

# ALEXA & AMIRA

## Using the ARRI Look File 2

WORKFLOW GUIDELINE

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## Version History

Version	Author	Change Note
2016-06	Duschl	content collection
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## Introduction

Looks enable the director of photography to bring her/his vision of a movie's look and feel to set for shooting. The ARRI Look File 2 (ALF-2) is now supported in the whole range of available ARRI's digital cameras.

This document exposes the possibilities with and around the ALF-2 and offers background information on the available parameters. ALF-2 is supported in ALEXA SXT, AMIRA or ALEXA Mini.

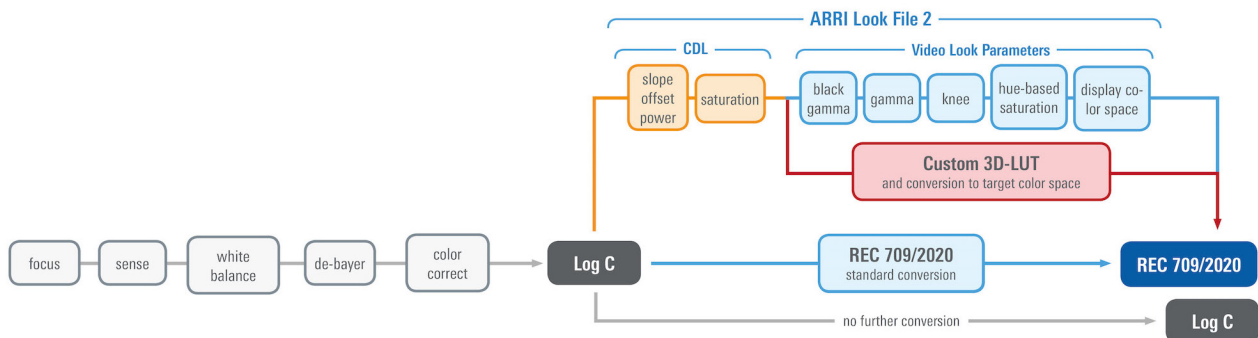
Please note that ALEXA Classic and ALEXA XT cameras are not able to use the ALF-2! Please use an external solution for the latter.

## What's inside of the ALF-2?

Being a look file the ARRI Look File 2 can influence the *look and feel* of an image, respectively a shot or scene. For a good overview of the color controls, follow the image path of the camera:

In the first step the sensor data is balanced for the light source's color temperature. This ensures a neutral representation of the R, G, and B values of objects - it is not part of the look settings. In the second step, a Log C image is created. The Log C transform is controlled by the exposure index (EI), which is also not part of the look.

Next is either nothing, if the image is recorded in Log C – a standard conversion to REC 709 or REC 2020 – or: the look file. All alternations to the color is based on a Log C image.



## CDL is the first part of the look

The ASC (American Society of Cinematographers) has standardized relevant color transformation parameters in the ASC CDL policy, in order to allow for a standardized exchange of color transform data between the postproduction systems of different manufacturers. Image parameters can multiply the image data, adding an offset or raising to an exponent, independently of each of the color channels, which results in nine parameters plus color saturation as the 10th. In camera the ASC CDL transforms are applied to the Log C image before the image is transformed for display on the viewfinder or monitor. This conversion can be done with the integrated 3D LUT (to REC 709/2020) or a custom 3D LUT included in a look. Using the standard 3D-LUT for video additionally allows for modification of Video Look Parameters.

### CDL values

- **Slope (RGB, Master)**  
This parameter affects the inclination of the Log C curve. The slope of the linear part of the Log C curve is equivalent to the gamma of the camera negative. The Log C curve has a gamma of approx. 0.51. Hence, using a slope parameter of 1.2 will have a similar effect to using a negative stock having a gamma of 0.6 ( $= 1.2 * 0.5$ ). A parameter of less than 1.0 will lower the gamma accordingly. Note: Often it is assumed that the typical camera negative gamma is 0.6. Some motion picture films, however, have gamma values in the range from 0.45 to 0.6.
- **Offset (RGB, Master)**  
The CDL offset parameter is the most intuitive of the CDL parameters. Adding an offset to the Log C image has a similar effect to increasing the exposure index. For people familiar with the motion picture print film process, it's the same as printer lights.
- **Power (RGB, Master)**  
The CDL power parameter has no equivalent in the motion picture film process. It can be used to raise or lower the mid tones in the Log C domain. The effect of the numerical value of power is reversed compared to the slope parameter. A power value smaller than 1.0 will increase the brightness and a value greater than 1.0 will decrease the brightness of the mid tones.
- **Saturation**  
The saturation parameter is used to in- or decrease the colorfulness of the image. One can go all the way down to a de-saturated grey-scale image at a value of 0 or add up another 100% color at a level of 2.0.

## Video Look Parameters

- Tone map parameters
  - Gamma  
This is a standard parameter in video processing; it affects the mid tones while leaving black and white unchanged. Values below 1.0 will darken the image, higher values will brighten the image.
  - Black gamma  
The parameter black gamma controls the toe of the tone map curve. Lower values of black gamma cause shadows to be darker (lower values cause the lower part of the curve to be steeper, higher values cause a more linear start). This parameter leaves the level of the mid grey unchanged over a wide range. Only for the lowest value of black gamma is the mid grey raised.
  - Knee  
The parameter knee controls the roll-off of the tone map curve. Lower knee values cause highlights to be brighter, while higher values produce an image showing dimmer and flatter highlights (lower values cause the upper part of the curve to be steeper, higher values cause a linear ending). This parameter leaves the level of the mid grey unchanged.
  
- Saturation by hue parameters  
Saturation can be controlled along the six color vector: red, yellow, green, cyan, blue, and magenta.
  - Red saturation
  - Yellow saturation
  - Green saturation
  - Cyan saturation
  - Blue saturation
  - Magenta saturation
  
- Saturation (overall)  
Besides CDL saturation we also offer a video parameter to control the color saturation. It affects the image in a way that is very similar to the former.

## Custom 3D-LUT

ARRI Look File 2 allows custom 3D LUTs from grading or on-set tools to be used in the camera (requires Premium license on AMIRA). 3D LUTs need to be converted to an ALF-2 using the ARRI Color Tool, before they can be loaded into the camera.

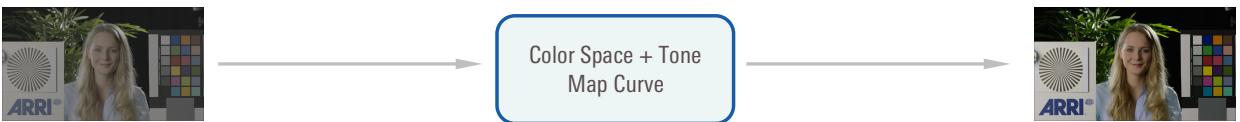
## Different ways to alter the image

Using all the controls mentioned above makes the ALF-2 a suitable companion in different situations: in total there are six different ways to alter the image:

### Straight Log C



### Log C with color space conversion (to e.g. REC 709)



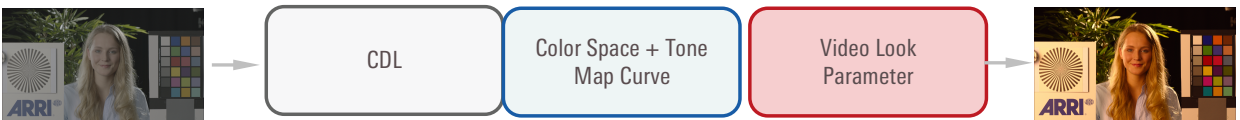
### Log C with color space conversion and VLP's changed



### Log C with edited CDL and color space conversion



### Log C with edited CDL and color space conversion and changed VLP's



### Log C with 3D LUT

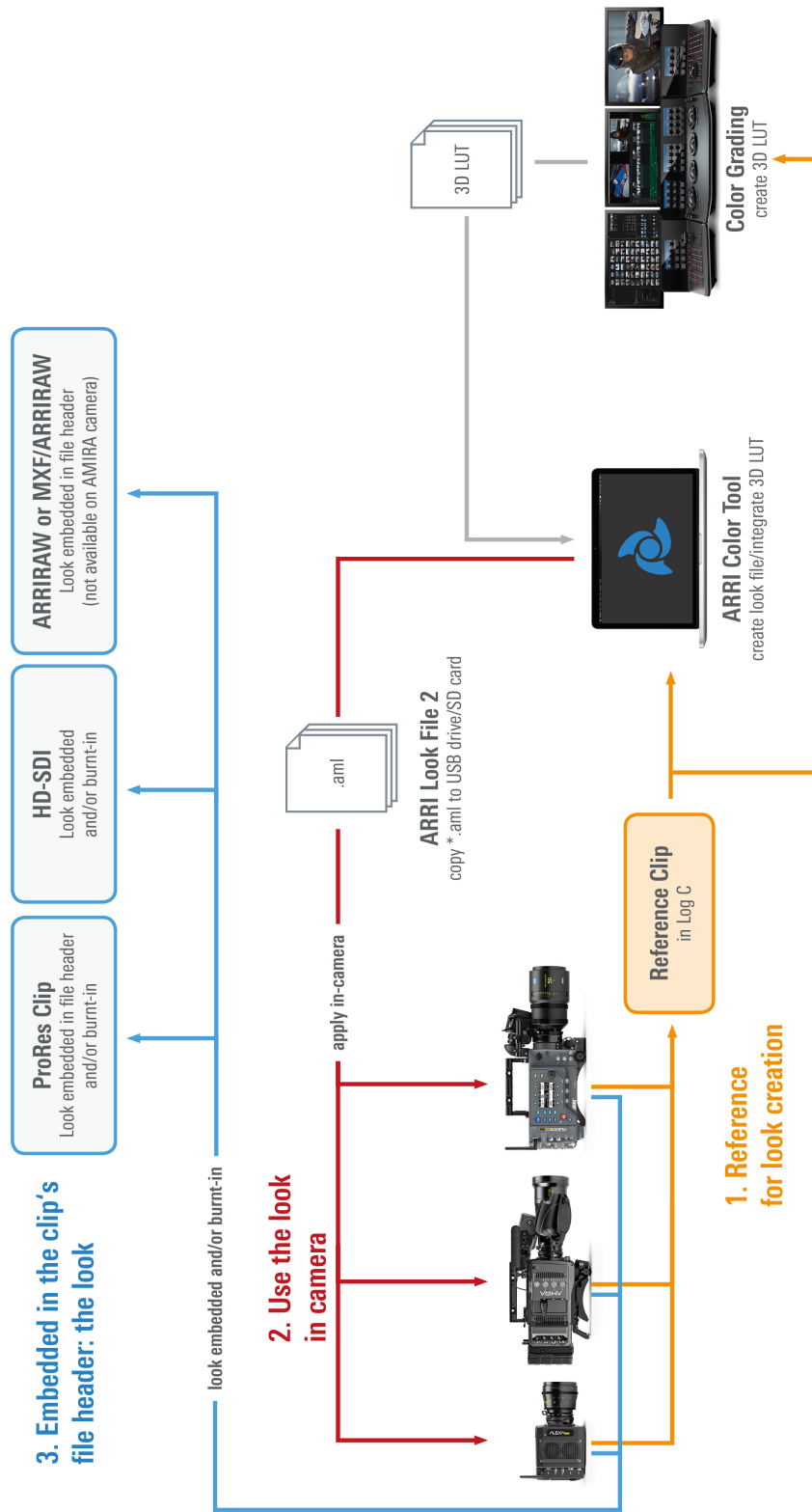


### Log C with changed CDL and 3D LUT



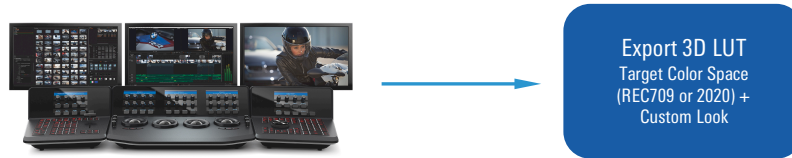
# How to create a look

## General Workflow



## Design a LUT

A look is usually being created in a color grading environment before shooting/during costume or set tests:



Any color grading application can be used to export looks consisting of a primary grade and Color Decision List (CDL) values combined as a 3D LUT. Secondary grades like keys or shapes are not supported.

### Possible grading values:

- Lift, gamma, gain, offset
- saturation, tint, temperature
- CDL: slope, offset, power

### Not possible:

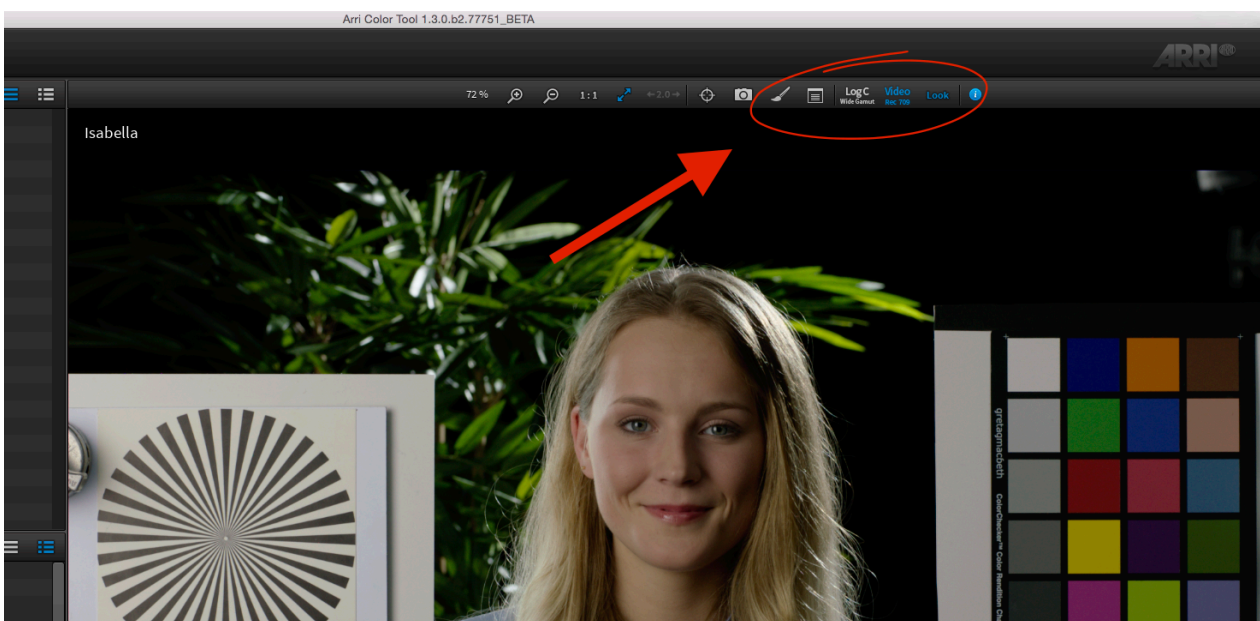
- Shapes, windows, tracking or stabilizing
- Compositing or color-keys

For export create a 3D LUT with  $33^3$  mesh points and choose \*.cube- or \*.lut-format for saving.

## Import LUT into ARRI Color Tool

In order to have a file that can go into the camera, an intermediate step is needed: the creation of a \*.aml ALF-2 look file. To do so, open up the ARRI Color Tool. Go to FILE > Open Look/LUT File... and select the 3D LUT you want to import.

Once the LUT as been imported you can toggle between look on/off or view the Log C image.



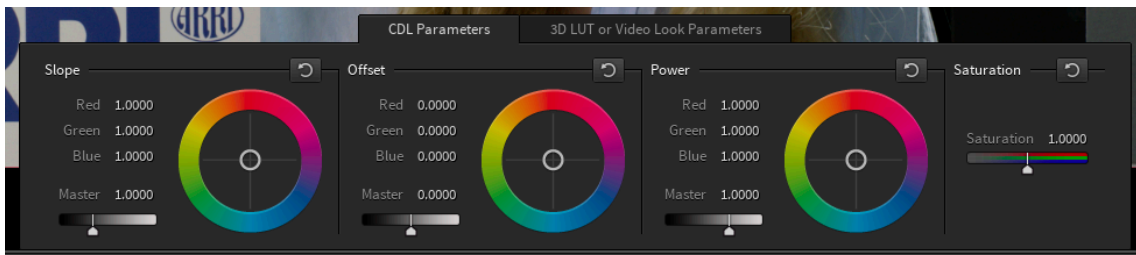
## Using ACT to further tweak the look file

For further fine tuning the look file in the ARRI Color Tool either use CDL or Video Look Parameters. The following parameters can be changed in the *Look Editor*:

Please note: in case a look is utilizing a 3D LUT one can only access CDL values!

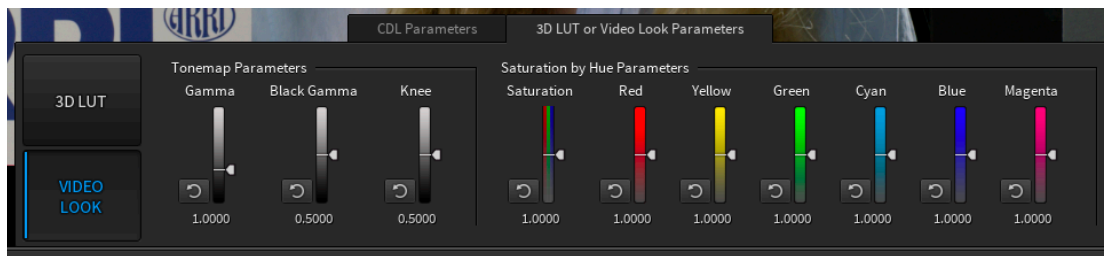
### Color Decision List (CDL):

- Slope
- Offset
- Power
- Saturation



### Video Parameter (VLP; not available if a 3D LUT is used):

- Tonemap (Gamma, Black Gamma, Knee)
- Saturation by Hue (R, G, B, C, M, Y)





## Transfer: look to camera

If no further changes to the look are needed select FILE > Save Look as... to create the actual look file.



Copy the \*.aml file to a USB thumbdrive/SD card (depending on the camera you are shooting with) in the look folder:

USB thumbdrive (AMIRA & ALEXA Mini):

ARRI/AMIRA/LOOKFILES/

ARRI/A-MINI/LOOKFILES/

SD Card (ALEXA SXT):

ARRI/ALEXA/LookFiles/

Please refer to the corresponding camera manual to find out how to import lookfiles.

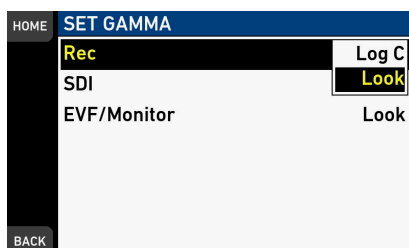
Always make sure to set the „recording gamma“ to Log C. If set to „look“ the camera will instantly apply the look to the recorded footage and „burn-it“ the selected look. By default recording gamma is set to Log C. In any case the look will be held in the clip-metadata and can be extracted afterwards.

## Look utilization in-camera

Each look can be altered in camera (preferably you use a copy of the look): Video Look Parameters or CDL values can be altered freely, the Custom 3D-LUT itself cannot be changed in-camera

### 1. Destructive use of a look (“burn-in”)

The look file has to be imported to the camera’s internal memory. Once loaded it can be activated. If you choose “Look” for the gamma setting of the recording path the image manipulations will be applied to the image in a non-reversible way. Additionally the look file you used will be embedded in each clip’s file header.



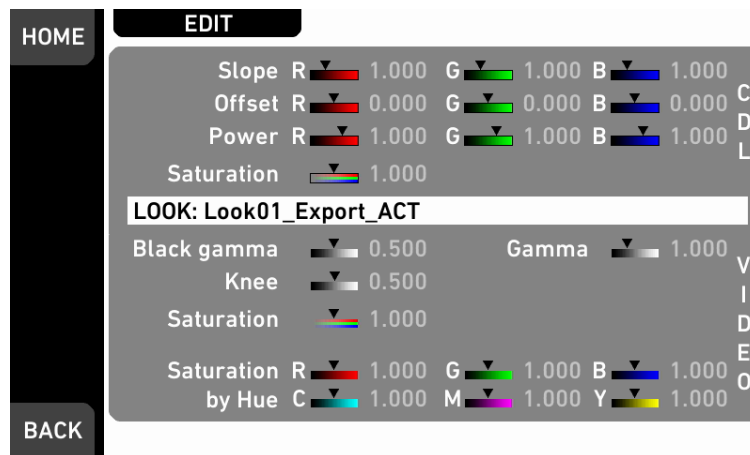
### 2. Non-destructive use (“just metadata”)

If you are not on a tight schedule or the color grading will be done in post-production, set the gamma to “Log C”. The look will not be used to alter the recorded image but travel with its metadata and can be applied the downstream pipeline.

## Tweaking the ARRI Look File 2 in-camera „via the menu“

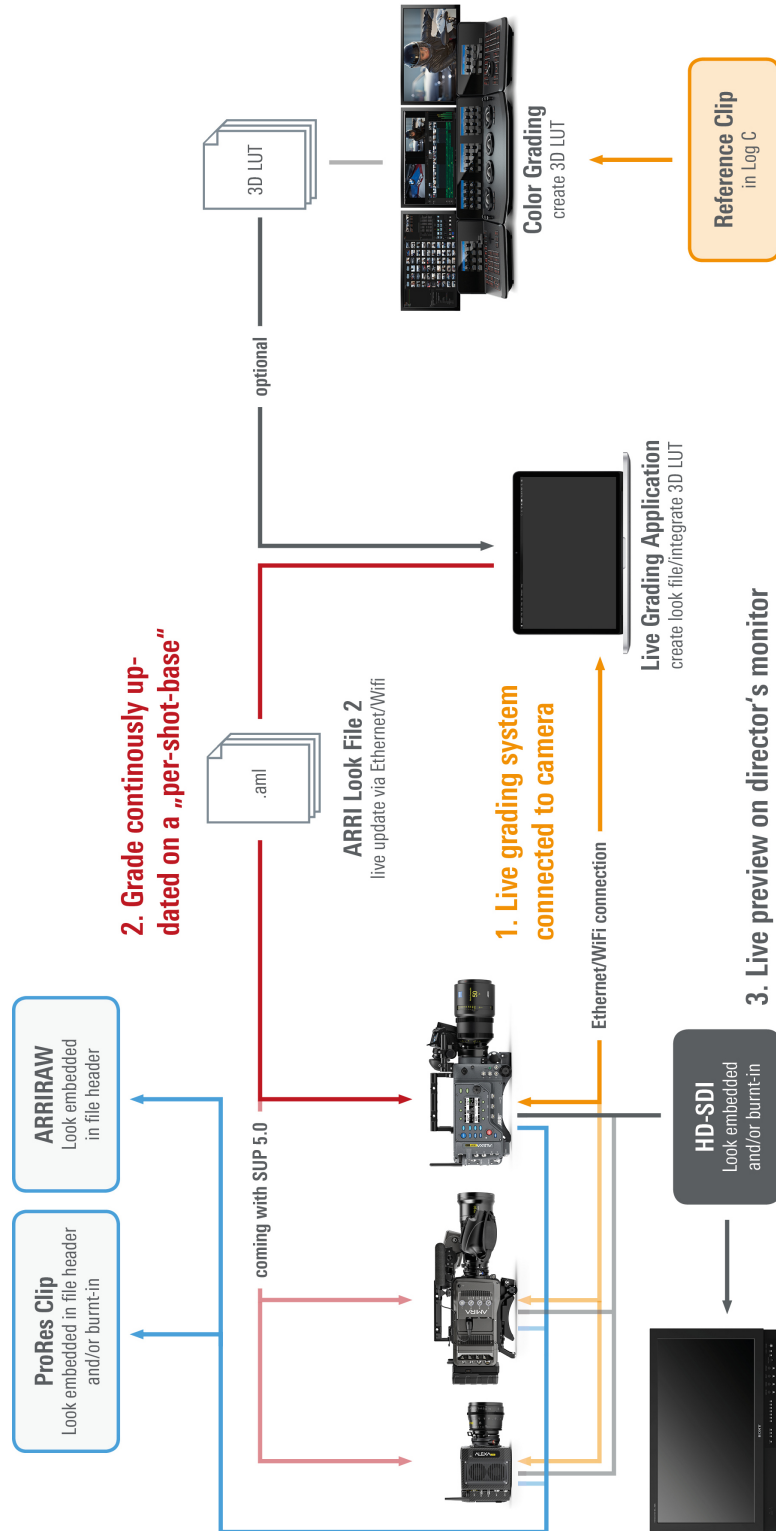
A quick way to edit only a few values is directly via the camera menu. Here shown for AMIRA and ALEXA Mini:

Navigate to LOOK, choose a look you want to change or create a copy of that look. Next, go to LOOK PARAM. to edit the look's parameters. If it is a look without 3D LUT, you have all possible options:



## In-camera live grading

With the introduction of CAP 1.0 (Camera Access Protocol) a way to live grading in ARRI cameras has been paved: now it is possible to alter a loaded look file *on-the-fly*. By using an ethernet or wifi connection to the camera a look file can be altered instantly.

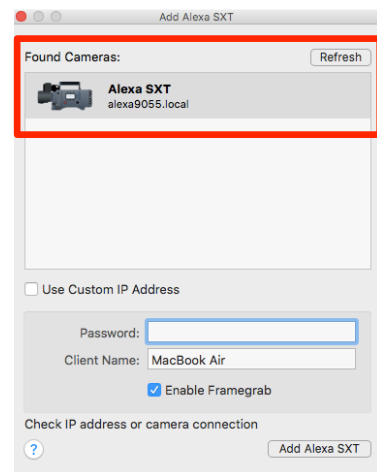
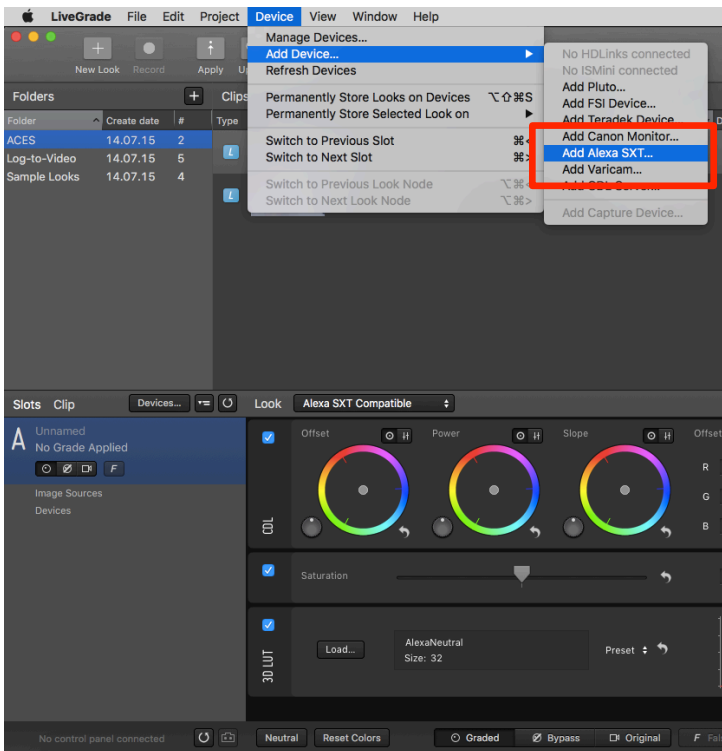


At the point of writing there's a number of tools able to access the camera by using CAP 1.0:

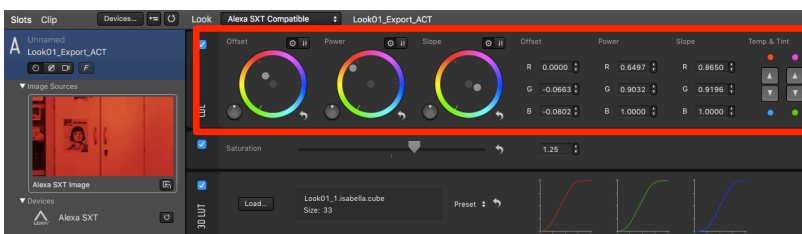
- Codex Live
- colorfront Express Dailies
- Filmlight Prelight
- Pomfort LiveGrade
- Technicolor DP Lights

We will use Pomfort's LiveGrade to show the general procedure of live grading a look.

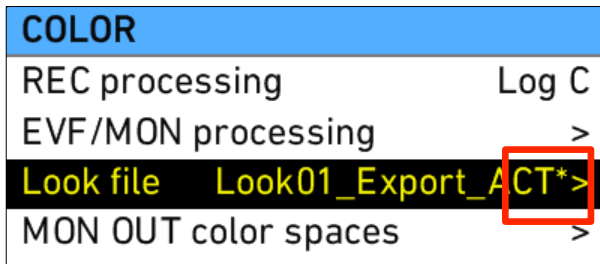
Open up Live Grade. To initiate the camera-connection go to: DEVICE > ADD DEVICE... > (e.g.) ADD ALEXA SXT.



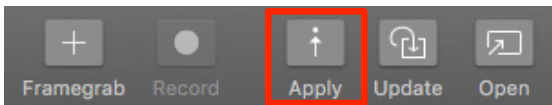
LiveGrade will automatically read the values of the currently loaded look file as a starting point. It also shows the 3D LUT (if used). You can change the values in the CDL tab. If you change a value it will automatically sync to the camera and can be monitored via the camera's SDI outputs.



A look which has been altered from its original is marked with an asterisk in the camera menu.



If you are done with your look, simply choose APPLY to save (and overwrite!) the look in-camera with the new changes.



Please note: grade values are not being tracked in a dynamic fashion: there are two times the camera asks its *image core* for values:

1. At the start of each recording when the whole metadata set is being requested.
2. At the end of each clip the image core is being asked to send its latest values. The data captured at the beginning will be overwritten by “stop-recording-values”.

## Look in Post

### Look utilization off-camera

#### 1. Extract embedded looks from the clips by using ARRI's Color Tool

Each clip that comes with an embedded look file can be viewed in the AMIRA Color Tool with the look applied. The look file can be exported as a new \*.aml file or be converted to a 3D LUT.

#### 2. Import clips to an AMIRA Look File aware 3<sup>rd</sup> party application

Just like in the Color Tool 3<sup>rd</sup> party applications are offering "ARRI Look File 2 awareness" which means the application will recognize and auto-apply the look (reversible process). If you've opted for a destructive path or do not want to use the look at all there's no limitation: the clip can be handled like an ordinary QuickTime-wrapped ProRes clip.

### Dailies Workflow

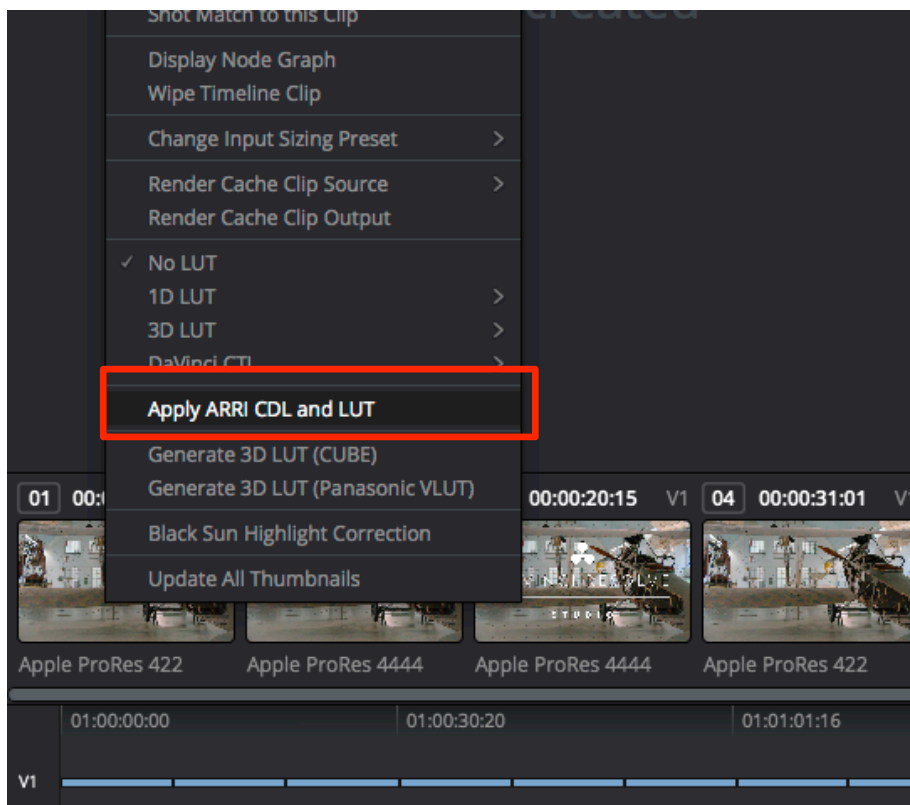
Dailies creation is a key step in postproduction where the ALF-2 can speed up the workflow: Deliver graded dailies (with the on-set look) to editorial/offline edit by using an ALF-2-aware software for rendering

Here's a list of ALF-2 compatible applications:

[http://www.ari.com/camera/alexa\\_mini/workflow/alexa\\_mini\\_workflow/](http://www.ari.com/camera/alexa_mini/workflow/alexa_mini_workflow/)

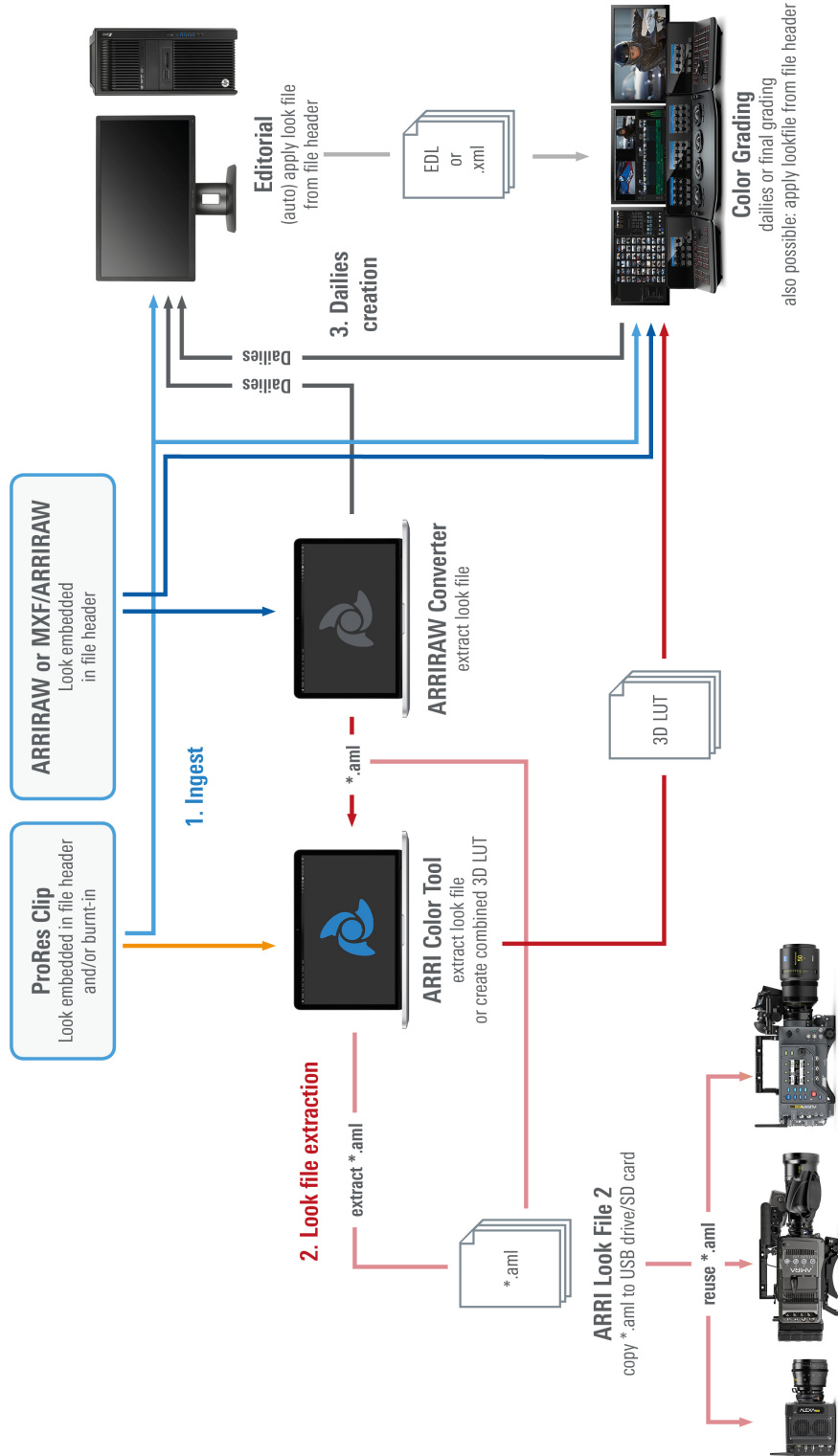
One of the supporters of ALF-2 is BMD Resolve 12.5. Only a right-click is needed to apply the embedded look to a clip:

First import clips with ALF-2 information in the file header to a Resolve project. Create a new timeline using the recently imported clips. Switch to the COLOR room. Here you see a thumbnail view of every clip in the timeline. If you do so, Resolve takes the look information straight from the file header to the image path's node. Additional changes may be applied, for editorial use, you need to repeat this step vor all the clips within that timeline by selecting them all and repeating the step outlined before.



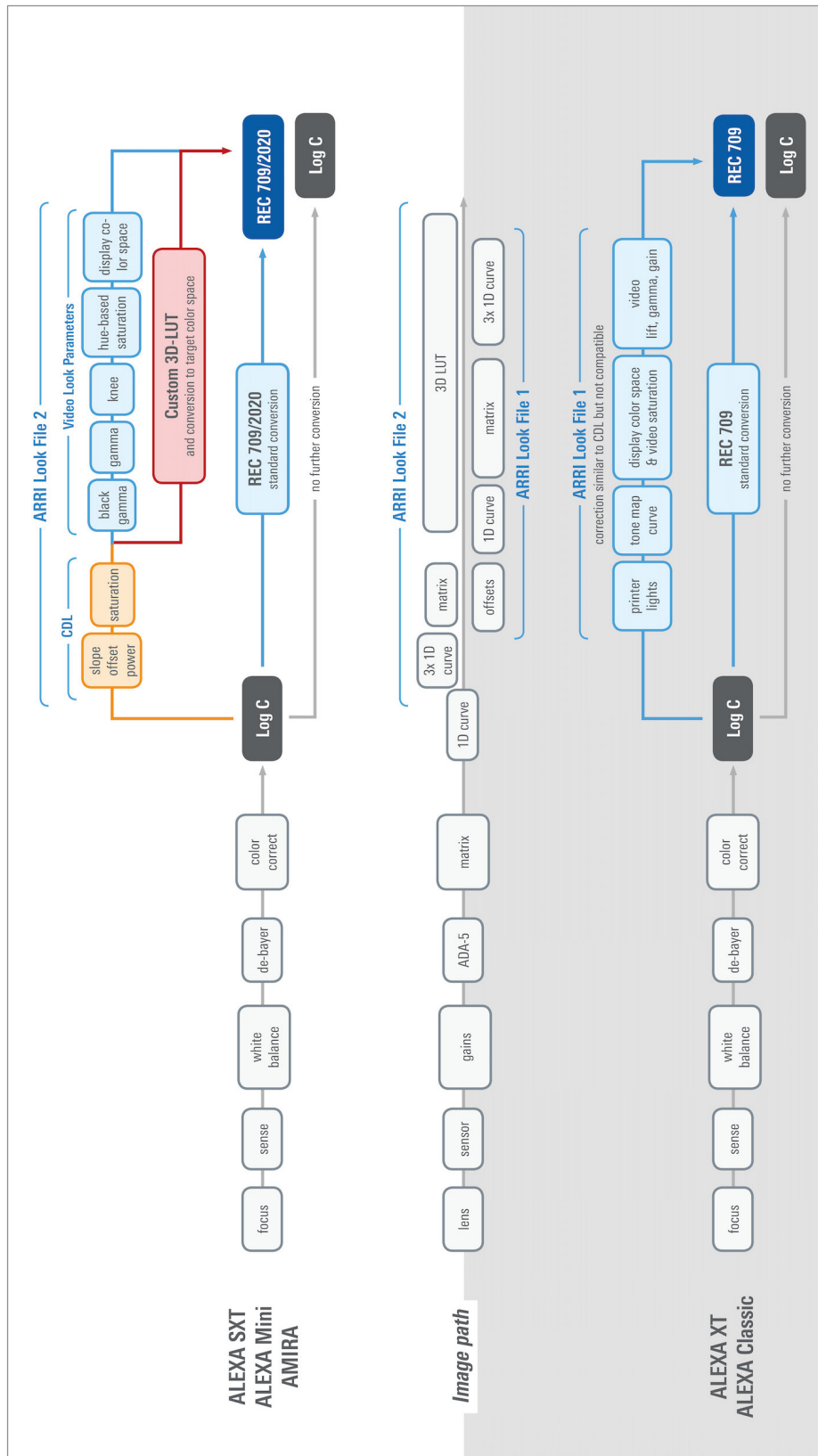
## Final grading and mastering

In a similar fashion the ALF-2 can be a guideline for final grading: as Resolve automatically applies the look to the current node, a parallel node might hold the colorist's grade for easy comparison and fluent grading.



# Comparing ALF-2 to ALF-1 (ALEXA Classic and ALEXA XT)

The following chart explains both cameras' image paths and the differences between both looks.





## Terminology

For further information on ARRI's color management or HDR please browse to our FAQs at:

[http://www.arri.com/camera/alexa\\_mini/learn/hdr\\_faq/](http://www.arri.com/camera/alexa_mini/learn/hdr_faq/)

[http://www.arri.com/camera/alexa\\_mini/learn/color\\_faq/](http://www.arri.com/camera/alexa_mini/learn/color_faq/)

## Further reading

For an in-depth read on AMIRA's color management and look creation have a look at our "Color By Numbers" document at <http://www.arri.de/camera/amira/downloads>.

For feedback or questions regarding this or other topics please email us at [digitalworkflow@arri.de](mailto:digitalworkflow@arri.de).