

ARRI



Pocket Guide

ALEXA 

SUP 6.1

ALEXA Pocket Guide

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ALEXA Pocket Guide WebApp

www.arri.com/alexa/apg

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ALEXA Overview

Introduction

Welcome to the Pocket Guide for the ALEXA family of cameras, which contains important preproduction and production information for an ALEXA shoot. The ALEXA platform has been designed with ease of use and user-friendliness in mind; the menu and controls are simple and intuitive, and the best way to learn ALEXA is to get your hands on the real thing. However, carrying using guide and combining it with other resources such as the ALEXA manual at www.arri.com/alex/downloads or the interactive ALEXA Camera Simulator at www.arri.com/alex/tools will ensure your readiness to take full advantage of the camera's unique and versatile features.



ALEXA – the original

Meeting the family



ALEXA Plus – the allrounder

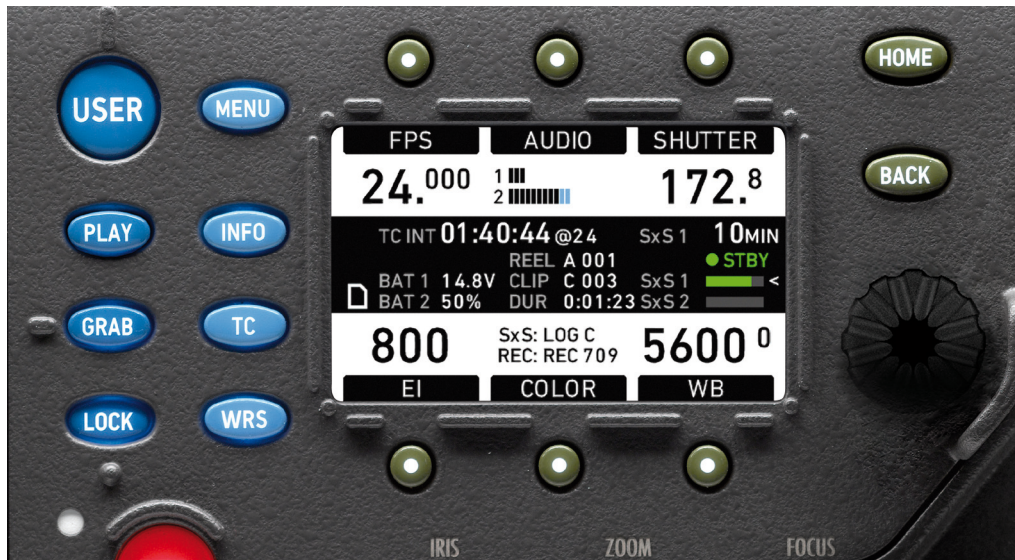


ALEXA M – the specialist



ALEXA Studio – the flagship

ALEXA Operation







Home Screen Soft Buttons

The soft buttons lead to screens where the respective settings can be changed. In the home screen, the following info is displayed:


- FPS:** Set sensor frame rate
- AUDIO:** When audio is active, audio levels are shown. Audio can also be switched OFF, or DISABLED (when the sensor is not running at sync-sound speed)
- SHUTTER:** Set shutter angle (and turn mirror shutter on/off for ALEXA Studio)
- EI:** Set exposure index (and insert internal ND filter for ALEXA Studio)
- COLOR:** Set gamma for REC OUT and SxS image paths. If REC and/or SxS icons have a blue background, a look is active on this image path.

- WB:** Set white balance, consisting of a Kelvin value for red-blue correction and a CC shift for green-magenta correction (shown as exponent).

ALEXA Studio Icons

Name	Icon	Description
Mirror Shutter		Flashing Icon when the Mirror Shutter is spinning.
View Position		Mirror Shutter in View position
Gate Position		Mirror Shutter in Gate position
ND filter		ND filter active

Home Screen Center Bar

TC	Displays current timecode including source (INT=internal or EXT=external source). Frames are not displayed, instead the time base of the timecode is shown in small digits.	BAT 2	Voltage level of battery attached to top and/or back onboard battery adapter, or percentage of remaining capacity of attached battery if it transmits this information.
MASTER	Camera is set to Ext sync: MASTER	REEL	Identifies current reel. Consists of camera index and reel counter.
SLAVE	Camera is set to Ext sync: SLAVE	CLIP	Identifies current clip. Consists of clip index and clip counter.
	Settings sync is active	DUR	Duration of current clip during recording or length of last recorded clip during standby. Shown as h:mm:ss.
BAT 1	Voltage level of power source present at BAT connector, or percentage of remaining capacity of attached battery if it transmits this information.		

Home Screen Center Bar

CARD section

Displays capacity information of SxS PRO cards.

SxS 1 10MIN

Remaining capacity of active card in minutes.

Calculated for the set frame rate and codec.

Note: these are only approximate values.



Green capacity bar showing remaining capacity as a percentage.
Grey if card slot is empty.
Red if card cannot be recorded.



Marks the active card.

• STBY

The camera is in standby and ready to record.










• REC

The camera is recording.

• ERROR

An error occurred. Recording is not possible. Press the INFO button for more details.

If nothing is shown (neither the red/green bar), the camera works properly, but no SxS PRO card is present for recording.

Name	Icon	Description	Name	Icon	Description
General Warning		Important information waiting on the info screen. Press the INFO button for more details.	Lock		Camera is locked.
General Error		An error occurred. Press the INFO button for more details.	SD Card		SD Card present. Turns orange during card access.
Temperature Warning		Slight sensor temperature offset. Image quality might be affected.	Grab		Still frame is being captured to the SD card. A new still frame can only be captured when this is completed.
Temperature Error		Great sensor temperature offset. Image quality might be affected seriously.	Tropical Mode		Sensor is in tropical mode (=40° C sensor temperature). Should be used in very humid conditions.
			WRS Radio		WRS radio is active. Only on ALEXA Plus and Studio.

Menu Settings & Button Functions



RECORDING menu

SxS Cards >>

SxS Recording (Off/ProRes/DNxHD*DNxHD)
 Codec (ProRes 422 Proxy/422 LT/422/422 HQ/4444)
 (DNxHD 115/120/145 or DNxHD 175x/185x/220x)
 HS Codec (ProRes 422 Proxy/422 LT/422/422 HQ)
 (DNxHD 115/120/145 or DNxHD 175x/185x/220x)

Dual Recording (On/Off)

Quick format SxS Card 1

Quick format SxS Card 2

Erase SxS Card 1

Erase SxS Card 2

REC.OUT >>

Framerate (23.976/24/25/29.97/30/48/50/59.94/60fps)

HD-SDI format (422 1.5G SL/422 1.5G DL/422 3G SL

444 1.5 DL/444 3G SL/444 3G DL

ARRIRAW 1.5G DL/ARRIRAW 3G SL

ARRIRAW 3G DL)

Scan format (psf/p)

Output range (Legal/Extended/Raw)

REC OUT fps sets sensor fps (On/Off)

SDI remote (On/Off)

Vari flag (On/Off)

MONITORING menu

Electronic viewfinder >>

Brightness (1-5)

Rotate image (On/Off)

Smooth mode (On/Off)

Surround view (On/Off)

Frame lines + status info >>

Frame lines (On/Off)

Surround mask (Black line/Color line/Mask 25%/50%/75%)

Center mark (Off/Dot/Cross)

Status info (On/Off)

Electronic level (On/Off)

LDS info (On/Off)

Peaking (Off/0n) >>

Peaking (0n/0ff)

Peaking level (Low/0ff)

Anamorphic desqueeze*ANAMORPH (0ff/1.3x/2.0x/2.0xmag)

Zoom position (Centered/Eye level)

MON OUT >>>

Framerate (23.976/24/25/29.97/30/48/50/59.94/60fps)

Scanformat (psf/p)

Surround view (0n/0ff)

Frame lines + status info >>

Frame lines (0n/0ff)

Surround mask (Black line/Color line/Mask 25%/50%/75%)

Center mark (0ff/Dot/Cross)

Status info (0n/0ff)

Electronic level (0n/0ff)

LDS info (0n/0ff)

Show reel + clip number (0n/0ff)

Peaking (Off/0n) >>>

Peaking (0n/0ff)

Peaking level (Low/0ff)

False Color (0n/0ff)

Anamorphic desqueeze*ANAMORPH (0ff/1.3x/2.0x/2.0xmag)

Frame lines >>>



Frame line 1 (choose/add/delete; 0ff)

Frame line 2 (choose/add/delete; 0ff)

User rectangles >>>

User rectangles (0ff/Rect 1/Rect 2/Rect 1+2)

Set rect 1/2 >>>

Top, Bottom, Left, Right (0 — 1000), Reset

Color (Red/Green/Blue/Yellow/Black/White)

Intensity (1-4)

RET IN path (EVF, MON OUT, EVF+MON)

Electronic level sensitivity (1x, 2x, 4x, 8x, 16x)

False color index >>>

ALEXA SUP 6.0 underlined values represent the factory reset.

Menu Settings & Button Functions

MENU

SYSTEM menu

Sensor >>

Sensor temperature (Sandard/Tropical)

Mirror image horizontal (0n/0ff)

Power >>

BAT1 (Plug) warning (10.0-30.0V; 21.0V)

BAT2 (Onboard) warning (10.0-30.0V; 12.0V)

External sync >>

Eye index (R/L)

Sensor sync (Off/EXT master/EXT slave)

HD out phase (+/- 30 clocks; 0 clocks)

Send HD sync trigger >

Settings sync (Off/ETH master/slave)

Test signal >>

Color bar (0n/0ff)

Enable test tone (0n/0ff)

Test tone level (0 dB(fs)/-9 dB(fs)/-18 dB(fs)/-20 dB(fs))

Display + beeper >>

Display button brightness (1-9)

Button brightness (Off/Low/Medium/High)

Run beeper mode (Off/Start/Stop/Start+Stop)

System time + date >>

set date, time, timezone and daylight saving time

Fan >>

Fan mode (Regular/Rec low)

SD card >>

Format + prepare SD card

Prepare SD card



WNA-1 >>

WNA state (*shows WNA-1 status*)

WiFi power (0n/Off)

Mode (Ad Hoc/Access Point Client)

SSID (set SSID name)

Password (set Password)

IP Address (adjust IP address)

Subnet (adjust subnet mask address)

Frequency band (2.4 GHz/5 GHz)

Channel selection (Auto/Manual)

Channel >> (select channel in manual mode)

Authentication (Open/Shared Secret/PSK/LEAP/PEAP/PEAP/MSCHAP V2)

Encryption (None/WEP 64/WEP 128/TKIP/AES CCMP)

Firmware >>

Select update file >>

Licensed features >>

install/delete licenses; save hardware info



PROJECT menu

Project frame rate (23.976/24/25/29.97/30fps)

Camera index (A-Z)

Next reel count (001-999)

Production info >>

Director

Cinematographer

Location

Production

User info 1

User info 2

FRAME GRABS menu

File format (Jpeg/Tiff/Dpx/Ari)

Compare grab to live image >>

load grab



Options

Compare Options >>

Compare mode (Toggle/Interleave)

Active on EVF (0n/Off)

Active on MON OUT (0n/Off)

Grabbed images inherit REC OUT settings!

Ari only possible, when REC OUT = ARRI RAW

USER SETUPS menu

Save current setup

Load setup

Factory reset



ALEXA SUP 6.0 underlined values represent the factory reset.

Menu Settings & Button Functions

HOME

FPS

set sensor speed | 0.75 fps-60fps /120fps*HS; 24fps
add/delete value

HIGHSPEED/EXIT HS*HS (boot ALEXA to HS mode; 60-120fps)

SxS CODEC (MENU > RECORDING > SxS CARDS)

SxS INFO (INFO > SxS CARDS)

SDI FPS >>

REC OUT (23.976, 24, 25, 29.97, 30)

MON OUT (23.976, 24, 25, 29.97, 30)

EI

set exposure index | 160ASA - 3200ASA; 800ASA

ND FILTER*STUDIO (On/Off)

COLOR

SET LOOK

choose/delete/load look from SD



set COLORPATH

EVF (LOOK ON/OFF FOR REC709, DCI P3)

MON OUT (LOOK ON/OFF FOR REC709, DCI P3)

SxS REC OUT } (LOOK ON/OFF FOR REC709, DCI P3)

GAMMA

COLOR > GAMMA >>

SxS (REC709, DCI P3, LOGC)

REC OUT (REC709, DCI P3, LOGC, ARRIRAW)

MON OUT (REC709, DCI P3, LOGC)

EVF (REC709, LOGC)

LOG C film matrix (On/Off)

AUDIO

adjust CH1 +/- (level +20/-10; unity)
adjust CH2 +/- (level +20/-10; unity)

AUDIO OUT

set AUDIO OUT
Phones Level (+/-)

OPTIONS

AUDIO OUT > OPTIONS >>

Left out (CH1, CH2, CH1+2, None)
Right out (CH1, CH2, CH1+2, None)
Audio OUT level (Manual, Unity max.)

OPTIONS

AUDIO IN > OPTIONS >>

Record (On/Off)
Channel 1/2 level (Manual/Unity)
Channel 1/2 source (L/R in)
Soundroll (=Tape) (edit name)

SHUTTER

set shutter angle (5.0° - 358.0°; 172.8°)
in highspeed mode (5.0°-356.0°)*HS
add/delete value

see *calculated exposure time*

MIRROR*STUDIO (On/Off)

WB

set WHITEBALANCE (2000K - 11000K, Auto WB; 5600K;
and CC SHIFT)

add/rename/delete value

BACK & JOGWHEEL

press BACK while turning the jogwheel
to change the display brightness

ALEXA SUP 6.0 underlined values represent the factory reset.

Menu Settings & Button Functions



USER

USER BUTTON ASSIGNMENT

set Button 1, 2, 3

None

MON OUT surround
 MON OUT gamma
 MON OUT frame lines
 MON OUT status info
 MON OUT false color
 MON OUT peaking
 MON anam. desqu. *ANAMORPH
 Frame lines color
 EVF surround
 EVF gamma
 EVF frame lines
 EVF status info
 EVF zoom
 EVF false color
 EVF peaking
 EVF anam. desqu. *ANAMORPH
 Grab still frame
 Return in active
 Toggle SxS
 Check last clip
 Circle clip
 Auto WB
 ND filter active *STUDIO

set Button 4, 5

None

MON OUT surround
 MON OUT gamma
 MON OUT frame lines
 MON OUT status info
 MON OUT false color
 MON OUT peaking
 Return in active
 Frame lines color
 Toggle SxS
 Format Card1
 Format Card2
 False color index

PLAY

SxS PLAYBACK screen

start Playback of last clip (press wheel)

CLIP LIST

OPTIONS

PLAY Options >>

Clip end action (Stop/Pause/Loop)

Show frame lines (On/Off)

Status info on **MON OUT** (On/Off)

STEPSIZE (1 frame/1 second)

CIRCLE CLIP

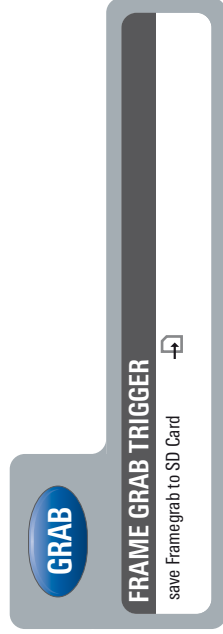
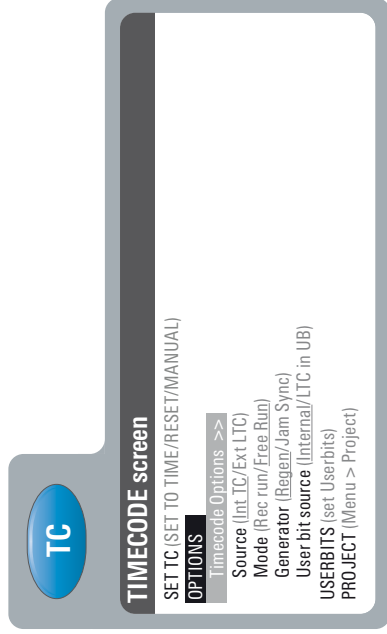
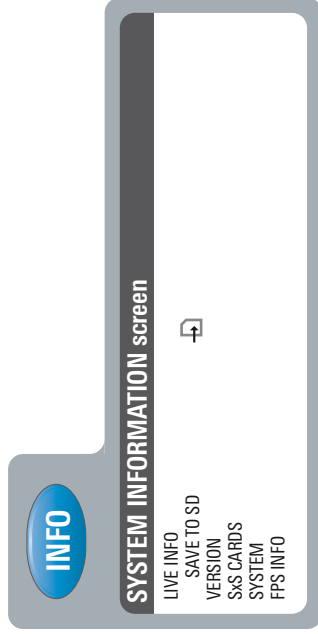
LOCK

BUTTON LOCK

locks HOMESCREEN, MENU, PLAY, INFO, GRAB and TC;
also locks the buttons on EVF and WRS*PLUS & STUDIO!

ALEXA SUP 6.0 underlined values represent the factory reset.

Menu Settings & Button Functions



ALEXA SUP 6.0 underlined values represent the factory reset.

Menu Settings & Button Functions ALEXA Plus & ALEXA Studio



RADIO

STATUS

Channel: 0
Units: 0
Ready/Off

WRS > RADIO >>

WRS radio power (On/Off)
WRS radio channel (0-7)

IRIS CLM

CLM STATUS

displays TYPE, DIRECTION and TORQUE(1-4; only CLM-3)

IRIS CLM

set DIRECTION
set TORQUE (only CLM-3)
CALIBRATE/CALIBRATE ALL motors

CAM LEVEL

STATUS READOUT FROM SENSORS

Tilt: 0.0°
Roll: 0.0°

CAM LEVEL > CALIBRATE

use to reset your null balance

ZOOM CLM

CLM STATUS

displays TYPE, DIRECTION and TORQUE(1-4; only CLM-3)

ZOOM CLM

set DIRECTION
set TORQUE (only CLM-3)
CALIBRATE/CALIBRATE ALL motors

LENS DATA

LDS READOUT

Status

LENS DATA

displays FOCAL LENGTH, IRIS, FOCUS and DoF close/far

LDS OPTIONS

Lens distance unit (Metric, Imperial, Default Unit)

Circle of confusion (0.013/0.025/0.035/0.050mm)

Inverse iris scale (On/Off)

Inverse zoom scale (On/Off)

Inverse focus scale (On/Off)

LDA *available when non-LDS lens in use*
manage lens data for non-LDS lenses

FOCUS CLM

CLM STATUS

displays TYPE, DIRECTION and TORQUE(1-4; only CLM-3)

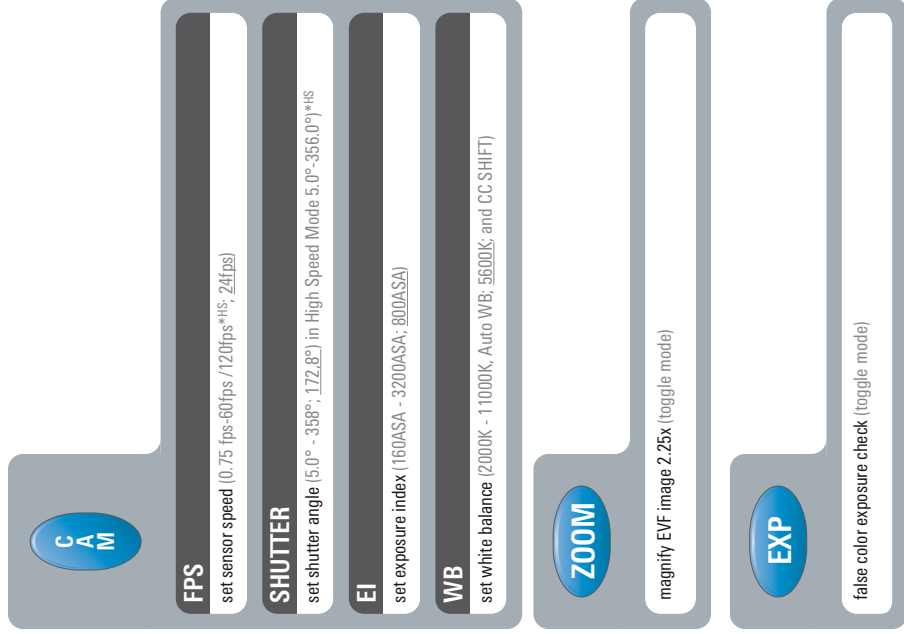
FOCUS CLM

set DIRECTION
set TORQUE (only CLM-3)
CALIBRATE/CALIBRATE ALL motors

ALEXA SUP 6.0 underlined values represent the factory reset.

Menu Settings & Button Functions

Electronic Viewfinder EVF-1



E
V
F

EVF menu

Brightness (0-5)
Rotate Image (On/Off)
Smooth Mode (On/Off)
Surround View (On/Off)
Surround Mask (Black line/Color Line/Mask 25%/50%/75%)
Status Info (On/Off)
Frame Lines (On/Off)
Select Frame Lines 1 (choose from list)
Select Frame Lines 2 (choose from list)
Center Mark (Off/Dot/Cross)
User Rectangles (Off/Rect 1/Rect 2/Rect 1&2)
Edit User Rectangles (only when User Rectangles active)
Frame Lines Color (Red/Green/Blue/Yellow/Black/White)
Frame Lines Intensity (1 - 4)

Mirror Control - ALEXA Studio

VIEW

switch to VIEW-mode (Operator sees an image)
press 2x for spinning mirror

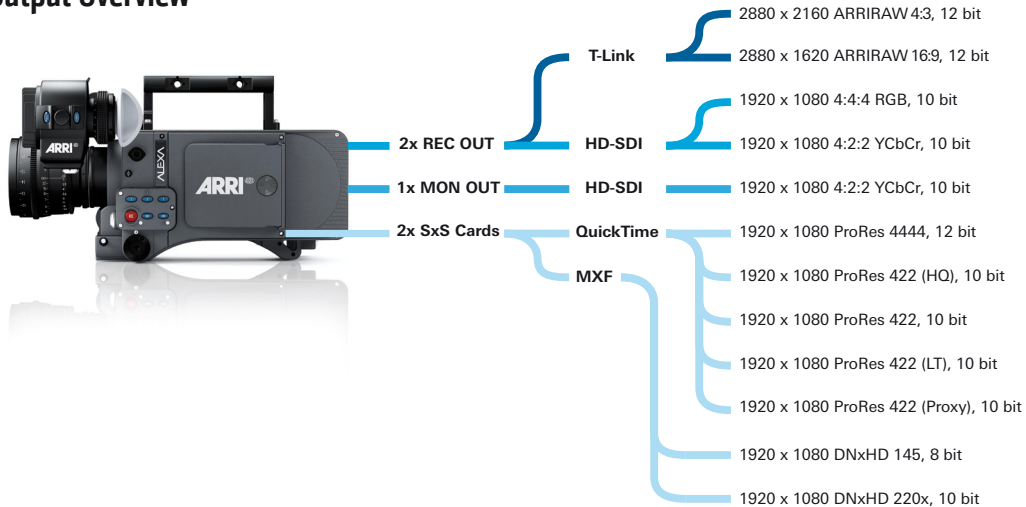
GATE

switch to GATE-mode (sensor & all video outs "see" an image)
press 2x for spinning mirror

ALEXA SUP 6.0 underlined values represent the factory reset.

ALEXA Outputs

Output Overview



Output Overview / ProRes Recording

Codec	Color Coding	Bit Depth	Data rate (24fps)	Min. rec. time (on 32GB SxS PRO card at 24fps)	Max. fps (on 32GB/64GB SxS PRO card)	Application
ProRes 422 (Proxy)	YCbCr	10	36 Mb/s	1 h 23 min	60/120 fps	On-set monitoring and proxy editing while the master is captured with an external device.
ProRes 422 (LT)	YCbCr	10	82 Mb/s	37 min	60/120 fps	Same as above when a higher image quality is desired.
ProRes 422	YCbCr	10	117 Mb/s	25 min	60/120 fps	Basic television applications if images do not require adjustments in postproduction
ProRes 422 (HQ)	YCbCr	10	176 Mb/s	17 min	60/120 fps	High quality television applications requiring color correction and special effects high speed shots at higher frame rates.
ProRes 4444*	RGB	12	264 Mb/s	11 min	40/60 fps	High quality television or cinema applications requiring color correction and/or compositing.

* Even though the official name of this codec (pronounced “ProRes four by four”) contains four fours, ALEXA records three (444). The fourth four stands for an alpha channel that can be used in post but has no relevancy for image capture in the camera. ProRes 4444 is not available in High Speed mode.

Output Overview / DNxHD Recording

Codec	Color Coding	Bit Depth	Data rate (24fps)	Min. rec. time (on 32GB SxS PRO card at 24fps)	Max. fps (on 32GB/64GB SxS PRO card)	Application
DNxHD 145	YCbCr	8	116 Mb/s	1 h 23 min	60/120 fps	Television applications if images do not require adjustments in postproduction
DNxHD 220x	YCbCr	10	176 Mb/s	37 min	60/120 fps	High quality television applications requiring color correction.

ALEXA Recording

ARRIRAW

ARRIRAW provides the highest quality image output when shooting with ALEXA. It delivers the unprocessed sensor data output as uncompressed and unencrypted 12 bit log raw Bayer data. Any steps that are necessary to create a full color image in a given resolution are performed in post.

When shooting for 2K delivery, recording ARRIRAW at 2880 x 1620 pixels and downscaling to a 2K image in post shows visibly better resolution than upscaling from a 1920 x 1080 image. For VFX, ARRIRAW files can be reconstructed to a 2880 x 1620 full color image, where effects work can be applied with high detail, before the result is downscaled to 2K.

ALEXA Studio and M, in addition, feature the 4:3 mode, which delivers ARRIRAW data at 2880 x 2160 pixel bayer resolution. The taller aspect ratio allows DPs to capture the unique look of true (2x) anamorphic

lenses. When shooting with anamorphic lenses de-squeezing of the master image takes place in post. For viewing, the camera can deliver a de-squeezed image in the viewfinder and over the MON OUT.

To record ALEXA ARRIRAW, a recording device needs to meet certain technical requirements. ARRI introduced the ALEXA ARRIRAW recording certificate, which indicates that a product can reliably record ARRIRAW data with metadata, deliver a live-processed preview and playback image and that it outputs data that can be processed with the standard ARRIRAW toolkit. The currently certified ARRIRAW recorders are:

- Codex ARRIRAW and OnBoard recorder
- S.two OB-1
- ASTRODESIGN's HR-7502-A
- cineFlow cineTake

For an updated list and more information, please go to: www.arri.com/alexa/arriraw.

Gamma in the ALEXA

Aside from the ARRIRAW output, which contains no color processing, ALEXA can output images in different color processing methods (commonly called 'gamma'): Rec 709 and Log C with film matrix off or on.

Rec 709

'Rec 709' is short for the International Telecommunication Union's ITU-R Recommendation BT.709 - the output format for a traditional television workflow. Since Rec 709 is the standard for displaying images on video monitors, Rec 709 images can be shown as they are on monitors or used to create dailies or editing proxies. Additionally, Rec 709 images can be easily processed by most HD video postproduction gear in real time. While providing somewhat reduced choices in color grading, Rec 709 still maintains ALEXA's wide exposure latitude, cinematic look and

natural color rendition and offers the fastest workflow for any HD video-based infrastructure.

Log C

The "C" in Log C stands for "Cineon". Cineon was the digital film scanning, processing and recording system developed by Kodak in the 90s. It is also the name of a file format that contains density data from scanned negative film. Density is a logarithmic measure of the opacity of the film. The relation of the density to the film's exposure (measured in logarithmic units) is called the characteristic curve of the film. Each stock has its own characteristic curve, but the overall shape is always the same. For ALEXA and the D-21, ARRI introduced a log encoding that is similar to scanned negative and because of its similarity, called it "Log C". While offering great

Gamma in the ALEXA cont.

flexibility in color grading, Log C material looks washed out and flat when viewed without any additional processing, and so requires a Look Up Table (LUT) to appear natural to the human eye

Shooting in Log C

When scanned film material is brought into color grading, the colorist uses a preview LUT, so the monitor displays the image as it would appear in a projection from film. Log C material from ALEXA can be graded the same way as scanned footage (using preview LUTs). LUTs are required early in production and for a wide range of applications:

On Location

The live signal from the camera and recorded material that is played back for review has to be converted using a LUT to deliver a visually correct image on a monitor. Technically, we are not talking about a print

simulation LUT anymore, but a conversion LUT as it is intended to present the image as if the camera were recording with “what you see is what you get” HD video encoding (Rec 709).

- If Log C material is recorded directly onto SxS PRO cards in an ALEXA, the camera’s MON OUT is typically set to Rec 709. This activates a conversion LUT, which is applied on the monitoring output.
- Shooting images in Log C delivers the best foundation for the colorist’s work, providing the camera’s full latitude in an unconfined color space. For output on HDTV or in a DCI P3 projection, Log C images need to be tone-mapped and transformed into the target color space. This is typically done using a 3D LUT provided through the ARRI LUT Generator at www.arni.com/alexa/tools

Log C material is best recorded using a 4:4:4 codec (currently ProRes 4444, soon also DNxHD 444). The top quality 4:2:2 codecs (ProRes 422 (HQ) and DNxHD 220x) will also provide acceptable results in Log C, but due to the higher compression ratio, grading images recorded with these codecs may exhibit artifacts.

- If an external recorder is used with ALEXA, monitoring usually is hooked up to the recorder rather than the camera, to eliminate the risk of defective cables. The conversion therefore is applied on the recorder's monitoring output.
- When an HD playback system is used to record the camera's output in parallel, it could record Log C and play back using a conversion LUT.

Dailies Creation

For dailies and offline edit, the Log C material needs to be delivered in standard Rec 709 video encoding. The camera metadata, embedded in the HD-SDI signal and QuickTime files, lists all information needed to select the appropriate LUT. While current hardware would allow applying LUTs on the fly, most workflows rely on a copy of rendered 'video proxies' with baked-in LUTs.

When it is not desired to have matched shots with a first color correction:

- Externally recorded material can be ingested/ transferred to postproduction with a LUT applied on the recorder's outputs (file-based as well as signal output).

Gamma in the ALEXA cont.

- Material recorded to SxS cards with an ALEXA can be converted with a LUT directly in the editing tool using a software plugin or outside the editing tool using a standalone converter app. When it is desired to have matched shots and an optional first color correction to get a preview of the intended look, the clips or e.g. dpx or tiff file sequences are usually brought into a color grading tool which applies the LUT upon rendering. Converting Log C encoded material to Rec 709 video gets rid of all information that is not required for a “what you see is what you get image”. When Rec 709 material is brought back to Log C it therefore does not contain the same amount of information.

Visual Effects

Visual effects often work with linear light encoded material. When Log C material is linearized, all information can be preserved. It is therefore possible to do round-trip conversions from Log C to linear and back to Log C.

ARRI's LUT Generator

Nowadays a broad variety of post tools work with LUTs and are meant to apply color transformations to the signal. ARRI offers LUTs for all commonly used software and hardware solutions. Please visit our LUT Generator at www.ari.com/alexa/tools to download the LUTs you need.

Shooting Log C with film matrix on

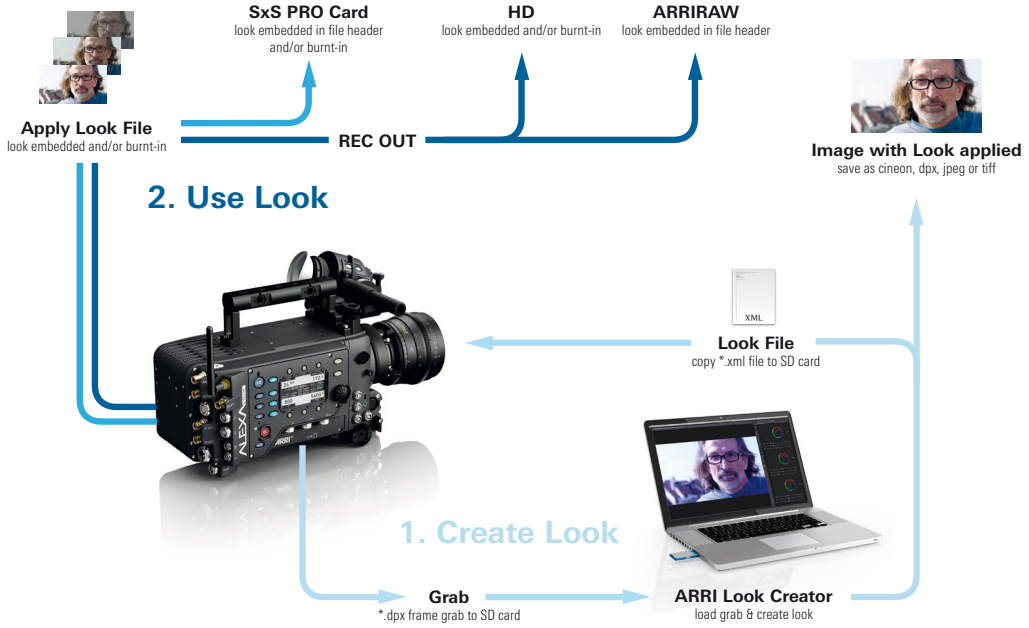
'Film matrix on' applies a color matrix making the resulting image resemble a film negative scanned on an ARRISCAN. This option somewhat lifts the over all chroma and introduces a certain colorcast in contrast to regular Log C (film matrix off).

We recommend to only shooting Log C with film matrix on if you are sure that this is required. If needed, colorists can easily activate a film emulation LUT in their grading application afterwards. For most purposes, leaving the film matrix off leaves you with higher flexibilities in post.

Look files in the ALEXA

ARRI Look Files are editable XML files that can apply a customized look to all outputs (EVF-1, MON OUT, REC OUT, ProRes and/or DNxHD) that are set to either Rec 709 or DCI P3.

These files can be saved to an SD card and imported into the camera. One look file can be activated at a time and applied to the different image paths individually. It is possible, for instance, to record a clean Log C image onto the SxS PRO card while outputting a Rec 709 image with a look applied on the MON OUT output. As soon as a look file gets applied to any output, the data of the look file is stored in metadata.



Look files in a non-destructive workflow

The Look File does not only go back into ALEXA where it is embedded in the metadata/file header, but it is also used in the ARRI LUT Generator at www.arri.com/alexa/tools. The ARRI LUT Generator incorporates the Look File into a LUT.

The LUT on the other hand is used e.g. in a Color Grading application where it serves as a reference point for the grading artist. In this way the Director of Photography's vision is being transported directly to post, where the actual 'development' of the footage takes place.



Legal and Extended Range

An image encoded in 10 bit legal range has a code value range from 64 to 940 (876 code values), and a 10 bit extended range signal has a code value range from 4 to 1019 (1015 code values). Contrary to popular belief, extended range encoding does not provide a higher dynamic range, not does legal range encoding limit the dynamic range that can be captured. It is only the quantization (the number of lightness steps between the darkest and brightest image parts) that is increased by a marginal amount (about 0.2 bits).

The concept of legal/extended range can be applied to data in 8, 10, or 12 bit. All ProRes/DNxHD materials generated by the ALEXA camera are in legal range, meaning that the minimum values are encoded by the number 64 (in 10 bit) or 256 (in 12 bit). The maximum value is 940, or 3760, respectively. All known systems, however, will automatically

rescale the data to the more customary value range in computer graphics, which goes from zero to the maximum value allowed by the number of bits used in the system (e.g. 255, 1023, or 4095). FCP will display values outside the legal range (“superblack” and “superwhite”) but as soon as you apply a RGB filter layer, those values are clipped. This handling is the reason why the ALEXA camera does not allow recording extended range in ProRes.

p and psf

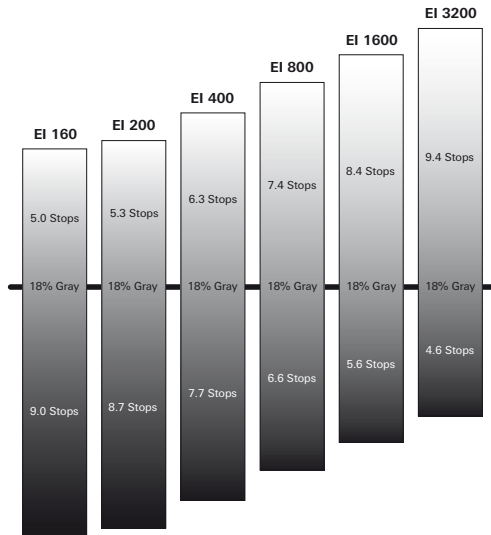
The ALEXA camera offers two different ways to output a HD-SDI signal. Either as progressive frame (p) or as progressive segmented frame (psf).

A progressive segmented frame is a progressive frame split into two segments (odd and even lines), which is transported 'like' an interlaced frame. In contrast to the interlaced frame it does not have two different states of movement in it. Psf has been introduced for devices only capable of processing interlaced streams to be able to transport progressive images.

This setting has no influence on the internal recording of ProRes or DNxHD nor on the ARRIRAW output.

Exposure Index

While ALEXA's 14 stops of exposure latitude and unique highlight handling approaches that of film, there is one major difference between the way film and digital cameras behave: with digital cameras, a change in EI will shift how many stops are available above and below 18% grey – each EI step shifts the location of 18% grey. What is special about ALEXA, however, is that its wide exposure latitude is available at all EI settings.



As a shortcut, we have come up with the following method of writing ALEXA's exposure index:

EI 160^{+5.0}_{-9.0} EI 200^{+5.3}_{-8.7} EI 400^{+6.3}_{-7.7} EI 800^{+7.4}_{-6.6} EI 1600^{+8.4}_{-5.6} EI 3200^{+9.4}_{-4.6}

Values next to the exposure index are the number of stops above and below 18% grey. These values are for Log C. Rec 709 and DCI P3 have 0.5 stops fewer

in the low end at EI 160, 0.4 stops fewer in the low end at EI 200 and 0.2 stops fewer in the low end at EI 400. Otherwise they are the same.

ND filters with ALEXA

While traditional ND filters work great for film, for digital cameras we recommend the use of ND filters that have a built-in far-red blocker. Such filters are available from a number of manufacturers, often called “ND filters with an IR-cut off”. A single filter that combines an ND and a far-red cut off generally yields better results and fewer reflections than a traditional ND filter stacked on top of a separate IR cut off filter.

While the close match between ALEXA’s custom designed IR filter and the sensor’s spectral response makes this issue less critical in contrast to some other digital cameras, it is in general a good idea to only use traditional film ND filters up to an ND 0.9. The ALEXA Studio has a built-in ND filter with a density of ND 1.3 (4.3 stops), which can be moved in and out of the optical path. The advantage over classical ND filters is that it is located behind the mirror

shutter, so the optical viewfinder image stays bright. While not blocking all the IR energy a commercial Infrared blocker would, the Infrared blocking abilities of the ALEXA Studio’s internal ND filter are sufficient for most situations.

False Color Exposure Check

The false color exposure check for the electronic viewfinder and/or MON OUT output measures the camera image, tints certain signal levels in a distinct color and shows the rest as a black and white image. The false color exposure check is based on the color processing set for the respective output signal path.

So if you have the viewfinder set to Rec 709, the false color exposure check will be based on the Rec 709 image. If you have the MON OUT at the same time set to Log C, the false color exposure check for MON OUT will be based on Log C.

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

Metadata Overview

Metadata is a set of data that describes and gives information about other data. ALEXA always records as much metadata as is available. This additional information makes documentation easier as the metadata is stored within the image files so it cannot get lost.

A range of automatic and human-readable data is being delivered by the ALEXA camera, that makes work in post much easier: exposure index, gamma and white balance information, for example, is essential for creating dailies or color grading. Reel number, project fps, date and time become important when combining images and sound from different sources. Frame by frame lens metadata, as recorded by ALEXA Plus, ALEXA M or ALEXA Studio, when used with an LDS lens or a non-LDS lens in combination with the Lens Data Mount or Lens Data Archive, is very useful for VFX work.

The Metadata fields listed here are a selection from a larger set of metadata that is stored along with the movie clips on the SxS PRO card. Metadata in the ALEXA appears in several different ways: Final Cut Pro 7 XML file, Avid Log Exchange (ALE) file, QuickTime metadata atom, MXF metadata XML and the ARRI Digital MetaData (ADMD) atom.

These atoms or text based files can be parsed by e.g. an editing software and offer the accompanying information mentioned above to the application and its user.

Camera Parameter	Description	*.XML (SxS)	*.ALE (SxS)	META (SxS)	ADMD (SxS)	SDI	Grab**
Camera Serial Number	Serial number of camera as on housing	take	take	take		take	take
Camera ID	Camera serial number short form	take	take	take		take	take
Camera SUP Version	Software version active on camera	take	take	take		take	take
Sensor Fps	Frame rate of sensor	take	take	take		frame	frame
Shutter Angle	Shutter angle of sensor in degrees	take	take	take		frame	frame
Exposure Index	Exposure index value set on camera in ASA	take	take	take		frame***	frame***
White Balance	White balance of camera as a color temperature in Kelvin	take	take	take		frame***	frame***
White Balance CC	Green/magenta correction value of white balance	take	take	take		frame***	frame***
Gamma	Gamma set on image path	take	take	take		frame***	frame***
Camera Model	Type of camera (ALEXA, ALEXA Plus, ALEXA Studio, ALEXA M)	take	take	take		take	take
UUID	Universal unique identifier created by camera for each new clip	take	take	take		take	take
Lens Type*	Lens model connected to camera	take	take	take		take	take
Zoom Distance*	Current focal position on zoom lenses	take	take		frame	frame	frame
Focus Distance*	Current focus distance of lens				frame	frame	frame
Iris Value*	Current iris value of lens				frame	frame	frame
Master/Slave Info	Identifies master/slave camera	take	take	take		take	take
Channel Info	Marks left or right channel of 3D setup	take	take	take		take	take
Reel Name	Name of current SxS reel	take	take	take		frame***	frame***
Take Name	Counter of take on SxS card	take	take			frame***	frame***
Sound Reel Name	Name of sound reel as entered by user	take	take			frame***	frame***
SxS Serial Number	Number of SxS card used for recording	take	take				
User Date	Date as set by user on camera menu	take	take			frame***	frame***
User Time	Time as set by user on camera menu	take	take			take	frame***

* ALEXA Plus, ALEXA M or ALEXA Studio

** Only for .ari frame grabs.

*** This metadata is updated every frame but might be delayed in the processing chain by up to 10 frames.

Licenses

Licensed features expand the capabilities of an ALEXA camera. A license file is serial number sensitive and can only be used on the camera which it has been purchased for. Currently there are three licenses available: Anamorphic De-squeeze, High-speed and DNxHD Recording.

- Anamorphic De-squeeze shows a properly de-squeezed image (with or without surround view) on EVF-1 and/or MON OUT when working with 1.3x or 2x anamorphic lenses.
- The High Speed license allows recording 60 to 120 fps in 16:9 with ProRes codecs up to ProRes 422 HQ or with DNxHD codec up to DNxHD 220x onto SxS PRO 64 GB cards.
- High Speed mode uses the same Super 35 sensor area as Regular Speed mode (same depth of field, same angle of view). ARRIRAW, ProRes 444, HD-SDI 4:4:4 and 4:3 sensor mode are not supported in High Speed mode.
- The DNxHD license allows in-camera recording onto SxS PRO cards of 16:9 Avid DNxHD 145 (8 bit 4:2:2) and DNxHD 220x (10 bit 4:2:2) codecs, both with an MXF wrapper and embedded audio, Timecode and metadata. ALEXA MXF/DNxHD files use operational pattern OP1a, frame wrapped, per SMPTE 2019-4-2008 and a MXF (Media eXchange Format) container (compared to the Quicktime “mov” container). MXF/DNxHD files can be linked to Avid Media

Composer 5.5 or 6.0 using an ALEXA AMA plug-in available from the ARRI website for Windows or Mac OS X. Of course DNxHD recording is available in Regular and in High Speed mode (see High Speed license).

ALEXA Preshoot Checklist

General considerations

This chapter offers checklists for typical use-cases of an ALEXA camera. During Prep or pre-production, the following topics should be clear:

The basic camera parameters (e.g. timecode basis respectively project speed, choice of gamma and recording format) should always be discussed with postproduction. The choice of camera settings can be affected for different reasons. Sometimes the reasons are creative, sometimes the production pace may have an influence.

To avoid surprises, it is critical to give the planned setup a try and run a short test through the entire workflow before starting the shoot; This is the

fastest and most reliable way to identify problems in the digital workflow.

We highly recommend that you make at least one verified backup immediately after the recording media is removed from the camera. We also recommend that a first quality control ideally should happen on location. With digitally captured footage being viewable immediately after recording, potential problems can be spotted right away and re-shooting a scene will be less of a problem. Also check the conditions of your completion bond; it is not unusual that LTO backups are a requirement for the camera material to be covered.

Recording on SxS PRO cards

Camera Setup

The following steps are necessary to prep the camera for SxS recording.

- ▶ Always start your camera setup with a **factory reset**. Press the **Menu button**, go to **User Setup** > **Factory reset** and press **both soft buttons** to confirm.
- ▶ Use the **PROJECT** shortcut to go straight to the project settings.
 - ▶ Set the **project frame rate** (i.e. timecode base and playback frame rate).
 - ▶ If shooting with several cameras, assign an individual **camera index** to each camera unit.
 - ▶ **Next reel count** typically starts with 001 and automatically increments when the camera starts recording to a new card. This setting usually does not need to be touched.
- ▶ Press the **TC button** and enter the timecode **OPTIONS**. Assuming we'll get timecode from the sound guy:
 - ▶ Set **Source** to **Ext LTC** and verify that
 - ▶ **Mode** is set to **Free Run** and
 - ▶ **Generator** is set to **Jam Sync**.
- ▶ Press the **HOME button** and go to the **FPS** screen.
 - ▶ Enter **SXS CODEC** to select the **Codec** used for recording.
 - ▶ Go **BACK** and enter **FPS > SDI FPS** and set **REC OUT** and **MON OUT** to the Project frame rate.
 - ▶ Go **BACK**, select the **SENSOR FPS** from the list and enter by clicking the menu wheel.
- ▶ From the **HOME** screen, go to **SHUTTER** and adjust the exposure time.
- ▶ **HOME > WB** to adjust the white balance to match the light source.

Recording on SxS PRO cards cont.

- › **HOME > COLOR > GAMMA**, set **SxS** to **LOG C** and everything else to **REC 709**.
- › **HOME > EI** and adjust the sensitivity, if required.

Frequently used functions should be assigned to the **USER buttons**

- › Press **USER button** and enter the **EDIT** screen.
 - › Buttons 1 – 3 can also be used on the operator side, so assign functions like **EVF Gamma**, **MON OUT false color** and **MON OUT peaking**.
 - › Buttons 4 and 5 are only available on the assistant side through the user screen, so assign functions like **Format Card1** or **2** or **Toggle SxS**.

SxS Card Rotation

- › Take a fresh SxS PRO card, make sure it is not locked and insert it into one of the camera's slots, label facing outwards.

- › If the card had not been used before in an ALEXA, the camera will automatically prompt you to format it.
- › If the card had been used before, first **verify that the material has been properly transferred**. Then use **MENU > Recording > SxS cards > Quick format SxS Card #** to format/empty the card for recording.
- › Don't wait for the cards to fill up completely. As a rule of thumb, it's time to change the reel when the remaining recording time is less than twice the length of the current take.
- › When a card is full:
 - › Eject the card,
 - › engage the write protection lock,
 - › put the card it into a case and
 - › visually mark the "exposed negative" with colored tape.

- The data wrangler should perform at least the following steps:
 - Transfer the card's contents to at least **two backup drives** including **checksum verification**.
 - Disengage the write protection lock.
 - Optionally quick format the card using any type of file system. This greatly reduces risk of accidentally formatting over a card that has not been backed up.
 - Put the card back into a cover without color tape and hand over to the camera assistant.

Recording High Speed

Camera Setup

The following steps are necessary to prep the camera for High Speed SxS recording. Makes sure you are using Sony SxS PRO 64GB cards.

- ▶ Always start your camera setup with a **factory reset**. Press the **Menu button**, go to **User Setups** > **Factory reset** and press **both soft buttons** to confirm.
- ▶ Use the **PROJECT** shortcut to go straight to the project settings.
 - ▶ Set the **project frame rate** (i.e. timecode base and playback frame rate).
 - ▶ If shooting with several cameras, assign an individual **camera index** to each camera unit.
 - ▶ **Next reel count** typically starts with 001 and automatically increments when the camera starts recording to a new card. This setting usually does not need to be touched.
- ▶ Press the **TC button** and enter the timecode **OPTIONS**. Sync with audio usually is not required, so the best option is to use record run timecode:
 - ▶ Set **Source** to **Int TC** and
 - ▶ set **Mode** to **Rec Run**.
- ▶ Press the **HOME button** and go to the **FPS** screen.
 - ▶ Press **HIGHSPEED** and confirm switching to High Speed mode.
 - ▶ Enter **SET CODEC**, set **SxS recording** to **ProRes** or **DNxHD** and **HS Codec** to e.g. **ProRes 422 (HQ)** or **DNxHD 175x/185x/220x**.
 - ▶ Go **BACK**, enter **SDI FPS** and set **MON OUT** to the Project frame rate.
 - ▶ Go **BACK**, select the **SENSOR FPS** from the list and enter by clicking the menu wheel.
- ▶ From the **HOME** screen, go to **SHUTTER** and adjust the exposure time.
- ▶ **HOME** > **WB** to adjust the white balance to match the light source.
- ▶ **HOME** > **COLOR** > **GAMMA**, set **SxS** to **LOG C** and everything else to **REC 709**.
- ▶ **HOME** > **EI** and adjust the sensitivity, if required.

Frequently used functions should be assigned to the

USER buttons

- Press **USER button** and enter the **EDIT** screen.
 - › Buttons 1 – 3 can also be used on the operator side, so assign functions like **EVF Gamma**, **MON OUT false** color and **MON OUT peaking**.
 - › Buttons 4 and 5 are only available on the assistant side through the user screen, so assign functions like **Format Card1** or **2** or **Toggle SxS**.

SxS Card Rotation

- Take a fresh SxS PRO card, make sure it is not locked and insert it into one of the camera's slots, label facing outwards.
- If the card had not been used before in an ALEXA, the camera will automatically prompt you to format it.
- If the card had been used before, first **verify that the material has been properly transferred**. Then use **MENU > Recording > SxS cards > Quick format SxS Card #** to format/empty the card for recording.

- Don't wait for the cards to fill up completely. As a rule of thumb, it's time to change the reel when the remaining recording time is less than twice the length of the current take.
- When a card is full:
 - › Eject the card,
 - › engage the write protection lock,
 - › put the card it into a case and
 - › visually mark the "exposed negative" with colored tape.
- The data wrangler should perform at least the following steps:
 - › Transfer the card's contents to at least **two backup drives** including **checksum verification**.
 - › Disengage the write protection lock.
 - › Optionally quick format the card using any type of file system. This greatly reduces risk of accidentally formatting over a card that has not been backed up.
 - › Put the card back into a cover without color tape and hand over to the camera assistant.

Recording ARRIRAW

Camera Setup

The following steps are necessary to prep the camera for ARRIRAW recording.

- ▶ Always start your camera setup with a **factory reset**. Press the **Menu button**, go to **User Setups** > **Factory** reset and press **both soft buttons** to confirm.
- ▶ Use the **PROJECT** shortcut to go straight to the project settings.
 - ▶ Set the **project frame rate** (i.e. timecode base and playback frame rate).
 - ▶ If shooting with several cameras, assign an individual **camera index** to each camera unit.
 - ▶ **Next reel count** typically starts with 001 and automatically increments when the camera starts recording to a new card. This setting usually does not need to be touched.
- ▶ Press the **TC button** and enter the timecode **OPTIONS**.
 - ▶ Assuming we'll get timecode from the sound guy:
 - ▶ set **Source** to **Ext LTC** and verify that
 - ▶ **Mode** is set to **Free Run** and
 - ▶ **Generator** is set to **Jam Sync**.
 - ▶ Press the **Menu button** and go to **Recording** > **REC OUT**.
 - ▶ Set the **frame rate** according to the **project frame rate**.
 - ▶ Set the **HD-SDI format** to **ARRIRAW 1.5G SL** for recording standard speeds. If the recorded supports 3G HD-SDI, you can also set the camera to **ARRIRAW 3G SL**.
 - ▶ Turn **REC OUT fps sets sensor fps on**.
 - ▶ Turn **SDI remote on**.
 - ▶ Turn **Variflag off**.
 - ▶ Press the **BACK button** and go to **SxS Cards**.
 - ▶ If editing proxies shall be recorded to SxS cards, go to **SXS CODEC** and select a **Codec**. If nothing will be recorded to SxS cards, turn **SxS recording Off**.

- Press the **HOME button**, go to the **FPS > SDI FPS** and set the **MON OUT** frame rate to same as **REC OUT**.
- From the **HOME** screen, go to **SHUTTER** and adjust the exposure time.
- **HOME > WB** to adjust the white balance to match the light source.
- **HOME > COLOR > GAMMA**, set **SxS** (if used), **MON OUT** and **EVF** to **REC 709**.
- **HOME > EI** and adjust the sensitivity, if required.

Frequently used functions should be assigned to the **USER buttons**

- Press **USER button** and enter the **EDIT** screen.
 - Buttons 1 – 3 can also be used on the operator side, so assign functions like **EVF Gamma**, **MON OUT false color** and **MON OUT peaking**.

- Buttons 4 and 5 are only available on the assistant side through the user screen, so assign functions like **Return in active** or **Format Card 1**

Recorder Setup

As the recorder setup greatly varies for each manufacturer, please check the respective manuals for setup instructions. Operating the recording hardware needs to be taken very seriously. Only trained personnel should be charged to handle recording equipment.

- Input format: ARRIRAW 1620p
- HD-SDI: 1.5G or 3G, as set on camera
- Frame rate: REC OUT frame rate from camera
- Record trigger: SDI
- TC source: HD VANC

ALEXA in a 3D Sync configuration

Camera Setup

The first steps need to be performed on both cameras to prep them for a 3D shoot.

- ▶ Connect the ALEXA EXT to EXT cable to both cameras.
- ▶ Connect the ALEXA Ethernet to Ethernet cable to both cameras.
- ▶ Start the camera setup with a **factory reset**. Press the **Menu button**, go to **User Setups > Factory reset** and press **both soft buttons** to confirm.
- ▶ Don't bother to set up the **PROJECT** settings.
- ▶ Press the **MENU button** and go to **SYSTEM > External Sync**.
 - ▶ Set the **Eye index** for each camera depending on their position.
 - ▶ Set **Sensor sync** to **EXT master** on one camera and **EXT slave** on the other.
 - ▶ Set **Settings sync** to **ETH master** on one camera and **EXR slave** on the other.

Note:

The camera that can be seen better in the 3D rig should be set to **EXT/ETH slave** as only the slave camera indicates a missing sync between master and slave before recording.

Now follow the guides for SxS, High Speed SxS or ARRIRAW recording using the master or the slave camera. The settings are automatically synced on both cameras no matter if master or slave is used for setup.

From time to time (reboot, switching from playback to recording) it is advisable to re-trigger the REC OUTs. Navigate to **SYSTEM > External Sync** and choose **Send HD sync trigger**.

ALEXA M fiber maintenance

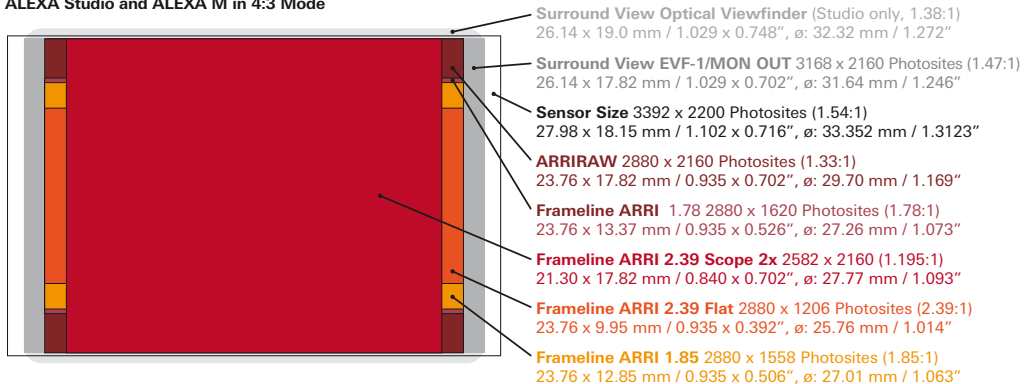
The cleanliness of the optical fiber connectors is mandatory for seamless functionality. Make sure not to touch the white fiber ends and never leave the connectors open - cover them with their rubber covers when not in use. Plug the fiber covers together while using the fiber cable to prevent dirt from accumulating inside the cover. Regularly check the cleanliness of the fiber end; if dirty, clean the fiber end with an appropriate tool such as the SMPTE cleaning pen (K2.72082.0).

ALEXA Specifications

Camera Types:

ALEXA	35 format film-style digital camera integrated shoulder arch and receptacles for 15 mm lightweight rods.
ALEXA Plus	In addition to the above offers built-in support for the ARRI Wireless Remote System, motion evolution lens control system and ARRI Lens Data System (including Lens Data Mount and Lens Data Archive for lenses without built-in LDS).
ALEXA Studio	In addition to the above features a rotating mirror shutter, an optical viewfinder that can be exchanged with the standard electronic viewfinder and 4:3 capture mode. Includes anamorphic de-squeeze and high speed licences.
ALEXA M	Based on the ALEXA, but with separate camera head and body. Also offers 4:3 capture mode and LDS lens mount and includes anamorphic de-squeeze and high speed licences.

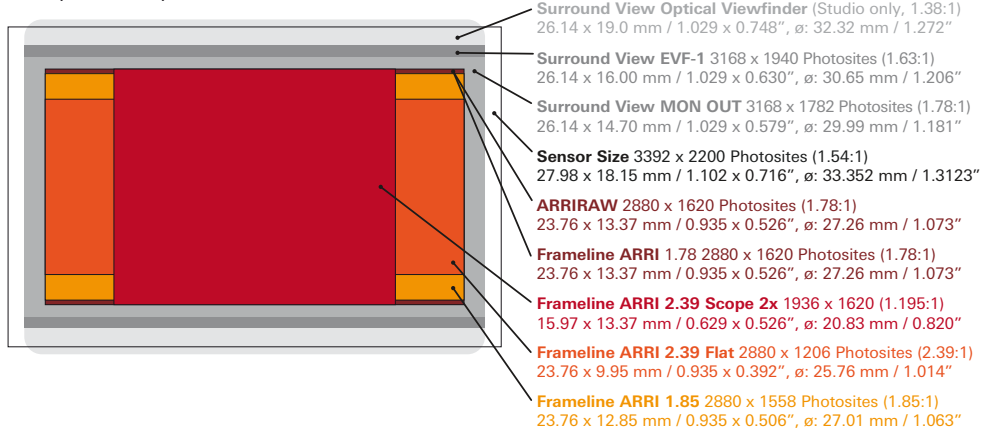
ALEXA Studio and ALEXA M in 4:3 Mode



Sensor

35 format ALEV III CMOS sensor with Dual Gain Architecture (DGA) and Bayer pattern color filter array.

ALEXA, ALEXA Plus, ALEXA M and ALEXA Studio in 16:9 Mode



Photosites

16:9 sensor mode:

2880 x 1620 for ARRIRAW, 2880 x 1620 down sampled to 1920 x 1080 for HD video, ProRes and DNxHD

4:3 sensor mode (ALEXA Studio and M only):

2880 x 2160 for ARRIRAW, 2880 x 2160 down sampled to 1440 x 1080 (pillar box) for monitoring in EVF-1 and HD video (MON OUT only)

Operating Modes

Regular or High Speed mode. High Speed mode requires license key purchase. Switching takes approximately 40 seconds. High Speed mode is currently limited to 16:9.

Mirror shutter on or off (ALEXA Studio only)

Switching takes approximately 3 seconds through camera display.

16:9 or 4:3 sensor mode (ALEXA Studio and M only)

Switching takes approximately 3 minutes. 4:3 is currently only available for ARRIRAW; a pillar box format is used for 16:9 EVF-1 as well as HD-SDI MON OUT; ProRes or DNxHD recording is currently not supported.

Filter (ALEXA Studio only)

Sealed behind-the-lens motorized filter mechanism provides optical flat or ND 1.3 (4 1/3 stops)

Frame Rates

Operating Mode (2)	Recording Format	Configuration	Fps Range (1)
16:9	ProRes 422 (Proxy), 422 (LT), 422 and 422 (HQ)	64 GB/32 GB SxS PRO cards	0.75 - 60
16:9	ProRes 422 (Proxy), 422 (LT), 422 and 422 (HQ)	High Speed license and 64 GB SxS PRO cards	0.75 - 120
16:9	ProRes 4444	32 GB SxS PRO cards	0.75 - 40
16:9	ProRes 4444	64 GB SxS PRO cards, SUP 5.0 or later	0.75 - 60
	DNxHD 145 and 220x	64 GB/32 GB SxS PRO cards	0.75 - 60
	DNxHD 145 and 220x	High Speed license and 64 GB SxS PRO cards	0.75 - 120
	HD-SDI		0.75 - 60
16:9	ARRIRAW		0.75 - 60
4:3	ARRIRAW		0.75 - 48

⁽¹⁾ All speeds adjustable with 1/1000 fps precision

⁽²⁾ ALEXA Studio mirror shutter only available from 0.75 to 60 fps regardless of the operating mode

Shutter

Rotating mirror shutter (Studio only) 11.2° - 180.0°. At some frame rates mirror shutter needs to be less than 180°.

Electronic rolling shutter, 0.75 - 60 fps: 5.0° - 358.0°, 60 - 120 fps: 356°. Shutter angle setting precision: 1/10 degree.

Exposure Latitude

14 stops for all sensitivity settings from EI 160 to EI 3200, as measured with the ARRI Dynamic Range Test Chart (DRTC)

Exposure Index

EI 160^{+5,0}_{-9,0} EI 200^{+5,3}_{-8,7} EI 400^{+6,3}_{-7,7} EI 800^{+7,4}_{-6,6} EI 1600^{+8,4}_{-5,6} EI 3200^{+9,4}_{-4,6}

Values behind the exposure index are the number of stops above and below 18% grey. These values are for Log C. Rec 709 offer 0.5 stops fewer in the low end at EI 160, 0.4 stops fewer in the low end at EI 200 and 0.2 stops fewer in the low end at EI 400.

White Balance

Separate red/blue and green/magenta balance available through Auto White Balance or manual setting. Red/blue: 2000 to 11000 Kelvin, adjustable in 100 K steps, with presets of 3200 (tungsten), 4300 (fluorescent), 5600 (daylight), 7000 (daylight cool). Green/magenta: -8 to +8 color correction (CC), 1 CC = 035 Kodak CC values or 1/8 Rosco values.

Sound Level

Under 20 db(A) @ 24 fps (mirror shutter running on the Studio) and $\leq +30^{\circ}$ Celsius ($\leq +86^{\circ}$ Fahrenheit) with lens attached and fan mode set to 'Regular', measured 1 m/3 feet in front of the lens. Silent operation at higher temperatures possible with fan mode set to 'Rec low'.

Power In

Three inputs: BAT connector, battery adapter back and battery adapter top.
All accept 10.5 to 34 V DC.

Power draw:

ALEXA/ALEXA Plus:

85 W for camera and EVF-1 in typical use recording to SxS PRO cards, without accessories.

ALEXA Studio:

90 W for camera with OVF-1 in typical use recording 24 fps to SxS PRO cards, mirror shutter on, without accessories. When running over 30 fps with mirror shutter on, supply voltage of 18V or more is recommended.

ALEXA M:

85 W for body in typical use recording to SxS PRO cards, without accessories.
40 W for camera head in typical use without accessories. A minimum of 15V power input to the body is required to power the camera head from the body through a standard SMPTE 311M hybrid fiber cable up to 50 meters, without accessories. The camera head has one 10.5 to 34 V DC power input that can be used to power the head independently from the camera body.

Power Out

12 V connector:

limited to 12 V, up to 2.2 A.

RS, EXT and ETHERNET:

input below 24 V is regulated up to 24 V, above 24 V: input = output voltage.
Both RS and EXT connectors combined: up to 2.2 A.

ETHERNET:

up to 1.2 A. Maximum power draw is also limited by the power source.
The camera head on the ALEXA M offers two RS connectors and one ETHERNET connector, with the same specifics as on the camera body.

Weight

ALEXA camera body + SxS Module: 6.3 Kg/13.8 lb

ALEXA camera body + SxS Module + EVF-1 + Viewfinder Mounting Bracket

VMB-1 + viewfinder cable + Center Camera Handle CCH-1: 7.7 Kg/16.9 lb

ALEXA Plus camera body + SxS Module: 7.0 Kg/15.4 lb

ALEXA Plus camera body + SxS Module + EVF-1 + Viewfinder Mounting

Bracket VMB-2 + viewfinder cable + Center Camera Handle CCH-1: 8.4 Kg/18.5 lb

ALEXA Studio camera body + SxS Module: 8.0 Kg/17.6 lb

ALEXA Studio camera body + SxS Module + OVF-1 + Center Camera Handle

CCH-1: 10.2 Kg/22.5 lb

ALEXA M Head: 2.9 kg / 6.39 lb

ALEXA M Backend: 5.5 kg / 12 lb

Dimensions

ALEXA:	Length: 332 mm/12.95", width: 153 mm/6.02", height: 158 mm/6.22"
ALEXA Plus:	Length: 332 mm/12.95", width: 175 mm/6.89", height: 158 mm/6.22"
ALEXA Studio:	With OVF-1: Length: 402 mm/15.83", width: 268 mm/10.55", height: 241 mm/9.49"
ALEXA M Head:	Length: 212 mm/8.35", width: 129 mm/5.08", height: 149 mm/5.87"
ALEXA M Backend:	Length: 323 mm/12.72", width: 153 mm/6.02", height: 158 mm/6.22"

Detailed drawings can be found in the ALEXA Dimensions PDF document on our website at: www.arri.com/alexa/downloads

Environmental

Operating temperature range: -20° C to +45° C (-4° F to +113° F) @ 95% humidity max, non condensing.

ALEXA Studio: -10° C to +45° C (+14° F to +113° F) @ 95% humidity max, non condensing.

Cameras are splash and dust proof through sealed electronics. System cooling through radiator/single fan.

Lens Mount

ARRI Exchangeable Lens Mount (ELM); ships with Lens Adapter PL Mount with LDS contacts, 54 mm stainless steel PL mount, Super 35 centered. Standard ALEXA has no LDS contacts.

Flange Focal Depth

52.00 mm nominal

Viewfinder

Low latency (≤ 1 frame delay) electronic color viewfinder ARRI EVF-1 with 1280 x 784 F-LCOS micro display (image: 1280 x 720, status bars: 1280 x 32 above and 1280 x 32 below image) and ARRI LED illumination, both temperature controlled. Image can be flipped for use of viewfinder on camera left or right. Viewfinder Mounting Bracket allows movement of viewfinder forward/backwards, left/right, up/down, 360 degree-rotation and placement on camera left or right. EVF-1 controls: viewfinder and basic camera settings, ZOOM button (2.25x pixel to pixel magnification), EXP button (false color exposure check) and jog wheel.

ALEXA Studio: Optical viewfinder OVF-1 shows a bright, high contrast image for through-the-lens viewing with low distortion, accurate color fidelity and no delay. Can be used camera left or right and the viewfinder arm telescopes closer/farther from the camera body. Automatically keeps an upright image in all positions with an optional override for manual image rotation. Includes a flip in ND 0.6 contrast filter and 2x de-squeeze module for 2x anamorphic lenses (a 1.3x de-squeeze module is also available for retrofit). Includes Basic Insert Module BIM-1 for RGB frameglow. Accepts 8x and 10x 435 eyepieces, 435 eyepiece extensions and heated eyecups. With the optional ARRICAM Eyepiece Adapter AEA-1, the OVF-1 can accept the 8x ARRICAM Studio eyepiece, ARRICAM Studio Viewfinder Extension Medium and ARRICAM Studio Viewfinder Zoom Extension. Not compatible with Lite Universal Eyepiece. Can be replaced with the ALEXA Electronic Viewfinder EVF-1 by using the Electronic Viewfinder Adapter EVA-1.

Assistive Displays

For EVF-1 and MON OUT:

frame lines, surround view, camera status, false color exposure check, peaking focus check, electronic level, compare stored image with live image, RETURN IN video and anamorphic de-squeeze. MON OUT only: Reel & clip number.

For OVF-1:

Warning LEDs for REC (recording), BAT (battery low), FULL (SxS PRO card full). ALEXA Studio uses the same physical ground glass holder and frameglow frames as ARRICAMs, so ARRICAM ground glasses and frameglow masks could be used. However, the actual frameline dimensions are different, so for a precise alignment of framelines and captured pixels only ALEXA Studio ground glasses and frameglow masks are recommended. For frameline markings beyond the options in the price list, please use the online ground glass composer at www.arri.com/camera/ground_glass_composer.html.

Control

Camera right:

main user interface with a 3" transfective 400 x 240 pixel LCD color screen, illuminated buttons, button lock and jog wheel.

Camera left:

operator interface with illuminated buttons, button lock and card swap button.

In-camera Recording

Records Apple QuickTime files with ProRes encoding or MXF files with DNxHD encoding onto either one or two (Dual Recording) SxS PRO cards. All codecs legal range with embedded audio, timecode and metadata. MXF/DNxHD recording requires a license key.

Recording Outputs

2x 1.5 G or 3G REC OUT BNC connectors for ARRIRAW T-Link or HD-SDI video. Both with embedded audio, timecode, metadata and optional recording flag.

ARRIRAW 2880 x 1620 (16:9) uncompressed 12 bit log without white balance or exposure index processing applied. Requires an ARRIRAW T-Link certified recorder.

ARRIRAW 2880 x 2160 (4:3, ALEXA Studio and M only). Both uncompressed 12 bit log without white balance or exposure index processing applied. Requires an ARRIRAW T-Link certified recorder.

HD-SDI video:

uncompressed 1920 x 1080 (16:9) 4:4:4 RGB or 4:2:2 YCbCr; both legal or extended range. Recording frame rates other than HD standard (23.976, 24, 25, 29.97, 30, 50, 59.94, 60 fps) requires a recorder with Variflag support.

Monitor Output	2x MON OUT BNC connector on ALEXA Plus and Studio for uncompressed 1.5G HD-SDI video: 1920 x 1080 (16:9), 4:2:2 YCbCr; all legal range. ALEXA and ALEXA M offer 1x MON OUT.
Image Processing	16 bit linear internal image processing. Target color spaces for all ProRes codecs, DNxHD 220x, REC OUT and MON OUT: Log C or Rec 709. Target color spaces for DNxHD 145: Rec 709. For Rec 709, a customized look can be applied during record and playback with ARRI Look Files. Optional horizontal image mirroring.
Synchronization	Master/Slave mode for precision sync of settings, sensor, processing, HD-SDI outputs and QuickTime/ProRes or MXF/DNxHD recording for 3D applications.
Playback	QuickTime/ProRes or MXF/DNxHD clips can be played back from SxS PRO cards to the EVF-1, MON OUT and REC OUT. Playback audio is available embedded in the MON OUT and REC OUT signals and on the headphones jack.
Audio	1x XLR 5 pin AUDIO IN connector for 2 channel, line level balanced audio input, 24 bit/48 kHz A/D conversion, works at 23.976, 24, 25, 29.97 and 30 fps. Audio is recorded uncompressed into the QuickTime/ProRes or MXF/DNxHD files and embedded uncompressed in all HD-SDI outputs, including ARRIRAW T-Link. Max of 2.5 dBm output from AUDIO OUT headphones connector.

Connectors

Connector	Name	ALEXA	ALEXA Plus/Studio	ALEXA M Backend	ALEXA M Head
Slots for SxS PRO cards	SxS	2	2	2	–
BNC recording out HD-SDI, 1.5G/3G	REC-OUT 1/2	2	2	2	–
BNC monitoring out HD-SDI, 1.5G	MON OUT	1	2	1	–
XLR 5 pin audio in	AUDIO IN	1	1	1	–
BNC return signal HD-SDI, 1.5G	RET/SYNC IN	1	1	1	–
LEMO 16 pin external accessories	EXT	1	1	1	–
Fischer 2 pin 24 V power in	BAT	1	1	1	1
Fischer 3 pin 24 V remote start and accessory power out	RS	2	3	2	2
LEMO 2 pin 12 V accessory power out	12 V	1	1	1	–
LEMO 5 pin timecode in/out	TC	1	1	1	–
TRS 3.5 mm headphone mini stereo jack out	AUDIO OUT	1	1	1	–
LEMO custom 16 pin electronic viewfinder	EVF	1	1	–	1
LEMO 10 pin Ethernet with 24 V power	ETHERNET	1	1	2	1
Fischer 5 pin Lens Control System	LCS	–	2	–	–
Fischer 5 pin Lens Data Display	LDD	–	1	–	–
Fischer 12 pin for CLM-2, CLM-3 or later	IRIS	–	1	–	–
Fischer 12 pin for CLM-2, CLM-3 or later	ZOOM	–	1	–	–
Fischer 12 pin for CLM-2, CLM-3 or later	FOCUS	–	1	–	–
LEMO SMPTE 304M hybrid fiber connector	Optical Link	–	–	1	1

SD Card

For importing ARRI Look Files, camera set up files, frame line files and feature license keys. Stores captured stills from the REC OUT image path during Regular Speed (not High Speed) in ARRIRAW (.ari, 12 bit), TIFF (.tif, 16 bit), DPX (.dpx, 10 bit) and JPEG (.jpg, 8 bit) format as well as log files. Also used for software updates.

Upgrades

The Storage Interface Module (currently available for SxS PRO cards) can be exchanged for future storage modules. The Electronics Interface Module (available as either regular ALEXA or ALEXA Plus versions) can be exchanged for future control electronics. Exchangeable Lens Mount (ELM) allows other lenses beyond PL mount lenses to be used. Simple camera software updates. License keys available for purchase: Anamorphic De-squeeze, High Speed and DNxHD. ALEXA Studio comes with all license keys pre-installed. ALEXA M comes with Anamorphic De-squeeze and High Speed license keys pre-installed.

All technical data based on Software Update Packet (SUP) 6.1. All data is subject to change without notice.

ARRI Lenses

ARRI/ZEISS Master Prime lenses

Name	Lens Mount ⁽¹⁾	Aperture	Close focus ⁽²⁾	Magnification ratio ⁽³⁾	Length ⁽⁴⁾	Front diameter ⁽⁵⁾	Maximum housing diameter	Weight
Master Prime 12	PL LDS	T1.3 - T22	0.40 m / 16"	1:16.5	197 mm / 7.8"	156 mm / 6.1"	159 mm / 6.3"	2.9 Kg / 6.4 lb
Master Prime 14	PL LDS	T1.3 - T22	0.35 m / 14"	1:11.7	172 mm / 6.8"	114 mm / 4.5"	128 mm / 5"	2.4 Kg / 5.3 lb
Master Prime 16	PL LDS	T1.3 - T22	0.35 m / 14"	1:11.8	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.2 Kg / 4.8 lb
Master Prime 18	PL LDS	T1.3 - T22	0.35 m / 14"	1:11.0	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.2 Kg / 4.8 lb
Master Prime 21	PL LDS	T1.3 - T22	0.35 m / 14"	1:9.5	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.4 Kg / 5.3 lb
Master Prime 25	PL LDS	T1.3 - T22	0.35 m / 14"	1:8.6	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.6 Kg / 5.1 lb
Master Prime 27	PL LDS	T1.3 - T22	0.35 m / 14"	1:7.8	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.2 Kg / 4.8 lb
Master Prime 32	PL LDS	T1.3 - T22	0.35 m / 14"	1:7.1	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.3 Kg / 5.1 lb
Master Prime 35	PL LDS	T1.3 - T22	0.35 m / 14"	1:6.4	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.2 Kg / 4.8 lb
Master Prime 40	PL LDS	T1.3 - T22	0.40 m / 16"	1:7.0	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.3 Kg / 5.1 lb
Master Prime 50	PL LDS	T1.3 - T22	0.50 m / 20"	1:7.0	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.7 Kg / 5.9 lb
Master Prime 65	PL LDS	T1.3 - T22	0.65 m / 2'3"	1:8.2	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.6 Kg / 5.7 lb
Master Prime 75	PL LDS	T1.3 - T22	0.80 m / 2'9"	1:8.9	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.8 Kg / 6.2 lb
Master Prime 100	PL LDS	T1.3 - T22	1.00 m / 3'6"	1:8.9	153 mm / 6"	114 mm / 4.5"	128 mm / 5"	2.9 Kg / 6.4 lb
Master Prime 135	PL LDS	T1.3 - T22	0.95m / 3'3"	1:6.6	172 mm / 6.8"	114 mm / 4.5"	128 mm / 5"	2.8 Kg / 6.2 lb
Master Prime 150	PL LDS	T1.3 - T22	1.50 m / 4'11"	1:10.3	210 mm / 8.3"	134 mm / 5.3"	137 mm / 5.4"	4.0 Kg / 8.8 lb



Angle of view H. V. D			Entrance pupil ⁽⁶⁾
Normal 35 ⁽⁸⁾ ID = 27.20 mm ⁽⁷⁾	DIN Super 35 ⁽⁹⁾ ID = 30.00 mm ⁽⁷⁾	ANSI Super 35 ⁽¹⁰⁾ ID = 31.14 mm ⁽⁷⁾	
83.87° - 66.44° - 96.13°	88.85° - 72.70° - 101.97°	90.98° - 74.78° - 104.26°	208.3 mm / 8.2"
76.42° - 59.41° - 88.52°	81.24° - 65.39° - 94.07°	83.44° - 67.49° - 96.33°	189.3 mm / 7.4"
70.07° - 53.79° - 81.76°	74.85° - 59.56° - 87.24°	76.87° - 61.50° - 89.33°	158.8 mm / 6.2"
63.98° - 48.60° - 75.29°	68.56° - 53.97° - 80.52°	70.53° - 55.80° - 82.48°	154.9 mm / 6.1"
55.96° - 42.05° - 66.60°	60.22° - 46.85° - 71.70°	62.07° - 48.50° - 73.66°	149.3 mm / 5.8"
48.12° - 35.79° - 57.97°	52.01° - 40.00° - 62.89°	53.72° - 41.45° - 64.81°	135.9 mm / 5.3"
43.82° - 32.45° - 53.08°	47.45° - 36.31° - 57.80°	49.06° - 37.64° - 59.66°	136.7 mm / 5.4"
38.84° - 28.74° - 47.10°	42.07° - 32.16° - 51.31°	43.51° - 33.35° - 52.98°	128.4 mm / 5.0"
35.04° - 25.82° - 42.64°	38.01° - 28.94° - 46.52°	39.33° - 30.02° - 48.04°	126.9 mm / 4.9"
30.91° - 22.75° - 37.68°	33.55° - 25.51° - 41.15°	34.73° - 26.46° - 42.52°	119.5 mm / 4.7"
25.02° - 18.27° - 30.81°	27.26° - 20.53° - 33.88°	28.26° - 21.32° - 35.13°	136.1 mm / 5.3"
19.27° - 14.06° - 23.72°	20.99° - 15.80° - 26.08°	21.59° - 16.58° - 27.00°	107.3 mm / 4.2"
16.66° - 12.17° - 20.51°	18.15° - 13.67° - 22.56°	18.82° - 14.20° - 23.39°	102.5 mm / 4.0"
12.60° - 9.17° - 15.56°	13.74° - 10.32° - 17.14°	14.25° - 10.72° - 17.79°	57.2 mm / 2.2"
9.49° - 6.91° - 11.72°	10.35° - 7.77° - 12.91°	10.73° - 8.07° - 13.40°	29.9 mm / 0.098"
8.53° - 6.22° - 10.53°	9.30° - 6.99° - 11.59°	9.65° - 7.26° - 12.03°	-89.0 mm / -3.5"

Normal 35 ⁽⁸⁾ ID = 27.20 mm ⁽⁷⁾

DIN Super 35 ⁽⁹⁾ ID = 30.00 mm ⁽⁷⁾

ANSI Super 35 ⁽¹⁰⁾ ID = 31.14 mm ⁽⁷⁾

Operation Temperature: -20°C to +40°C / -4°F to +104°F

Storage/Transport Temperature: -40C to +70°C / -40°F to +158°F

⁽¹⁾ Positive locking (PL) 54 mm stainless steel lens mount with Lens Data System (LDS) contacts

⁽²⁾ Close focus is measured from the film/sensor plane

⁽³⁾ Magnification ratio is the relationship of the size of an object on the film/sensor plane (first number) to the size of that object in real life (second number) at the close focus setting

⁽⁴⁾ Lens length is measured from the lens mount to the front of the lens housing

⁽⁵⁾ Diameter of the lens/matte box interface

⁽⁶⁾ The distance from the entrance pupil to the film/sensor plane. Positive numbers indicated an entrance pupil in front, negative numbers indicated an entrance pupil behind the film/sensor plane. The entrance pupil (often mistakenly called "nodal point") is the center of perspective; moving the camera/lens system around the center of the entrance pupil prevents parallax errors. While largely irrelevant for live action, this measurement is important for special effects work.

⁽⁷⁾ The image diameter (ID) is the diameter of the image circle needed for the respective format. These lenses are designed for the largest ID given here.

⁽⁸⁾ Horizontal (H), vertical (V) and diagonal (D) angles of view for a Normal 35 Academy camera aperture (aspect ratio 1.37:1, dimensions 22mm x 16mm / 0.8661" x 0.6299")

⁽⁹⁾ Horizontal (H), vertical (V) and diagonal (D) angles of view for a DIN Super 35 Silent camera aperture (aspect ratio 1.33:1, dimensions 24mm x 18mm / 0.944" x 0.7087")

⁽¹⁰⁾ Horizontal (H), vertical (V) and diagonal (D) angles of view for an ANSI Super 35 Silent camera aperture (aspect ratio 1.33:1, dimensions 24.9mm x 18.7mm / 0.980" x 0.7362")

All data subject to change without notice.

ARRI/ZEISS Ultra Primes lenses

Name	Lens Mount ⁽¹⁾	Aperture	Close focus ⁽²⁾	Length ⁽⁴⁾	Front diameter ⁽⁵⁾	Weight	
							Normal 35 ⁽⁸⁾ ID = 27.20 mm ⁽⁷⁾
Ultra Prime 8R	PL	T2.8 to T22	0.35 m / 13.8"	130 mm / 5.1"	134 mm / 5.3"	2.0 Kg / 4.4 lb	107.0°
Ultra Prime 10	PL	T2.1 to T22	0.35 m / 13.8"	143 mm / 5.6"	156 mm / 6.1"	2.9 Kg / 6.4 lb	90.8°
Ultra Prime 12	PL	T2.0 to T22	0.30 m / 11.8"	140 mm / 5.5"	156 mm / 6.1"	2.0 Kg / 4.4 lb	85.2°
Ultra Prime 14	PL	T1.9 to T22	0.22 m / 8.7"	112 mm / 4.4"	114 mm / 4.5"	1.8 Kg / 4.0 lb	75.6°
Ultra Prime 16	PL	T1.9 to T22	0.25 m / 9.8"	94 mm / 3.7"	95 mm / 3.7"	1.2 Kg / 2.6 lb	70.8°
Ultra Prime 20	PL	T1.9 to T22	0.28 m / 11"	91 mm / 3.6"	95 mm / 3.7"	1.2 Kg / 2.6 lb	58.4°
Ultra Prime 24	PL	T1.9 to T22	0.30 m / 11.8"	91 mm / 3.6"	95 mm / 3.7"	1.0 Kg / 2.2 lb	50.2°
Ultra Prime 28	PL	T1.9 to T22	0.28 m / 11"	91 mm / 3.6"	95 mm / 3.7"	1.0 Kg / 2.2 lb	43.2°
Ultra Prime 32	PL	T1.9 to T22	0.35 m / 13.8"	91 mm / 3.6"	95 mm / 3.7"	1.1 Kg / 2.4 lb	38.2°
Ultra Prime 40	PL	T1.9 to T22	0.38 m / 15"	91 mm / 3.6"	95 mm / 3.7"	1.0 Kg / 2.2 lb	30.6°
Ultra Prime 50	PL	T1.9 to T22	0.60 m / 23.6"	91 mm / 3.6"	95 mm / 3.7"	1.0 Kg / 2.2 lb	24.0°
Ultra Prime 65	PL	T1.9 to T22	0.65 m / 25.6"	91 mm / 3.6"	95 mm / 3.7"	1.1 Kg / 2.4 lb	19.2°
Ultra Prime 85	PL	T1.9 to T22	0.90 m / 35.4"	91 mm / 3.6"	95 mm / 3.7"	1.2 Kg / 2.6 lb	15.2°
Ultra Prime 100	PL	T1.9 to T22	1.00 m / 39.4"	91 mm / 3.6"	95 mm / 3.7"	1.2 Kg / 2.6 lb	12.6°
Ultra Prime 135	PL	T1.9 to T22	1.50 m / 59.1"	119 mm / 4.7"	95 mm / 3.7"	1.6 Kg / 3.5 lb	9.3°
Ultra Prime 180	PL	T1.9 to T22	2.60 m / 102.4"	166 mm / 6.5"	114 mm / 4.5"	2.6 Kg / 5.7 lb	7.0°



Horizontal Angle of View		Entrance pupil ⁽⁶⁾
DIN Super 35 ⁽⁹⁾ ID = 30.00 mm ⁽⁷⁾	ANSI Super 35 ⁽¹⁰⁾ ID = 31.14 mm ⁽⁷⁾	
112.0°	114.0°	155.2 mm / 6.1"
100.2°	102.1°	120.2 mm / 4.7"
90.2°	92.6°	113.4 mm / 4.4"
80.6°	82.6°	91.3 mm / 3.5"
73.0°	75.2°	85.1 mm / 3.3"
62.8°	65.0°	73.3 mm / 2.8"
54.2°	55.8°	67.4 mm / 2.6"
46.8°	48.4°	67.3 mm / 2.6"
41.6°	43.0°	61.1 mm / 2.4"
33.2°	34.7°	59.2 mm / 2.3"
26.2°	27.2°	13.4 mm / 0.5"
21.0°	21.8°	19.0 mm / 0.7"
16.5°	17.1°	3.5 mm / 0.1"
13.7°	13.9°	12.4 mm / 0.4"
10.2°	10.5°	-56.9 mm / -2.2"
7.6°	7.9°	-19.7 mm / -0.7"

Normal 35 ⁽⁸⁾ ID = 27.20 mm ⁽⁷⁾

DIN Super 35 ⁽⁹⁾ ID = 30.00 mm ⁽⁷⁾

ANSI Super 35 ⁽¹⁰⁾ ID = 31.14 mm ⁽⁷⁾

Operation Temperature: -20°C to +40°C / -4°F to +104°F

Storage/Transport Temperature: -40°C to +70°C / -40°F to +158°F

⁽¹⁾ Positive locking (PL) 54 mm stainless steel lens mount

⁽²⁾ Close focus is measured from the film/sensor plane

⁽³⁾ Magnification ratio is the relationship of the size of an object on the film/sensor plane (first number) to the size of that object in real life (second number) at the close focus setting

⁽⁴⁾ Lens length is measured from the lens mount to the front of the lens housing

⁽⁵⁾ Diameter of the lens/matte box interface

⁽⁶⁾ The distance from the entrance pupil to the film/sensor plane. Positive numbers indicated an entrance pupil in front, negative numbers indicated an entrance pupil behind the film/sensor plane. The entrance pupil (often mistakenly called "nodal point") is the center of perspective; moving the camera/lens system around the center of the entrance pupil prevents parallax errors. While largely irrelevant for live action, this measurement is important for special effects work.

⁽⁷⁾ The image diameter (ID) is the diameter of the image circle needed for the respective format. These lenses are designed for the largest ID given here.

⁽⁸⁾ Horizontal angles of view for a Normal 35 Academy camera aperture (aspect ratio 1.37:1, dimensions 22mm x 16mm / 0.8661" x 0.6299")

⁽⁹⁾ Horizontal angles of view for a DIN Super 35 Silent camera aperture (aspect ratio 1.33:1, dimensions 24mm x 18mm / 0.944" x 0.7087")

⁽¹⁰⁾ Horizontal angles of view for an ANSI Super 35 Silent camera aperture (aspect ratio 1.33:1, dimensions 24.9mm x 18.7mm / 0.980" x 0.7362")

All data subject to change without notice.

ARRI/ZEISS LDS Ultra Prime lenses

Name	Lens Mount ⁽¹⁾	Aperture	Close focus ⁽²⁾	Length ⁽⁴⁾	Front diameter ⁽⁵⁾	Weight	
							Normal 35 ⁽⁸⁾ ID = 27.20 mm ⁽⁷⁾
Ultra Prime 12	PL LDS	T2.0 to T22	0.30 m / 11.8"	140 mm / 5.5"	156 mm / 6.1"	2.2 Kg / 4.8 lb	85.2°
Ultra Prime 14	PL LDS	T1.9 to T22	0.22 m / 8.7"	112 mm / 4.4"	114 mm / 4.5"	1.8 Kg / 4.0 lb	75.6°
Ultra Prime 16	PL LDS	T1.9 to T22	0.25 m / 9.8"	94 mm / 3.7"	104 mm / 4.1"	1.5 Kg / 3.3 lb	70.8°
Ultra Prime 20	PL LDS	T1.9 to T22	0.28 m / 11"	91 mm / 3.6"	104 mm / 4.1"	1.5 Kg / 3.3 lb	58.4°
Ultra Prime 24	PL LDS	T1.9 to T22	0.30 m / 11.8"	91 mm / 3.6"	104 mm / 4.1"	1.3 Kg / 2.9 lb	50.2°
Ultra Prime 28	PL LDS	T1.9 to T22	0.28 m / 11"	91 mm / 3.6"	104 mm / 4.1"	1.5 Kg / 3.3 lb	43.2°
Ultra Prime 32	PL LDS	T1.9 to T22	0.35 m / 13.8"	91 mm / 3.6"	104 mm / 4.1"	1.4 Kg / 2.1 lb	38.2°
Ultra Prime 40	PL LDS	T1.9 to T22	0.38 m / 15"	91 mm / 3.6"	104 mm / 4.1"	1.4 Kg / 2.1 lb	30.6°
Ultra Prime 50	PL LDS	T1.9 to T22	0.60 m / 23.6"	91 mm / 3.6"	104 mm / 4.1"	1.2 Kg / 2.6 lb	24.0°
Ultra Prime 65	PL LDS	T1.9 to T22	0.65 m / 25.6"	91 mm / 3.6"	104 mm / 4.1"	1.4 Kg / 2.1 lb	19.2°
Ultra Prime 85	PL LDS	T1.9 to T22	0.90 m / 35.4"	91 mm / 3.6"	104 mm / 4.1"	1.5 Kg / 3.3 lb	15.2°
Ultra Prime 100	PL LDS	T1.9 to T22	1.00 m / 39.4"	91 mm / 3.6"	104 mm / 4.1"	1.5 Kg / 3.3 lb	12.6°
Ultra Prime 135	PL LDS	T1.9 to T22	1.50 m / 59.1"	119 mm / 4.7"	104 mm / 4.1"	2.0 Kg / 4.4 lb	9.3°
Ultra Prime 180	PL LDS	T1.9 to T22	2.60 m / 102.4"	166 mm / 6.5"	114 mm / 4.5"	2.8 Kg / 6.2 lb	7.0°



Horizontal Angle of View		Entrance pupil ⁽⁶⁾
DIN Super 35 ⁽⁹⁾ ID = 30.00 mm ⁽⁷⁾	ANSI Super 35 ⁽¹⁰⁾ ID = 31.14 mm ⁽⁷⁾	
90.2°	92.6°	113.4 mm / 4.4"
80.6°	82.6°	91.3 mm / 3.5"
73.0°	75.2°	85.1 mm / 3.3"
62.8°	65.0°	73.3 mm / 2.8"
54.2°	55.8°	67.4 mm / 2.6"
46.8°	48.4°	67.3 mm / 2.6"
41.6°	43.0°	61.1 mm / 2.4"
33.2°	34.7°	59.2 mm / 2.3"
26.2°	27.2°	13.4 mm / 0.5"
21.0°	21.8°	19.0 mm / 0.7"
16.5°	17.1°	3.5 mm / 0.1"
13.7°	13.9°	12.4 mm / 0.4"
10.2°	10.5°	-56.9 mm / -2.2"
7.6°	7.9°	-19.7 mm / -0.7"

Operation Temperature: -20°C to +40°C / -4°F to +104°F
Storage/Transport Temperature: -40C to +70°C / -40°F to +158°F

- ⁽¹⁾ Positive locking (PL) 54 mm stainless steel lens mount with Lens Data System (LDS) contacts
- ⁽²⁾ Close focus is measured from the film/sensor plane
- ⁽³⁾ Magnification ratio is the relationship of the size of an object on the film/sensor plane (first number) to the size of that object in real life (second number) at the close focus setting
- ⁽⁴⁾ Lens length is measured from the lens mount to the front of the lens housing
- ⁽⁵⁾ Diameter of the lens/matte box interface
- ⁽⁶⁾ The distance from the entrance pupil to the film/sensor plane. Positive numbers indicated an entrance pupil in front, negative numbers indicated an entrance pupil behind the film/sensor plane. The entrance pupil (often mistakenly called "nodal point") is the center of perspective; moving the camera/lens system around the center of the entrance pupil prevents parallax errors. While largely irrelevant for live action, this measurement is important for special effects work.
- ⁽⁷⁾ The image diameter (ID) is the diameter of the image circle needed for the respective format. These lenses are designed for the largest ID given here.
- ⁽⁸⁾ Horizontal angles of view for a Normal 35 Academy camera aperture (aspect ratio 1.37:1, dimensions 22mm x 16mm / 0.8661" x 0.6299")
- ⁽⁹⁾ Horizontal angles of view for a DIN Super 35 Silent camera aperture (aspect ratio 1.33:1, dimensions 24mm x 18mm / 0.944" x 0.7087")
- ⁽¹⁰⁾ Horizontal angles of view for an ANSI Super 35 Silent camera aperture (aspect ratio 1.33:1, dimensions 24.9mm x 18.7mm / 0.980" x 0.7362")

All data subject to change without notice.

ARRI/FUJINON Alura Zooms

Name	Lens Mount ⁽¹⁾	Focal Length Wide	Focal Length Long	Focal Length Ratio	Aperture	Close focus ⁽²⁾	Magnification ratio ⁽³⁾	Length ⁽⁴⁾	Front diameter ⁽⁵⁾
ARRI/FUJINON Alura Zoom 15.5-45	PL LDS	15.5	45	2.9	T2.8 - T22	0.6 m / 2'0"	1 : 8.1	228 mm / 9.0"	114 mm / 4.5"
ARRI/FUJINON Alura Zoom 30-80	PL LDS	30	80	2.7	T2.8 - T22	0.6 m / 2'0"	1 : 4.9	228 mm / 9.0"	114 mm / 4.5"
ARRI/FUJINON Alura Zoom 18-80	PL	18	80	4.4	T2.6 - T22	0.7 m / 2'4"	1:5.5	285 mm / 11.2"	134 mm / 5.3"
ARRI/FUJINON Alura Zoom 45-250	PL	45	250	5.6	T2.6 - T22	1.2 m / 3'11"	1:4	370 mm / 14.6"	134 mm / 5.3"

Operation Temperature: -10°C to +50°C / 14°F to +122°F
 Storage/transport Temperature: -20°C to +60°C / -4°F to +140°F

⁽¹⁾ Positive locking 54 mm stainless steel lens mount

⁽²⁾ Close focus is measured from the film/sensor plane

⁽³⁾ Magnification ratio is the relationship of the size of an object on film (first number) to the size of that object in real life (second number) at the close focus and the telephoto zoom setting

⁽⁴⁾ Length is measured from the lens mount to the front of the lens housing

⁽⁵⁾ Diameter of the lens/matte box interface

⁽⁶⁾ The distance from the entrance pupil to the film/sensor plane. Positive numbers indicated an entrance pupil in front, negative numbers indicated an entrance pupil behind the film/sensor plane. The entrance pupil (often mistakenly called "nodal point") is the center of perspective; moving the camera/lens system around the center of the entrance pupil prevents parallax errors. While largely irrelevant for live action, this measurement is important for special effects work.



Maximum housing diameter	Weight	Focal Length	Angle of view H, V, D				Entrance pupil ⁽⁶⁾
			Normal 35 ⁽⁸⁾ ID = 27.20 mm ⁽⁷⁾	DIN Super 35 ⁽¹¹⁾ ID = 30.00 mm ⁽⁷⁾	Alexa/D-21 HD ⁽⁹⁾ ID = 27.26 mm ⁽⁷⁾	Alexa 2K ⁽¹⁰⁾ ID = 29.08 mm ⁽⁷⁾	
114 mm / 4.5"	2.2 Kg / 4.9 lb	at 15.5 mm	70.7° - 54.6° - 82.5°	74.9° - 46.7° - 82.7°	78.5° - 49.4° - 86.3°	75.5° - 60.3° - 88.1°	237.0 mm / 9.3"
		at 25 mm	47.5° - 35.5° - 57.1°	50.8° - 29.9° - 57.2°	53.8° - 31.8° - 60.4°	51.3° - 39.6° - 61.9°	230.9 mm / 9.1"
		at 45 mm	27.5° - 20.2° - 33.6°	29.6° - 16.9° - 33.7°	31.4° - 18° - 35.8°	29.9° - 22.6° - 36.9°	222.6 mm / 8.8"
114 mm / 4.5"	2.2 Kg / 4.9 lb	at 30 mm	40.3° - 29.9° - 48.8°	43.2° - 25.1° - 48.9°	45.8° - 26.7° - 51.7°	43.6° - 33.4° - 53.1°	219.3 mm / 8.6"
		at 50 mm	24.8° - 18.2° - 30.4°	26.7° - 15.2° - 30.5°	28.4° - 16.2° - 32.4°	27° - 20.4° - 33.4°	201.0 mm / 7.9"
		at 80 mm	15.7° - 11.4° - 19.3°	16.9° - 9.6° - 19.3°	18° - 10.2° - 20.6°	17.1° - 12.8° - 21.2°	187.4 mm / 7.4"
134 mm / 5.3"	4.7 Kg / 10.4 lb	at 18 mm	62.8° - 48.0° - 74.1°	67.4° - 53.1° - 79.6°	66.8° - 40.7° - 74.3°	70.3° - 43.2° - 77.9°	264.0 mm / 10.4"
		at 50 mm	24.8° - 18.2° - 30.4°	27.0° - 20.4° - 33.4°	26.7° - 15.2° - 30.5°	28.4° - 16.2° - 32.4°	231.6 mm / 9.1"
		at 80 mm	15.6° - 11.4° - 19.3°	17.1° - 12.8° - 21.2°	16.9° - 9.5° - 19.3°	18.0° - 10.2° - 20.6°	213.9 mm / 8.4"
153 mm / 6"	7.5 Kg / 16.5 lb	at 45 mm	27.5° - 20.2° - 33.6°	29.9° - 22.6° - 36.9°	29.6° - 16.9° - 33.7°	31.4° - 18.0° - 35.8°	234.4 mm / 9.6"
		at 150 mm	8.4° - 6.1° - 10.4°	9.1° - 6.9° - 11.4°	9.1° - 5.1° - 10.4°	9.7° - 5.4° - 11.1°	2.0 mm / 0.1"
		at 250 mm	5.0° - 3.7° - 6.2°	5.5° - 4.1° - 6.9°	5.4° - 3.1° - 6.2°	5.8° - 3.3° - 6.7°	-101.5 mm / -4.0"

⁽⁷⁾ The image diameter (ID) is the diameter of the image circle needed for the respective format.

⁽⁸⁾ Horizontal (H), vertical (V) and diagonal (D) angles of view for a Normal 35 Academy camera aperture (aspect ratio 1.37:1, dimensions 22 mm x 16 mm / 0.866" x 0.630")

⁽⁹⁾ Horizontal (H), vertical (V) and diagonal (D) angles of view for the Alexa/D-21 HD camera aperture (aspect ratio 1.78:1, 2880 x 1620 sensor pixels, dimensions 23.76 mm x 13.37mm / 0.935" x 0.526")

⁽¹⁰⁾ Horizontal (H), vertical (V) and diagonal (D) angles of view for the Alexa 2K camera aperture (aspect ratio 1.78:1, 3072 x 1728 sensor pixels, dimensions 25.34 mm x 14.26 mm / 0.998" x 0.561")

⁽¹¹⁾ Horizontal (H), vertical (V) and diagonal (D) angles of view for a DIN Super 35 Silent camera aperture (aspect ratio 1.33:1, dimensions 24 mm x 18 mm / 0.944" x 0.709")

All data subject to change without notice.

ARRI/ZEISS Master Macro

Name	Lens Mount ⁽¹⁾	Aperture	Close focus ⁽²⁾	Magnification ratio ⁽³⁾	Length ⁽⁴⁾	Front diameter ⁽⁵⁾
Master Macro T2.0/100 mm	PL-LDS	T2.0/T4.3 to T32	0.35 m / 13 3/4"	1:1	202.7 mm / 8"	114 mm / 4.5"

⁽¹⁾ Positive locking 54 mm stainless steel lens mount with Lens Data System (LDS) contacts

⁽²⁾ Maximum aperture at infinity is T2.0, at close focus T4.3

⁽³⁾ Close focus is measured from the film/sensor plane

⁽⁴⁾ Magnification ratio is the relationship of the size of an object on the film/sensor plane (first number) to the size of that object in real life (second number) at the close focus setting

⁽⁵⁾ Lens length is measured from the lens mount to the front of the lens housing

⁽⁶⁾ Diameter of the lens/matte box interface. Maximum lens housing diameter for the Master Macro 100 is 138 mm.

⁽⁷⁾ Horizontal angle of view for an ANSI Super 35 Silent camera aperture (aspect ratio 1.33:1, dimensions 24.9mm x 18.7mm / 0.980" x 0.7362")

⁽⁸⁾ Horizontal angle of view for a DIN Super 35 Silent camera aperture (aspect ratio 1.33:1, dimensions 24mm x 18mm / 0.944" x 0.7087")



Weight	Horizontal Angle of View			Entrance pupil ⁽⁶⁾
	Normal 35 ⁽⁸⁾ ID = 27.20 mm ⁽⁷⁾	DIN Super 35 ⁽⁹⁾ ID = 30.00 mm ⁽⁷⁾	ANSI Super 35 ⁽¹⁰⁾ ID = 31.14 mm ⁽⁷⁾	
2.6 kg / 5.7 lbs	12.42°	13.52°	14.02°	-77.139 mm / -3.0"

⁽⁸⁾ Horizontal angle of view for a Normal 35 Academy camera aperture (aspect ratio 1.37:1, dimensions 22mm x 16mm / 0.8661" x 0.6299")

⁽⁹⁾ The image diameter (ID) is the diameter of the image circle needed for the respective format. The Master Macro 100 is designed for the largest ID given here (ANSI Super 35).

⁽¹¹⁾ The distance from the entrance pupil to the film/sensor plane. Positive numbers indicated an entrance pupil in front, negative numbers indicated an entrance pupil behind the film/sensor plane

The entrance pupil (often mistakenly called „nodal point“) is the center of perspective; moving the camera/lens system around the center of the entrance pupil prevents parallax errors. While largely irrelevant for live action, this measurement is important for special effects work.

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ALEXA Resources and Contacts

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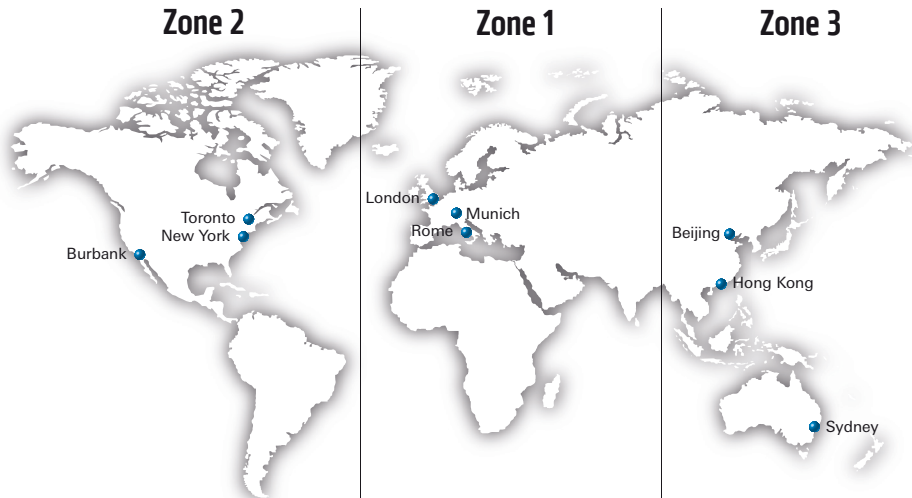
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ARRI Service is the first address for all questions around not only the ALEXA cameras, but all ARRI cameras ever made with world wide service centers and 24h availability on Monday to Friday.

Well trained technicians cover all hard- and software related issues, upgrades or e.g. the recovery of cards that have been accidentally erased.

ARRI Digital Workflow Solutions

The Digital Workflow Solutions (DWS) group deals with all workflow related issues including ARRI Look File handling, data copying, back ups, quality check, LUTs, metadata or dealing with Log C files. In addition the DWS group provides support for such tools as the ARRIRAW Converter, ARRI Look Creator, ARRI LUT Generator and ALEXA Frameline Composer.

Feel free to contact DWS at digitalworkflow@arri.de

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