



AMIRA & ALEXA SXT / SXT W / LF / Mini

ARRIRAW Converter 4.2 (CMD)

USER MANUAL

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1 ARC CMD Usage

The ARRIRAW Converter CMD (hereafter referred to as “ARC CMD”) is a command line tool using the ARRIRAW SDK to convert ARRIRAW images into different file formats. Using a XML based configuration file (the so called short settings), parameters affecting the rendering output can be set.

The settings are explained in more detail in the ARRIRAW SDK documentation.

1.1 Package Content

The ARC_CMD is delivered as a package of two (CPU only) or three files:

- ARC_CMD: the main binary, call it for image processing
- Shortsettings.xml: sample configuration file. For documentation purposes, all parameters are shown and commented in it. For a more detailed documentation, this document was created.
- Libcudart.dylib (optional): builds supporting CUDA necessarily come with the CUDA runtime library libcudart.dylib.

1.2 Command Line Parameters

Possible command line parameters are:

-h [--help]	Show this message and exit.
-v [--version]	Output version information and exit.
-c [--config] arg	Filename of the ArriRaw decoder settings config file (if not set, the settings will be read from the ARRIRAW header).
-i [--input-file] arg	input file(s) (--inputfile resp. -i is optional) Cannot be used together with -f.
-f [--list-file] arg	Text file containing the list of ARRIRAW files to render. Must be a text file containing one ARRIRAW file name per line. Cannot be used together with -i.
--output.directory arg	Set or override output directory
--output.filename arg	Set or override output filename
--output.format arg	Set or override output format
--output.exrcompression arg	Set or override compression for exr output format
--output.startnumber arg	Set or override output start number
--performance.processors arg	Number of CPU cores to be used
--performance.rendermode arg	Name of the render mode (cpu or gpu)
--cpu	Shortcut for --performance.rendermode cpu
-gpu	Shortcut for --performance.rendermode gpu
--gpuNumber arg	Select GPU device number (only available on Apple systems)

<code>--monochrome</code>	Sets or overrides colorspace to LogC monochrome.
<code>--verbose</code>	Enables verbose output
<code>--test.forcelocalimagedata</code>	Internal option, significantly lowers performance
<code>-r [--range] arg</code>	Select index range, e.g. <code>-r 5-17</code> , or <code>-r first last</code> . Only relevant for MXF/ARRIRAW files

A typical command line expression in Linux and Mac OS X is:

```
>/path/to/ARC_CMD -c shortsettings.xml -I /path/Images/ArriRaw/TestImages_001*.ari
```

In Windows, you can use a cygwin bash shell, for which the syntax is similar to the one above:

```
$/cygdrive/c/path/to/ARC_CMD_Win32 -c /cygdrive/c/path/to/shortsettings.xml -i /cygdrive/c/Images/ArriRaw/TestImages_001*.ari
```

Under Windows, you can also use a command line prompt (cmd), for which the syntax is:

```
>C:\path\to\ARC_CMD_Win32.exe -c C:\path\to\shortsettings.xml -i C:\path\to\ari\images\0000.ari
C:\path\to\ari\images\0001.ari
```

Note that the windows command line prompt will not let you use wildcards like *.ari.

ATTENTION!

If the number of ARRIRAW files to render is large and you are using the `-i` option, you might see the error message "Argument list too long". In that case, the workaround is to create a file containing the list of ARRIRAW files that have to be rendered and to use this file as input for the command line option `-f`. You can do that in a cygwin bash shell, a Linux or a Mac OS X terminal:

```
$/path/to/ari/images/*.ari > ari_file_list.txt
$/path/to/ARC_CMD -c /path/to/shortsettings.xml -f ari_file_list.txt
or
$ cd /path/to/ari/images
$ ls | sed "s#^#`pwd`/#" > ari_file_list.txt
$/path/to/ARC_CMD -c /path/to/shortsettings.xml -f ari_file_list.txt
```

The input sequence can also be specified in the short settings XML file (see section "Input"). In that case, neither `-i` nor `-f` is required. However, if you still specify an input sequence using `-i` or `-f`, the sequence in the XML file will be ignored.

Unless specified otherwise, the converted files will be written in the directory where the ARC CMD executable has been called. The same file name as the input images will be used, with the output format dependent file extension. If you wish to change this behavior, you can use the `<output>` block described in section "Output".

If no decoder settings XML file is specified, the values to render the image will be taken from the ARRIRAW header.

If an error occurs while writing the output files, the rendering process will stop.

2 Configuration XML

The configuration XML is logically structured into different sections

2.1 Whitebalance

Optional block configuring the whitebalance settings.

If not present, values from the ARRIRAW V3 file header will be taken.

```

<whitebalance>
    <param name="burntinred"           value="1.0" />
    <param name="burntingreen"        value="1.0" />
    <param name="burntinblue"         value="1.0" />
    <param name="desiredred"          value="1.0" />
    <param name="desiredgreen"        value="1.0" />
    <param name="desiredblue"         value="1.0" />
    <param name="WBAppliedincamera"   value="false" />
    <param name="usecctandtint"       value="false" />
</whitebalance>

```

2.2 Colorhandling

Optional block configuring settings for colour handling.

If not present, values from the ARRIRAW V3 file header will be taken.

```

<colorhandling>
    <param name="colorencodingrange"   value="fullRange" />
    <param name="colorspace"          value="ITU709" />
    <param name="illumination"        value="planck" />
    <param name="colorblending"       value="1.0" />
    <param name="cct"                 value="5600.0" />
    <param name="tint"                value="0.0" />
    <param name="colorimetry"         value="ALEXA" />
</colorhandling>

```

Colorencodingrange (fullrange), illumination (planck), and colorblending (1.0) only support the named values at the moment.

Supported colorspace parameter are:

- ITU709 (encoding Video)
- P3 (encoding Video)
- Video_ITU2020 (encoding Video)
- Video_DCID60 (encoding Video)
- Video_DCID65 (encoding Video)
- Video_ITU2100_PQ (encoding Video)
- Video_ITU2100_HLG (encoding Video)
- CameraNative (encoding LogC)
- WideGamut (encoding LogC)
- Film (encoding LogC)
- ACES (encoding scene linear)
- LogC_Monochrome (encoding LogC)
- Video_Monochrome (encoding Video)
- SceneLinear_WideGamut (encoding scene linear)
- SceneLinear_CameraNative (encoding scene linear)

“Colorimetry” stands for the colorimetric dataset that is used in the processing. For certain cameras and sensors different colorimetric sets may exist and can then be switched with this parameter. Currently available values: ALEXA, ALEXA65, ALEXA_LF, AMIRA, ALEXA_MINI. Note that these values will only work with the corresponding camera type.

All other values are present in the ARRIRAW V3 file header or will be set depending on the ARRIRAW V3 header values.

2.3 Asalut

Optional block setting the ISO value.

If not present, the value from ARRIRAW V3 file header will be taken.

```
<asalut>
    <param name="iso" value="200" />
</asalut>
```

2.4 Downscale

Optional block configuring downscale parameters. This block is deprecated and will be removed in future releases. Please use the Scaling block instead. If both blocks, Downscale and Scaling, are set, this block will be ignored.

```
<downscale>
    <param name="mode"           value="TWO_K_FROM_2868PX" />
    <param name="anamorph"      value="1.0" />
    <param name="crispness"     value="1.0" />
</downscale>
```

If not present, for anamorph and crispness values from the ARRIRAW V3 file header will be taken; the mode will then be set to TWO_K_FROM_2880PX for 2.8k images and to TWO_K_1_78_FROM_3414PX for a 3.4k image, which results in the output of a 2K image.

Possible values for the mode parameter are:

- NATIVE_3414PX, NATIVE_2880PX, NATIVE_2868PX, NATIVE_2578PX, NATIVE_6560PX, NATIVE_5120PX, NATIVE_4320PX, NATIVE_3168PX, NATIVE_3424PX, NATIVE_2592PX, NATIVE_3200PX, NATIVE_1920PX, NATIVE_3840PX, NATIVE_4448PX, NATIVE_SCOPE_4448PX
- SD_FROM_2880PX
- HD_1_78_FROM_3414PX , HD_1_85_FROM_3414PX, HD_2_39_FROM_3414PX, HD_1_78_FROM_2880PX, HD_2_39_FROM_2880PX, HD_2_39_FROM_2578PX, HD_FROM_2880PX, HD_FROM_6560PX, HD_2_39_FROM_6560PX, HD_1_85_FROM_6560PX, HD_1_78_FROM_6560PX, HD_FROM_5120PX, HD_2_39_FROM_5120PX, HD_1_85_FROM_5120PX, HD_1_78_FROM_5120PX, HD_FROM_4320PX, HD_2_39_FROM_4320PX, HD_1_85_FROM_4320PX, HD_1_78_FROM_4320PX, HD_FROM_3168PX, HD_FROM_3200PX, HD_FROM_1920PX, HD_FROM_3840PX, HD_FROM_4448PX, HD_FROM_SCOPE_4448PX, HD_1_78_FROM_3840PX, HD_1_78_FROM_4448PX, HD_1_85_FROM_4448PX, HD_2_39_FROM_4448PX
- TWO_K_1_78_FROM_3414PX, TWO_K_DCI_1_85_FROM_3414PX, TWO_K_1_85_FROM_3414PX, TWO_K_2_39_FROM_3414PX, TWO_K_DCI_1_85_FROM_2880PX, TWO_K_FROM_2880PX, TWO_K_FROM_2868PX, TWO_K_1_78_FROM_2880PX,

- TWO_K_1_78_FROM_2868PX, TWO_K_2_39_FROM_2880PX,
TWO_K_2_39_FROM_2578PX, TWO_K_FROM_6560PX,
TWO_K_2_39_FROM_6560PX, TWO_K_1_85_FROM_6560PX,
TWO_K_DCI_1_85_FROM_6560PX, TWO_K_1_78_FROM_6560PX,
TWO_K_FROM_5120PX, TWO_K_2_39_FROM_5120PX,
TWO_K_1_85_FROM_5120PX, TWO_K_DCI_1_85_FROM_5120PX,
TWO_K_1_78_FROM_5120PX, TWO_K_FROM_4320PX,
TWO_K_2_39_FROM_4320PX, TWO_K_1_85_FROM_4320PX,
TWO_K_DCI_1_85_FROM_4320PX, TWO_K_1_78_FROM_4320PX,
TWO_K_FROM_3168PX, TWO_K_FROM_3200PX, TWO_K_FROM_3840PX,
TWO_K_FROM_4448PX, TWO_K_1_78_FROM_3840PX,
TWO_K_DCI_1_85_FROM_3840PX, TWO_K_DCI_1_85_FROM_4448PX,
TWO_K_2_39_FROM_3840PX, TWO_K_2_39_FROM_SCOPE_4448PX,
TWO_K_2_39_FROM_4448PX
- QUAD_HD_1_85_FROM_3414PX, QUAD_HD_2_39_FROM_3414PX,
QUAD_HD_2_39_FROM_2880PX, QUAD_HD_2_39_FROM_2578PX,
QUAD_HD_FROM_2880PX, QUAD_HD_FROM_6560PX,
QUAD_HD_2_39_FROM_6560PX, QUAD_HD_1_85_FROM_6560PX,
QUAD_HD_1_78_FROM_6560PX, QUAD_HD_FROM_5120PX,
QUAD_HD_2_39_FROM_5120PX, QUAD_HD_1_85_FROM_5120PX,
QUAD_HD_1_78_FROM_5120PX, QUAD_HD_FROM_4320PX,
QUAD_HD_2_39_FROM_4320PX, QUAD_HD_1_85_FROM_4320PX,
QUAD_HD_1_78_FROM_4320PX, QUAD_HD_FROM_3168PX,
QUAD_HD_FROM_3200PX, QUAD_HD_FROM_3840PX,
QUAD_HD_FROM_4448PX, QUAD_HD_1_78_FROM_3840PX,
QUAD_HD_1_78_FROM_4448PX, QUAD_HD_1_85_FROM_4448PX,
QUAD_HD_2_39_FROM_4448PX
 - FOUR_K_DCI_1_78_FROM_3414PX, FOUR_K_1_78_FROM_3414PX,
FOUR_K_DCI_1_85_FROM_3414PX, FOUR_K_1_85_FROM_3414PX,
FOUR_K_2_39_FROM_3414PX, FOUR_K_2_39_FROM_2880PX,
FOUR_K_FROM_2880PX, FOUR_K_DCI_1_78_FROM_2880PX,
FOUR_K_DCI_1_85_FROM_2880PX, FOUR_K_2_39_FROM_2578PX,
FOUR_K_FROM_6560PX, FOUR_K_2_39_FROM_6560PX,
FOUR_K_1_85_FROM_6560PX, FOUR_K_DCI_1_85_FROM_6560PX,
FOUR_K_1_78_FROM_6560PX, FOUR_K_FROM_5120PX,
FOUR_K_2_39_FROM_5120PX, FOUR_K_1_85_FROM_5120PX,
FOUR_K_DCI_1_85_FROM_5120PX, FOUR_K_1_78_FROM_5120PX,
FOUR_K_FROM_4320PX, FOUR_K_2_39_FROM_4320PX,
FOUR_K_1_85_FROM_4320PX, FOUR_K_DCI_1_85_FROM_4320PX,
FOUR_K_1_78_FROM_4320PX, FOUR_K_FROM_3168PX,
FOUR_K_FROM_3200PX, FOUR_K_FROM_4448PX,
FOUR_K_DCI_1_85_FROM_3840PX, FOUR_K_DCI_1_85_FROM_4448PX,
FOUR_K_2_39_FROM_3840PX, FOUR_K_2_39_FROM_SCOPE_4448PX,
FOUR_K_2_39_FROM_4448PX

The parameter "factor" is deprecated and was dropped in a former release. Please use the following downscale modes instead:

1.0 → NATIVE_2880PX
 1.40 → TWO_K_FROM_2880PX
 1.50 → HD_FROM_2880PX
 3.75 → SD_FROM_2880PX.

2.5 Scaling

Optional block configuring scaling parameters. This block is new and created to replace the "Downscale" block. If both blocks, Downscale and Scaling, are set, this node will be used.

```
<scaling>
  <param name="activeImagePreset" value="Custom" />
  <param name="activeImageLeft" value="2" />
  <param name="activeImageTop" value="2" />
  <param name="activeImageWidth" value="3420" />
  <param name="activeImageHeight" value="2198" />
  <param name="outputSizePreset" value="Custom" />
  <param name="outputImageWidth" value="0" />
  <param name="outputImageHeight" value="0" />
  <param name="anamorph" value="1.0" />
  <param name="sharpness" value="0.0" />
  <param name="detail" value="0.0" />
</scaling>
```

Possible values of activeImagePreset: ActiveImage, FullImage, Frameline1A, Frameline1B, Frameline1C, Frameline2A, Frameline2B, Frameline2C or Custom for detailed specification of active image in activeImageLeft, activeImageTop, activeImageWidth and activeImageHeight

activeImageLeft:

Manually specify the left offset of the active image; is ignored, if activeImagePreset is not set to "Custom"

activeImageTop:

Manually specify the top offset of the active image; is ignored, if activeImagePreset is not set to "Custom"

activeImageWidth:

Manually specify the width of the active image; is ignored, if activeImagePreset is not set to "Custom"

activeImageHeight:

Manually specify the height of the active image; is ignored, if activeImagePreset is not set to "Custom"

Possible values of outputSizePreset:

Native, HD, 2K_DCI_Flat_1_85, 2K_DCI_Scope_2_39, 2K, UHD, 4K_DCI_Flat_1_85, 4K_DCI_Scope_2_39 or Custom for detailed specification of outputImageWidth and outputImageHeight

outputImageWidth:

Manually specify output image width; is ignored, if outputSizePreset is not set to "Custom", if set to zero output image width is calculated from outputImageHeight, if both are zero scaling is set to native

outputImageHeight:

Manually specify output image height; do not use in combination with outputSizePreset, if set to zero output image height is calculated from outputImageWidth, if both are zero scaling is set to native

Anamorph:

1.00 for spherical footage, 1.25, 1.30, 1.33, 1.50, and 2.00 for anamorphic. Present in fileheader.

Sharpness:

-5.0 to 5.0. Setting sharpness to 0.0 means neutral behaviour, no extra sharpening or blurring is done.

Detail:

-5.0 to 5.0. Setting detail to 0.0 means neutral behaviour.

2.6 Camera

Optional block describing the cameratype.

If not present, the value from the ARRIRAW V3 file header will be taken.

```
<camera>
  <param name="cameratype" value="D21" />
  <param name="inputContainer" value="FullOpenGate" />
</camera>
```

Values for the parameter cameratype can be "D20," "D21", "ALEXA", "ALEXA65", "ALEXA_LF", "ALEXA_MINI", or "AMIRA".

Values for the parameter inputContainer can be "FullOpenGate", "OpenGateWith4by3", "OpenGateWith6by5", "OpenGateWith8by9" or "Classic16by9".

2.7 Orientation

Optional block describing possible flipping and rotation. If not present, the value from the ARRIRAW V3 header will be taken.

```
<orientation>
  <param name="flip" value="none" />
</orientation>
```

Values for flip may be none, horizontal, vertical, rotate (where "rotate" means a 180° counterclockwise rotation).

2.8 Quality

Optional block describing the output quality.

```
<quality>
  <param name="mode" value="HQ" />
  <param name="debayer" value="ADA-5 SW" />
  <param name="ada5finetuningred" value="100" />
  <param name="ada5finetuninggreen" value="100" />
  <param name="ada5finetuningblue" value="50" />
  <param name="denoise" value="2.5" />
</quality>
```

Possible "mode" parameters are:

- HQ:
High quality image that also needs the longest processing time.
- Proxy1, proxy2:
Smaller and much faster rendered images of lower quality. If not present, "HQ" will be assumed.

The "debayer" parameter offers different (in speed and quality) debayer algorithms that can be used:

- ADA-1 HW:
Identical to the debayering used in the camera types D20, D21, and ALEXA (until SUP 6).
- ADA-2 SW:
Even higher quality debayering, but also more resource intensive.
- ADA-3 HW:
Newest ARRI Debayering Algorithm used in the ALEXA camera (SUP 7 or higher).
- ADA-3 SW:
Newest ARRI Debayering Algorithm, with again enhanced quality.
- ADA-5 HW:
Brand new ARRI Debayering Algorithm, with again enhanced quality, less complex version to be used in hardware.
- ADA-5 SW:
Brand new ARRI Debayering Algorithm, with again enhanced quality.

The "adafinetuningred/green/blue" parameters have a value range from 0 to 100 with a default of 100, 100, 50 for red, green, blue.

The "denoise" parameter describes a temporal denoising algorithm and defines its strength. Value space is from 1.0 to 3.5, default is 2.5. As this value is present in the fileheader's metadata, use this node to either override an existing denoising strength or switch on/off the denoising overriding the fileheader's content. If the denoising is switched of in the metadata, use a value between 1.0 and 3.5 to switch it on applying the used strength. Enter 0.0 here to switch the denoising off.

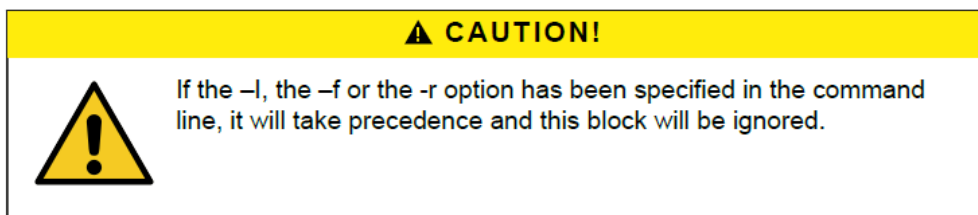
2.9 Input

Optional block describing the input sequence.

```
<input>
  <param name="sequence" value="/img/ARRIRAW/Take058_18004-18157#####.ari" />
  <param name="mxfStartFrame" value="0" />
  <param name="mxfEndFrame" value="0" />
</input>
```

Example: To render a specific range of a sequence that consists of the files Take058_18000.ari ... Take058_18190.ari but you only want to render the images from 18004 up to 18157, use the pattern Take058_18004-18157#####.ari.

The values for mxfStartFrame and mxfEndFrame are zero based. Using -1 for mxfEndFrame means rendering to the end of the clip.



2.10 Output

Required block specifying the output settings for the rendered images.

```
<output>
  <param name="format" value="tiff" />
  <param name="exrcompression" value="none" />
  <param name="directory" value="." />
  <param name="filename" value="$inputfile#####" />
  <param name="startnumber" value="-1" />
</output>
```

The “format” parameter determines the output file format and accepts the following values: tif, tiff, dpx, dpx_16bit, dpx_16bit_bgr, cineon, jpg, jpeg, exr, or openexr. It must be set.

The “exrcompression” parameter sets the compression, that is used when writing openexr files. Possible values are none, rle, zips, zip, piz, pxr24, b44 and b44a. Please note that for the ACES colour space, only none, piz and b44a are allowed.

The “startnumber” parameter allows you to specify the start value that is used for the numbering of the output files, and must be set, too. A value of -1 will take the original numbering of the input files, only if the `-i` or the `-f` option has not been specified in the command line. Otherwise it must be set to a value ≥ 0 . The “directory” and “filename” parameters are optional.

The “directory” parameter specifies the target folder for rendered images, and the “filename” parameter specifies the naming of the output files.

The following variables can be used to specify the directory and filename:

- \$resolution:
The output resolution of the rendered images.
- \$seqdir:

The source path to the sequence.

- **\$reel:**
The reel name written in the ARRIRAW header of the file.
- **\$scene:**
The scene name written in the ARRIRAW header of the file.
- **\$take:**
The take name written in the ARRIRAW header of the file.
- **\$format:**
The output format of the rendered images.

2.11 Performance

Optional block to set processing performance parameters.

```
<performance>
    <param name="processors" value="8" />
    <param name="rendermode" value="GPU" />
</performance>
```

Set “processors” to the desired number of CPUs that will be used by the ARRIRAW SDK in order to increase rendering speed.

Set “rendermode” to GPU to use your graphics adapter. Depending on the performance of the graphics adapter, this can speed up rendering even more.

To force usage of CUDA, set the “rendermode” parameter to “CUDA”. This is only possible when using a NVIDIA GPU with at least compute capability 3.0.

2.12 Processing

Optional block that specified the color processing version. If not present, the value from the ARRIRAW V3 file header will be taken.

```
<processing>
    <param name="version" value="5.0" />
</processing>
```

Used for compatibility reasons to different camera firmware versions.

2.13 Studio

Optional block that specifies the ND color compensation filter type for ALEXA Studio cameras.

```
<studio>
    <param name="ND-filter" value="0" />
</studio>
```

Specify the ND filter by using the value from the meta data field “ND Filter Type” which describes the used filter type or set the parameter to 0 in order to deactivate the ND filter compensation.

2.14 Look

Optional block that specifies the CDL and printer lights parameters.

```
<look>
  <param name="printerlightsRed" value="0.0" />
  <param name="printerlightsGreen" value="0.0" />
  <param name="printerlightsBlue" value="0.0" />
  <param name="slopeRed" value="1.0" />
  <param name="slopeGreen" value="1.0" />
  <param name="slopeBlue" value="1.0" />
  <param name="offsetRed" value="0.0" />
  <param name="offsetGreen" value="0.0" />
  <param name="offsetBlue" value="0.0" />
  <param name="powerRed" value="1.0" />
  <param name="powerGreen" value="1.0" />
  <param name="powerBlue" value="1.0" />
  <param name="saturation" value="1.0" />
  <param name="customLut" value="false"/>
  <param name="lookFileName" value="/tmp/mylook.xml" />
  <param name="lookMode" value="Alexa Look" />
</look>
```

The look mode describes the type of look parameters and their position in the image processing chain. "look mode" accepts the following values:

- Alexa Look:
Look values are applied as described in the colour processing white papers.
- CDL LogC:
CDL values (slope, offset, power and saturation) are applied on LogC image data.
- CDL Video:
CDL values (slope, offset, power and saturation) are applied at the end of the processing chain, after colour space matrix and gamma curve.
- None:
No look is applied

```

<lookVideoParameters>
  <param name="BlackGamma"    value="0.5" />
  <param name="Knee"          value="0.5" />
  <param name="VideoGamma"    value="1.0" />
  <param name="VideoSaturation" value="1.0" />
  <param name="RedSaturation"  value="1.0" />
  <param name="YelSaturation"  value="1.0" />
  <param name="GrnSaturation"  value="1.0" />
  <param name="CynSaturation"  value="1.0" />
  <param name="BluSaturation"  value="1.0" />
  <param name="MagSaturation"  value="1.0" />
  <param name="RedVideoSlope"  value="1.0" />
  <param name="GrnVideoSlope"  value="1.0" />
  <param name="BluVideoSlope"  value="1.0" />
  <param name="RedVideoGamma"  value="1.0" />
  <param name="GrnVideoGamma"  value="1.0" />
  <param name="BluVideoGamma"  value="1.0" />
  <param name="RedVideoPedestal" value="0.0" />
  <param name="GrnVideoPedestal" value="0.0" />
  <param name="BluVideoPedestal" value="0.0" />
</lookVideoParameters>

```

This node contains look information only available in the new Alexa SXT look, used in processing version 5.0. For details please see the ALF2 documentation.

3 Help

If you have any questions about the general process, please send an email to digitalworkflow@arri.de.

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