How to create an ARRI Look File 4

ALF4 and ALF4c

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Version History

Version	Author / Editor	Change Note
2022-02-10	Florian Martin	Version 1.0
2022-07-18	Simon Duschl	Update for ARRI Reference Tool (ART)
2023-09-04	Simon Duschl	Update to distinguish between ALF4 and ALF4c
2023-10-11	Christian Grafwallner	ALF4c & ARRI Reference Tool
2023-12-13	Simon Duschl	Color Workflow considerations with Custom Color Management
2024-09-12	Simon Duschl	Added ALEXA 265
2024-09-17	Jan Heugel	Revised graphics

Table of Contents

1   Introduction

This document is designed to help you to create an ALF4 or ALF4c look file to be used within the ARRI ALEXA 35 or ALEXA 265 camera. Both cameras are supporting our ARRI Look File 4.

2   The two variants of the ARRI Look File 4

2.1   ARRI Look File 4 (.alf4) with ARRI Color Management | ALF4

With the introduction of the ALEXA 35 camera in 2022 and ALEXA 265 in 2024, ARRI also introduced its new look file ALF4. While the previous version of the ARRI look file, the ALF2, combines creative intent (aka "Creative Modification Transform") and a dedicated target color space conversion (aka "video rendering" or "Display Render Transform"), the ALF4 for the ALEXA 35 and ALEXA 265 camera now only contains the creative intent, without a conversion into a target color space. The new ALF4 look file is "Log to Log", providing greater flexibility in several areas (please also have a look at the diagrams in the next section). Here some notes on ALF4:

- ASC CDL values (optional)
- The creative intent that feeds into a look file as a "Log to Log" LUT is now called Creative Modification Transform (CMT). The CMT gives you full control over the image since it takes place in LogC4 domain.
- In addition to the creative part of the look file, you can choose different Display Render Transforms (DRT) for different target color spaces for both SDI outputs: this means that the look has a LogC4/AWG4 source and LogC4/AWG4 destination color space and can be shown on one SDI output in SDR, and on another in HDR. The ALF4 is using the ARRI Color Management and therefore the DRTs are fixed to our official LogC4 DRTs.
- During color grading in post, it is now much easier to use the look file stored in metadata as a starting point. Colorists can apply that look for multiple deliverables and different target color spaces (such as P3 or Rec 2100) with the click of a button.

2.2   ARRI Look File 4 (.alf4c) with Custom Color Management | ALF4c

Custom Color Management is a new feature that allows those with a thorough understanding of color management to use their own Display Render Transforms (DRT) in ALEXA 35 and ALEXA 265 instead of the built-in DRTs. In order to use Custom Color Management in-camera, an ARRI Look File (ALF4c) must be created with the ARRI Reference Tool 1.4.0 or later. ALEXA 35 supports Custom Color Management starting with SUP 1.2.1. The ALEXA 265 supports Custom Color Management starting with SUP 1.0
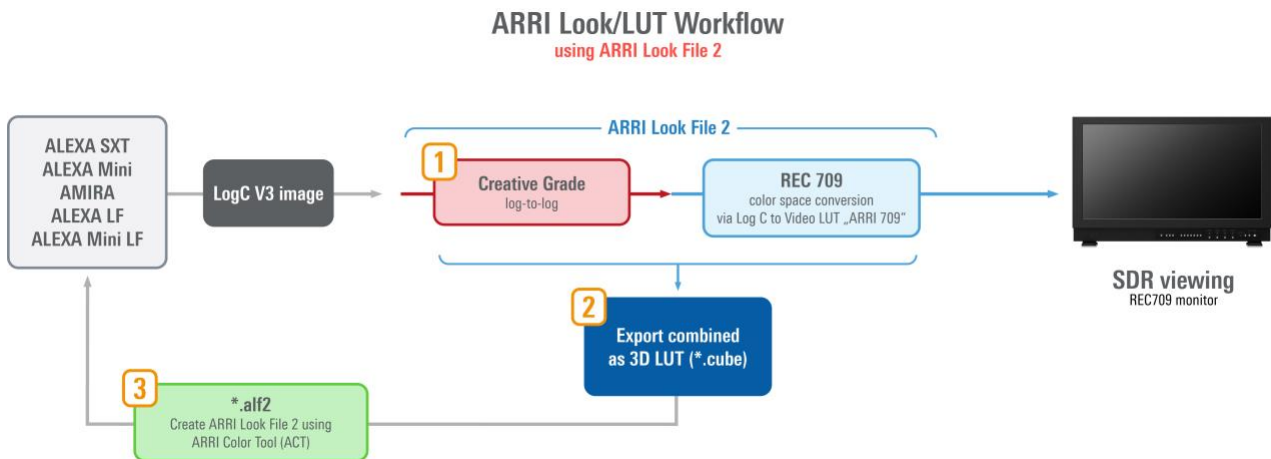
To better distinguish between both files, we named the new look file "ALF4c" (.alf4c). Here some notes on ALF4c:

- ASC CDL values (optional). Please note that the ASC CDL values are applied before the CMT in the LogC4/AWG4 color space.
- In Custom Color Management it's still possible to use a Creative Modification Transform (CMT) (optional)
    - The CMT now has two options:
        - LogC4/AWG4 source and LogC4/AWG4 destination color space (recommended)
        - LogC4/AWG4 source and custom destination color space
- When creating an ALF4c file in the ARRI Reference Tool, it is mandatory to supply an SDR and an HDR Display Render Transform.
- Warning: When choosing "Custom Color Management", you are fully responsible for color management of the images on set and in post, and it is much easier to royally mess things up than when using ARRI Color Management. Only use Custom Color Management when you know exactly what you are doing, have tested the entire imaging pipeline thoroughly and all departments involved are informed and have agreed!

3 Differences between ALF2, ALF4 & ALF4c

As mentioned above, an ALF2 look file always incorporates the creative intent and a video rendering to a given color space. The ALF4 look file on the other hand only incorporates the creative intent as a "Log to Log" Creative Modification Transform (CMT) and therefore can be used for multiple target color spaces. In addition, the ALF4c offers now the possibility to use a Creative Modification Transform (CMT) and two Custom Display Render Transforms (DRTs in SDR and HDR).

The diagram below demonstrates the necessary steps to create an **ALF2** look file to be used with an ARRI ALEXA SXT, ALEXA Mini, AMIRA, ALEXA LF, ALEXA Mini LF and ALEXA 65.
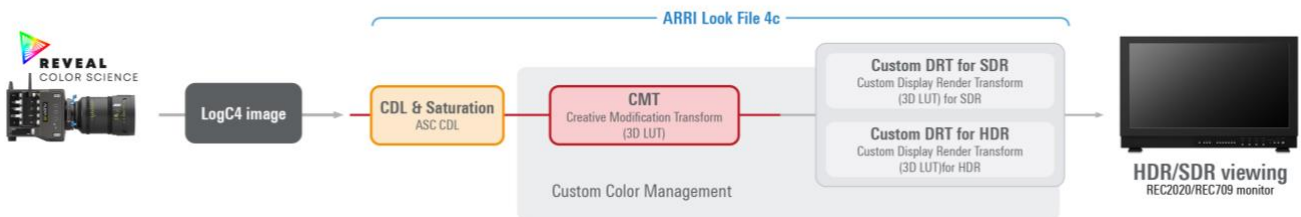
The diagram below demonstrates the necessary steps to create an **ALF4** look file for the ALEXA 35 or ALEXA 265 camera. We will show this workflow inside the [ARRI Reference Tool](#) (ART) and [DaVinci Resolve Studio](#) in [chapter 4](#).
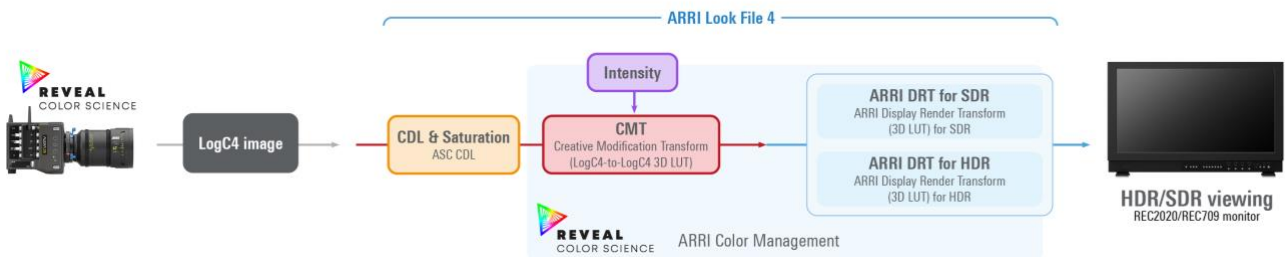
The diagram below demonstrates the necessary steps to create an **ALF4c** look file for the ALEXA 35 or ALEXA 265 camera. We will show this workflow inside the [ARRI Reference Tool](#) (ART) and [DaVinci Resolve Studio](#) in [chapter 5](#).


Please note: ALF1 look files are used in ALEXA Classic and ALEXA XT. ALF2 look files are used in AMIRA, ALEXA Mini, ALEXA SXT, ALEXA LF, ALEXA Mini LF and ALEXA 65. ALF4 files are used with ALEXA 35 or ALEXA 265 camera and the ALF4c files can be used with ALEXA 35 (SUP 1.2.1) or ALEXA 265 (SUP 1.0).

4 Workflow for creating an ALF4 look file with DaVinci Resolve Studio and ARRI Reference Tool (ART) | ARRI Color Management

4.1 Set up your Resolve project.

- Please open a new project inside DaVinci Resolve Studio.
- Open the "Project Settings", go to the "Color Management" page, and set the "Color science", "Video monitor lookup table" and "3D lookup table interpolation" according to the screenshot below. (Resolve Version 18.6.1 was used for all screenshots.) We assume you are creating an ALF4 look file using a calibrated Rec 709 with gamma 2.4 monitor on the SDI out of DaVinci Resolve Studio. We suggest you not to use a color managed workflow within DaVinci Resolve Studio for creating an ARRI Look File.
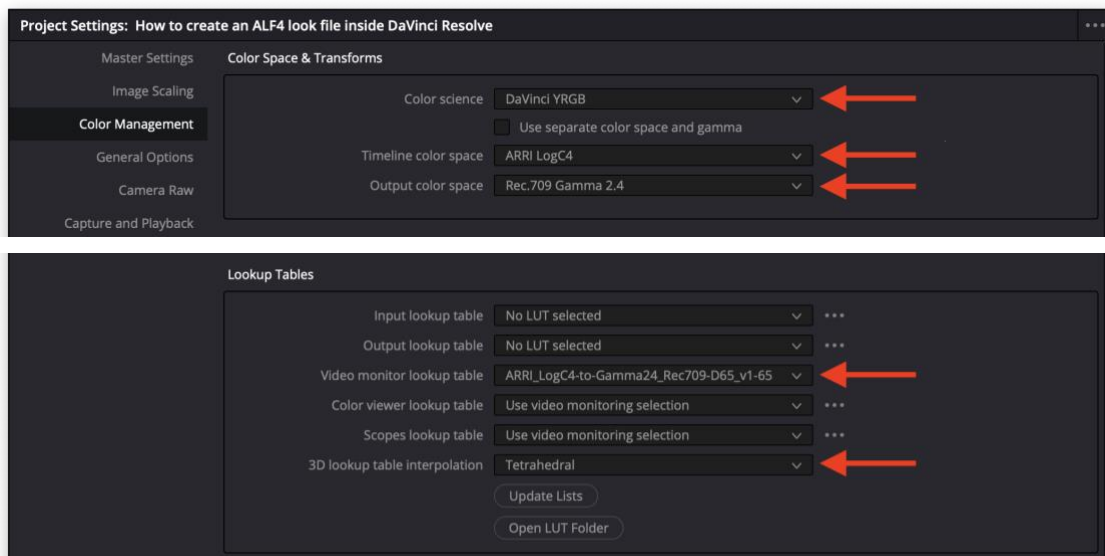

Please note: For creating correct "Log-to Log" CMT 3D LUTs, you should ensure to not include a DRT into your 3D LUT export. By setting your video rendering as the "Video monitor lookup table" you will be able to see this on the SDI monitor, but it will not be incorporated once you export your grading as a 3D LUT.

4.2 Color grading the "Creative Modification Transform (CMT)" = "Creative Intent"

- Load your footage into a timeline and add your node.
- **1st Node** = Grade your desired "CMT" = custom Log-to-Log look using all except spatial tools, since they cannot be incorporated inside a 3D LUT (spatial tools are shapes, blurs, denoise, grain,...).

4.3 Export a 3D LUT

- Right click on the clip in the thumbnail timeline and choose "Generate LUT" and select either "65 Point Cube" or "33 Point Cube".
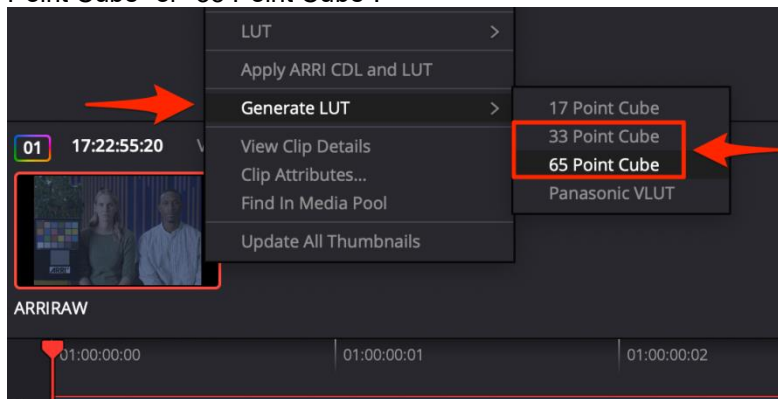

- Name your 3D LUT.
- This 3D LUT is your Creative Modification Transform (CMT) without a Display Render Transform (DRT) and should contain only the "Log-to-Log" information.
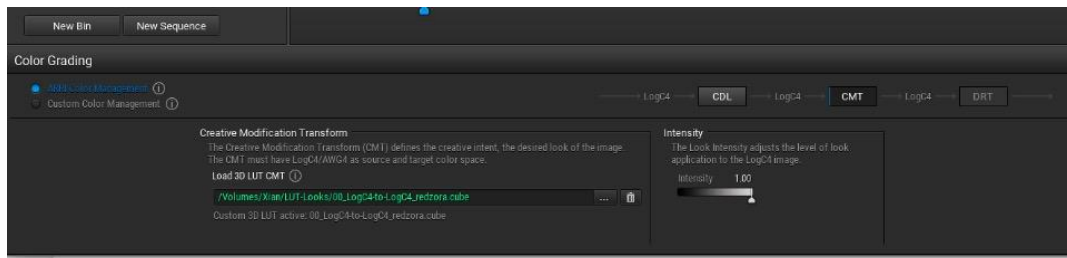

4.4   Convert the 3D LUT file into a ALF4 file using the ARRI Reference Tool (ART)

4.4.1   How to load the CMT 3D LUT you saved in the previous step into ART.

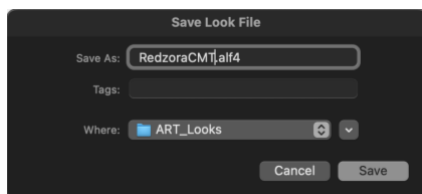- Go to the Look Room and select ARRI Color Management in the Color Grading menu (1)

- press the CMT button (2)
- load the newly created CMT LUT from the menu (3)

- if necessary you can adjust the CMT intensity with the intensity slider (4)
- save a ALF4 (.alf4) look file by using the menu

- enter your file name for the ALF4 (.alf4) look file

4.5 Load your ALF4 look file into the ALEXA 35 or ALEXA 265 camera

- Copy the ALF4 (.alf4) look file on a USB stick you prepared inside the camera:
  //ALEXA35/LOOKFILES/ or //ALEXA265/LOOKFILES/
- Load and select look file in camera
- The selected look will be saved in the file header of each captured file and can be extracted by using our ARRI Reference Tool (ART).

5 Workflow for creating an ALF4c look file with DaVinci Resolve Studio and ARRI Reference Tool (ART) | Custom Color Management

ALEXA 35 and ALEXA 265 look file workflow with Custom Color Management
using ARRI Look File 4c
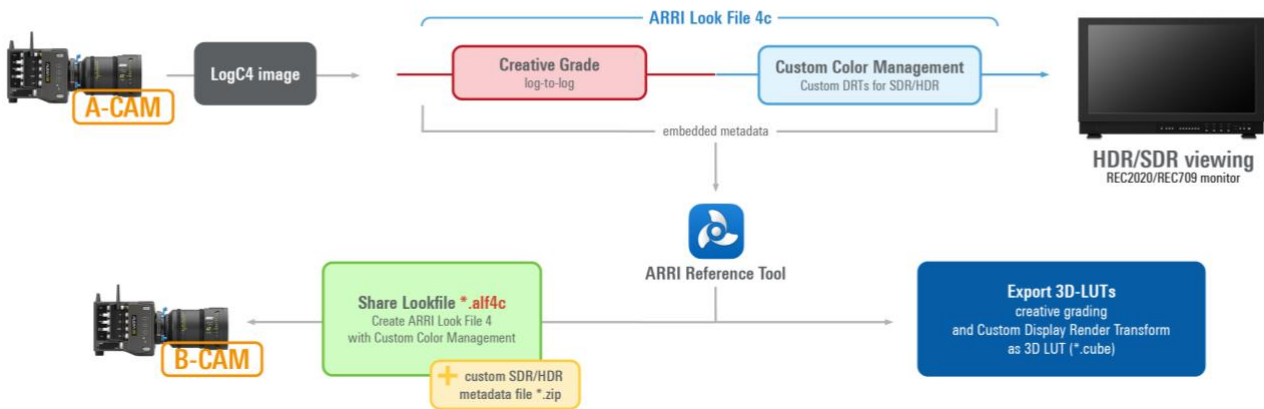
5.1 Set up your Resolve project for a Creative Modification Transform (CMT) and Custom DRT with SDR target color space

- Please open a new project inside DaVinci Resolve Studio.
- Open the "Project Settings" and go to the "Color Management" page and set the "Color science", "Video monitor lookup table" and "3D lookup table interpolation" according to the screenshot below. (Resolve Version 18.6.1 was used for all screenshots.) We assume you are creating an ALF4c look with a Custom Display Render Transform for SDR. We suggest you not to use a color managed workflow within DaVinci Resolve Studio for creating an ARRI Look File.
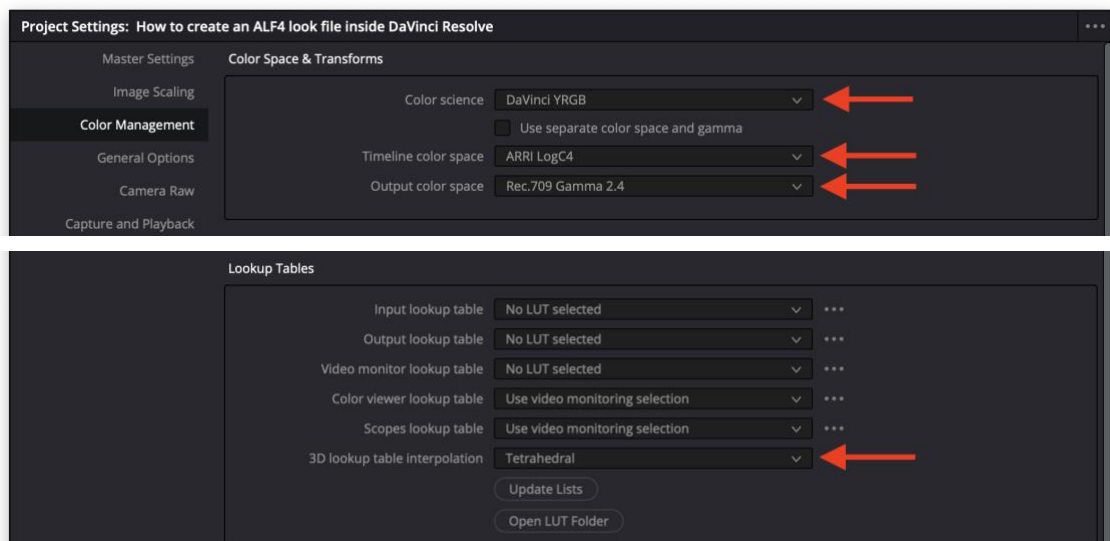
5.2   Set up your Resolve project for a Creative Modification Transform (CMT) and Custom DRT with HDR target color space


- Please open a new project inside DaVinci Resolve Studio.
- Open the "Project Settings" and go to the "Color Management" page and set the "Color science", "Video monitor lookup table" and "3D lookup table interpolation" according to the screenshot below. (Resolve Version 18.6.1 was used for all screenshots.) We assume you are creating an ALF4c look with a Custom Display Render Transform for HDR. We suggest you not to use a color managed workflow within DaVinci Resolve Studio for creating an ARRI Look File.
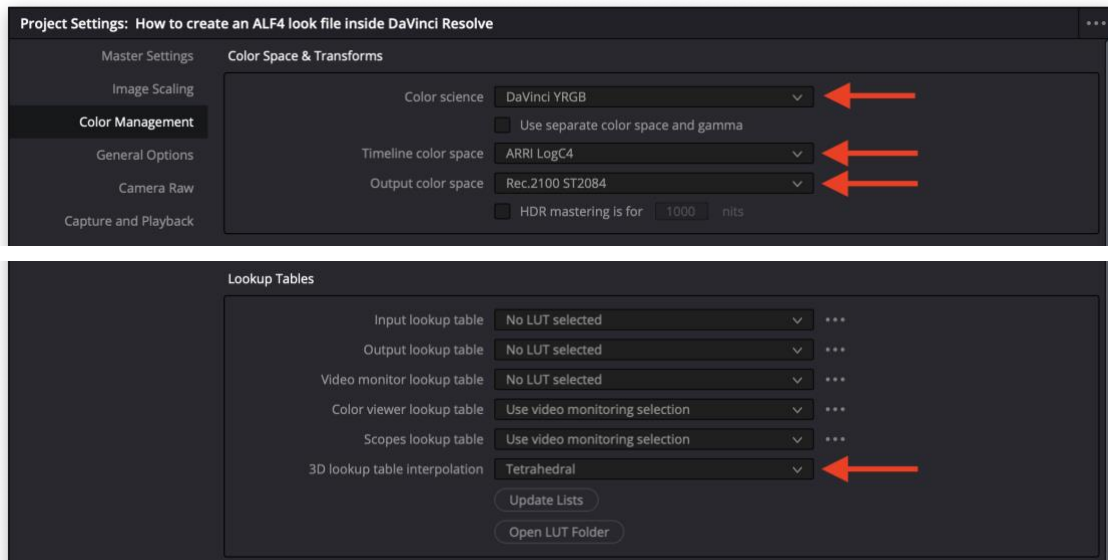
5.2.1   Setup your Resolve Nodes for a CMT & custom DRT

- Load your footage into a timeline and create two nodes.
- **1. Node** = Grade your desired CMT = "Log-to-Log" look using all tools except spatial tools, since they cannot be incorporated inside a 3D LUT (spatial tools are shapes, blurs, denoise, grain,...)
- **2. Node** = Custom Display Render Transform for example this can be an ACES output Transform for SDR or HDR.

Please note: The 2. Node can be a Custom Display Render Transform to any color space such as Rec 2020 / P3 / Rec 709 (SDR) or Rec 2020/PQ / Rec 2020/HLG (HDR).
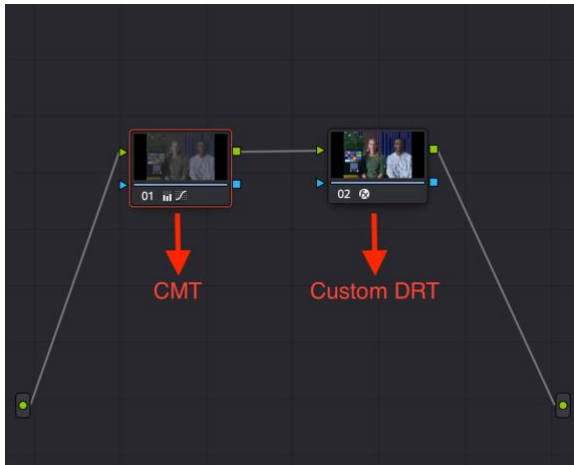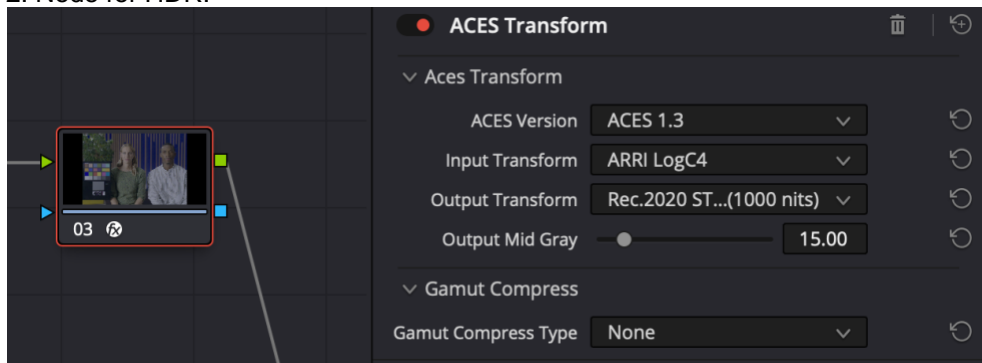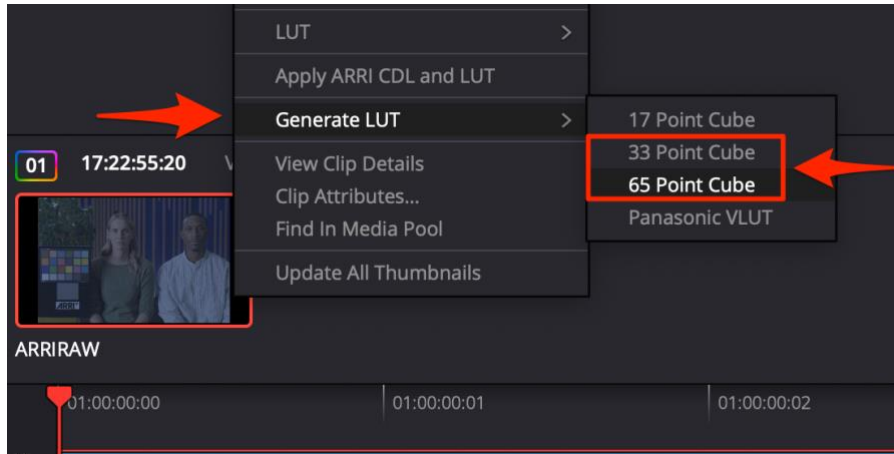

2. Node for SDR:
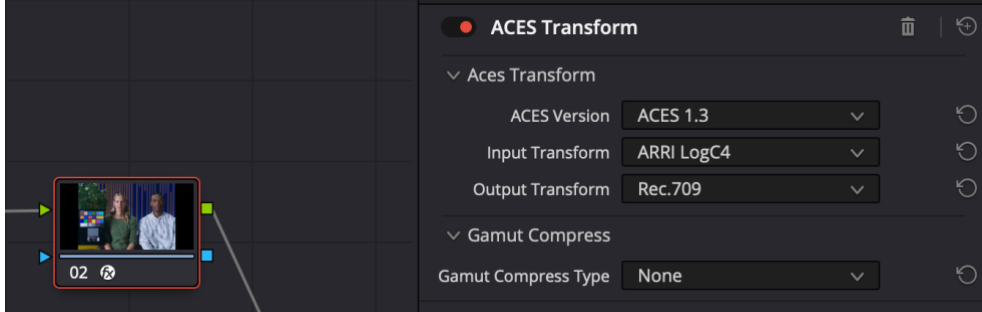
OR

2. Node for HDR:

5.2.2   Export two 3D LUTs for "Creative Modification Transform (CMT) & "Custom Display Render Transform"

- Deactivate the 2. Node and activate the 1. Node = Creative Modification Transform (CMT)
- Right click on the clip in the thumbnail timeline choose "Generate LUT" and select either "65 Point Cube" or "33 Point Cube".

- Name your 3D LUT
- This 3D LUT is your Creative Modification Transform

- Deactivate the 1. Node and activate the 2. Node = Custom Display Render Transform (DRT)
- Right click on the clip in the thumbnail timeline choose "Generate LUT" and select either "65 Point Cube" or "33 Point Cube".
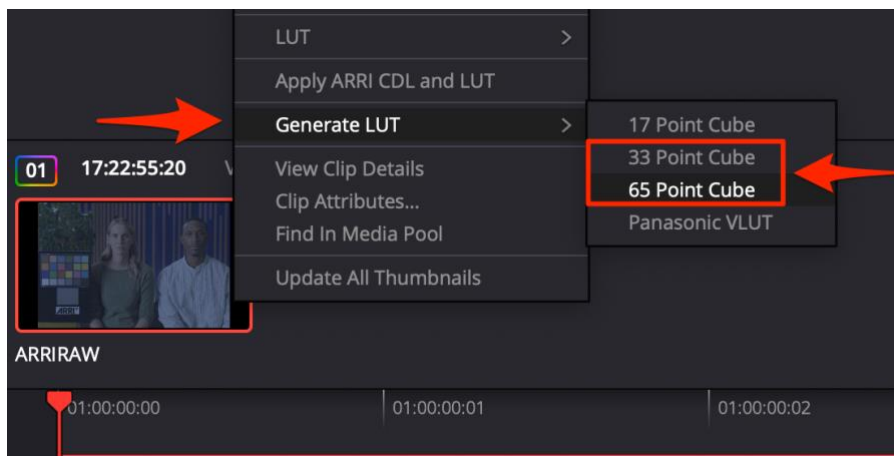
- Name your 3D LUT.
- This 3D LUT is your Custom Display Render Transform

5.3 Convert CMT and both DRT 3D LUTs into a ALF4c file using the ARRI Reference Tool (ART)

- In ART, go to the "LOOK" room and choose Custom Color Management.

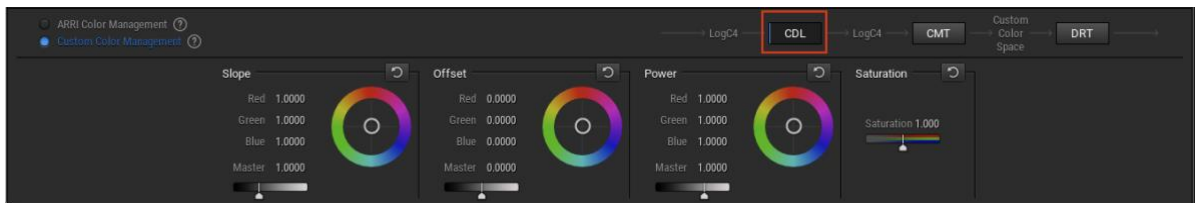### 5.3.1 ASC CDL Menu

- Activate the CDL menu by pressing the CDL button.

Please note:

a) The ASC CDL is always applied to LogC4 (LogC4 -> ASC CDL -> LogC4)

b) There is no possibility to apply a transformation before the ASC CDL
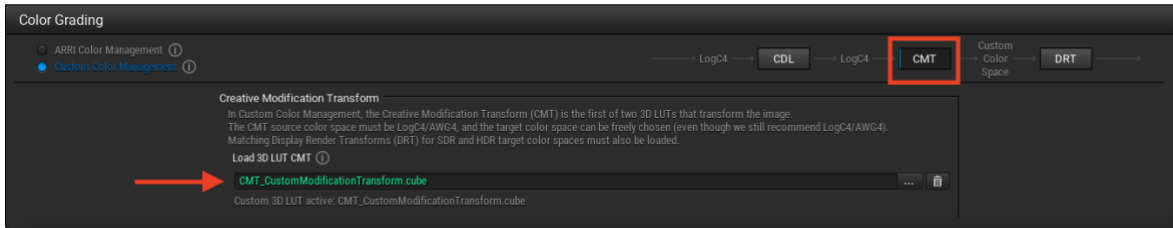

5.3.2 Creative Modification Transform (CMT)

- Activate the CMT menu by pressing the CMT button.
- Load the 3D LUT for the Creative Modification Transform (CMT)

Please note:.
- a) The intensity for CMT is not available because we do not know the transformation.
- b) We recommend for the CMT using LogC4 as the target color space.

5.3.3 Display Render Transform (DRT) for SDR & HDR

- Activate the DRT menu by pressing the DRT button.
- Load the 3D LUTs for the Custom Display Render Transforms (DRT) for SDR & HDR and select the appropriate color space from the drop-down menu:
  - SDR
    - i. Rec 709-D65
    - ii. Rec 2020-D65
  - HDR
    - i. Rec 2100/PQ
    - ii. Rec 2100/HLG

Please note:
- a) We recommend for the DRTs using LogC4 as the source color space (unless your CMT target color space is not LogC4. Then you should choose the CMT target color space as the DRT source color space.). This ensures full compatibility with our ARRI Look Library, which is based on LogC4
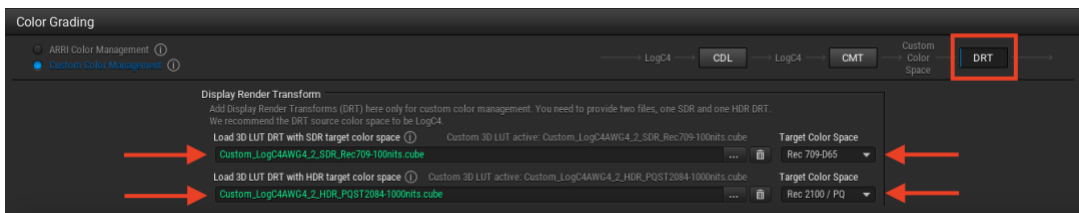
### 5.3.4   Create ALF4c (.alf4c) Look File

- To save an ALF4c (.alf4c) look file, select the LUT Export button in the Look room menu.

 a further "Save Look File" menu opens with the following input fields:

- Custom Color Management Name:
    - a mandatory field to assign a name to the custom look that appears in the camera look selection menu to better distinguish between ARRI and custom color space looks (available in ALEXA 35 SUP 1.2.1 or later and ALEXA 265 SUP 1.0 or later)

- SDR/HDR Custom Color Management Metadata (*.zip) Files:
    - the two fields can optionally be used to provide additional details in the form of an AMF or in the form of CLT files as *.zip format in the clip metadata for post-production.

  The AMF (ACES Metadata File) and CLF (Common LUT Format) are intended to provide a more detailed description of the transformations used in the DRTs.
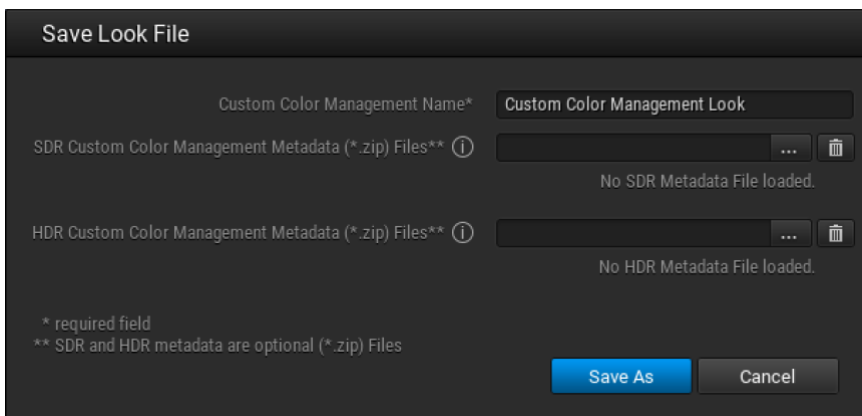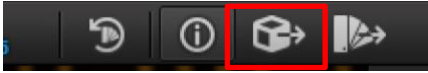

5.3.5   Look Info menu

- To see which DRTs are in use in a certain look file, click the "Look Info" button to reveal the pop up:
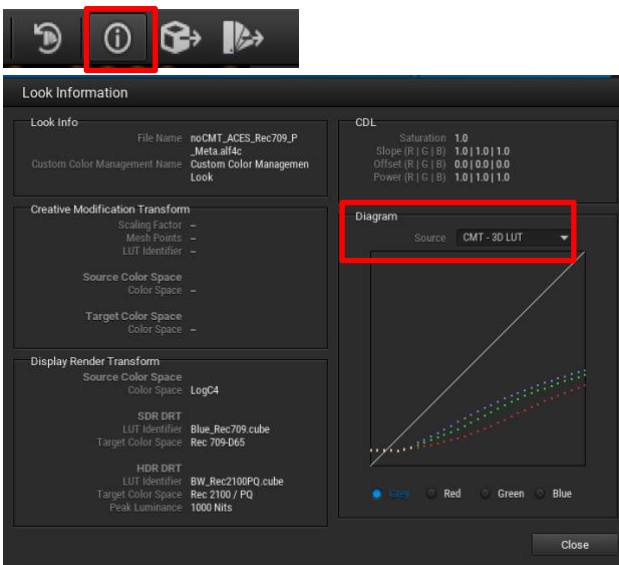

5.3.6   3D LUT Export

- In the Export Look to 3D LUT menu you can choose which of the 3D LUT files to export.

Please note: When you export a 3D LUT from an ALF4c file the exported LUT will be saved as loaded into ART without any conversions (e.g. meshpoints and LUT size)

- If the optional metadata is available for the SDR or HDR DRT LUT, the checkbox can be selected and extracted as .zip files.
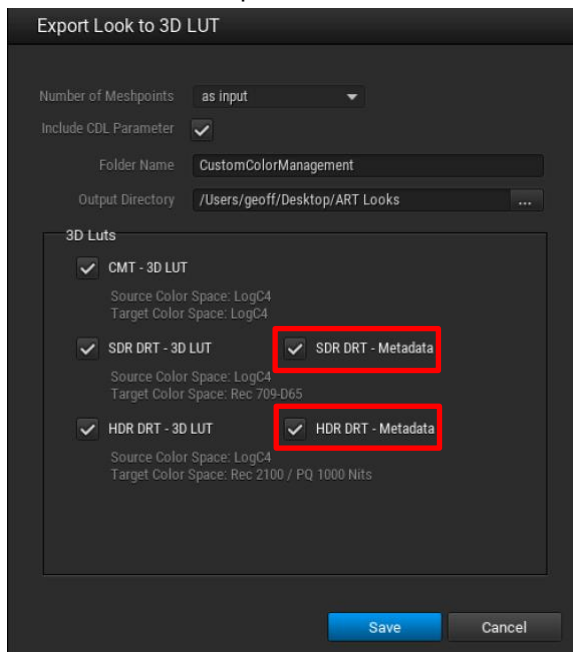
5.4   Load your custom ALF4c look file into the ALEXA 35 or ALEXA 265 camera.

- Copy the ALF4c (.alf4c) look file on a USB stick you prepared inside the camera //ALEXA35/LOOKFILES/ or //ALEXA265/LOOKFILES/
- Load and select look file in camera.
- The selected look will be saved in the file header of each captured clip and can be extracted by using our ARRI Reference Tool (ART)

6 Color Workflow considerations with Custom Color Management

This chapter will give some basic insights to color workflows and what's possible with Custom Color Management. We show two possible ways here, Case A and Case B. Depending on the chosen color workflow some nodes and color space transforms must be combined into one 3D-LUT, before loading into our ARRI Reference Tool for creating the ARRI Look File 4 (ALF4c) with Custom Color Management for the ALEXA 35 or ALEXA 265 camera.

6.1 Case A | Creative Modification Transform (CMT) as a "Log-to-Log" LUT within ACES
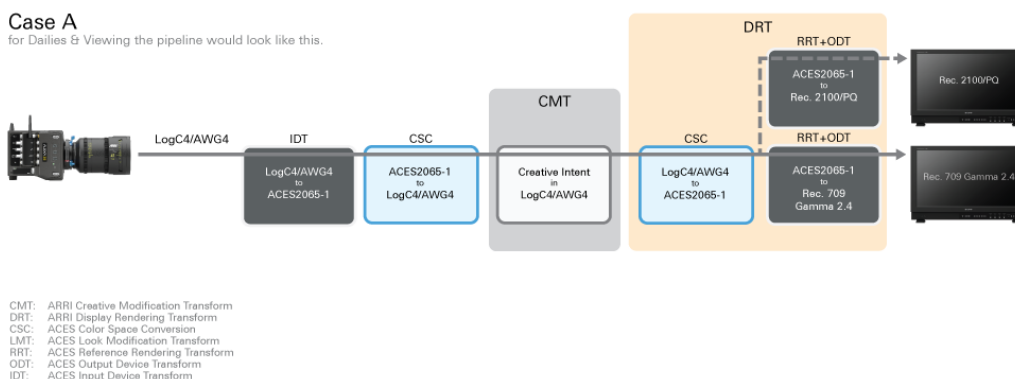
6.1.1 Post-production pipeline
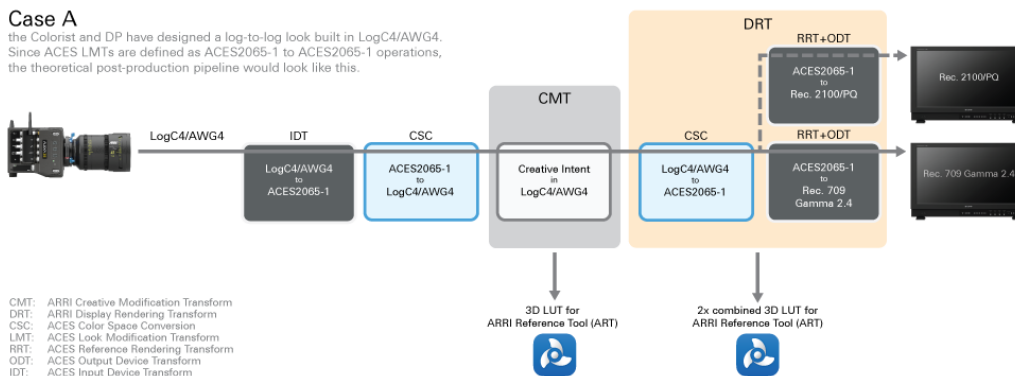
For creating an ALF4c within the ARRI Reference Tool you now need three 3D-LUTs:
1. 3D LUT for CMT in ART
2. combined 3D LUT for DRT (SDR) in ART
3. combined 3D LUT for DRT (HDR) in ART
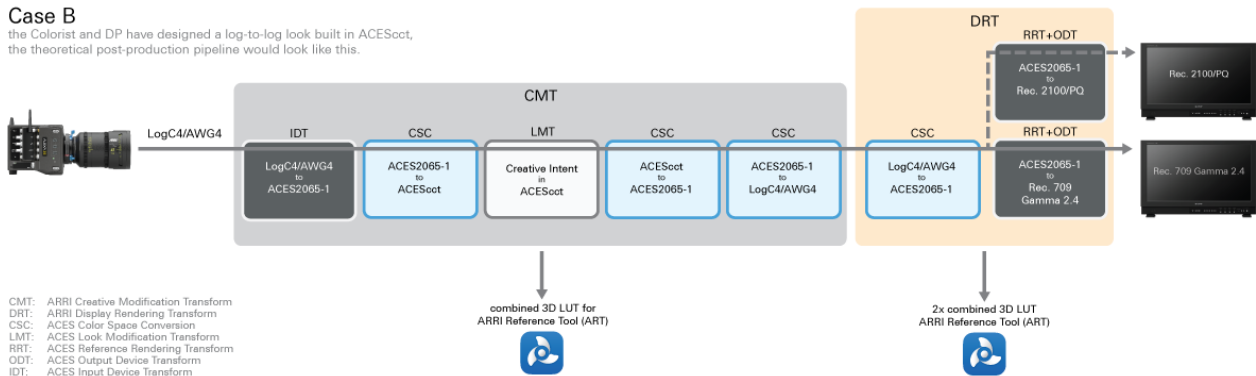
6.1.2 Dailies/Viewing pipeline

Please note: We suggest doing a full color pipeline and workflow test together with your post-production facility to ensure a correct full to end color pipeline.

6.2 Case B | Creative Modification Transform (CMT) as a Look Modification Transform (LMT) within ACES

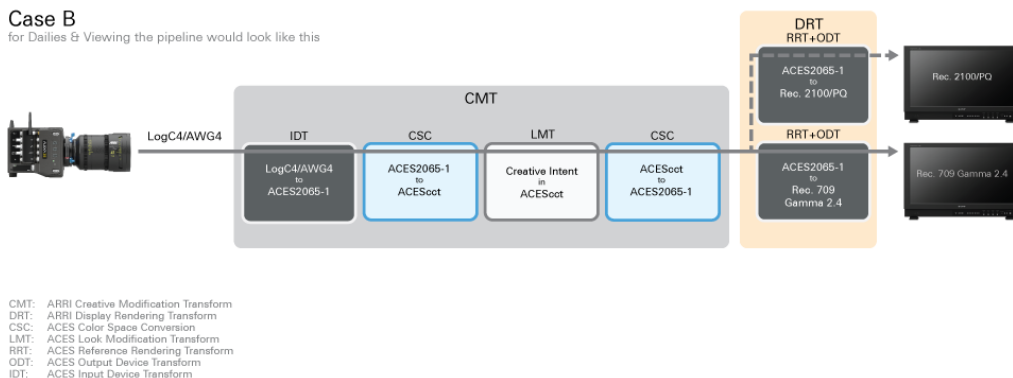### 6.2.1 Post-production pipeline

For creating an ALF4c within the ARRI Reference Tool you now need three 3D-LUTs:

1. combined 3D LUT for CMT in ART
2. combined 3D LUT for DRT (SDR) in ART
3. combined 3D LUT for DRT (HDR) in ART

6.2.2 Dailies/Viewing pipeline

Please note: We suggest doing a full color pipeline and workflow test together with your post-production facility to ensure a correct full to end color pipeline.

7 Contact

In case you have questions or recommendations, please contact the Digital Workflow Support within ARRI via email: digitalworkflow@arri.de