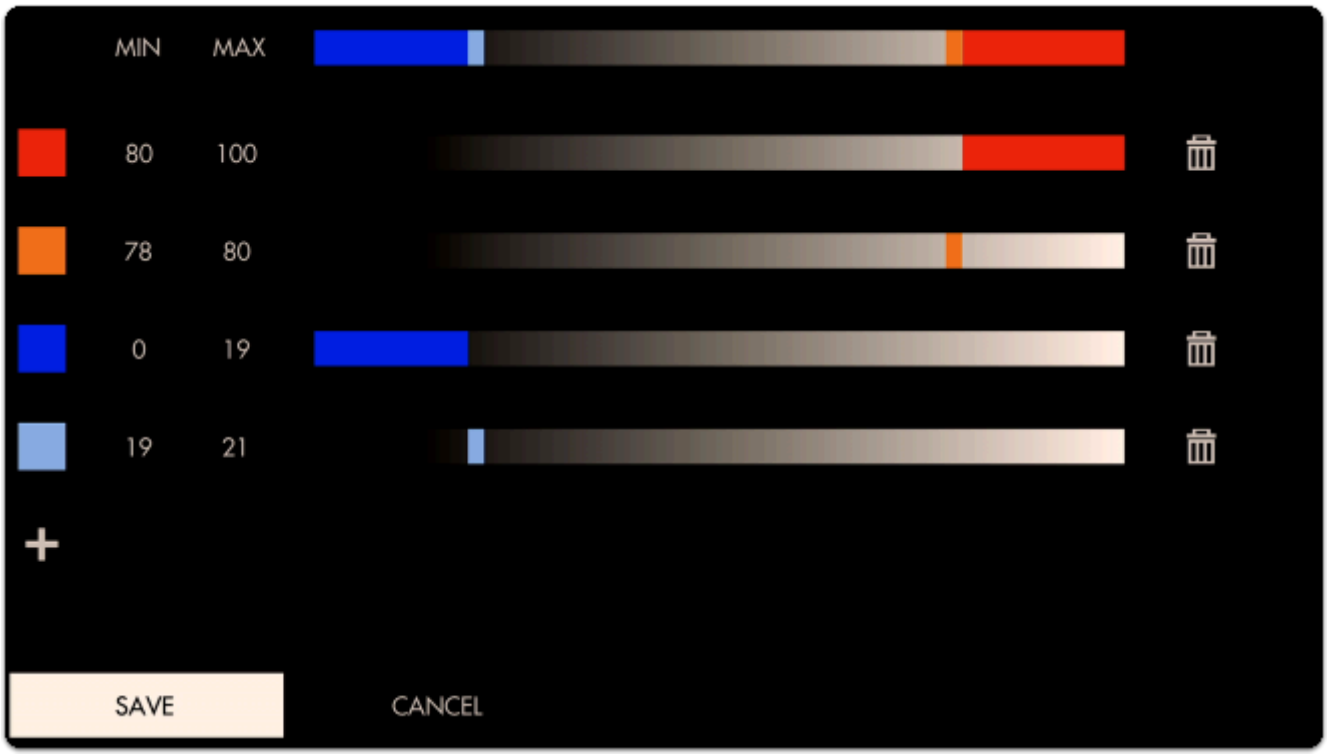
Set the **MIN** to **0** and adjust the **MAX** value to the point where color starts being introduced - You can customize this value until the **noise level** is acceptable to you (anything that gets painted blue is considered 'clipped', so increase the **MAX** to 'clip' more of the noise).

Because Exposure Assist is ultimately a guide, setting these ranges is for keeping us aware of issues as soon as they show up. In this case if we see a **deep blue** on someone's face, we'll need to **increase exposure** or the footage will be **noisy**.

Next we can add a small 'warning zone' next to our 'clipping zone' just like with the highlights:

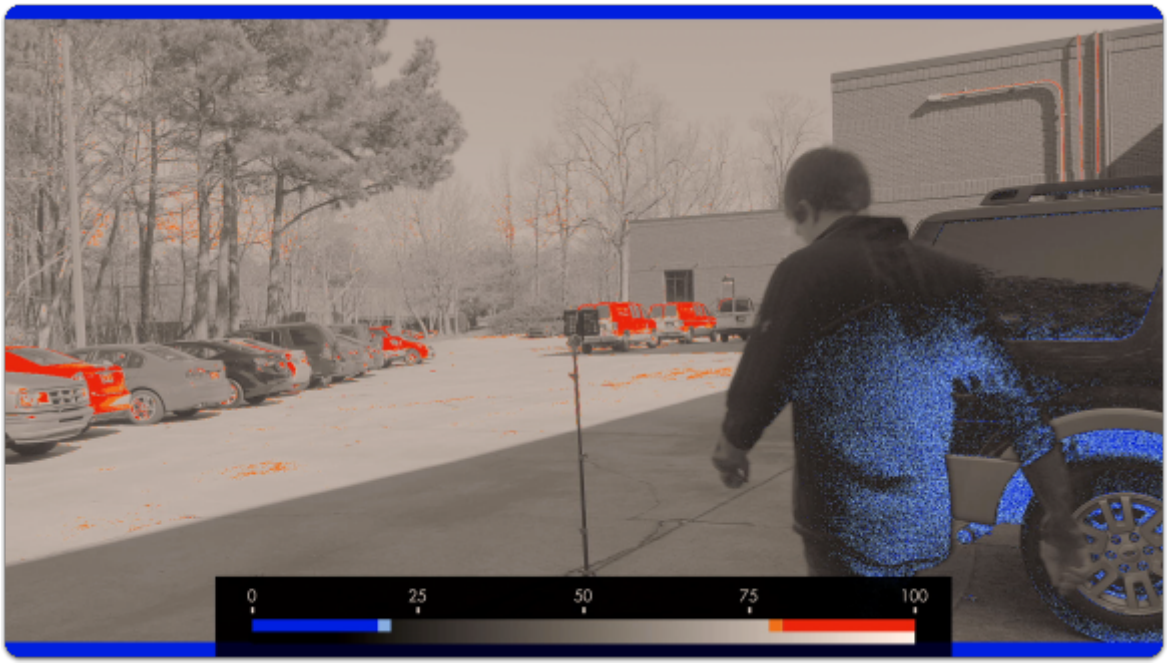


This is what our scale looks like with the upper and lower ranges applied:



Here is what a shot looks like when we're employing the new exposure scale. The colors reveal precisely which areas are **recoverable** and which are **lost**.

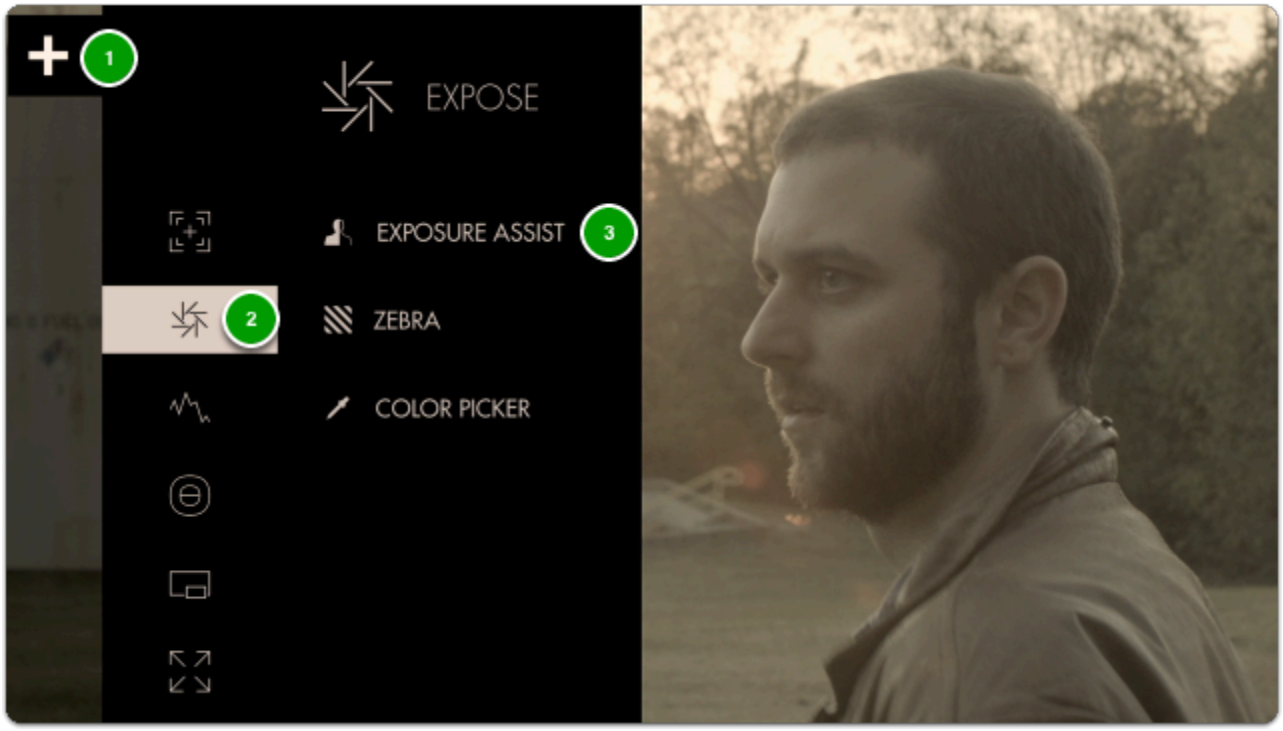
Red areas are clipped highlights, blue areas are noisy/clipped shadows.



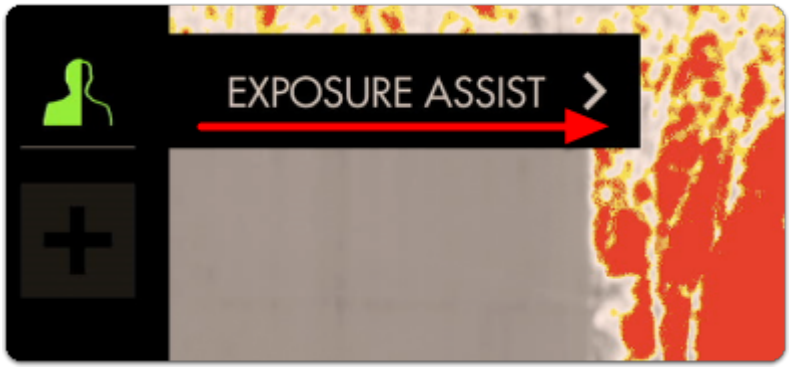
You may continue to add colors to the scale, for example a **midpoint** to represent **skin tones** or an 18% grey card/chart.

Exposure Assist - Quick Start

From any page, click the joystick or tap the screen to bring up **(1) 'Add New Tool'** and navigate to **(2) Expose > (3) Exposure Assist** and select to add it to the current page.



Once added you can **edit** the settings by **navigating right** or tapping the right arrow when 'Exposure assist' is highlighted.



By default the **Arri False Color** scale is used which is a great place to start.
You will also have the **Spectrum** False color, which is a gradient of color from Pink-Blue-Green-Yellow-Red. This is easily seen on the Guide bar.
You can also create your own custom set, up to 3.

The chart below describes what each color means for **ARRI**- essentially when an **element** in your scene gets **colorized**, that means it is **within the brightness range specified** here.

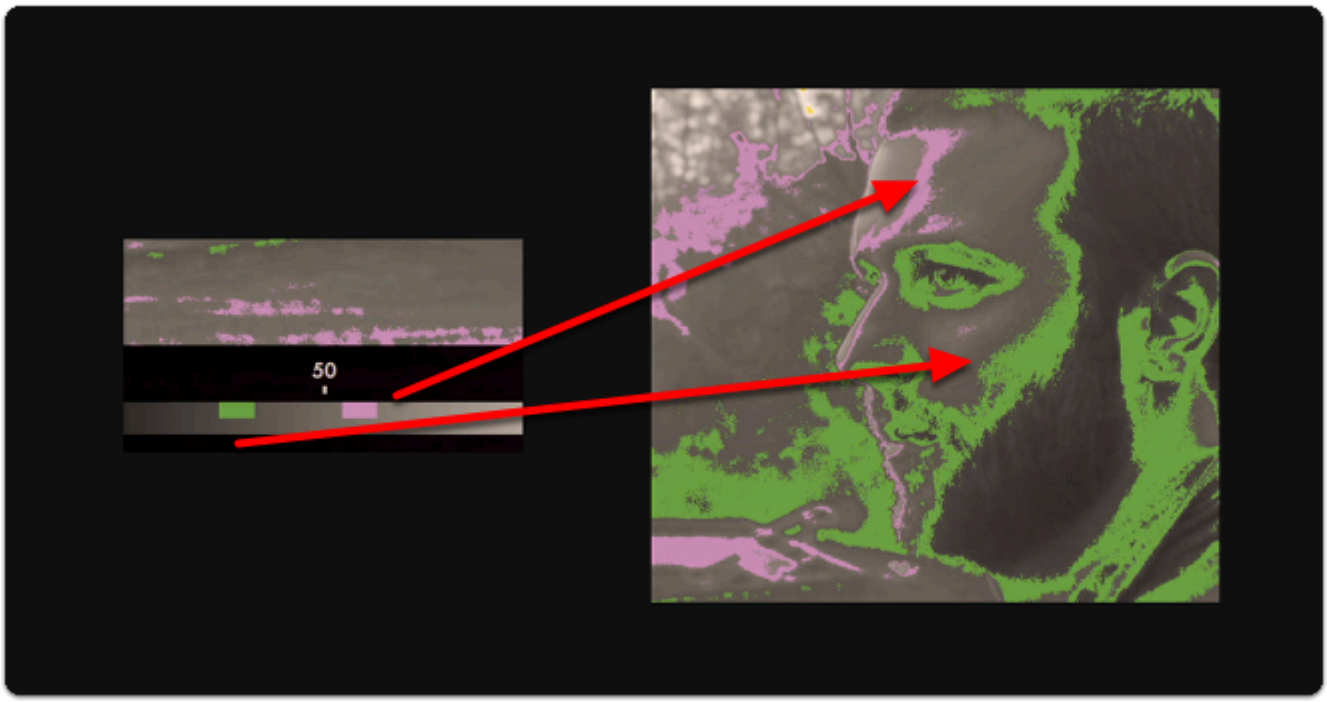
Color	Level	Description
red	99 – 100%	White clipping
yellow	97 – 99%	Just below white clipping/white shoulder
pink	52 – 56%	One stop over medium gray (Caucasian skin)
green	38 – 42%	18% neutral gray
blue	2.5 – 4.0%	Just above black clipping/black slope
purple	0 – 2.5%	Black clipping

(ARRI FALSE COLOR SCALE)

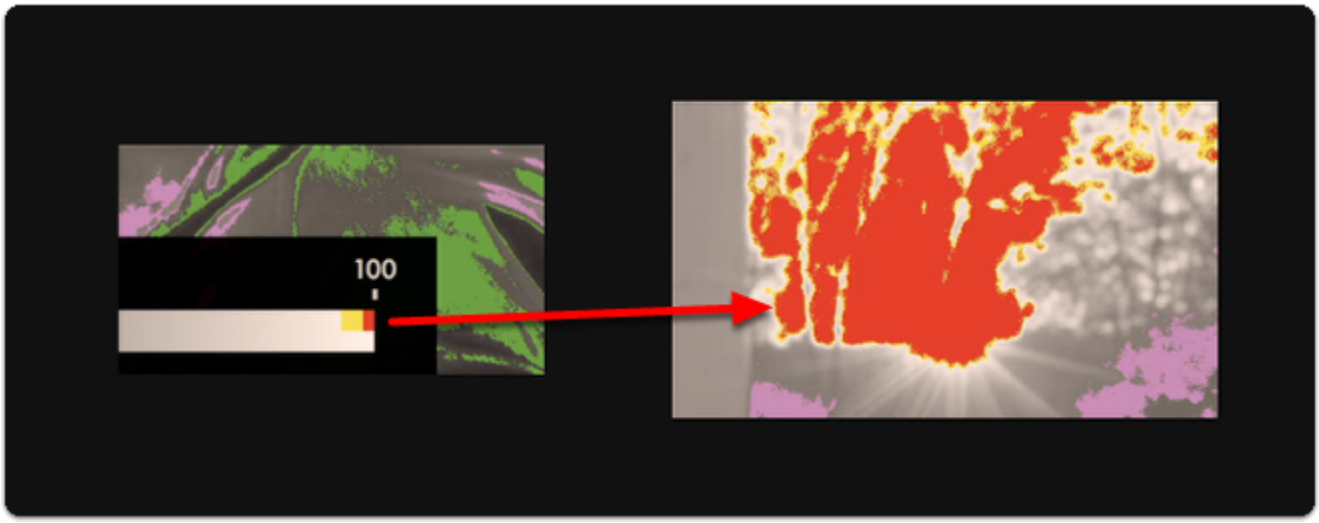
This allows you to make exposure decisions that are based on **numeric values** as opposed to simply how the image **appears**, which depending on viewing environment and many other factors can yield inconsistent results.

Enable **'SHOW IRE GUIDE'** to get an on-monitor view of which **values** are getting **mapped** to the colors on the scale.

Exposure values near the **50%** mark on the scale will generally provide the most **natural result** on **human skin**. With the **Arri scale** this means the **pink** and **green** bands provide a great guide as the **upper** and **lower** range for exposing faces.

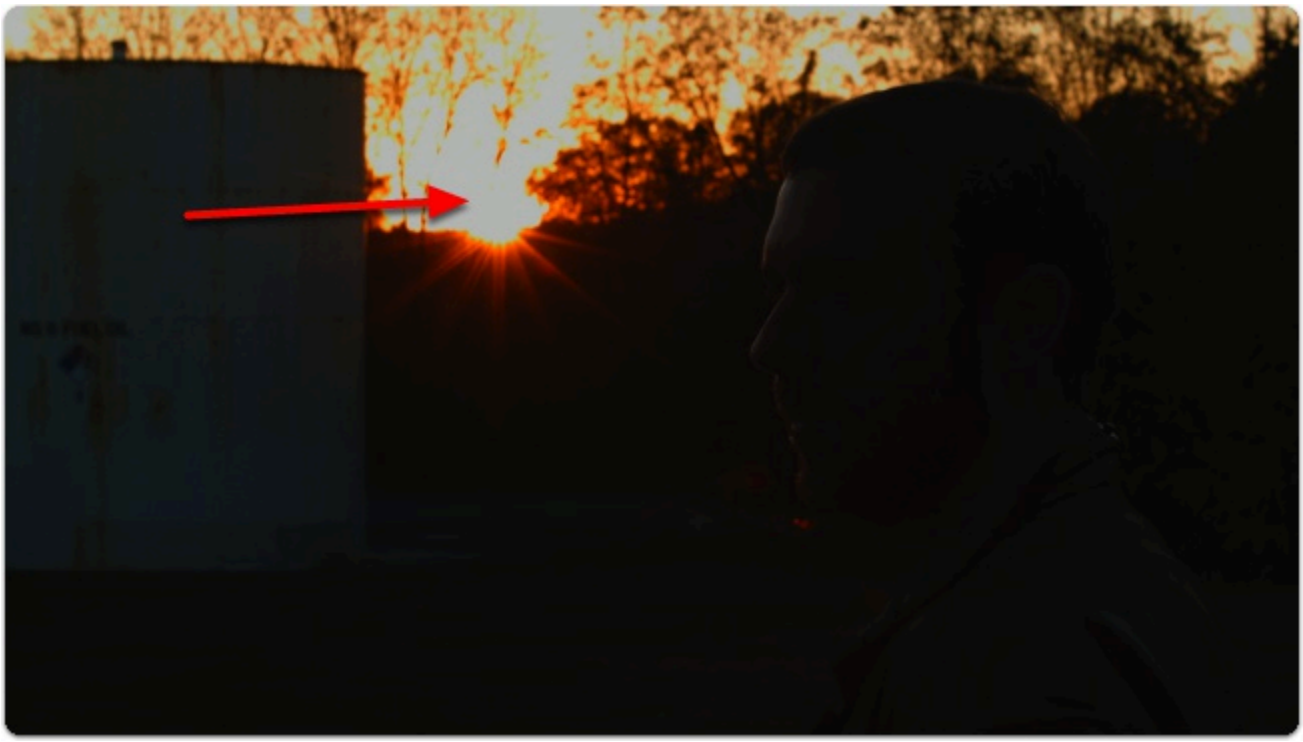


Sticking with this exposure value means we'll be **clipping** a portion of the sky & sun - Exposure Assist makes it clear which areas will be clipping/losing detail as a result of overexposure by painting such areas **red**.



Clipped areas are tricky to manipulate in post production because they are effectively comprised of a single 'blob' of color/value.

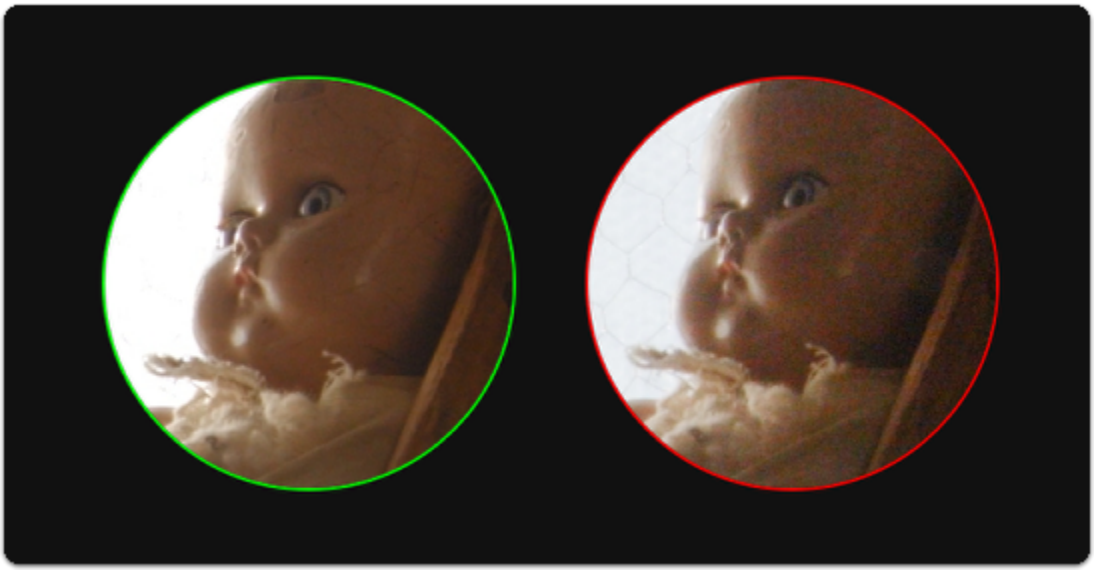
If I **darken the entire shot**, the clipped areas of the sky & sun appear quite unnatural:



If I darken **everything but** the sky/sun, they each appear much more acceptable:

When graded normally, **skin tones maintain plenty of detail** due to being exposed in an optimal range.

Below-left is an example of **normally-exposed face**, **below-right** is an example of an **underexposed face** that has been brought up in color grading - take note the difference in **image noise.**



Exposing a shot ‘just right’ will vary greatly between shoots, operators and cameras but is always a compromise in some way. You must decide **how important** are your **highlights** and **shadows** and what will contribute to the better final image, and this can vary depending on many elements including

intended color grade, delivery methods, VFX and of course the camera itself - some handle highlights better than shadows for example, others vice-versa.

Zebra PagesOS 4

Similar to [Exposure Assist](), the Zebra tool helps you monitor exposure to your image properly by displaying a **stripe pattern (sometimes called marching ants) over a **specific brightness** range (IRE) on your image.

This is useful for essentially setting exposure ‘boundaries’ typically for highlights but you can add one for shadows as well; as soon as a value hits the range you specify, a zebra pattern is displayed on that portion of the image to warn you of over or under exposure if desired.

Zebras - Overview

The Zebra tool acts on only one brightness range at a time (maximum of 2 instances of Zebra allowed simultaneously) AND it doesn't desaturate the image like Exposure Assist.

If set to the proper range, In many cases using the Zebra tool is as fast as rolling the iris until you don't see -- or see the appropriate amount of -- zebra stripes. If the zebra pattern effect is still too distracting

for your other on-set tasks, try creating a new page specifically for it so that you can flip back and forth for a quick exposure spot-check when needed.

If you would rather look at a graph to exposure your image than to have it 'painted over', have a look at the Waveform.

Zebra - Settings

Access Zebra tool settings menu by navigating right or pressing the right arrow when Zebra is highlighted in the tool list.

On

Toggles Zebra Off/On. This can also be done on the tool bar by selecting the tool and activating or deactivating it. It will be Green when active and Grey when inactive.

Min IRE

Sets the minimum IRE (brightness value) that will activate the Zebra functionality. This will be the exposure you will 'start" to see the stripes.

Max IRE

Sets the maximum IRE (brightness value) that will activate the Zebra functionality. This will be where the 'stripes' will stop showing.

Color

Choose the background color of the zebra pattern - adjust for visibility in difficult viewing conditions such as outdoors or on a jib/gimbal.

Ignore Look

When using a Look (3D LUT) file, you may want to enable this feature which applies the zebra tool to the **original picture** coming into the monitor and **ignores the applied 3D LUT** which would alter the points at which the tool would activate. This is important because it allows you to adjust for the original shot, giving you the most flexibility in post.

*We recommend keeping this option activated unless you plan to apply a Look/3D LUT directly to your footage in post without any additional adjustments before exporting.

Zebra - Quick Start

In this section we will add a Zebra to a page and customize it to use as a functional exposure aid.

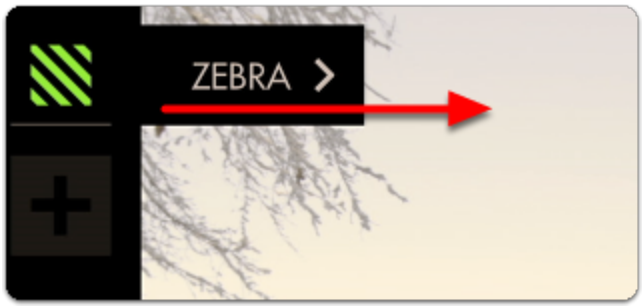
Here we have a shot that is **overexposed**; we can use the **Zebra** tool to determine **what we need to do** to compensate for it and by **how much**.

From any page, click the joystick or tap the screen to bring up ‘Add New Tool’

Navigate to **Expose > Zebra** and select the '**+**' to add it to the current page.

We don't see any effect yet because the **Zebra** tool only **activates by default on 100% brightness and above** (confusingly, luma values can reach below 0% and above 100%).

Because our camera **places its overexposure limit below 100%** or 100 IRE (quite common when shooting in log/flat gammas) **we need to adjust the minimum IRE** until the Zebra is activated.



You can **edit** the settings by **navigating right** (tap the arrow on touchscreen) when ‘Zebra’ is highlighted.

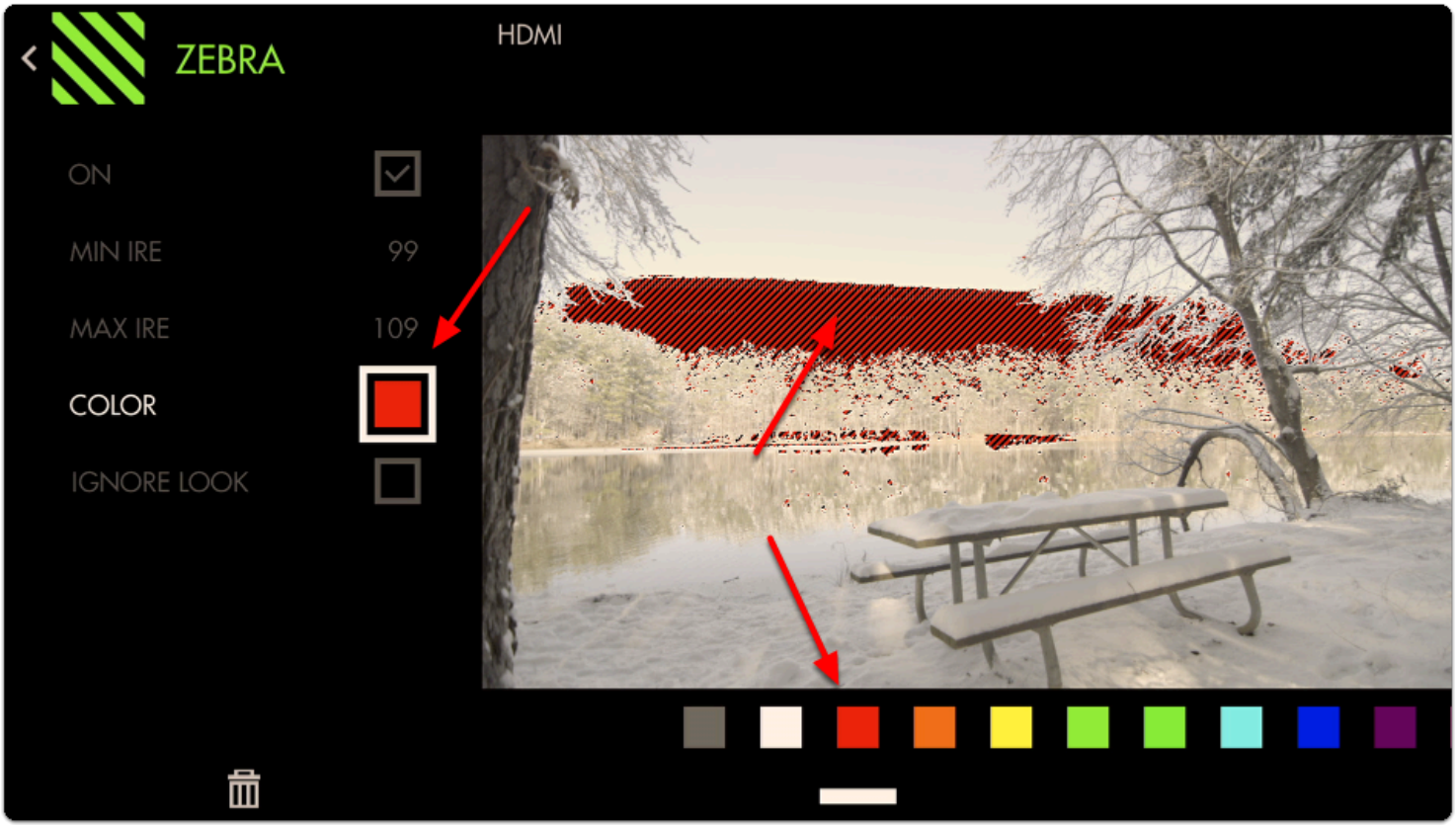
Now **decrease the 'MIN IRE'** setting until you can see a **zebra pattern** being painted over the **brightest** portion of your image.

This adjustment will vary between cameras/gammas.

The zebra pattern is now informing us the **exact area** on our image that the **camera clips highlights**; this marks the **'top end' of our dynamic range**. From now on if we see a zebra pattern, we know for sure that the shot is being overexposed in that portion of the frame.

Bright objects, lights, sun often **need** to be overexposed and will display a zebra pattern in these cases.

If you wish to make the Zebra pattern more **visible** (purely cosmetic) you can **change the color** of the highlighted area. I have changed mine to **red** to make a very distinct **overexposure warning area**.

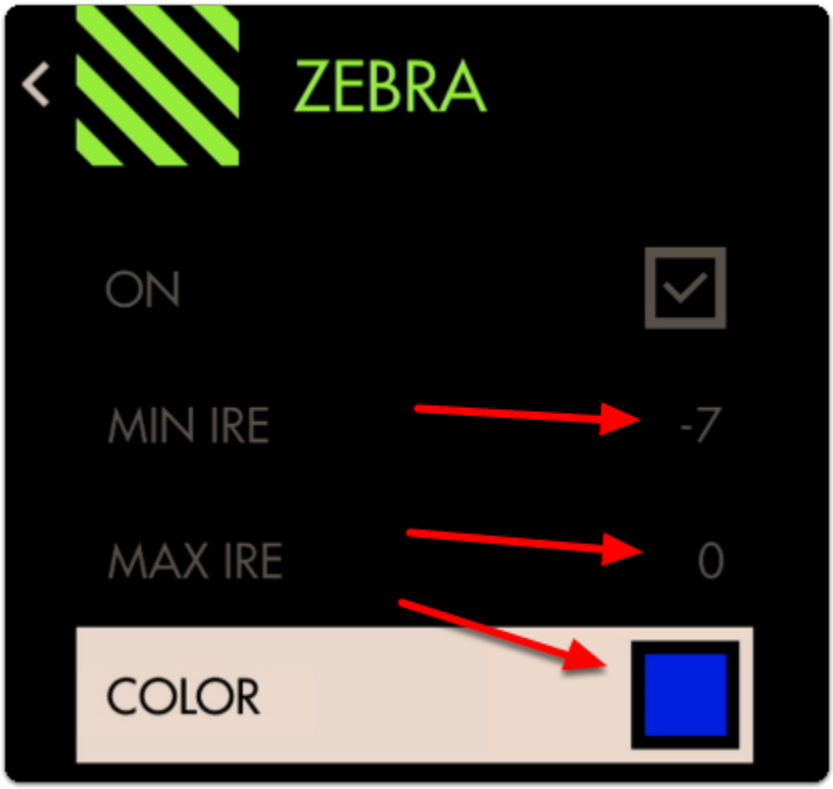


At this stage we can roll **exposure down**, add an **ND filter**, **decrease ISO** or **increase shutter speed** to **darken** the image until the zebra pattern is no longer visible to get **highlight detail back**.

At this point you may wish to add a **second Zebra** tool and set its range to **shadow areas** to act as exposure 'boundaries' to help **maximize dynamic range**.

Here we place the **MIN IRE** at its **lowest possible** setting then set the **MAX IRE to 0** and **increase if necessary** until pitch-black shadow areas activate the filter.

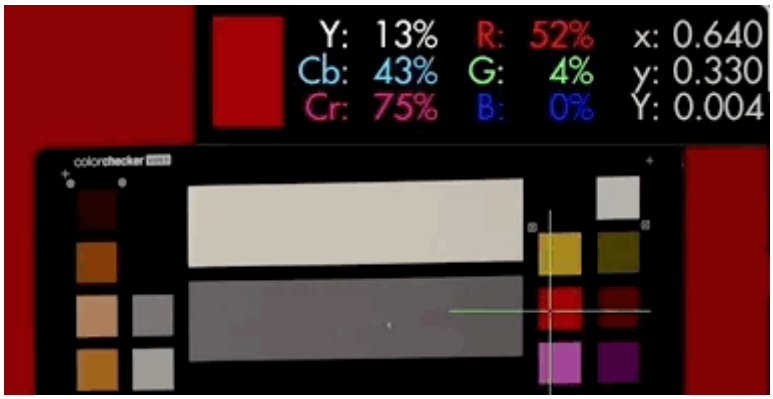
Feel free to place a lens cap on your camera to gauge what it considers pitch black.



Now we have a page configured to warn us when we are **overexposing** and when **underexposing** our footage. Anything in these areas will be clipped so you can now adjust for these limits consistently and precisely.

Because the Zebra tool doesn't activate on parts of the image outside the specified ranges, it combines well with other tools such as a Focus Assist or Frame Guides without the screen becoming too cluttered.

Color Picker PagesOS 4



Color Picker samples color/value information from a **single pixel** to give a precise readout of a specific location. Great for **matching** multiple cameras or getting **consistent exposure** in changeable lighting conditions by sampling from a color chart or an actor/subject's face.

The Color Picker is unique in that it doesn't remain active when not in use, meaning when the tool is activated, moving the joystick will move the crosshair around the image and not flip through pages. To freely move between pages, disable the Color Picker.
You must have a video signal to use this tool.

Color Picker - Overview

The Color Picker is **easily placed** anywhere on the image moving the **joystick** or **tapping on the touchscreen for a quick select and then touch hold and scrolling with your finger for more delicate movement around the screen**. Making judgements based on the data will depend on the user's preference.

> An example use case for the color picker is placing the sampler on a **mid grey card** before every take during changing weather conditions. **Roll exposure** to keep the values matched for consistent exposure throughout the day.

Speed is not where the Color Picker shines for setting exposure if you need to keep an eye on several areas simultaneously - for the fastest exposure tools we recommend Zebra, Exposure Assist or the Waveform if you prefer a scope. (Scroll speed is adjustable, but this is a very precise tool).

The Color Picker serves exposure decisions that can be made from a **single point** such as a **human face** or a color chip on a **test chart**. To gauge a slightly wider area, have a look at the Spot Meter function of the Waveform.

The Color Picker displays only a crosshair and a popup containing some information on the pixel that's being highlighted so it keeps a relatively **low profile**, allowing other imaging decisions to be made without too much on-screen distraction.

Color Picker - Settings

On

Toggles Color Picker Off/On. This is also done on the tool bar by selecting the tool. It will be Green when it is active and Grey when it is not.

Format

Choose how you wish to display brightness ranges:
PERCENT - (%)
RAW - image value which will change depending on bit depth (8-bit is 0-255, 10-bit is 0-1023, etc).

Location

Set the location of the on-screen display to a spot of your choosing for best readability or to make room for the crosshair itself. You have 6 positions:
TOP - Left, Center, Right
BOTTOM - Left, Center, Right

Color

Adjusts the color of the crosshair for easier viewability.

Joy Speed

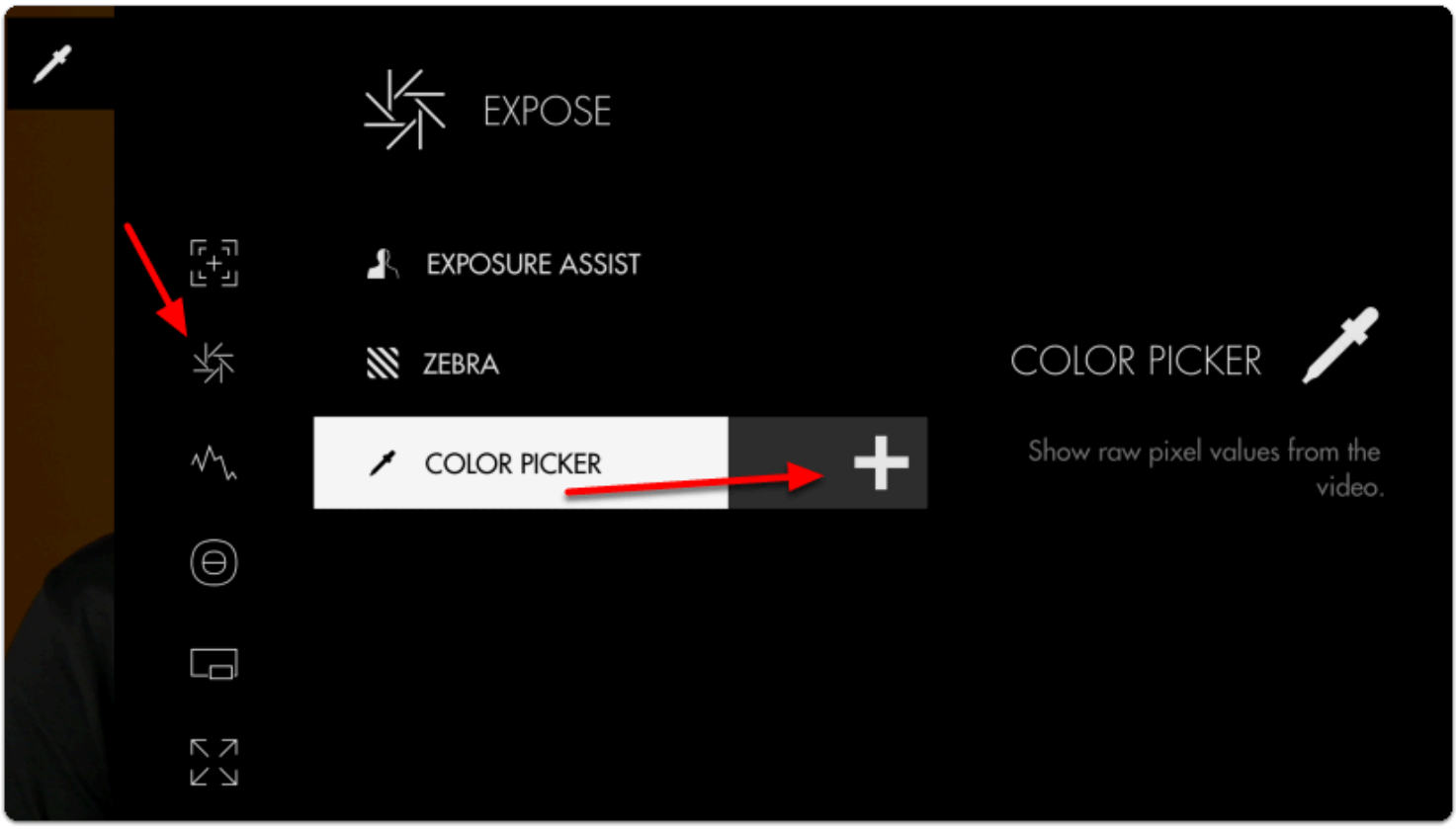
Adjusts the speed at which the color picker crosshair will glide across the screen when moved.

Color Picker - Quick Start

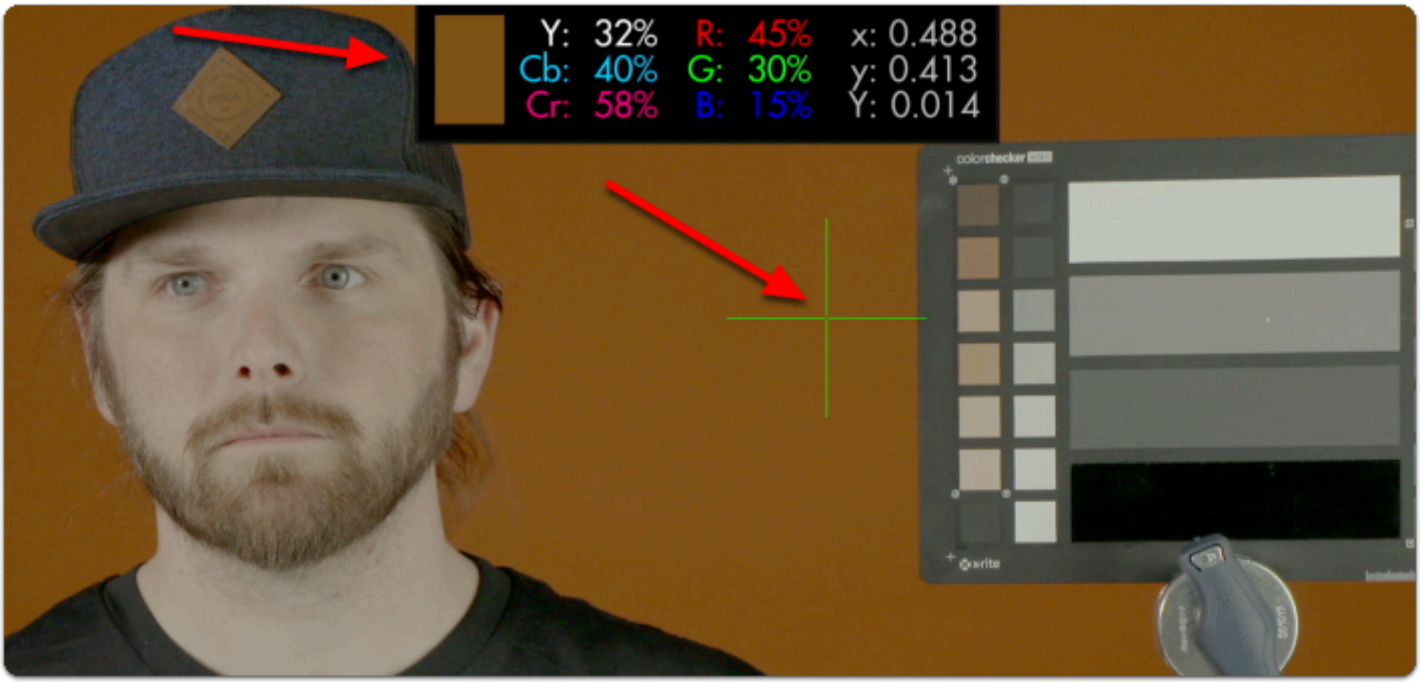
In this section we will add a Color Picker to a page and use it to set exposure in **differing lighting conditions** using a calibration chart.

From any page with a video feed, **click the joystick** or **tap the screen** to bring up **'Add New Tool'.**

Navigate to **Expose** > **Color Picker** and select to add it to the current page.

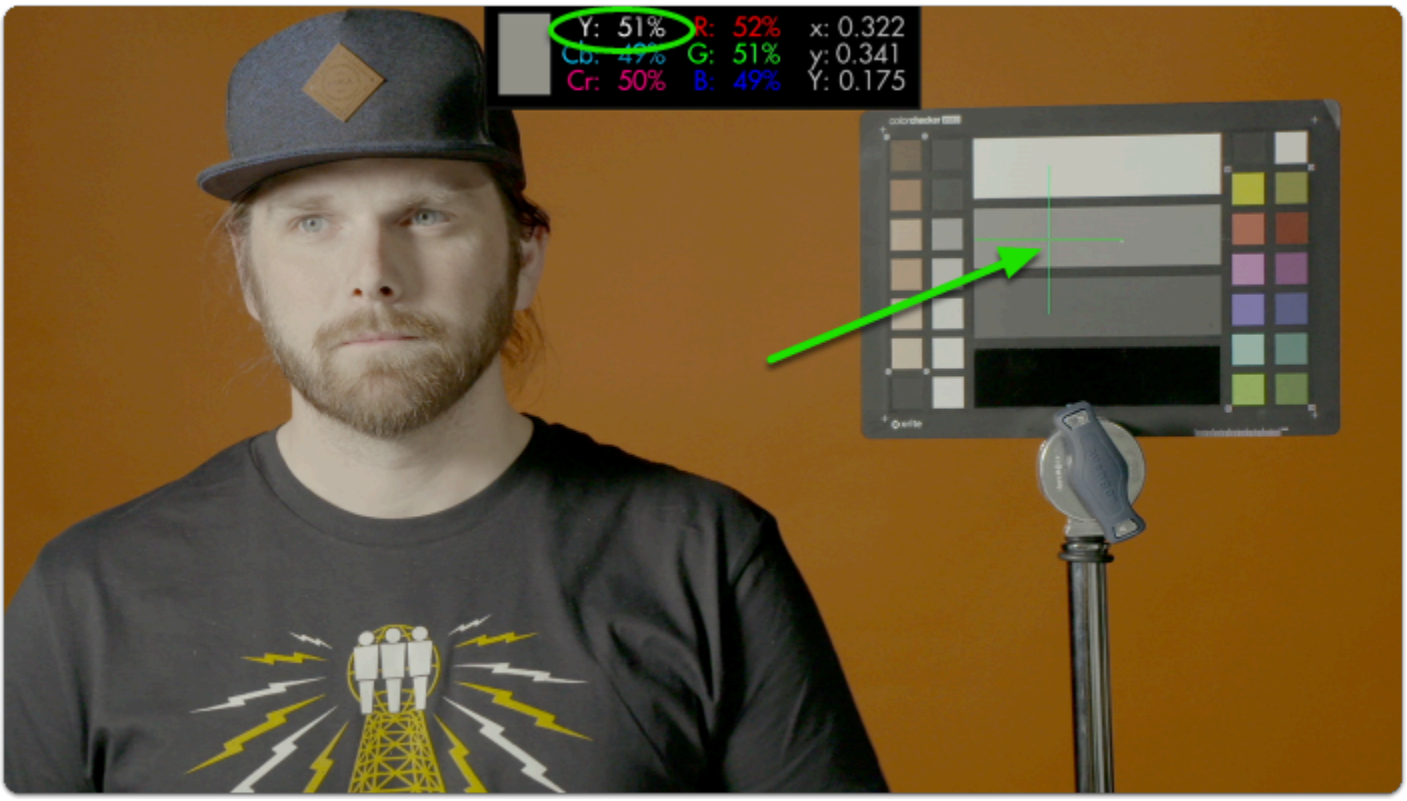


A **stats window** and **crosshair** populate the window; if we **move the joystick** or **tap the screen** we can **change the point** currently being sampled.



Set the crosshair on a **point** on the image that you wish to get a **precise reading** from. In my case I will pick the **middle grey chip** on an **X-Rite ColorChecker Video** chart.

This enables us to **set consistent exposure** shot-to-shot, resulting in less work fixing levels in post.



This particular color chip has been designed to read as 'middle grey'. Look for the 'Y' (luma/brightness) percentage and roll exposure until it reads **near 50%**.

Changing the light setup means our exposure gets **thrown out of its proper range**:

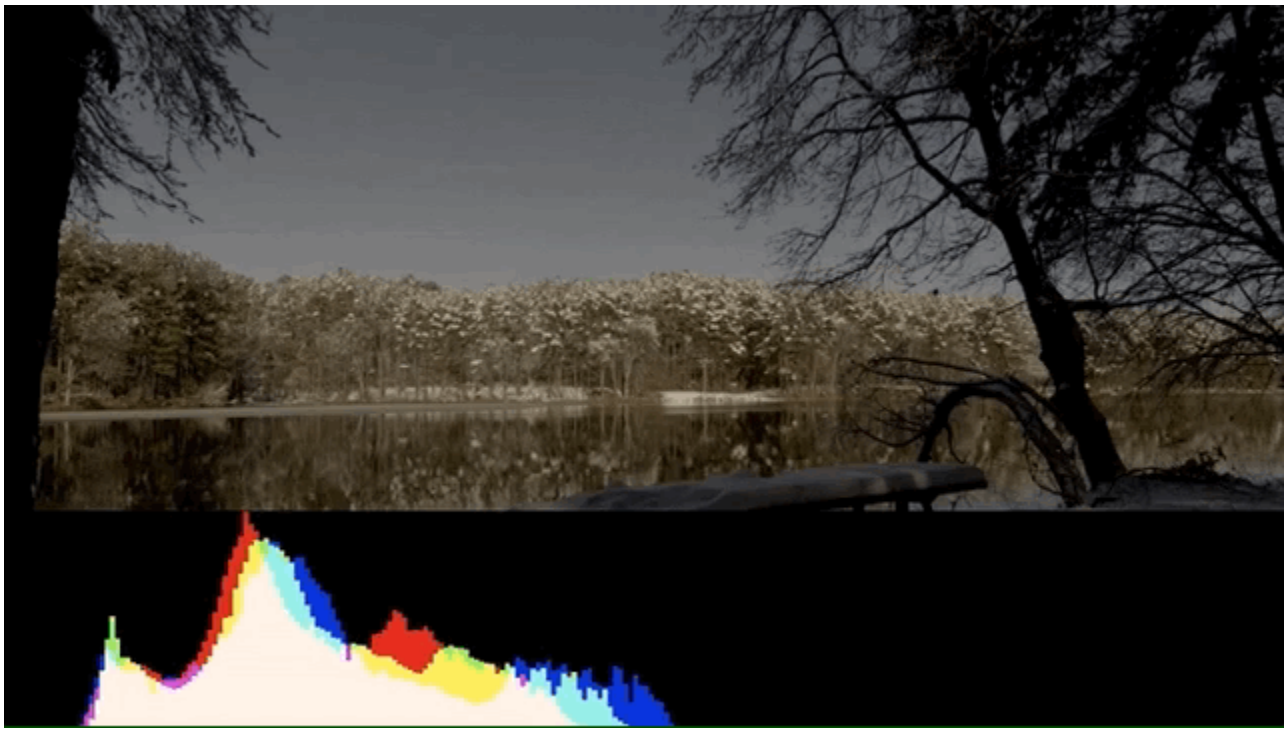
To compensate all we need to do is roll (close) the iris until we get back to the **same value from before**.

Using the same technique we can adjust for exposure under any lighting condition and arrive at a clean result that will give us **consistent, gradeable footage!**


Y: 51% R: 51% x: 0.313
Cb: 50% G: 52% y: 0.333
Cr: 50% B: 51% Y: 0.189

Tools - Scopes

Histogram PagesOS 4



The Histogram is a brightness graph - left side is darker values, right side brighter. Use it to judge the **overall balance of exposure** in your image.

Histogram - Overview

Determining where your exposure is balanced is simple with the Histogram- if a **'lump'** is shifting more to the **left**, more of your image is in **shadow**, if a **'lump'** is towards the **right**, your image is largely in **highlight**.

One quick glance of the Histogram is enough to **determine the overall exposure balance** of your image -- not fine details about it but a general gauge of where most of your image is 'weighted'.

Beyond determining exposure balance, the Histogram is outclassed in utility by the other exposure aids that are more suitable for pinpointing specific issues on the image. For the most versatile scope for most setups, have a look at the Waveform.

The Histogram is a good low-profile scope as it doesn't generally lose any utility by being scaled down and mostly out of the way.

Histogram - Settings

On

Toggles Histogram Off/On. This can also be done on the tool bar by selecting the tool and either activating or deactivating it. It will be Green when active and Grey when inactive.

Style

Pick your flavor of Histogram-
LUMA - displays a brightness/luma plot only
RGB - displays Luman, red, green and blue values individually for a look at the chromaticity of the image.

Full Screen

Displays the histogram in a full-screen view, which is useful when viewing from a distance or if using multiple monitors where another can be displaying the image itself.

Width

Scales the Histogram horizontally to help with rearranging your workspace.

Height

Scales the Histogram vertically.

Location

Set the location of the Histogram to a spot of your choosing - useful when placing multiple tools/scopes on screen.

There are 9 locations to place the Histogram field:
TOP - Left, Center, Right

MIDDLE - Left, Center, Right

BOTTOM - Left, Center, Right

*(Full Screen is another option)

Opacity

Adjusts the transparency of the black background behind the Histogram for readability. Boosting Intensity helps to compensate for a lower Opacity.

Ignore Look

Because monitoring with a Look (3D LUT) alters the image and therefore its exposure, it can be useful to ignore its effects on exposure tools. This means you can monitor with any graded Look while using the Histogram to set up your camera to be exposed properly for any other grading possibilities in post because it's working off the camera's original ungraded image.

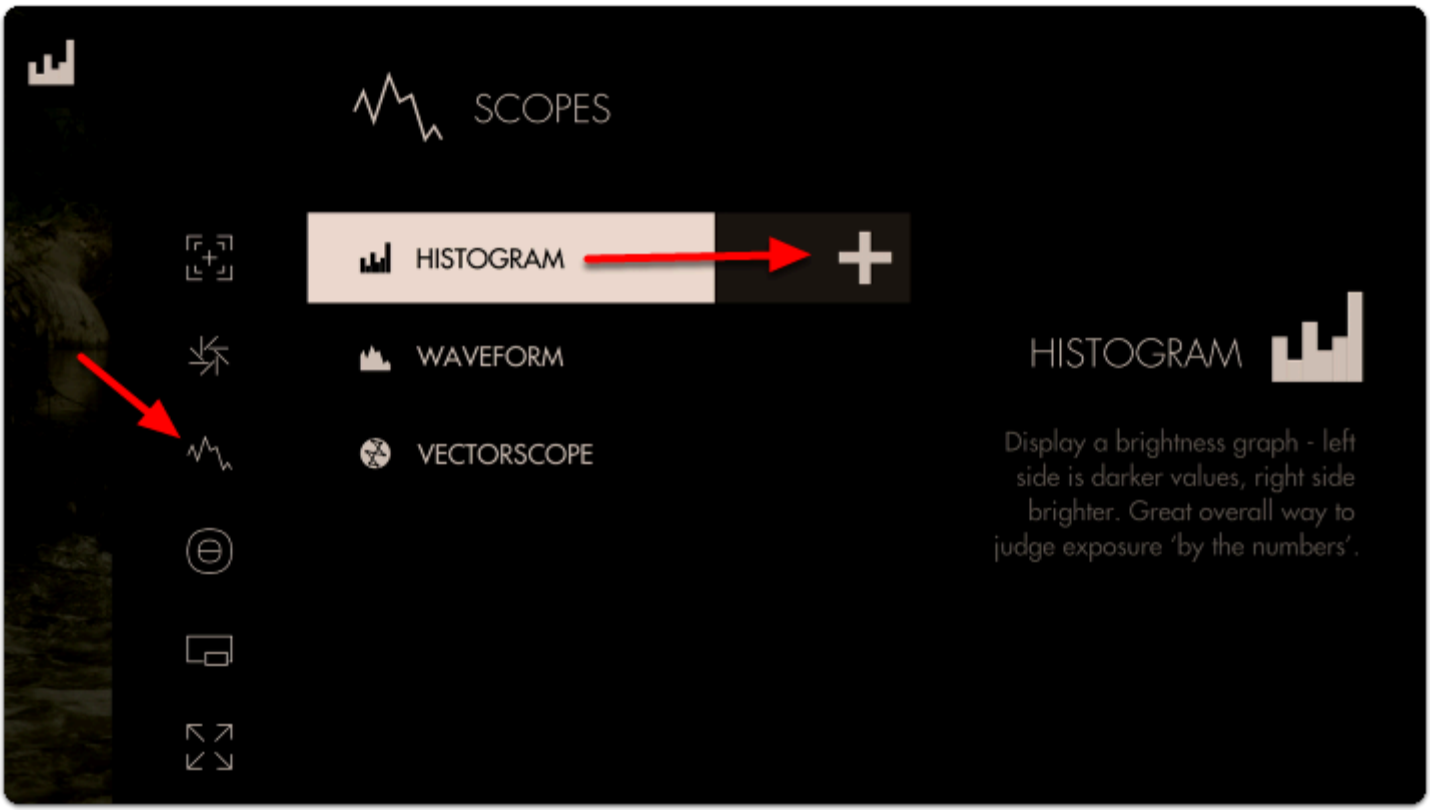
We recommend leaving this on for most shooting scenarios unless you are baking a LUT into your footage on set and do not intend to color grade in post.

Histogram - Quick Start

In this section we will add a Histogram to a page and use it to set exposure.

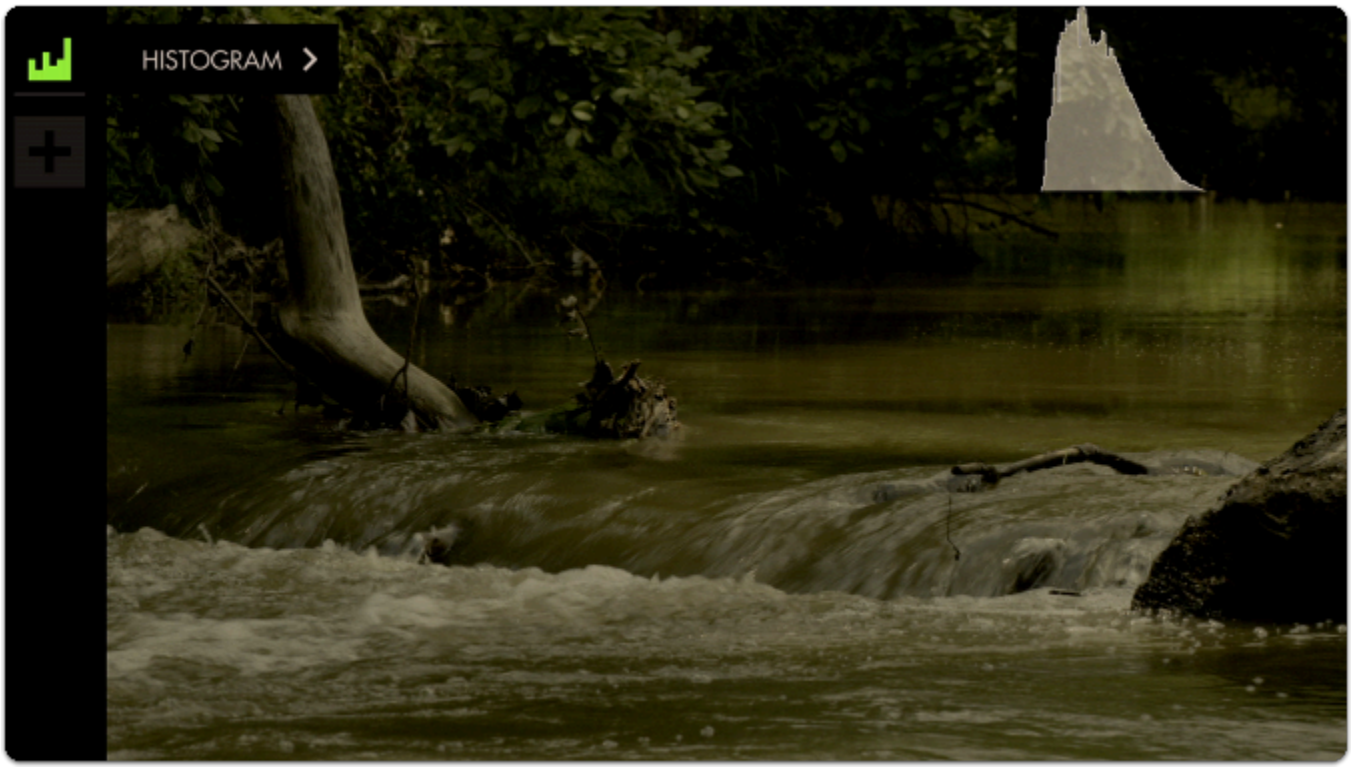
From any page with a feed, **click the joystick** or **tap the screen** to bring up **'Add New Tool'**

Navigate to **Scopes > Histogram** and select the **'+'** to add it to the current page.



A graph appears in the top-right of the image. It will default to LUMA values (Overall Exposure). Histograms read Shadow levels on the left and Highlights on the right. The weight of the curve will tell you where your exposure values are falling along that scale.

The overall 'weight' of the image data is positioned towards the **left of the graph**; this is telling us we have a lot more shadow areas than highlight areas.



Since this is a daytime shot with relatively even light (no super-bright objects) we can **roll exposure** to better balance the **'lump'** of the graph toward the **center**.

There are no 'spikes' toward the far-left or far-right of the graph, meaning **everything in our shot** is within a **usable exposure** range and as a result **no clipping** is occurring.

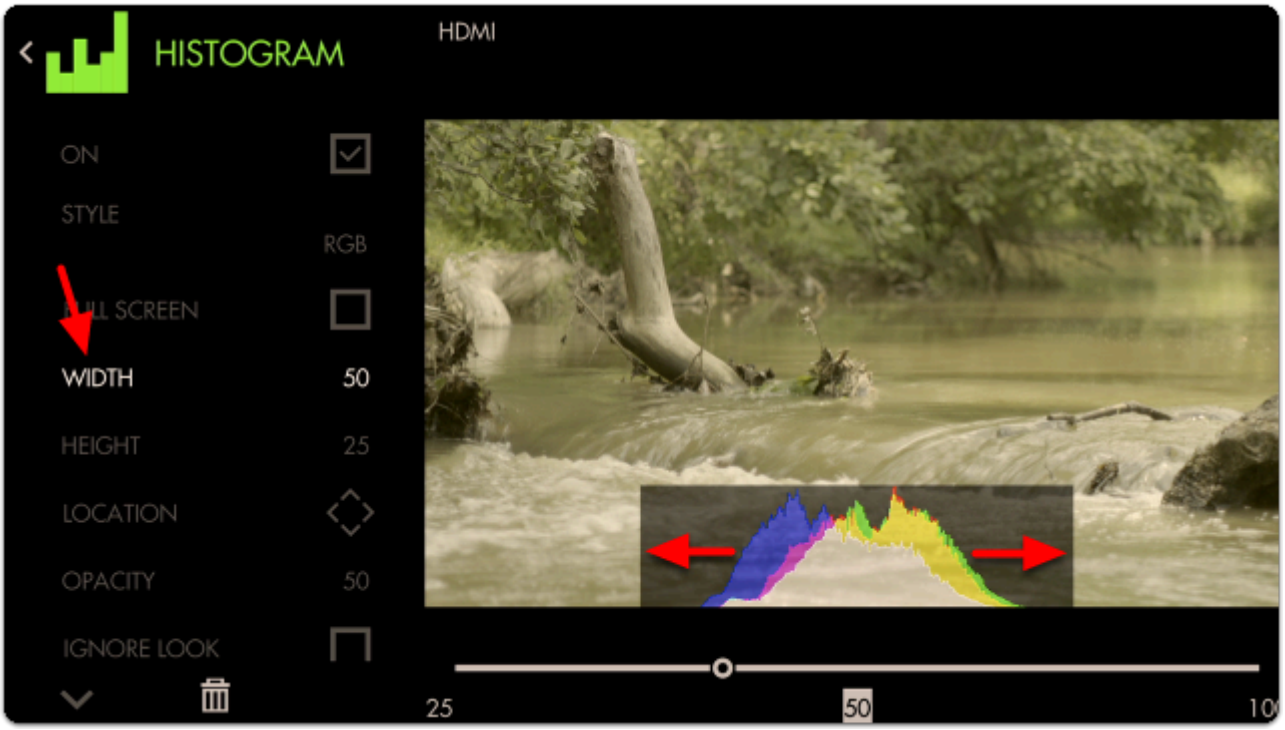
Let's edit how the graph appears by **navigating right** or **tapping the arrow** when 'Histogram' is highlighted.

For a bit more useful info you can navigate to **'STYLE'** and set from **LUMA** to **RGB** to get access to color information in addition to luma/value.

Just as with Waveform, using RGB mode lets you see the individual luma values of red, green and blue that make up your image - If you see a distinct separation of colors on the graph you will notice more colorization/saturation.

To adjust the position of the Histogram on the screen (to arrange with other tools or for better general visibility) alter the **LOCATION** and use the joystick or tap around the screen to place the graph.

We can also adjust the **size** of the graph any way we wish (or use FULL SCREEN to dedicate an entire page to the feature)



With the addition of RGB data, we can tell that our image has a warm cast toward the brighter end (yellow area) and a cooler cast in the shadows (blue area).

Cameras which have an 'auto exposure' will often use an internal histogram as their guide, meaning it will center the 'weight' on the graph as best as possible just as we are doing here manually.

Because the Histogram does not know the context of your shot it can sometimes be tricky to use for exposure balance. For example a brightly lit snow scene will weigh heavily on the right but if we roll exposure to center the 'lump', the whole scene will then be too dark, because brightly lit snow should appear brightly lit. Conversely if you are shooting a subject under a spotlight but against a dark background, the Histogram may appear as if you have an underexposed image if it's reacting to the dark background. For these cases we recommend the Waveform, Exposure Assist or Zebra as they can report issues from discrete portions of the image.

Waveform PagesOS 4

The **Waveform** is generally considered the **most robust exposure tool** because it plots your image's luminance (brightness) -- and chrominance if using RGB mode -- to a graph but unlike the Histogram, it physically **matches the screen from left-to-right**.

1. Waveform - Overview

Although SmallHD provides many available tools to help with setting proper exposure, most of the decision will be down to what works for you. Use this section if you need help deciding where to start.

The Waveform is an extremely comprehensive exposure tool but when needing to understand your exposure levels from a quick glance, Exposure Assist or Zebra may be better options.

Once you get comfortable with how the Waveform works you can quickly reach optimal exposure with it by **balancing exposure** between the top and bottom of the graph to **make sure highlights and shadows aren't being clipped too harshly**. If they are, perhaps adding some light into shadow areas or diffusing/ filtering highlights can help compensate.

Waveform is often considered the best exposure tool because it allows very precise measurement of all aspects of the image's luma (brightness) and chroma (color) by setting the 'style' to RGB.

Because the Waveform gains the most benefit when using the full width of the screen (so that it matches the image horizontally) it might consume more of your image than you are comfortable with. It might work best as its own screen or taking up the lower portion (1/3) of the screen, but you can use this tool however it will work best for you.

2. Waveform Settings

Access the Waveform's settings menu by navigating right or pressing the right arrow when the Waveform is highlighted.

On

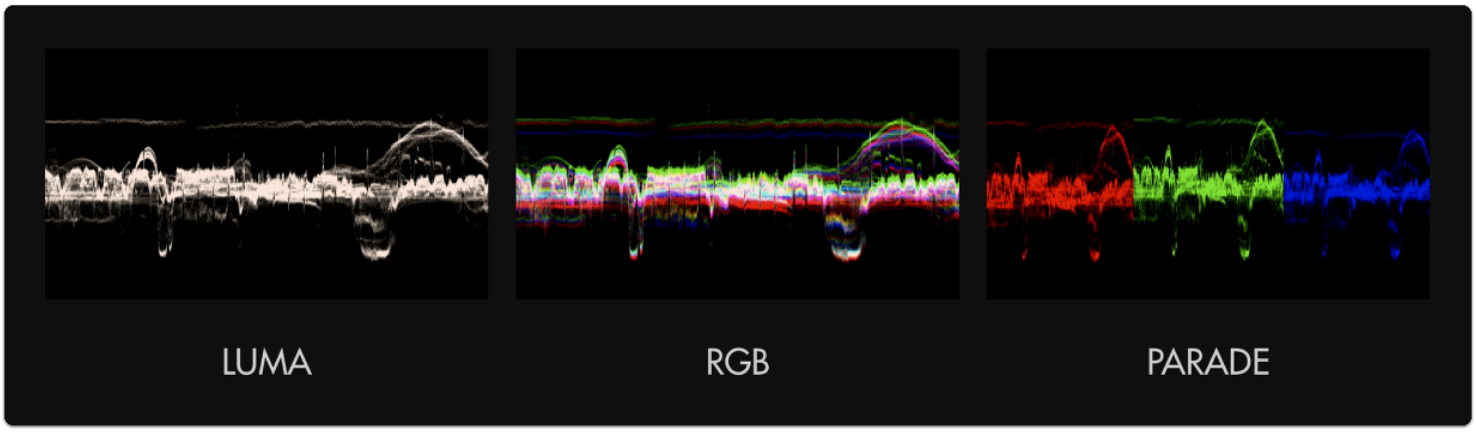
Toggles the Waveform On/Off. This can also be done on the tool bar by selecting the tool and activating or deactivating it. It will be Green when active and Grey when inactive.

Ignore Look

Allows you to apply a Look (3D LUT) to your footage while monitoring a waveform that is not affected by the Look. This lets you make exposure decisions based on the signal coming from the monitor for ideal flexibility in post-production.

We recommend leaving this on (Ignoring your LUT) for most shooting scenarios so that the waveform applies to the **footage being recorded** instead of shifting around while adding or adjusting a 3D LUT.

Style



You will have three options:

LUMA displays a brightness/luma plot only

RGB graphs each primary color on top of one another.

RGB PARADE physically separates the Red, Blue and Green channels into discrete sections from left to right so they can be viewed easily in isolation.

LAYOUT

Layout has a set of Submenus that will allow you to set the positioning, scale and visibility of the Waveform.

*Full Screen

Displays the waveform in a full-screen view, useful when viewing from a distance or if using multiple monitors where another can be displaying the image itself.

*Width

Scales the Waveform horizontally.

We recommend leaving this at 100 (or set to the same width as your image) to gain the benefit if the graph matching up evenly with your image from left-to-right.

*Color

This is only available if using LUMA Style.
You can select the color of the waveform if desired from a specified set.

*Height

Scales the Waveform vertically.

*Location

Set the location of the Waveform to a spot of your choosing - useful when placing multiple tools/scopes on screen.
There are 9 positions to choose from:

TOP - Left, Center, Right
MIDDLE - Left, Center, Right
BOTTOM - Left, Center, Right

(Full screen is also an option)

*Intensity

Adjusts the brightness of the waveform graph (the plotted portion) - increase if the graph appears too faint. This affects the colored part of the graph, not the black background, adjust the Opacity to change that.

*Opacity

Adjusts the transparency of the black background behind the Waveform. 100 is black, 0 is opaque.

For better visibility, boost Intensity to compensate for a lower Opacity if desired.

SPOT METER

Brings up a small, moveable ‘window’ you can place on the image that highlights the portion of the Waveform it corresponds to. Useful for getting very specific exposure information from a specific part of the image such as skin tones, hot spots or calibration charts.

This will open a submenu for more settings.

*Enabled

Toggles visibility of the Spot Meter. This must be enabled to open the sub menu.

*Width

Adjusts the width of the Spot Meter.

*Height

Scales the height of the Spot Meter.

*Spot Location

Set the location of the Spot Meter to an area of your choosing. It follows a 7x7 grid giving you a preset 49 locations.

LEGEND

Places a guide onto the Waveform graph listing numeric IRE (brightness) values for measuring levels.
This will open up a set of submenus.

*Overlaid

Toggles if the legend is outside of the waveform (right) or over the top of it (left).
*If in full screen mode, the outside will push the legend off the screen. If you want the legend outside and have a full screen waveform, you will need to adjust the size manually rather than using the fill screen and shorten the width 94.

*Num Labels

This breaks the measurements from 0 to 100 into multiples:
2 - x100 (0,100)

3 - x50 (50,100)

4 - x33 (33,66...)

5 - x24 (25,50...)

6 - x20 (20,40...)

7 - x17 (16,33...)

8 - x14 (14,28...)

9 - x13 (12,25...)

10 - x11 (11,22...)

11 - x10 (10,20...)

*Legend Color

Change the legend (numbers) color if in need of extra readability of IRE values against your background.

*Line Color

Change the line color of the graph to more clearly see when your values are reaching a specific level. This will correlate to any numbers on your legend, giving you a horizontal line to use for measurement.

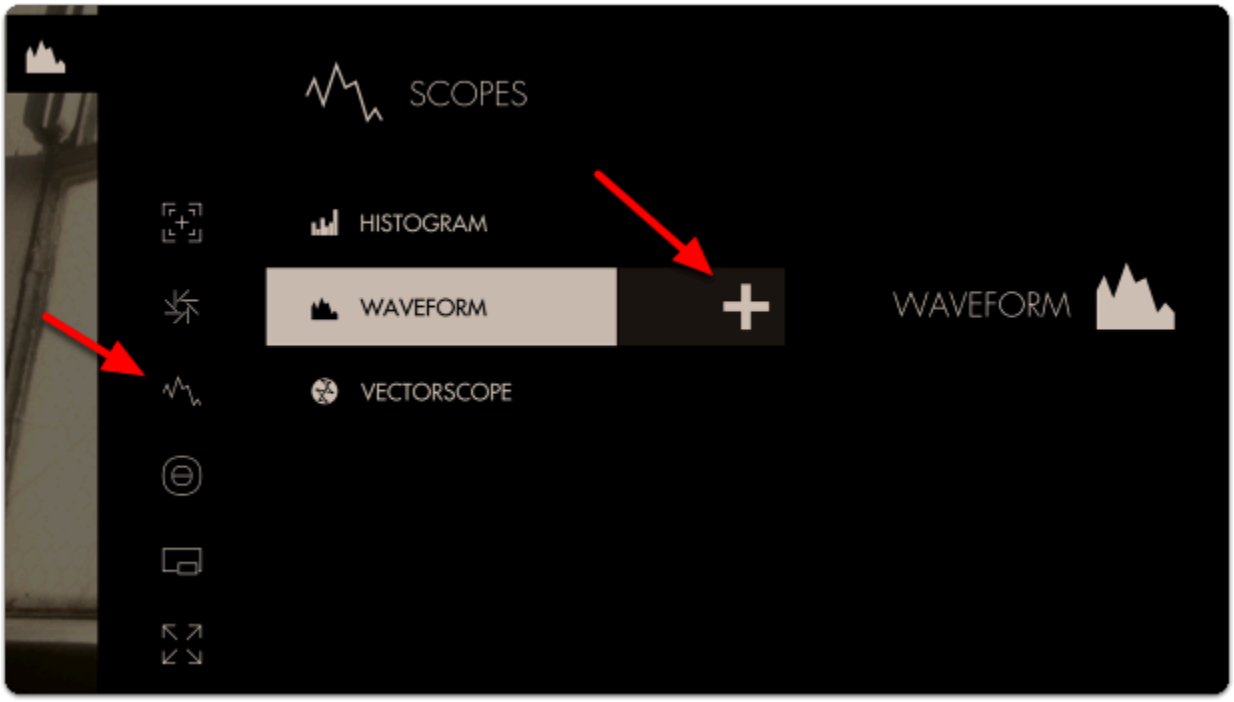
Adjusts the opacity of the graph lines to make them stand out - or invisible to improve graph visibility.

Adjusts the thickness of the graph lines for readability.

Pixel 0-5.

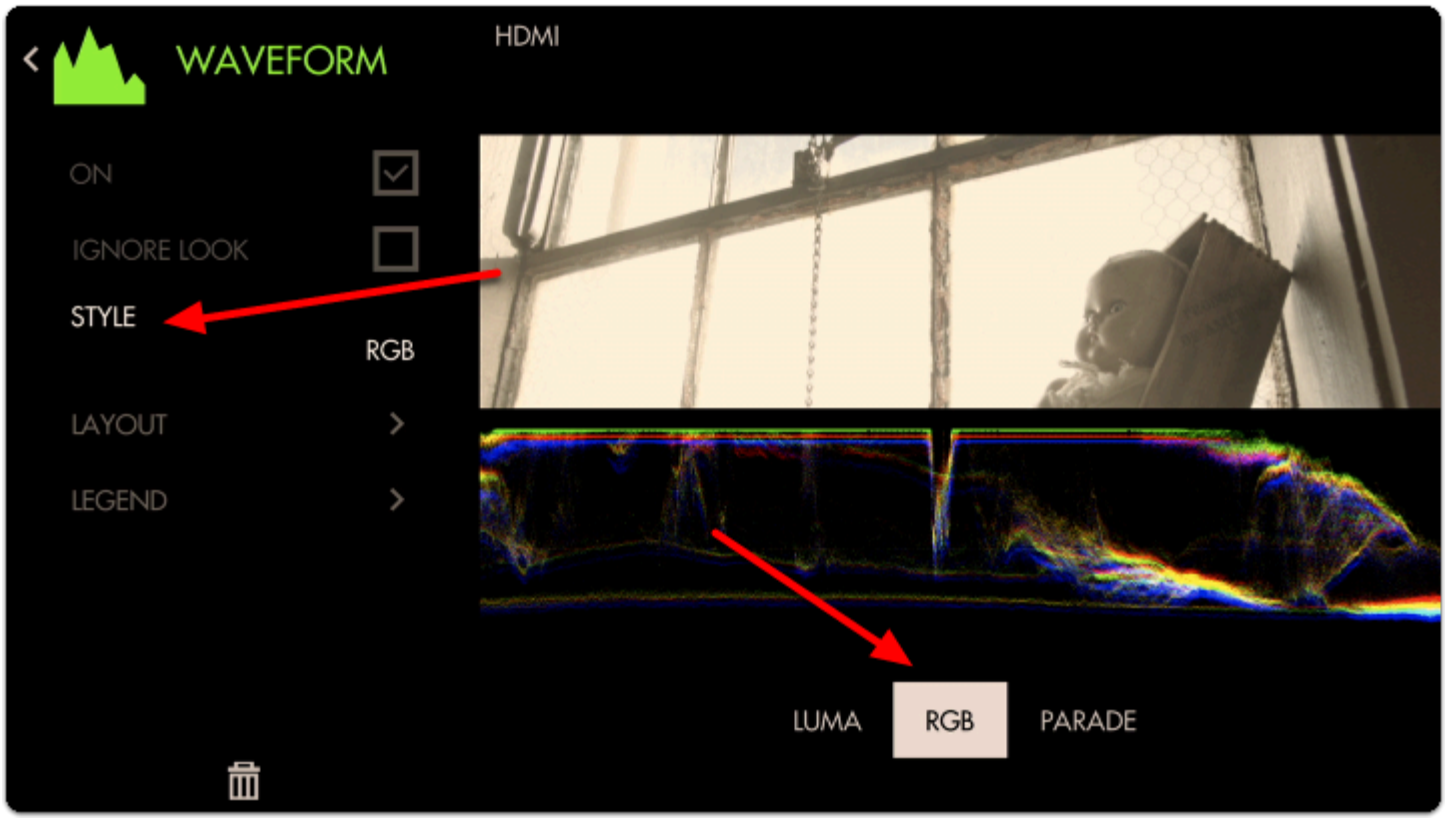
3. Waveform - Quick-Start

Press right on the joystick or tap the right arrow next to 'ADD NEW TOOL' and navigate to **Scopes > Waveform** and select to add it to the current page.



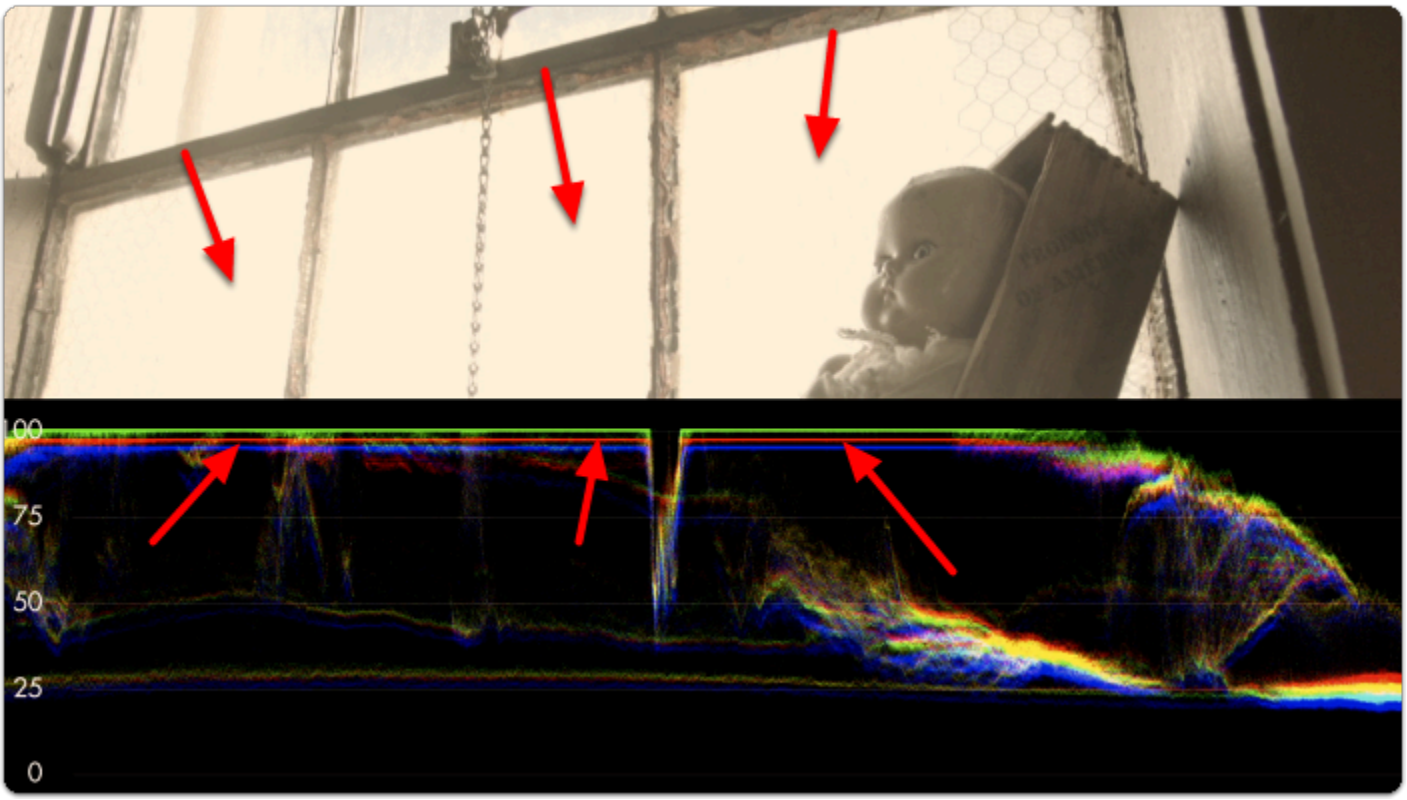
Once added you can **edit the settings** by **navigating right** when 'Waveform' is highlighted.

Select **'Style'** and switch from **LUMA to RGB** - this will let you observe each **Red**, **Green** and **Blue** value simultaneously - a unique benefit of the Waveform.

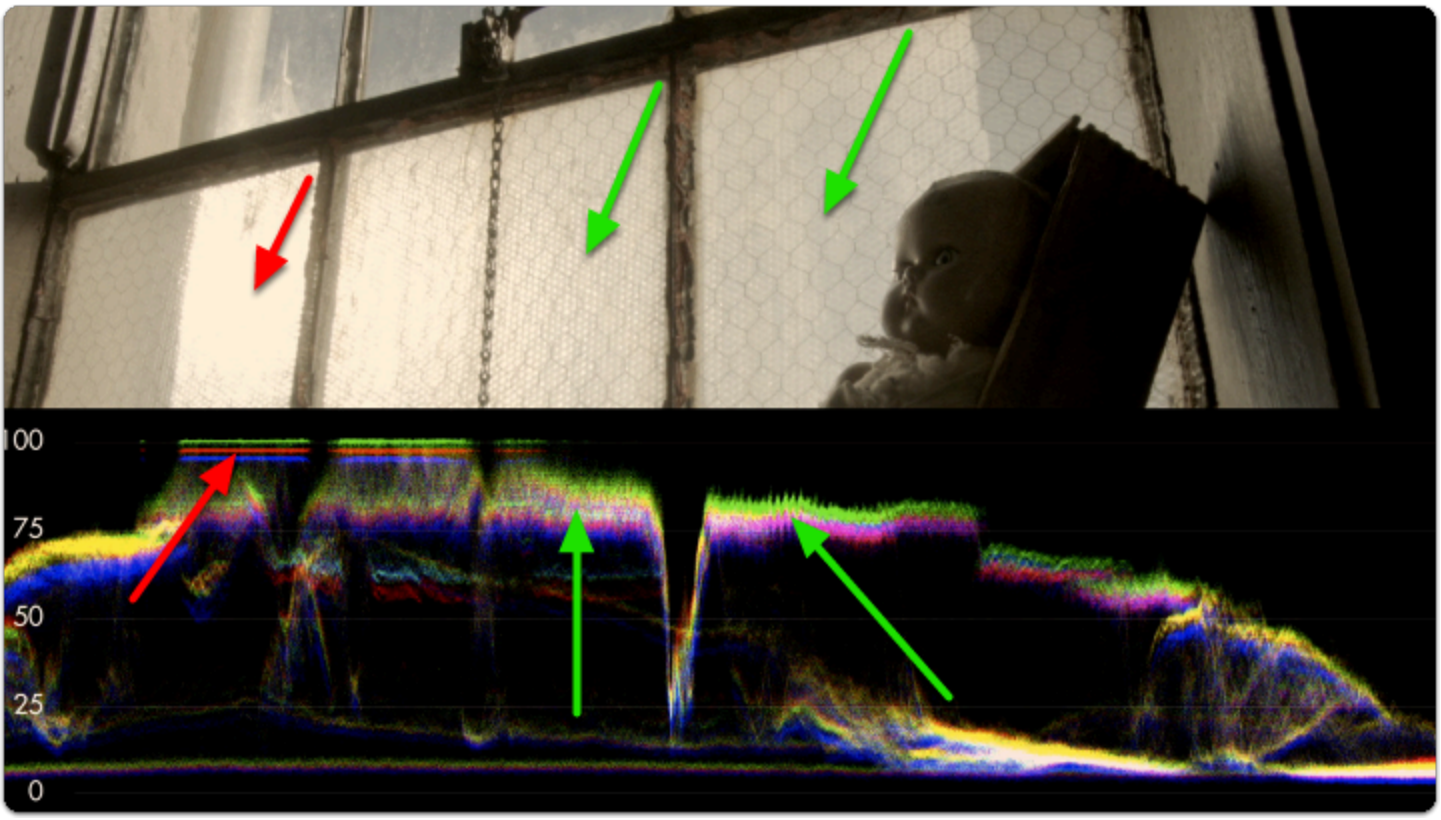


Back out of the Edit Tool menu to observe the waveform in action and to accurately expose your footage.

The Waveform **'flattens'** at the top when highlights are being **blown or 'clipped'** - this will result in footage that is a solid 'block' of color **without the ability to manipulate** it meaningfully in post production.

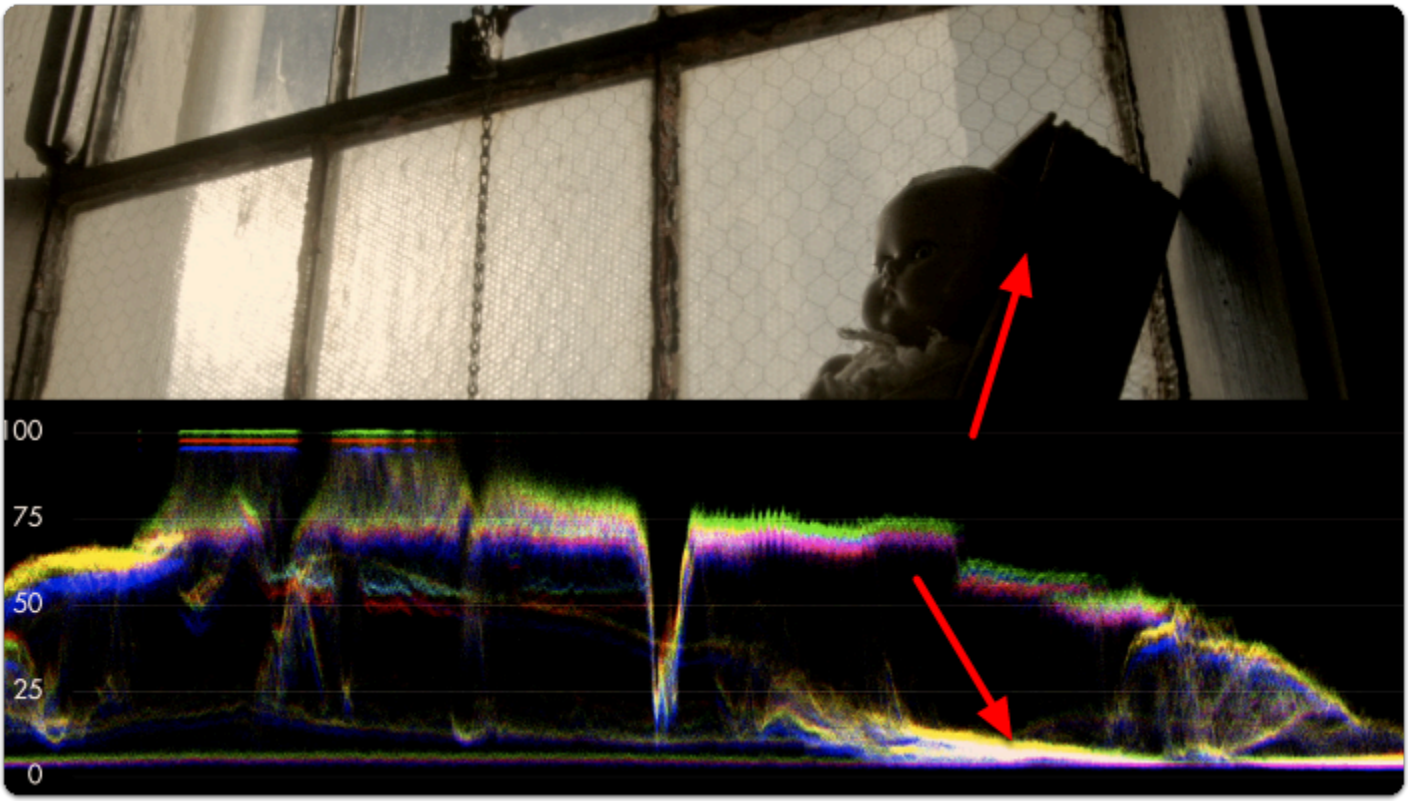


Rolling exposure downwards, the lines **'un-flatten'** and much more of the window can now be **manipulated in color grading** while some areas **remain overexposed.**



If we keep rolling exposure down (closing the aperture) we will continue seeing more 'into' the brighter details at the expense of **shadow details** which become **'crushed'** or **'clipped'** and **effectively lost** similar to overexposure.

The key to finding a healthy exposure relies on a graceful balance between clipped highlights (top of graph) and crushed/noisy shadows (bottom of graph).

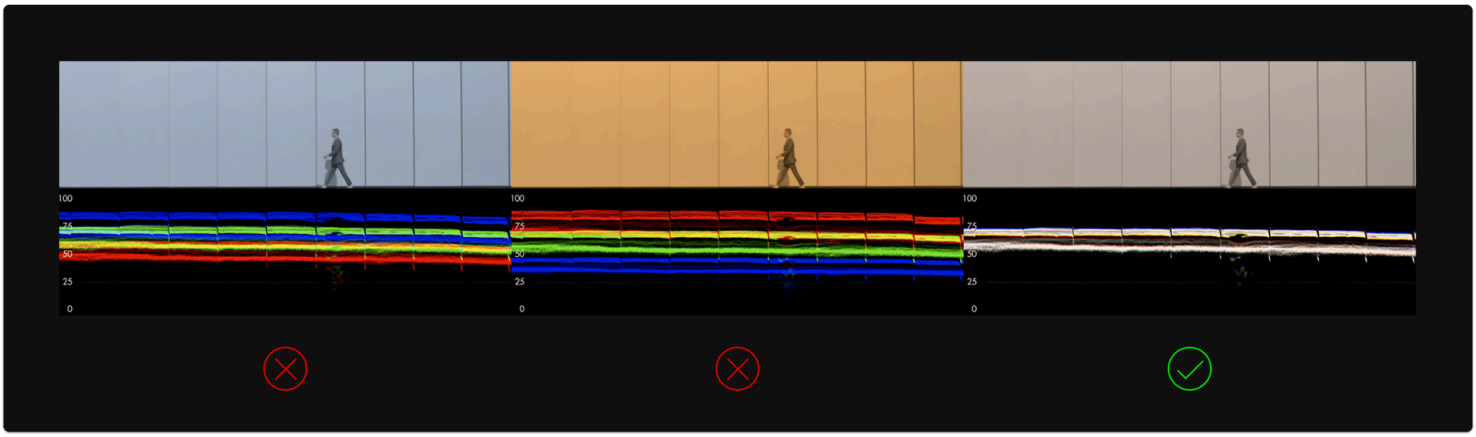


The **difference** between the **darkest** and the **brightest** areas that a camera can effectively see detail is known as its **dynamic range** - this is why high dynamic range is a highly sought after feature among cameras; you are able to capture and therefore **manipulate more of your image**.

As mentioned before, because we're looking at an **RGB Waveform** we can can use it to make color decisions in addition to luminance.

If a **pure white** or **pure gray** element occupies part of your scene, you can actually **white balance** with the **waveform**. Many newer cameras will do this automatically, but it is a good idea to use the spot meter if using a local source.

*Using a Macbeth or Grey card in the field works well.



Notice how adjusting the white balance setting on the camera shifts the RGB 'bands' - when lined up they **turn white**, indicating a **proper white balance** setting.

Vectorscope PagesOS 4

Though generally not considered as 'mission critical' during shooting as exposure scopes such as Waveform & Histogram, the **Vectorscope** plots the **chromaticity**, or the **hue + saturation** of your image onto a **color wheel** so you can help gauge **complimentary color**, ensure **skin tones** are being colorized properly, to visualize how overall scene color is being placed, and where potential adjustments may need to be made in general.

Vectorscopes are also used in Broadcast to make sure that the colors of the footage are exact. Vectorscopes will have a target for each zone. The idea would be if shooting a pure sample (such as a color or macbeth card) that the targets would be hit. You will see vector scopes used in post production to be sure that the colors from shot to shot will match.

Vectorscope - Settings

Access Vectorscope tool settings menu by navigating right or pressing the right arrow when Vectorscope is highlighted in the tool list.

On

Toggles Vectorscope Off/On. This can be done on the Tool Bar by selecting the tool. Active tools are Green, while inactive tools are Grey.

Size

Adjust the size of the Vectorscope for best view-ability.
The size ranges from 20 to 60. At 60, the scope takes up about 2 quadrants of a 3x3 grid.

Location

Arrange the Vectorscope on-screen using various pre-set locations.
There are 9 positions:
TOP - Left, Center, Right

MIDDLE - Left, Center, Right

BOTTOM - Left, Center, Right

Opacity

Set the transparency/opacity of the black background and Vectorscope graticule/graph.

Show Skintone

Displays a skin-tone line/taget directly on the Vectorscope to indicate where to place skin color during lighting to achieve a neutral, natural result.

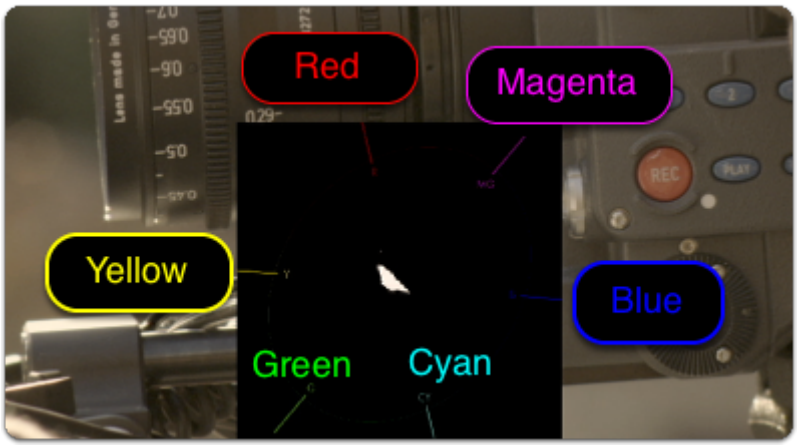
Vectorscope - Quick Start

In this section we will add a Vectorscope to a page and use it to light a scene with complimentary colors.

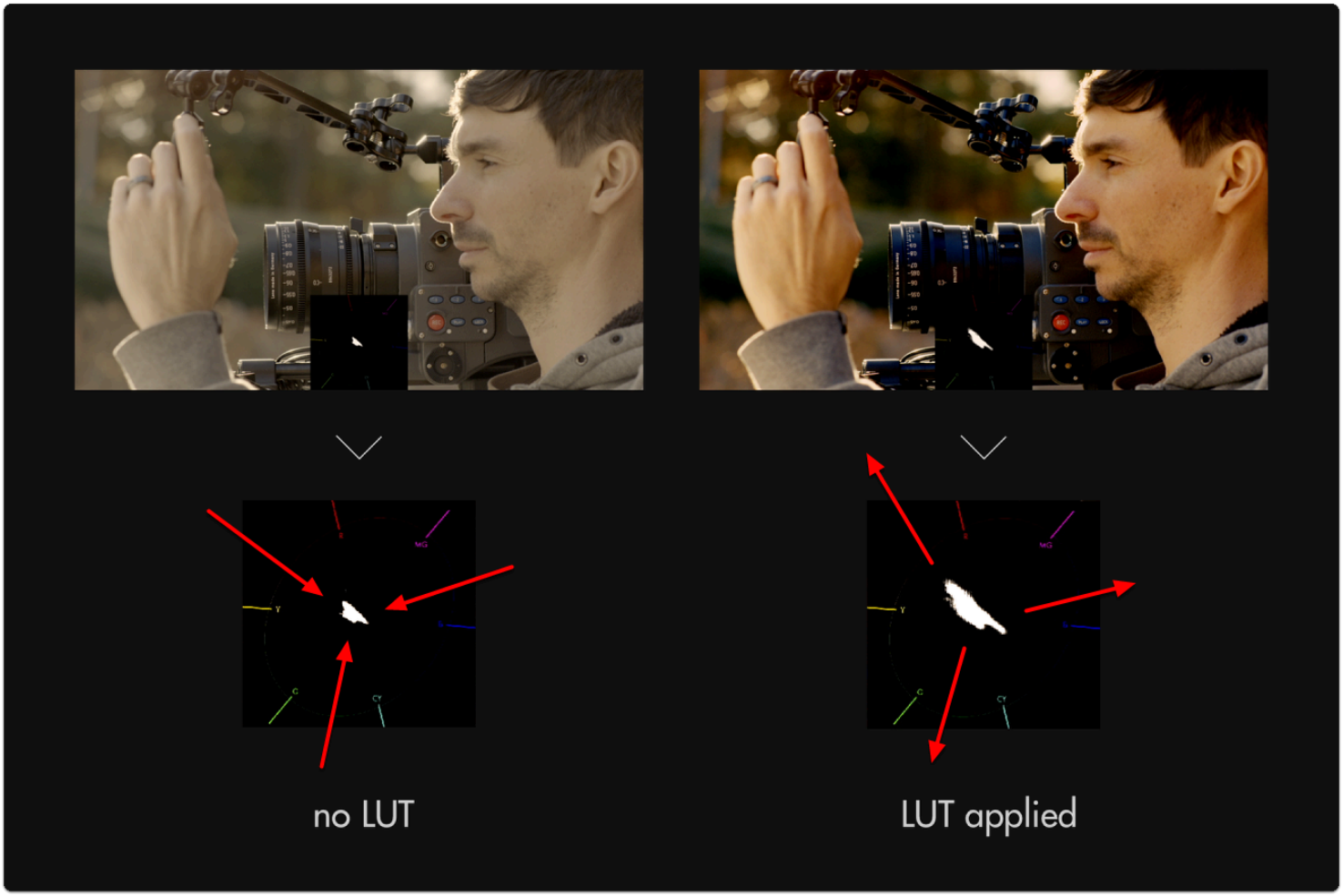
'Add New Tool' Navigate to **Scopes > Vectorscope** and select the **'+'** to add it to the current page.

A **Vectorscope** appears at the bottom of the image. The **'blob'** is largely contained in the **center** of the graticule/crosshairs which means the colors of the current image are **not very saturated** (which is especially true as this footage is using log-based gamma).

The Vectorscope represents saturation as **distance** from the **center** of the circle, and **hue** as the **angle** around it.

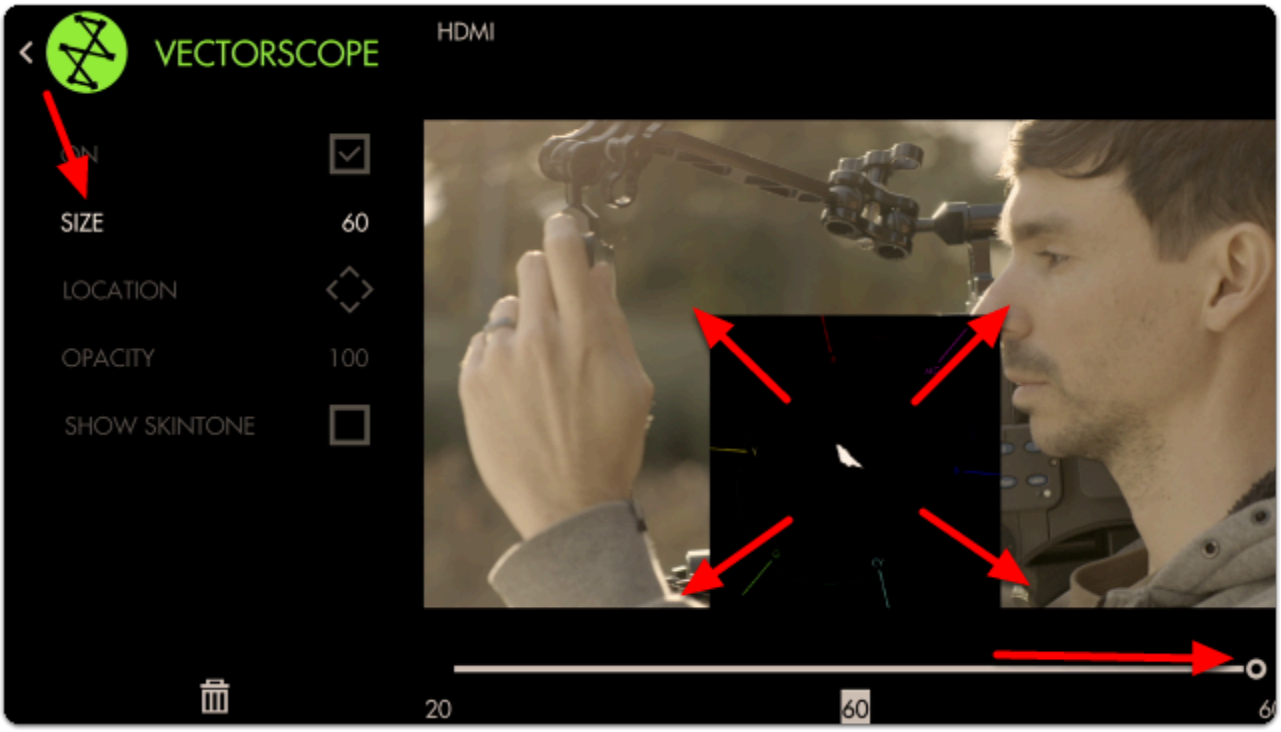


If we **apply a LUT** to this page, the Vectorscope reacts by **expanding** its plotted area. The scope confirms that we are viewing a more heavily saturated image after applying the look.



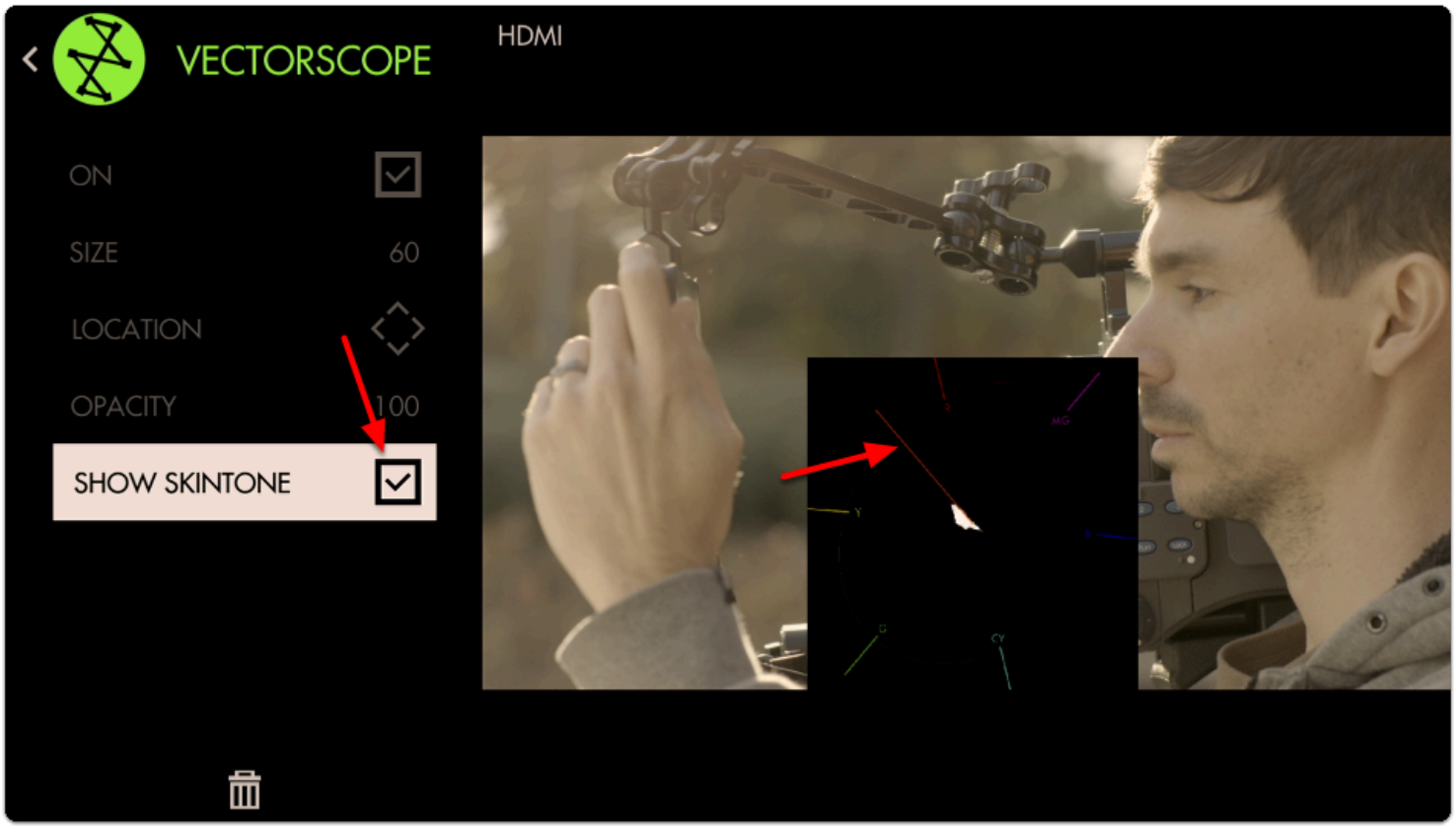
The Vectorscope uses the same layout as a **color wheel** and therefore principles of **color theory** apply - for example we can achieve **complimentary** colors by ensuring our scene plots to the graph on **exactly opposing sides**. Perhaps the most common example of this is the famous/infamous 'teal/orange' look popularized in Hollywood where skin is orange and nearly everything else gets colorized as teal.

We can **edit** some settings by **navigating right** or **tapping the right arrow** when 'Vectorscope' is highlighted in the toolbar.



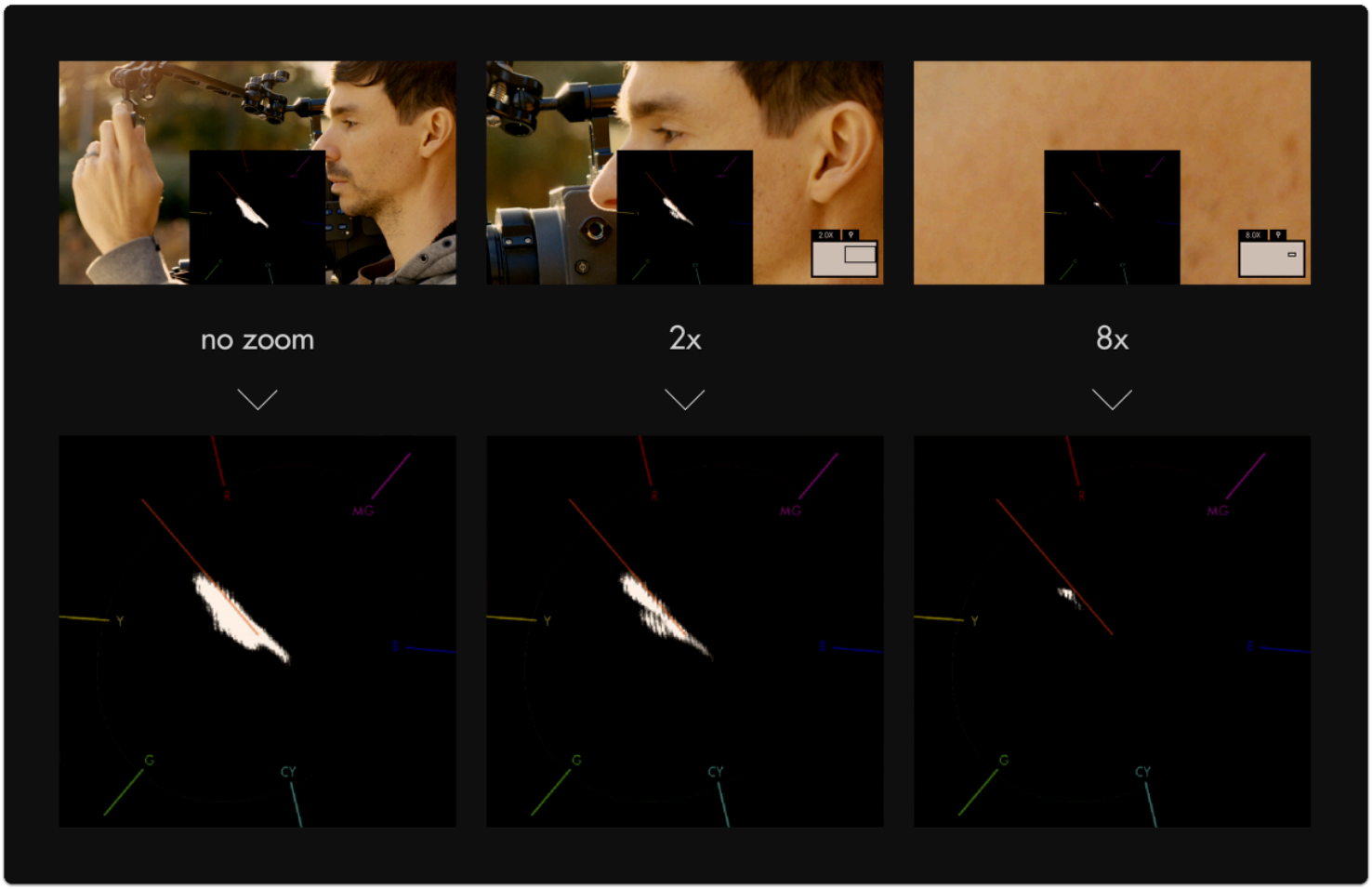
You can adjust the **SIZE** of the graph for better visibility. At this stage feel free to use **Size & Position** or **Crop & Scale** to **arrange** the image and scope so that they **don't overlap**.

Next let's enable **SHOW SKINTONE** - this provides a line on the graph for where to keep skintone hues for the most natural result under neutral lighting.



Because the **entire image** is being plotted to the graph all at once, we can check the status of individual areas by using **Pixel Zoom** in combination with the **Vectorscope** for **spot meter** functionality!

Press up on the joystick or **pinch-to-zoom** on touchscreens while the scope is activated to see its effect.



Zooming into an area consisting of **only** skin tones reveals the **exact hue** in which they plot - the result is **slightly** toward the **yellow** side - this is the result of a golden reflector which was used to bounce light onto the face. If we had used a silver reflector, the facial tones would rest precisely on the **skin tone line**.

Tools - Focusing

Peaking PagesOS 4

Peaking essentially mimics an exaggerated 'sharpening' filter like you may find on a consumer TV - this effectively increases contrast on in-focus portions of your image while retaining full color unlike Focus Assist. Because of its relatively benign effect on the image this makes it great to use in combination with other features.

Peaking - Overview

Focusing with Peaking is simple- just look at where edges are being highlighted more drastically than others and this gives an indication of where your focus is placed.

Apart from the effect not being as visible as with Focus Assist, getting focus with Peaking can be done very quickly if within a clear enough view of your monitor.

Because Peaking doesn't have an extremely pronounced overall effect, critical applications where you may not have as clear a view of the monitor may benefit when using Pixel Zoom or Focus Assist.

Because it only enhances edges to a certain degree and doesn't otherwise mess with the image, Peaking is very useful in combination with other tools and scopes.

Peaking - Settings

On

Enables/disables the Peaking tool. You can also enable or disable the tool by selecting it on the tool bar. It will be Green when enabled and Grey when disabled.

Intensity

Adjust the opacity of the edge highlighting effect - increase for a more visible 'halo' with which to focus.

Brightness/Contrast

Adjust the brightness/contrast of the image to feed the Peaking filter with an adequate (ie not a flat log signal) source, translating into a clearer view of what is in focus.

⚠ Any active exposure tools will respond to changes in brightness and contrast made here unless "Ignore Look" has been applied on each exposure tool - we recommend leaving these checked so that you are making exposure judgements off your original footage.

Peaking - Quick Start

The main benefit of using Peaking to focus your shot is that due to its relatively low impact on the image, we can use multiple tools along with it on a single page. in this example we'll add Peaking to a page that already has Frame Guides, a Look (3D LUT) file and the Zebra tool applied.

From any page, click the joystick or tap the screen to bring up ‘Add New Tool’ and navigate to Focus > Peaking and select to add it to the current page.

Once added you can edit the settings by navigating right when ‘Peaking’ is highlighted.

To make the effect more visible on footage, increase the intensity slider.

Press the Back button to get to a full screen view of your footage.

You can look at the white 'haloing' appearing around in-focus edges to determine where your focus plane is. Pointing the camera at the ground, you can very clearly what area is in focus.

💡 For tricky shots where you need to focus on a subject as they move toward or away from the camera, try using the ground as a reference point before shooting to get a feel for moving the lens, how far/how fast to turn etc.

If you want a similar but more pronounced effect with which to focus your shot, try Focus Assist

Focus Assist PagesOS 4

Paints a highlight around in-focus edges, enabling very fast and accurate focusing on-the-fly without needing any additional tools.
We have some Tips for focusing here.

Focus Assist - Overview

If configured properly, Focus Assist makes finding your focus point extremely easy- simply **roll focus** until your subject is displaying **bright edge highlights**. Focus Assist is a method to find your focus point because of its pronounced effect on in-focus edges.

Focus Assist is versatile and accurate, only at a slight disadvantage to Pixel Zoom in its overall utility since it doesn't allow for as much direct scrutiny of the underlying image, but at the advantage of speedy usage. The way it works is that the filter is looking for hard, crisp edges. When it sees crisp lines, it will add digital noise over the top, giving you a visual cue that those areas are in focus.

*FOCUS ASSIST is a tool that can be very useful for critical focus. It is best used when your depth of field is shallow and you want to be sure that your subject falls within the goldilocks zone. Focus Assist will not be very helpful when used in shots where you have a large depth of field. You will be better off to use calculations based on your Stop, distance and lens.

Depending on how it is set up, Focus Assist generally has a pronounced enough effect on the image that it tends to require its own page to not confuse readings with another feature or other aspects of the image. If you wish to, for example be able to focus and expose your image on the same page with minimal overlays, perhaps try a combination of Peaking and Zebra.

Focus Assist - Settings

On

Enable/Disable Focus Assist tool. You can also do this on the tool bar. Select the tool and activate or deactivate it as desired. Green tools are active, they are Grey when inactive.

Color

Choose the edge highlight color of the Focus Assist- this can be useful to modify if the current color isn't visible enough against your footage.

*If this is still an issue after adjusting color, try lowering the Brightness and/or Contrast

Sensitivity

Sensitivity adjusts the intensity of Focus Assist - a low number causes a faint edge highlight, high numbers cause many more edges to be detected.
In essence this will increase how many edges it will highlight.

Peak Threshold (Peak Thresh)

Peak Threshold is like a 'confidence' slider, the higher the Peak Threshold, the more confident Focus Assist needs to be about an area to paint it as 'in-focus'. Increase this setting to taste after increasing Sensitivity for best results.

B&W Background

Makes the underlying image monochrome so that the highlight color is more visible. This can be useful when you have trouble finding a color for the highlight that will not separate from your background.

Brightness

Adjust the brightness, which will affect black levels and luminance. (ie not a flat log signal) source, translating into a clearer view of what is in focus.

> ⚠ Any active exposure tools will respond to changes in brightness and contrast made here unless "Ignore Look" has been applied on each exposure tool - we recommend leaving these settings checked so that you are making exposure judgements off your original un-manipulated footage.

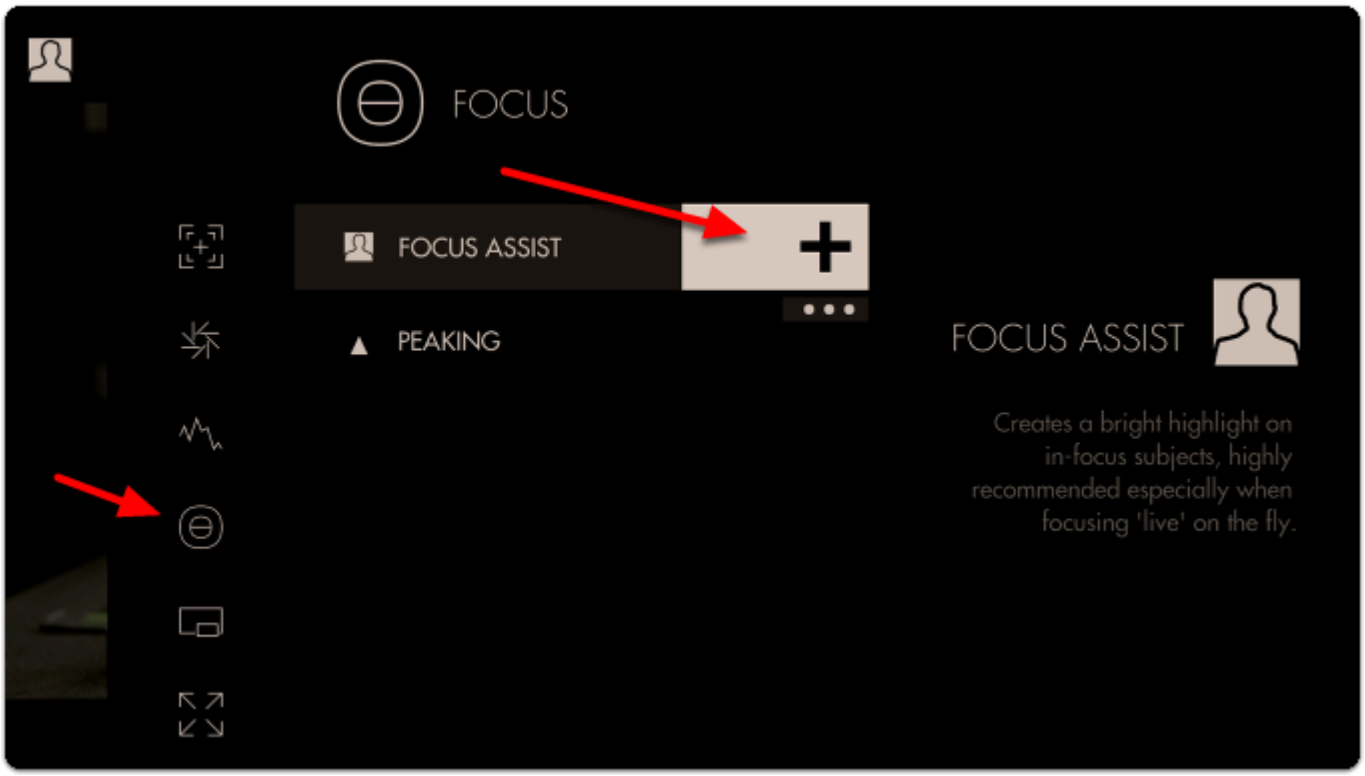
Contrast

Adjust the contrast of the image, affecting gamma levels.

Focus Assist - Quick Start

> Focus Assist benefits from being **configured** for each camera due to differences in **noise levels** which can affect readings and exhibit false positives.

'Add New Tool'. Navigate to **Focus > Focus Assist** and select to add it to the current page.

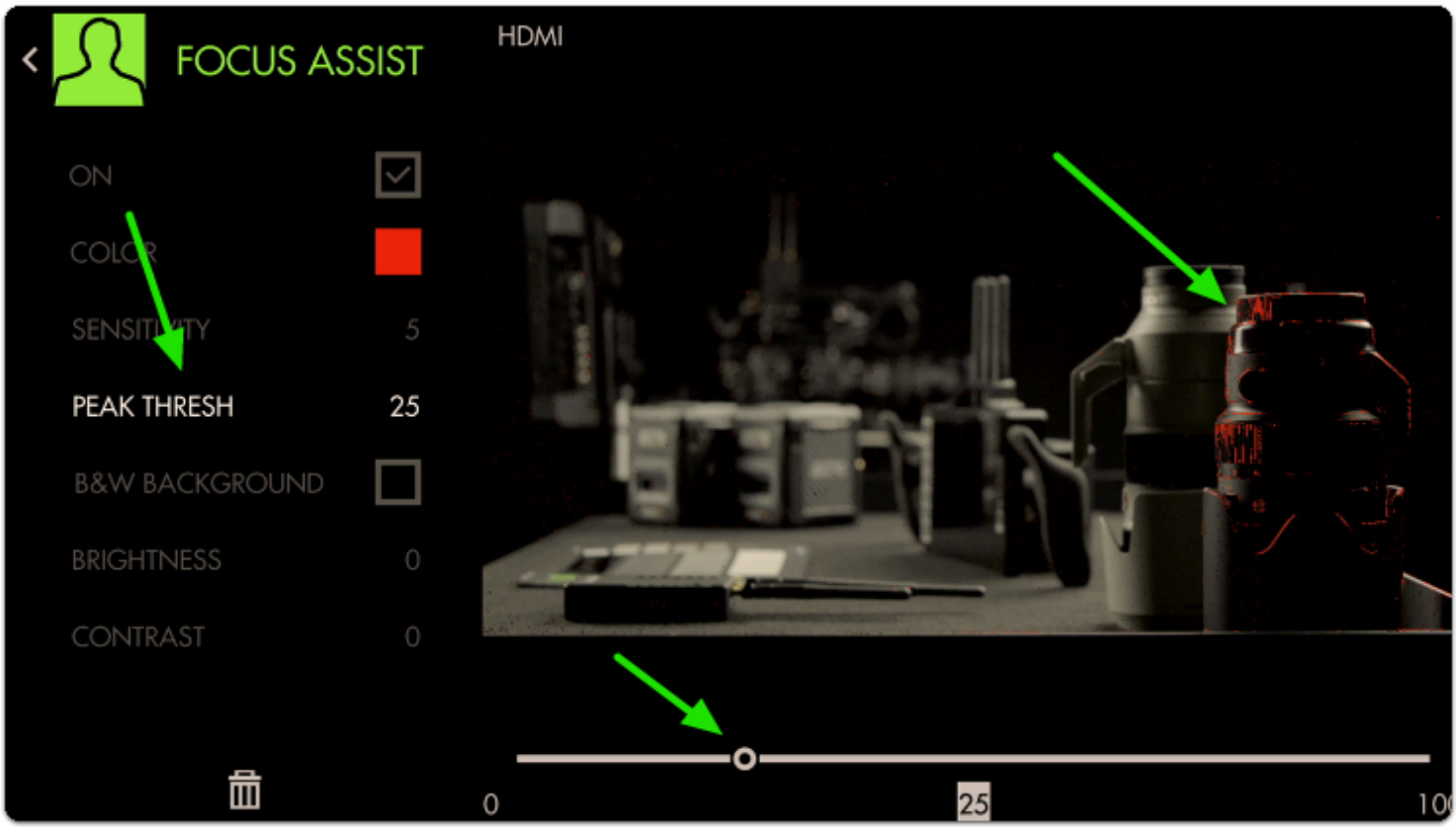


Once added you can **edit the settings** by **navigating right** or **tapping the right arrow** when ‘Focus Assist’ is highlighted.

The default **sensitivity** is usually a good starting point but if you are **not** seeing enough **edge highlighting**, give this value a **boost**.

Notice how we are picking up many edges that are **not in focus** in addition to the areas that are in focus.

Increase the next slider labeled '**Peak Thresh**' to help eliminate the false positives.



Now we are getting a **much more isolated** area of focus with this particular setup.

> A good rule-of-thumb for sensitivity/threshold is to adjust until image noise is *just* out of range of affecting the filter drastically. Some false positives will almost always be present and proper usage is generally about looking at the 'center of mass' of the colorized area as the focus distance.

You can check 'B&W Background' to make the colorizing effect stand out more if view ability is compromised.

Accurately rack focusing on-the-fly is now made vastly less tricky by way of Focus Assist!

Tools - Overlay

Look (3D LUT) PagesOS 4

A Look or 3D LUT is a simple but very powerful way to apply a color grade to footage. 3D LUT files are quite small, (often around 1MB) and can be produced with most any color grading software and can be saved on to an SD card for use on the monitor or at any point in post production.

3D LUTs are particularly powerful when used with SmallHD monitors - many can be applied simultaneously on several pages so visualizing color variants on set is made as easy as swiping from page to page. We have some sample LUTS that you can

Look - Settings

Access Look tool settings menu by navigating right/pressing the right arrow when Look is highlighted in the tool list.

On

Toggles the Look Off/On. You can also do this on the tool bar. Select the tool and activate or deactivate it as desired. Green tools are active, they are Grey when inactive.

Look File

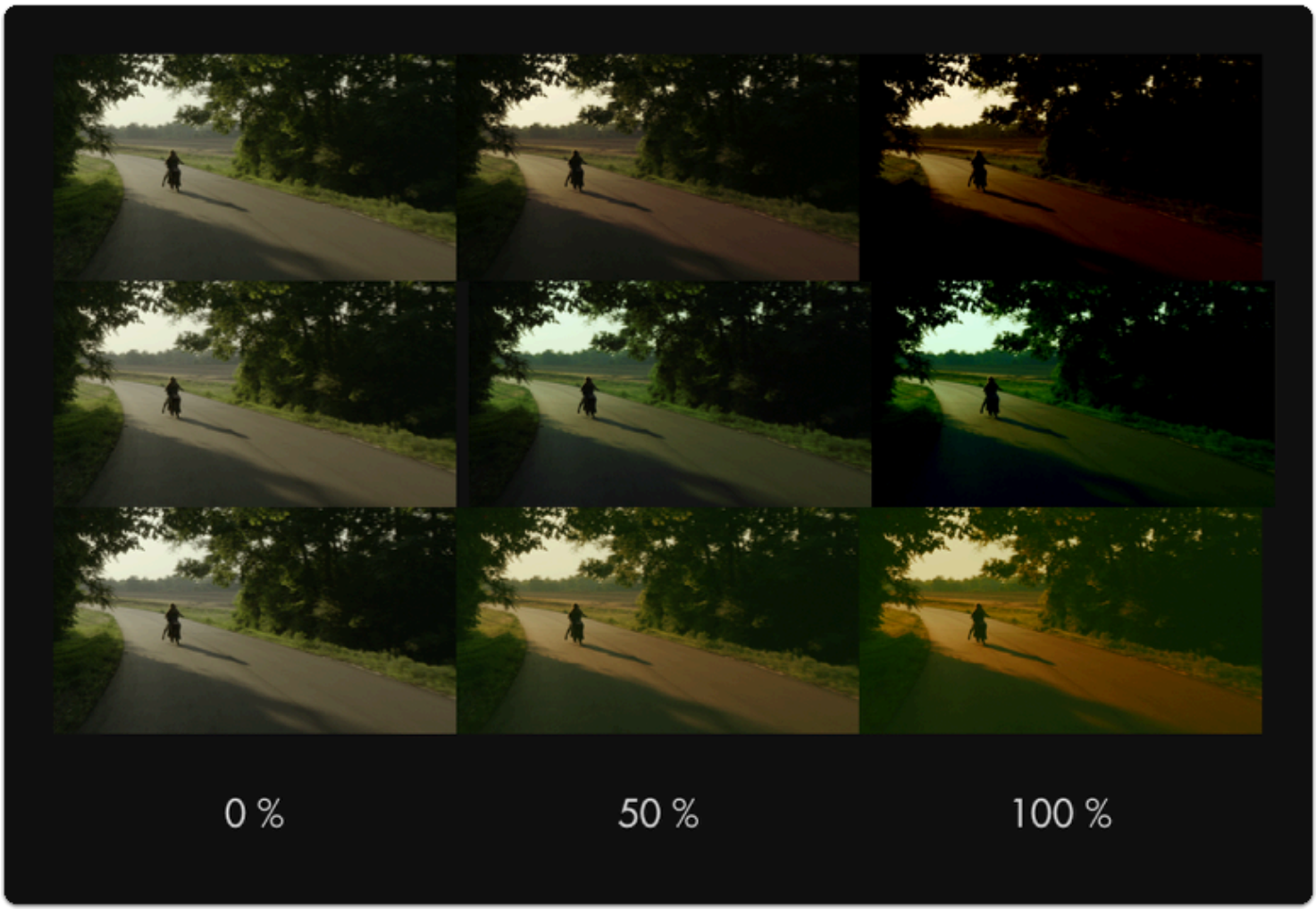
This will list the LUT file associated with this too. To add a LUT, Select this option and it will open a browser for your SD card. There should be some default Internal LUTS that we have provided as a base, but we always recommend that you use one that is ade for your production by either your DIT or Editor to give the closest results to Final.

*Many camera manufactures will post LUTS for corrections for their specific camera models on their websites. This is a god place to go to get a base LUT.

*REMEMBER this is an approximation to show what the footage will remember when finalized. Since there has been no post processing (color enhancements etc) this will not be the Final result but rather a representation.

Intensity

This setting lets you scale back the effect of the Look for situations where color & value are being pushed too far. Leave this at 100% if you wish to maintain accuracy of the LUT, this will in effect, change the "overlay opacity" like in photoshop.



For LUTs with a high default intensity, this is a great option to be able to visualize a 'toned down' version - just apply the same LUT with the same intensity in your color grading application to match the look on set!

Input Data Range

If your LUT has been designed for 'legal' broadcast range (16-235 for 8-bit, 64-940 for 10-bit), use this setting so that your signal gets displayed properly. If you aren't sure what this means, leave at the 'full' setting. Full should give you the spectrum set in the LUT itself. This will be most noticeable when using scopes.

Output Data Range

This setting currently mirrors the selection of 'Input Data Range' - splitting input/output data ranges is on the roadmap for a future firmware update.

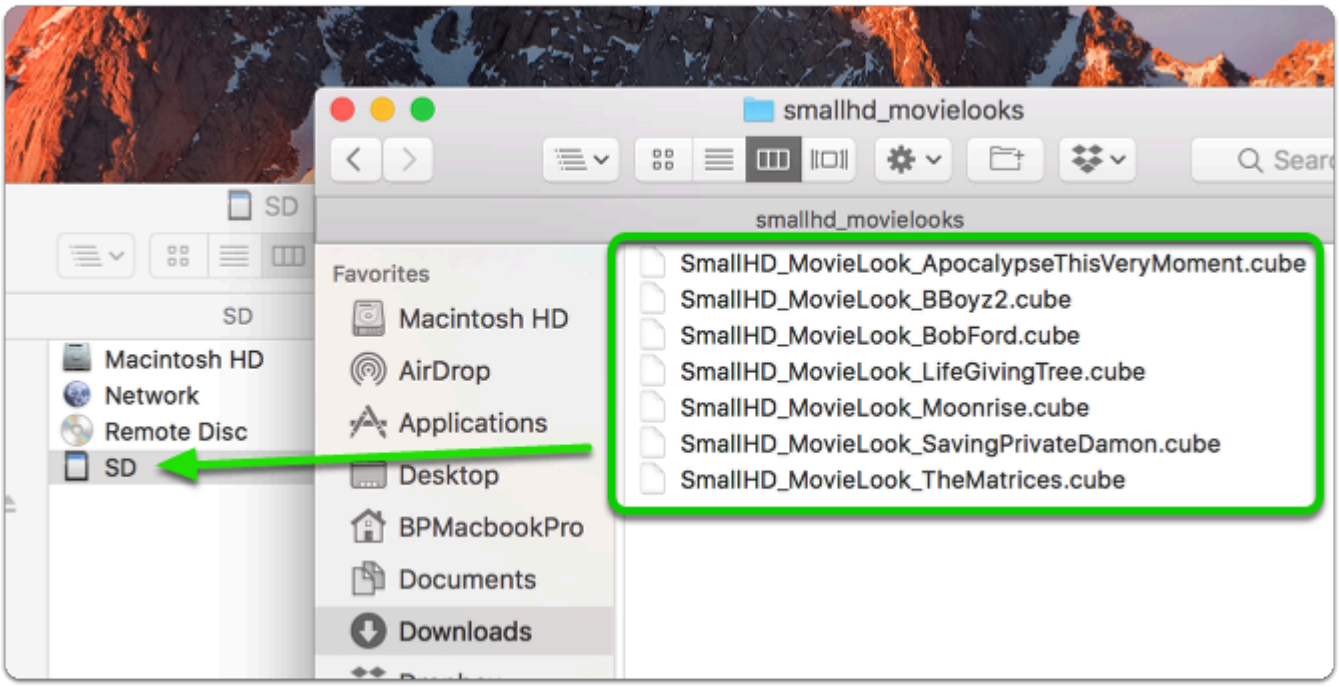
Converting a LUT using Davinci Resolve

If you need help creating a LUT or are having issue loading one, we have a tutorial that can help.
We also have a more detailed walkthrough of the using the LUT process that you may also find helpful.

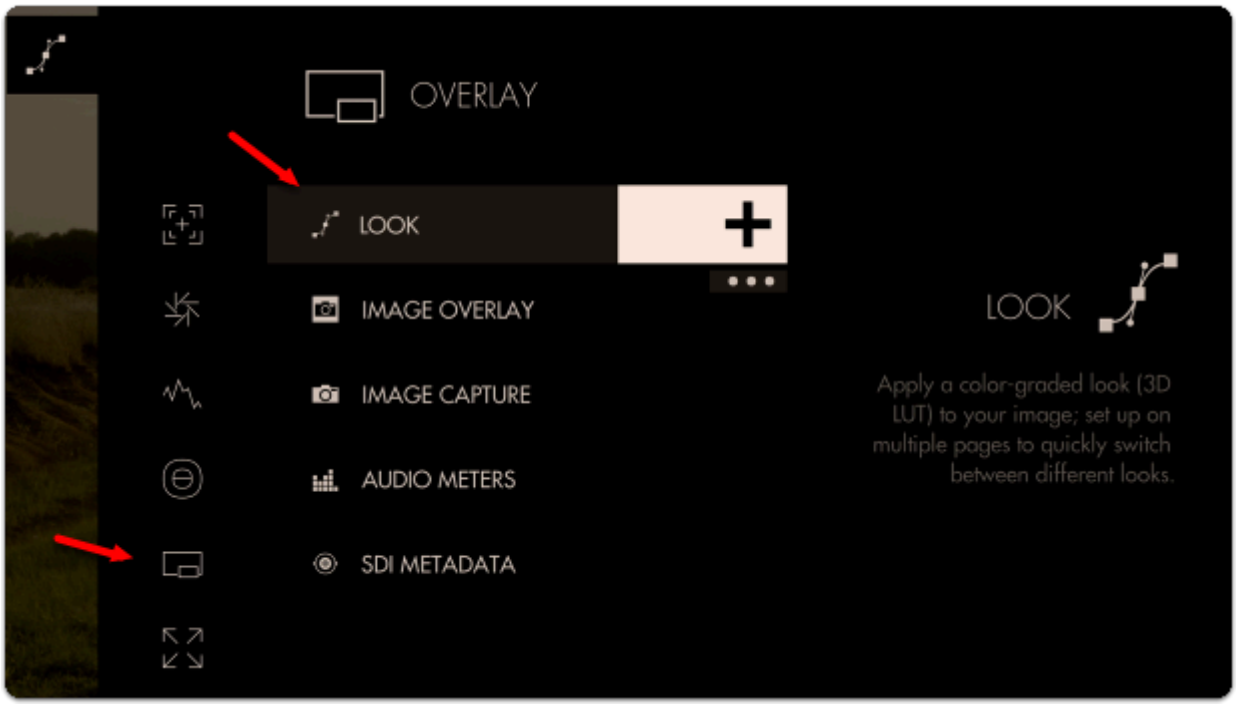
Look (3D LUT) - Quick Start

In this section we'll place a downloaded look on an SD card and apply it to a page.

Using a computer, place as many Look files as you wish onto an SD card. For this example we'll be using our very own "Movie Looks" pack that you can download here for free.



With the LUTs placed on the SD card, insert it into your monitor. From any page with a video feed, click the joystick or tap the screen to bring up 'Add New Tool' and navigate to Overlay > Look.



You will then be presented with a file browser where you can select your Look. You can see a preview before making a selection.

The Look is now applied to the page. To get the most benefit out of this feature, try applying different Looks to several pages to switch between them at any point to help inform your decisions about how to approach any given shot!

Image Overlay PagesOS 4

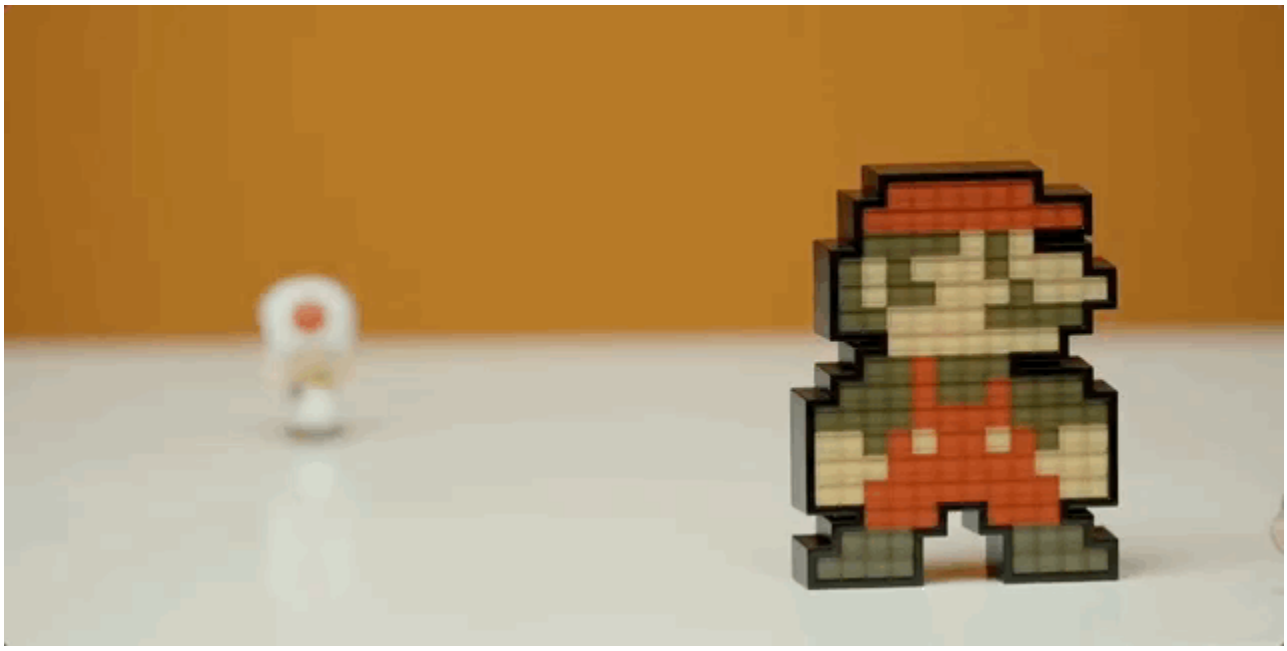


Image Overlay places an image (taken with the **Image Capture** function or manually placed from a computer onto the SD card) directly on top of your footage - very useful for judging **shot continuity**, particularly when using the built-in **'blink'** feature.

Image Overlay - Settings

Access Image Overlay tool settings menu by navigating right or pressing the right arrow when Image Overlay is highlighted in the tool list.

On

Toggles display of the currently selected Image Capture. You can also do this on the tool bar. Select the tool and activate or deactivate it as desired. Green tools are active, they are Grey when inactive.

Opacity

Set the transparency/opacity of the Image Overlay.

Blink Speed

Blinks the overlaid image at a speed of your choosing. Leaving this at zero disables the Blink functionality. Speed of 1 = on for 2 seconds, off for 2 seconds. Speed of 10 = on and off 2x per second.

Use Latest Capture

Displays the latest Image Capture automatically, even as a new one is taken.

Turning off this option will open the **Choose Image** option.

Navigate to the image you wish to use, select and confirm and the image name will appear on the tool panel.

Image Overlay - Quick Start

In this section we will add an Image Overlay to a page to help us shot-match.

Having already used the Image Capture function to take a snapshot of our scene, we can now use Image Overlay to display that snapshot back on top of our footage.

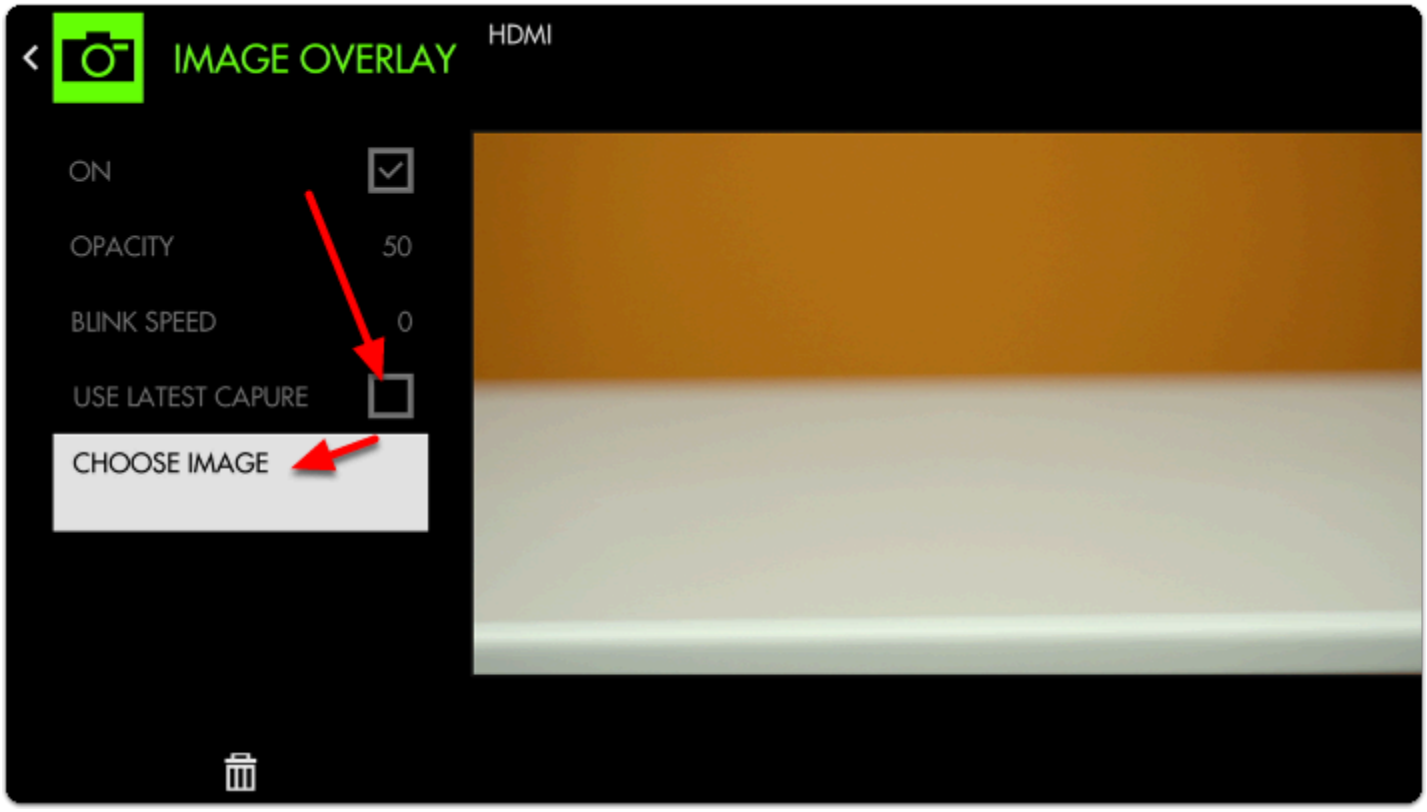
From any page with a feed, **click the joystick** or **tap the screen** to bring up **'Add New Tool'**

Navigate to **Overlay** > **Image Overlay** and click on the **'+'** to add it to the current page.

By default Image Overlay displays the **latest snapshot** taken with Image Capture at 50% opacity.

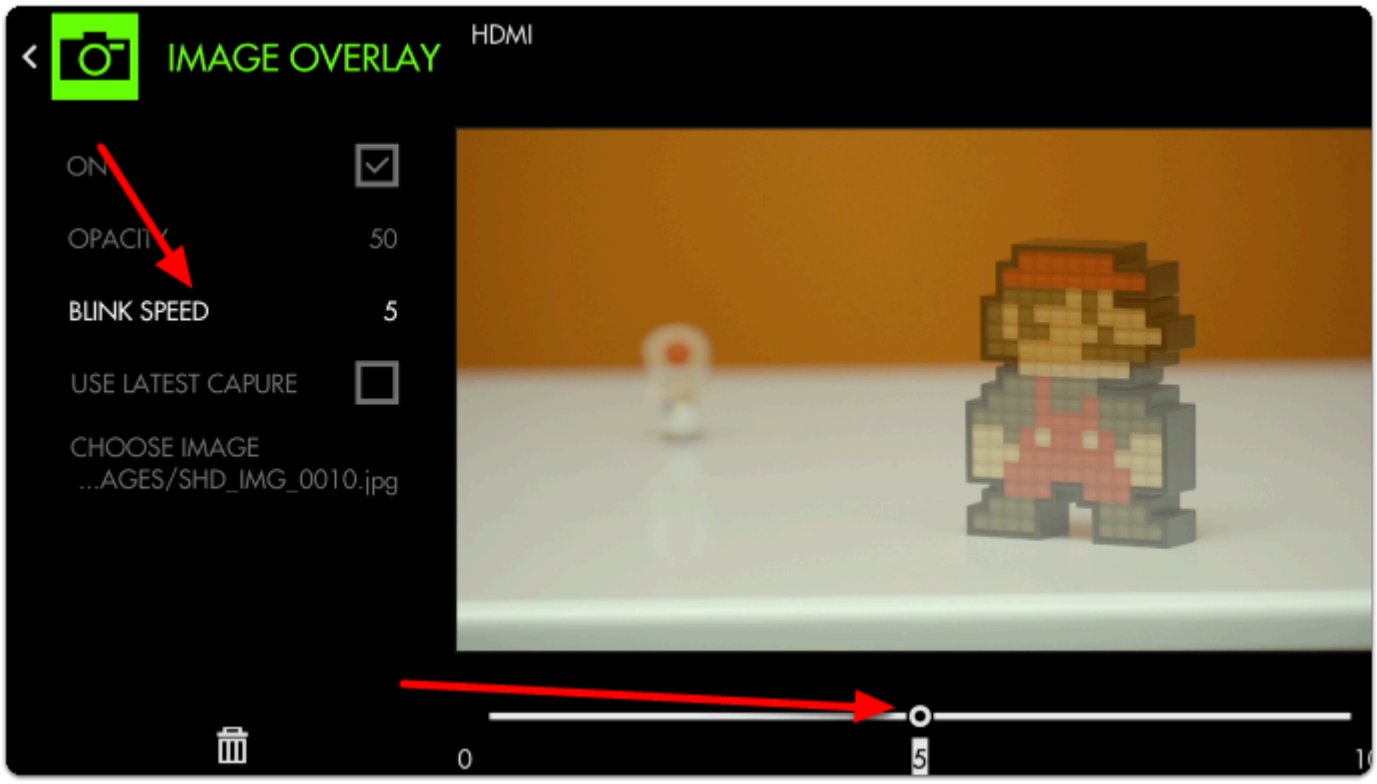
You can edit the settings by **navigating right** with a joystick or **tapping the right arrow** on a touchscreen when **'Image Overlay'** is highlighted.

If you wish to overlay a different image, disable **'USE LATEST CAPTURE'** and select **'CHOOSE IMAGE'**

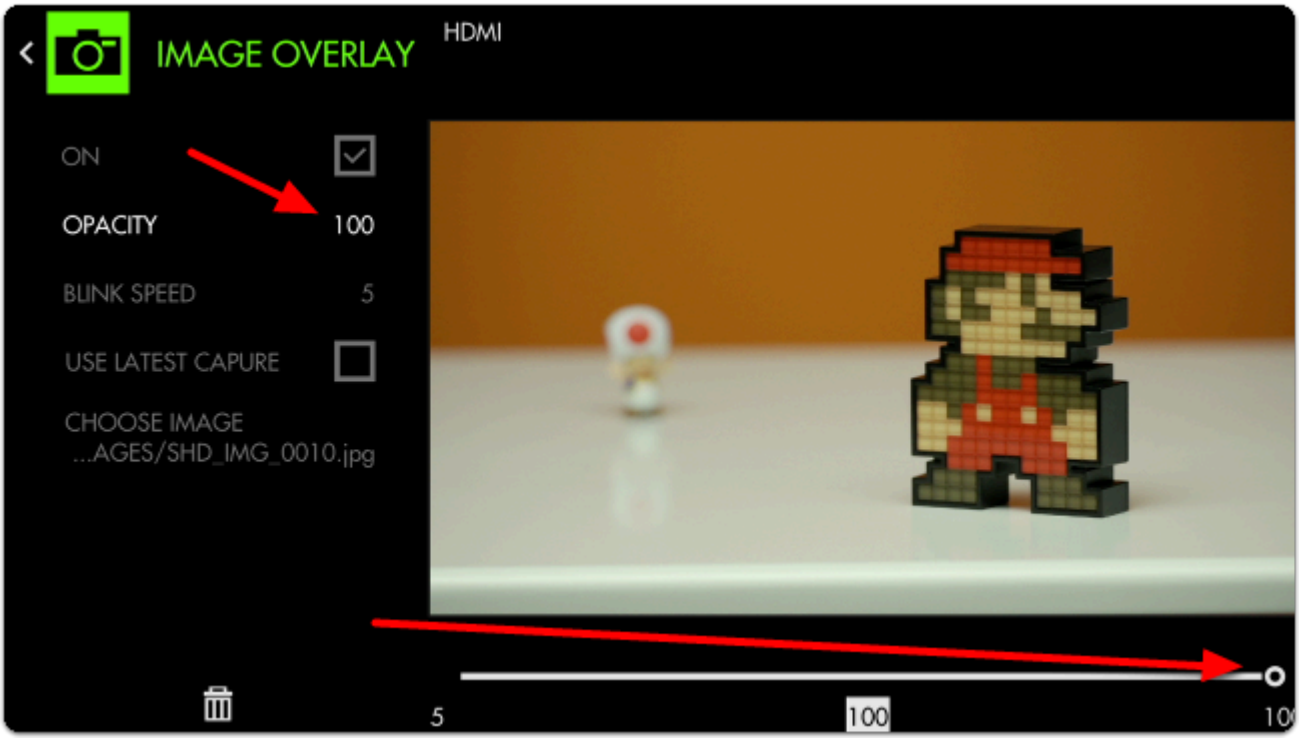


If you wish to overlay an image from a computer, first ensure it is in .jpg format and save it anywhere to the SD card. You can select it with **CHOOSE IMAGE** [above]

If we then dial up **BLINK SPEED** the monitor will flash alternately between the live feed and the Image Capture, offering a very clear view of how to fix the shot.



Increasing the **OPACITY** gives us a clearer distinction between the two images when blinking (if not set to blink, this will make the overlaid image completely opaque, covering the underlying feed)



With Image Overlay blinking, we now have a straightforward means of **matching** the **original placement** of characters on screen!

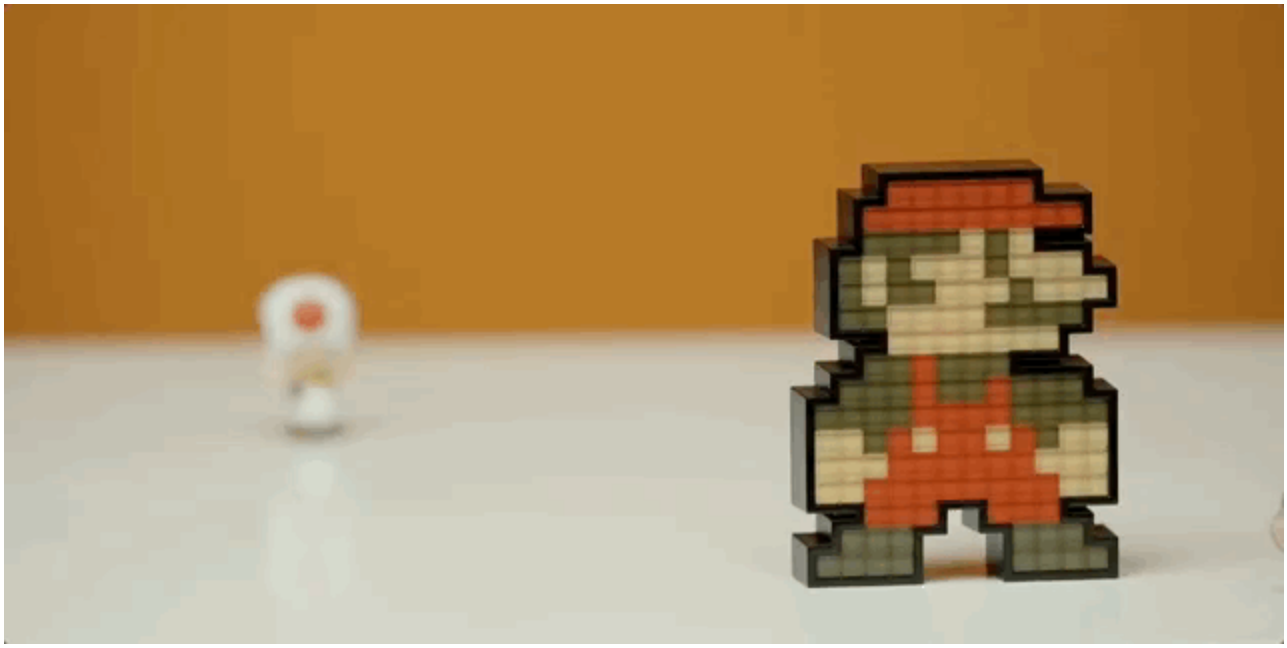


Image Capture PagesOS 4

Image Capture takes a **snapshot** of the video feed being sent through SDI or HDMI (combined with a LUT if desired) and **saves** it to an **SD card** - great for **shot matching** (continuity) or a quick overview of the days' shots.

If using a 500/700 (joystick) series monitor, the snapshot function can be quickly accessed by pressing the 'O' (capture) button on the top-right of the unit. On Production monitors press the 'CAP' button next to the joystick. Touchscreen monitors will need to tap to activate the tool bar and tap the tool icon to take an image.
*The BT-1 remote can be used with its capture button for any paired monitor.

Image Capture - Settings

Image Capture Settings can be found in the global Settings Menu > Capture > Image Capture

Image Capture - Quick Start

In this section we will add **Image Capture to a page** and set it up so that a **snapshot** (with a LUT) gets taken every time we **press record** on our camera (currently compatible with SDI cameras only) resulting in **graded stills** of each take from the day's footage.

First **insert an SD card** on which to save your images.

*You can set a folder structure on your computer and select the destination is the settings menu.

From any page with a feed, **click the joystick** or **tap the screen** to bring up **'Add New Tool'**.

Navigate to **Overlay** > Image Capture and select the **'+'** to add it to the current page.

You will see the **snapshot overlay** appear indicating the monitor is ready for a snapshot.
*This is just letting you know the tool is active, it does not get captured to the image. It does not apply to the capture zone. The Capture will be of the entire frame.

Click the joystick (or **tap the touchscreen**) to capture an image.

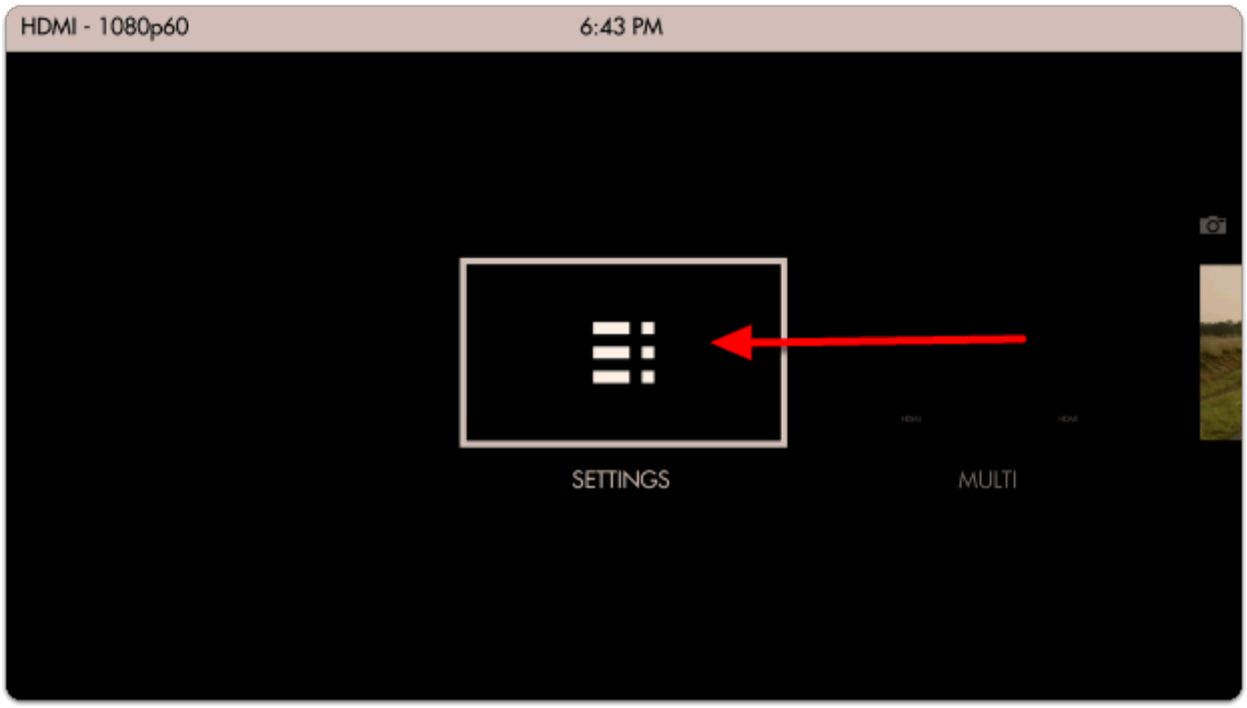
A flag appears at the top to inform you of **where** you are saving your image and its **name**.

Next let's enable the **capture of LUTs** so that we can take **color-graded snapshots.**

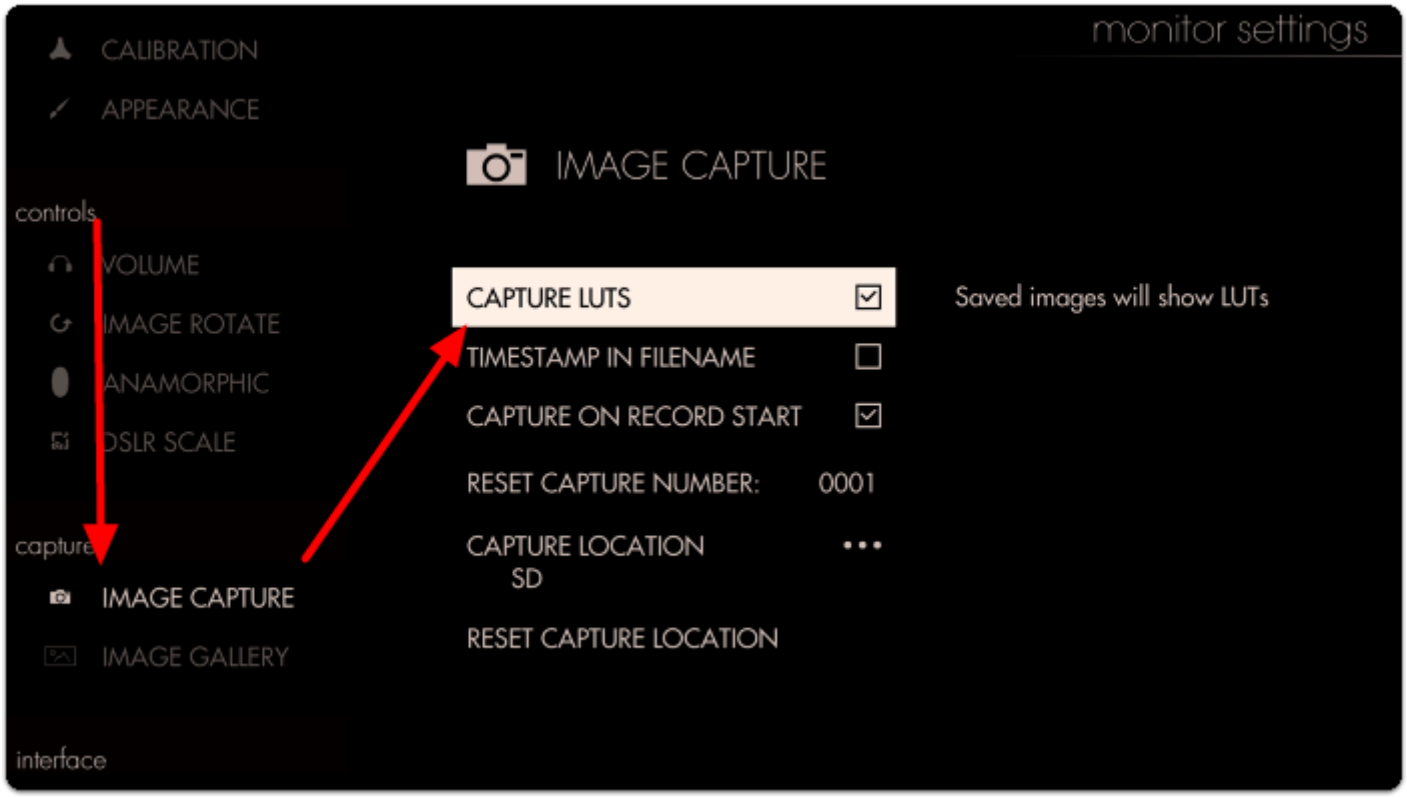
Start by **pressing down** on the joystick or **swiping down** on a touchscreen monitor to access the **zoomed-out view**.

Move left until you reach the **global Settings menu**.

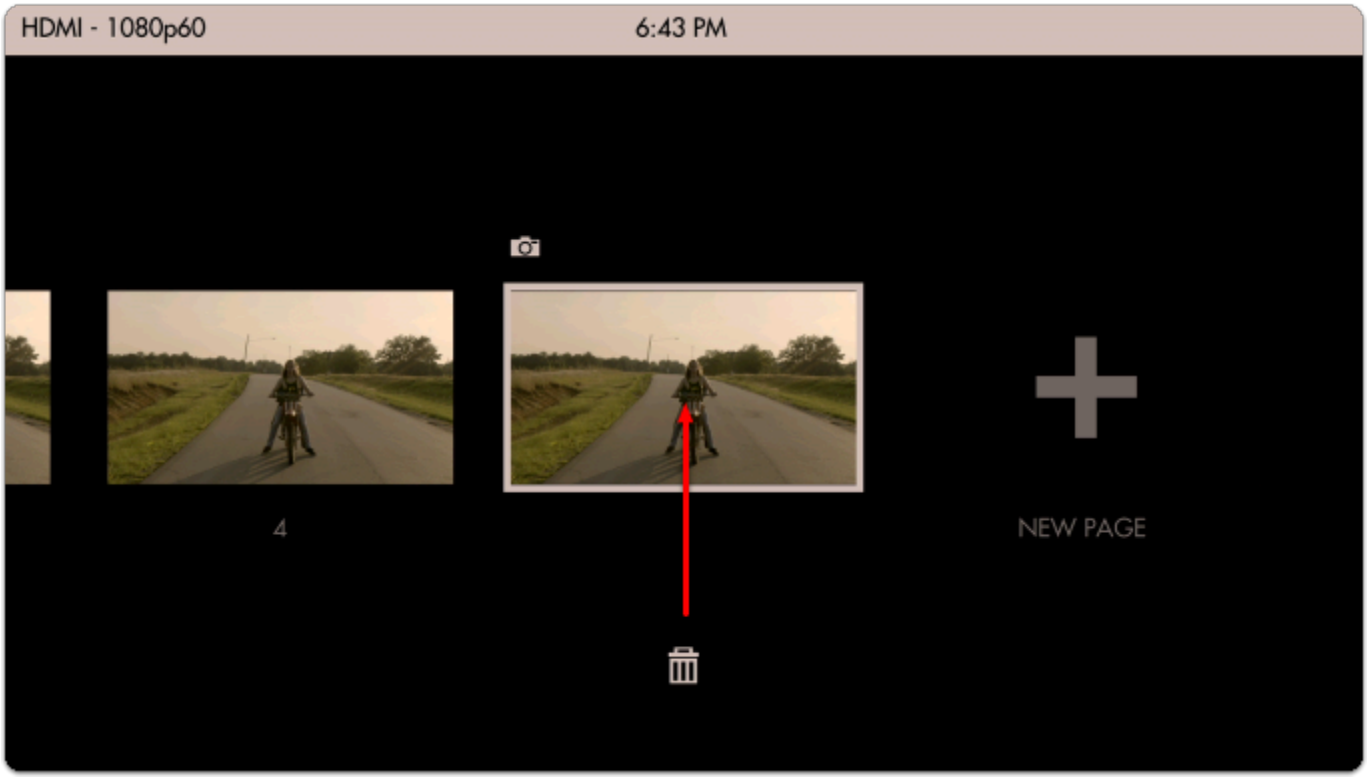
> **Image Capture settings** are located in the **far-left Settings menu** since they affect the way images are captured **globally** across the monitor.



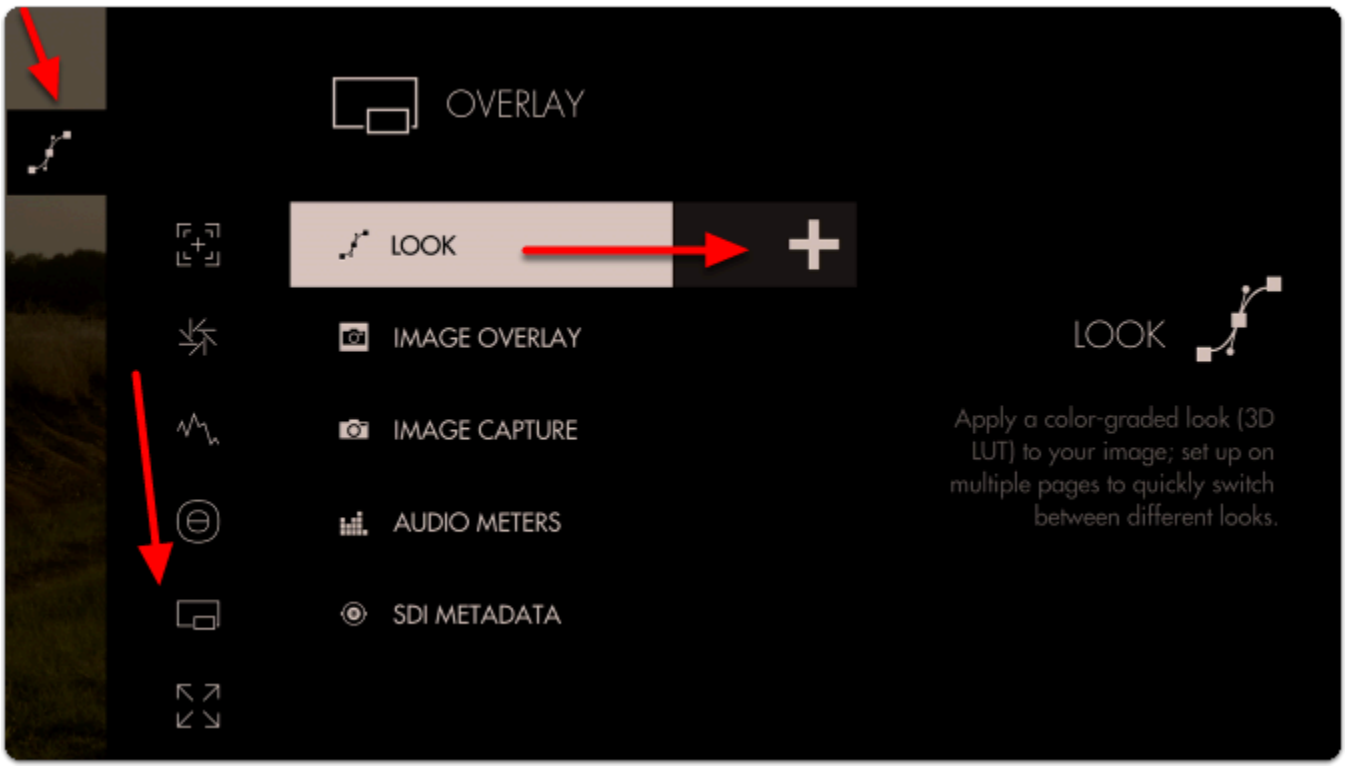
Navigate to **Capture > Image Capture** and select **'CAPTURE LUTS'** to automatically apply any active Look/3D LUT to the saved image.



Flip back over to the page with **Image Capture** applied so that we can take a snapshot.

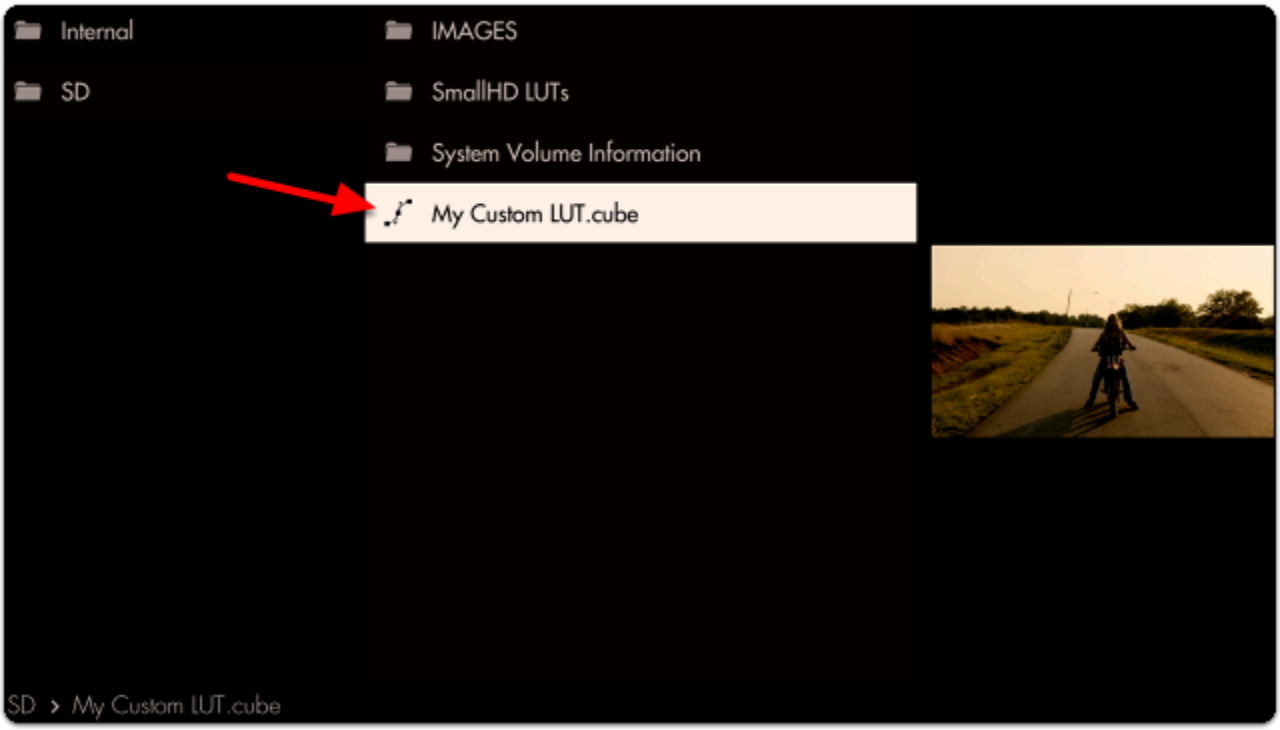


Let's add a Look (3D LUT) to the page via **Add Tool** > **Overlay** > **Look**

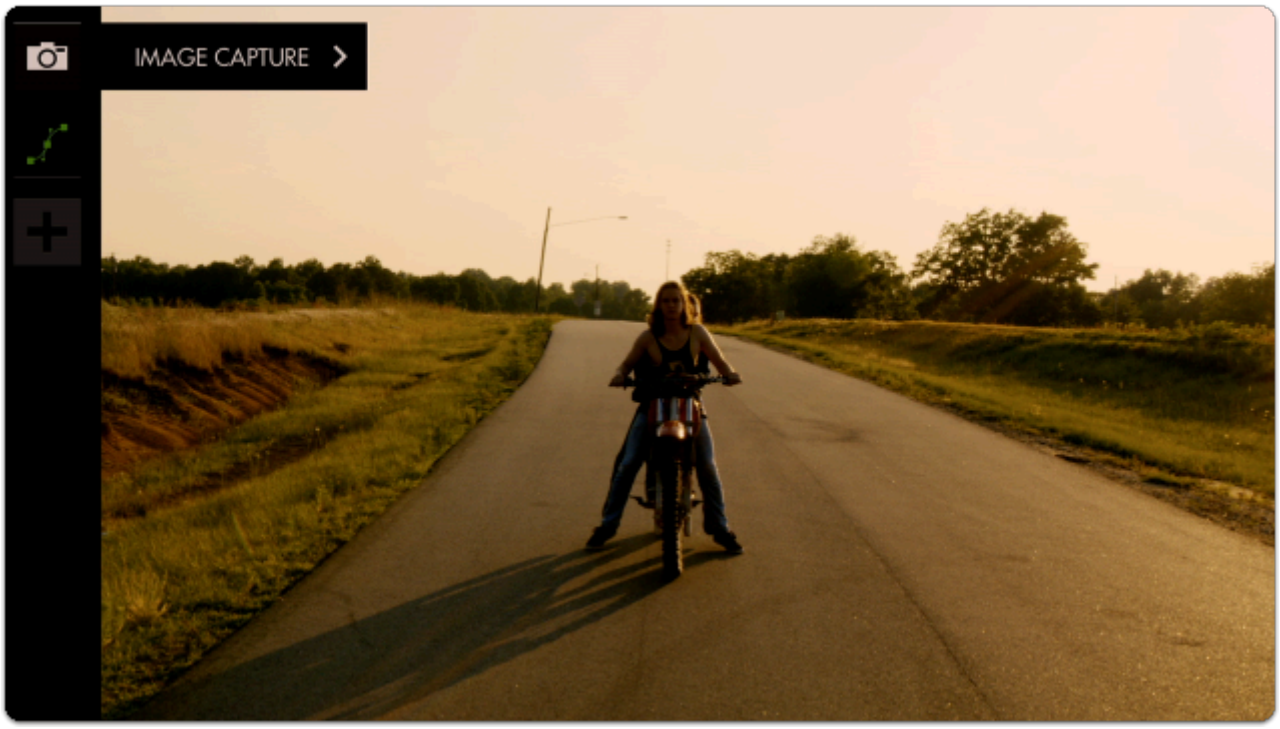


Next **select a Look/3D LUT** from an SD card or the internal memory.

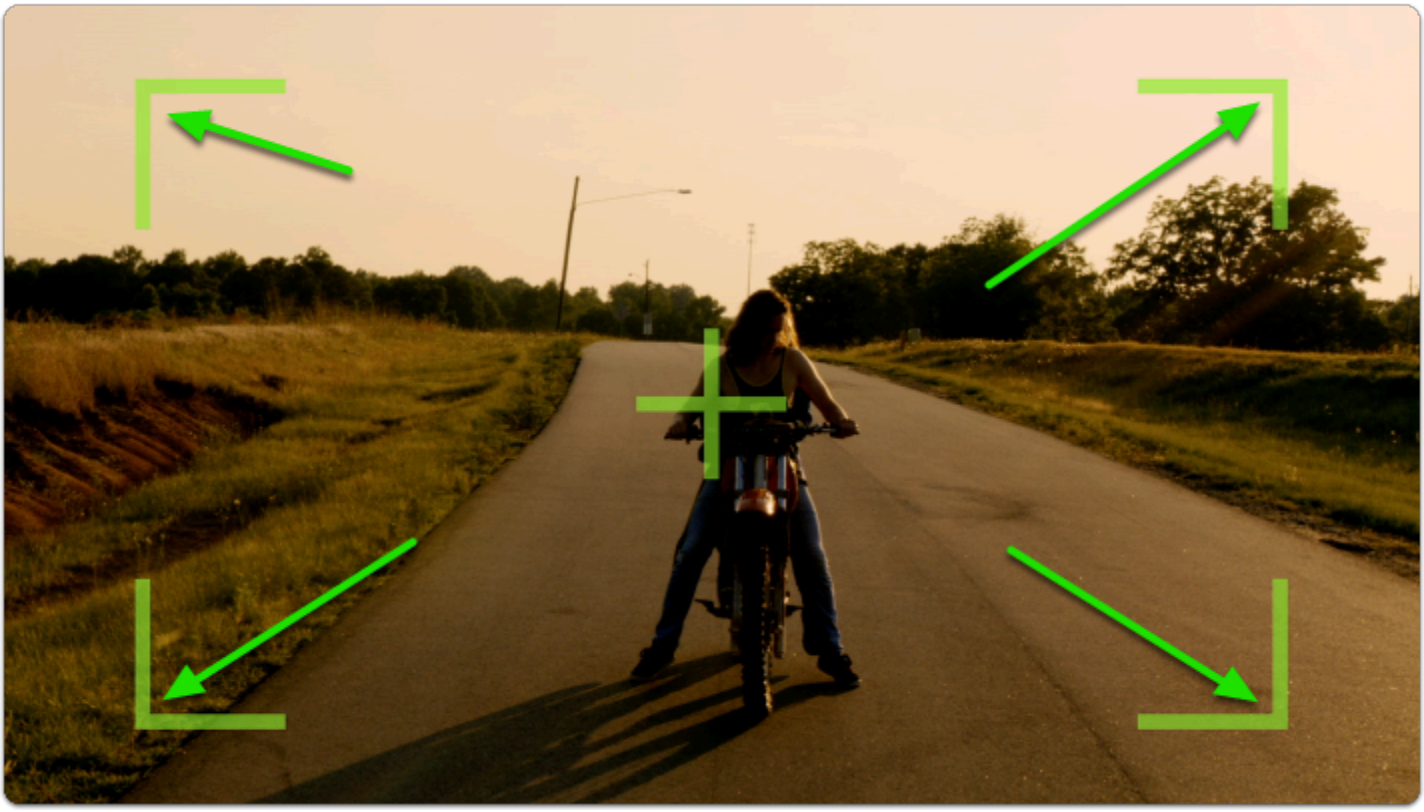
If you wish to learn how to create your own Look/3D LUT in Davinci Resolve, follow our video tutorial!



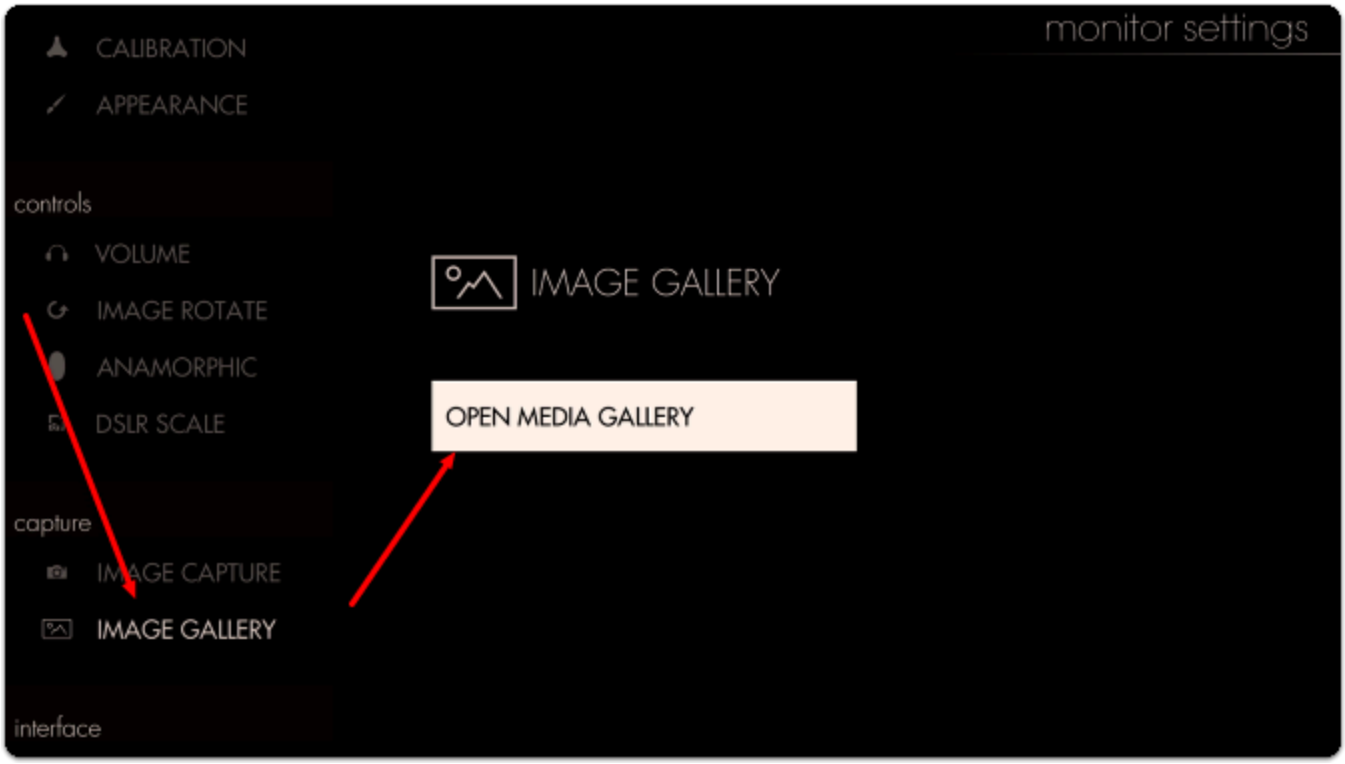
We're finally ready to take a snapshot! Select **Image Capture** that's already in the toolbar.



A grey **snapshot overlay** will appear; **click the joystick** or **tap the screen** and the overlay turns **green, indicating a snapshot has been taken. The screen will also appear to flicker.**



To **browse** through your captured images on the monitor, you can access the **Image Gallery** back from within the global **Settings** menu.



The default capture location is under the SD/IMAGES, so navigate to this folder by selecting the appropriate folders in the Image Gallery.

Note the **difference in color grade** between our **first capture** and **each additional capture** due to the application of the **Look/3D LUT**.

Select any image to display it in **full screen**.

*If you are having issue displaying the image full screen on the LITE series, use the Image Overlay tool at 100% to preview your images.

At this point you could apply any screenshot as an **Image Overlay** for help with **continuity/shot matching** or plug the **SD card** into a **computer** to backup/save/edit.

Audio Meters PagesOS 4

Monitor up to 8 channels of audio with a built-in clip warning.

Audio Meters - Settings

Access Audio Meters tool settings by navigating right or pressing the right arrow when Audio Meters is highlighted in the tool list.

On

Toggles the Audio Meters Off/On. You can also do this on the tool bar. Select the tool and activate or deactivate it as desired. Green tools are active, they are Grey when inactive.

Size

Adjust the size of the Audio Meters to make way for other tools or for better visibility when viewing from a distance. The range is from 20% to 100% and this translates to horizon real estate. It will scale form the position/ location you have selected.

Channels

Adjust the amount of audio channels you wish to monitor - up to 4x stereo (8 channels in total)- which stack vertically.

Location

Arrange the Audio Meters on-screen using various pre-set locations to make way for other tools or the image itself. You have 6 options:

TOP - Left, Center, Right

BOTTOM - Left, Center, Right

Opacity

Set the transparency/opacity of the Audio Meters.

Audio Meters - Quick Start

In this section we will add Audio Meters to a page so we can keep an eye on levels.

From any page with a feed, click the joystick or tap the screen to bring up ‘Add New Tool’ and navigate to Overlay > Audio Meters and select to add it to the current page.

This may be all you need at this point, but let's increase the size of the meter for better viewability.

When 'Audio Meters' is highlighted, press the joystick right or tap the right arrow to edit its settings.

Select 'Size' and bring it up to 100 for a full-width audio meter.

You can also increase the amount of channels being displayed if your production requires it.

If you don't wish to have Audio Meters covering your image, you can scale the image to make room with Size & Position.

Metadata PagesOS 4

Displays a small information bar containing metadata information being sent over HDMI or SDI such as timecode and tally flags. Useful for ensuring the camera is recording without having to take your eyes off the monitor.

Not all cameras support outputting metadata over HDMI or SDI. Some cameras may not have metadata enabled by default. Please refer to your camera's user manual for information on supported metadata and how to enable this feature.

Metadata - Settings

Access Metadata settings by pressing to the right when the tool is highlighted.

On

Toggles Metadata Off/On. You can also do this on the tool bar. Select the tool and activate or deactivate it as desired. Green tools are active, they are Grey when inactive.

Timecode

Enables display of the camera’s timecode being sent over HDMI or SDI. This will appear in a small black box in the location selected.

Record

Enables display of the camera’s record flag being sent over HDMI or SDI. This displays as a red rectangle around the edge of the monitor frame.

Location

Arrange the SDI Metadata on-screen using various pre-set locations to make way for other tools or the image itself.

You have 6 locations:

TOP - Left, Center, Right
BOTTOM - Left, Cetner, Right

Opacity

Set the transparency/opacity of the Metadata.

Metadata - Quick Start

Let's add Metadata to a page.

From any page displaying an SDI signal, click the joystick or tap the screen and select Add New Tool > Overlay > Metadata.

By default timecode and record tally are enabled, meaning you will be able to view your camera's specific timecode value and an indicator if the camera is currently recording.

Tools - Scale

Size & Position PagesOS 4

Resize and position your image to accommodate other features you may wish to simultaneously view, such as scopes or audio meters.
This will be helpful for users that want to keep multiple tools on the same screen, rather than using pages.

Size & Position - Settings

On

Enables/disables the Size & Position tool. You can also do this on the tool bar. Select the tool and activate or deactivate it as desired. Green tools are active, they are Grey when inactive.

Size

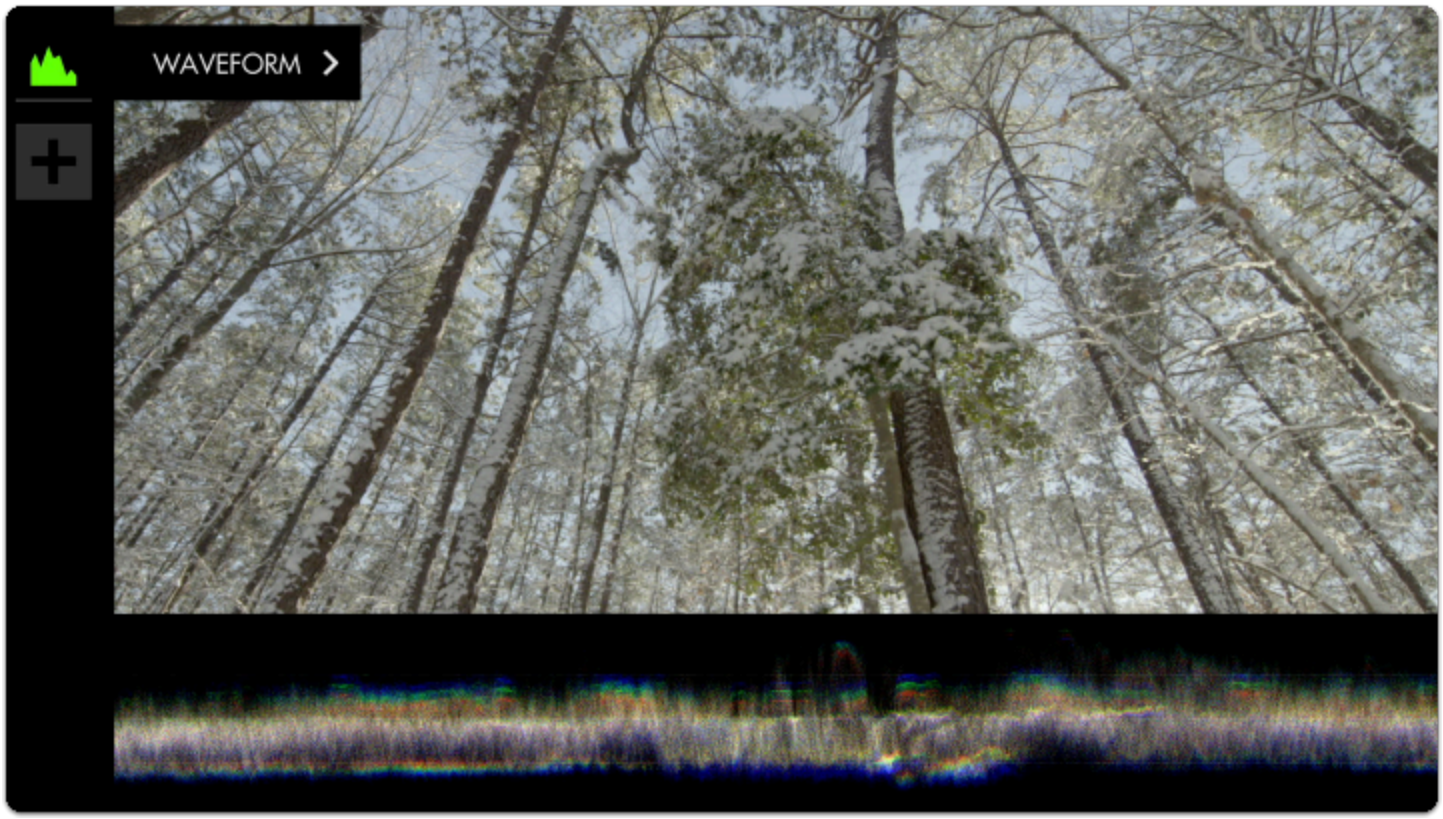
Adjusts the size of the image proportionally within a page compressing toward the center of the selected location.

Location

After scaling the image, use this to position it where desired. There are 9 positions:
TOP - Left, Center, Right
MIDDLE - Left, Center, Right
BOTTOM - Left, Center, Right

Size & Position - Quick Start

In this section we will use **Size & Position** to help arrange the image so that a **full-width Waveform** will not overlap the footage, enabling a **clean view** of the **picture** and the **scope** on the **same page**.



I have already added a **Waveform** to an empty page and adjusted its **height** from **50** down to **25** to make a bit more room for the image, but it is still **covering a portion of the picture** which we can address with **Scale & Position**.

Click the joystick or **tap the screen** to bring up **'Add New Tool'.**

Navigate to **Scale** > Size & Position & select the **'+'** to add it to the current page.

Once added you can **edit** the settings by **navigating right** when **'Size & Position'** is highlighted.

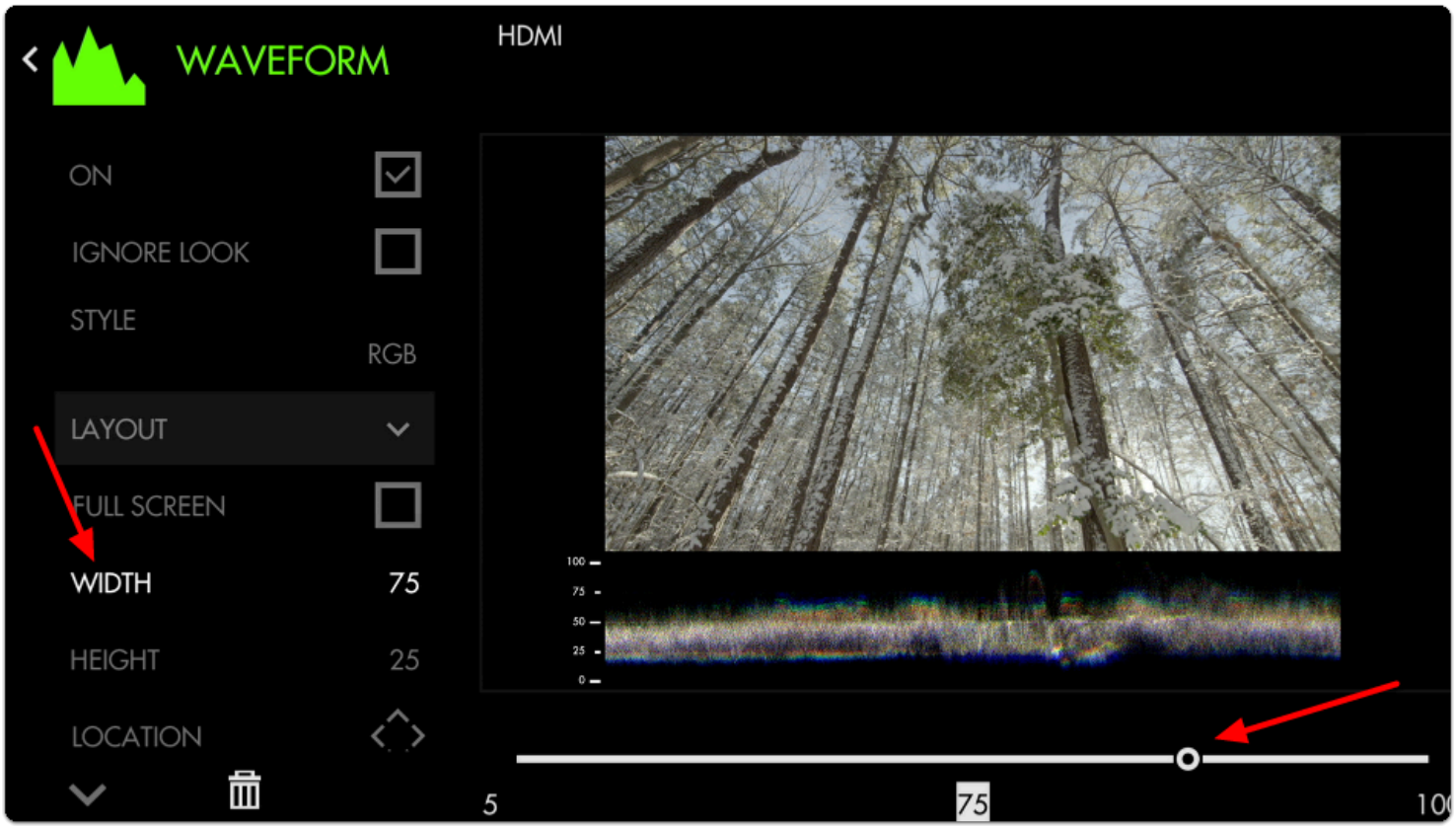
Navigate to **SIZE** and adjust it from **100** to **75**- you will notice the image scaling from its' center point.

Because the Waveform is scaled to 25% height, the image fits perfectly when scaled to 75%.

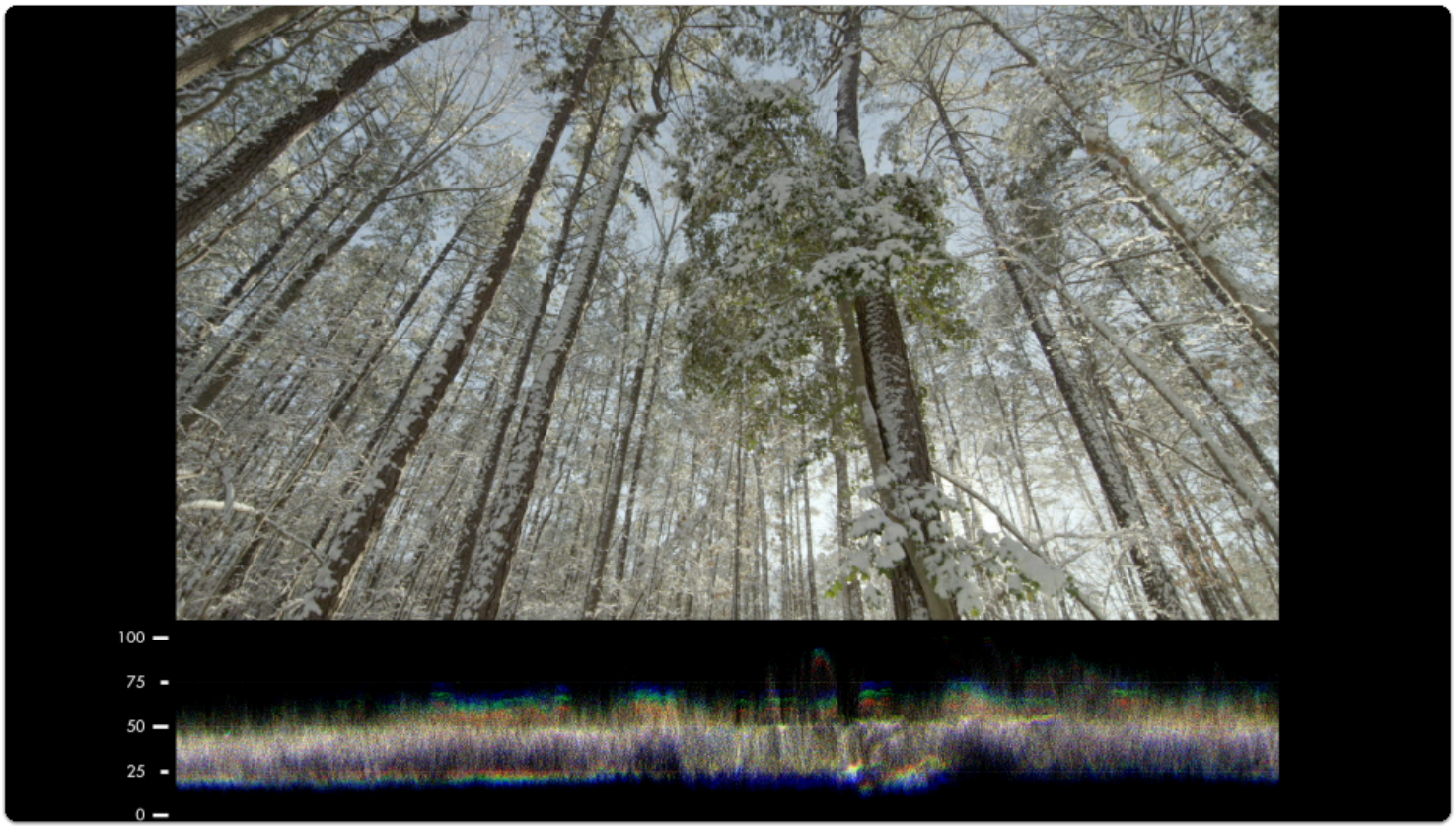
Now move the image to the top of the frame by selecting **LOCATION** and pressing **up on the joystick** or **tapping the top portion of the image**. This leaves us with an unobstructed view of the **Waveform**.

Press **Back** or tap the left arrow at the top right hand corner to **exit.**

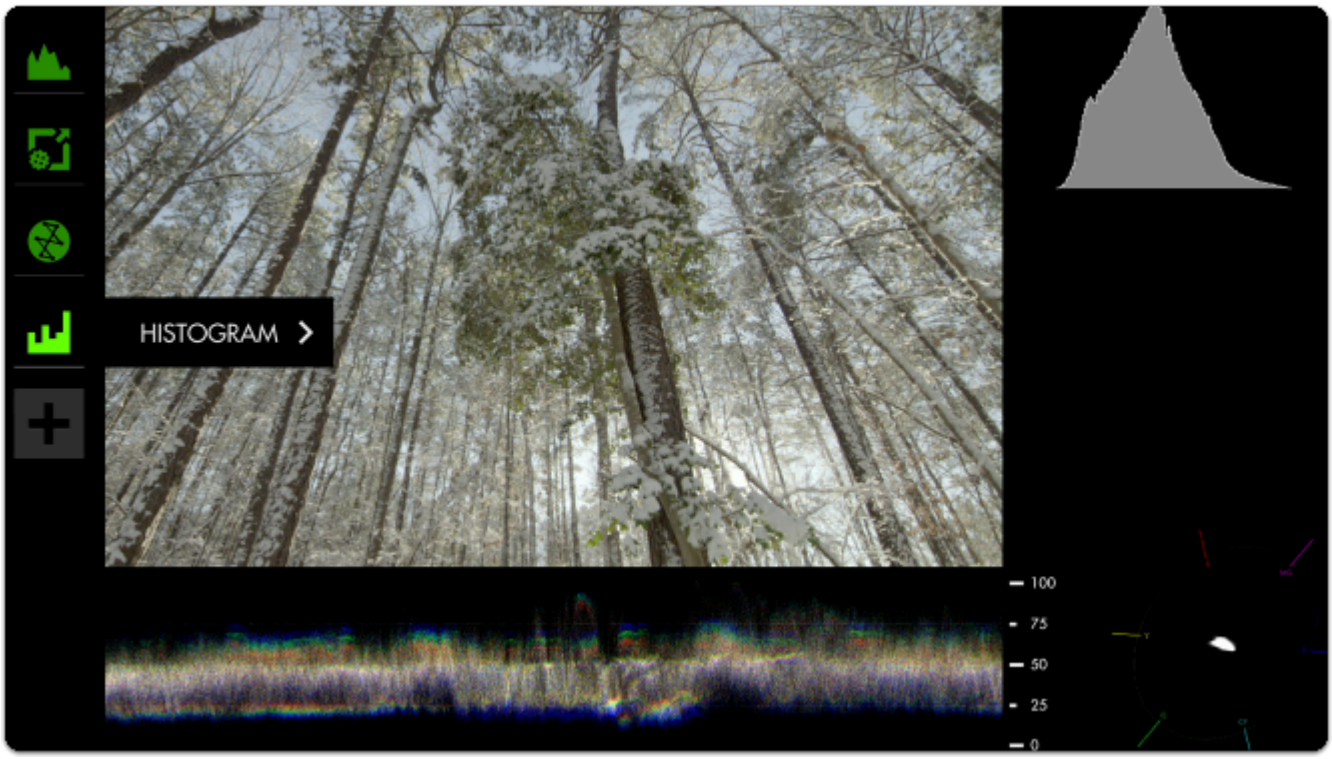
Next we **edit** the Waveform and scale its **WIDTH** to **75** to match the width of the image.



We now have an unobstructed view of our **image** and its corresponding **Waveform!**



At this stage you can use the **LOCATION** adjustment to add & arrange more tools such as a **Vectorscope** and **Histogram** if you wish.


HISTOGRAM
100
75
50
25
0

Size & Position PagesOS 4

Resize and position your image to accommodate other features you may wish to simultaneously view, such as scopes or audio meters.
This will be helpful for users that want to keep multiple tools on the same screen, rather than using pages.

Size & Position - Settings

On

Enables/disables the Size & Position tool. You can also do this on the tool bar. Select the tool and activate or deactivate it as desired. Green tools are active, they are Grey when inactive.

Size

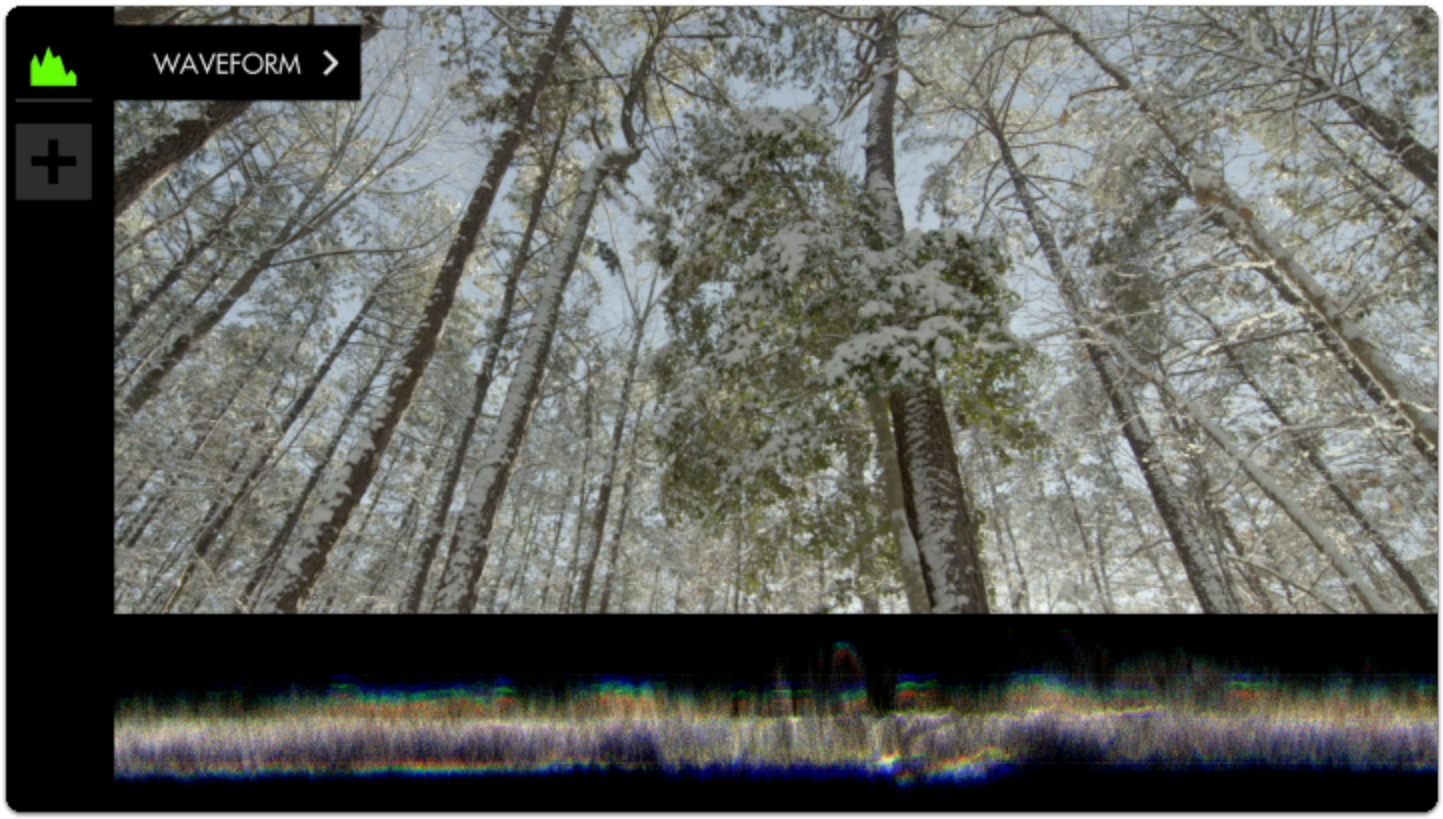
Adjusts the size of the image proportionally within a page compressing toward the center of the selected location.

Location

After scaling the image, use this to position it where desired. There are 9 positions:
TOP - Left, Center, Right
MIDDLE - Left, Center, Right
BOTTOM - Left, Center, Right

Size & Position - Quick Start

In this section we will use **Size & Position** to help arrange the image so that a **full-width Waveform** will not overlap the footage, enabling a **clean view** of the **picture** and the **scope** on the **same page**.



I have already added a **Waveform** to an empty page and adjusted its **height** from **50** down to **25** to make a bit more room for the image, but it is still **covering a portion of the picture** which we can address with **Scale & Position**.

Click the joystick or **tap the screen** to bring up **'Add New Tool'.**

Navigate to **Scale** > Size & Position & select the **'+'** to add it to the current page.

Once added you can **edit** the settings by **navigating right** when **'Size & Position'** is highlighted.

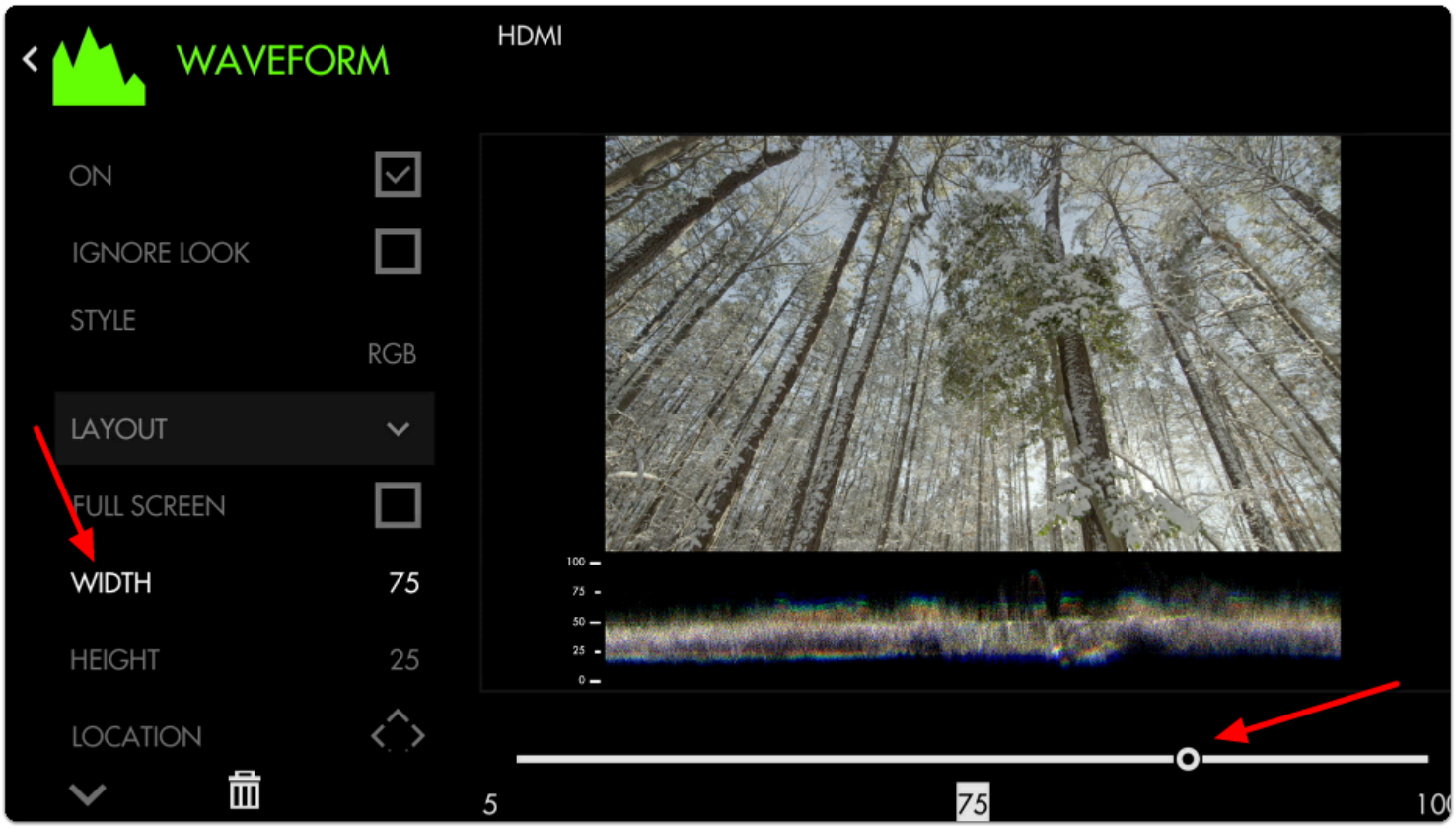
Navigate to **SIZE** and adjust it from **100** to **75**- you will notice the image scaling from its' center point.

Because the Waveform is scaled to 25% height, the image fits perfectly when scaled to 75%.

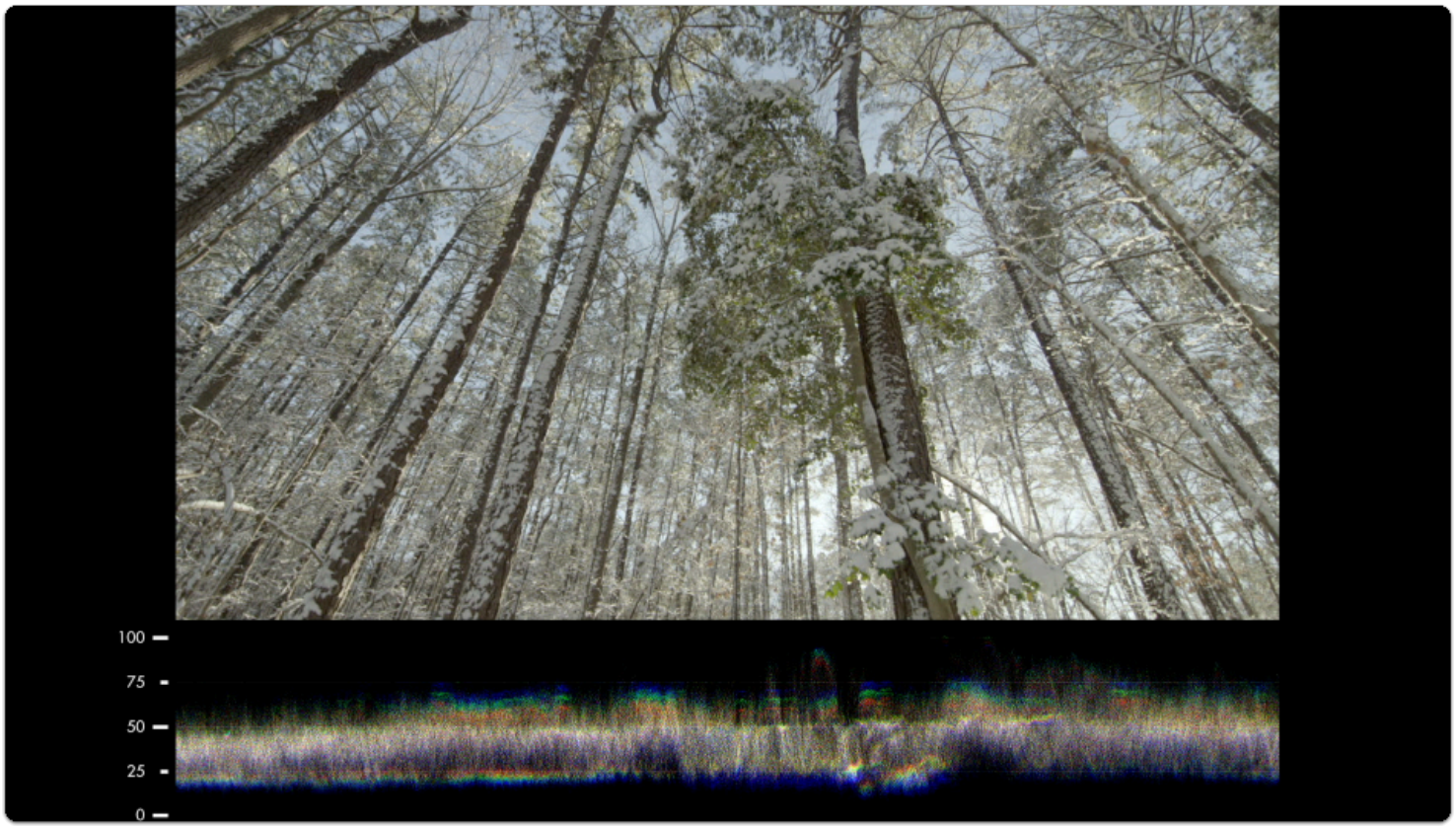
Now move the image to the top of the frame by selecting **LOCATION** and pressing **up on the joystick** or **tapping the top portion of the image**. This leaves us with an unobstructed view of the **Waveform**.

Press **Back** or tap the left arrow at the top right hand corner to **exit.**

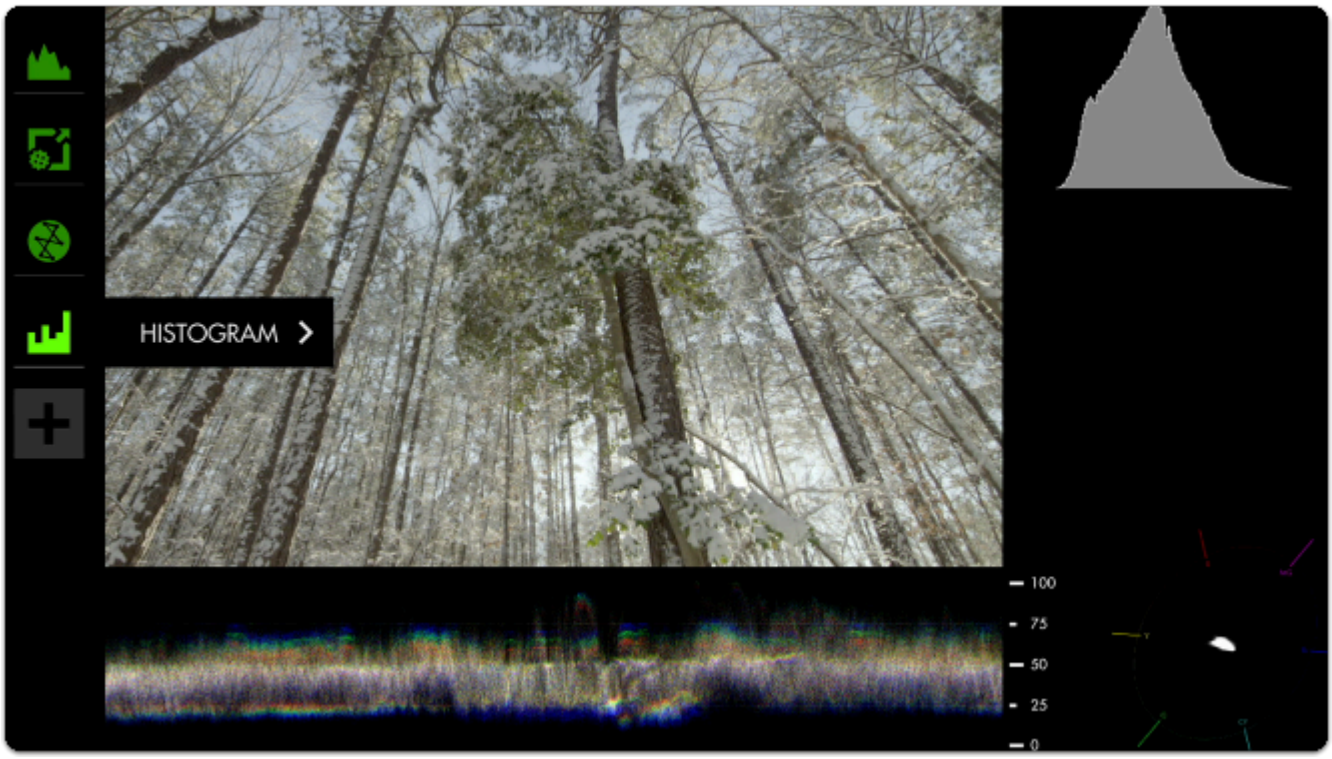
Next we **edit** the Waveform and scale its **WIDTH** to **75** to match the width of the image.



We now have an unobstructed view of our **image** and its corresponding **Waveform!**



At this stage you can use the **LOCATION** adjustment to add & arrange more tools such as a **Vectorscope** and **Histogram** if you wish.


HISTOGRAM
100
75
50
25
0

Anamorphic PagesOS 4

Anamorphic video is a technique where an image is squeezed horizontally during the recording process. On film sets this is done to make better use of the film or sensor's vertical space using specialty lenses. It is also often seen when footage originated in HD needs to pass through SD equipment. In all cases an anamorphic de-squeeze can restore footage to its native aspect ratio, although lost resolution is not recovered. Lost horizontal resolution is generally not perceptible to human eyes; lost vertical resolution (such as from HD footage being sent through SD equipment) may be noticeable.

Anamorphic - Settings

On

Enables/Disables Anamorphic de-squeeze

Input Video

The monitor will automatically attempt to determine the correct aspect ratio for the video from its resolution and any flags in the video stream. In some cases those flags are incorrect and this tool can be used to fix the video.

Select the aspect ratio of the video input (4:3 or 16:9), regardless of what the monitor identifies the input video as being. (This will squeeze a 16:9 image into a 4:3 frame for example if 4:3 is selected and you are sending it a 16:9 image).

If you need to correct video that has been incorrectly identified as 16:9 or 4:3, this may be the only setting you need to adjust.

Desqueeze

Choose the amount to de-squeeze your input by. Choices are **1×**, **1.33×** (this will stretch a 4×3 video back to 16×9), **1.5×, 1.66x, 1.79x**, **2×**, or **Custom**.

Selecting **Custom** from the Desqueeze setting will add this additional setting. It brings up a slider allowing you to adjust your anamorphic de-squeeze by a custom value between 1.00× to 3.00×. Please note that this is an adjustment factor based off your video input, not the aspect ratio you are working in.

Anamorphic - Quick Start

Anamorphic was added as a tool in firmware version 3.5.0. Previous firmware versions had a limited Anamorphic de-squeeze function in the monitor **Settings** under **Controls**.

From any page, click the joystick or tap the screen to bring up **Add New Tool**.

Navigate to **Scale** > **Anamorphic** and choose **Add to This Page** or **Add to All Pages**

If the footage connected to your monitor is all coming from an anamorphic source you may want to add this tool to all pages