

ALEXA

Framelines and ARRIRAW Converter / SDK Settings

WHITE PAPER

Date: 7 October 2014

1 Table of Contents

1	Table of Contents	2
2	Introduction	2
3	ALEXA Framelines and ARC/SDK Settings	3
3.1	Sensor Mode 16:9 (ProRes HD, DNxHD, ARRIRAW 2.8K).....	3
3.2	Sensor Mode 16:9 (ProRes 2K, ARRIRAW 2.8K).....	6
3.3	Sensor Mode 4:3 (ProRes 2K, ARRIRAW Full/2.8K).....	8
3.4	Sensor Mode 4:3 (ARRIRAW Cropped/2.6K)	11
3.5	Sensor Mode Open Gate (ARRIRAW Full/3.4K)	12
4	Parameters that Determine the Render Output Format in ARC 3.1	14
4.1	How to Set Up the Parameters in ARC 3.1	14
5	Special ProRes Formats	14
6	Processing Version 4 (ALEXA SUP 4 or later)	14
7	Processing Versions 1 and 3 – Legacy Mode	15
7.1	Sensor Mode 16:9 (2880 x 1620).....	15
7.2	Sensor Mode 4:3 (2880 x 2160).....	15

2 Introduction

The ARRIRAW Converter (ARC), which is based on the ARRIRAW Software Developer Kit (SDK), provides common output formats which always refer to one of ALEXA’s sensor modes: **16:9**, **4:3** or **Open Gate**. Due to the different aspect ratios of the sensor modes, a variety of output options are possible.

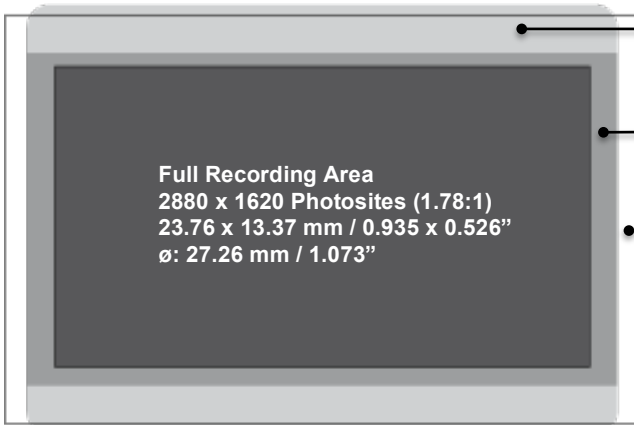
This document provides an overview of the existing framelines available in ALEXA cameras as well as the corresponding render output aspect ratios and resolutions available in the ARC and SDK.

Note 1: Some formats have to be cropped and scaled to the final dimensions. For example we deliver from the 16:9 sensor mode 16:9 full frame outputs only and not a 1.85:1 or 2.39:1 version; you can crop the 16:9 to CinemaScope (2.39:1) in your postproduction tool and keep a full frame version for 16:9 full frame mastering.

Note 2: If a crop is applied, it is always a center crop. The crop area cannot be moved or shifted in the ARC or SDK. If you framed for common top, for example, you cannot use the center crop. You have to render out the full frame and crop later in your postproduction tool.

3 ALEXA Framelines and ARC/SDK Settings

3.1 Sensor Mode 16:9 (ProRes HD, DNxHD, ARRIRAW 2.8K) for all ALEXAs (excluding ALEXA HD and ALEXA Fiber Remote)



Surround View Optical Viewfinder

(for ALEXA Studio and ALEXA XT Studio only, 1.38:1)
26.14 x 19.0 mm / 1.029 x 0.748", ø: 32.32 mm / 1.272"

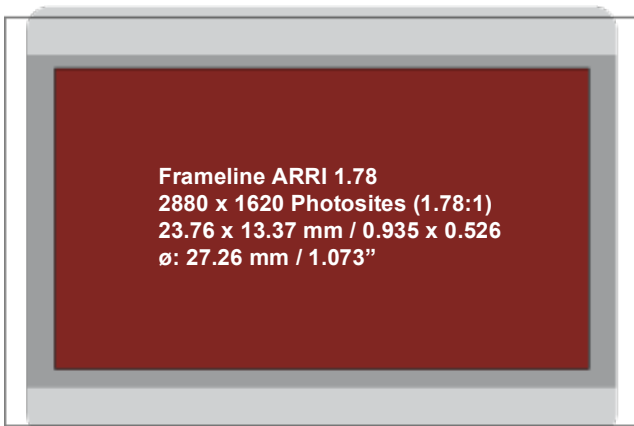
Surround View EVF-1/MON OUT

3168 x 1782 Photosites (1.78:1)
26.14 x 14.70 mm / 1.029 x 0.579", ø: 29.99 mm / 1.181"

Sensor Size

3414 x 2198 Photosites (1.55:1)
28.17 x 18.13 mm / 1.109 x 0.714", ø: 33.50 mm / 1.319"

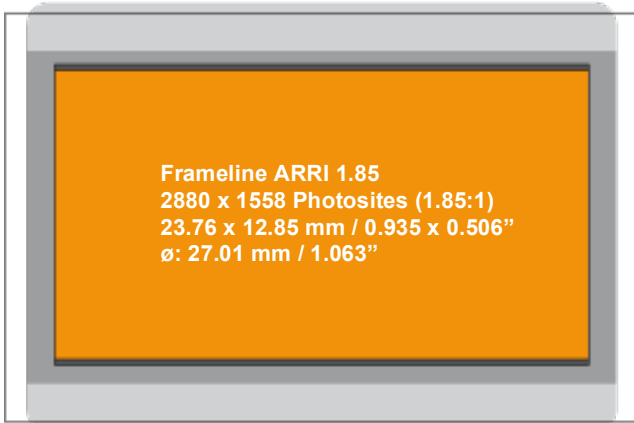
3.1.1 Target Aspect Ratio 1.78:1



Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
native	2880 x 1620	2880 x 1620
HD	2880 x 1620	1920 x 1080
2K	2880 x 1620	2048 x 1152
UHD-1	2880 x 1620	3840 x 2160
4K	2880 x 1620	4096 x 2304

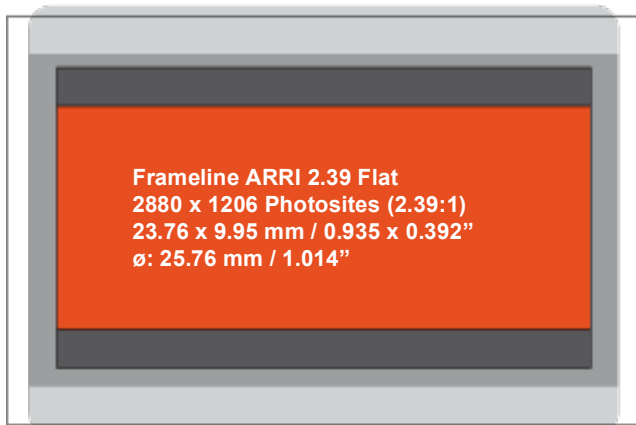
3.1.2 Target Aspect Ratio 1.85:1



Settings in ARC and SDK for ARRIRAW Processing

No special ARC or SDK output. You can use the output of the 16:9 recording area and crop the image in your post tool.

3.1.3 Target Aspect Ratio 2.39:1 Flat



Settings in ARC and SDK for ARRIRAW Processing

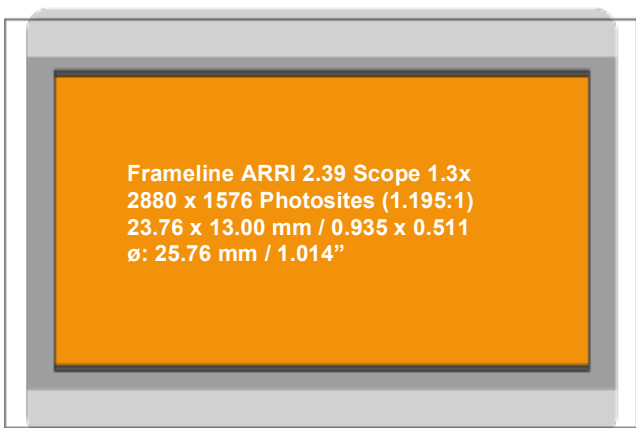
No special ARC or SDK output. You can use the output of the 16:9 recording area and crop the image in your post tool.

Note 1: This necessitates the use of spherical lenses.

Note 2: While this is a technically possible route to go for a 2.39:1 aspect ratio end result, you can gain extra resolution by using one of three alternative set ups:

1. Shooting with spherical lenses and Open Gate sensor mode.
2. Shooting with traditional 2x anamorphic lenses, 4:3 sensor mode and 'ARRI 2.39:1 Scope 2x' framelines.
3. Shooting with 1.3x anamorphic lenses, 16:9 sensor mode and 'ARRI 2.39:1 Scope 1.3x' framelines.

3.1.4 Target Aspect Ratio 2.39:1 Scope 1.3x

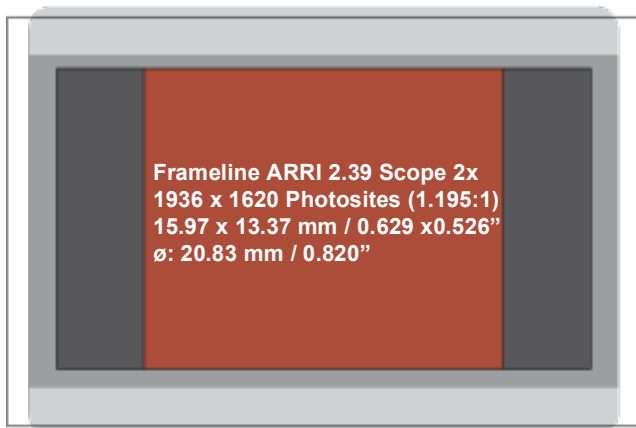


Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
2K	2880 x 1576	2048 x 858
4K	2880 x 1576	4096 x 1716

Note: This necessitates the use of 1.3x anamorphic lenses.

3.1.5 Target Aspect Ratio 2.39:1 Scope 2x



Settings in ARC and SDK for ARRIRAW Processing

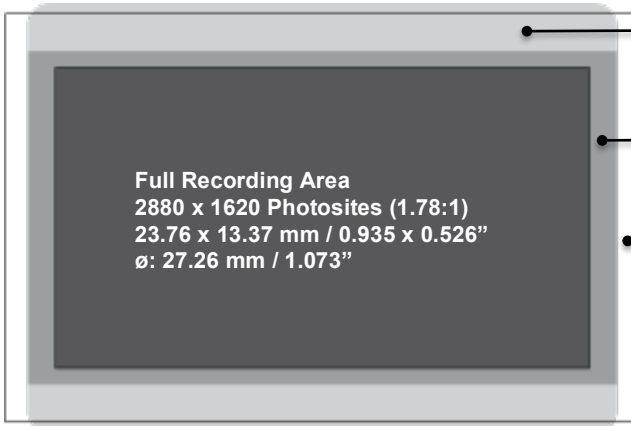
Resolution Name	Used Active Sensor Area	Output Resolution
native	2880 x 1620	2880 x 810
native (ProRes 2K)	2868 x 1614	2868 x 807

Note 1: This necessitates the use of traditional 2x anamorphic lenses.

Note 2: While this is a technically possible route to go for a 2.39:1 aspect ratio end result, you gain extra resolution by using one of three alternative set ups:

1. Shooting with traditional 2x anamorphic lenses, 4:3 sensor mode and 'ARRI 2.39:1 Scope 2x' framelines.
2. Shooting with spherical lenses and Open Gate sensor mode.
3. Shooting with 1.3x anamorphic lenses, 16:9 sensor mode and 'ARRI 2.39:1 Scope 1.3x' framelines.

3.2 Sensor Mode 16:9 (ProRes 2K, ARRIRAW 2.8K)
for all ALEXAs (excluding ALEXA HD and ALEXA Fiber Remote)



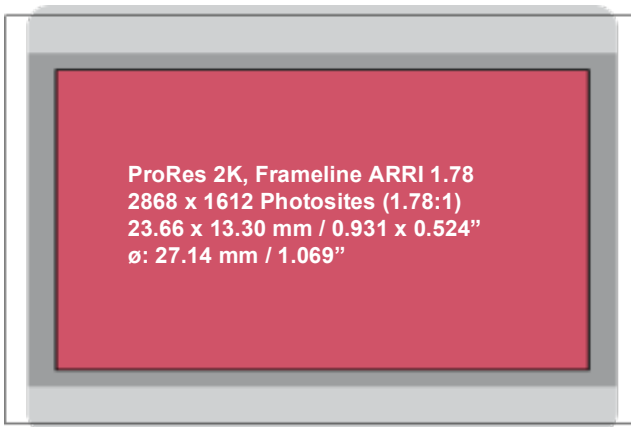
- Surround View Optical Viewfinder**
(for ALEXA Studio and ALEXA XT Studio only, 1.38:1)
26.14 x 19.0 mm / 1.029 x 0.748", ø: 32.32 mm / 1.272"
- Surround View EVF-1/MON OUT**
3168 x 1782 Photosites (1.78:1)
26.14 x 14.70 mm / 1.029 x 0.579", ø: 29.99 mm / 1.181"
- Sensor Size**
3414 x 2198 Photosites (1.55:1)
28.17 x 18.13 mm / 1.109 x 0.714", ø: 33.50 mm / 1.319"

Note 1: When shooting 16:9 in ARRIRAW it is recommended to use 16:9 HD mode, as more output options are available for monitoring and on-set workflow.

Note 2: The 16:9 2K sensor mode uses the same sensor area as 16:9 HD, but different processing when downscaling inside the camera to derive ProRes. While the 16:9 HD sensor mode delivers an HD ProRes file, the 16:9 2K sensor mode delivers a 2K ProRes file.

Note 3: When shooting for HDTV delivery (i.e. 1920 x 1080), there is no advantage to recording ProRes 2K over ProRes HD unless a 1920 x 1080 image should be cropped from the ProRes 2K.

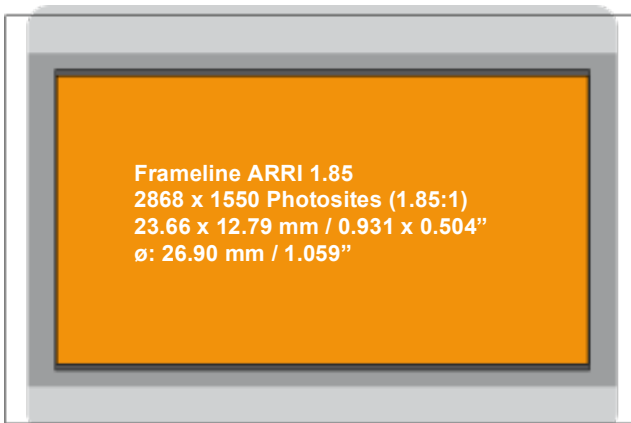
3.2.1 Target Aspect Ratio 1.78:1



Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
native (ProRes 2K)	2868 x 1614	2868 x 1614
2K (ProRes 2K)	2868 x 1614	2048 x 1152

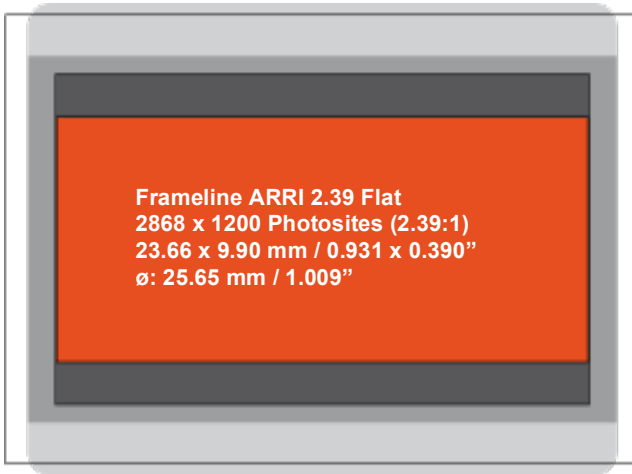
3.2.2 Target Aspect Ratio 1.85:1



Settings in ARC and SDK for ARRIRAW Processing

No special ARC or SDK output. You can use the output of the 16:9 recording area and crop the image in your post tool.

3.2.3 Target Aspect Ratio 2.39:1 Flat



Settings in ARC and SDK for ARRIRAW Processing

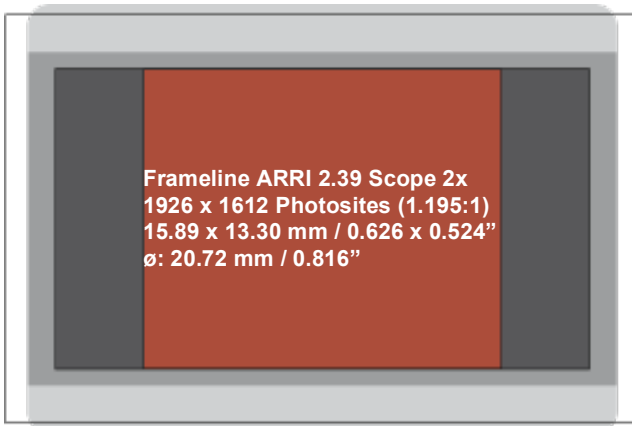
No special ARC or SDK output. You can use the output of the 16:9 recording area and crop the image in your post tool.

Note 1: This necessitates the use of spherical lenses.

Note 2: While this is a technically possible route to go for a 2.39:1 aspect ratio end result, you gain extra resolution by using one of three alternative set ups:

1. Shooting with spherical lenses and Open Gate sensor mode.
2. Shooting with traditional 2x anamorphic lenses, 4:3 sensor mode and 'ARRI 2.39:1 Scope 2x' framelines.
3. Shooting with 1.3x anamorphic lenses, 16:9 sensor mode and 'ARRI 2.39:1 Scope 1.3x' framelines.

3.2.4 Target Aspect Ratio 2.39:1 Scope 2x



Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
native	2880 x 1620	2880 x 810
native (ProRes 2K)	2868 x 1614	2868 x 807

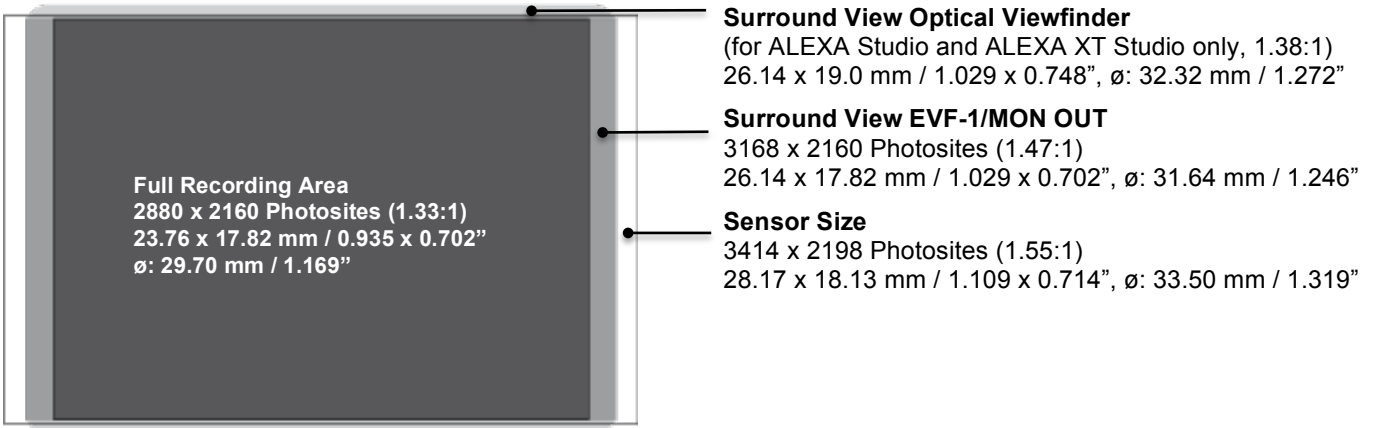
Note 1: This necessitates the use of traditional 2x anamorphic lenses.

Note 2: While this is a technically possible route to go for a 2.39:1 aspect ratio end result, you gain extra resolution by using one of three alternative set ups:

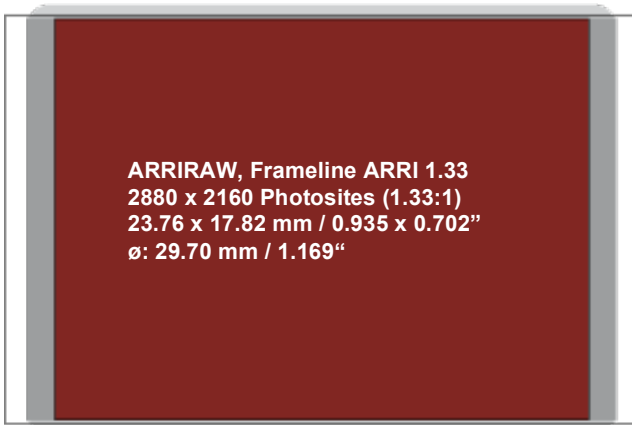
1. Shooting with traditional 2x anamorphic lenses, 4:3 sensor mode and 'ARRI 2.39:1 Scope 2x' framelines.
2. Shooting with spherical lenses and Open Gate sensor mode.
3. Shooting with 1.3x anamorphic lenses, 16:9 sensor mode and 'ARRI 2.39:1 Scope 1.3x' framelines.

3.3 Sensor Mode 4:3 (ProRes 2K, ARRIRAW Full/2.8K)

for ALEXA Plus 4:3, ALEXA Studio, ALEXA M and all ALEXA XTs



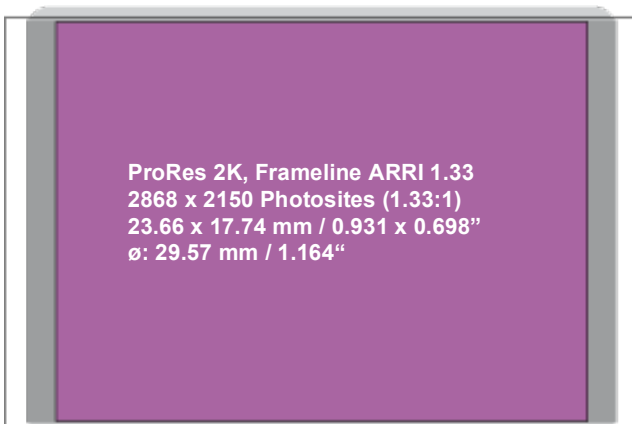
3.3.1 Target Aspect Ratio 1.33:1



Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
native	2880 x 2160	2880 x 2160
HD	2880 x 2160	1920 x 1440
2K	2880 x 2160	2048 x 1536
UHD-1	2880 x 2160	3840 x 2880
4K	2880 x 2160	4096 x 3072

3.3.2 Target Aspect Ratio 1.33:1 (2K Mode)



Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
native (ProRes 2K)	2880 x 2160	2868 x 2152
2K ProRes crop	2880 x 2160	2048 x 1536

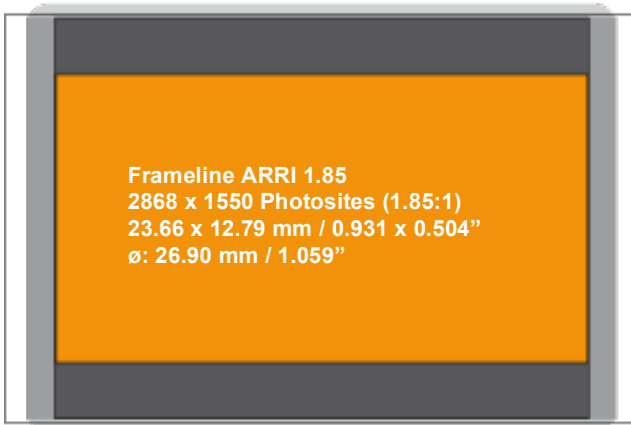
3.3.3 Target Aspect Ratio 1.78:1



Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
HD	2880 x 1620	1920 x 1080
2K	2880 x 1620	2048 x 1152
2K ProRes crop	2868 x 1614	2048 x 1152

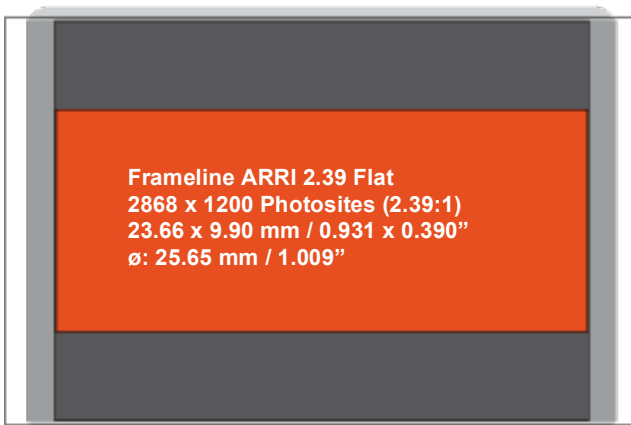
3.3.4 Target Aspect Ratio 1.85:1



Settings in ARC and SDK for ARRIRAW Processing

No special ARC or SDK output. You can use the output of the 16:9 recording area and crop the image in your post tool.

3.3.5 Target Aspect Ratio 1.78:1 and 1.85:1 Scope 1.3x

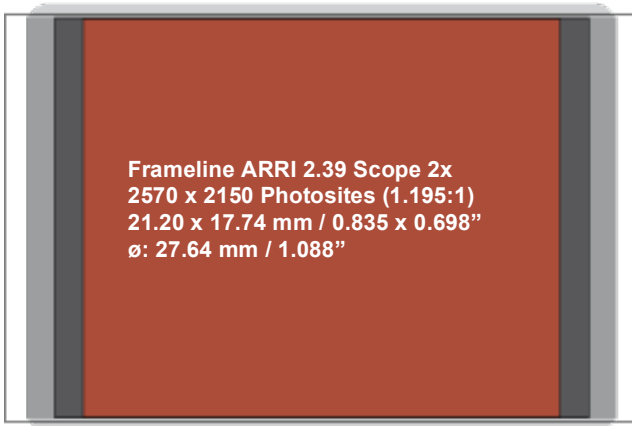


Settings in ARC and SDK for ARRIRAW Processing

Aspect Ratio	Resol. Name	Used Active Sensor Area	Output Resolution
1.78:1 center cropped	HD	2880 x 1620	1920 x 1080
	UHD-1	2880 x 2102	3840 x 2160
1.85:1 center cropped	2K DCP	2880 x 2025	1998 x 1080
	4K DCP	2880 x 2025	3996 x 2160

Note: This necessitates the use of 1.3x anamorphic lenses.

3.3.6 Target Aspect Ratio 2.39 Scope 2x

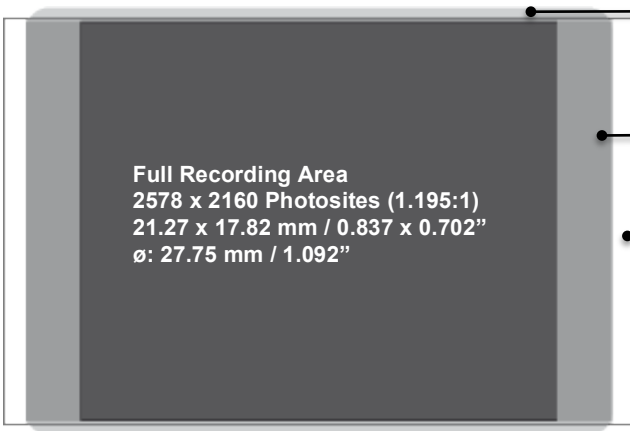


Note: This necessitates the use of traditional 2x anamorphic lenses.

Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
HD	2560 x 2144	1920 x 804
2K	2560 x 2145	2048 x 858
UHD-1	2560 x 2144	3840 x 1608
4K	2560 x 2145	4096 x 1716

3.4 Sensor Mode 4:3 (ARRIRAW Cropped / 2.6K)
for all ALEXA XT and XR cameras

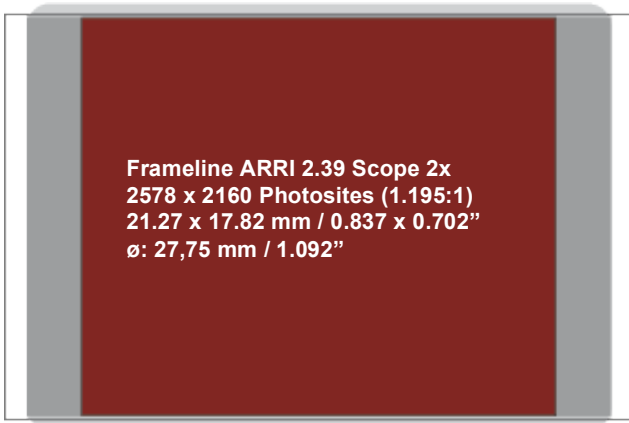


Surround View Optical Viewfinder
(for ALEXA Studio and ALEXA XT Studio only, 1.38:1)
26.14 x 19.0 mm / 1.029 x 0.748", ø: 32.32 mm / 1.272"

Surround View EVF-1/MON OUT
3168 x 2160 Photosites (1.47:1)
26.14 x 17.82 mm / 1.029 x 0.702", ø: 31.64 mm / 1.246"

Sensor Size
3414 x 2198 Photosites (1.55:1)
28.17 x 18.13 mm / 1.109 x 0.714", ø: 33.50 mm / 1.319"

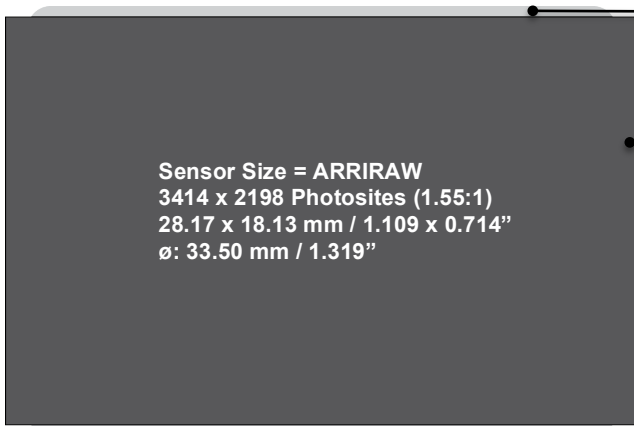
3.4.1 Target Aspect Ratio 2.39 Scope 2x



Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
native	2578 x 2160	2578 x 2160
HD	2578 x 2160	1920 x 804
2K	2578 x 2160	2048 x 858
UHD-1	2578 x 2160	3840 x 1608
4K	2578 x 2160	4096 x 1716

3.5 Sensor Mode Open Gate (ARRIRAW Full / 3.4K)
for ALEXA XT cameras (as of SUP 10)



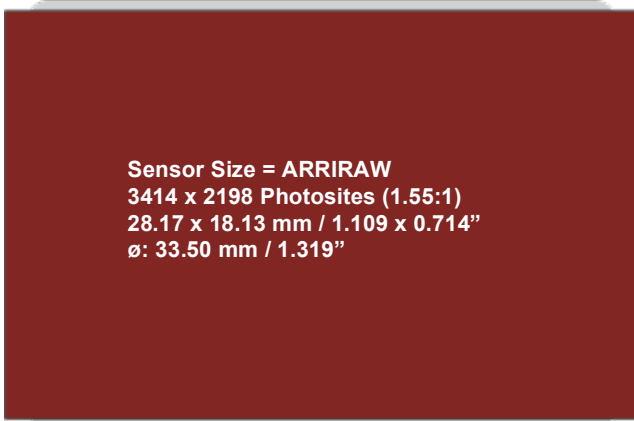
Surround View Optical Viewfinder

(for ALEXA Studio and ALEXA XT Studio only, 1.38:1)
26.14 x 19.0 mm / 1.029 x 0.748", ø: 32.32 mm / 1.272"

EVF-1/MON OUT

3414 x 2198 Photosites (1.55:1)
28.17 x 18.13 mm / 1.109 x 0.714", ø: 33.50 mm / 1.319"

3.5.1 Target Aspect Ratio 1.55:1



Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
native	3414 x 2198	3414 x 2198

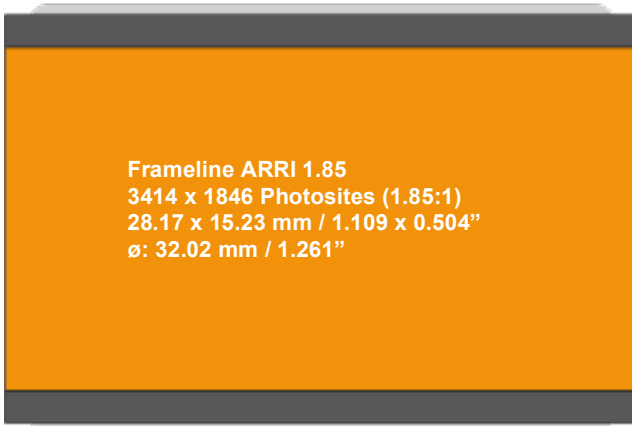
3.5.2 Target Aspect Ratio 1.78:1



Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
HD	3414 x 1920	1920 x 1080
2K	3414 x 1920	2048 x 1152
UHD-1	3414 x 1920	3840 x 2160
4K	3414 x 1920	4096 x 2304

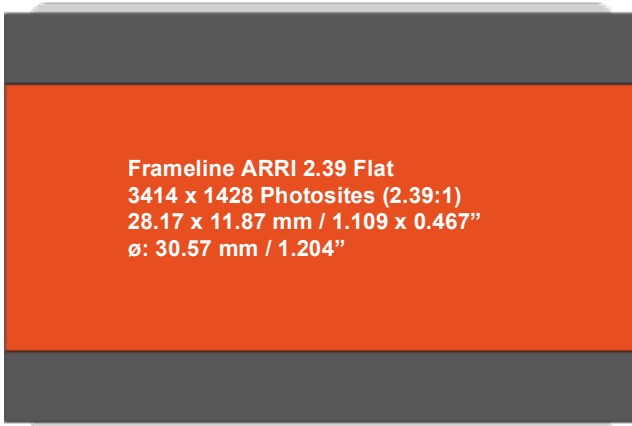
3.5.3 Target Aspect Ratio 1.85:1



Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
HD	3414 x 1846	1920 x 1038
2K DCP	3414 x 1845	1998 x 1080
2K	3414 x 1847	2048 x 1108
4K DCP	3414 x 1845	3996 x 2160
4K	3414 x 1845	4096 x 2214

3.5.4 Target Aspect Ratio 2.39:1 Flat

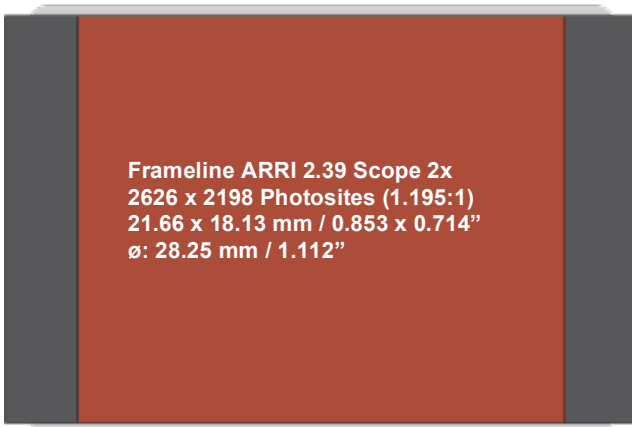


Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
HD	2624 x 2198	1920 x 804
2K	2624 x 2199	2048 x 858
UHD-1	2624 x 2198	3840 x 1608
4K	2624 x 2199	4096 x 1716

Note: This necessitates the use of spherical lenses.

3.5.5 Target Aspect Ratio 2.39:1 Scope 2x



Settings in ARC and SDK for ARRIRAW Processing

Resolution Name	Used Active Sensor Area	Output Resolution
HD	2624 x 2198	1920 x 804
2K	2624 x 2199	2048 x 858
UHD-1	2624 x 2198	3840 x 1608
4K	2624 x 2199	4096 x 1716

Note 1: This necessitates the use of traditional 2x anamorphic lenses.

Note 2: When shooting with anamorphic lenses it is recommended to use the 4:3 sensor mode, as it has a higher fps (96 vs. 75), unless the extra sensor area to the left and right of the sensor area within the framelines is also needed.

4 Parameters that Determine the Render Output Format in ARC 3.1

The available render output format is determined by a combination the following parameters:

Processing Version	Determines different image processing capabilities; among them are the following parameters:
Lens Squeeze	One of the Lens Squeeze correction factors: 1.0, 1.3 and 2.0
Aspect Ratio	One of the targeted output aspect ratios
Resolution	One of the targeted image output resolutions

4.1 How to Set Up the Parameters in ARC 3.1

VIEW room

In the VIEW room, you should set the parameters in the following order:

1. Processing Version
2. Lens Squeeze
3. Aspect Ratio
4. Resolution.

The available settings will be narrowed down based on the already set parameters.

RENDER room

In the *Render Target* dialog this logic cannot be applied since it is possible to have different image formats in one render queue; you can configure all parameters independently. As soon as you start the render process or use the “Check Integrity” button, the validity of the settings for all clips of the render queue will be checked and an error message will be shown for each clip that cannot be rendered with the configured render settings.

5 Special ProRes Formats

Two format names that are used in the following tables need a short description:

1. **Native (ProRes 2K)** is provided for a workflow with ALEXA Classic cameras where ARRIRAW and the camera's internal ProRes are being recorded simultaneously. The sensor area that is used for ProRes encoding inside the camera is slightly smaller compared to the sensor area that is stored in the ARRIRAW files due to the available downscale filters in the camera. The resulting image is not scaled and only represents a debayered version of the cropped ARRIRAW image.
2. **2K (ProRes 2K)** is provided for the same workflow as described above but results in an image that is already scaled to the final 2K image resolution.

6 Processing Version 4 (ALEXA SUP 4 or later)

Processing Version 4 is our latest and most advanced image processing chain that supports all sensor modes of the ALEXA camera family (including Open Gate) and is also capable of processing *the monochrome images* of the *ALEXA XT B+W*.

For best image quality, we recommend to set this processing version 4 in your render settings together with the debayer algorithm ADA-5.

Version 4 is always selected by default if a shot is recorded with ALEXA SUP 4.0 (July 2011) or later. For current footage, there is no need to change the processing version to an older version.

7 Processing Versions 1 and 3 – Legacy Mode

We kept the processing versions 1 and 3 (there is and never was a released processing version 2) as an option in ARC 3.1 for legacy reasons (for *ARRIFLEX D-20 and D-21* cameras the processing version 1.0 has to be used). If you need to render material that has to exactly match already rendered images of an old ARRIRAW project, you can still use the legacy image processing versions 1 and 3.

7.1 Sensor Mode 16:9 (2880 x 1620)

7.1.1 Spherical Lens

Aspect Ratio	Resolution Name	Frameline	Used Active Sensor Area	Resolution
1.78:1	native	ARRI 1.78	2880 x 1620	2880 x 1620
	SD	ARRI 1.78	2880 x 1620	768 x 432
	HD	ARRI 1.78	2880 x 1620	1920 x 1080
	2K	ARRI 1.78	2880 x 1620	2048 x 1152

7.1.1 2x Anamorphic Lens

Aspect Ratio	Resolution Name	Frameline	Used Active Sensor Area	Resolution
3.56:1	native	ARRI 1.78	2880 x 1620	2880 x 810

7.2 Sensor Mode 4:3 (2880 x 2160)

7.2.1 Spherical Lens

Aspect Ratio	Resolution Name	Frameline	Used Active Sensor Area	Resolution
1.33:1	native	ARRI 1.33	2880 x 2160	2880 x 2160
	SD	ARRI 1.33	2880 x 2160	768 x 576
	HD	ARRI 1.33	2880 x 2160	1920 x 1440
	2K	ARRI 1.33	2880 x 2160	2048 x 1536

7.2.2 2x Anamorphic Lens

Aspect Ratio	Resolution Name	Frameline	Used Active Sensor Area	Resolution
3.56:1	native	ARRI 1.33	2880 x 2160	2880 x 1080